FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	F2021(587)		1
STATE	STATE DIST.	COUNTY	
TEXAS	YKM	FAYETTE	
CONTROL	SECTION	JOB	HIGHWAY NO.
0266	01	086	SH 71

INDEX OF SHEETS

SEE SHEET 2

STATE OF TEXAS
TEXAS DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

FOR THE CONSTRUCTION OF ADD ACCELERATING AND DECELERATING LANES
CONSISTING OF GRADING, BASE, SURFACE AND STRUCTURES

FAYETTE COUNTY
SH 71
CSJ: 0266-01-086
PROJECT NO.: F2021(587)
LIMITS: FROM 0.3 MILES NORTH OF FM 955 TO 1.2 MILES SOUTH OF FM 955

FUNCTIONAL CLASS: PRINCIPAL ARTERIAL

DESIGN SPEED: 70 MPH
ADT: 12,833 VPD (2019)
15,400 VPD (2039)

PROJECT LENGTH

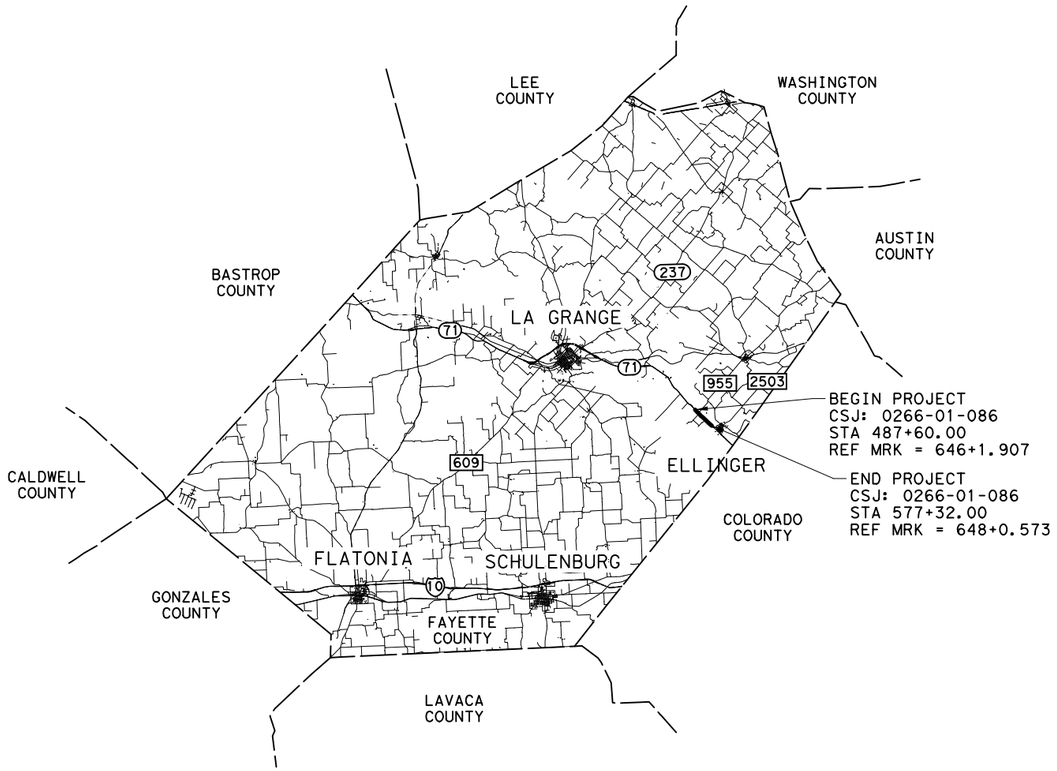
ROADWAY = 8,972.00 FT. = 1.699 MI.
BRIDGE = 0 FT. = 0 MI.
TOTAL = 8,972.00 FT. = 1.699 MI.

CONTRACTOR: _____
DATE OF LETTING: _____
DATE WORK BEGAN: _____
DATE WORK COMPLETED: _____
DATE WORK ACCEPTED: _____
FINAL CONTRACT COST: $ _____

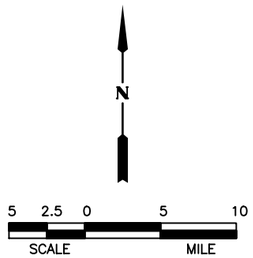
LIST OF APPROVED FIELD CHANGES:

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

P.E.
AREA ENGINEER DATE



CP&Y
TBPE FIRM # 1741



FAYETTE COUNTY
YOAKUM DISTRICT

EXCEPTIONS: NONE
RAILROAD CROSSINGS: NONE
EQUATIONS: NONE

SUBMITTED FOR LETTING 3/24/2021

PROJECT MANAGER
CP&Y, INC.

APPROVED FOR LETTING 4-2-21

DISTRICT ENGINEER

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014 AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS SHALL GOVERN ON THIS PROJECT: REQUIRED CONTRACT PROVISIONS FOR ALL FEDERAL-AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, MAY 2012).

SHEET NO.		DESCRIPTION
		GENERAL
1		TITLE SHEET
2		INDEX OF SHEETS
3		PROJECT LAYOUT
4 – 9		TYPICAL SECTIONS
10, 10A – 10E		GENERAL NOTES
11, 11A – 11B		QUANTITY SHEET
12 – 14		ROADWAY SUMMARY
15 – 18		MISCELLANEOUS SUMMARIES
19 – 22		SUMMARY OF SMALL SIGNS
		TRAFFIC CONTROL PLAN
23		TRAFFIC CONTROL PLAN NARRATIVE
24 – 26		TRAFFIC CONTROL PLAN TYPICAL SECTIONS PHASE 1
27 – 29		TRAFFIC CONTROL PLAN TYPICAL SECTIONS PHASE 2
30 – 35		TRAFFIC CONTROL PLAN PHASE 1
36 – 41		TRAFFIC CONTROL PLAN PHASE 2
42		TRAFFIC CONTROL PLAN BACA RD CLOSURE LAYOUT
		STANDARD SHEETS
43 – 54	*	BC(1)–14 TO BC(12)–14
55	*	TCP(2–1)–18
56	*	TCP(2–2)–18
57	*	TCP(2–6)–18
58	*	TCP(3–2)–13
59	*	TCP(3–3)–14
60	*	TCP(5–1)–18
61	*	TCP(7–1)–13
62	*	WZ(STPM)–13
62A	*	WZ(RS)–16
		ROADWAY DETAILS
63		SURVEY CONTROL INDEX SHEET
64		HORIZONTAL AND VERTICAL CONTROL SHEET
65		HORIZONTAL & VERTICAL ALIGNMENT DATA
66 – 74		PLAN LAYOUT
75 – 79		INTERSECTION LAYOUT
80		MISCELLANEOUS DETAILS
		STANDARD SHEETS
81 – 82	*	CRCP(1)–20
83	*	JS–14
84 – 87	*	MB–15(1)
88	*	RS(1)–13
		DRAINAGE
89 – 92		CULVERT LAYOUT
93		BCS
94 – 96		SETB–FW–0
97 – 99		SETB–FW–S
		STANDARD SHEETS
100	*	SCC–MD
101 – 102	*	SCC–3&4
103	*	MC–MD
104 – 105	*	MC–6–16
106 – 107	*	MC–8–13
108 – 109	*	SETB–CD
110	*	SETP–PD
		TRAFFIC ITEMS AND ENVIRONMENTAL ISSUES
111		ILLUMINATION LAYOUT
112 – 131		SIGNING, PAVEMENT MARKING & SW3P LAYOUT
132		SIGN DETAILS
133		EPIC
134		TXDOT STORM WATER POLLUTION PREVENTION PLAN
		STANDARD SHEETS
135	*	ED(1)–14
136 – 137	*	ED(3 & 4)–14
138 – 139	*	RID(1 & 2)–20
140 – 143	*	D & OM(1 THRU 4)–20
144 – 146	*	PM(1 THRU 3)–20
147	*	SMD(GEN)–08
148 – 150	*	SMD(SLIP–1 THRU –3)–08
151	*	SMD(TWT)–08
152	*	SMD(2–1)–08
153 – 154	*	TSR(3 & 4)–13
155	*	EC(1)–16
156	*	EC(2)–16

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED PROFESSIONAL ENGINEER
03/29/2021

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

BRIAN A. JONES, P.E.

NO.	REVISION	BY	DATE

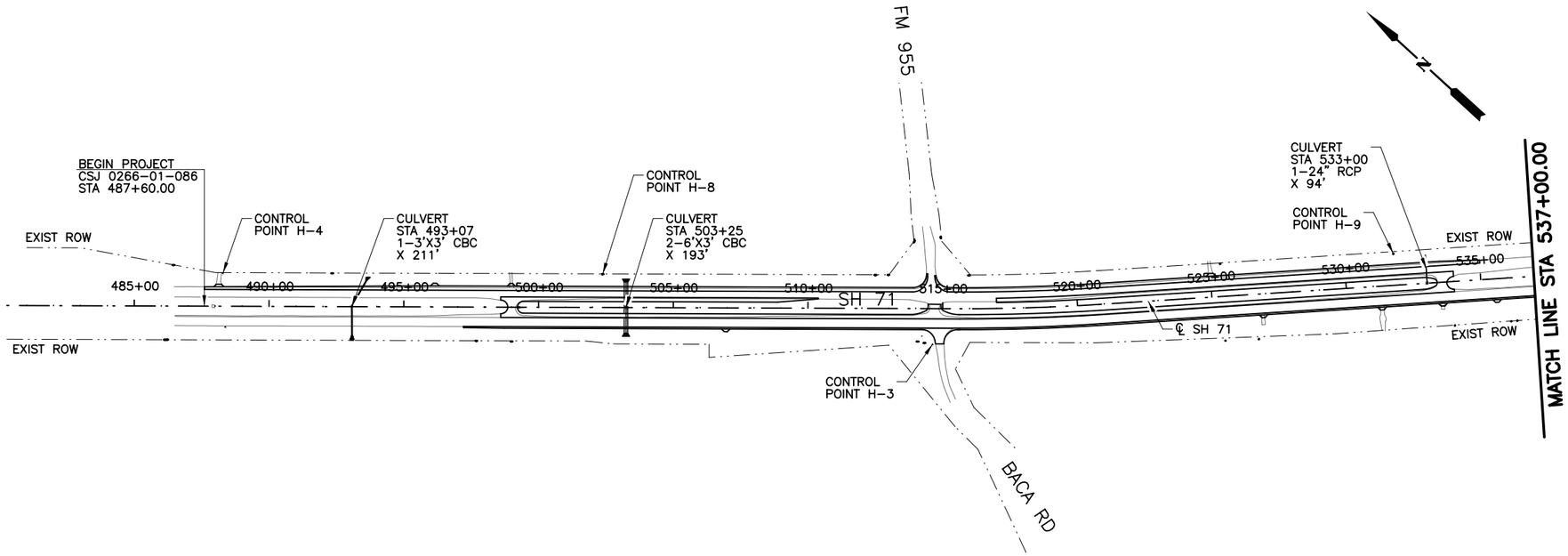
CP&Y
TEXAS REGISTERED ENGINEERING FIRM F–1741

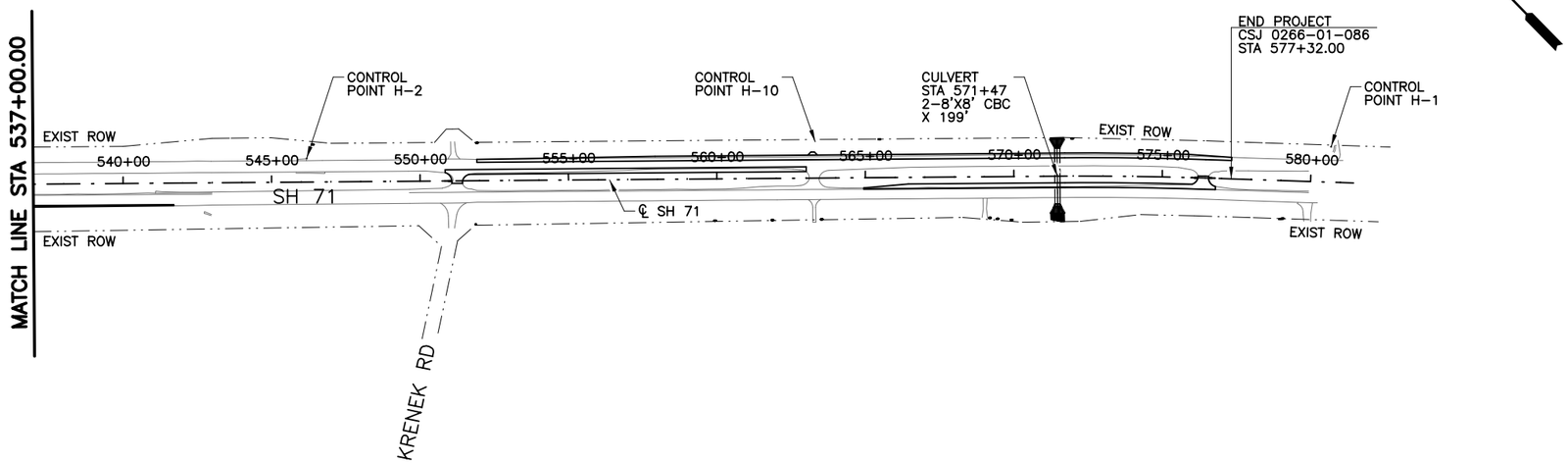
SH 71

INDEX OF SHEETS

SHEET 1 OF 1

Designed:	GM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					SH 71
Drawn:	GM	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086		2





STATE OF TEXAS
BRIAN A. JONES
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03/24/2021

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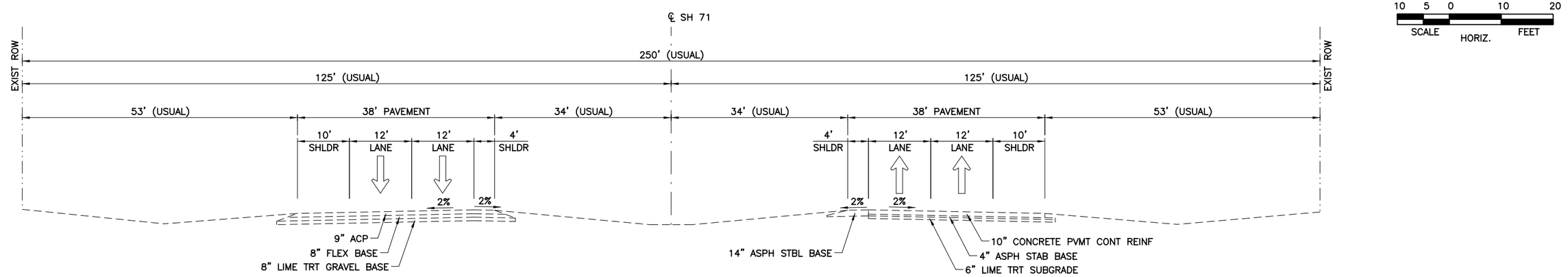
CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

SH 71

PROJECT LAYOUT

SHEET 1 OF 1

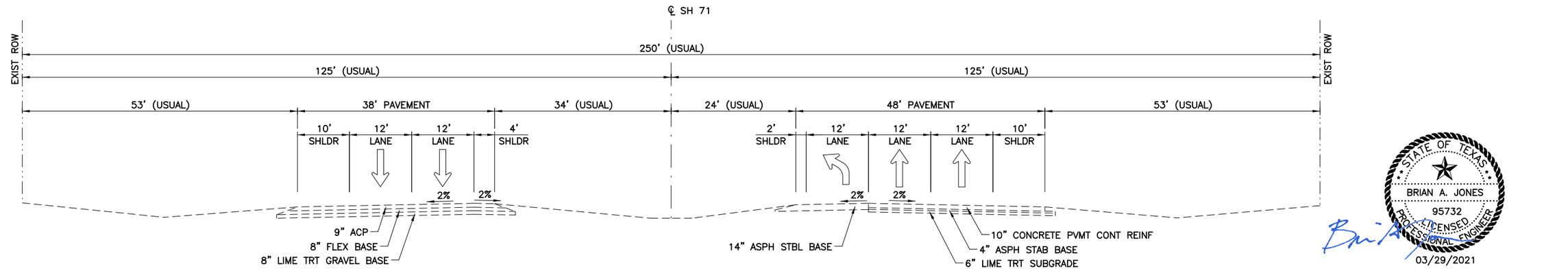
Designed:	GM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					SH 71
Drawn:	SW	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086		3



10 5 0 10 20
SCALE HORIZ. FEET

EXISTING TYPICAL SECTION

STA 487+60 TO STA 507+00
STA 521+00 TO STA 541+70
STA 541+70 TO STA 550+85 (NO PROPOSED CONSTRUCTION)
STA 550+85 TO STA 577+32



EXISTING TYPICAL SECTION

STA 507+00 TO STA 514+72

STATE OF TEXAS
BRIAN A. JONES
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PROFESSIONAL ENGINEER
03/29/2021

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

SH 71

TYPICAL SECTIONS

SHEET 1 OF 6

Designed:	GM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	BAJ	6	TEXAS				SH 71
Drawn:	GM	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086	4

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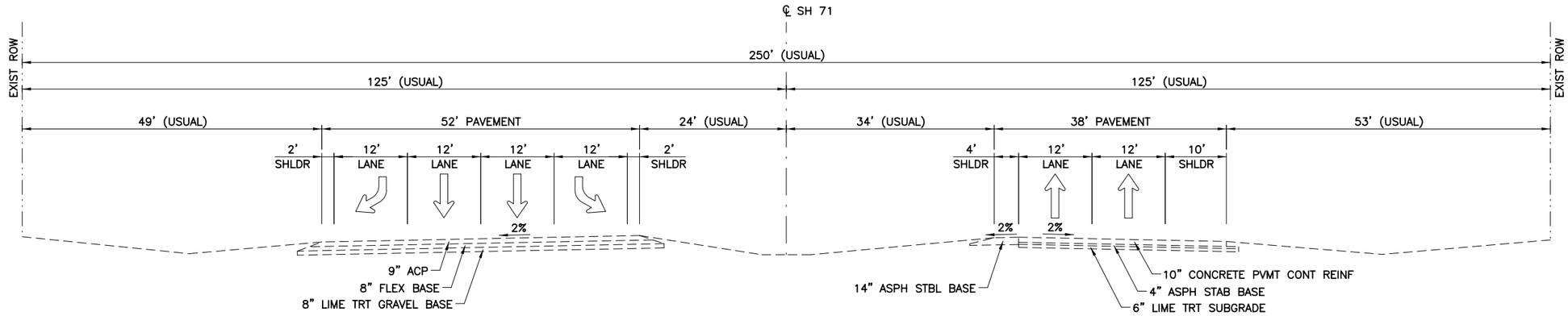

10 5 0 10 20
SCALE HORIZ. FEET

EXISTING TYPICAL SECTION

STA 514+72 TO STA 521+00

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED PROFESSIONAL ENGINEER
03/29/2021

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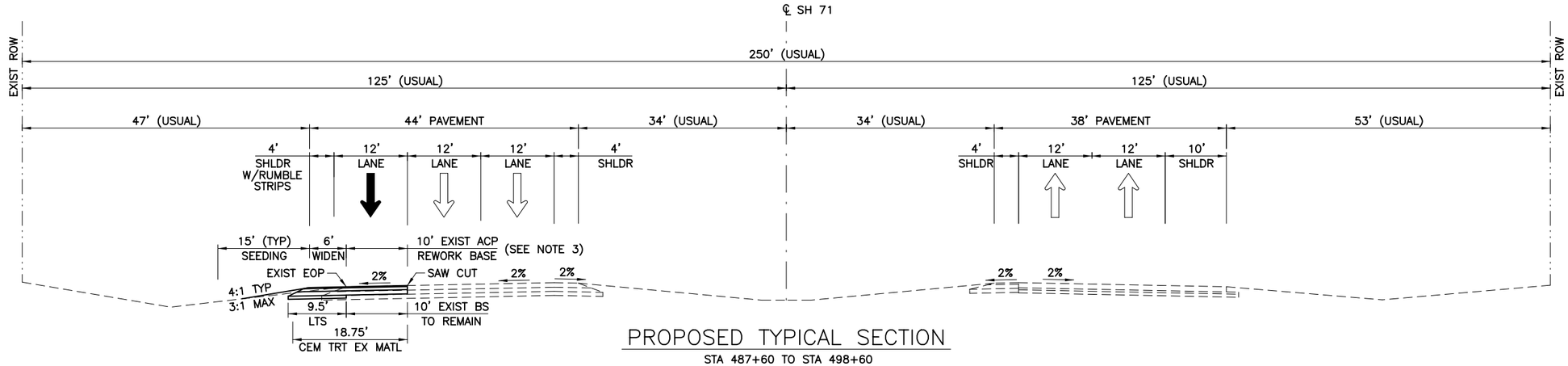
SH 71

TYPICAL SECTIONS

SHEET 2 OF 6

		FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Designed:	GM	6	TEXAS				SH 71
Checked:	BAJ						
Drawn:	GM	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086	5



PROPOSED TYPICAL SECTION

STA 487+60 TO STA 498+60
STA 563+01 TO STA 564+95

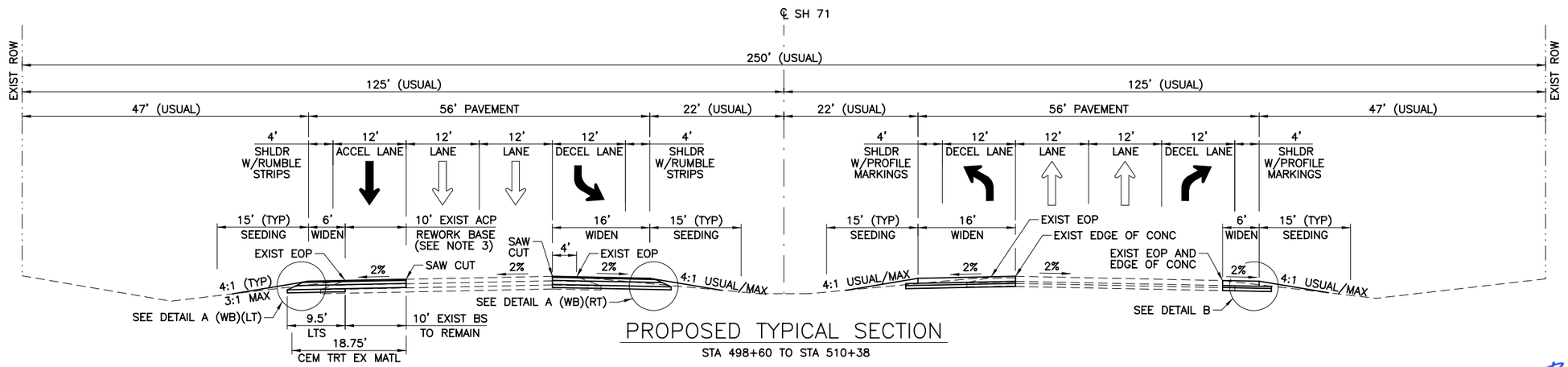
SH 71 WB (LT)

STA 487+60 TO STA 496+00 (10'–16')
STA 496+00 TO STA 498+60 (16')
STA 563+01 TO STA 564+95 (16')

SH 71 WB (RT)

SH 71 EB (LT)

SH 71 EB (RT)



PROPOSED TYPICAL SECTION

STA 498+60 TO STA 510+38

SH 71 WB (LT)

STA 498+60 TO STA 510+38 (16')

SH 71 WB (RT)

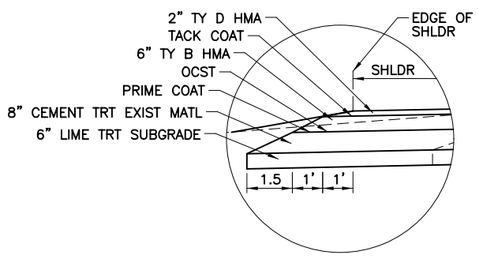
STA 498+60 TO STA 499+43.50 (8')
STA 499+43.50 TO STA 508+88 (16')
STA 508+88 TO STA 510+38 (16'–4')

SH 71 EB (LT)

STA 498+60 TO STA 499+43.50 (13.6'–16')
STA 499+43.50 TO STA 510+38 (16')

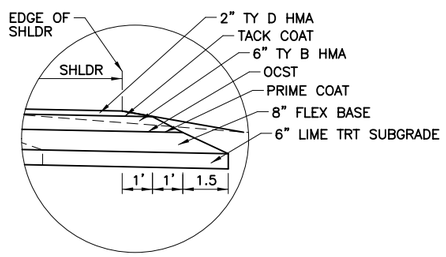
SH 71 EB (RT)

STA 497+22 TO STA 498+72 (4'–6')
STS 498+72 TO STA 510+38 (6')



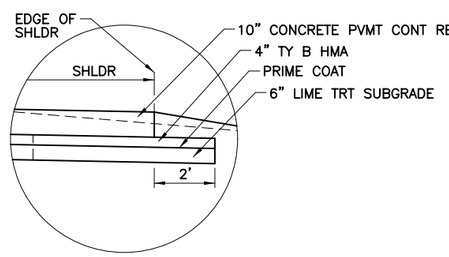
DETAIL A (WB)(LT)

N.T.S.



DETAIL A (WB)(RT)

N.T.S.



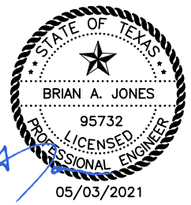
DETAIL B (EB)

N.T.S.

10 5 0 10 20
SCALE HORIZ. FEET

NOTES

1. NO PROPOSED CONTRUCTION FROM STA 541+70.00 TO STA 550+85.00.
2. WIDEN CONCRETE PAVEMENT USING "LONGITUDINAL WIDENING DETAIL" SHOWN ON STANDARD DRAWING CRCP(1)–20.
3. EXISTING 10' WIDE BY 16" DEPTH OF PAVEMENT TO BE SCARIFIED, SPREAD, CEMENT TREATED AND SHAPED TO 18' WIDE X 8" THICK BASE.



05/03/2021

NO.	REVISION	BY	DATE

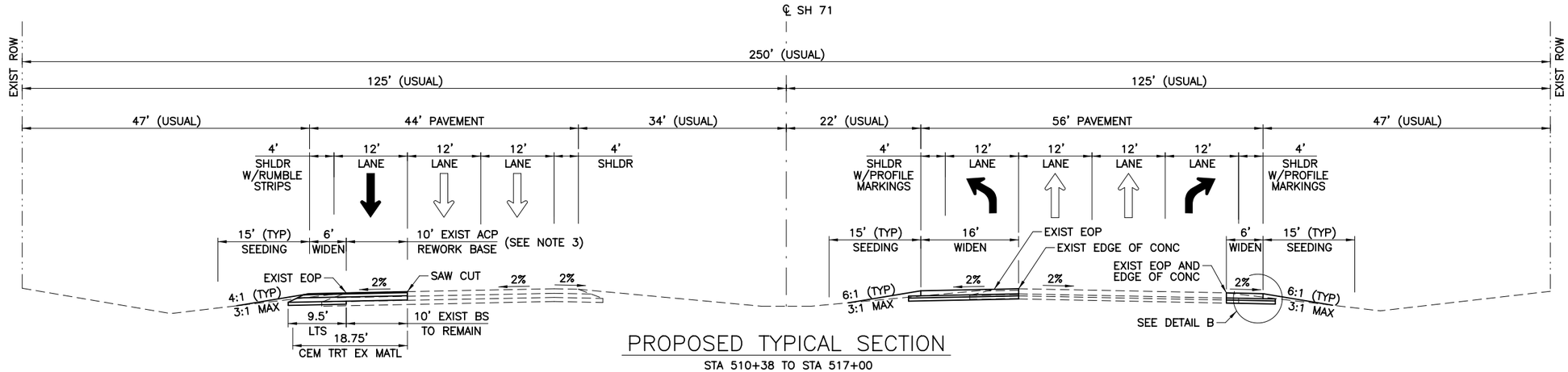
CP&Y
TEXAS REGISTERED ENGINEERING FIRM F–1741

SH 71

TYPICAL SECTIONS

SHEET 3 OF 6

Designed:	GM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					SH 71
Drawn:	GM	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086		6



PROPOSED TYPICAL SECTION

STA 510+38 TO STA 517+00

10 5 0 10 20
SCALE HORIZ. FEET

NOTES

1. NO PROPOSED CONTRUCTION FROM STA 541+70.00 TO STA 550+85.00.
2. WIDEN CONCRETE PAVEMENT USING "LONGITUDINAL WIDENING DETAIL" SHOWN ON STANDARD DRAWING CRCP(1)-20.
3. EXISTING 10' WIDE BY 16" DEPTH OF PAVEMENT TO BE SCARIFIED, SPREAD, CEMENT TREATED AND SHAPED TO 18' WIDE X 8" THICK BASE.

SH 71 WB (LT)

STA 510+38 TO STA 513+89.62 (16')
STA 515+24.40 TO STA 517+00 (16')

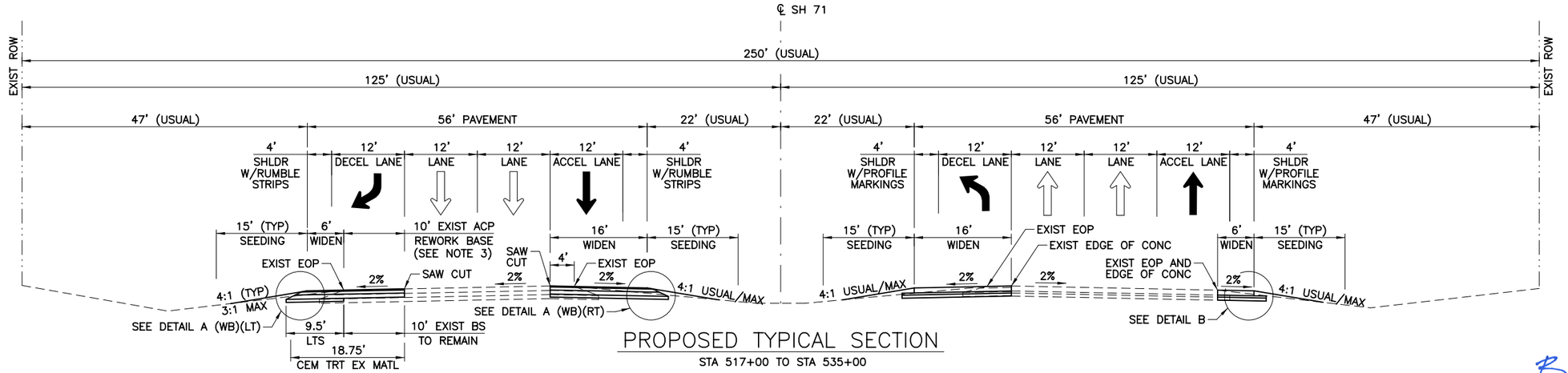
SH 71 WB (RT)

SH 71 EB (LT)

STA 510+38 TO STA 517+00 (16')

SH 71 EB (RT)

STA 510+38 TO STA 517+00 (6')



PROPOSED TYPICAL SECTION

STA 517+00 TO STA 535+00

SH 71 WB (LT)

STA 517+00 TO STA 533+50 (16')
STA 533+50 TO STA 535+00 (16'-10')

SH 71 WB (RT)

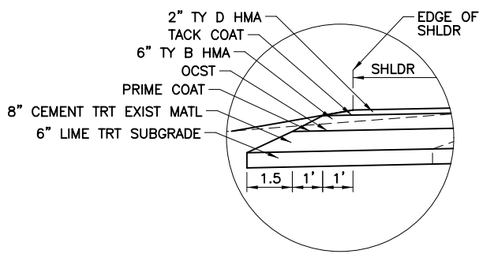
STA 517+00 TO STA 532+85.30 (16')
STA 532+85.30 TO STA 534+00 (12')

SH 71 EB (LT)

STA 517+00 TO STA 532+85.30 (16')
STA 532+85.30 TO STA 534+00 (16'-9.5')

SH 71 EB (RT)

STA 517+00 TO STA 533+30 (6')
STA 533+30 TO STA 535+00 (6'-5.6')



DETAIL A (WB)(LT)

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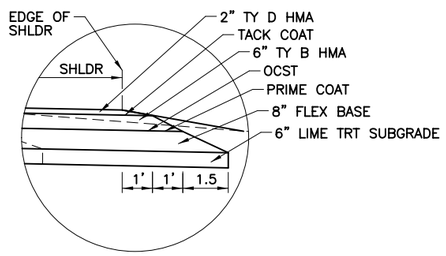

DETAIL A (WB)(RT)

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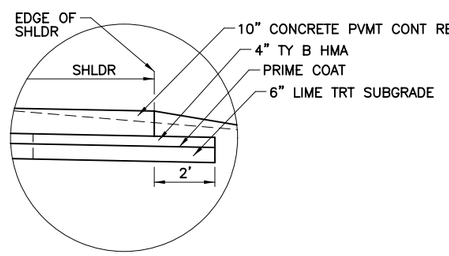


DETAIL B (EB)

N.T.S.

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED
PROFESSIONAL ENGINEER
05/03/2021

NO.	REVISION	BY	DATE

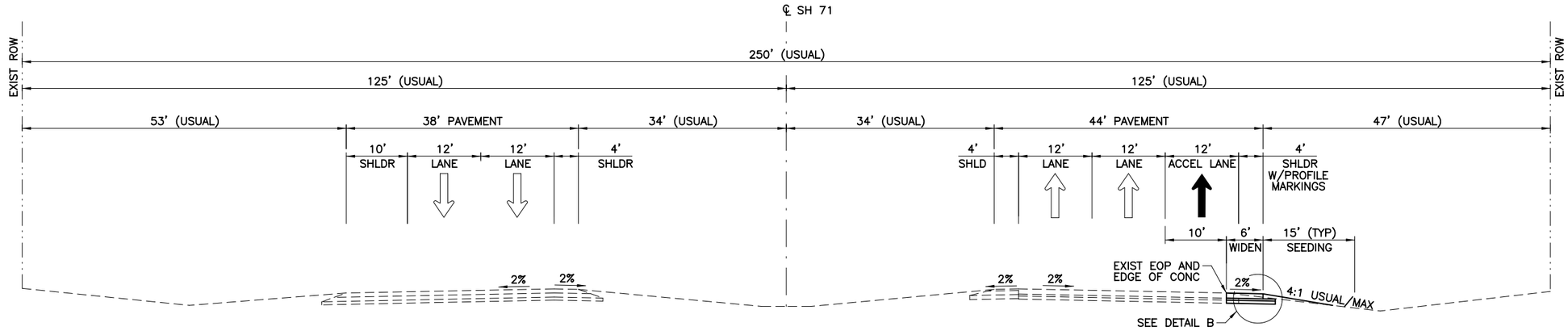
CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

SH 71

TYPICAL SECTIONS

SHEET 4 OF 6

Designed:	GM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					SH 71
Drawn:	GM	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086		7

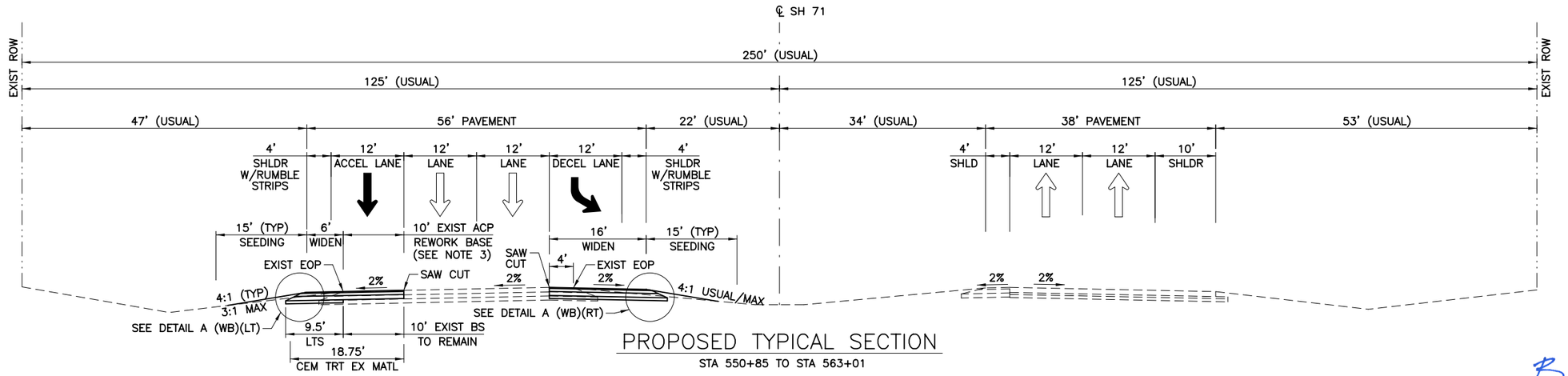


PROPOSED TYPICAL SECTION

STA 535+00 TO STA 541+70

SH 71 WB (LT) | SH 71 WB (RT) | SH 71 EB (LT) | SH 71 EB (RT)

STA 535+00 TO STA 541+70 (5.6'–4')



PROPOSED TYPICAL SECTION

STA 550+85 TO STA 563+01

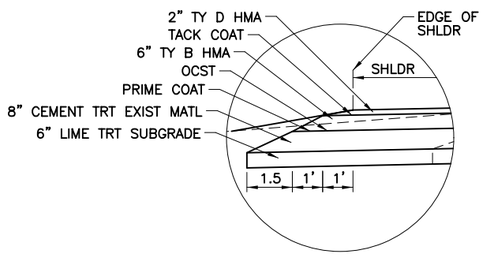
SH 71 WB (LT)

STA 551+92 TO STA 557+92 (10'–16')
STA 557+92 TO STA 563+01 (16')

SH 71 WB (RT)

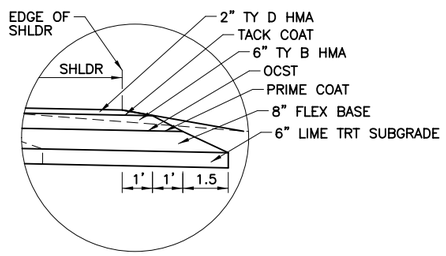
STA 550+85 TO STA 551+67 (9.75'–16')
STA 551+67 TO STA 563+01 (16')

SH 71 EB (LT) | SH 71 EB (RT)



DETAIL A (WB)(LT)

N.T.S.



DETAIL A (WB)(RT)

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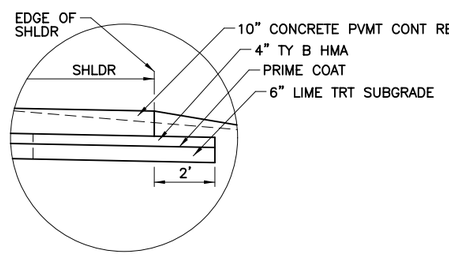

DETAIL B (EB)

N.T.S.

10 5 0 10 20
SCALE HORIZ. FEET

NOTES

1. NO PROPOSED CONTRUCTION FROM STA 541+70.00 TO STA 550+85.00.
2. WIDEN CONCRETE PAVEMENT USING "LONGITUDINAL WIDENING DETAIL" SHOWN ON STANDARD DRAWING CRCP(1)–20.
3. EXISTING 10' WIDE BY 16" DEPTH OF PAVEMENT TO BE SCARIFIED, SPREAD, CEMENT TREATED AND SHAPED TO 18' WIDE X 8" THICK BASE.

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED
PROFESSIONAL ENGINEER
05/03/2021

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F–1741

SH 71

TYPICAL SECTIONS

SHEET 5 OF 6

Designed:	GM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					SH 71
Drawn:	GM	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086		8

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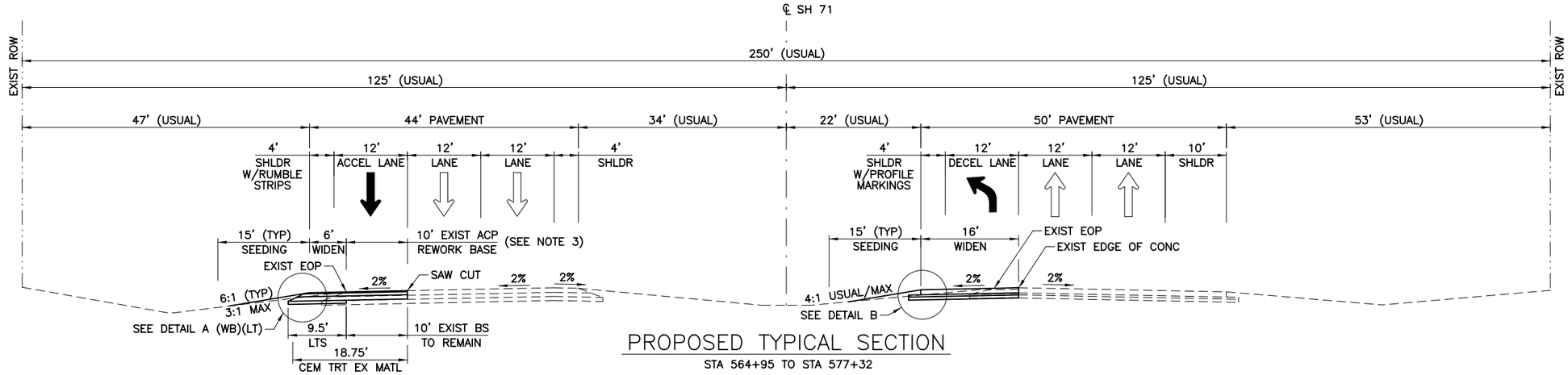


PROPOSED TYPICAL SECTION

STA 564+95 TO STA 577+32

10 5 0 10 20
SCALE HORIZ. FEET

NOTES

1. NO PROPOSED CONTRUCTION FROM STA 541+70.00 TO STA 550+85.00.
2. WIDEN CONCRETE PAVEMENT USING "LONGITUDINAL WIDENING DETAIL" SHOWN ON STANDARD DRAWING CRCP(1)-20.
3. EXISTING 10' WIDE BY 16" DEPTH OF PAVEMENT TO BE SCARIFIED, SPREAD, CEMENT TREATED AND SHAPED TO 18' WIDE X 8" THICK BASE.

SH 71 WB (LT)

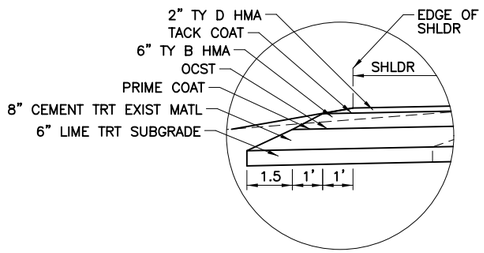
STA 564+95 TO STA 575+82 (16')
STA 575+82 TO STA 577+32 (16'-10')

SH 71 WB (RT)

SH 71 EB (LT)

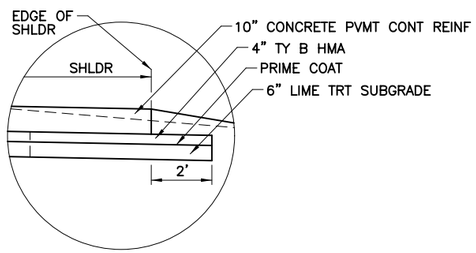
STA 564+95 TO STA 566+45 (4'-16')
STA 566+45 TO STA 576+01.36 (16')
STA 576+01.36 TO STA 576+80 (16'-10.65')

SH 71 EB (RT)



DETAIL A (WB)(LT)

N.T.S.



DETAIL B (EB)

N.T.S.

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED
PROFESSIONAL ENGINEER
05/03/2021

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

SH 71

TYPICAL SECTIONS

SHEET 6 OF 6

Designed:	GM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					SH 71
Drawn:	GM	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086		9

cpybw: ANSIB.tbl
cpypdf: ANSIB.pltcfg
pw:/
swoldevohannes
2:50:22 PM
5/3/2021
pw:/

GENERAL NOTES:

GENERAL:

Contractor questions on this project are to be addressed to the following individual(s):
Rodney Svec Rodney.Svec@txdot.gov
Covey Morrow IV Covey.Morrow@txdot.gov

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

All contractor questions will be reviewed by the Engineer. Once a response is developed, it will be posted to TxDOT's Public FTP at the following Address:
https://ftp.dot.state.tx.us/pub/txdot-info/Pre-Letting%20Responses/

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

Provide a minimum two week advance notice to TxDOT prior to closing County Roads. TxDOT will notify local officials at least one week in advance.

Remove and dispose of existing raised pavement markers as directed. All work involved in the removal and disposal of these markers will not be paid for directly but shall be considered subsidiary to the various bid items involved.

In the removal of the surface and base material on the existing pavement, exercise extreme care in providing a smooth and uniform edge adjacent to the existing travelway pavement which is to remain in place.

Individual structures will be extended on one side at a time through completion before construction work is begun on the opposite side unless otherwise directed.

Do not work on the roadway before sunrise or after sunset unless otherwise approved.

Furnish a certified copy of the legal gross weight of each vehicle hauling materials by weight and certified measurements for all trucks hauling material by volume.

Do not cross the median except at existing crossovers.

Leave all intersecting roadways and entrances open at night unless otherwise directed. Should the contractor desire to close a side street or entrance overnight, approval will be required 48

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hours in advance and the contractor will be required to coordinate the closure satisfactorily with any affected business or resident.

Unless otherwise approved, maintain a minimum safety clearance from the edge of the travelway for material stockpiled in proximity of traffic lanes based on the current average traffic count of the particular highway as follows:

0 - 1500 = 16 feet
Over 1500 = 30 feet

In the event the above requirements cannot be met, make arrangements to stockpile material off the right of way.

The Department will provide the cylinder testing machine for this project. Deliver the test specimens to the engineer's curing facilities as directed.

Do not clean out concrete trucks within the right of way.

Do not store equipment or stockpile material in the median overnight unless otherwise approved.

The contractor shall field verify all existing pipe, box culvert, and safety end treatments sizes prior to fabrication of related items.

ITEM 7: LEGAL RELATIONS AND RESPONSIBILITIES

The Contractor's attention is directed to the fact that discharge of permanent or temporary fill material into the waters of the United States (U.S.) including jurisdictional wetlands, as necessary for construction, will require specific approval of the U.S. Army Corps of Engineers (USACE) under Section 404 of the Clean Water Act.

The Department will obtain the appropriate permit(s), Nationwide or Individual, when necessary as dictated by the proposed actions for the project and its potential to affect USACE jurisdictional areas. The Contractor may review the permitted plans at the office of the Area Engineer in charge of construction. The Department will hold the Contractor responsible for following all conditions of the approved permit. If the Contractor cannot work within the limits of this permit(s), then it becomes the Contractor's entire responsibility to consult with the USACE pertaining to the need for changes or amendments to the conditions of the existing permit(s) as originally obtained by the Department.

If the Contractor elects to work on a structure when the stream is flowing, near normal flow shall be maintained by a method approved by the Engineer. Labor and materials involved in this work will not be paid for directly, but will be considered subsidiary to the various bid items of the contract.

No significant traffic generator events identified.

If the contractor proposes work beyond the TxDOT obtained permit limitations, the contractor is responsible for additional costs, delays, and obtaining new or revised permits prior to construction.

ITEM 8: PROSECUTION AND PROGRESS

Provide progress schedule as a Bar Chart.

ITEM 100: PREPARING RIGHT-OF-WAY

Dispose of trees from the right-of-way within 24 hours of removal.

ITEM 110: EXCAVATION

Remove existing vegetation, including roots and topsoil, within the grading limits to a depth of approximately 2 inches immediately before grading operations begin within any section. Place the material in a windrow on each side of the roadbed, and replace as directed on the completed slopes as soon as practicable. Measurement and payment will be in accordance with Item "Excavation" for cut sections. All topsoil excavation and the work involved in replacing the topsoil will not be paid for directly but will be subsidiary to the pertinent items for fill sections.

ITEMS 110 & 132: EXCAVATION AND EMBANKMENT

Grading quantities required to construct side road intersections and entrances will not be measured or paid for directly, but will be subsidiary to pertinent items.

Do not disturb areas designated as “Non-Mow” areas, unless otherwise shown in the plans.

ITEM 132: EMBANKMENT

Furnish Type C embankment consisting of suitable earth material such as loam, clay or other such material that will form a stable embankment and has a plasticity index of at least 15 but not more than 40. Requirements may vary for material excavated under Item 110, "Excavation" as directed.

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ITEM 150: BLADING

Sprinkling and rolling which may be required during the operation of Item 150 will not be measured or paid for directly, but will be considered subsidiary to this item.

ITEM 247: FLEXIBLE BASE

Unless otherwise approved, the delivered material’s moisture content at most will be two percent above optimum moisture content, determined by TEX-113-E.

Level-off trucks hauling flexible base material to insure uniform and adequate loads before dumping.

Limit the depth of any course to 6 inches unless otherwise approved. Compact each course to the required density before subsequent courses are placed.

For Type E material, furnish crushed limestone produced and graded from oversize quarried aggregate that originates from a single, naturally occurring source. Do not use caliche, iron ore, gravel, or multiple sources.

Compact the Type E flex base to at least 98.0% of the maximum density determined by TEX-113-E.

ITEMS 247 & 530: FLEXIBLE BASE & INTERSECTIONS, DRIVEWAYS AND TURNOUTS

Density requirements for base in side road entrances and intersections may be waived provided the material is satisfactorily sprinkled and compacted.

ITEM 251: REWORKING BASE COURSES

Existing RAP and Flex Base shall be scarified and mixed to provide a homogeneous mixture, approved by the Engineer, and spread to the proposed width shown on the typical section.

Pulverize the existing bituminous material surface into particles at most 2 inches in size and mix uniformly with the salvaged base material.

ITEM 275: CEMENT TREATMENT (ROAD MIXED)

Pulverize the existing bituminous surface so that 100% of the material passes a 2 inch sieve and incorporate it into the 8 inch base overlay. Provide equipment capable of thoroughly mixing the materials full depth in a single pass. This work will not be paid for directly but will be subsidiary to this item.

Limit the depth of any course to 6 inches unless otherwise approved. Compact each course to the required density before subsequent courses are placed.

ITEM 302: AGGREGATES FOR SURFACE TREATMENTS

Furnish Type PE aggregate consisting of crushed slag, crushed stone or natural limestone rock asphalt.

Furnish precoated aggregate that has a residual bitumen coating target value of 1.0% by weight.

ITEM 316: SEAL COAT

The asphalt application season for this project is May 1 to September 15. Use an Emulsion instead of an Asphalt Cement as approved when the surface treatment is placed between September 15 and May 1.

The asphalt application rate shown in the plans is an average between an Asphalt Cement and an Emulsion. The type of asphalt and application rate to be used will be as directed. The approximate application rate for Asphalt Cement with a a Grade 4 aggregate is 0.27 Gal/SY. The approximate application rate for an Emulsion with a Grade 4 aggregate is 0.40 Gal/SY.

ITEM 320: EQUIPMENT FOR ASPHALT CONCRETE PAVEMENT

Provide a material transfer device capable of transferring mix from the haul trucks to the paver. Monitor its loading such that no damage is done to the existing pavement structures if a material transfer vehicle is used.

Securely attach a waterproof tarpaulin to the top of all trucks hauling ACP, to prevent air flow across the mix, for the duration of all ACP operations.

ITEM 360: CONCRETE PAVEMENT

Use joint sealing materials that are in accordance with method “B” as shown on standard JS-14.

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Match existing joints where pavement adjoins the existing concrete highway.

If the concrete design requires greater than 5.5 sacks of cementitious material per cubic yard, obtain written approval. If placing concrete pavement mixes from April 1 to October 31, inclusive, use a minimum of 25 percent by weight of Class F Fly Ash.

Repair portions of the concrete pavement surfaces that are damaged while in a plastic state. The repairs shall be structurally equivalent to the adjacent undamaged areas. Do not repair by grouting on the surface.

Unless otherwise directed, use coarse aggregate to produce concrete with a coefficient of thermal expansion (CoTE) less than or equal to 5.5 microstrain/ºF when tested in accordance with Tex-428-A. Provide samples or test specimens as directed and allow 30 days for testing. TxDOT will perform the testing and test results are final. Testing is required for naturally occurring aggregates.

Place 1/2 inch expansion joint material where concrete pavement is placed against other concrete such as structures, riprap, and/or curb and gutter except as otherwise shown on the plans or as directed. No direct payment will be made for this work or materials but will be considered subsidiary to the various bid items involved.

Backfill joint between new CRCP and existing flexible base pavement with TY D ACP or approved equivalent.

ITEM 432: RIPRAP

Place 1/2 inch expansion joint material between the two concrete areas or structures where riprap is placed against other concrete such as concrete pavement and structures unless otherwise shown on the plans or as directed. This work will not be paid for directly but will be subsidiary to the pertinent items.

Unless otherwise shown on the plans or directed, riprap will be 5" deep and reinforced; reinforced toewalls 6" wide and 12" deep will be placed around the perimeter of each location.

ITEM 462: CONCRETE BOX CULVERTS AND DRAINS

When extending box culverts, if footings and interior walls are not broken back to expose reinforcement, embed steel dowels into the concrete to splice with the "F" bars of the proposed footing and wall extensions. Embed dowels a minimum of 12" into the new construction to meet the minimum splice requirements of Item 440. Match the number, size and grade of dowel bars to the proposed "F" bars. Epoxy for dowel bar embedment will be as approved. This work will not be paid for directly but will be subsidiary to pertinent items.

ITEMS 464 & 467: REINFORCED CONCRETE PIPE & SAFETY END TREATMENT

If required, concrete collars, as approved, will be used at pipe joints. Collars will be reinforced as directed. No direct compensation will be made for concrete collars and they will be subsidiary to the pertinent items, except as noted in the plans.

ITEM 467: SAFETY END TREATMENT

Precast safety end treatment sections will not be allowed.

Provide reinforced concrete riprap for all pipe safety end treatments. Round corners on safety end treatment riprap to a minimum 12 inch radius as directed. The riprap will not be paid for directly but will be subsidiary to Item 467.

Provide and use a form along the cut end of the pipe when placing the adjacent reinforced concrete riprap for pipe safety end treatment sections.

Riprap cross slope above the working point may need to be flatter than 6:1 slope to improve driveway tie-in as directed by the engineer.

ITEM 502: BARRICADES, SIGNS, AND TRAFFIC HANDLING

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.

Work zone speed limit signing will be utilized, and shall be used as directed by the Engineer.

Use WZ(RS)-16 in conjunction with TCP(2-2)and TCP(2-6).

Use TCP(2-2b) for one-lane, two-way traffic control.

When using TCP(2-2b), a pilot car is required to lead traffic through the work space with or without channelizing devices on the center line unless otherwise approved.

When using TCP(2-2b), channelizing devices may be omitted during base, subgrade and seal coat operations unless otherwise directed. Flaggers will be required at public intersections when channelizing devices are omitted.

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When using TCP(2-2b), arrow boards, displaying the caution mode, may be used to enhance the flagger stations. If used, place the arrow board in advance of the flagger station a distance of ½X, the sign spacing distance shown on BC(2). Use arrow boards as shown on BC(7).

When using TCP(2-2b), the temporary 24" stop line and the CW16-2P plaques may be omitted.

When using TCP(2-2b), an additional “Road Work Ahead” and “Be Prepared To Stop” signs will be required on each end of the lane closure unless otherwise approved.

Provide trail and lead vehicles when using TCP(3-2) or TCP(3-3).

Utilize TCP(3-3) for sweeping operations or for installing and removing tabs or raised pavement markers.

Provide suitable warning lights mounted high enough to be visible from all directions on all construction equipment, including pilot vehicles, and operate warning lights when the equipment is within the right of way. Equip other equipment such as trucks, trailers, autos, etc., with emergency flashers and use emergency flashers while within the work area.

All culvert work must be completed prior to performing excavation and embankment within the work area. The contractor will only be allowed to perform culvert work on one side of the roadway at a time, through completion, before starting on the opposite side unless otherwise approved.

No additional payment will be made for relocating existing sign assemblies to temporary mounts.

Signs warning of temporary conditions, such as “NO CENTER LINE,” “LOOSE GRAVEL,” etc., shall only be displayed when conditions are present. Remove or completely cover signs that do not apply to the roadway conditions. These signs may be installed prior to beginning work but shall remain completely covered until the signs are applicable.

In accordance with Article 502.4.2, no payment will be made for the month if the contractor fails to provide or properly maintain signs in compliance with the contract requirements. Temporary warning signs that are visible when conditions do not apply will be considered improper maintenance of signs.

Provide a 3:1 slope or flatter from the pavement edge with drums in all work areas during non-working hours. If adequate width is not available to set the drums, the 3:1 edge build up shall be widened to accommodate drum placement. Labor and materials involved in this work will not be paid for directly, but shall be considered subsidiary to the various bid items of the contract. After placement of the prime, the 3:1 slope will not be required, but drums will still be required.

Do not close consecutive crossovers at any time unless authorized by the Engineer.

In the event of a called evacuation, emergencies, impending adverse weather or as directed, do not perform any work without written authorization. The District reserves the right to suspend all work in support of evacuations or emergencies occurring from other parts of the state. Any work performed, other than work directed by the Department, is unauthorized work in accordance with Item 5.

ITEM 504: FIELD OFFICE AND LABORATORY

Provide a Type D structure for the asphalt mix control laboratory for the engineer's exclusive use. Equip the structure with a 240 volt electrical entrance service. The service will consist of a minimum of four 120 volt circuits with 20 amp breakers and at most two grounded convenience outlets per circuit and provisions for a minimum of two 220 volt ovens. Space heaters for heating the structure are unacceptable. Portable structures will be support blocked for stability and will be tied down.

ITEM 506: TEMPORARY EROSION, SEDIMENTATION, AND ENVIRONMENTAL CONTROLS

1. See SW3P plan sheet for total disturbed acreage.

2. The disturbed area in this project, all project locations in the contract, and contractor project specific locations (PSLs), within one (1) mile of the project limits, for the contract will further establish the authorization requirements for storm water discharges.

3. The department will obtain an authorization to discharge storm water from the Texas Commission on Environmental Quality (TCEQ) for the construction activities shown on the plans.

4. Obtain any required authorization from the TCEQ for any contractor PSLs for construction activities on or off right-of-way (ROW).

5. When the total disturbed area for all projects in the contract and PSLs within one (1) mile of the project limits exceeds five (5) acres, provide a copy of the contractor NOI.

6. Provide a signed sketch detailing the location of any contractor's PSLs on ROW or within one (1) mile of the project.

ITEM 560: MAILBOX ASSEMBLIES

Furnish and place two OM-2Y Object Markers on mailbox supports, one in each direction. These will not be paid for directly but are subsidiary to this item.

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Provide 12 inches of clearance from the pavement edge to the mailbox.

ITEM 585: RIDE QUALITY FOR PAVEMENT SURFACES

Pay adjustments for ride quality on travel lanes shall be determined by Schedule 2.

ITEM 618: CONDUIT

Provide as-built or certified as-installed plans, including GPS coordinates, for all conduit to establish the locations, vertical elevations, and horizontal alignments based on the department's survey datum. The plans shall also show the relationship to existing highway facilities and the right of way line. Submit to the engineer on an 11x17 inch scaled plan sheet.

Where PVC, duct cable, and HDPE conduit 1" and larger is allowed and installed as per TXDOT standards, provide a PVC elbow in place of the galvanized rigid metal elbow required by the Electrical Detail standards. Ensure the PVC elbow is of the same schedule rating as the conduit to which it is connected. Ensure only a flat, high tensile strength polyester fiber pull tape is used for pulling conductors through the PVC conduit system.

All conduit elbows and rigid metal extensions required when installing PVC conduit systems, are subsidiary to the various bid items.

Unless shown otherwise on the plans, install the underground conduit a minimum of 24 in. deep. Place conduit under driveway or roadways a minimum of 24 in. below the pavement surface.

ITEM 644: SMALL ROADSIDE SIGN SUPPORTS AND ASSEMBLIES

Use Class B concrete for all small roadside sign assembly concrete footings.

Replace the signs with reference markers to the exact station from which they were removed.

Drill the holes in the signs carefully as to not damage the reflective sheeting of the signs.

ITEM 662: WORK ZONE PAVEMENT MARKINGS

Use raised pavement markers for removable work zone pavement markings.

Remove the exposed portions of the temporary flexible reflective roadway marker tabs after raised pavement markers are installed. If the tabs are not in line with the markings, remove the tabs immediately after the centerline markings are installed.

ITEM 666: REFLECTORIZED PAVEMENT MARKINGS

Use a mobile retroreflectometer to measure retroreflectivity unless otherwise directed. A DVD video of the retroreflectometer data will not be required.

Place permanent pavement markings within 7 calendar days of initial tab placement on ACP.

For non-profile pavement markings, provide Type I pavement markings in accordance with this item. The requirements of this item are supplemented with the following provision: Place Type I pavement markings with a ribbon-gun application. All other provisions remain in effect.

ITEM 668: PREFABRICATED PAVEMENT MARKINGS

Pavement marking material may be placed on roadways at any time during the year, subject to temperature and moisture limitations specified.

ITEM 677: ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS

Remove existing stripe with the water blasting method.

ITEM 3076: DENSE-GRADED HOT-MIX ASPHALT

Tie HMACP tapers to a vertical transition joint created by the milling operation at the beginning and ending transitions and at all exceptions, or as directed. Provide a temporary HMACP taper at vertical joints until overlay operations begin. Milling and HMACP work will not be paid for directly but will be considered subsidiary to this item.

Mixture designs, using the PG binder originally specified and without additives, failing to meet the requirements of Table 10 will require the addition of a minimum 1.0% of Type A hydrated lime based on dry weight of the total aggregate.

Use of RAS in the HMACP surface course is not permitted.

Do not add additional quantity of RAP to stockpiles tested and approved. If additional RAP is added to a stockpile, a new design and trial batch will be required prior to placement on the roadway.

The extracted aggregate from contractor-owned RAP shall have a minimum of 85% two crushed faces when tested in accordance with TEX-460-A, Part I.

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Place the inside shoulder with the inside mainlane continuously through median crossovers on 4-lane divided highways.

Limit uneven pavement to two days production with the requirement that all longitudinal joints adjacent to a travelway are constructed with a joint maker providing a maximum one inch vertical edge (1/2” desirable) with an adjacent 6:1 taper.

ITEM 6001: PORTABLE CHANGEABLE MESSAGE SIGN

Provide Portable Changeable Message Signs (PCMS) for the duration of the project. Locations and messages or other miscellaneous uses of PCMS, shall be as approved or directed by the Engineer.

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

Shadow vehicle(s) with TMA are set up for stationary and/or mobile operations. The contractor will be responsible for determining if one or more of these operations will be ongoing at the same time to determine the total number of TMAs needed for the project.

QUANTITY SHEET

CONTROLLING PROJECT ID 0266-01-086 **DISTRICT** Yoakum **COUNTY** Fayette
HIGHWAY SH 71

						TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB		**0266-01-086**			
		PROJECT ID		**A00137746**			
		COUNTY		**Fayette**			
		HIGHWAY		**SH 71**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	100-6002	PREPARING ROW	STA	1.000		1.000	
	104-6001	REMOVING CONC (PAV)	SY	140.000		140.000	
	105-6016	REMOVING STAB BASE & ASPH PAV(16")	SY	7,334.000		7,334.000	
	106-6002	OBLITERATING ABANDONED ROAD	SY	473.000		473.000	
	110-6001	EXCAVATION (ROADWAY)	CY	3,570.000		3,570.000	
	132-6005	EMBANKMENT (FINAL)(ORD COMP)(TY C)	CY	4,312.000		4,312.000	
	150-6002	BLADING	HR	25.000		25.000	
	164-6003	BROADCAST SEED (PERM) (RURAL) (CLAY)	SY	400.000		400.000	
	164-6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	37,029.000		37,029.000	
	164-6041	DRILL SEEDING (TEMP) (WARM)	SY	9,265.000		9,265.000	
	164-6043	DRILL SEEDING (TEMP) (COOL)	SY	9,265.000		9,265.000	
	168-6001	VEGETATIVE WATERING	MG	314.200		314.200	
	247-6057	FL BS (CMP IN PLC)(TYE GR1-2)(FNAL POS)	CY	2,013.000		2,013.000	
	251-6036	REWORK BS MTL (TY C) (8") (DENS CONT)	SY	7,939.000		7,939.000	
	260-6012	LIME(HYD,COM OR QK)(SLRY)OR QK(DRY)	TON	364.000		364.000	
	260-6079	LIME TRT (SUBGRADE)(6")	SY	30,396.000		30,396.000	
	275-6001	CEMENT	TON	175.000		175.000	
	275-6011	CEMENT TREAT(EXIST MATL)(8")	SY	14,313.000		14,313.000	
	310-6009	PRIME COAT (MC-30)	GAL	7,340.000		7,340.000	
	316-6249	AGGR(TY-PE GR-4 SAC-B)	CY	265.000		265.000	
	316-6400	ASPH (AC-15P OR AC-10-2TR OR CRS-2P)	GAL	8,973.000		8,973.000	
	360-6004	CONC PVMT (CONT REINF - CRCP) (10")	SY	11,561.000		11,561.000	
	360-6051	CONC PVMT (CONT REINF-CRCP)(HES)(10")	SY	615.000		615.000	
	400-6005	CEM STABIL BKFL	CY	8.000		8.000	
	403-6001	TEMPORARY SPL SHORING	SF	1,234.000		1,234.000	
	416-6029	DRILL SHAFT (RDWY ILL POLE) (30 IN)	LF	10.000		10.000	
	420-6009	CL A CONC (COLLAR)	EA	1.000		1.000	
	432-6002	RIPRAP (CONC)(5 IN)	CY	26.000		26.000	
	432-6024	RIPRAP (STONE COMMON)(DRY)(12 IN)	CY	96.000		96.000	
	462-6046	CONC BOX CULV (3 FT X 3 FT)(EXTEND)	LF	5.000		5.000	
	462-6067	CONC BOX CULV (8 FT X 8 FT)(EXTEND)	LF	22.000		22.000	
	464-6005	RC PIPE (CL III)(24 IN)	LF	32.000		32.000	
	467-6111	SET (TY I)(S=3 FT)(HW= 4 FT)(3:1)(C)	EA	2.000		2.000	
	467-6211	SET (TY I)(S= 6 FT)(HW= 4 FT)(3:1) (C)	EA	4.000		4.000	
	467-6288	SET (TY I)(S= 8 FT)(HW= 9 FT)(3:1) (C)	EA	4.000		4.000	
	467-6395	SET (TY II) (24 IN) (RCP) (6: 1) (P)	EA	4.000		4.000	
	500-6001	MOBILIZATION	LS	100.00%		100.00%	

QUANTITY SHEET

CONTROLLING PROJECT ID 0266-01-086 **DISTRICT** Yoakum **COUNTY** Fayette
HIGHWAY SH 71

						TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB		**0266-01-086**			
		PROJECT ID		**A00137746**			
		COUNTY		**Fayette**			
		HIGHWAY		**SH 71**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	8.000		8.000	
	506-6001	ROCK FILTER DAMS (INSTALL) (TY 1)	LF	120.000		120.000	
	506-6011	ROCK FILTER DAMS (REMOVE)	LF	120.000		120.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	1,234.000		1,234.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	1,234.000		1,234.000	
	530-6005	DRIVEWAYS (ACP)	SY	261.000		261.000	
	533-6001	RUMBLE STRIPS (SHOULDER)	LF	19,977.000		19,977.000	
	560-6007	MAILBOX INSTALL-S (WC-POST) TY 3	EA	4.000		4.000	
	610-6004	RELOCATE RD IL ASM (TRANS-BASE)	EA	1.000		1.000	
	618-6023	CONDT (PVC) (SCH 40) (2")	LF	30.000		30.000	
	620-6007	ELEC CONDR (NO.8) BARE	LF	30.000		30.000	
	620-6008	ELEC CONDR (NO.8) INSULATED	LF	115.000		115.000	
	624-6002	GROUND BOX TY A (122311)W/APRON	EA	1.000		1.000	
	624-6028	REMOVE GROUND BOX	EA	1.000		1.000	
	644-6002	IN SM RD SN SUP&AM TY10BWG(1)SA(P-BM)	EA	11.000		11.000	
	644-6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	7.000		7.000	
	644-6007	IN SM RD SN SUP&AM TY10BWG(1)SA(U)	EA	2.000		2.000	
	644-6060	IN SM RD SN SUP&AM TYTWT(1)WS(P)	EA	56.000		56.000	
	644-6061	IN SM RD SN SUP&AM TYTWT(1)WS(T)	EA	8.000		8.000	
	644-6076	REMOVE SM RD SN SUP&AM	EA	42.000		42.000	
	658-6099	INSTL OM ASSM (OM-2Z)(WFLX)GND	EA	11.000		11.000	
	662-6060	WK ZN PAV MRK REMOV (W)4"(BRK)	LF	2,762.000		2,762.000	
	662-6063	WK ZN PAV MRK REMOV (W)4"(SLD)	LF	31,628.000		31,628.000	
	662-6069	WK ZN PAV MRK REMOV (W)8"(DOT)	LF	532.000		532.000	
	662-6071	WK ZN PAV MRK REMOV (W)8"(SLD)	LF	6,718.000		6,718.000	
	662-6095	WK ZN PAV MRK REMOV (Y)4"(SLD)	LF	20,442.000		20,442.000	
	662-6109	WK ZN PAV MRK SHT TERM (TAB)TY W	EA	4,728.000		4,728.000	
	666-6006	REFL PAV MRK TY I (W)4"(DOT)(100MIL)	LF	1,295.000		1,295.000	
	666-6030	REFL PAV MRK TY I (W)8"(DOT)(100MIL)	LF	216.000		216.000	
	666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	7,580.000		7,580.000	
	666-6300	RE PM W/RET REQ TY I (W)4"(BRK)(100MIL)	LF	5,644.000		5,644.000	
	666-6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	10,326.000		10,326.000	
	666-6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	9,651.000		9,651.000	
	666-6342	REF PROF PAV MRK TY I(W)4"(SLD)(100MIL)	LF	9,263.000		9,263.000	
	666-6345	REF PROF PAV MRK TY I(Y)4"(SLD)(100MIL)	LF	8,494.000		8,494.000	
	668-6076	PREFAB PAV MRK TY C (W) (24") (SLD)	LF	39.000		39.000	
	668-6077	PREFAB PAV MRK TY C (W) (ARROW)	EA	9.000		9.000	

QUANTITY SHEET

CONTROLLING PROJECT ID 0266-01-086 **DISTRICT** Yoakum **COUNTY** Fayette
HIGHWAY SH 71

							TOTAL EST.	TOTAL FINAL
			CONTROL SECTION JOB		**0266-01-086**			
			PROJECT ID		**A00137746**			
			COUNTY		**Fayette**			
			HIGHWAY		**SH 71**			
ALT	**BID CODE**	**DESCRIPTION**		**UNIT**	EST.	FINAL		
	668-6080	PREFAB PAV MRK TY C (W) (UTURN ARROW)		EA	10.000		10.000	
	668-6083	PREFAB PAV MRK TY C (W) (LNDP ARROW)		EA	8.000		8.000	
	668-6085	PREFAB PAV MRK TY C (W) (WORD)		EA	18.000		18.000	
	668-6092	PREFAB PAV MRK TY C (W) (36")(YLD TRI)		EA	56.000		56.000	
	672-6010	REFL PAV MRKR TY II-C-R		EA	681.000		681.000	
	677-6001	ELIM EXT PAV MRK & MRKS (4")		LF	40,250.000		40,250.000	
	678-6001	PAV SURF PREP FOR MRK (4")		LF	20,666.000		20,666.000	
	678-6004	PAV SURF PREP FOR MRK (8")		LF	4,399.000		4,399.000	
	678-6009	PAV SURF PREP FOR MRK (ARROW)		EA	7.000		7.000	
	678-6012	PAV SURF PREP FOR MRK (UTURN ARR)		EA	5.000		5.000	
	678-6016	PAV SURF PREP FOR MRK (WORD)		EA	10.000		10.000	
	678-6023	PAV SURF PREP FOR MRK (36")(YLD TRI)		EA	44.000		44.000	
	3076-6001	D-GR HMA TY-B PG64-22		TON	10,317.000		10,317.000	
	3076-6050	D-GR HMA TY-D SAC-B PG76-22		TON	2,257.000		2,257.000	
	3076-6066	TACK COAT		GAL	5,727.000		5,727.000	
	6001-6002	PORTABLE CHANGEABLE MESSAGE SIGN		EA	2.000		2.000	
	6049-6001	LONG CHANNEL MOUNT CURB SYS (INSTALL)		LF	670.000		670.000	
	6185-6002	TMA (STATIONARY)		DAY	15.000		15.000	
	6185-6005	TMA (MOBILE OPERATION)		DAY	30.000		30.000	
	18	EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)		LS	1.000		1.000	
		SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)		LS	1.000		1.000	

SUMMARY OF ROADWAY QUANTITIES

PLAN LAYOUT SHEET NO.	LOCATION		SIDE	LENGTH	WIDENING		ITEM 100	ITEM 104	ITEM 105	ITEM 106	ITEM 150	FL BS/CEM TRT MATL		ITEM 247	ITEM 275		ITEM 251	ITEM 260				REMARKS
																		LIME TRT				
	BEGIN STA	END STA			BEGIN WIDTH	END WIDTH	PREPARING ROW	REMOVING CONC (PAV)	REMOVING STAB BASE & ASPH PAV(16")	OBLITERATING ABANDONED ROAD	BLADING	BEGIN WIDTH	END WIDTH	FL BS (CMP IN PLC) (TYE GR1-2) (FNAL POS) 8"	CEMENT 135 LB/CF (3%)	CEMENT TREAT (EXIST MATL) (8")	REWORK BS MTL (TY C) (8") (DENS CONT)	BEGIN WIDTH	END WIDTH	LIME (HYD,COM OR QK) (SLRY) OR QK(DRY) 105 LB/CF (5%)	LIME TRT (SUBGRADE) (6")	
				FT	FT	FT	STA	SY	SY	SY	HR	FT	FT	CY	TON	SY	SY	FT	FT	TON	SY	
	SH 71 WB																					
1 OF 9	487+60.00	496+00.00	LT	840.00	10	16	1					12.75	18.75		18	1470	933	3.5	9.5	7	607	TAPER
1 OF 9	496+00.00	497+50.00	LT	150.00	16	16						18.75	18.75		4	313	167	9.5	9.5	2	158	
2 OF 9	497+50.00	508+50.00	LT	1100.00	16	16						18.75	18.75		28	2292	1222	9.5	9.5	14	1161	
3 OF 9	508+50.00	513+89.62	LT	539.62	16	16						18.75	18.75		14	1124	600	9.5	9.5	7	570	
3 OF 9	513+89.62	514+39.62	LT						82					29						2	156	FM 955
3 OF 9	514+74.72	515+24.40	LT						92					27						2	148	FM 955
3 OF 9	515+24.40	519+50.00	LT	425.60	16	16						18.75	18.75		11	887	473	9.5	9.5	5	449	
4 OF 9	519+50.00	530+50.00	LT	1100.00	16	16						18.75	18.75		28	2292	1222	9.5	9.5	14	1161	
5 OF 9	530+50.00	533+50.00	LT	300.00	16	16						18.75	18.75		8	625	333	9.5	9.5	4	317	
5 OF 9	533+50.00	535+00.00	LT	150.00	16	10						18.75	12.75		3	263	167	9.5	3.5	1	108	TAPER
6 OF 9	551+92.00	552+50.00	LT	58.00	10	10.7						12.75	13.45		1	84	64	3.5	4.2	0	25	TAPER
7 OF 9	552+50.00	557+92.00	LT	542.00	10.7	16						13.45	18.75		12	970	602	4.2	9.5	5	413	TAPER
7 OF 9	557+92.00	563+50.00	LT	558.00	16	16						18.75	18.75		14	1163	620	9.5	9.5	7	589	
8 OF 9	563+50.00	574+50.00	LT	1100.00	16	16						18.75	18.75		28	2292	1222	9.5	9.5	14	1161	
9 OF 9	574+50.00	575+82.00	LT	132.00	16	16						18.75	18.75		3	275	147	9.5	9.5	2	139	
9 OF 9	575+82.00	577+32.00	LT	150.00	16	10						18.75	12.75		3	263	167	9.5	3.5	1	108	TAPER
2 OF 9	498+60.00	499+43.50	RT	83.50	8	8			233			10.75	10.75	22				11.5	11.5	1	107	
2 OF 9	499+43.50	508+50.00	RT	906.50	16	16			582			18.75	18.75	420				19.5	19.5	23	1964	
3 OF 9	508+50.00	508+88.00	RT	38.00	16	16			17			18.75	18.75	18				19.5	19.5	1	82	
3 OF 9	508+88.00	510+38.00	RT	150.00	16	4			67			18.75	6.75	47				19.5	7.5	3	225	TAPER
3 OF 9	517+00.00	519+50.00	RT	250.00	16	16			317			18.75	18.75	116				19.5	19.5	6	542	
4 OF 9	519+50.00	530+50.00	RT	1100.00	16	16			538			18.75	18.75	509				19.5	19.5	28	2383	
5 OF 9	530+50.00	532+85.30	RT	235.30	16	16			104			18.75	18.75	109				19.5	19.5	6	510	
5 OF 9	532+85.30	534+00.00	RT	114.70	12	12			285			14.75	14.75	42				15.5	15.5	2	198	
6 OF 9	550+85.00	551+67.00	RT						266					70						4	274	CROSSOVER
6 OF 9	551+67.00	552+50.00	RT	83.00	16	16			121			18.75	18.75	38				19.5	19.5	2	180	
7 OF 9	552+50.00	563+01.00	RT	1051.00	16	16			799			18.75	18.75	487				19.5	19.5	27	2277	
	SH 71 EB																					
2 OF 9	498+60.00	499+43.50	LT						220											6	385	CROSSOVER
2 OF 9	499+43.50	508+50.00	LT	906.50	16	16			397									18	18	21	1813	
3 OF 9	508+50.00	513+80.40	LT	530.40	16	16			620									18	18	13	1061	
3 OF 9	513+80.40	515+59.60	LT						437											8	537	CROSSOVER
3 OF 9	515+59.60	519+50.00	LT	390.40	16	16			142									18	18	9	781	
4 OF 9	519+50.00	530+50.00	LT	1100.00	16	16			354									18	18	26	2200	
5 OF 9	530+50.00	532+85.30	LT	235.30	16	16			202									18	18	6	471	
5 OF 9	532+85.30	534+00.00	LT						294											6	545	CROSSOVER
7 OF 9	560+12.00	563+50.00	LT							443												
8 OF 9	563+50.00	564+23.00	LT							30												
8 OF 9	564+95.00	566+45.00	LT	150.00	4	16			57									6	18	2	200	TAPER
8 OF 9	566+45.00	574+50.00	LT	805.00	16	16			352									18	18	19	1610	
9 OF 9	574+50.00	576+01.36	LT	151.36	16	16			190									18	18	4	303	
9 OF 9	576+01.36	576+80.00	LT						256											3	262	CROSSOVER
1 OF 9	497+22.00	497+50.00	RT	28.00	4	4.4												6	6.4	1	19	TAPER
2 OF 9	497+50.00	498+72.00	RT	122.00	4.4	6												6.4	8	1	98	TAPER
2 OF 9	498+72.00	508+50.00	RT	978.00	6	6		3										8	8	10	869	
3 OF 9	508+50.00	514+22.20	RT	572.20	6	6		109										8	8	6	509	
3 OF 9	514+22.20	515+54.67	RT	132.47	6	6		28	310					79				8	8	5	488	BACA RD
3 OF 9	515+54.67	519+50.00	RT	395.33	6	6												8	8	4	351	
4 OF 9	519+50.00	530+50.00	RT	1100.00	6	6												8	8	12	978	
5 OF 9	530+50.00	533+30.00	RT	280.00	6	6												8	8	3	249	
5 OF 9	533+30.00	541+50.00	RT	820.00	6	4.1												8	6.1	8	642	TAPER
6 OF 9	541+50.00	541+70.00	RT	20.00	4.1	4												6.1	6	1	13	TAPER
			PROJECT TOTAL				1	140	7334	473	25			2013	175	14313	7939			364	30396	

NO.	REVISION	BY	DATE

CP&Y

TEXAS REGISTERED ENGINEERING FIRM F-1741

SH 71

ROADWAY SUMMARY

SHEET 1 OF 3

Designed:	GM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	BAJ	6	TEXAS				SH 71
Drawn:	GM	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086	12

SUMMARY OF ROADWAY QUANTITIES

PLAN LAYOUT SHEET NO.	LOCATION BEGIN STA	LOCATION END STA	SIDE	ITEM 310 PRIME BEGIN WIDTH FT	ITEM 310 PRIME END WIDTH FT	ITEM 310 PRIME PRIME COAT (MC-30) 0.20 GAL/SY GAL	ITEM 316 OCST AGGR(TY-PE GR-4 SAC-B) 1 CY/85 SY CY	ITEM 316 OCST ASPH (AC-15P OR AC-10-2TR OR CRS-2P) 0.40 GAL/SY GAL	ITEM 360 CONCRETE BEGIN WIDTH FT	ITEM 360 CONCRETE END WIDTH FT	ITEM 360 CONCRETE CONC PVMT (CONT REINF-CRCP) (10") SY	ITEM 360 CONCRETE CONC PVMT (CONT REINF-CRCP) (HES)(10") SY	ITEM 3076 6" HMA BEGIN WIDTH FT	ITEM 3076 6" HMA END WIDTH FT	ITEM 3076 6" HMA D-GR HMA TY-B PG64-22 660 LB/SY TON	ITEM 3076 4" HMA BEGIN WIDTH FT	ITEM 3076 4" HMA END WIDTH FT	ITEM 3076 4" HMA D-GR HMA TY-B PG64-22 440 LB/SY TON	ITEM 3076 2" HMA BEGIN WIDTH FT	ITEM 3076 2" HMA END WIDTH FT	ITEM 3076 2" HMA D-GR HMA TY-D SAC-B PG76-22 220 LB/SY TON	ITEM 3076 TACK COAT ① BEGIN WIDTH FT	ITEM 3076 TACK COAT ① END WIDTH FT	ITEM 3076 TACK COAT ① TACK COAT 0.10 GAL/SY GAL	REMARKS
	SH 71 WB																								
1 OF 9	487+60.00	496+00.00	LT	12	18	280	16	560					11.5	17.5	447				10.5	16.5	139	11	17	266	TAPER
1 OF 9	496+00.00	497+50.00	LT	18	18	60	4	120					17.5	17.5	96				16.5	16.5	30	17	17	58	
2 OF 9	497+50.00	508+50.00	LT	18	18	440	26	880					17.5	17.5	706				16.5	16.5	222	17	17	422	
3 OF 9	508+50.00	513+89.62	LT	18	18	216	13	432					17.5	17.5	346				16.5	16.5	109	17	17	207	
3 OF 9	513+89.62	514+39.62	LT			26	2	52							40						12			25	FM 955
3 OF 9	514+74.72	515+24.40	LT			25	1	49							38						12			24	FM 955
3 OF 9	515+24.40	519+50.00	LT	18	18	170	10	340					17.5	17.5	273				16.5	16.5	86	17	17	163	
4 OF 9	519+50.00	530+50.00	LT	18	18	440	26	880					17.5	17.5	706				16.5	16.5	222	17	17	422	
5 OF 9	530+50.00	533+50.00	LT	18	18	120	7	240					17.5	17.5	193				16.5	16.5	61	17	17	115	
5 OF 9	533+50.00	535+00.00	LT	18	12	50	3	100					17.5	11.5	80				16.5	10.5	25	17	11	48	TAPER
6 OF 9	551+92.00	552+50.00	LT	12	12.7	16	1	32					11.5	12.2	25				10.5	11.2	8	11	11.7	15	TAPER
7 OF 9	552+50.00	557+92.00	LT	12.7	18	185	11	370					12.2	17.5	295				11.2	16.5	92	11.7	17	176	TAPER
7 OF 9	557+92.00	563+50.00	LT	18	18	223	13	446					17.5	17.5	358				16.5	16.5	113	17	17	214	
8 OF 9	563+50.00	574+50.00	LT	18	18	440	26	880					17.5	17.5	706				16.5	16.5	222	17	17	422	
9 OF 9	574+50.00	575+82.00	LT	18	18	53	3	106					17.5	17.5	85				16.5	16.5	27	17	17	51	
9 OF 9	575+82.00	577+32.00	LT	18	12	50	3	100					17.5	11.5	80				16.5	10.5	25	17	11	48	TAPER
2 OF 9	498+60.00	499+43.50	RT	10	10	19	1	37					9.5	9.5	29				8.5	8.5	9	9	9	17	
2 OF 9	499+43.50	508+50.00	RT	18	18	363	21	725					17.5	17.5	582				16.5	16.5	183	17	17	347	
3 OF 9	508+50.00	508+88.00	RT	18	18	15	1	30					17.5	17.5	24				16.5	16.5	8	17	17	15	
3 OF 9	508+88.00	510+38.00	RT	18	6	40	2	80					17.5	5.5	63				16.5	4.5	19	17	5	38	TAPER
3 OF 9	517+00.00	519+50.00	RT	18	18	100	6	200					17.5	17.5	160				16.5	16.5	50	17	17	96	
4 OF 9	519+50.00	530+50.00	RT	18	18	440	26	880					17.5	17.5	706				16.5	16.5	222	17	17	422	
5 OF 9	530+50.00	532+85.30	RT	18	18	94	6	188					17.5	17.5	151				16.5	16.5	47	17	17	90	
5 OF 9	532+85.30	534+00.00	RT	14	14	36	2	71					13.5	13.5	57				12.5	12.5	18	13	13	34	
6 OF 9	550+85.00	551+67.00	RT			63	4	125							99						32			62	CROSSOVER
6 OF 9	551+67.00	552+50.00	RT	18	18	33	2	66					17.5	17.5	53				16.5	16.5	17	17	17	32	
7 OF 9	552+50.00	563+01.00	RT	18	18	420	25	841					17.5	17.5	674				16.5	16.5	212	17	17	403	
	SH 71 EB																								
2 OF 9	498+60.00	499+43.50	LT			95					441							104						48	CROSSOVER
2 OF 9	499+43.50	508+50.00	LT	18	18	363			16	16	1612					18	18	399				18	18	181	
3 OF 9	508+50.00	513+80.40	LT	18	18	212			16	16	943					18	18	233				18	18	106	
3 OF 9	513+80.40	515+59.60	LT			131						615						144						66	CROSSOVER
3 OF 9	515+59.60	519+50.00	LT	18	18	156			16	16	694					18	18	172				18	18	78	
4 OF 9	519+50.00	530+50.00	LT	18	18	440			16	16	1956					18	18	484				18	18	220	
5 OF 9	530+50.00	532+85.30	LT	18	18	94			16	16	418					18	18	104				18	18	47	
5 OF 9	532+85.30	534+00.00	LT			109					501							120						55	CROSSOVER
7 OF 9	560+12.00	563+50.00	LT																						
8 OF 9	563+50.00	564+23.00	LT																						
8 OF 9	564+95.00	566+45.00	LT	6	18	40			4	16	167					6	18	44				6	18	20	TAPER
8 OF 9	566+45.00	574+50.00	LT	18	18	322			16	16	1431					18	18	354				18	18	161	
9 OF 9	574+50.00	576+01.36	LT	18	18	61			16	16	269					18	18	67				18	18	30	
9 OF 9	576+01.36	576+80.00	LT			58					272							64						29	CROSSOVER
1 OF 9	497+22.00	497+50.00	RT	6	6.4	4			4	4.4	13					6	6.4	4				6	6.4	2	TAPER
2 OF 9	497+50.00	498+72.00	RT	6.4	8	20			4.4	6	70					6.4	8	21				6.4	8	10	TAPER
2 OF 9	498+72.00	508+50.00	RT	8	8	174			6	6	652					8	8	191				8	8	87	
3 OF 9	508+50.00	514+22.20	RT	8	8	102			6	6	381					8	8	112				8	8	51	
3 OF 9	514+22.20	515+54.67	RT	8	8	95	4	143	6	6	88				111	8	8	26			35	8	8	81	BACA RD
3 OF 9	515+54.67	519+50.00	RT	8	8	70			6	6	264					8	8	77				8	8	35	
4 OF 9	519+50.00	530+50.00	RT	8	8	196			6	6	733					8	8	215				8	8	98	
5 OF 9	530+50.00	533+30.00	RT	8	8	50			6	6	187					8	8	55				8	8	25	
5 OF 9	533+30.00	541+50.00	RT	8	6.1	128			6	4.1	460					8	6.1	141				8	6.1	64	TAPER
6 OF 9	541+50.00	541+70.00	RT	6.1	6	3			4.1	4	9					6.1	6	3				6.1	6	1	TAPER
		SUB TOTAL													7183			3134							
		PROJECT TOTAL				7340	265	8973			11561	615			10317						2257			5727	

① APPLIED BETWEEN LIFTS OF TY B HMA, AND PRIOR TO TY D HMA.

NO.	REVISION	BY	DATE

CP&Y

TEXAS REGISTERED ENGINEERING FIRM F-1741

SH 71

ROADWAY SUMMARY

SHEET 2 OF 3

		FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Designed:	GM	6	TEXAS				SH 71
Checked:	BAJ	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Drawn:	GM	YKM	FAYETTE	0266	01	086	13
Checked:	BAJ						

SUMMARY OF EARTHWORK QUANTITIES				
	0110		0132	
LOCATION	EXCAVATION (ROADWAY)	ACCUMLATIVE EXCAVATION	EMBANKMENT (FINAL) (ORD COMP) (TY C)	ACCUMULATIVE EMBANKMENT
	CY	CY	CY	CY
488+00.00	1.8	2	0	0
488+50.00	2.8	5	0.2	0
489+00.00	2.2	7	0.9	1
489+50.00	2.4	9	1.7	3
490+00.00	2.6	12	1.6	4
490+50.00	3.2	15	1.1	6
491+00.00	3.2	18	1.3	7
491+50.00	3.1	21	1.7	9
492+00.00	3.7	25	2	11
492+50.00	4.1	29	2.9	13
493+00.00	16.9	46	10	23
493+07.00	12	58	0	23
493+50.00	16.3	74	19.5	43
494+00.00	2.2	77	32.6	76
494+50.00	1.7	78	38.9	114
495+00.00	2.8	81	24.1	139
495+50.00	3.6	85	12.6	151
496+00.00	8.2	93	6.1	157
496+50.00	10.7	104	0.7	158
497+00.00	7.3	111	2.9	161
497+50.00	10.1	121	6	167
498+00.00	14.6	136	8.1	175
498+50.00	15	151	9.2	184
499+00.00	37.8	188	7.8	192
499+50.00	46.3	235	12.2	204
500+00.00	28.6	263	26.9	231
500+50.00	26.7	290	34.5	266
501+00.00	27.8	318	34.8	300
501+50.00	28.7	346	41	341
502+00.00	25.7	372	46.7	388
502+50.00	20	392	53.4	441
503+00.00	20.1	412	65.1	507
503+25.00	14	426	0	507
503+50.00	21.9	448	65.7	572
504+00.00	21.6	470	61.4	634
504+50.00	20.5	490	62.4	696
505+00.00	19.7	510	67.9	764
505+50.00	19.6	530	74.3	838
506+00.00	18	548	70.8	909
506+50.00	20.1	568	65.5	975
507+00.00	28.4	596	56.6	1031
507+50.00	28.5	625	49.1	1080
508+00.00	22.9	647	58.5	1139
508+50.00	21.3	669	58.4	1197
509+00.00	20.7	689	48.7	1246
509+50.00	18.6	708	46.4	1292
510+00.00	17.1	725	39.5	1332
510+50.00	16	741	29.7	1361
511+00.00	14.5	756	24.5	1386

SUMMARY OF EARTHWORK QUANTITIES				
	0110		0132	
LOCATION	EXCAVATION (ROADWAY)	ACCUMLATIVE EXCAVATION	EMBANKMENT (FINAL) (ORD COMP) (TY C)	ACCUMULATIVE EMBANKMENT
	CY	CY	CY	CY
511+50.00	14.2	770	22.1	1408
512+00.00	13	783	22.1	1430
512+50.00	13.2	796	21	1451
513+00.00	14.6	811	19.6	1471
513+50.00	15.9	827	17.4	1488
514+00.00	19.4	846	10.1	1498
514+50.00	47.1	893	3.2	1501
515+00.00	105.8	999	2.6	1504
515+50.00	81.7	1081	6.6	1511
516+00.00	23.9	1104	16.8	1527
516+50.00	22.4	1127	29.2	1557
517+00.00	20	1147	38.2	1595
517+50.00	22.9	1170	38.9	1634
518+00.00	27.4	1197	29.6	1663
518+50.00	26.8	1224	31	1694
519+00.00	26.8	1251	36	1730
519+50.00	27.8	1279	36.5	1767
520+00.00	28.5	1307	34.6	1801
520+50.00	28.2	1335	35.3	1837
521+00.00	29.9	1365	40	1877
521+50.00	31.6	1397	40.8	1918
522+00.00	31.2	1428	38.7	1956
522+50.00	33.3	1461	33.7	1990
523+00.00	35.6	1497	30.5	2020
523+50.00	37.2	1534	27.6	2048
524+00.00	37.6	1572	25.7	2074
524+50.00	38.6	1610	26.4	2100
525+00.00	43	1653	25	2125
525+50.00	36.8	1690	32.6	2158
526+00.00	26.1	1716	46	2204
526+50.00	26.3	1742	50.3	2254
527+00.00	30.9	1773	45	2299
527+50.00	31.1	1804	41.8	2341
528+00.00	27.9	1832	45.1	2386
528+50.00	26.4	1859	47.7	2434
529+00.00	27.1	1886	44.6	2478
529+50.00	28	1914	44.3	2523
530+00.00	27.5	1941	47.6	2570
530+50.00	28.7	1970	49.2	2619
531+00.00	30.1	2000	44.8	2664
531+50.00	29.6	2030	36.2	2700
532+00.00	27.4	2057	32	2732
532+50.00	29.8	2087	25.4	2758
533+00.00	33.8	2121	23.4	2781
533+50.00	48.3	2169	18.2	2799
534+00.00	36	2205	13.3	2813
534+50.00	8.6	2214	16.3	2829
535+00.00	6.8	2220	11.9	2841
535+50.00	11	2231	3.5	2844

SUMMARY OF EARTHWORK QUANTITIES				
	0110		0132	
LOCATION	EXCAVATION (ROADWAY)	ACCUMLATIVE EXCAVATION	EMBANKMENT (FINAL) (ORD COMP) (TY C)	ACCUMULATIVE EMBANKMENT
	CY	CY	CY	CY
536+00.00	12.7	2244	2	2846
536+50.00	8.6	2253	4.4	2851
537+00.00	8	2261	5.1	2856
537+50.00	8.3	2269	4.3	2860
538+00.00	8.8	2278	2.7	2863
538+50.00	8.3	2286	3.3	2866
539+00.00	7.8	2294	4.5	2871
539+50.00	8	2302	4.1	2875
540+00.00	8.2	2310	3	2878
540+50.00	8.3	2318	2.4	2880
541+00.00	8.4	2327	1.9	2882
541+50.00	8.6	2335	0.8	2883
542+00.00	4.4	2340	0.1	2883
542+50.00	0	2340	0	2883
		2340		2883
551+00.00	6	2346	10.7	2894
551+50.00	11.2	2357	10.7	2904
552+00.00	9.2	2366	0.2	2905
552+50.00	7.9	2374	0.6	2905
553+00.00	8.3	2382	1.2	2906
553+50.00	8.6	2391	3.6	2910
554+00.00	8.2	2399	5.4	2915
554+50.00	9.5	2409	5.6	2921
555+00.00	12.2	2421	6.6	2928
555+50.00	14.7	2436	6.2	2934
556+00.00	15	2451	8.8	2943
556+50.00	13.9	2465	12.2	2955
557+00.00	13.1	2478	17.9	2973
557+50.00	16	2494	19.2	2992
558+00.00	17	2511	20.6	3012
558+50.00	14.6	2525	23.2	3036
559+00.00	13.9	2539	24.3	3060
559+50.00	13.6	2553	28.6	3089
560+00.00	14.4	2567	28.6	3117
560+50.00	15.2	2582	27.7	3145
561+00.00	15.3	2598	25.8	3171
561+50.00	14.5	2612	28.1	3199
562+00.00	16.5	2629	26.9	3226
562+50.00	17.4	2646	22.8	3248
563+00.00	16.7	2663	15.5	3264
563+50.00	12	2675	7.7	3272
564+00.00	5.1	2680	7.2	3279
564+50.00	4.7	2685	6.5	3285
565+00.00	6	2691	5.3	3291
565+50.00	8.4	2699	6	3297
566+00.00	12.5	2711	9	3306
566+50.00	13.6	2725	14.2	3320
567+00.00	11.9	2737	16.3	3336
567+50.00	10.8	2748	16.8	3353

SUMMARY OF EARTHWORK QUANTITIES				
	0110		0132	
LOCATION	EXCAVATION (ROADWAY)	ACCUMLATIVE EXCAVATION	EMBANKMENT (FINAL) (ORD COMP) (TY C)	ACCUMULATIVE EMBANKMENT
	CY	CY	CY	CY
568+00.00	11.4	2759	17.2	3370
568+50.00	12.5	2772	15.1	3385
569+00.00	12.1	2784	15.2	3400
569+50.00	9.8	2794	21.6	3422
570+00.00	7.7	2801	33.1	3455
570+50.00	6.8	2808	35.2	3490
571+00.00	6.5	2815	43.3	3534
571+47.00	632	3447	0	3534
571+50.00	6.4	3453	151.4	3685
572+00.00	23.9	3477	180.2	3865
572+50.00	29.3	3506	104	3969
573+00.00	11.5	3518	81.6	4051
573+50.00	5.4	3523	60.1	4111
574+00.00	4.7	3528	46.7	4158
574+50.00	4.2	3532	39.2	4197
575+00.00	3.5	3535	34.9	4232
575+50.00	4.3	3540	31.3	4263
576+00.00	4.2	3544	27.2	4290
576+50.00	13.1	3557	16.7	4307
577+00.00	12.6	3570	5	4312
577+35.00	0.7	3570	0.3	4312
PROJECT TOTAL	3570		4312	

SUMMARY OF DRIVEWAY QUANTITIES												
								0247 *	0316 (PRIME) *	0316 (OCST) *		0530
PLAN LAYOUT SHEET NO.	DRIVEWAY	STATION AT CENTERLINE	SIDE	EXISTING SURFACE DESCRIPTION	LENGTH	WIDTH	FLARE WIDTH	FL BS (CMP IN PLC) (TYE GR1-2) (FNAL POS) 6"	PRIME COAT (MC-30) 0.20 GAL/SY	AGGR(TY-PE GR-4 SAC-B) 1 CY/85 SY	ASPH (AC-15P OR AC-10-2TR OR CRS-2P) 0.40 GAL/SY	DRIVEWAYS (ACP)
			LT/RT		FT	FT	FT	CY	GAL	CY	GAL	SY
1	1	488+13.50	LT	GRAVEL	10	18	10	5.0	6	0.4	12	30
1	2	496+15.00	LT	DIRT/GRASS	10	12	10	4.1	5	0.3	10	25
2	3	498+95.50	LT	GRAVEL	10	10	10	3.8	5	0.3	9	23
2	4	506+95.00	RT	DIRT/GRASS	10	12	10	4.1	5	0.3	10	25
4	5	525+02.00	LT	GRAVEL	10	16	10	4.9	6	0.4	12	29
4	6	526+87.00	RT	GRAVEL	10	12	10	4.1	5	0.3	10	25
5	7	531+28.50	RT	GRAVEL	10	14	10	4.5	5	0.4	11	27
5	8	533+54.50	RT	GRAVEL	10	14	10	4.5	5	0.4	11	27
5	9	535+56.00	RT	DIRT/GRASS	10	12	10	4.1	5	0.3	10	25
7	10	563+23.00	LT	DIRT/GRASS	10	12	10	4.1	5	0.3	10	25
				PROJECT TOTAL				44	52	4	105	261

* FOR CONTRACTOR INFORMATION ONLY

NOTES:

1. DIMENSIONS FOR EACH DRIVEWAY ARE TYPICAL AND MAY VARY DURING ACTUAL CONSTRUCTION TO MEET FIELD CONDITIONS AND MATCH EXISTING DRIVEWAYS.
2. THE TYPES OF MATERIAL SHALL CONFORM TO THE ROADWAY ITEMS.

NO.	REVISION	BY	DATE

CP&Y

TEXAS REGISTERED ENGINEERING FIRM F-1741

SH 71

ROADWAY SUMMARY

SHEET 3 OF 3

Designed:	GM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					SH 71
Drawn:	GM	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086		14

SUMMARY OF TRAFFIC CONTROL QUANTITIES

PLAN LAYOUT SHEET NO.	LOCATION BEGIN STA	LOCATION END STA	0662 WK ZN PAV MRK REMOV (W)4"(BRK) LF	0662 WK ZN PAV MRK REMOV (W)4"(SLD) LF	0662 WK ZN PAV MRK REMOV (W)8"(DOT) LF	0662 WK ZN PAV MRK REMOV (W)8"(SLD) LF	0662 WK ZN PAV MRK REMOV (Y)4"(SLD) LF	0662 WK ZN PAV MRK SHT TERM (TAB) TY W EA	0677 ELIM EXT PAV MRK & MRKS (4") LF	6001 PORTABLE CHANGEABLE MESSAGE SIGN EA	6185 TMA (STATIONARY) DAY	6185 TMA (MOBILE OPERATION) DAY
SH 71 WB												
PHASE 1												
1 OF 6	483+52.00	486+50.00										
1 OF 6	486+50.00	497+50.00	273	1090				82	1362			
2 OF 6	497+50.00	508+50.00	275	1100				82	1375			
2 OF 6	508+50.00	519+50.00	136	983		441		86	1450			
3 OF 6	519+50.00	530+50.00		1099		1099		110	1374			
3 OF 6	530+50.00	541+50.00		1100	38	300		80	1378			
4 OF 6	541+50.00	552+50.00		1100					1378			
4 OF 6	552+50.00	563+50.00		1100					1378			
5 OF 6	563+50.00	574+50.00		1101					1380			
5 OF 6	574+50.00	579+05.00		1101					1379			
6 OF 6	N/A	N/A		562					562			
PHASE 2												
1 OF 6	483+52.00	486+50.00										
1 OF 6	486+50.00	497+50.00	313	991				94				
2 OF 6	497+50.00	508+50.00	275	1100			1094	82	1064			
2 OF 6	508+50.00	519+50.00	135	962		423	963	82	1038			
3 OF 6	519+50.00	530+50.00		1099		1099	1099	110	1099			
3 OF 6	530+50.00	541+50.00		1100	38	300	1100	80	1091			
4 OF 6	541+50.00	552+50.00		1100			1100		1100			
4 OF 6	552+50.00	563+50.00	140	1100			1100	42	1030			
5 OF 6	563+50.00	574+50.00	313	1102			1101	82	1166			
5 OF 6	574+50.00	579+05.00	222	284			456	10	399			
6 OF 6	N/A	N/A										
PHASE 3												
PHASE 4								1252	2605			
SH 71 EB												
PHASE 1												
1 OF 6	483+52.00	486+50.00		298			298		308			
1 OF 6	486+50.00	497+50.00		1100			1100		1375			
2 OF 6	497+50.00	508+50.00		1100	64	263	1100	85	1375			
2 OF 6	508+50.00	519+50.00	100	1102		550	550	30	1260			
3 OF 6	519+50.00	530+50.00	275	1101				82	1376			
3 OF 6	530+50.00	541+50.00	275	1100				82	1375			
4 OF 6	541+50.00	552+50.00	30	120				9	120			
4 OF 6	552+50.00	563+50.00										
5 OF 6	563+50.00	574+50.00										
5 OF 6	574+50.00	579+05.00										
6 OF 6	N/A	N/A										
PHASE 2												
1 OF 6	483+52.00	486+50.00		298			298		170			
1 OF 6	486+50.00	497+50.00		1100			1100		1100			
2 OF 6	497+50.00	508+50.00		1100	112	68	1100	157	938			
2 OF 6	508+50.00	519+50.00		974		974	1053	97	1238			
3 OF 6	519+50.00	530+50.00		1101		1101	1101	110	1101			
3 OF 6	530+50.00	541+50.00		1100	275	100	1100	378	986			
4 OF 6	541+50.00	552+50.00		860	5		1100	6	1100			
4 OF 6	552+50.00	563+50.00					1100		1150			
5 OF 6	563+50.00	574+50.00					1099		1056			
5 OF 6	574+50.00	579+05.00					330		234			
6 OF 6	N/A	N/A										
PHASE 3												
PHASE 4								1418	380			
PROJECT TOTAL			2762	31628	532	6718	20442	4728	40250	2	15	30

NO.	REVISION	BY	DATE

CP&Y

TEXAS REGISTERED ENGINEERING FIRM F-1741

SH 71

MISCELLANEOUS SUMMARY

SHEET 1 OF 4

Designed:	MR	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					SH 71
Drawn:	MR	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086		15

SUMMARY OF PAVEMENT MARKING QUANTITIES

PLAN LAYOUT SHEET NO.	LOCATION		0533	0666	0666	0666	0666	0666	0666	0666	0666	0668	0668	0668
	BEGIN	END	RUMBLE STRIPS (SHOULDER)	REFL PAV MRK TY I (W) 4" (DOT) (100MIL)	REFL PAV MRK TY I (W) 8" (DOT) (100MIL)	REFL PAV MRK TY I (W) 8" (SLD) (100MIL)	RE PM W/RET REQ TY I (W) 4" (BRK) (100MIL)	RE PM W/RET REQ TY I (W) 4" (SLD) (100MIL)	RE PM W/RET REQ TY I (Y) 4" (SLD) (100MIL)	REF PROF PAV MRK TY I (W) 4" (SLD) (100MIL)	REF PROF PAV MRK TY I (Y) 4" (SLD) (100MIL)	PREFAB PAV MRK TY C (W) (24") (SLD)	PREFAB PAV MRK TY C (W) (ARROW)	PREFAB PAV MRK TY C (W) (UTURN ARROW)
	STA	STA	LF	LF	LF	LF	LF	LF	LF	LF	LF	LF	EA	EA
	SH 71 WB													
1 OF 20	483+42.00	486+50.00	0											
2 OF 20	486+50.00	492+00.00	1082				135	541	541					
3 OF 20	492+00.00	497+50.00	1100	38			138	550	550					
4 OF 20	497+50.00	503+00.00	983	138		363	138	550	433					1
5 OF 20	503+00.00	508+50.00	1100	80		550	195	550	550					1
6 OF 20	508+50.00	514+00.00	1081			38	272	540	541					
7 OF 20	514+00.00	519+50.00	863	24		425	138	425	438			39	1	
8 OF 20	519+50.00	525+00.00	1095	137		547	137	546	549					
9 OF 20	525+00.00	530+50.00	1100	200		130	180	550	550				1	
10 OF 20	530+50.00	536+00.00	878	59		111	196	550	328					1
11 OF 20	536+00.00	541+50.00	1100				137	550	550					
12 OF 20	541+50.00	547+00.00	1100				138	550	550					
13 OF 20	547+00.00	552+50.00	991			90	137	550	441				1	
14 OF 20	552+50.00	558+00.00	1100			550	138	550	550					
15 OF 20	558+00.00	563+50.00	1100	135		531	138	550	550				1	
16 OF 20	563+50.00	569+00.00	1100	116			160	550	550					
17 OF 20	569+00.00	574+50.00	1103				276	552	551					
18 OF 20	574+50.00	580+00.00	859			62	171	551	308					1
19 OF 20			1102				138	551	551					
20 OF 20			1140				142	570	570					
	SH 71 EB													
1 OF 20	483+42.00	486+50.00					77			308	308			
2 OF 20	486+50.00	492+00.00					138			550	550			
3 OF 20	492+00.00	497+50.00				8	138			550	510			
4 OF 20	497+50.00	503+00.00		106	91	105	138			550	363			1
5 OF 20	503+00.00	508+50.00		6	25	978	138			550	550		2	
6 OF 20	508+50.00	514+00.00				901	138			551	540		2	
7 OF 20	514+00.00	519+50.00			37	21	237			420	398			
8 OF 20	519+50.00	525+00.00		48	63	300	229			554	551			1
9 OF 20	525+00.00	530+50.00		138		550	138			550	550			
10 OF 20	530+50.00	536+00.00		70		269	137			550	413			1
11 OF 20	536+00.00	541+50.00					137			550	550			
12 OF 20	541+50.00	547+00.00					138			550	550			
13 OF 20	547+00.00	552+50.00				121	137			550	335			1
14 OF 20	552+50.00	558+00.00					138			550	550			
15 OF 20	558+00.00	563+50.00					138			550	550		1	
16 OF 20	563+50.00	569+00.00				255	137			550	551			1
17 OF 20	569+00.00	574+50.00				549	137			549	549			
18 OF 20	574+50.00	580+00.00				126	70			281	126			1
19 OF 20														
20 OF 20														
		PROJECT TOTAL	19977	1295	216	7580	5644	10326	9651	9263	8494	39	9	10

NO.	REVISION	BY	DATE

CP&Y

TEXAS REGISTERED ENGINEERING FIRM F-1741

SH 71

MISCELLANEOUS SUMMARY

SHEET 2 OF 4

Designed:	GM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	BAJ	6	TEXAS				SH 71
Drawn:	GM	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086	16

SUMMARY OF PAVEMENT MARKING QUANTITIES

PLAN LAYOUT SHEET NO.	LOCATION BEGIN STA	LOCATION END STA	0668 PREFAB PAV MRK TY C (W) (LNDP ARROW) EA	0668 PREFAB PAV MRK TY C (W) (WORD) EA	0668 PREFAB PAV MRK TY C (W) (36") (YLD TRI) EA	0672 REFL PAV MRKR TY II-C-R EA	0678 PAV SURF PREP FOR MRK (4") LF	0678 PAV SURF PREP FOR MRK (8") LF	0678 PAV SURF PREP FOR MRK (ARROW) EA	0678 PAV SURF PREP FOR MRK (UTURN ARR) EA	0678 PAV SURF PREP FOR MRK (WORD) EA	0678 PAV SURF PREP FOR MRK (36")(YLD TRI) EA	6049 LONG CHANNEL MOUNT CURB SYS (INSTALL) LF
	SH 71 WB												
1 OF 20	483+42.00	486+50.00											
2 OF 20	486+50.00	492+00.00				7							
3 OF 20	492+00.00	497+50.00				7							
4 OF 20	497+50.00	503+00.00	1	1	6	25						6	
5 OF 20	503+00.00	508+50.00	1	1		37							
6 OF 20	508+50.00	514+00.00				16							
7 OF 20	514+00.00	519+50.00		1		28							
8 OF 20	519+50.00	525+00.00	1			34							
9 OF 20	525+00.00	530+50.00	1	1		16							
10 OF 20	530+50.00	536+00.00		1	7	15						7	
11 OF 20	536+00.00	541+50.00				7							
12 OF 20	541+50.00	547+00.00				7							
13 OF 20	547+00.00	552+50.00		1	6	11							
14 OF 20	552+50.00	558+00.00				34							
15 OF 20	558+00.00	563+50.00	1	1		32							
16 OF 20	563+50.00	569+00.00	1			10							
17 OF 20	569+00.00	574+50.00				14							
18 OF 20	574+50.00	577+32.00		1	6	12							
19 OF 20						7							
20 OF 20						7							
	SH 71 EB												
1 OF 20	483+42.00	486+50.00				4	693						
2 OF 20	486+50.00	492+00.00				7	1238						
3 OF 20	492+00.00	497+50.00				7	1198	8					
4 OF 20	497+50.00	503+00.00		1	6	20	1157	195		1	1	6	
5 OF 20	503+00.00	508+50.00		2		58	1243	1003	2		2		
6 OF 20	508+50.00	514+00.00		2		52	1229	901	2		2		201
7 OF 20	514+00.00	519+50.00			6	16	1056	59				6	469
8 OF 20	519+50.00	525+00.00	1	1		32	1382	363	1	1	1		
9 OF 20	525+00.00	530+50.00	1			34	1375	550	1				
10 OF 20	530+50.00	536+00.00		1	7	20	1171	269		1	1	7	
11 OF 20	536+00.00	541+50.00				7	1238						
12 OF 20	541+50.00	547+00.00				7	1238						
13 OF 20	547+00.00	552+50.00		1	6	13	1022	121	1		1	6	
14 OF 20	552+50.00	558+00.00				7	1238	0					
15 OF 20	558+00.00	563+50.00				7	1238	0					
16 OF 20	563+50.00	569+00.00		1		20	1238	255		1	1		
17 OF 20	569+00.00	574+50.00				34	1235	549					
18 OF 20	574+50.00	577+32.00		1	6	10	477	126		1	1	6	
19 OF 20													
20 OF 20													
		PROJECT TOTAL	8	18	56	681	20666	4399	7	5	10	44	670

SUMMARY OF SW3P QUANTITIES

PLAN LAYOUT SHEET NO.	LOCATION BEGIN STA	LOCATION END STA	0164 # BROADCAST SEED (PERM) (RURAL) (CLAY) SY	0164 DRILL SEEDING (PERM) (RURAL) (CLAY) SY	0164 DRILL SEEDING (TEMP) (WARM) SY	0164 DRILL SEEDING (TEMP) (COOL) SY	0166 * FERTILIZER 500 LBS/AC TON	0168 VEGETATIVE WATERING 13.58 MG/AC X 3 CYCLES MG	0506 ROCK FILTER DAMS (INSTALL) (TY 1) LF	0506 ROCK FILTER DAMS (REMOVE) LF	0506 TEMP SEDMT CONT FENCE (INSTALL) LF	0506 TEMP SEDMT CONT FENCE (REMOVE) LF
2 OF 20	486+50.00	492+00.00		706	177	177	0.04	6.1			30	30
3 OF 20	492+00.00	497+50.00		937	235	235	0.05	8.1			120	120
4 OF 20	497+50.00	503+00.00		3208	802	802	0.17	27.3			60	60
5 OF 20	503+00.00	508+50.00		3640	910	910	0.19	31.0	60	60	162	162
6 OF 20	508+50.00	514+00.00		3697	925	925	0.19	31.4				
7 OF 20	514+00.00	519+50.00		3717	930	930	0.19	31.4				
8 OF 20	519+50.00	525+00.00		3655	914	914	0.19	31.0			150	150
9 OF 20	525+00.00	530+50.00		3626	907	907	0.19	30.6			120	120
10 OF 20	530+50.00	536+00.00		2695	674	674	0.14	22.8			102	102
11 OF 20	536+00.00	541+50.00		917	230	230	0.05	7.7				
12 OF 20	541+50.00	547+00.00		34	9	9	0.00	0.4			30	30
13 OF 20	547+00.00	552+50.00		432	108	108	0.02	3.7			90	90
14 OF 20	552+50.00	558+00.00		1834	459	459	0.10	15.5			30	30
15 OF 20	558+00.00	563+50.00		2701	676	676	0.14	22.8			90	90
16 OF 20	563+50.00	569+00.00		2478	620	620	0.13	21.2			90	90
17 OF 20	569+00.00	574+50.00		1837	460	460	0.10	15.5	60	60	40	40
18 OF 20	574+50.00	580+00.00		915	229	229	0.05	7.7			120	120
		PROJECT TOTAL	400	37029	9265	9265	1.94	314.2	120	120	1234	1234

* FOR CONTRACTOR INFORMATION ONLY
\# TO BE USED AROUND CULVERT ENDS

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

SH 71

MISCELLANEOUS SUMMARY

SHEET 3 OF 4

Designed: GM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked: BAJ	6	TEXAS					SH 71
Drawn: GM	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked: BAJ	YKM	FAYETTE	0266	01	086		17

SUMMARY OF SIGNING AND OBJECT MARKER QUANTITIES

PLAN LAYOUT SHEET NO.	LOCATION BEGIN STA	LOCATION END STA	0644 IN SM RD SN SUP&AM TY10BWG (1) SA (P-BM) EA	0644 IN SM RD SN SUP&AM TY10BWG (1) SA (T) EA	0644 IN SM RD SN SUP&AM TY10BWG (1) SA (U) EA	0644 IN SM RD SN SUP&AM TYTWT (1) WS (P) EA	0644 IN SM RD SN SUP&AM TYTWT (1) WS (T) EA	0644 REMOVE SM RD SN SUP&AM EA	0658 INSTL OM ASSM (OM-2Z) (WFLX) GND EA
SH 71 WB									
2 OF 20	486+50.00	492+00.00							
3 OF 20	492+00.00	497+50.00							1
4 OF 20	497+50.00	503+00.00	1			2	1	3	
5 OF 20	503+00.00	508+50.00				3		1	2
6 OF 20	508+50.00	514+00.00		1		3		2	
7 OF 20	514+00.00	519+50.00	2		1	6	2	5	
8 OF 20	519+50.00	525+00.00		1		2		2	
9 OF 20	525+00.00	530+50.00				1			
10 OF 20	530+50.00	536+00.00	1			4	1	3	1
11 OF 20	536+00.00	541+50.00							
12 OF 20	541+50.00	547+00.00							
13 OF 20	547+00.00	552+50.00	1			1			
14 OF 20	552+50.00	558+00.00		1		2		1	
15 OF 20	558+00.00	563+50.00				1		1	
16 OF 20	563+50.00	569+00.00		1				2	
17 OF 20	569+00.00	574+50.00				2		1	2
18 OF 20	574+50.00	580+00.00	1			2	1	2	
SH 71 EB									
2 OF 20	486+50.00	492+00.00							
3 OF 20	492+00.00	497+50.00							1
4 OF 20	497+50.00	503+00.00	1			2	1	2	
5 OF 20	503+00.00	508+50.00		1		3		1	2
6 OF 20	508+50.00	514+00.00		1	1	4	1	2	
7 OF 20	514+00.00	519+50.00	1	1		3		5	
8 OF 20	519+50.00	525+00.00				3		1	
9 OF 20	525+00.00	530+50.00				2			
10 OF 20	530+50.00	536+00.00	1			3	1	3	
11 OF 20	536+00.00	541+50.00							
12 OF 20	541+50.00	547+00.00							
13 OF 20	547+00.00	552+50.00	1			2		2	
14 OF 20	552+50.00	558+00.00							
15 OF 20	558+00.00	563+50.00						2	
16 OF 20	563+50.00	569+00.00				1			
17 OF 20	569+00.00	574+50.00				2			2
18 OF 20	574+50.00	580+00.00	1			2		1	
PROJECT TOTAL			11	7	2	56	8	42	11

SUMMARY OF MAILBOX QUANTITIES

PLAN LAYOUT SHEET NO.	STATION AT CENTERLINE	SIDE LT/RT	0560 MAILBOX INSTALL-S (WC-POST) TY 3 EA
2	499+35	LT	1
2	507+20	RT	1
4	524+75	LT	1
5	531+05	RT	1
PROJECT TOTAL			4

SUMMARY OF ILLUMINATION QUANTITIES

BID CODE	DESCRIPTION	UNIT	QUANTITY
0416 6029	DRILL SHAFT (RDWY ILL POLE) (30 IN)	LF	10
0610 6004	RELOCATE RD IL ASM (TRANS-BASE)	EA	1
0618 6023	CONDT (PVC) (SCH 40) (2")	LF	30
0620 6007	ELEC CONDR (NO. 8) BARE	LF	30
0620 6008	ELEC CONDR (NO. 8) INSULATED	LF	115
0624 6002	GROUND BOX TY A (122311)W/APRON	EA	1
0624 6028	REMOVE GROUND BOX	EA	1

SUMMARY DRAINAGE QUANTITIES

CULVERT LAYOUT SHEET NO.	LOCATION STA	0400 CEM STABIL BKFL CY	0403 TEMPORARY SPL SHORING SF	0420 CL A CONC (COLLAR) EA	0432 RIPRAP (CONC)(5 IN) CY	0432 RIPRAP (STONE COMMON) (DRY) (12 IN) CY	0462 CONC BOX CULV (3 FT X 3 FT) (EXTEND) LF	0462 CONC BOX CULV (8 FT X 8 FT) (EXTEND) LF	0464 RC PIPE (CL III) (24 IN) LF	0467 SET (TY I) (S=3FT)(HW=4FT) (3:1)(C) EA	0467 SET (TY I) (S=6FT)(HW=4FT) (3:1) (C) EA	0467 SET (TY I) (S=8FT)(HW=9FT) (3:1) (C) EA	0467 SET (TY II) (24 IN) (RCP) (6: 1) (P) EA
1 OF 4	493+07				2	3	5			2			
2 OF 4	503+25				4						4		
3 OF 4	553+00	8	120	1									
4 OF 4	571+47		1114		20	93		22				4	
CROSSOVER	499+04								8				1
CROSSOVER	545+75								10				1
CROSSOVER	563+27												
CROSSOVER	576+38								14				2
PROJECT TOTAL		8	1234	1	26	96	5	22	32	2	4	4	4

NO.	REVISION	BY	DATE

CP&Y

TEXAS REGISTERED ENGINEERING FIRM F-1741

SH 71

MISCELLANEOUS SUMMARY

SHEET 4 OF 4

Designed:	GM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	BAJ	6	TEXAS				SH 71
Drawn:	GM	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086	18

DISCLAIMER:
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DATE:
FILE:

SUMMARY OF SMALL SIGNS

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

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
4	1	R6-1L	ONE WAY	54 X 18	X		TWT	1	WS	T		
	2	R6-1L	ONE WAY	54 X 18	X		10BWG	1	SA	P	BM	
		R1-2	YIELD	48 X 48 X 48	X							
	3	R5-1	DO NOT ENTER	36 X 36	X		TWT	1	WS	P		
	4	R3-8uT	TURNAROUND ONLY	30 X 36	X		TWT	1	WS	P		
	5	R3-8uT	TURNAROUND ONLY	30 X 36	X		TWT	1	WS	P		
	6	R5-1	DO NOT ENTER	36 X 36	X		TWT	1	WS	P		
	7	R6-1L	ONE WAY	54 X 18	X		10BWG	1	SA	P	BM	
		R1-2	YIELD	48 X 48 X 48	X							
	8	R6-1L	ONE WAY	54 X 18	X		TWT	1	WS	T		
5	1	M1-6T	71 TEXAS	24 X 24	X		TWT	1	WS	P		
		D10-7aT	REFERENCE MARKER									
	2	R3-8uT	TURNAROUND ONLY	30 X 36	X		TWT	1	WS	P		
	3	R2-1	SPEED LIMIT 75	30 X 36	X		TWT	1	WS	P		
	4	R3-7L	LEFT LANE MUST TURN LEFT	36 X 36	X		TWT	1	WS	P		
	5	R3-7R	RIGHT LANE MUST TURN RIGHT	36 X 36	X		TWT	1	WS	P		
	6	D1-1L	← Fayetteville	102 X 18	X		10BWG	1	SA	T		
	7	R3-7L	LEFT LANE MUST TURN LEFT	36 X 36	X		TWT	1	WS	P		
6	1	R3-8uT	TURNAROUND ONLY	30 X 36	X		TWT	1	WS	P		
	2	W9-2TL	LANE ENDS MERGE LEFT	36 X 36	X		TWT	1	WS	P		
	3	D1-1L	← Baca Rd	78 X 18	X		10BWG	1	SA	T		
	4	M3-4	WEST	24 X 12	X		TWT	1	WS	P		
		M1-6T	71 TEXAS	24 X 24	X							
	5	R3-7R	RIGHT LANE MUST TURN RIGHT	36 X 36	X		TWT	1	WS	P		
	6	D1-1R	Baca Rd →	78 X 18	X		10BWG	1	SA	T		
	7	R3-7L	LEFT LANE MUST TURN LEFT	36 X 36	X		TWT	1	WS	P		
	8	D7-7aTL	HISTORICAL MARKER LEFT ARROW 4354	48 X 48	X		10BWG	1	SA	U		
	9	R3-5L	LEFT TURN ONLY	30 X 36	X		TWT	1	WS	P		
	10	R3-5R	RIGHT TURN ONLY	30 X 36	X		TWT	1	WS	P		
	11	R5-1a	WRONG WAY	42 X 30	X		TWT	1	WS	T		

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

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0266	01	086	SH 71
4-16	DIST	COUNTY		SHEET NO.
8-16	YKM	FAYETTE		19

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SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE: FRP = Fiberglass, TWT = Thin-Wall, 10BWG = 10 BWG, S80 = Sch 80	POSTS: 1 or 2	ANCHOR TYPE: UA=Universal Conc, UB=Universal Bolt, SA=Slipbase-Conc, SB=Slipbase-Bolt, WS=Wedge Steel, WP=Wedge Plastic	MOUNTING DESIGNATION: PREFABRICATED: P = "Plain", T = "T", U = "U"	MOUNTING DESIGNATION: 1EXT or 2EXT = # of Ext, BM = Extruded Wind Beam, WC = 1.12 #/ft Wing Channel, EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE: TY N, TY S
7	1	R6-1R	ONE WAY — BACK TO BACK	54 X 18	X		10BWG	1	SA	P	BM	
		R6-1L	ONE WAY — BACK TO BACK	54 X 18	X							
		R1-1	STOP	36 X 36	X							
	2	R6-1L	ONE WAY	54 X 18	X		TWT	1	WS	T		
	3	R6-1L	ONE WAY	54 X 18	X		10BWG	1	SA	P	BM	
		R1-2	YIELD	48 X 48 X 48	X							
	4	R5-1	DO NOT ENTER	36 X 36	X		TWT	1	WS	P		
	5	R5-1	DO NOT ENTER	36 X 36	X		TWT	1	WS	P		
	6	M1-6F	FARM ROAD 955	24 X 24	X		TWT	1	WS	P		
		M6-1	RIGHT ARROW	21 X 15	X							
	7	R5-1a	WRONG WAY	42 X 30	X		TWT	1	WS	T		
	8	R3-5R	RIGHT TURN ONLY	30 X 36	X		TWT	1	WS	P		
	9	D7-7aTR	HISTORICAL MARKER RIGHT ARROW 4354	48 X 48	X		10BWG	1	SA	U		
	10	R3-18	MOVEMENT PROHIBITION	36 X 36	X		TWT	1	WS	P		
	11	R3-7R	RIGHT LANE MUST TURN RIGHT	36 X 36	X		TWT	1	WS	P		
	12	R1-2	YIELD	48 X 48 X 48	X		10BWG	1	SA	T		
	13	R5-1	DO NOT ENTER	36 X 36	X		TWT	1	WS	P		
	14	R6-1L	ONE WAY — BACK TO BACK	54 X 18	X		10BWG	1	SA	P	BM	
		R6-1R	ONE WAY — BACK TO BACK	54 X 18	X							
		R1-1	STOP	36 X 36	X							
	15	M3-2	EAST	24 X 12	X		TWT	1	WS	P		
		M1-6T	71 TEXAS	24 X 24	X							
	16	M4-5	TO	24 X 12	X		TWT	1	WS	P		
		M1-6F	FARM ROAD 955	24 X 24	X							
		M5-3T	ADVANCED TURNAROUND ARROW	24 X 15	X							
8	1	W9-2TR	LANE ENDS MERGE RIGHT	36 X 36	X		TWT	1	WS	P		
	2	R3-7R	RIGHT LANE MUST TURN RIGHT	36 X 36	X		TWT	1	WS	P		
	3	D1-1R	Fayetteville →	102 X 18	X		10BWG	1	SA	T		
	4	W9-2TL	LANE ENDS MERGE LEFT	36 X 36	X		TWT	1	WS	P		
	5	R2-1	SPEED LIMIT 75	30 X 36	X		TWT	1	WS	P		
	6	R3-7L	LEFT LANE MUST TURN LEFT	36 X 36	X		TWT	1	WS	P		

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

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3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

DATE:
FILE:

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0266	01	086	SH 71
4-16	DIST	COUNTY		SHEET NO.
8-16	YKM	FAYETTE		20

T8

SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE	POSTS	ANCHOR TYPE	MOUNTING DESIGNATION PREFABRICATED	MOUNTING DESIGNATION 1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE
							FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	1 or 2	UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	P = "Plain" T = "T" U = "U"		TY N TY S
9	1	R3-7R	RIGHT LANE MUST TURN RIGHT	36 X 36	X		TWT	1	WS	P		
	2	R3-8uT	TURNAROUND ONLY	30 X 36	X		TWT	1	WS	P		
	3	R3-8uT	TURNAROUND ONLY	30 X 36	X		TWT	1	WS	P		
10	1	M2-1	JCT	21 X 15	X		TWT	1	WS	P		
		M1-6F	FARM ROAD 955	24 X 24	X							
	2	R3-7R	RIGHT LANE MUST TURN RIGHT	36 X 36	X		TWT	1	WS	P		
	3	W9-2TR	LANE ENDS MERGE RIGHT	36 X 36	X		TWT	1	WS	P		
	4	R6-1L	ONE WAY	54 X 18	X		TWT	1	WS	T		
	5	R5-1	DO NOT ENTER	36 X 36	X		TWT	1	WS	P		
	6	R6-1L	ONE WAY	54 X 18	X		10BWG	1	SA	P	BM	
		R1-2	YIELD	48 X 48 X 48	X							
	7	M4-5	TO	24 X 12	X		TWT	1	WS	P		
		M1-6F	FARM ROAD 955	24 X 24	X							
		M5-3T	ADVANCED TURNAROUND ARROW	24 X 15	X							
	8	R3-8uT	TURNAROUND ONLY	30 X 36	X		TWT	1	WS	P		
	9	R5-1	DO NOT ENTER	36 X 36	X		TWT	1	WS	P		
	10	R6-1L	ONE WAY	54 X 18	X		10BWG	1	SA	P	BM	
		R1-2	YIELD	48 X 48 X 48	X							
	11	R6-1L	ONE WAY	54 X 18	X		TWT	1	WS	T		
13	1	R3-7L	LEFT LANE MUST TURN LEFT	36 X 36	X		TWT	1	WS	P		
	2	R5-1	DO NOT ENTER	36 X 36	X		TWT	1	WS	P		
	3	R6-1L	ONE WAY	54 X 18	X		10BWG	1	SA	P	BM	
		R1-2	YIELD	48 X 48 X 48	X							
	4	R5-1	DO NOT ENTER	36 X 36	X		TWT	1	WS	P		
	5	R6-1L	ONE WAY	54 X 18	X		10BWG	1	SA	P	BM	
		R1-2	YIELD	48 X 48 X 48	X							
14	1	R3-7L	LEFT LANE MUST TURN LEFT	36 X 36	X		TWT	1	WS	P		
	2	D1-1L	← Krenek Rd	96 X 18	X		10BWG	1	SA	T		
	3	R3-7L	LEFT LANE MUST TURN LEFT	36 X 36	X		TWT	1	WS	P		
15	1	R3-7L	LEFT LANE MUST TURN LEFT	36 X 36	X		TWT	1	WS	P		

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

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

http://www.txdot.gov/

NOTE:

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

DATE:
FILE:

SHEET 3 OF 4

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0266	01	086	SH 71
4-16	DIST	COUNTY		SHEET NO.
8-16	YKM	FAYETTE		21

TB

SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE: FRP = Fiberglass, TWT = Thin-Wall, 10BWG = 10 BWG, S80 = Sch 80	POSTS: 1 or 2	ANCHOR TYPE: UA=Universal Conc, UB=Universal Bolt, SA=Slipbase-Conc, SB=Slipbase-Bolt, WS=Wedge Steel, WP=Wedge Plastic	MOUNTING DESIGNATION: PREFABRICATED: P = "Plain", T = "T", U = "U"	MOUNTING DESIGNATION: 1EXT or 2EXT = # of Ext, BM = Extruded Wind Beam, WC = 1.12 #/ft Wing Channel, EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE: TY N, TY S
16	1	D7-6aTR	HISTORICAL MARKER 1 MILE ON RIGHT 4354	48 X 48	X		10BWG	1	SA	T		
	2	R3-8uT	TURNAROUND ONLY	30 X 36	X		TWT	1	WS	P		
17	1	W9-2TL	LANE ENDS MERGE LEFT	36 X 36	X		TWT	1	WS	P		
	2	R4-2aT	LEFT LANE FOR PASSING ONLY	24 X 36	X		TWT	1	WS	P		
	3	R3-8uT	TURNAROUND ONLY	30 X 36	X		TWT	1	WS	P		
	4	R3-8uT	TURNAROUND ONLY	30 X 36	X		TWT	1	WS	P		
18	1	R6-1L	ONE WAY	54 X 18	X		TWT	1	WS	T		
	2	R6-1L	ONE WAY	54 X 18	X		10BWG	1	SA	P	BM	
		R1-2	YIELD	48 X 48 X 48	X							
	3	R5-1	DO NOT ENTER	36 X 36	X		TWT	1	WS	P		
	4	R3-8uT	TURNAROUND ONLY	30 X 36	X		TWT	1	WS	P		
	5	R3-8uT	TURNAROUND ONLY	30 X 36	X		TWT	1	WS	P		
	6	R5-1	DO NOT ENTER	36 X 36	X		TWT	1	WS	P		
	7	R6-1L	ONE WAY	54 X 18	X		10BWG	1	SA	P	BM	
		R1-2	YIELD	48 X 48 X 48	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

FILE:	sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT	May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS		0266	01	086	SH 71
4-16		DIST	COUNTY		SHEET NO.
8-16		YKM	FAYETTE		22

DATE:
FILE:

TB

GENERAL

THE CONTRACTOR SHALL AVOID CLOSURES OF CONSECUTIVE CROSSOVERS AT ANY GIVEN TIME.

SEQUENCE OF WORK

SUB–PHASE – ERECT ADVANCE WARNING SIGNS

PRIOR TO THE BEGINNING OF ANY CONSTRUCTION PHASE, THE CONTRACTOR SHALL ERECT ADVANCE WARNING SIGNS. ALL ADVANCE WARNING SIGNS ARE TO BE PLACED IN ACCORDANCE WITH THE APPLICABLE TXDOT STANDARDS.

PRIOR TO THE BEGINNING OF THESE PHASES, PLACE TRAFFIC CONTROL DEVICES AND SW3P ITEMS IN THE IMMEDIATE VICINITY OF THE CONSTRUCTION WORK AS SHOWN, AND/OR AS DIRECTED BY THE ENGINEER.

PHASE 1 DRAINAGE – CULVERT EXTENSIONS AND END TREATMENTS

1. CONSTRUCT PORTION OF PROPOSED CULVERT EXTENSIONS AND SAFETY END TREATMENTS AS SHOWN ON PLANS, USING TCP (S–1)–18 AS NEEDED.
2. CONTRACTOR TO MATCH EXISTING FLOW LINE. INSTALL RIPRAP AS SHOWN ON PLANS.

PHASE 1 TCP – WIDEN OUTSIDE OF MAINLANES

1. MAINTAIN ALL ADVANCE WARNING SIGNS, CHANNELIZING DEVICES, CONSTRUCTION SIGNING, AND WORK ZONE PAVEMENT MARKINGS AS SHOWN ON THE TCP PLANS AND FOLLOWING STANDARD DETAILS THROUGHOUT WORK AREAS.

<u>WESTBOUND LANES</u>

2. WIDEN SUBGRADE ADJACENT TO EXISTING PAVEMENT USING EXCAV AND EMBANK.
3. LIME TREAT THE NEW SUBGRADE AS SHOWN ON THE TYPICAL SECTION.
4. SCARIFY THE EXISTING 10' SHOULDER, 16" DEEP AND SPREAD TO 18' WIDTH. EXISTING RAP AND BASE SHALL BE MIXED TO PROVIDE A HOMOGENEOUS MIXTURE 8" THICK, AS APPROVED BY THE ENGINEER, USING ITEM 251.
5. CEMENT TREAT THE EXISTING BASE.
6. PLACE 3:1 SAFETY TAPER FROM EXISTING PAVEMENT EDGE NIGHTLY OR DURING NON–WORKING HOURS UNTIL THE PRIME COAT IS PLACED.
7. PLACE PRIME COAT.
8. PLACE OCST AFTER PRIME COAT HAS CURED FOR 7 DAYS, UNLESS OTHERWISE APPROVED BY THE ENGINEER.
9. PLACE TY B ACP WITHIN 5 DAYS OF PLACING OCST.
10. PLACE TY D ACP.
11. CONSTRUCT PAVEMENT WIDENING ON FM 955 INTERSECTION UTILIZING TCP (2–2)–18 STANDARD WITH FLAGGER CONTROL AS NEEDED.

<u>EASTBOUND LANES</u>

2. BACA RD SHALL BE CLOSED AS PER THE ROAD CLOSURE LAYOUT.
3. WIDEN SUBGRADE ADJACENT TO EXISTING PAVEMENT USING EXCAV AND EMBANKMENT.
4. LIME TREAT THE NEW SUBGRADE AS SHOWN ON THE TYPICAL SECTION.
5. PLACE 3:1 SAFETY TAPER FROM EXISTING PAVEMENT EDGE NIGHTLY OR DURING NON–WORKING HOURS UNTIL THE PRIME COAT IS PLACED.
6. PLACE PRIME COAT.
7. PLACE 4" TY B ACP.
8. PLACE 10" CRCP.

PHASE 2 TCP – WIDEN INSIDE OF MAINLANES

1. CONSTRUCT CROSSOVER PIPE EXTENSIONS AND SAFETY END TREATMENTS AS SHOWN ON PLANS. MATCH EXISTING FLOW LINE.

<u>WESTBOUND LANES</u>

2. WIDEN SUBGRADE ADJACENT TO EXISTING EDGE OF TRAVEL LANE USING EXCAV AND EMBANK.
3. LIME TREAT THE NEW SUBGRADE AS SHOWN ON THE TYPICAL SECTION.
4. PLACE 8" FLEX BASE.
5. PLACE 3:1 SAFETY TAPER FROM EXISTING PAVEMENT EDGE NIGHTLY OR DURING NON–WORKING HOURS UNTIL THE PRIME COAT IS PLACED.
6. PLACE PRIME COAT.
7. PLACE OCST AFTER PRIME COAT HAS CURED FOR 7 DAYS, UNLESS OTHERWISE APPROVED BY THE ENGINEER.
8. PLACE TY B ACP WITHIN 5 DAYS OF PLACING OCST.
9. PLACE TY D ACP.

<u>EASTBOUND LANES</u>

2. WIDEN SUBGRADE ADJACENT TO EXISTING TRAVEL LANE USING EXCAV AND EMBANK.
3. LIME TREAT THE NEW SUBGRADE AS SHOWN ON THE TYPICAL SECTION.
4. PLACE 3:1 SAFETY TAPER FROM EXISTING PAVEMENT EDGE NIGHTLY OR DURING NON–WORKING HOURS UNTIL THE PRIME COAT IS PLACED.
5. PLACE PRIME COAT.
6. PLACE 4" TY B ACP.
7. PLACE 10" CRCP.
8. OBLITERATE CROSSOVER AT 563+30 AS SHOWN ON THE LAYOUT.

PHASE 3 TCP – CONSTRUCT HES CONCRETE PAVEMENT (EASTBOUND)

1. PLACE TRAFFIC CONTROL DEVICES TO CLOSE THE CROSSOVER.
2. REMOVE EXISTING PAVEMENT USING EXCAVATION.
3. LIME TREAT THE NEW SUBGRADE.
4. PLACE PRIME COAT.
5. PLACE 4" TY B ACP.
6. PLACE 10" CRCP USING HES CONCRETE.
7. PLACE LONG CHANNEL MOUNT CURB SYSTEM AS SHOWN IN PLANS USING TCP (2–6)–18.

PHASE 4 TCP – SIGNING PAVEMENT MARKINGS, ETC.

THIS PHASE SHALL BE COMPLETED USING MOBILE OPERATIONS DURING NON–PEAK HOURS.

1. APPLY PERMANENT PAVEMENT MARKINGS; INSTALL SIGNS, DELINEATORS, RUMBLE STRIPS AND OBJECT MARKERS.
2. REMOVE CONSTRUCTION TRAFFIC CONTROL DEVICES AND ADVANCE WARNING SIGNS.

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED
PROFESSIONAL ENGINEER
05/03/2021

NO.	REVISION	BY	DATE

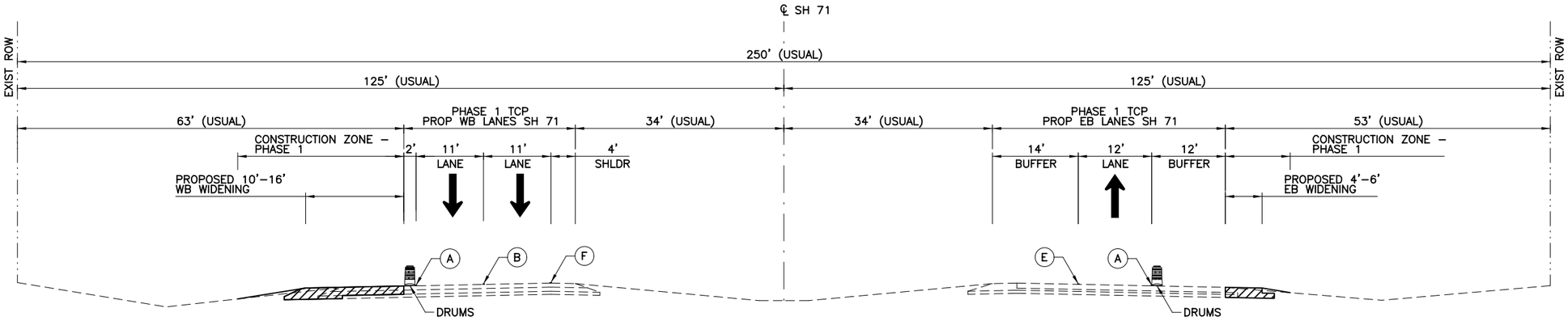
CP&Y
TEXAS REGISTERED ENGINEERING FIRM F–1741

SH 71

TRAFFIC CONTROL PLAN NARRATIVE

SHEET 1 OF 1

Designed:	MR	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.	
Checked:	BAJ	6	TEXAS				SH 71	
Drawn:	MR	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.	
Checked:	BAJ	YKM	FAYETTE	0266	01	086	23	

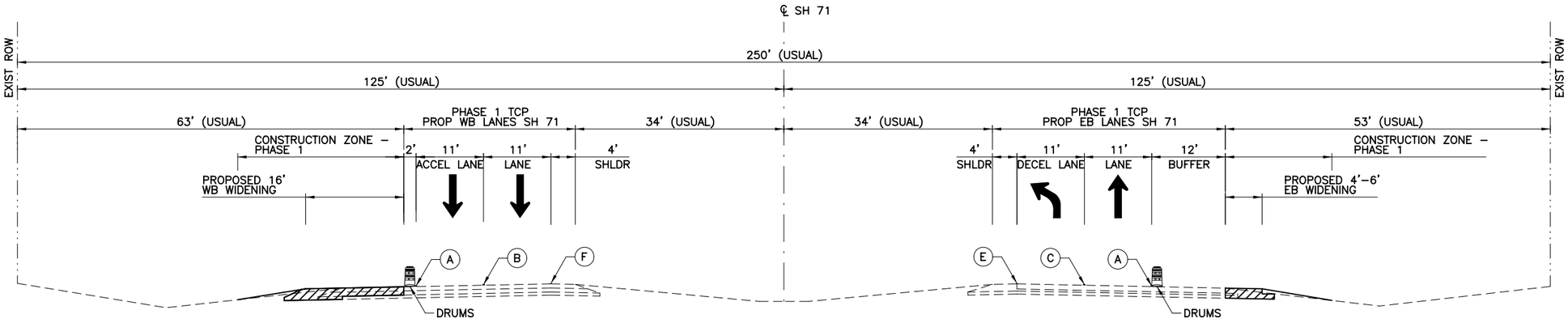


SH 71 WB

PHASE 1

STA 483+52 TO STA 503+32

SH 71 EB



SH 71 WB

PHASE 1

STA 503+32 TO STA 514+70

SH 71 EB

10 5 0 10 20

SCALE HORIZ. FEET

NOTES

1. USE 3:1 SLOPE AT PAVEMENT DROP–OFF AT THE END OF EACH DAY OR WHEN NOT ACTIVELY WORKING IN AN AREA, UNTIL FLEX BASE AND PRIME IS PLACED.

LEGEND

- (A) WK ZN PAV MRK REMOV (W)4"(SLD)
- (B) WK ZN PAV MRK REMOV (W)4"(BRK)
- (C) WK ZN PAV MRK REMOV (W)8"(SLD)
- (D) WK ZN PAV MRK REMOV (W)8"(DOT)
- (E) WK ZN PAV MRK REMOV (Y)4"(SLD)
- (F) EXISTING PAVEMENT MARKING
- PROP CONSTRUCTION THIS PHASE
- CONSTRUCTION PREVIOUS PHASE

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED PROFESSIONAL ENGINEER
03/24/2021

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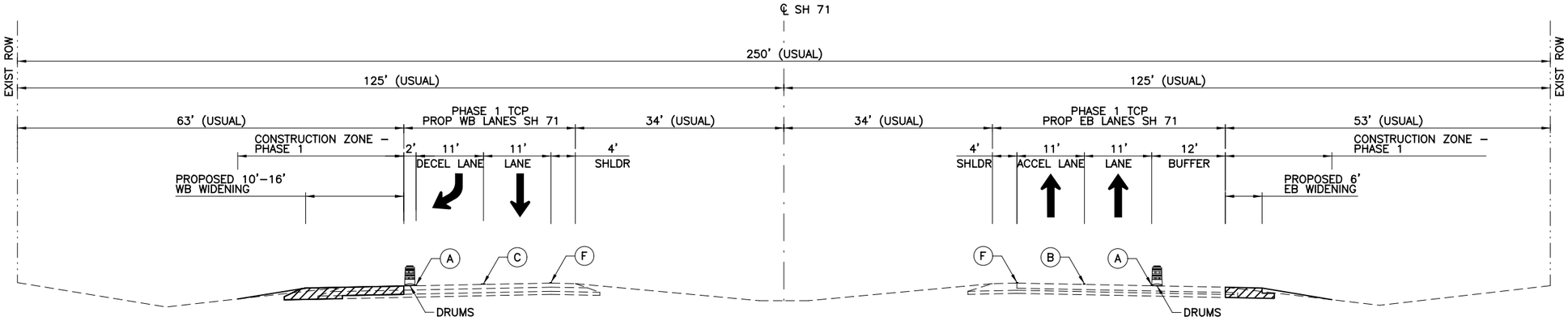
SH 71

TCP TYPICAL SECTIONS

PHASE 1 SHEET 1 OF 3

		FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Designed:	MR	6	TEXAS				SH 71
Checked:	BAJ	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Drawn:	MR	YKM	FAYETTE	0266	01	086	24
Checked:	BAJ						

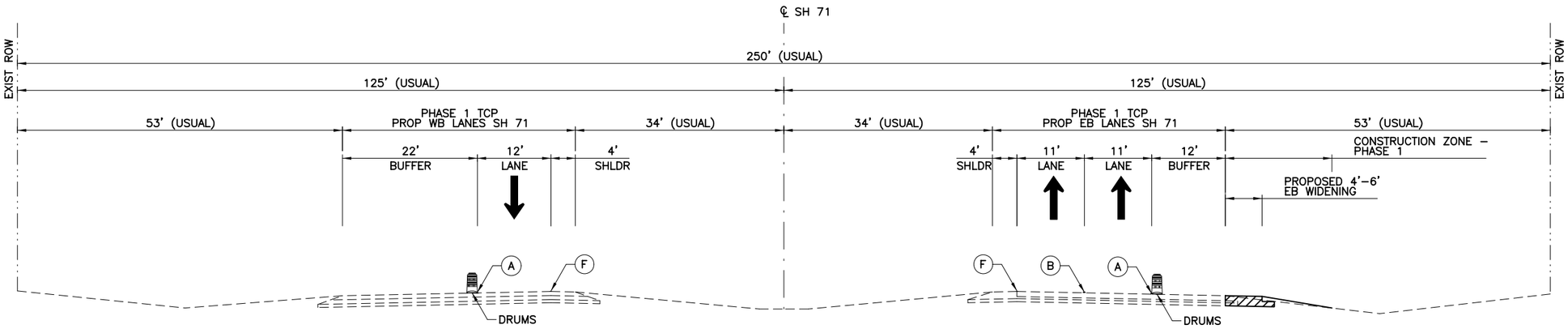


SH 71 WB

PHASE 1

STA 514+70 TO STA 535+00

SH 71 EB



SH 71 WB

PHASE 1

STA 535+00 TO STA 541+70

SH 71 EB

10 5 0 10 20

SCALE HORIZ. FEET

NOTES

1. USE 3:1 SLOPE AT PAVEMENT DROP–OFF AT THE END OF EACH DAY OR WHEN NOT ACTIVELY WORKING IN AN AREA, UNTIL FLEX BASE AND PRIME IS PLACED.

LEGEND

- (A) WK ZN PAV MRK REMOV (W)4"(SLD)
- (B) WK ZN PAV MRK REMOV (W)4"(BRK)
- (C) WK ZN PAV MRK REMOV (W)8"(SLD)
- (D) WK ZN PAV MRK REMOV (W)8"(DOT)
- (E) WK ZN PAV MRK REMOV (Y)4"(SLD)
- (F) EXISTING PAVEMENT MARKING
- PROP CONSTRUCTION THIS PHASE
- CONSTRUCTION PREVIOUS PHASE

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED
PROFESSIONAL ENGINEER
03/24/2021

NO.	REVISION	BY	DATE

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TEXAS REGISTERED ENGINEERING FIRM F–1741

SH 71

TCP TYPICAL SECTIONS

PHASE 1 SHEET 2 OF 3

		FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Designed:	MR	6	TEXAS					SH 71
Checked:	BAJ	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Drawn:	MR	YKM	FAYETTE	0266	01	086		25
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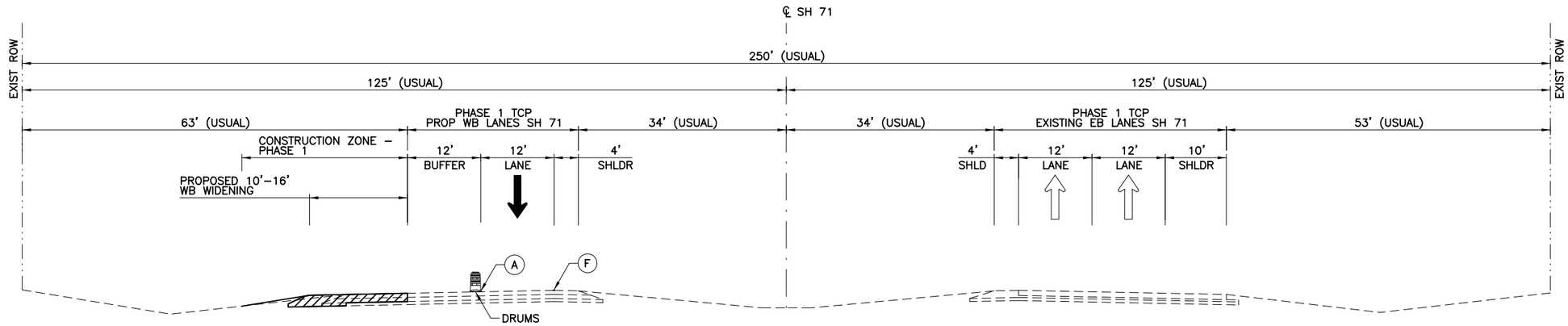

SH 71 WB

PHASE 1

STA 541+70 TO STA 577+32

SH 71 EB

10 5 0 10 20
SCALE HORIZ. FEET

NOTES

1. USE 3:1 SLOPE AT PAVEMENT DROP–OFF AT THE END OF EACH DAY OR WHEN NOT ACTIVELY WORKING IN AN AREA, UNTIL FLEX BASE AND PRIME IS PLACED.

LEGEND

- (A) WK ZN PAV MRK REMOV (W)4"(SLD)
- (B) WK ZN PAV MRK REMOV (W)4"(BRK)
- (C) WK ZN PAV MRK REMOV (W)8"(SLD)
- (D) WK ZN PAV MRK REMOV (W)8"(DOT)
- (E) WK ZN PAV MRK REMOV (Y)4"(SLD)
- (F) EXISTING PAVEMENT MARKING
- PROP CONSTRUCTION THIS PHASE
- CONSTRUCTION PREVIOUS PHASE

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED
PROFESSIONAL ENGINEER
03/24/2021

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SH 71

TCP TYPICAL SECTIONS

PHASE 1 SHEET 3 OF 3

		FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Designed:	MR	6	TEXAS					SH 71
Checked:	BAJ							
Drawn:	MR	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086		26

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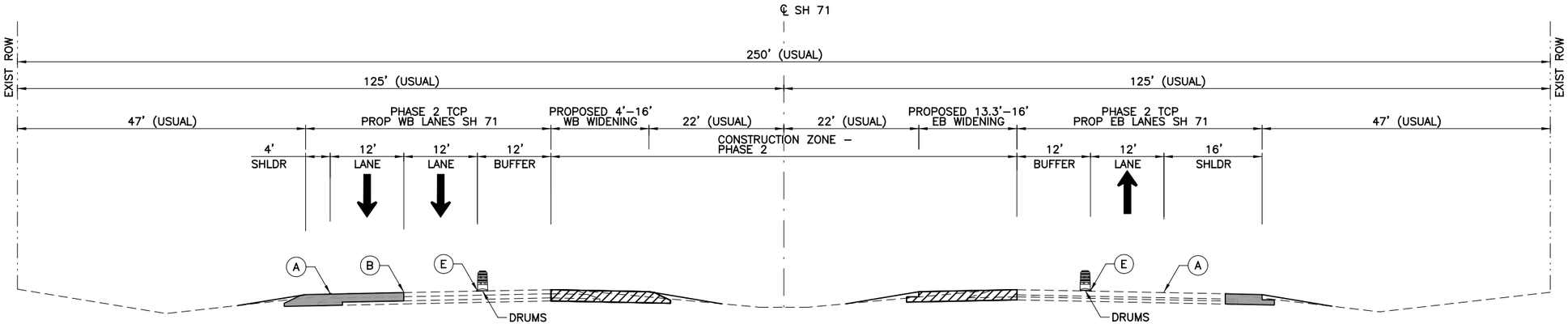
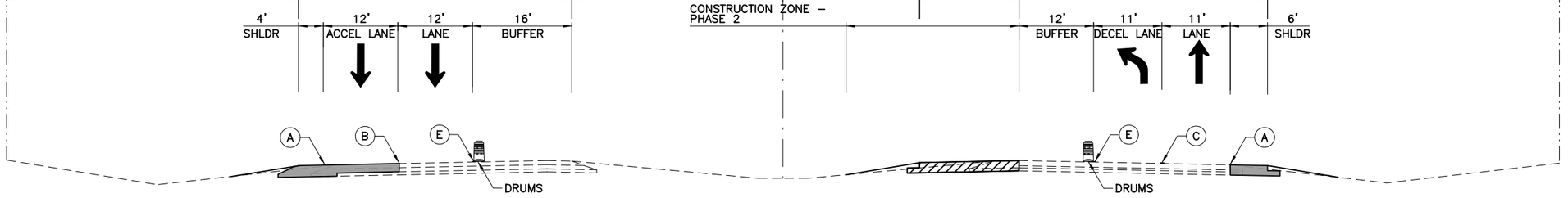


SH 71 WB

PHASE 2

STA 483+52 TO STA 503+32

SH 71 EB



SH 71 WB

PHASE 2

STA 503+32 TO STA 514+70

SH 71 EB

10 5 0 10 20

SCALE HORIZ. FEET

NOTES

1. USE 3:1 SLOPE AT PAVEMENT DROP–OFF AT THE END OF EACH DAY OR WHEN NOT ACTIVELY WORKING IN AN AREA, UNTIL FLEX BASE AND PRIME IS PLACED.

LEGEND

- (A) WK ZN PAV MRK REMOV (W)4"(SLD)
- (B) WK ZN PAV MRK REMOV (W)4"(BRK)
- (C) WK ZN PAV MRK REMOV (W)8"(SLD)
- (D) WK ZN PAV MRK REMOV (W)8"(DOT)
- (E) WK ZN PAV MRK REMOV (Y)4"(SLD)
- (F) EXISTING PAVEMENT MARKING
- PROP CONSTRUCTION THIS PHASE
- CONSTRUCTION PREVIOUS PHASE

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED
PROFESSIONAL ENGINEER
03/24/2021

NO.	REVISION	BY	DATE

CP&Y

TEXAS REGISTERED ENGINEERING FIRM F–1741

SH 71

TCP TYPICAL SECTIONS

PHASE 2 SHEET 1 OF 3

Designed:	MR	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					SH 71
Drawn:	MR	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086		27

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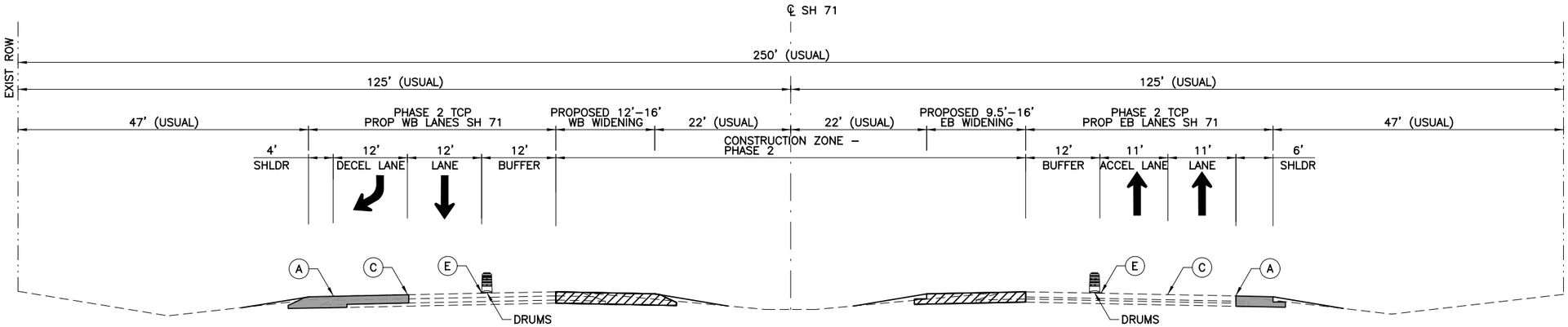
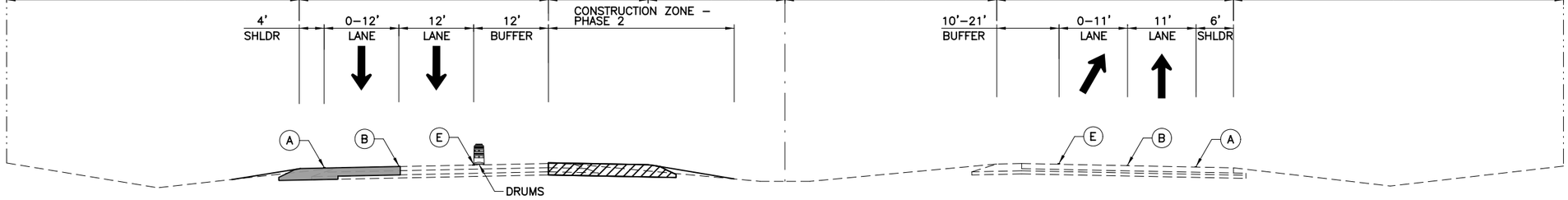


SH 71 WB

PHASE 2

STA 514+70 TO STA 535+00

SH 71 EB



SH 71 WB

PHASE 2

STA 535+00 TO STA 550+10

SH 71 EB

10 5 0 10 20

SCALE HORIZ. FEET

NOTES

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LEGEND

- (A) WK ZN PAV MRK REMOV (W)4"(SLD)
- (B) WK ZN PAV MRK REMOV (W)4"(BRK)
- (C) WK ZN PAV MRK REMOV (W)8"(SLD)
- (D) WK ZN PAV MRK REMOV (W)8"(DOT)
- (E) WK ZN PAV MRK REMOV (Y)4"(SLD)
- (F) EXISTING PAVEMENT MARKING
- PROP CONSTRUCTION THIS PHASE
- CONSTRUCTION PREVIOUS PHASE

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED PROFESSIONAL ENGINEER
03/24/2021

NO.	REVISION	BY	DATE

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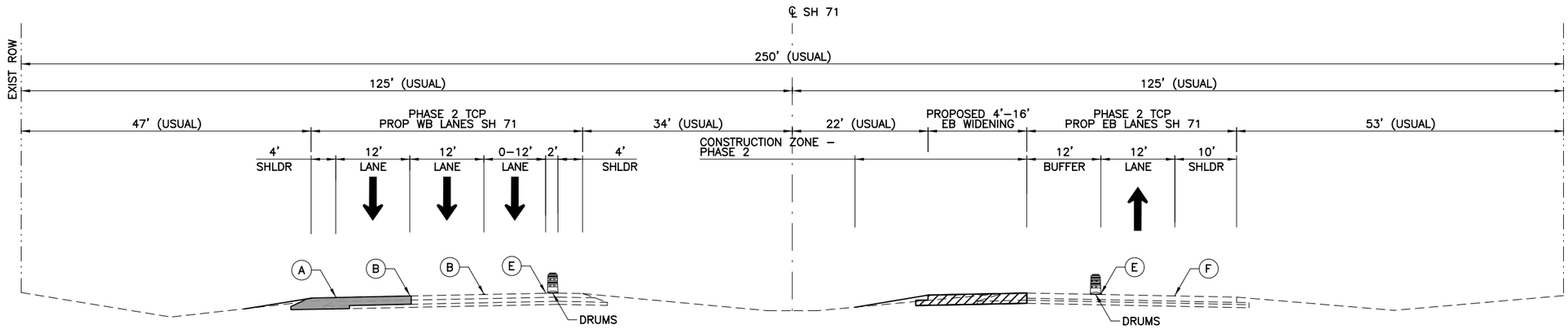
TEXAS REGISTERED ENGINEERING FIRM F–1741

SH 71

TCP TYPICAL SECTIONS

PHASE 2 SHEET 2 OF 3

Designed:	MR	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					SH 71
Drawn:	MR	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086		28



SH 71 WB

PHASE 2

STA 550+10 TO STA 579+05

SH 71 EB

10 5 0 10 20

SCALE HORIZ. FEET

NOTES

1. USE 3:1 SLOPE AT PAVEMENT DROP–OFF AT THE END OF EACH DAY OR WHEN NOT ACTIVELY WORKING IN AN AREA, UNTIL FLEX BASE AND PRIME IS PLACED.

LEGEND

- (A) WK ZN PAV MRK REMOV (W)4"(SLD)
- (B) WK ZN PAV MRK REMOV (W)4"(BRK)
- (C) WK ZN PAV MRK REMOV (W)8"(SLD)
- (D) WK ZN PAV MRK REMOV (W)8"(DOT)
- (E) WK ZN PAV MRK REMOV (Y)4"(SLD)
- (F) EXISTING PAVEMENT MARKING
- PROP CONSTRUCTION THIS PHASE
- CONSTRUCTION PREVIOUS PHASE

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED
PROFESSIONAL ENGINEER
03/24/2021

NO.	REVISION	BY	DATE

CP&Y

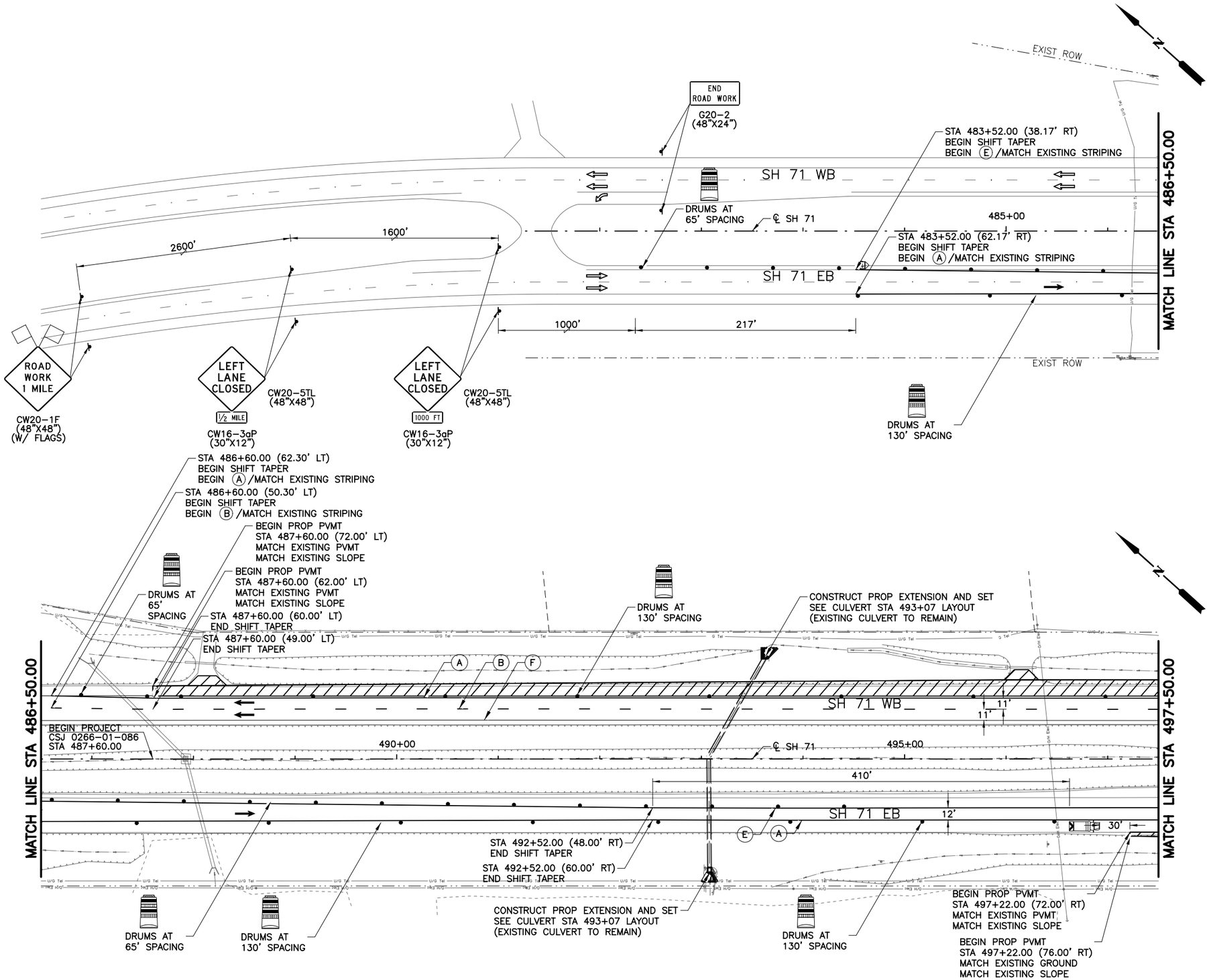
TEXAS REGISTERED ENGINEERING FIRM F–1741

SH 71

TCP TYPICAL SECTIONS

PHASE 2 SHEET 3 OF 3

		FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Designed:	MR	6	TEXAS					SH 71
Checked:	BAJ	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Drawn:	MR	YKM	FAYETTE	0266	01	086		29
Checked:	BAJ							



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SCALE HORIZ. FEET

LEGEND

- PROP CONSTRUCTION THIS PHASE
- CONSTRUCTION PREVIOUS PHASE
- CHANNELIZING DEVICES
- TYPE 3 BARRICADE
- CONSTRUCTION SIGN
- (A) WK ZN PAV MRK REMOV (W)4"(SLD)
- (B) WK ZN PAV MRK REMOV (W)4"(BRK)
- (C) WK ZN PAV MRK REMOV (W)8"(SLD)
- (D) WK ZN PAV MRK REMOV (W)8"(DOT)
- (E) WK ZN PAV MRK REMOV (Y)4"(SLD)
- (F) EXISTING PAVEMENT MARKING
- PROP LANE
- EXIST LANE
- HEAVY VEHICLE WITH TRUCK MOUNTED ATTENUATOR (TMA)
- TRAILER MOUNTED FLASHING ARROW BOARD

NOTES:

1. SEE "BC STANDARDS" FOR PROJECT LIMIT SIGNAGE.
2. SEE "BC STANDARDS" FOR SIGN SPACING.

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED PROFESSIONAL ENGINEER
03/24/2021

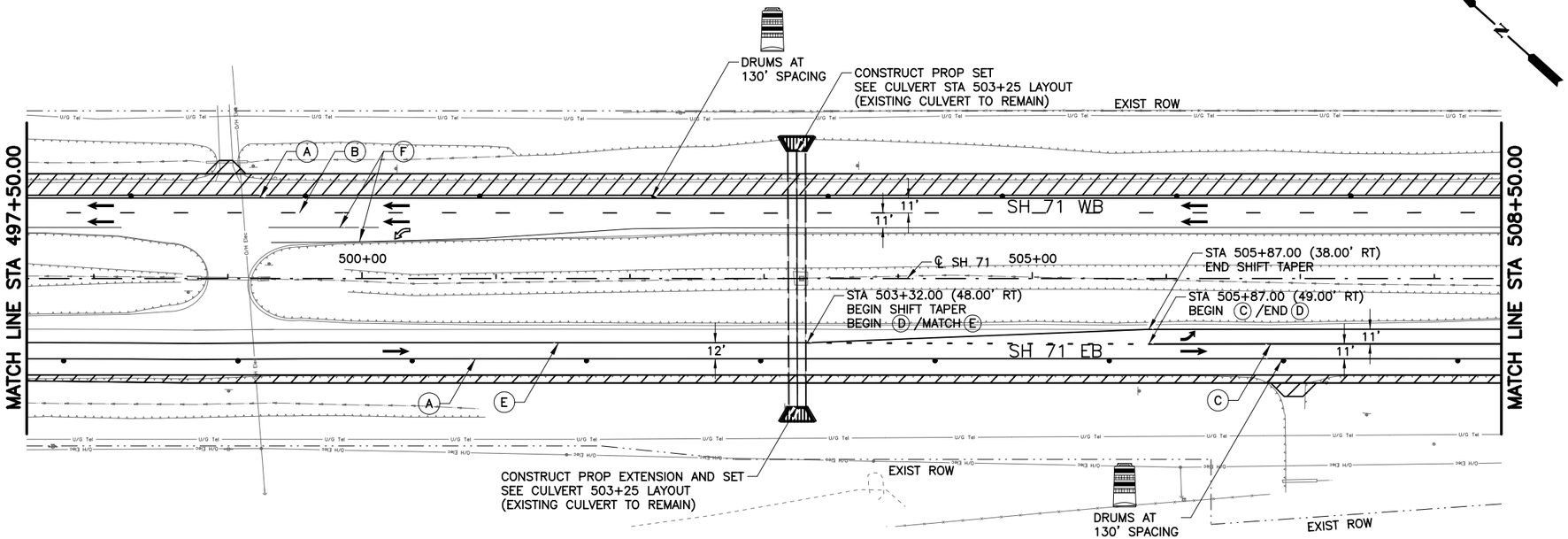
NO.	REVISION	BY	DATE

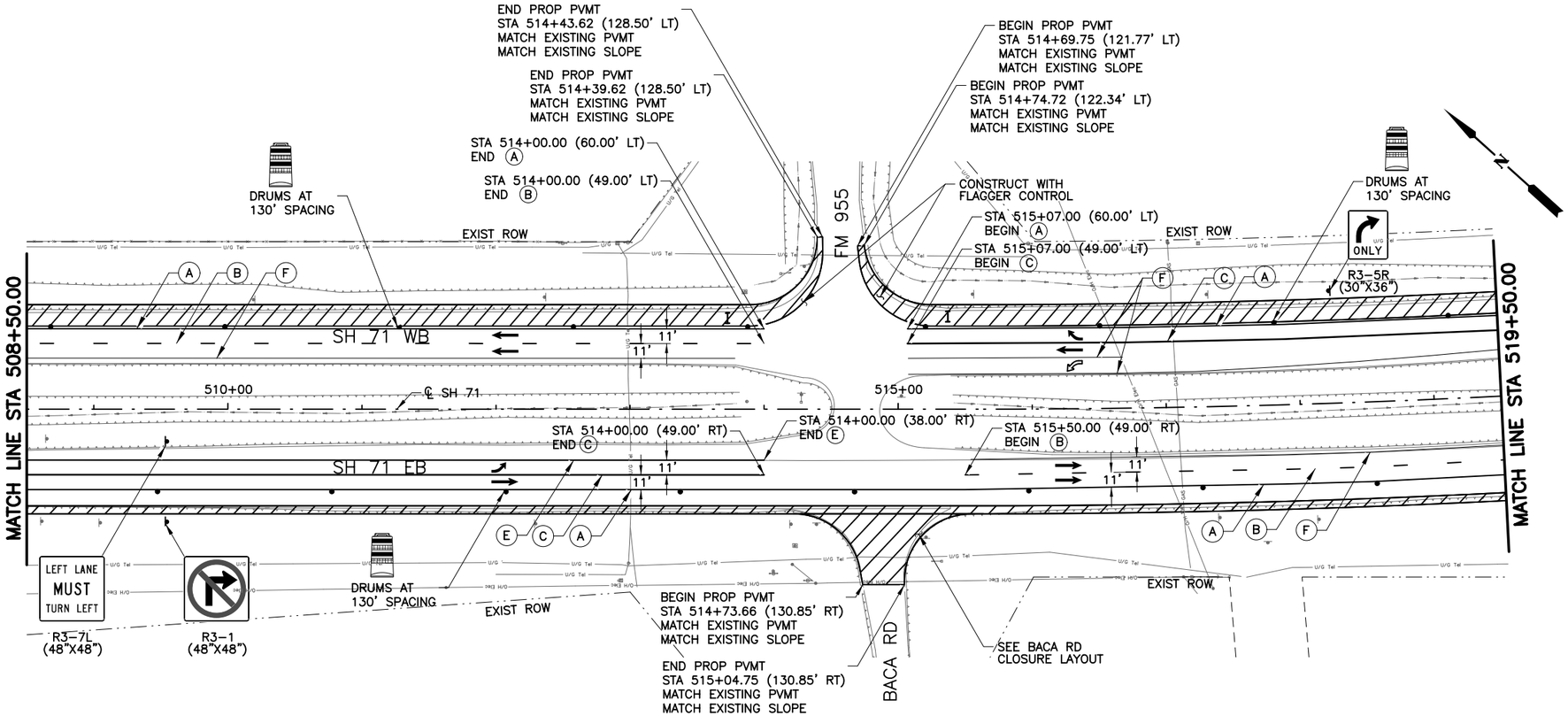
CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

SH 71
TRAFFIC CONTROL PLAN PHASE 1
STA 483+52.00 TO STA 497+50.00

SHEET 1 OF 6

Designed:	MR	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					SH 71
Drawn:	GM	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086		30





50 25 0 50 100
SCALE HORIZ. FEET

LEGEND

- PROP CONSTRUCTION THIS PHASE
- CONSTRUCTION PREVIOUS PHASE
- CHANNELIZING DEVICES
- TYPE 3 BARRICADE
- CONSTRUCTION SIGN
- (A) WK ZN PAV MRK REMOV (W)4"(SLD)
- (B) WK ZN PAV MRK REMOV (W)4"(BRK)
- (C) WK ZN PAV MRK REMOV (W)8"(SLD)
- (D) WK ZN PAV MRK REMOV (W)8"(DOT)
- (E) WK ZN PAV MRK REMOV (Y)4"(SLD)
- (F) EXISTING PAVEMENT MARKING
- PROP LANE
- EXIST LANE
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- TRAILER MOUNTED FLASHING ARROW BOARD

NOTES:

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03/24/2021

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

SH 71
TRAFFIC CONTROL PLAN PHASE 1
STA 497+50.00 TO STA 519+50.00

SHEET 2 OF 6

Designed:	MR	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					SH 71
Drawn:	GM	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086		31

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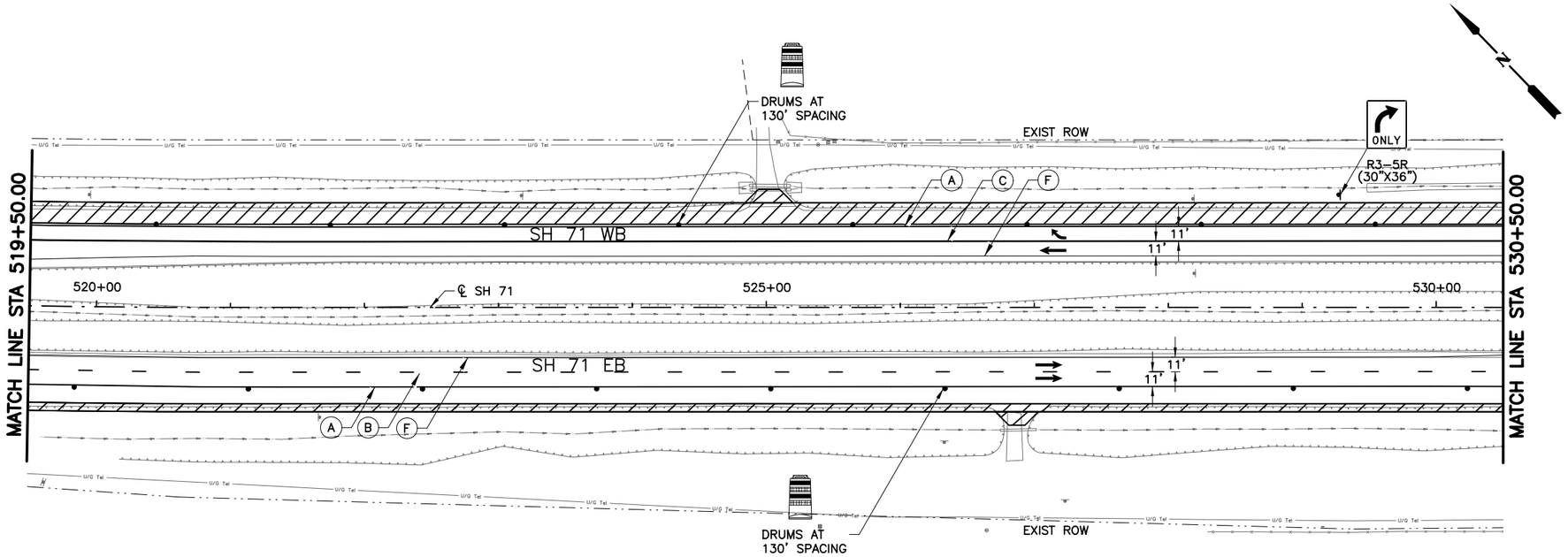

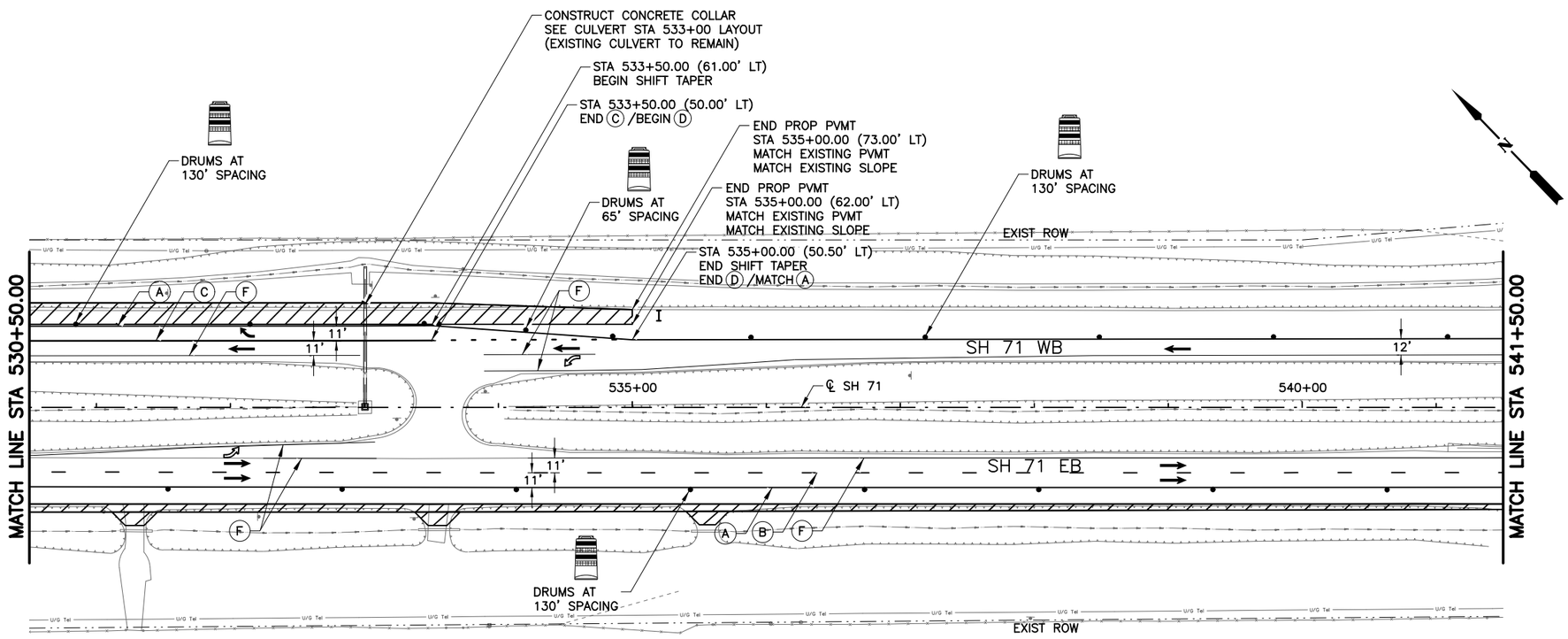

50 25 0 50 100
SCALE HORIZ. FEET

LEGEND

- PROP CONSTRUCTION THIS PHASE
- CONSTRUCTION PREVIOUS PHASE
- CHANNELIZING DEVICES
- TYPE 3 BARRICADE
- CONSTRUCTION SIGN
- (A) WK ZN PAV MRK REMOV (W)4"(SLD)
- (B) WK ZN PAV MRK REMOV (W)4"(BRK)
- (C) WK ZN PAV MRK REMOV (W)8"(SLD)
- (D) WK ZN PAV MRK REMOV (W)8"(DOT)
- (E) WK ZN PAV MRK REMOV (Y)4"(SLD)
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- PROP LANE
- EXIST LANE
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NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

SH 71
TRAFFIC CONTROL PLAN PHASE 1
STA 519+50.00 TO STA 541+50.00

SHEET 3 OF 6

Designed:	MR	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	BAJ	6	TEXAS				SH 71
Drawn:	GM	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086	32

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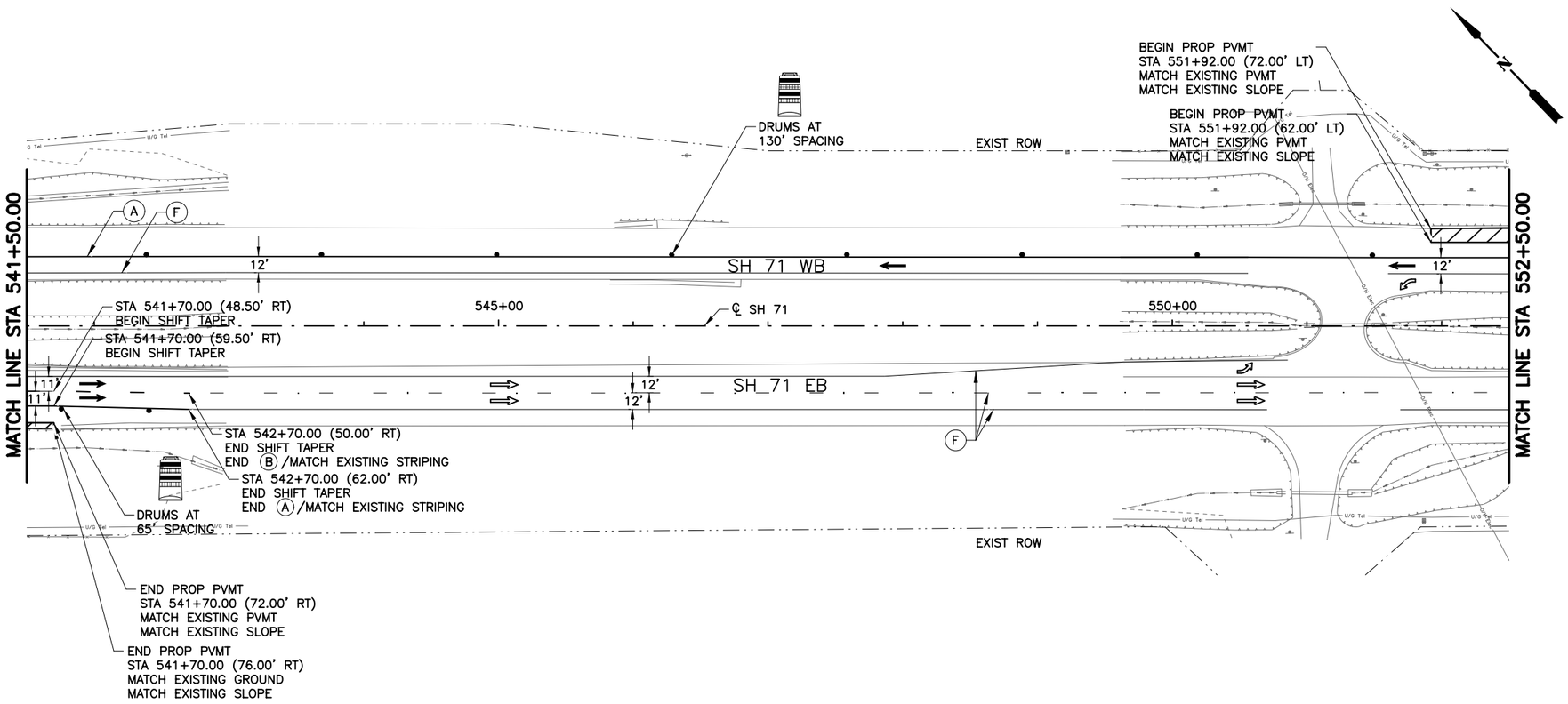

50 25 0 50 100
SCALE HORIZ. FEET

LEGEND

- PROP CONSTRUCTION THIS PHASE
- CONSTRUCTION PREVIOUS PHASE
- CHANNELIZING DEVICES
- TYPE 3 BARRICADE
- CONSTRUCTION SIGN
- (A) WK ZN PAV MRK REMOV (W)4"(SLD)
- (B) WK ZN PAV MRK REMOV (W)4"(BRK)
- (C) WK ZN PAV MRK REMOV (W)8"(SLD)
- (D) WK ZN PAV MRK REMOV (W)8"(DOT)
- (E) WK ZN PAV MRK REMOV (Y)4"(SLD)
- (F) EXISTING PAVEMENT MARKING
- PROP LANE
- EXIST LANE
- HEAVY VEHICLE WITH TRUCK MOUNTED ATTENUATOR (TMA)
- TRAILER MOUNTED FLASHING ARROW BOARD

NOTES:

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2. SEE "BC STANDARDS" FOR SIGN SPACING.

STATE OF TEXAS
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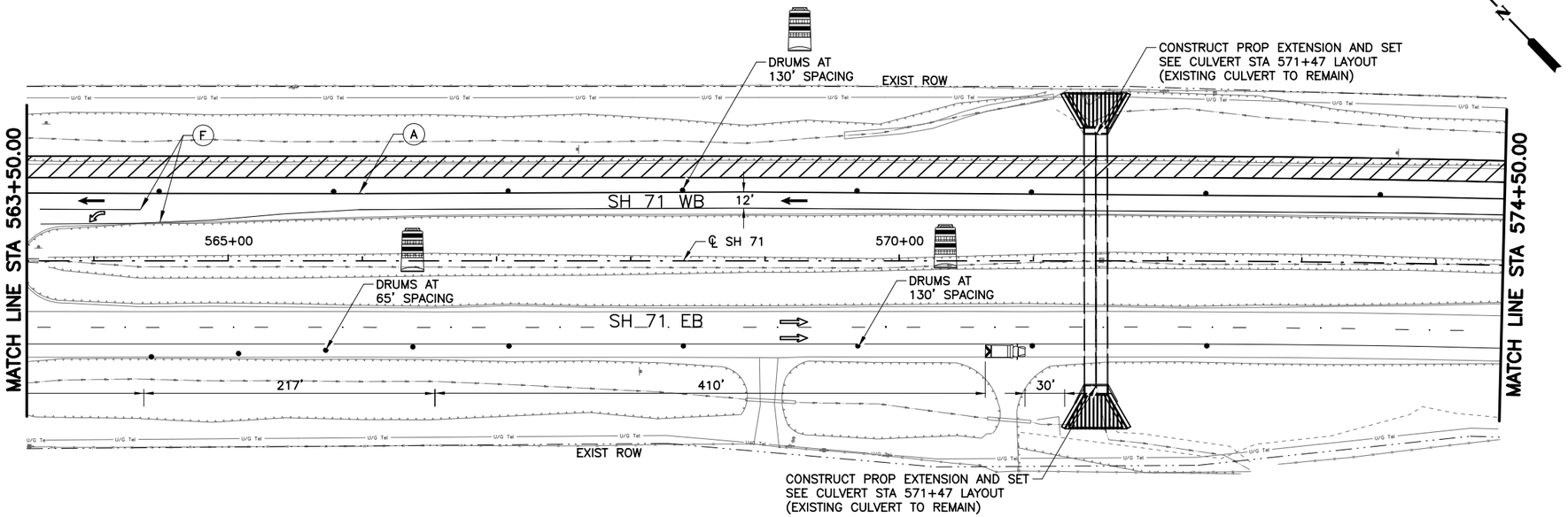
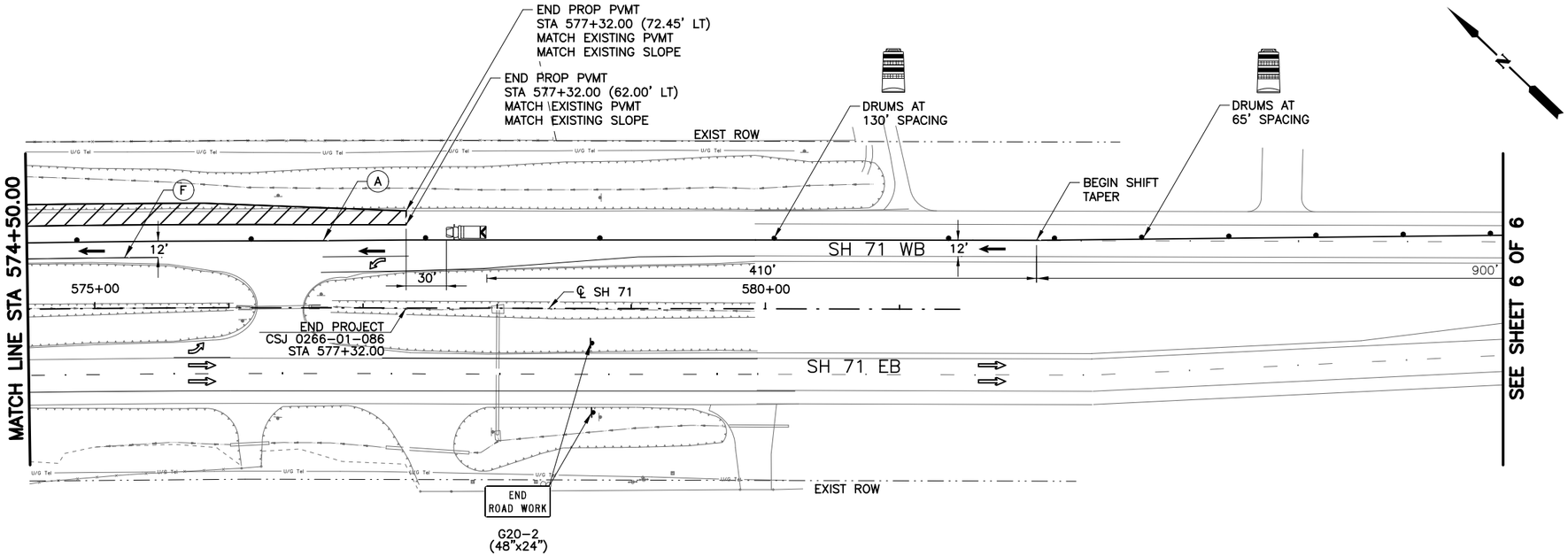
TEXAS REGISTERED ENGINEERING FIRM F-1741

SH 71
TRAFFIC CONTROL PLAN PHASE 1
STA 541+50.00 TO STA 563+50.00

SHEET 4 OF 6

Designed:	MR	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					SH 71
Drawn:	GM	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086		33





50 25 0 50 100
SCALE HORIZ. FEET

LEGEND

- PROP CONSTRUCTION THIS PHASE
- CONSTRUCTION PREVIOUS PHASE
- CHANNELIZING DEVICES
- TYPE 3 BARRICADE
- CONSTRUCTION SIGN
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- (B) WK ZN PAV MRK REMOV (W)4"(BRK)
- (C) WK ZN PAV MRK REMOV (W)8"(SLD)
- (D) WK ZN PAV MRK REMOV (W)8"(DOT)
- (E) WK ZN PAV MRK REMOV (Y)4"(SLD)
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- PROP LANE
- EXIST LANE
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NOTES:

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2. SEE "BC STANDARDS" FOR SIGN SPACING.

STATE OF TEXAS
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03/24/2021

NO.	REVISION	BY	DATE

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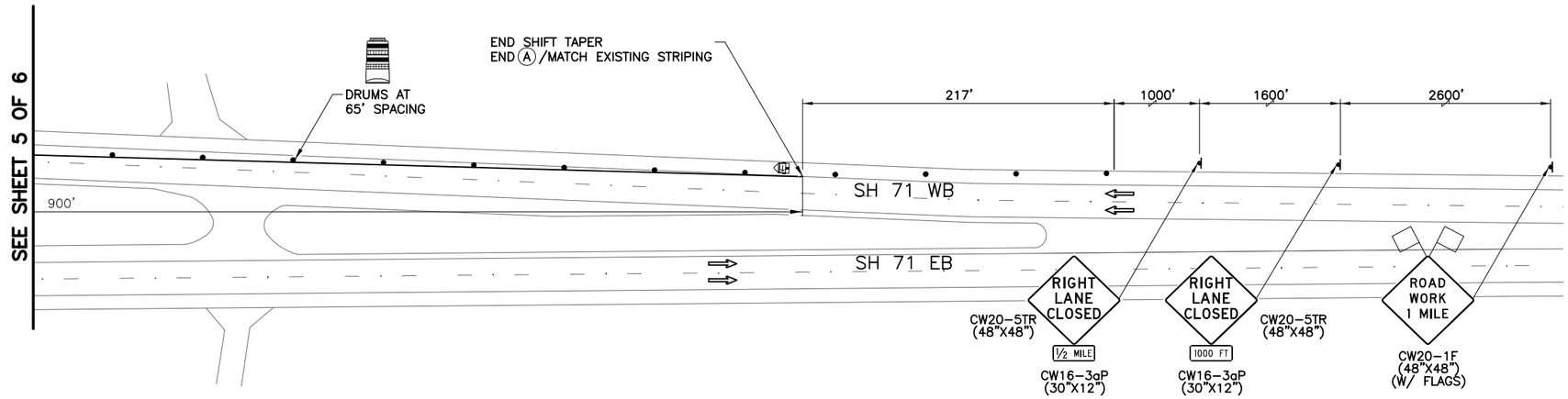
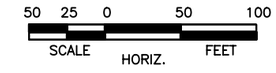
TEXAS REGISTERED ENGINEERING FIRM F-1741

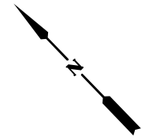
SH 71
TRAFFIC CONTROL PLAN
PHASE 1
STA 563+50.00 TO STA 579+05.00

SHEET 5 OF 6

Designed:	MR	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					SH 71
Drawn:	GM	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086		34







LEGEND

- PROP CONSTRUCTION THIS PHASE
- CONSTRUCTION PREVIOUS PHASE
- CHANNELIZING DEVICES
- TYPE 3 BARRICADE
- CONSTRUCTION SIGN
- (A) WK ZN PAV MRK REMOV (W)4"(SLD)
- (B) WK ZN PAV MRK REMOV (W)4"(BRK)
- (C) WK ZN PAV MRK REMOV (W)8"(SLD)
- (D) WK ZN PAV MRK REMOV (W)8"(DOT)
- (E) WK ZN PAV MRK REMOV (Y)4"(SLD)
- (F) EXISTING PAVEMENT MARKING
- PROP LANE
- EXIST LANE
- HEAVY VEHICLE WITH TRUCK MOUNTED ATTENUATOR (TMA)
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PROFESSIONAL ENGINEER
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CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

SH 71

TRAFFIC CONTROL PLAN PHASE 1

SHEET 6 OF 6

Designed:	MR	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					SH 71
Drawn:	GM	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086		35

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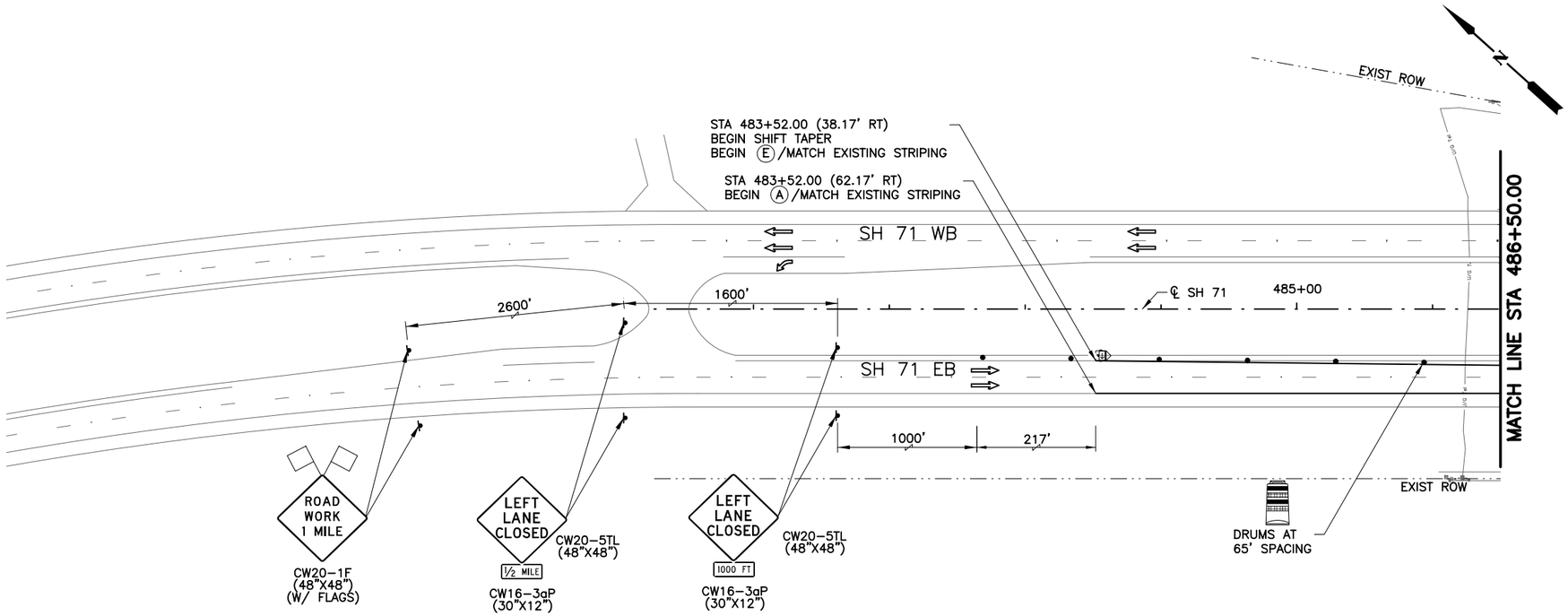

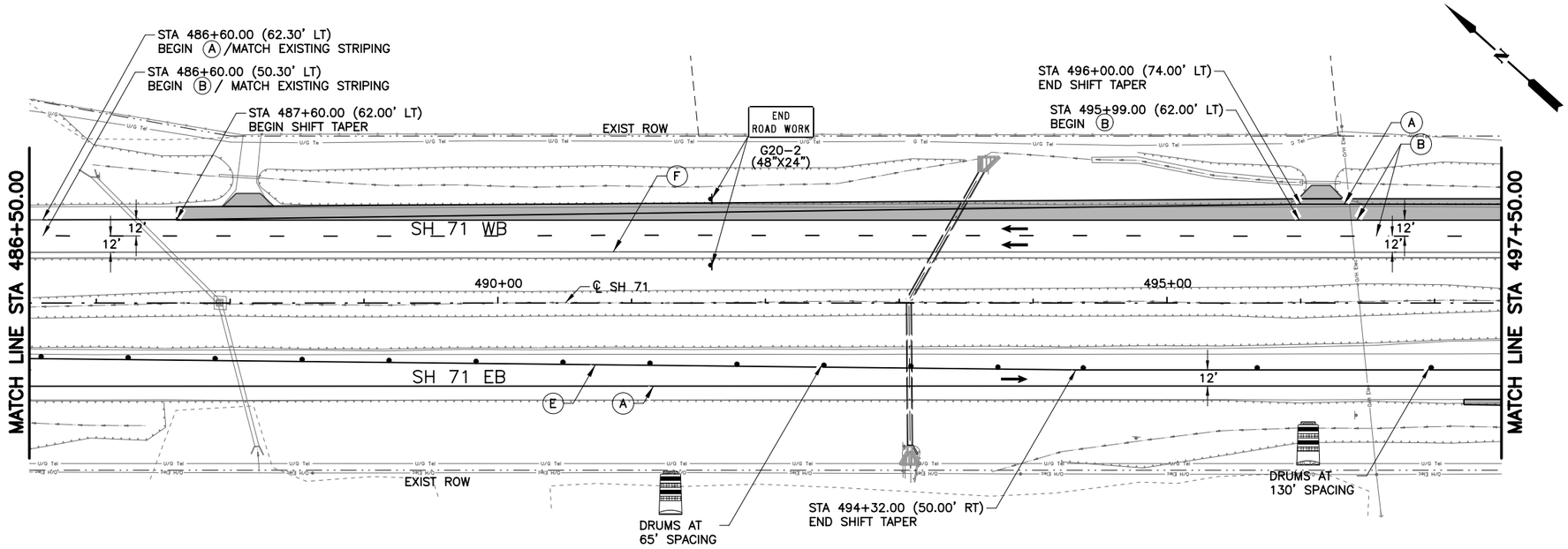

50 25 0 50 100
SCALE HORIZ. FEET

LEGEND

- PROP CONSTRUCTION THIS PHASE
- CONSTRUCTION PREVIOUS PHASE
- OBLITERATE PAVEMENT THIS PHASE
- CHANNELIZING DEVICES
- TYPE 3 BARRICADE
- CONSTRUCTION SIGN
- (A) WK ZN PAV MRK REMOV (W)4"(SLD)
- (B) WK ZN PAV MRK REMOV (W)4"(BRK)
- (C) WK ZN PAV MRK REMOV (W)8"(SLD)
- (D) WK ZN PAV MRK REMOV (W)8"(DOT)
- (E) WK ZN PAV MRK REMOV (Y)4"(SLD)
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- PROP LANE
- EXIST LANE
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NOTES:

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95732
LICENSED PROFESSIONAL ENGINEER
03/24/2021

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CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

SH 71
TRAFFIC CONTROL PLAN PHASE 2
STA 483+52.00 TO STA 497+50.00

SHEET 1 OF 6

Designed:	MR	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					SH 71
Drawn:	GM	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086		36

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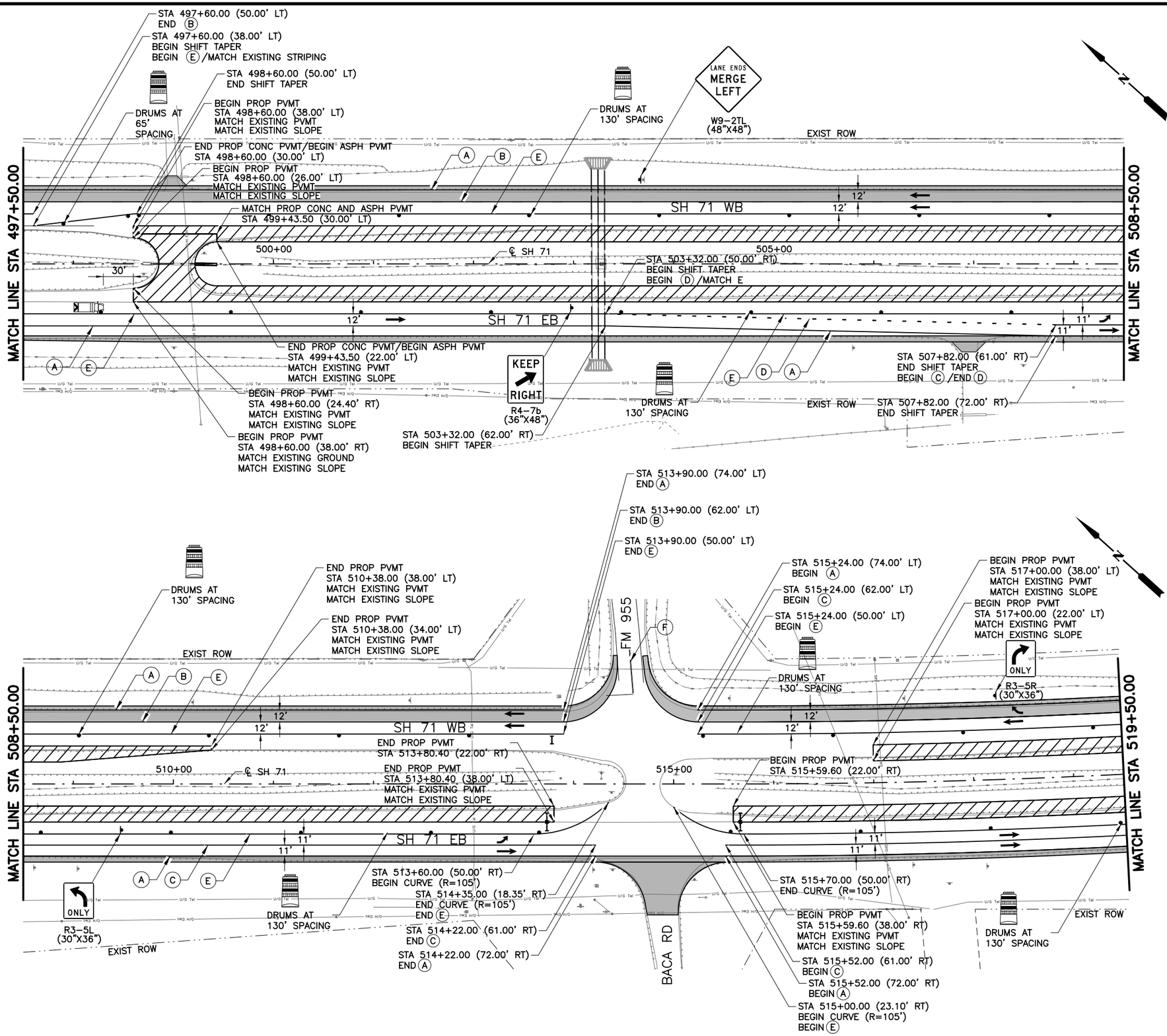

50 25 0 50 100
SCALE HORIZ. FEET

LEGEND

- PROP CONSTRUCTION THIS PHASE
- CONSTRUCTION PREVIOUS PHASE
- OBLITERATE PAVEMENT THIS PHASE
- CHANNELIZING DEVICES
- TYPE 3 BARRICADE
- CONSTRUCTION SIGN
- (A) WK ZN PAV MRK REMOV (W)4"(SLD)
- (B) WK ZN PAV MRK REMOV (W)4"(BRK)
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- (D) WK ZN PAV MRK REMOV (W)8"(DOT)
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LICENSED PROFESSIONAL ENGINEER
03/24/2021

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

SH 71
TRAFFIC CONTROL PLAN PHASE 2
STA 497+50.00 TO STA 519+50.00

SHEET 2 OF 6

Designed:	MR	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					SH 71
Drawn:	GM	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
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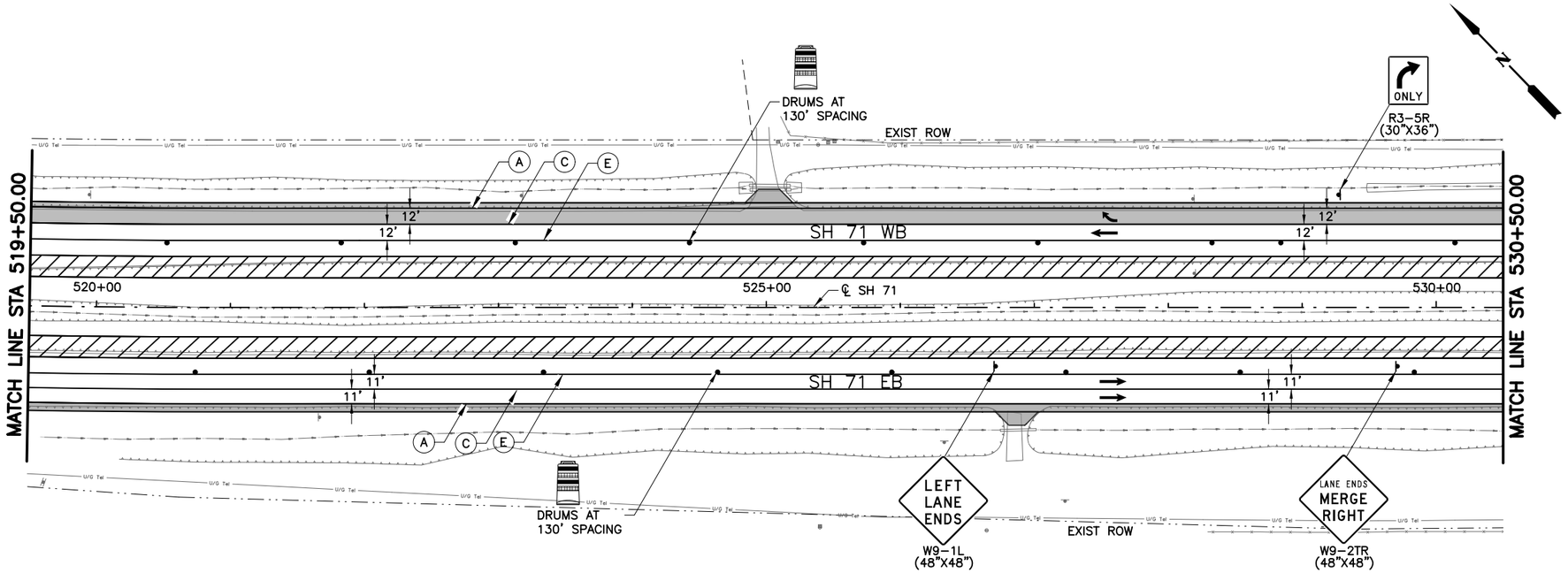

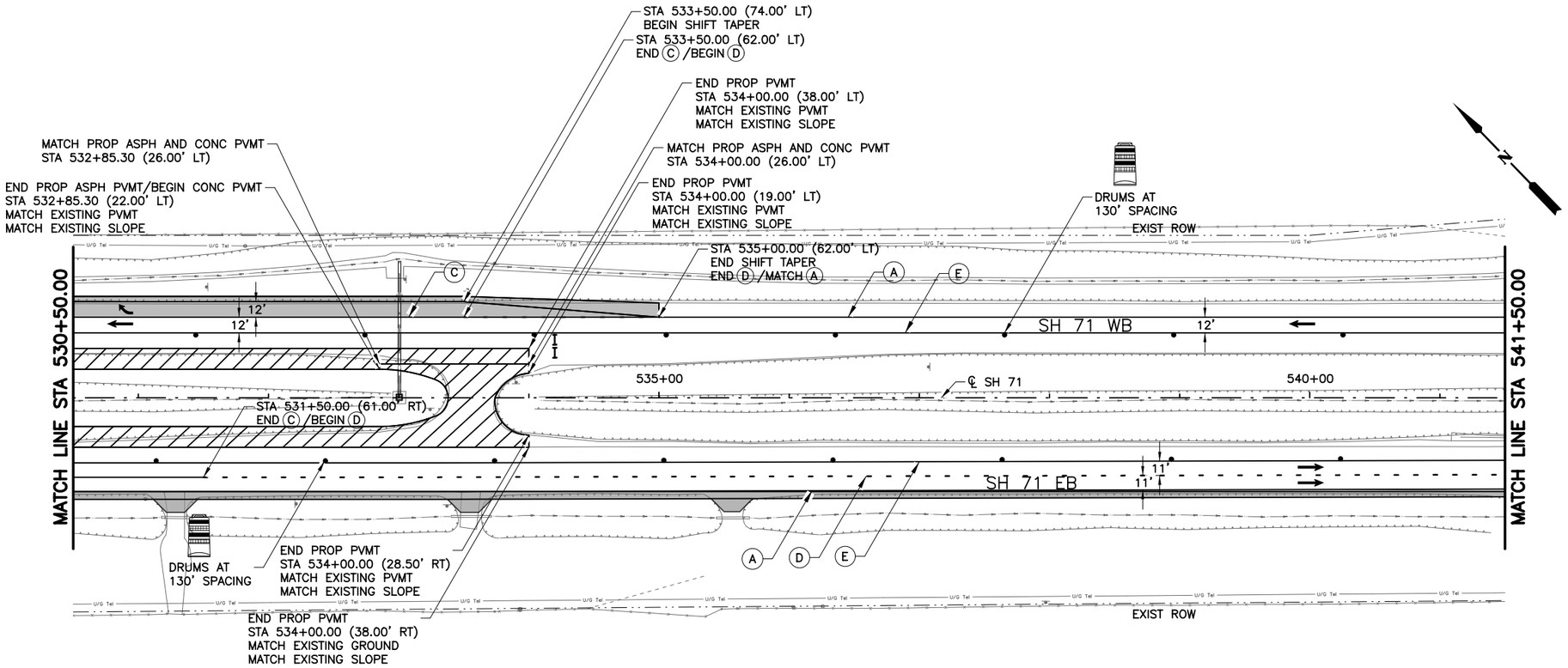

50 25 0 50 100
SCALE HORIZ. FEET

LEGEND

- PROP CONSTRUCTION THIS PHASE
- CONSTRUCTION PREVIOUS PHASE
- OBLITERATE PAVEMENT THIS PHASE
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- TYPE 3 BARRICADE
- CONSTRUCTION SIGN
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STATE OF TEXAS
BRIAN A. JONES
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LICENSED PROFESSIONAL ENGINEER
03/24/2021

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

SH 71
TRAFFIC CONTROL PLAN PHASE 2
STA 519+50.00 TO STA 541+50.00

SHEET 3 OF 6

Designed:	MR	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	BAJ	6	TEXAS				SH 71
Drawn:	GM	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086	38

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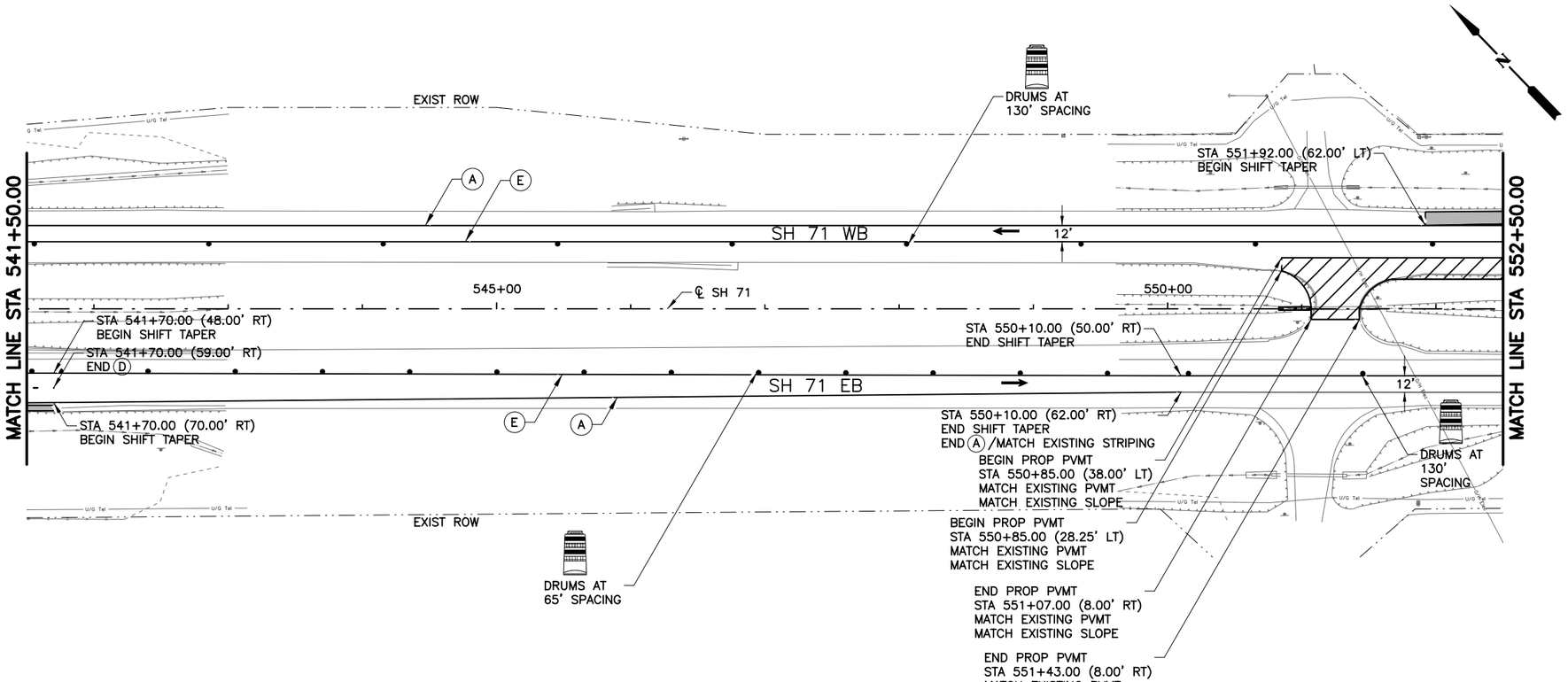

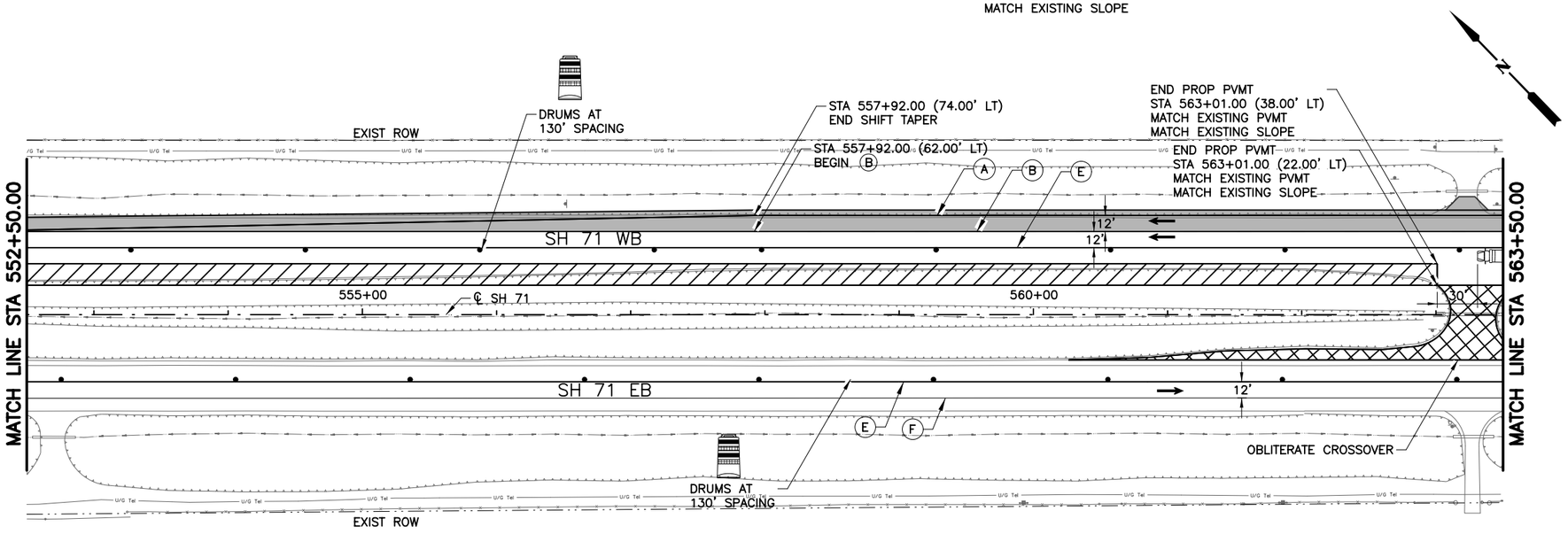

50 25 0 50 100
SCALE HORIZ. FEET

LEGEND

- PROP CONSTRUCTION THIS PHASE
- CONSTRUCTION PREVIOUS PHASE
- OBLITERATE PAVEMENT THIS PHASE
- CHANNELIZING DEVICES
- TYPE 3 BARRICADE
- CONSTRUCTION SIGN
- (A) WK ZN PAV MRK REMOV (W)4"(SLD)
- (B) WK ZN PAV MRK REMOV (W)4"(BRK)
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- (D) WK ZN PAV MRK REMOV (W)8"(DOT)
- (E) WK ZN PAV MRK REMOV (Y)4"(SLD)
- (F) EXISTING PAVEMENT MARKING
- PROP LANE
- EXIST LANE
- HEAVY VEHICLE WITH TRUCK MOUNTED ATTENUATOR (TMA)
- TRAILER MOUNTED FLASHING ARROW BOARD

NOTES:

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03/24/2021

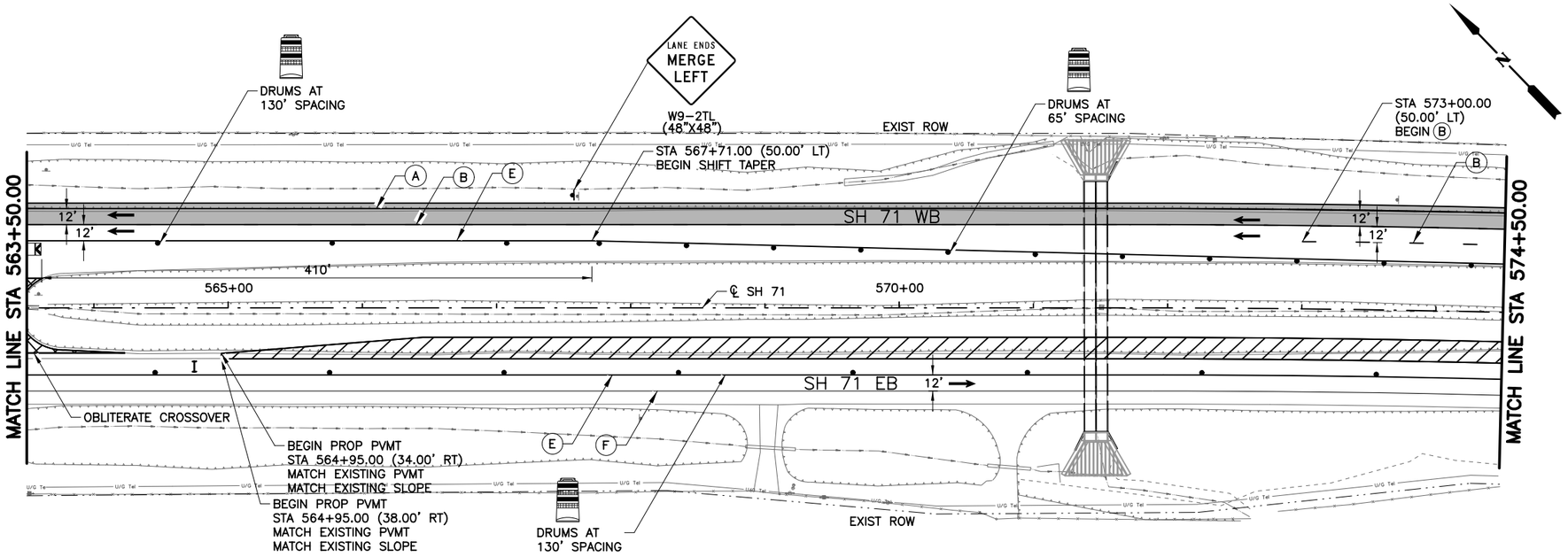
NO.	REVISION	BY	DATE

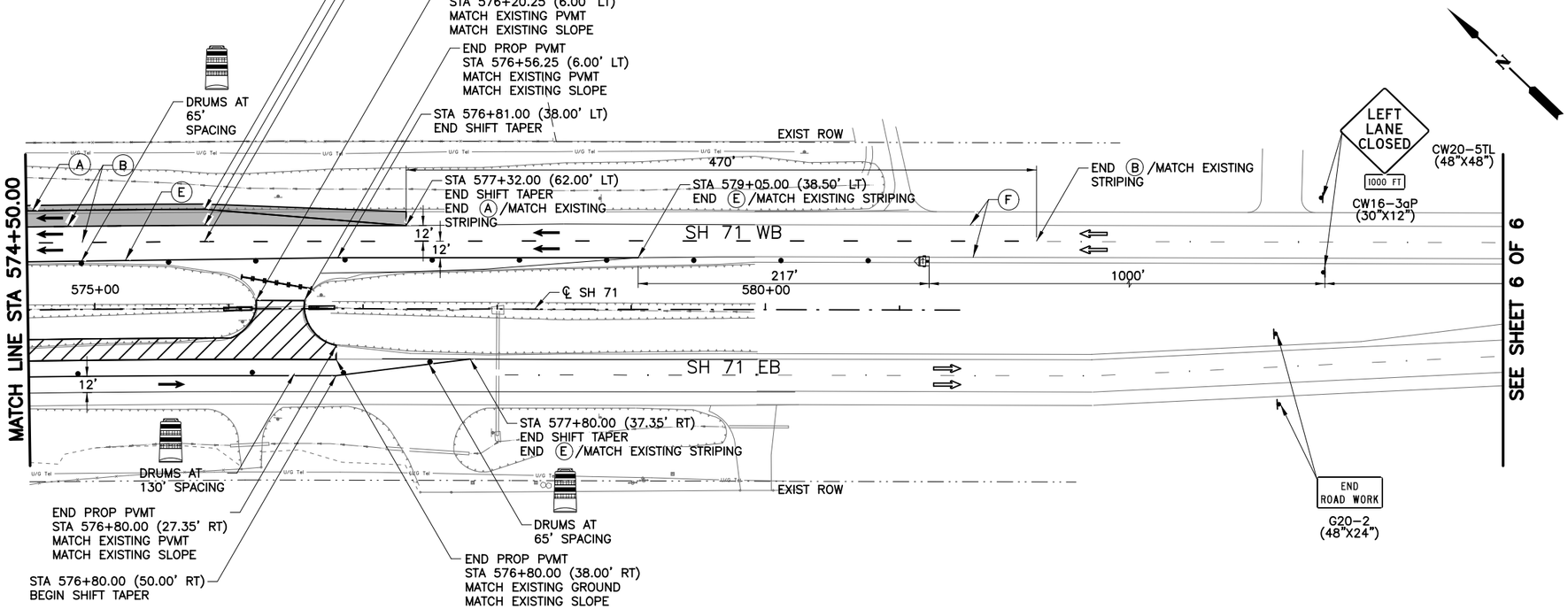
CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

SH 71
TRAFFIC CONTROL PLAN
PHASE 2
STA 541+50.00 TO STA 563+50.00

SHEET 4 OF 6

Designed:	MR	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					SH 71
Drawn:	GM	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086		39





50 25 0 50 100
SCALE HORIZ. FEET

LEGEND

- PROP CONSTRUCTION THIS PHASE
- CONSTRUCTION PREVIOUS PHASE
- OBLITERATE PAVEMENT THIS PHASE
- CHANNELIZING DEVICES
- TYPE 3 BARRICADE
- CONSTRUCTION SIGN
- (A) WK ZN PAV MRK REMOV (W)4"(SLD)
- (B) WK ZN PAV MRK REMOV (W)4"(BRK)
- (C) WK ZN PAV MRK REMOV (W)8"(SLD)
- (D) WK ZN PAV MRK REMOV (W)8"(DOT)
- (E) WK ZN PAV MRK REMOV (Y)4"(SLD)
- (F) EXISTING PAVEMENT MARKING
- PROP LANE
- EXIST LANE
- HEAVY VEHICLE WITH TRUCK MOUNTED ATTENUATOR (TMA)
- TRAILER MOUNTED FLASHING ARROW BOARD

NOTES:

1. SEE "BC STANDARDS" FOR PROJECT LIMIT SIGNAGE.
2. SEE "BC STANDARDS" FOR SIGN SPACING.

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED
PROFESSIONAL ENGINEER
03/24/2021

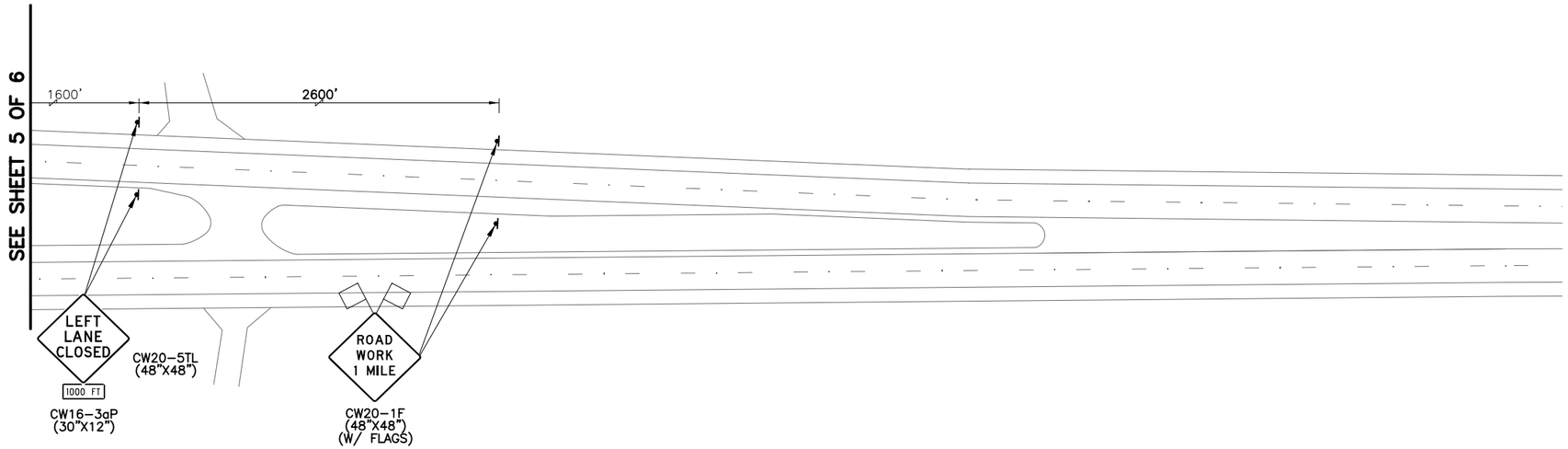
NO.	REVISION	BY	DATE

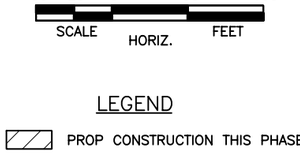
CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

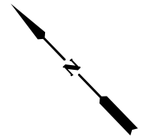
SH 71
TRAFFIC CONTROL PLAN
PHASE 2
STA 563+50.00 TO STA 579+05.00

SHEET 5 OF 6

Designed:	MR	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					SH 71
Drawn:	GM	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086		40







LEGEND

- PROP CONSTRUCTION THIS PHASE
- CONSTRUCTION PREVIOUS PHASE
- OBLITERATE PAVEMENT THIS PHASE
- CHANNELIZING DEVICES
- TYPE 3 BARRICADE
- CONSTRUCTION SIGN
- (A) WK ZN PAV MRK REMOV (W)4"(SLD)
- (B) WK ZN PAV MRK REMOV (W)4"(BRK)
- (C) WK ZN PAV MRK REMOV (W)8"(SLD)
- (D) WK ZN PAV MRK REMOV (W)8"(DOT)
- (E) WK ZN PAV MRK REMOV (Y)4"(SLD)
- (F) EXISTING PAVEMENT MARKING
- PROP LANE
- EXIST LANE
- HEAVY VEHICLE WITH TRUCK MOUNTED ATTENUATOR (TMA)
- TRAILER MOUNTED FLASHING ARROW BOARD

NOTES:

1. SEE "BC STANDARDS" FOR PROJECT LIMIT SIGNAGE.
2. SEE "BC STANDARDS" FOR SIGN SPACING.

STATE OF TEXAS
BRIAN A. JONES
95732
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SH 71
TRAFFIC CONTROL PLAN
PHASE 2

SHEET 6 OF 6

Designed:	MR	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					SH 71
Drawn:	GM	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086		41

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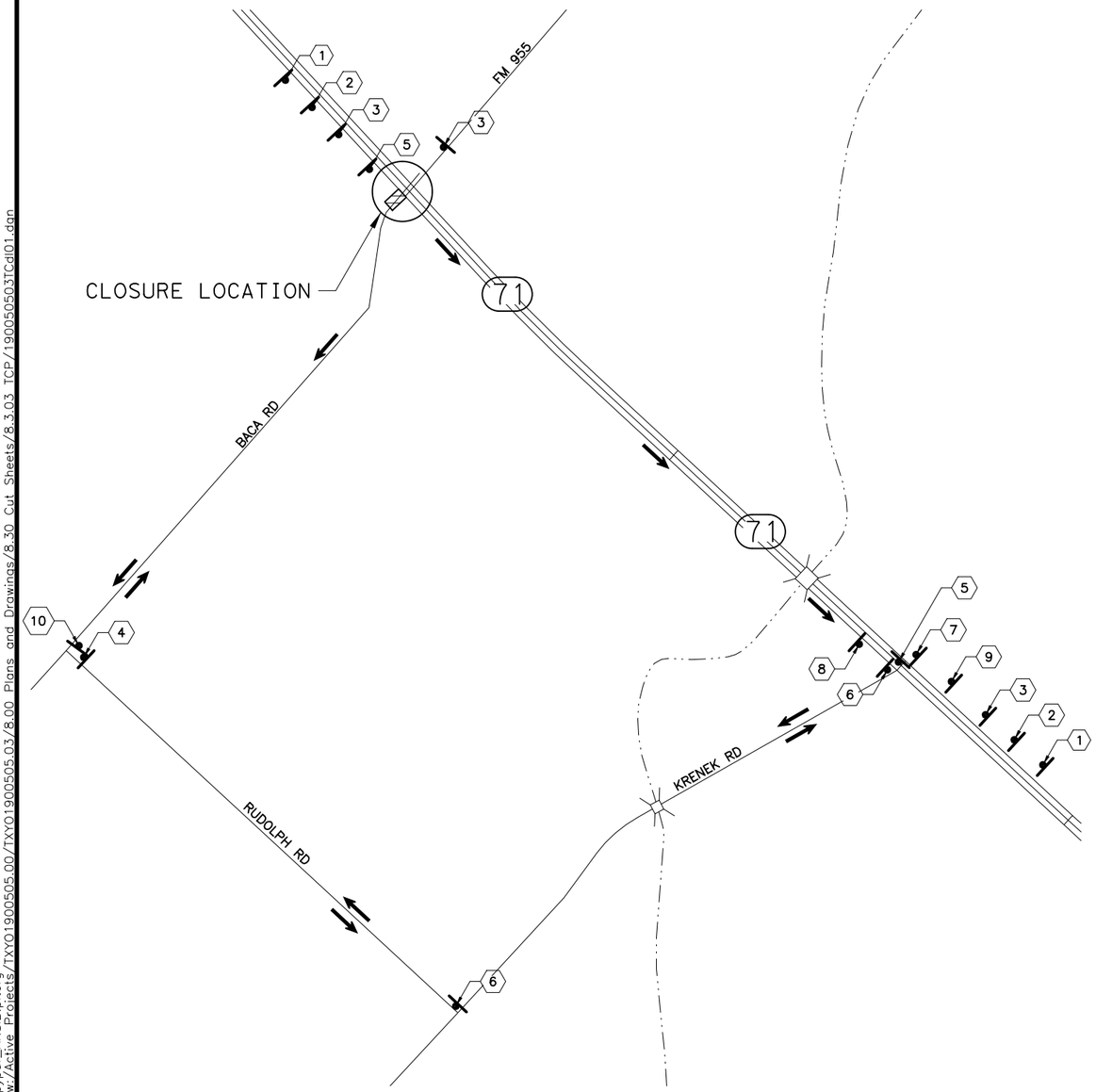
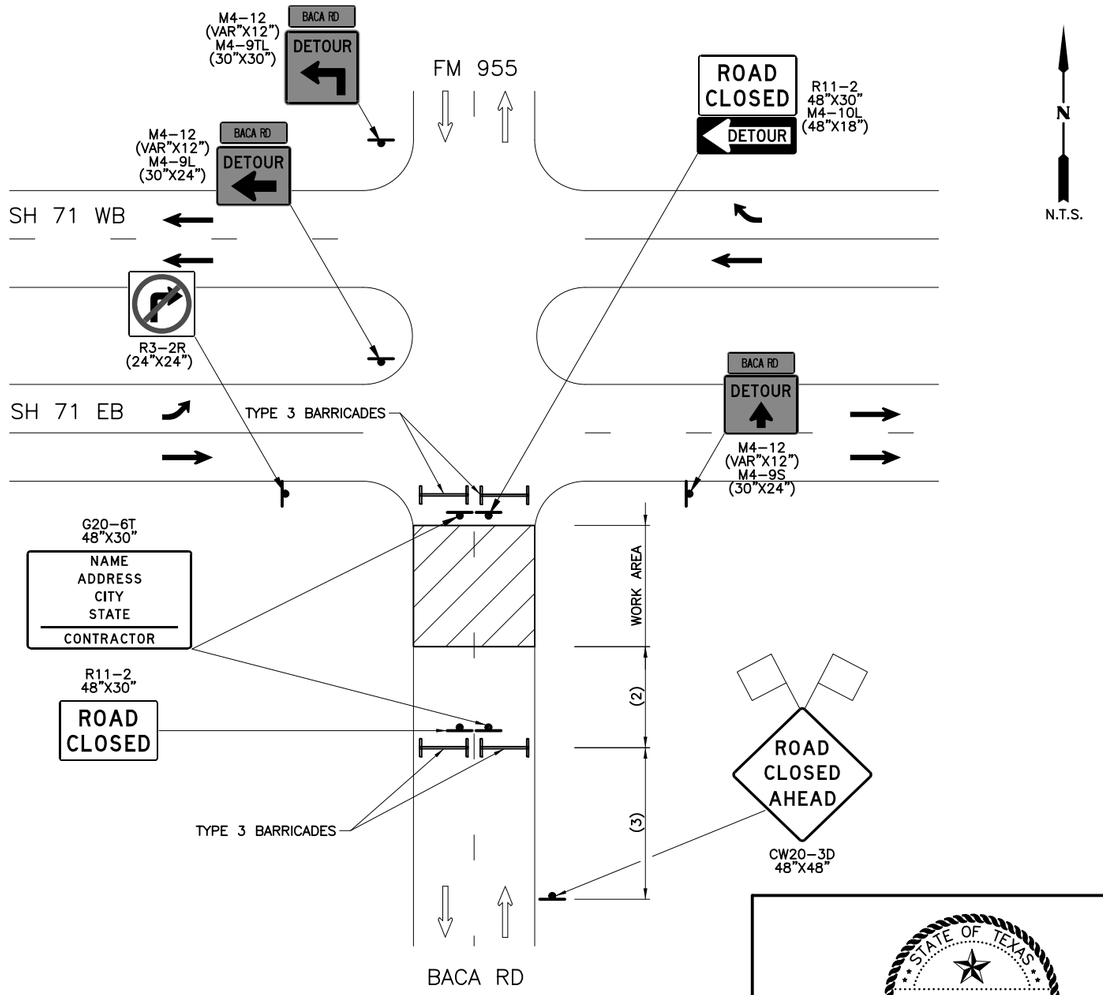
3/21/2021 7:10:46 PM gmontelongo



1	DETOUR 1500 FT	CW20-2A (48"X48")	4	END DETOUR	M4-8a (24"X18")	7	BACA RD DETOUR	M4-12 (VAR"X12") M4-9L (30"X24")	10	ROAD CLOSED 1 MILE AHEAD LOCAL TRAFFIC ONLY	R11-3a 60"X30"
2	ROAD CLOSED AHEAD	CW20-3D (48"X48")	5	BACA RD DETOUR	M4-12 (VAR"X12") M4-9S (30"X24")	8	BACA RD DETOUR	M4-12 (VAR"X12") M4-9R (30"X30")			
3	DETOUR AHEAD	CW20-2D (48"X48")	6	BACA RD DETOUR	M4-12 (VAR"X12") M4-9R (30"X24")	9	BACA RD DETOUR	M4-12 (VAR"X12") M4-9L (30"X30")			



CONSTRUCTION SIGNING AT CLOSURE LOCATION

NOTES:

(1.) BACA RD WILL BE CLOSED TO THROUGH TRAFFIC UNTIL SUBSTANTIAL COMPLETION AS APPROVED BY THE AREA ENGINEER.

(2.) TYPE 3 BARRICADES TO BE PLACED IN A LOCATION THAT IS SATISFACTORY TO THE ENGINEER TO ALLOW EGRESS AND INGRESS FOR LOCAL PROPERTY OWNERS.

(3.) SEE BC SHEETS FOR SIGN SPACING.

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED PROFESSIONAL ENGINEER
03/24/2021

NO.	REVISION	BY	DATE

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SH 71

TRAFFIC CONTROL PLAN
BACA RD CLOSURE LAYOUT

SHEET 1 OF 1

Designed:	MR	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					SH 71
Drawn:	MR	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086		42

DATE:
FILE:

BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

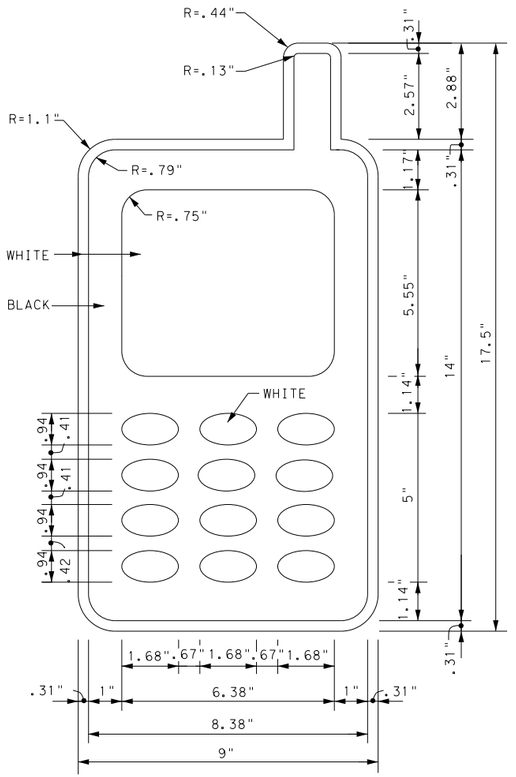
11. Except for devices required by Note 10, traffic control devices should be in place only while work is actually in progress or a definite need exists.

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

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

WORKER SAFETY APPAREL NOTES:

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



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

SIGN DETAIL (G20-10T)

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

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

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

Texas Department of Transportation | Traffic Operations Division Standard

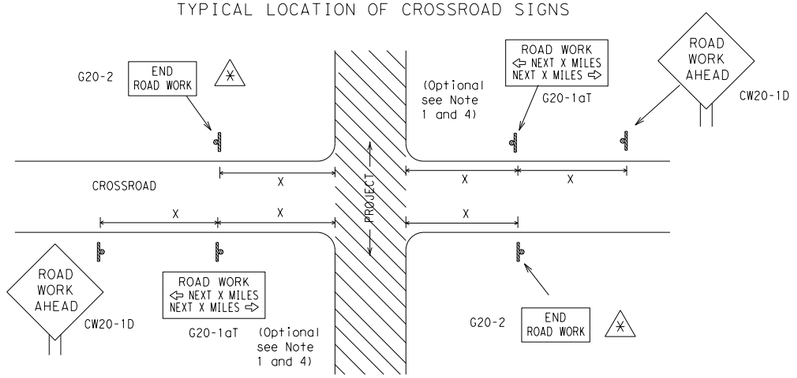
BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0266	01	086	SH 71
4-03 5-10 8-14	DIST	COUNTY		SHEET NO.
9-07 7-13	YKM	FAYETTE		43

DATE:
FILE:

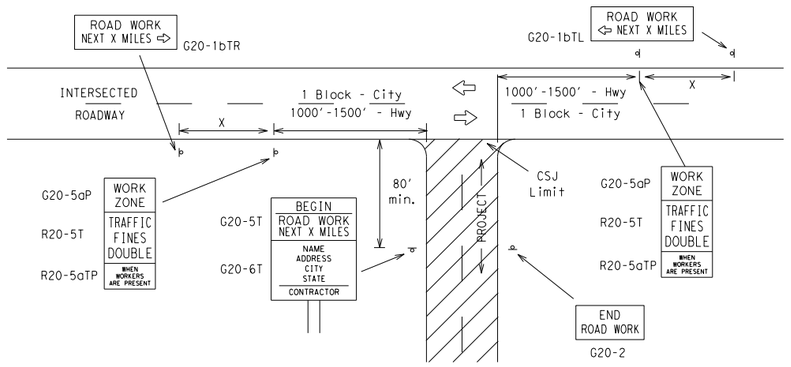
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

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

SIZE

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

SPACING

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

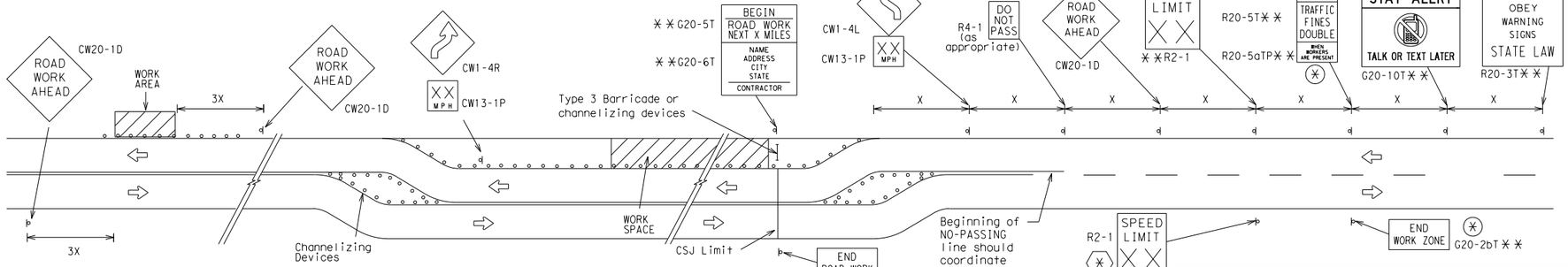
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

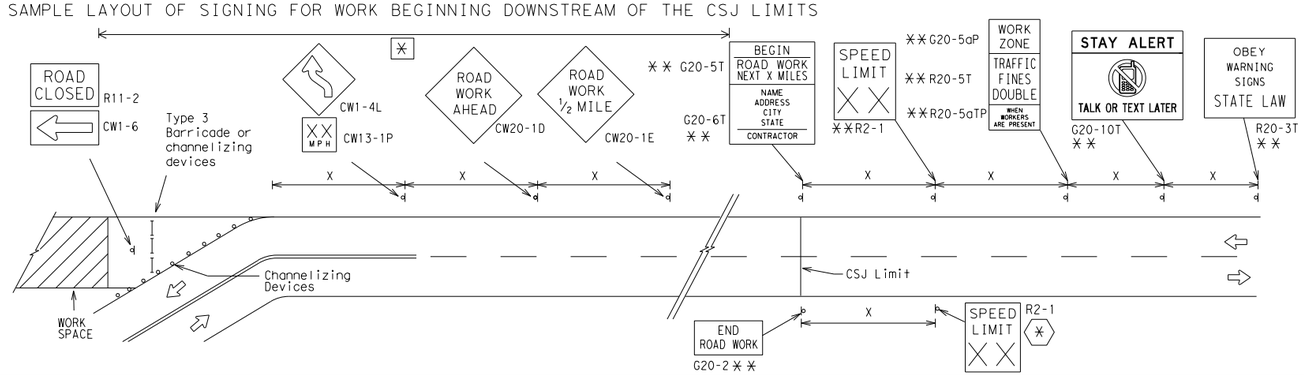
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may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

WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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

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



SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS

NOTES

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

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

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

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

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

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

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0266	01	086	SH 71
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	YKM	FAYETTE		44

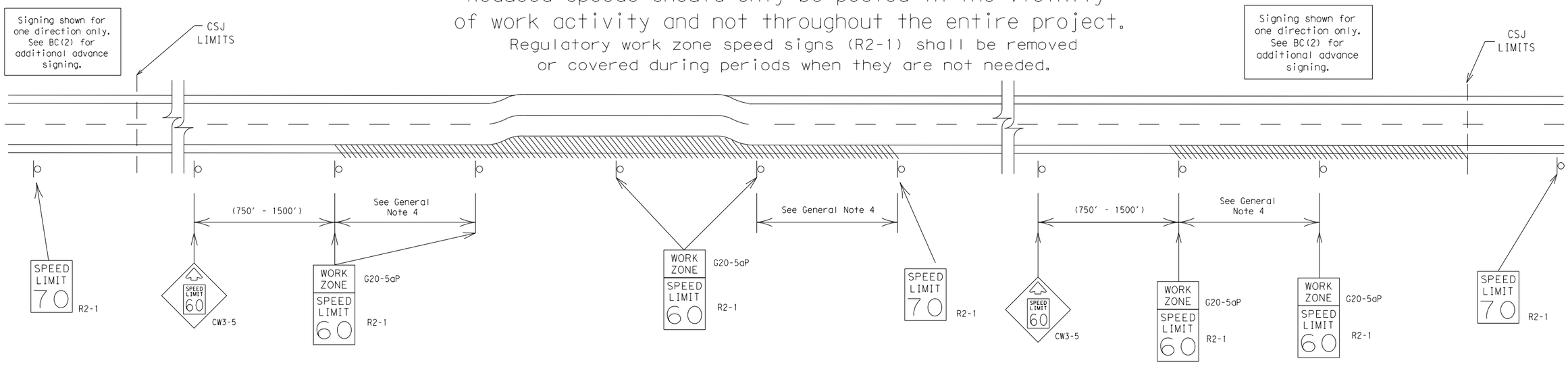
DATE:
FILE:

TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

Texas Department of Transportation

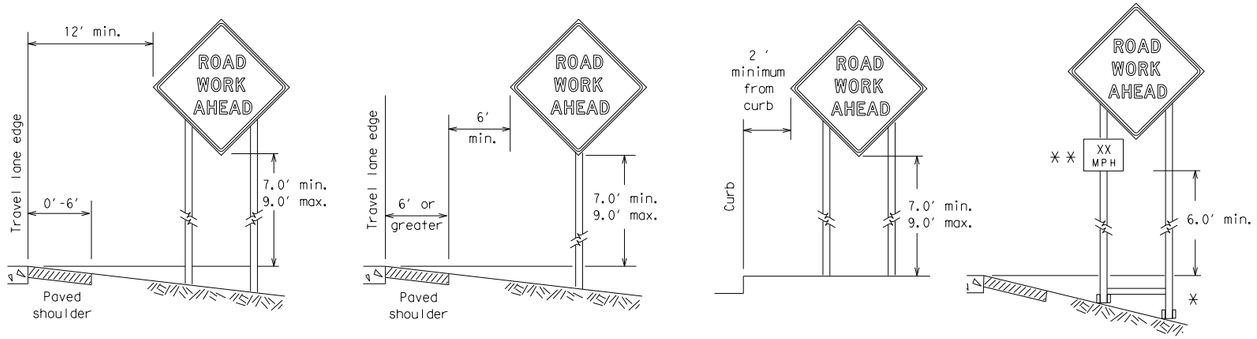
Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 9-07 8-14 7-13	0266	01	086	SH 71
	DIST	COUNTY		SHEET NO.
	YKM	FAYETTE		45

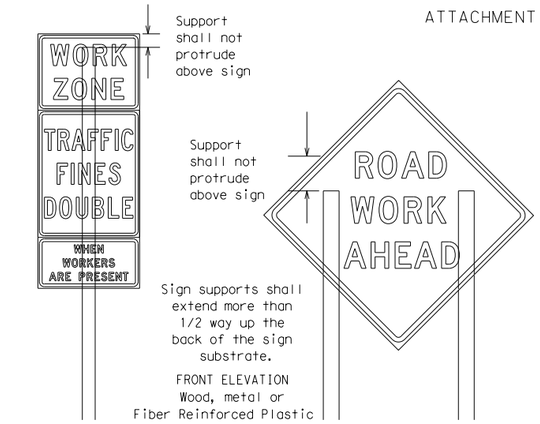
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



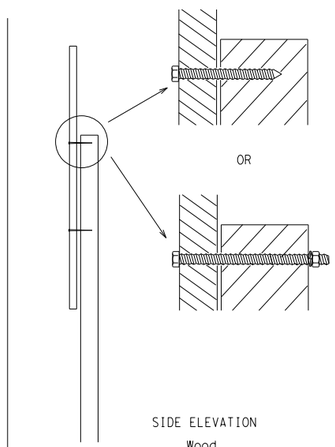
⚹ When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

⚹⚹ 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



FRONT ELEVATION
Wood, metal or Fiber Reinforced Plastic



SIDE ELEVATION
Wood

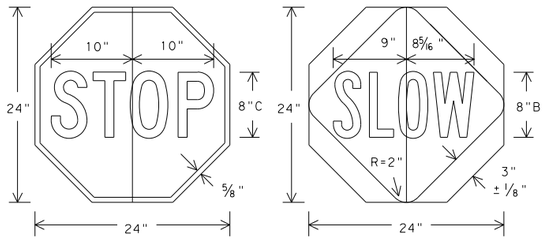
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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

STOP/SLOW PADDLES

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



CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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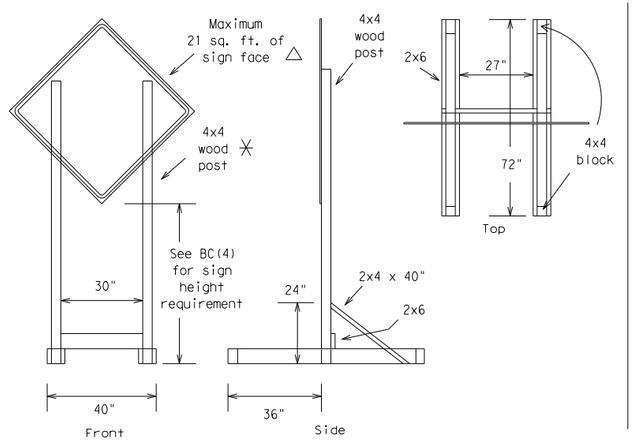
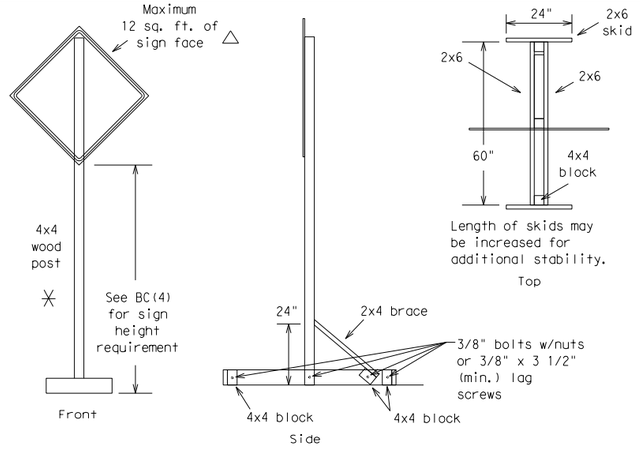
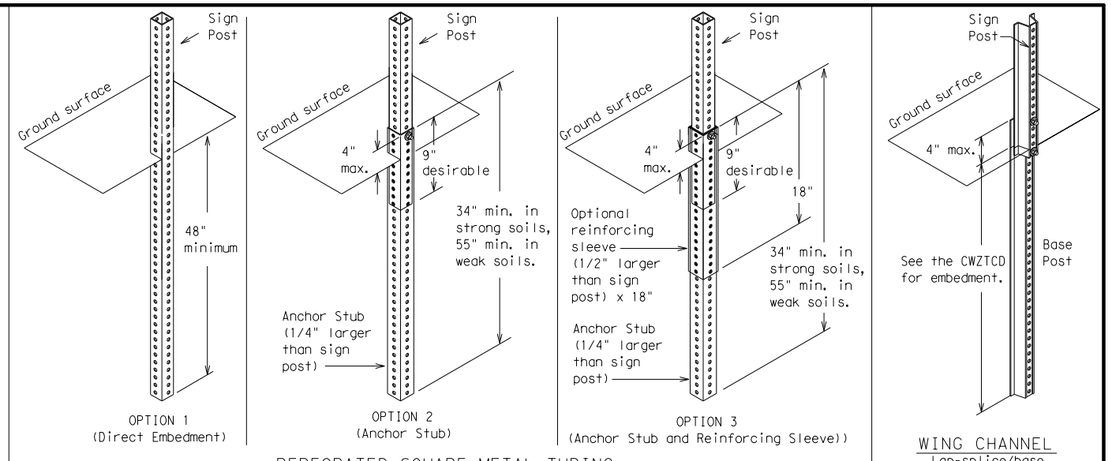




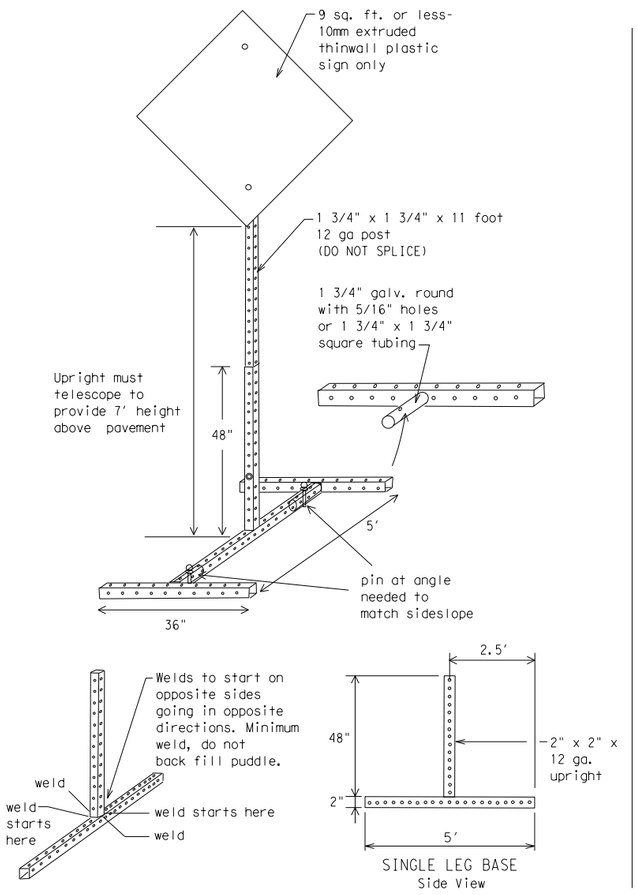
SKID MOUNTED WOOD SIGN SUPPORTS

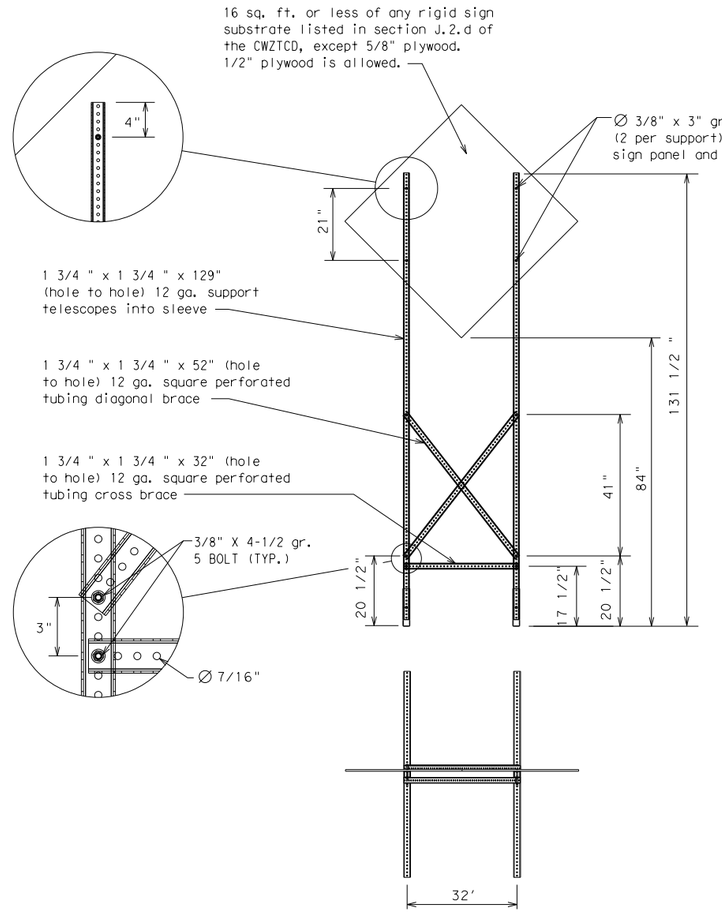
LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS □

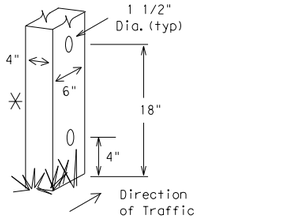


GROUND MOUNTED SIGN SUPPORTS

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

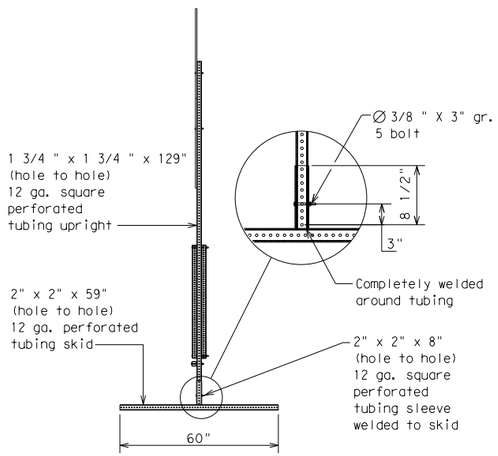






Nominal Post Size	Number of Posts	Maximum Sq. feet of Sign Face	Minimum Soil Embedment	Drilled Hole(s) Required
4 x 4	1	12	36"	NO
4 x 4	2	21	36"	NO
4 x 6	1	21	36"	YES
4 x 6	2	36	36"	YES

WOOD POST SYSTEM FOR GROUND MOUNTED SIGN SUPPORTS



WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

SHEET 5 OF 12

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

DATE:
FILE:

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

Location List

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

Warning List

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

** Advance Notice List

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

* See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-14

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9-07	8-14	DIST	COUNTY		SHEET NO.
7-13		YKM	FAYETTE		48

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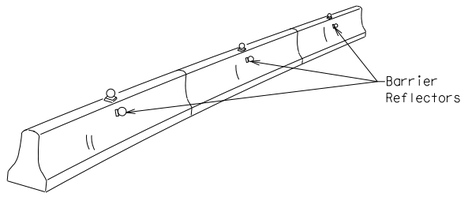
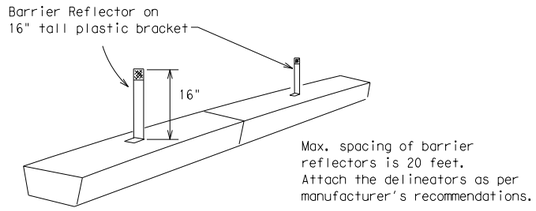
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost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

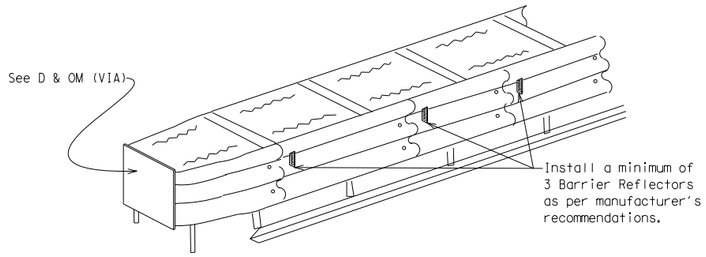


CONCRETE TRAFFIC BARRIER (CTB)

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



LOW PROFILE CONCRETE BARRIER (LPCB)

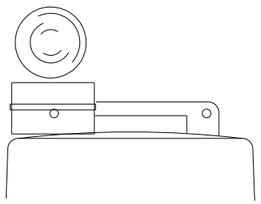


DELINEATION OF END TREATMENTS

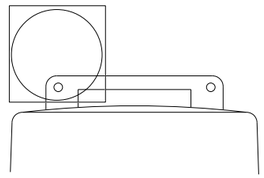
END TREATMENTS FOR
CTB'S USED
IN WORK ZONES

End treatments used on CTB's in work zones shall meet crashworthy standards as defined in the National Cooperative Highway Research Report 350. Refer to the CWZTCD List for approved end treatments and manufacturers.

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

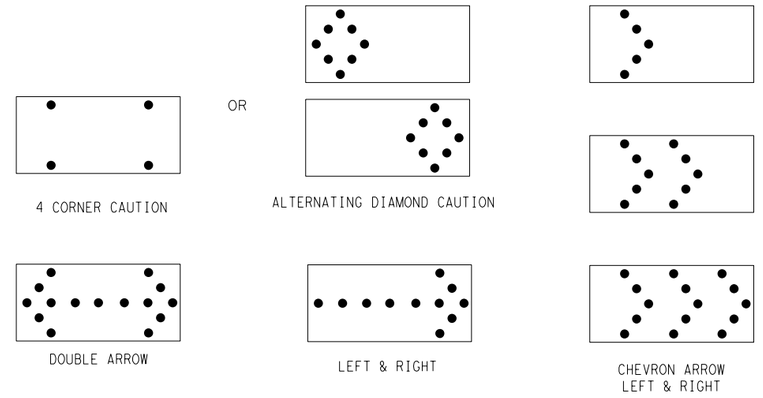
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

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

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



4 CORNER CAUTION

ALTERNATING DIAMOND CAUTION

DOUBLE ARROW

LEFT & RIGHT

CHEVRON ARROW
LEFT & RIGHT

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

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

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

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

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

Texas Department of Transportation

Traffic Operations Division Standard

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

BC(7)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0266	01	086	SH 71
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	YKM	FAYETTE		49

101

DATE:
FILE:

GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

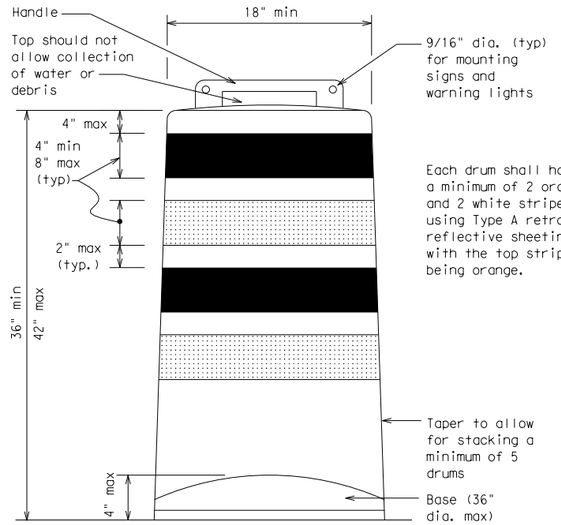
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

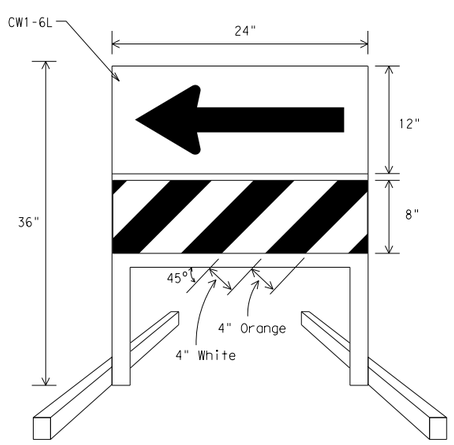
RETROREFLECTIVE SHEETING

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

BALLAST

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

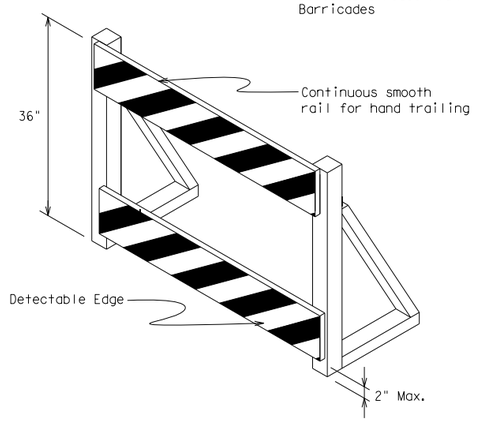




DIRECTION INDICATOR BARRICADE

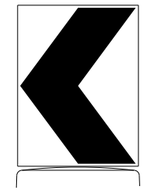
1. The Direction Indicator Barricade may be used in tapers, transitions, and other areas where specific directional guidance to drivers is necessary.
2. If used, the Direction Indicator Barricade should be used in series to direct the driver through the transition and into the intended travel lane.
3.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

This detail is not intended for fabrication. See note 3 and the CWZTCD list for providers of approved Detectable Pedestrian Barricades

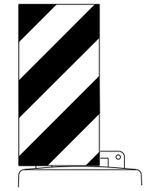


DETECTABLE PEDESTRIAN BARRICADES

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



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



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0266	01	086	SH 71
4-03 7-13	DIST	COUNTY		SHEET NO.
9-07 8-14	YKM	FAYETTE		50

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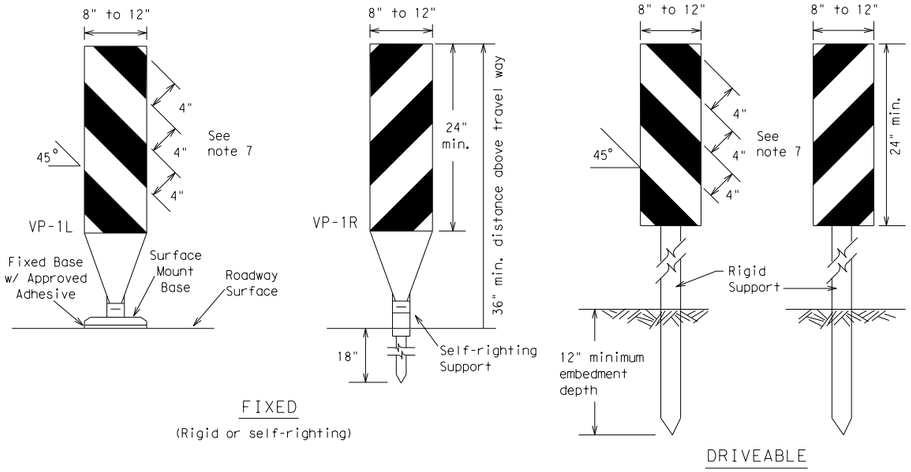
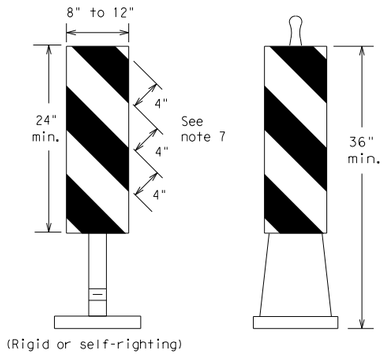


FIXED
(Rigid or self-righting)

DRIVEABLE

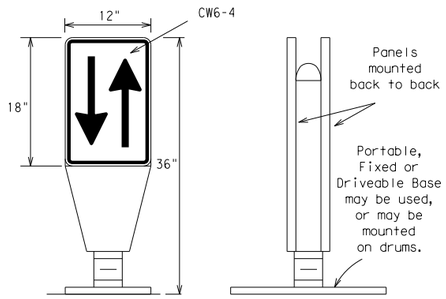


(Rigid or self-righting)

PORTABLE

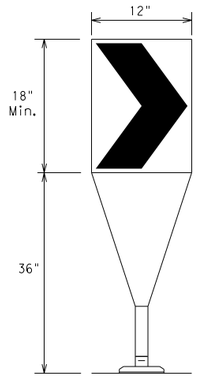
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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

VERTICAL PANELS (VPs)



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

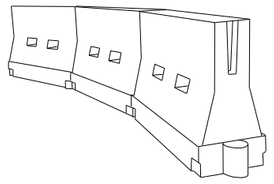
OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



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

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

CHEVRONS



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

1. Water ballasted systems used as barriers shall not be used solely to channelize road users, but also to protect the work space per the appropriate NCHRP 350 crashworthiness requirements based on roadway speed and barrier application.
2. Water ballasted systems used to channelize vehicular traffic shall be supplemented with retroreflective delineation or channelizing devices to improve daytime/nighttime visibility. They may also be supplemented with pavement markings.
3. Water ballasted systems used as barriers shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. Water ballasted systems used as barriers should not be used for a merging taper except in low speed (less than 45 MPH) urban areas. When used on a taper in a low speed urban area, the taper shall be delineated and the taper length should be designed to optimize road user operations considering the available geometric conditions.
5. When water ballasted systems used as barriers have blunt ends exposed to traffic, they should be attenuated as per manufacturer recommendations or flared to a point outside the clear zone.

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

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

GENERAL NOTES

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

SHEET 9 OF 12

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-14

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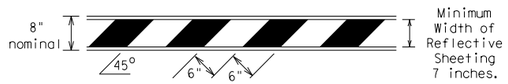
	DIST	COUNTY		SHEET NO.
	YKM	FAYETTE		51

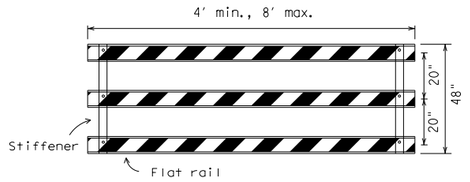
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



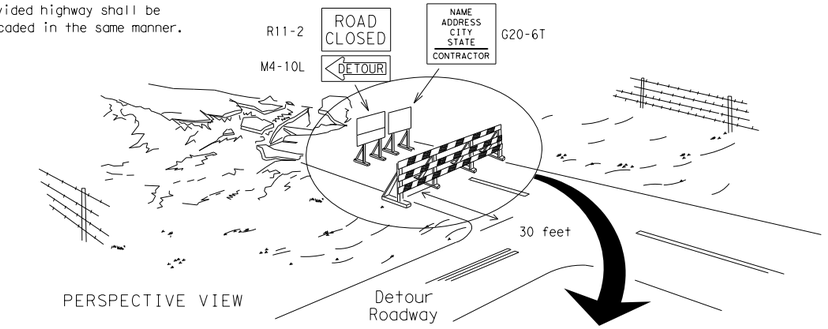
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

TYPICAL PANEL DETAIL
FOR SKID OR POST TYPE BARRICADES

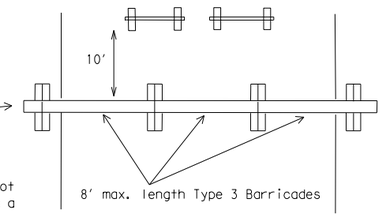
Each roadway of a divided highway shall be barricaded in the same manner.



PERSPECTIVE VIEW

The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.

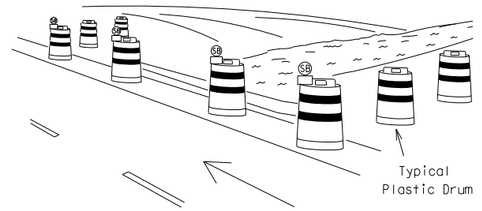
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

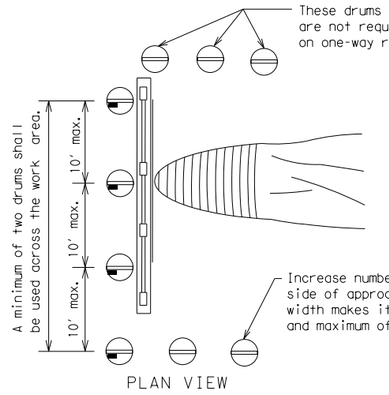
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

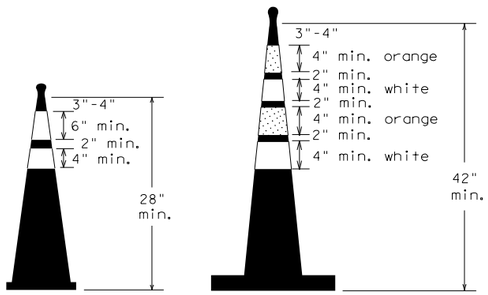
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



PLAN VIEW

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

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones

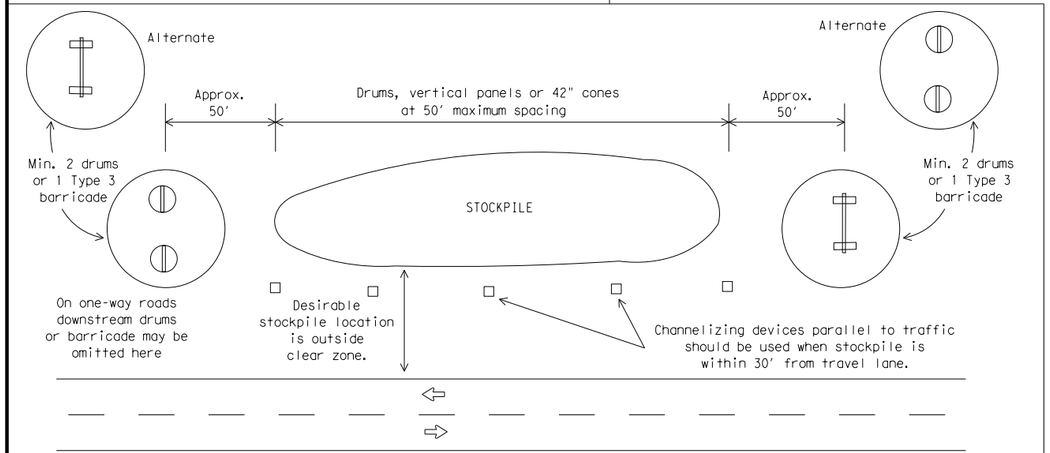
One-Piece cones

Tubular Marker

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

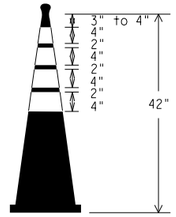
42" 2-piece cones shall have a minimum weight of 30 lbs. including base.

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

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



EDGELINE CHANNELIZER

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

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BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-14

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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.

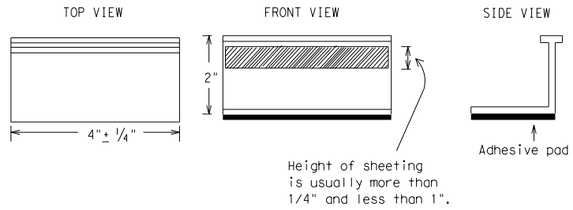
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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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Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-14

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11-02 8-14				

DATE:
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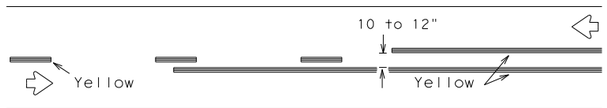
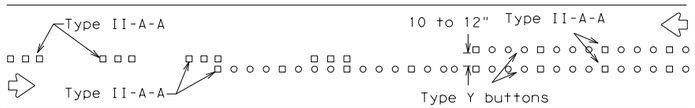
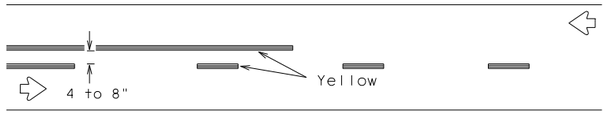
PAVEMENT MARKING PATTERNS



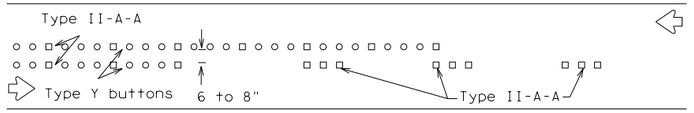
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



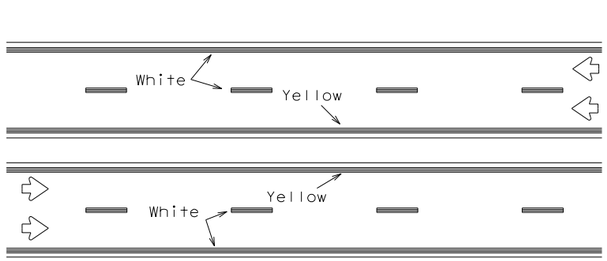
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



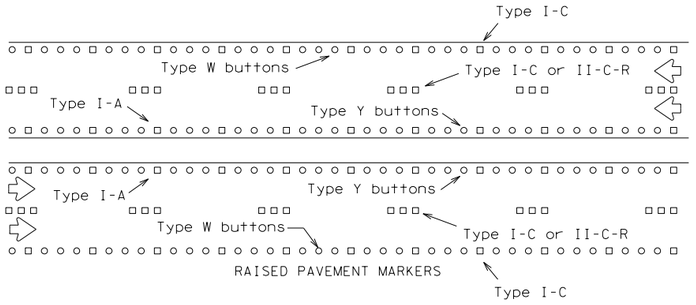
RAISED PAVEMENT MARKERS - PATTERN B

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

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



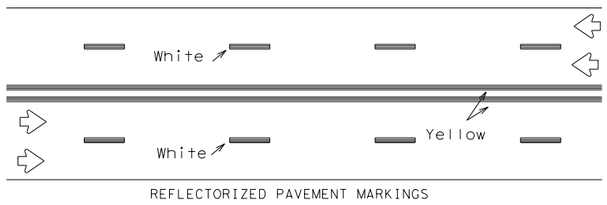
REFLECTORIZED PAVEMENT MARKINGS



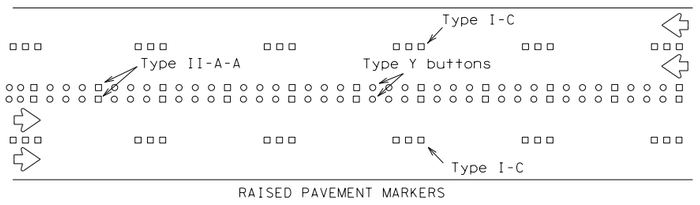
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



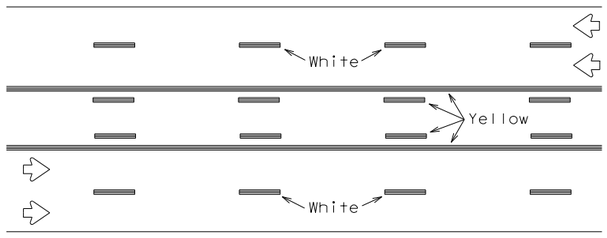
REFLECTORIZED PAVEMENT MARKINGS



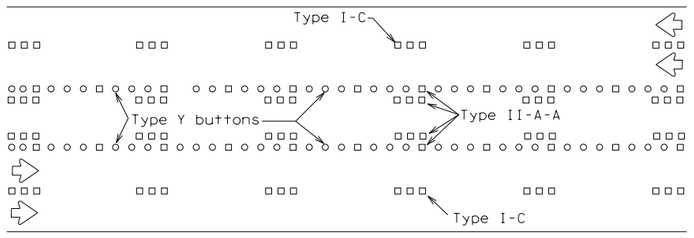
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

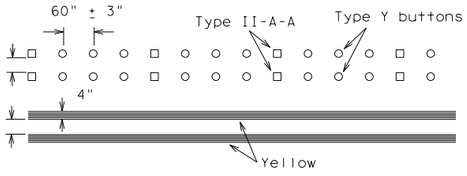
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

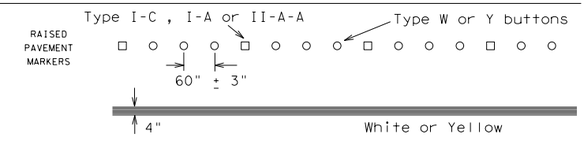
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

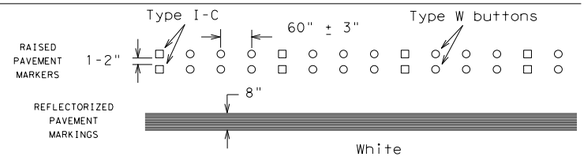


EDGE LINE OR SINGLE NO-PASSING LINE



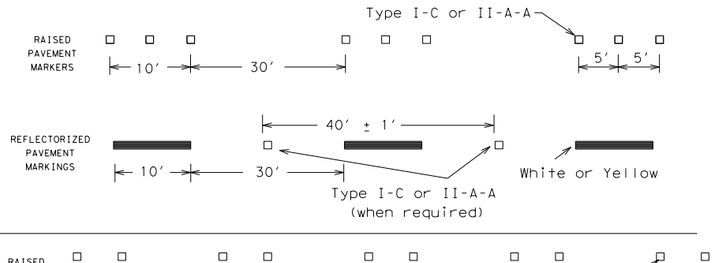
WIDE LINE

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

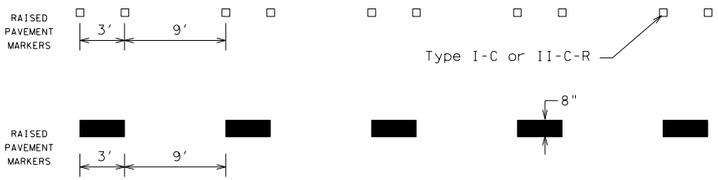


BROKEN LINES

CENTER LINE OR LANE LINE

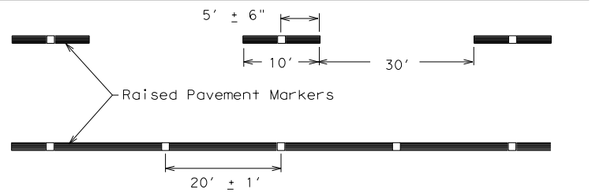


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0266	01	086	SH 71
1-97 9-07	DIST	COUNTY		SHEET NO.
2-98 7-13	YKM	FAYETTE		54
11-02 8-14				

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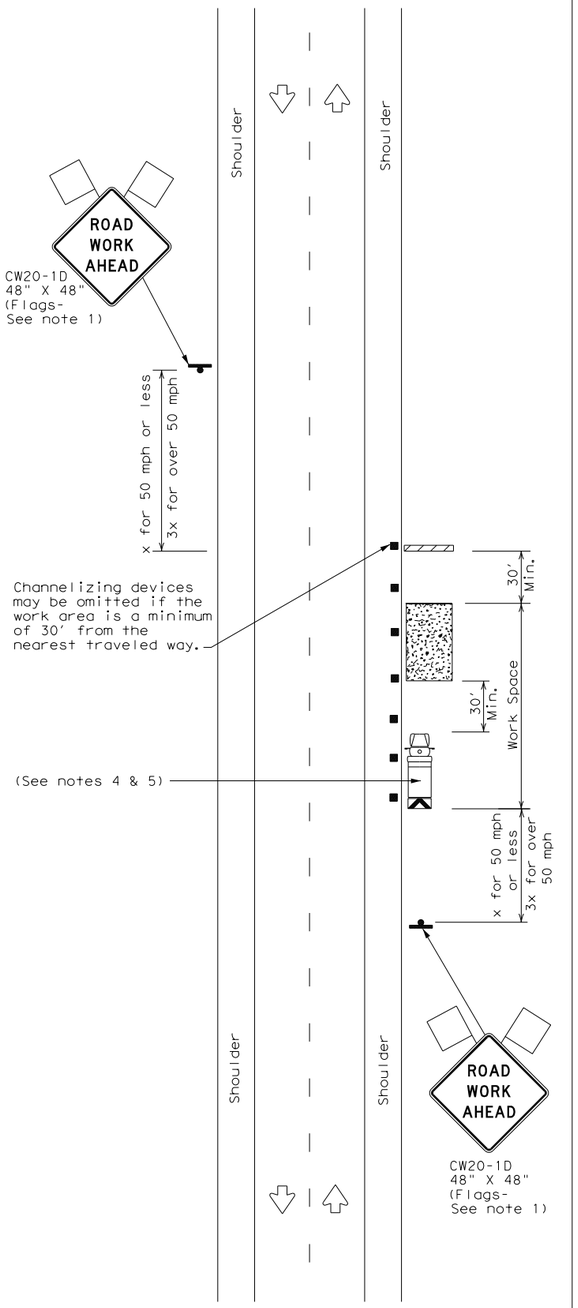
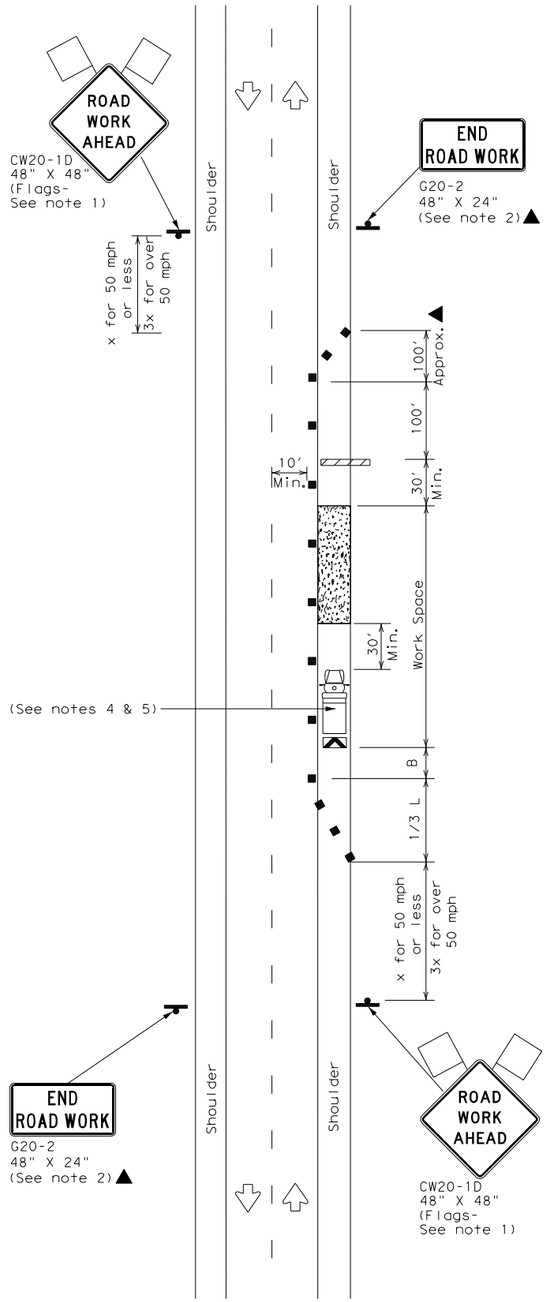
DATE:
FILE:



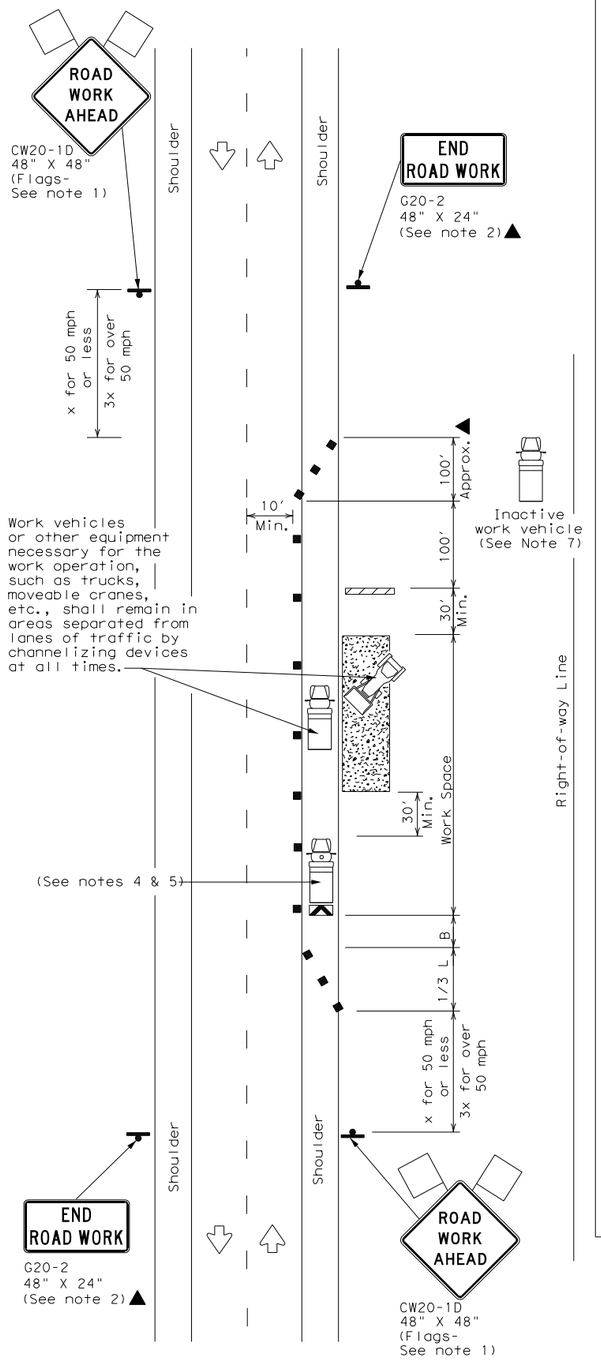
TCP (2-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (2-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (2-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(2-1)-18

FILE: tcp2-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0266	01	086	SH 71
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	YKM	FAYETTE		55
1-97 2-18				

DATE:
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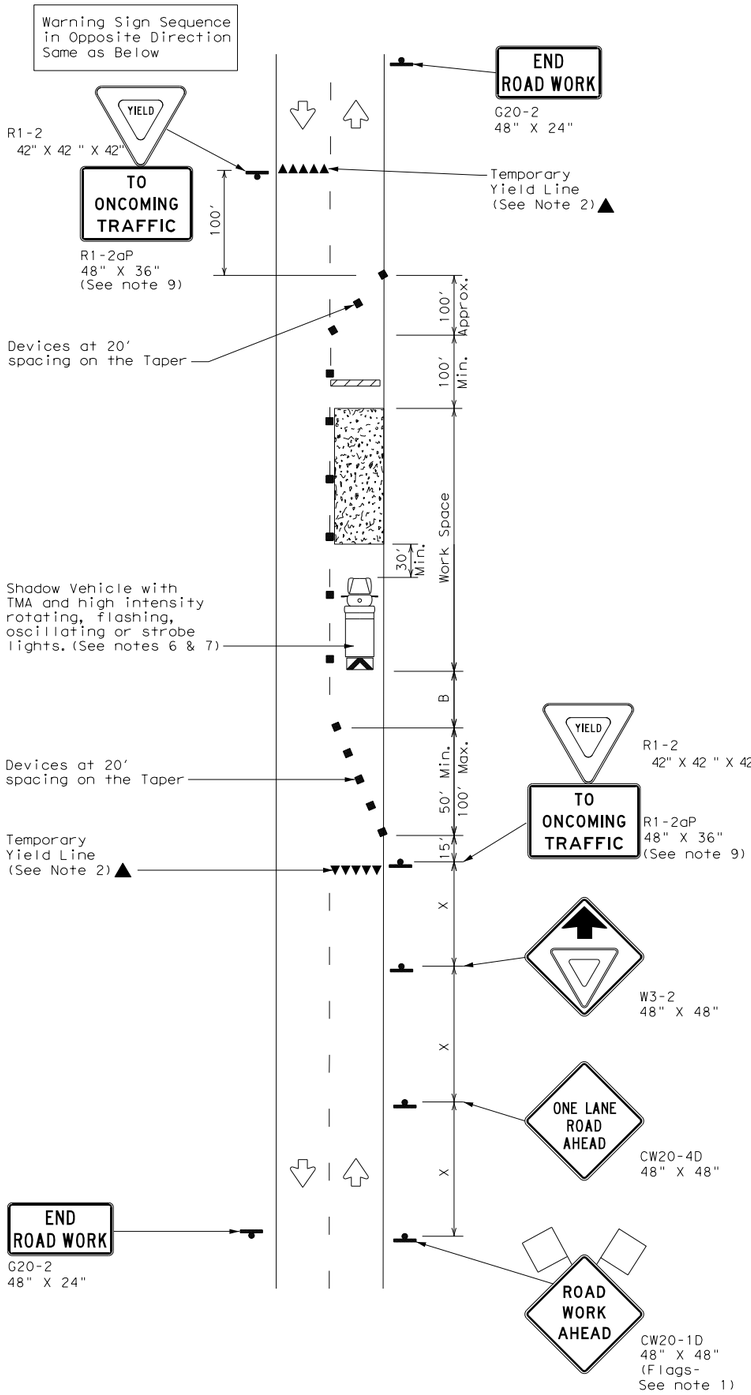
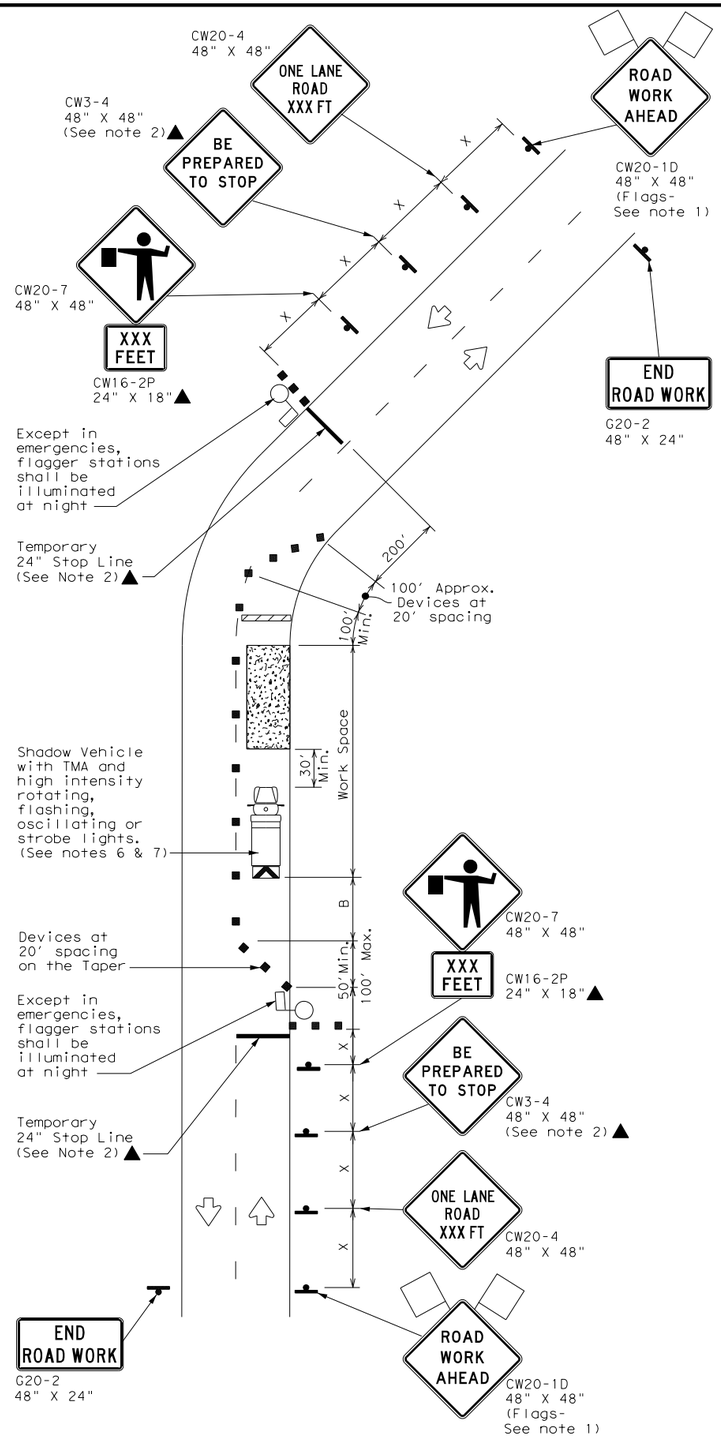


TCP (2-2a)
2-LANE ROADWAY WITHOUT PAVED SHOULDERS
ONE LANE TWO-WAY
CONTROL WITH YIELD SIGNS
(Less than 2000 ADT - See Note 9)



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	0266	01	086	SH 71
	DIST	COUNTY		SHEET NO.
	YKM	FAYETTE		56

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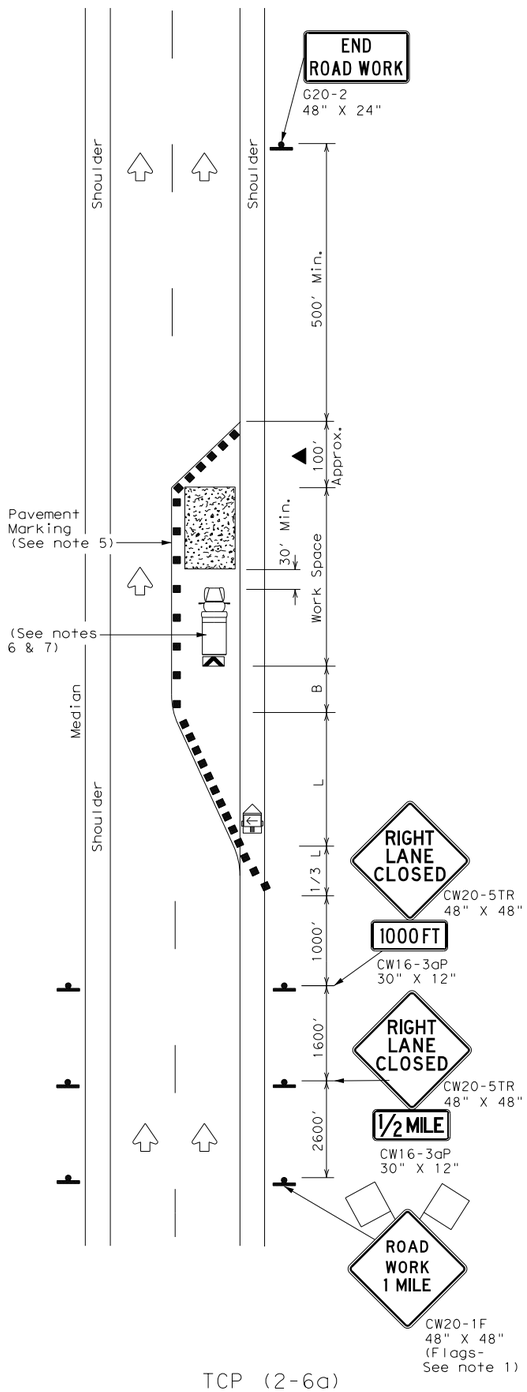
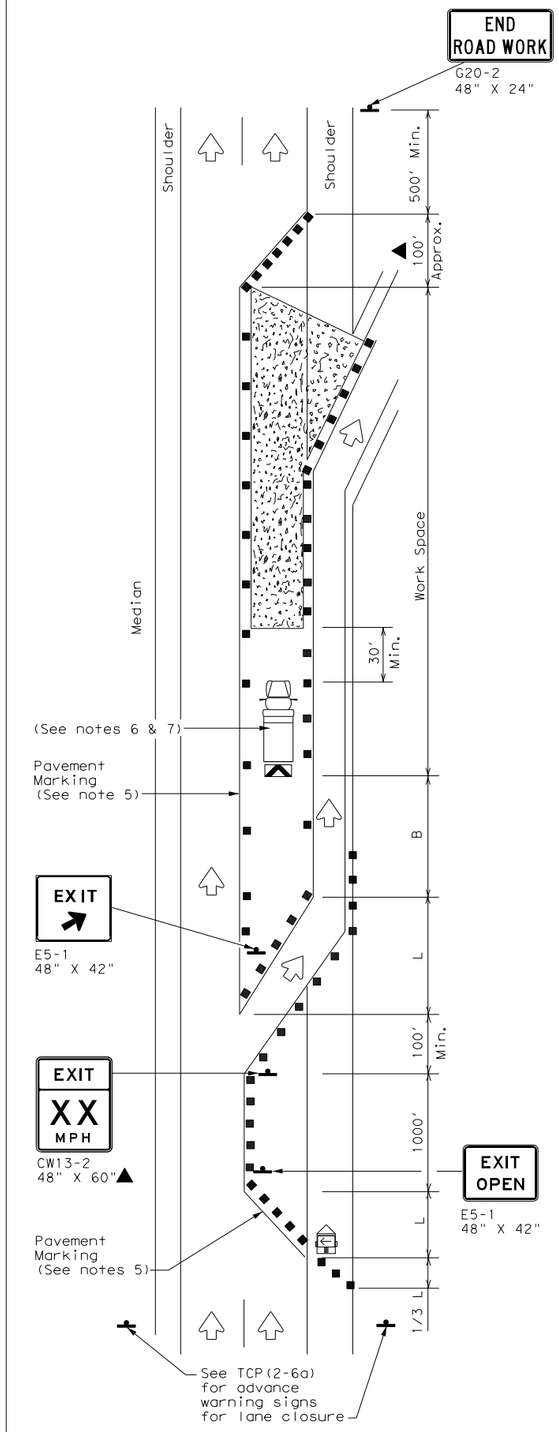


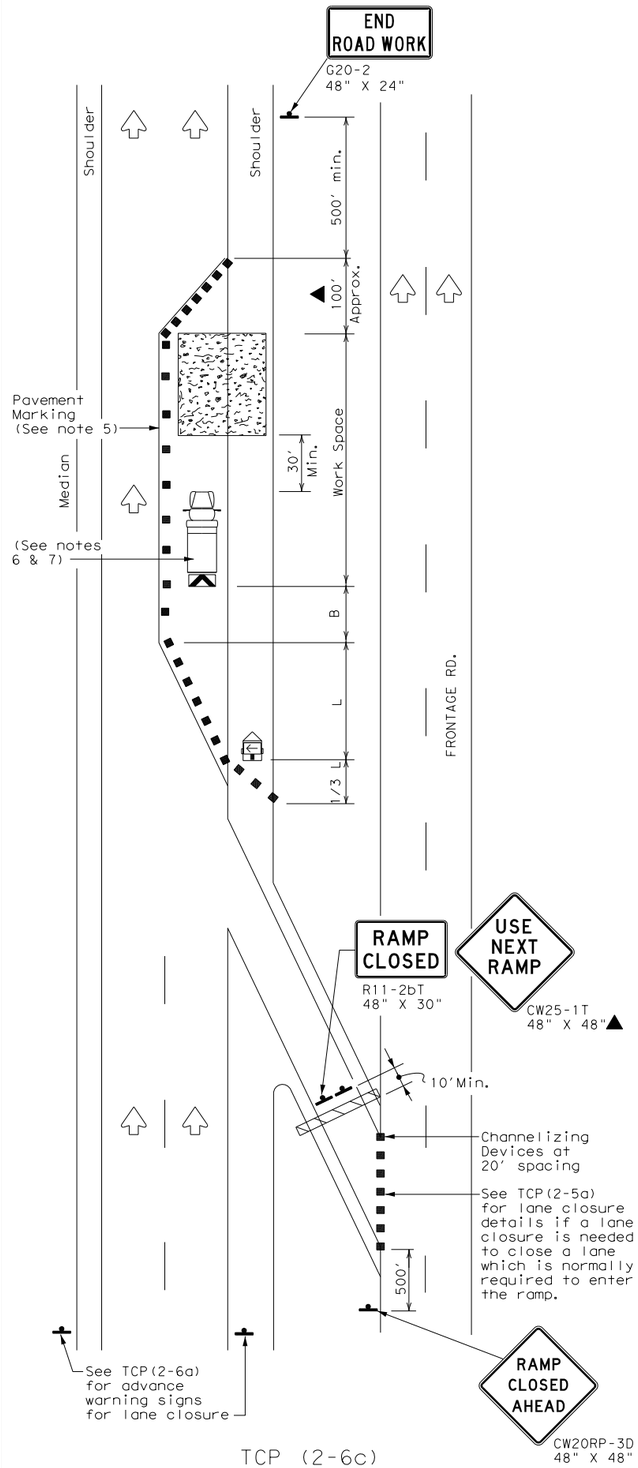
TCP (2-6a)

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		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	0266	01	086	SH 71
	DIST	COUNTY		SHEET NO.
	YKM	FAYETTE		57

DATE:
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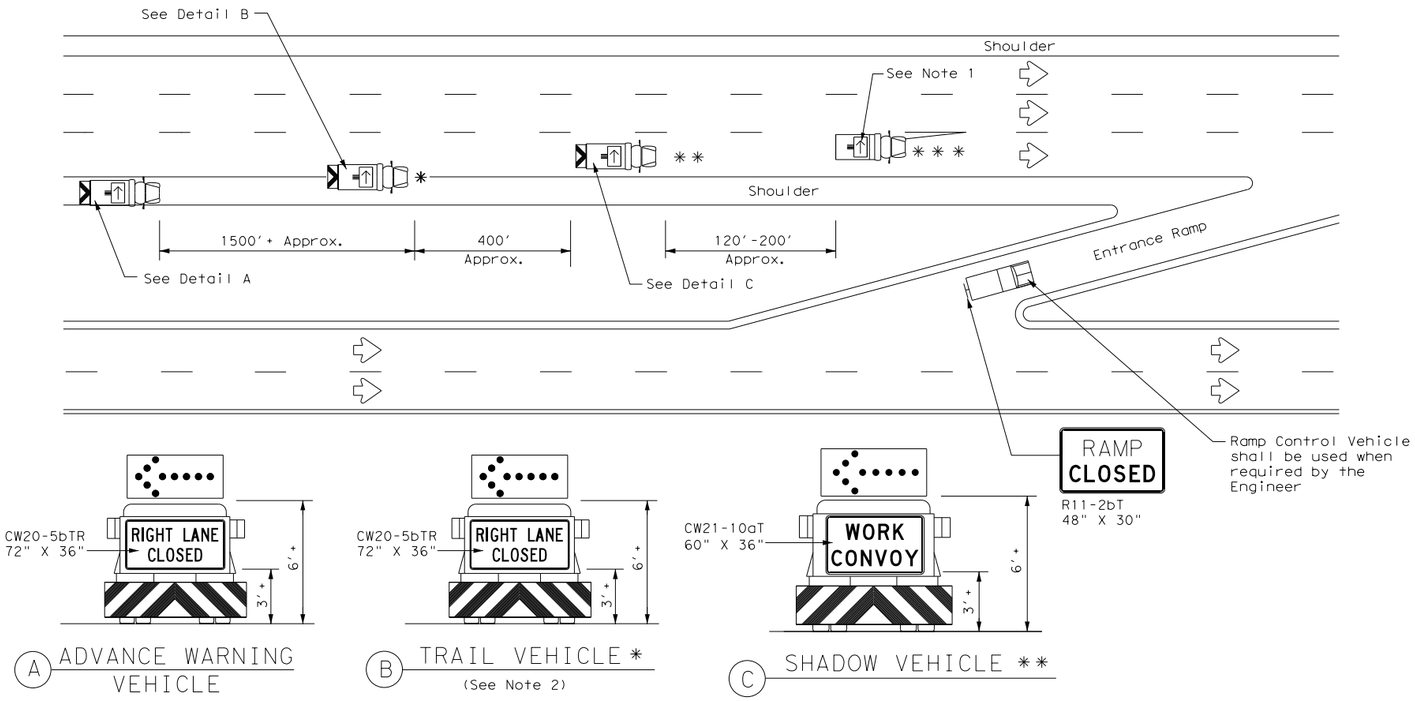
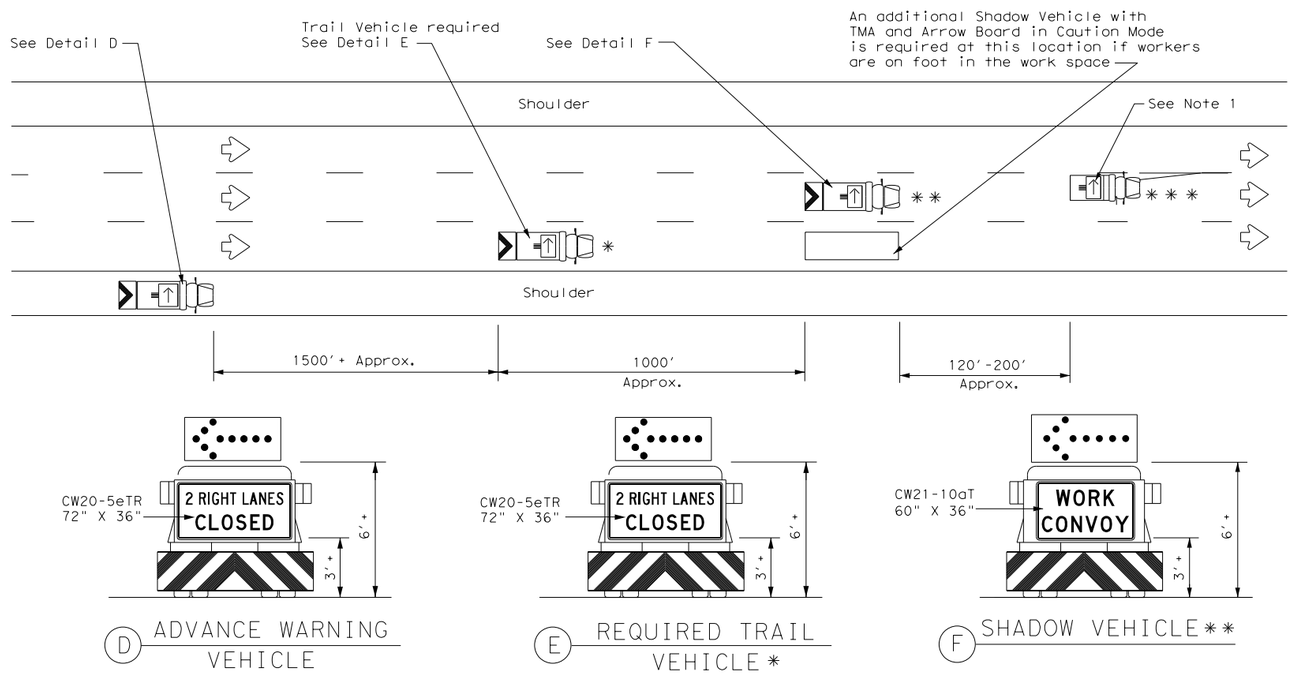


A ADVANCE WARNING VEHICLE

B TRAIL VEHICLE * (See Note 2)

C SHADOW VEHICLE **

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



D ADVANCE WARNING VEHICLE

E REQUIRED TRAIL VEHICLE *

F SHADOW VEHICLE **

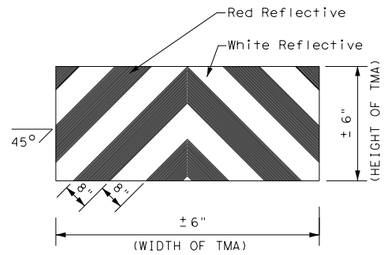
INTERIOR LANE CLOSURE ON MULTI-LANE DIVIDED HIGHWAY - TCP(3-2b)

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

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

GENERAL NOTES

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



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS DIVIDED HIGHWAYS

TCP(3-2)-13

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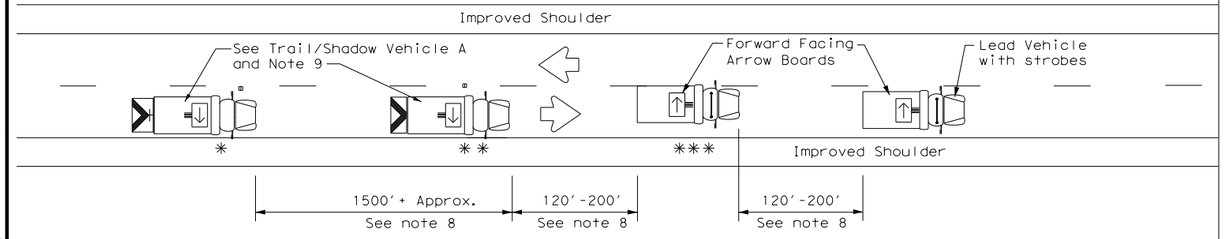
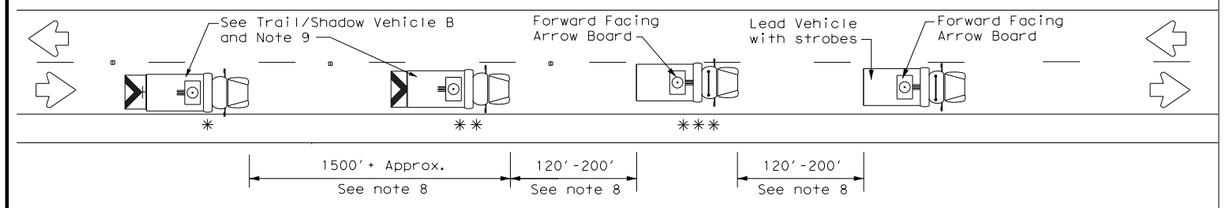
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0266	01	086	SH 71
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 7-13	YKM	FAYETTE		58
1-97				

DATE:
FILE:



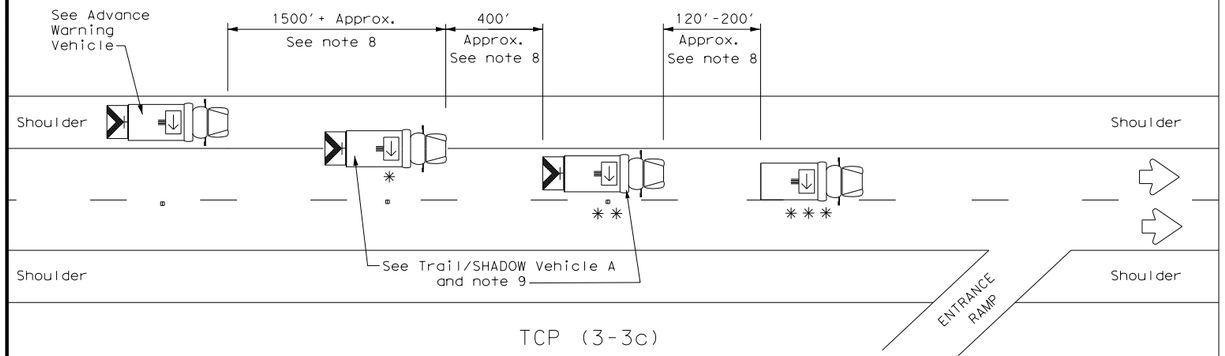
TCP (3-3a)

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



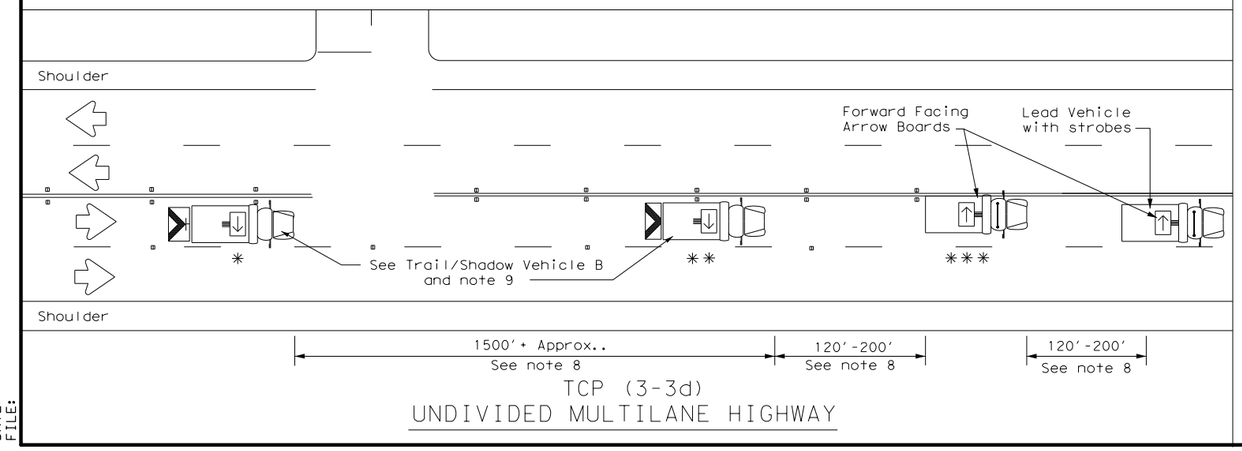
TCP (3-3b)

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



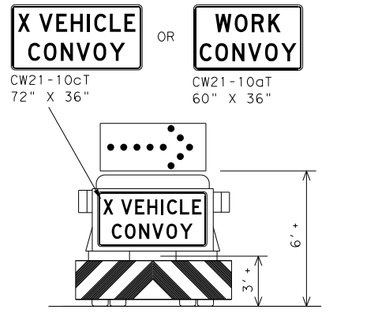
TCP (3-3c)

DIVIDED MULTILANE HIGHWAY



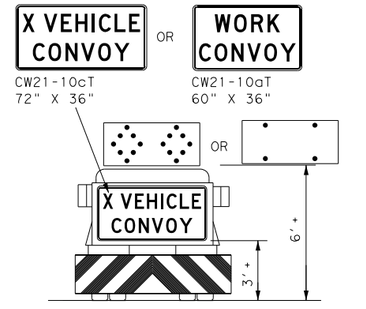
TCP (3-3d)

UNDIVIDED MULTILANE HIGHWAY



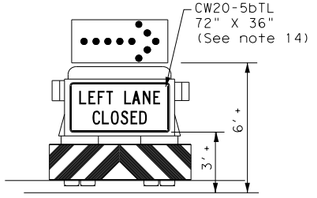
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display
Flashing Arrow Board

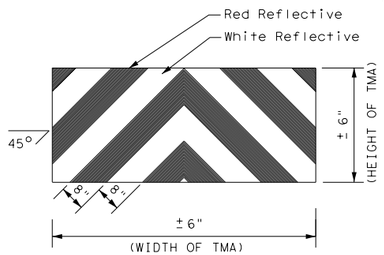


TRAIL/SHADOW VEHICLE B

with Flashing Arrow Board
in Caution Mode



ADVANCE WARNING VEHICLE



STRIPING FOR TMA

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS RAISED PAVEMENT MARKER INSTALLATION/ REMOVAL

TCP(3-3)-14

FILE: tcp3-3.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT September 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0266	01	086	SH 71
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 7-13	YKM	FAYETTE		59
1-97 7-14				

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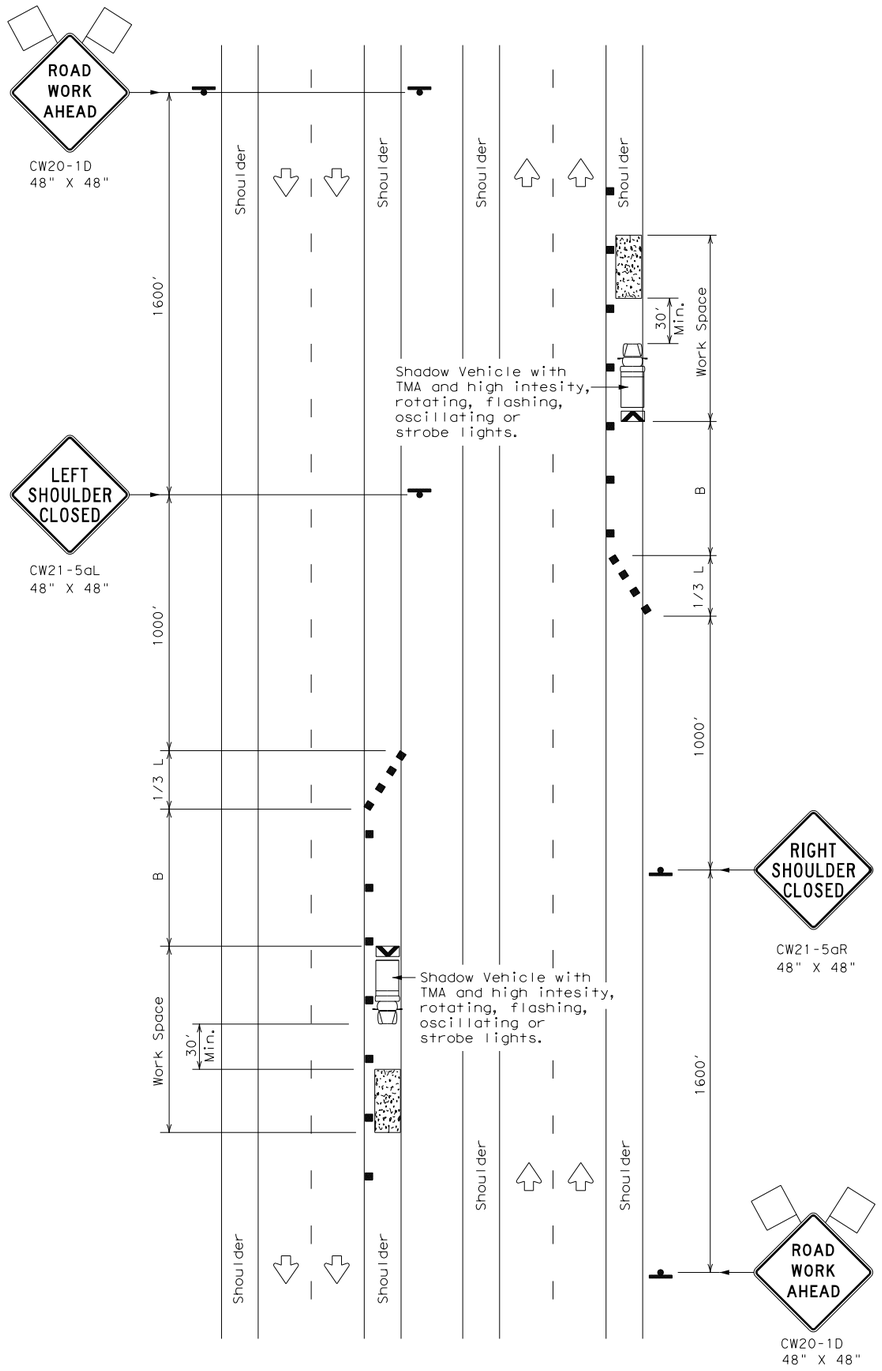
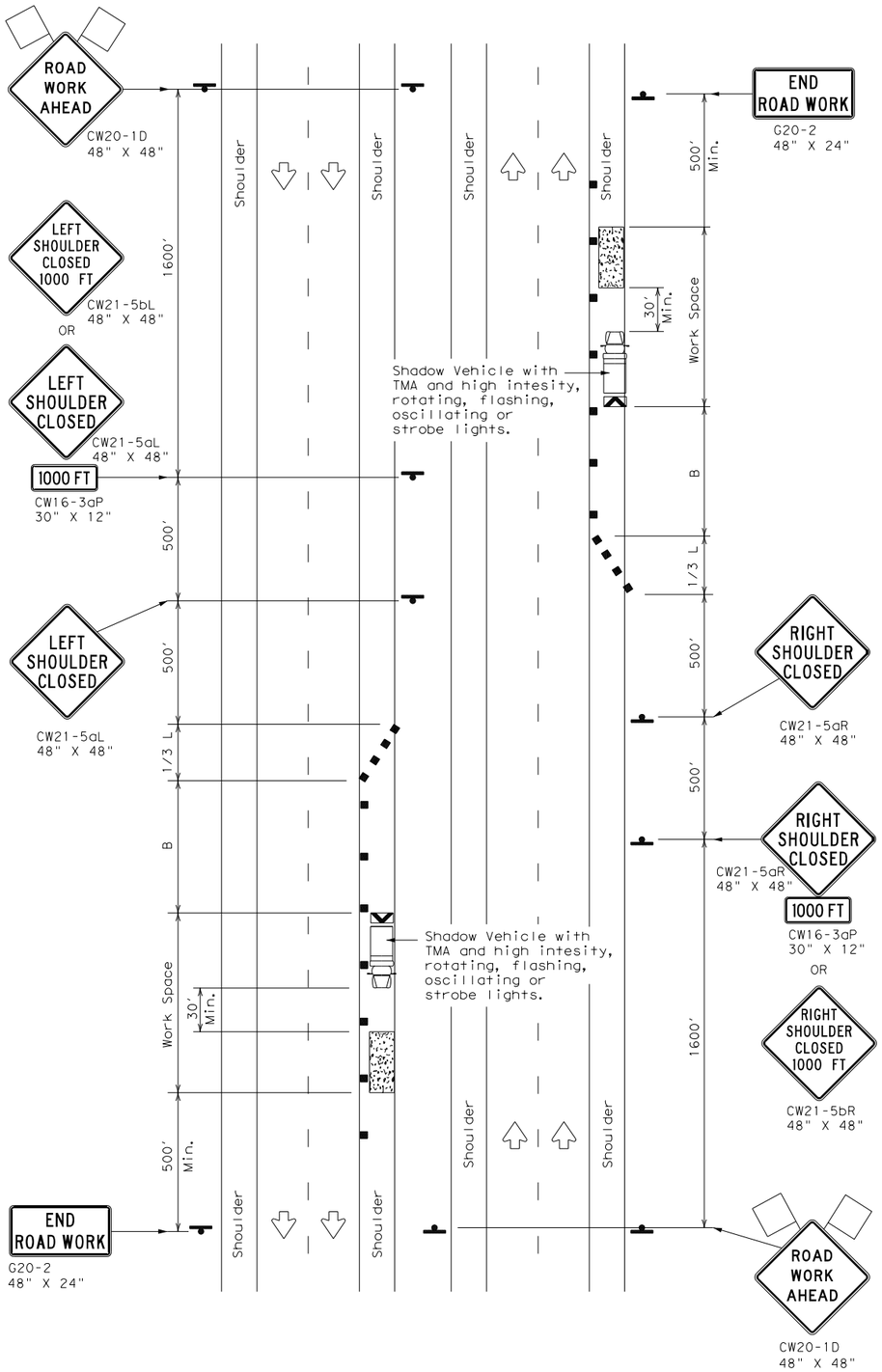
DATE:
FILE:



TCP (5-1a)

WORK AREA ON SHOULDER



TCP (5-1b)

WORK AREA ON SHOULDER

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	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	90'
35		205'	225'	245'	35'	70'	120'
40		265'	295'	320'	40'	80'	155'
45	L=WS	450'	495'	540'	45'	90'	195'
50		500'	550'	600'	50'	100'	240'
55		550'	605'	660'	55'	110'	295'
60		600'	660'	720'	60'	120'	350'
65		650'	715'	780'	65'	130'	410'
70		700'	770'	840'	70'	140'	475'
75		750'	825'	900'	75'	150'	540'
80		800'	880'	960'	80'	160'	615'

* 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(5-1a)	TCP(5-1b)	TCP(5-1b)	

GENERAL NOTES

1. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30' to 100' in advance of the area of crew exposure without adversely effecting the performance or quality of the work. Type 3 barricades or drums may be substituted when workers on foot are no longer present when approved by the Engineer.
2. 28" tall or taller one-piece cones will be allowed only for Short Duration or Short Term stationary operations when workers are present to maintain the devices upright and in proper location. Intermediate Term stationary work areas should use Drums, Vertical Panels or 42" tall two-piece cones.

Texas Department of Transportation

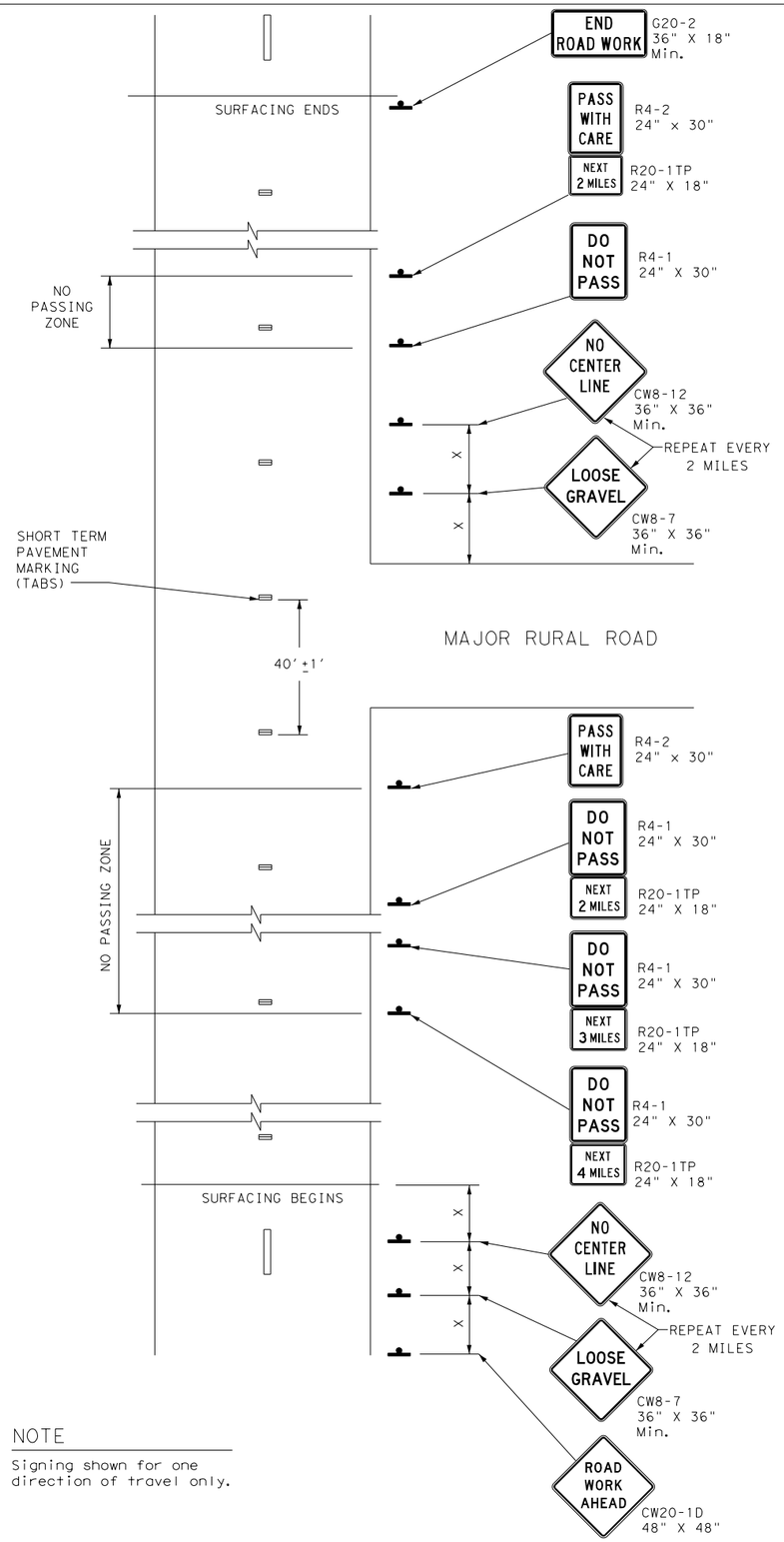
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN SHOULDER WORK FOR FREEWAYS / EXPRESSWAYS

TCP(5-1)-18

FILE: tcp5-1-18.dgn	DN:	CK:	DW:	CK:
©TxDOT February 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS	0266	01	086	SH 71
2-18	DIST	COUNTY		SHEET NO.
	YKM	FAYETTE		60

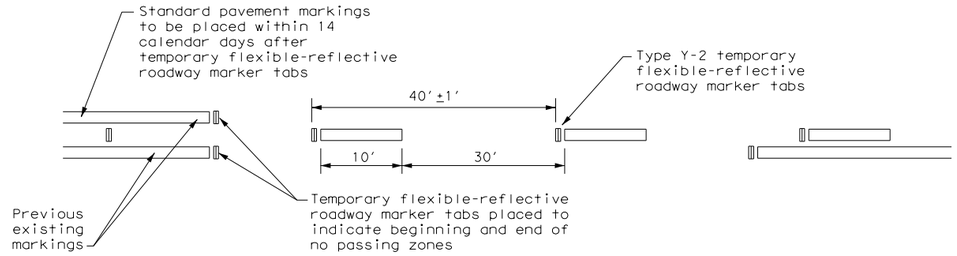
DATE:
FILE:



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
REVISIONS	0266	01	086	SH 71
4-92 4-98	DIST	COUNTY		SHEET NO.
1-97 7-13	YKM	FAYETTE		61

210

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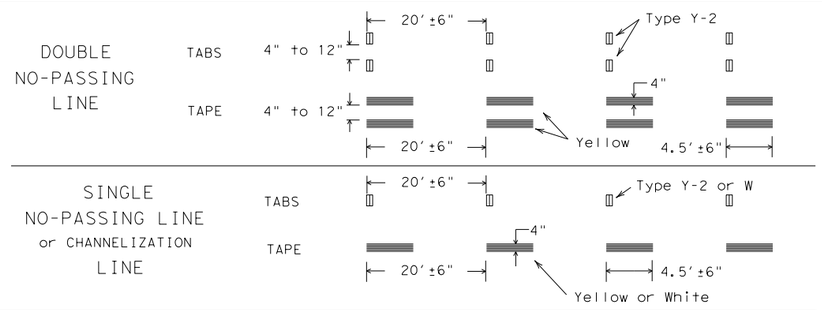
WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS



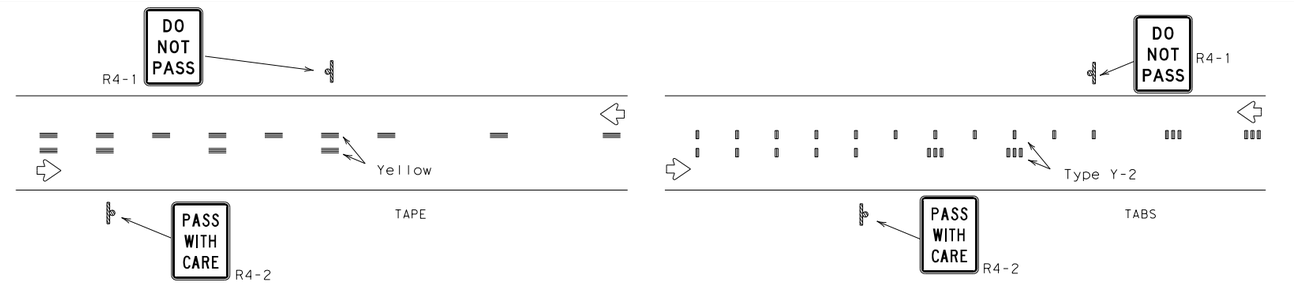
NOTES:

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.

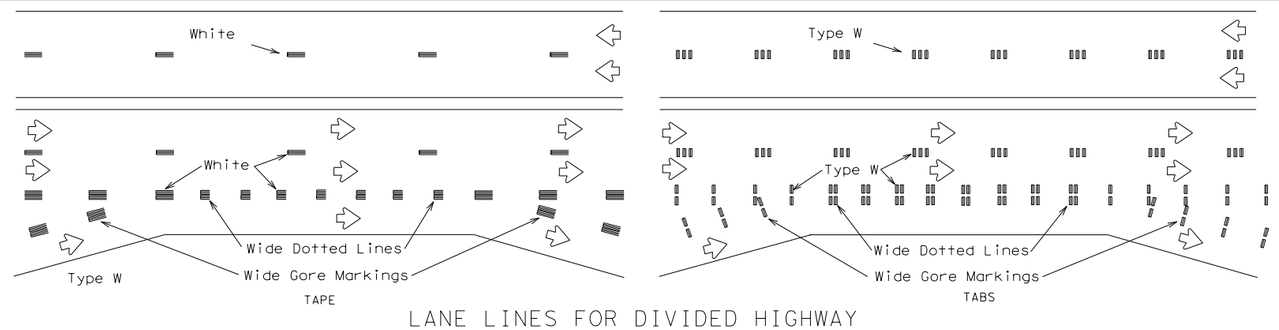
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

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.

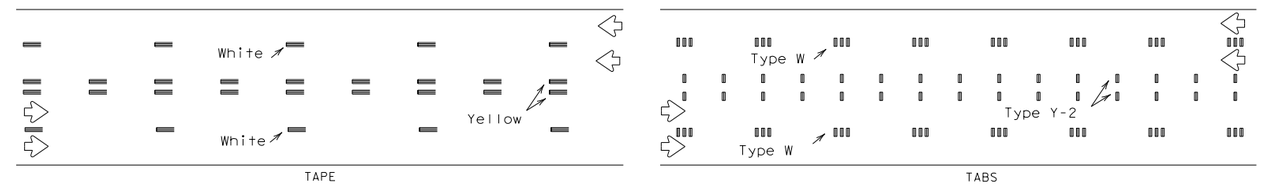
WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



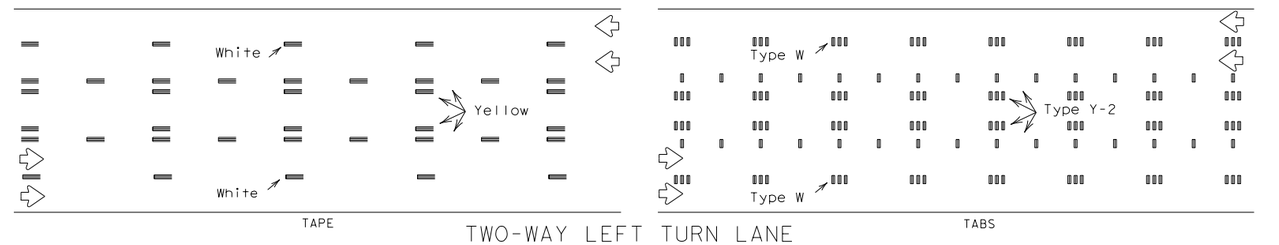
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



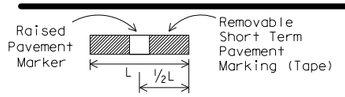
LANE LINES FOR DIVIDED HIGHWAY



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

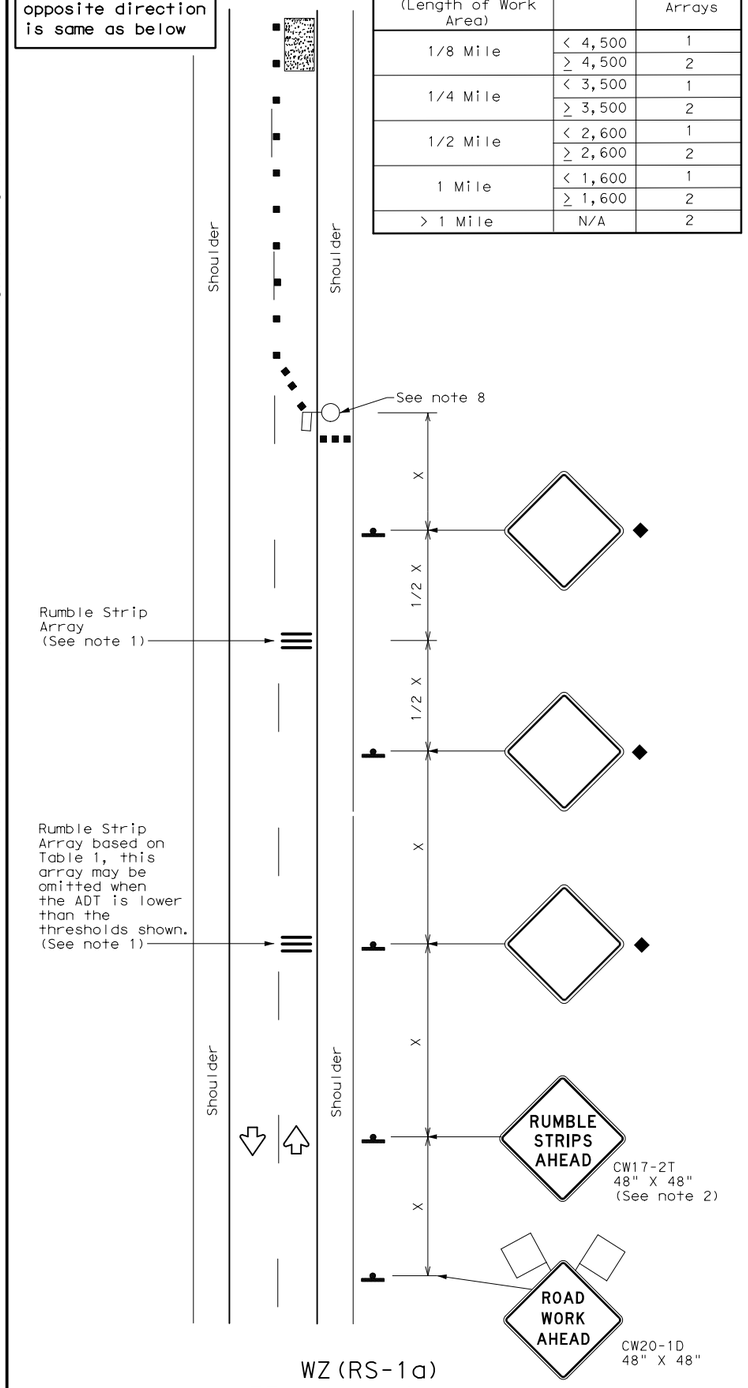
FILE:	wzstpm-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS		0266	01	086	SH 71
1-97		DIST	COUNTY		SHEET NO.
3-03		YKM	FAYETTE		62
7-13					

111

DATE:
FILE:

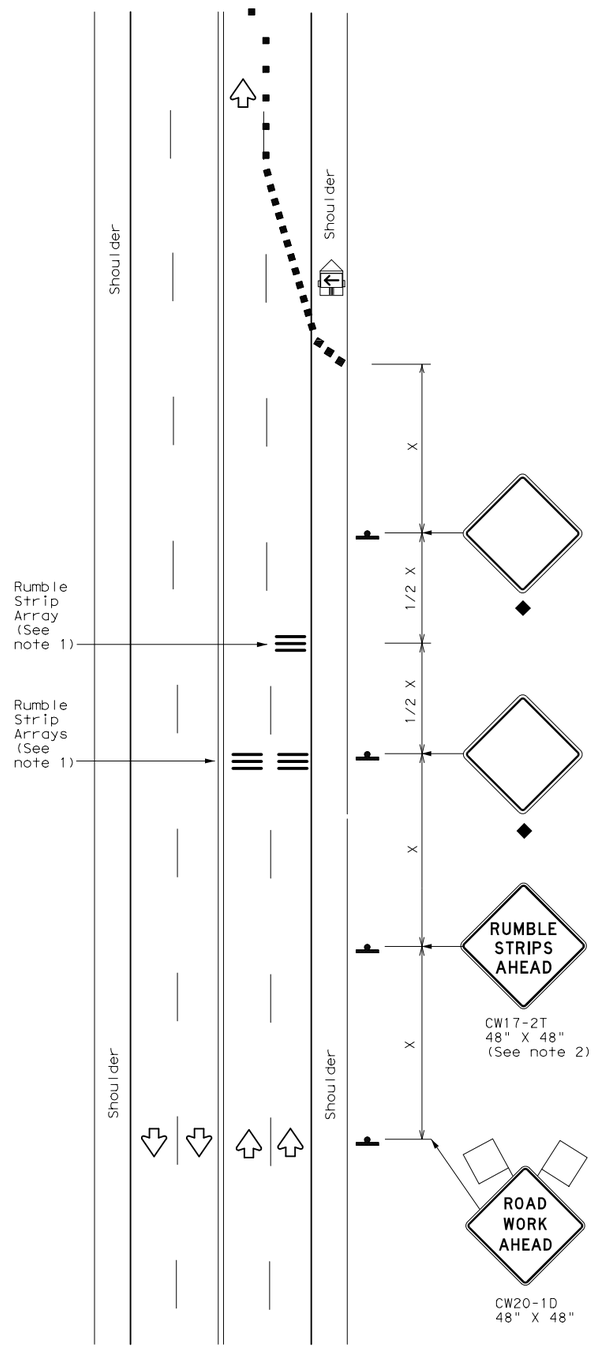
Warning sign and rumble strip sequence in opposite direction is same as below

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)
75 mph or Less

RUMBLE STRIPS ON ONE-LANE TWO-WAY APPLICATION



WZ(RS-1b)
75 mph or Less

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. Removal of the Temporary Rumble Strips should be accomplished before removing the advance 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 AFAD or a portable traffic signal.
9. Temporary Rumble Strips may be used on freeways or expressways based on engineering judgment.

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.

TABLE 2	
Speed	Approximate distance between strips in an Array
≤ 40 MPH	10'
> 40 MPH & ≤ 55 MPH	15'
> 55 MPH	20'

Texas Department of Transportation

Traffic Operations Division Standard

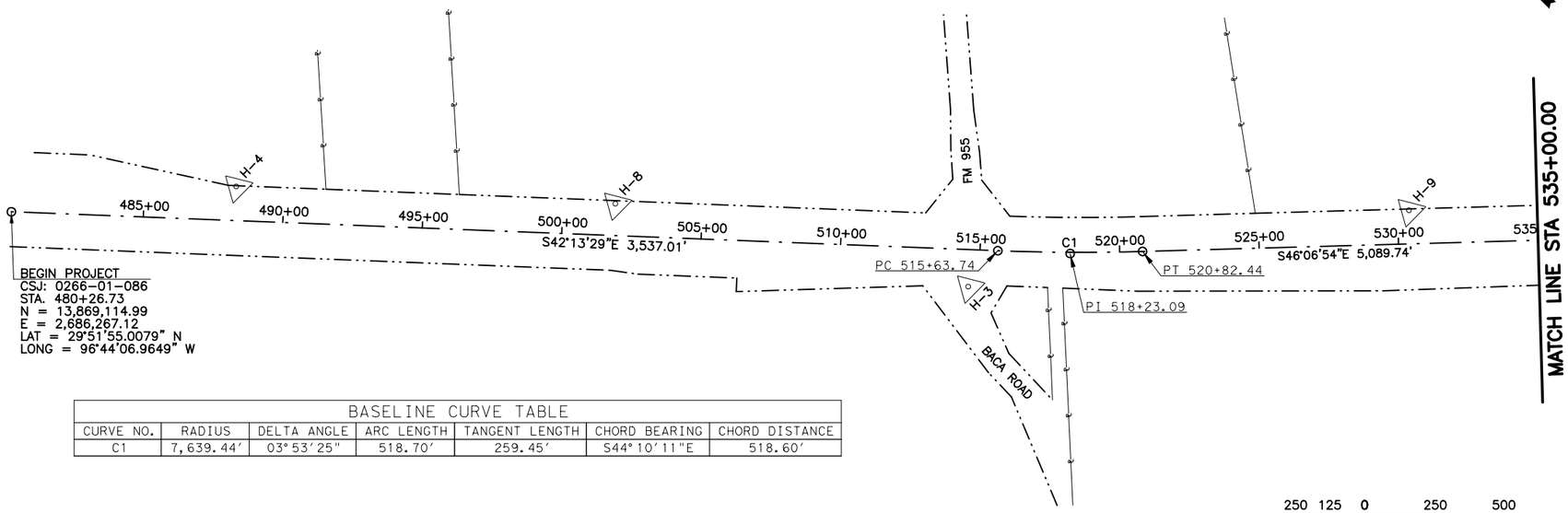
TEMPORARY RUMBLE STRIPS

WZ(RS)-16

FILE: wzrs16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS	0266	01	086	SH 71
2-14	DIST	COUNTY		SHEET NO.
4-16	YKM	FAYETTE		62A

CONTROL MONUMENTATION						
POINT NO.	NORTHING (Y)	EASTING (X)	ELEVATION	STATION	OFFSET	DESCRIPTION
H-3	13,866,481.32′	2,688,477.76′	293.10′	514+62.64	132.92′ RT	SET 5/8" IR W/PLASTIC GREEN CAP "MBCO"
H-4	13,868,603.85′	2,686,896.31′	276.91′	488+28.08	122.42′ LT	SET 5/8" IR W/PLASTIC GREEN CAP "MBCO"
H-8	13,867,591.44′	2,687,803.84′	285.79′	501+87.67	114.08′ LT	SET 5/8" IR W/PLASTIC GREEN CAP "MBCO"
H-9	13,865,546.47′	2,689,779.87′	289.38′	530+40.77	120.71′ LT	SET 5/8" IR W/PLASTIC GREEN CAP "MBCO"

MONUMENT INVERSE			
FROM POINT	BEARING	DISTANCE	TO POINT
H-2	N44°37′07"W	1,578.40′	H-9
H-9	N54°19′24"W	1,602.95′	H-3
H-3	N31°15′38"W	1,298.67′	H-8
H-8	N41°52′24"W	1,359.62′	H-4



BASELINE CURVE TABLE						
CURVE NO.	RADIUS	DELTA ANGLE	ARC LENGTH	TANGENT LENGTH	CHORD BEARING	CHORD DISTANCE
C1	7,639.44′	03°53′25"	518.70′	259.45′	S44°10′11"E	518.60′

NOTES

1. ALL BEARINGS AND DISTANCES SHOWN HEREON ARE BASED ON THE TEXAS COORDINATE SYSTEM OF 1983, SOUTH CENTRAL ZONE NO. 4204, NAD83 (2011), EPOCH 2010.00, AND MEASURED IN U.S. SURVEY FEET.
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3. ALL ELEVATIONS SHOWN HEREON ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88), GEOID 2018.
4. THE HORIZONTAL AND VERTICAL POSITIONS OF MONUMENTS IN THE CONTROL NETWORK HAVE BEEN IDENTIFIED THROUGH TXDOT RTN.

LEGEND

PROPERTY LINE — APPROXIMATE ROW
PROPOSED BASELINE — CONTROL POINT

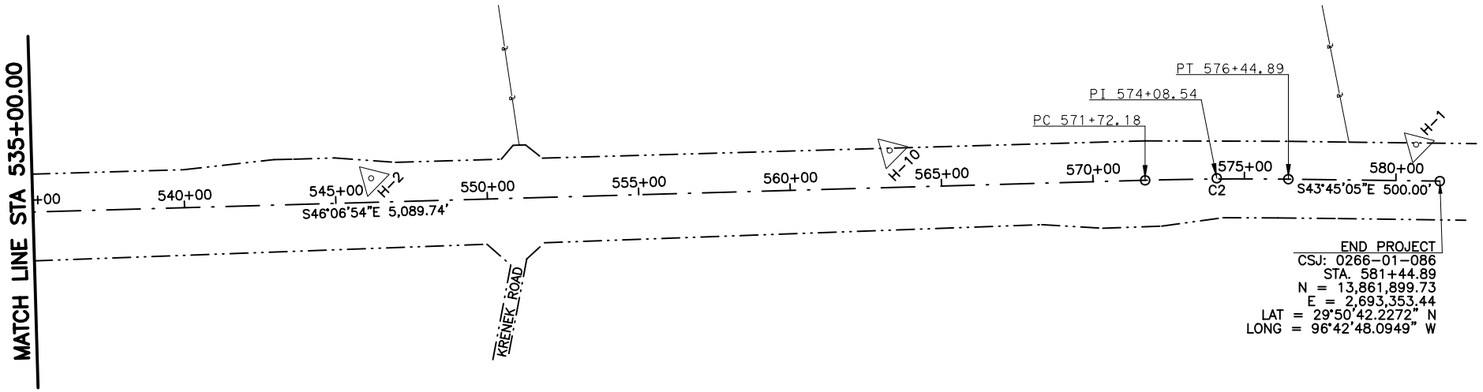
THIS SURVEY CONTROL INFORMATION HAS BEEN ACCEPTED AND INCORPORATED IN THIS PS&E.

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED
PROFESSIONAL ENGINEER

DATED: 3/3/2021

CONTROL MONUMENTATION						
POINT NO.	NORTHING (Y)	EASTING (X)	ELEVATION	STATION	OFFSET	DESCRIPTION
H-1	13,862,040.24′	2,693,384.72′	277.70′	580+65.02	119.76′ LT	SET 5/8" IR W/PLASTIC GREEN CAP "MBCO"
H-2	13,864,422.96′	2,690,888.51′	275.67′	546+18.64	79.49′ LT	SET 5/8" IR W/PLASTIC GREEN CAP "MBCO"
H-10	13,863,266.17′	2,692,152.98′	281.14′	563+31.98	122.30′ LT	SET 5/8" IR W/PLASTIC GREEN CAP "MBCO"

MONUMENT INVERSE			
FROM POINT	BEARING	DISTANCE	TO POINT
H-1	N45°08′07"W	1,737.83′	H-10
H-10	N47°32′47"W	1,713.78′	H-2
H-2	N44°37′07"W	1,578.40′	H-9



BASELINE CURVE TABLE						
CURVE NO.	RADIUS	DELTA ANGLE	ARC LENGTH	TANGENT LENGTH	CHORD BEARING	CHORD DISTANCE
C2	11,459.16′	02°21′49"	472.71′	236.39′	S44°56′00"E	472.68′

THE CONTROL POINTS SHOWN HEREIN WERE DETERMINED BY A SURVEY MADE ON THE GROUND UNDER MY SUPERVISION.

STATE OF TEXAS
REGISTERED
JOEL D. HILLER
5522
PROFESSIONAL
LAND SURVEYOR

DATED: 2/23/2021

SURVEY DATE:
JANUARY, 2021

MBCO ENGINEERING & SURVEYING
1505 Highway 6 South
Suite 180
Houston, Texas 77077
TBPE Reg. No. F16850
TBPLS Reg. No. 10194112
Phone: 281-760-1656
www.mbcoengineering.com

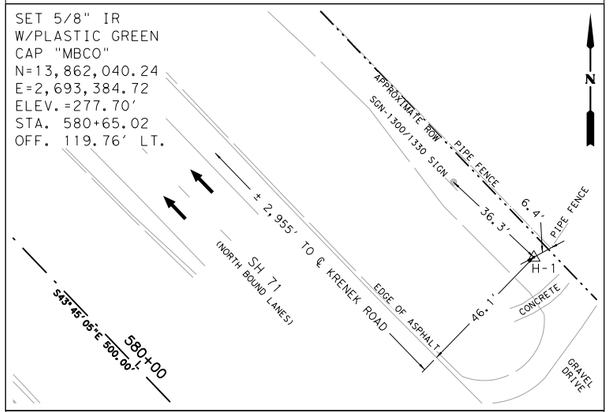
CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

SH 71

SURVEY CONTROL INDEX SHEET

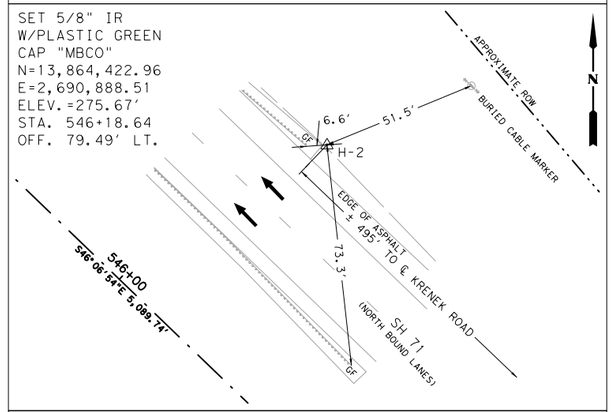
Designed:	SBS	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	JH	6	TEXAS				SH 71
Drawn:	SBS	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	JH	YKM	FAYETTE	0266	01	086	63

H-1



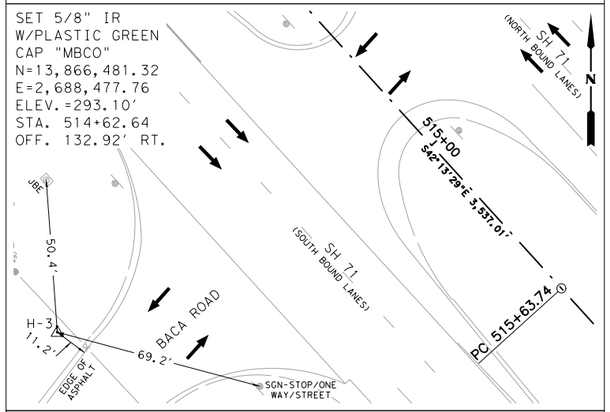
LOCATED NEAR THE NORTH ROW LINE OF SH 71, APPROXIMATELY 2,955' SOUTH OF THE CENTER LINE OF KRENEK ROAD, AT BASELINE STATION 580+65.02, 119.76' LEFT.

H-2



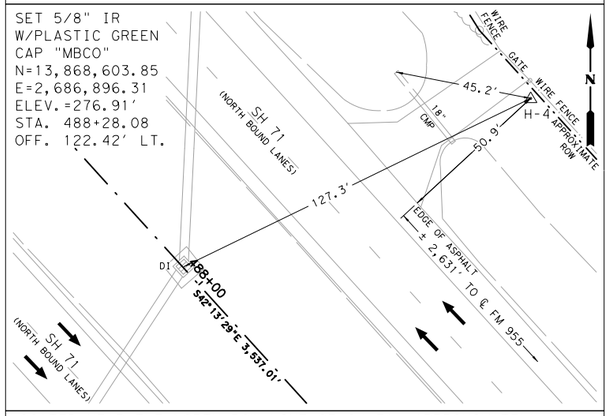
LOCATED ON THE NORTH SIDE OF SH 71, APPROXIMATELY 495' NORTH OF THE CENTERLINE OF KRENEK ROAD, AT BASELINE STATION 546+18.64, 79.49' LEFT.

H-3



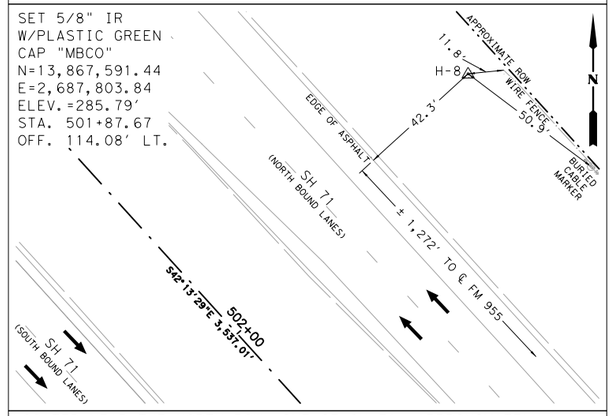
LOCATED ON THE SOUTH SIDE OF SH 71, APPROXIMATELY 28' NORTH OF THE CENTERLINE OF BACA ROAD, AT BASELINE STATION 514+62.64, 132.92' RIGHT.

H-4



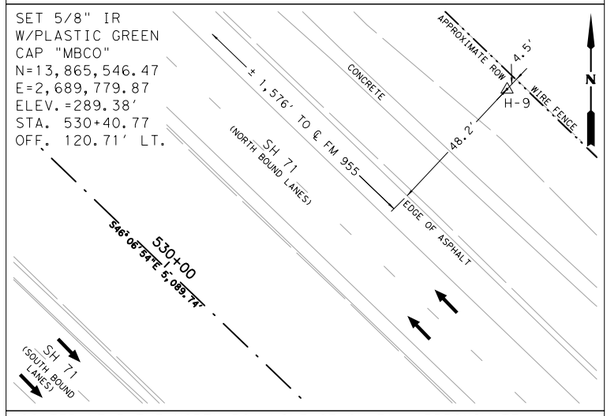
LOCATED NEAR THE NORTH ROW LINE OF SH 71, APPROXIMATELY 2,631' NORTH OF THE CENTERLINE OF FM 955, AT BASELINE STATION 488+28.08, 122.42' LEFT.

H-8



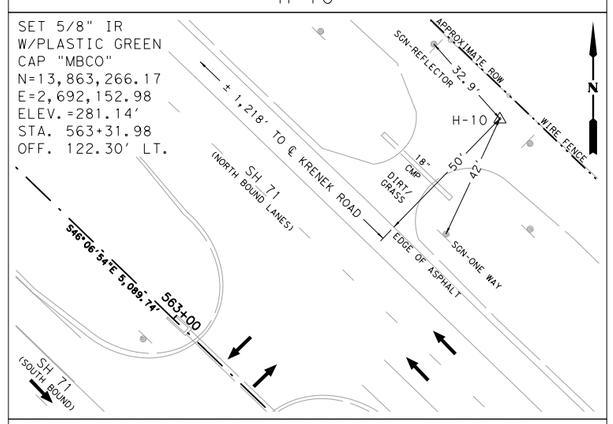
LOCATED NEAR THE NORTH ROW LINE OF SH 71, APPROXIMATELY 1,272' NORTH OF THE CENTERLINE OF FM 955, AT BASELINE STATION 501+87.67, 114.08' LEFT.

H-9



LOCATED NEAR THE NORTH ROW LINE OF SH 71, APPROXIMATELY 1,576' SOUTH OF THE CENTERLINE OF FM 955, AT BASELINE STATION 530+40.77, 120.71' LEFT.

H-10



LOCATED NEAR THE NORTH ROW LINE OF SH 71, APPROXIMATELY 1,218' SOUTH OF THE CENTERLINE OF KRENEK ROAD, AT BASELINE STATION 563+31.98, 122.30' LEFT.

NOTES

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LEGEND

△ CONTROL POINT

0 25 50

SCALE: 1 INCH = 50 FEET

THIS SURVEY CONTROL INFORMATION HAS BEEN ACCEPTED AND INCORPORATED IN THIS PS&E.

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED
PROFESSIONAL ENGINEER

DATED: 3/3/2021

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STATE OF TEXAS
REGISTERED
JOEL D. HILLER
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PROFESSIONAL
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DATED: 2/23/2021

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CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

SH 71

HORIZONTAL & VERTICAL CONTROL SHEET

Designed:	SBS	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	JH	6	TEXAS					SH 71
Drawn:	SBS	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	JH	YKM	FAYETTE	0266	01	086		64

Chain CLSH71 contains:
400 CUR CLSH711 CUR CLSH712 401

Beginning chain CLSH71 description

Point 400 N 13,869,114.9878 E 2,686,267.1222 Sta 480+26.73

Course from 400 to PC CLSH711 S 42° 13′ 29.01" E Dist 3,537.0100

		Curve Data			
Curve CLSH711					
P.I. Station	518+23.19	N	13,866,303.6537	E	2,688,818.4957
Delta =	3° 53′ 24.90"	(LT)			
Degree =	0° 45′ 00.00"				
Tangent =	259.4497				
Length =	518.7000				
Radius =	7,639.4373				
External =	4.4044				
Long Chord =	518.6004				
Mid. Ord. =	4.4019				
P.C. Station	515+63.74	N	13,866,495.7800	E	2,688,644.1351
P.T. Station	520+82.44	N	13,866,123.7996	E	2,689,005.4895
C.C.		N	13,871,629.7889	E	2,694,301.2505
Back = S	42° 13′ 29.01" E				
Ahead = S	46° 06′ 53.91" E				
Chord Bear = S	44° 10′ 11.46" E				

Course from PT CLSH711 to PC CLSH712 S 46° 06′ 53.91" E Dist 5,089.7400

		Curve Data			
Curve CLSH712					
P.I. Station	574+08.57	N	13,862,431.6555	E	2,692,844.2023
Delta =	2° 21′ 48.78"	(RT)			
Degree =	0° 30′ 00.00"				
Tangent =	236.3885				
Length =	472.7100				
Radius =	11,459.1560				
External =	2.4379				
Long Chord =	472.6765				
Mid. Ord. =	2.4374				
P.C. Station	571+72.18	N	13,862,595.5232	E	2,692,673.8295
P.T. Station	576+44.89	N	13,862,260.9010	E	2,693,007.6723
C.C.		N	13,854,336.5393	E	2,684,730.1879
Back = S	46° 06′ 53.91" E				
Ahead = S	43° 45′ 05.13" E				
Chord Bear = S	44° 55′ 59.52" E				

Course from PT CLSH712 to 401 S 43° 45′ 05.13" E Dist 500.0000

Point 401 N 13,861,899.7276 E 2,693,353.4378 Sta 581+44.89

Ending chain CLSH71 description

VERTICAL ALIGNMENT DATA

PI	ELEV	CURVE LENGTH	CREST/SAG	G1%	G2%	A	K	e	DESIGN SPEED
472+50	260.17	400	SAG	−0.002222	1.323076	1.325	302	0.66	> 80 MPH
492+00	285.97	700	CREST	1.323076	0.472000	0.851	822	0.74	> 80 MPH
514+50	296.59	750	CREST	0.472000	−0.399393	0.871	861	0.82	> 80 MPH
531+00	290.00	800	CREST	−0.399393	−1.300000	0.901	888	0.9	> 80 MPH
541+00	277.00	400	SAG	−1.300000	0.000000	1.300	308	0.65	> 80 MPH
546+50	277.00	300	SAG	0.000000	0.510476	0.510	588	0.19	> 80 MPH
557+00	282.36	800	CREST	0.510476	−0.510000	1.020	784	1.02	> 80 MPH
572+00	274.10	300	SAG	−0.510000	0.221400	0.731	410	0.27	> 80 MPH
586+00	277.80	300	SAG	0.221400	0.366670	0.145	2065	0.05	> 80 MPH
598+00	282.20	300	CREST	0.366670	0.200000	0.167	1800	0.06	> 80 MPH

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED
PROFESSIONAL ENGINEER
03/24/2021

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F−1741

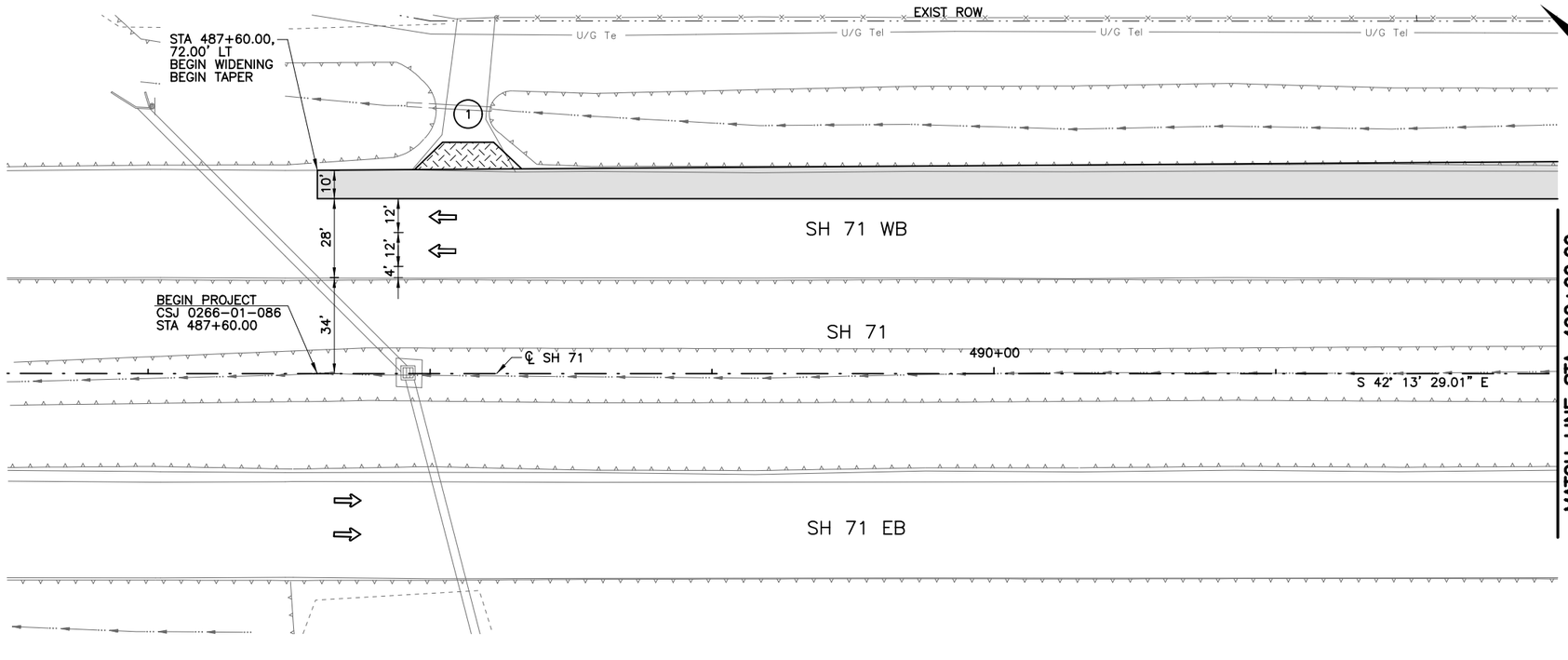
 Texas Department of Transportation

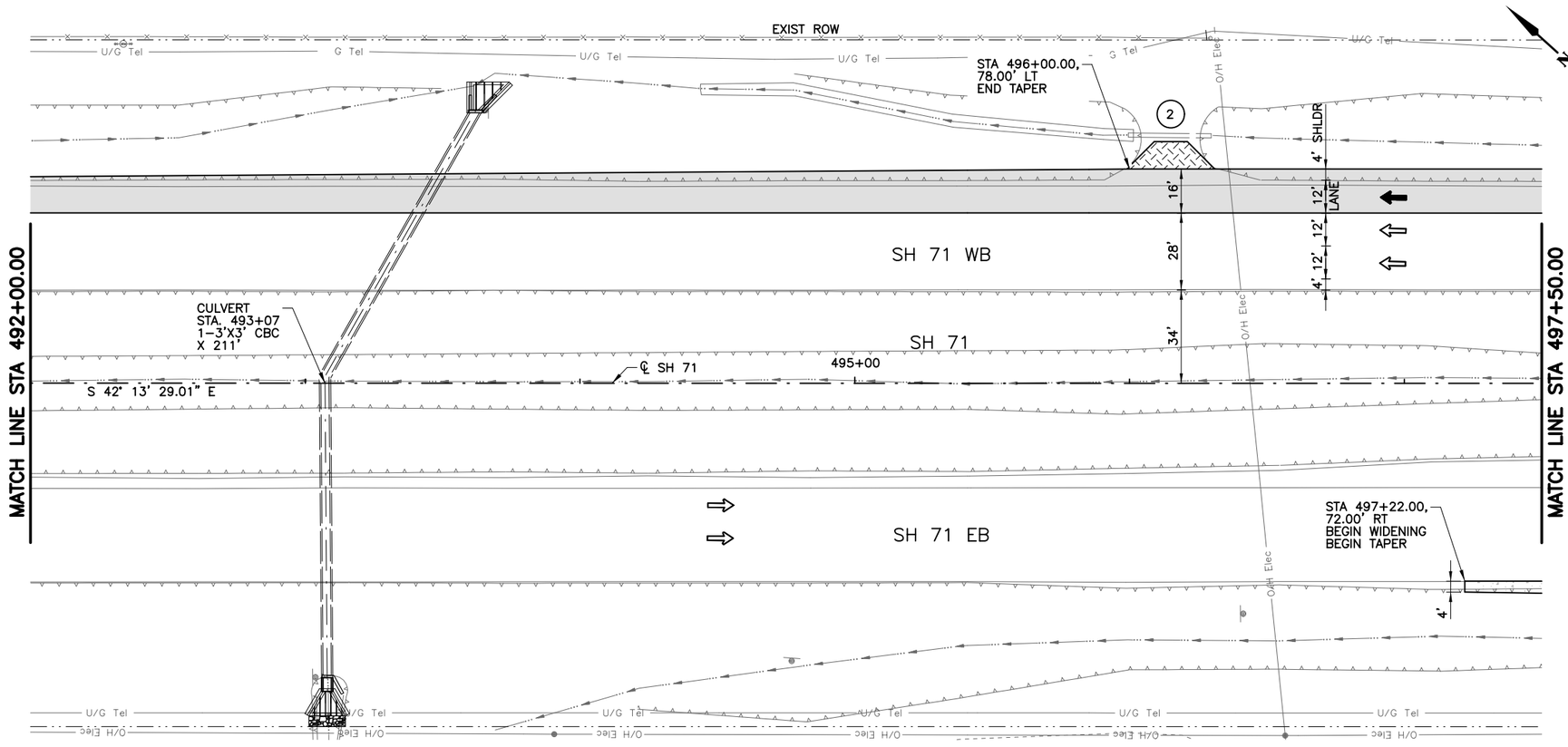
SH 71

HORIZONTAL AND VERTICAL ALIGNMENT DATA

SHEET 1 OF 1

Designed: GM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.	
Checked: BAJ	6	TEXAS					SH 71	
Drawn: GM	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.	
Checked: BAJ	YKM	FAYETTE	0266	01	086		65	





25 12.5 0 25 50
SCALE HORIZ. FEET

LEGEND

- DIRECTION OF TRAFFIC
- FLOW DIRECTION
- PROPOSED MAILBOX
- PROPOSED DRIVEWAY
- PROPOSED HMA
- PROPOSED CONCRETE
- OBLITERATE/REMOVE PAVEMENT
- (XX) DRIVEWAY NUMBER
- EXISTING ROW
- EXISTING FENCE
- EXISTING DITCH BANKS
- O/H Elec — OVERHEAD ELECTRIC
- U/G Tel — UNDERGROUND TELEPHONE
- GAS — GAS LINE

NOTES

1. FOR DRIVEWAY INFORMATION, SEE DRIVEWAY SUMMARY AND MISCELLANEOUS DETAILS.
2. FOR MAILBOX INFORMATION, SEE MAILBOX SUMMARY.
3. FOR CULVERT INFORMATION, SEE CULVERT LAYOUT.
4. FOR WESTBOUND PAVEMENT TRANSITION SEE MISCELLANEOUS DETAILS.
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6. EXISTING RIGHT OF WAY IS SHOWN IN AN APPROXIMATE LOCATION. A BOUNDARY SURVEY WAS NOT PERFORMED.

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED
PROFESSIONAL ENGINEER
03/24/2021

NO.	REVISION	BY	DATE

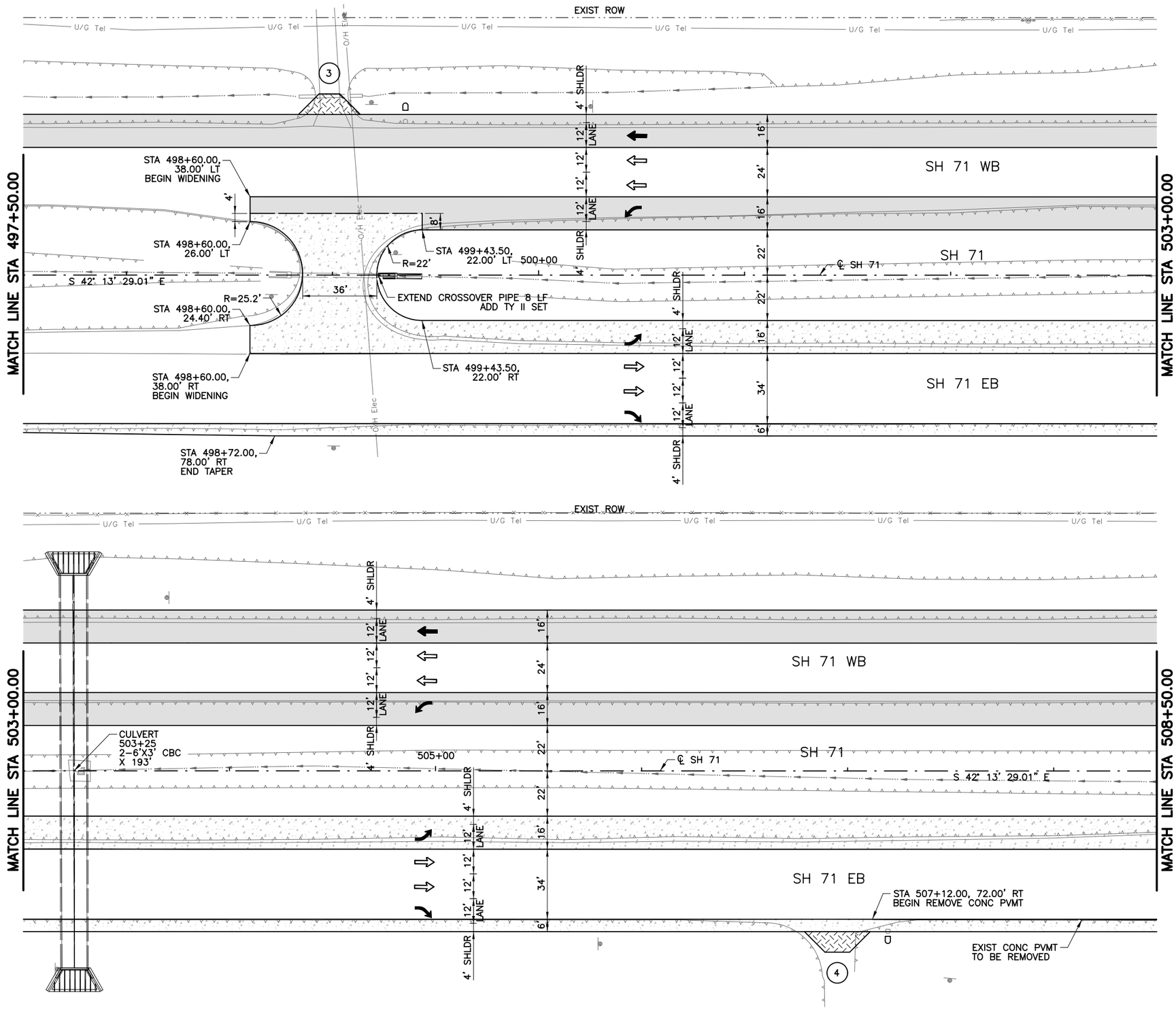
CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

SH 71

PLAN LAYOUT
STA 487+60.00 TO STA 497+50.00

SHEET 1 OF 9

Designed:	GM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					SH 71
Drawn:	SW	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086		66



SCALE HORIZ. 25 12.5 0 25 50 FEET

LEGEND

- DIRECTION OF TRAFFIC
- FLOW DIRECTION
- PROPOSED MAILBOX
- PROPOSED DRIVEWAY
- PROPOSED HMA
- PROPOSED CONCRETE
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STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED
PROFESSIONAL ENGINEER
03/24/2021

NO.	REVISION	BY	DATE

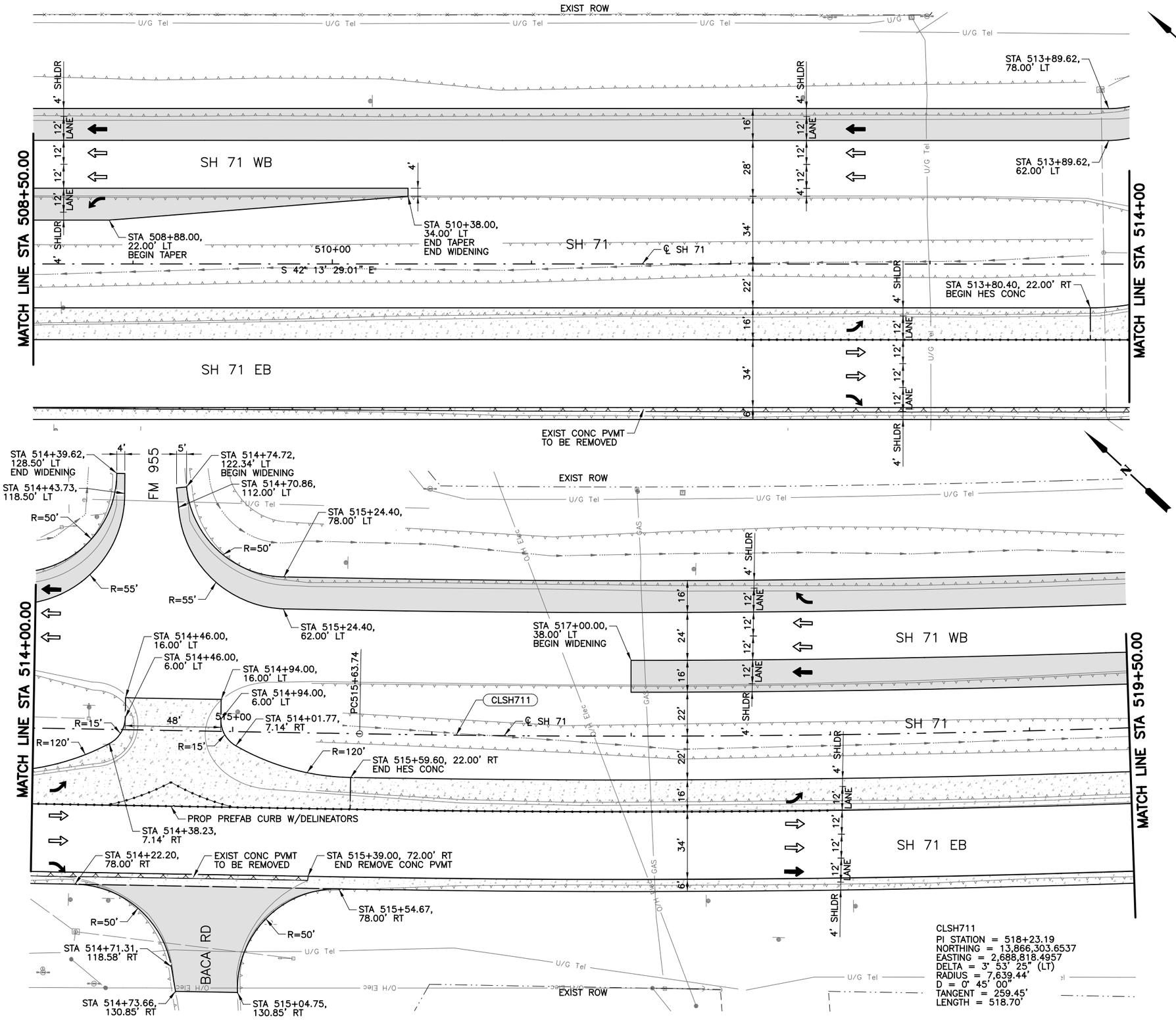
CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

SH 71

PLAN LAYOUT
STA 497+50.00 TO STA 508+50.00

SHEET 2 OF 9

Designed:	GM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					SH 71
Drawn:	SW	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086		67



25 12.5 0 25 50
SCALE HORIZ. FEET

LEGEND

- DIRECTION OF TRAFFIC
- FLOW DIRECTION
- PROPOSED MAILBOX
- PROPOSED DRIVEWAY
- PROPOSED HMA
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STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED PROFESSIONAL ENGINEER
03/24/2021

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

SH 71

PLAN LAYOUT
STA 508+50.00 TO STA 519+50.00

SHEET 3 OF 9

Designed:	GM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					SH 71
Drawn:	SW	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086		68

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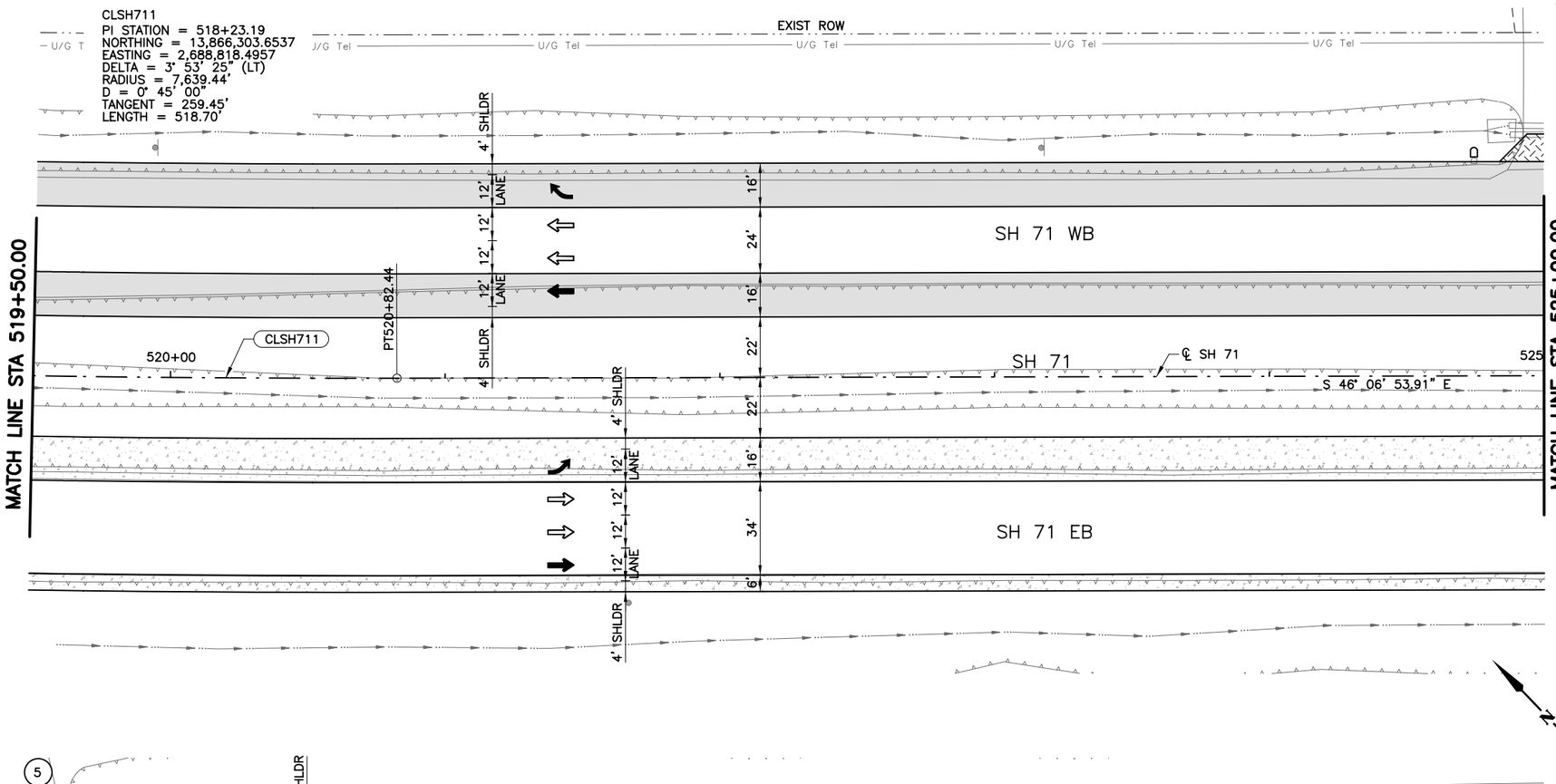

25 12.5 0 25 50

SCALE HORIZ. FEET

LEGEND

- DIRECTION OF TRAFFIC
- FLOW DIRECTION
- PROPOSED MAILBOX
- PROPOSED DRIVEWAY
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NO.	REVISION	BY	DATE

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SH 71

PLAN LAYOUT
STA 519+50.00 TO STA 530+50.00

SHEET 4 OF 9

Designed:	GM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					SH 71
Drawn:	SW	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086		69

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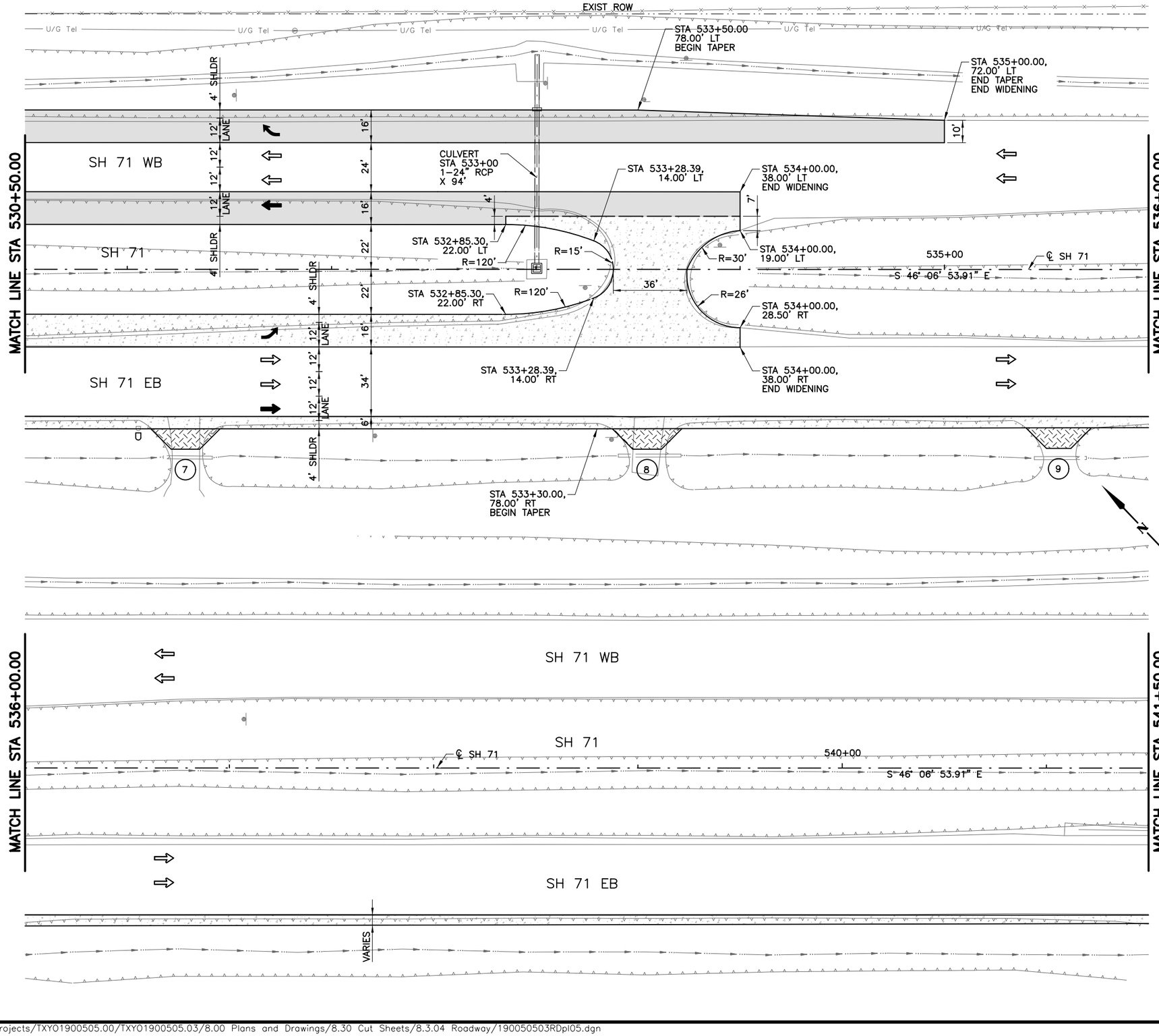

25 12.5 0 25 50
SCALE HORIZ. FEET

LEGEND

- DIRECTION OF TRAFFIC
- FLOW DIRECTION
- PROPOSED MAILBOX
- PROPOSED DRIVEWAY
- PROPOSED HMA
- PROPOSED CONCRETE
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95732
LICENSED
PROFESSIONAL ENGINEER
03/24/2021

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

SH 71

PLAN LAYOUT
STA 530+50.00 TO STA 541+50.00

SHEET 5 OF 9

Designed:	GM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					SH 71
Drawn:	SW	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086		70

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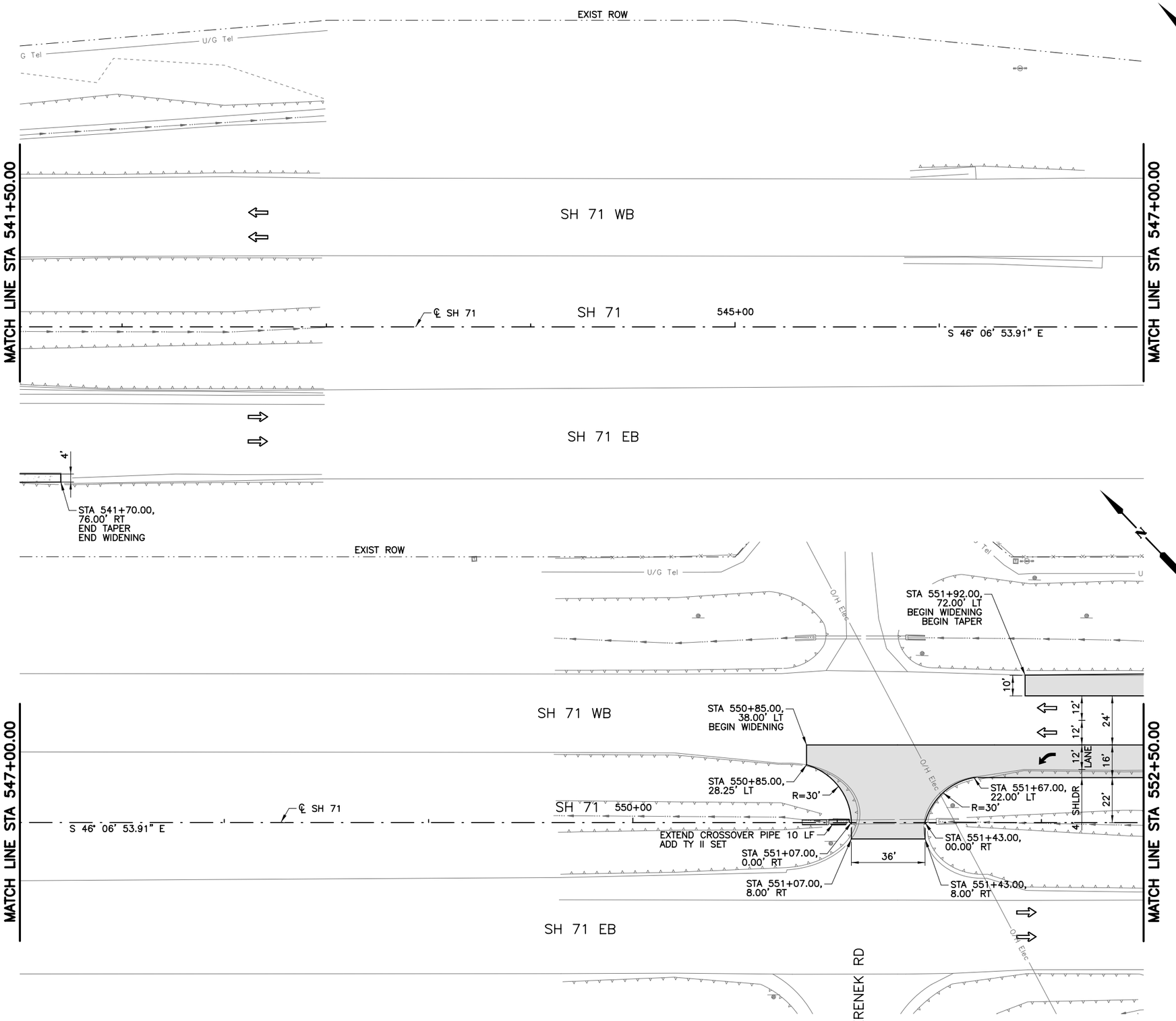

25 12.5 0 25 50
SCALE HORIZ. FEET

LEGEND

- DIRECTION OF TRAFFIC
- FLOW DIRECTION
- PROPOSED MAILBOX
- PROPOSED DRIVEWAY
- PROPOSED HMA
- PROPOSED CONCRETE
- OBLITERATE/REMOVE PAVEMENT
- XX DRIVEWAY NUMBER
- EXISTING ROW
- EXISTING FENCE
- EXISTING DITCH BANKS
- O/H Elec OVERHEAD ELECTRIC
- U/G Tel UNDERGROUND TELEPHONE
- GAS GAS LINE

NOTES

1. FOR DRIVEWAY INFORMATION, SEE DRIVEWAY SUMMARY AND MISCELLANEOUS DETAILS.
2. FOR MAILBOX INFORMATION, SEE MAILBOX SUMMARY.
3. FOR CULVERT INFORMATION, SEE CULVERT LAYOUT.
4. FOR WESTBOUND PAVEMENT TRANSITION SEE MISCELLANEOUS DETAILS.
5. THE LOCATION OF ALL UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION BEFORE COMMENCING WORK.
6. EXISTING RIGHT OF WAY IS SHOWN IN AN APPROXIMATE LOCATION. A BOUNDARY SURVEY WAS NOT PERFORMED.

STATE OF TEXAS
BRIAN A. JONES
95732
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03/24/2021

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SH 71

PLAN LAYOUT
STA 541+50.00 TO STA 552+50.00

SHEET 6 OF 9

Designed:	GM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	BAJ	6	TEXAS				SH 71
Drawn:	SW	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086	71

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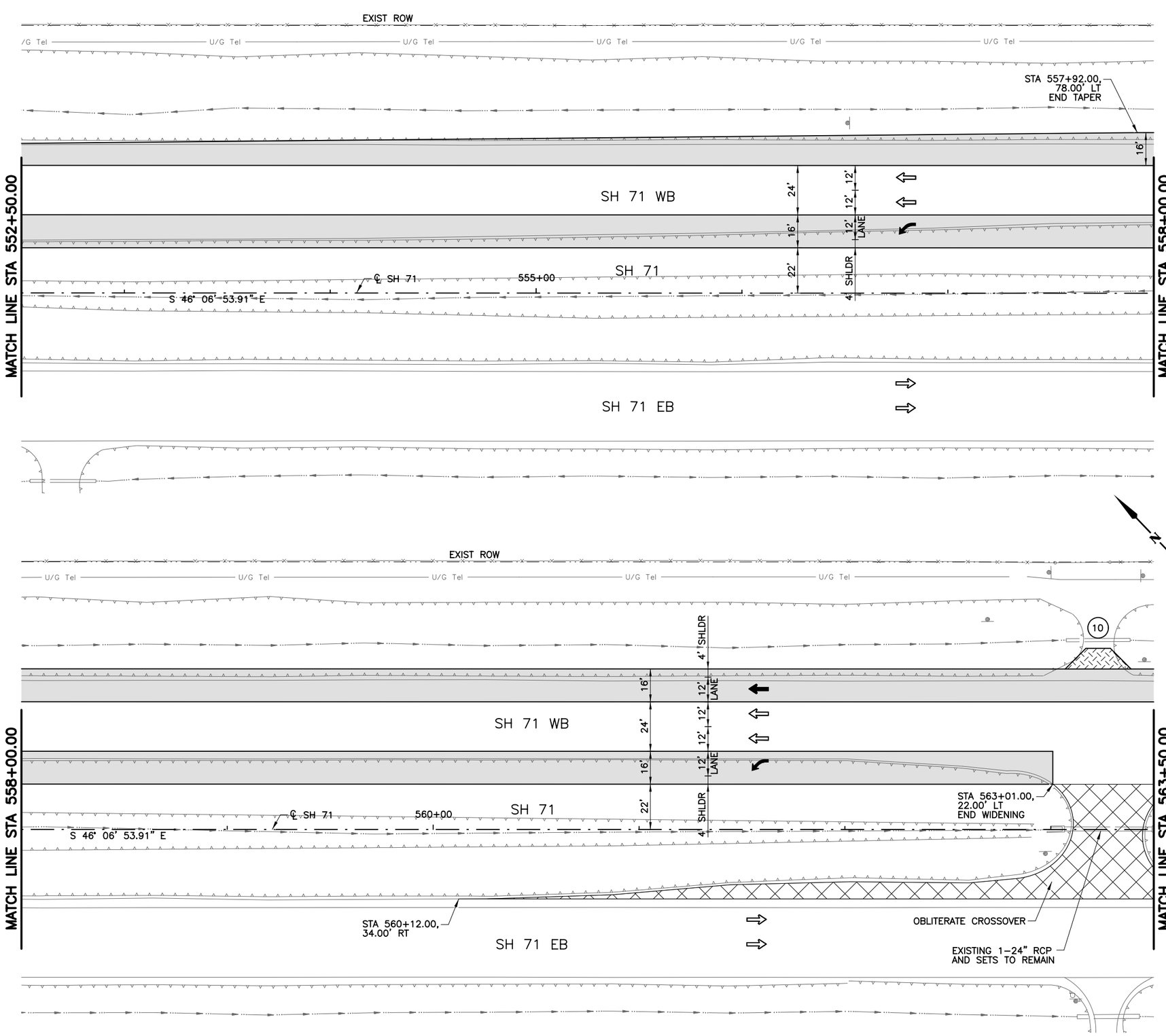

25 12.5 0 25 50
SCALE HORIZ. FEET

LEGEND

- DIRECTION OF TRAFFIC
- FLOW DIRECTION
- PROPOSED MAILBOX
- PROPOSED DRIVEWAY
- PROPOSED HMA
- PROPOSED CONCRETE
- OBLITERATE/REMOVE PAVEMENT
- (XX) DRIVEWAY NUMBER
- EXISTING ROW
- EXISTING FENCE
- EXISTING DITCH BANKS
- O/H Elec — OVERHEAD ELECTRIC
- U/G Tel — UNDERGROUND TELEPHONE
- GAS — GAS LINE

NOTES

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2. FOR MAILBOX INFORMATION, SEE MAILBOX SUMMARY.
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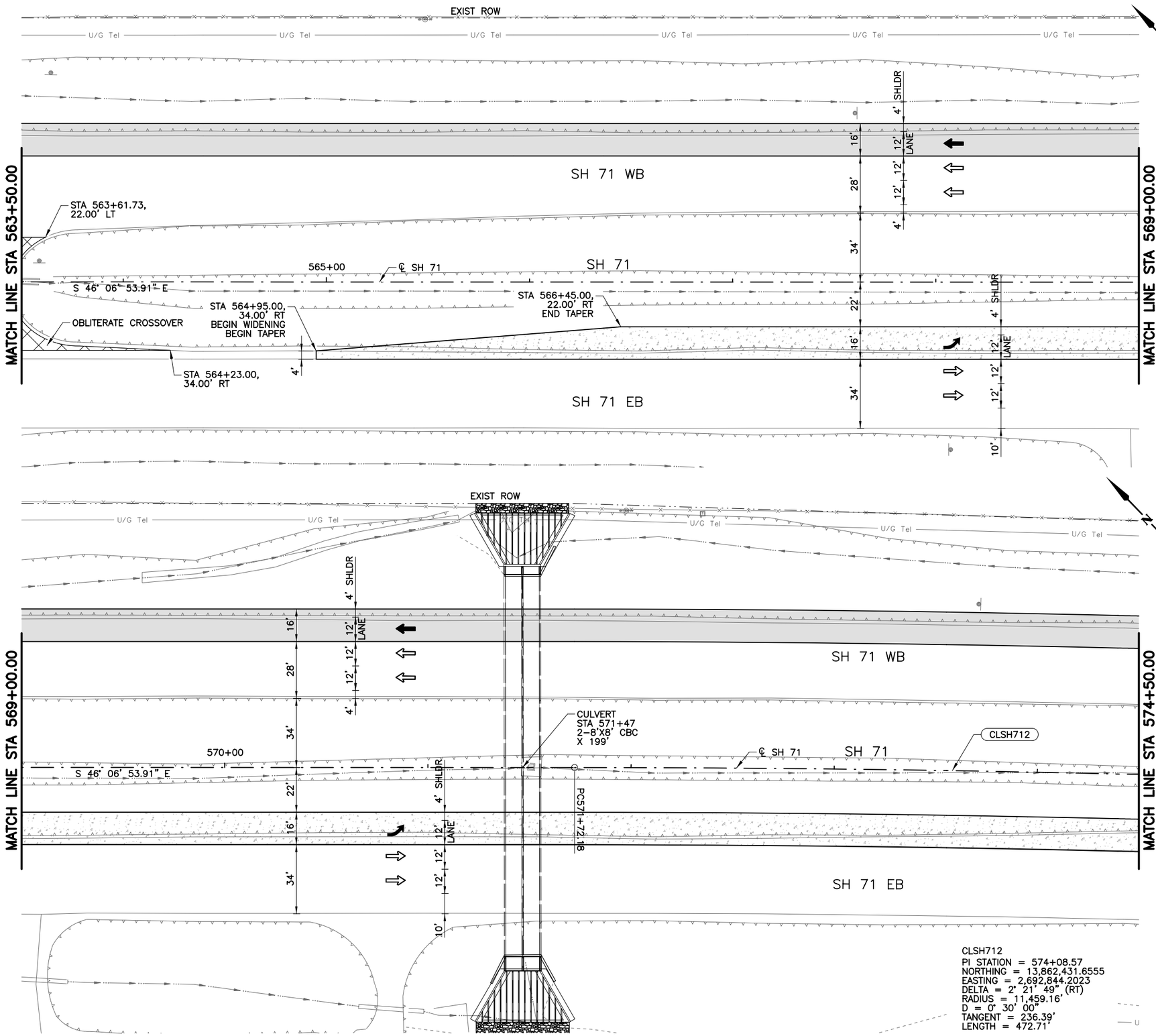
SH 71

PLAN LAYOUT
STA 552+50.00 TO STA 558+00.00

SHEET 7 OF 9

Designed:	GM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					SH 71
Drawn:	SW	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086		72



CLSH712
PI STATION = 574+08.57
NORTHING = 13,862,431.6555
EASTING = 2,692,844.2023
DELTA = 2° 21' 49" (RT)
RADIUS = 11,459.16'
D = 0° 30' 00"
TANGENT = 236.39'
LENGTH = 472.71'

LEGEND

- DIRECTION OF TRAFFIC
- FLOW DIRECTION
- PROPOSED MAILBOX
- PROPOSED DRIVEWAY
- PROPOSED HMA
- PROPOSED CONCRETE
- OBLITERATE/REMOVE PAVEMENT
- (XX) DRIVEWAY NUMBER
- EXISTING ROW
- EXISTING FENCE
- EXISTING DITCH BANKS
- O/H Elec — OVERHEAD ELECTRIC
- U/G Tel — UNDERGROUND TELEPHONE
- GAS — GAS LINE

NOTES

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3. FOR CULVERT INFORMATION, SEE CULVERT LAYOUT.
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SH 71

PLAN LAYOUT
STA 563+50.00 TO STA 574+50.00

SHEET 8 OF 9

Designed:	GM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	BAJ	6	TEXAS				SH 71
Drawn:	SW	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086	73

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PI STATION = 574+08.57
NORTHING = 13,862,431.6555
EASTING = 2,692,844.2023
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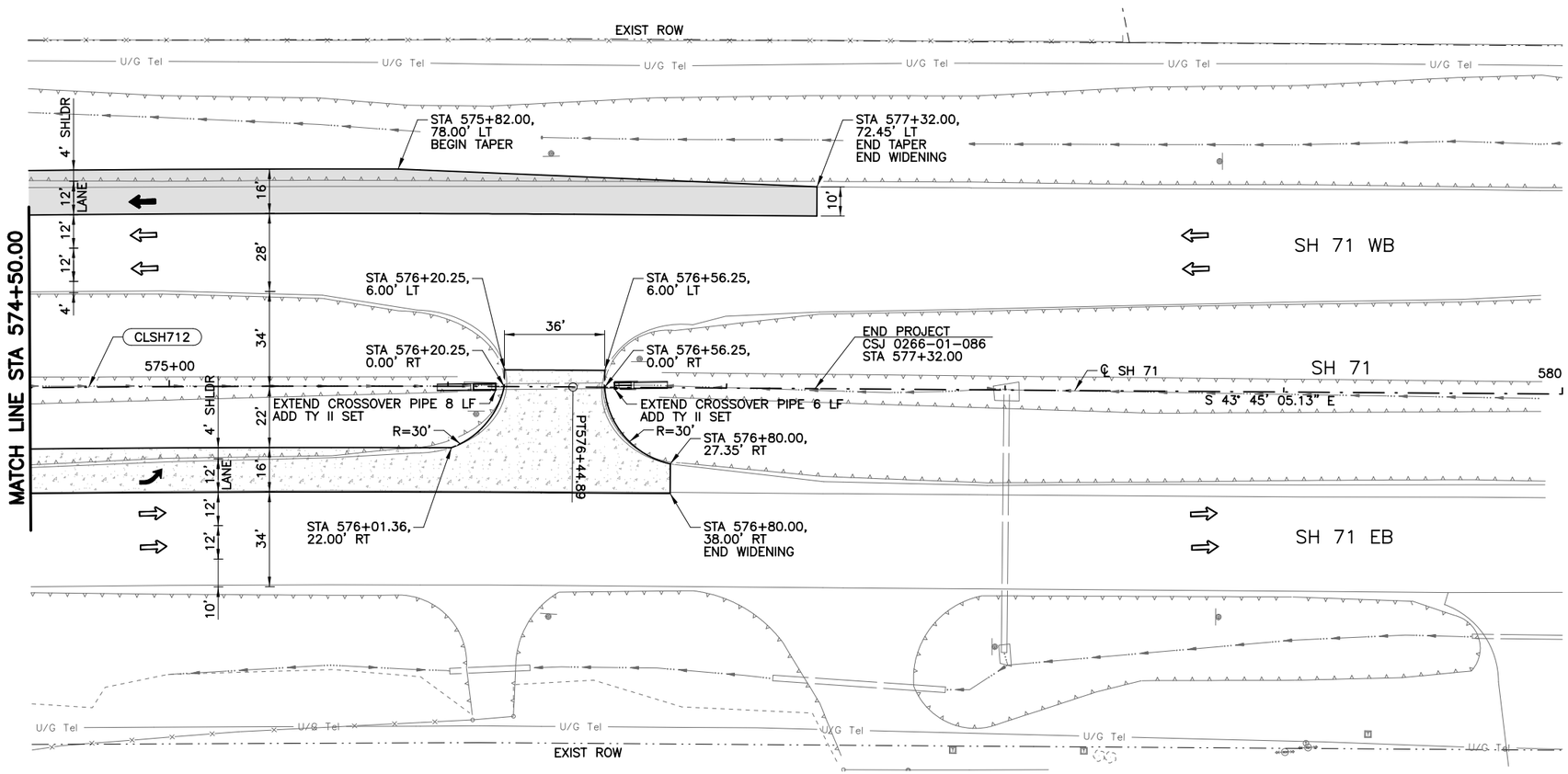
RADIUS = 11,459.16'
D = 0° 30' 00"
TANGENT = 236.39'
LENGTH = 472.71'



25 12.5 0 25 50
SCALE HORIZ. FEET

LEGEND

- DIRECTION OF TRAFFIC
- FLOW DIRECTION
- PROPOSED MAILBOX
- PROPOSED DRIVEWAY
- PROPOSED HMA
- PROPOSED CONCRETE
- OBLITERATE/REMOVE PAVEMENT
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NOTES

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2. FOR MAILBOX INFORMATION, SEE MAILBOX SUMMARY.
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SH 71

PLAN LAYOUT
STA 574+50.00 TO STA 577+32.00

SHEET 9 OF 9

Designed:	GM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	BAJ	6	TEXAS				SH 71
Drawn:	SW	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086	74

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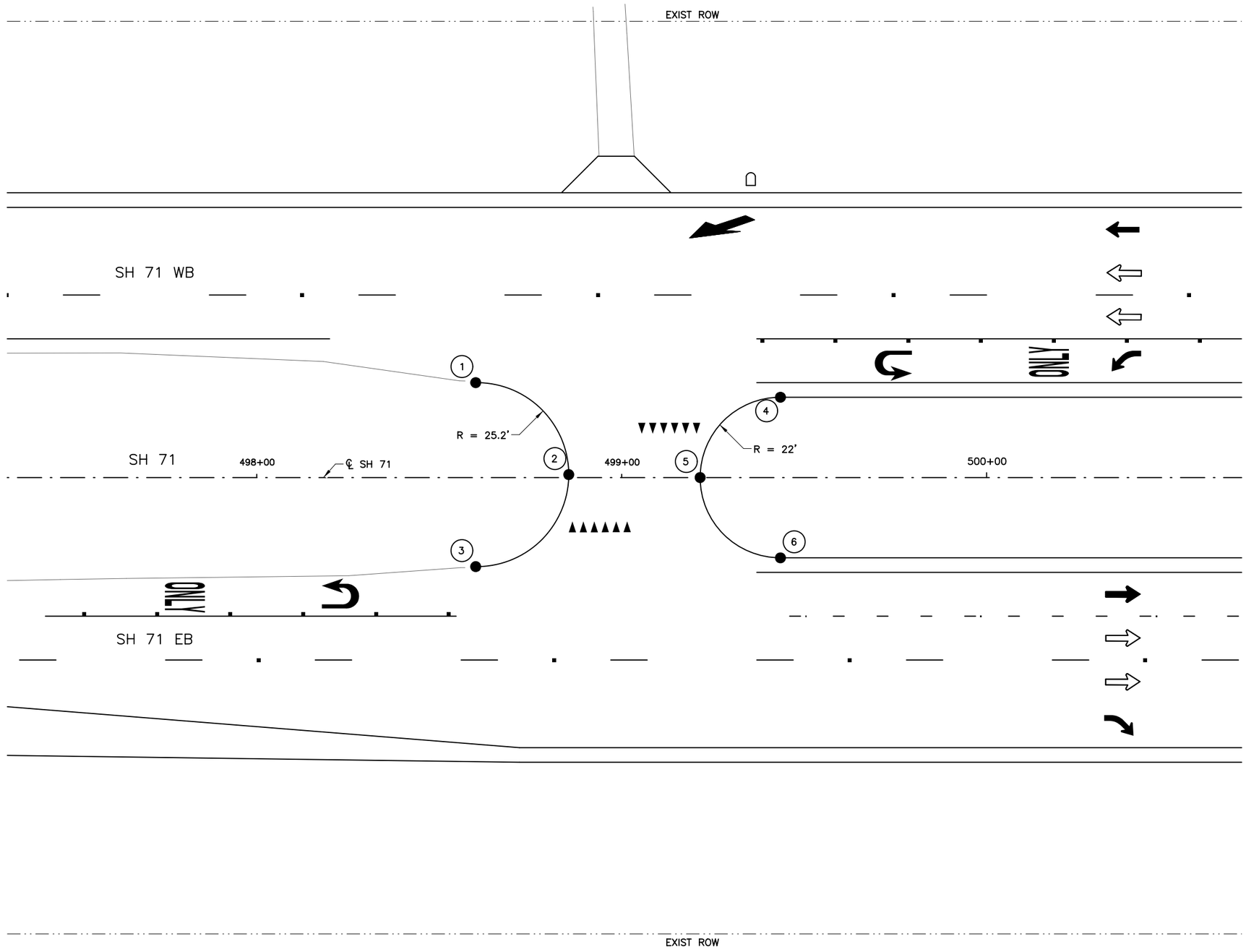

15 7.5 0 15 30
SCALE HORIZ. FEET

PAVEMENT EDGE KEY POINTS				
POINT #	DESCRIPTION	STATION	OFFSET	ELEVATION
1	PC	498+60.00	26.00' LT	288.97
2		498+85.50	0.00'	289.25
3	PT	498+60.00	24.40' RT	288.93
4	PC	499+43.50	22.00' LT	289.08
5		499+21.50	0.00'	289.59
6	PT	499+43.50	22.00' RT	289.26

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SH 71

INTERSECTION LAYOUT

SHEET 1 OF 5

Designed:	GM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	BAJ	6	TEXAS				SH 71
Drawn:	SW	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086	75

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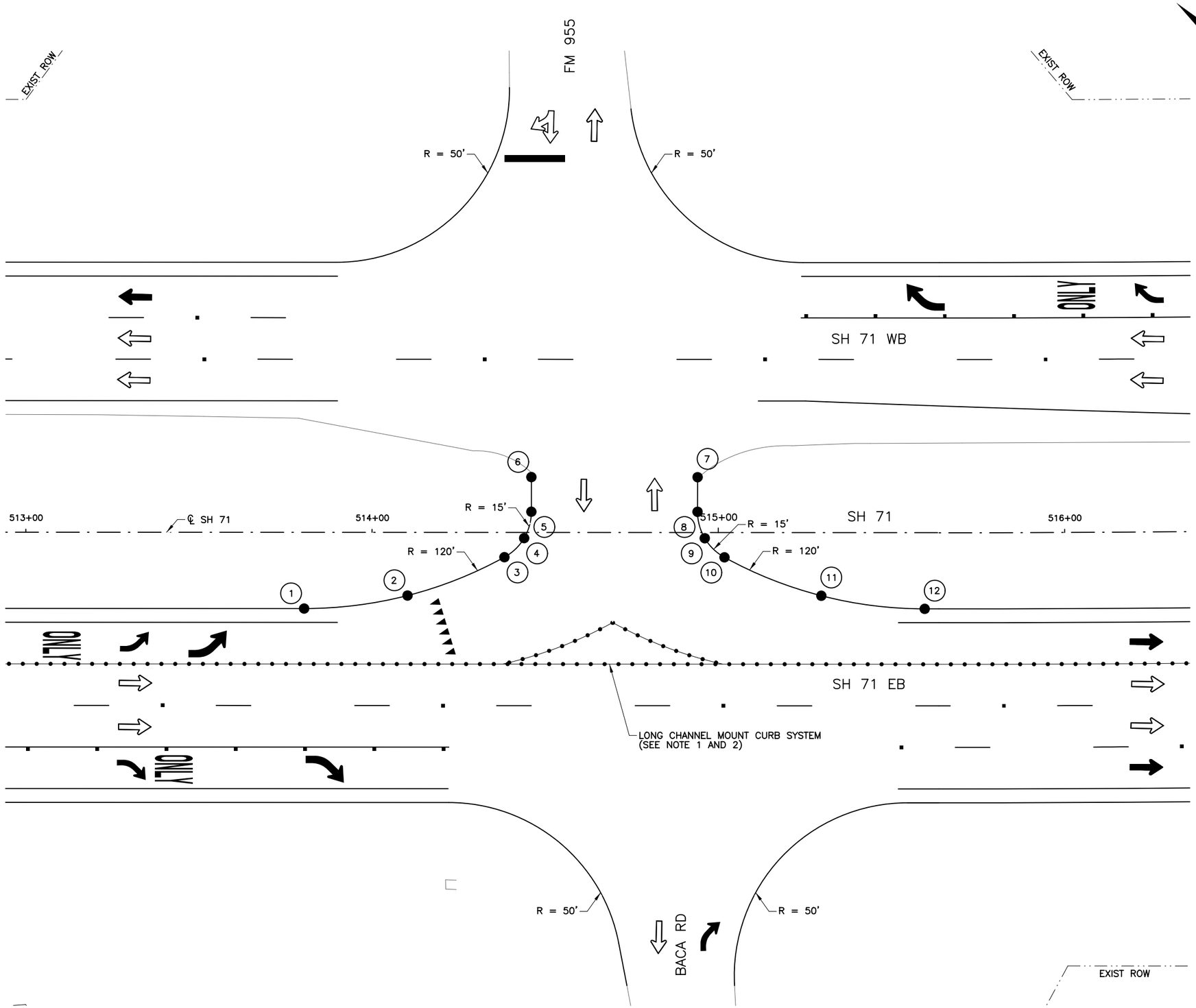

15 7.5 0 15 30
SCALE HORIZ. FEET

PAVEMENT EDGE KEY POINTS				
POINT #	DESCRIPTION	STATION	OFFSET	ELEVATION
1	PC	513+80.40	22.00' RT	295.55
2		514+10.26	18.23' RT	295.67
3	PC	514+38.23	7.14' RT	295.80
4		514+43.91	1.63' RT	295.83
5	PT	514+46.00	6.00' LT	295.86
6		514+46.00	16.00' LT	295.91
7		514+94.00	16.00' LT	296.00
8	PC	514+94.00	6.00' LT	295.94
9		514+96.09	1.63' RT	295.89
10	PC	515+01.77	7.14' RT	295.84
11		515+29.74	18.23' RT	295.65
12	PT	515+59.60	18.23' RT	295.45

NOTES

1. SEE SIGNING, PAVEMENT MARKING AND SW3P LAYOUT FOR STATION LIMITS FOR THE LONG CHANNEL MOUNT CURB SYSTEM.
2. PROVIDE DELINEATORS COMPRISED OF RUBBER COMPOSITE WITH 80% BY VOLUME POST CONSUMER RECYCLED HDPE AND A BRIGHT WHITE PREMIUM U.V. INGIBITED, CO-EXTRUDED HDTP SHELL. THIS WORK WILL BE CONSIDERED SUBSIDIARY TO ITEM 6049.

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SH 71

INTERSECTION LAYOUT

SHEET 2 OF 5

		FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Designed:	GM	6	TEXAS				SH 71
Checked:	BAJ	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Drawn:	SW	YKM	FAYETTE	0266	01	086	76
Checked:	BAJ						

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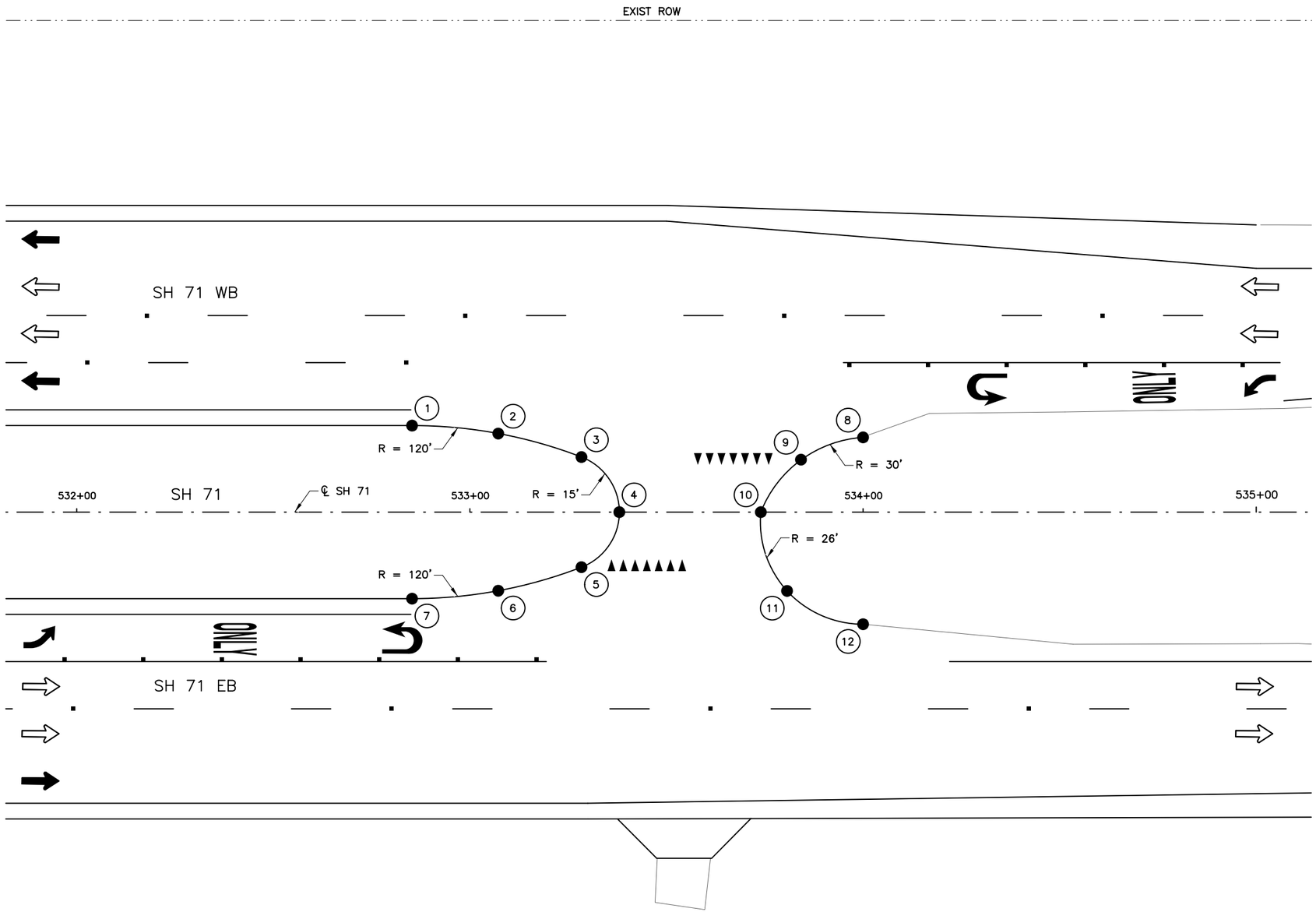

15 7.5 0 15 30
SCALE HORIZ. FEET

N

PAVEMENT EDGE KEY POINTS				
POINT #	DESCRIPTION	STATION	OFFSET	ELEVATION
1	PC	532+85.30	22.00' LT	287.35
2		533+07.21	19.98' LT	287.16
3	PC	533+28.39	14.00' LT	286.96
4		533+38.00	0.00'	286.81
5	PC	533+28.39	14.00' RT	286.95
6		533+07.21	19.98' RT	287.13
7	PT	532+85.30	22.00' RT	287.30
8	PC	534+00.00	19.00' LT	286.45
9		533+84.21	13.28' LT	286.57
10	PC	533+74.00	0.00'	286.68
11		533+80.67	20.02' RT	283.39
12	PT	534+00.00	28.50' RT	286.09

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SH 71

INTERSECTION LAYOUT

SHEET 3 OF 5

Designed:	GM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					SH 71
Drawn:	SW	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086		77

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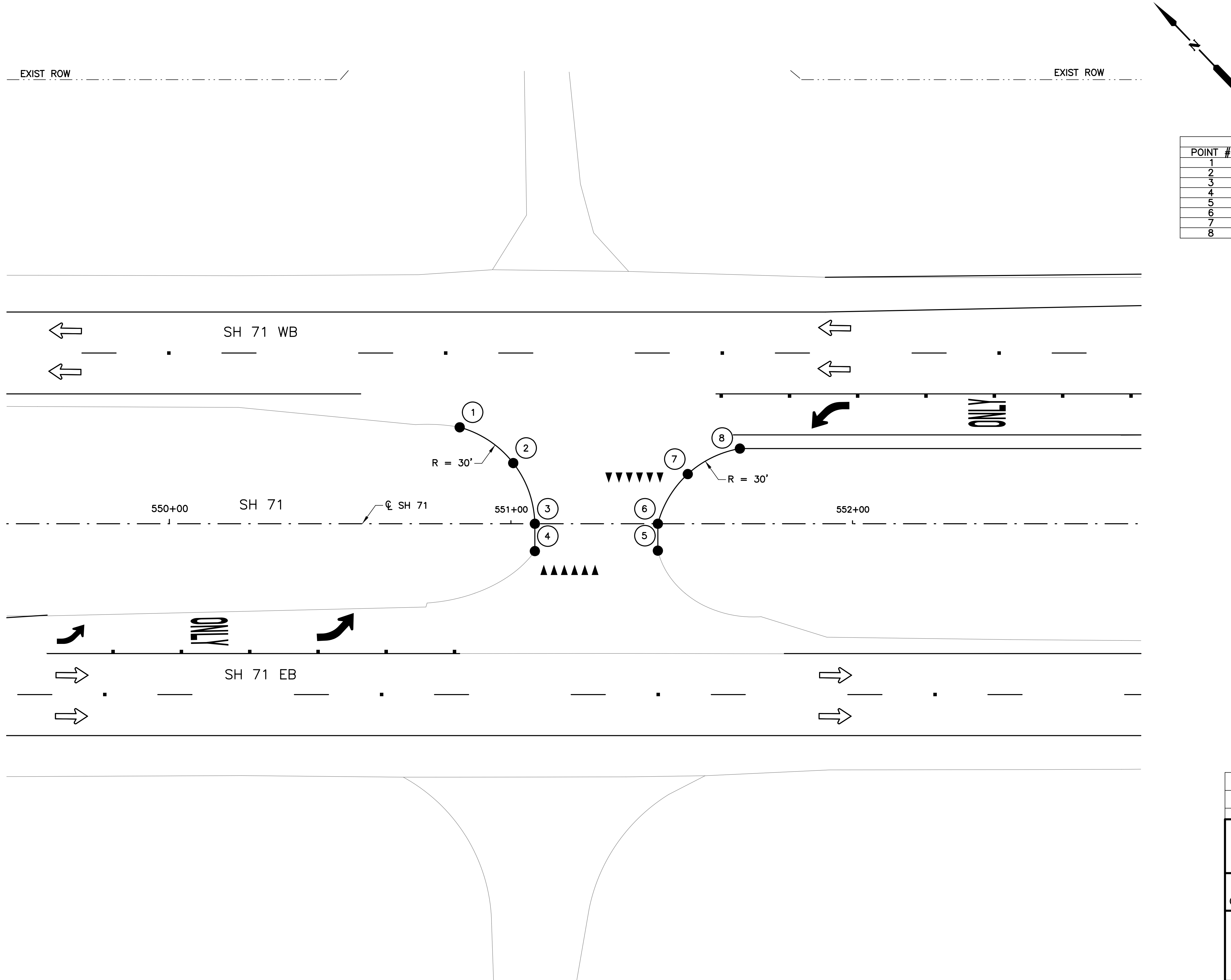
SCALE HORIZ. FEET



PAVEMENT EDGE KEY POINTS				
POINT #	DESCRIPTION	STATION	OFFSET	ELEVATION
1	PC	550+85.00	28.25' LT	279.40
2		551+00.68	17.77' LT	279.39
3	PT	551+07.00	0.00'	279.38
4		551+07.00	8.00' RT	279.37
5		551+43.00	7.88' RT	279.58
6	PC	551+43.00	0.00'	279.53
7		551+51.76	14.54' LT	279.43
8	PT	551+67.00	22.00' LT	279.33

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SH 71

INTERSECTION LAYOUT

SHEET 4 OF 5

Designed:	GM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	BAJ	6	TEXAS				SH 71
Drawn:	SW	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086	78

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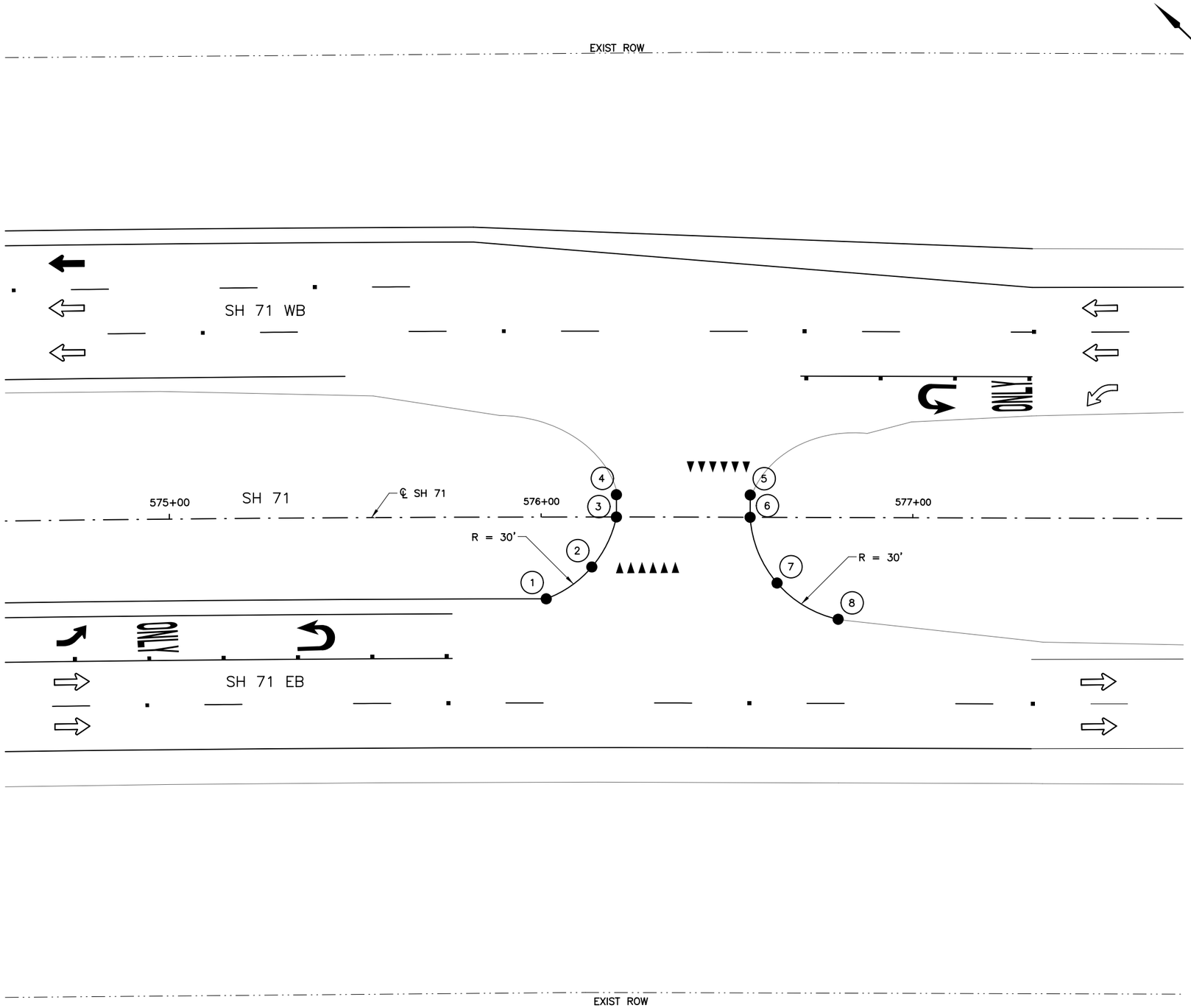

15 7.5 0 15 30
SCALE HORIZ. FEET

PAVEMENT EDGE KEY POINTS				
POINT #	DESCRIPTION	STATION	OFFSET	ELEVATION
1	PC	576+01.36	22.00' RT	275.54
2		576+13.65	13.43' RT	275.57
3	PT	576+20.25	0.00'	275.60
4		576+20.25	6.00' LT	275.61
5		576+56.25	6.00' LT	275.87
6	PC	576+56.25	0.00'	275.87
7		576+63.53	17.66' RT	275.88
8	PT	576+80.00	27.35' RT	275.90

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INTERSECTION LAYOUT

SHEET 5 OF 5

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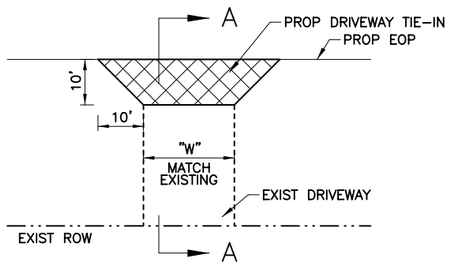
Drawn:	SW	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086		79



DRIVEWAY (SURF TRT) DETAIL

N.T.S.

SECTION A–A

N.T.S.

STATE OF TEXAS
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TEXAS REGISTERED ENGINEERING FIRM F–1741

 Texas Department of Transportation

SH 71

MISCELLANEOUS DETAILS

SHEET 1 OF 1

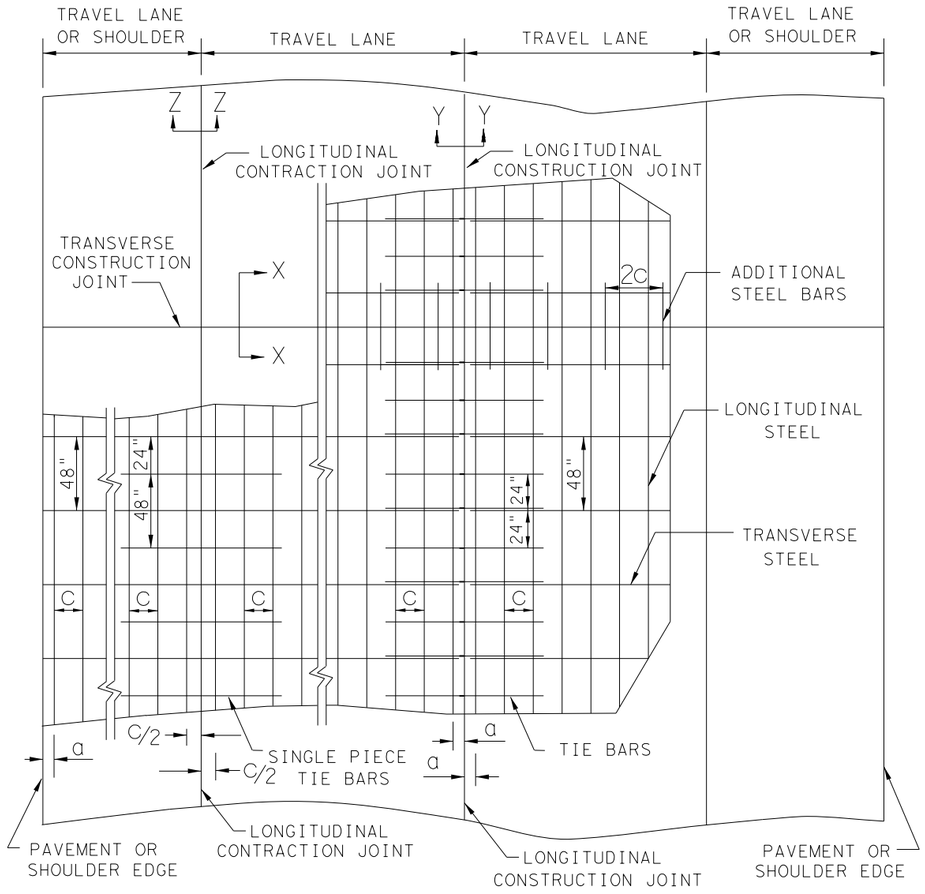
Designed:	GM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					SH 71
Drawn:	GM	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086		80

DATE:
FILE:

GENERAL NOTES

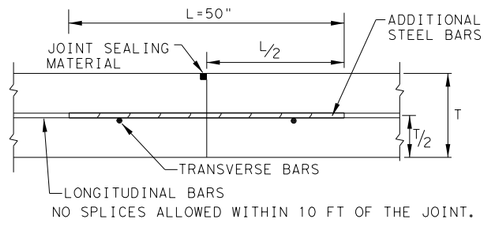
TABLE NO. 1 LONGITUDINAL STEEL					
SLAB THICKNESS AND BAR SIZE		REGULAR STEEL BARS	FIRST SPACING AT EDGE OR JOINT	ADDITIONAL STEEL BARS AT TRANSVERSE CONSTRUCTION JOINT (SECTION X-X)	
T (IN.)	BAR SIZE	SPACING C (IN.)	SPACING a (IN.)	SPACING 2 X C (IN.)	LENGTH L (IN.)
7.0	#5	6.5	3 TO 4	13	50
7.5	#5	6.0	3 TO 4	12	50
8.0	#6	9.0	3 TO 4	18	50
8.5	#6	8.5	3 TO 4	17	50
9.0	#6	8.0	3 TO 4	16	50
9.5	#6	7.5	3 TO 4	15	50
10.0	#6	7.0	3 TO 4	14	50
10.5	#6	6.75	3 TO 4	13.5	50
11.0	#6	6.5	3 TO 4	13	50
11.5	#6	6.25	3 TO 4	12.5	50
12.0	#6	6.0	3 TO 4	12	50
12.5	#6	5.75	3 TO 4	11.5	50
13.0	#6	5.5	3 TO 4	11	50

TABLE NO. 2 TRANSVERSE STEEL AND TIE BARS						
SLAB THICKNESS (IN.)	TRANSVERSE STEEL		TIE BARS AT LONGITUDINAL CONTRACTION JOINT (SECTION Z-Z)		TIE BARS AT LONGITUDINAL CONSTRUCTION JOINT (SECTION Y-Y)	
	BAR SIZE	SPACING (IN.)	BAR SIZE	SPACING (IN.)	BAR SIZE	SPACING (IN.)
7.0 - 7.5	#5	48	#5	48	#5	24
8.0 - 13.0	#5	48	#6	48	#6	24



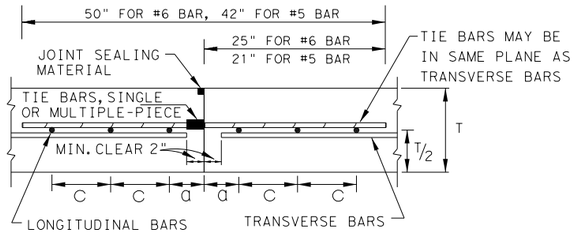
TYPICAL PAVEMENT LAYOUT

PLAN VIEW (NOT TO SCALE)



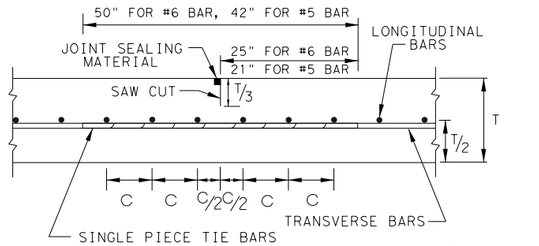
TRANSVERSE CONSTRUCTION JOINT

SECTION X - X



LONGITUDINAL CONSTRUCTION JOINT

SECTION Y - Y



LONGITUDINAL CONTRACTION JOINT

SECTION Z - Z

Texas Department of Transportation

Design Division Standard

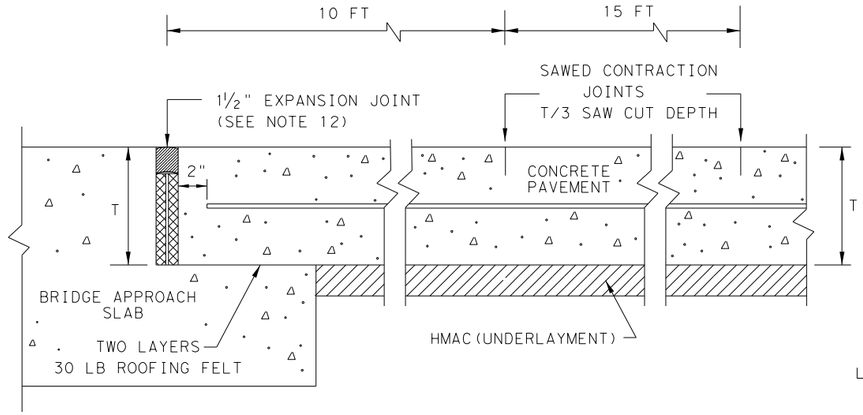
CONTINUOUSLY REINFORCED CONCRETE PAVEMENT

ONE LAYER STEEL BAR PLACEMENT
T - 7 to 13 INCHES

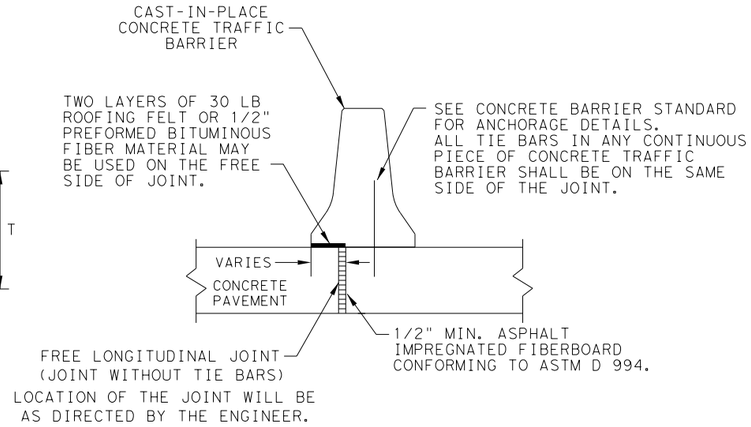
CRCP(1)-20

FILE: crcp120.dgn	DN: TxDOT	CK: KM	DW: AN	CK: VP
© TxDOT: APRIL 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS 10/10/2011 ADD GN #12 04/09/2013 REMOVE 6" AND 6.5" ADD CTE REQUIREMENTS 05/05/2017 CoTE AS RATED 4.3	0266	01	086	SH 71
	DIST	COUNTY		SHEET NO.
	YKM	FAYETTE		81

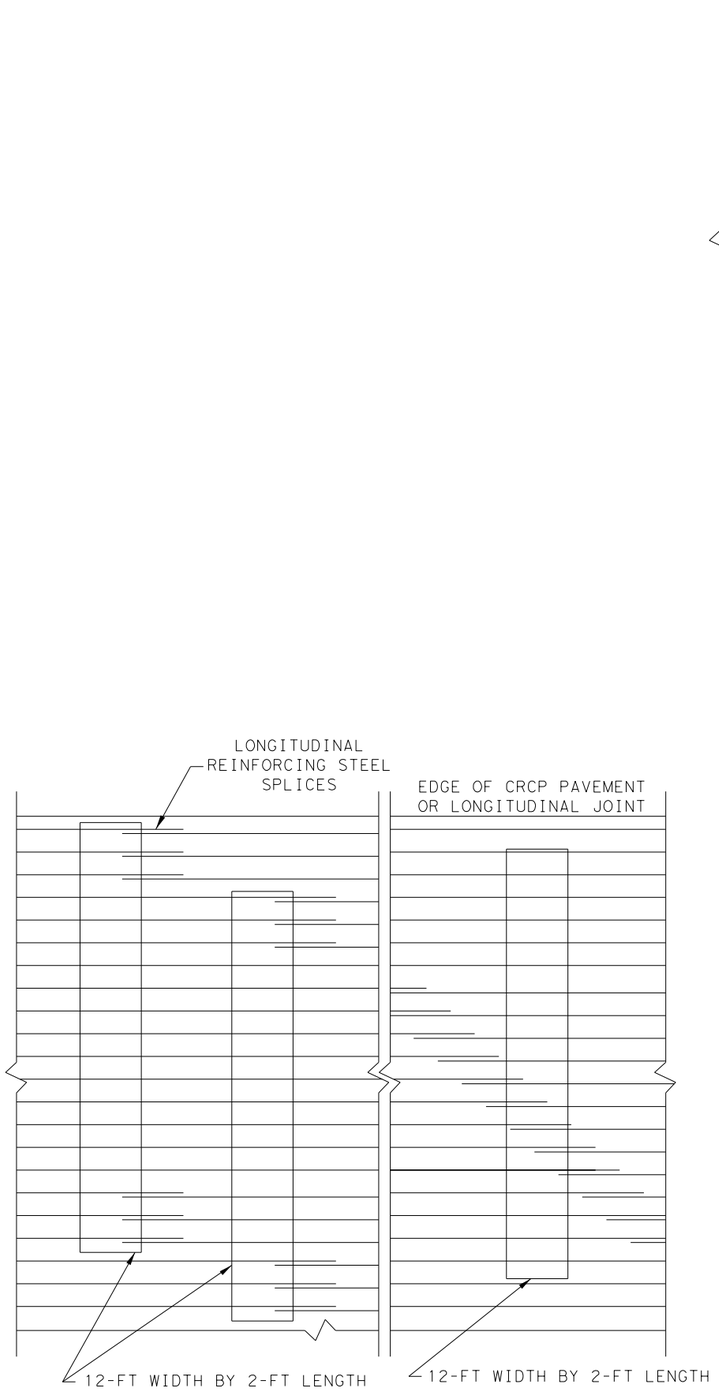
DATE:
FILE:



TRANSVERSE EXPANSION JOINT DETAIL
AT BRIDGE APPROACH

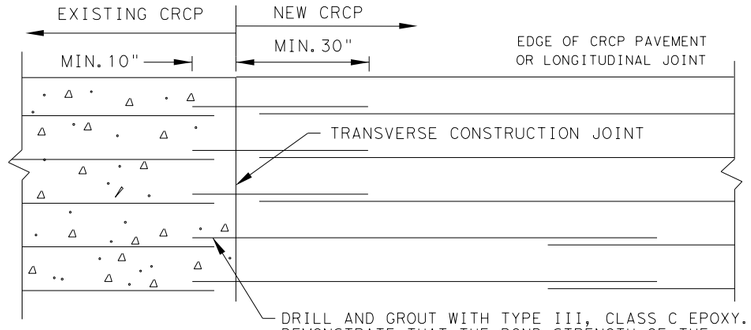


FREE LONGITUDINAL JOINT DETAIL

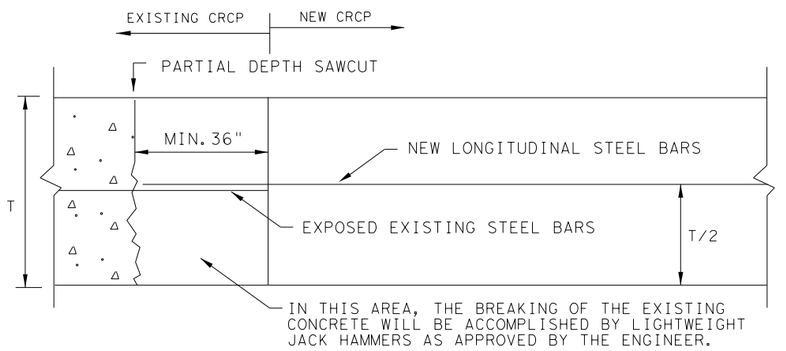


STAGGER THE LAP LOCATIONS SO THAT NO MORE THAN 1/3 OF THE LONGITUDINAL STEEL IS SPLICED IN ANY GIVEN 12-FT. WIDTH AND 2-FT. LENGTH OF THE PAVEMENT. ANY OTHER LAP CONFIGURATION MEETING THIS REQUIREMENT WILL BE ALLOWED.

EXAMPLES OF LAP CONFIGURATION
PLAN VIEW (NOT TO SCALE)

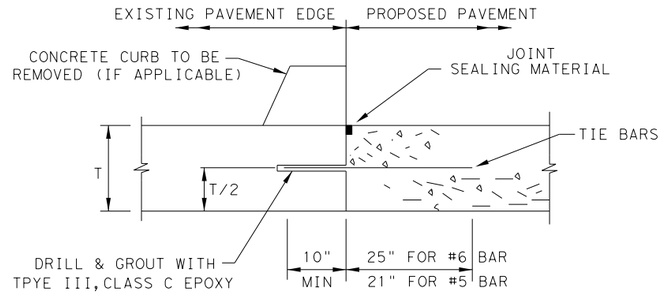


OPTION A: DRILL AND EPOXY
PLAN VIEW (NOT TO SCALE)



OPTION B: BREAKBACK AND LAP

TRANSVERSE TIE JOINT DETAIL
EXISTING CRCP TO NEW CRCP



1. BEFORE WIDENING WORK, DEMONSTRATE THAT THE BOND STRENGTH OF THE EPOXY-GROUTED TIE BARS MEETS THE REQUIRMENTS OF PULL-OUT TEST SPECIFIED IN ITEM 361.
2. SPACE TIE BARS AT 24" SPACING. USE #6 TIE BARS FOR 8" AND THICKER SLABS, USE #5 TIE BARS FOR LESS THAN 8" THICK SLABS.

LONGITUDINAL WIDENING JOINT DETAIL

Texas Department of Transportation

Design Division Standard

CONTINUOUSLY REINFORCED CONCRETE PAVEMENT

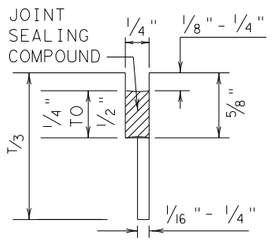
ONE LAYER STEEL BAR PLACEMENT
T - 7 to 13 INCHES

CRCP(1)-20

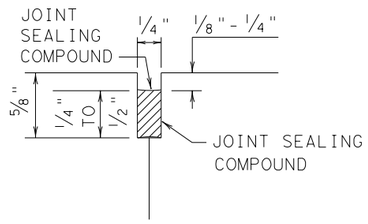
FILE: crcp120.dgn	DN: TxDOT	CK: KM	DW: AN	CK: VP
© TxDOT: APRIL 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS 03/16/2020 REMOVED TABLE 1A	0266	01	086	SH 71
	DIST	COUNTY		SHEET NO.
	YKM	FAYETTE		82

DATE:
FILE:

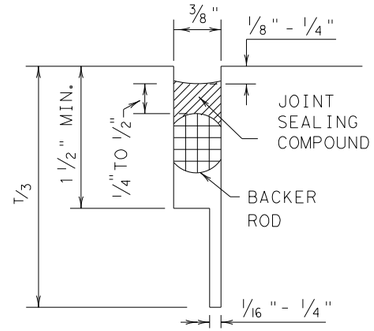
METHOD B: JOINT SEALING COMPOUND



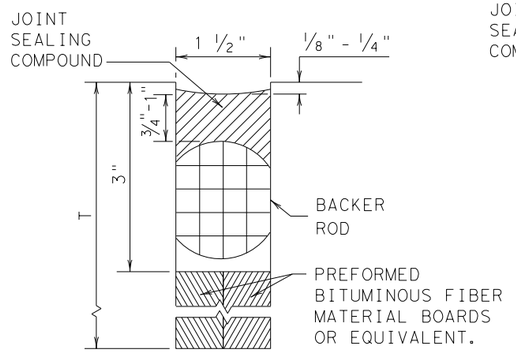
LONGITUDINAL SAWED CONTRACTION JOINT



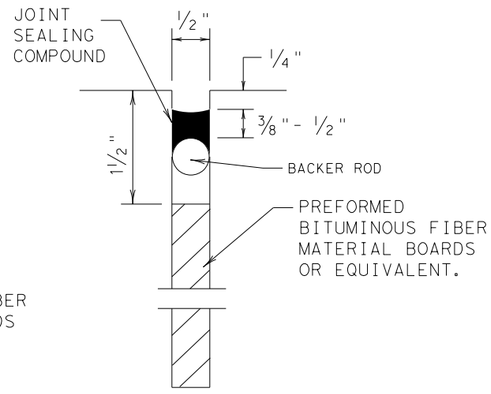
LONGITUDINAL OR TRANSVERSE CONSTRUCTION JOINT



TRANSVERSE SAWED CONTRACTION JOINT

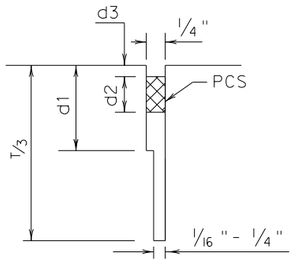


TRANSVERSE FORMED EXPANSION JOINT

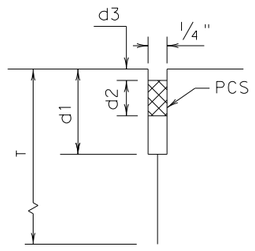


FORMED ISOLATION JOINT

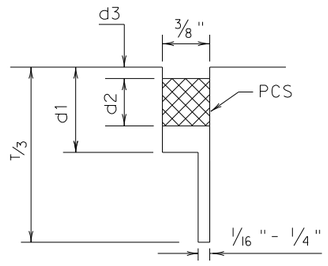
METHOD A: PREFORMED COMPRESSION SEALS (PCS)(DMS-6310 CLASS 6)



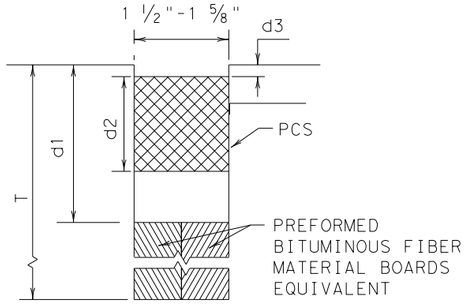
LONGITUDINAL SAWED CONTRACTION JOINT



LONGITUDINAL CONSTRUCTION JOINT



TRANSVERSE SAWED CONTRACTION JOINT



TRANSVERSE FORMED EXPANSION JOINT

GENERAL NOTES

1. UNLESS OTHERWISE SHOWN IN THE PLANS, EITHER METHOD "A" OR METHOD "B" MAY BE USED.
2. THE LOCATION OF JOINTS SHALL BE AS SHOWN ELSEWHERE IN THE PLANS.
3. THE JOINT RESERVOIR FOR SEALANT OR PCS SHALL BE SAWED UNLESS OTHERWISE SHOWN ON THE PLANS FOR THE LONGITUDINAL AND TRANSVERSE CONSTRUCTION JOINTS AND THE SAWED JOINTS.
4. DIMENSIONS d1, d2, AND d3 SHOWN IN METHOD A SHALL BE IN ACCORDANCE WITH THE PREFORMED COMPRESSION SEAL MANUFACTURER'S RECOMMENDATION.
5. REFER TO DMS-6310 "JOINT SEALANTS AND FILLERS" FOR THE CLASSIFICATIONS.
6. FOR SAWED LONGITUDINAL JOINT, LONGITUDINAL OR TRANSVERSE CONSTRUCTION JOINT, USE JOINT SEALANT CLASS 5 OR 8 UNLESS OTHERWISE SHOWN ON THE PLAN OR APPROVED.
7. FOR TRANSVERSE SAWED CONTRACTION, TRANSVERSE FORMED EXPANSION JOINT, AND ISOLATION JOINT USE JOINT SEALANT CLASS 5 OR 8 AT NEW JOINTS. USE JOINT SEALANT CLASS 4,5,7,OR 8 FOR MAINTAINING EXISTING JOINTS.
8. THE JOINTS SHALL BE CLEANED IN ACCORDANCE WITH THE ITEM 438 "CLEANING AND SEALING JOINTS" OR ITEM 713 "CLEANING AND SEALING JOINTS AND CRACKS (CONCRETE PAVEMENT)".
9. ISOLATION JOINTS ACCOMMODATE HORIZONTAL AND VERTICAL MOVEMENTS THAT OCCUR BETWEEN A PAVEMENT AND A STRUCTURE. ISOLATION JOINTS MAY BE USED FOR BRIDGE ABUTMENTS, INTERSECTIONS, CURB AND GUTTER, OLD AND NEW PAVEMENTS, OR AROUND DRAINAGE INLETS, MANHOLES, FOOTINGS AND LIGHTING STRUCTURES.

Texas Department of Transportation

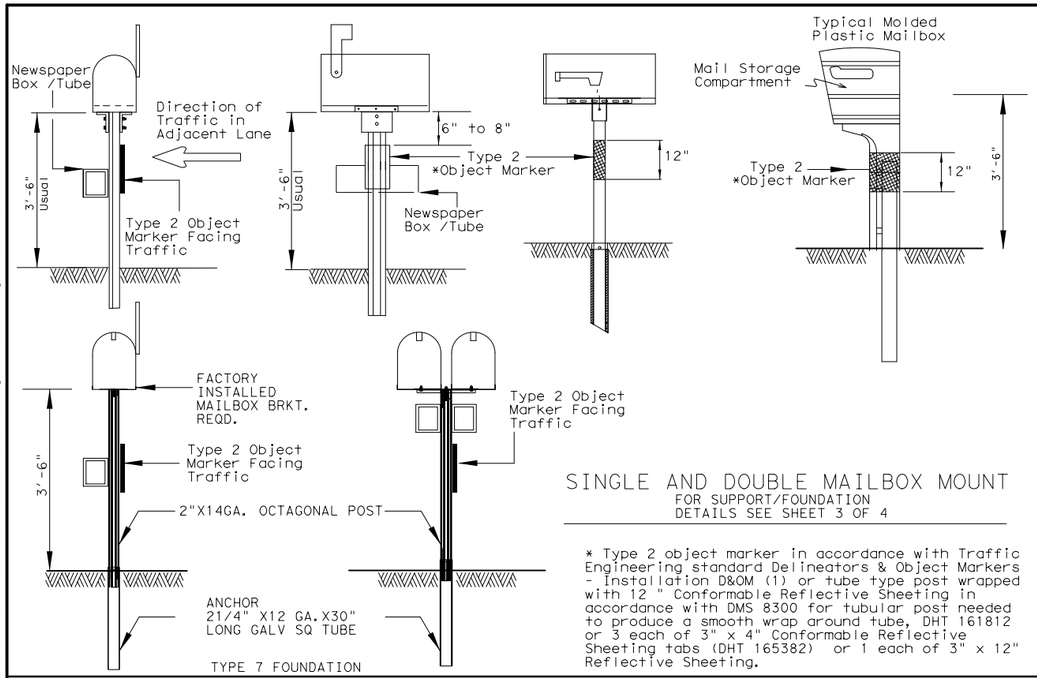
Design Division Standard

CONCRETE PAVING DETAILS

JOINT SEALS

JS-14

FILE: js14.dgn	DN: TxDOT	DN: HC	DW: HC	CK: AN
©TxDOT: DECEMBER 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0266	01	086	SH 71
	DIST	COUNTY		SHEET NO.
	YKM	FAYETTE		83



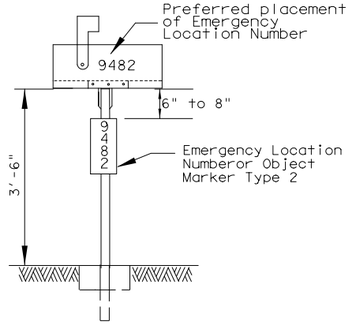
SINGLE AND DOUBLE MAILBOX MOUNT

FOR SUPPORT/FOUNDATION DETAILS SEE SHEET 3 OF 4

* Type 2 object marker in accordance with Traffic Engineering standard Delineators & Object Markers - Installation D&OM (1) or tube type post wrapped with 12 " Conformable Reflective Sheeting in accordance with DMS 8300 for tubular post needed to produce a smooth wrap around tube, DHT 161812 or 3 each of 3" x 4" Conformable Reflective Sheeting tabs (DHT 165382) or 1 each of 3" x 12" Reflective Sheeting.

Note: Mailbox installations in sidewalk areas shall be in accordance with the latest TxDOT Pedestrian Facilities Curb ramps standard *PED-XX for pedestrian facilities.

*PED-XX: XX is the standard year for example PED- 12 , PED-13,etc.



PLACEMENT OF EMERGENCY LOCATION NUMBER

Location Number shall be placed on: 1. A yellow, type A plate with class 1 flat surface reflective sheeting in accordance with DMS 8600. The color of numbers shall be black. or 2: A green or blue plate with white numbers attached to post beside the object marker. Other contrasting color configuration, as approved , may be used. (Use Same type plate as used for the type 2 Object Marker. Recommended sign size is 6" by 15")

MAILBOX SIZES

TYPICAL MAILBOX SIZE				LIGHT WEIGHT MATERIAL	
				SHEET METAL	**PLASTIC
SIZE	LENGTH (INCHES)	WIDTH (INCHES)	HEIGHT (INCHES)	MAXIMUM WEIGHT (POUNDS)	
SMALL	19 1/2	6	7	5	5
MEDIUM	22 1/2	8	11 1/2	7	7
LARGE	23 1/2*	11 1/2*	13 1/2*	10	10

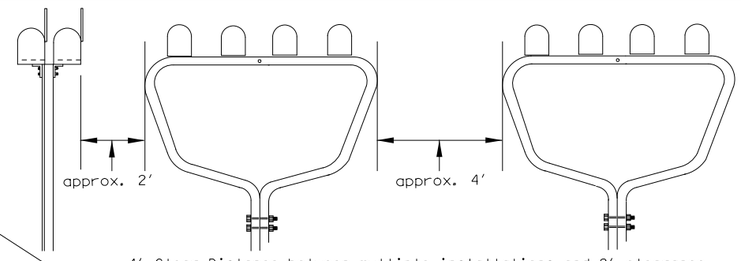
* Maximum allowed dimensions for mailbox
** Excluding Molded Plastic on 4 X 4 Post

LOCKABLE ARCHITECTURAL MAILBOX SIZE (INCHES)					
VIEW	TOP	BOTTOM	FRONT SIDE	BACK SIDE	WEIGHT (POUNDS)
SIDE	18	15	18.3	15	22.4
BACK	11 1/2	11 1/2		15	

SEE TOP RIGHT CORNER OF SHEET 2 OF 4

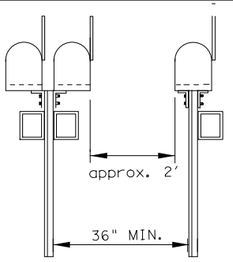
Mailboxes shall be made of light weight sheet metal or light weight plastic. Lockable architectural mailboxes shall meet the requirements of the above table.

Heavy steel, cast iron or decorative mailboxes shall not be used on the state highway system.



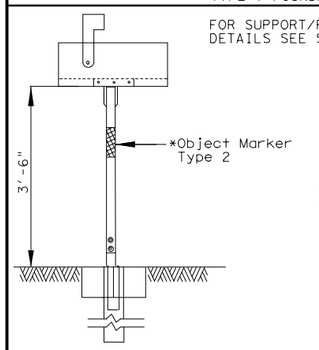
4' Clear Distance between multiple installations and 2' clearance between double or single installations and the multiple installation. DHT #'s 164116 or 149339.

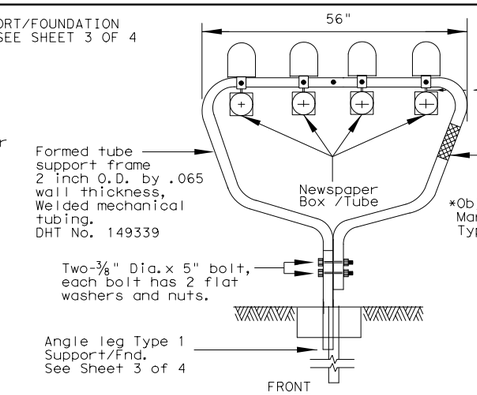
MULTIPLE MAILBOX PLACEMENT

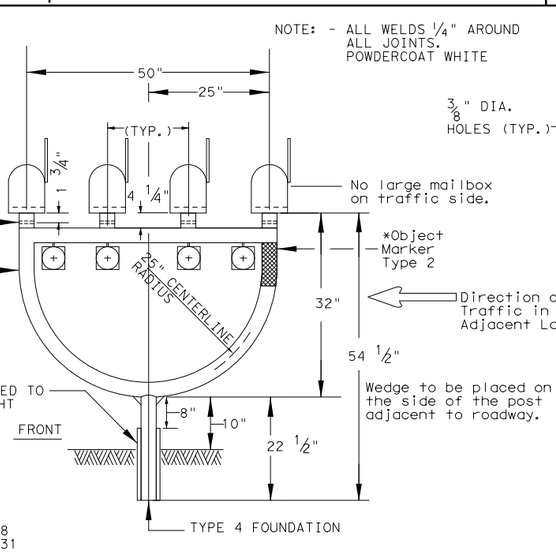


Clear Distance between single or double mounted posts. (Normally when 3 or more mailboxes are in one location, a multiple support is used).

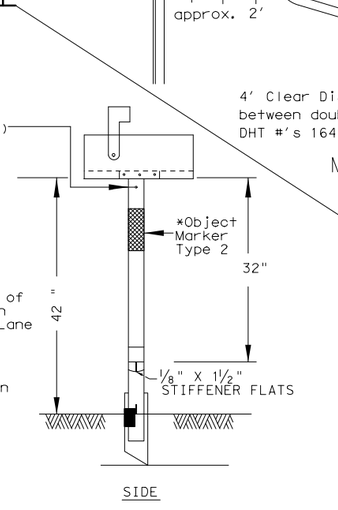
SINGLE & DOUBLE MAILBOX PLACEMENT

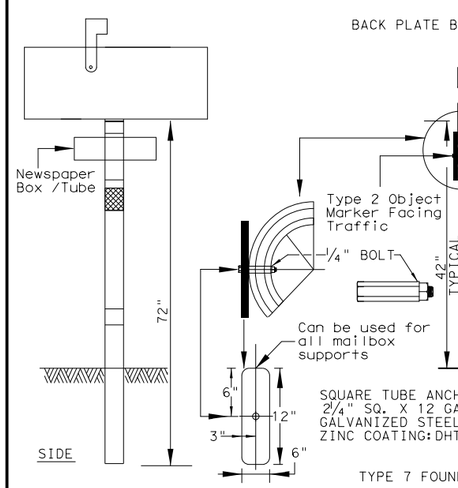






NOTE: - ALL WELDS 1/4" AROUND ALL JOINTS. POWDERCOAT WHITE





DOUBLE AND MULTIPLE MAILBOX MOUNT

FOR SUPPORT/FOUNDATION DETAILS SEE SHEET 3 OF 4
FOR DHT NUMBERS SEE SHEET 4 OF 4

MULTIPLE MAILBOX MOUNT

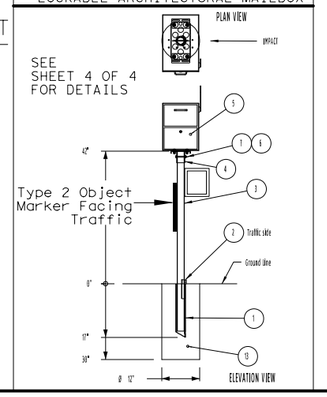
INDEX OF MAILBOX DETAIL SHEETS

NEWSPAPER RECEPTACLE

A light weight receptacle for newspaper delivery can be attached to mailbox posts as shown on this page if the receptacle:

- Does not touch the mailbox.
- Does not present a hazard to traffic or delivery of the mail.
- Does not extend beyond the front of the mailbox.
- Does not display advertising, except the publication title.
- Newspaper receptacles on separate supports are prohibited.

LOCKABLE ARCHITECTURAL MAILBOX



SHEET 1 OF 4

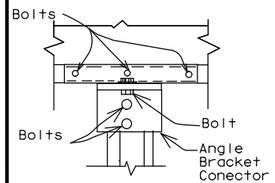
Texas Department of Transportation

Maintenance Division Standard

MAILBOX MOUNTING AND SPACING

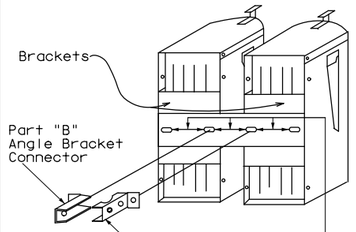
MB-15(1)

FILE: MB14(1).DGN	DN: JEO		CK: JEO	DW:	CK:
©TxDOT APRIL 2015	CONT	SECT	JOB		HIGHWAY
REVISIONS: Added additional newspaper receptacle for double mailbox support	0266	01	086		SH 71
	DIST	COUNTY			SHEET NO.
	YKM	FAYETTE			84



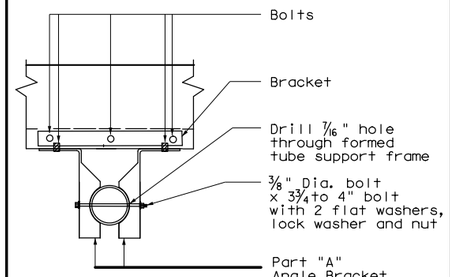
For bolt sizes see details below for "SMALL MAILBOX" and "MEDIUM AND LARGE MAILBOXES"

SINGLE MAILBOX

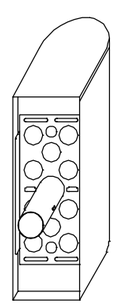


(Not permitted for Large Mailboxes)

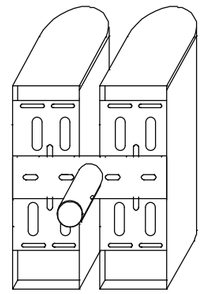
DOUBLE MAILBOX



MULTIPLE MAILBOX



To be used with 2 3/8" OD RR or thinwall Steel posts.



To be used with thinwall Steel posts. Not to be used with RR posts.

WELDED SINGLE MAILBOXBRACKET

WELDED DOUBLE MAILBOX BRACKET WITHADAPTER PLATE

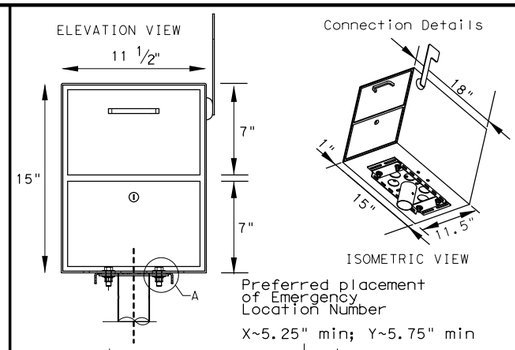
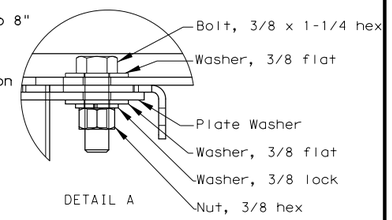
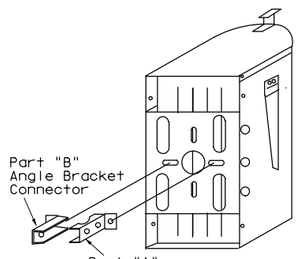
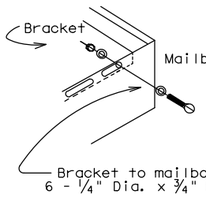


Plate Washer for Architectural Mailbox Plate, 2" x 1/8" ASTM A36 Steel



LOCKABLE ARCHITECTURAL MAILBOX CONNECTION DETAILS



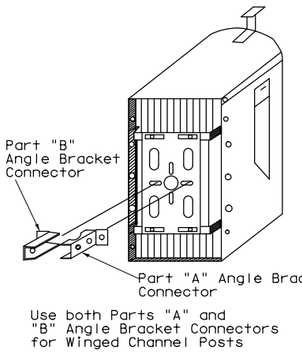


Bracket to mailbox attachment: 6 - 1/4" Dia. x 3/4" bolt w/ 2 flat washers and nut per each bolt.

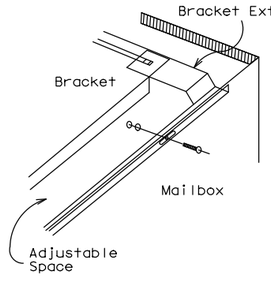
Angle to bracket attachment: 2 - 3/8" Dia. x 3/4" bolt with 2 flat washers, lock washer and nut per each bolt.

Angle to 2 - 3/8" Dia. x 2 1/2" bolt with 2 flat washers, lock washer and nut per each bolt.

SMALL MAILBOX



Use both Parts "A" and "B" Angle Bracket Connectors for Winged Channel Posts



Bracket to mailbox attachment: 6 - 1/4" Dia. x 3/4" bolt w/2 flat washers and nut per each bolt.

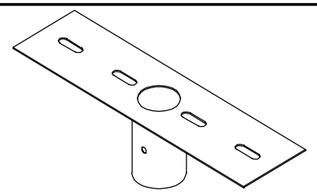
Bracket to bracket extension attachment: 2 - 1/4" Dia. x 3/4" carriage bolt w/ flat washer, lock washer and nut per bolt (4 bolts required if 2 bracket extensions are used).

Angle to bracket attachment: 2 - 3/8" Dia. x 3/4" bolt w/2 flat washers, lock washer and nut per each bolt.

Angle to mailbox support attachment: 2 - 3/8" Dia. x 2 1/2" bolt w/2 flat washers, lock washer, and nut per each bolt.

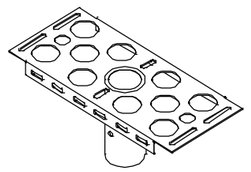
Medium size mailboxes - one extension bracket
Large size mailboxes - two extension brackets

MEDIUM AND LARGE MAILBOXES



DHT 162323

For use with galvanized thinwall steel posts DHT # 143426 or powder-coated thinwall steel post DHT # 162911.

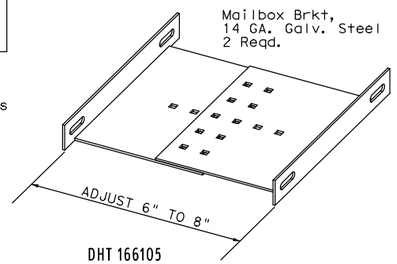


DHT 161443

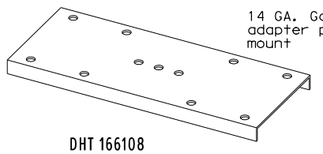
For use with RCR post DHT # 161442 or galvanized thinwall steel post DHT # 143426 or powder-coated thinwall steel post. DHT # 162911.

DHT #3789

Used for mounting two Mailboxes on the same post.

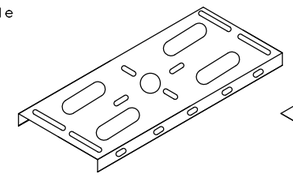


DHT 166105



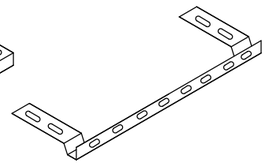
DHT 166108

14 GA. Galv. Steel adapter plate for double mount



DHT 148939

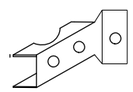
Mailbox Bracket



DHT 148938

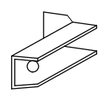
Used for extending 6" wide bracket to attach larger mailboxes.

Bracket Extension



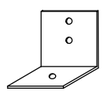
DHT 159489

Part "A" Angle Bracket Connector



DHT 159490

Part "B" Angle Bracket Connector



DHT 2917

Angle Bracket For Temporary Mailbox

HARDWARE AT TXDOT REGIONAL WAREHOUSES

Brackets and adapter plate shown in this section should be available to the Contractor when stated elsewhere in plans or specifications.

See Table of Applicable DHT Numbers on sheet 4 of 4 for DHT description and unit of measure.

GENERAL NOTES

1. Connecting hardware detailed on this sheet is for the hardware that the Department stocks at the Regional Warehouses. This hardware is available to the contractor only when so stated elsewhere in the plans or specification.
2. Hardware for mounting mailboxes to the support/foundation furnished by industry should be used when shown on the Maintenance Divisions "Approved Products List." Only mailbox hardware that have been crash tested in accordance with NCHRP Report 350, will be on the approved list.
3. Hardware furnished by industry shall be erected in accordance with the manufacturer's recommendation.
4. Bracket and bracket extension shall be constructed of 14 gauge galvanized steel sheet metal.
5. The angles, brackets and adapter plates shall be constructed of 12 gauge galvanized steel sheet metal.
6. Items with evidence of damage to the galvanized coating or wet storage stains (white rust) will not be accepted.

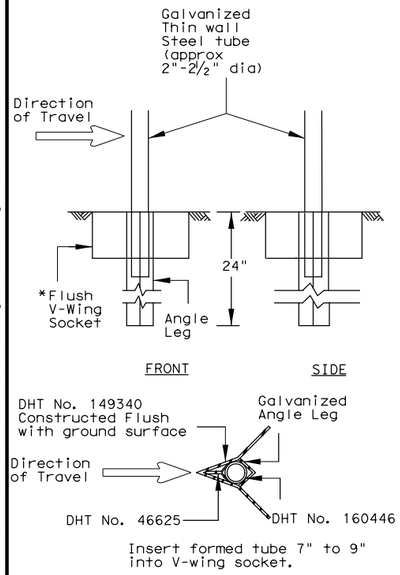
Texas Department of Transportation

Maintenance Division Standard

MAILBOX BRACKET CONNECTING DETAILS

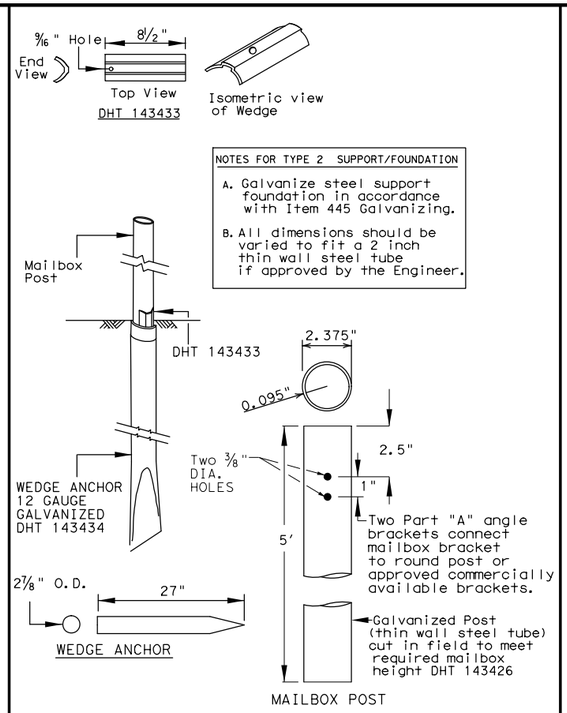
MB-15(1)

FILE: MB14(1).DGN	DN: JEO	CK:	DW: JEO	CK:
©TxDOT APRIL 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS ADDED DHT 163730	0266	01	086	SH 71
	DIST	COUNTY		SHEET NO.
	YKM	FAYETTE		85



TYPE 1 SUPPORT/FOUNDATION

THIN WALL STEEL TUBE w/ V-LOC ANCHORAGE



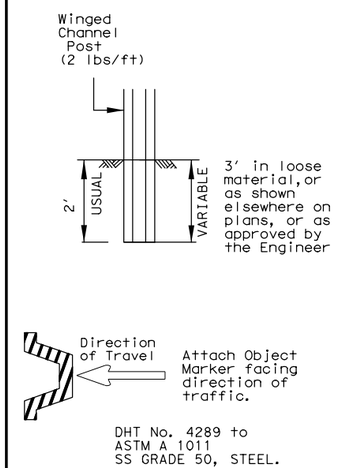
NOTES FOR TYPE 2 SUPPORT/FOUNDATION

A. Galvanize steel support foundation in accordance with Item 445 Galvanizing.

B. All dimensions should be varied to fit a 2 inch thin wall steel tube if approved by the Engineer.

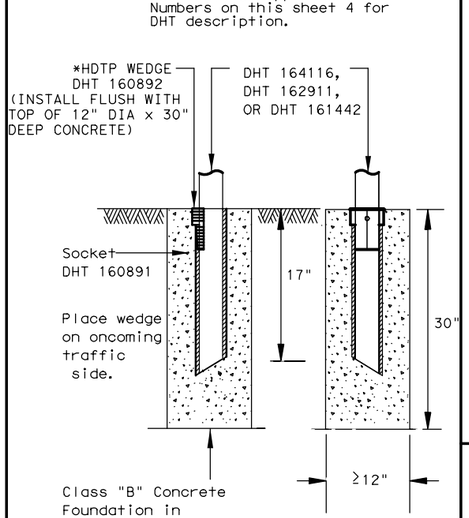
TYPE 2 SUPPORT/FOUNDATION

THIN WALL STEEL TUBE w/ WEDGE ANCHOR SYSTEM



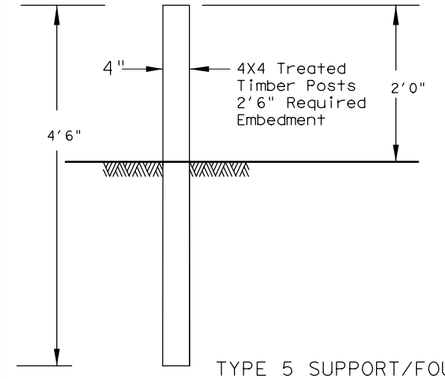
TYPE 3 SUPPORT/FOUNDATION

WINGED CHANNEL POST



TYPE 4 SUPPORT/FOUNDATION

FOR WHITECOATED STEEL POST, MULTIPLE POST, AND RECYCLED RUBBER.

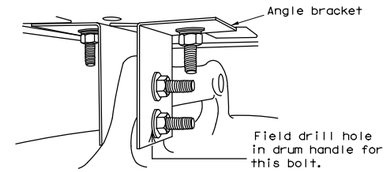


TYPE 5 SUPPORT/FOUNDATION

FOR ONE PIECE MOLDED PLASTIC MAILBOX

ONE PIECE MOLDED PLASTIC MAILBOXES

Molded Plastic Mailboxes shall be installed on 4"x4" treated timber posts only. The use of steel pipe or structural tubing in place of timber post is prohibited.

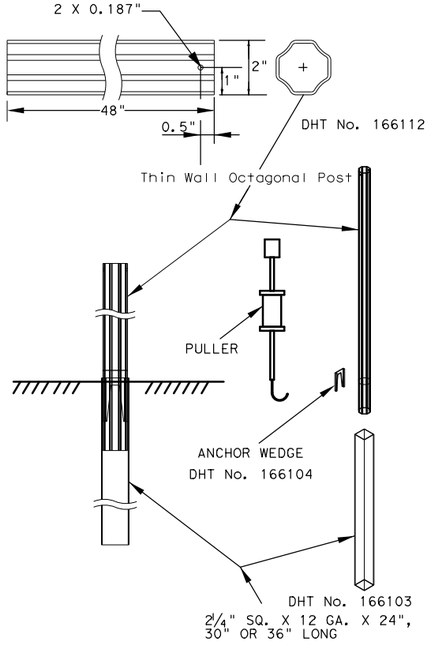


Placed on approved plastic drum as shown in the Compliant Work Zone Traffic Control Devices (CWZTCD).

Existing attachment hardware shall be used unless damaged. Damaged hardware shall be replaced.

TYPE 6 TEMPORARY MAILBOX SUPPORT

CONNECTION DETAIL



TYPE 7 MAILBOX SUPPORT/FOUNDATION

CONNECTION DETAIL

GENERAL NOTES

1. Erect post plumb or vertical.
2. When galvanized part is required galvanize in accordance with Item 445.
3. type 1, 2, 3, 4 or 7 supports or foundation can be used for single or double mailbox installations. The RCR post should be used only for a single installation with a small mailbox. The Type 5 support/foundation is used for the single molded plastic mailbox. The Type 4 support/foundation is used for the 2.375" O.D. RR post, thin wall steel post, and white multiple mailbox post.
4. The Type 1 or type 7 support/foundation can be used for a multiple mailbox mount.
5. The Type 4 support should be used with thin wall steel pipe for the medium, large and double mailbox installations.
6. 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.

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

Type of Mailbox
- S = Single
- D = Double
- M = Multiple
- SP = Single 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
- Ty 7 = Wedge Anchor

Type of Bracket
- AB = Angle Bracket.
- TB = 2.375" Tube Bracket

DOUBLE AND LARGE MAILBOXES MUST BE ON STEEL POST.

*HDTP: High density thermoplastic polyesters

Texas Department of Transportation

Maintenance Division Standard

MAILBOX SUPPORT AND FOUNDATION

MB-15(1)

FILE: MB14(1).DGN	DN: JEO		CK:	DW: JEO	CK:
©TxDOT APRIL 2015	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0266	01	086	SH 71	
	DIST	COUNTY		SHEET NO.	
	YKM	FAYETTE		86	

LOCKABLE ARCHITECTURAL MAILBOX

SINGLE-MOUNT INSTALLATION PARTS			
#	PART NAME	PART/DHT #	QTY
1	SOCKET, TYPE 4 FOUNDATION	160891	1
2	WEDGE FOR TYPE 4 FOUNDATION	160892	1
3	THIN-WALL WHITE STEEL TUBE 2.375 OD	162911	1
4	BRACKET FOR ATTACHING MAILBOX	161443	1
5	ARCHITECTURAL MAILBOX	SEE NOTE	1
6	NUT, 5/16" HEX	NUT, 5/16" HEX	1
7	BOLT, 5/16 X 3 HEX	GRADE 5	1
8	PLATE WASHER FOR ARCHITECTURAL MAILBOX	SEE SEE SHEET 2	2
9	WASHER, 3/8 FLAT		8
10	WASHER, 3/8 LOCK		4
11	NUT, 3/8 HEX		4
12	BOLT, 3/8 X 1-1/4 HEX	GRADE 5	4
13	CONCRETE, CLASS B (2000 PSI)		1

LOCKABLE ARCHITECTURAL MAILBOX DETAILS

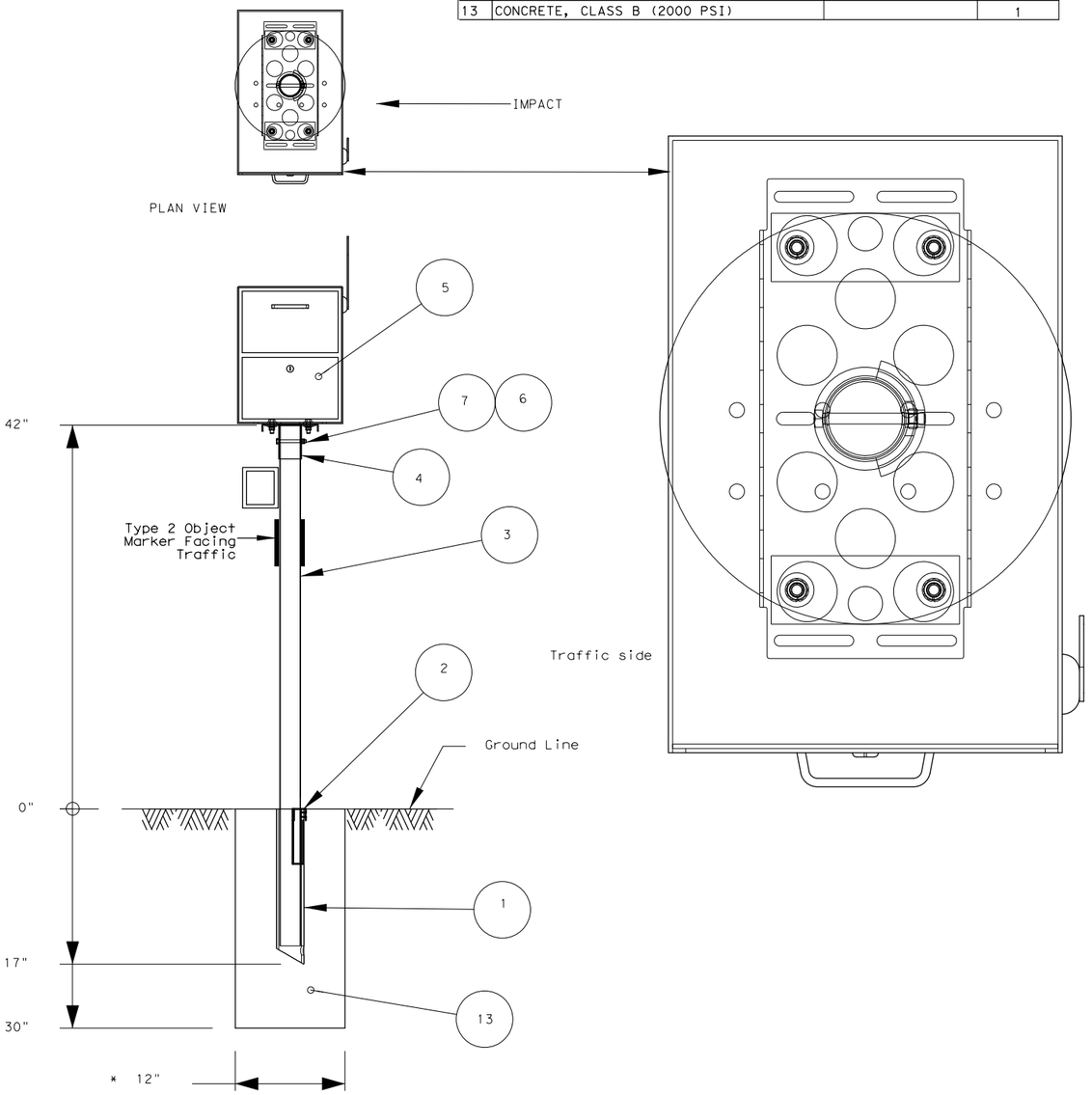


TABLE OF APPLICABLE DHT NUMBERS	
DHT NUMBER	DESCRIPTION
	FOUNDATIONS
46625	WEDGE FOR V-WING SOCKET FOR TYPE 1 FOUNDATION
149340	V-WING SOCKET FOR TYPE 1 FOUNDATION
143433	WEDGE FOR TYPE 2 FOUNDATION
143434	ANCHOR FOR TYPE 2 FOUNDATION
166103	ANCHOR FOR TYPE 7 FOUNDATION
160891	SOCKET FOR TYPE 4 FOUNDATION
160892	WEDGE FOR TYPE 4 FOUNDATION
166104	WEDGE FOR TYPE 7 FOUNDATION
	POSTS
4289	WINGED CHANNEL MAILBOX POST
149339	MULTIPLE MAILBOX POST (GALVANIZED TUBING)
164116	MULTIPLE MAILBOX POST (WHITE COATED)
166114	MULTIPLE MAILBOX POST (WHITE COATED OCTAGONAL)
166153	MULTIPLE MAILBOX POST (GALVANIZED OCTAGONAL)
161442	RECYCLED RUBBER POST. FOR SMALL MAILBOX ONLY
143426	THIN-WALL GALVANIZED STEEL TUBE 2.375" OUTER DIAMETER
162911	THINWALL WHITE STEEL TUBE 2.375" OUTER DIAMETER
166152	SINGLE OR DOUBLE THIN-WALL MAILBOX POST GALVANIZED 2" OCTAGONAL
166112	SINGLE OR DOUBLE THIN-WALL MAILBOX POST WHITECOATED 2" OCTAGONAL
	REFLECTIVE SHEETING
161812	REFLECTIVE SHEETING FOR EMERGENCY LOCATION NUMBER PANEL
	CONNECTING HARDWARE
2917	ANGLE BRACKET USED FOR TEMPORARY MAILBOX SUPPORT
166105	BRACKET FOR SINGLE MOUNTING OF MAILBOXES (MOUNTING KIT)
3789	PLATE FOR DOUBLE MOUNTING OF MAILBOXES
166108	BRACKET FOR DOUBLE MOUNTING OF MAILBOXES (MOUNTING KIT)
166111	BRACKET FOR MULTIPLE MOUNTING OF MAILBOXES (MOUNTING KIT)
148939	BRACKET FOR ATTACHING SMALL OR MEDIUM SIZE MAIL BOX
148938	EXTENDER TO BRACKET FOR ATTACHING LARGE MAILBOX
159489	ANGLE BRACKET PART A
159490	ANGLE BRACKET PART B
162323	BRACKET FOR DOUBLE MOUNTING OF MAILBOXES ON THINWALL STEEL POST, GALVANIZED OR POWDERCOATED.
161443	BRACKET FOR ATTACHING MAILBOX TO RECYCLED RUBBER POST AND TO MULTIPLE WHITE MAILBOX POST
158358	CASTING (NEWSPAPER RECEPTACLE BRACKET)
163731	U-BOLT (NEWSPAPER RECEPTACLE BRACKET)
160698	BOLT;HEX HEAD, GALV;3/8"DIA X 3/4"L HD, W/2-FLAT WASHERS
163750	BOLT;HEX HEAD, GALV;3/8" X 1-1/2, 16 NC, W/WASHERS
160701	BOLT;HEX HEAD, GALV;3/8"DIA X 2-1/2"L, HD, W/2-FLAT WASHERS
163730	BOLT;HEX HEAD, GALV;3/8" X 3-1/2", NC, W/NUT, 2 FLAT WASHERS
160699	BOLT;HEX HEAD, GALV;3/8"DIA X 3-3/4"L HD, W/2-FLAT WASHERS
160700	BOLT;HEX HEAD, GALV;3/8"DIA X 4"L HD, W/2-FLAT WASHERS

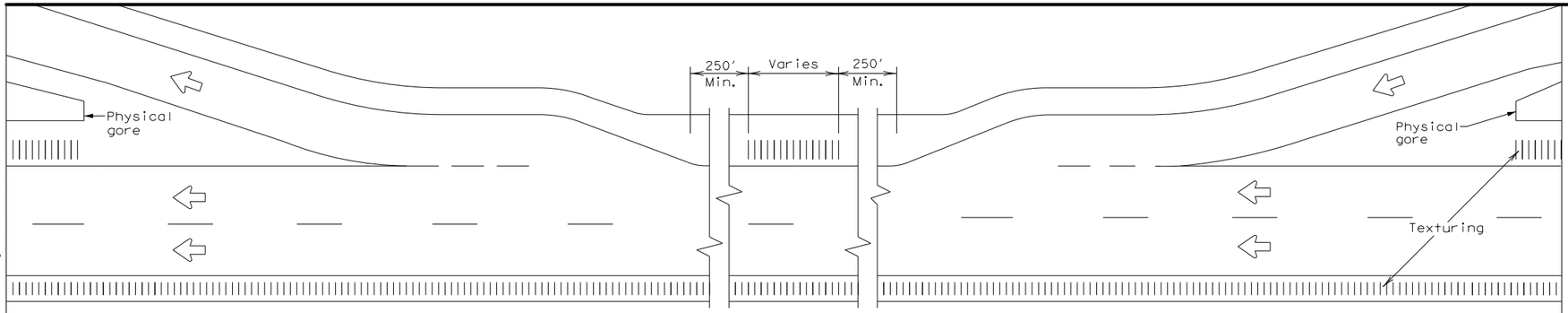
Texas Department of Transportation

Maintenance Division Standard

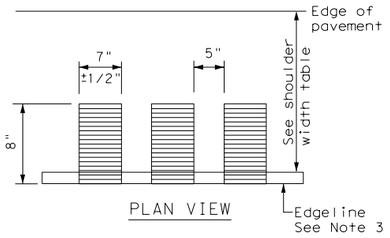
DHT NUMBERS TABLE

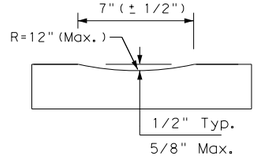
MB-15(1)

FILE:MB14(1).DGN	DN:	CK:	DW:	CK:
© TxDOT APRIL 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0266	01	086	SH 71
	DIST	COUNTY		SHEET NO.
	YKM	FAYETTE		87



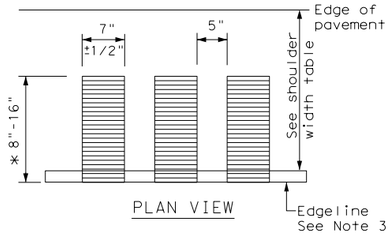
TYPICAL RUMBLE STRIP PLACEMENT AT EXIT AND ENTRANCE RAMPS



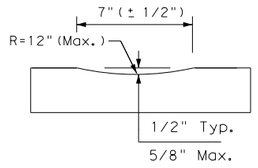


PROFILE VIEW
OPTION 1

CONTINUOUS MILLED DEPRESSIONS
(Rumble Stripes)

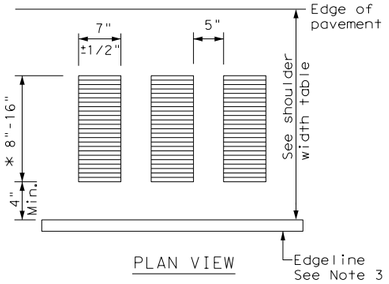


* This distance may vary based on width of shoulder

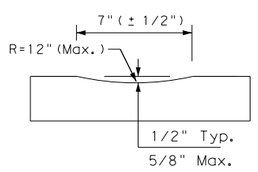


PROFILE VIEW
OPTION 2

CONTINUOUS MILLED DEPRESSIONS
(Rumble Stripes)

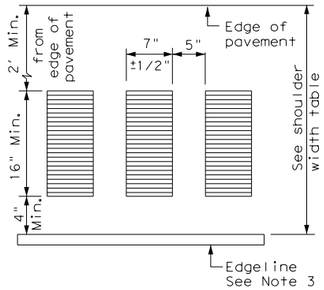


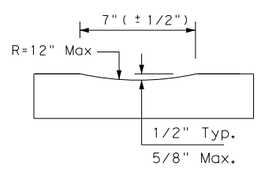
* This distance may vary based on width of shoulder



PROFILE VIEW
OPTION 3

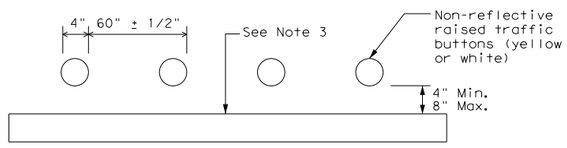
CONTINUOUS MILLED DEPRESSIONS
(Rumble Strips)





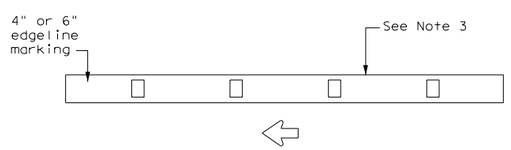
PROFILE VIEW
OPTION 4

CONTINUOUS MILLED DEPRESSIONS
(Rumble Strips)



PLAN VIEW
OPTION 5

RAISED EDGELINE RUMBLE STRIPS



PLAN VIEW
OPTION 6

PROFILE EDGELINE MARKINGS

GENERAL NOTES

1. Rumble strips and profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.
2. Milled rumble strips are preferred when adequate pavement depth is available. If pavement thickness is less than 2 inches, milled rumble strips shall not be used. Rumble strips shall not be milled or depressed into bridge decks.
3. Use Standard Sheet PM(2) for positioning, dimensioning, and spacing of all reflective raised pavement markers, pavement markings, and profile markings.
4. See the table below for determining what options may be used for edgeline rumble strips.

WHEN INSTALLING MILLED DEPRESSION EDGELINE RUMBLE STRIPS:

5. See dimensions for milled rumble strips. Other shapes and dimensions may be used if approved by the Traffic Operations Division.
6. Pavement markings can be applied over milled shoulder rumble strips to create an edgeline rumble stripe.
7. Breaks in edgeline rumble strips shall occur at least 50 feet and no more than 150 feet in advance of bridges, railroad crossings, intersections and driveways with high usage of large trucks when installed on conventional highways.
8. Rumble strips shall not be placed across exit or entrance ramps, acceleration and deceleration lanes, crossovers, gore areas or intersections with other roadways.
9. Consideration should be given to noise levels when edgeline rumble strips are installed near residential areas, schools, churches, etc. A minimum of 3/8 inches depth of milled rumble strip may be considered in these areas.
10. On roadways with high bicycle activity, consideration should be given before the installation of edgeline rumble strips. Things to consider include size of rumble strips, rumble strip material and location of rumble strips on the shoulder. If the designer determines that gaps are needed in the rumble strips due to bicycle use of the road, then follow the requirement shown in FHWA Technical Advisory T5040.39, or latest version. A detail of the spacing shall be included in the plans.

WHEN INSTALLING RAISED OR PROFILE EDGELINE RUMBLE STRIPS:

11. Raised rumble strips consisting of non-reflective raised traffic buttons may be used. Non-reflective raised traffic buttons can be affixed to asphalt or concrete with bitumen or adhesives, as per the manufacturer's recommendations.
12. Non-reflective traffic buttons shall be placed adjacent to the pavement marking delineating the edgeline when used as a rumble strip. The color of the button should match the color of the adjacent edgeline marking (white or yellow). The buttons will be paid for under Item 672, "Raised Pavement Markers." Non-reflective traffic buttons must meet the requirements of DMS-4300.
13. Non-reflective traffic buttons shall not be placed across exit or entrance ramps, acceleration and deceleration lanes, crossovers, gore areas or intersections with other roadways.
14. Breaks in edgeline rumble strips using raised traffic buttons shall occur at least 50 feet and no more than 150 feet in advance of bridges, railroad crossing, intersections and driveways with high usage of large trucks when installed on conventional highways.
15. The minimum distance between the edgeline and the buttons should be used if the shoulder is less than 8 feet in width.
16. Raised profile thermoplastic markings used as edgelines may substitute for buttons.

SHOULDER WIDTH TABLE		
EQUAL TO OR LESS THAN 2 FEET	GREATER THAN 2 FEET LESS THAN 4 FEET	EQUAL TO OR GREATER THAN 4 FEET
Option 1, 5 OR 6	Option 1, 2, 3, 5 or 6	Option 2, 4, 5 OR 6

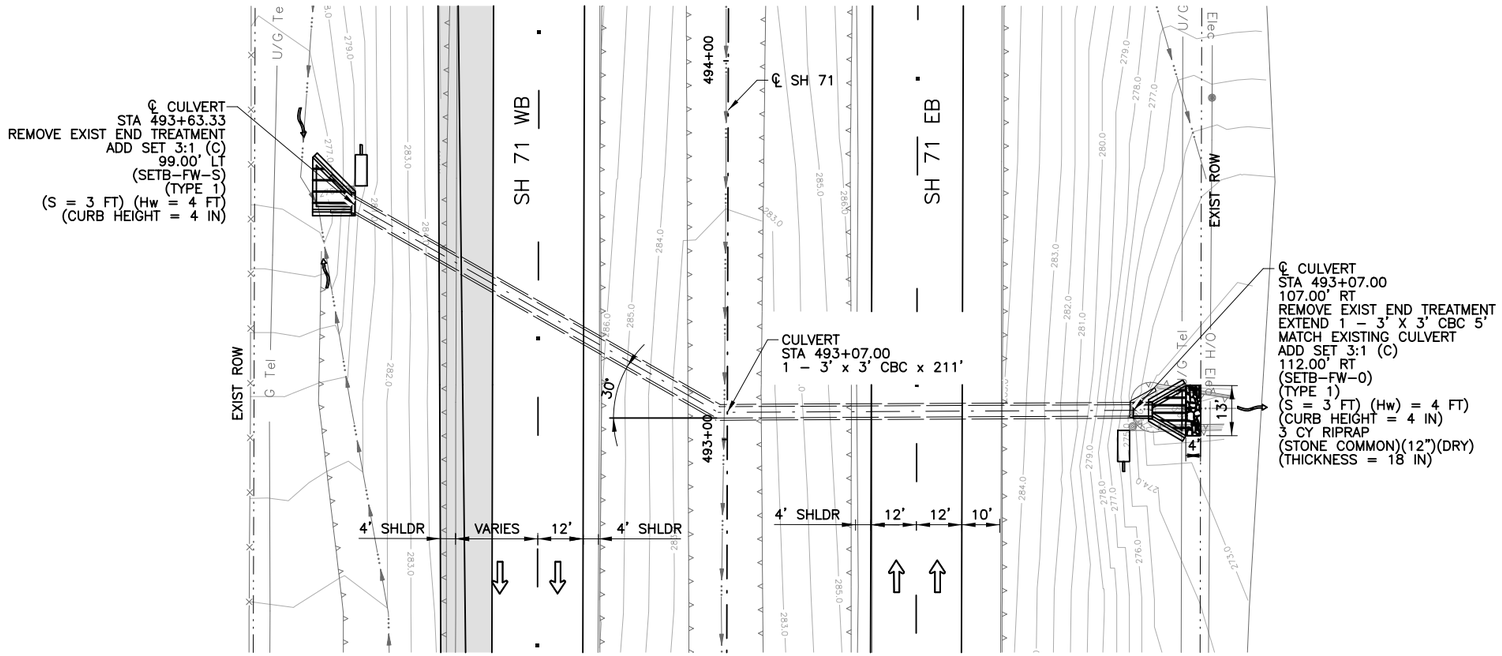
Texas Department of Transportation

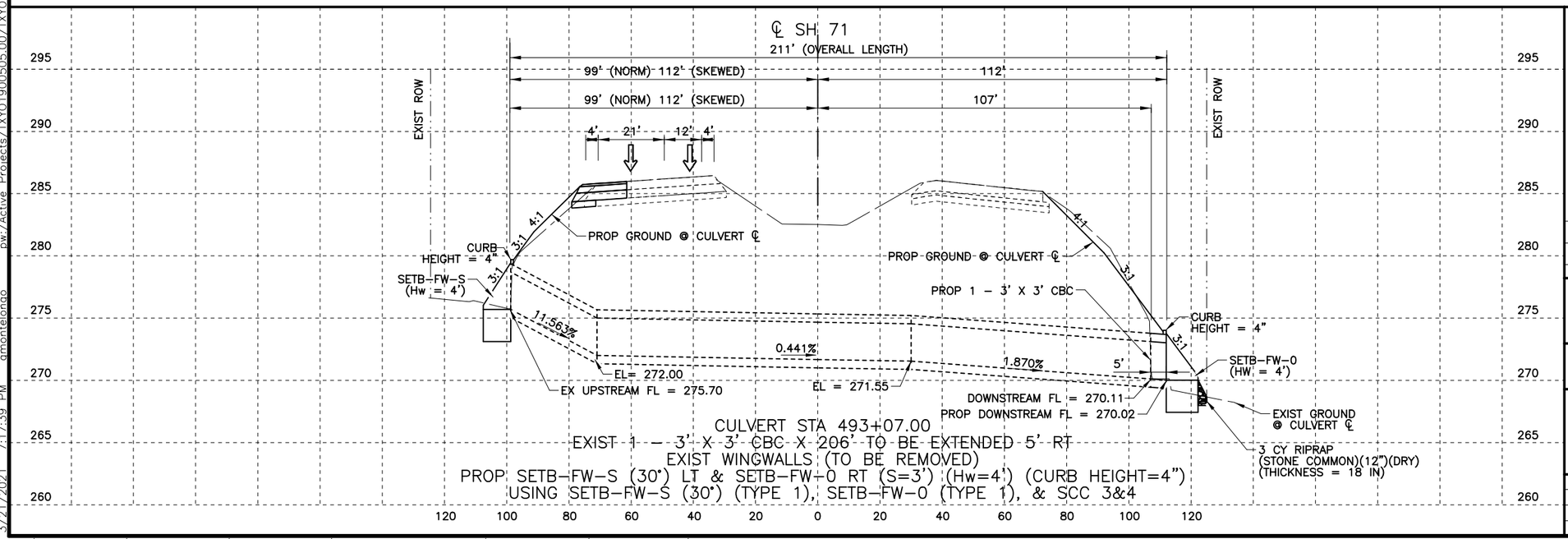
Traffic Operations Division Standard

EDGELINE RUMBLE STRIPS ON FREEWAYS AND DIVIDED HIGHWAYS RS(1)-13

FILE: rs(1)-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT April 2006	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-10 10-13	0266	01	086	SH 71
	DIST	COUNTY		SHEET NO.
	YKM	FAYETTE		88

DATE:
FILE:





CULVERT STA 493+07.00
EXIST 1 – 3' X 3' CBC X 206' TO BE EXTENDED 5' RT
EXIST WINGWALLS (TO BE REMOVED)
PROP SETB–FW–S (30°) LT & SETB–FW–0 RT (S=3') (Hw=4') (CURB HEIGHT=4")
USING SETB–FW–S (30°) (TYPE 1), SETB–FW–0 (TYPE 1), & SCC 3&4

SCALE HORIZ. 20 10 0 20 40 FEET

SCALE VERT. 5 2.5 0 5 10 FEET

N

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED
PROFESSIONAL ENGINEER
03/24/2021

NO.	REVISION	BY	DATE

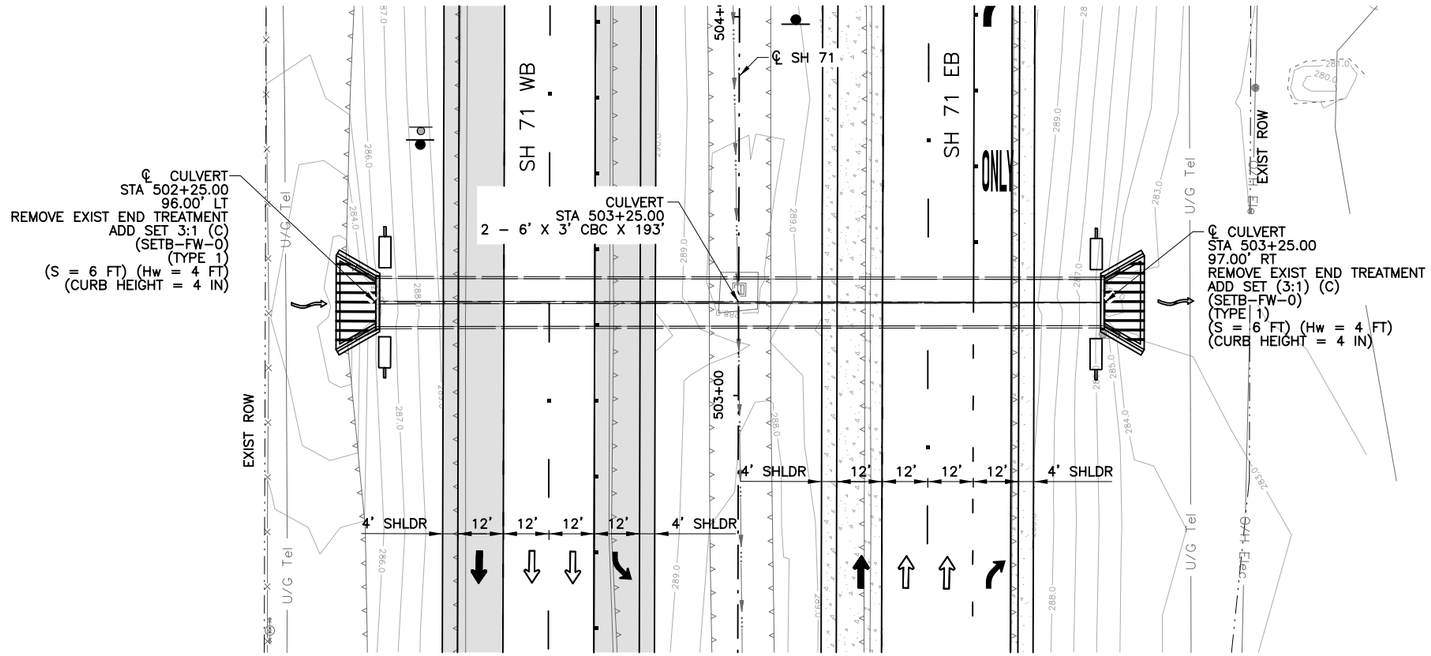
CP&Y
TEXAS REGISTERED ENGINEERING FIRM F–1741

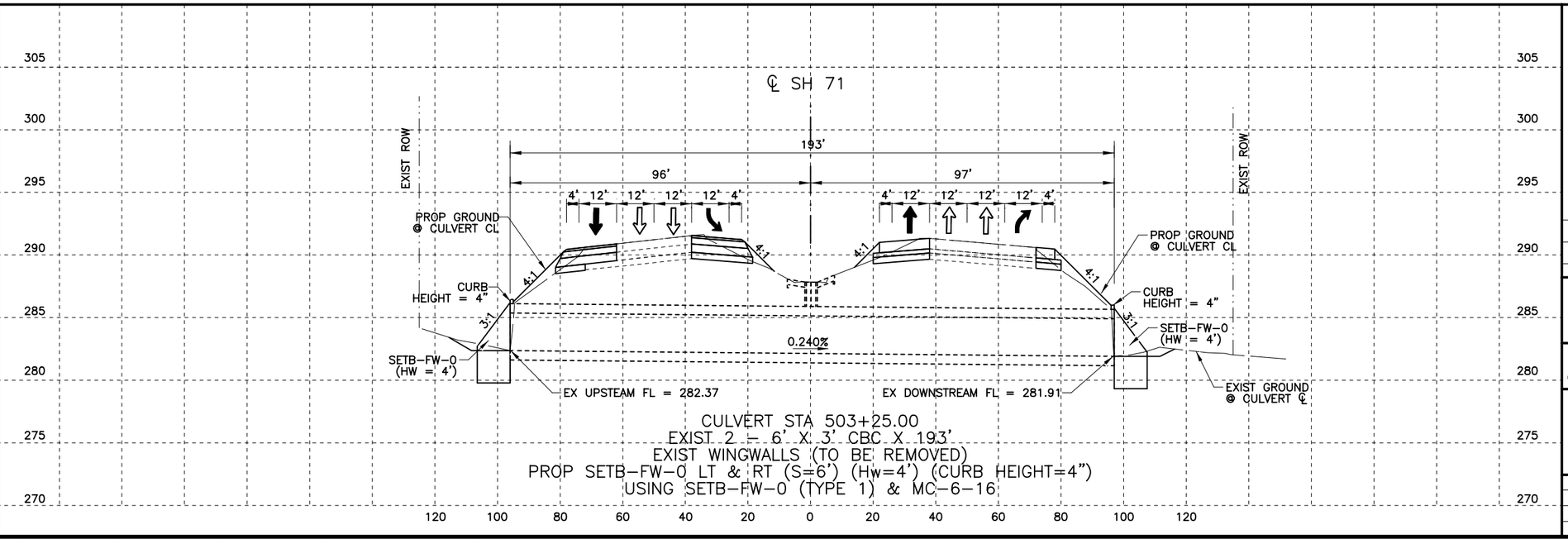
SH 71

CULVERT LAYOUT
STA 493+07.00

SHEET 1 OF 4

Designed:	CM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					SH 71
Drawn:	SW	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086		89





CULVERT STA 503+25.00
EXIST 2 - 6' X 3' CBC X 193'
EXIST WINGWALLS (TO BE REMOVED)
PROP SETB-FW-0 LT & RT (S=6') (Hw=4') (CURB HEIGHT=4")
USING SETB-FW-0 (TYPE 1) & MC-6-16

20 10 0 20 40
SCALE HORIZ. FEET

5 2.5 0 5 10
SCALE VERT. FEET

N

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03/24/2021

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

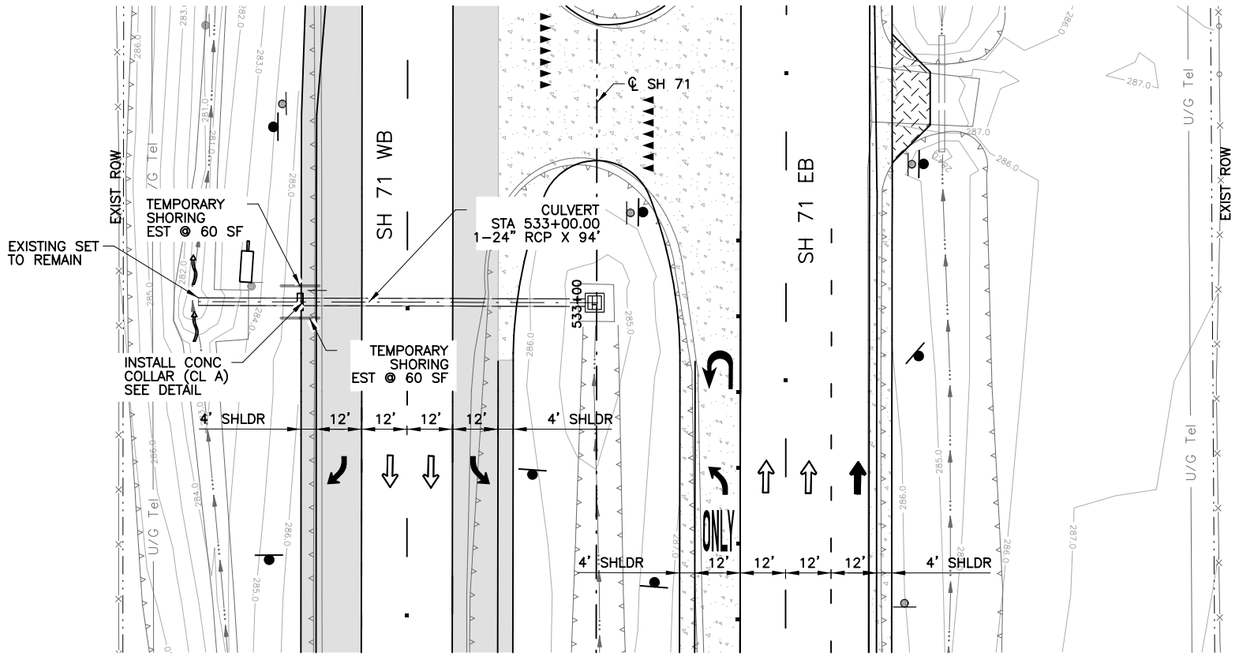
 Texas Department of Transportation

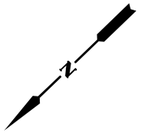
SH 71

CULVERT LAYOUT
STA 503+25.00

SHEET 2 OF 4

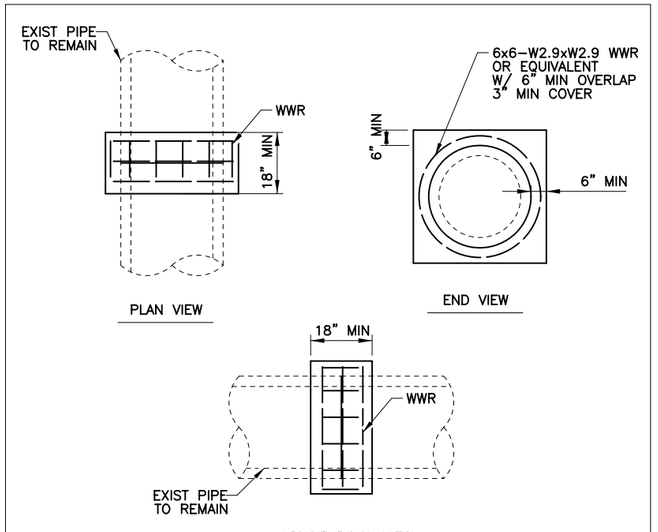
Designed:	CM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					SH 71
Drawn:	SW	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086		90





20 10 0 20 40
SCALE HORIZ. FEET

5 2.5 0 5 10
SCALE VERT. FEET

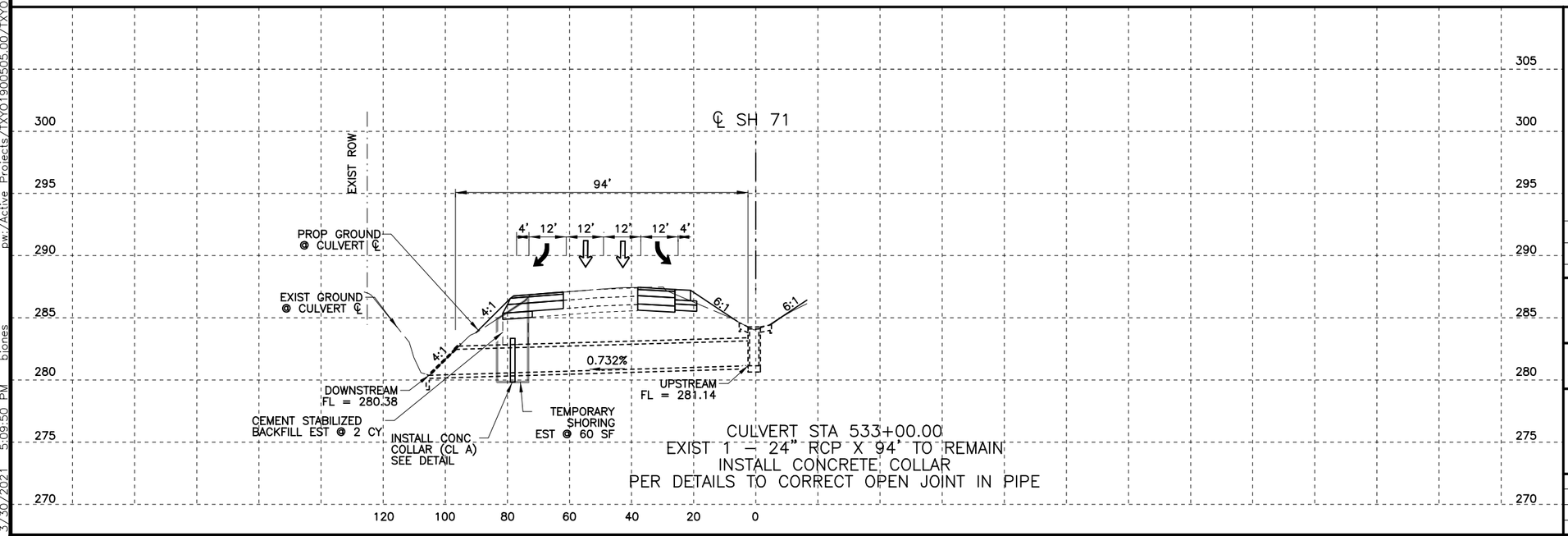


CONCRETE COLLAR DETAIL

N.T.S

CONCRETE COLLAR NOTES:

A CL "A" CONCRETE COLLAR SHALL BE USED AT LOCATIONS AS SHOWN ON THE PLANS. LENGTH OF COLLAR ALONG PIPE MAYBE BE VARIED TO ADEQUATELY SEAL PIPE. BACKFILL EXCAVATED AREA UNDER PROPOSED PAVING USING CEMENT STABILIZED BACKFILL UP TO PROPOSED PAVEMENT SUBGRADE. ALL WORK AND INCIDENTALS ASSOCIATED WITH CONCRETE COLLARS ARE NOT PAID FOR DIRECTLY BUT ARE SUBSIDIARY TO ITEM 420.



CULVERT STA 533+00.00
EXIST 1 - 24" RCP X 94' TO REMAIN
INSTALL CONCRETE COLLAR
PER DETAILS TO CORRECT OPEN JOINT IN PIPE

STATE OF TEXAS
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03/30/2021

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SH 71

CULVERT LAYOUT
STA 533+00.00

SHEET 3 OF 4

Designed:	CM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					SH 71
Drawn:	SW	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086		91

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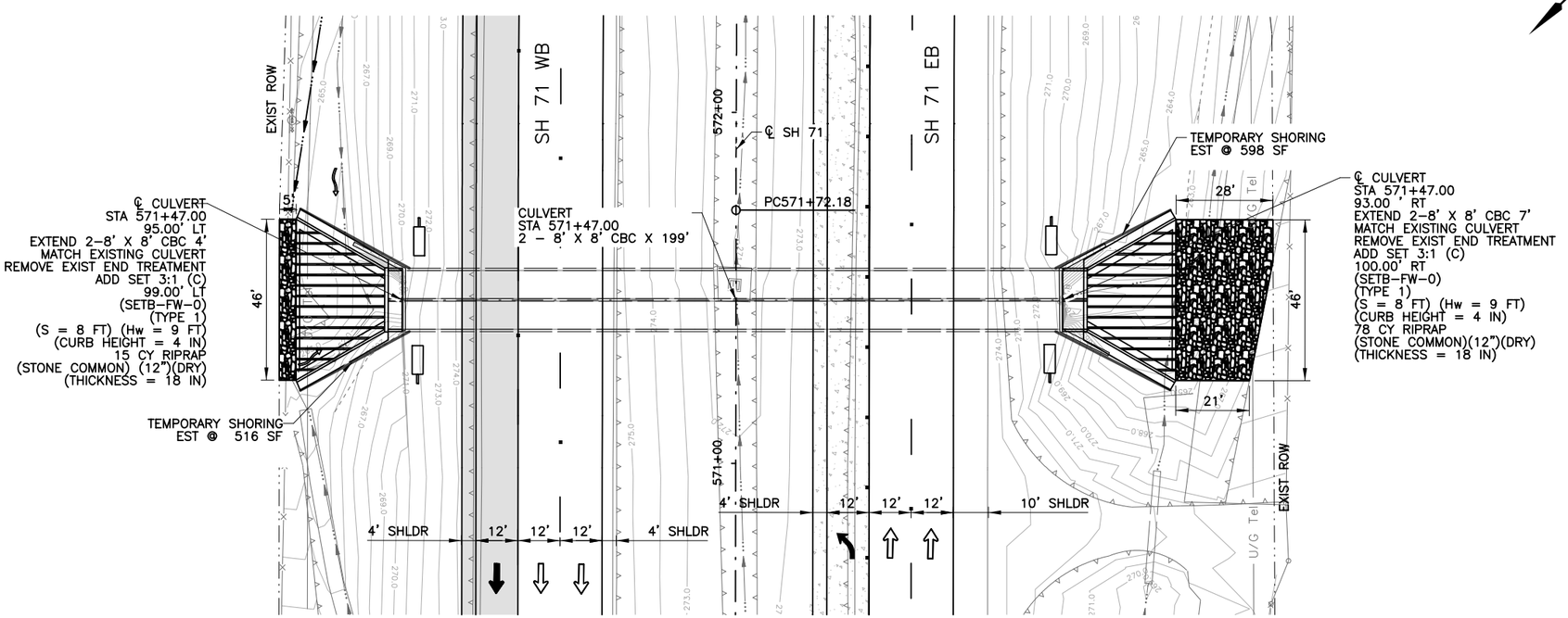

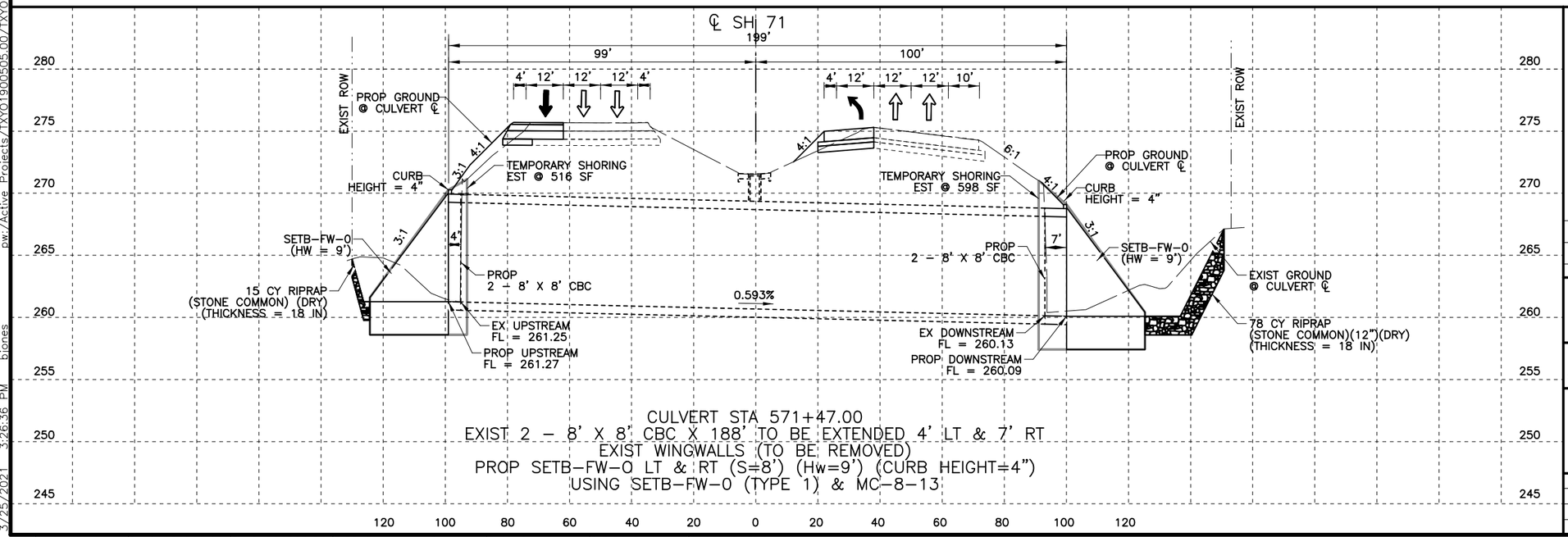

CULVERT STA 571+47.00
EXIST 2 – 8' X 8' CBC X 188' TO BE EXTENDED 4' LT & 7' RT
EXIST WINGWALLS (TO BE REMOVED)
PROP SETB–FW–0 LT & RT (S=8') (Hw=9') (CURB HEIGHT=4")
USING SETB–FW–0 (TYPE 1) & MC–8–13

20 10 0 20 40
SCALE HORIZ. FEET

5 2.5 0 5 10
SCALE VERT. FEET

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED
PROFESSIONAL ENGINEER
03/24/2021

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F–1741

SH 71

CULVERT LAYOUT
STA 571+47.00

SHEET 4 OF 4

Designed:	CM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					SH 71
Drawn:	SW	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086		92

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3/25/2021 3:26:36 PM biones

Culvert Station and/or Creek Name followed by applicable end (Lt, Rt or Both)	Description of Box Culvert No. Spans ~ Span X Height	Max Fill Height (Ft)	Applicable Box Culvert Standard (4)	Applicable Wingwall or End Treatment Standard	Skew Angle (0°,15°, 30° or 45°)	Side Slope or Channel Slope Ratio (SL:1)	T Culvert Top Slab Thickness (In)	U Culvert Wall Thickness (In)	C Estimated Curb Height (Ft)	Hw (1) Height of Wingwall (Ft)	A Curb to End of Wingwall (Ft)	B Offset of End of Wingwall (Ft)	Lw Length of Longest Wingwall (Ft)	Ltw Culvert Toewall Length (Ft)	Atw Anchor Toewall Length (Ft)	Riprap Apron (CY)	Class "C" (2) Conc (Curb) (CY)	Class "C" (3) Conc (Wingwall) (CY)	Total Wingwall Area (SF)
Culvert 1 STA 493+07.00 (Lt)	1 ~ 3'x 3'	2'	SCC-3&4	SETB-FW-S	30°	3:1	8"	7"	0.333'	3.750'	10.250'	10.250'	14.496'	N/A	13.714'	0.9	0.1	4.4	N/A
Culvert 1 STA 493+07.00 (Rt)	1 ~ 3'x 3'	2'	SCC-3&4	SETB-FW-0	0°	3:1	8"	7"	0.333'	3.750'	10.250'	5.918'	11.836'	N/A	14.836'	0.9	0.1	4.3	N/A
Culvert 2 STA 503+25.00 (Lt)	2 ~ 6'x 3'	2'	MC-6-16	SETB-FW-0	0°	3:1	9"	7"	0.333'	3.833'	10.500'	6.062'	12.124'	N/A	24.708'	2.4	0.2	5.2	N/A
Culvert 2 STA 503+25.00 (Rt)	2 ~ 6'x 3'	2'	MC-6-16	SETB-FW-0	0°	3:1	9"	7"	0.333'	3.833'	10.500'	6.062'	12.124'	N/A	24.708'	2.4	0.2	5.2	N/A
Culvert 4 STA 571+47.00 (Lt)	2 ~ 8'x 8'	2'	MC-8-13	SETB-FW-0	0°	3:1	8"	7"	0.333'	8.750'	25.250'	14.578'	29.156'	N/A	45.740'	9.9	0.2	18.7	N/A
Culvert 4 STA 571+47.00 (Rt)	2 ~ 8'x 8'	2'	MC-8-13	SETB-FW-0	0°	3:1	8"	7"	0.333'	8.750'	25.250'	14.578'	29.156'	N/A	45.740'	9.9	0.2	18.7	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.

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED
PROFESSIONAL ENGINEER
03/24/2021

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	0266	01	086	SH 71
	DIST	COUNTY		SHEET NO.
	YKM	FAYETTE		93

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

DATE:
FILE:

DATE:
FILE:

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

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

TABLE OF WING WALL REINFORCING (Two~Wings)

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

TABLE OF ESTIMATED CULVERT TOEWALL QUANTITIES

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

TABLE OF ESTIMATED ANCHOR TOEWALL QUANTITIES

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

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

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

(3) Quantities shown are based on an average wing height for two wings (one structure end). To determine total quantities for two wings multiply the tabulated values by Lw.

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

(5) When shown elsewhere on the plans, construct 5" deep concrete riprap. Payment for riprap is as required by Item 432, "Riprap". Unless otherwise shown on the plans or directed by the Engineer, extend construction joints or grooved joints, oriented in the direction of flow, across the full distance of the riprap, at intervals of approximately 20'. When such riprap is provided, the culvert toewall shown in SECTION B-B is not required.

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

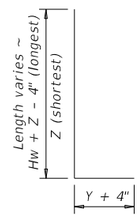
(7) 3" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures without railing and curbs taller than 1'-0", refer to the Extend Curb Details (ECD) standard sheet.

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

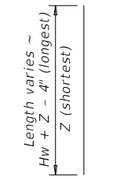
(9) See Table of Maximum Wing Heights for various slopes. Height is limited based on a 33'-6" maximum safety pipe runner length.

TABLE OF MAXIMUM WING HEIGHTS (9)

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



BARS J1



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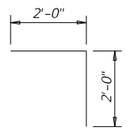
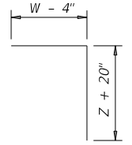
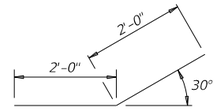


BARS L

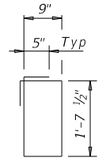


BARS J2

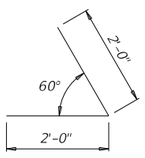


BARS D

BARS R



BARS K
(Length = 5'-5")



BARS OL

WING DIMENSION CALCULATIONS:

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

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

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

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

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

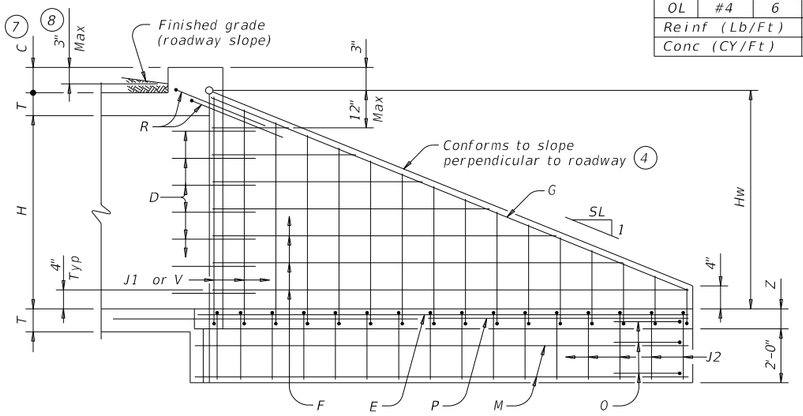
MATERIAL NOTES:

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

GENERAL NOTES:

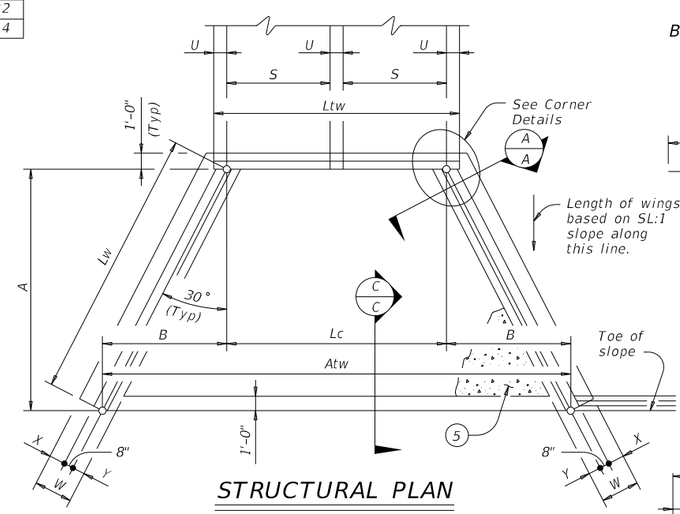
Designed according to AASHTO LRFD Bridge Design Specifications.
The safety end treatments shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the pipe runners.
Pipe runners are designed for a traversing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

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



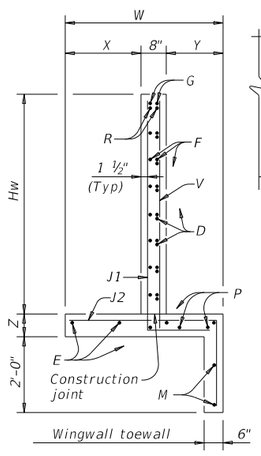
INSIDE ELEVATION OF WINGWALL

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

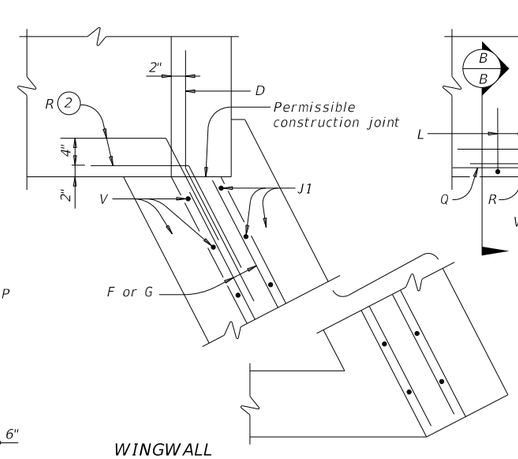


STRUCTURAL PLAN

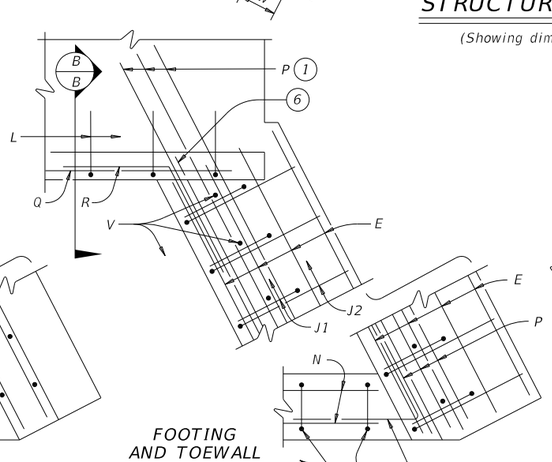
(Showing dimensions.)



SECTION A-A



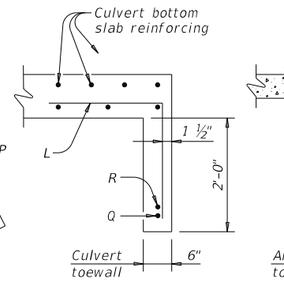
WINGWALL



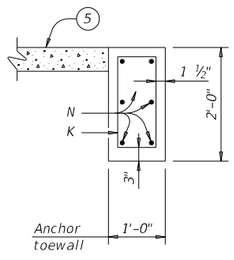
FOOTING AND TOEWALL

CORNER DETAILS

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



SECTION B-B (5)



SECTION C-C

SHEET 1 OF 3

Texas Department of Transportation

Bridge Division Standard

SAFETY END TREATMENT WITH FLARED WINGS

FOR 0° SKEW BOX CULVERTS
TYPE I ~ CROSS DRAINAGE

SETB-FW-0

FILE: setbf0se-20.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
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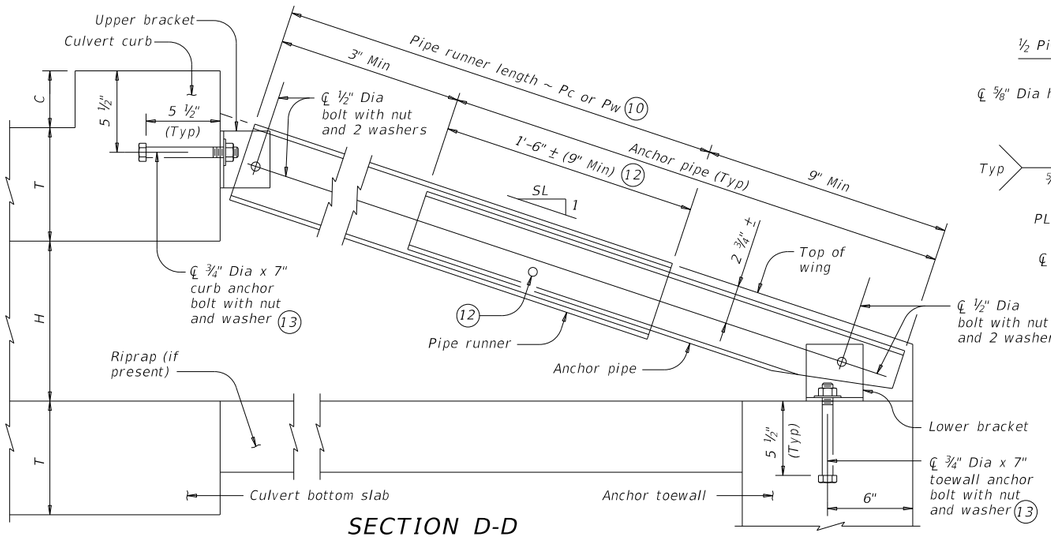
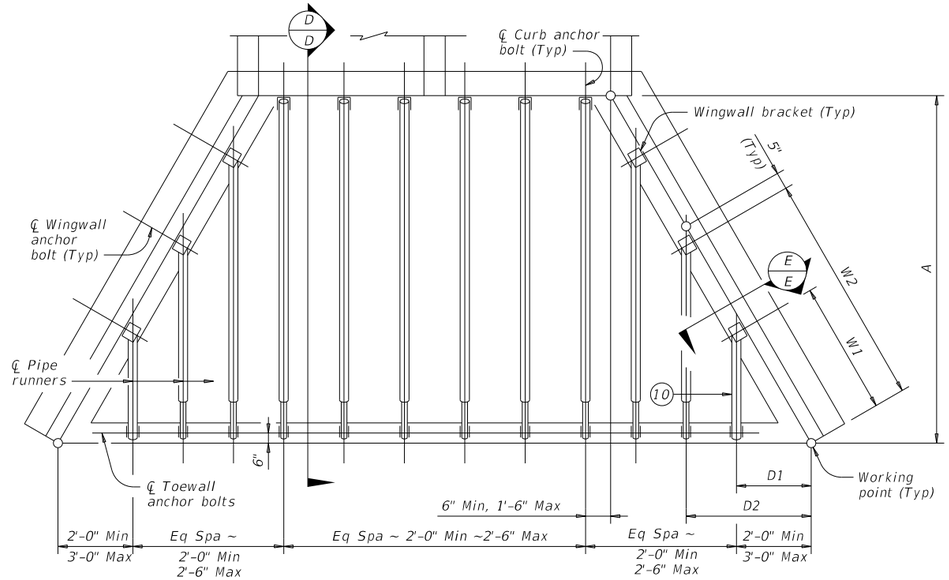
REVISIONS	0266	01	086	SH 71
	DIST	COUNTY		SHEET NO.
	YKM	FAYETTE		94

DATE:
FILE:

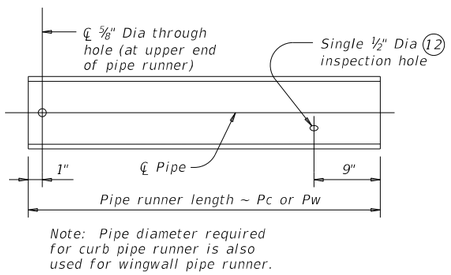


SECTION D-D

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

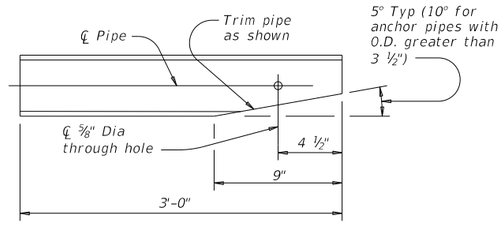


PIPE RUNNER PLAN

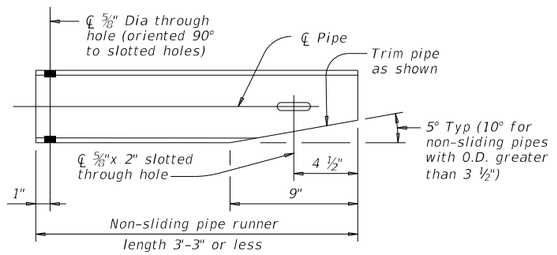


Note: Pipe diameter required for curb pipe runner is also used for wingwall pipe runner.

PIPE RUNNER DETAILS

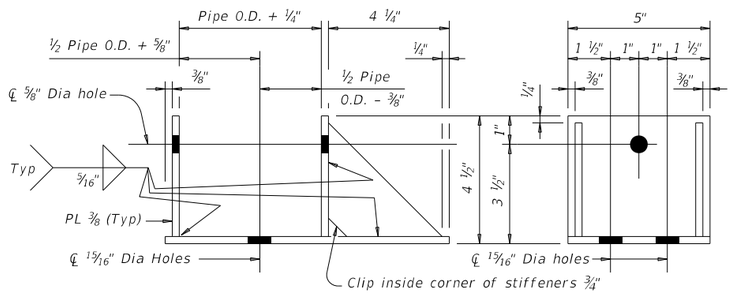


ANCHOR PIPE DETAILS

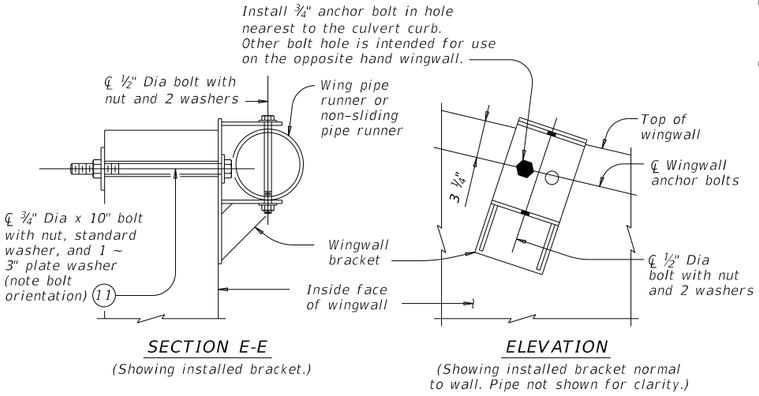


Note: Pipe size is the same as required for curb pipe runner. Adjust the corresponding lower bracket accordingly.

NON-SLIDING PIPE RUNNER DETAILS



ELEVATION SIDE VIEW

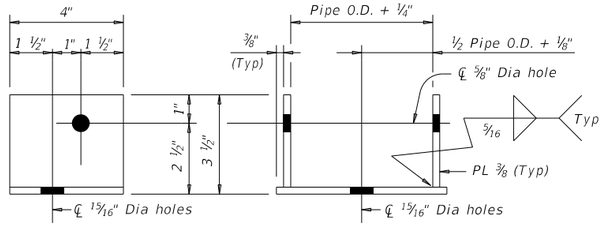


SECTION E-E (Showing installed bracket.)

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

Note: Match wingwall bracket to the upper curb bracket size.

WINGWALL BRACKET DETAILS



SIDE VIEW ELEVATION

Note: Match upper and lower brackets, except for the brackets used with non-sliding pipe runners, to the required pipe diameters as shown in the table.

UPPER AND LOWER BRACKET DETAILS

MAXIMUM PIPE RUNNER LENGTHS AND REQUIRED PIPE RUNNER SIZES

Maximum Pipe Runner Length (Pc or Pw)	Required Pipe Runner Size			Required Anchor Pipe Size		
	Pipe Size	Pipe O.D.	Pipe I.D.	Pipe Size	Pipe O.D.	Pipe I.D.
9'-4"	3" STD	3.500"	3.068"	2" STD	2.375"	2.067"
19'-0"	4" STD	4.500"	4.026"	3" STD	3.500"	3.068"
33'-6"	5" STD	5.563"	5.047"	4" STD	4.500"	4.026"

(10) If pipe runner length (Pw) is 1'-9" or less replace the normal pipe runner and anchor pipe with a single non-sliding pipe runner. See Non-Sliding Pipe Runner Details for additional information.

(11) At Contractor's option, ⅞" diameter hole may be formed or cored drilled. Percussion drilling is not permitted. Adjust placement of reinforcing steel as necessary to avoid bolt holes.

(12) After installation of pipe runner, use the ½" inspection hole to ensure that the lap of the anchor pipe with the pipe runner is adequate.

(13) At Contractor's option, an adhesive anchor may be used. Provide ¾" Dia adhesive anchors that meet the requirements of ASTM A307 Gr A fully threaded rods. Embed threaded rods into curb, wingwalls, and toewall using a Type III, Class C, D, E, or F anchor adhesive. Minimum embedment depth is 5 ½". Provide anchor adhesive able to achieve a basic bond strength in tension, Nba, of 20 kips. Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use.

PIPE RUNNER DIMENSION CALCULATIONS:

Wn = (2.000) (Dn) - (0.416')
Pwn = (Dn) (K2) - (2.063')
Pw1 Non-Sliding Pipe Runner (If required) = (D1) (K2) - (0.563')
Pc = (A) (K1) - (1.688')

Wn = Distance from working point to centerline anchor bolt measured along bottom inside face of wing (feet)
Dn = Distance from working point to centerline pipe runner measured along outside face of anchor toewall (feet)
Pw = Wingwall pipe runner length (feet)
Pc = Curb pipe runner length (feet)
K = Constant values for use in formulas

Slope SL:1	K1		K2
3:1	~ 1.054	~	1.826
4:1	~ 1.031	~	1.785
6:1	~ 1.014	~	1.756

n = Wing pipe runner number

Texas Department of Transportation

Bridge Division Standard

SAFETY END TREATMENT WITH FLARED WINGS

FOR 0° SKEW BOX CULVERTS
TYPE I ~ CROSS DRAINAGE

SETB-FW-0

FILE: setbf0se-20.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
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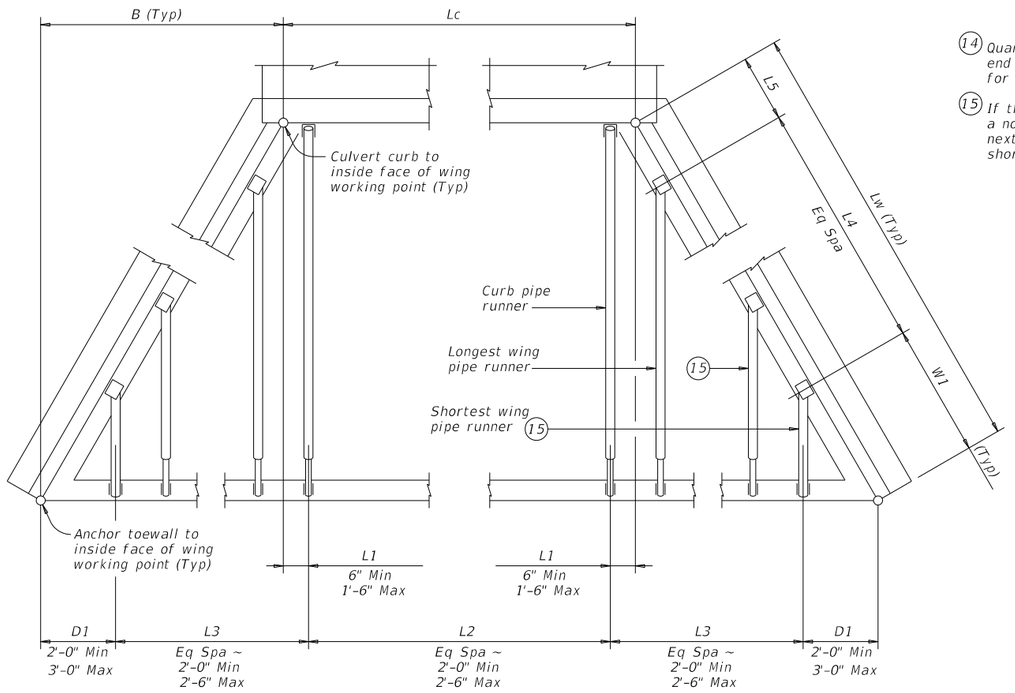
REVISIONS	0266	01	086	SH 71
	DIST	COUNTY		SHEET NO.
	YKM	FAYETTE		95

Culvert Station and/or Creek name followed by applicable end (Lt, Rt or Both) (14)	Lc	L1	L2			D1	L3			W1	L4			L5	Curb Pipe Runner (Pc)		Longest Wing Pipe Runner (Pw)	Shortest Wing Pipe Runner (Pw)	Non-Sliding Wing Pipe Runner (if applicable)	Curb, Wing, and/or Non-Sliding Pipe Runners		3'-0" Anchor Pipe	
			No. Spa	Spa at	Overall Length		No. Spa	Spa at	Overall Length		No. Spa	Spa at	Overall Length		No.	Length				Size (3",4" or 5")	Total Length (14)	Size (2",3" or 4")	Total Length (14)
	(Ft)	(Ft)		(Ft)	(Ft)	(Ft)		(Ft)	(Ft)	(Ft)		(Ft)	(Ft)	(Ft)		(Ft)	(Ft)	(Ft)	(Ft)				
Culvert 1 STA 493+07.00 (Rt)	3.000'	0.500'	1	2.000'	2.000'	2.000'	2	2.209'	4.418'	3.583'	1	4.418'	4.418'	3.835'	2	9.125'	5.625'	N/A	3.083'	3"	35.667'	2"	12.000'
Culvert 2 STA 503+25.00 (Lt)	12.583'	0.500'	5	2.317'	11.583'	2.500'	2	2.031'	4.062'	4.583'	1	4.062'	4.062'	3.479'	6	9.375'	6.208'	2.500'	N/A	4"	73.667'	3"	30.000'
Culvert 2 STA 503+25.00 (Rt)	12.583'	0.500'	5	2.317'	11.583'	2.500'	2	2.031'	4.062'	4.583'	1	4.062'	4.062'	3.479'	6	9.375'	6.208'	2.500'	N/A	4"	73.667'	3"	30.000'
Culvert 4 STA 571+47.00 (Lt)	16.583'	0.500'	7	2.226'	15.583'	3.000'	5	2.416'	12.078'	5.583'	4	4.831'	19.325'	4.248'	8	24.917'	21.063'	3.417'	N/A	5"	321.729'	4"	54.000'
Culvert 4 STA 571+47.00 (Rt)	16.583'	0.500'	7	2.226'	15.583'	3.000'	5	2.416'	12.078'	5.583'	4	4.831'	19.325'	4.248'	8	24.917'	21.063'	3.417'	N/A	5"	321.729'	4"	54.000'



PIPE RUNNER LAYOUT

(14) Quantities shown are for one structure end if Lt or Rt. Quantities shown are for two structure ends if Both.

(15) If the outermost wing pipe runner is a non-sliding pipe runner, consider the next outermost wing pipe runner as the shortest.

DATE:
FILE:

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED
PROFESSIONAL ENGINEER
03/24/2021

Texas Department of Transportation

Bridge Division Standard

SAFETY END TREATMENT WITH FLARED WINGS

FOR 0° SKEW BOX CULVERTS TYPE I ~ CROSS DRAINAGE

SETB-FW-0

FILE: setbf0se-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0266	01	086	SH 71
	DIST	COUNTY		SHEET NO.
	YKM	FAYETTE		96

DATE:
FILE:

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

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

TABLE OF WINGWALL REINFORCING (Two~Wings)

Bar	Size	No.	Spa
DL & DS	#5	~	1'-0"
E	#4	~	1'-0"
F	#4	~	1'-0"
G	#6	4	~
M	#4	4	~
P	#4	~	1'-0"
RL	#5	3	~
RS	#5	3	~
V	#4	~	1'-0"

TABLE OF ESTIMATED CULVERT TOEWALL QUANTITIES

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

TABLE OF ESTIMATED ANCHOR TOEWALL QUANTITIES

Bar	Size	No.	Spa
K	#4	~	1'-0"
N	#5	6	~
OL	#4	3	~
OS	#4	3	~
Reinf (Lb/Ft)			9.82
Conc (CY/Ft)			0.074

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

(2) Adjust to fit as necessary to maintain 11#2" clearcover and 4" Min between bars.

(3) Quantities shown are based on an average wing height for two wings (one structure end). To determine total quantities for two wings multiply the tabulated values by 0.5 (A+Lw).

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

(5) When shown elsewhere on the plans, construct 5" deep concrete riprap. Payment for riprap is as required by Item 432, "Riprap". Unless otherwise shown on the plans or directed by the Engineer, extend construction joints or grooved joints, oriented in the direction of flow, across the full distance of the riprap, at intervals of approximately 20'. When such riprap is provided, the culvert toewall shown in SECTION B-B is not required.

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

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

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

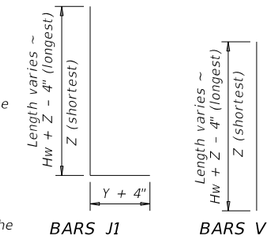
(9) Culvert skew (limit to 15° or 30°)

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

(11) Typical wingwall angle for all skews.

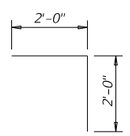
TABLE OF MAXIMUM WING HEIGHTS (10)

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

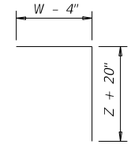


BARS J1

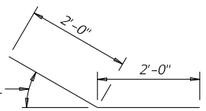
BARS V



BARS L

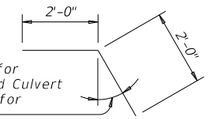


BARS J2



Angle = Culvert Skew for Bars DS and 15° for Bars DL

BARS DS and DL
(DS ~ Short wing and DL ~ Long wing)



Angle = 0° for Bars RS and Culvert Skew + 15° for Bars RL

BARS RS and RL
(RS ~ Short wing and RL ~ Long wing)

WING DIMENSION CALCULATIONS:

Formulas:

Hw = H + T + C - 0.250' (10)
A = (Hw - 0.333') (SL)
B = (A) [tan (θ + 15°)]
Lw = (A) ÷ [cos (θ + 15°)]

For cast-in-place culverts:

Ltw = [(N) (S) + (N + 1) (U)] ÷ (cos θ)

For precast culverts:

Ltw = [(N) (2U + S) + (N - 1) (0.500')] ÷ (cos θ)

Lc = (Ltw) - (2U) ÷ (cos θ)
Atw = (Lc) + (B)
Total Wingwall Area (two wings ~ S.F.) = (0.5) (Hw + 0.333') (Lw + A)

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

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

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.

Provide galvanized reinforcing steel if required elsewhere in the plans.

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

Provide Class "C" concrete (f`c = 3,600 psi).

Adjust reinforcing as necessary to provide a minimum clear cover of 1 ½".

Provide pipe runners and anchor pipes meeting the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 Gr B, or API 5LX52.

Provide ASTM A307 bolts and nuts.

Provide ASTM A36 steel plates.

Galvanize all steel components, except reinforcing unless required elsewherein the plans, after fabrication.

Repair galvanizing damaged during transport or construction in accordance with the Item 445, "Galvanizing".

For optional adhesive anchors, install adhesive anchorages in accordance with the manufacturer's instructions including hole size, drilling equipment and method, hole cleaning equipment and method, mixing and dispensing adhesive, and anchor insertion. Do not alter the manufacturer's mixing nozzle or dispenser. Provide anchorage rods that are clean and free of grease, oil, or any other foreign material. Demonstrate hole cleaning method to the Engineer for approval and continue the approved process for all anchorage locations. Test adhesive anchors in accordance with Item 450.3.3, "Tests." Test 3 anchors per 100 anchors installed.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

The safety end treatments shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the pipe runners.

Pipe runners are designed for a traversing load of 1,800 pounds at yield as recommended by Research Report 280-1, "Safety Treatment of Roadside Cross-Drainage Structures", Texas Transportation Institute, March 1981.

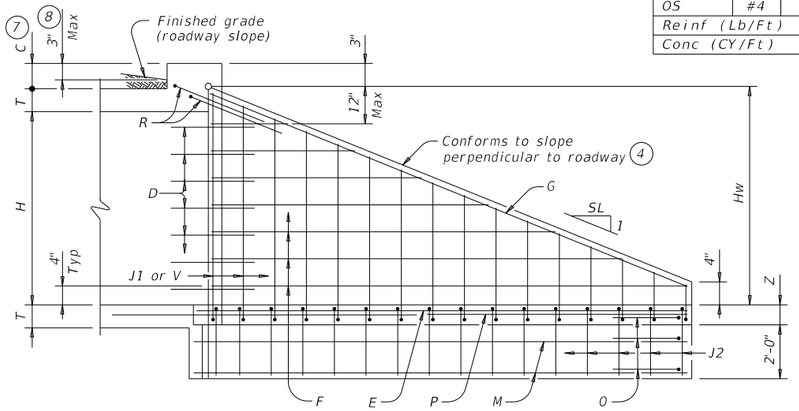
When structure is founded on solid rock, depth of toewalls for culverts and wingwalls may be reduced or eliminated as directed by the Engineer.

All bolts, nuts, washers, brackets, angles, and pipe runners are considered parts of the safety end treatment for payment

The quantities for pipe runners, reinforcing steel, and concrete, resulting from the formulas given herein are for Contractor's information only.

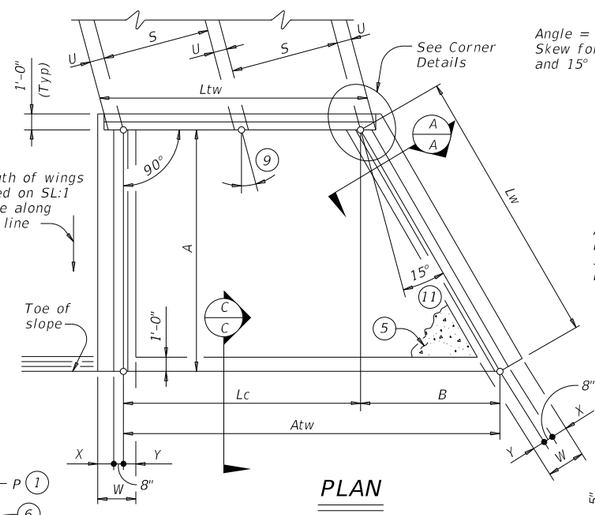
See Box Culvert Supplement (BCS) standard sheet for additional dimensions and information.

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



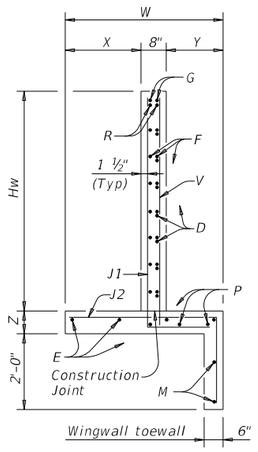
INSIDE ELEVATION OF WINGWALL

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

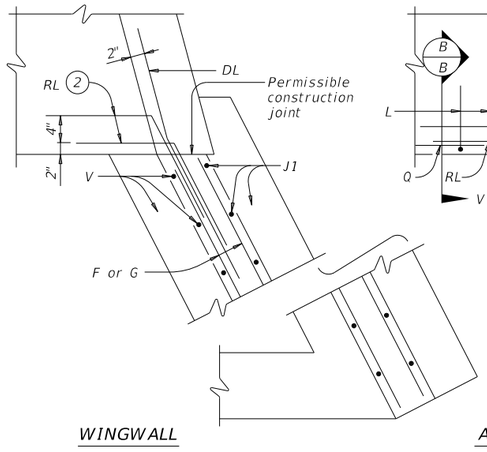


PLAN

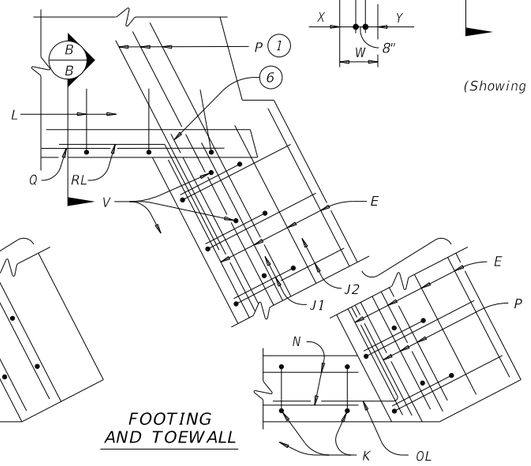
(Showing dimensions and 15° skew.)



SECTION A-A



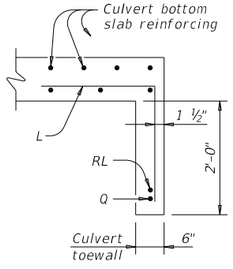
WINGWALL



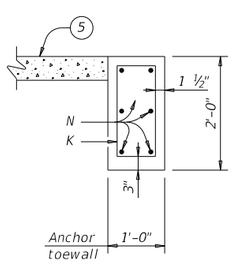
FOOTING AND TOEWALL

CORNER DETAILS

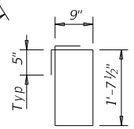
(Culvert and culvert toewall reinforcing not shown for clarity.)



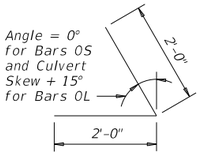
SECTION B-B (5)



SECTION C-C



BARS K
(Length = 5'-5")



BARS OS and OL
(OS ~ Short wing and OL ~ Long wing)

SHEET 1 OF 3

Texas Department of Transportation

Bridge Division Standard

SAFETY END TREATMENT WITH FLARED WINGS

FOR 15° AND 30° SKEW BOX CULVERTS
TYPE I ~ CROSS DRAINAGE

SETB-FW-S

FILE: setbfsse-20.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
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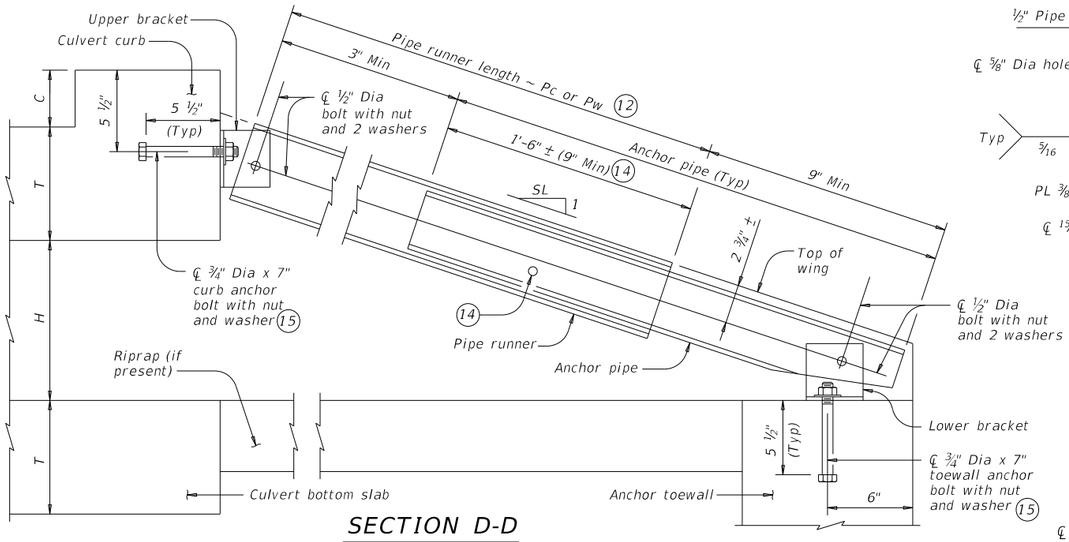
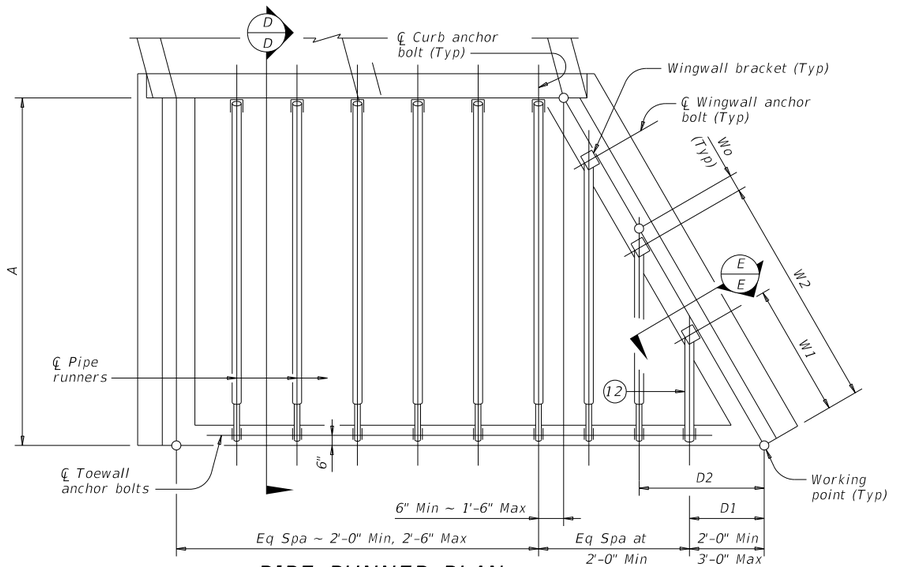
	0266	01	086	SH 71
	DIST	COUNTY		SHEET NO.
	YKM	FAYETTE		97

DATE:
FILE:

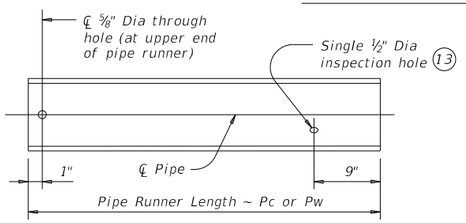


SECTION D-D

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

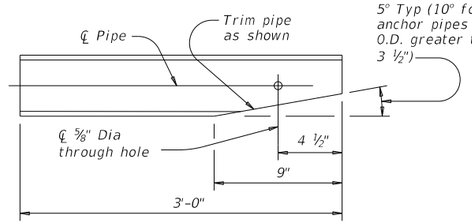


PIPE RUNNER PLAN

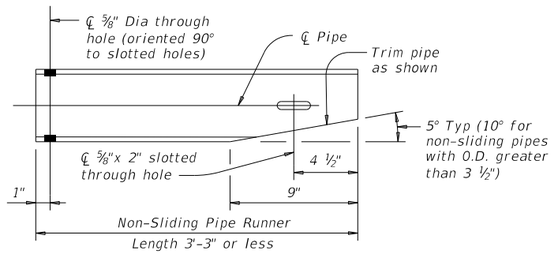


Note: Use pipe diameter required for curb pipe runner for wingwall pipe runner.

PIPE RUNNER DETAILS

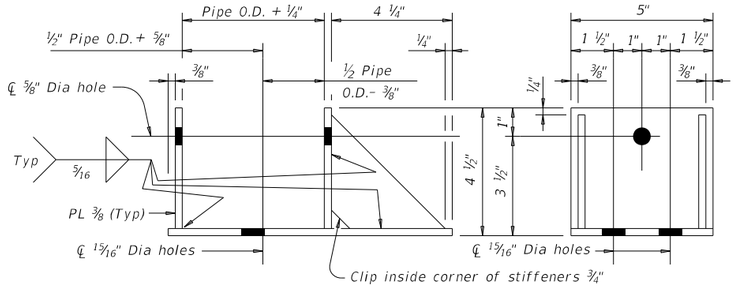


ANCHOR PIPE DETAILS



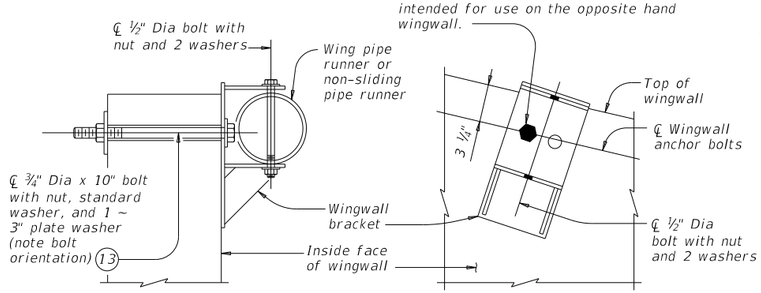
Note: Pipe size is the same as required for curb pipe runner. Adjust the corresponding lower bracket accordingly.

NON-SLIDING PIPE RUNNER DETAILS



ELEVATION

SIDE VIEW



SECTION E-E

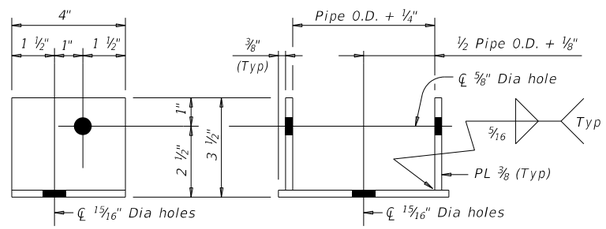
(Showing installed bracket.)

ELEVATION

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

Note: Match wingwall bracket to the upper curb bracket size.

WINGWALL BRACKET DETAILS



SIDE VIEW

ELEVATION

Note: Match upper and lower brackets, except for the brackets used with non-sliding pipe runners, to the required pipe diameters as shown in the table.

UPPER AND LOWER BRACKET DETAILS

MAXIMUM PIPE RUNNER LENGTHS AND REQUIRED PIPE RUNNER AND ANCHOR PIPE SIZES

Maximum Pipe Runner Length (Pc or Pw)	Required Pipe Runner Size			Required Anchor Pipe Size		
	Pipe Size	Pipe O.D.	Pipe I.D.	Pipe Size	Pipe O.D.	Pipe I.D.
9'-4"	3" STD	3.500"	3.068"	2" STD	2.375"	2.067"
19'-0"	4" STD	4.500"	4.026"	3" STD	3.500"	3.068"
33'-6"	5" STD	5.563"	5.047"	4" STD	4.500"	4.026"

(12) If pipe runner length (Pw) is 1'-9" or less, replace the normal pipe runner and anchor pipe with a single non-sliding pipe runner. See Non-Sliding Pipe Runner Details for additional information.

(13) At Contractor's option, ⅞" diameter hole may be formed or cored drilled. Percussion drilling is not permitted. Adjust placement of reinforcing steel as necessary to avoid bolt holes.

(14) After installation of pipe runner, use the ½" inspection hole to ensure that the lap of the anchor pipe with the pipe runner is adequate.

(15) At Contractor's option, an adhesive anchor may be used. Provide ¾" Dia adhesive anchors that meet the requirements of ASTM A307, Gr A fully threaded rods. Embed threaded rods into curb, wingwalls, and toewall using a Type III, Class C, D, E, or F anchor adhesive. Minimum embedment depth is 5 ½". Provide anchor adhesive able to achieve a basic bond strength in tension, Nba, of 20 kips. Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use.

PIPE RUNNER DIMENSION CALCULATIONS:

Wn = (K3) (Dn) – (Wo)
Pwn = (Dn) (K2) – (2.063')
Pw1 Non-Sliding Pipe Runner (If required) = (D1) (K2) – (0.563')
Pc = (A) (K1) – (1.688')

Wn = Distance from working point to centerline anchor bolt measured along bottom inside face of wing (feet)
Dn = Distance from working point to centerline pipe runner measured along outside face of anchor toewall (feet)
Pw = Wingwall pipe runner length (feet)
Pc = Curb pipe runner length (feet)
K = Constant values for use in formulas

Slope SL:1	K1		K2~15° Skew		K2~30° Skew
3:1	~ 1.054	~	1.826	~	1.054
4:1	~ 1.031	~	1.785	~	1.031
6:1	~ 1.014	~	1.756	~	1.014

K3 = 15° Skew ~ 2.000
30° Skew ~ 1.414
n = Wing pipe runner number
Wo = 15° Skew ~ 5"
30° Skew ~ 2 ½"

Texas Department of Transportation

Bridge Division Standard

SAFETY END TREATMENT WITH FLARED WINGS

FOR 15° AND 30° SKEW BOX CULVERTS
TYPE I ~ CROSS DRAINAGE

SETB-FW-S

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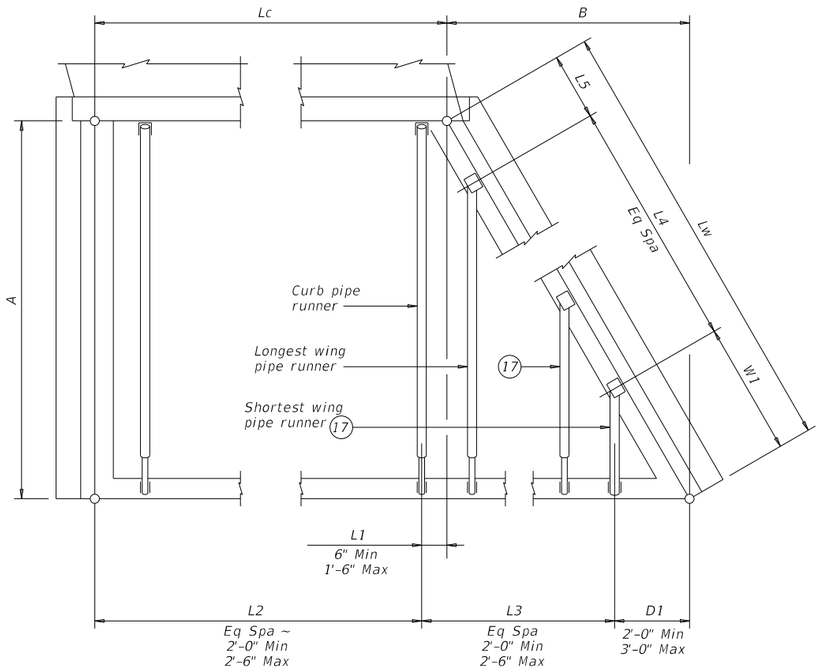
REVISIONS	0266	01	086	SH 71
	DIST	COUNTY		SHEET NO.
	YKM	FAYETTE		98

Culvert Station and/or Creek name followed by applicable end (Lt, Rt or Both) (16)	Lc	L1	L2			D1	L3			W1	L4			L5	Curb Pipe Runner (Pc)		Longest Wing Pipe Runner (Pw)	Shortest Wing Pipe Runner (Pw)	Non-Sliding Wing Pipe Runner (if applicable)	Curb, Wing, and/or Non-Sliding Pipe Runners		3'-0" Anchor Pipe	
			No. Spa	Spa at	Overall Length		No. Spa	Spa at	Overall Length		No. Spa	Spa at	Overall Length		No.	Length				Size (3",4" or 5")	Total Length (16)	Size (2",3" or 4")	Total Length (16)
	(Ft)	(Ft)		(Ft)	(Ft)	(Ft)			(Ft)	(Ft)			(Ft)	(Ft)		(Ft)	(Ft)	(Ft)	(Ft)		(Ft)		(Ft)
Culvert 1 STA 493+07.00 (Lt)	3.464'	1.000'	1	2.464'	2.464'	3.000'	4	2.063'	8.250'	4.034'	3	2.916'	8.749'	1.713'	1	9.125'	7.625'	3.271'	2.604'	3"	28.073'	2"	12.000'



PIPE RUNNER LAYOUT

Note: Right forward culvert skew shown, actual culvert skew may be opposite hand.

(16) Quantities shown are for one structure end if Lt or Rt. Quantities shown are for two structure ends if Both.

(17) If the outermost wing pipe runner is a non-sliding pipe runner, consider the next outermost wing pipe runner as the shortest.

DATE:
FILE:

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED
PROFESSIONAL ENGINEER
03/24/2021

Texas Department of Transportation

Bridge Division Standard

SAFETY END TREATMENT WITH FLARED WINGS

FOR 15° AND 30° SKEW BOX CULVERTS
TYPE I ~ CROSS DRAINAGE

SETB-FW-S

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©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
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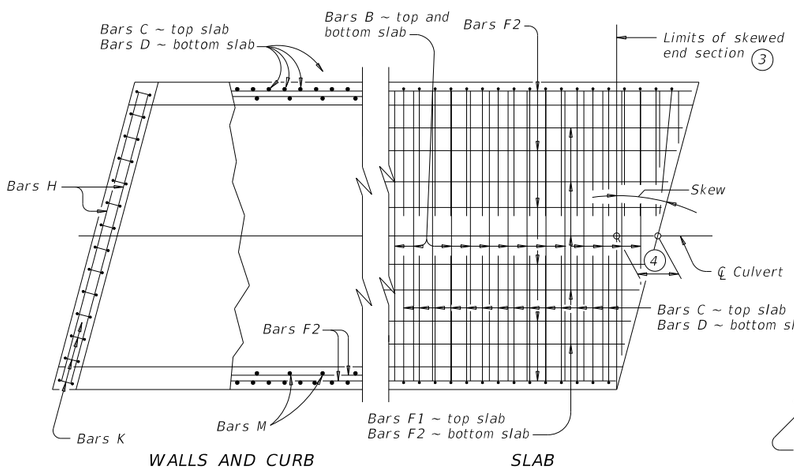
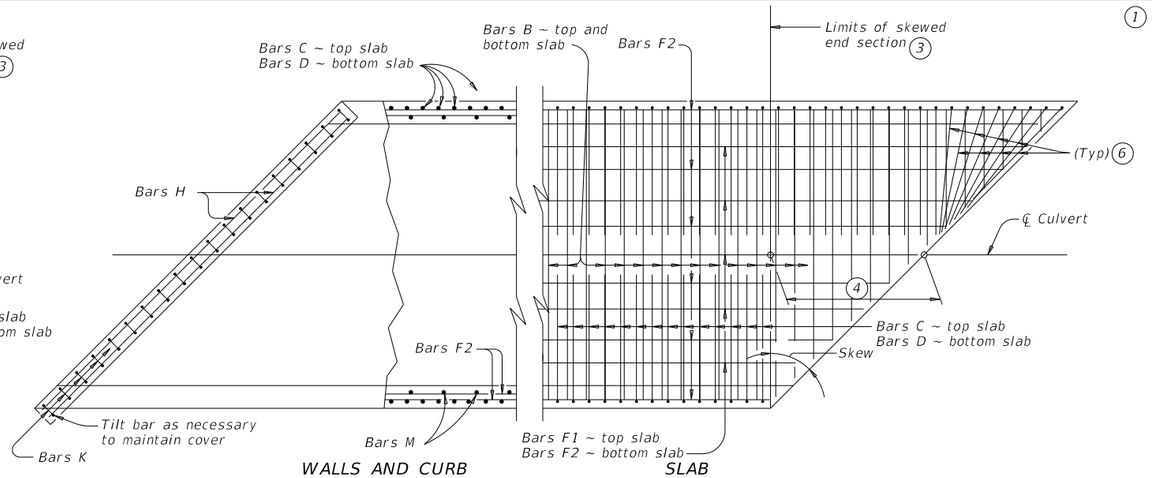
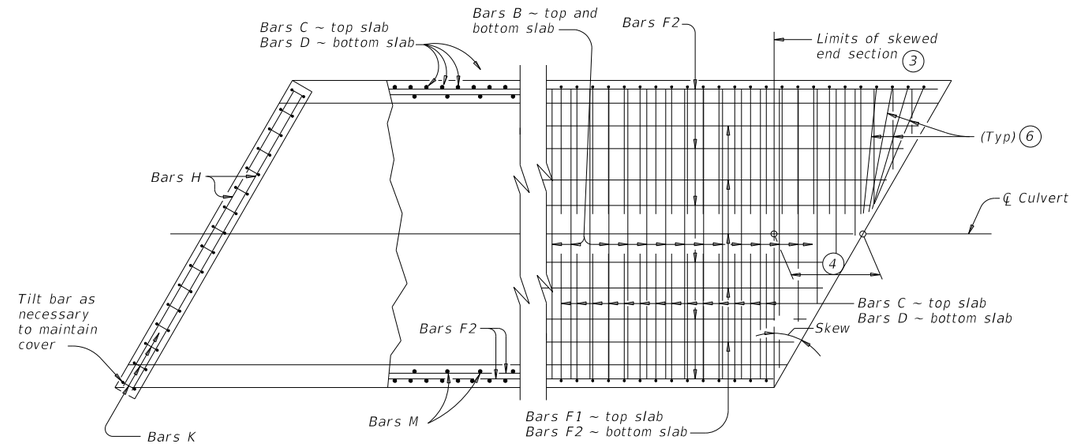


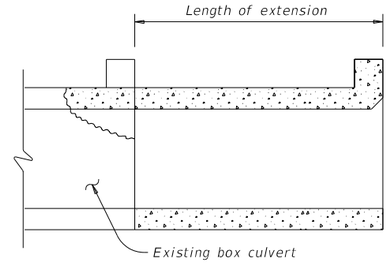
PLAN OF SKEWED ENDS ~ FROM 0° TO 15° (7)



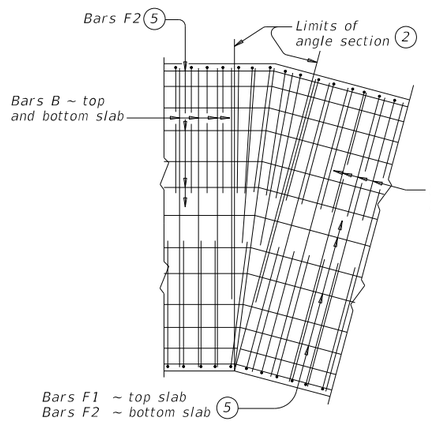
PLAN OF SKEWED ENDS ~ OVER 30° TO 45°



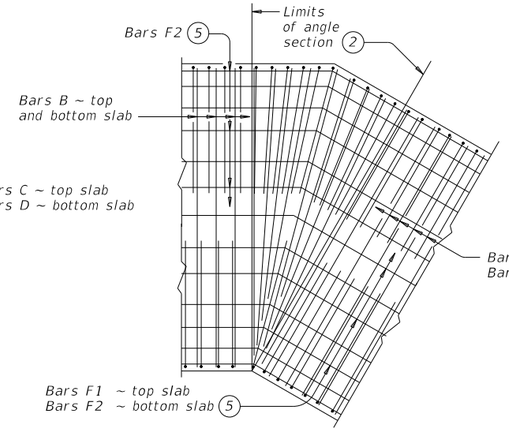
PLAN OF SKEWED ENDS ~ OVER 15° TO 30°



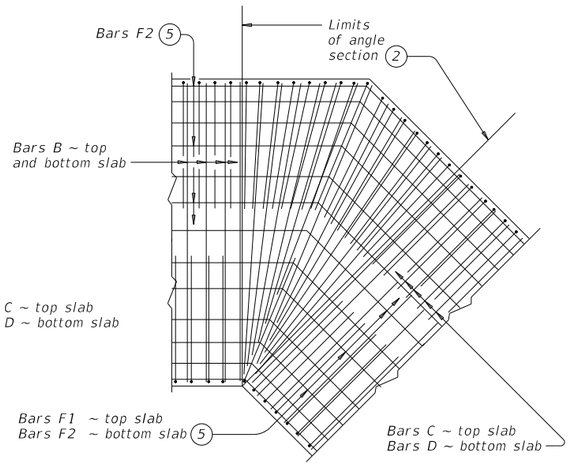
LENGTHENING DETAIL (1)



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 with the 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 ancher 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 conflictin 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 sizes, maximum 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
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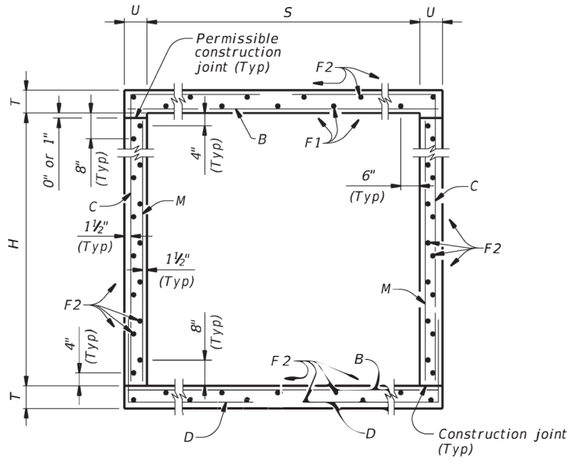
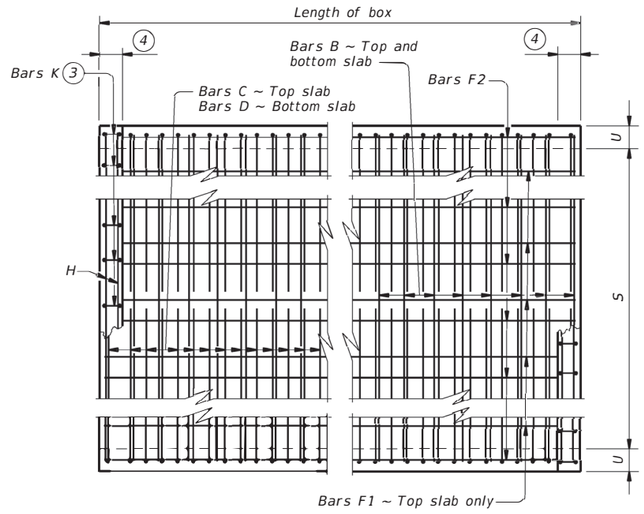
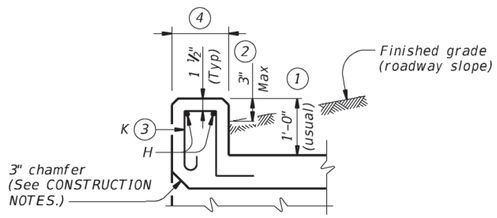


TYPICAL SECTION



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:

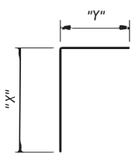
- Uncoated or galvanized ~ #4 = 1'-8" Min
- Uncoated or galvanized ~ #5 = 2'-1" Min

GENERAL NOTES:

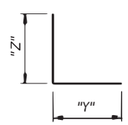
Designed according to AASHTO LRFD Bridge Design Specifications for the range of fill heights shown.

See the Single Box Culverts Cast-In-Place Miscellaneous Detail (SCC-MD) standard sheet for details pertaining to skewed ends, angle sections, and lengthening.

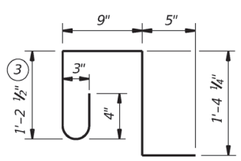
Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.



BARS C



BARS D



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

HL93 LOADING SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS CAST-IN-PLACE
0' TO 30' FILL

SCC-3 & 4

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©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0266	01	086	SH 71
04/2021 Updated X values.	DIST	COUNTY		SHEET NO.
	YKM	FAYETTE		101

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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)
3' – 0"	2' – 0"	8"	7"	30'	108	#5	9"	3' – 11"	441	108	#4	9"	5' – 4"	385	2' – 6"	2' – 10"	108	#4	9"	5' – 1"	367	2' – 10"	2' – 3"	108	9"	2' – 0"	144	3	39' – 9"	80	19	39' – 9"	505	3' – 11"	10	10	28	0.292	48.1	0.3	38	12.0	1,960
3' – 0"	3' – 0"	8"	7"	30'	108	#5	9"	3' – 11"	441	108	#4	9"	6' – 4"	457	3' – 6"	2' – 10"	108	#4	9"	5' – 1"	367	2' – 10"	2' – 3"	108	9"	3' – 0"	216	3	39' – 9"	80	23	39' – 9"	611	3' – 11"	10	10	28	0.335	54.3	0.3	38	13.7	2,210
4' – 0"	2' – 0"	8"	7"	30'	108	#5	9"	4' – 11"	554	162	#4	6"	5' – 8"	613	2' – 6"	3' – 2"	162	#4	6"	5' – 5"	586	3' – 2"	2' – 3"	108	9"	2' – 0"	144	3	39' – 9"	80	21	39' – 9"	558	4' – 11"	13	12	33	0.342	63.4	0.4	46	14.1	2,581
4' – 0"	3' – 0"	8"	7"	30'	108	#5	9"	4' – 11"	554	162	#4	6"	6' – 8"	721	3' – 6"	3' – 2"	162	#4	6"	5' – 5"	586	3' – 2"	2' – 3"	108	9"	3' – 0"	216	3	39' – 9"	80	25	39' – 9"	664	4' – 11"	13	12	33	0.385	70.5	0.4	46	15.8	2,867
4' – 0"	4' – 0"	8"	7"	30'	108	#5	9"	4' – 11"	554	162	#4	6"	7' – 8"	830	4' – 6"	3' – 2"	162	#4	6"	5' – 5"	586	3' – 2"	2' – 3"	108	9"	4' – 0"	289	3	39' – 9"	80	25	39' – 9"	664	4' – 11"	13	12	33	0.428	75.1	0.4	46	17.5	3,049

(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 2

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS CAST-IN-PLACE
0' TO 30' FILL

SCC-3 & 4

FILE: scc34ste-21.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
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REVISIONS	0266	01	086	SH 71
04/2021 Updated X values.	DIST	COUNTY		SHEET NO.
	YKM	FAYETTE		102

DATE:
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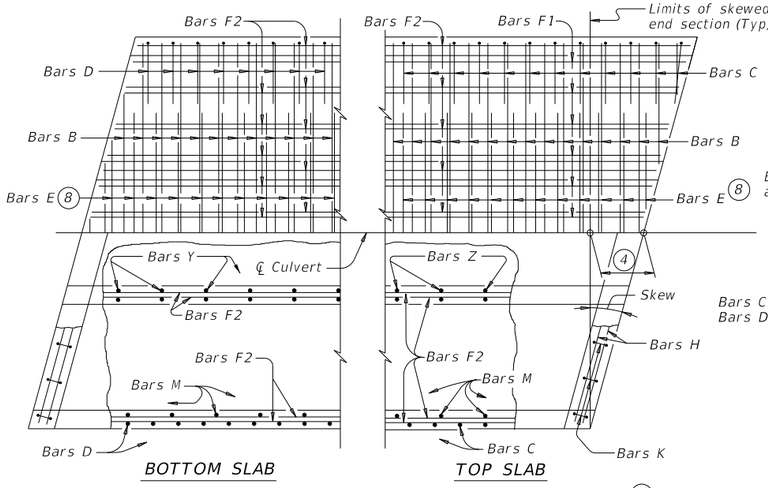
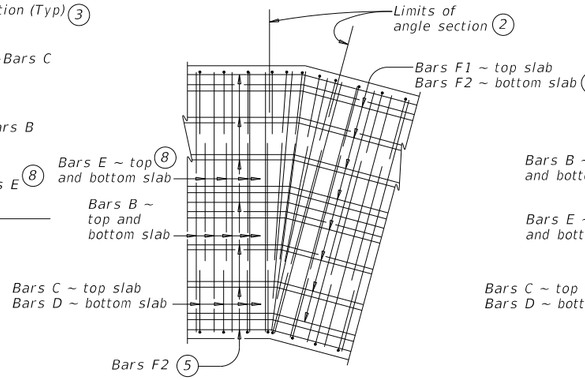
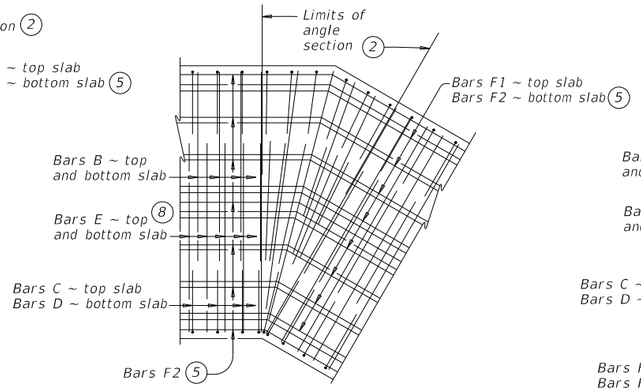


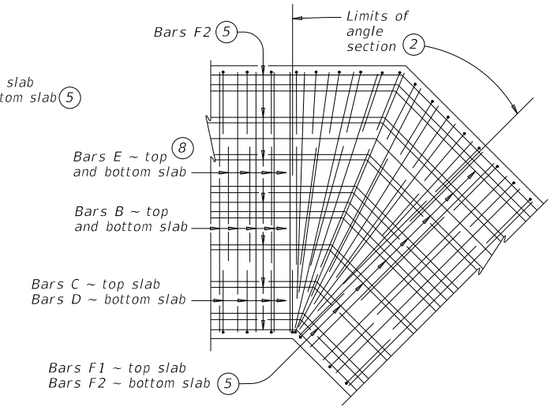
PLAN OF SKEWED ENDS ~ FROM 0° TO 15° 7



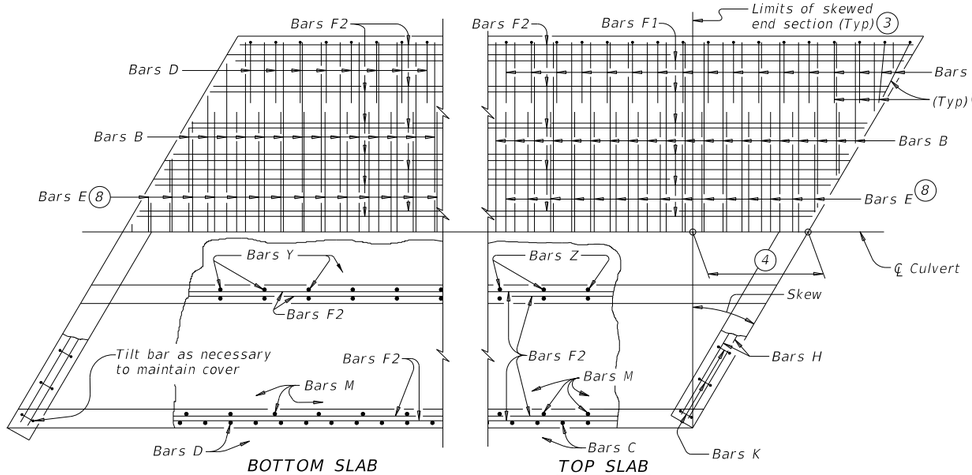
PLAN OF ANGLE SECTION ~ FROM 0° TO 15°



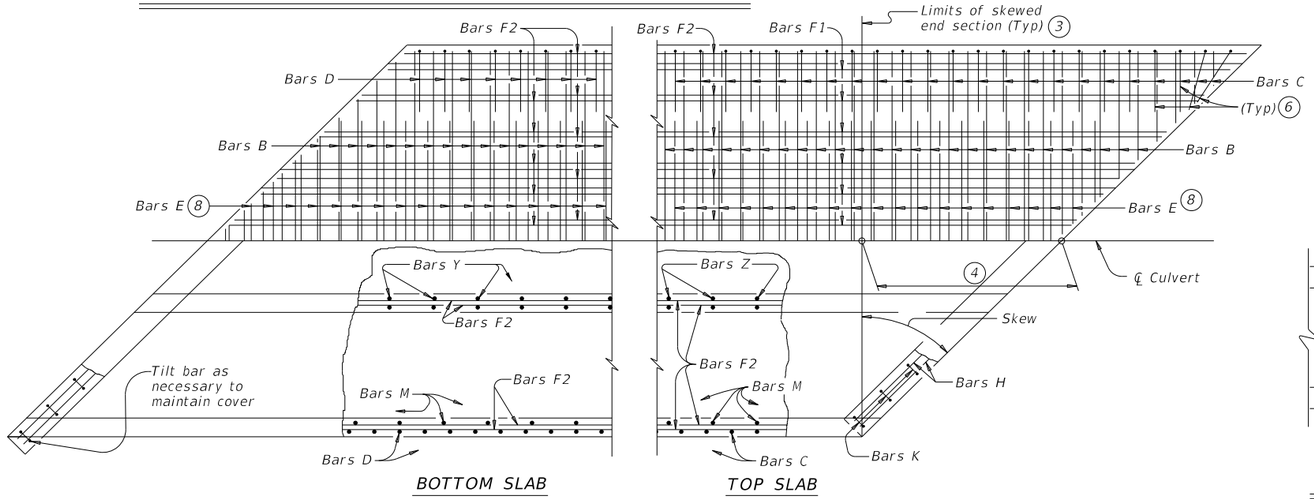
PLAN OF ANGLE SECTION ~ OVER 15° TO 30°



PLAN OF ANGLE SECTION ~ OVER 30° TO 45°



PLAN OF SKEWED ENDS ~ OVER 15° TO 30°



PLAN OF SKEWED ENDS ~ 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 with the 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, Class 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 or Bars E becomes less than half of the normal spacing, cut bars to avoid conflict.

3 The length of Bars B and Bars E will vary in the skewed end sections.

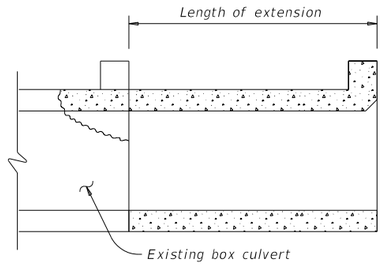
4 [One half of overall width] x [tangent of the skew angle]

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, D, and E parallel to the skewed end while maintaining spacing along centerline of box. Increase lengths of Bars B and Bars E shown on the Multiple Box Culverts Cast-In-Place (MC) standard sheets to accommodate the skew.

8 Extend Bars E as shown on the MC standard sheet for direct traffic culverts.



LENGTHENING DETAIL 1

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 Multiple Box Culverts Cast-in-Place (MC) standard sheets for details of straight sections of culvert.
For skewed sections and angle sections, refer to Multiple Box Culverts Cast-in-Place (MC) standard sheets for slab and wall dimensions, bar sizes, maximum 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 Multiple Box Culverts Cast-In-Place (MC) 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

MULTIPLE BOX CULVERTS CAST-IN-PLACE MISCELLANEOUS DETAILS

MC-MD

FILE: mc-mdste-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0266	01	086	SH 71
	DIST	COUNTY		SHEET NO.
	YKM	FAYETTE		103

DATE:
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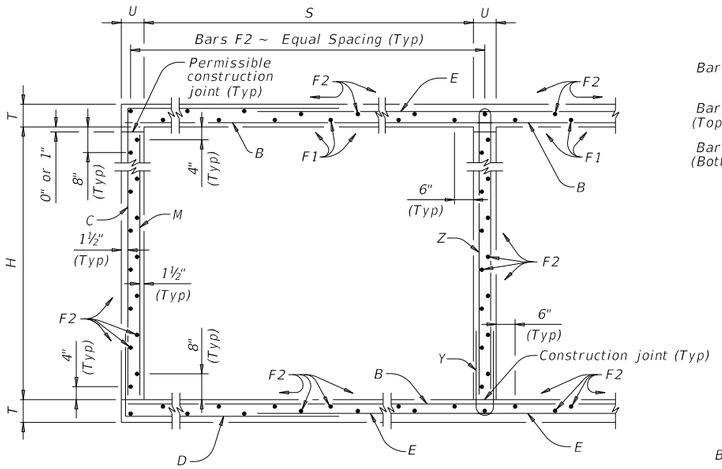
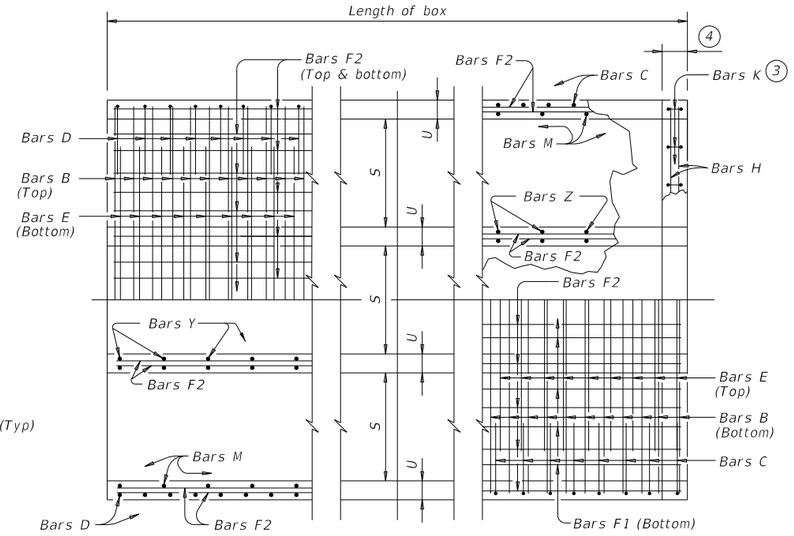
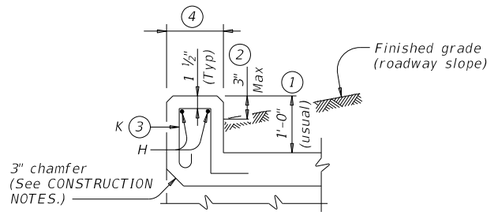


TYPICAL SECTION



BOTTOM SLAB TOP SLAB

PART PLANS



SECTION THRU CURB

TABLE OF BAR DIMENSIONS		
H	"X"	"Y"
2'-0"	2'-7 ½"	4'-1"
3'-0"	3'-7 ½"	4'-1"
4'-0"	4'-7 ½"	4'-1"
5'-0"	5'-7 ½"	4'-1"
6'-0"	6'-7 ½"	4'-1"

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, and Bars Y and Z may be reversed.

MATERIAL NOTES:

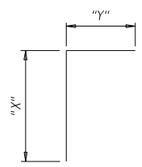
Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
Provide Class C concrete (f'c = 3,600 psi) for culvert barrel and curb, with the following exceptions: provide Class S concrete (f'c = 4,000 psi) for top slabs of:
- culverts with overlay,
- culverts 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

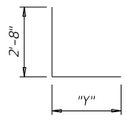
GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications for the range of fill heights shown.
See the Multiple Box Culverts Cast-In-Place Miscellaneous Detail (MC-MD) standard sheet for details pertaining to skewed ends, angle sections, and lengthening.

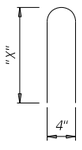
Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.



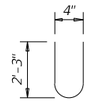
BARS C



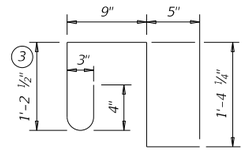
BARS D



BARS Z



BARS Y



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

HL93 LOADING SHEET 1 OF 2

Texas Department of Transportation — Bridge Division Standard

MULTIPLE BOX CULVERTS CAST-IN-PLACE
6'-0" SPAN
0' TO 16' FILL

MC-6-16

FILE: mc616ste-20.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
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REVISIONS	0266	01	086	SH 71
	DIST	COUNTY		SHEET NO.
	YKM	FAYETTE		104

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BILLS OF REINFORCING STEEL (For Box Length = 40 feet)

NUMBER OF SPANS	SECTION DIMENSIONS				Bars B					Bars C & D							Bars E					Bars F1 ~ #4				Bars F2 ~ #4				Bars M ~ #4				Bars Y & Z ~ #4								Bars H 4 ~ #4		Bars K		QUANTITIES: Per Foot of Barrel		Curb		Total	
	S	H	T	U	No.	Size	Spa	Length	Wt	No.	Size	Spa	Bars C Length	Bars C Wt	Bars D Length	Bars D Wt	No.	Size	Spa	Length	Wt	No.	Spa	Length	Wt	No.	Spa	Length	Wt	No.	Spa	Length	Wt	No.	Spa	Bars Y Length	Bars Y Wt	Bars Z Length	Bars Z Wt	Length	Wt	No.	Wt	No.	Wt	Conc (CY)	Renf (Lb)	Conc (CY)	Renf (Lb)	Conc (CY)	Renf (Lb)
2	6' – 0"	2' – 0"	9"	7"	108	#6	9"	13' – 6"	2,190	108	#5	9"	6' – 8"	751	6' – 9"	760	108	#6	9"	10' – 2"	1,649	10	18"	39' – 9"	266	44	18"	39' – 9"	1,168	108	9"	2' – 0"	144	54	9"	4' – 9"	171	5' – 5"	195	13' – 6"	36	30	84	0.894	182.4	1.0	120	36.8	7,414
3	6' – 0"	2' – 0"	9"	7"	108	#6	9"	20' – 1"	3,258	108	#5	9"	6' – 8"	751	6' – 9"	760	108	#6	9"	16' – 9"	2,717	15	18"	39' – 9"	398	63	18"	39' – 9"	1,673	108	9"	2' – 0"	144	108	9"	4' – 9"	343	5' – 5"	391	20' – 1"	54	44	122	1.302	260.9	1.5	176	53.6	10,611
4	6' – 0"	2' – 0"	9"	7"	108	#6	9"	26' – 8"	4,326	108	#5	9"	6' – 8"	751	6' – 9"	760	108	#6	9"	23' – 4"	3,785	20	18"	39' – 9"	531	82	18"	39' – 9"	2,177	108	9"	2' – 0"	144	162	9"	4' – 9"	514	5' – 5"	586	26' – 8"	71	56	156	1.711	339.4	2.0	227	70.4	13,801
5	6' – 0"	2' – 0"	9"	7"	108	#6	9"	33' – 3"	5,394	108	#5	9"	6' – 8"	751	6' – 9"	760	108	#6	9"	29' – 11"	4,853	25	18"	39' – 9"	664	101	18"	39' – 9"	2,682	108	9"	2' – 0"	144	216	9"	4' – 9"	685	5' – 5"	782	33' – 3"	89	70	195	2.120	417.9	2.5	284	87.3	16,999
6	6' – 0"	2' – 0"	9"	7"	108	#6	9"	39' – 10"	6,462	108	#5	9"	6' – 8"	751	6' – 9"	760	108	#6	9"	36' – 6"	5,921	30	18"	39' – 9"	797	120	18"	39' – 9"	3,186	108	9"	2' – 0"	144	270	9"	4' – 9"	857	5' – 5"	977	39' – 10"	106	82	228	2.529	496.4	3.0	334	104.1	20,189
2	6' – 0"	3' – 0"	9"	7"	108	#6	9"	13' – 6"	2,190	108	#5	9"	7' – 8"	864	6' – 9"	760	108	#6	9"	10' – 2"	1,649	10	18"	39' – 9"	266	50	18"	39' – 9"	1,328	108	9"	3' – 0"	216	54	9"	4' – 9"	171	7' – 5"	268	13' – 6"	36	30	84	0.958	192.8	1.0	120	39.3	7,832
3	6' – 0"	3' – 0"	9"	7"	108	#6	9"	20' – 1"	3,258	108	#5	9"	7' – 8"	864	6' – 9"	760	108	#6	9"	16' – 9"	2,717	15	18"	39' – 9"	398	71	18"	39' – 9"	1,885	108	9"	3' – 0"	216	108	9"	4' – 9"	343	7' – 5"	535	20' – 1"	54	44	122	1.389	274.4	1.5	176	57.1	11,152
4	6' – 0"	3' – 0"	9"	7"	108	#6	9"	26' – 8"	4,326	108	#5	9"	7' – 8"	864	6' – 9"	760	108	#6	9"	23' – 4"	3,785	20	18"	39' – 9"	531	92	18"	39' – 9"	2,443	108	9"	3' – 0"	216	162	9"	4' – 9"	514	7' – 5"	803	26' – 8"	71	56	156	1.819	356.1	2.0	227	74.7	14,469
5	6' – 0"	3' – 0"	9"	7"	108	#6	9"	33' – 3"	5,394	108	#5	9"	7' – 8"	864	6' – 9"	760	108	#6	9"	29' – 11"	4,853	25	18"	39' – 9"	664	113	18"	39' – 9"	3,000	108	9"	3' – 0"	216	216	9"	4' – 9"	685	7' – 5"	1,070	33' – 3"	89	70	195	2.250	437.7	2.5	284	92.5	17,790
6	6' – 0"	3' – 0"	9"	7"	108	#6	9"	39' – 10"	6,462	108	#5	9"	7' – 8"	864	6' – 9"	760	108	#6	9"	36' – 6"	5,921	30	18"	39' – 9"	797	134	18"	39' – 9"	3,558	108	9"	3' – 0"	216	270	9"	4' – 9"	857	7' – 5"	1,338	39' – 10"	106	82	228	2.681	519.3	3.0	334	110.2	21,107
2	6' – 0"	4' – 0"	9"	7"	108	#6	9"	13' – 6"	2,190	108	#5	9"	8' – 8"	976	6' – 9"	760	108	#6	9"	10' – 2"	1,649	10	18"	39' – 9"	266	50	18"	39' – 9"	1,328	108	9"	4' – 0"	289	54	9"	4' – 9"	171	9' – 5"	340	13' – 6"	36	30	84	1.023	199.2	1.0	120	41.9	8,089
3	6' – 0"	4' – 0"	9"	7"	108	#6	9"	20' – 1"	3,258	108	#5	9"	8' – 8"	976	6' – 9"	760	108	#6	9"	16' – 9"	2,717	15	18"	39' – 9"	398	71	18"	39' – 9"	1,885	108	9"	4' – 0"	289	108	9"	4' – 9"	343	9' – 5"	679	20' – 1"	54	44	122	1.475	282.6	1.5	176	60.5	11,481
4	6' – 0"	4' – 0"	9"	7"	108	#6	9"	26' – 8"	4,326	108	#5	9"	8' – 8"	976	6' – 9"	760	108	#6	9"	23' – 4"	3,785	20	18"	39' – 9"	531	92	18"	39' – 9"	2,443	108	9"	4' – 0"	289	162	9"	4' – 9"	514	9' – 5"	1,019	26' – 8"	71	56	156	1.927	366.1	2.0	227	79.1	14,870
5	6' – 0"	4' – 0"	9"	7"	108	#6	9"	33' – 3"	5,394	108	#5	9"	8' – 8"	976	6' – 9"	760	108	#6	9"	29' – 11"	4,853	25	18"	39' – 9"	664	113	18"	39' – 9"	3,000	108	9"	4' – 0"	289	216	9"	4' – 9"	685	9' – 5"	1,359	33' – 3"	89	70	195	2.380	449.5	2.5	284	97.7	18,264
6	6' – 0"	4' – 0"	9"	7"	108	#6	9"	39' – 10"	6,462	108	#5	9"	8' – 8"	976	6' – 9"	760	108	#6	9"	36' – 6"	5,921	30	18"	39' – 9"	797	134	18"	39' – 9"	3,558	108	9"	4' – 0"	289	270	9"	4' – 9"	857	9' – 5"	1,698	39' – 10"	106	82	228	2.832	533.0	3.0	334	116.2	21,652
2	6' – 0"	5' – 0"	9"	7"	108	#6	9"	13' – 6"	2,190	108	#5	9"	9' – 8"	1,089	6' – 9"	760	108	#6	9"	10' – 2"	1,649	10	18"	39' – 9"	266	56	18"	39' – 9"	1,487	108	9"	5' – 0"	361	54	9"	4' – 9"	171	11' – 5"	412	13' – 6"	36	30	84	1.088	209.6	1.0	120	44.5	8,505
3	6' – 0"	5' – 0"	9"	7"	108	#6	9"	20' – 1"	3,258	108	#5	9"	9' – 8"	1,089	6' – 9"	760	108	#6	9"	16' – 9"	2,717	15	18"	39' – 9"	398	79	18"	39' – 9"	2,098	108	9"	5' – 0"	361	108	9"	4' – 9"	343	11' – 5"	824	20' – 1"	54	44	122	1.562	296.2	1.5	176	64.0	12,024
4	6' – 0"	5' – 0"	9"	7"	108	#6	9"	26' – 8"	4,326	108	#5	9"	9' – 8"	1,089	6' – 9"	760	108	#6	9"	23' – 4"	3,785	20	18"	39' – 9"	531	102	18"	39' – 9"	2,708	108	9"	5' – 0"	361	162	9"	4' – 9"	514	11' – 5"	1,235	26' – 8"	71	56	156	2.035	382.7	2.0	227	83.4	15,536
5	6' – 0"	5' – 0"	9"	7"	108	#6	9"	33' – 3"	5,394	108	#5	9"	9' – 8"	1,089	6' – 9"	760	108	#6	9"	29' – 11"	4,853	25	18"	39' – 9"	664	125	18"	39' – 9"	3,319	108	9"	5' – 0"	361	216	9"	4' – 9"	685	11' – 5"	1,647	33' – 3"	89	70	195	2.509	469.3	2.5	284	102.8	19,056
6	6' – 0"	5' – 0"	9"	7"	108	#6	9"	39' – 10"	6,462	108	#5	9"	9' – 8"	1,089	6' – 9"	760	108	#6	9"	36' – 6"	5,921	30	18"	39' – 9"	797	148	18"	39' – 9"	3,930	108	9"	5' – 0"	361	270	9"	4' – 9"	857	11' – 5"	2,059	39' – 10"	106	82	228	2.983	555.9	3.0	334	122.3	22,570
2	6' – 0"	6' – 0"	9"	7"	108	#6	9"	13' – 6"	2,190	108	#5	9"	10' – 8"	1,202	6' – 9"	760	108	#6	9"	10' – 2"	1,649	10	18"	39' – 9"	266	62	18"	39' – 9"	1,646	108	9"	6' – 0"	433	54	9"	4' – 9"	171	13' – 5"	484	13' – 6"	36	30	84	1.153	220.0	1.0	120	47.1	8,921
3	6' – 0"	6' – 0"	9"	7"	108	#6	9"	20' – 1"	3,258	108	#5	9"	10' – 8"	1,202	6' – 9"	760	108	#6	9"	16' – 9"	2,717	15	18"	39' – 9"	398	87	18"	39' – 9"	2,310	108	9"	6' – 0"	433	108	9"	4' – 9"	343	13' – 5"	968	20' – 1"	54	44	122	1.648	309.7	1.5	176	67.4	12,565
4	6' – 0"	6' – 0"	9"	7"	108	#6	9"	26' – 8"	4,326	108	#5	9"	10' – 8"	1,202	6' – 9"	760	108	#6	9"	23' – 4"	3,785	20	18"	39' – 9"	531	112	18"	39' – 9"	2,974	108	9"	6' – 0"	433	162	9"	4' – 9"	514	13' – 5"	1,452	26' – 8"	71	56	156	2.144	399.4	2.0	227	87.7	16,204
5	6' – 0"	6' – 0"	9"	7"	108	#6	9"	33' – 3"	5,394	108	#5	9"	10' – 8"	1,202	6' – 9"	760	108	#6	9"	29' – 11"	4,853	25	18"	39' – 9"	664	137	18"	39' – 9"	3,638	108	9"	6' – 0"	433	216	9"	4' – 9"	685	13' – 5"	1,936	33' – 3"	89	70	195	2.639	489.1	2.5	284	108.0	19,849
6	6' – 0"	6' – 0"	9"	7"	108	#6	9"	39' – 10"	6,462	108	#5	9"	10' – 8"	1,202	6' – 9"	760	108	#6	9"	36' – 6"	5,921	30	18"	39' – 9"	797	162	18"	39' – 9"	4,302	108	9"	6' – 0"	433	270	9"	4' – 9"	857	13' – 5"	2,420	39' – 10"	106	82	228	3.134	578.9	3.0	334	128.3	23,488

HL93 LOADING SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

MULTIPLE BOX CULVERTS
CAST-IN-PLACE
6'-0" SPAN
0' TO 16' FILL

MC-6-16

FILE: mc616ste-20.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0266	01	086	SH 71
	DIST	COUNTY		SHEET NO.
	YKM	FAYETTE		105

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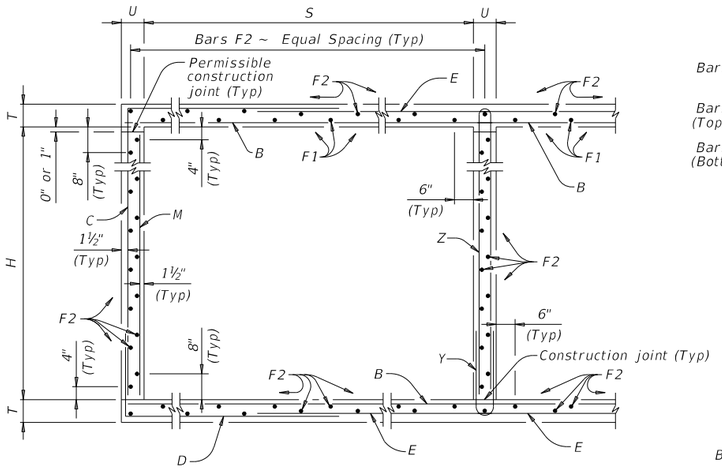
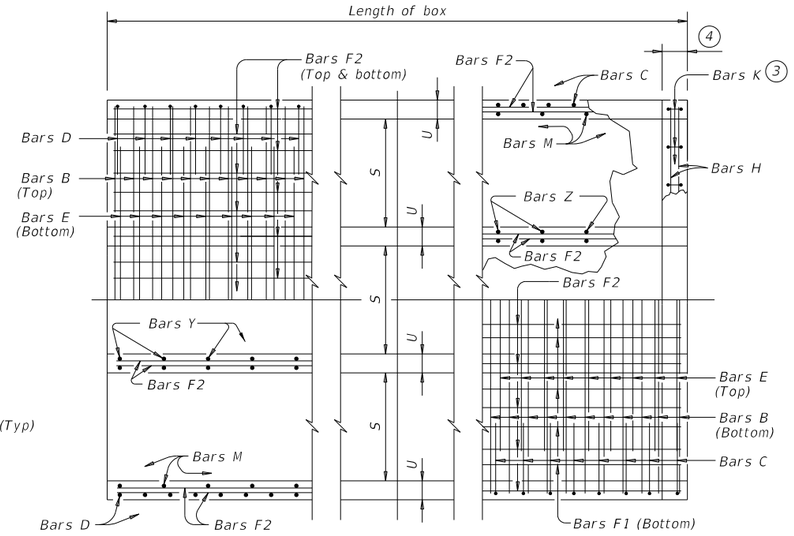
DATE:
FILE:

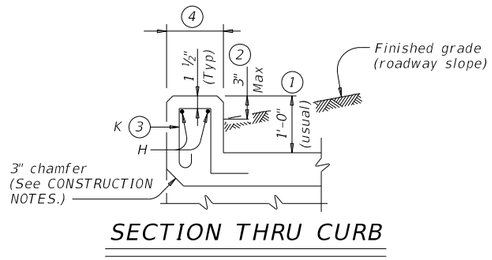


TYPICAL SECTION



BOTTOM SLAB TOP SLAB

PART PLANS



SECTION THRU CURB

TABLE OF BAR DIMENSIONS		
H	"X"	"Y"
3'-0"	3'-6 ½"	5'-1"
4'-0"	4'-6 ½"	5'-1"
5'-0"	5'-6 ½"	5'-1"
6'-0"	6'-6 ½"	5'-1"
7'-0"	7'-6 ½"	5'-1"
8'-0"	8'-6 ½"	5'-1"

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, and Bars Y and Z may be reversed.

MATERIAL NOTES:

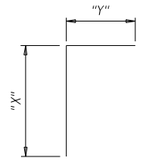
Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
Provide Class C concrete (f'c = 3,600 psi) for culvert barrel and curb, with the following exceptions: provide Class S concrete (f'c = 4,000 psi) for top slabs of:
- culverts with overlay,
- culverts 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

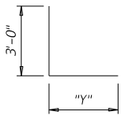
GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications for the range of fill heights shown.
See the Multiple Box Culverts Cast-In-Place Miscellaneous Detail (MC-MD) standard sheet for details pertaining to skewed ends, angle sections, and lengthening.

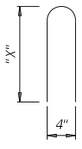
Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.



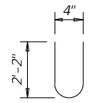
BARS C



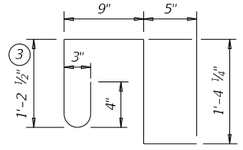
BARS D



BARS Z



BARS Y



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

HL93 LOADING SHEET 1 OF 2

Texas Department of Transportation — Bridge Division Standard

MULTIPLE BOX CULVERTS CAST-IN-PLACE
8'-0" SPAN
0' TO 13' FILL

MC-8-13

FILE: mc813ste-20.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0266	01	086	SH 71
	DIST	COUNTY		SHEET NO.
	YKM	FAYETTE		106

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DATE:
FILE:

NUMBER OF SPANS	SECTION DIMENSIONS				BILLS OF REINFORCING STEEL (For Box Length = 40 feet)																																QUANTITIES					
					Bars B					Bars C & D							Bars E					Bars F1 ~ #4				Bars F2 ~ #4				Bars M ~ #4				Bars Y & Z ~ #4						Bars H 4 ~ #4		Bars K		Per Foot of Barrel		Curb		Total	
	S	H	T	U	No.	Size	Spa	Length	Wt	No.	Size	Spa	Bars C Length	Bars C Wt	Bars D Length	Bars D Wt	No.	Size	Spa	Length	Wt	No.	Spa	Length	Wt	No.	Spa	Length	Wt	No.	Spa	Length	Wt	No.	Spa	Bars Y Length	Bars Y Wt	Bars Z Length	Bars Z Wt	Length	Wt	No.	Wt	Conc (CY)	Renf (Lb)	Conc (CY)	Renf (Lb)	Conc (CY)	Renf (Lb)
2	8' – 0"	3' – 0"	8"	7"	162	#6	6"	17' – 6"	4,258	108	#6	9"	8' – 8"	1,406	8' – 2"	1,325	162	#6	6"	12' – 9"	3,102	12	18"	39' – 9"	319	56	18"	39' – 9"	1,487	108	9"	3' – 0"	216	54	9"	4' – 7"	165	7' – 3"	262	17' – 6"	47	38	106	1.071	313.5	1.3	153	44.2	12,693
3	8' – 0"	3' – 0"	8"	7"	162	#6	6"	26' – 1"	6,347	108	#6	9"	8' – 8"	1,406	8' – 2"	1,325	162	#6	6"	21' – 4"	5,191	18	18"	39' – 9"	478	80	18"	39' – 9"	2,124	108	9"	3' – 0"	216	108	9"	4' – 7"	331	7' – 3"	523	26' – 1"	70	56	156	1.560	448.5	1.9	226	64.3	18,167
4	8' – 0"	3' – 0"	8"	7"	162	#6	6"	34' – 8"	8,435	108	#6	9"	8' – 8"	1,406	8' – 2"	1,325	162	#6	6"	29' – 11"	7,279	24	18"	39' – 9"	637	104	18"	39' – 9"	2,762	108	9"	3' – 0"	216	162	9"	4' – 7"	496	7' – 3"	785	34' – 8"	93	72	200	2.048	583.5	2.6	293	84.5	23,634
5	8' – 0"	3' – 0"	8"	7"	162	#6	6"	43' – 3"	10,524	108	#6	9"	8' – 8"	1,406	8' – 2"	1,325	162	#6	6"	38' – 6"	9,368	30	18"	39' – 9"	797	128	18"	39' – 9"	3,399	108	9"	3' – 0"	216	216	9"	4' – 7"	661	7' – 3"	1,046	43' – 3"	116	90	251	2.537	718.6	3.2	367	104.7	29,109
6	8' – 0"	3' – 0"	8"	7"	162	#6	6"	51' – 10"	12,612	108	#6	9"	8' – 8"	1,406	8' – 2"	1,325	162	#6	6"	47' – 1"	11,457	36	18"	39' – 9"	956	152	18"	39' – 9"	4,036	108	9"	3' – 0"	216	270	9"	4' – 7"	827	7' – 3"	1,308	51' – 10"	138	106	295	3.026	853.6	3.8	433	124.9	34,576
2	8' – 0"	4' – 0"	8"	7"	162	#6	6"	17' – 6"	4,258	108	#6	9"	9' – 8"	1,568	8' – 2"	1,325	162	#6	6"	12' – 9"	3,102	12	18"	39' – 9"	319	56	18"	39' – 9"	1,487	108	9"	4' – 0"	289	54	9"	4' – 7"	165	9' – 3"	334	17' – 6"	47	38	106	1.136	321.2	1.3	153	46.8	13,000
3	8' – 0"	4' – 0"	8"	7"	162	#6	6"	26' – 1"	6,347	108	#6	9"	9' – 8"	1,568	8' – 2"	1,325	162	#6	6"	21' – 4"	5,191	18	18"	39' – 9"	478	80	18"	39' – 9"	2,124	108	9"	4' – 0"	289	108	9"	4' – 7"	331	9' – 3"	667	26' – 1"	70	56	156	1.646	458.0	1.9	226	67.8	18,546
4	8' – 0"	4' – 0"	8"	7"	162	#6	6"	34' – 8"	8,435	108	#6	9"	9' – 8"	1,568	8' – 2"	1,325	162	#6	6"	29' – 11"	7,279	24	18"	39' – 9"	637	104	18"	39' – 9"	2,762	108	9"	4' – 0"	289	162	9"	4' – 7"	496	9' – 3"	1,001	34' – 8"	93	72	200	2.156	594.8	2.6	293	88.8	24,085
5	8' – 0"	4' – 0"	8"	7"	162	#6	6"	43' – 3"	10,524	108	#6	9"	9' – 8"	1,568	8' – 2"	1,325	162	#6	6"	38' – 6"	9,368	30	18"	39' – 9"	797	128	18"	39' – 9"	3,399	108	9"	4' – 0"	289	216	9"	4' – 7"	661	9' – 3"	1,335	43' – 3"	116	90	251	2.667	731.7	3.2	367	109.9	29,633
6	8' – 0"	4' – 0"	8"	7"	162	#6	6"	51' – 10"	12,612	108	#6	9"	9' – 8"	1,568	8' – 2"	1,325	162	#6	6"	47' – 1"	11,457	36	18"	39' – 9"	956	152	18"	39' – 9"	4,036	108	9"	4' – 0"	289	270	9"	4' – 7"	827	9' – 3"	1,668	51' – 10"	138	106	295	3.177	868.5	3.8	433	130.9	35,171
2	8' – 0"	5' – 0"	8"	7"	162	#6	6"	17' – 6"	4,258	108	#6	9"	10' – 8"	1,730	8' – 2"	1,325	162	#6	6"	12' – 9"	3,102	12	18"	39' – 9"	319	62	18"	39' – 9"	1,646	108	9"	5' – 0"	361	54	9"	4' – 7"	165	11' – 3"	406	17' – 6"	47	38	106	1.201	332.8	1.3	153	49.4	13,465
3	8' – 0"	5' – 0"	8"	7"	162	#6	6"	26' – 1"	6,347	108	#6	9"	10' – 8"	1,730	8' – 2"	1,325	162	#6	6"	21' – 4"	5,191	18	18"	39' – 9"	478	88	18"	39' – 9"	2,337	108	9"	5' – 0"	361	108	9"	4' – 7"	331	11' – 3"	812	26' – 1"	70	56	156	1.733	472.8	1.9	226	71.3	19,138
4	8' – 0"	5' – 0"	8"	7"	162	#6	6"	34' – 8"	8,435	108	#6	9"	10' – 8"	1,730	8' – 2"	1,325	162	#6	6"	29' – 11"	7,279	24	18"	39' – 9"	637	114	18"	39' – 9"	3,027	108	9"	5' – 0"	361	162	9"	4' – 7"	496	11' – 3"	1,217	34' – 8"	93	72	200	2.264	612.7	2.6	293	93.1	24,800
5	8' – 0"	5' – 0"	8"	7"	162	#6	6"	43' – 3"	10,524	108	#6	9"	10' – 8"	1,730	8' – 2"	1,325	162	#6	6"	38' – 6"	9,368	30	18"	39' – 9"	797	140	18"	39' – 9"	3,717	108	9"	5' – 0"	361	216	9"	4' – 7"	661	11' – 3"	1,623	43' – 3"	116	90	251	2.796	752.7	3.2	367	115.1	30,473
6	8' – 0"	5' – 0"	8"	7"	162	#6	6"	51' – 10"	12,612	108	#6	9"	10' – 8"	1,730	8' – 2"	1,325	162	#6	6"	47' – 1"	11,457	36	18"	39' – 9"	956	166	18"	39' – 9"	4,408	108	9"	5' – 0"	361	270	9"	4' – 7"	827	11' – 3"	2,029	51' – 10"	138	106	295	3.328	892.6	3.8	433	137.0	36,138
2	8' – 0"	6' – 0"	8"	7"	162	#6	6"	17' – 6"	4,258	108	#6	9"	11' – 8"	1,893	8' – 2"	1,325	162	#6	6"	12' – 9"	3,102	12	18"	39' – 9"	319	68	18"	39' – 9"	1,806	108	9"	6' – 0"	433	54	9"	4' – 7"	165	13' – 3"	478	17' – 6"	47	38	106	1.265	344.5	1.3	153	51.9	13,932
3	8' – 0"	6' – 0"	8"	7"	162	#6	6"	26' – 1"	6,347	108	#6	9"	11' – 8"	1,893	8' – 2"	1,325	162	#6	6"	21' – 4"	5,191	18	18"	39' – 9"	478	96	18"	39' – 9"	2,549	108	9"	6' – 0"	433	108	9"	4' – 7"	331	13' – 3"	956	26' – 1"	70	56	156	1.819	487.6	1.9	226	74.7	19,729
4	8' – 0"	6' – 0"	8"	7"	162	#6	6"	34' – 8"	8,435	108	#6	9"	11' – 8"	1,893	8' – 2"	1,325	162	#6	6"	29' – 11"	7,279	24	18"	39' – 9"	637	124	18"	39' – 9"	3,293	108	9"	6' – 0"	433	162	9"	4' – 7"	496	13' – 3"	1,434	34' – 8"	93	72	200	2.372	630.6	2.6	293	97.5	25,518
5	8' – 0"	6' – 0"	8"	7"	162	#6	6"	43' – 3"	10,524	108	#6	9"	11' – 8"	1,893	8' – 2"	1,325	162	#6	6"	38' – 6"	9,368	30	18"	39' – 9"	797	152	18"	39' – 9"	4,036	108	9"	6' – 0"	433	216	9"	4' – 7"	661	13' – 3"	1,912	43' – 3"	116	90	251	2.926	773.7	3.2	367	120.3	31,316
6	8' – 0"	6' – 0"	8"	7"	162	#6	6"	51' – 10"	12,612	108	#6	9"	11' – 8"	1,893	8' – 2"	1,325	162	#6	6"	47' – 1"	11,457	36	18"	39' – 9"	956	180	18"	39' – 9"	4,780	108	9"	6' – 0"	433	270	9"	4' – 7"	827	13' – 3"	2,390	51' – 10"	138	106	295	3.479	916.8	3.8	433	143.0	37,106
2	8' – 0"	7' – 0"	8"	7"	162	#6	6"	17' – 6"	4,258	108	#6	9"	12' – 8"	2,055	8' – 2"	1,325	162	#6	6"	12' – 9"	3,102	12	18"	39' – 9"	319	68	18"	39' – 9"	1,806	108	9"	7' – 0"	505	54	9"	4' – 7"	165	15' – 3"	550	17' – 6"	47	38	106	1.330	352.1	1.3	153	54.5	14,238
3	8' – 0"	7' – 0"	8"	7"	162	#6	6"	26' – 1"	6,347	108	#6	9"	12' – 8"	2,055	8' – 2"	1,325	162	#6	6"	21' – 4"	5,191	18	18"	39' – 9"	478	96	18"	39' – 9"	2,549	108	9"	7' – 0"	505	108	9"	4' – 7"	331	15' – 3"	1,100	26' – 1"	70	56	156	1.905	497.0	1.9	226	78.1	20,107
4	8' – 0"	7' – 0"	8"	7"	162	#6	6"	34' – 8"	8,435	108	#6	9"	12' – 8"	2,055	8' – 2"	1,325	162	#6	6"	29' – 11"	7,279	24	18"	39' – 9"	637	124	18"	39' – 9"	3,293	108	9"	7' – 0"	505	162	9"	4' – 7"	496	15' – 3"	1,650	34' – 8"	93	72	200	2.480	641.9	2.6	293	101.8	25,968
5	8' – 0"	7' – 0"	8"	7"	162	#6	6"	43' – 3"	10,524	108	#6	9"	12' – 8"	2,055	8' – 2"	1,325	162	#6	6"	38' – 6"	9,368	30	18"	39' – 9"	797	152	18"	39' – 9"	4,036	108	9"	7' – 0"	505	216	9"	4' – 7"	661	15' – 3"	2,200	43' – 3"	116	90	251	3.056	786.8	3.2	367	125.5	31,838
6	8' – 0"	7' – 0"	8"	7"	162	#6	6"	51' – 10"	12,612	108	#6	9"	12' – 8"	2,055	8' – 2"	1,325	162	#6	6"	47' – 1"	11,457	36	18"	39' – 9"	956	180	18"	39' – 9"	4,780	108	9"	7' – 0"	505	270	9"	4' – 7"	827	15' – 3"	2,750	51' – 10"	138	106	295	3.631	931.7	3.8	433	149.1	37,700
2	8' – 0"	8' – 0"	8"	7"	162	#6	6"	17' – 6"	4,258	108	#6	9"	13' – 8"	2,217	8' – 2"	1,325	162	#6	6"	12' – 9"	3,102	12	18"	39' – 9"	319	74	18"	39' – 9"	1,965	108	9"	8' – 0"	577	54	9"	4' – 7"	165	17' – 3"	622	17' – 6"	47	38	106	1.395	363.8	1.3	153	57.1	14,703
3	8' – 0"	8' – 0"	8"	7"	162	#6	6"	26' – 1"	6,347	108	#6	9"	13' – 8"	2,217	8' – 2"	1,325	162	#6	6"	21' – 4"	5,191	18	18"	39' – 9"	478	104	18"	39' – 9"	2,762	108	9"	8' – 0"	577	108	9"	4' – 7"	331	17' – 3"	1,244	26' – 1"	70	56	156	1.992	511.8	1.9	226	81.6	20,698
4	8' – 0"	8' – 0"	8"	7"	162	#6	6"	34' – 8"	8,435	108	#6	9"	13' – 8"	2,217	8' – 2"	1,325	162	#6	6"	29' – 11"	7,279	24	18"	39' – 9"	637	134	18"	39' – 9"	3,558	108	9"	8' – 0"	577	162	9"	4' – 7"	496	17' – 3"	1,867	34' – 8"	93	72	200	2.588	659.8	2.6	293	106.1	26,684
5	8' – 0"	8' – 0"	8"	7"	162	#6	6"	43' – 3"	10,524	108	#6	9"	13' – 8"	2,217	8' – 2"	1,325	162	#6	6"	38' – 6"	9,368	30	18"	39' – 9"	797	164	18"	39' – 9"	4,355	108	9"	8' – 0"	577	216	9"	4' – 7"	661	17' – 3"	2,489	43' – 3"	116	90	251	3.185	807.8	3.2	367	130.6	32,680
6	8' – 0"	8' – 0"	8"	7"	162	#6	6"	51' – 10"	12,612	108	#6	9"	13' – 8"	2,217	8' – 2"	1,325	162	#6	6"	47' – 1"	11,457	36	18"	39' – 9"	956	194	18"	39' – 9"	5,151	108	9"	8' – 0"	577	270	9"	4' – 7"	827	17' – 3"	3,111	51' – 10"	138	106	295	3.782	955.8	3.8	433	155.1	38,666

HL93 LOADING SHEET 2 OF 2

Texas Department of Transportation

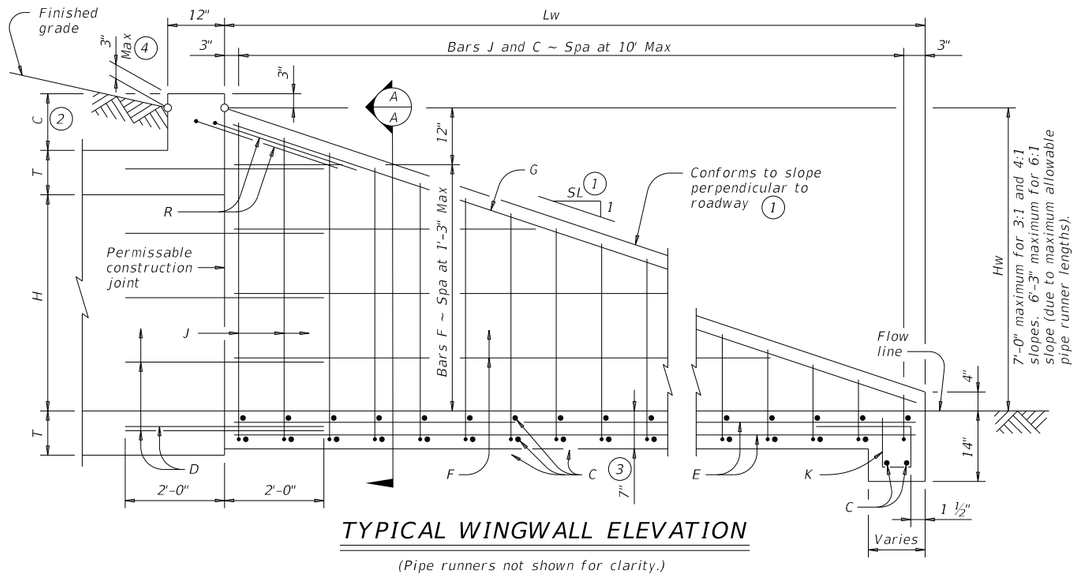
Bridge Division Standard

MULTIPLE BOX CULVERTS CAST-IN-PLACE
8'-0" SPAN
0' TO 13' FILL

MC-8-13

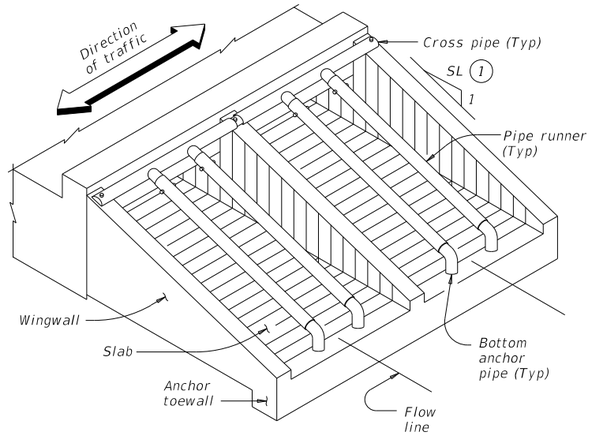
FILE: mc813ste-20.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0266	01	086	SH 71
	DIST	COUNTY		SHEET NO.
	YKM	FAYETTE		107

DATE:
FILE:



TYPICAL WINGWALL ELEVATION

(Pipe runners not shown for clarity.)



ISOMETRIC VIEW OF TYPICAL INSTALLATION

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)
= [(Wingwall Area) (0.583') +
(Lw) (Atw) (0.583') +
(Atw) (1.167') (1.167' – 0.583')] ÷ (27)

PIPE RUNNER DIMENSION CALCULATIONS:

Pipe Runner Length
= (Lw) (K1) – (1.917')
Total Reinforcing (Lb)
= (1.55) (Lw) (Atw) +
(4.43) (Atw) +
(K2) (Hw) (N + 1) (√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.

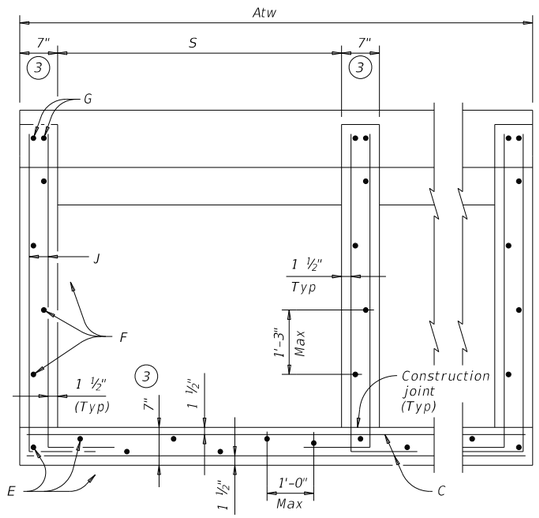
MATERIAL NOTES:

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 1 ½".
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 the Item 445, "Galvanizing".

GENERAL NOTES:

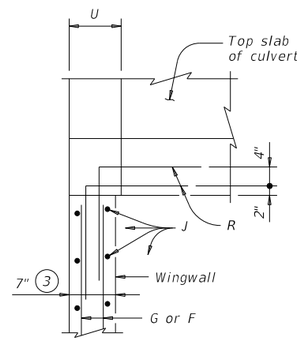
Designed according to AASHTO LRFD Bridge Design Specifications.
The safety end treatments shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the pipe runners.
Pipe runners are designed for a traversing load of 1,800 pounds at yield as recommended by Research Report 280-1, "Safety Treatment of Roadside Cross-Drainage Structures", Texas Transportation Institute, March 1981.
The quantities for pipe runners, reinforcing steel, and concrete resulting from the formulas given herein are for Contractor's information only.
See the Box Culvert Supplement (BCS) standard sheet for additional dimensions and information.
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.



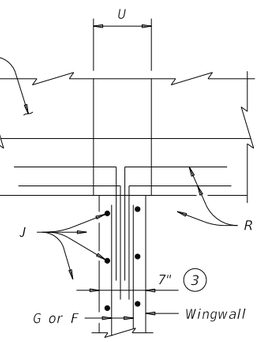
SECTION A-A

(Showing typical wingwall and wing slab reinforcing. Pipe runners not shown for clarity.)



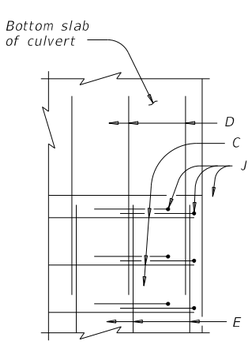
AT TOP OF EXTERIOR WINGWALL

(Cast-in-place culvert)



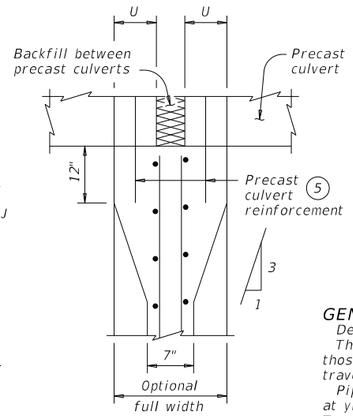
AT TOP OF INTERIOR WINGWALL

(Cast-in-place culvert)



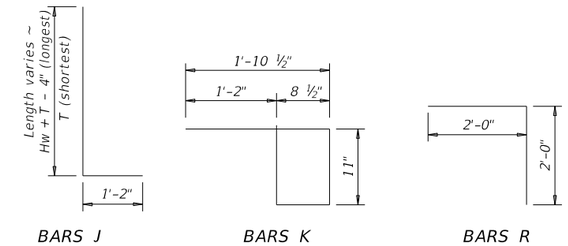
AT OUTSIDE OF BOTTOM SLAB

(Cast-in-place culvert)



AT INTERIOR WINGWALL

(Precast culvert)



BARS J | BARS K | BARS R

(Length = 4'-3")

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

PLAN VIEWS OF CORNER DETAILS

(1) *Recommended values of slope are: 3:1, 4:1, and 6:1. Provide 3:1 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 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 curb height, if necessary, to provide a maximum 3" projection. 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

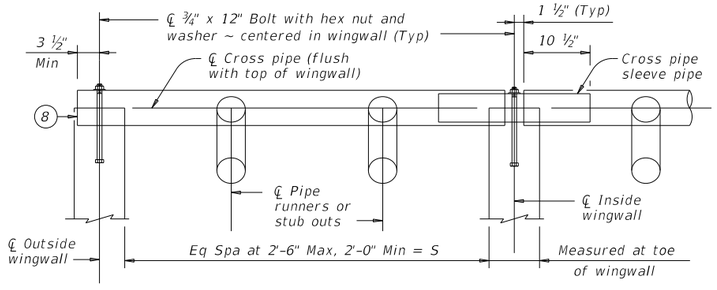
SAFETY END TREATMENT

FOR 0° SKEW BOX CULVERTS (MAXIMUM Hw = 7'-0") TYPE I ~ CROSS DRAINAGE

SETB-CD

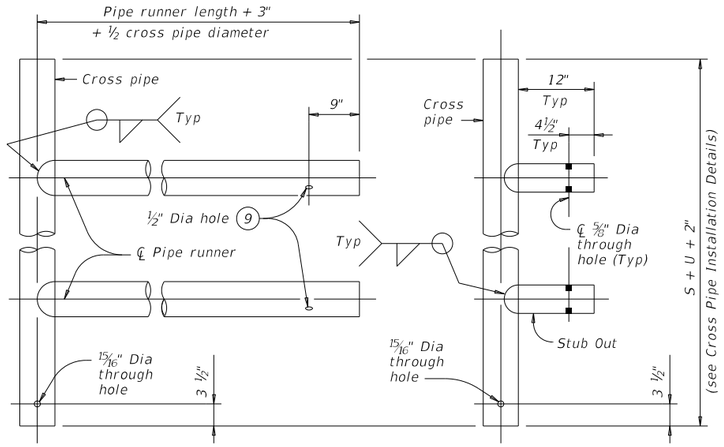
FILE: setbcdse-20.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0266	01	086	SH 71
	DIST	COUNTY		SHEET NO.
	YKM	FAYETTE		108

DATE:
FILE:



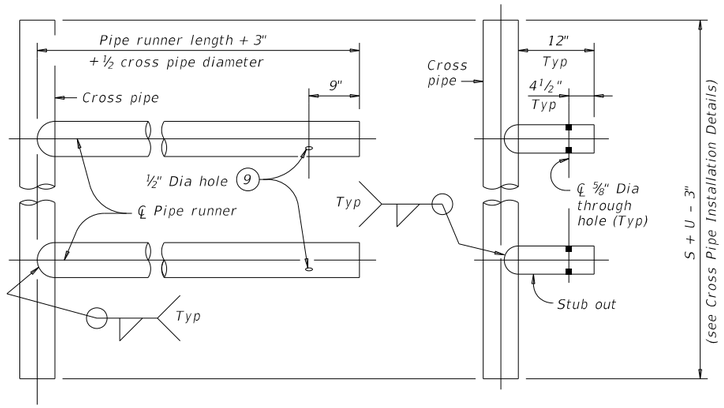
NOTE: At Contractor's option, make the cross pipe continuous across the inside wingwalls. If option is selected, omit the sleeve pipe and make a $^{15}/_{16}$" diameter through hole in the cross pipe to accept the anchor bolt at the centerline of each inside wingwall.

CROSS PIPE INSTALLATION DETAILS



OPTION A2 OPTION A1

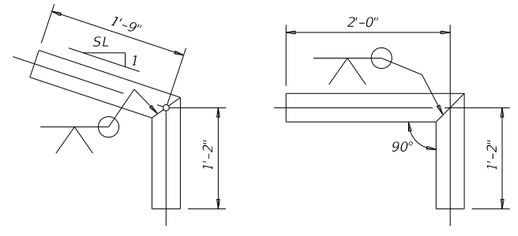
FOR USE IN OUTSIDE CULVERT BAY



OPTION A2 OPTION A1

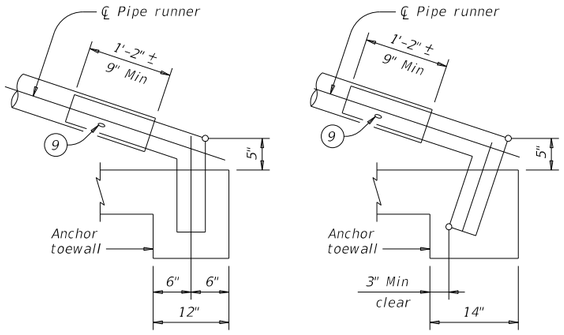
FOR USE IN INSIDE CULVERT BAY

CROSS PIPE AND CONNECTIONS DETAILS



OPTION A OPTION B

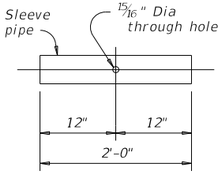
BOTTOM ANCHOR PIPE DETAILS (10)



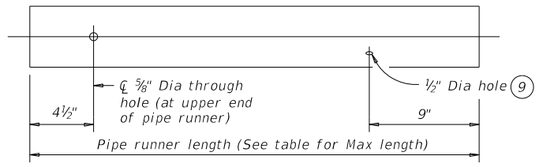
OPTION B1 OPTION B2

BOTTOM ANCHOR TOEWALL DETAILS

(Wingwall not shown for clarity.)

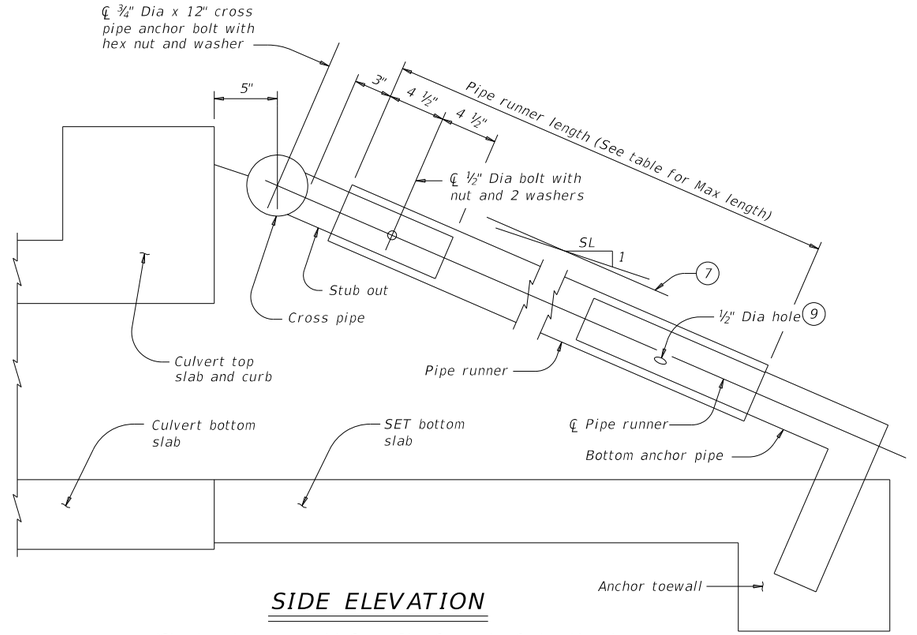


CROSS PIPE SLEEVE PIPE DETAILS



NOTE: The separate pipe runner shown is required when Cross Pipe Connection Option A1 is used.

PIPE RUNNER DETAILS



SIDE ELEVATION

(Showing pipe runner with Cross Pipe Connection Option A1 and Bottom Anchor Toewall Option B2. Wingwall not shown for clarity.)

(6) Cross pipe is the same size as the pipe runner. Cross pipe stub out is the same size as the anchor pipe.

(7) Note that actual slope of safety pipe runner may vary slightly from side slope.

(8) Take care to 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 safety 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.

MAXIMUM PIPE RUNNER LENGTHS AND (6) REQUIRED PIPE RUNNER AND ANCHOR PIPE SIZES

Maximum Pipe Runner Length	Required Pipe Runner Size			Required Anchor Pipe Size		
	Pipe Size	Pipe O.D.	Pipe I.D.	Pipe Size	Pipe O.D.	Pipe I.D.
10'- 0"	3" STD	3.500"	3.068"	2" STD	2.375"	2.067"
19'- 8"	4" STD	4.500"	4.026"	3" STD	3.500"	3.068"
34'- 2"	5" STD	5.563"	5.047"	4" STD	4.500"	4.026"

Texas Department of Transportation

Bridge Division Standard

SAFETY END TREATMENT

FOR 0° SKEW BOX CULVERTS
(MAXIMUM Hw = 7'-0")
TYPE I ~ CROSS DRAINAGE

SETB-CD

FILE: setbcdse-20.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0266	01	086	SH 71
	DIST	COUNTY		SHEET NO.
	YKM	FAYETTE		109

DATE:
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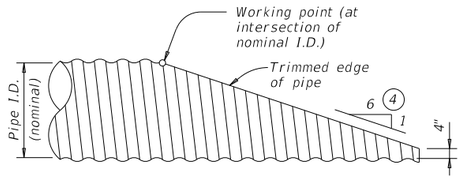
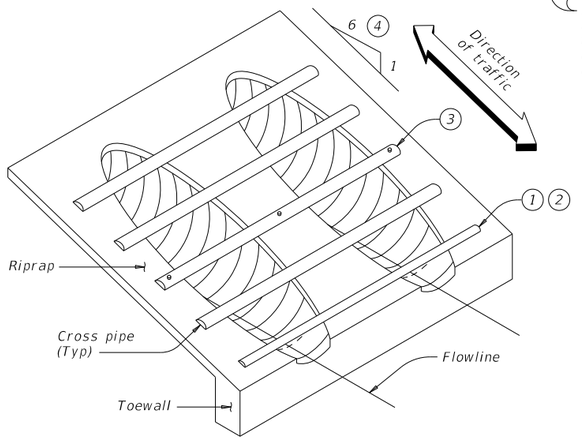


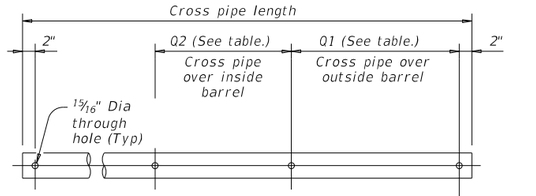
NOTE: All cross pipes, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

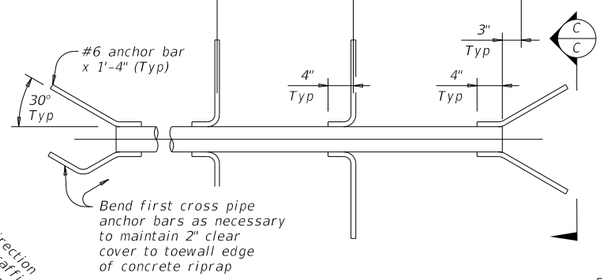
(Showing corrugated metal pipe (CMP) culvert Details at reinforced concrete pipe (RCP) culvert are similar.)



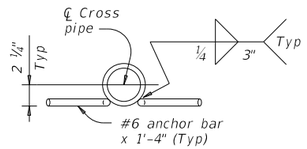
ISOMETRIC VIEW OF TYPICAL INSTALLATION



PIPE WITH BOLTED ANCHOR

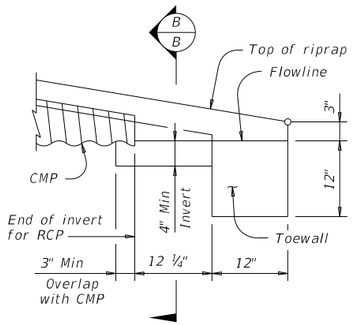


PIPE WITH ANCHOR BARS



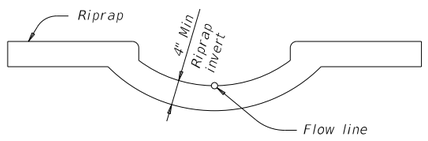
SECTION C-C

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.

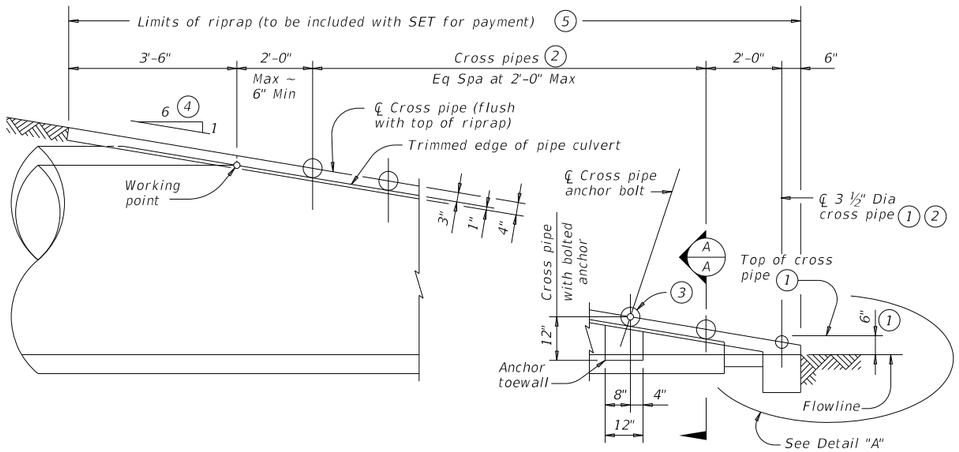
GENERAL NOTES:

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.

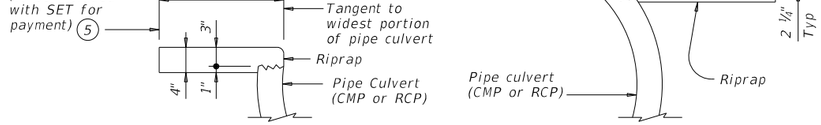
Construct concrete riprap and all necessary inverts in accordance with the requirements of Item 432, "Riprap".

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



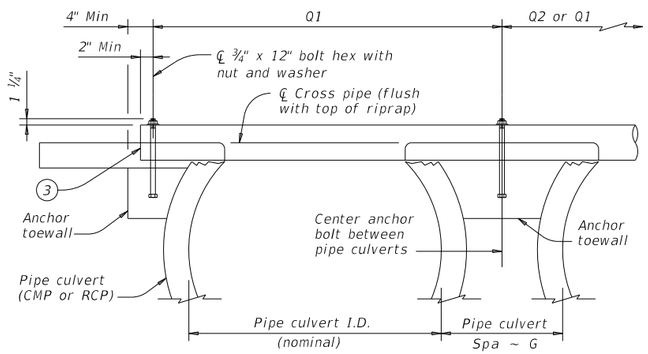
SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

(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

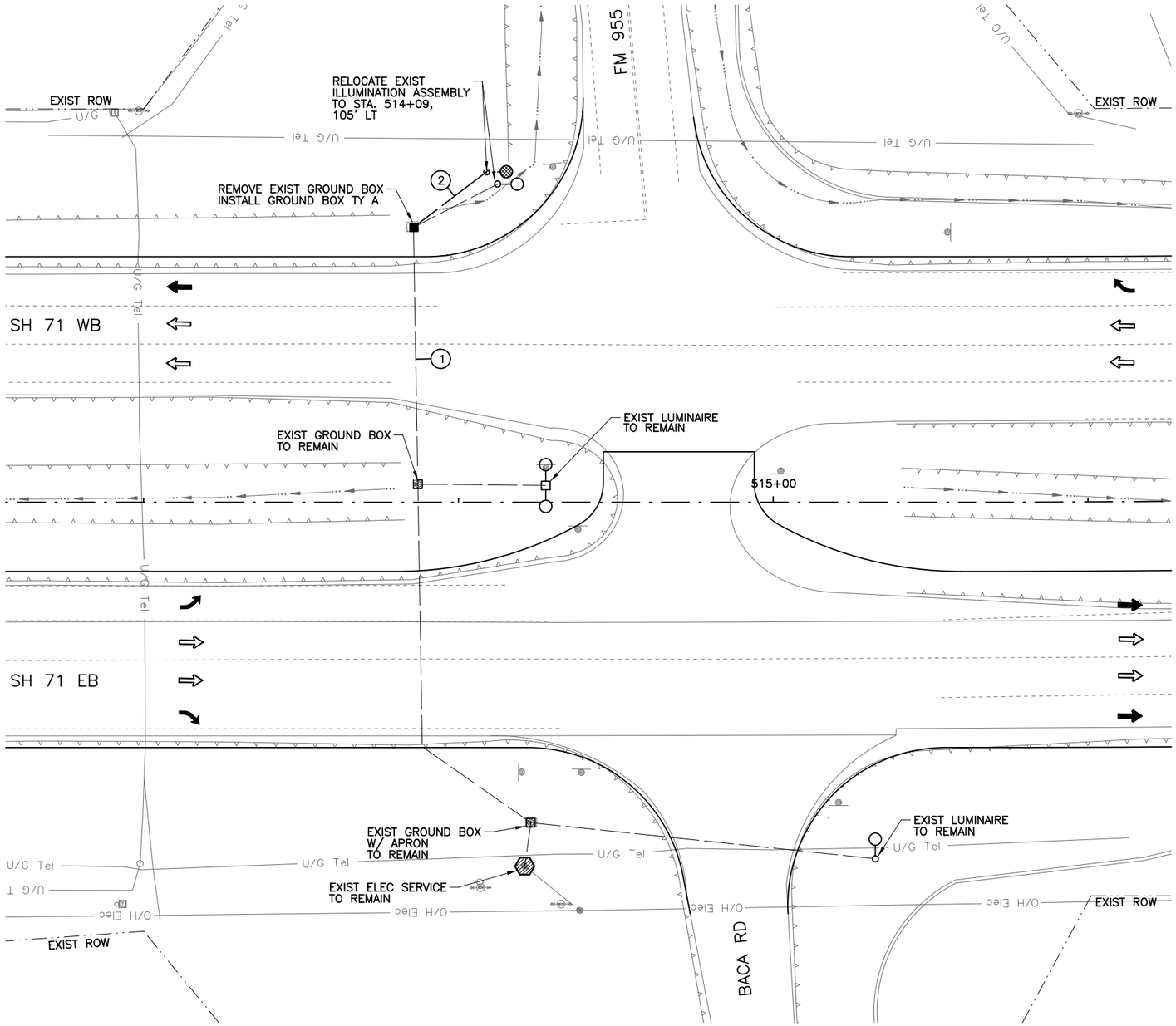
Bridge Division Standard

SAFETY END TREATMENT

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

SETP-PD

FILE: setppdse-20.dgn	DN: GAF	CK: CAT	DW: JRP	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0266	01	086	SH 71
	DIST	COUNTY		SHEET NO.
	YKM	FAYETTE		110



CONDUIT AND CONDUCTOR SUMMARY			
RUN NO.	GROUND LENGTH (LF)	CONDUCTOR LENGTH (LF)	CONDUIT LENGTH (LF)
	#8 BARE	#8 XHHW	2" PVC SCH 40 (TRENCHED)
1	85 (EX.)	85	85 (EX.)
2	30	30	30

20 10 0 20 40
SCALE HORIZ. FEET

N

LEGEND

- RDWY ILL ASM (TY SA 50T–10–10)(400 W EQ) LED – EXISTING
- RDWY ILL ASM (TY SA 40T–10–10)(250 W EQ) LED – EXISTING
- RDWY ILL ASM (TY SA 40T–10–10)(250 W EQ) LED – RELOCATE
- CONDUIT AND CONDUCTOR – EXISTING
- CONDUIT AND CONDUCTOR – PROPOSED (TRENCHED)
- CONDUIT AND CONDUCTOR – PROPOSED (BORED)
- (XX) CONDUIT RUN NUMBER
- ELECTRICAL SERVICE – EXISTING
- GROUND BOX – EXISTING
- GROUND BOX – PROPOSED
- 1A–1 POLE DESIGNATION
  - POLE or LUMINAIRE NO.
  - CIRCUIT NO.
  - SERVICE NO.

NOTES

1. THE LOCATION OF ALL UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION BEFORE COMMENCING WORK.
2. EXISTING RIGHT OF WAY IS SHOWN IN AN APPROXIMATE LOCATION. A BOUNDARY SURVEY WAS NOT PERFORMED.

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED
PROFESSIONAL ENGINEER
03/24/2021

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F–1741

SH 71

ILLUMINATION LAYOUT

SHEET 1 OF 1

Designed:	ZS	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	BAJ	6	TEXAS				SH 71
Drawn:	GM	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086	111

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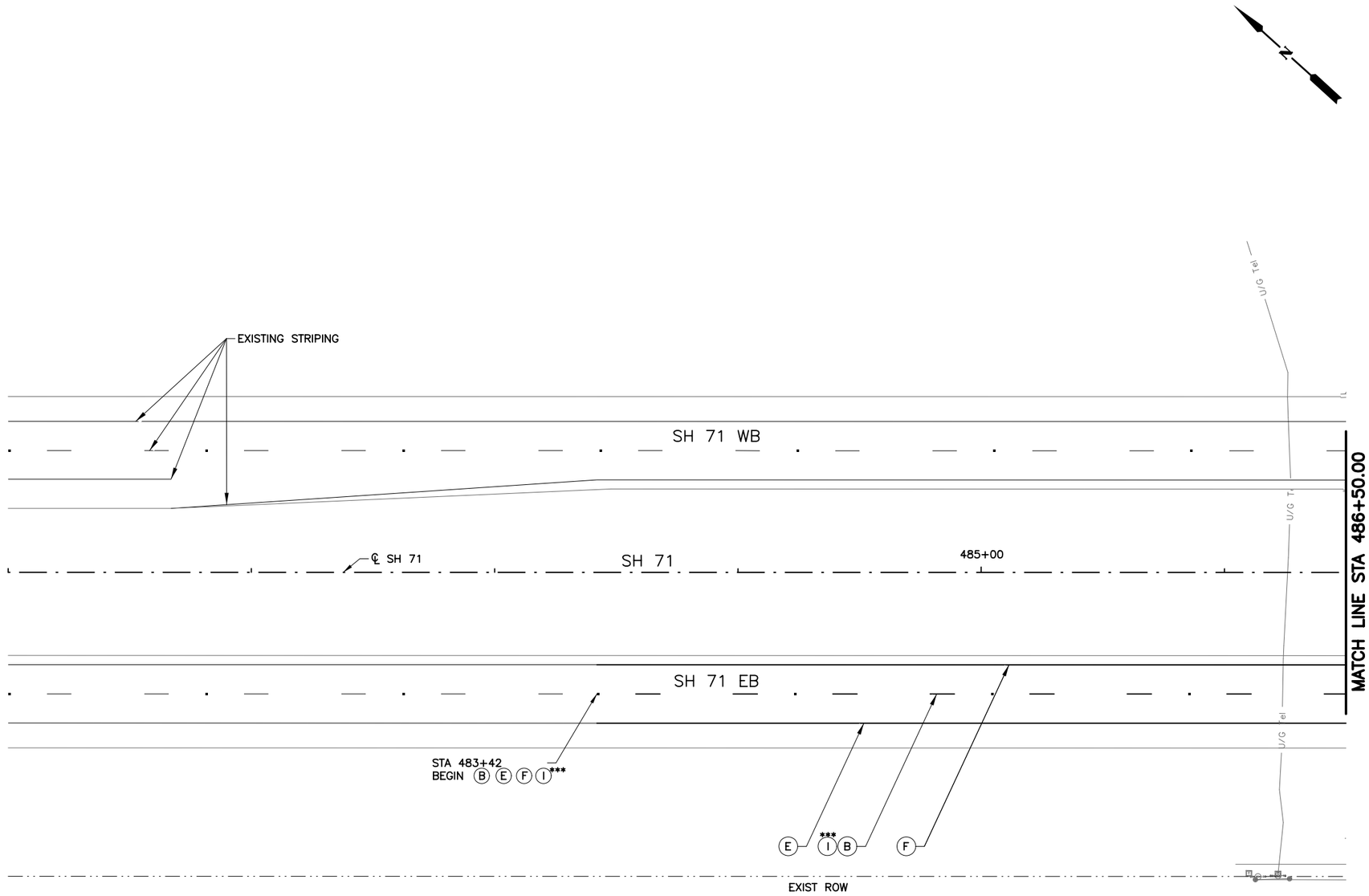

25 12.5 0 25 50

SCALE HORIZ. FEET

LEGEND

- (A) RE PM W/RET REQ TY I (W) 4" (SLD)(100 MIL)
- (B) RE PM W/RET REQ TY I (W) 4" (BRK)(100 MIL)
- (C) RE PM W/RET REQ TY I (Y) 4" (SLD)(100 MIL)
- (D) RE PM W/RET REQ TY I (W) 8" (SLD)(100 MIL)
- (E) REF PROF PAV MRK TY I (W) 4"(SLD)(100MIL)
- (F) REF PROF PAV MRK TY I (Y) 4"(SLD)(100MIL)
- (G) REFL PAV MRK TY I (W) 4" (DOT)(100MIL)
- (H) REFL PAV MRK TY I (W) 8" (DOT)(100MIL)
- (I) REFL PAV MRK TY II-C-R
- (J) PREFAB PAV MRK TY C (W) (ARROW)
- (K) PREFAB PAV MRK TY C (W) (WORD)
- (L) PREFAB PAV MRK TY C (W) (36")(YLD TRI)
- (M) LONG CHANNEL MOUNT CURB SYS
- (N) REFL PAV MRK TY I (W) 24" (SLD)
- (O) PREFAB PAV MRK TY C (W) (UTURN ARROW)
- (P) PREFAB PAV MRK TY C (W) (LNDP ARROW)
- PROPOSED SIGN
- (#) PROPOSED SIGN NUMBER
- (#) SIGN TO BE REMOVED
- PROPOSED OBJECT MARKER
- (SCF) SEDIMENT CONTROL FENCE
- (RFD) TYPE 1 ROCK FILTER DAM
- FLOW DIRECTION
- PROPOSED HMA
- PROPOSED CONCRETE

NOTES:

* (I) AT 20' SPACING
** (I) AT 40' SPACING
*** (I) AT 80' SPACING

NOTES

1. ALL EXISTING SIGNS MUST BE REMOVED WITHIN THE WIDENING LIMITS UNLESS OTHERWISE NOTED.
2. ALL SIGN LOCATIONS ARE APPROXIMATE AND CAN BE ADJUSTED TO ACCOMMODATE SITE CONDITIONS AS APPROVED BY THE ENGINEER.
3. ALL SIGNS MUST BE CONSTRUCTED IN ACCORDANCE WITH DETAILS FOUND IN "TMUTCD" AND "STANDARD HIGHWAY SIGN DETAILS FOR TEXAS", LATEST EDITIONS.
4. RUMBLE STRIPS NOT SHOWN FOR CLARITY. USE MILLED RUMBLE STRIPS ON WESTBOUND SHOULDERS AND PROFILE MARKINGS ON EASTBOUND SHOULDERS EXCLUDING CROSSOVERS, INTERSECTIONS AND BRIDGE DECK.
5. INSTALL BMP'S TO CORRESPOND WITH SEQUENCE OF CONSTRUCTION. ADDITIONAL BMP'S MAY BE ADDED TO CORRESPOND WITH CONTRUCTION ACTIVITIES AS APPROVED BY THE ENGINEER.
6. ACTUAL BMP LOCATIONS AND LENGTHS MAY VARY TO MEET FIELD CONDITIONS, AS APPROVED BY THE ENGINEER.

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED PROFESSIONAL ENGINEER
03/24/2021

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

 Texas Department of Transportation

SH 71

SIGNING, PAVEMENT MARKING AND SW3P LAYOUT
STA 483+42.00 TO STA 486+50.00

SHEET 1 OF 20

Designed:	YP	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
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Drawn:	SW	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
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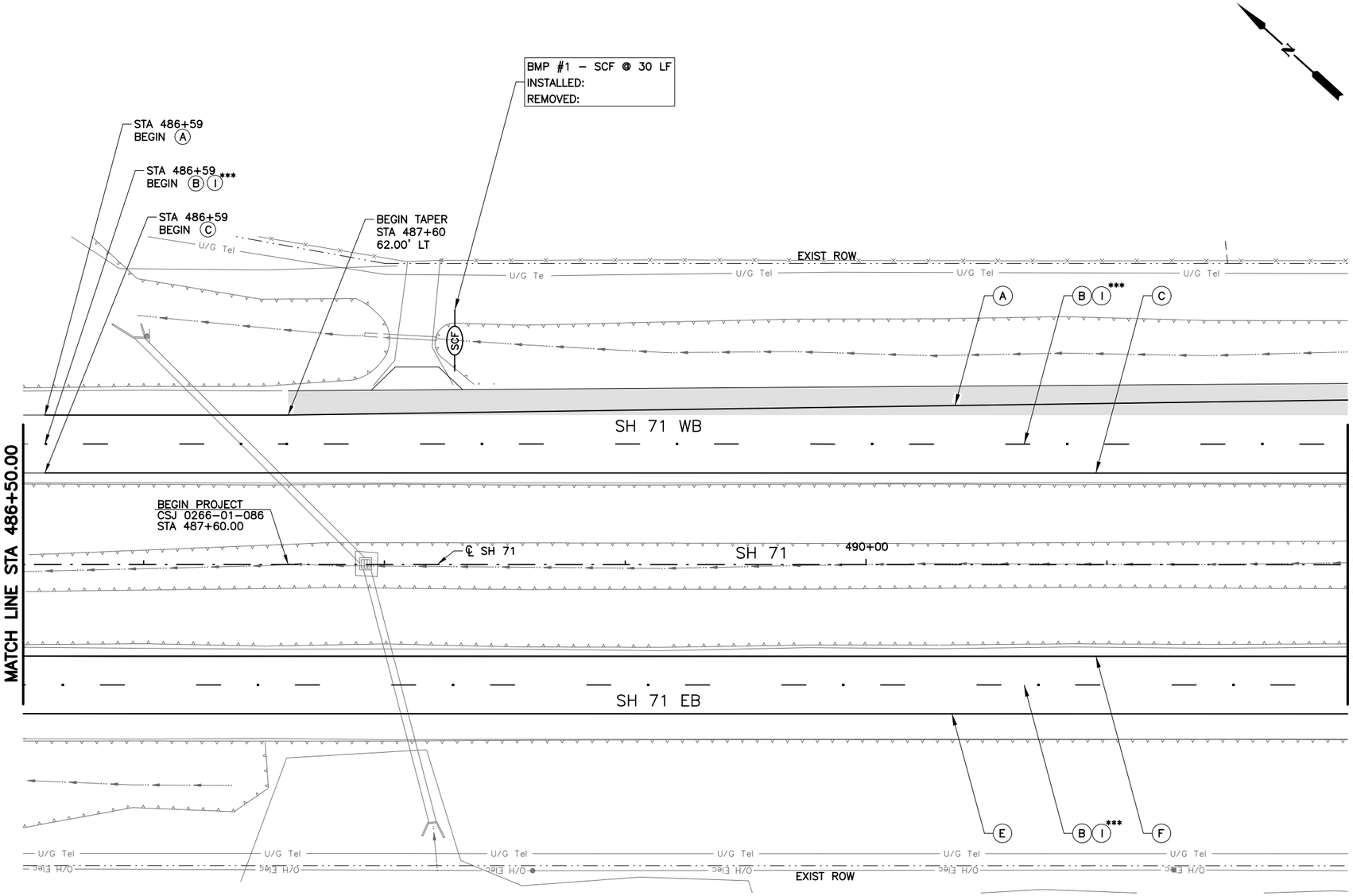

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SCALE HORIZ. FEET

LEGEND

- (A) RE PM W/RET REQ TY I (W) 4" (SLD)(100 MIL)
- (B) RE PM W/RET REQ TY I (W) 4" (BRK)(100 MIL)
- (C) RE PM W/RET REQ TY I (Y) 4" (SLD)(100 MIL)
- (D) RE PM W/RET REQ TY I (W) 8" (SLD)(100 MIL)
- (E) REF PROF PAV MRK TY I (W) 4"(SLD)(100MIL)
- (F) REF PROF PAV MRK TY I (Y) 4"(SLD)(100MIL)
- (G) REFL PAV MRK TY I (W) 4" (DOT)(100MIL)
- (H) REFL PAV MRK TY I (W) 8" (DOT)(100MIL)
- (I) REFL PAV MRK TY II-C-R
- (J) PREFAB PAV MRK TY C (W) (ARROW)
- (K) PREFAB PAV MRK TY C (W) (WORD)
- (L) PREFAB PAV MRK TY C (W) (36")(YLD TRI)
- (M) LONG CHANNEL MOUNT CURB SYS
- (N) REFL PAV MRK TY I (W) 24" (SLD)
- (O) PREFAB PAV MRK TY C (W) (UTURN ARROW)
- (P) PREFAB PAV MRK TY C (W) (LNDP ARROW)
- PROPOSED SIGN
- (#) PROPOSED SIGN NUMBER
- (#) SIGN TO BE REMOVED
- PROPOSED OBJECT MARKER
- (SCF) SEDIMENT CONTROL FENCE
- (RFD) TYPE 1 ROCK FILTER DAM
- FLOW DIRECTION
- PROPOSED HMA
- PROPOSED CONCRETE

NOTES:

* (I) AT 20' SPACING
** (I) AT 40' SPACING
*** (I) AT 80' SPACING

NOTES

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4. RUMBLE STRIPS NOT SHOWN FOR CLARITY. USE MILLED RUMBLE STRIPS ON WESTBOUND SHOULDERS AND PROFILE MARKINGS ON EASTBOUND SHOULDERS EXCLUDING CROSSOVERS, INTERSECTIONS AND BRIDGE DECK.
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STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED
PROFESSIONAL ENGINEER
03/24/2021

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

 Texas Department of Transportation

SH 71
SIGNING, PAVEMENT MARKING AND SW3P LAYOUT
STA 486+50.00 TO STA 492+00.00

SHEET 2 OF 20

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Checked:	BAJ	YKM	FAYETTE	0266	01	086		113

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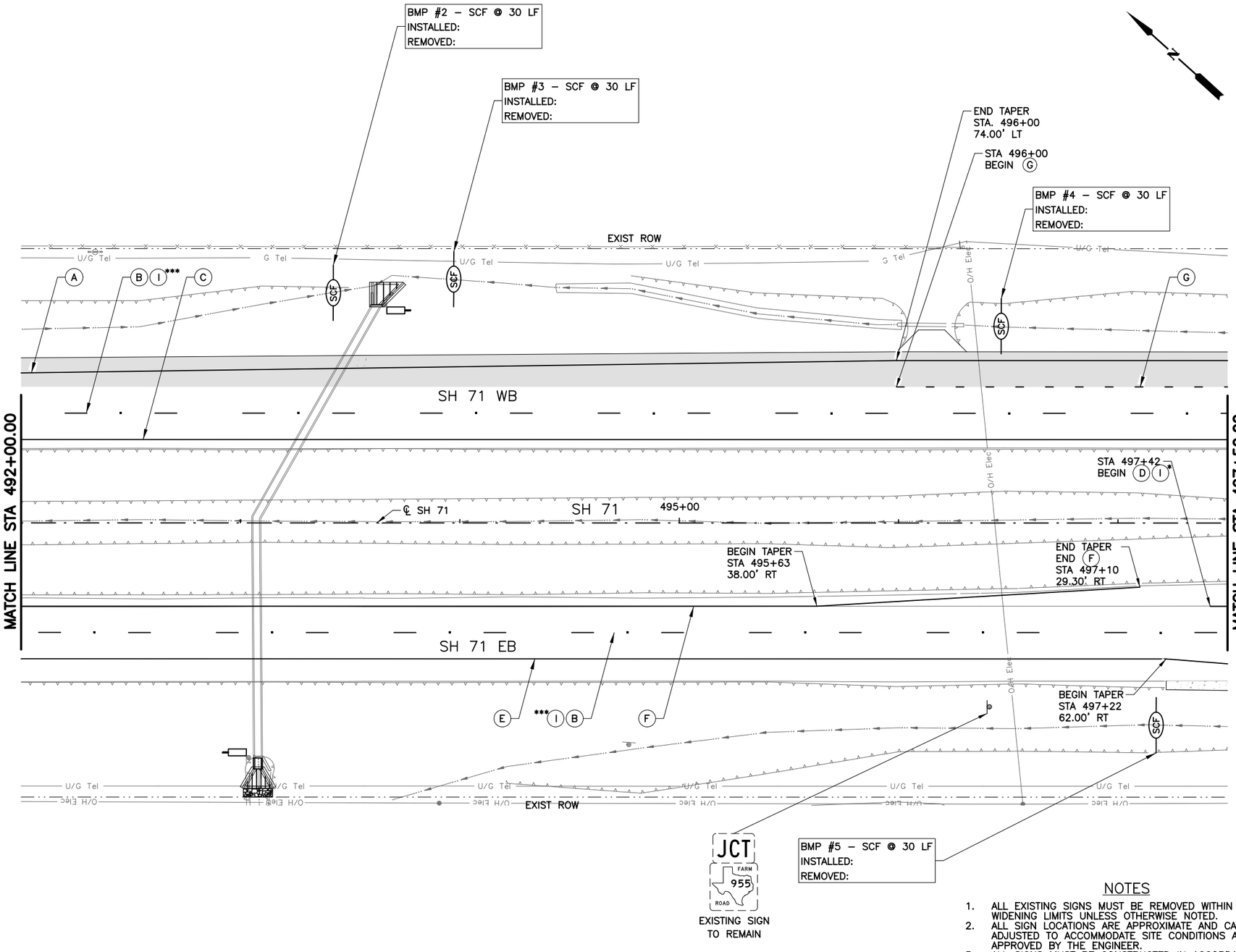

25 12.5 0 25 50
SCALE HORIZ. FEET

LEGEND

- (A) RE PM W/RET REQ TY I (W) 4" (SLD)(100 MIL)
- (B) RE PM W/RET REQ TY I (W) 4" (BRK)(100 MIL)
- (C) RE PM W/RET REQ TY I (Y) 4" (SLD)(100 MIL)
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- (J) PREFAB PAV MRK TY C (W) (ARROW)
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- PROPOSED SIGN
- (#) PROPOSED SIGN NUMBER
- (#) SIGN TO BE REMOVED
- PROPOSED OBJECT MARKER
- (SCF) SEDIMENT CONTROL FENCE
- (RFD) TYPE 1 ROCK FILTER DAM
- FLOW DIRECTION
- PROPOSED HMA
- PROPOSED CONCRETE

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STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED
PROFESSIONAL ENGINEER
03/24/2021

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

SH 71
SIGNING, PAVEMENT MARKING AND SW3P LAYOUT
STA 492+00.00 TO STA 497+50.00

SHEET 3 OF 20

Designed:	YP	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
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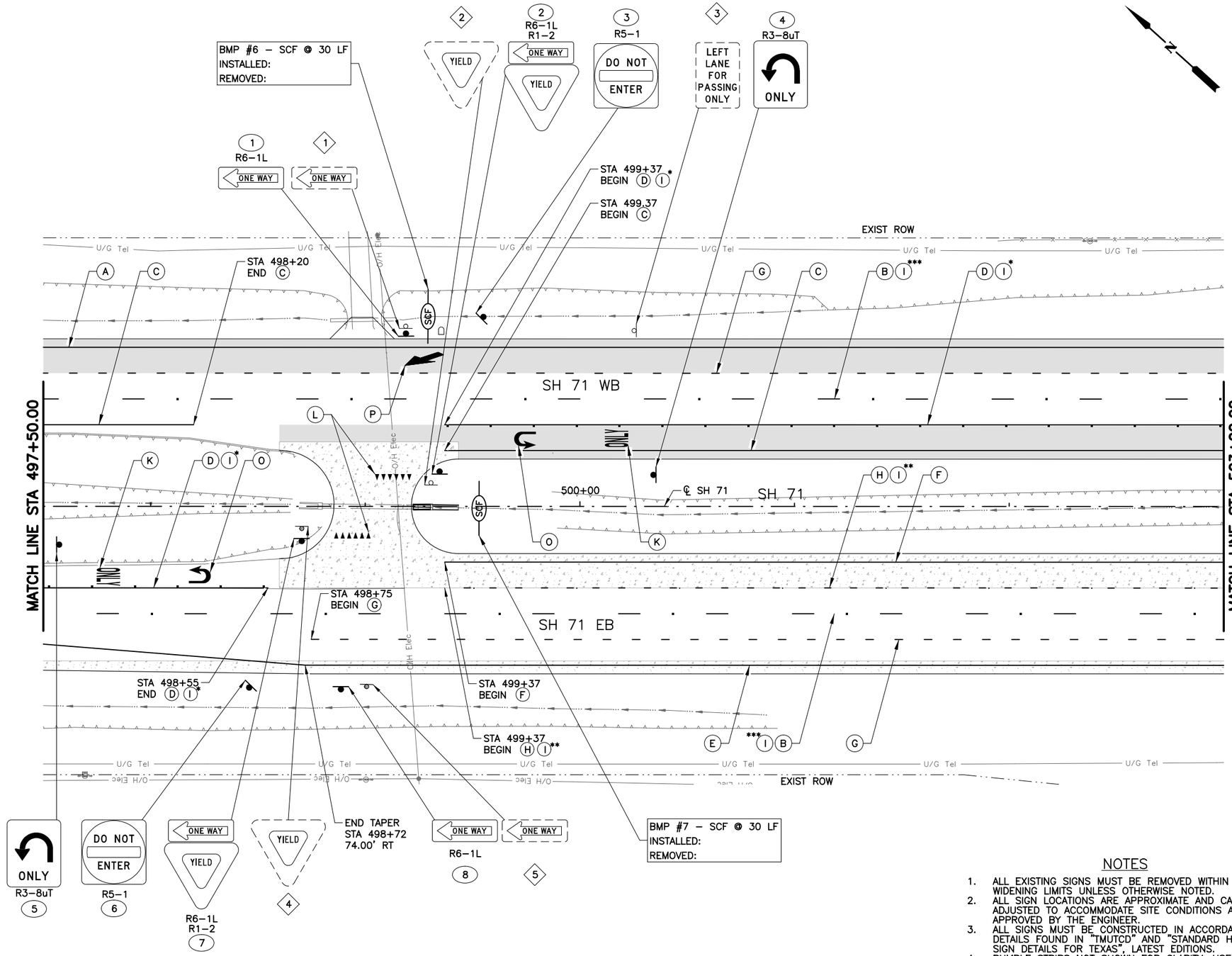
Drawn:	SW	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086	114



25 12.5 0 25 50
SCALE HORIZ. FEET

LEGEND

- (A) RE PM W/RET REQ TY I (W) 4" (SLD)(100 MIL)
- (B) RE PM W/RET REQ TY I (W) 4" (BRK)(100 MIL)
- (C) RE PM W/RET REQ TY I (Y) 4" (SLD)(100 MIL)
- (D) RE PM W/RET REQ TY I (W) 8" (SLD)(100 MIL)
- (E) REF PROF PAV MRK TY I (W) 4"(SLD)(100MIL)
- (F) REF PROF PAV MRK TY I (Y) 4"(SLD)(100MIL)
- (G) REFL PAV MRK TY I (W) 4" (DOT)(100MIL)
- (H) REFL PAV MRK TY I (W) 8" (DOT)(100MIL)
- (I) REFL PAV MRK TY II–C–R
- (J) PREFAB PAV MRK TY C (W) (ARROW)
- (K) PREFAB PAV MRK TY C (W) (WORD)
- (L) PREFAB PAV MRK TY C (W) (36")(YLD TRI)
- (M) LONG CHANNEL MOUNT CURB SYS
- (N) REFL PAV MRK TY I (W) 24" (SLD)
- (O) PREFAB PAV MRK TY C (W) (UTURN ARROW)
- (P) PREFAB PAV MRK TY C (W) (LNDP ARROW)
- PROPOSED SIGN
- (#) PROPOSED SIGN NUMBER
- (#) SIGN TO BE REMOVED
- PROPOSED OBJECT MARKER
- (SCF) SEDIMENT CONTROL FENCE
- (RFD) TYPE 1 ROCK FILTER DAM
- FLOW DIRECTION
- PROPOSED HMA
- PROPOSED CONCRETE

NOTES:
* (I) AT 20' SPACING
** (I) AT 40' SPACING
*** (I) AT 80' SPACING

NOTES

1. ALL EXISTING SIGNS MUST BE REMOVED WITHIN THE WIDENING LIMITS UNLESS OTHERWISE NOTED.
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5. INSTALL BMP'S TO CORRESPOND WITH SEQUENCE OF CONSTRUCTION. ADDITIONAL BMP'S MAY BE ADDED TO CORRESPOND WITH CONTRUCTION ACTIVITIES AS APPROVED BY THE ENGINEER.
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STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED PROFESSIONAL ENGINEER
03/24/2021

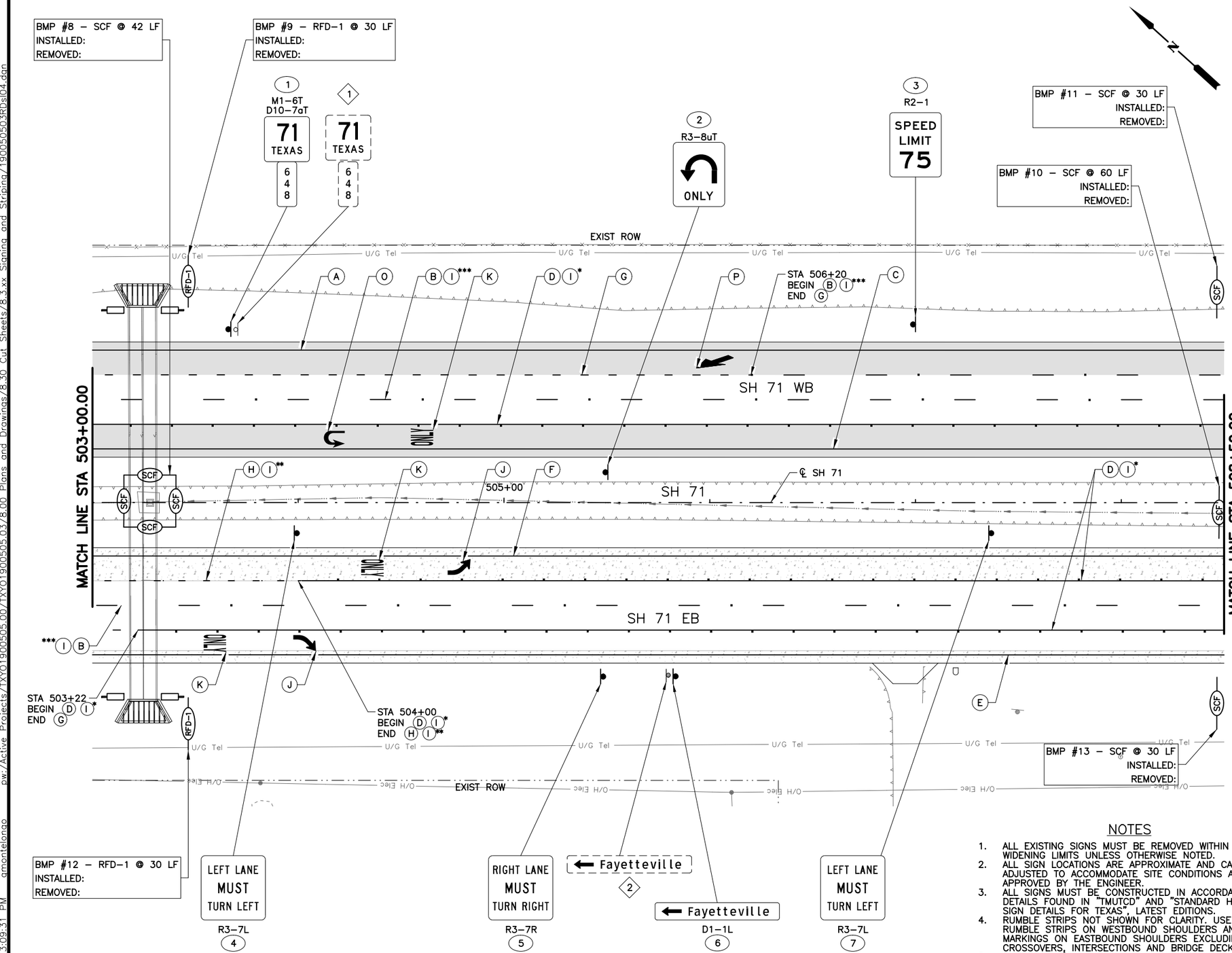
NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F–1741

SH 71
SIGNING, PAVEMENT MARKING AND SW3P LAYOUT
STA 497+50.00 TO STA 503+00.00

SHEET 4 OF 20

Designed:	YP	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					SH 71
Drawn:	SW	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086		115



25 12.5 0 25 50
SCALE HORIZ. FEET

LEGEND

- (A) RE PM W/RET REQ TY I (W) 4" (SLD)(100 MIL)
- (B) RE PM W/RET REQ TY I (W) 4" (BRK)(100 MIL)
- (C) RE PM W/RET REQ TY I (Y) 4" (SLD)(100 MIL)
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- PROPOSED SIGN
- (#) PROPOSED SIGN NUMBER
- (#) SIGN TO BE REMOVED
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- FLOW DIRECTION
- PROPOSED HMA
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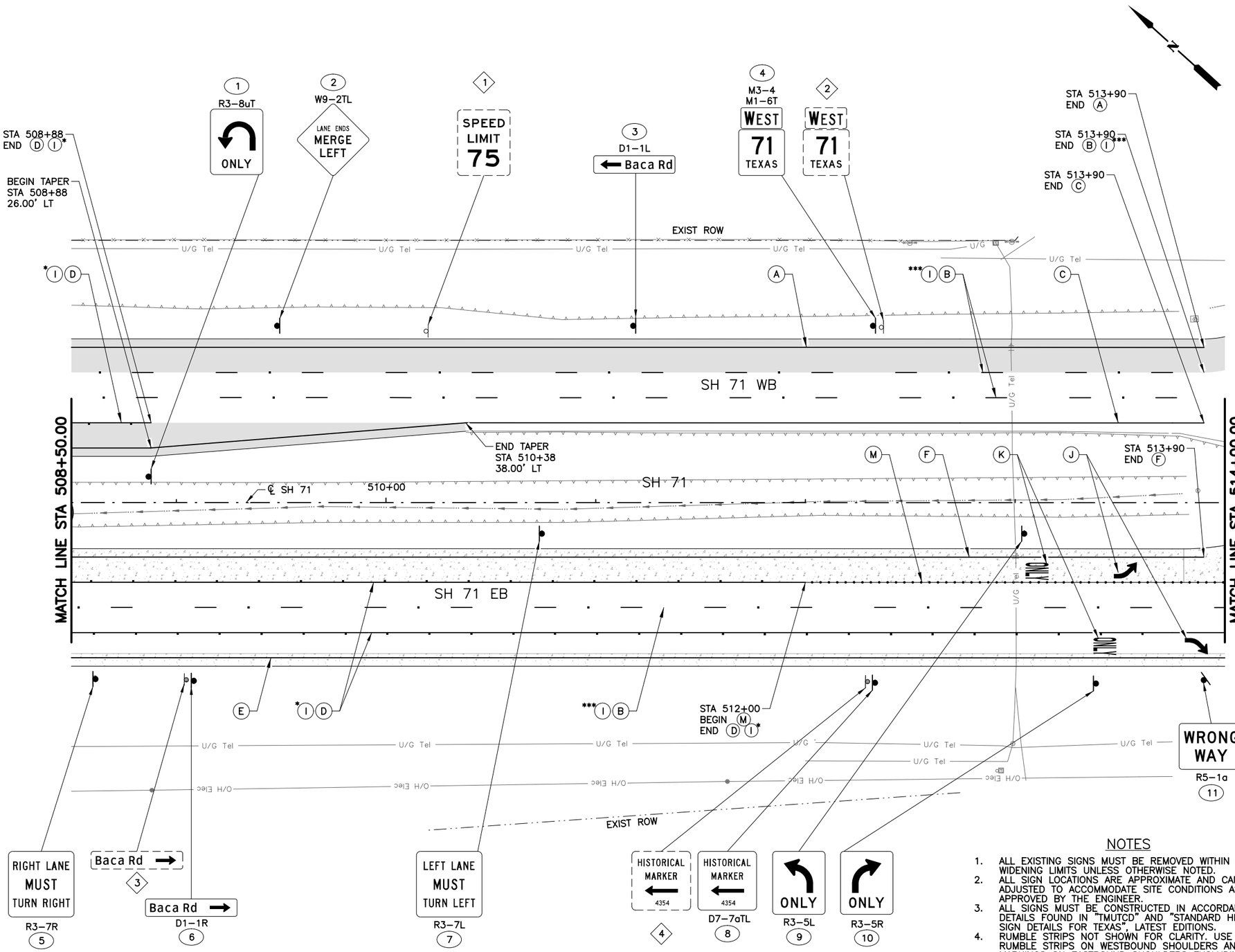
NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F–1741

SH 71
SIGNING, PAVEMENT MARKING AND SW3P LAYOUT
STA 503+00 TO STA 508+50.00

SHEET 5 OF 20

Designed:	YP	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					SH 71
Drawn:	SW	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086		116



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03/24/2021

NO.	REVISION	BY	DATE

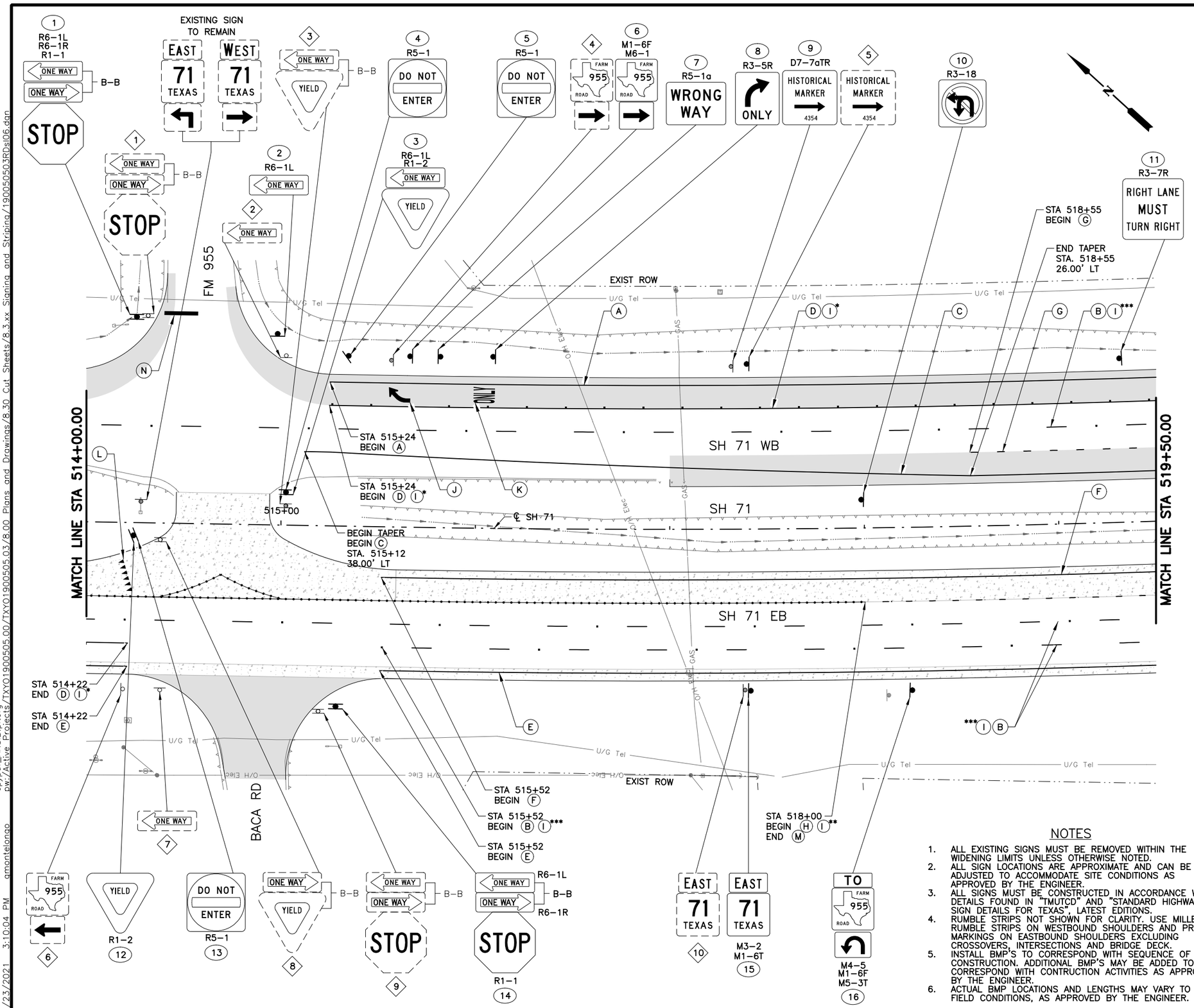
CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

SH 71

SIGNING, PAVEMENT MARKING AND SW3P LAYOUT STA 508+50.00 TO STA 514+00.00

SHEET 6 OF 20

Designed:	YP	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					SH 71
Drawn:	SW	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086		117



LEGEND

- (A) RE PM W/RET REQ TY I (W) 4" (SLD)(100 MIL)
- (B) RE PM W/RET REQ TY I (W) 4" (BRK)(100 MIL)
- (C) RE PM W/RET REQ TY I (Y) 4" (SLD)(100 MIL)
- (D) RE PM W/RET REQ TY I (W) 8" (SLD)(100 MIL)
- (E) REF PROF PAV MRK TY I (W) 4"(SLD)(100MIL)
- (F) REF PROF PAV MRK TY I (Y) 4"(SLD)(100MIL)
- (G) REFL PAV MRK TY I (W) 4" (DOT)(100MIL)
- (H) REFL PAV MRK TY I (W) 8" (DOT)(100MIL)
- (I) REFL PAV MRK TY II-C-R
- (J) PREFAB PAV MRK TY C (W) (ARROW)
- (K) PREFAB PAV MRK TY C (W) (WORD)
- (L) PREFAB PAV MRK TY C (W) (36")(YLD TRI)
- (M) LONG CHANNEL MOUNT CURB SYS
- (N) REFL PAV MRK TY I (W) 24" (SLD)
- (O) PREFAB PAV MRK TY C (W) (UTURN ARROW)
- (P) PREFAB PAV MRK TY C (W) (LNDP ARROW)
- PROPOSED SIGN
- (#) PROPOSED SIGN NUMBER
- ◇(#) SIGN TO BE REMOVED
- PROPOSED OBJECT MARKER
- (SCF) SEDIMENT CONTROL FENCE
- (RFD) TYPE 1 ROCK FILTER DAM
- FLOW DIRECTION
- PROPOSED HMA
- PROPOSED CONCRETE

NOTES:
- * (I) AT 20' SPACING
- ** (I) AT 40' SPACING
- *** (I) AT 80' SPACING

NOTES

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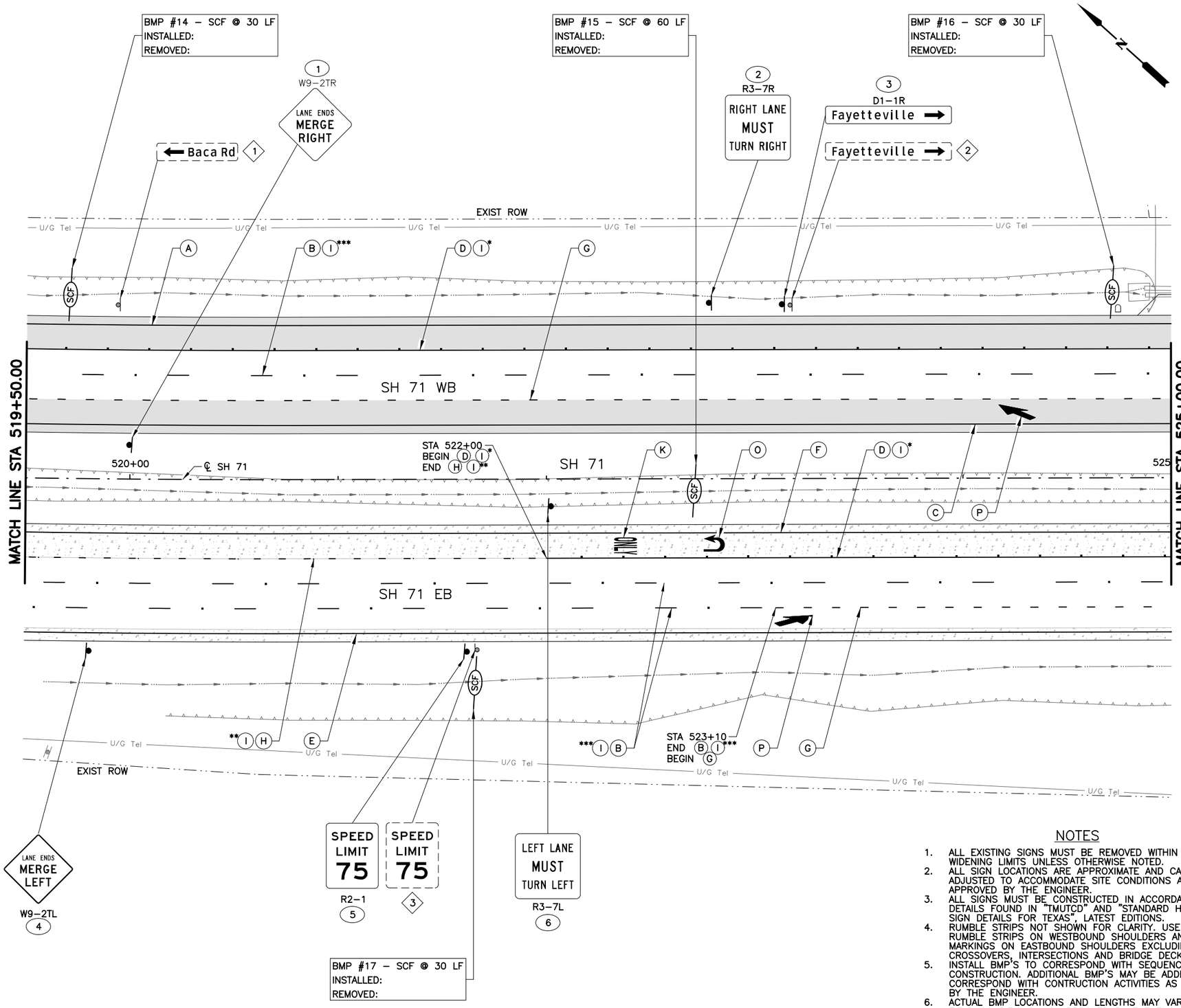
CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

SH 71
SIGNING, PAVEMENT MARKING AND SW3P LAYOUT
STA 514+00.00 TO STA 519+50.00

SHEET 7 OF 20

Designed:	YP	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	BAJ	6	TEXAS				SH 71
Drawn:	SW	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086	118



25 12.5 0 25 50
SCALE HORIZ. FEET

LEGEND

- (A) RE PM W/RET REQ TY I (W) 4" (SLD)(100 MIL)
- (B) RE PM W/RET REQ TY I (W) 4" (BRK)(100 MIL)
- (C) RE PM W/RET REQ TY I (Y) 4" (SLD)(100 MIL)
- (D) RE PM W/RET REQ TY I (W) 8" (SLD)(100 MIL)
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- (F) REF PROF PAV MRK TY I (Y) 4"(SLD)(100MIL)
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- (#) PROPOSED SIGN NUMBER
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- FLOW DIRECTION
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NOTES:
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NOTES

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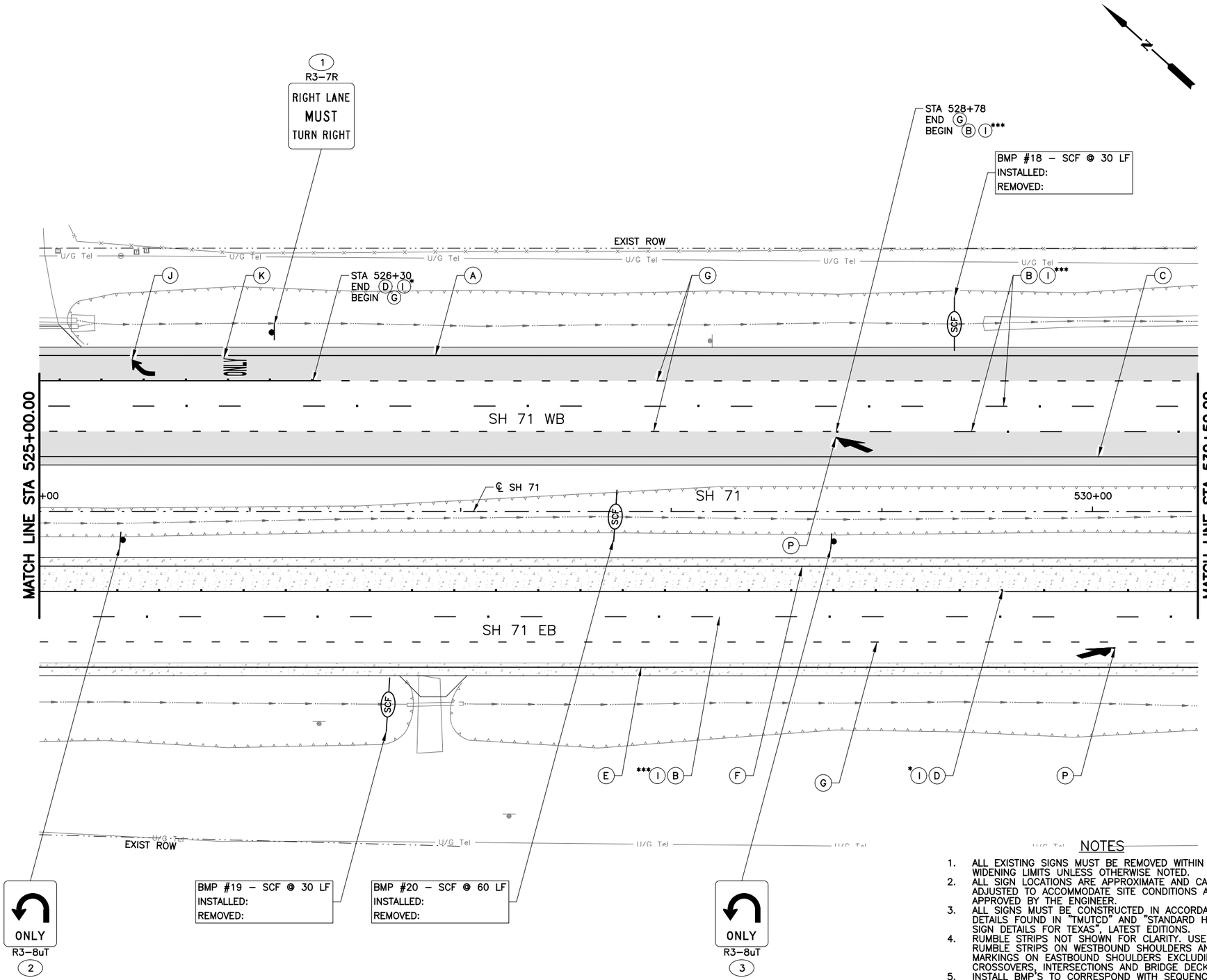
NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F–1741

SH 71
SIGNING, PAVEMENT MARKING AND SW3P LAYOUT
STA 519+50.00 TO STA 525+00.00

SHEET 8 OF 20

Designed:	YP	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					SH 71
Drawn:	SW	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086		119



25 12.5 0 25 50
SCALE FEET
HORIZ.

LEGEND

- (A) RE PM W/RET REQ TY I (W) 4" (SLD)(100 MIL)
- (B) RE PM W/RET REQ TY I (W) 4" (BRK)(100 MIL)
- (C) RE PM W/RET REQ TY I (Y) 4" (SLD)(100 MIL)
- (D) RE PM W/RET REQ TY I (W) 8" (SLD)(100 MIL)
- (E) REF PROF PAV MRK TY I (W) 4"(SLD)(100MIL)
- (F) REF PROF PAV MRK TY I (Y) 4"(SLD)(100MIL)
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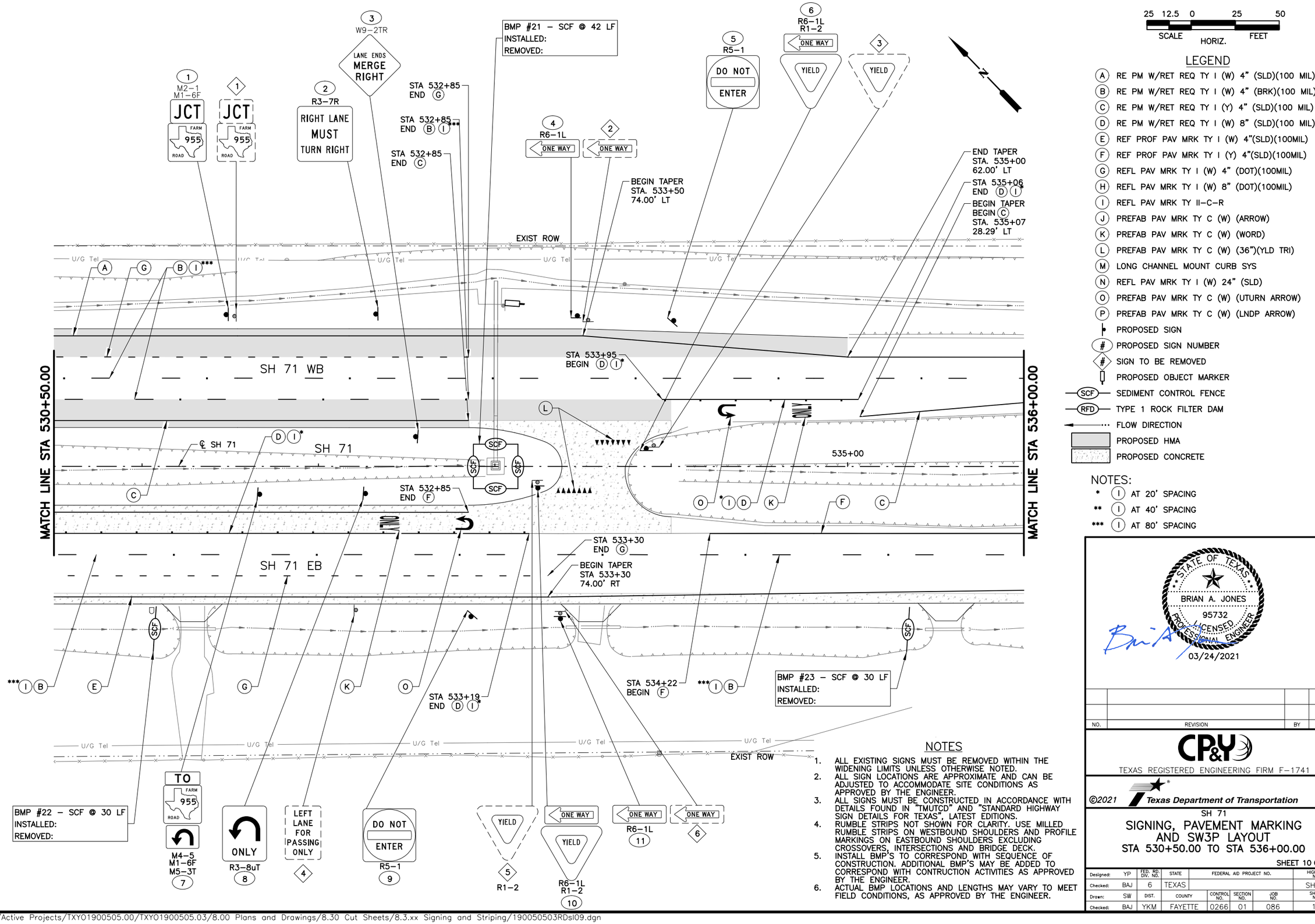
CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

 Texas Department of Transportation

SH 71
SIGNING, PAVEMENT MARKING AND SW3P LAYOUT
STA 525+00.00 TO STA 530+50.00

SHEET 9 OF 20

Designed:	YP	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					SH 71
Drawn:	SW	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086		120



25 12.5 0 25 50
SCALE HORIZ. FEET

LEGEND

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CP&Y
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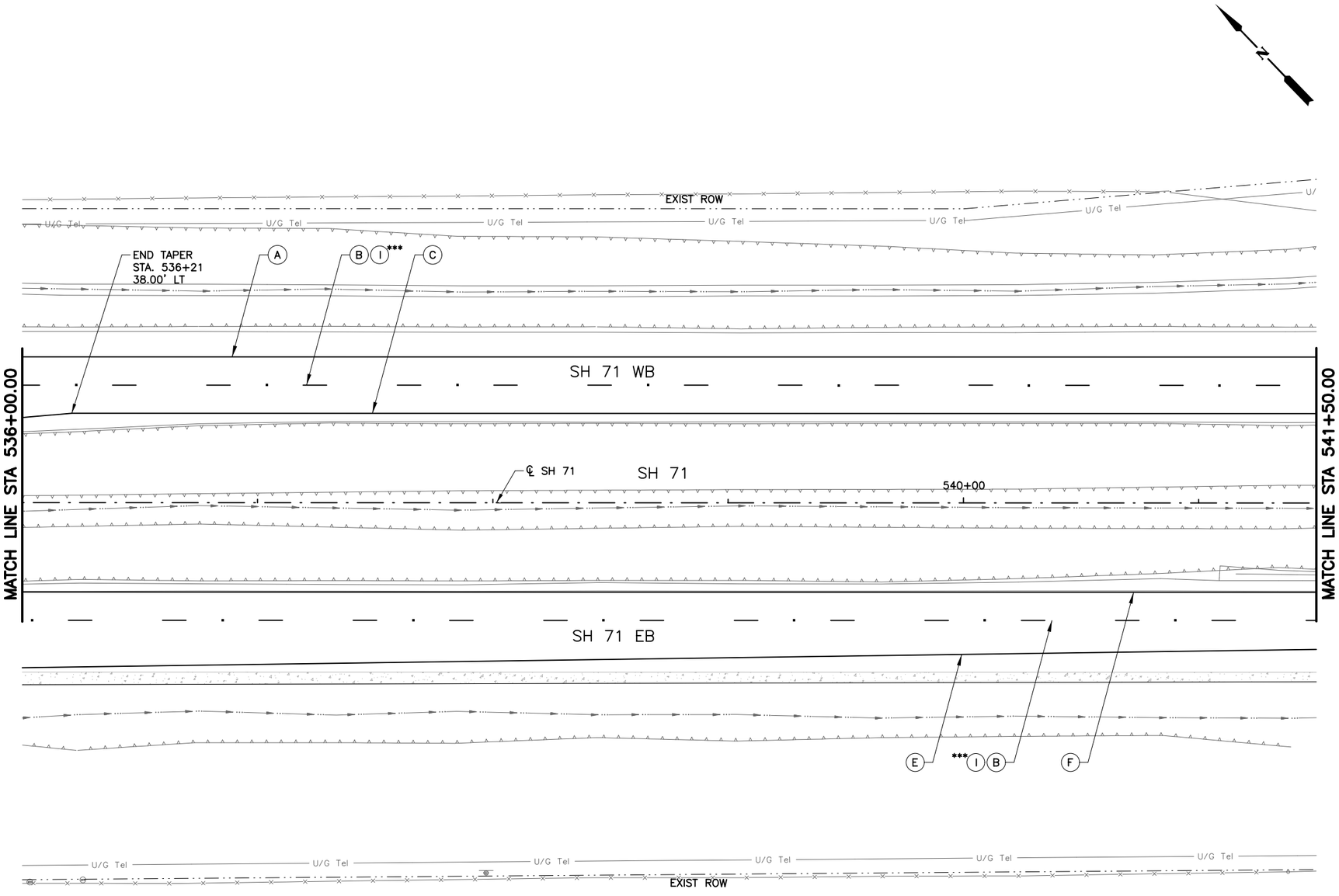
SH 71
SIGNING, PAVEMENT MARKING AND SW3P LAYOUT
STA 530+50.00 TO STA 536+00.00

SHEET 10 OF 20

Designed:	YP	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					SH 71
Drawn:	SW	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086		121



25 12.5 0 25 50

SCALE HORIZ. FEET

LEGEND

- (A) RE PM W/RET REQ TY I (W) 4" (SLD)(100 MIL)
- (B) RE PM W/RET REQ TY I (W) 4" (BRK)(100 MIL)
- (C) RE PM W/RET REQ TY I (Y) 4" (SLD)(100 MIL)
- (D) RE PM W/RET REQ TY I (W) 8" (SLD)(100 MIL)
- (E) REF PROF PAV MRK TY I (W) 4"(SLD)(100MIL)
- (F) REF PROF PAV MRK TY I (Y) 4"(SLD)(100MIL)
- (G) REFL PAV MRK TY I (W) 4" (DOT)(100MIL)
- (H) REFL PAV MRK TY I (W) 8" (DOT)(100MIL)
- (I) REFL PAV MRK TY II-C-R
- (J) PREFAB PAV MRK TY C (W) (ARROW)
- (K) PREFAB PAV MRK TY C (W) (WORD)
- (L) PREFAB PAV MRK TY C (W) (36")(YLD TRI)
- (M) LONG CHANNEL MOUNT CURB SYS
- (N) REFL PAV MRK TY I (W) 24" (SLD)
- (O) PREFAB PAV MRK TY C (W) (UTURN ARROW)
- (P) PREFAB PAV MRK TY C (W) (LNDP ARROW)
- PROPOSED SIGN
- (#) PROPOSED SIGN NUMBER
- (#) SIGN TO BE REMOVED
- PROPOSED OBJECT MARKER
- (SCF) SEDIMENT CONTROL FENCE
- (RFD) TYPE 1 ROCK FILTER DAM
- FLOW DIRECTION
- PROPOSED HMA
- PROPOSED CONCRETE

NOTES:

* (I) AT 20' SPACING
** (I) AT 40' SPACING
*** (I) AT 80' SPACING

NOTES

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4. RUMBLE STRIPS NOT SHOWN FOR CLARITY. USE MILLED RUMBLE STRIPS ON WESTBOUND SHOULDERS AND PROFILE MARKINGS ON EASTBOUND SHOULDERS EXCLUDING CROSSOVERS, INTERSECTIONS AND BRIDGE DECK.
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STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED
PROFESSIONAL ENGINEER
03/24/2021

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

SH 71

SIGNING, PAVEMENT MARKING AND SW3P LAYOUT
STA 536+00.00 TO STA 541+50.00

SHEET 11 OF 20

Designed:	YP	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					SH 71
Drawn:	SW	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086		122

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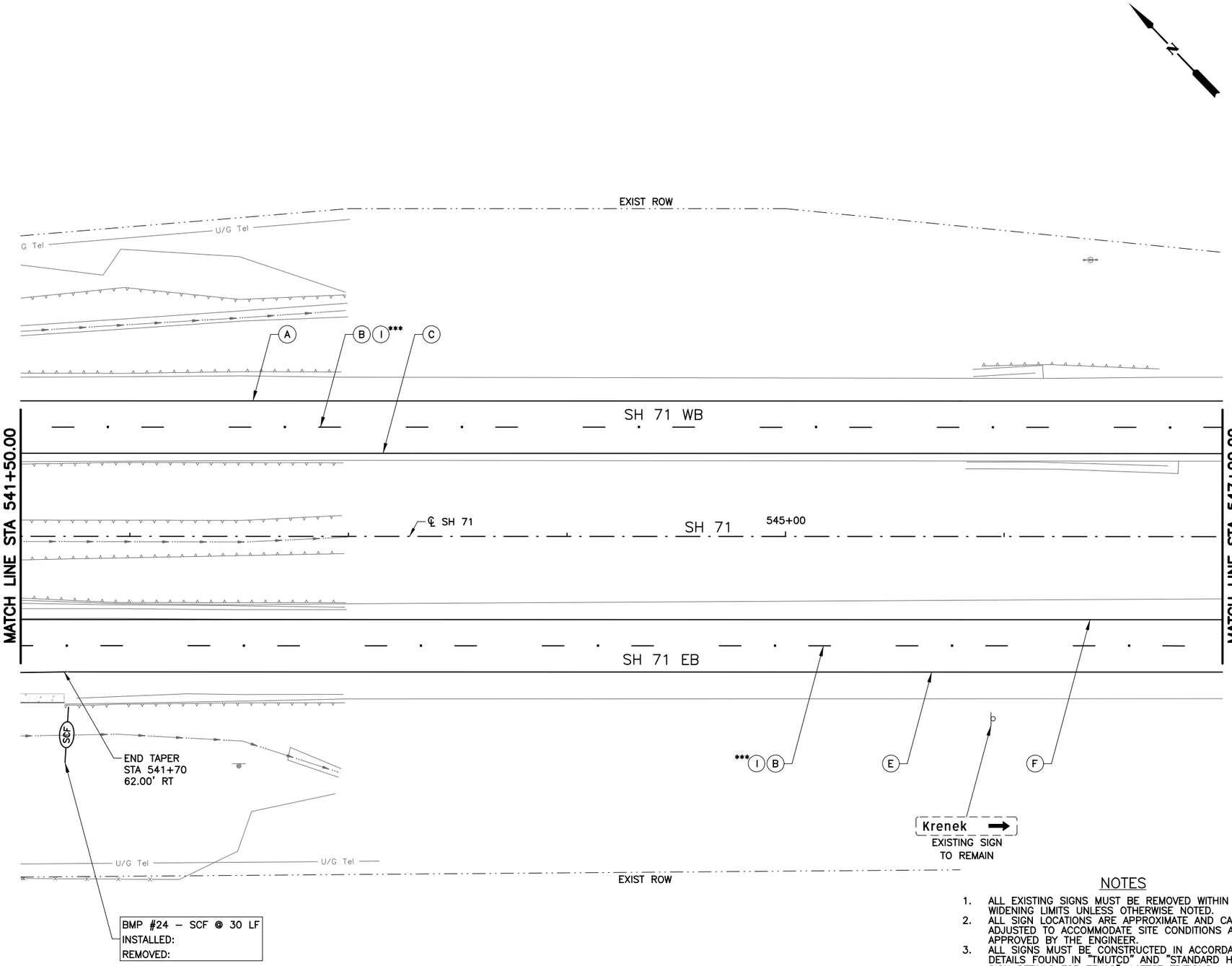

25 12.5 0 25 50

SCALE HORIZ. FEET

N

LEGEND

- (A) RE PM W/RET REQ TY I (W) 4" (SLD)(100 MIL)
- (B) RE PM W/RET REQ TY I (W) 4" (BRK)(100 MIL)
- (C) RE PM W/RET REQ TY I (Y) 4" (SLD)(100 MIL)
- (D) RE PM W/RET REQ TY I (W) 8" (SLD)(100 MIL)
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- (F) REF PROF PAV MRK TY I (Y) 4"(SLD)(100MIL)
- (G) REFL PAV MRK TY I (W) 4" (DOT)(100MIL)
- (H) REFL PAV MRK TY I (W) 8" (DOT)(100MIL)
- (I) REFL PAV MRK TY II-C-R
- (J) PREFAB PAV MRK TY C (W) (ARROW)
- (K) PREFAB PAV MRK TY C (W) (WORD)
- (L) PREFAB PAV MRK TY C (W) (36")(YLD TRI)
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- (N) REFL PAV MRK TY I (W) 24" (SLD)
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- PROPOSED SIGN
- (#) PROPOSED SIGN NUMBER
- (#) SIGN TO BE REMOVED
- PROPOSED OBJECT MARKER
- (SCF) SEDIMENT CONTROL FENCE
- (RFD) TYPE 1 ROCK FILTER DAM
- FLOW DIRECTION
- PROPOSED HMA
- PROPOSED CONCRETE

NOTES:

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*** (I) AT 80' SPACING

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STATE OF TEXAS
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NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

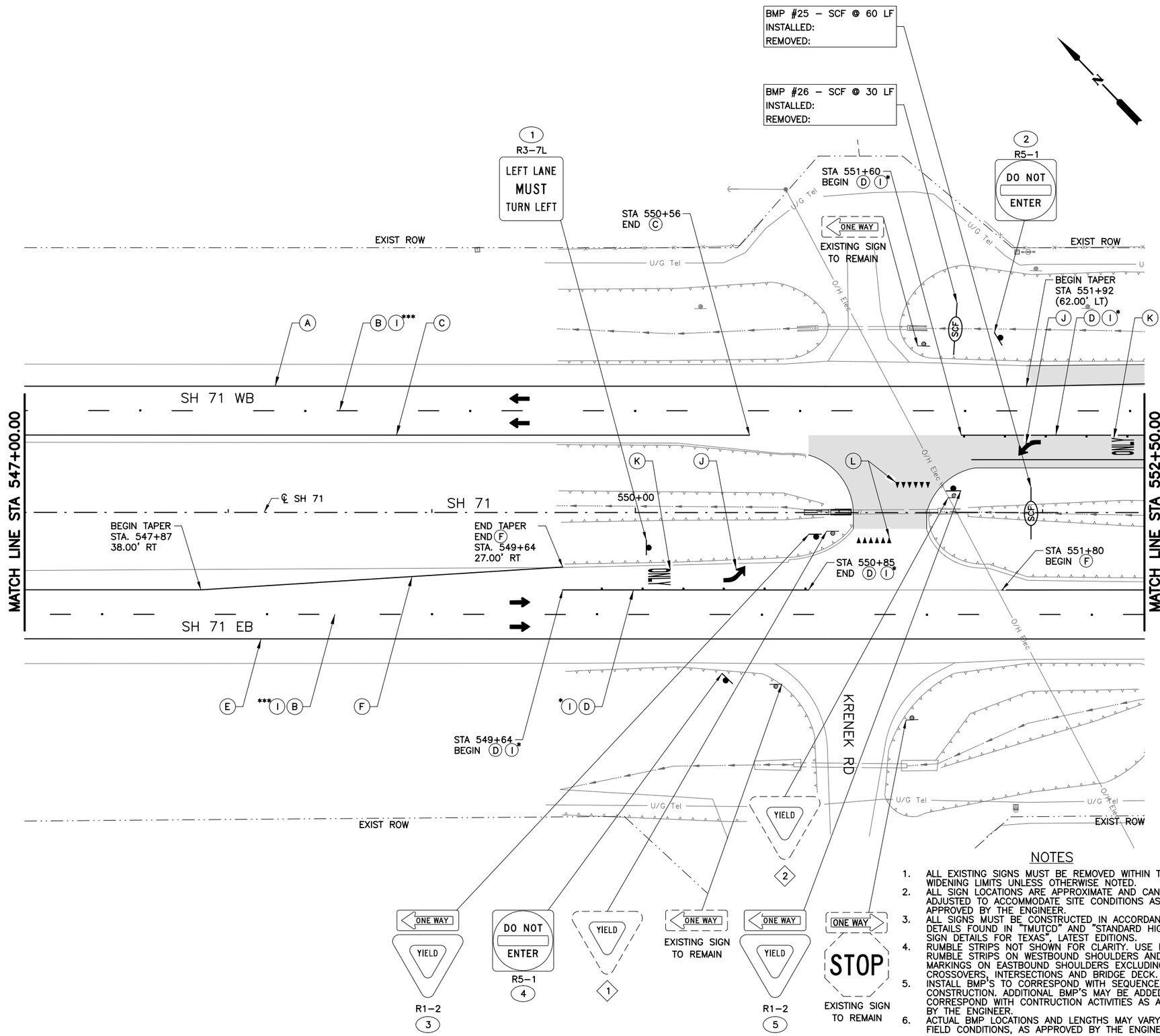
 Texas Department of Transportation

SH 71

SIGNING, PAVEMENT MARKING AND SW3P LAYOUT
STA 541+50.00 TO STA 547+00.00

SHEET 12 OF 20

Designed:	YP	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					SH 71
Drawn:	SW	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086		123



25 12.5 0 25 50
SCALE HORIZ. FEET

LEGEND

- (A) RE PM W/RET REQ TY I (W) 4" (SLD)(100 MIL)
- (B) RE PM W/RET REQ TY I (W) 4" (BRK)(100 MIL)
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TEXAS REGISTERED ENGINEERING FIRM F–1741

SH 71
SIGNING, PAVEMENT MARKING AND SW3P LAYOUT
STA 547+00.00 TO STA 552+50.00

SHEET 13 OF 20

Designed:	YP	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					SH 71
Drawn:	SW	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086		124

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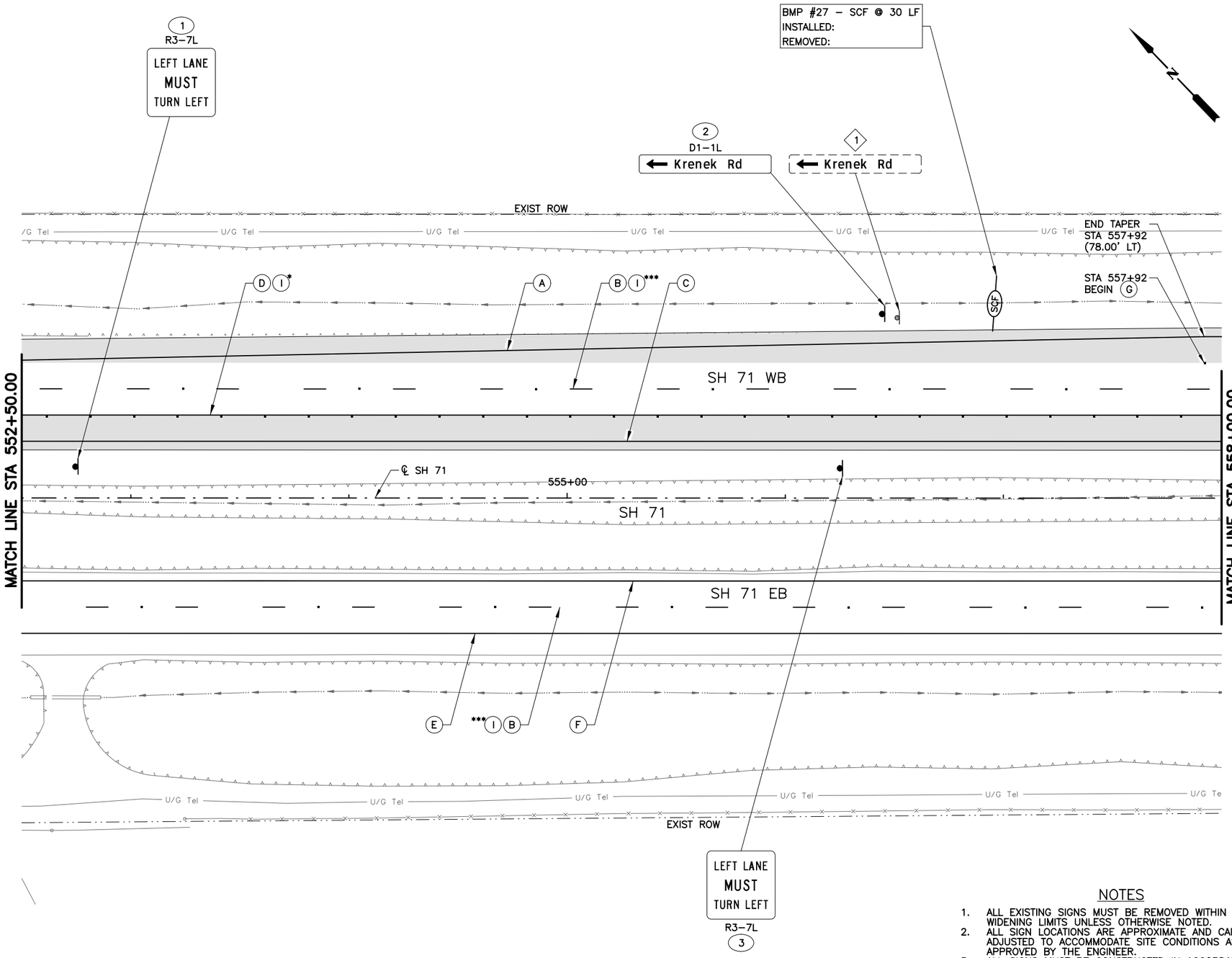

25 12.5 0 25 50
SCALE HORIZ. FEET

LEGEND

- (A) RE PM W/RET REQ TY I (W) 4" (SLD)(100 MIL)
- (B) RE PM W/RET REQ TY I (W) 4" (BRK)(100 MIL)
- (C) RE PM W/RET REQ TY I (Y) 4" (SLD)(100 MIL)
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- (E) REF PROF PAV MRK TY I (W) 4"(SLD)(100MIL)
- (F) REF PROF PAV MRK TY I (Y) 4"(SLD)(100MIL)
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- (J) PREFAB PAV MRK TY C (W) (ARROW)
- (K) PREFAB PAV MRK TY C (W) (WORD)
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- (M) LONG CHANNEL MOUNT CURB SYS
- (N) REFL PAV MRK TY I (W) 24" (SLD)
- (O) PREFAB PAV MRK TY C (W) (UTURN ARROW)
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- PROPOSED SIGN
- (#) PROPOSED SIGN NUMBER
- (#) SIGN TO BE REMOVED
- PROPOSED OBJECT MARKER
- (SCF) SEDIMENT CONTROL FENCE
- (RFD) TYPE 1 ROCK FILTER DAM
- FLOW DIRECTION
- PROPOSED HMA
- PROPOSED CONCRETE

NOTES:

* (I) AT 20' SPACING
** (I) AT 40' SPACING
*** (I) AT 80' SPACING

NOTES

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STATE OF TEXAS
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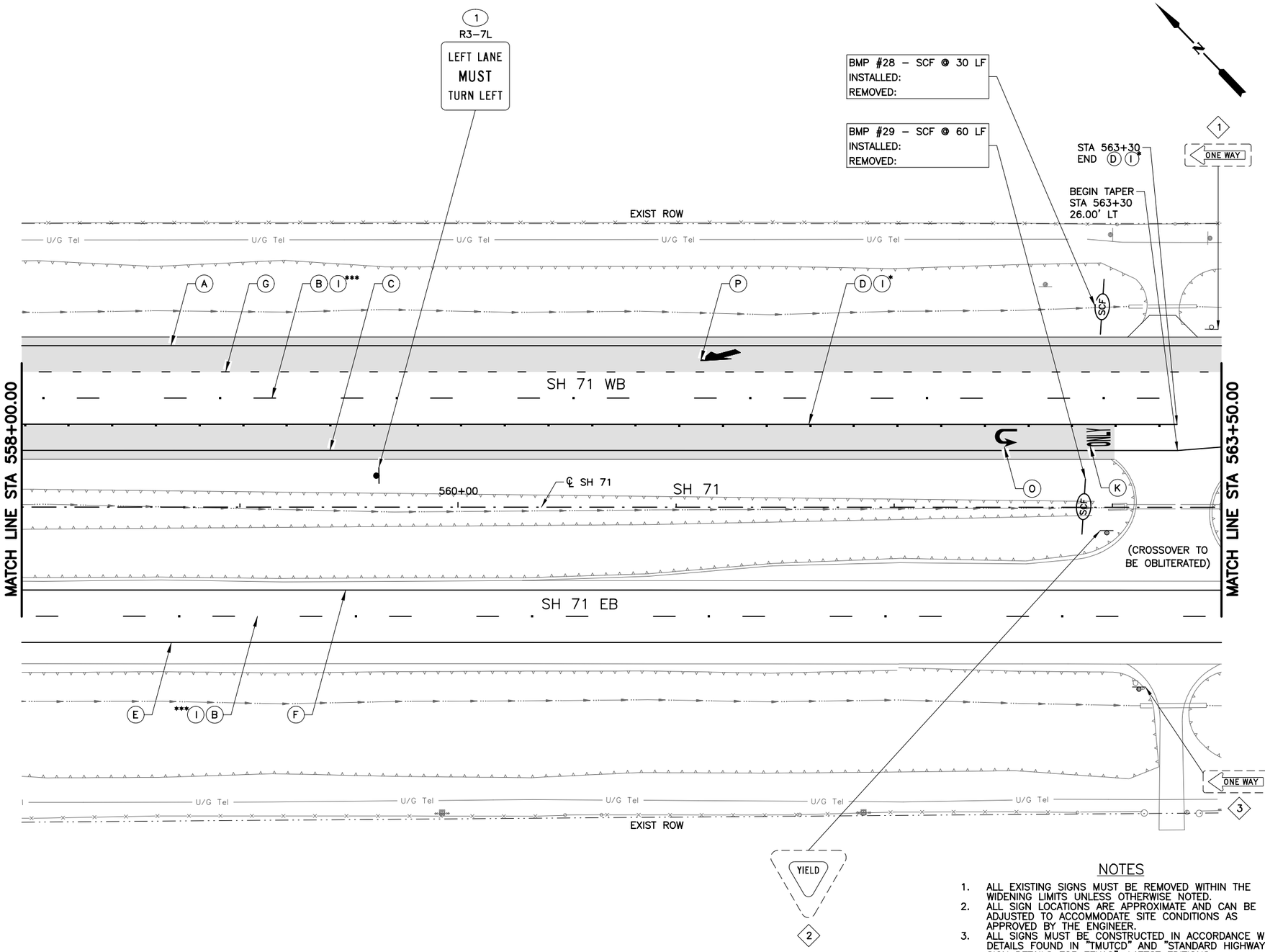
NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

SH 71
SIGNING, PAVEMENT MARKING AND SW3P LAYOUT
STA 552+50.00 TO STA 558+00.00

SHEET 14 OF 20

Designed:	YP	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.	
Checked:	BAJ	6	TEXAS				SH 71	
Drawn:	SW	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.	
Checked:	BAJ	YKM	FAYETTE	0266	01	086	125	



25 12.5 0 25 50

SCALE HORIZ. FEET

LEGEND

- (A) RE PM W/RET REQ TY I (W) 4" (SLD)(100 MIL)
- (B) RE PM W/RET REQ TY I (W) 4" (BRK)(100 MIL)
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- (#) PROPOSED SIGN NUMBER
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- PROPOSED OBJECT MARKER
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- PROPOSED HMA
- PROPOSED CONCRETE

NOTES:

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NO.	REVISION	BY	DATE

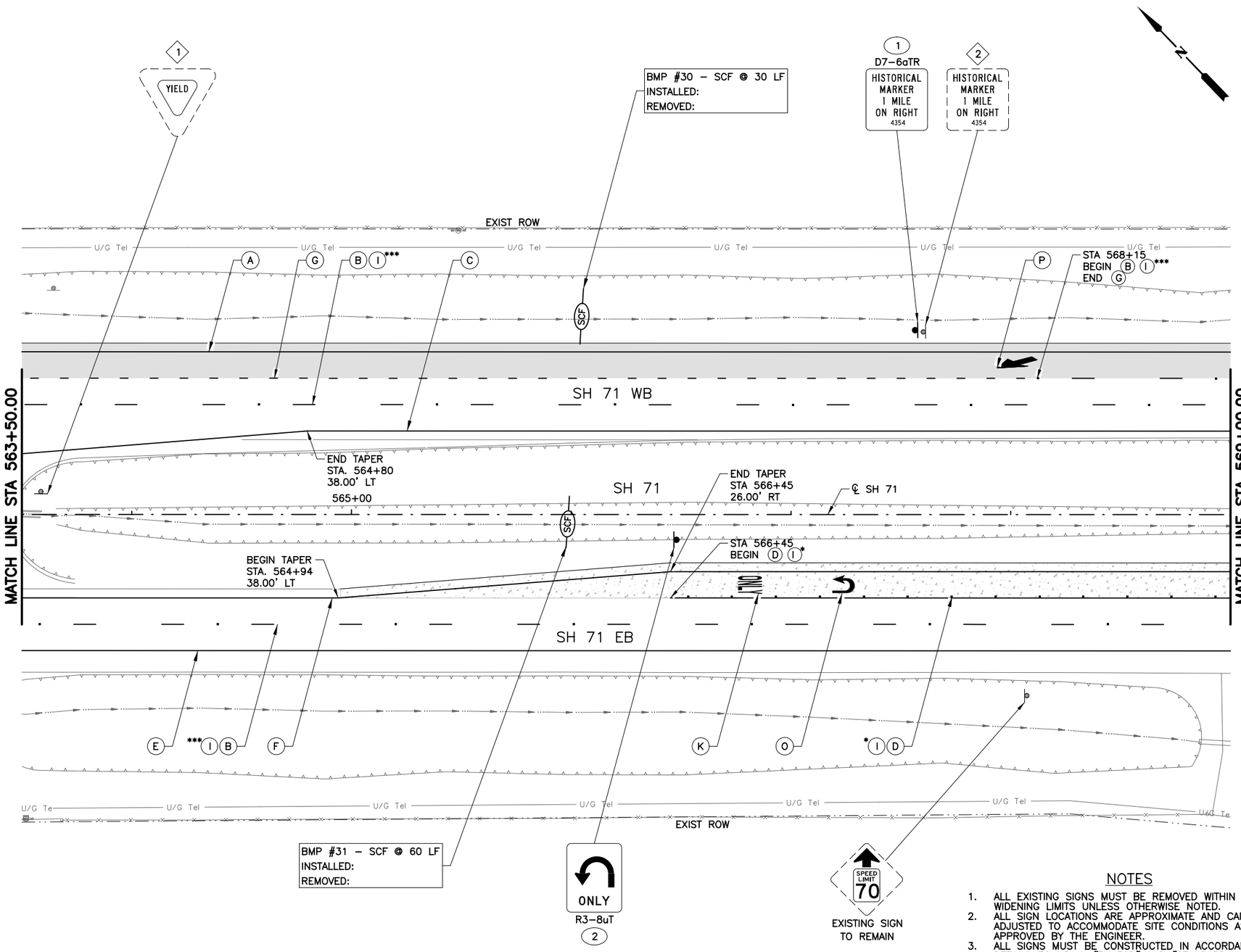
CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

SH 71

SIGNING, PAVEMENT MARKING AND SW3P LAYOUT
STA 558+00.00 TO STA 563+50.00

SHEET 15 OF 20

Designed:	YP	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	BAJ	6	TEXAS				SH 71
Drawn:	SW	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086	126



25 12.5 0 25 50
SCALE HORIZ. FEET

LEGEND

- (A) RE PM W/RET REQ TY I (W) 4" (SLD)(100 MIL)
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- FLOW DIRECTION
- PROPOSED HMA
- PROPOSED CONCRETE

NOTES:
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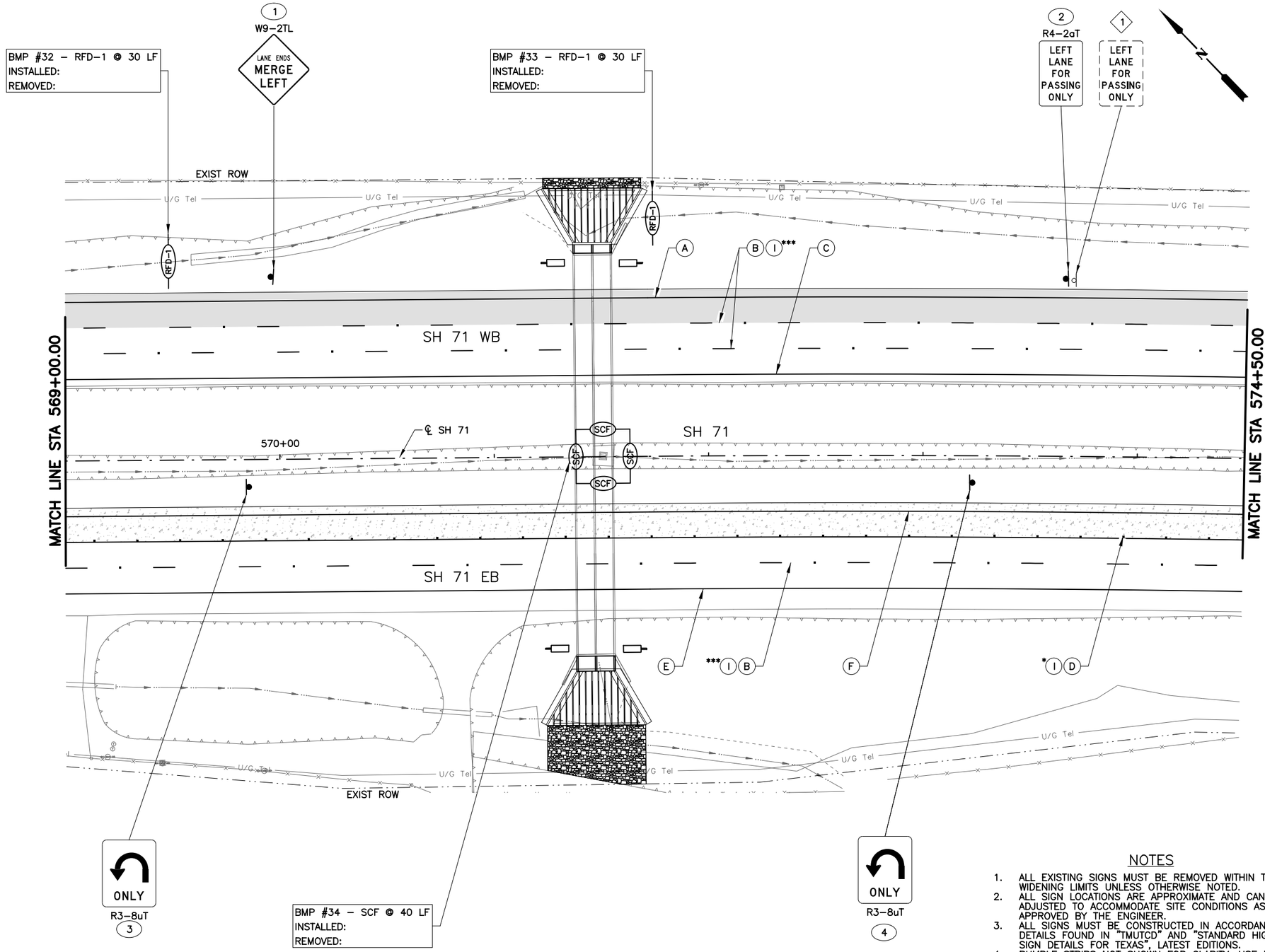
SH 71
SIGNING, PAVEMENT MARKING AND SW3P LAYOUT
STA 563+50.00 TO STA 569+00.00

SHEET 16 OF 20

Designed:	YP	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					SH 71
Drawn:	SW	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086		127



25 12.5 0 25 50
SCALE HORIZ. FEET

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STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED
PROFESSIONAL ENGINEER
03/24/2021

NO.	REVISION	BY	DATE

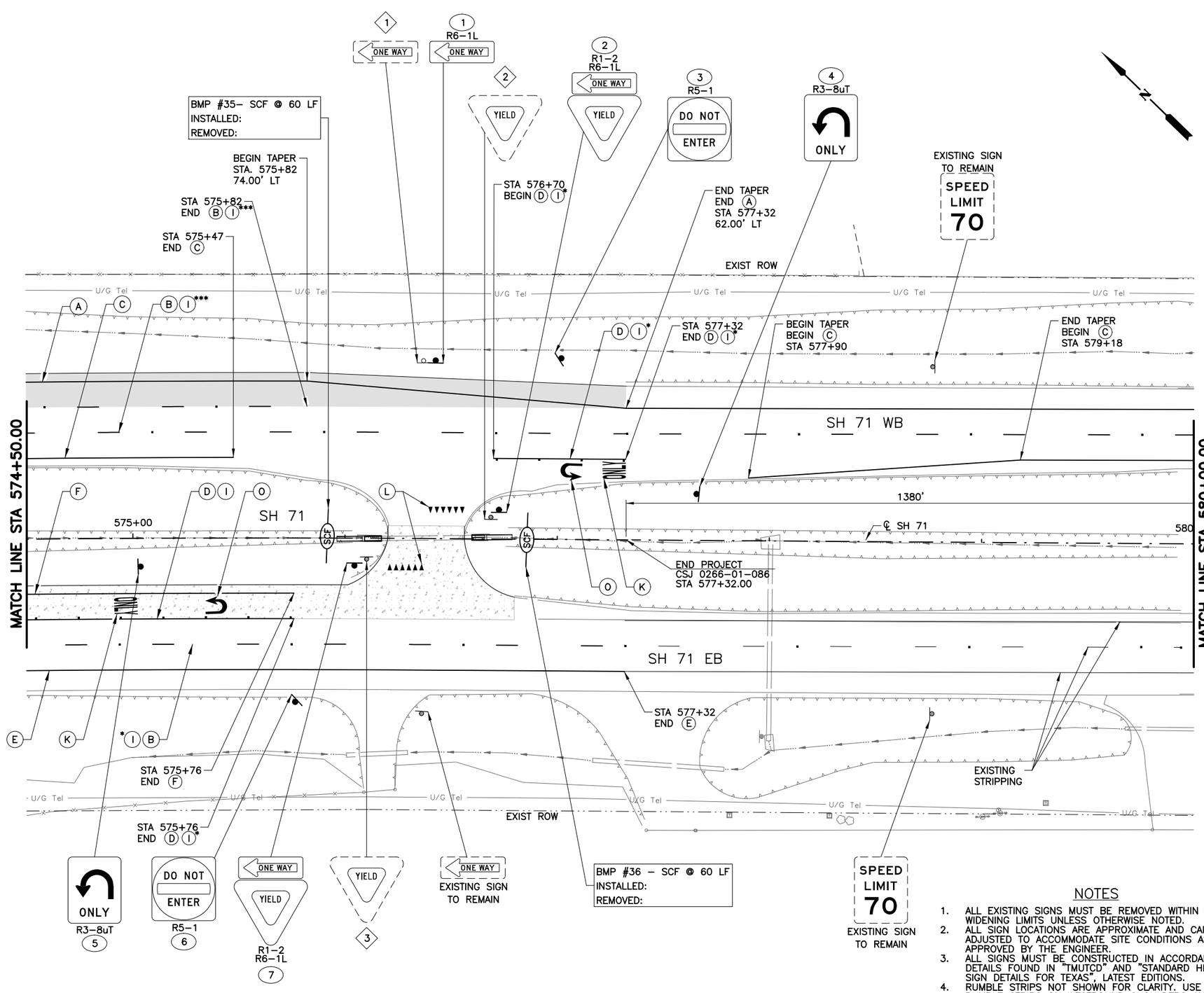
CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

 Texas Department of Transportation

SH 71
SIGNING, PAVEMENT MARKING AND SW3P LAYOUT
STA 569+00.00 TO STA 574+50.00

SHEET 17 OF 20

Designed:	YP	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					SH 71
Drawn:	SW	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086		128



25 12.5 0 25 50
SCALE HORIZ. FEET

LEGEND

- (A) RE PM W/RET REQ TY I (W) 4" (SLD)(100 MIL)
- (B) RE PM W/RET REQ TY I (W) 4" (BRK)(100 MIL)
- (C) RE PM W/RET REQ TY I (Y) 4" (SLD)(100 MIL)
- (D) RE PM W/RET REQ TY I (W) 8" (SLD)(100 MIL)
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- (J) PREFAB PAV MRK TY C (W) (ARROW)
- (K) PREFAB PAV MRK TY C (W) (WORD)
- (L) PREFAB PAV MRK TY C (W) (36")(YLD TRI)
- (M) LONG CHANNEL MOUNT CURB SYS
- (N) REFL PAV MRK TY I (W) 24" (SLD)
- (O) PREFAB PAV MRK TY C (W) (UTURN ARROW)
- (P) PREFAB PAV MRK TY C (W) (LNDP ARROW)
- PROPOSED SIGN
- (#) PROPOSED SIGN NUMBER
- (#) SIGN TO BE REMOVED
- PROPOSED OBJECT MARKER
- (SCF) SEDIMENT CONTROL FENCE
- (RFD) TYPE 1 ROCK FILTER DAM
- FLOW DIRECTION
- PROPOSED HMA
- PROPOSED CONCRETE

NOTES:
- * (I) AT 20' SPACING
- ** (I) AT 40' SPACING
- *** (I) AT 80' SPACING

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SHEET 18 OF 20

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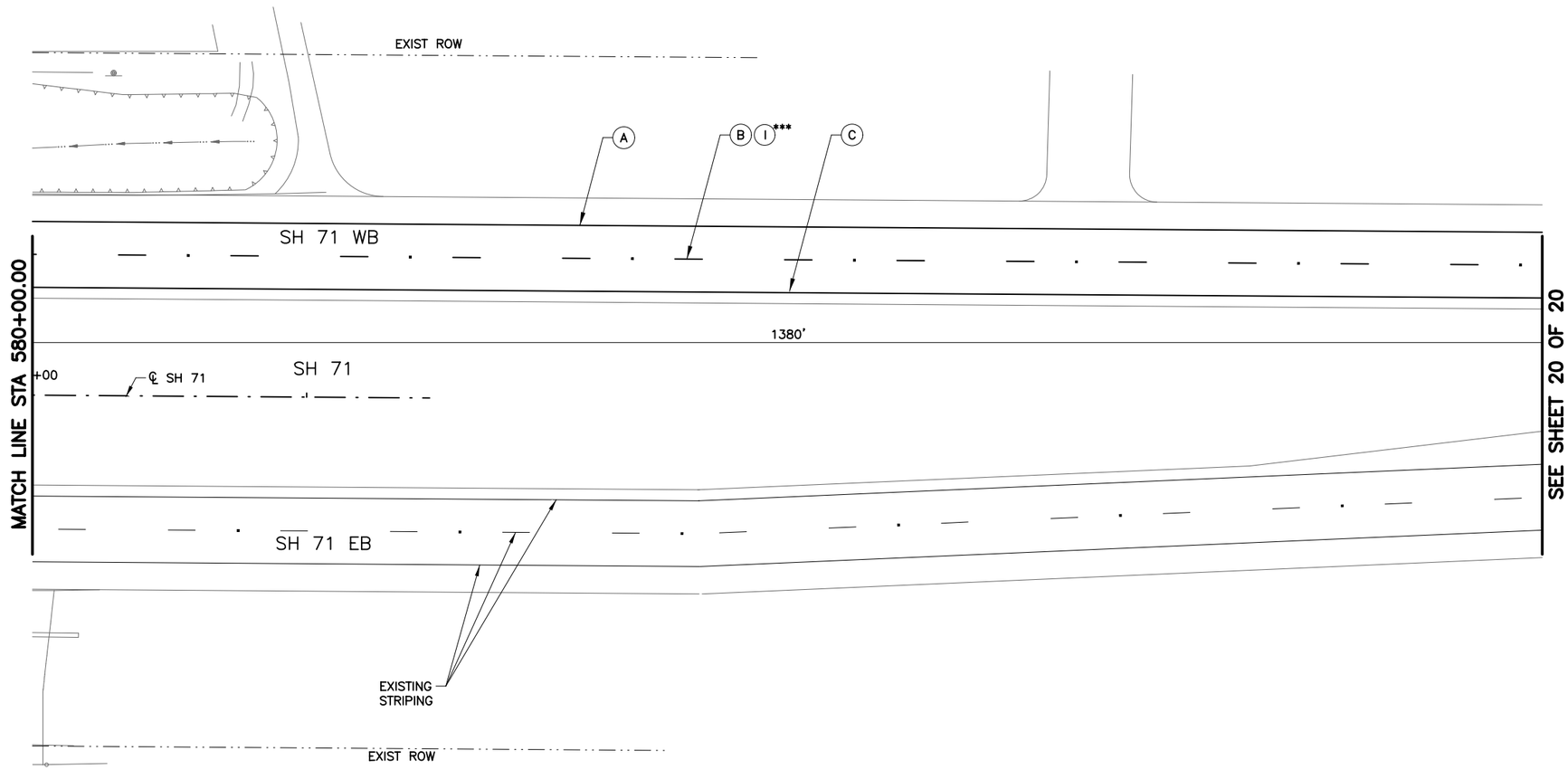
Checked:	BAJ	6	TEXAS					SH 71
Drawn:	SW	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086		129



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SCALE HORIZ. FEET

N

LEGEND

- (A) RE PM W/RET REQ TY I (W) 4" (SLD)(100 MIL)
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SH 71
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SHEET 19 OF 20

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Checked:	BAJ	YKM	FAYETTE	0266	01	086		130

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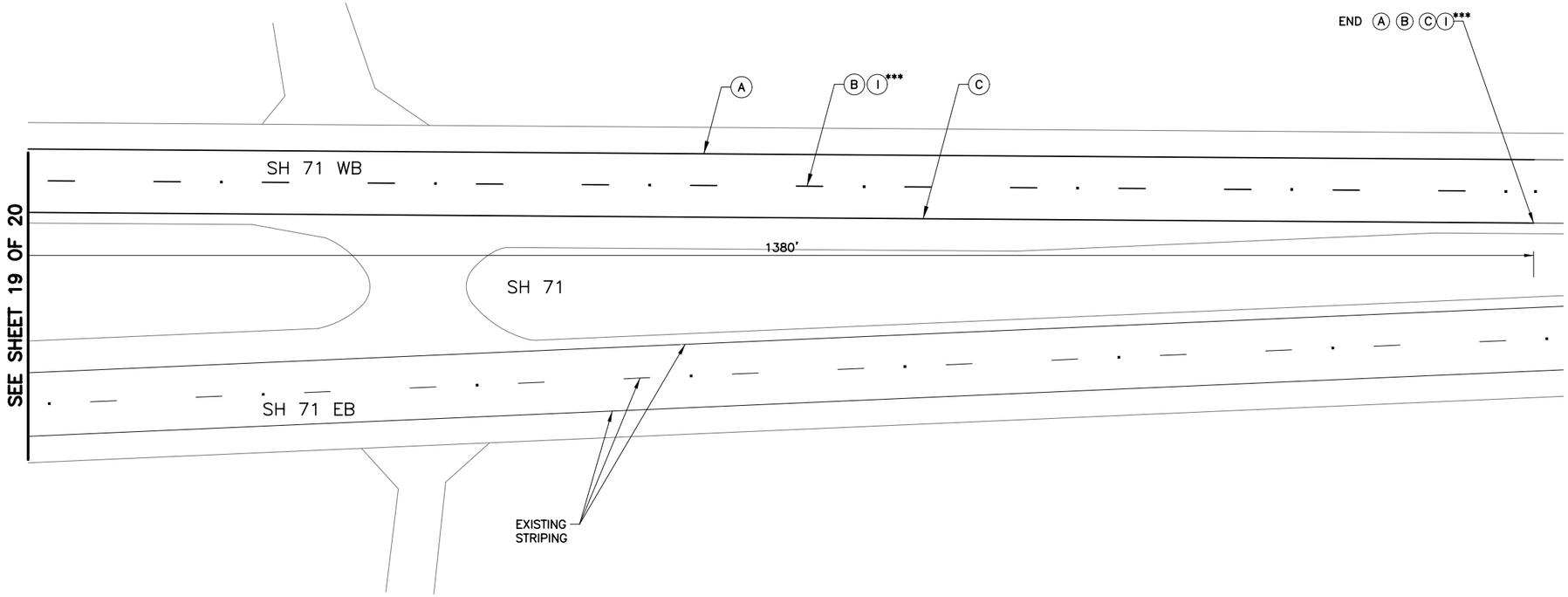

25 12.5 0 25 50

SCALE HORIZ. FEET

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SH 71
SIGNING, PAVEMENT MARKING AND SW3P LAYOUT

SHEET 20 OF 20

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Checked:	BAJ	6	TEXAS				SH 71
Drawn:	SW	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086	131

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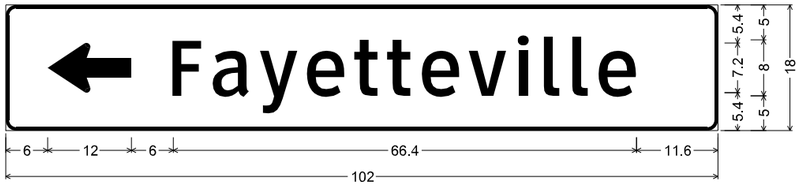
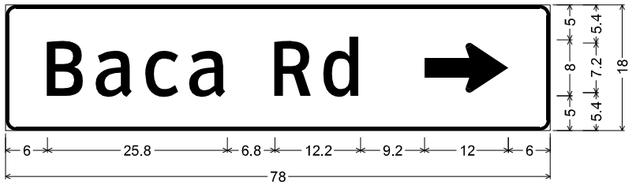


1.5" Radius, 0.5" Border, White on, Green;
Standard Arrow Custom 12.0" X 7.1" 180"; "Fayetteville", ClearviewHwy-3-W;
Table of letter and object lefts

←	F	a	y	e	t	t	e	v	i	l	l	e
6.0	24.0	29.7	36.4	43.3	49.9	54.6	59.7	66.4	73.3	77.2	81.3	85.0



1.5" Radius, 0.5" Border, White on, Green;
"Baca Rd", ClearviewHwy-3-W; Standard Arrow Custom 12.0" X 7.1" 0';
Table of letter and object lefts

B	a	c	a	R	d	→
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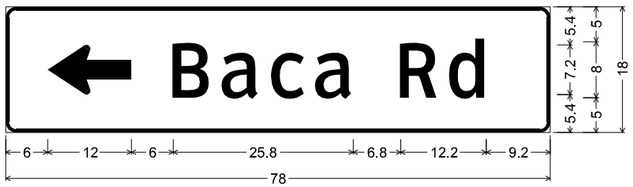

1.5" Radius, 0.5" Border, White on, Green;
Standard Arrow Custom 12.0" X 7.1" 180"; "Baca Rd", ClearviewHwy-3-W;
Table of letter and object lefts

←	B	a	c	a	R	d
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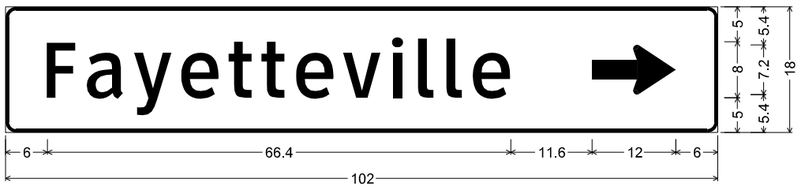

1.5" Radius, 0.5" Border, White on, Green;
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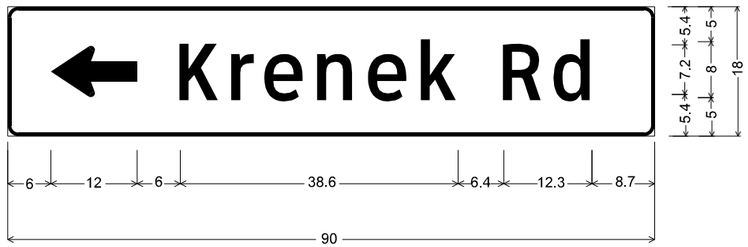
Table of letter and object lefts

F	a	y	e	t	t	e	v	i	l	l	e	→
6.0	11.7	18.4	25.3	31.9	36.6	41.7	48.4	55.3	59.2	63.3	67.0	84.0



1.5" Radius, 0.5" Border, White on, Green;
Standard Arrow Custom 12.0" X 7.1" 180";
"Krenek Rd", ClearviewHwy-3-W;
Table of letter and object lefts

←	K	r	e	n	e	k	R	d
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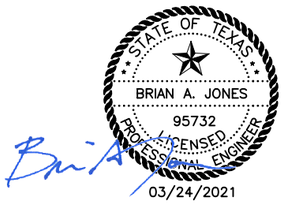

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

SH 71

SIGN DETAILS

SHEET 1 OF 1

Designed:	YP	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	BAJ	6	TEXAS				SH 71
Drawn:	YP	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	BAJ	YKM	FAYETTE	0266	01	086	132

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

DATE:
FILE:

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

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

List MS4 Operator(s) that may receive discharges from this project. They may need to be notified prior to construction activities.

1.

2.

☐ No Action Required ☒ Required Action

Action No.

1. Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000
2. Comply with the SW3P and revise when necessary to control pollution or required by the Engineer.
3. Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and TCEQ, EPA or other inspectors.
4. When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, submit NOI to TCEQ and the Engineer.

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

USACE Permit required for filling, dredging, excavating or other work in any water bodies, rivers, creeks, streams, wetlands or wet areas.

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

☒ No Permit Required

☐ Nationwide Permit 14 - PCN not Required (less than 1/10th acre waters or wetlands affected)

☐ Nationwide Permit 14 - PCN Required (1/10 to <1/2 acre, 1/3 in tidal waters)

☐ Individual 404 Permit Required

☐ Other Nationwide Permit Required: NWP# _____

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

1.

2.

3.

4.

The elevation of the ordinary high water marks of any areas requiring work to be performed in the waters of the US requiring the use of a nationwide permit can be found on the Bridge Layouts.

Best Management Practices:

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

III. CULTURAL RESOURCES

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

☒ No Action Required ☐ Required Action

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

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

☒ No Action Required ☐ Required Action

BIRD BMPs

1. Prior to construction, perform daytime surveys for nestsincluding 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.

VI. GENERAL NOTES

THE DEPARTMENT HAS DETERMINED THAT A USACE NATIONWIDE OR INDIVIDUAL PERMIT IS NOT NECESSARY FOR THE PROJECT SINCE ALL WORK SHALL BE CONDUCTED OUTSIDE THE USACE JURISDICTIONAL AREAS. ANY IMPACTS TO THESE JURISDICTIONAL AREAS BY THE CONTRACTOR WITHOUT A USACE PERMIT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR. IF THE CONTRACTOR DEEMS IT NECESSARY TO IMPACT THE USACE JURISDICTIONAL AREAS, THEN IT BECOMES THE CONTRACTOR'S ENTIRE RESPONSIBILITY TO CONSULT WITH THE USACE PERTAINING TO THE NEED FOR A NATIONWIDE OR INDIVIDUAL PERMIT. TXDOT WILL THEN HOLD THE CONTRACTOR RESPONSIBLE FOR FOLLOWING ALL CONDITIONS OF THE APPROVED PERMIT.

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

VII. 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.

VIII. 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.	0266	01	086	SH 71
	DIST	COUNTY		SHEET NO.
	YKM	COLORADO		133

SITE DESCRIPTION

PROJECT LIMITS: *SH 71 from 0.3 Miles North of FM 955 to 1.2 Miles South of FM 955.*

PROJECT DESCRIPTION: *For the Construction of Add Accelerating and Decelerating Lanes Consisting of Grading, Base, Surface and Sturctures.*

MAJOR SOIL DISTURBING ACTIVITIES: *Major soil disturbing activities may include but are not limited to: right-of-way preparation, cut and/or fill to improve roadway profile, final grading and placement of topsoil and the following: upgrading or replacing culverts.*

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: *Approximately 50.10 acres.*

TOTAL AREA TO BE DISTURBED: *Approximately 28.04 acres.*

EXISTING CONDITION OF SOIL & VEGETATIVE COVER AND % OF EXISTING VEGETATIVE COVER: *The existing soils are Latium Clay that is well drained, Wilson Clay Loam that is moderately well drained and Crockett loam that is moderately well drained. Vegetation is thick grass covering approximately 95% of the surface area.*

NAME OF RECEIVING WATERS: *All runoff associated with this project drains into Colorado River Below LaGrange Segment No. 1402.*

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
- [ ] 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
- [ ] VELOCITY CONTROL DEVICES
- [x] BIODEGRADABLE EROSION CONTROL LOGS

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" ditched. 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 shall be maintained in good working order. If a repair is necessary, it shall be performed before the next anticipated storm event but no later than 7 calendar days after the surrounding exposed ground has dried sufficiently to prevent further damage from equipment. If maintenance prior to the next anticipated storm event is impracticable, maintenance must be scheduled and accomplished as soon as practicable. Disturbed areas on which construction activities have ceased, temporarily or permanently, shall be stabilized within 14 calendar days unless they are scheduled to and do resume within 21 calendar days. The areas adjacent to creeks and drainageways shall have priority followed by protecting storm sewer inlets.*

INSPECTION: *For areas of the construction site that have not been finally stabilized, areas used for storage of materials, structural control measures, and locations where vehicles enter or exit the site, personnel provided by the permittee and familiar with the SW3P must inspect disturbed areas at least once every seven (7) calendar days. An Inspection and Maintenance Report shall be prepared for each inspection and the controls shall be revised on the SW3P within seven (7) calendar days following the inspection.*

WASTE MATERIALS: *All non-hazardous municipal waste materials such as litter, rubbish, trash and garbage located on or originating from the project shall be collected and stored in a securely lidded metal dumpster, provided by the Contractor. The dumpster shall be emptied as necessary or as required by local regulation and the trash shall be hauled to a permitted disposal facility. The burying of non-hazardous municipal waste on the project shall not be permitted. Construction material waste sites, stockpiles and haul roads shall be constructed to minimize and control the amount of sediment that may enter receiving waters. Construction material waste sites shall not be located in any wetland, water body or stream bed. Construction staging areas and vehicle maintenance areas shall be constructed in a manner to minimize the runoff of pollutants.*

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:

- [x] HAUL ROADS DAMPENED FOR DUST CONTROL
- [x] LOADED HAUL TRUCKS TO BE COVERED WITH TARPAULIN
- [ ] EXCESS DIRT ON ROAD REMOVED DAILY
- [ ] 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.

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED
PROFESSIONAL ENGINEER
03/24/2021

TxDOT STORM WATER POLLUTION PREVENTION PLAN (SW3P)

Texas Department of Transportation

Rev: 04/16/13

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			134
STATE	DIST.	COUNTY	
TEXAS	YKM	FAYETTE	
CONT.	SECT.	JOB	HIGHWAY NO.
0266	01	086	SH 71

ACC: 144.45.31.223 FILE US77kcsw3p.dgn 2/2006

LEVELS DISPLAYED

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

DATE:
FILE:

GENERAL NOTES FOR ALL ELECTRICAL WORK

1. The location of all conduits, junction boxes, ground boxes, and electrical services is diagrammatic and may be shifted to accommodate field conditions.

2. Provide new and unused materials. Ensure that all materials and installations comply with the applicable articles of the National Electrical Code (NEC), TxDOT standards and specifications, National Electrical Manufacturers Association (NEMA), and are listed by Underwriters Laboratories (UL) or a Nationally Recognized Testing Lab (NRTL). NRTLs such as Canadian Standard Association (CSA), Intertek Testing Services NA Inc., or FM Approvals LLC can be considered equivalent to UL. Where reference is made to NEMA listed devices, International Electrotechnical Commission (IEC) listed devices will not be considered an acceptable equal to a NEMA listed device. Acceptable devices may have both a NEMA and IEC listing. Faulty fabrication or poor workmanship in any material, equipment, or installation is justification for rejection. Replace or reinstall rejected material or equipment at no additional cost to the Department.

3. Miscellaneous nuts, bolts and hardware, except for high strength bolts, may be stainless steel when plans specify galvanized, provided the bolt size is ½ in. or less in diameter.

4. Provide the following test equipment as required by the Engineer to confirm compliance with the contract and the NEC: voltmeter, ammeter, megohm meter (1000 volt DC), ground resistance tester, torque wrenches, and torque screwdrivers. Ensure all equipment has been properly calibrated within the last year. Provide calibration certification to the Engineer upon request. Operate test equipment during inspection as requested by the Engineer.

5. Install grounding as shown on the plans and in accordance with the NEC. Ensure all metallic conduits; metal poles; luminaires; and metal enclosures are bonded to the equipment grounding conductor. Provide stranded bare copper or green insulated grounding conductors. Ground rods, connectors, and bonding jumpers are subsidiary to the various bid items.

6. When required by the Engineer, notify the Department in writing of materials from the Material Producers List (MPL) intended for use on each project. Prequalified materials are listed on the MPL on TxDOT's website under "Roadway Illumination and Electrical Supplies." No substitutions will be allowed for materials on this list.

CONDUIT

A. MATERIALS

1. Provide conduit, junction boxes, fittings, and hardware as per TxDOT Departmental Material Specification (DMS) 11030 "Conduit" and Item 618 "Conduit" of TxDOT's "Standard Specifications For Construction And Maintenance Of Highways, Streets, And Bridges," latest edition. Provide conduits listed under Item 618 on the MPL under "Roadway Illumination and Electrical Supplies." Provide conduit types according to the descriptive code or as shown on the plans. Do not substitute other types of conduits for those shown. Provide liquidtight flexible metal conduit (LFMC) when flexible conduit is called for on galvanized steel rigid metallic conduit (RMC) systems. Provide liquidtight flexible nonmetallic conduit (LFNC) when flexible conduit is called for on polyvinyl chloride (PVC) systems.

2. Provide galvanized steel RMC for all exposed conduits, unless otherwise shown on the plans. Properly bond all metal conduits.

3. Unless otherwise shown on the plans, provide junction boxes with a minimum size as shown in the following table, which applies to the greatest number of conductors entering the box through one conduit with no more than four conduits per box. When a mixture of conductor sizes is present, count the conductors as if all are of the larger size. For situations not applicable to the table, size junction boxes in accordance with NEC.

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

4. Junction boxes with an internal volume of less than 100 cu. in. and supported by entering raceways must have threaded entries or hubs identified for the intended purpose and supported by connection of two or more rigid metal conduits. Secure conduit within 3 ft. of the enclosure or within 18 in. of the enclosure if all conduit entries are on the same side. Mechanically secure all junction boxes with an internal volume greater than 100 cu. inches.

5. Provide hot dipped galvanized cast iron or sand cast aluminum outlet boxes for junction boxes containing only 10 AWG or 12 AWG conductors. Do not use die cast aluminum boxes. Size outlet boxes according to the NEC.

6. Do not use intermediate metal conduit (IMC) or electrical metallic tubing (EMT) unless specifically required by the plan sheets. When EMT is called for, provide junction boxes made from galvanized steel sheeting, listed and approved for outdoor use, unless otherwise noted on the plans. Size all galvanized steel junction boxes in accordance with the NEC. Provide junction boxes for IMC conduit systems that meet the same requirements for junction boxes used with RMC systems.

7. Provide PVC junction boxes intended for outdoor use on PVC conduit systems, unless otherwise noted on the plans.

8. Provide PVC elbows in PVC conduit systems, unless otherwise shown on the plans. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the PVC conduit system. When galvanized steel RMC elbows are specifically called for in the plans and any portion of the RMC elbow is buried less than 18 in., ground the RMC elbow by means of a grounding bushing on a rigid metal extension. Grounding of the rigid metal elbow is not required if the entire RMC elbow is encased in a minimum of 2 in. of concrete. PVC extensions are allowed on these concrete encased rigid metal elbows. RMC or PVC elbows are subsidiary to various bid items.

9. When required, provide High-Density Polyethylene (HDPE) conduit with factory installed internal conductors according to Item 622 "Duct Cable." At the Contractor's request and with approval by the Engineer, substitute HDPE conduit with no conductors for bored schedule 40 or schedule 80 PVC conduit bid under Item 618. Ensure bored HDPE substituted for PVC is schedule 40 and of the same size PVC called for in the plans. Ensure the substituted HDPE meets the requirements of Item 622, except that the conduit is supplied without factory-installed conductors. Make the transition of the HDPE conduit to PVC (or RMC elbow when required) at the bore pit. Provide conduit of the size and schedule as shown on the plans. Do not extend substituted conduit into ground boxes or foundations. Provide PVC or galvanized steel RMC elbows as called for at all ground boxes and foundations.

10. Use two-hole straps when supporting 2 in. and larger conduits. On electrical service poles, properly sized stainless steel or hot dipped galvanized one-hole standoff straps are allowed on the service riser conduit.

B. CONSTRUCTION METHODS

1. Provide and install expansion joint conduit fittings on all structure-mounted conduits at the structure's expansion joints to allow for movement of the conduit. In addition, provide and install expansion joint fittings on all continuous runs of galvanized steel RMC conduit externally exposed on structures such as bridges at maximum intervals of 150 ft. When requested by the project Engineer, supply manufacturer's specification sheet for expansion joint conduit fittings. Repair or replace expansion joint fittings that do not allow for movement at no additional cost to the Department. Provide the method of determining the amount of expansion to the Engineer upon request. Do not use LFMC or LFNC as a substitute for the required expansion conduit fittings.

2. Space all conduit supports at maximum intervals of 5 ft. Install conduit spacers when attaching metal conduit to surface of concrete structures. See "Conduit Mounting Options" on ED(2). Install conduit support within 3 ft. of all enclosures and conduit terminations.

3. Do not attach conduit supports directly to pre-stressed concrete beams except as shown specifically in the plans or as approved by the Engineer.

4. Unless otherwise shown on the plans, jack or bore conduit placed beneath existing roadways, driveways, sidewalks, or after the base or surfacing operation has begun. Backfill and compact the bore pits below the conduit per Item 476 "Jacking, Boring, or Tunneling Pipe or Box" prior to installing conduit or duct cable to prevent bending of the connections.

5. When placing conduit in the sub-grade of new roadways, backfill all trenches with excavated material unless otherwise noted on the plans. When placing conduit in the sub-base of new roadways, backfill all trenches with cement-stabilized base as per requirements of Items 110 "Excavation", 400 "Excavation and Backfill for Structures", 401 "Flowable Backfill", 402 "Trench Excavation Protection", and 403 "Temporary Special Shoring."

6. Provide and place warning tape approximately 10 in. above all trenched conduit as per Item 618.

7. During construction, temporarily cap or plug open ends of all conduit and raceways immediately after installation to prevent entry of dirt, debris and animals. Temporary caps constructed of durable duct tape are allowed. Tightly fix the tape to the conduit opening. Clean out the conduit and prove it clear in accordance with Item 618 prior to installing any conductors.

8. Ensure conduit entry into the top of any enclosure is waterproof by installing conduit sealing hubs or using boxes with threaded bosses. This includes surface mounted safety switches, meter cans, service enclosures, auxiliary enclosures and junction boxes. Grounding bushings on water tight sealing hubs are not required.

9. Fit the ends of all PVC conduit terminations with bushings or bell end fittings. Provide and install a grounding type bushing on all metal conduit terminations.

10. Install a bonding jumper from each grounding bushing to the nearest ground rod, grounding lug, or equipment grounding conductor. Ensure all bonding jumpers are the same size as the equipment grounding conductor. Bonding of conduit used as a casing under roadways for duct cable is not required, if the duct extends the full length through the casing.

11. At all electrical services, install a 6 AWG solid copper grounding electrode conductor.

12. Place conduits entering ground boxes so that the conduit openings are between 3 in. and 6 in. from the bottom of the box. See the ground box detail on sheet ED(4).

13. Seal ends of all conduits with duct seal, expandable foam, or by other methods approved by the Engineer. Seal conduit immediately after completion of conductor installation and pull tests. Do not use duct tape as a permanent conduit sealant. Do not use silicone caulk as a conduit sealant.

14. File smooth the cut ends of all mounting strut and conduit. Before installing, paint the field cut ends of all mounting strut and RMC (threaded or non-threaded) with zinc rich paint (94% or more zinc content) to alleviate overspray. Use zinc rich paint to touch up galvanized material as allowed under Item 445 "Galvanizing." Do not paint non-galvanized material with a zinc rich paint as an alternative for materials required to be galvanized.

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS CONDUITS & NOTES

ED(1)-14

FILE:	ed1-14.dgn	DN:	CK:	DW:	CK:
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	REVISIONS	0266	01	086	SH 71
		DIST	COUNTY		SHEET NO.
		YKM	FAYETTE		135

ELECTRICAL CONDUCTORS

A. MATERIAL INFORMATION

1. Provide Type XHHW insulated conductors in accordance with Departmental Material Specification (DMS)11040 "Conductors" and Item 620 "Electrical Conductors." Provide conductors as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies" Item 620. Color code insulated conductors in conformance with the NEC. Identify grounded (neutral) conductors with white insulation. Identify grounding conductors (ground wires) with green insulation or bare conductors. Identify ungrounded (hot) conductors with any color insulation except green, white, or gray. Keep color scheme consistent throughout the wiring system. Identify conductors 6 American Wire Gauge (AWG) and smaller by continuous color jacket. Identify electrical conductors 4 AWG and larger by continuous color jacket or by colored tape. When identifying conductors with colored tape, mark at least 6 in. of the conductor's insulation with half laps of tape.

2. Provide a solid copper 6 AWG grounding electrode conductor to bond the electrical service equipment to the concrete encased grounding electrode or the ground rod at the service location. Connect the grounding electrode conductor to the ground rod with a UL listed connector in accordance with DMS 11040. Connect the grounding electrode conductor to the concrete encased grounding electrode as shown in the plans.

3. Where two or more circuits are present in one conduit or enclosure, permanently identify the conductors of each branch circuit by attaching a non-metallic tag around both circuit conductors at each accessible location. Provide tags with two straps, large enough to indicate circuit number, letter, or other identification as shown in the plans. Print circuit identification on the tag with a permanent marker.

4. Use listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors for splicing as specified in DMS 11040. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Provide UL listed gel-filled insulating splice covers. Splicing materials, insulating materials, breakaway disconnects, splice covers, and fuse holders are subsidiary to various bid items.

B. CONSTRUCTION METHODS

1. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the conduit system. After installing conductors in conduit, perform conductor pull test. If a conductor cannot be freely pulled, make any needed alterations or repairs at no additional cost to the department. Perform insulation resistance tests in accordance with Item 620. Coordinate with the Engineer to witness the tests.

2. Leave 2 ft. minimum, 3 ft. maximum length for each conductor up to the splice in ground boxes. Leave 3 ft. minimum, 4 ft. maximum length of conductor in ground boxes when pulled through with no splice. Leave 1 ft. minimum, 1.5 ft. maximum length of conductor at enclosures, weatherheads and pole bases.

3. Make splices only in junction boxes, ground boxes, pole bases, or electrical enclosures and use only listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors. Insulate splices with heavy wall heat shrink tubing or gel-filled insulating splice covers to provide a watertight splice. Overlap conductor insulation with heat shrink tubing a minimum of 2 in. past both sides of the splice. Where heat shrink tubing may not shrink sufficiently to provide a watertight seal around the individual conductors, prior to heating the tubing, increase the diameter of the conductor insulation using hot melt adhesive tape to provide a watertight seal between the individual conductors and the heat shrink tubing. Ensure the tape extends past the heat shrink tubing. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Heat shrink tubing that appears to have been burned, or overheated, is considered defective and must be replaced.

4. Size and install gel-filled insulating splice covers according to manufacturer's specifications when used in place of heat shrink tubing.

5. Wire nuts with factory applied waterproof sealant may be used for 8 AWG or smaller conductors in above ground junction boxes, but not in pole bases or ground boxes. Install wire nuts in an upright position to prevent the accumulation of water.

6. Support conductors in illumination poles with a J-hook at the top of the pole.

7. When terminating conductors, remove the insulation and jacketing material without nicking the individual strands of the conductor. Conductors with nicked individual conductor strands or removed strands will be considered damaged.

8. Replace conductors and cables that are damaged beyond repair or that fail an insulation resistance test at no additional cost to the department.

9. Do not repair damaged conductors with duct tape, electrical tape, or wire nuts. Use only approved splicing methods.

10. Do not terminate more than one conductor under a single connector, unless the connector is rated for multiple conductors. Do not exceed the pressure connector's listing for maximum number and size of conductors allowed.

11. Install breakaway connectors on conductors bid under Item 620 whenever those conductors pass through a breakaway support device. Follow manufacturer's instructions when terminating conductors to breakaway connectors. Properly torque threaded connections. Proper terminations are critical to the safe operation of breakaway devices. Trim waterproofing boots on breakaway connectors to fit snugly around the conductor to ensure waterproof connection. Only one conductor may enter a single opening in a boot. Provide waterproof boots with the correct number of openings. Leave unused openings factory sealed. Use prequalified breakaway connectors as shown on the MPL.

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

C. TEMPORARY WIRING

1. Install temporary conductors and electrical equipment in accordance with the NEC article "Temporary Installations" and Department standard sheets.

2. Provide a ground fault circuit interrupter (GFCI) for power outlets for portable electrical equipment, power tools, ice machines, ice storage bins and refrigerators located outdoors at grade. GFCI may be any one of the following: molded cord and plug set, receptacle, or circuit breaker type.

3. Use listed wire nuts with factory applied sealant for temporary wiring where approved.

4. Enclose conductor splices within a listed enclosure or ground box, or ensure the splices are more than 10 ft. above grade vertically and more than 5 ft. horizontally from any metal structure. Where installing temporary conductors in areas subject to vehicle traffic or mobile construction equipment, ensure the vertical clearance to ground is at least 18 ft. when measured at the lowest point. Ground messenger wires that support power conductors in conformance with the NEC.

5. Protect and when necessary repair any existing electrical conduits uncovered during the construction process in a timely manner and in conformance with the NEC.

GROUND RODS & GROUNDING ELECTRODES

A. MATERIAL INFORMATION

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

B. CONSTRUCTION METHODS

1. Furnish auxiliary ground rods for lightning protection and install in soil, concrete, or both, as called for in the plans. For ground rods installed in concrete, ensure the connection of the conductor to the ground rod is readily accessible for inspection or repairs. For ground rods installed in soil, ensure that the upper end is between 2 to 4 in. below finished grade.

2. Do not place ground rods in the same drilled hole as a timber pole.

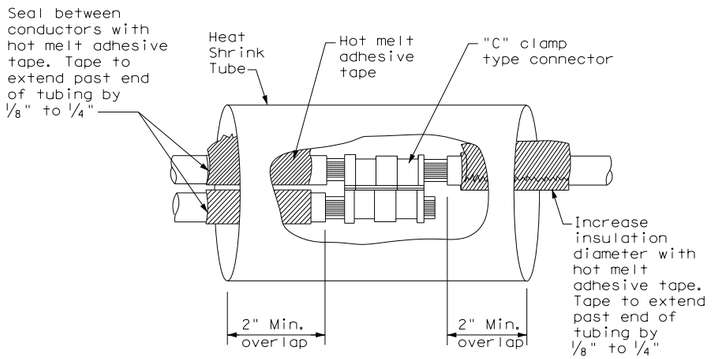
3. Install ground rods so the imprinted part number is at the upper end of the rod.

4. Remove all non-conductive coatings such as concrete splatter from the rod at the clamp location.

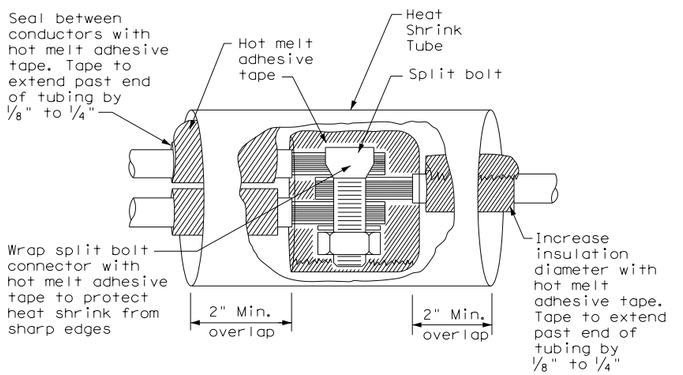
5. Route all conductors as short and straight as possible for connection to lightning protection ground rods. When a bend is required, ensure a minimum radius bend of four inches for these conductors.

6. Unless otherwise called for in the plans, protect grounding electrode conductors with non-metallic conduit. When protecting grounding electrode conductors with metal conduit, provide and install a grounding type bushing and properly sized bonding jumper on each end of the metal conduit.

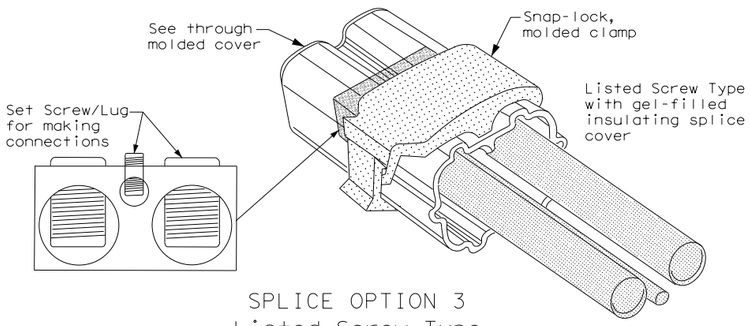
7. Written authorization is required before installing a ground rod in a horizontal trench for rocky soil or a solid rock bottom.



SPLICE OPTION 1
Compression Type



SPLICE OPTION 2
Split Bolt Type



SPLICE OPTION 3
Listed Screw Type

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS CONDUCTORS

ED(3)-14

FILE:	ed3-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS		0266	01	086	SH 71
		DIST	COUNTY		SHEET NO.
		YKM	FAYETTE		136

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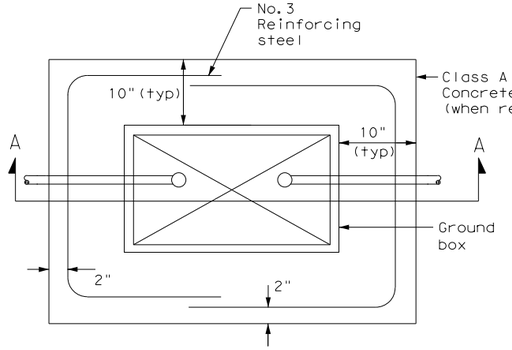
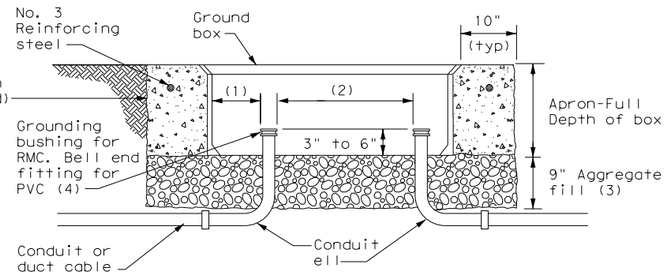


PLAN VIEW



SECTION A - A

APRON FOR GROUND BOX

(1) Uniformly space ends of conduits within the ground box. Position ends of conduits so that ground box walls do not interfere with the installation of grounding bushings or bell end fittings.

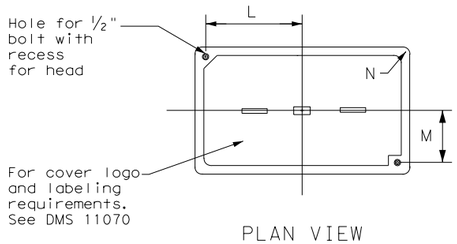
(2) Maintain sufficient space between conduits to allow for proper installation of bushing.

(3) Place aggregate under the box, not in the box. Aggregate should not encroach on the interior volume of the box.

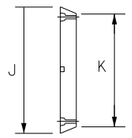
(4) Install a grounding bushing on the upper end of all RMC terminating in a ground box. Ground RMC elbows when any part of the elbow is less than 18 in. below the bottom of the ground box. Install a PVC bushing or bell end fitting on the upper end of all PVC conduits terminating in a ground box.

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

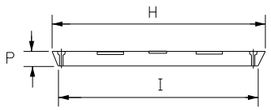
GROUND BOX COVER DIMENSIONS								
TYPE	DIMENSIONS (INCHES)							
	H	I	J	K	L	M	N	P
A, B & E	23 1/4	23	13 3/4	13 1/2	9 7/8	5 1/8	1 3/8	2
C & D	30 1/2	30 1/4	17 1/2	17 1/4	13 1/4	6 3/4	1 3/8	2



PLAN VIEW



END



SIDE

GROUND BOX COVER

GROUND BOXES

A. MATERIALS

1. Provide polymer concrete ground boxes measuring 16x30x24 in. (WxLxD) or smaller in accordance with Departmental Material Specification (DMS) 11070 "Ground Boxes" and Item 624 "Ground Boxes."

2. Provide Type A, B, C, D, and E ground boxes as shown in the plans, and as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," Item 624.

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

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

B. CONSTRUCTION METHODS

1. Remove all gravel and dirt from conduit. Cap all conduits prior to placing aggregate and setting ground box. Provide Grade 3 or 4 coarse aggregate as shown on Table 2 of Item 302 "Aggregates for Surface Treatments." Ensure aggregate bed is in place and at least 9 inches deep, prior to setting the ground box. Install ground box on top of aggregate.

2. Cast ground box aprons in place. Reinforcing steel may be field bent. Ensure the depth of concrete for the apron extends from finished grade to the top of the aggregate bed under the box. Ground box aprons, including concrete and reinforcing steel, are subsidiary to ground boxes when called for by descriptive code.

3. Keep bolt holes in the box clear of dirt. Bolt covers down when not working in ground boxes.

4. Install all conduits and ells in a neat and workmanlike manner. Uniformly space conduits so grounding bushings and bell end fittings can easily be installed.

5. Temporarily seal all conduits in the ground box until conductors are installed.

6. Permanently seal conduits immediately after the completion of conductor installation and pull tests. Permanently seal the ends of all conduits with duct seal, expandable foam, or other method as approved. Do not use duct tape as a permanent conduit sealant. Do not use silicone caulk as a sealant.

7. When a ground rod is present in a ground box, bond all equipment grounding conductors together and to the ground rod with listed connectors.

8. When a type B or D ground box is stacked to meet volume requirements, it is allowable to cut an appropriately sized hole for conduit entry in the side wall at least 18 inches below grade.

9. If an existing ground box in the contract has a metal cover, bond the cover to the equipment grounding conductor with a 3 ft. long stranded bonding jumper the same size as the grounding conductor. The bonding jumper is subsidiary to various bid items. Verify existing ground boxes with metal covers are shown on the plans, with notes fully describing the work required.

10. If other ground boxes with metal covers are within the project limits but are not part of the contract, the Engineer may direct the Contractor to bond the metal covers, identifying the specific boxes in writing. This work will be paid for separately.

11. Bond metal ground box covers to the grounding conductor with a tank ground type lug.

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS
GROUND BOXES

ED(4)-14

FILE: ed4-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
	CONT	SECT	JOB	HIGHWAY
REVISIONS	0266	01	086	SH 71
	DIST	COUNTY		SHEET NO.
	YKM	FAYETTE		137

71D

DATE:
FILE:

ROADWAY ILLUMINATION ASSEMBLY NOTES

1. Details apply to roadway lighting installations bid or referenced under Item 610, "Roadway Illumination Assemblies." Provide, furnish, and install all other materials not shown on the plans which may be necessary for complete and proper construction. Where manufacturers provide warranties or guarantees as a customary trade practice, furnish to the State such warranties or guarantees.

2. The locations of poles and fixtures may be shifted by the Engineer to accommodate local conditions. Install or remove poles and luminaires located near overhead electrical lines using established industry and utility safety practices and in accordance with laws governing such work. Consult with the appropriate utility company prior to beginning such work.

3. Provide new and unused materials. Ensure that all materials and installations comply with the applicable articles of the National Electrical Code (NEC),TxDOT standards and specifications, National Electrical Manufacturers Association (NEMA),and are listed by Underwriters Laboratories (UL) or a Nationally Recognized Testing Lab (NRTL). NRTLs such as Canadian Standard Association, Intertek Testing Services NA Inc., or FM Approvals LLC can be considered equivalent to UL. Faulty fabrication or poor workmanship in any material, equipment, or installation is justification for rejection.

4. Provide Roadway Illumination Light Fixtures as per TxDOT Departmental Material Specification (DMS) 11010, Item 610, and as shown on the Material Producers List (MPL) for Roadway Illumination and Electrical Supplies.

5. Fabricate steel roadway illumination poles in accordance with Roadway Illumination Poles (RIP) standards and Item 610. Poles fabricated according to RIP standards do not require shop drawing submittals.

   a. Alternate designs to RIP standards or the use of aluminum to fabricate poles will require the submission of shop drawings electronically. For instructions on submitting shop drawings electronically see "Guide to Electronic Shop Drawing Submittal" on the TxDOT web site.

   b. Limitations on use of the RIP standard: The RIP standard details were developed for installations in locations where the 3-second gust basic maximum wind speed is 110 mph, and where the elevation of the base of the pole is less than (i.e. not more than) 25′ above the elevation of the surrounding terrain, in accordance with the "AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals," 6th Edition (2013) of the AASHTO Design Specifications. For poles to be installed in regions where the maximum basic wind speed exceeds 110 mph or to be mounted more than 25′ above the surrounding terrain, provide poles meeting the following requirements:

      i. Submittals. Following the electronic shop drawing submittal process (see Guide to Electronic Shop Drawing Submittal on the TxDOT web site), submit to the Engineer for approval fabrication drawings and calculations for the poles, sealed by a Texas licensed professional engineer (P.E.).

      ii. Luminaire Structural Support Requirements. Provide light poles, arms, and anchor bolt assemblies with a 25 year design life to safely resist dead loads, ice loads and the required basic wind speeds at the location of installation in accordance with the 6th edition (2013) of the AASHTO Design Specifications. For transformer base poles, include transformer base and connecting hardware in calculations and shop drawing submittals. Structurally test all transformer bases to resist the theoretical plastic moment capacity of the pole. Submit certification of the plastic moment load test and FHWA breakaway requirement test of the model of base being furnished with the shop drawings. Show breakaway base model number, manufacturer's name, and logo on shop drawings. Include on manufacturer's shop drawings the ASTM designations for all materials to be used.

6. For both transformer and shoe-base type illumination poles, provide and install double-pole breakaway fuse holders as specified by DMS-11040. Breakaway fuse holders are listed on the MPL for Roadway Illumination and Electrical Supplies under Items 610 & 620. Provide 10 amp time delay fuses for breakaway connectors in light poles, or inside the light fixture for underpass luminaires. In each pole, connect luminaires to the breakaway connector with continuous stranded 12 AWG copper conductors as listed on the MPL. Bond all equipment grounding conductors together and to the ground lug in the transformer base or hand hole.

7. Tighten anchor bolts for shoe base, concrete traffic barrier base, and bridge mount roadway illumination poles, in accordance with Item 449.

8. Install T-Base with following procedure:

   a. Anchor Bolt Tightening.

      i. Coat the threads of the anchor bolts with electrically conductive lubricant.

      ii. Place the T-base over the anchor bolts. Foundation must be level and flat. The maximum permissible gap under any one corner of the t-base is 1/8" before nuts are tightened.

      iii. Coat the bearing surfaces of the nuts and washers with electrically conductive lubricant. Install (1) 1/2" hold down washer, (1) lock washer, and (1) nut on each anchor bolt. Turn the nuts onto the bolts so that each is hand-tight against the washer.

      iv. Using a torque wrench, tighten each nut to 150 ft-lb. Uniform contact is required between the foundation and the T-base in the corner regions of the T-base, and all corner gaps must be closed after applying torque. If a gap still exists after torquing to 150 ft-lbs, continue torquing each bolt incrementally until gap is closed or maximum allowable torque of 250 ft. pound is reached, whichever comes first. If 250 ft-lbs is not enough to close the gap the foundation must be leveled. Gaps along the straight sides of the T-bases and the foundation are permissible. Ensure that no high point of contact occurs between the straight sides of the T-base and the foundation.

      v. Check top of T-base for level. If not level then foundation must be leveled.

   b. Top Bolt Procedure

      i. Erect pole over T-base with crane. Coat bolts, nuts, washers, and lock washers with electrically conductive lubricant.

      ii. Install bolts and 1/2" connecting washers from the inside of the T-base, thread up through the pole base. Install flat washers, lock washers and nuts snug tight according to Item 447, "Structural Bolting."

      iii. Tighten each nut to 150 ft-lb. using a torque wrench.

   c. Level and Plumb

      i. Ensure pole is plumb and mast arm is perpendicular to the roadway according to plans to within 5 degrees.

9. Construct luminaire pole foundations in accordance with Item 416, "Drilled Shaft Foundations," and TxDOT standard sheet RID(2).

10. Provide and install underpass luminaires in accordance with Item 610, DMS-11010, and TxDOT standard sheet RID(3). Typical luminaire size for underpass luminaires is 150W HPS or 150W EQ LED.

11. Mount luminaires on arms level as shown by the luminaire level indicator.

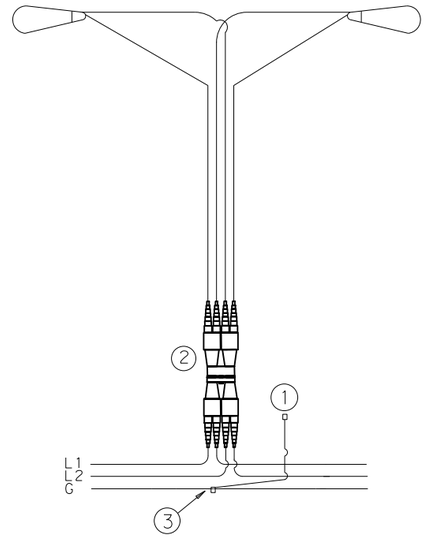
12. Orient luminaires perpendicular to the roadway intended to be lit unless otherwise shown on the plans.

Wiring Diagram Notes:

(1) Use 1/2 in.-13 UNC threaded, copper or tin-plated copper, pole bonding connector, sized appropriately for conductors, bonded to T-base, or use ground lug in handhole as available.

(2) Use pre-qualified two-pole breakaway connectors for all luminaire pole installations. For luminaires fed by a circuit with a neutral conductor, use double pole breakaway connectors with the neutral side unfused and marked white.

(3) Split Bolt or other connector.



L1,L2 = Hot Conductors
G = Grounding Conductor

TYPICAL WIRING DIAGRAM

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

Decorative LED Lighting Notes:

1. LED Drivers in Remote Outdoor enclosures (for drivers that do not include an enclosure as part of a factory assembly):

   a. Provide NEMA 3R outdoor enclosure or as approved.

   b. Install enclosure at least 12" above ground or other horizontal surface. Mount vertically or on ceiling, and avoid direct sun where possible.

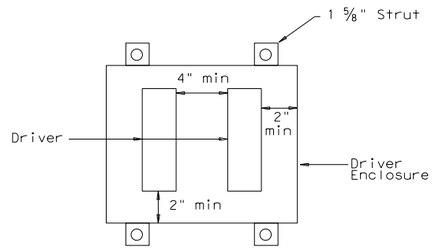
   c. Install drivers with at least 2 inches of space from enclosure walls.

   d. For multiple drivers in an enclosure, provide at least 4 inches side to side and 1 inch end to end from other drivers or electronic equipment

   e. For drivers mounted on back wall of enclosure, mount enclosure on 1 5/8" strut or other standoff to dissipate heat, or mount driver to side of the enclosure or to the metal cover.

   f. Provide remote drivers with a maximum of 100 watts

   g. Provide drivers with documentation of 100,000 hr lifetime at Tcase of 65C or higher.



Driver Spacing In Remote Enclosure

Texas Department of Transportation

Traffic Safety Division Standard

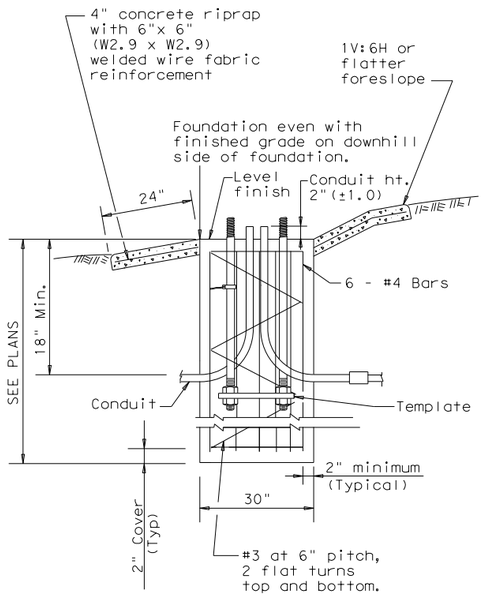
ROADWAY ILLUMINATION DETAILS

RID(1)-20

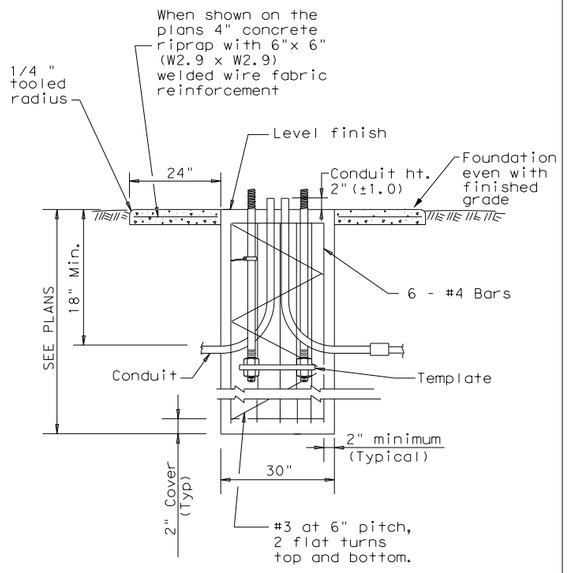
FILE: rid1-20.dgn	DN:	CK:	DW:	CK:
© TxDOT January 2007	CONT	SECT	JOB	HIGHWAY
REVISIONS	0266	01	086	SH 71
7-17	DIST	COUNTY		SHEET NO.
12-20	YKM	FAYETTE		138

72A

DATE:
FILE:



SECTION A-A
SHOWING SLOPED GRADE



SECTION A-A
SHOWING CONSTANT GRADE

TABLE 1

ANCHOR BOLTS

POLE MOUNTING HEIGHT	BOLT CIRCLE		ANCHOR BOLT SIZE
	Shoe Base	T-Base	
<40 ft.	13 in.	14 in.	1in. x 30in.
40-50 ft.	15 in.	17 ¼in.	1 ¼in. x 30in.

TABLE 2

RECOMMENDED FOUNDATION LENGTHS (See note 1)

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

TABLE 3

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

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

GENERAL NOTES:

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

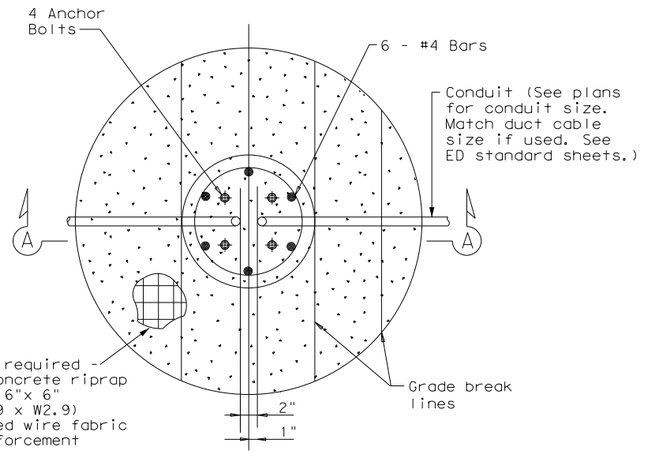
TABLE 4

BREAKAWAY POLE PLACEMENT (See note 6)

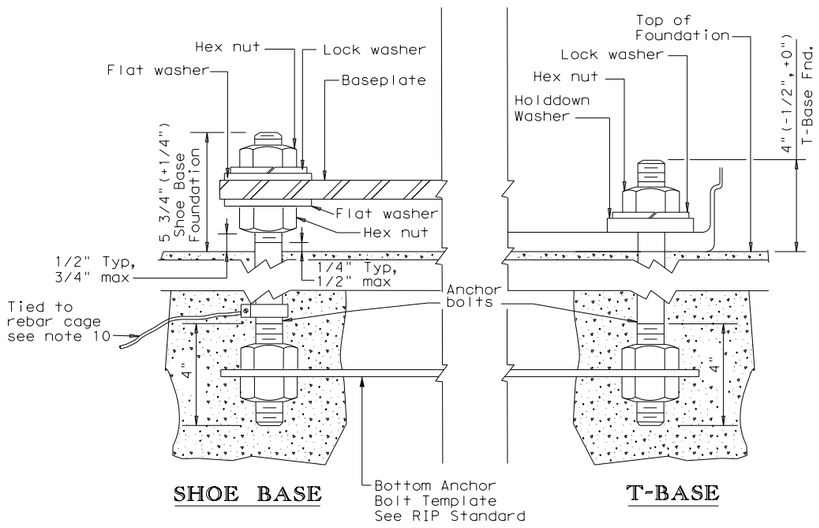
ROADWAY FUNCTIONAL CLASSIFICATION	** POLE OFFSET (DISTANCE TO FACE OF TRANSFORMER BASE)
Freeway Mainlanes (roadway with full control of access)	15 ft. (minimum and typical) from lane edge
All curbed, 45 mph or less design speed	2.5 ft. minimum (15 ft. desirable) from curb face
All others	10 ft. minimum*(15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

* or as close to ROW line as is practical

** provide 2/5 of the luminaire mounting height behind the pole for "falling area" to prevent encroachment on the other travel lanes. See design guidelines.



FOUNDATION DETAIL



ANCHOR BOLT DETAIL

Texas Department of Transportation

Traffic Safety Division Standard

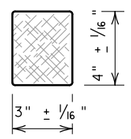
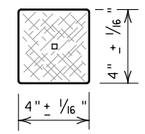
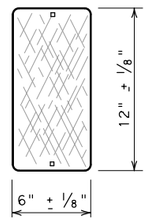
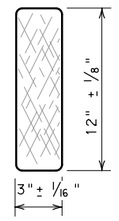
ROADWAY ILLUMINATION DETAILS
(RDWY ILLUM FOUNDATIONS)

RID(2)-20

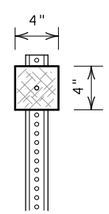
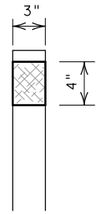
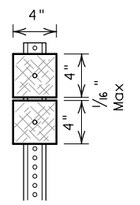
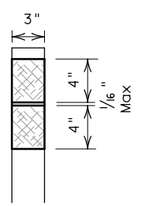
FILE: rid2-20.dgn	DN:	CK:	DW:	CK:
© TxDOT January 2007	CONT	SECT	JOB	HIGHWAY
REVISIONS	0266	01	086	SH 71
1-11	DIST	COUNTY		SHEET NO.
7-17	YKM	FAYETTE		139
12-20				

72B

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

TYPE OF MOUNT
GND = Embedded (drivable or set in concrete)
CTB = Concrete Barrier Mount
GF1 or GF2 = Guard Fence Attachment
SRF = Surface Mount

DIRECTION
If Required
BI = Bi-Directional
BR = Bi-Directional with red on back

INSTL OM ASSM (OM-XX) (XXXX)XXX(XX)

TYPE OF OBJECT MARKER
1, 2, 3, or 4

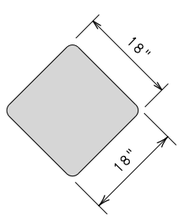
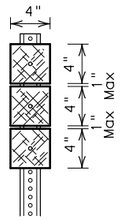
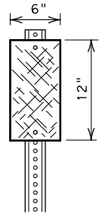
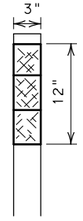
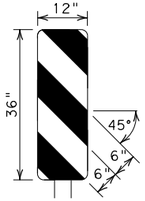
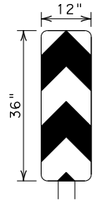
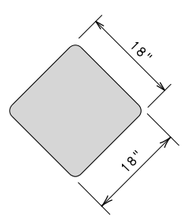
NUMBER OF REFLECTORS OR DIRECTION
X = 3-Size 2 reflector units (Type 2 only)
Y = 1-Size 3 reflector unit (Type 2 only)
Z = 3-Size 1 or 1-Size 4 reflector unit(s) (Type 2 only)
L = Left Side (Type 3 Object Marker only)
R = Right Side (Type 3 Object Marker only)
C = Center (Type 3 Object Marker only)

TYPE OF POST
WC = Wing Channel Post
WFLX = White Flexible Post
TWT = Thin Walled Tubing

TYPE OF MOUNT
GND = Embedded (drivable)
SRF = Surface Mount
WAS = Wedge Anchor Steel
WAP = Wedge Anchor Plastic

DIRECTION
If Required
BI = Bi-Directional

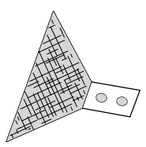
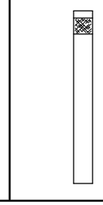
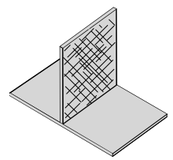
OBJECT MARKERS

	Type 1 (OM-1)	Type 2 (OM-2)			Type 3 (OM-3)			Type 4 (OM-4)
	OM-1	OM-2X	OM-2Y	OM-2Z	OM-3L	OM-3R	OM-3C	OM-4
DEVICE								
		3-Size 2 reflector units	1-Size 3 reflector unit	3-Size 1 reflector units or 1-Size 4 reflector unit				
SHEETING	Yellow-Type B_{FL} or C_{FL} Sheeting	Yellow - Type B or C Sheeting			Alternating acrylic black and retroflective yellow - Type B_{FL} or C_{FL} Sheeting			Red -Type B_{FL} or C_{FL} Sheeting
POST TYPE	TWT	WC	WC	WFLX	TWT			TWT
MOUNT TYPE	WAS, WAP	GND	GND	GND, SRF	WAS, WAP			WAS, WAP

DEPARTMENTAL MATERIAL SPECIFICATIONS

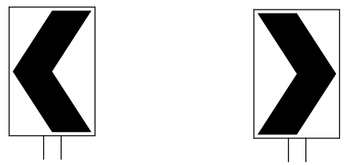
FLEXIBLE DELINEATOR & OBJECT MARKER POSTS (EMBEDDED & SURFACE MOUNT TYPES)	DMS-4400
SIGN FACE MATERIALS	DMS-8300
DELINEATORS, OBJECT MARKERS AND BARRIER REFLECTORS	DMS-8600

BARRIER REFLECTORS (BRF)

	GF1	GF2	CTB
DEVICE			
	1. Barrier reflectors shall meet the requirements of DMS 8600. 2. Approved Barrier Reflectors are listed on the "Barrier Reflectors" Material Producer List at: www.txdot.gov.		
SHEETING	Yellow, White, Red		
NOTE	1. Reflective sheeting shall have a minimum dimension of 3 inches and minimum surface area of 9 square inches.		

CHEVRONS

DEVICE



W1-8

SIZE (W x L)	18"x 24" (Conventional)	24"x 30" (Conventional Oversize)	30"x 36" (Expressway)	36" x 48" (Freeway)
MOUNTING HEIGHT	4'-0" or 7'-0"		7'-0" Only	

NOTE

1. CHEVRON (W1-8) signs and ONE DIRECTION LARGE ARROW (W1-6) Signs shall be installed per Sign Mounting Details (SMD) Standard Sheets and paid under Item 644 (Small Roadside Sign Assemblies).
2. When there is a need to increase conspicuity, the Texas version of the ONE DIRECTION LARGE ARROW sign (W1-9T) may be used instead of the ONE DIRECTION LARGE ARROW (W1-6).

ONE DIRECTION LARGE ARROW

DEVICE

W1-6

SIZE (W x L)	48" x 24" (Conventional)	60" x 30" (Expressway & Freeway)
MOUNTING HEIGHT	7'-0"	

NOTE:

Delineator and object marker substrates and sign substrates shall be 0.080" Aluminum sign blank to conform to ASTM B-209 Alloy 6061-T6 or approved alternative.

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DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

D & OM(1)-20

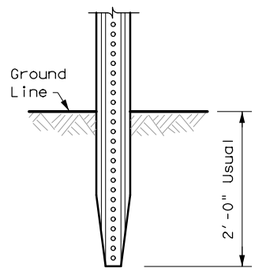
FILE: dom1-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0266	01	086	SH 71
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	YKM	FAYETTE		140

DATE:
FILE:

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

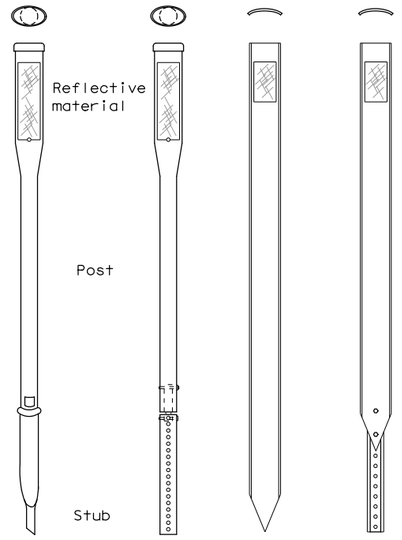


NOTES

1. Embedded Wing Channel (WC) post option may be used for Type 2 Object Markers and Delineators only.
2. 1.12 lbs/ft steel per ASTM A 1011 SS Gr. 50, or ASTM A499.

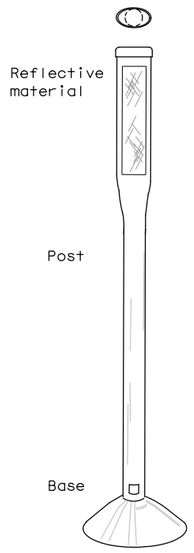
FLEXIBLE POSTS (YFLX, WFLX)

GND



EMBEDDED

SRF



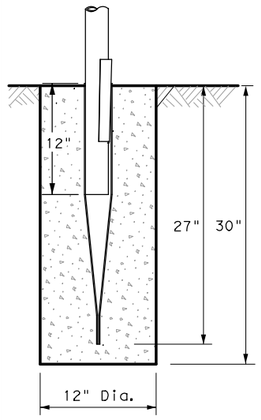
SURFACE MOUNT

NOTES

1. See "Flexible Delineator and Object Marker Posts" Material Producer List for approved devices.
2. Install per manufacturer's recommendations.
3. Post length may vary to meet field conditions.
4. When using yellow delineators with flexible posts to separate opposing direction of travel, such as centerline or median use, the flexible posts shall be yellow.

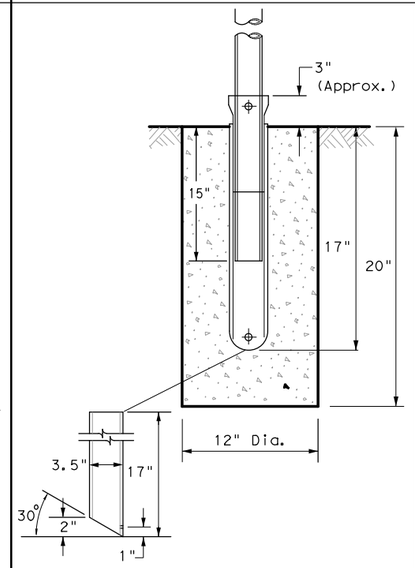
WEDGE ANCHOR SYSTEMS

WAS



STEEL

WAP



PLASTIC

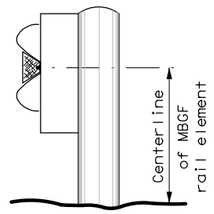
NOTE

1. Install per manufacturer's recommendations.

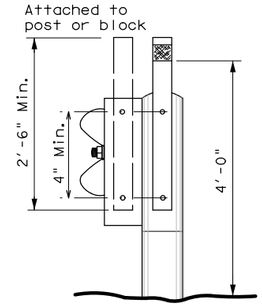
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

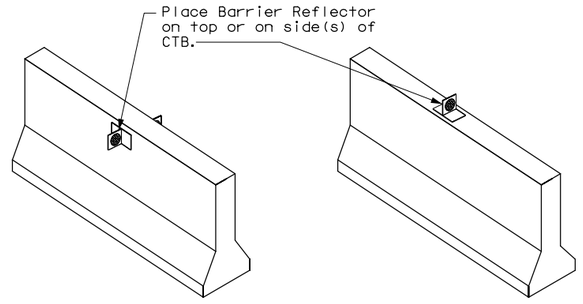
GF1



GF2



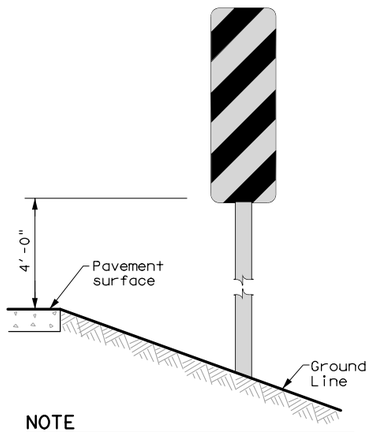
CONCRETE TRAFFIC BARRIER (CTB)



GENERAL NOTES

1. Place delineators on a section of roadway at a consistent distance from the edge of pavement.
2. Where a restriction prevents consistent placement from the pavement edge, place the affected object markers in line with the innermost edge of the obstruction.
3. When Type 2 object markers and delineators are more than 8'-0" from the edge of the pavement, it may not be possible to maintain a height of approximately 4'-0". If this is the case, place the object marker or delineator as close to the desired height as possible.
4. Install all delineators, object markers and barrier reflectors in accordance with the manufacturer's recommendation.
5. Barrier reflectors should be installed a minimum of 18 inches above the edge of the pavement surface.
6. Diagonal stripes on Type 3 object markers shall slope down toward the intended travel lane.

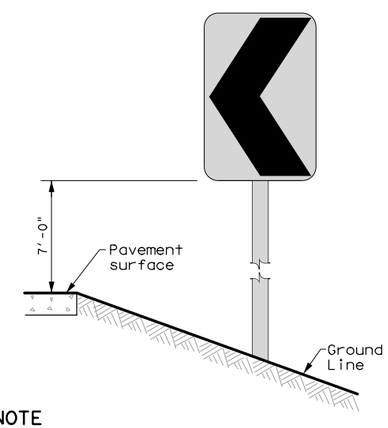
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



NOTE

Mounting at 4 feet to the bottom of the chevron is permitted for chevrons that will not exceed a height of 6'-6" to the top of the chevron (sizes 24" x 30" and smaller)

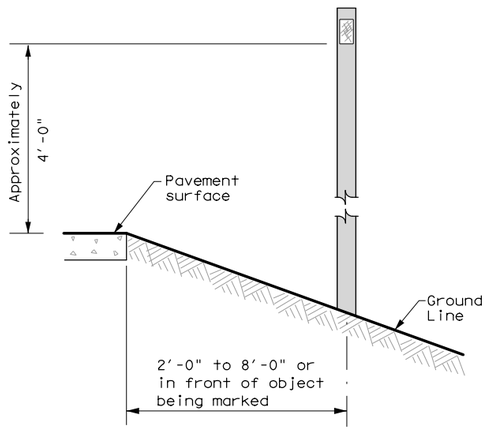
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



NOTE

Chevrons 30" x 36" and larger shall be mounted at a height of 7' to the bottom of the chevron. Chevron sign and ONE DIRECTION LARGE ARROW sign (W1-9T) shall be installed per SMD standard sheets and paid under item 644.

DELINEATORS AND TYPE 2 OBJECT MARKERS



See general notes 1, 2 and 3.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER INSTALLATION

D & OM(2)-20

FILE: dom2-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0266	01	086	SH 71
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	YKM	FAYETTE		141

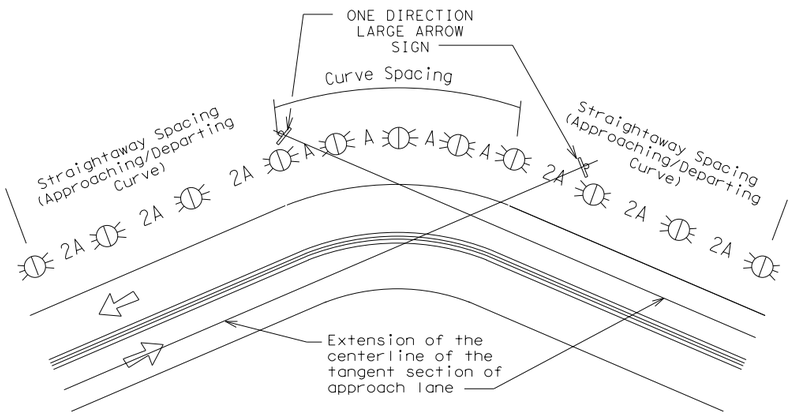
20B

DATE:
FILE:

MINIMUM WARNING DEVICES AT CURVES WITH ADVISORY SPEEDS

Amount by which Advisory Speed is less than Posted Speed	Curve Advisory Speed	
	Turn (30 MPH or less)	Curve (35 MPH or more)
5 MPH & 10 MPH	• RPMs	• RPMs
15 MPH & 20 MPH	• RPMs and One Direction Large Arrow sign	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons.
25 MPH & more	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons	• RPMs and Chevrons

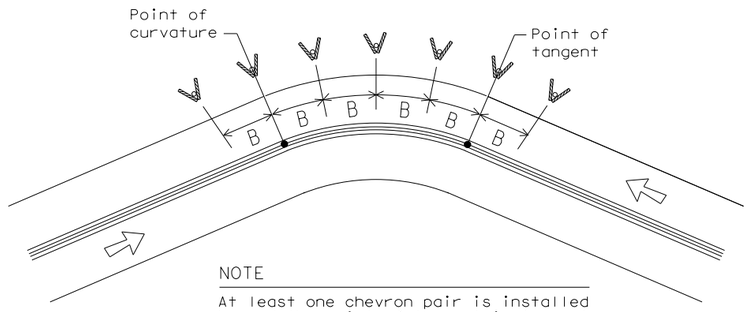
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



NOTE

ONE DIRECTION LARGE ARROW (W1-6) sign should be located at approximately and perpendicular to the extension of the centerline of the tangent section of approach lane.

SUGGESTED SPACING FOR CHEVRONS ON HORIZONTAL CURVES



NOTE

At least one chevron pair is installed beyond the point of tangent in tangent section.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS KNOWN

Degree of Curve	FEET			
	Radius of Curve	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
		A	2A	B
1	5730	225	450	——
2	2865	160	320	——
3	1910	130	260	200
4	1433	110	220	160
5	1146	100	200	160
6	955	90	180	160
7	819	85	170	160
8	716	75	150	160
9	637	75	150	120
10	573	70	140	120
11	521	65	130	120
12	478	60	120	120
13	441	60	120	120
14	409	55	110	80
15	382	55	110	80
16	358	55	110	80
19	302	50	100	80
23	249	40	80	80
29	198	35	70	40
38	151	30	60	40
57	101	20	40	40

Curve delineator approach and departure spacing should include 3 delineators spaced at 2A. This spacing should be used during design preparation or when the degree of curve is known.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS NOT KNOWN

Advisory Speed (MPH)	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
	A	2xA	B
65	130	260	200
60	110	220	160
55	100	200	160
50	85	170	160
45	75	150	120
40	70	140	120
35	60	120	120
30	55	110	80
25	50	100	80
20	40	80	80
15	35	70	40

If the degree of curve is not known, delineator spacing may be determined based on the Advisory Speed of the curve. Use the delineator curve spacing for each Advisory Speed (MPH).

DELINEATOR AND OBJECT MARKER APPLICATION AND SPACING

CONDITION	REQUIRED TREATMENT	MINIMUM SPACING
Frwy./Exp. Tangent	RPMs	See PM-series and FPM-series standard sheets
Frwy./Exp. Curve	Single delineators on right side	See delineator spacing table
Frwy/Exp.Ramp	Single delineators on at least one side of ramp (should be on outside of curves) (see Detail 3 on D&OM(4))	100 feet on ramp tangents Use delineator spacing table for ramp curves ("straightway spacing" does not apply to ramp curves)
Acceleration/Deceleration Lane	Double delineators (see Detail 3 on D&OM(4))	100 feet (See Detail 3 on D & OM (4))
Truck Escape Ramp	Single red delineators on both sides	50 feet
Bridge Rail (steel or concrete)and Metal Beam Guard Fence	Bi-Directional Delineators when undivided with one lane each direction Single Delineators when multiple lanes each direction	Equal spacing (100'max) but not less than 3 delineators
Concrete Traffic Barrier (CTB) or Steel Traffic Barrier	Barrier reflectors matching the color of the edge line	Equal spacing 100' max
Cable Barrier	Reflectors matching the color of the edge line	Every 5th cable barrier post (up to 100'max)
Guard Rail Terminus/Impact Head	Divided highway - Object marker on approach end Undivided 2-lane highways - Object marker on approach and departure end	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5) and D & OM (6)
Bridges with no Approach Rail	Type 3 Object Marker (OM-3) at end of rail and 3 single delineators approaching rail	See D & OM(5)
Reduced Width Approaches to Bridge Rail	Type 2 and Type 3 Object Markers (OM-3) and 3 single delineators approaching bridge	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5)
Culverts without MBGF	Type 2 Object Markers	See Detail 2 on D & OM(4)
Crossovers	Double yellow delineators and RPMs	See Detail 1 on D & OM (4)
Pavement Narrowing (lane merge) on Freeways/Expressway	Single delineators adjacent to affected lane for full length of transition	100 feet

NOTES

1. Unless indicated otherwise, the delineator or barrier reflector color shall conform to the color of the pavement edge line on the side of the road where the delineators or barrier reflectors are placed.
2. Barrier reflectors may be used to replace required delineators.
3. Single red delineators may be mounted on the back side of delineator posts for wrong way driver applications

LEGEND	
	Bi-directional Delineator
	Delineator
	Sign

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

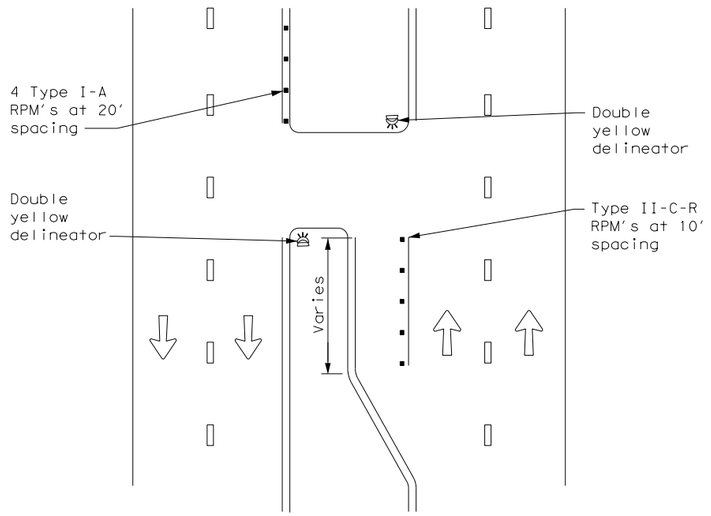
D & OM(3)-20

FILE: dom3-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0266	01	086	SH 71
3-15 8-15	DIST	COUNTY		SHEET NO.
8-15 7-20	YKM	FAYETTE		142

DATE:
FILE:

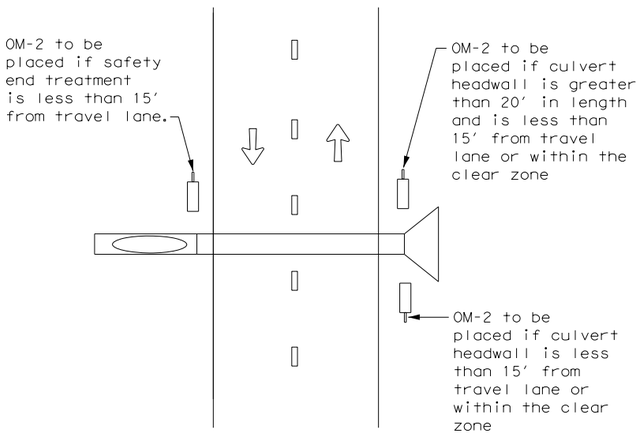
DATE:
FILE:

CROSSOVERS



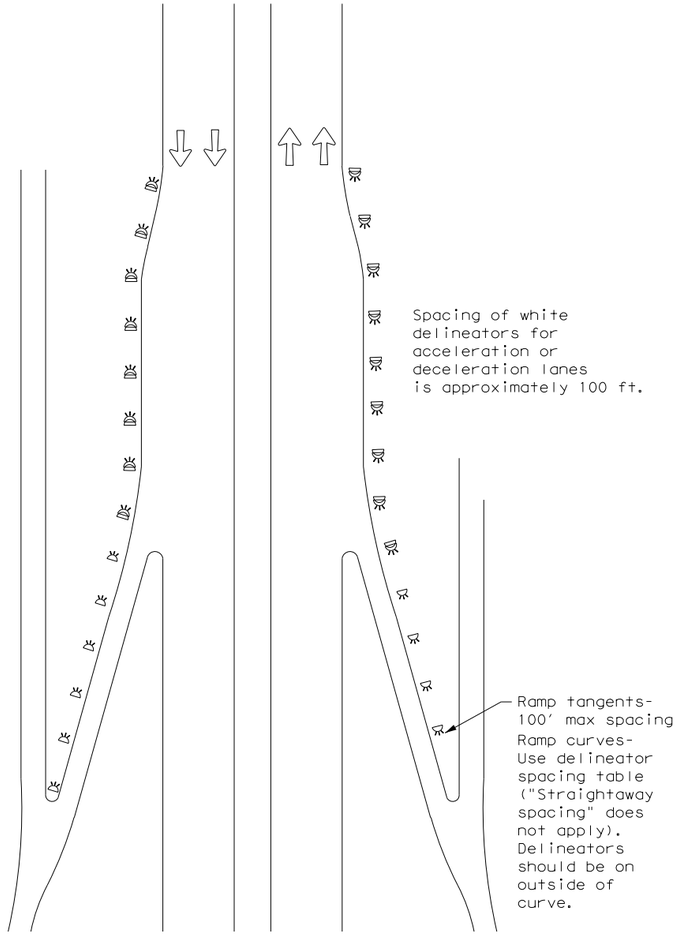
DETAIL 1

FOR CULVERTS WITHOUT MBGF



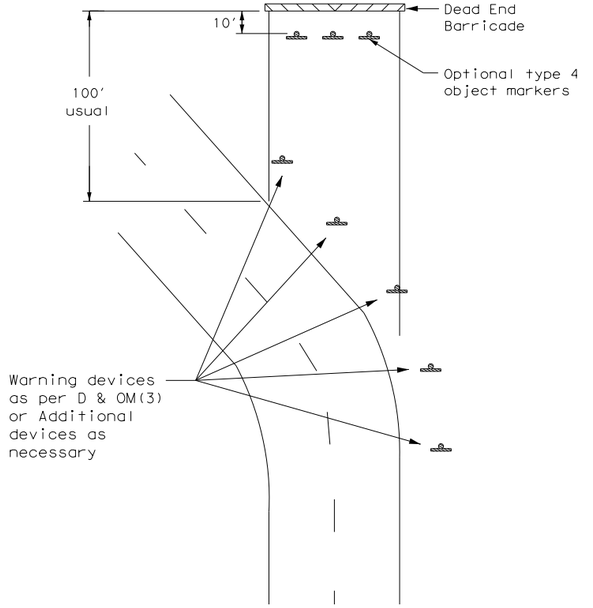
DETAIL 2

FREEWAY DELINEATION FOR RAMPS AND ACCELERATION/DECELERATION LANES



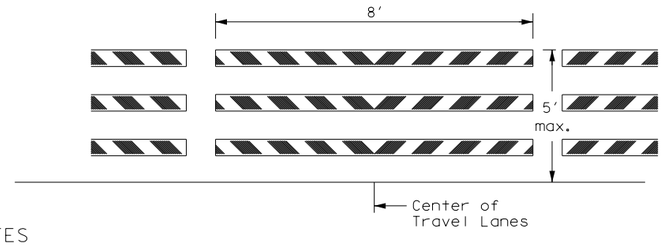
DETAIL 3

TYPICAL APPLICATION OF DEAD END BARRICADE



DETAIL 4

TYPICAL DEAD END BARRICADE INSTALLATION



NOTES

1. Barricade striping shall be red and white reflective sheeting for all permanent road closures.
2. Barricade striping is red and white sloping toward the center of the roadway.
3. Type 3 Barricade Supports should be anchored to soil or pavement as described in compliant Work Zone Traffic Control Devices List, section D.2.f and D.2.g.

DETAIL 5

LEGEND	
	Bidirectional Delineator
	Delineator
	OM-3
	Barricade
	Sign
	OM-2
	Double Delineator

Texas Department of Transportation

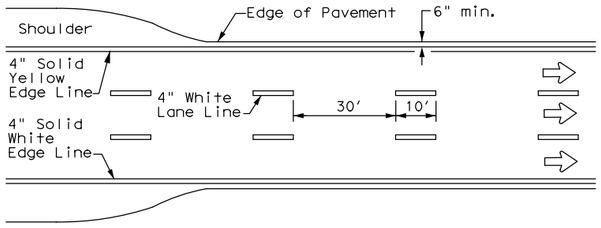
Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

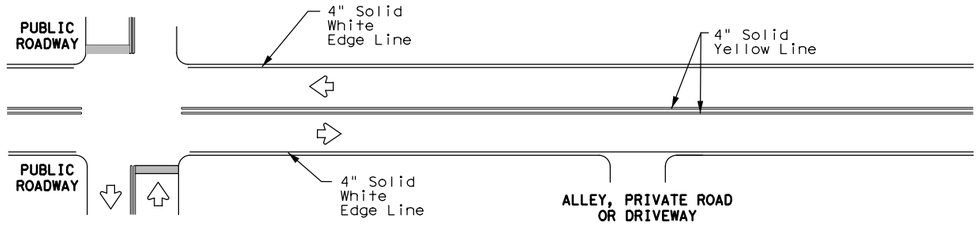
D & OM(4)-20

FILE: dom4-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0266	01	086	SH 71
3-15	DIST	COUNTY		SHEET NO.
7-20	YKM	FAYETTE		143

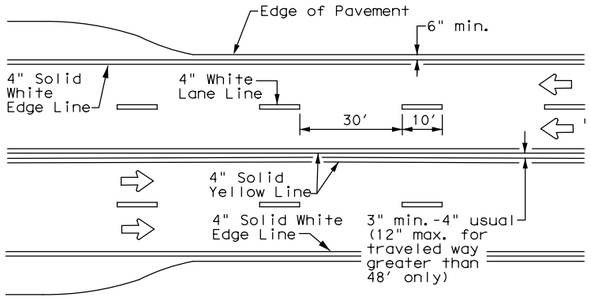
20D



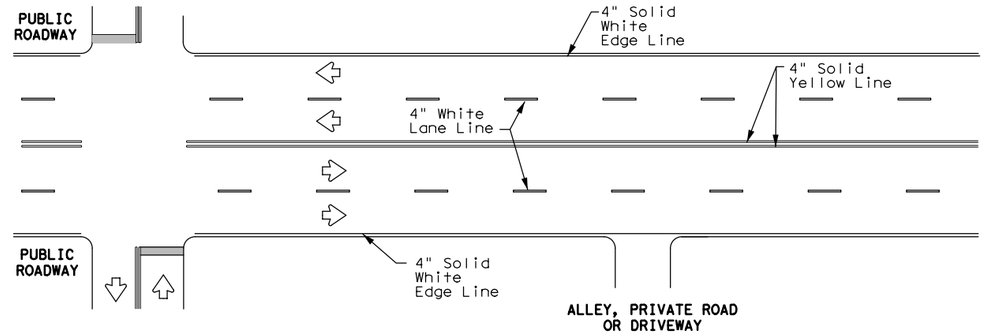
EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



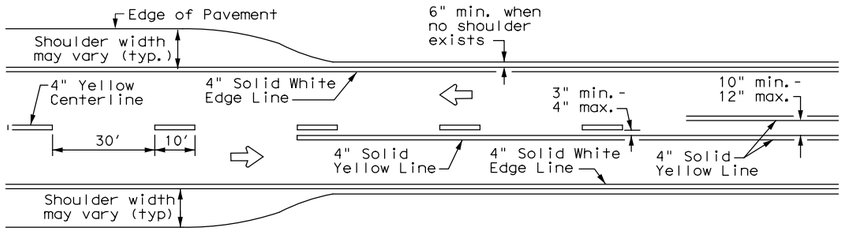
TYPICAL TWO-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

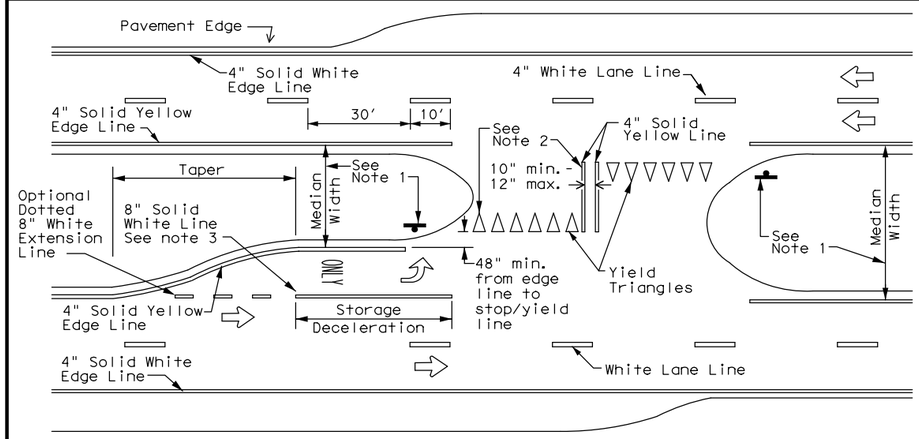


TYPICAL MULTI-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

YIELD LINES



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs are optional as determined by the Engineer.

2. Install median striping (double yellow centerlines and stop bars/yield triangles) when a 50' or greater median centerline can be placed. Stop bars shall only be used with stop signs. Yield traingles shall only be used with yield signs.

3. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

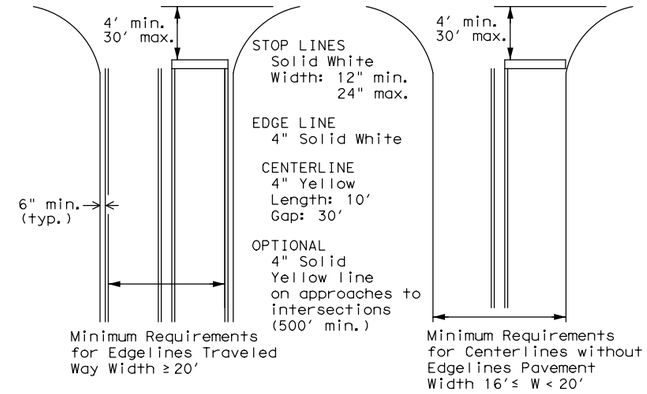
GENERAL NOTES

1. Edgeline striping shall be as shown in the plans or as directed by the Engineer. The edgeline should not be placed less less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edgelines are not required in curb and gutter sections of roadways.

2. The traveled way includes only that portion of the roadway used for vehicular travel. It does not include the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the inside of edgeline to the inside of edgeline of a two lane roadway.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Highways

Texas Department of Transportation

Traffic Safety Division Standard

TYPICAL STANDARD PAVEMENT MARKINGS

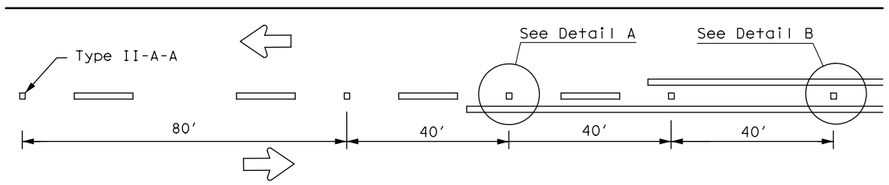
PM(1)-20

FILE: pm1-20.dgn	DN:	CK:	DW:	CK:
© TxDOT November 1978	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	0266	01	086	SH 71
5-00 2-12	DIST	COUNTY		SHEET NO.
8-00 6-20	YKM	FAYETTE		144

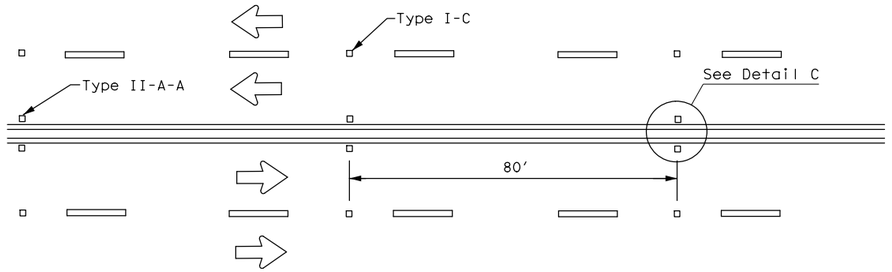
22B

DATE:
FILE:

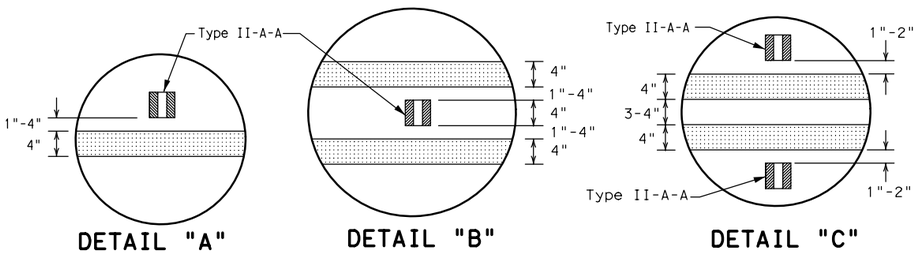
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE



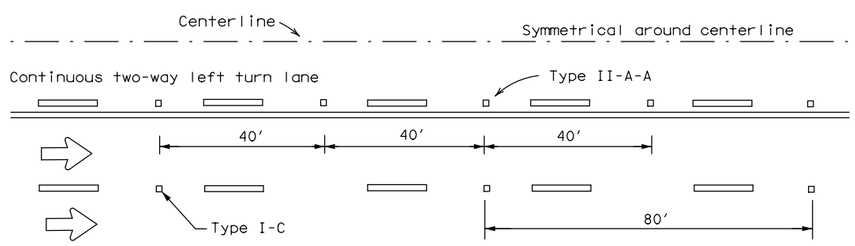
CENTERLINE FOR ALL TWO LANE ROADWAYS



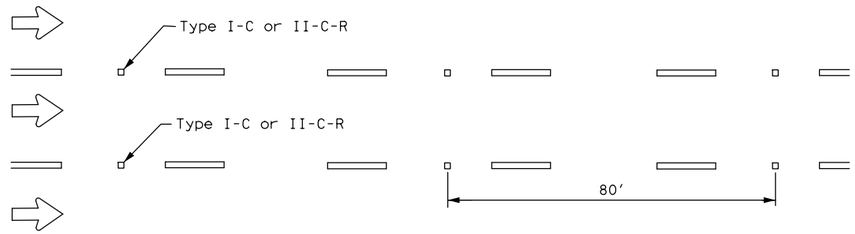
CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY HIGHWAYS



DETAIL "A" **DETAIL "B"** **DETAIL "C"**

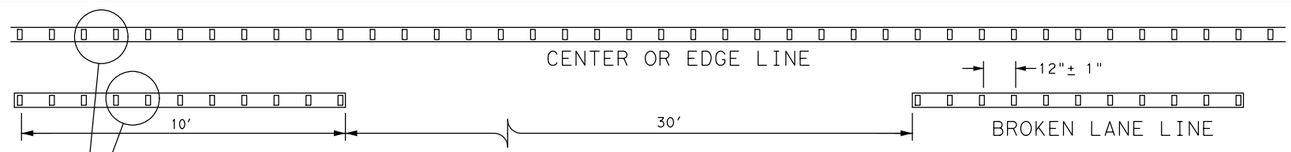


CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



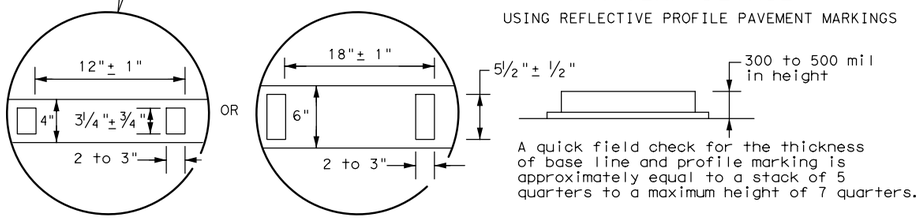
LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.



REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS



4" EDGE LINE, CENTER LINE OR LANE LINE

OPTIONAL 6" EDGE LINE, CENTER LINE OR LANE LINE

A quick field check for the thickness of base line and profile marking is approximately equal to a stack of 5 quarters to a maximum height of 7 quarters.

NOTE

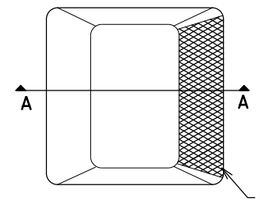
Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

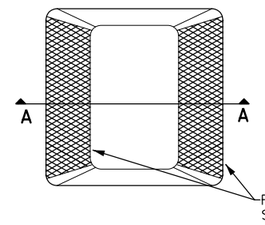
1. All raised pavement markers placed in broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

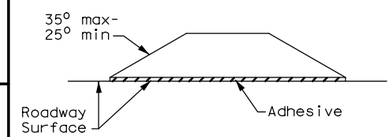
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)



Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS

Texas Department of Transportation

Traffic Safety Division Standard

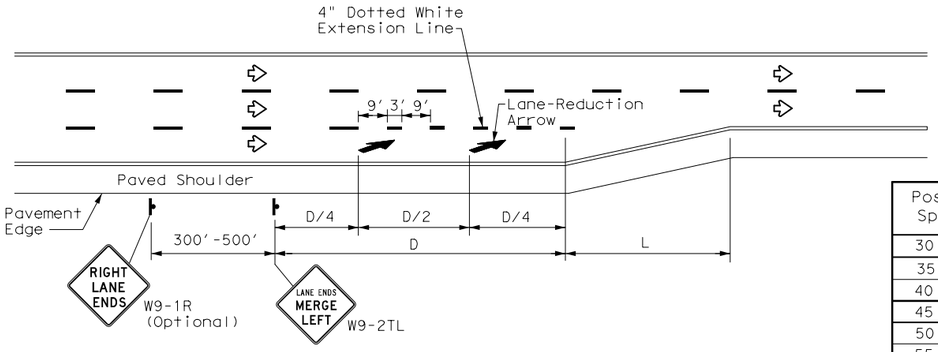
POSITION GUIDANCE USING RAISED MARKERS RELECTORIZED PROFILE MARKINGS PM(2)-20

FILE: pm2-20.dgn	DN:	CK:	DW:	CK:
©TxDOT April 1977	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-92 2-10	0266	01	086	SH 71
5-00 2-12	DIST	COUNTY		SHEET NO.
8-00 6-20	YKM	FAYETTE		145

22B

DATE:
FILE:

DATE:
FILE:

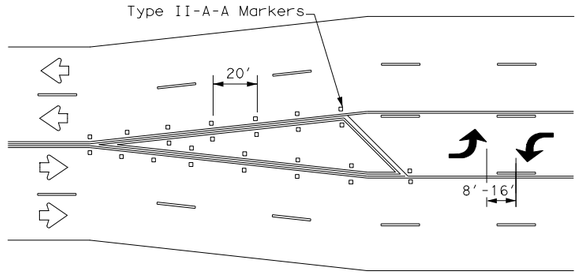


LANE REDUCTION

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	

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 W9-1R "RIGHT LANE ENDS" 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.



A two-way left-turn (TWLT) lane-use arrow pavement marking should be used at or just downstream from the beginning of a two-way left-turn lane within a corridor. Repeating the marking after each intersection or dedicated turn bay is not required unless stated elsewhere in the plans.

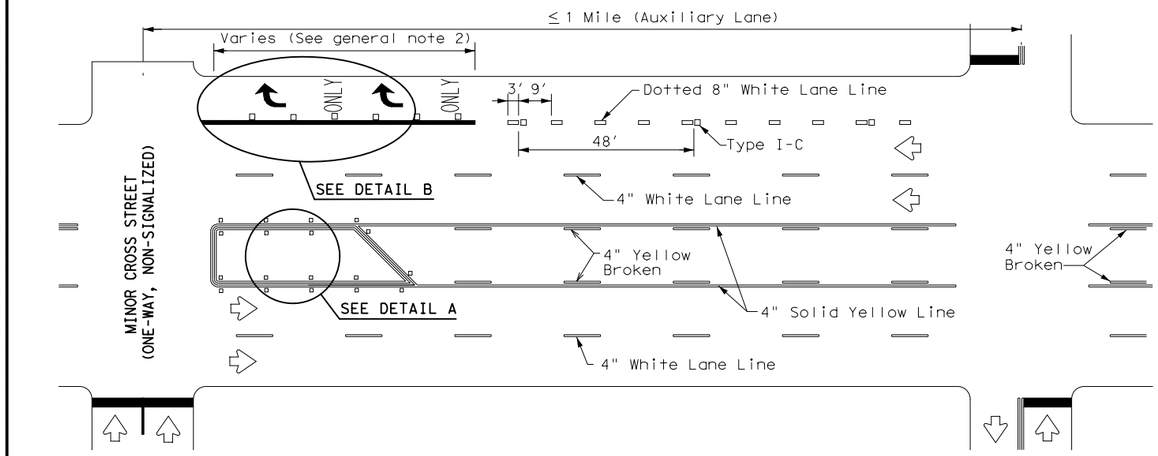
TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY

GENERAL NOTES

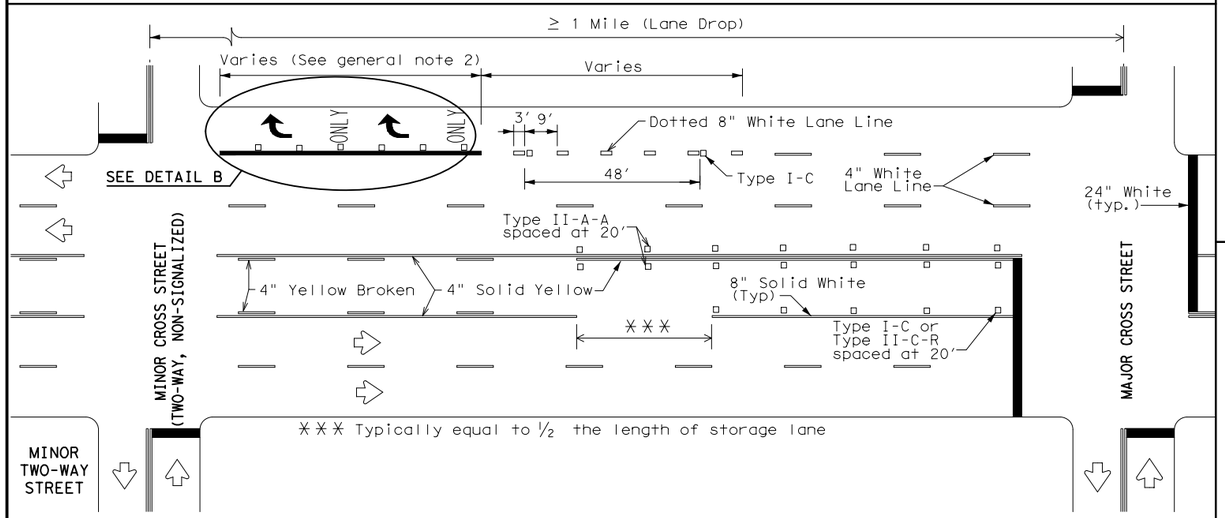
1. Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn bays for emphasis. Details for words and arrows are as shown in the Standard Highway Sign Designs for Texas.
2. When lane-use words and arrow markings are used, two sets of arrows should be used if the length of the bay is greater than 180 feet. When a single lane use arrow or word and arrow marking is used for a short turn lane, it should be located at or near the upstream end of the full-width turn lane.
3. Use raised pavement marker Type I-C with undivided highways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.
4. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

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

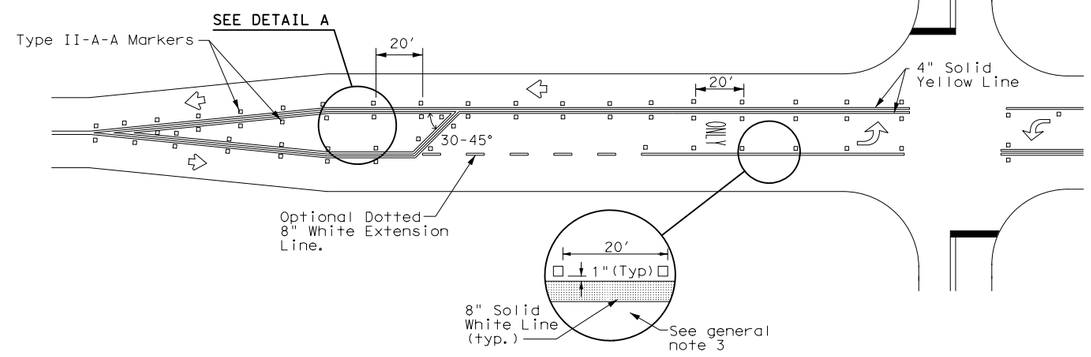
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



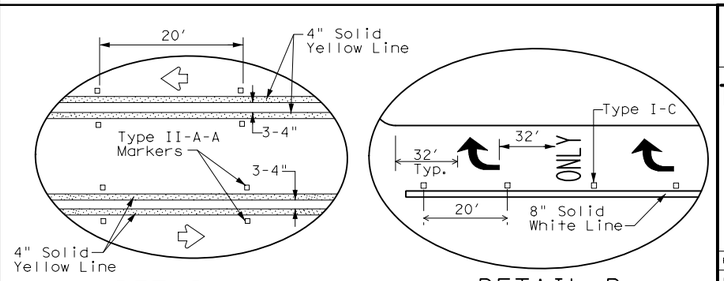
TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



TYPICAL TWLTL AT TWO-WAY CROSS STREET AND RIGHT TURN LANE DROP



TYPICAL TWO-LANE HIGHWAY INTERSECTION WITH LEFT TURN BAYS



Texas Department of Transportation

Traffic Safety Division Standard

TWO-WAY LEFT TURN LANES, RURAL LEFT TURN BAYS, AND LANE REDUCTION PAVEMENT MARKINGS PM(3)-20

FILE: pm3-20.dgn	DN:	CK:	DW:	CK:
©TxDOT April 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0266	01	086	SH 71
5-00 2-10	DIST	COUNTY		SHEET NO.
8-00 2-12	YKM	FAYETTE		146
3-03 6-20				

22C

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

SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

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

Post Type

FRP = Fiberglass Reinforced Plastic Pipe (see SMD(FRP))
TWT = Thin-Walled Tubing (see SMD(TWT))
10BWG = 10 BWG Tubing (see SMD(SLIP-1) to (SLIP-3))
S80 = Schedule 80 Pipe (see SMD(SLIP-1) to (SLIP-3))

Number of Posts (1 or 2)

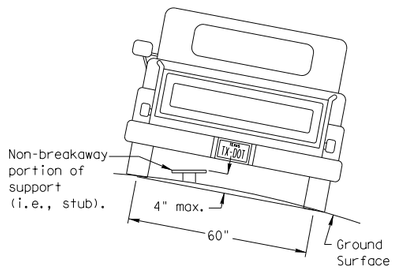
Anchor Type

UA = Universal Anchor - Concreted (see SMD(FRP) and (TWT))
UB = Universal Anchor - Bolted down (see SMD(FRP) and (TWT))
WS = Wedge Anchor Steel - (see SMD(TWT))
WP = Wedge Anchor Plastic (see SMD(TWT))
SA = Slipbase - Concreted (see SMD(SLIP-1) to (SLIP-3))
SB = Slipbase - Bolted Down (see SMD(SLIP-1) to (SLIP-3))

Sign Mounting Designation

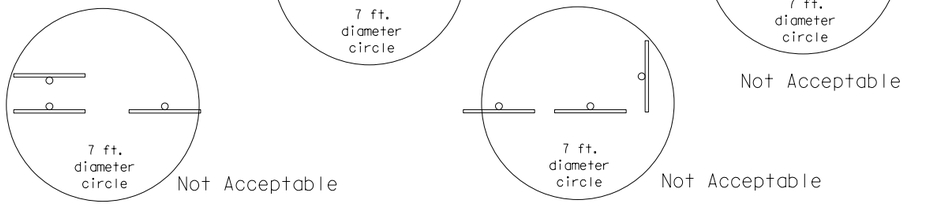
P = Prefab. "Plain" (see SMD(SLIP-1) to (SLIP-3), (TWT), (FRP))
T = Prefab. "T" (see SMD(SLIP-1) to (SLIP-3), (TWT))
U = Prefab. "U" (see SMD(SLIP-1) to (SLIP-3))
IF REQUIRED
1EXT or 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))
WC = 1.12 #/ft Wing Channel (see SMD(SLIP-1) to (SLIP-3))
EXAL = Extruded Aluminum Sign Panels (see SMD(SLIP-1))

REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



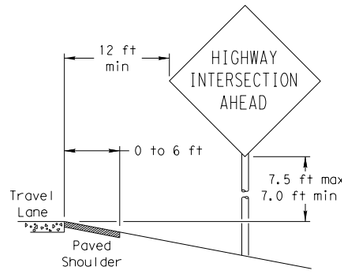
To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

No more than 2 sign posts should be located within a 7 ft. circle.



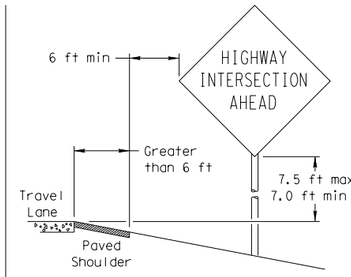
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

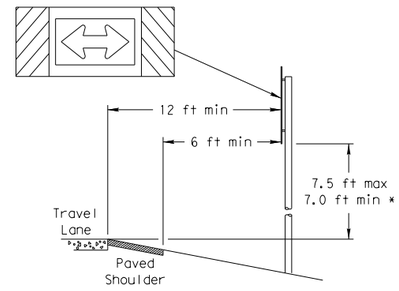
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



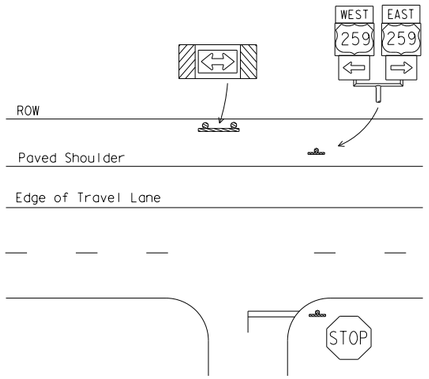
GREATER THAN 6 FT. WIDE

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.

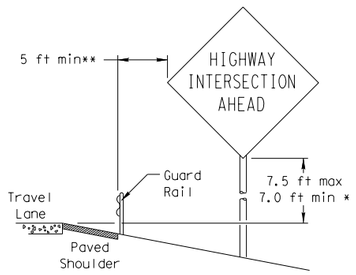
T-INTERSECTION



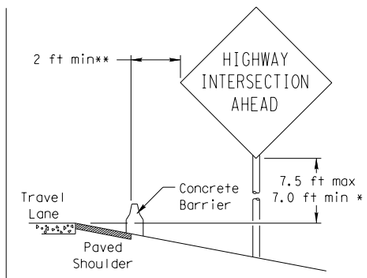
When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



BEHIND BARRIER



BEHIND GUARDRAIL



BEHIND CONCRETE BARRIER

**Sign clearance based on distance required for proper guard rail or concrete barrier performance.

* 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.

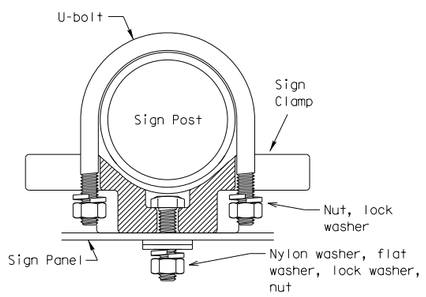
The maximum values may be increased when directed by the Engineer.

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

TYPICAL SIGN ATTACHMENT DETAIL

Single Signs

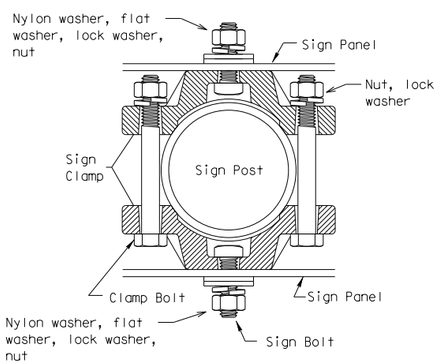


Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

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.

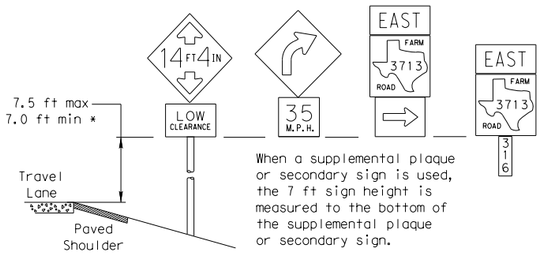
Sign clamps may be either the specific size clamp or the universal clamp.

Back-to-Back Signs



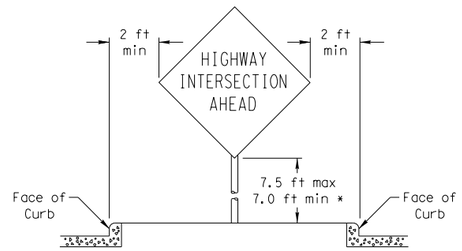
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



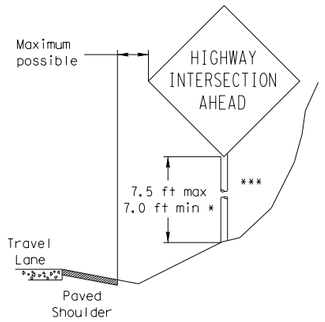
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

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.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN)-08

REVISIONS
9-08

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

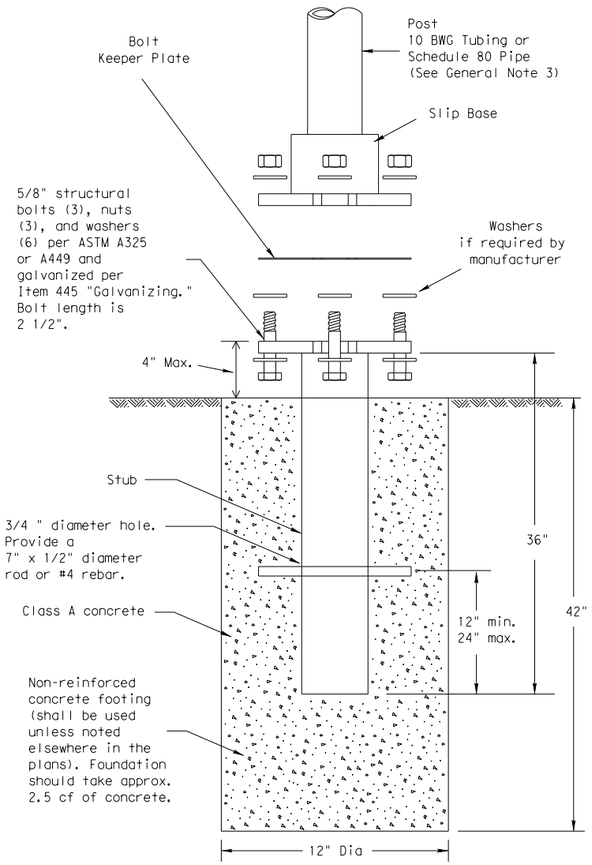
CONT	SECT	JOB	HIGHWAY
0266	01	086	SH 71

DIST	COUNTY	SHEET NO.
YKM	FAYETTE	147

26A

DATE:
FILE:

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.

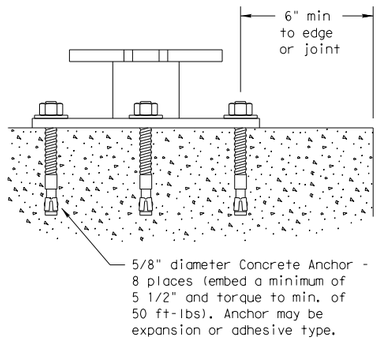
   Schedule 80 Pipe (2.875" outside diameter)
   - 0.276" nominal wall thickness
   - Steel tubing per ASTM A500 Gr C
   - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
     - 46,000 PSI minimum 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

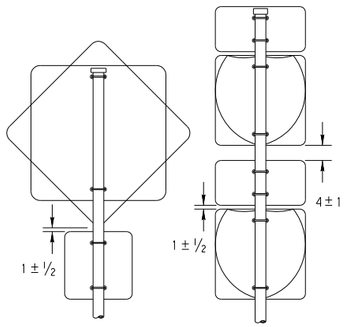
DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS
9-08

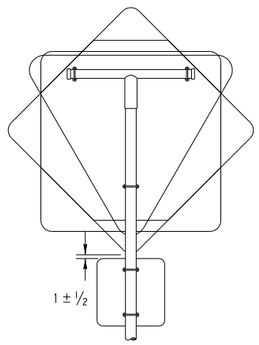
CONT	SECT	JOB	HIGHWAY
0266	01	086	SH 71

DIST	COUNTY	SHEET NO.
YKM	FAYETTE	148

DATE:
FILE:



SM RD SGN ASSM TY XXXXX(1)XX(P)



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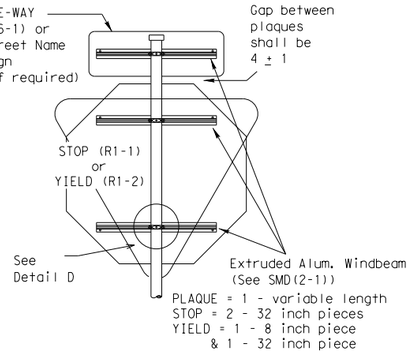
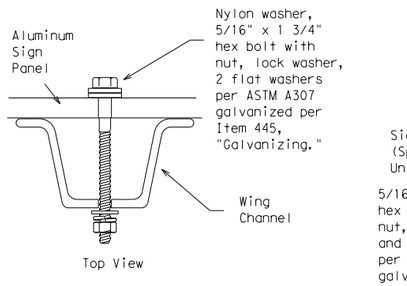
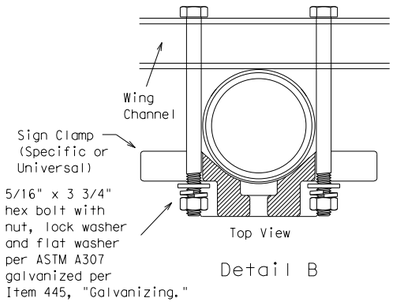


SM RD SGN ASSM TY XXXXX(1)XX(P-BM)



Detail A



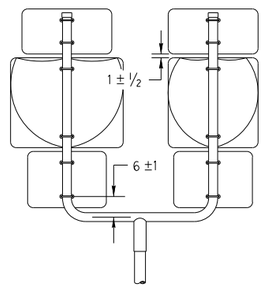
Detail B

GENERAL NOTES:

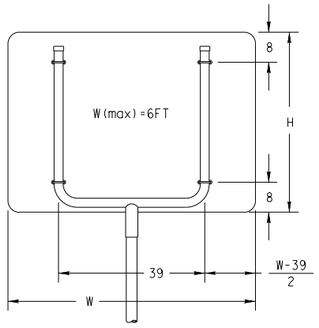
1.

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Additional route markers may be added vertically, provided the total sign area does not exceed the maximum allowable amount per Note 1.
11. Additional sign clamp required on the "T-bracket" post for 24 inch height signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.
13. Sign blanks shall be the sizes and shapes shown on the plans.



SM RD SGN ASSM TY XXXXX(1)XX(U)



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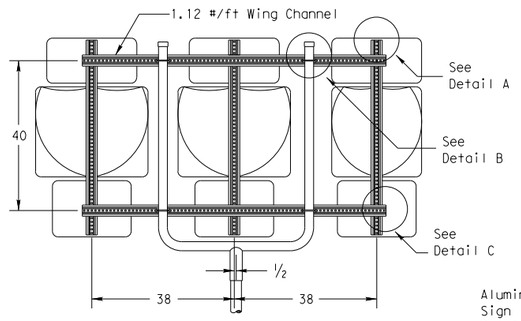
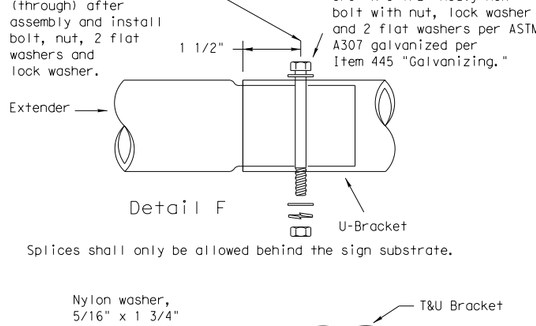
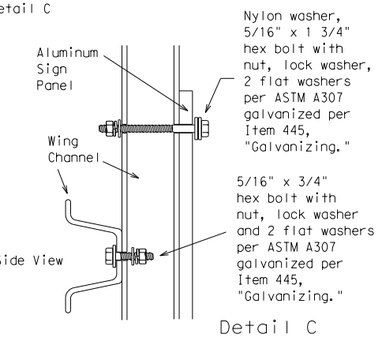


SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)

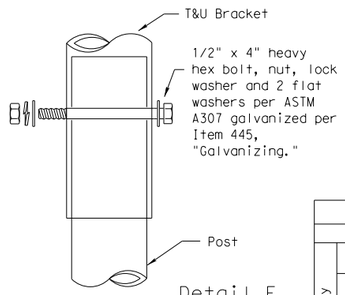


Detail F

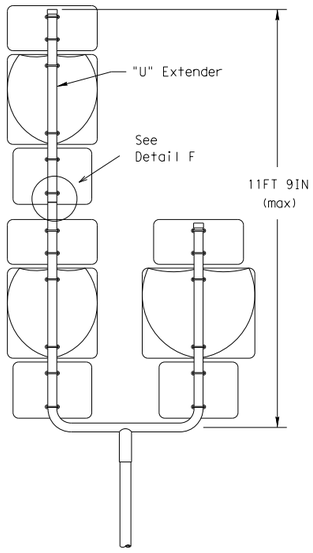
Splices shall only be allowed behind the sign substrate.



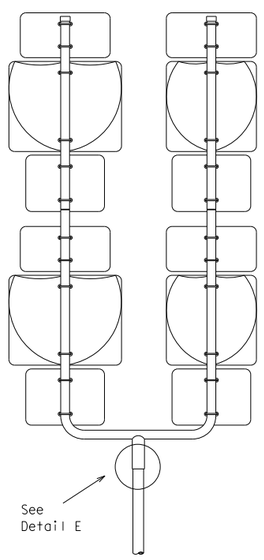
Detail C



Detail E



SM RD SGN ASSM TY S80(1)XX(U-1EXT)



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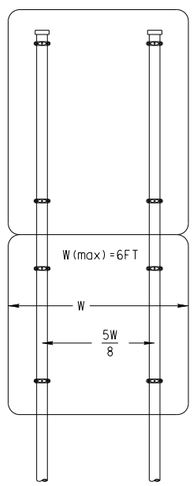
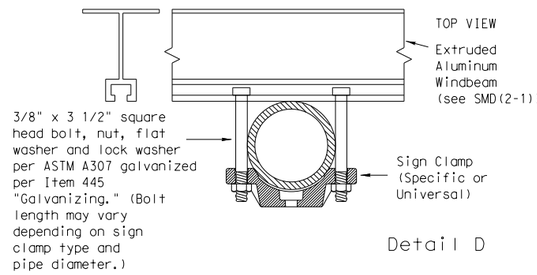
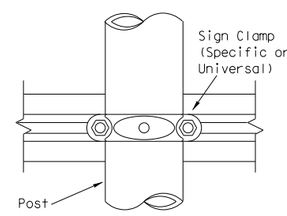


SM RD SGN ASSYM TY XXXXX(2)XX(P)

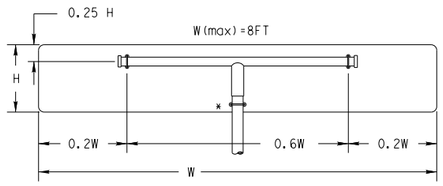
SIDE VIEW



Detail D



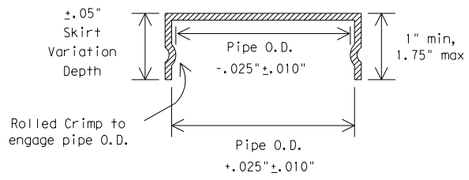
REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)



SM RD SGN ASSM TY XXXXX(1)XX(T)
(* - See Note 12)

All dimensions are in english unless detailed otherwise.

FRICTION CAP DETAIL



Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 gauge for all cap sizes.

The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth shall be sufficient to give positive protection against entrance of rainwater. They shall be free of sharp creases or indentations and show no evidence of metal fracture.

Caps shall have an electrodeposited coating of zinc in accordance with the requirements of ASTM B633 Class FE/ZN 8.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-2)-08

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

CONT	SECT	JOB	HIGHWAY
0266	01	086	SH 71

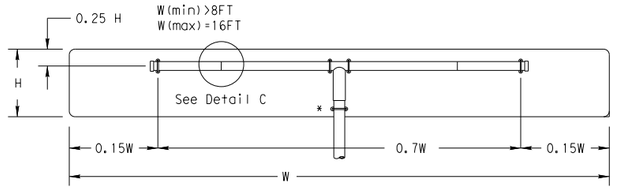
DIST	COUNTY	SHEET NO.
YKM	FAYETTE	149

9-08 REVISIONS

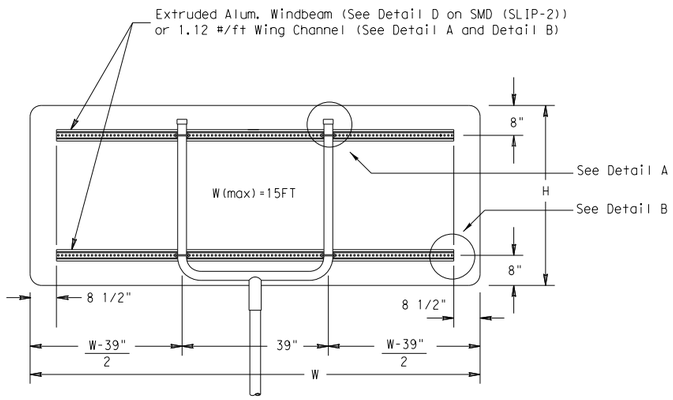
DATE:
FILE:

26C

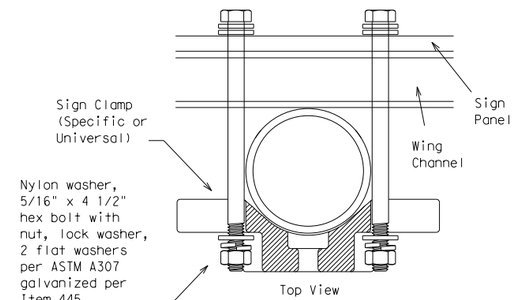
DATE:
FILE:



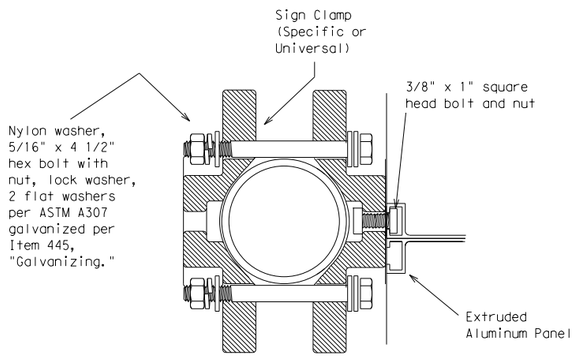
SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)
(* - See Note 12)



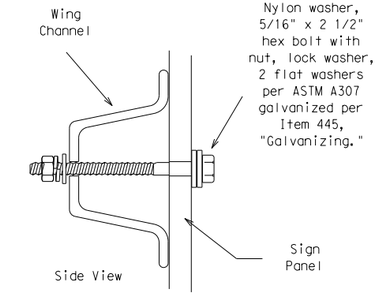
SM RD SGN ASSM TY XXXXX(1)XX(U-XX)



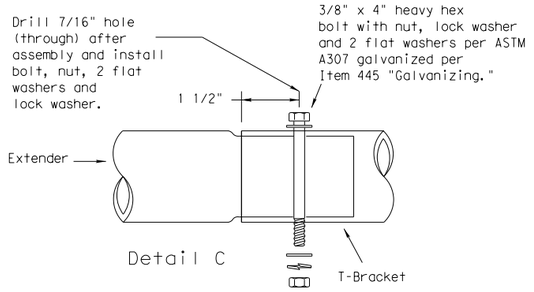
Detail A



Detail D
EXTRUDED ALUMINUM SIGN WITH T BRACKET

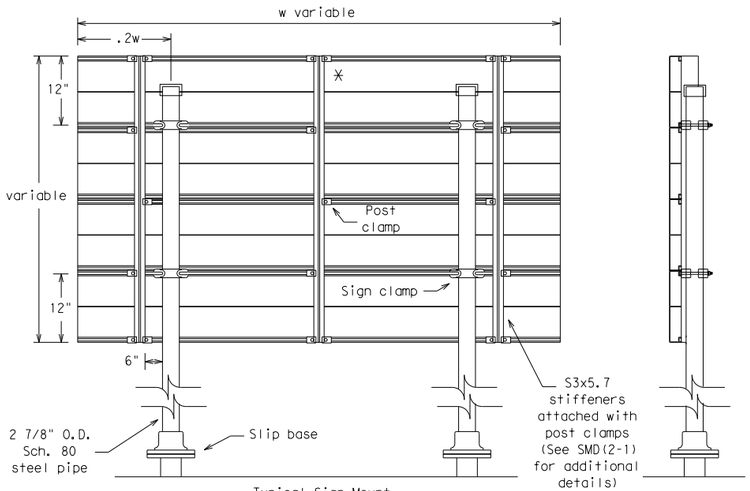


Detail B



Detail C

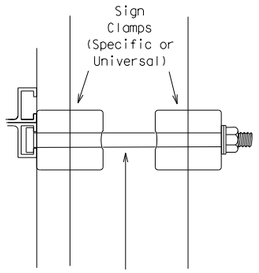
Splices shall only be allowed behind the sign substrate.



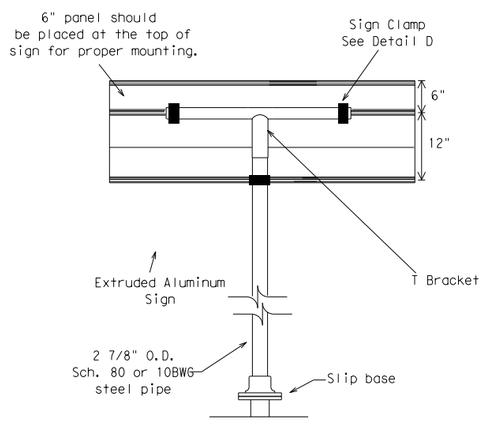
Typical Sign Mount
SM RD SGN ASSM TY S80(2)XX(P-EXAL)

* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.

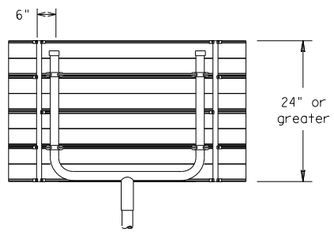
See Detail E
for clamp installation



Detail E



Extruded Aluminum Sign
With T Bracket



Use Extruded Alum. Windbeam as stiffeners
See SMD (2-1) for additional details

See Detail E
for clamp installation

GENERAL NOTES:

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Sign blanks shall be the sizes and shapes shown on the plans.
11. Additional sign clamp required on the "T-bracket" post for 24 inch high signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.

REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-3)-08

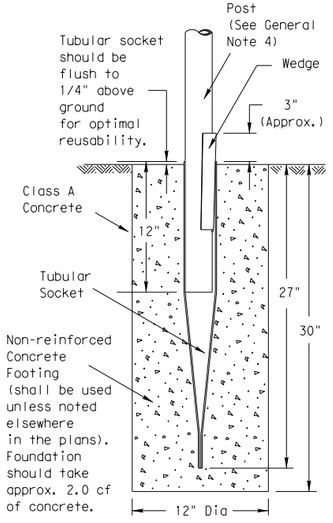
REVISIONS
9-08

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

CONT	SECT	JOB	HIGHWAY
0266	01	086	SH 71
DIST	COUNTY		SHEET NO.
YKM	FAYETTE		150

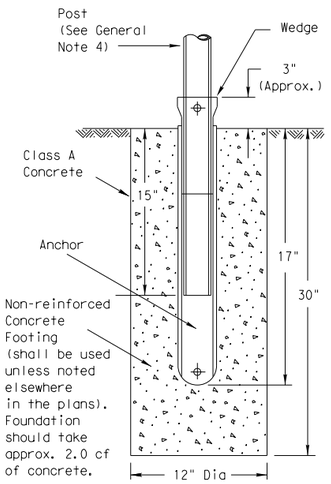
26D

Wedge Anchor Steel System



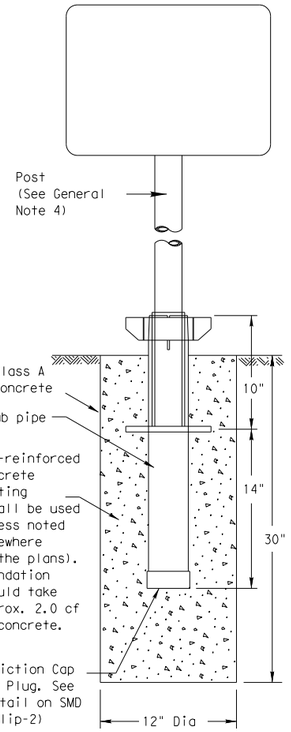
SM RD SGN ASSM TY TWT(X)WS(X)

Wedge Anchor High Density Polyethylene (HDPE) System

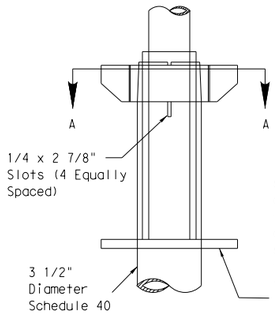


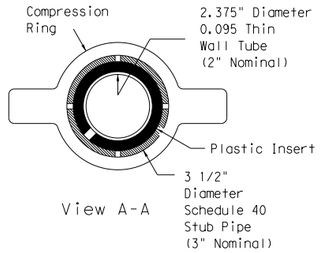
SMD RD SGN ASSM TY TWT(X)WP(X)

Universal Anchor System with Thin-Walled Tubing Post



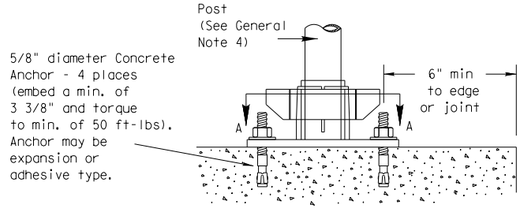
SM RD SGN ASSM TY TWT(X)UA(P)



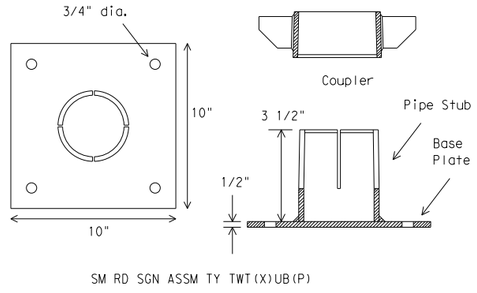


View A-A

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.

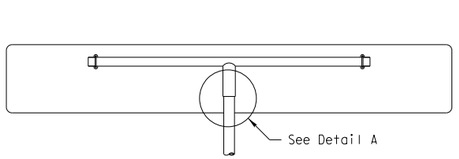


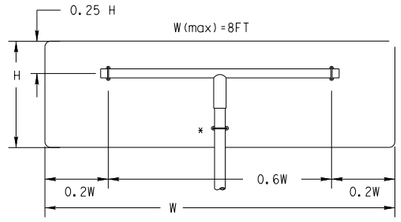
Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. A heavy hex nut per ASTM A563 and hardened washer per ASTM F436. The stud bolt shall have minimum yield and ultimate tensile strengths of 50 and 75 ksi, respectively. Nuts, bolts and washers shall be galvanized 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)

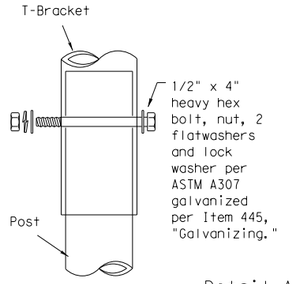
Sign Installation Using a Prefabricated T-Bracket for Thin-Wall Tubing Post





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

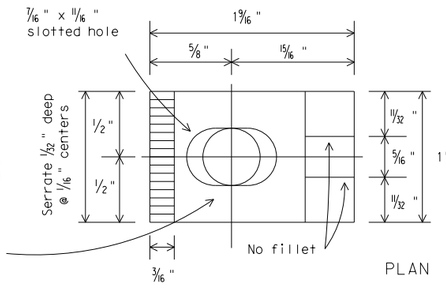
CONT	SECT	JOB	HIGHWAY
0266	01	086	SH 71
DIST	COUNTY		SHEET NO.
YKM	FAYETTE		151

9-08 REVISIONS

26E

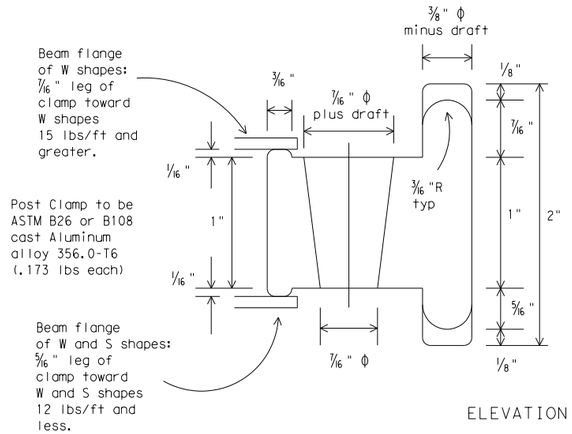
DATE:
FILE:

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



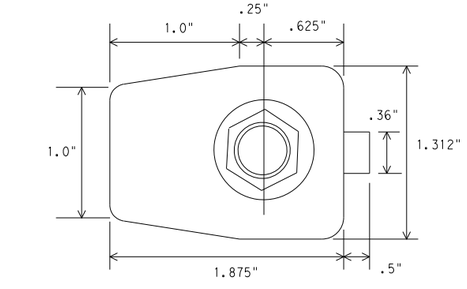
NOTE: centerline of hole for 3/8" diameter squarehead bolt x 2 1/4" long with a flat washer and self-locking nut, or lock washer and hex. nut. Bolt head dimensions shall be in accordance with ANSI B 18.2.1 as referred to in the AISC Manual of steel construction. Bolt assembly shall be galvanized.

PLAN

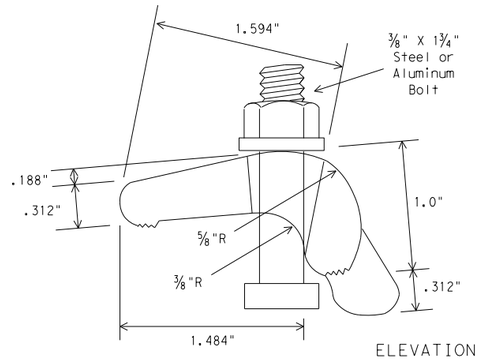


ELEVATION

POST CLAMP DETAIL

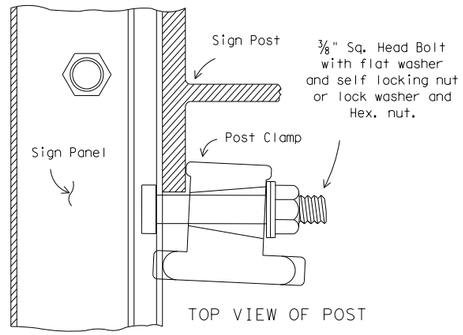


PLAN

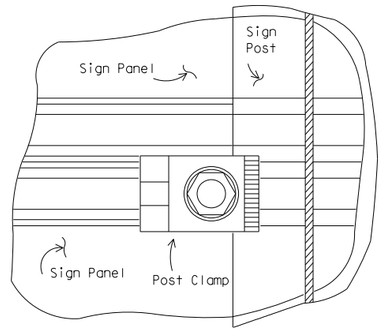


ELEVATION

ALTERNATE POST CLAMP DETAIL



TOP VIEW OF POST



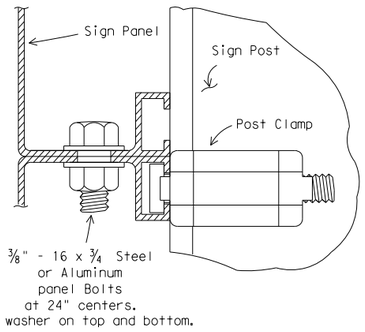
TOP VIEW OF CLAMP

DEPARTMENTAL MATERIAL SPECIFICATIONS

SIGN HARDWARE DMS-7120

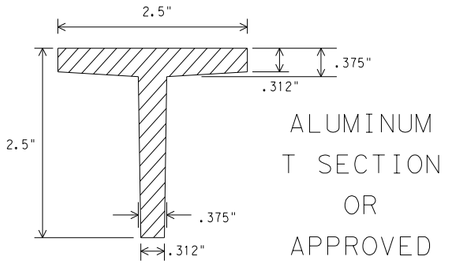
GENERAL NOTES:

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.



SIDE VIEW OF PANELS

CONNECTION DETAILS

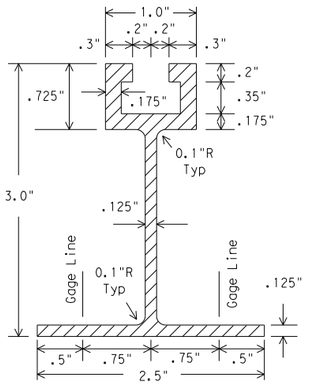


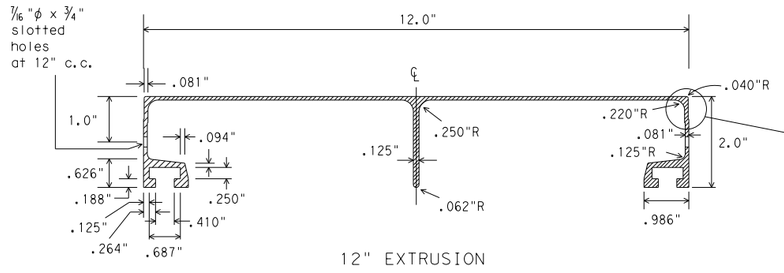
1.912 lbs/ft

ALUMINUM T SECTION OR APPROVED ALTERNATIVE

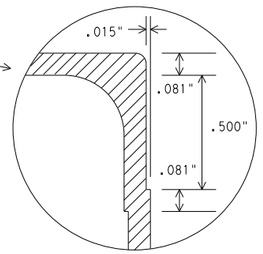
WINDBEAM CROSS SECTION

Windbeam to be extruded aluminum (1.175 lbs/ft) or approved alternative

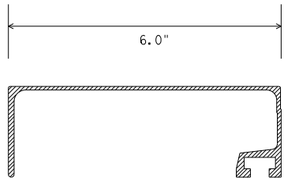




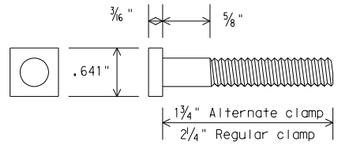
12" EXTRUSION



ALUMINUM SIGN PANEL EXTRUSION DETAILS



6" EXTRUSION



POST CLAMP BOLT DETAIL

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS- EXTRUDED ALUMINUM SIGN PANELS & HARDWARE

SMD(2-1)-08

©TxDOT 2001	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0266	01	086	SH 71
	DIST	COUNTY		SHEET NO.
	YKM	FAYETTE		152

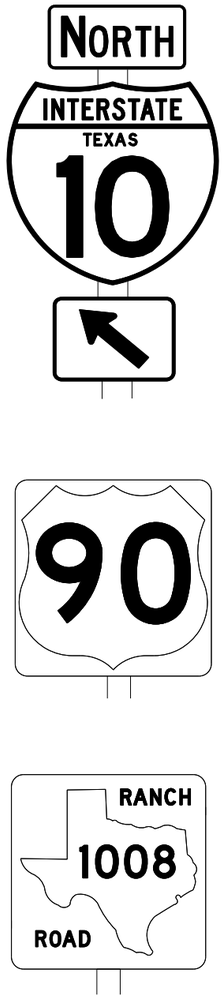
27A

DATE:
FILE:

DATE:
FILE:

REQUIREMENTS FOR INDEPENDENT MOUNTED ROUTE SIGNS

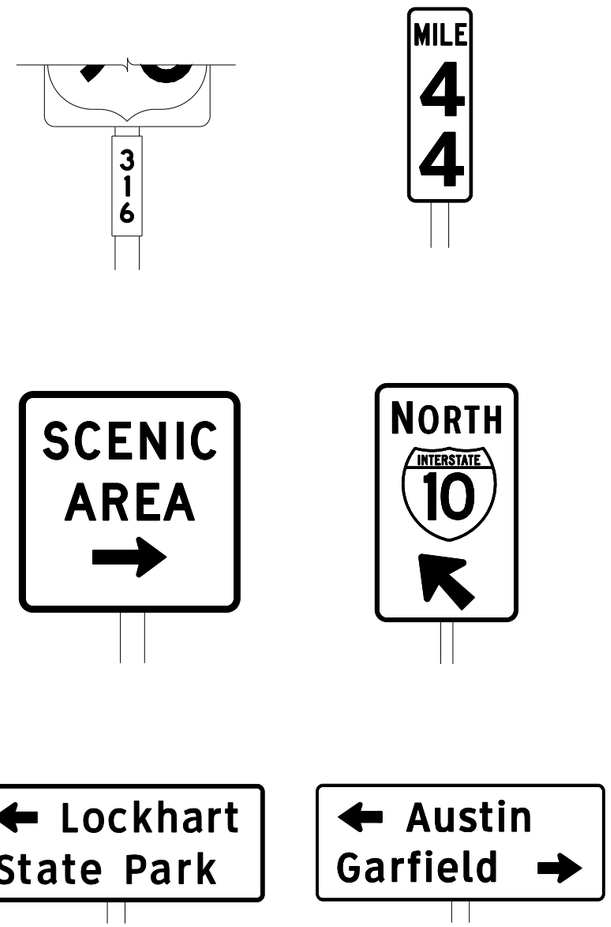
SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE A SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & BORDERS	ALL OTHERS	TYPE B or C SHEETING



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

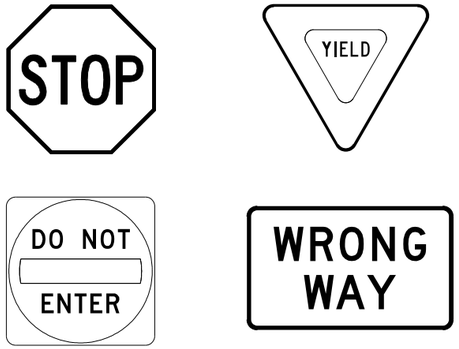
TSR(3)-13

FILE: tsr3-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0266	01	086	SH 71
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	YKM	FAYETTE		153

DATE:
FILE:

REQUIREMENTS FOR RED BACKGROUND REGULATORY SIGNS

(STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)



REQUIREMENTS FOR FOUR SPECIFIC SIGNS ONLY

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	WHITE	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE B OR C SHEETING
LEGEND	RED	TYPE B OR C SHEETING

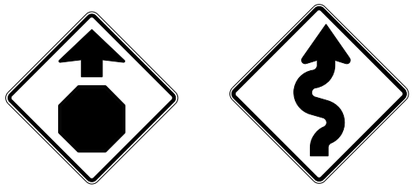
REQUIREMENTS FOR WHITE BACKGROUND REGULATORY SIGNS

(EXCLUDING STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND, BORDERS AND SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR WARNING SIGNS



TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	FLOURESCENT YELLOW	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR SCHOOL SIGNS

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	FLOURESCENT YELLOW GREEN	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
SYMBOLS	RED	TYPE B OR C SHEETING

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).
2. Sign legend shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets (B, C, D, E, Emod or F).
3. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.
4. Black legend and borders shall be applied by screening process or cut-out acrylic non-reflective black film to background sheeting, or combination thereof.
5. White legend and borders shall be applied by screening process with transparent colored ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof.
6. Colored legend shall be applied by screening process with transparent colored ink, transparent colored overlay film or colored sheeting to background sheeting, or combination thereof.
7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.
8. Mounting details for roadside mounted signs are shown in the "SMD series" Standard Plan Sheets.

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

DEPARTMENTAL MATERIAL SPECIFICATIONS	
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

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

http://www.txdot.gov/

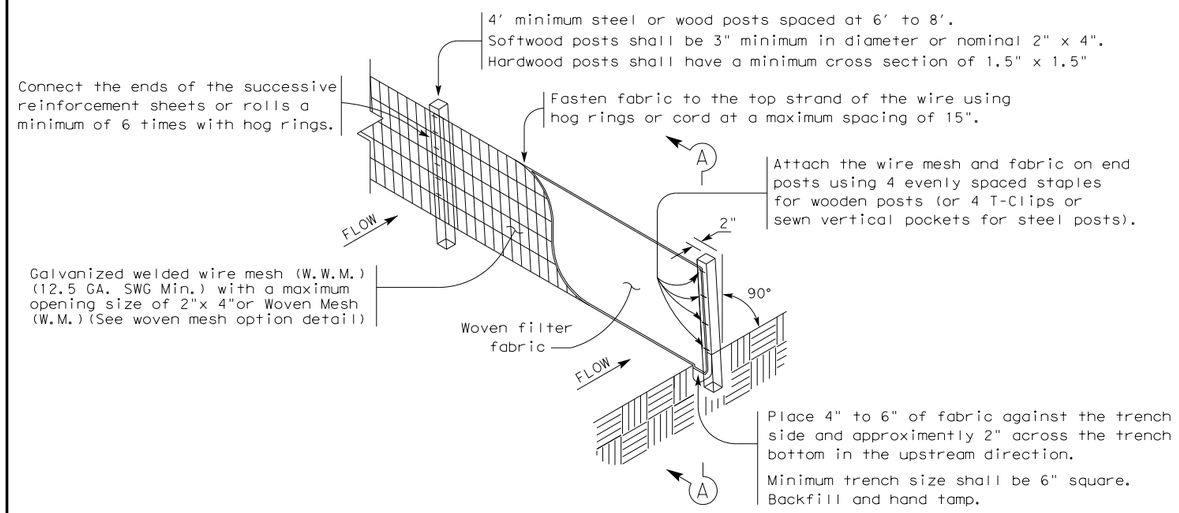
Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

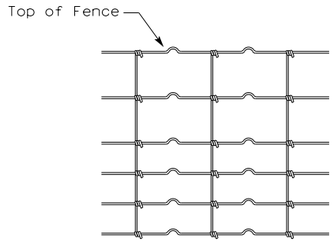
TSR(4)-13

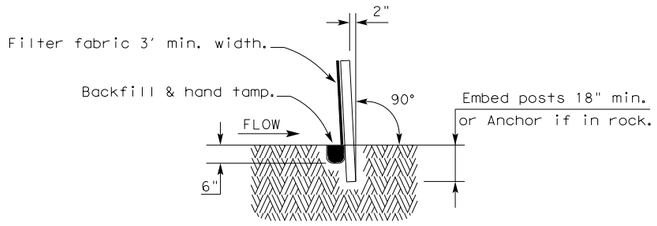
FILE: tsr4-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0266	01	086	SH 71
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	YKM	FAYETTE		154



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.

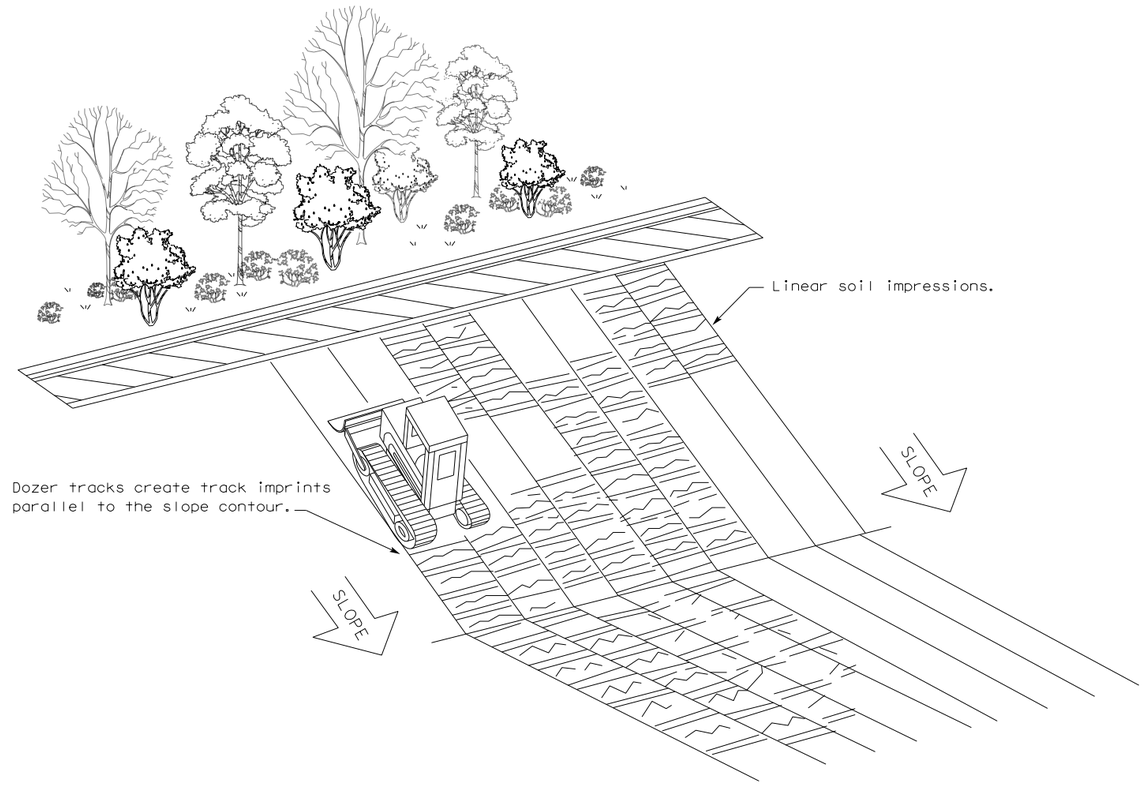
LEGEND

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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© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY	
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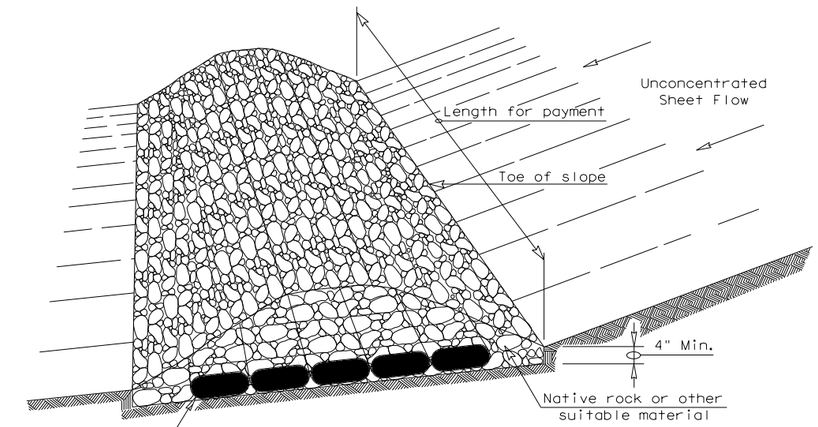
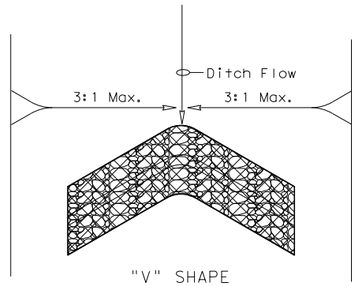


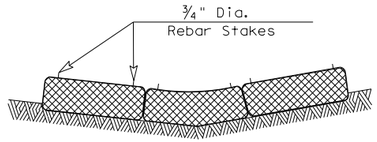
FILTER DAM AT TOE OF SLOPE

RFD1

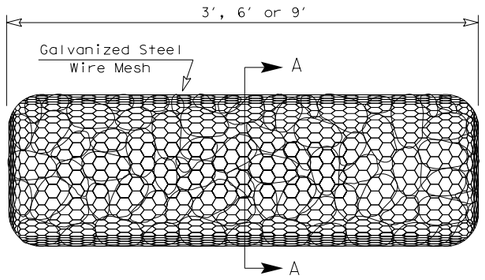


"V" SHAPE
PLAN VIEW

PLAN VIEW

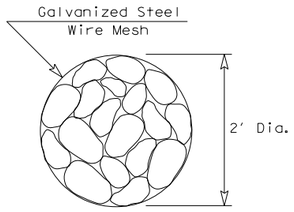


SECTION B-B

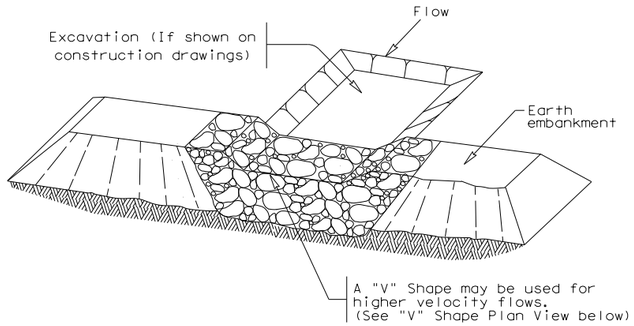


TYPE 4 (SACK GABIONS)

RFD4

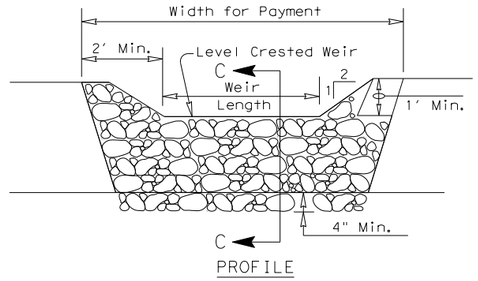


SECTION A-A

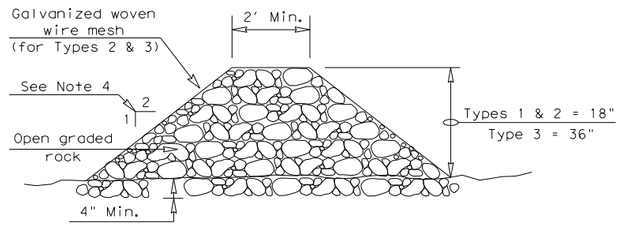


FILTER DAM AT SEDIMENT TRAP

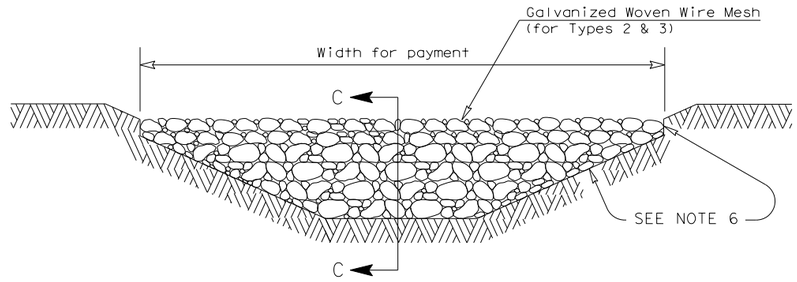
RFD1 OR RFD2



PROFILE



SECTION C-C



FILTER DAM AT CHANNEL SECTIONS

RFD1 OR RFD2 OR RFD3

GENERAL NOTES

1. If shown on the plans or directed by the Engineer, filter dams should be placed near the toe of slopes where erosion is anticipated, upstream and/or downstream at drainage structures, and in roadway ditches and channels to collect sediment.
2. Materials (aggregate, wire mesh, sandbags, etc.) shall be as indicated by the specification for "Rock Filter Dams for Erosion and Sedimentation Control".
3. The rock filter dam dimensions shall be as indicated on the SW3P plans.
4. Side slopes should be 2:1 or flatter. Dams within the safety zone shall have sideslopes of 6:1 or flatter.
5. Maintain a minimum of 1' between top of rock filter dam weir and top of embankment for filter dams at sediment traps.
6. Filter dams should be embedded a minimum of 4" into existing ground.
7. The sediment trap for ponding of sediment laden runoff shall be of the dimensions shown on the plans.
8. Rock filter dam types 2 & 3 shall be secured with 20 gauge galvanized woven wire mesh with 1" diameter hexagonal openings. The aggregate shall be placed on the mesh to the height & slopes specified. The mesh shall be folded at the upstream side over the aggregate and tightly secured to itself on the downstream side using wire ties or hog rings. For in stream use, the mesh should be secured or staked to the stream bed prior to aggregate placement.
9. Sack Gabions should be staked down with ¾" dia. rebar stakes, and have a double-twisted hexagonal weave with a nominal mesh opening of 2 ½" x 3 ¼"
10. Flow outlet should be onto a stabilized area (vegetation, rock, etc.).
11. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

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.

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

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