DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		050229	1	39
				(2) BRIER CREEK STR. AND APPRS. (S)				

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
CONSTRUCTION PLANS FOR STATE HIGHWAY

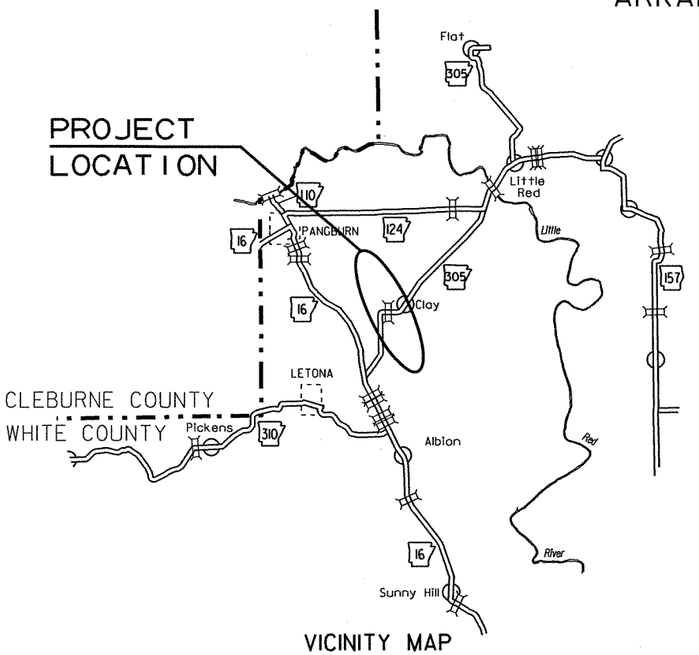
BRIER CREEK
STR. & APPRS. (S)

WHITE COUNTY

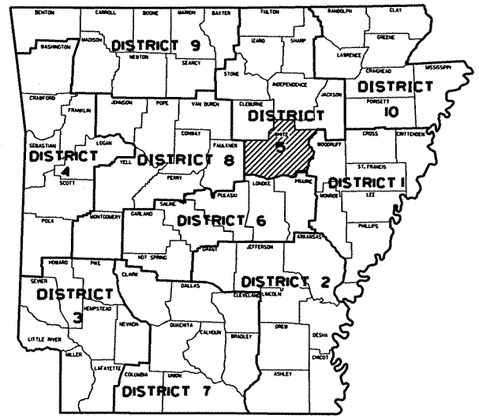
ROUTE 305 SECTION 3

JOB 050229

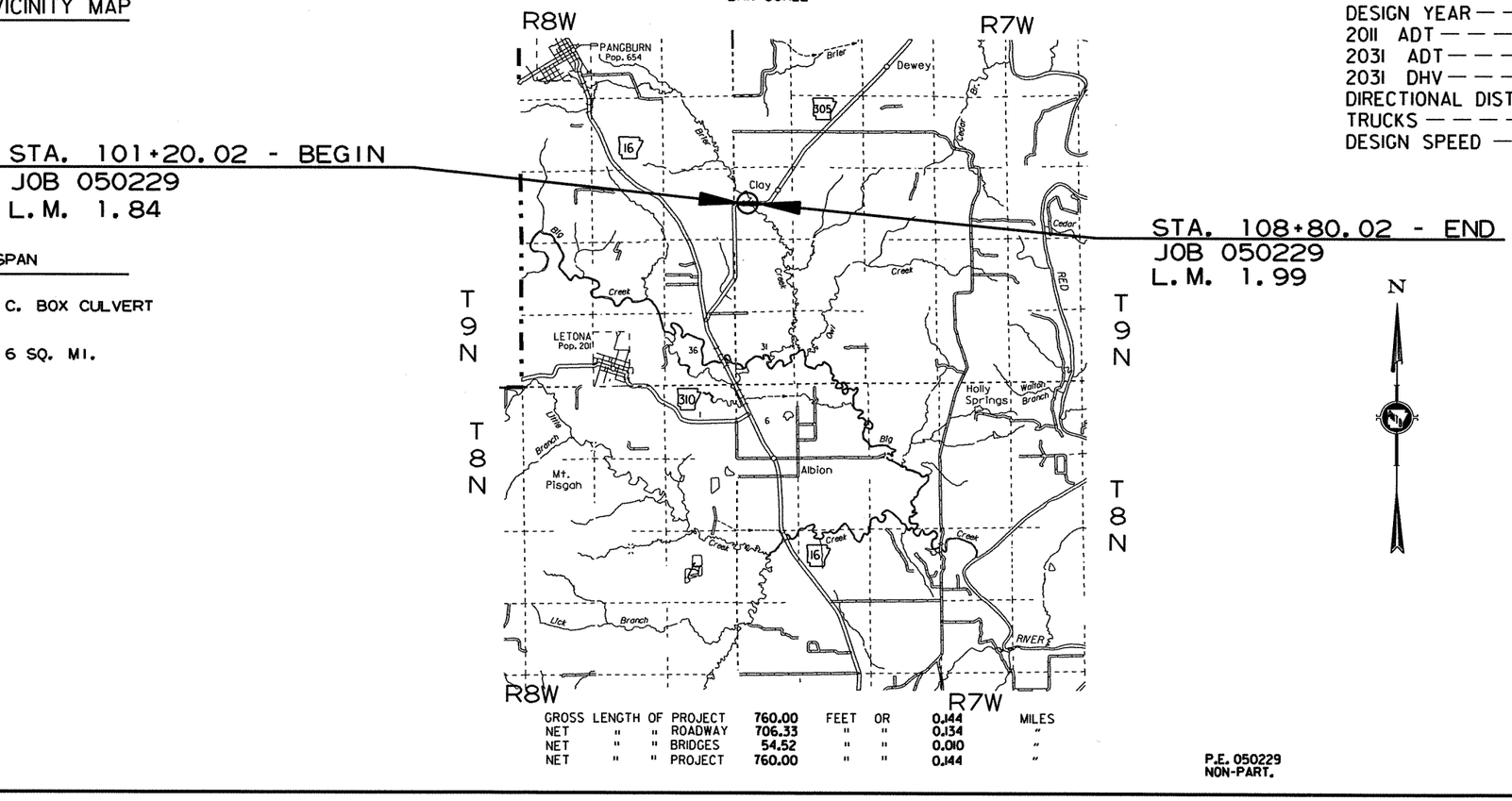
FED. AID PROJ. - BRN-0073(53)



VICINITY MAP



ARK. HWY. DIST. NO. 5



STA. 101+20.02 - BEGIN
JOB 050229
L.M. 1.84

STA. 108+80.02 - END
JOB 050229
L.M. 1.99

STRUCTURES OVER 20'-0" SPAN

STA. 105+06 CONSTRUCT
QUAD. 12' X 10' X 89' R.C. BOX CULVERT
@ 15° RT. FWD. SKEW
WITH 3:1 WINGS LT. & RT.
Q25 = 3300 CFS D.A. = 7.6 SQ. MI.
ROADWAY SPAN = 54.52'

BEGINNING:	
LAT: N35° 23' 40"	
LONG: W91° 47' 45"	
MID POINT:	
LAT: N35° 23' 40"	
LONG: W91° 47' 38"	
ENDING:	
LAT: N35° 23' 39"	
LONG: W91° 47' 32"	

• DESIGN TRAFFIC DATA •

DESIGN YEAR	2031
2011 ADT	1200
2031 ADT	1500
2031 DHV	165
DIRECTIONAL DISTRIBUTION	60 %
TRUCKS	19 %
DESIGN SPEED	60 MPH

GROSS LENGTH OF PROJECT	760.00	FEET	OR	0.144	MILES
NET " " ROADWAY	706.33	"	"	0.134	"
NET " " BRIDGES	54.52	"	"	0.010	"
NET " " PROJECT	760.00	"	"	0.144	"

P.E. 050229
NON-PART.

APPROVED

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 3918
FRANK VOZEL

10/21/11
DEPUTY DIRECTOR
AND CHIEF ENGINEER

8/26/2010 r050229.dgn

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		050229	2	39

(2) INDEX OF SHEETS, GOV. SPECS. & GEN. NOTES

INDEX OF SHEETS

SHEET NO.	TITLE	DRAWING NO.	DATE
1	TITLE SHEET		
2	INDEX OF SHEETS, GOVERNING SPECIFICATIONS, AND GENERAL NOTES		
3-4	TYPICAL SECTIONS OF IMPROVEMENT		
5	SPECIAL DETAILS		
6	SPECIAL EMBANKMENT DETAILS		
7	TEMPORARY EROSION CONTROL DETAILS		
8-10	MAINTENANCE OF TRAFFIC DETAILS		
11-13	QUANTITY SHEETS		
14	SUMMARY OF QUANTITIES AND REVISIONS		
15-16	SURVEY CONTROL DETAILS		
17	PLAN AND PROFILE SHEETS		
18	DETOUR PLAN AND PROFILE SHEET		
19	PRECAST CONCRETE BOX CULVERTS	PBC-1	10-15-09
20	CONCRETE PIPE CULVERT FILL HEIGHTS & BEDDING	PCC-1	5-18-00
21	METAL PIPE CULVERT FILL HEIGHTS & BEDDING	PCM-1	3-30-00
22	PAVEMENT MARKING DETAILS	PM-1	11-17-10
23	DETAILS OF PIPE UNDERDRAIN	PU-1	4-10-03
24	REINFORCED CONCRETE BOX CULVERT DETAILS	RCB-1	5-25-06
25	EXCAVATION PAY LIMITS, BACKFILL, & SOLID SODDING FOR BOX CULVERTS	RCB-2	11-20-03
26	TABLES AND METHOD OF SUPERELEVATION FOR TWO-WAY TRAFFIC	SE-2	10-18-96
27	STANDARD TRAFFIC CONTROLS FOR HIGHWAY CONSTRUCTION	TC-1	11-17-10
28	STANDARD TRAFFIC CONTROLS FOR HIGHWAY CONSTRUCTION	TC-2	3-11-10
29	STANDARD TRAFFIC CONTROLS FOR HIGHWAY CONSTRUCTION	TC-3	10-15-09
30	TEMPORARY EROSION CONTROL DEVICES	TEC-1	11-18-98
31	TEMPORARY EROSION CONTROL DEVICES.	TEC-2	6-02-94
32	TEMPORARY EROSION CONTROL DEVICES	TEC-3	11-03-94
33	WIRE FENCE WATER GAPS	WF-2	4-20-79
34	WIRE FENCE TYPE C AND D	WF-4	8-22-02
35	DETAILS OF STANDARD WINGS FOR REINFORCED CONCRETE BOX CULVERTS	W-X15	6-13-63
36	DETAILS OF STANDARD WINGS FOR REINFORCED CONCRETE BOX CULVERTS	W-X153-2	6-12-63
37	DETAILS OF STANDARD BARREL SECTIONS FOR REINFORCED CONCRETE BOX CULVERTS	R-415X-0	9-04-63
38-39	CROSS SECTIONS		

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 7605
MICHAEL D. FUGETT
10-21-11

GOVERNING SPECIFICATIONS
ARKANSAS STATE HIGHWAY COMMISSION STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION, EDITION OF 2003, AND THE FOLLOWING SPECIAL PROVISIONS AND SUPPLEMENTAL SPECIFICATIONS.

NUMBER	TITLE
ERRATA	ERRATA FOR THE BOOK OF STANDARD SPECIFICATIONS
FHWA-1273	FHWA-1273 REVISIONS
FHWA-1273	REQUIRED CONTRACT PROVISIONS FEDERAL-AID CONSTRUCTION CONTRACTS
FHWA-1273	SUPPLEMENT - EQUAL EMPLOYMENT OPPORTUNITY - NOTICE TO CONTRACTORS
FHWA-1273	SUPPLEMENT- SPECIFIC EQUAL EMPLOYMENT OPPORTUNITY RESPONSIBILITIES (23 U.S.C. 140)
FHWA-1273	SUPPLEMENT - EQUAL EMPLOYMENT OPPORTUNITY - GOALS AND TIMETABLES
FHWA-1273	SUPLLEMENT - EQUAL EMPLOYMENT OPPORTUNITY - FEDERAL STANDARDS
FHWA-1273	SUPPLEMENT - POSTERS AND NOTICES REQUIRED FOR FEDERAL-AID PROJECTS
FHWA-1273	SUPPLEMENT - WAGE RATE DETERMINATION
100-2	MANUAL FOR ASSESSING SAFETY HARDWARE (MASH)
103-1	DETERMINATION OF DBE PARTICIPATION
105-1	CONSTRUCTION CONTROL MARKINGS
105-2	EQUIPMENT AND MATERIAL STORAGE ON BRIDGE STRUCTURES
107-1	WORKER VISIBILITY
108-1	LIQUIDATED DAMAGES
110-1	PROTECTION OF WATER QUALITY AND WETLANDS
303-1	AGGREGATE BASE COURSE
404-1	PRODUCTION VERIFICATION OF ASPHALT CONCRETE HOT MIX
409-1	MINERAL AGGREGATES
410-3	DENSITY TESTING FOR ACHM LEVELING COURSE AND BOND BREAKERS
411-1	ASPHALT CONCRETE COLD PLANT MIX
600-1	WATER FOR VEGETATION
603-1	MAINTENANCE OF TRAFFIC
604-1	RETROREFLECTIVE SHEETING FOR TRAFFIC CONTROL DEVICES IN CONSTRUCTION ZONES
606-1	PIPE CULVERTS FOR SIDE DRAINS
606-2	PIPE CULVERTS
718-2	REFLECTORIZED PAINT PAVEMENT MARKINGS
JOB 050229	BROADBAND INTERNET SERVICE FOR ASPHALT CONCRETE PLANT
JOB 050229	BROADBAND INTERNET SERVICE FOR FIELD OFFICE
JOB 050229	CONSTRUCTION IN SPECIAL FLOOD HAZARD AREAS
JOB 050229	GOALS FOR DISADVANTAGED BUSINESS ENTERPRISE PARTICIPATION
JOB 050229	INTERNET BIDDING
JOB 050229	NESTING SITES OF MIGRATORY BIRDS
JOB 050229	SOIL STABILIZATION
JOB 050229	STORM WATER POLLUTION PREVENTION PLAN
JOB 050229	SUBMISSION OF ASPHALT CONCRETE HOT MIX ACCEPTANCE TEST RESULTS
JOB 050229	UTILITY ADJUSTMENTS
JOB 050229	WARM MIX ASPHALT

GENERAL NOTES

1. GRADE LINE DENOTES FINISHED GRADE WHERE SHOWN ON PLANS.
2. ALL PIPE LINES, POWER, TELEPHONE AND TELEGRAPH LINES TO BE MOVED OR LOWERED BY THE RESPECTIVE OWNERS AS PER AGREEMENT WITH SUCH OWNERS.
3. ANY EQUIPMENT OR APPURTENANCE THAT INTERFERES WITH THE PROPOSED CONSTRUCTION AND WHICH MAY BE THE PROPERTY OF UTILITY SERVICE ORGANIZATIONS SHALL BE MOVED BY THE OWNERS UNLESS OTHERWISE PROVIDED.
4. ALL LAND MONUMENTS LOCATED WITHIN THE CONSTRUCTION AREA SHALL BE PROTECTED IN ACCORDANCE WITH SECTION 107.12 OF THE STANDARD SPECIFICATIONS.
5. ALL TREES THAT DO NOT DIRECTLY INTERFERE WITH THE PROPOSED CONSTRUCTION SHALL BE SPARED AS DIRECTED BY THE ENGINEER. CARE AND DISCRETION SHALL BE USED TO INSURE THAT ALL TREES NOT TO BE REMOVED SHALL BE HARMED AS LITTLE AS POSSIBLE DURING THE CONSTRUCTION OPERATIONS.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING A FENCE TO CONTROL LIVESTOCK IN AREAS WHERE PASTURES ARE SEVERED. WIRE FENCE MAY BE CONSTRUCTED INITIALLY, OR IN LIEU THEREOF, THE CONTRACTOR AT HIS OWN EXPENSE, MAY ELECT TO PROVIDE TEMPORARY FENCING SUITABLE TO CONTAIN LIVESTOCK.
7. THIS PROJECT IS COVERED UNDER A NATIONWIDE 14 SECTION 404 PERMIT. REFER TO SECTION 110 OF THE STANDARD SPECIFICATIONS, EDITION OF 2003, FOR PERMIT REQUIREMENTS.
8. ALL FLEXIBLE BASE AND ASPHALTIC PAVEMENTS REMOVED SHALL BE PAID FOR UNDER THE ITEM NO. 210 UNCLASSIFIED EXCAVATION.
9. THE EXISTING ASPHALT PAVEMENT TO BE REMOVED FROM THE REMAINING PAVEMENT SHALL BE SEPARATED BY SAWING ALONG A NEAT LINE. AFTER SAWING, THE PAVEMENT TO BE REMOVED SHALL BE CAREFULLY REMOVED IN A MANNER THAT WILL NOT DAMAGE THE PAVEMENT THAT IS TO REMAIN. ANY DAMAGE OF THE ASPHALT PAVEMENT THAT IS TO REMAIN IN PLACE SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.

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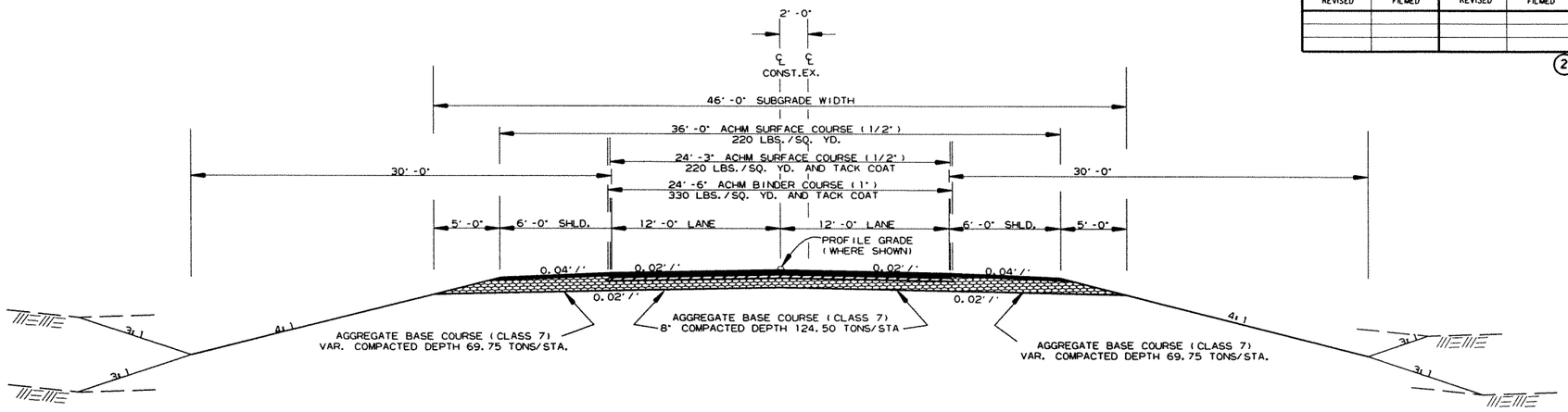
				6	ARK.			
				JOB NO.		050229	3	39

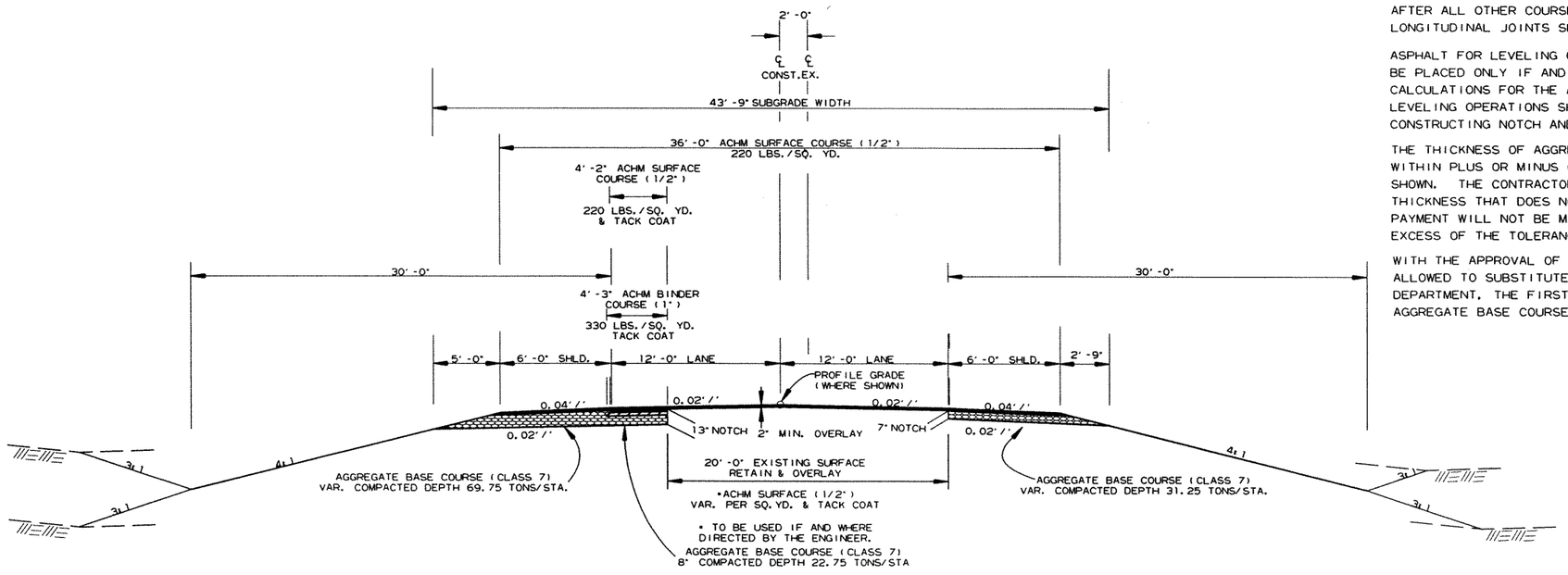
(2) TYPICAL SECTIONS OF IMPROVEMENT

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 7905
MICHAEL D. FUGETT
10-21-11



TYPICAL SECTION OF IMPROVEMENT
FULL DEPTH

STA. 104+33.01 TO STA. 105+75.86



TYPICAL SECTION OF IMPROVEMENT
NOTCH & WIDENING

STA. 101+20.02 TO STA. 104+33.01
STA. 105+75.86 TO STA. 108+80.02

NOTES:
REFER TO CROSS SECTIONS FOR DEVIATION FROM THE NORMAL SLOPES. NO CHANGES SHALL BE MADE FROM THE PLANNED SLOPES WITHOUT THE APPROVAL OF THE ENGINEER.

THE FINAL 2" OF SURFACE COURSE IS TO BE PLACED AFTER ALL OTHER COURSES HAVE BEEN LAID. LONGITUDINAL JOINTS SHALL BE AT LANE LINES.

ASPHALT FOR LEVELING OF EXISTING PAVEMENT SHALL BE PLACED ONLY IF AND WHERE DIRECTED BY THE ENGINEER. CALCULATIONS FOR THE AMOUNT OF LEVELING AND/OR LEVELING OPERATIONS SHALL BE PERFORMED BEFORE CONSTRUCTING NOTCH AND WIDENING.

THE THICKNESS OF AGGREGATE BASE COURSE SHALL BE WITHIN PLUS OR MINUS ONE INCH OF THE PLAN THICKNESS SHOWN. THE CONTRACTOR WILL CORRECT ANY DEFICIENT THICKNESS THAT DOES NOT MEET TOLERANCE INDICATED. PAYMENT WILL NOT BE MADE FOR MATERIAL PLACED IN EXCESS OF THE TOLERANCE INDICATED.

WITH THE APPROVAL OF THE ENGINEER, THE CONTRACTOR WILL BE ALLOWED TO SUBSTITUTE, AT NO ADDITIONAL COST TO THE DEPARTMENT, THE FIRST LIFT OF ACHM SURFACE (1/2") IN LIEU OF AGGREGATE BASE COURSE ON THE SHOULDERS.

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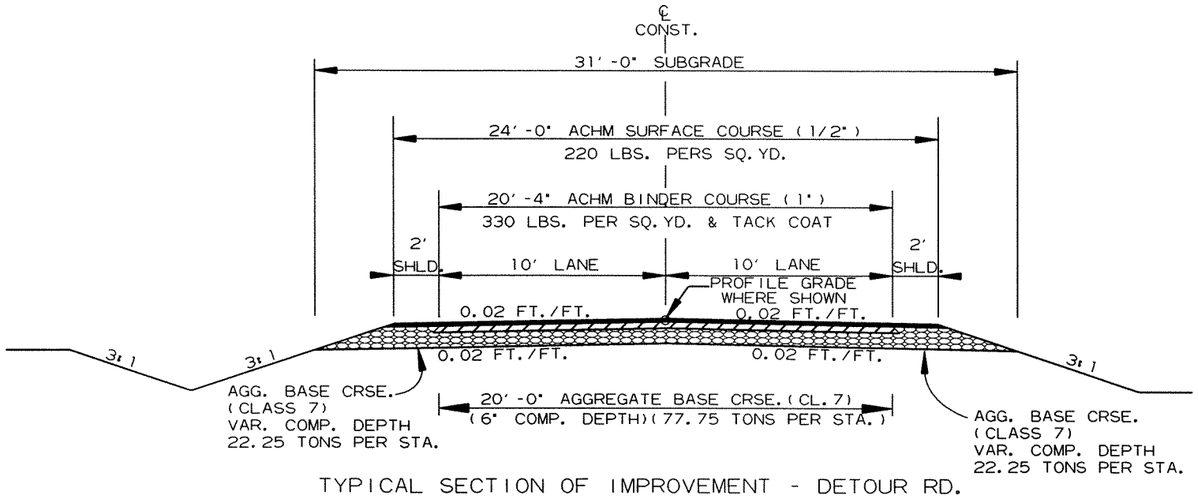
				6	ARK.			
				JOB NO.		050229	4	39

(2) TYPICAL SECTIONS OF IMPROVEMENT

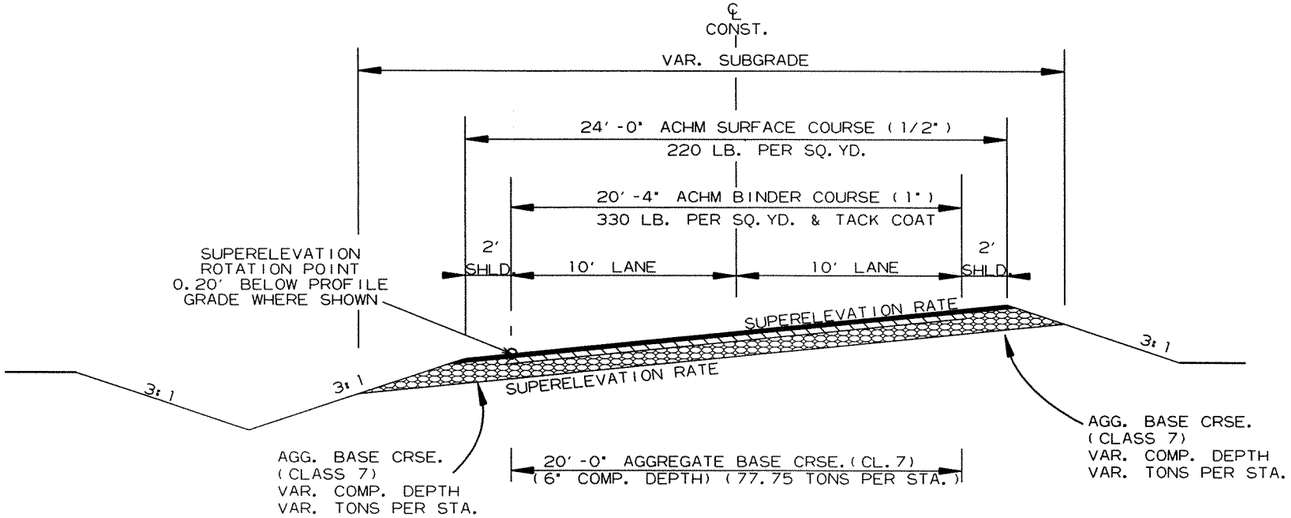


TYPICAL SECTION OF IMPROVEMENT - DETOUR RD.
NORMAL CROWN

NOTES:
REFER TO CROSS SECTIONS FOR DEVIATION FROM THE NORMAL SLOPES. NO CHANGES SHALL BE MADE FROM THE PLANNED SLOPES WITHOUT THE APPROVAL OF THE ENGINEER.

THE THICKNESS OF AGGREGATE BASE COURSE SHALL BE WITHIN PLUS OR MINUS ONE INCH OF THE PLAN THICKNESS SHOWN. THE CONTRACTOR WILL CORRECT ANY DEFICIENT THICKNESS THAT DOES NOT MEET TOLERANCE INDICATED. PAYMENT WILL NOT BE MADE FOR MATERIAL PLACED IN EXCESS OF THE TOLERANCE INDICATED.

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 7605
MICHAEL D. FUGETT
10-21-11



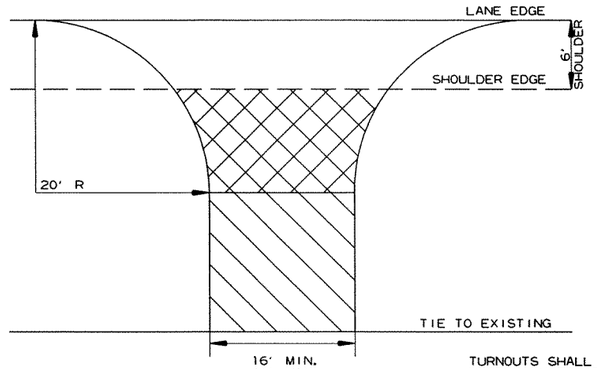
TYPICAL SECTION OF IMPROVEMENT - DETOUR RD.
SUPERELEVATION

R050229.DGN 10/19/2011

TYPICAL SECTIONS OF IMPROVEMENT

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		050229	5	39

(2) SPECIAL DETAILS

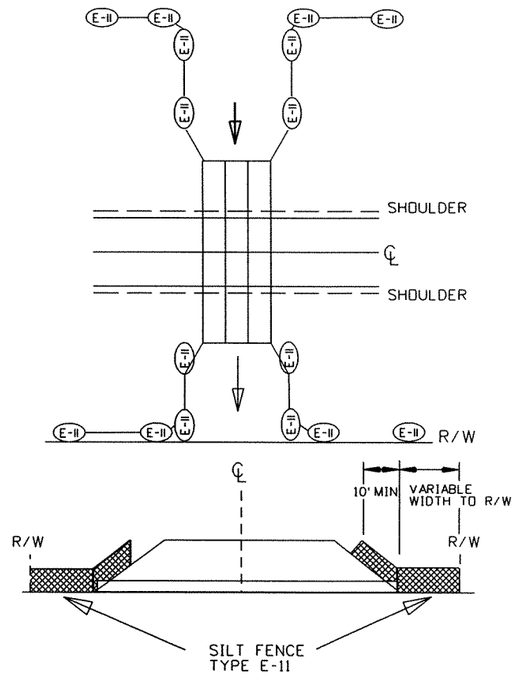


TURNOUTS SHALL BE MODIFIED AS NECESSARY TO MEET LOCAL CONDITIONS AS DIRECTED BY THE ENGINEER.

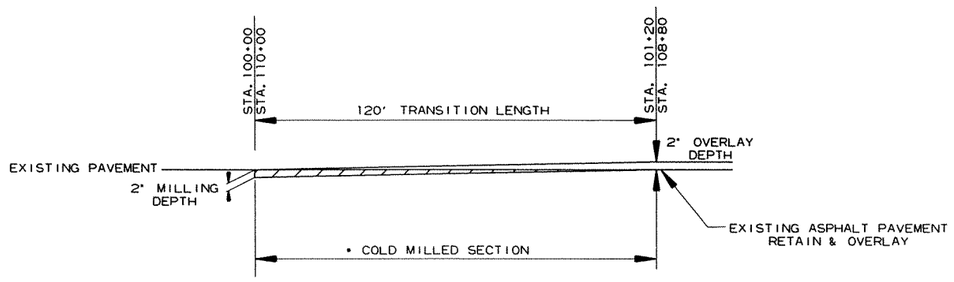
A.C.H.M. SURFACE COURSE (1/2") (220 LBS./SQ. YD.) & AGGREGATE BASE COURSE (CLASS 7)(7" COMP. DEPTH) IF ASPHALT DRIVEWAY EXISTS.

AGGREGATE BASE COURSE (CLASS 7) 9" COMP. DEPTH OR CONFORM TO EXISTING DRIVEWAY.

DETAIL FOR DRIVEWAY TURNOUTS (COLLECTORS)



DETAILS OF SILT FENCE AT CROSS DRAINS



DETAIL SHOWING TRANSITION TO EXISTING PAVEMENT

• TO BE USED AS DIRECTED BY THE ENGINEER

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 7605
MICHAEL D. FUGETT
10-21-11

R050229.DGN 10/19/2011

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				6	ARK.			
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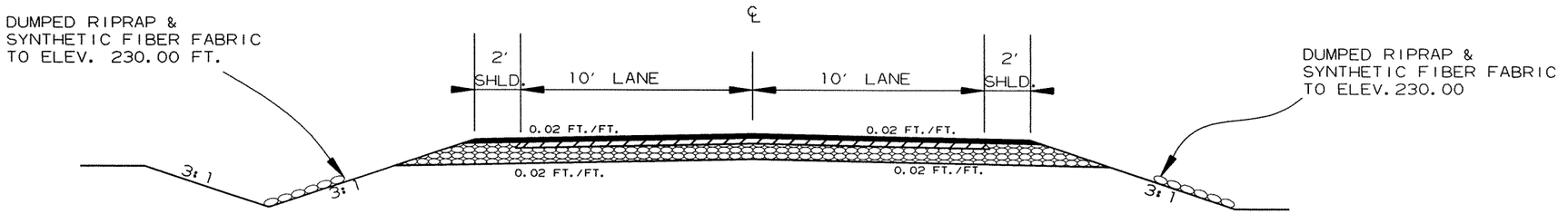
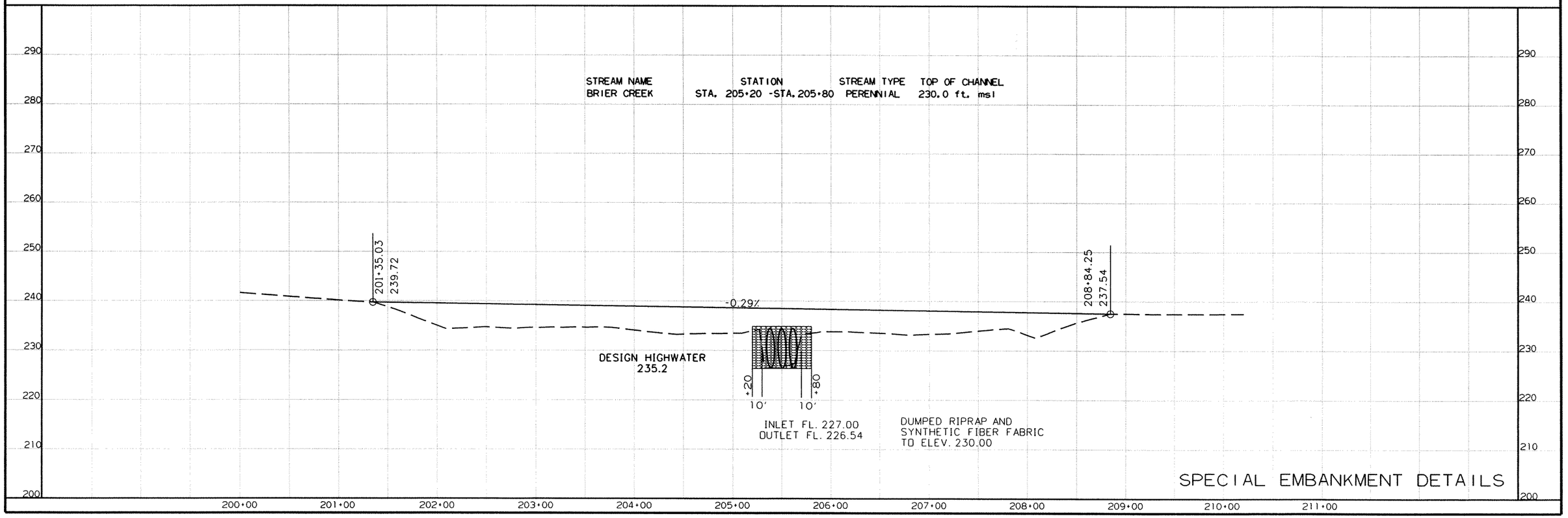
(2) SPECIAL EMBANKMENT DETAILS

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 7605
MICHAEL P. FUGETT
10-21-11



TYPICAL SECTION OF IMPROVEMENT - DETOUR RD.
STA. 205+20 - STA. 205+80

SPECIAL DETAILS FOR
DUMPED RIPRAP AND
SYNTHETIC FIBER FABRIC
BRIER CREEK



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DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		050229	7	39

(2) TEMPORARY EROSION CONTROL DETAILS

SILT FENCE (E-11)

STA.	STA.	SIDE	LIN. FT.	STAGE
100+00	103+00	LT.	300	1, 2
100+00	105+48	RT.	548	1, 2
104+50	105+38	RT.	224	2
104+75	105+62	RT.	153	2
104+83	105+58	RT.	129	1, 2
105+20	105+48	RT.	48	1, 2
105+92	106+00	RT.	24	1, 2
106+00	108+00	RT.	200	1, 2

SAND BAG DITCH CHECKS (E-5)

STA.	SIDE	BAGS	STAGE
104+50	LT.	20	1, 2
104+50	RT.	20	1, 2
105+10	RT.	20	1, 2
105+60	LT.	20	1, 2
105+75	RT.	20	1, 2
106+10	RT.	20	1, 2
109+15	LT.	20	1, 2

SEDIMENT BASIN (E-14)

STA.	SIDE	CU. YDS.	STAGE
104+25	LT.	29	2
105+50	LT.	22	2

STATE OF ARKANSAS
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MICHAEL D. FUGETT
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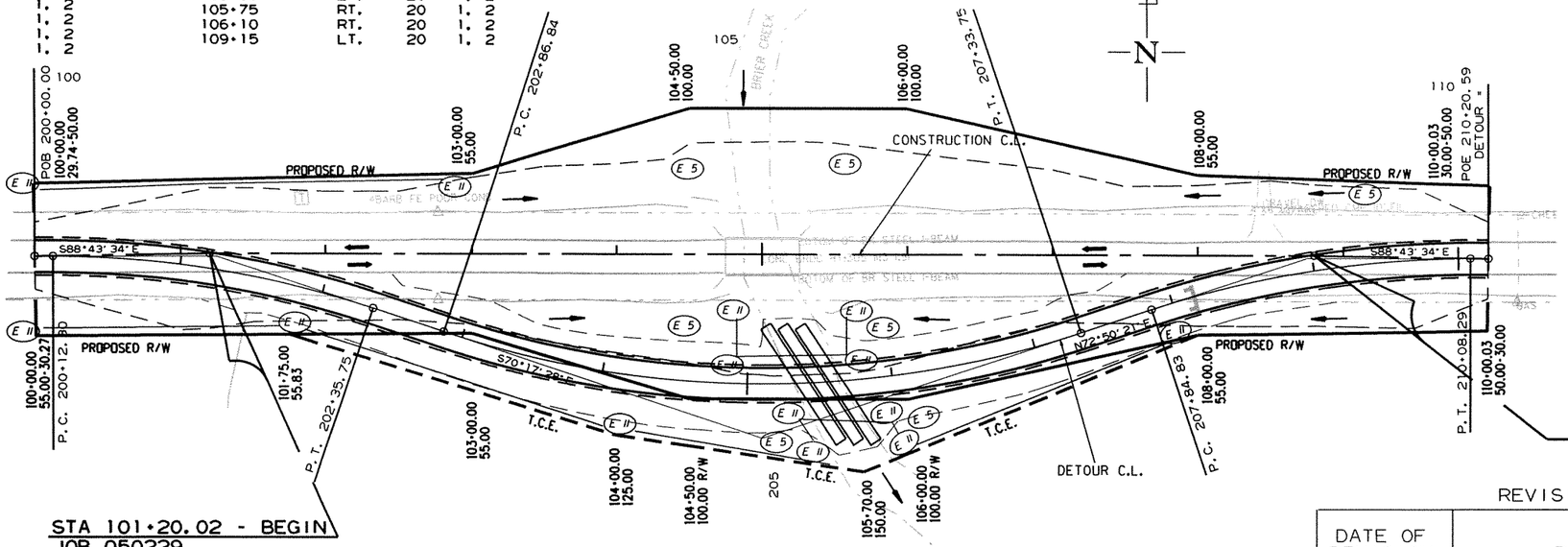


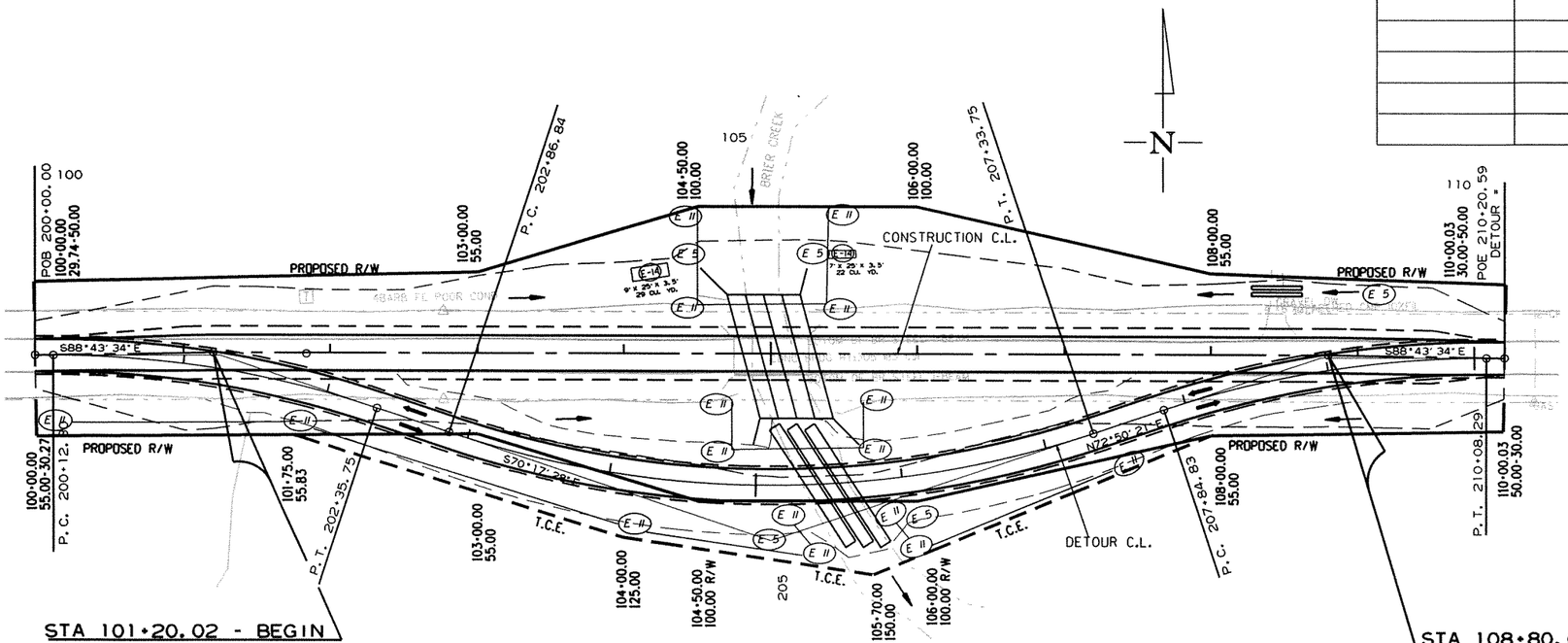
STA 101+20.02 - BEGIN
JOB 050229
L.M. 1.84

STAGE 1

STA 108+80.02 - END
JOB 050229
L.M. 1.99

REVISION BOX

DATE OF REVISION	REVISION



STA 101+20.02 - BEGIN
JOB 050229
L.M. 1.84

STAGE 2

STA 108+80.02 - END
JOB 050229
L.M. 1.99

TEMPORARY EROSION CONTROL DETAILS

R050229.DGN 10/4/2011

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		050229	8	39

(2) MAINTENANCE OF TRAFFIC DETAILS

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
NO. 7805
MICHAEL D. FUGETT
10-21-11

STA. 101+20.02
BEGIN JOB 050229
L.M. 1.84

N

100

P.I. 100+00.00

P.I. 101+20.02
Δ = 0°57'17.4" RT.

S 89°40'51" E

BIRCH CREEK

110

P.I. 108+80.02
Δ = 0°57'17.4" RT.

POE 110+00.03

(1) R4-1 (24" X 30")
DO NOT PASS

(1) W20-1 (48" x 48")
ROAD WORK 500 FT

(1) W20-1 (48" x 48")
ROAD WORK 1000 FT

(1) W20-1 (48" x 48")
ROAD WORK 1500 FT

(1) G20-2 (48" x 24")
ROAD WORK

STA. 108+80.02
END JOB 050229
L.M. 1.99

(1) G20-2 (48" x 24")
ROAD END WORK

(1) R4-1 (24" X 30")
DO NOT PASS

(1) W20-1 (48" x 48")
ROAD WORK 500 FT

(1) W20-1 (48" x 48")
ROAD WORK 1000 FT

(1) W20-1 (48" x 48")
ROAD WORK 1500 FT

R050229.DGN 10/19/2011

ADVANCE WARNING SIGNS
MAINTENANCE OF TRAFFIC DETAILS

SEQUENCE OF WORK

STAGE 1 - PLACE ADVANCE WARNING SIGNS, MAINTAIN TRAFFIC ON EXISTING ROADWAY. CONSTRUCT DETOUR AS SHOWN ON PLANS OR AS DIRECTED BY THE ENGINEER.

STAGE 2 - SHIFT AND MAINTAIN TRAFFIC ON DETOUR ROADWAY AND REMOVE EXISTING BRIDGE. CONSTRUCT R.C. BOX CULVERT AND PERMANENT DRIVEWAYS.

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				6	ARK.			
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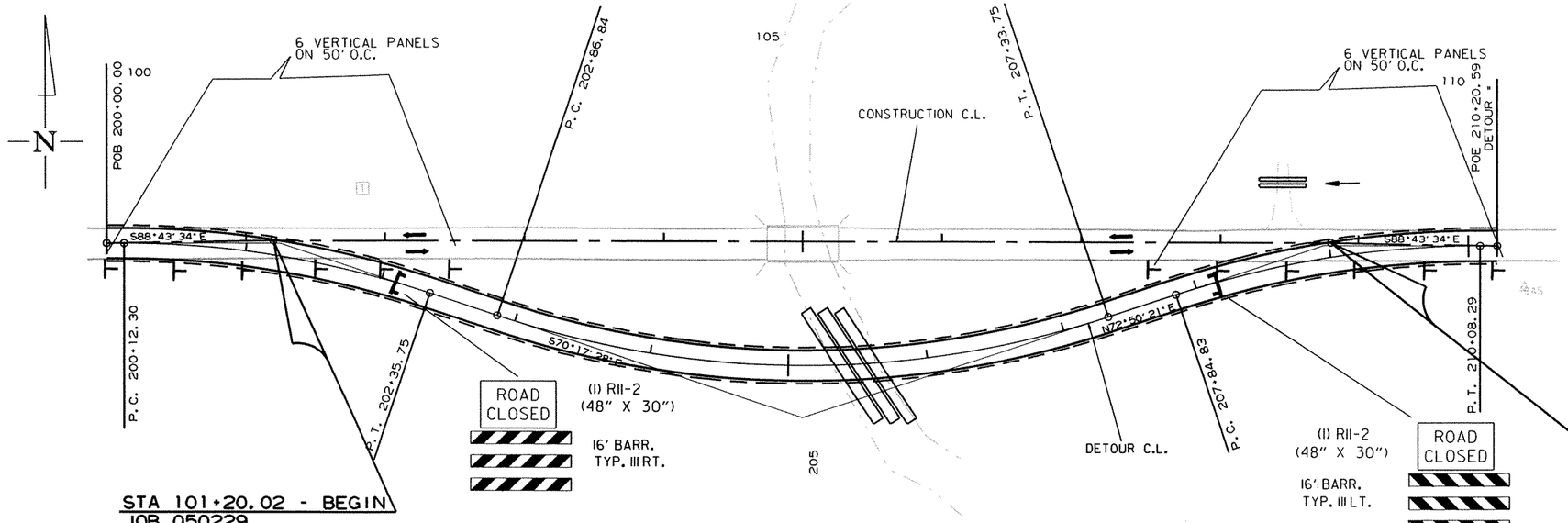
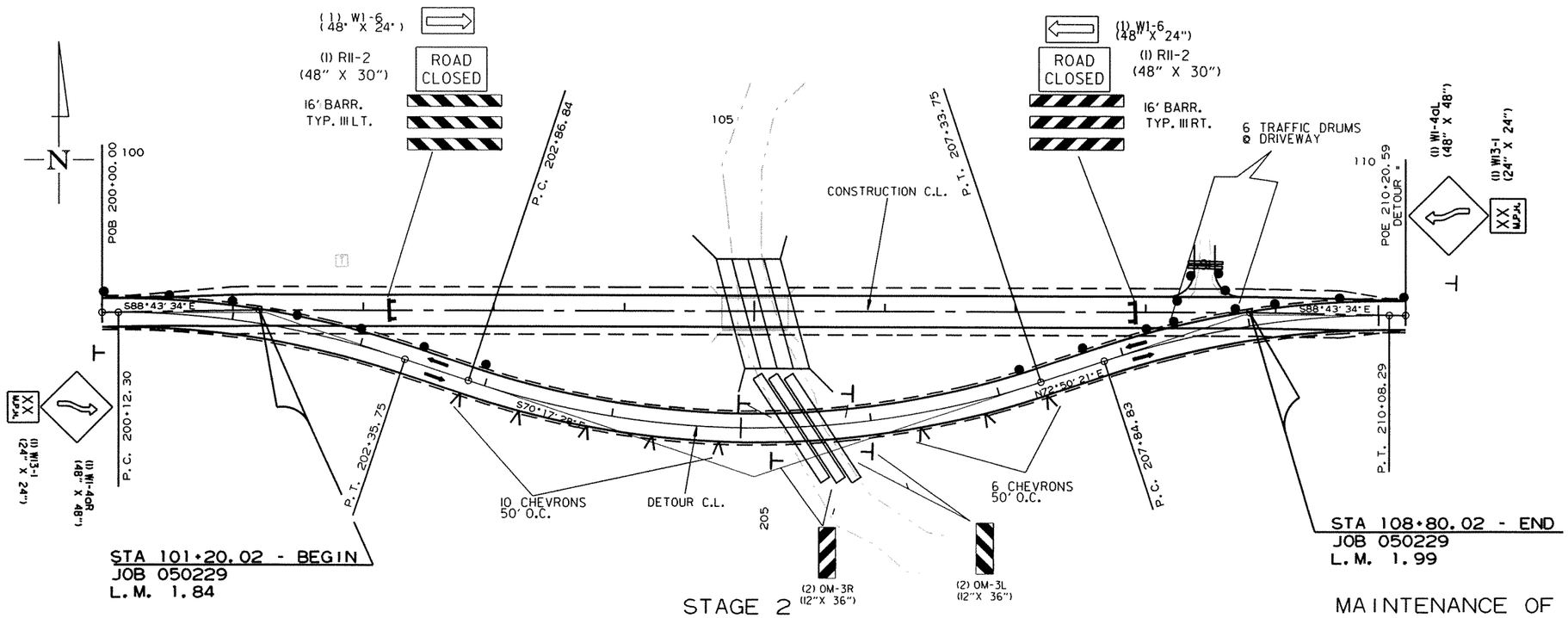
(2) MAINTENANCE OF TRAFFIC DETAILS

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 7605
MICHAEL D. FUGETT
10-21-11



STAGE 1



STAGE 2

MAINTENANCE OF TRAFFIC DETAILS

R050229.DGN 10/19/2011

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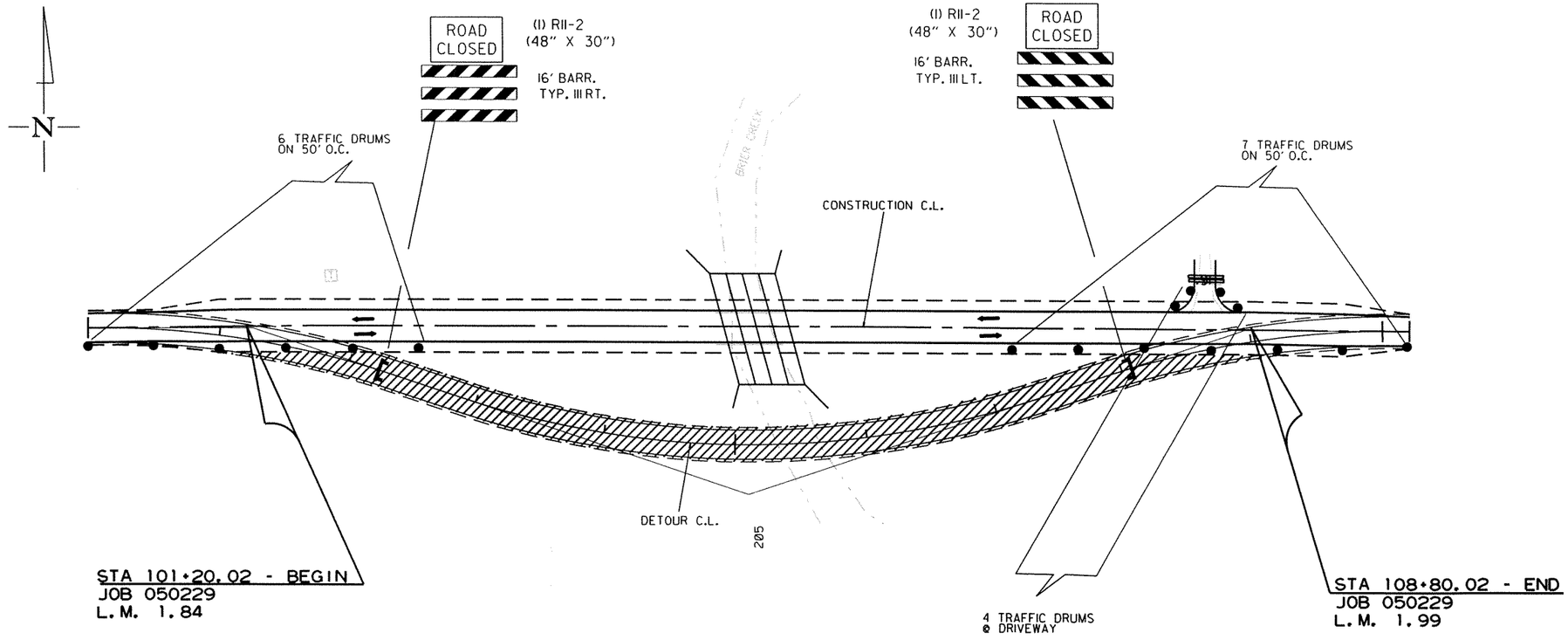
				6	ARK.			
				JOB NO.		050229	10	39

(2) MAINTENANCE OF TRAFFIC DETAILS

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 7605
MICHAEL D. FUGETT
10-21-11



OBLITERATE ROADWAY

SEQUENCE OF STRIPING

STAGE 2
REMOVAL OF PERMANENT PAVEMENT MARKINGS = 1164 LIN. FT.
CONSTRUCTION PAVEMENT MARKINGS = 4080 LIN. FT.
RAISED PAVEMENT MARKERS TYPE II (YEL/YEL) = 26 EACH

STAGE 3
REFLECTORIZED PAINT PAVEMENT MARKINGS 4" WHITE = 2020 LIN. FT.
REFLECTORIZED PAINT PAVEMENT MARKINGS 4" YELLOW = 2020 LIN. FT.

STAGE 3

R050229.DGN 10/19/2011

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		050229	11	39

(2) QUANTITIES

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 7605
MICHAEL D. FUGETT
10-21-11

ADVANCE WARNING SIGNS AND TRAFFIC CONTROL DEVICES

SIGN NUMBER	DESCRIPTION	SIGN SIZE	STAGE 1	STAGE 2	STAGE 3	MAXIMUM REQUIRED	TOTAL SIGNS REQUIRED		VERTICAL PANELS	TRAFFIC DRUMS	BARRICADES (TYPE III)	
											LEFT	RIGHT
							NO.	SQ. FT.	EACH	EACH	LIN. FT.	
W20-1	ROAD WORK 1500 FT.	48" X 48"	2	2	2	2	2	32				
W20-1	ROAD WORK 1000 FT.	48" X 48"	2	2	2	2	2	32				
W20-1	ROAD WORK 500 FT.	48" X 48"	2	2	2	2	2	32				
G20-2	END ROAD WORK	48" X 24"	2	2	2	2	2	16				
W1-4aR	REVERSE CURVE RT.	48" X 48'		1	1	1	1	16				
W1-4aL	REVERSE CURVE LT.	48" X 48"		1	1	1	1	16				
W1-3-1	SPEED LIMIT (ADVISORY)	24" X 24"	2	2	2	2	2	8				
W1-6	ARROWS	48" X 24"		2		2	2	16				
OM-3R	OBJECT MARKER	12" X 36"	2	2	2	2	2	6				
OM-3L	OBJECT MARKER	12" X 36"	2	2	2	2	2	6				
WI-8	CHEVRONS	18" X 24"		16		16	16	48				
R4-1	DO NOT PASS	24" X 30"		2	2	2	2	10				
	VERTICAL PANELS		12			12			12			
	TRAFFIC DRUMS			19	17	19				19		
	TYPE III BARRICADES - RT. (16')		16	16	16	16						16
	TYPE III BARRICADES - LT. (16')		16	16	16	16					16	
TOTALS								238	12	19	16	16

NOTE: THIS IS A LOW VOLUME ROAD AS DEFINED IN SECTION 604.03 OF THE STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION, EDITION OF 2003.

CONSTRUCTION PAVEMENT MARKINGS AND PERMANENT PAVEMENT MARKINGS

DESCRIPTION	STAGE 1	STAGE 2	STAGE 3	CONSTRUCTION PAVEMENT MARKINGS	REMOVAL OF PERMANENT PAVEMENT MARKINGS	REFLECTORIZED PAINT PAVEMENT MARKINGS (4")		RAISED PAVEMENT MARKERS TYPE II
						WHITE	YELLOW	(YEL/YEL)
				LIN. FT.	LIN. FT.	LIN. FT.		EACH
CONSTRUCTION PAVEMENT MARKINGS		4080		4080				
REMOVAL OF PERMANENT PAVEMENT MARKINGS		1164			1164			
REFLECTORIZED PAINT PAVEMENT MARKINGS WHITE (4")			2020			2020		
REFLECTORIZED PAINT PAVEMENT MARKINGS YELLOW (4")			2020				2020	
RAISED PAVEMENT MARKERS (TYPE II) (YEL/YEL)		26						26
TOTALS				4080	1164	2020	2020	26

NOTE: THIS IS A LOW VOLUME ROAD AS DEFINED IN SECTION 604.03 OF THE STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION, EDITION OF 2003.

CLEARING AND GRUBBING

STATION	STATION	CLEARING	GRUBBING
		STATION	
100+00	110+00	10	10
TOTALS		10	10

BENCH MARKS

STATION	LOCATION	BENCH MARKS
		EACH
105+00	R.C. BOX CULVERT HEADWALL	1

SHOWN FOR INFORMATIONAL PURPOSES ONLY.
BENCH MARKS TO BE FURNISHED, PLACED AND RECORDED BY STATE FORCES.

4" PIPE UNDERDRAINS

LOCATION	4" PIPE UNDERDRAINS	UNDERDRAIN OUTLET PROTECTORS
	LIN. FT.	EACH
ENTIRE PROJECT - IF AND WHERE DIRECTED BY THE ENGINEER	1000	8
TOTALS	1000	8

NOTE: QUANTITIES ESTIMATED. SEE SECTION 104.03 OF THE STANDARD SPECIFICATIONS.

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DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		050229	12	39

(2) QUANTITIES

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 7605
MICHAEL D. PUGETT
10-21-11

ASPHALT CONCRETE PATCHING FOR MAINTENANCE OF TRAFFIC

LOCATION	ASPHALT CONC. PATCHING FOR MAINTENANCE OF TRAFFIC	TACK COAT
	TON	GALLON
ENTIRE PROJECT - IF AND WHERE DIRECTED BY THE ENGINEER	10	20
TOTALS	10	20

NOTE: QUANTITIES ESTIMATED. SEE SECTION 104.03 OF THE STANDARD SPECIFICATIONS.

ACHM PATCHING OF EXISTING ROADWAY

LOCATION	ACHM PATCHING OF EXISTING ROADWAY	TACK COAT
	TON	GALLON
ENTIRE PROJECT - IF AND WHERE DIRECTED BY THE ENGINEER	10	20
TOTALS	10	20

NOTE: QUANTITIES ESTIMATED. SEE SECTION 104.03 OF THE STANDARD SPECIFICATIONS.

REMOVAL AND DISPOSAL OF STRUCTURES

STATION	DESCRIPTION	SIDE	PIPE CULVERTS
			EACH
108+46	71"X47" 21' ARCH C.M. PIPE CULVERT	LT.	1
TOTAL			1

REMOVAL OF EXISTING BRIDGE STRUCTURES

STATION	STATION	DESCRIPTION	LUMP SUM
104+74.68	105+25.80	53' X 24' STEEL STRINGER/GRIRDER W/ CONCRETE DECK BR. NO. M2828 (SITE NO. 1)	1.00

SOIL LOG

STATION	LOCATION	DEPTH	LIQUID LIMIT	PLASTICITY INDEX	AASHTO SOIL CLASS	COLOR
		FEET				
102+00	25' RT. OF CENTER	0 - 5	31	12	A-6(8)	BROWN
102+00	5' RT. OF CENTER	0 - 5	29	12	A-6(7)	BR/GR
102+00	25' LT. OF CENTER	0 - 5	28	13	A-6 (8)	BROWN
108+00	5' LT. OF CENTER	0 - 5	29	14	A-6(9)	RD/BR
108+25	25' LT. OF CENTER	0 - 5	30	14	A-6 (10)	RED

NOTE: SOIL CHARACTERISTICS TABULATED ABOVE ARE REPRESENTATIVE AT THE LOCATION OF THE SAMPLE, AND FROM SURFACE INDICATIONS ARE TYPICAL FOR THE LIMITS SHOWN. THESE DATA ARE SHOWN FOR INFORMATION ONLY. THE STATE WILL NOT BE RESPONSIBLE FOR VARIATIONS IN THE SOIL CHARACTERISTICS AND/OR EXTENT OF THE SAME DIFFERING FROM THE ABOVE TABULATIONS.

COLD MILLING ASPHALT PAVEMENT

STATION	STATION	DESCRIPTION	LENGTH	WIDTH	COLD MILLING ASPHALT PAVEMENT
			LIN. FT.		SQ. YD.
100+00	101+20	120' TRANSITION	120	20	267
108+80	110+00	120' TRANSITION	120	20	267
TOTAL					534

NOTE: QUANTITY ESTIMATED. TO BE USED IF AND WHERE DIRECTED BY THE ENGINEER. SEE SECTION 104.03 OF THE STANDARD SPECIFICATIONS.

EARTHWORK

STATION	STATION	LOCATION	UNCLASSIFIED EXCAVATION	COMPACTED EMBANKMENT	* SOIL STABILIZATION
			CU. YD.		TON
100+00	110+00	MAIN LANES	1756	2718	
ENTIRE	PROJECT	DETOUR CONSTRUCTION		4769	
ENTIRE	PROJECT	DETOUR REMOVAL	3103		
ENTIRE	PROJECT	DRIVEWAYS		56	
ENTIRE	PROJECT	CHANNEL EXCAVATION	100		
ENTIRE	PROJECT	IF AND WHERE DIRECTED BY THE ENGINEER.			50
TOTALS			4959	7543	50

NOTE: EARTHWORK QUANTITIES TO BE PAID AS PLAN QUANTITY.
* NOTE: QUANTITY ESTIMATED. SEE SECTION 104.03 OF THE STANDARD SPECIFICATIONS.

FENCING ITEMS

STATION	STATION	SIDE	REMOVAL AND DISPOSAL OF FENCE	WIRE FENCE (TYPE D)
			LIN. FT.	LIN.FT.
100+00	110+00	LT.	1000	1219
TOTALS			1000	1219

STRUCTURES

STATION	DESCRIPTION	96" TEMPORARY CULVERT	SPAN	HEIGHT	LENGTH	CLASS "S" CONCRETE - ROADWAY	REINFORCING STEEL ROADWAY- (GRADE 60)	UNCLASSIFIED EXCAVATION FOR STRUCTURES- ROADWAY	SOLID SODDING	WATER	STANDARD DRAWING NUMBERS
		LIN. FT.				CU. YD.	POUND	CU. YD.	SQ.YD.	M.GAL.	
105+50	INSTALL TRP. 96" X 94' TEMPORARY CULVERT ON 30^ RT. FWD. SKEW	282									PCM-1
STRUCTURE OVER 20'-0" SPAN											
105+06	CONST.QUAD. 12' X 10' X 89' R.C. BOX CULVERT ON 15^ RT.FWD. SKEW		12	10	89	523.68	84510	221	48	0.6	PBC-1, RCB-1, RCB-2, R-415X-0, W-X15, W-X153-2
TOTALS		282				523.68	84510	221	48	0.6	

BASIS OF ESTIMATE: WATER: 12.6 GAL. PER SQ.YD. SOLID SODDING.

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DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		050229	13	39

(2) QUANTITIES

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
NO. 7605
MICHAEL D. FUGETT
10-21-11

EROSION CONTROL ITEMS - PERMANENT

STATION	STATION	LOCATION	SEEDING	LIME	MULCH COVER	WATER	SECOND SEEDING APPLICATION
			ACRE	TON	ACRE	M. GAL.	ACRE
100+00	110+00	MAIN LANES	1.27	3	1.27	129.5	1.27
ENTIRE	PROJECT	DETOUR REMOVAL	0.28	1	0.28	28.6	0.28
*ENTIRE	PROJECT	MAIN LANES	1.00	2	1.00	102.0	1.00
TOTALS			2.55	6	2.55	260.1	2.55

BASIS OF ESTIMATE:
LIME ..... 2 TONS PER ACRE SEEDING;
WATER ..... 102.0 M.GAL. PER ACRE SEEDING
*QUANTITIES ARE ESTIMATED. TO BE USED IF AND WHERE DIRECTED BY THE ENGINEER. SEE SECTION 104.03 OF THE STANDARD SPECIFICATIONS.

EROSION CONTROL ITEMS - TEMPORARY

LOCATION	SAND BAG DITCH CHECKS (E-5)	SILT FENCE (E-11)	SEDIMENT BASIN (E-14)	OBLITERATION OF SEDIMENT BASIN	*SEDIMENT REMOVAL AND DISPOSAL	TEMPORARY SEEDING	MULCH COVER	WATER	DUMPED RIPRAP	FILTER BLANKET
	BAG	LIN. FT.	CU. YD.		CU. YD.	ACRE	ACRE	M.GAL.	CU. YD.	SQ. YD.
MAIN LANES - STAGE 1	100	1120			100	2.00	0.45	40.8		
MAIN LANES - STAGE 2	100	1120	51	51	100					
ENTIRE PROJECT DETOUR						0.32		6.5	44	88
TOTALS	200	2240	51	51	200	2.32	0.45	47.3	44	88

*QUANTITY ESTIMATED. TO BE USED IF AND WHERE DIRECTED BY THE ENGINEER. SEE SECTION 104.03 OF THE STANDARD SPECIFICATIONS.
BASIS OF ESTIMATE:
WATER .....20.4 M.G. / ACRE OF TEMPORARY SEEDING
SAND BAG DITCH CHECKS..... 20 BAGS / LOCATION

NOTE: TEMPORARY EROSION CONTROL DEVICES SHOWN ABOVE AND ON THE PLANS SHALL BE INSTALLED IN SUCH A SEQUENCE AS TO DETER EROSION AND SEDIMENTATION OF U.S. WATERWAYS AS EXPLAINED BY THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT.

ADDITIONAL BASE AND SURFACING - DRIVEWAYS

STATION	SIDE	LOCATION	DESCRIPTION	WIDTH	ACHM EXTENSION LENGTH	TURNOUT AREA	TOTAL DRIVEWAY AREA	AGGREGATE BASE COURSE (CLASS 7)	ACHM SURFACE COURSE (1/2") (220 LB./SQ. YD.)	42" SIDE DRAIN
				LIN.FT.		SQ. YD.	SQ. YD.	TON	TON	LIN. FT.
108+46	LT.	MAIN LANES	PRIVATE DRIVE-INSTALL DBL. 30" X 34' SIDE DRAIN	16	21	55	92	42	6	68
TOTALS								42	6	68

BASIS OF ESTIMATE:
MINERAL AGGREGATE IN ACHM SURFACE COURSE (1/2").....94.4%.....ASPHALT BINDER (PG 64-22) IN ACHM SURFACE COURSE (1/2") 5.6%
Nmax= 115 GYRATIONS
UNLESS OTHERWISE NOTED, ALL METAL PIPES ARE TO HAVE A TYPE 2 BEDDING.

BASE COURSE AND SURFACING

STATION	STATION	DESCRIPTION	LENGTH	AGGREGATE BASE COURSE (CLASS 7)		TACK COAT				ACHM BINDER COURSE (1 ") (330 LBS. PER SQ. YD.)				ACHM SURFACE COURSE (1/2 ") (220 LBS. PER SQ. YD.)			
				TONS PER STATION	TON	AVERAGE WIDTH FT.	SQ. YD.	GAL PER SQ. YD.	GALLON	AVERAGE WIDTH FT.	SQ. YD.	LBS. PER SQ. YD.	TON	AVERAGE WIDTH FT.	SQ.YD.	LBS. PER SQ. YD.	TON
100+00.00	101+20.00	MAIN LANES 120' TRANSITION	120.00			20.00	267	0.10	27					20.00	267	220	30
108+80.00	110+00.00	MAIN LANES 120' TRANSITION	120.00			20.00	267	0.10	27					20.00	267	220	30
101+20.00	104+33.00	MAIN LANES - LEVELING	313.00			20.00	696	0.10	70					20.00	696	220	77
101+20.00	104+33.00	MAIN LANES - NOTCH & WIDEN	313.00	123.75	388	28.25	982	0.10	99	4.25	148	330	25	40.17	1397	220	154
104+33.01	105+75.06	MAIN LANES - FULL DEPTH	142.05	264.00	376	48.75	769	0.03	24	24.50	387	330	64	60.25	951	220	105
105+75.00	108+80.00	MAIN LANES - LEVELING	305.00			20.00	678	0.10	68					20.00	678	220	75
105+75.00	108+80.00	MAIN LANES NOTCH & WIDEN	305.00	123.75	378	20.00	678	0.10	68	4.25	144	330	24	40.17	1361	220	150
201+35.00	208+84.00	DETOUR LANES	749.00	122.25	916	20.00	1664	0.03	50	20.58	1713	330	283	24.00	1997	220	220
TOTALS					2058				433				396				841

BASIS OF ESTIMATE:
MINERAL AGGREGATE IN ACHM SURFACE COURSE (1/2").....94.4%.....ASPHALT BINDER (PG 64-22) IN ACHM SURFACE COURSE (1/2") 5.6%
MINERAL AGGREGATE IN ACHM BINDER COURSE (1") ..... 95.5%.....ASPHALT BINDER (PG 64-22) IN ACHM BINDER COURSE (1") 4.5%
Nmax= 115 GYRATIONS

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				6	ARK.			
				JOB NO.		050229	14	39

(2) SUMMARY OF QUANTITIES AND REVISIONS

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 7605
MICHAEL D. FUGETT
10-21-11

SUMMARY OF QUANTITIES

ITEM NUMBER	ITEM	QUANTITY	UNIT
201	CLEARING	10	STATION
201	GRUBBING	10	STATION
202	REMOVAL AND DISPOSAL OF FENCE	1000	LIN. FT.
202	REMOVAL AND DISPOSAL OF PIPE CULVERTS	1	EACH
210	UNCLASSIFIED EXCAVATION	4959	CU. YD.
210	COMPACTED EMBANKMENT	7543	CU. YD.
SP& 210	SOIL STABILIZATION	50	TON
SS& 303	AGGREGATE BASE COURSE (CLASS 7)	2100	TON
401	TACK COAT	473	GALLON
SP,SS&406	MINERAL AGGREGATE IN ACHM BINDER COURSE (1")	378	TON
SP,SS&406	ASPHALT BINDER (PG 64-22) IN ACHM BINDER COURSE (1")	18	TON
SP,SS&407	MINERAL AGGREGATE IN ACHM SURFACE COURSE (1/2")	800	TON
SP,SS&407	ASPHALT BINDER (PG 64-22) IN ACHM SURFACE COURSE (1/2")	47	TON
412	COLD MILLING ASPHALT PAVEMENT	534	SQ. YD.
SP,SS&414	ASPHALT CONCRETE PATCHING FOR MAINTENANCE OF TRAFFIC	10	TON
SP,SS&415	ACHM PATCHING OF EXISTING ROADWAY	10	TON
601	MOBILIZATION	1.00	LUMP SUM
SP& 602	FURNISHING FIELD OFFICE	1	EACH
SS& 603	MAINTENANCE OF TRAFFIC	1.00	LUMP SUM
603	96" TEMPORARY CULVERT	282	LIN. FT.
SS& 604	SIGNS	238	SQ. FT.
SS& 604	BARRICADES	32	LIN. FT.
SS& 604	TRAFFIC DRUMS	19	EACH
SS& 604	VERTICAL PANELS	12	EACH
SS& 604	CONSTRUCTION PAVEMENT MARKINGS	4080	LIN. FT.
604	REMOVAL OF PERMANENT PAVEMENT MARKINGS	1164	LIN. FT.
SS& 606	42" SIDE DRAIN	68	LIN. FT.
611	4" PIPE UNDERDRAINS	1000	LIN. FT.
611	UNDERDRAIN OUTLET PROTECTORS	8	EACH
619	WIRE FENCE (TYPE D)	1219	LIN. FT.
620	LIME	6	TON
620	SEEDING	2.55	ACRE
620	MULCH COVER	3.00	ACRE
SS& 620	WATER	308.0	M. GAL.
621	TEMPORARY SEEDING	2.32	ACRE
621	SILT FENCE	2240	LIN. FT.
621	SAND BAG DITCH CHECKS	200	BAG
621	SEDIMENT BASIN	51	CU. YD.
621	OBLITERATION OF SEDIMENT BASIN	51	CU. YD.
621	SEDIMENT REMOVAL AND DISPOSAL	200	CU. YD.
623	SECOND SEEDING APPLICATION	2.55	ACRE
624	SOLID SODDING	48	SQ. YD.
635	ROADWAY CONSTRUCTION CONTROL	1.00	LUMP SUM
SS& 718	REFLECTORIZED PAINT PAVEMENT MARKING WHITE (4")	2020	LIN. FT.
SS& 718	REFLECTORIZED PAINT PAVEMENT MARKING YELLOW (4")	2020	LIN. FT.
721	RAISED PAVEMENT MARKERS (TYPE II)	26	EACH
816	FILTER BLANKET	88	SQ. YD.
816	DUMPED RIPRAP	44	CU. YD.
	STRUCTURES OVER 20'-0" SPAN		
205	REMOVAL OF EXISTING BRIDGE STRUCTURE (SITE NO. 1)	1.00	LUMP SUM
801	UNCLASSIFIED EXCAVATION FOR STRUCTURES-ROADWAY	221	CU. YD.
802	CLASS S CONCRETE-ROADWAY	523.68	CU. YD.
804	REINFORCING STEEL-ROADWAY (GRADE 60)	84510	POUND

REVISION BOX

DATE	REVISION	SHEET NUMBER(S)

R050229.DGN 10/21/2011

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		050229	15	39

(2) SURVEY CONTROL DETAILS

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 17605
MICHAEL D. PUGETT
10-21-11

Coordinate System: ARKANSAS STATE PLANE - NORTH ZONE BASED ON GPS CONTROL, PROJECTED TO GROUND.
Units: U.S. SURVEY FOOT

Point Name	Northing	Easting	Elev	Feature	Description
1	385215.8141	1372717.7937	255.639	CTL	5/8" REBAR W/2" ALUM CAP
2	385886.1413	1372718.8097	251.333	CTL	5/8" REBAR W/2" ALUM CAP
3	386293.3317	1372947.8832	246.882	CTL	5/8" REBAR W/2" ALUM CAP
4	386264.2426	1373585.4726	238.368	CTL	5/8" REBAR W/2" ALUM CAP
5	386284.8398	1374168.3361	236.608	CTL	5/8" REBAR W/2" ALUM CAP
6	386237.5600	1375064.6989	237.970	CTL	5/8" REBAR W/2" ALUM CAP
7	386396.1986	1375464.4798	245.368	CTL	5/8" REBAR W/2" ALUM CAP
8	386983.3312	1375856.8373	252.214	CTL	5/8" REBAR W/2" ALUM CAP
100	381375.0911	1370004.6798	318.526	GPS	AHTD GPS 730021
101	380084.4916	1369960.3589	317.946	GPS	AHTD GPS 730021A
102	386906.9701	1367135.1814	329.640	GPS	AHTD GPS 730022
103	387746.8235	1365593.1376	333.105	GPS	AHTD GPS 730022A
900	-99999.0000	-99999.0000	264.801	TBM	
901	-99999.0000	-99999.0000	288.921	TBM	
902	-99999.0000	-99999.0000	237.679	TBM	
990	-99999.0000	-99999.0000	252.590	BM	NGS 4C
991	-99999.0000	-99999.0000	234.427	BM	NGS 4B
992	-99999.0000	-99999.0000	258.345	BM	NGS F206
1501	385865.8962	1372948.7137	245.452	CTL	5/8" RBR 2" CAP 3' E OF EDGE OF PK/LOT
1502	385665.1012	1372634.8661	255.857	CTL	5/8" RBR 2" CAP TOP MIDDLE OF LEVY
1503	385993.2290	1372572.8074	253.740	CTL	5/8" RBR 2" CAP 25' E OF NE COR BRICK HOME
1504	386358.8646	1375192.1147	239.338	CTL	5/8" RBR 2" CAP 72' N OF PP W/GUY
1505	386448.3601	1375395.5851	243.328	CTL	5/8" RBR 2" CAP 12' S OF NE COR TRLR
1506	386674.4164	1375527.3184	246.733	CTL	5/8" RBR 2" CAP 80' SE OF NE COR TRLR

*Note - Rebar and Cap - Standard - 5/8" Rebar with 2" Aluminum Cap stamped
*(standard markings common to all caps), or as indicated
(other markings indicated in the point description of the individual point).
ALL DISTANCES ARE GROUND.
USE CAF = 1.0 FOR STAKEOUT FOR THIS PROJECT.
A PROJECT CAF OF 0.999932596 HAS BEEN USED TO COMPUTE THE ABOVE GROUND COORDINATES.
THIS CAF IS INTENDED FOR USE WITHIN THE PROJECT LIMITS.
GRID DISTANCE = GROUND DISTANCE X CAF.
GRID COORDINATES ARE STORED UNDER FILE NAME. S050229G1.CTL
HORIZONTAL DATUM: NAD 83 (1997)
VERTICAL DATUM: NAVD 88 POSITIONAL ACCURACY THIRD ORDER, UNLESS SPECIFIED OTHERWISE AT A SPECIFIC POINT.

REFERENCE POINTS (1500 SERIES) ARE TO BE USED TO ESTABLISH CONTROL IF THE PRIMARY CONTROL POINTS LISTED ABOVE HAVE BEEN DESTROYED.
REFERENCE POINTS ARE NOT TO BE USED FOR VERTICAL CONTROL

BASIS OF BEARING:
ARKANSAS STATE PLANE GRID BEARINGS - 0301-NORTH ZONE ZONE
DETERMINED FROM GPS CONTROL POINTS: 730021-730021A, 730022-730022A
CONVERGENCE ANGLE: 00-07-20.26910 RIGHT AT LT: 35-23-39.22 LG: 91-47-23.39
GRID AZIMUTH = ASTRONOMICAL AZIMUTH - CONVERGENCE ANGLE.

CONST

POINT NO.	TYPE	STATION	NORTHING	EASTING
8000	POB	100+00.00	386284.6915	1373314.3470
8010	P.I.	101+20.02	386284.0230	1373434.3618
8011	P.I.	108+80.02	386267.1255	1374194.1739
8001	POE	110+00.03	386262.4579	1374314.0999

DETOUR

POINT NO.	TYPE	STATION	NORTHING	EASTING
8000	POB	100+00.00	386284.6915	1373314.3470
8004	P.C.	100+12.30	386284.6230	1373326.6442
8005	P.T.	102+31.93	386281.5347	1373546.2516
8006	P.C.	102+80.40	386280.4571	1373594.7037
8007	P.T.	107+19.64	386270.6913	1374033.8319
8008	P.C.	107+68.10	386269.6138	1374082.2841
8009	P.T.	109+87.74	386262.9362	1374301.8117
8001	POE	110+00.03	386262.4579	1374314.0999

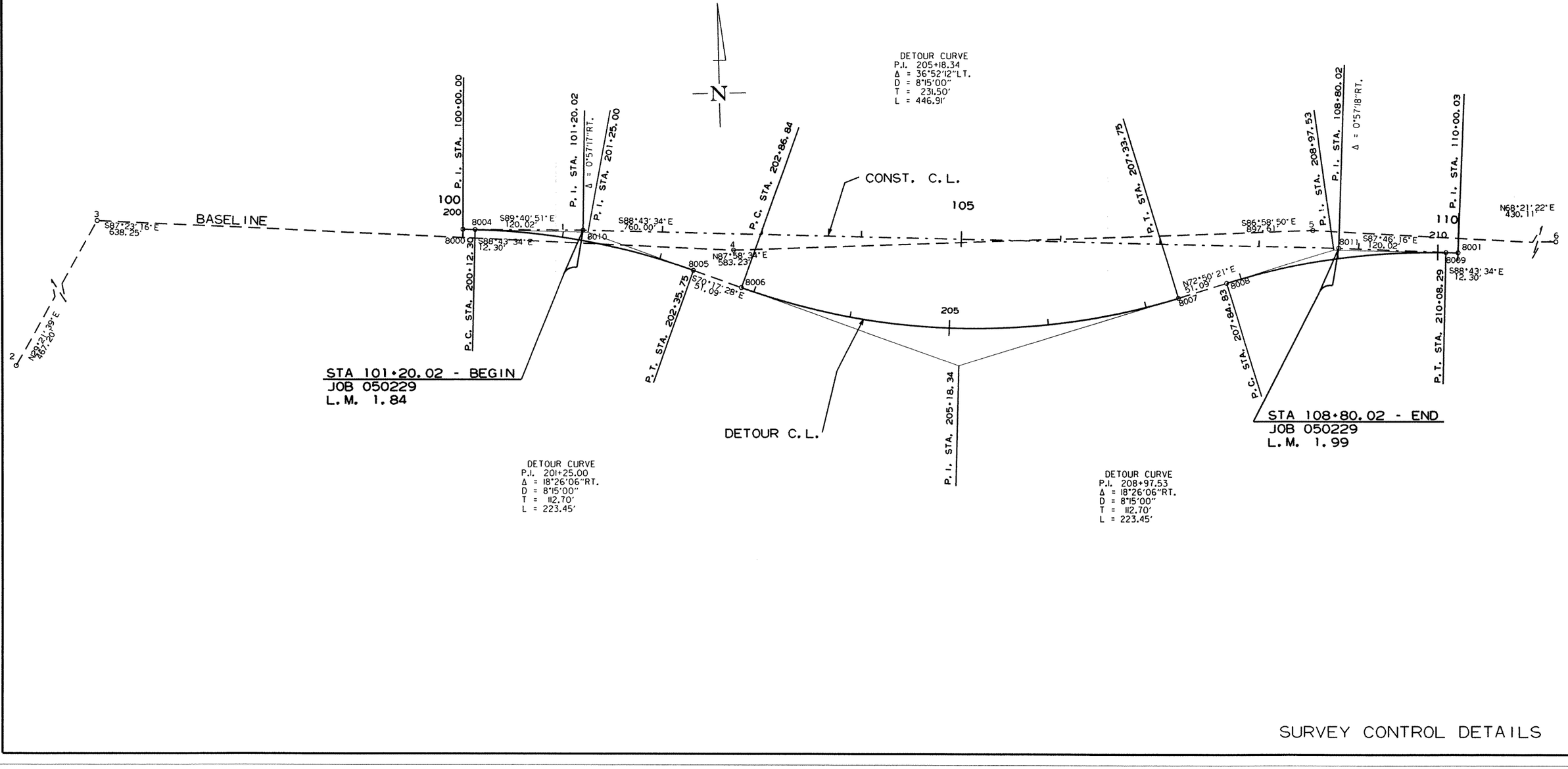
r050229.dgn 9/21/2010

SURVEY CONTROL DETAILS

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		050229	16	39

(2) SURVEY CONTROL DETAILS

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 7605
MICHAEL D. PUGETT
10-21-11



STA 101+20.02 - BEGIN
JOB 050229
L.M. 1.84

DETOUR CURVE
P.I. 201+25.00
Δ = 18°26'06"RT.
D = 8°15'00"
T = 112.70'
L = 223.45'

DETOUR CURVE
P.I. 205+18.34
Δ = 36°52'12"LT.
D = 8°15'00"
T = 231.50'
L = 446.91'

DETOUR CURVE
P.I. 208+97.53
Δ = 18°26'06"RT.
D = 8°15'00"
T = 112.70'
L = 223.45'

STA 108+80.02 - END
JOB 050229
L.M. 1.99

r050229.dgn 9/21/2010

SURVEY CONTROL DETAILS

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED

FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
6	ARK.			
JOB NO.		050229	17	39

(2) PLAN & PROFILE STA. 100+00 - STA. 110+00

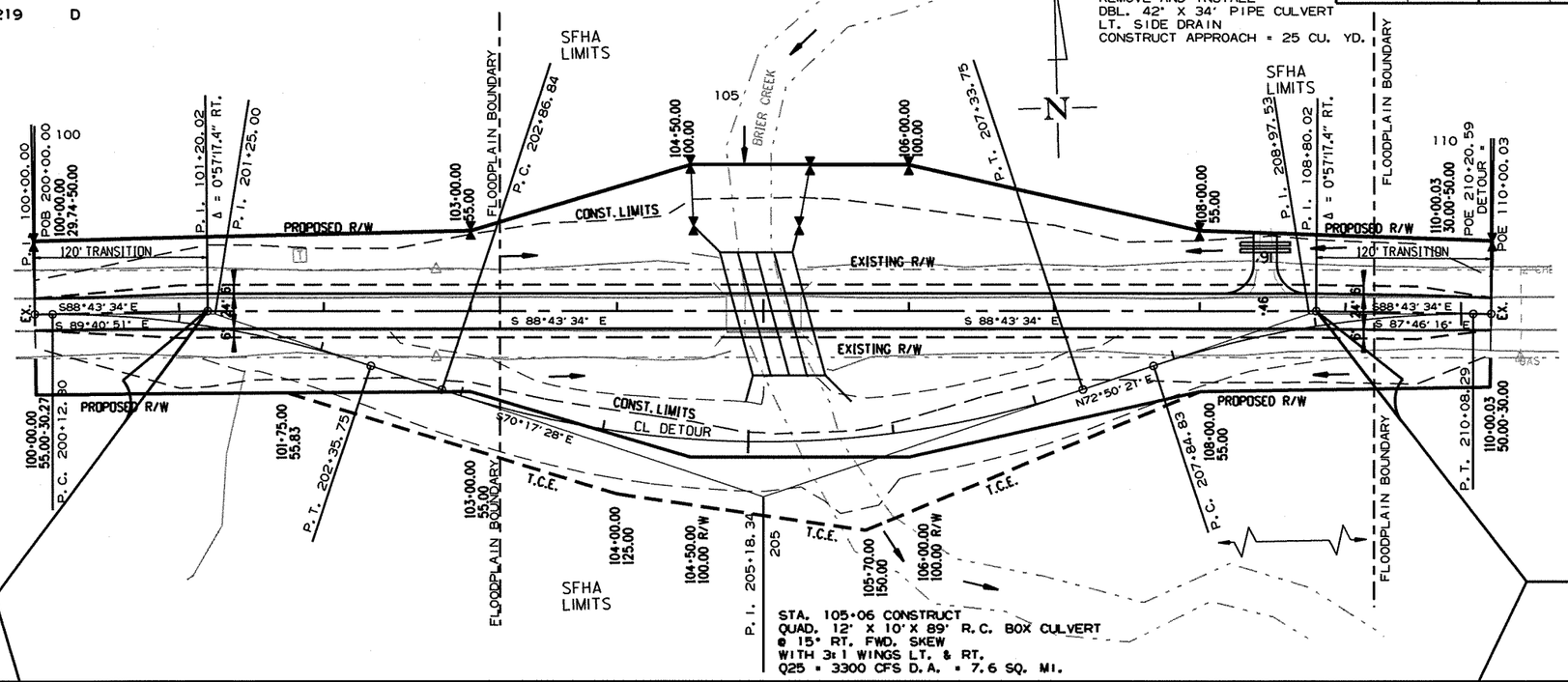
STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
NO. 7605
MICHAEL D. PUGETT
10-21-11

FENCE ITEMS

STA.	STA.	SIDE	LIN. FT.	TYPE
100+00	110+00	LT.	1219	D

STA. 104+74.68 TO STA. 105+25.80 - IN PLACE
53' X 24' CLEAR ROADWAY BRIDGE NO. M2828 AT L.M. 1.91
CONSISTING OF A STEEL STRINGER/GIRDER WITH CONCRETE DECK WITH WOOD PILINGS
REMOVE AS EXISTING BRIDGE STRUCTURE (SITE NO. 1) = 1.00 LUMP SUM

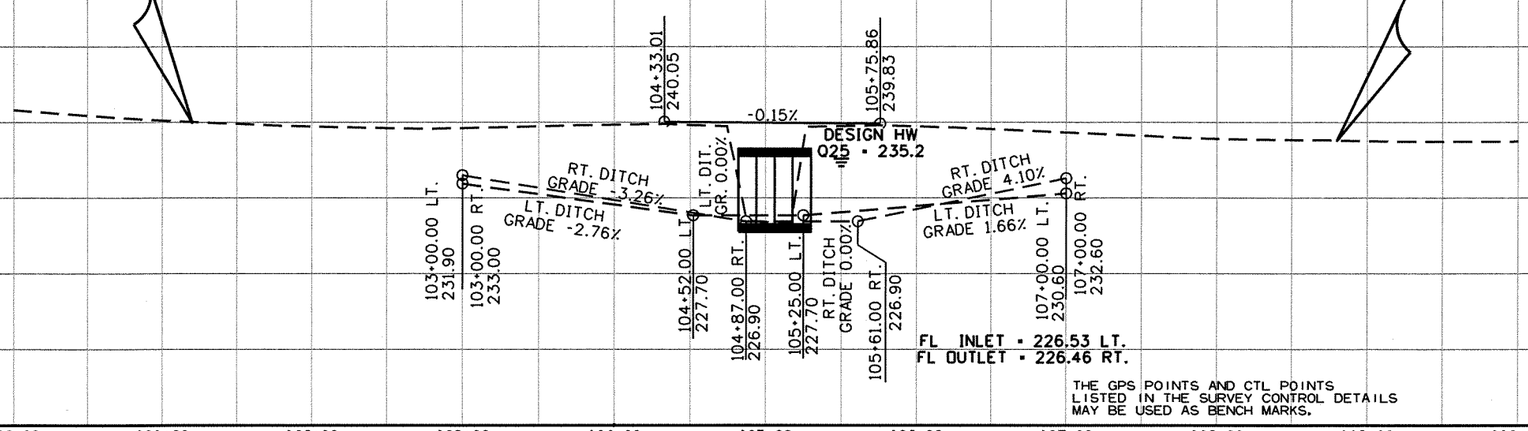
STA. 108+46 IN PLACE
71" X 47" X 21'
ARCH C.M. PIPE CULVERT
LT. SIDE DRAIN
REMOVE AND INSTALL
DBL. 42" X 34" PIPE CULVERT
LT. SIDE DRAIN
CONSTRUCT APPROACH = 25 CU. YD.



STA 101+20.02 - BEGIN
JOB 050229
L.M. 1.84

STA 108+80.02 - END
JOB 050229
L.M. 1.99

STREAM NAME	STATION	STREAM TYPE	TOP OF CHANNEL
BRIER CREEK	STA. 205+20 -STA. 205+80	PERENNIAL	230.0 ft. msl



THE GPS POINTS AND CTL POINTS LISTED IN THE SURVEY CONTROL DETAILS MAY BE USED AS BENCH MARKS.

290 280 270 260 250 240 230 220 210 200

100+00 101+00 102+00 103+00 104+00 105+00 106+00 107+00 108+00 109+00 110+00

R050229.DGN 11/3/2010

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		050229	18	39

(2) PLAN & PROFILE - DETOUR

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 7605
MICHAEL D. FUGETT
10-21-11

P.I. 205+18.34
Δ = 36°52'11.6"LT.
D = 8°15'00.0"
T = 231.50
L = 446.91
P.C. 202+86.84
P.T. 207+33.75
e = 0.100 '/'
Ls = 300

P.I. 100+00.00
POB 200+00.00
100+00.00
29.74-50.00

P.I. 101+20.02
Δ = 0°57'17.4" RT.
P.I. 201+25.00

P.C. 202+86.84

P.T. 207+33.75

P.I. 108+80.02
Δ = 0°57'17.4" RT.
P.I. 208+97.53

P.T. 210+08.29

P.C. 200+12.30

P.T. 202+35.75

P.I. 205+18.34

P.C. 207+94.83

P.I. 208+97.53
Δ = 18°26'05.8"RT.
D = 8°15'00.0"
T = 112.70
L = 223.45
P.C. 207+84.83
P.T. 210+08.29
NO SUPER

P.I. 201+25.00
Δ = 18°26'05.8"RT.
D = 8°15'00.0"
T = 112.70
L = 223.45
P.C. 200+12.30
P.T. 202+35.75
NO SUPER

STA. 105+50 INSTALL
TRIPLE 96" X 94'
TEMPORARY PIPE CULVERT
@ 30° RT. FWD. SKEW

STA 200+12.30 - BEGIN DETOUR

STA 210+08.29 END DETOUR

DETOUR

STA. 202+36 BEGIN SUPERELEVATION
STA. 205+10 MAX. SUPERELEVATION (0.091FT./FT.)
STA. 205+10 MAX. SUPERELEVATION (0.091FT./FT.)
STA. 207+84 END SUPERELEVATION

STREAM NAME	STATION	STREAM TYPE	TOP OF CHANNEL
BRIER CREEK	STA. 205+20 -STA. 205+80	PERENNIAL	230.0 ft. msl

201+35.03
239.72

208+84.25
237.54

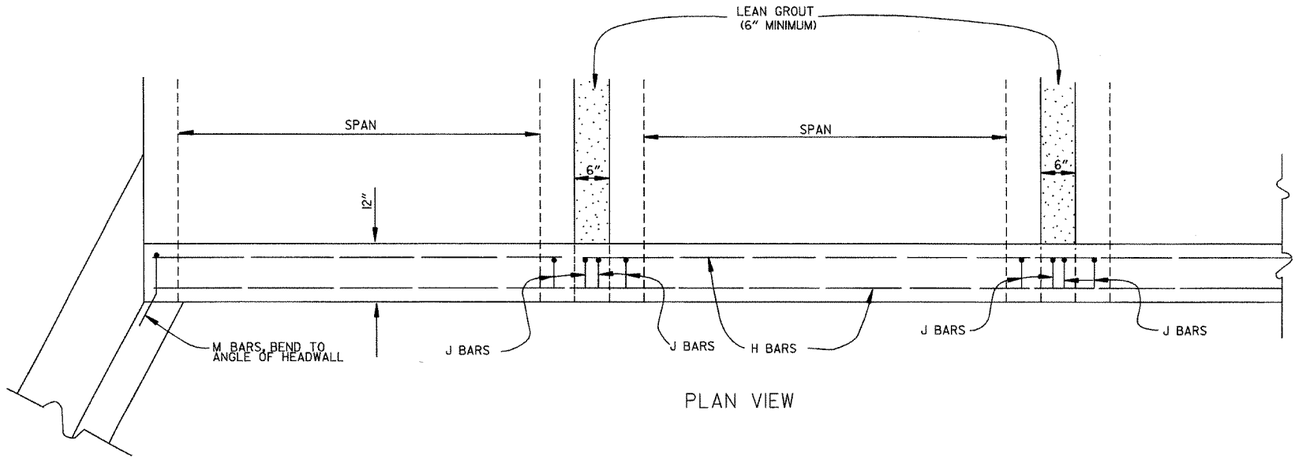
-0.29%

INLET FL. 227.00 LT.
OUTLET FL. 226.54 RT.

290 280 270 260 250 240 230 220 210 200

200+00 201+00 202+00 203+00 204+00 205+00 206+00 207+00 208+00 209+00 210+00 211+00

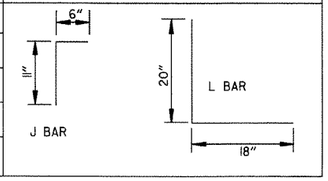
R050229.DGN 11/3/2010



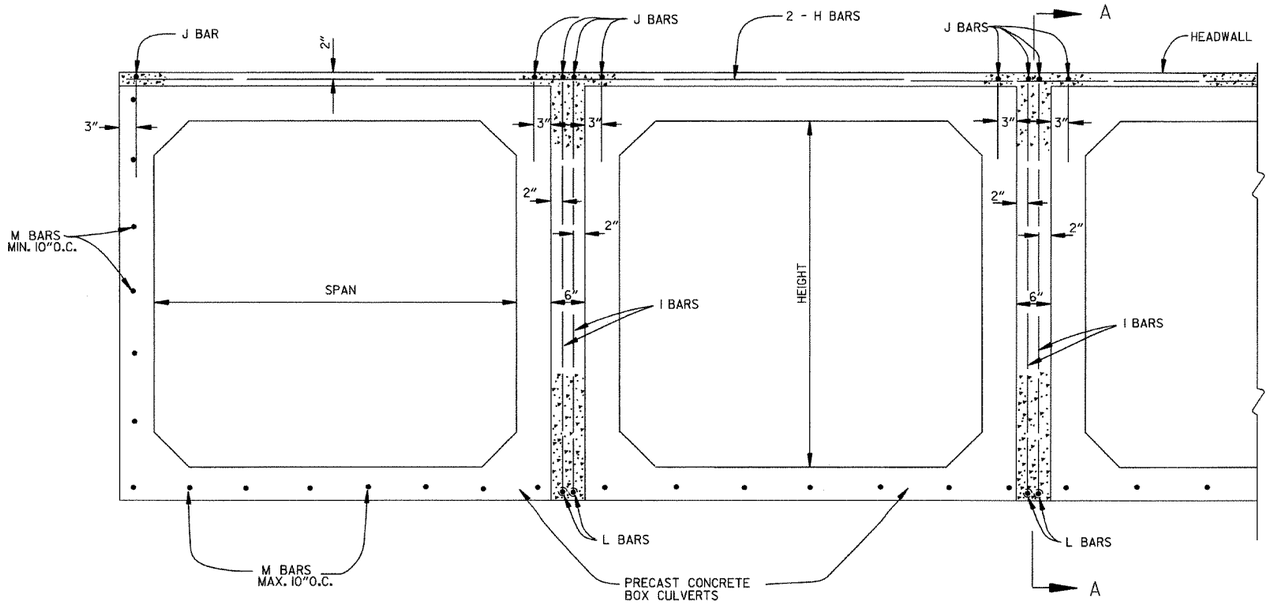
PLAN VIEW

BAR LIST

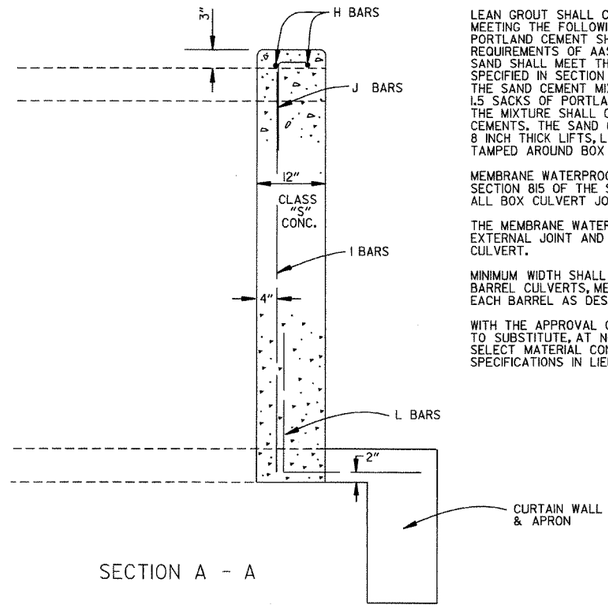
BAR	NO.	SIZE	LENGTH	BAR BENDING DIAGRAM
H	2	#4	•	
I	•	#4	•	
J	•	#4	1'-5"	
L	•	#4	3'-2"	
M	•	#4	1'-8"	



• NOTE: LENGTH AND NUMBER OF BARS VARIES WITH SIZE OF CULVERT



END VIEW



SECTION A - A

GENERAL NOTES

WINGS, CURTAIN WALLS AND APRONS SHALL BE TIED TO THE PRECAST CULVERT SECTION BY CASTING BARS IN CULVERT END SECTIONS AS SHOWN OR BY DOWELING AND GROUTING. J BARS AND M BARS SHALL BE EMBEDDED A MINIMUM OF 10" IN PRECAST BOX.

WINGS, FOOTINGS, APRONS AND CURTAIN WALLS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE APPLICABLE STANDARD WING DRAWING, STEEL AND CONCRETE QUANTITIES WILL BE ADJUSTED TO FIT THE IN-PLACE WIDTH & HEIGHT OF THE PRECAST CONCRETE BOX CULVERTS.

ALL EXPOSED CORNERS TO HAVE $\frac{3}{4}$" CHAMFERS.

WINGWALLS AND FOOTINGS MAY BE ADJUSTED IN THE FIELD AS DIRECTED BY THE ENGINEER.

ALL CONCRETE, REINFORCING STEEL, LEAN GROUT, LABOR, MATERIALS AND EQUIPMENT REQUIRED FOR INSTALLING PRECAST BOX CULVERTS WILL NOT BE PAID FOR DIRECTLY BUT WILL BE CONSIDERED TO BE INCLUDED IN THE PRICE BID FOR THE ITEMS AS SPECIFIED IN SECTION 607 OF THE STANDARD SPECIFICATIONS.

LEAN GROUT SHALL CONSIST OF A SAND CEMENT MIXTURE MEETING THE FOLLOWING REQUIREMENTS:
PORTLAND CEMENT SHALL BE TYPE I AND SHALL MEET THE REQUIREMENTS OF AASHTO M 85.
SAND SHALL MEET THE REQUIREMENTS OF FINE AGGREGATE AS SPECIFIED IN SECTION 802.02 OF THE STANDARD SPECIFICATIONS.
THE SAND CEMENT MIXTURE SHALL CONSIST OF NOT LESS THAN 1.5 SACKS OF PORTLAND CEMENT PER TON OF MATERIAL MIXTURE. THE MIXTURE SHALL CONTAIN SUFFICIENT WATER TO HYDRATE THE CEMENTS. THE SAND CEMENT MIXTURE SHALL BE PLACED IN MAXIMUM 8 INCH THICK LIFTS, LOOSE MEASURE, AND THOROUGHLY RODDED AND TAMPED AROUND BOX TO THOROUGHLY FILL ALL VOIDS.

MEMBRANE WATERPROOFING CONFORMING TO THE REQUIREMENTS OF SECTION 815 OF THE STANDARD SPECIFICATIONS SHALL BE APPLIED TO ALL BOX CULVERT JOINTS.

THE MEMBRANE WATERPROOFING WILL BE REQUIRED ON THE TOP EXTERNAL JOINT AND SHALL EXTEND 1 FOOT DOWN THE SIDES OF THE CULVERT.

MINIMUM WIDTH SHALL BE 12" (6" ON EACH SIDE OF JOINT). ON MULTIPLE BARREL CULVERTS, MEMBRANE WATERPROOFING SHALL BE APPLIED TO EACH BARREL AS DESCRIBED ABOVE.

WITH THE APPROVAL OF THE ENGINEER, THE CONTRACTOR WILL BE ALLOWED TO SUBSTITUTE, AT NO ADDITIONAL COST TO THE DEPARTMENT, FLOWABLE SELECT MATERIAL CONFORMING TO SECTION 206 OF THE STANDARD SPECIFICATIONS IN LIEU OF LEAN GROUT.

DATE	REVISION	DATE FILMED
10-15-09	ADDED GENERAL NOTE	
11-10-05	REVISED SPACING OF "M" BARS	
4-10-03	REVISED GENERAL NOTES	
10-18-96	CORRECTED AASHTO REF.	
10-1-92	ADDED NOTE FOR MEMBRANE WATERPROOFING	
8-15-91	ADDED NOTE FOR LEAN GROUT	
11- 8-90	REVISED FOR 1991 SPECS	
11-30-89	ISSUED; JABE	

ARKANSAS STATE HIGHWAY COMMISSION

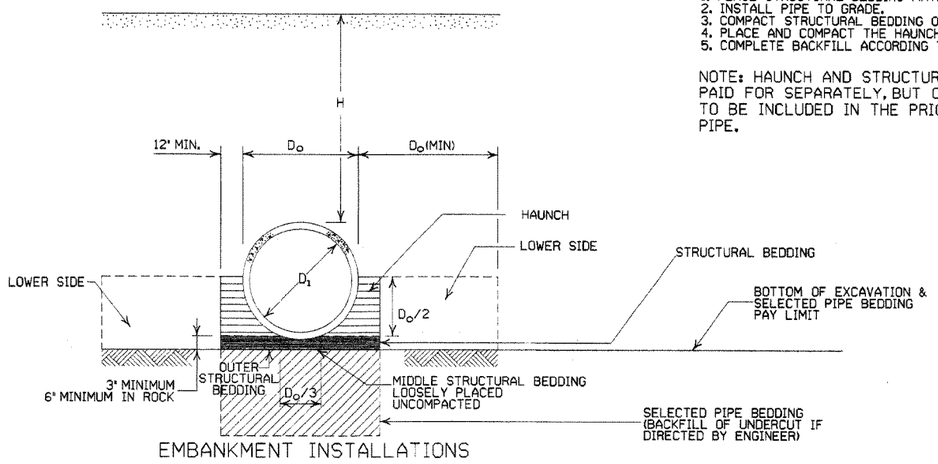
PRECAST CONCRETE BOX CULVERTS

STANDARD DRAWING PBC-1

CONSTRUCTION SEQUENCE

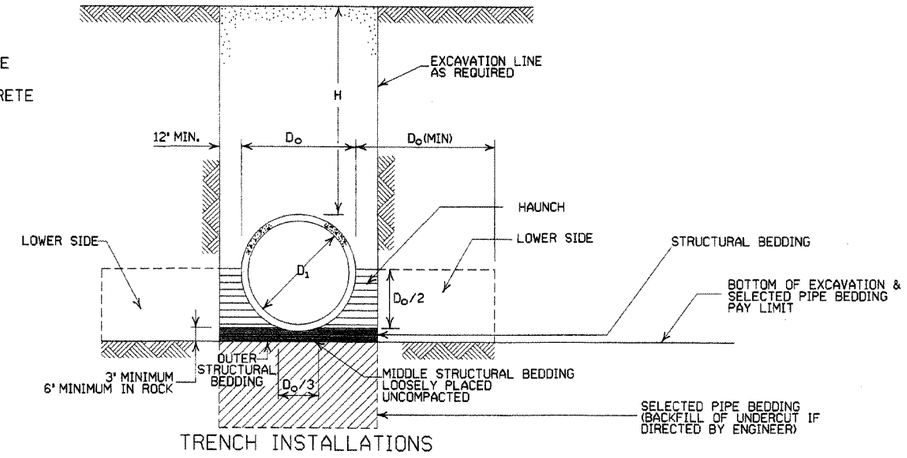
1. PLACE STRUCTURAL BEDDING MATERIAL TO GRADE. DO NOT COMPACT.
2. INSTALL PIPE TO GRADE.
3. COMPACT STRUCTURAL BEDDING OUTSIDE THE MIDDLE THIRD OF THE PIPE.
4. PLACE AND COMPACT THE HAUNCH AREA UP TO THE MIDDLE OF THE PIPE.
5. COMPLETE BACKFILL ACCORDING TO SPECIFICATIONS.

NOTE: HAUNCH AND STRUCTURAL BEDDING MATERIAL WILL NOT BE PAID FOR SEPARATELY, BUT COMPENSATION WILL BE CONSIDERED TO BE INCLUDED IN THE PRICE BID PER LINEAR FOOT OF CONCRETE PIPE.



EMBANKMENT INSTALLATIONS

1. MATERIAL IN THE LOWER SIDE, HAUNCH, AND OUTER STRUCTURAL BEDDING SHALL BE COMPACTED TO 95% OF THE MAXIMUM DENSITY ACCORDING TO THE TYPE OR CLASS OF MATERIAL USED.



TRENCH INSTALLATIONS

1. MATERIAL IN THE HAUNCH AND OUTER STRUCTURAL BEDDING SHALL BE COMPACTED TO 95% OF THE MAXIMUM DENSITY ACCORDING TO THE TYPE OR CLASS OF MATERIAL USED.
2. FOR TRENCHES WITH WALLS OF NATURAL SOIL, THE DENSITY OF THE SOIL IN THE LOWER SIDE ZONE SHALL BE AS FIRM AS THE 95% DENSITY REQUIRED FOR THE HAUNCH. IF THE EXISTING SOIL DOES NOT MEET THIS CRITERIA, IT SHALL BE REMOVED AND RECOMPACTED TO 95% OF THE MAXIMUM DENSITY ACCORDING TO THE TYPE OF MATERIAL USED.

REINFORCED CONCRETE ARCH PIPE DIMENSIONS

EQUIV. DIA.	•SPAN		• RISE	
	AASHTO M 206	AHD NOMINAL	AASHTO M 206	AHD NOMINAL
INCHES	INCHES			
15	18	18	11	11
18	22	22	13½	14
21	26	26	15½	16
24	28½	29	18	18
30	36½	36	22½	23
36	43¾	44	26⅝	27
42	51⅛	51	31⅛	31
48	58½	59	36	36
54	65	65	40	40
60	73	73	45	45
72	88	88	54	54
84	102	102	62	62
90	115	115	72	72
96	122	122	77¼	77
108	138	138	87⅛	87
120	154	154	96⅞	97
132	168¾	169	106½	107

• THE MEASURED SPAN AND RISE SHALL NOT VARY MORE THAN ± 2 PER CENT FROM THE VALUES SPECIFIED BY AASHTO M 206.

INSTALLATION TYPE	* MATERIAL REQUIREMENTS FOR HAUNCH AND STRUCTURAL BEDDING
TYPE 1	AGGREGATE BASE COURSE (CLASS 5 OR CLASS 7)
TYPE 2	SELECTED MATERIALS (CLASS SM-1, SM-2, OR SM-3) OR TYPE 1 INSTALLATION MATERIAL
TYPE 3	AASHTO CLASSIFICATION A-1 THRU A-6 SOIL OR TYPE 1 OR 2 INSTALLATION MATERIAL

* MATERIALS SHALL NOT INCLUDE ORGANIC MATERIALS OR STONES LARGER THAN 3 INCHES.

MAXIMUM HEIGHT OF FILL OVER R.C. PIPE CULVERTS

INSTALLATION TYPE	CLASS OF PIPE		
	CLASS III	CLASS IV	CLASS V
	FEET		
TYPE 1	21	32	50
TYPE 2	17	27	41
TYPE 3	13	20	32

NOTE: IF FILL HEIGHT EXCEEDS 50 FEET, A SPECIAL DESIGN CONCRETE PIPE WILL BE REQUIRED USING TYPE 1 INSTALLATION.

GENERAL NOTES

1. ALL PIPE SHALL BE PROTECTED DURING CONSTRUCTION BY A COVER SUFFICIENT TO PREVENT DAMAGE FROM PASSAGE OF EQUIPMENT.
2. THE MINIMUM TRENCH WIDTH SHALL BE THE OUTSIDE DIAMETER OF THE PIPE PLUS 24 INCHES.
3. THE MAXIMUM ALLOWABLE TRENCH WIDTH SHALL BE THE MINIMUM WIDTH PRACTICABLE FOR WORKING CONDITIONS.
4. MULTIPLE PIPE CULVERTS SHALL BE INSTALLED WITH A MINIMUM CLEARANCE OF 24 INCHES BETWEEN STRINGS OF PIPE.
5. REFER TO STD. DWG. FES-2 FOR MINIMUM CLEARANCE WHERE FLARED END SECTIONS ARE USED.
6. IMPERVIOUS MATERIAL SHOULD BE PLACED AS DIRECTED BY THE ENGINEER AT THE ENDS OF THE CULVERT TO PREVENT LOSS OF STRUCTURAL BEDDING WHEN PERVIOUS MATERIAL IS USED FOR STRUCTURAL BEDDING AND/OR BACKFILL.
7. NOT MORE THAN ONE LIFTING HOLE MAY BE PROVIDED IN CONCRETE PIPE TO FACILITATE HANDLING. HOLE MAY BE CAST IN PLACE, CUT INTO THE FRESH CONCRETE AFTER FORMS ARE REMOVED, OR DRILLED. THE HOLE SHALL NOT BE MORE THAN TWO INCHES IN DIAMETER OR TWO INCHES SQUARE. CUTTING OR DISPLACEMENT OF REINFORCEMENT WILL NOT BE PERMITTED. SPALLED AREAS AROUND THE HOLE SHALL BE REPAIRED IN A WORKMANLIKE MANNER. LIFTING HOLE SHALL BE FILLED WITH MORTAR, CONCRETE, OR OTHER METHOD AS APPROVED BY THE ENGINEER.
8. WHEN DIRECTED BY THE ENGINEER, UNSUITABLE MATERIAL THAT IS ENCOUNTERED AT THE BOTTOM OF THE EXCAVATED TRENCH (BELOW THE AREA IDENTIFIED AS 'STRUCTURAL BEDDING' ABOVE) WILL BE EXCAVATED AND REPLACED WITH SELECTED PIPE BEDDING. THE QUANTITY OF MATERIAL REQUIRED TO BACKFILL THE UNDERCUT AREA UP TO THE SELECTED PIPE BEDDING PAY LIMIT DESIGNATED ABOVE WILL BE MEASURED AND PAID FOR AS 'SELECTED PIPE BEDDING.'
9. WHEN THE EXISTING MATERIAL EXCAVATED FOR THE PIPE TRENCH IS DETERMINED BY THE ENGINEER TO BE UNSUITABLE FOR BACKFILLING THE PIPE (ABOVE THE AREA IDENTIFIED ABOVE AS THE HAUNCH), BORROW MATERIAL OR MATERIAL FROM THE ROADWAY EXCAVATION WILL BE USED TO BACKFILL THE PIPE. IF SUITABLE MATERIAL IS NOT AVAILABLE, THE ENGINEER MAY AUTHORIZE THE USE OF 'SELECTED PIPE BACKFILL.'

- LEGEND -

D_i = NORMAL INSIDE DIAMETER OF PIPE
D_o = OUTSIDE DIAMETER OF PIPE
H = FILL COVER HEIGHT OVER PIPE (FEET)
MIN. = MINIMUM
▨ = UNDISTURBED SOIL

DATE	REVISION	DATE FILMED
5-18-00	REVISED TYPE 3 BEDDING & ADDED NOTE	
3-30-00	REVISED INSTALLATIONS	
11-06-97	ISSUED	

ARKANSAS STATE HIGHWAY COMMISSION

CONCRETE PIPE CULVERT FILL HEIGHTS & BEDDING

STANDARD DRAWING PCC-1

CORRUGATED STEEL PIPE (ROUND) H-20 LOADING

PIPE DIAMETER (INCHES)	MINUMUM COVER TOP OF PIPE TO TOP OF SUBGRADE (INCHES)	MAX. FILL HEIGHT ABOVE TOP OF PIPE (FEET)							
		METAL THICKNESS IN INCHES							
		0.064	0.079	0.109		0.138		0.168	
				ROUND	ELONG.	ROUND	ELONG.	ROUND	ELONG.
		2⅔ INCH BY ½ INCH CORRUGATION RIVETED, WELDED, OR HELICAL							
12	12	84	91						
15	12	67	73						
18	12	56	61						
24	12	42	46	59					
30	12	34	36	47					
36 •	12		30	39		41			
42 •	12		43	46	67	48	70	50	73
48 •	12		37	45	58	46	61	47	64
		3 INCH BY 1 INCH OR 5 INCH BY 1 INCH CORRUGATION** RIVETED, WELDED, HELICAL, OR BOLTED							
36	12	48	60	78	88	89	111	101	131
42	12	41	51	64	72	71	90	79	102
48	12	36	45	57	64	61	77	66	85
54	12	32	40	52	59	55	71	59	79
60 •	12	29	36	49	53	51	64	54	71
66	12	26	33	47		49	58	51	64
72 •	12	24	30	44		47	53	49	59
78	12		28	41		46	49	47	54
84 •	12		26	38		45		46	51
90	12		24	35		43		45	
96 •	12		22	33		40		44	
102	24			31		38		42	
108 •	24			30		35		39	
114	24			28		34		37	
120 •	24			27		32		35	

• MAX. FILL CAN BE INCREASED IN THESE DIAMETER PIPES BY USING THE NEXT LARGER CORRUGATION. REFER TO 'CORRUGATED METAL PIPE', REVISED 1970, PUBLISHED BY U.S. DEPARTMENT OF TRANSPORTATION, F.H.W.A., B.P.R.

•• WHERE THE STANDARD 2 ⅔'× ½' CORRUGATION AND GAUGE IS SPECIFIED FOR A GIVEN DIAMETER A 3' × 1' OR 5' × 1' CORRUGATION PIPE OF THE SAME DIAMETER MAY BE SUBSTITUTED, PROVIDING IT IS GAUGED FOR A FILL HEIGHT CONDITION EQUAL TO OR GREATER THAN THE MAXIMUM FILL HEIGHT CONDITION FOR THE SPECIFIED GAGE AND CORRUGATION

CORRUGATED ALUMINUM PIPE (ROUND) H-20 LOADING

PIPE DIAMETER (INCHES)	MINUMUM COVER TOP OF PIPE TO TOP OF SUBGRADE (INCHES)	MAX. FILL HEIGHT ABOVE TOP OF PIPE (FEET)				
		METAL THICKNESS IN INCHES				
		0.060	0.075	0.105	0.135	0.164
		2 ⅔ INCH BY ½ INCH CORRUGATION RIVETED OR HELICAL				
12	12	45	45			
18	12	30	30	52		
24	12	22	22	39	41	
30	12	18	18	31	32	34
36	12		15	26	27	28
42	12		26	43	43	44
48	12			40	41	43
54	12			35	37	38
60	12				33	34
66	12				30	31
72	12					29

EQUIVALENT METAL THICKNESSES AND GAUGES

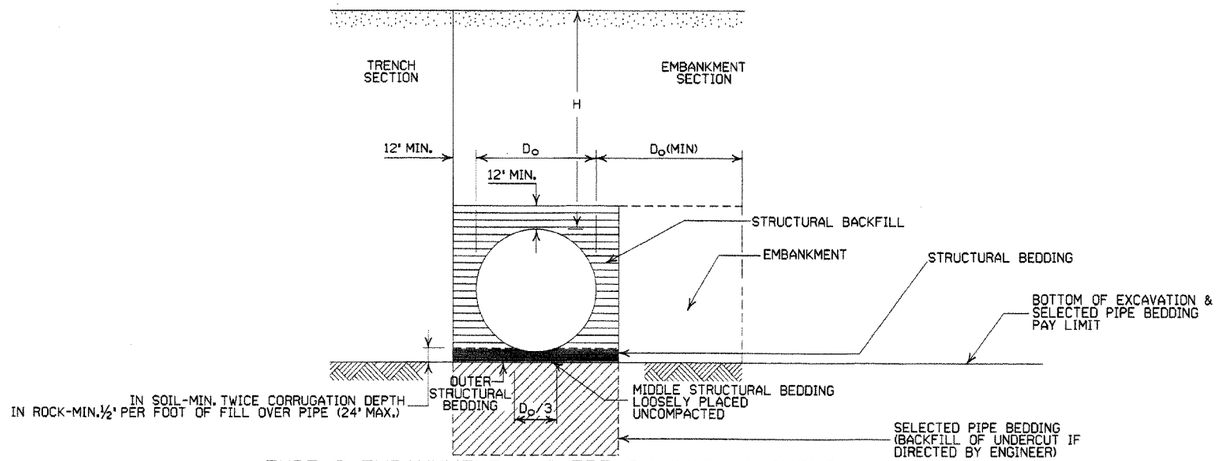
METAL THICKNESS IN INCHES			GAUGE NUMBER
STEEL			
ZINC COATED	UNCOATED	ALUMINUM	
0.064	0.0598	0.060	16
0.079	0.0747	0.075	14
0.109	0.1046	0.105	12
0.138	0.1345	0.135	10
0.168	0.1644	0.164	8
0.188	0.1838		7
0.218	0.2145		5
0.249	0.2451		3
0.280	0.2758		1

CORRUGATED METAL PIPE ARCHES (H - 20 LOADING)

EQUIV. DIA. (INCHES)	PIPE DIMENSION SPAN X RISE (INCHES)	MINUMUM CORNER RADIUS (INCHES)	MIN. COVER TOP OF PIPE TO TOP OF SUBGRADE FOR 2 TONS PER SQ. FT. (INCHES)	STEEL			ALUMINUM		
				MINIMUM THICKNESS REQUIRED INCHES	MAX. FILL HEIGHT ABOVE TOP OF PIPE(IN FT.) FOR THE FOLLOWING CORNER BEARING PRESSURE IN TONS PER SQ. FT.		MINIMUM THICKNESS REQUIRED INCHES	MAX. FILL HEIGHTS ABOVE TOP OF PIPE(IN FT.) FOR THE FOLLOWING CORNER BEARING PRESSURE IN TONS PER SQ. FT.	
					2 TONS	3 TONS[1]		2 TONS	3 TONS[1]
			2 ⅔ INCH BY ½ INCH CORRUGATION RIVETED, WELDED, OR HELICAL				2 ⅔ INCH BY ½ INCH CORRUGATION RIVETED OR HELICAL		
15	17×13	3	12	0.064	13	15+	0.060	15	
18	21×15	3	12	0.064	12	15+	0.060	14	
21	24×18	3	12	0.064	10	15+	0.060	12	15+
24	28×20	3	12	0.064	10	15	0.060	10	15+
30	35×24	3	12	0.079	9	14	0.075	9	14
36	42×29	3½	12	0.079	9	13	0.075	9	13
42	49×33	4	12	0.079	8	12	0.105	8	12
48	57×38	5	12	0.109	8	12	0.135	8	12
54	64×43	6	12	0.109	8	12	0.135	8	12
60	71×47	7	12	0.138	8	12	0.164	8	12
66	77×52	8	12	0.168	8	12	0.164	8	12
72	83×57	9	12	0.168	9	13			
			3 INCH BY 1 INCH OR 5 INCH BY 1 INCH CORRUGATION** RIVETED, WELDED, OR HELICAL						
36	40×31	5	12	0.079	15	15+			
42	46×36	6	12	0.079	15	15+			
48	53×41	7	12	0.079	15	15+			
54	60×46	8	12	0.079	15	15+			
60	66×51	9	12	0.079	15	15+			
66	73×55	12	12	0.079	15	15+			
72	81×59	14	18	0.079	15	15+			
78	87×63	14	18	0.079	14	15+			
84	95×67	16	18	0.109	13	15+			
90	103×71	16	24	0.109	12	15+			
96	112×75	18	24	0.109	11	15+			
102	117×79	18	24	0.109	10	15			
108	128×83	18	24	0.138	9	14			

1 WHERE BEARING PRESSURE EXCEEDING 2 TONS PER SQUARE FOOT IS REQUIRED FOR GIVEN FILL HEIGHTS, THE FOUNDATION MATERIAL SHALL BE INVESTIGATED TO DETERMINE THE BEARING CAPACITY.

•• WHERE THE STANDARD 2 ⅔' × ½' CORRUGATION AND GAUGE IS SPECIFIED FOR A GIVEN DIAMETER, A 3' × 1' OR 5' × 1' CORRUGATION PIPE OF THE SAME DIAMETER MAY BE SUBSTITUTED, PROVIDING IT IS GAUGED FOR A FILL HEIGHT CONDITION EQUAL TO OR GREATER THAN THE MAXIMUM FILL HEIGHT CONDITION FOR THE SPECIFIED GAUGE AND CORRUGATION.



TYPE 2 EMBANKMENT AND TRENCH INSTALLATIONS

1. STRUCTURAL BACKFILL, EMBANKMENT, AND OUTER STRUCTURAL BEDDING MATERIAL SHALL BE COMPACTED TO 95% OF THE MAXIMUM DENSITY ACCORDING TO THE TYPE OR CLASS OF MATERIAL USED.

CONSTRUCTION SEQUENCE

1. PLACE STRUCTURAL BEDDING MATERIAL TO GRADE. DO NOT COMPACT.
2. INSTALL PIPE TO GRADE.
3. COMPACT STRUCTURAL BEDDING OUTSIDE THE MIDDLE THIRD OF THE PIPE.
4. COMPLETE STRUCTURAL BACKFILL OPERATION BY WORKING FROM SIDE TO SIDE OF THE PIPE. THE SIDE TO SIDE STRUCTURAL BACKFILL DIFFERENTIAL SHALL NOT EXCEED 24 INCHES OR 1/3 THE SIZE OF THE PIPE, WHICHEVER IS LESS.

INSTALLATION TYPE	MATERIAL REQUIREMENTS FOR STRUCTURAL BACKFILL AND STRUCTURAL BEDDING
TYPE 2	•SELECTED MATERIALS (CLASS SM-1, SM-2 OR SM-3)

• AGGREGATE BASE COURSE (CLASS 4, 5, 6, OR 7) MAY BE USED IN LIEU OF SELECTED MATERIAL

NOTE: STRUCTURAL BACKFILL AND STRUCTURAL BEDDING MATERIAL WILL NOT BE PAID FOR SEPARATELY, BUT COMPENSATION WILL BE CONSIDERED TO BE INCLUDED IN THE PRICE BID PER LINEAR FOOT OF METAL PIPE.

GENERAL NOTES

1. ALL PIPE SHALL BE PROTECTED DURING CONSTRUCTION BY A COVER SUFFICIENT TO PREVENT DAMAGE FROM PASSAGE OF EQUIPMENT.
2. THE MINIMUM TRENCH WIDTH SHALL BE THE OUTSIDE DIAMETER OF THE PIPE PLUS 24 INCHES.
3. THE MAXIMUM ALLOWABLE TRENCH WIDTH SHALL BE THE MINIMUM WIDTH PRACTICABLE FOR WORKING CONDITIONS.
4. MULTIPLE PIPE CULVERTS SHALL BE INSTALLED WITH A MINIMUM CLEARANCE OF 24 INCHES BETWEEN STRINGS OF PIPE.
5. REFER TO STD. DWG. FES-2 FOR MINIMUM CLEARANCE WHERE FLARED END SECTIONS ARE USED.
6. IMPERVIOUS MATERIAL SHOULD BE PLACED AS DIRECTED BY THE ENGINEER AT THE ENDS OF THE CULVERT TO PREVENT LOSS OF STRUCTURAL BEDDING WHEN PERVIOUS MATERIAL IS USED FOR STRUCTURAL BEDDING AND/OR BACKFILL.
7. WHEN DIRECTED BY THE ENGINEER, UNSUITABLE MATERIAL THAT IS ENCOUNTERED AT THE BOTTOM OF THE EXCAVATED TRENCH (BELOW THE AREA IDENTIFIED AS 'STRUCTURAL BEDDING' ABOVE) WILL BE EXCAVATED AND REPLACED WITH SELECTED PIPE BEDDING. THE QUANTITY OF MATERIAL REQUIRED TO BACKFILL THE UNDERCUT AREA UP TO THE SELECTED PIPE BEDDING PAY LIMIT DESIGNATED ABOVE WILL BE MEASURED AND PAID FOR AS 'SELECTED PIPE BEDDING.'
8. WHEN THE EXISTING MATERIAL EXCAVATED FOR THE PIPE TRENCH IS DETERMINED BY THE ENGINEER TO BE UNSUITABLE FOR BACKFILLING THE PIPE (ABOVE THE AREA IDENTIFIED ABOVE AS STRUCTURAL BACKFILL), BORROW MATERIAL OR MATERIAL FROM THE ROADWAY EXCAVATION WILL BE USED TO BACKFILL THE PIPE. IF SUITABLE MATERIAL IS NOT AVAILABLE, THE ENGINEER MAY AUTHORIZE THE USE OF 'SELECTED PIPE BACKFILL.'

- LEGEND -

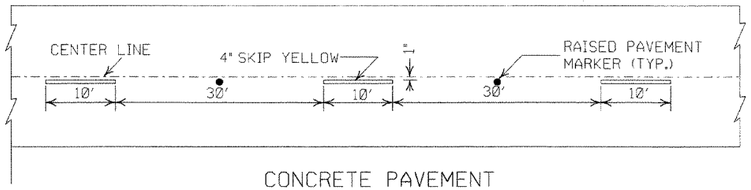
D_o = OUTSIDE DIAMETER OF PIPE
MAX. = MAXIMUM
MIN. = MINIMUM
= STRUCTURAL BACKFILL MATERIAL
= UNDISTURBED SOIL
ELONG. = ELONGATED
EQUIV. DIA. = EQUIVALENT DIAMETER
H = FILL COVER HEIGHT OVER PIPE (FEET)

DATE	REVISION	DATE FILMED
3-30-00	REVISED INSTALLATIONS	
11-06-97	ISSUED	

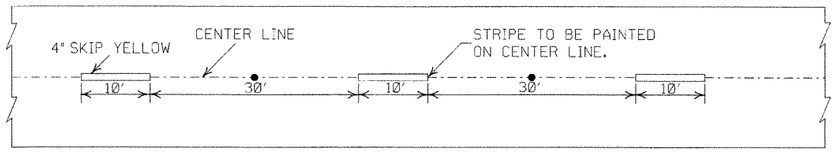
ARKANSAS STATE HIGHWAY COMMISSION

METAL PIPE CULVERT FILL HEIGHTS & BEDDING

STANDARD DRAWING PCM-1

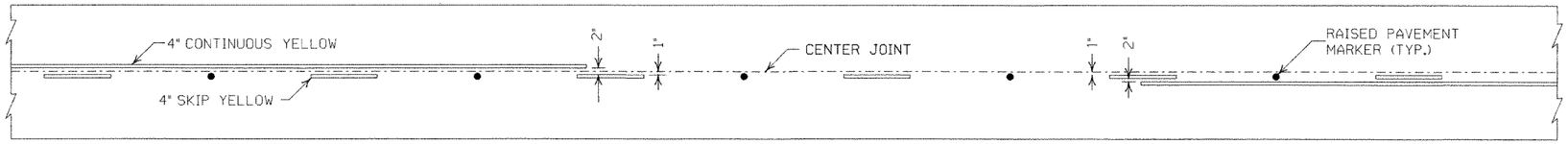


CONCRETE PAVEMENT

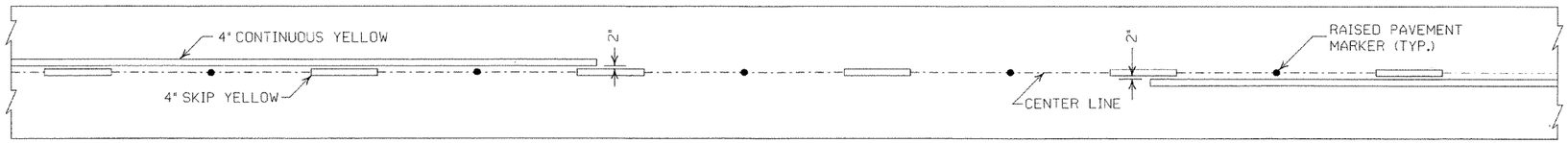


ASPHALT PAVEMENT

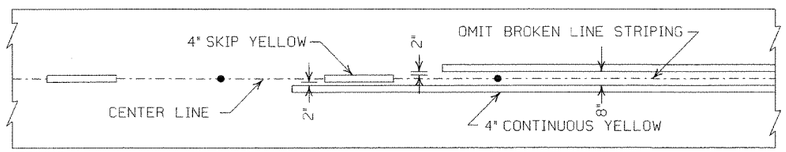
BROKEN LINE STRIPING



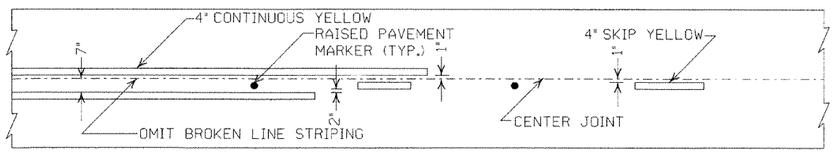
SOLID LINE STRIPING ON CONCRETE PAVEMENT



SOLID LINE STRIPING ON ASPHALT PAVEMENT

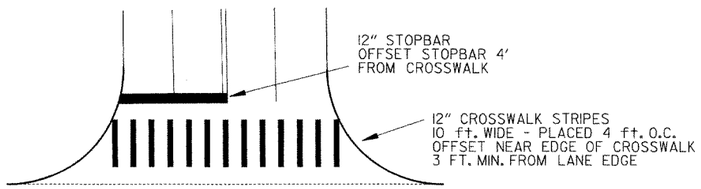


ASPHALT PAVEMENT



CONCRETE PAVEMENT

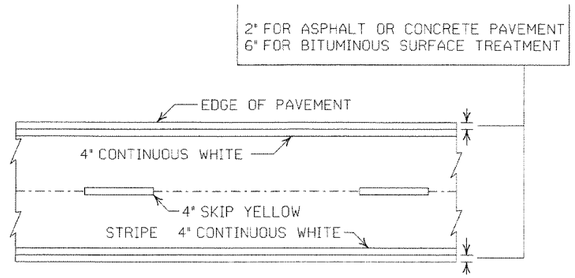
STRIPING AT ADJACENT NO PASSING LANES



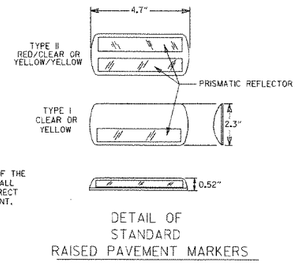
CROSSWALK AND STOPBAR DETAILS

NOTES:

1. ALL LINES SHALL HAVE A WIDTH OF 4 INCHES.
2. THE THICKNESS AND RATE OF PAINT APPLICATION SHALL BE AS SPECIFIED IN SECTION 718 OF THE STANDARD SPECIFICATIONS.
3. THIS DRAWING SHALL BE USED IN CONJUNCTION WITH THE LATEST REVISED ADDITION OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES."
4. RAISED PAVEMENT MARKERS SHALL BE CENTERED BETWEEN SKIP LINES ON 40 FEET SPACING UNLESS OTHERWISE SHOWN ON THE PLANS.



PAVEMENT EDGE LINE MARKING



NOTE:
THE RED LENS OF THE TYPE II R.P.M. SHALL FACE THE INCORRECT TRAFFIC MOVEMENT.

DETAIL OF STANDARD RAISED PAVEMENT MARKERS

GENERAL NOTES:

THIS DRAWING SHOULD BE CONSIDERED AS TYPICAL ONLY AND THE FINAL LOCATION OF THE STRIPING AND RAISED PAVEMENT MARKERS SHALL BE DETERMINED BY THE ENGINEER.

THIS DRAWING SHOULD BE USED IN CONJUNCTION WITH THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES", LATEST REVISION.

NOTE:

DIMENSIONS SHOWN FOR RAISED PAVEMENT MARKERS ARE TYPICAL. THE CONTRACTOR MAY SUBSTITUTE SIMILAR MARKERS WITH THE APPROVAL OF THE ENGINEER. REQUESTING APPROVAL FOR SIMILAR MARKERS MAY BE MADE BY REFERRING TO THE AHTD QUALIFIED PRODUCTS LIST.

DATE	REVISION	FILMED
11-17-10	REVISED GENERAL NOTES & REMOVED PLOWABLE PVMT MRKRS	
11-18-04	REVISED NOTE 2 & GENERAL NOTES	
8-22-02	ADDED CROSSWALK & STOPBAR DTLS.	
7-02-98	ADDED DETAILS OF STD. RAISED PAV'T. MARKERS	
4-26-96	REV. NOTES 3&4; ADDED R.P.M.	
9-30-80	DRAWN	1-9-30-80

ARKANSAS STATE HIGHWAY COMMISSION

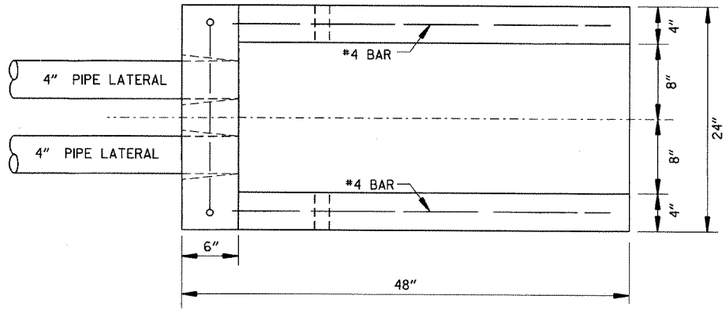
PAVEMENT MARKING DETAILS

STANDARD DRAWING PM-1

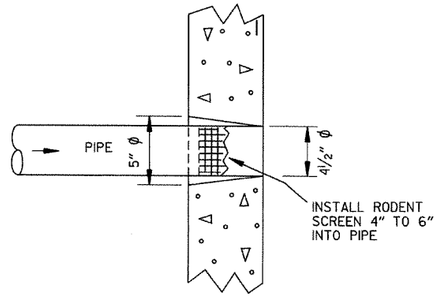
NOTE:
1. GRANULAR BACKFILL TO BE SUBSIDIARY TO PIPE UNDERDRAIN.

2. UNLESS OTHERWISE SPECIFIED ON THE PLANS, THE UNDERDRAIN COVER SHALL BE THOROUGHLY COMPACTED EARTH AND SHALL BE SUBSIDIARY TO PIPE UNDERDRAIN.

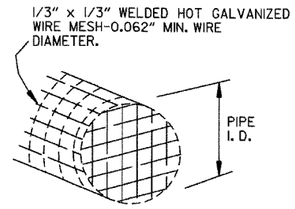
3. GRANULAR MATERIAL SHALL BE WRAPPED WITH GEOTEXTILE FABRIC. LAP FABRIC 12" OR THE WIDTH OF THE TRENCH AT THE TOP.



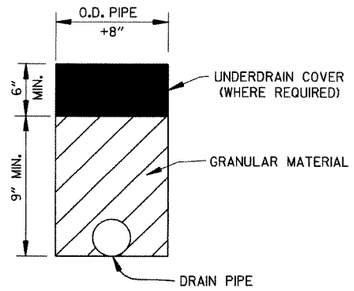
PLAN VIEW

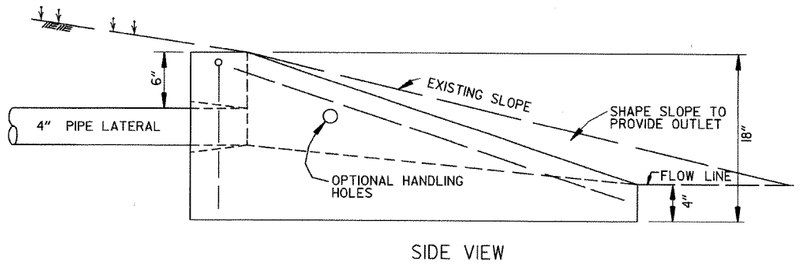


DETAIL OF HOLE FOR 4" PIPE

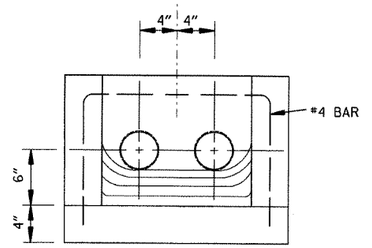


DETAIL OF RODENT SCREEN

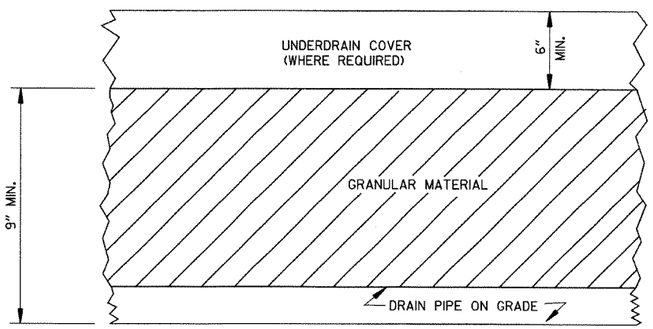




SIDE VIEW

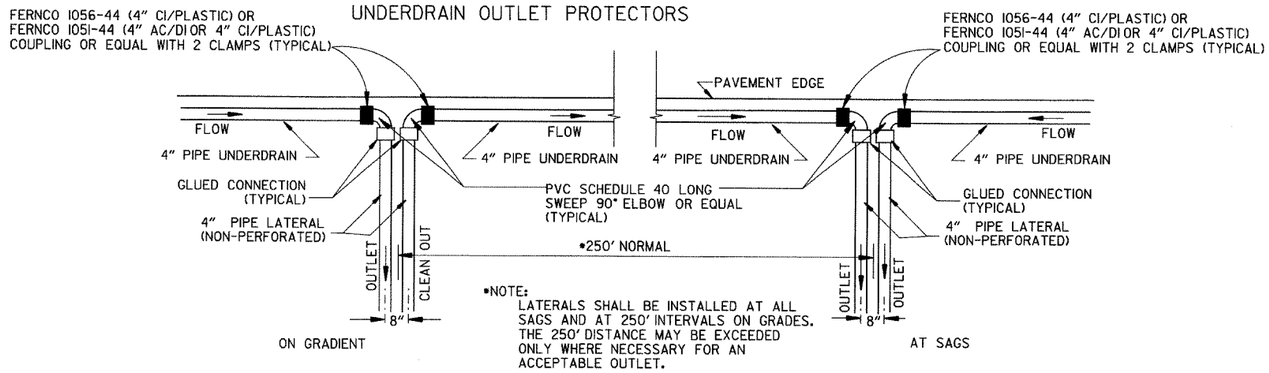


FRONT VIEW



DETAILS OF PIPE UNDERDRAIN

UNDERDRAIN OUTLET PROTECTORS



DETAIL OF PIPE UNDERDRAIN LATERALS WHEN PLACED ALONG PAVEMENT EDGE

NOTE: PVC PIPE FOR LATERALS SHALL MEET THE REQUIREMENTS OF ASTM D 1785 (LATEST REVISION) FOR SCHEDULE 40 PIPE.

DATE	REVISION	DATE FILMED
4-10-03	REVISED NOTE 3	
1-12-00	REVISED DETAIL OF UNDERDRAIN LATERALS	
11-18-98	REVISED NOTE	
10-18-96	REVISED MIN. DEPTH & GEOTEXTILE FABRIC	
4-26-96	ADDED LATERAL NOTE; 5½" TO 5"	
11-22-95	REVISED LATERALS	
7-20-95	REVISED LATERALS & ADDED NOTE	
11- 3-94	REVISED FOR DUAL LATERALS	11- 3-94
10- 1-92	SUBSTITUTED GEOTEXTILE	10- 1-92
8-15-91	ADDED POLYEDTHYLENE PIPE	8-15-91
11- 8-90	DELETED ALTERNATE NOTE	11- 8-90
1-25-90	ADDED 4" SNAP ADAPTER	1-25-90
11-30-89	DEL. (SUBGRADE); ADDED (WHERE REQUIRED)	11-30-89
7-15-88	ISSUED P.L.M.	647-7-15-88

ARKANSAS STATE HIGHWAY COMMISSION

DETAILS OF PIPE UNDERDRAIN

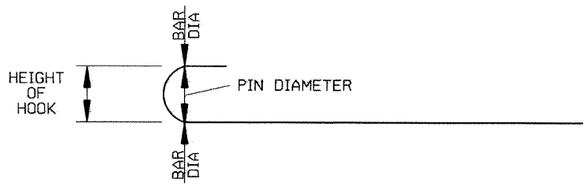
STANDARD DRAWING PU-1

7-20-95 INSTD.PUI

STEEL FABRICATION: REINFORCING STEEL FABRICATION SHALL CONFORM TO THE DIMENSIONS LISTED IN THE TABLE BELOW:

BAR SIZE	PIN DIAMETER	HOOK EXTENSION "K"
3	2¼"	4"
4	3 "	4½"
5	3¾"	5"
6	4½"	6"
7	5¼"	7"
8	6"	8"

IF THE OVERALL HEIGHT OF THE HOOK (SEE DIAGRAM BELOW) FOR A "b", "b1", "b2" or "b3" BENT BAR IS GREATER THAN THE CORRESPONDING TOP OR BOTTOM SLAB THICKNESS, LESS 2¾ INCHES, EACH BENT BAR SHALL BE REPLACED WITH ONE HOOKED BAR AND ONE STRAIGHT BAR, USING LENGTHS AS SHOWN IN THE TABLE BELOW. THE TWO BARS SHALL BE THE SAME DIAMETER AS, AND PLACED AT THE SAME SPACING AS, THE "b", "b1", "b2" OR "b3" BENT BARS THEY REPLACE.



NOTE: DIMENSIONS OF BARS ARE MEASURED OUT TO OUT OF BARS.

OVERALL HEIGHT OF HOOKED BAR DIAGRAM

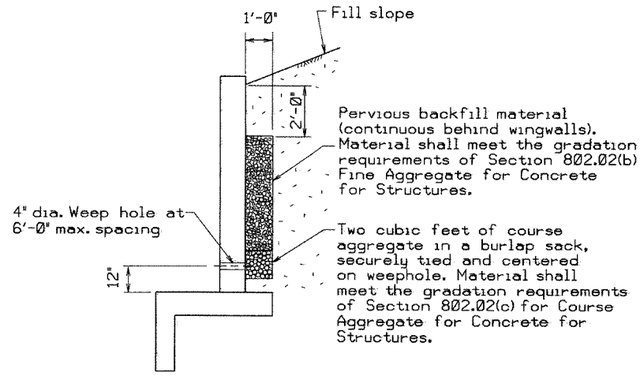
THE HOOKED BARS SHALL BE PLACED IN THE BOTTOM OF THE TOP SLAB AND THE TOP OF THE BOTTOM SLAB. THE STRAIGHT BARS SHALL BE PLACED IN THE TOP OF THE TOP SLAB AND THE BOTTOM OF THE BOTTOM SLAB. SEE TABLE BELOW FOR LENGTHS OF REPLACEMENT HOOKED AND STRAIGHT BARS.

FOR SKEWED CULVERTS, THE REPLACEMENT STRAIGHT BAR MAY HAVE TO BE CUT IN FIELD TO FIT.

REPLACEMENT BAR LENGTHS TABLE

BAR SIZE: "b", "b1", "b2" OR "b3"	LENGTH OF HOOKED BAR	LENGTH OF STRAIGHT BAR
#4	L + 1' - 0"	SEE "c" BAR LENGTH
#5	L + 1' - 2"	SEE "c" BAR LENGTH
#6	L + 1' - 4"	SEE "c" BAR LENGTH
#7	L + 1' - 8"	SEE "c" BAR LENGTH
#8	L + 1' - 10"	SEE "c" BAR LENGTH
#9	L + 2' - 6"	SEE "c" BAR LENGTH

L = "OW" - 3 INCHES



WINGWALL DRAINAGE DETAIL

REINFORCED CONCRETE BOX CULVERT GENERAL NOTES

CONCRETE SHALL BE CLASS S WITH A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 3500 PSI.

REINFORCING STEEL SHALL BE AASHTO M 31 OR M 53, GRADE 60.

CONSTRUCTION AND MATERIALS FOR WINGWALL DRAINAGE, INCLUDING WEEP HOLES AND GRANULAR MATERIAL, SHALL BE SUBSIDIARY TO THE BID ITEM, "CLASS S CONCRETE".

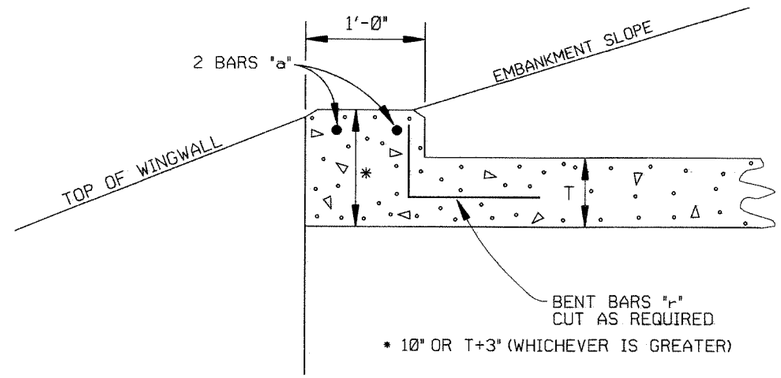
MEMBRANE WATERPROOFING SHALL CONFORM TO THE REQUIREMENTS OF SECTION 815 OF THE STANDARD SPECIFICATIONS.

MEMBRANE WATERPROOFING SHALL BE APPLIED TO ALL CONSTRUCTION JOINTS IN THE TOP SLAB AND THE SIDEWALLS OF R.C. BOX CULVERTS AS DIRECTED BY THE ENGINEER. NO PAYMENT SHALL BE MADE FOR THIS ITEM, BUT PAYMENT WILL BE CONSIDERED TO BE INCLUDED IN THE VARIOUS ITEMS BID FOR THE R.C. BOX CULVERT.

REINFORCING STEEL TOLERANCES: THE TOLERANCES FOR REINFORCING STEEL SHALL MEET THOSE LISTED IN "MANUAL OF STANDARD PRACTICE" PUBLISHED BY CONCRETE REINFORCING STEEL INSTITUTE (CRSI) EXCEPT THAT THE TOLERANCE FOR TRUSS BARS SUCH AS FIGURE 3 ON PAGE 7-4 OF THE CRSI MANUAL SHALL BE MINUS ZERO TO PLUS ½ INCH.

WEEP HOLES IN WINGWALLS: THE MAXIMUM HORIZONTAL SPACING OF WEEP HOLES IN WINGWALLS SHALL BE 6'-0" AND SHALL BE SPACED TO CLEAR ALL REINFORCING STEEL. THE DRAIN OPENING SHALL BE 4" DIAMETER AND PLACED 12" ABOVE TOP OF WINGWALL FOOTING.

THE REQUIREMENTS SHOWN ON THIS DRAWING SHALL SUPERCEDE THE CORRESPONDING REQUIREMENTS ON ALL REINFORCED CONCRETE BOX CULVERT STANDARD DRAWINGS.



* 10" OR T+3" (WHICHEVER IS GREATER)

NOTE: FOR ALL SKEWED R.C. BOX CULVERTS THE LENGTH "K" OF THE MODIFIED HEADWALL SHALL BE EQUAL TO THE ROADWAY LENGTH "RL". THE ENDS OF THE HEADWALL SHALL BE CONSTRUCTED PARALLEL TO THE SKEW ANGLE OF THE BOX CULVERT.

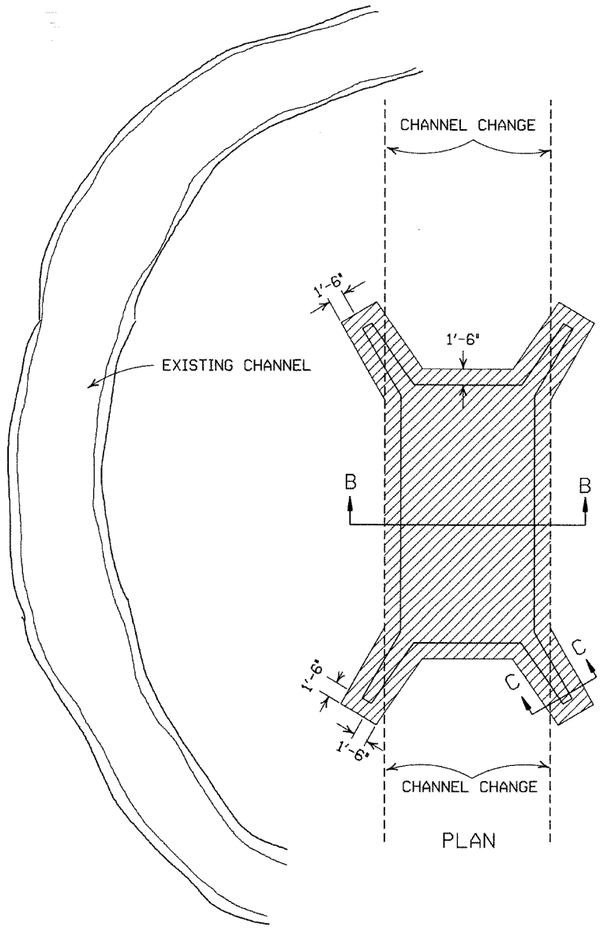
R.C. BOX CULVERT HEADWALL MODIFICATIONS

DATE	REVISION	DATE FILMED
05-25-06	REV. GEN. NOTES AND DETAILS FOR WEEP HOLES; BAR DIAGRAM	
11-16-01	ADDED WINGWALL DRAINAGE DETAIL./EDITED GEN. NOTES	
10-18-96	REV. ASTM REF. TO AASHTO & ADDED BAR DIAGRAM	
10-12-95	MOVED SOLID SODDING DETAIL TO RCB-2	
6-2-94	ADDED SOLID SODDING PLAN DETAIL	
8-5-93	REVISED PIN DIAMETER TO SPECS.	
8-15-91	DRAWN AND ISSUED	

ARKANSAS STATE HIGHWAY COMMISSION

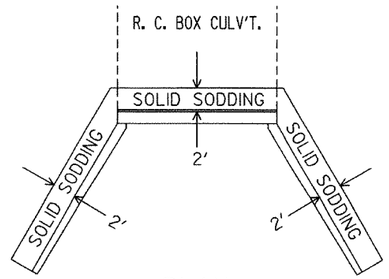
REINFORCED CONCRETE BOX CULVERT DETAILS

STANDARD DRAWING RCB-1



PLAN

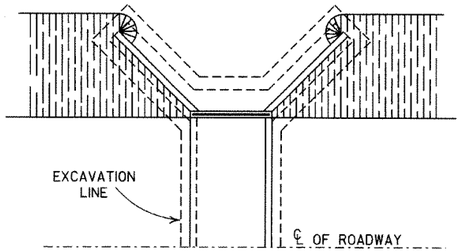
SOLID SODDING



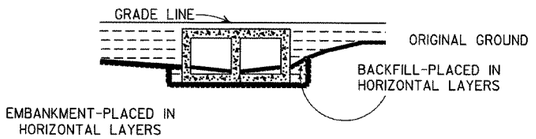
PLAN

PARTIAL SECTION SHOWING SOLID SODDING AT HEADWALLS AND WING WALLS

NOTE: LENGTH MEASURED ALONG THE CENTER OF 2' STRIP OF SOLID SODDING.

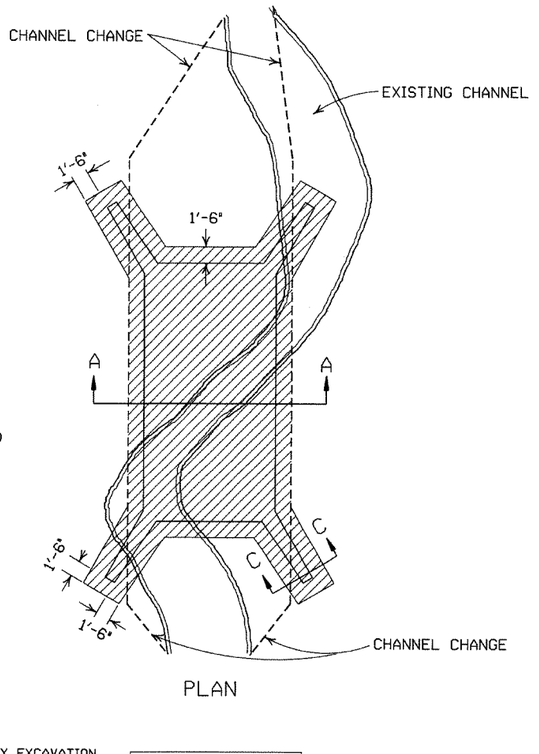


PLAN

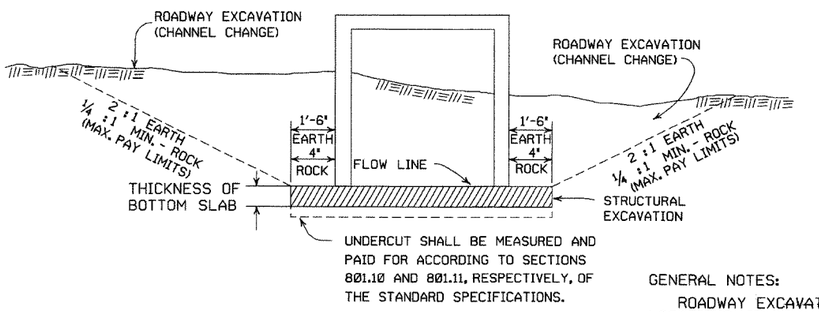


LONGITUDINAL SECTION

BACKFILL DETAILS FOR BOX CULVERT

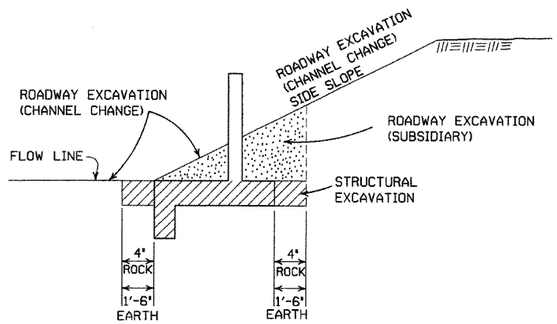


PLAN

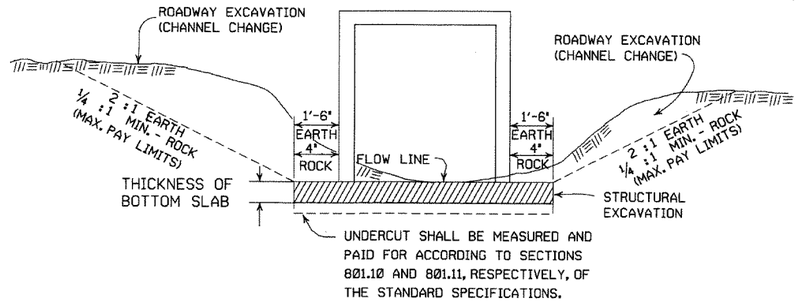


SECTION B-B

DETAILS FOR NEW CHANNELS



SECTION C-C



SECTION A-A

DETAILS THROUGH EXISTING CHANNELS

GENERAL NOTES:

ROADWAY EXCAVATION (CHANNEL CHANGE) WILL BE PAID FOR AT R.C. BOX CULVERT LOCATIONS. IT WILL BE PAID TO THE LIMITS ACTUALLY CUT AND WILL BE CONFINED TO THAT PORTION OF THE INDICATED AREA THAT IS ABOVE THE FLOW LINE. ROADWAY EXCAVATION (CHANNEL CHANGE) SHALL BE MEASURED BY CROSS SECTIONS AND VOLUMES COMPUTED BY AVERAGE END AREA METHOD. ALL CHANNEL CHANGES SHALL BE BROUGHT TO GRADE PRIOR TO MAKING ANY EXCAVATION FOR STRUCTURES.

EXCAVATION FOR STRUCTURES WILL BE PAID FOR AT ALL R.C. BOX CULVERT LOCATIONS. IT WILL BE PAID TO THE LIMITS SHOWN AND SHALL BE CONFINED TO THAT PORTION OF THE INDICATED AREA THAT IS BELOW THE CHANNEL FLOW LINE.

ROADWAY EXCAVATION SHOWN IN SECTION C-C ABOVE AS SUBSIDIARY WILL NOT BE MEASURED OR PAID FOR DIRECTLY, BUT PAYMENT WILL BE CONSIDERED TO BE INCLUDED IN THE VARIOUS ITEMS OF EXCAVATION.

DATE	REVISION	FILMED
11-20-03	REVISED SECTION A-A NOTE	
8-22-02	REVISED SECTION B-B NOTE	
10-12-95	COMBINED 18918 AND 1888A	
1-4-83	REVISED GENERAL NOTES AND ADDED MAXIMUM PAY LIMIT NOTES.	674-1-4-83
2-2-76	EXCAV. PAY LIMITS	917-2-2-76
10-2-72	REVISED AND REDRAWN	564-10-16-72

ARKANSAS STATE HIGHWAY COMMISSION

EXCAVATION PAY LIMITS, BACKFILL, & SOLID SODDING FOR BOX CULVERTS

STANDARD DRAWING RCB-2

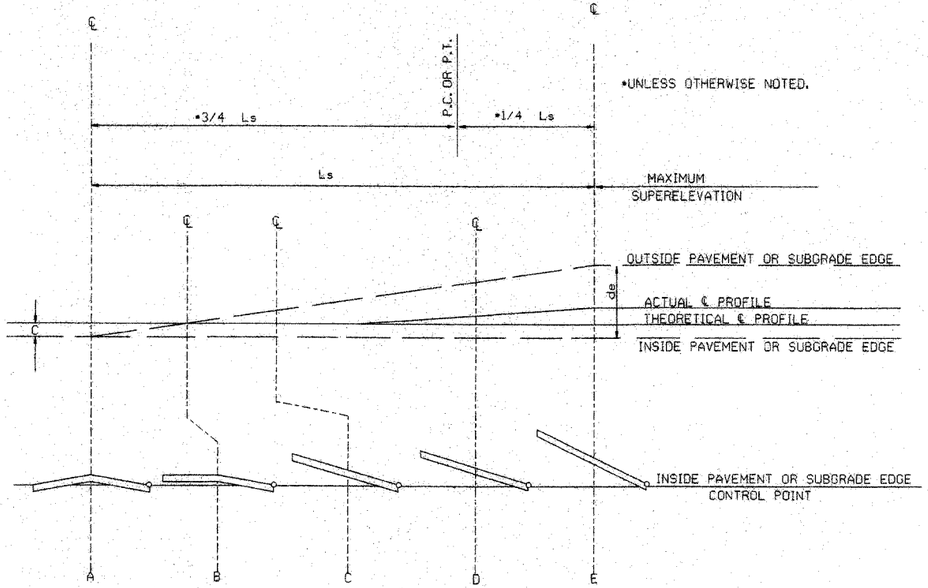
SUPERELEVATION TABLE FOR TWO - WAY TRAFFIC

DEGREE OF CURVE	30 MPH e	30 MPH Ls (FT) MINIMUM	30 MPH Ls (FT) DESIRABLE	40 MPH e	40 MPH Ls (FT) MINIMUM	40 MPH Ls (FT) DESIRABLE	50 MPH e	50 MPH Ls (FT) MINIMUM	50 MPH Ls (FT) DESIRABLE	55 MPH e	55 MPH Ls (FT) MINIMUM	55 MPH Ls (FT) DESIRABLE	60 MPH e	60 MPH Ls (FT) MINIMUM	60 MPH Ls (FT) DESIRABLE	70 MPH e	70 MPH Ls (FT) MINIMUM	70 MPH Ls (FT) DESIRABLE
0° 15′	N. C.			N. C.			N. C.			N. C.			N. C.			N. C.		
0° 30′	N. C.			N. C.			N. C.			N. C.			N. C.			N. C.		
0° 45′	N. C.			N. C.			R. C.			0.022			0.023			0.028		
1° 00′	N. C.			N. C.			0.021			0.026			0.030			0.037		
1° 15′	N. C.			R. C.			0.026			0.032			0.037			0.046		
1° 30′	N. C.			0.021			0.031			0.037			0.043			0.054		
1° 45′	N. C.			0.025			0.036			0.043			0.049			0.062		
2° 00′	R. C.			0.028	175		0.040			0.048			0.055			0.070		
2° 15′	R. C.			0.031			0.045			0.053			0.061			0.078	300	
2° 30′	0.021			0.034			0.049			0.058			0.067			0.085	315	350
2° 45′	0.023			0.037			0.053			0.063			0.072			0.091	335	
3° 00′	0.025			0.040			0.057			0.067	230		0.077	260		0.096	350	
3° 15′	0.027			0.043		200	0.061			0.072	245		0.082	275		0.098	360	400
3° 30′	0.029			0.046			0.065	205		0.076	255		0.086	285		0.100	360	
3° 45′	0.031			0.049			0.069	215		0.080	265		0.090	295				
4° 00′	0.033			0.051			0.072	225		0.083	270		0.093	305	350			
4° 30′	0.037			0.056			0.078	240		0.087	280		0.096	315				
5° 00′	0.040			0.061			0.083	250		0.091	295		0.098	320				
5° 30′	0.043			0.066	185		0.088	260		0.094	300	350						
6° 00′	0.046			0.070	190		0.092	270		0.096	305							
6° 30′	0.050			0.074	200		0.095	280	300	0.100	315							
7° 00′	0.053			0.078	210		0.098	285										
7° 30′	0.056			0.081	215		0.099	290										
8° 00′	0.058			0.084	220		0.100	290										
8° 30′	0.061			0.087	225	250												
9° 00′	0.063			0.089	230													
10° 00′	0.068	160		0.094	235													
11° 00′	0.072	170		0.097	250													
12° 00′	0.076	175		0.099	250													
13° 00′	0.080	180		0.100	250													
14° 00′	0.083	190																
15° 00′	0.086	195																
16° 00′	0.089	200																
17° 00′	0.091	200																
18° 00′	0.093	205																
19° 00′	0.095	210																
20° 00′	0.097	215	250															
21° 00′	0.098	215																
22° 00′	0.099	215																
23° 00′	0.099	215																
24° 00′	0.100	220																

D MAX = 24° 45′ | D MAX = 13° 15′ | D MAX = 8° 15′ | D MAX = 6° 30′ | D MAX = 5° 15′ | D MAX = 3° 30′

ABBREVIATIONS

NC - NORMAL CROWN
RC - REVERSE CROWN, SUPERELEVATION AT NORMAL CROWN SLOPE
e - RATE OF SUPERELEVATION (FT. PER FT.)
Ls - LENGTH OF SUPERELEVATION TRANSITION (FT.)
L - DISTANCE FROM BEGINNING OF SUPERELEVATION TRANSITION TO ANY POINT (FT.)
d - WIDTH OF PAVEMENT (FT.) OR WIDTH OF SUBGRADE (FT.)
C - NORMAL CROWN (FT.)



STANDARD METHOD WHEN SUPERELEVATION REVOLVES AROUND INNER SUBGRADE POINT OR INNER PAVEMENT EDGE

NOTE: MAINTAIN NORMAL CROWN ON INSIDE UNTIL SUPERELEVATION EXCEEDS 2C.

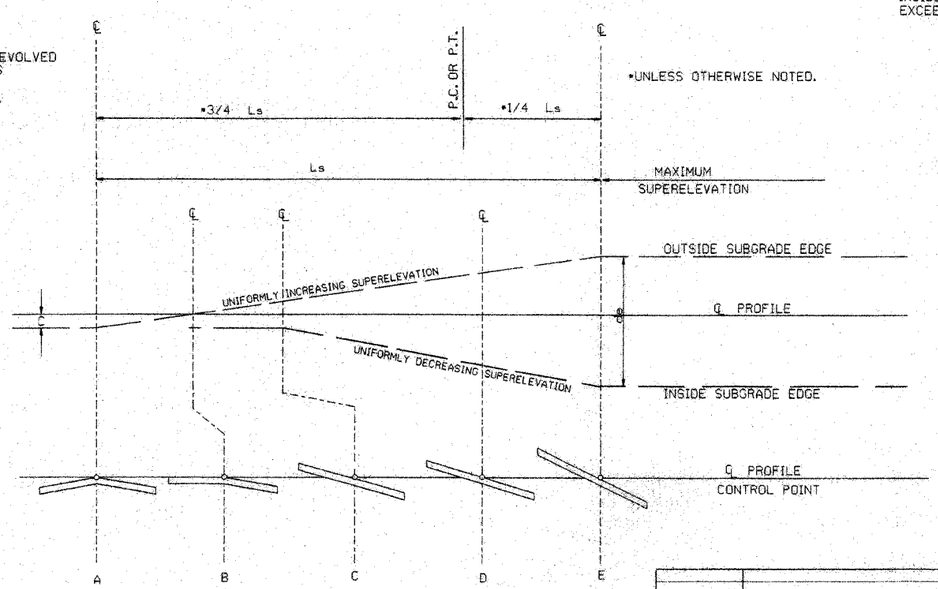
GENERAL NOTES

1. ON PAVEMENT WITH TWO-WAY TRAFFIC, THE SUPERELEVATION SHALL BE REVOLVED ON THE INSIDE PAVEMENT EDGE UNLESS OTHERWISE NOTED ON THE PLANS
2. SUPERELEVATION VALUES SHOWN ON THE CROSS SECTIONS ARE VALUES (+) OR (-) TO BE ADDED TO OR SUBTRACTED FROM THE POINT OF CONTROL.
3. LENGTHS FOR L MAY BE ROUNDED IN MULTIPLES OF 25 FT. OR 50 FT. TO PERMIT SIMPLER CALCULATIONS.
4. PAVEMENTS WIDER THAN 2 LANES SHALL HAVE ADDITIONAL TRANSITION LENGTHS AS FOLLOWS:

3 LANE UNDIVIDED - - - - - +20%
4 LANE UNDIVIDED - - - - - +50%
5 LANE UNDIVIDED - - - - - +80%
6 LANE UNDIVIDED - - - - - +100%

NOTE: MAINTAIN NORMAL CROWN ON INSIDE UNTIL SUPERELEVATION EXCEEDS 2C.

RATE OF SUPERELEVATION SHALL BE COMPUTED ON STRAIGHT LINE METHOD USING APPLICABLE Ls.



STANDARD METHOD WHEN SUPERELEVATION REVOLVES AROUND CENTER LINE

SUPERELEVATION FORMULA = $\frac{Lde}{Ls}$

DATE	REVISION	DATE FILMED
10-18-96	ADDED FORMULA	10-18-96
01-09-87	ISSUED	534-1-9-87

ARKANSAS STATE HIGHWAY COMMISSION

TABLES AND METHOD OF SUPERELEVATION FOR TWO-WAY TRAFFIC

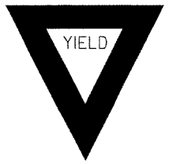
STANDARD DRAWING SE-2

FILE STDSE2.DGN

R1-1

STANDARD 30"X30"
EXPRESSWAY 36"X36"
SPECIAL 48"X48"

R1-2



STD. 36"X36"X36"
EXPWY. 48"X48"X48"
FWY. 60"X60"X60"

R2-1

STD. 24"X30"
EXPWY. 36"X48"
FWY. 48"X60"

R2-5A

STD. 24"X30"
EXPWY. 36"X48"
FWY. 48"X60"

R2-5C

STD. 24"X30"
EXPWY. 36"X48"
FWY. 48"X60"

R4-1

STD. 24"X30"
EXPWY. 36"X48"
FWY. 48"X60"

R4-2

STD. 24"X30"
EXPWY. 36"X48"
FWY. 48"X60"

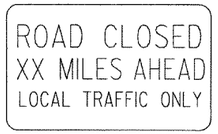
R5-1

STD. 30"X30"
EXPWY. 36"X36"
SPECIAL 48"X48"

RII-2

48"X30"

RII-3A



60"X30"

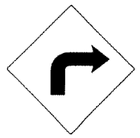
RII-4

60"X30"

RSP-1

48"X30"

WI-1



STD. 36"X36"
FWY. 48"X48"

WI-2

STD. 36"X36"
FWY. 48"X48"

WI-3

STD. 48"X48"

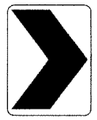
WI-4

STD. 48"X48"

WI-6

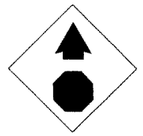
STD. 48"X24"
SPECIAL 60"X30"

WI-8



STD. 18"X24"
SPECIAL 24"X30"
EXPWY. 30"X36"
FWY. 36"X48"

W3-1

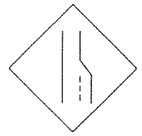


STD. 36"X36"
SPECIAL 48"X48"

W3-2

STD. 36"X36"
SPECIAL 48"X48"

W4-2



STD. 36"X36"
FWY. 48"X48"

W5-1

STD. 36"X36"
SPECIAL 48"X48"

W6-3

EXPWY. 36"X36"
SPECIAL 48"X48"

W8-7

EXPWY. 36"X36"
FWY. 48"X48"

W9-2

STD. 36"X36"
FWY. 48"X48"

WI3-1

STD. 24"X24"

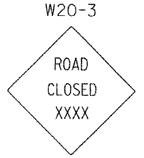
W20-1

STD. 48"X48"

W20-2

STD. 48"X48"

W20-3



STD. 48"X48"

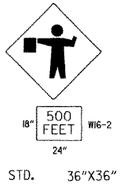
W20-4

STD. 48"X48"

W20-5

STD. 48"X48"

W20-7a



STD. 36"X36"
FWY. 48"X48"

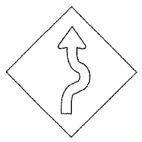
W21-2

STD. 30"X30"
SPECIAL 36"X36"

W21-5

STD. 30"X30"
SPECIAL 36"X36"

W24-1



STD. 36"X36"

WI-4b

STD. 48"X48"

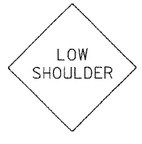
R56-1

STD. 18"XI8"

W8-11

STD. 36"X36"
FWY. 48"X48"

W8-9

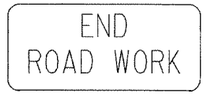


STD. 36"X36"
FWY. 48"X48"

G20-1

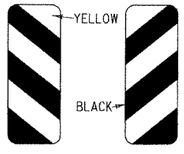
60"X24"

G20-2



48"X24"

OM-3L OM-3R



12"X36"

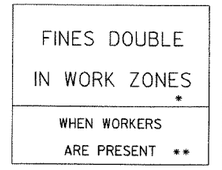
M4-9

STD. 30"X24"
SPECIAL 48"X36"
SPECIAL 60"X48"

M4-10

48"XI8"

R55-1



36"X60"

* USE 6" C LETTERS
** USE 4" D LETTERS

ADVANCE DISTANCES
(XXXX)

500 FT	½ MILE
1000 FT	¾ MILE
1500 FT	1 MILE
	AHEAD

GENERAL NOTES:

1. ALL TRAFFIC CONTROL DEVICES USED ON ROAD CONSTRUCTION SHALL CONFORM TO THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, LATEST EDITION, AND TO THE STANDARD HIGHWAY SIGNS, LATEST EDITION, OR AS APPROVED BY THE FEDERAL HIGHWAY ADMINISTRATION.

2. TRAFFIC CONTROL DEVICES SHALL BE SET UP JUST BEFORE THE START OF CONSTRUCTION OPERATIONS AND SHALL BE PROPERLY MAINTAINED DURING THE TIME SUCH CONDITIONS EXIST. THEY SHALL REMAIN IN PLACE ONLY AS LONG AS NEEDED AND REMOVED THEREAFTER.

3. EXISTING SIGNS AND CONSTRUCTION SIGNS SHALL BE KEPT IN PROPER POSITION, AND BE CLEAN AND LEGIBLE AT ALL TIMES. SIGNS THAT DO NOT APPLY TO EXISTING CONDITIONS SHALL BE REMOVED. SIGNS THAT ARE DAMAGED, DEFACED, OR THAT ACCUMULATE DIRT DURING CONSTRUCTION SHALL BE CLEANED, REPAIRED, OR REPLACED.

• 4. SIGNS ARE USUALLY MOUNTED ON A SINGLE POST, ALTHOUGH THOSE WIDER THAN 36" OR LARGER THAN 10 SQ. FT. SHALL BE MOUNTED ON TWO POSTS OR ABOVE A TYPE III BARRICADE.

• 5. SIGN POSTS DIRECT BURIED IN SOIL SHALL BE 2 LB. MINIMUM CHANNEL POST OR 4"x4" WOOD POSTS. CHANNEL POSTS SHALL BE PAINTED GREEN. WOOD POSTS SHALL BE PAINTED WHITE. ALL POSTS SHALL BE NEATLY CONSTRUCTED, AND SHALL BE REPLUMBED, CLEANED, OR REPAIRED AS NEEDED FOR THE DURATION OF THE JOB. THERE SHALL NOT BE MORE THAN 2 POSTS IN A 7' PATH FOR WOOD OR CHANNEL POSTS. ANY CHANNEL POST SPLICE SHALL BE IN ACCORDANCE WITH STANDARD DRAWING TC-3.

6. POST MOUNTED SIGNS IN RURAL AREAS SHALL BE CONSTRUCTED WITH THE NEAR EDGE OF THE SIGN FROM 6 TO 12 FEET FROM THE PAVEMENT EDGE. SIGNS IN URBAN AREAS AND BARRICADE MOUNTED SIGNS SHALL BE MOUNTED A MINIMUM OF 2 FEET FROM THE PAVEMENT EDGE.

7. ALL POST AND BARRICADE MOUNTED SIGNS MOUNTED IN URBAN AREAS SHALL BE MOUNTED A MINIMUM DISTANCE OF 7' FROM THE BOTTOM OF THE SIGN TO THE ROADWAY SURFACE. ALL POST AND BARRICADE MOUNTED SIGNS MOUNTED IN RURAL AREAS SHALL BE MOUNTED A MINIMUM DISTANCE OF 7' FROM THE BOTTOM OF THE SIGN TO THE ROADWAY SURFACE. EXCEPT A MINIMUM OF 6' SHALL BE USED WHEN MOUNTING AN ADVISORY SIGN BELOW A WARNING SIGN. TEMPORARY SIGNS MAY BE MOUNTED ON PORTABLE SUPPORTS FOR INTERMEDIATE TERM STATIONARY WORK CONDITIONS. THE SIGNS MINIMUM MOUNTING HEIGHT SHALL BE 5'. RETROREFLECTIVE DEVICES SHALL BE USED. TEMPORARY SIGNS MAY BE MOUNTED ON PORTABLE SUPPORTS FOR SHORT-TERM, SHORT DURATION, AND MOBILE CONDITIONS. THEY SHALL BE NO LESS THAN ONE (1) FOOT ABOVE THE TRAVELED WAY. LONG-TERM STATIONARY SIGNS SHALL BE DIRECT BURIED IN SOIL, UNLESS CONDITIONS NECESSITATE THE USE OF PORTABLE SIGNS, OR AS APPROVED BY THE ENGINEER. CONCRETE PADS, CONCRETE OR ROCK BALLAST, OR OTHER SOLID MATERIALS SHALL NOT BE UTILIZED WITH PORTABLE SIGN SUPPORTS.

8. FLAGGERS SHALL USE REFLECTORIZED STOP-SLOW PADDLES. FLAGS MAY BE USED ONLY FOR EMERGENCY SITUATIONS.

9. MOST OF THE SIGNS SHOWN ARE ORIENTED TO THE RIGHT. HOWEVER, THIS DOES NOT PRECLUDE THE USE OF MIRROR IMAGES OF THESE SIGNS WHERE THE REVERSE ORIENTATION MIGHT BETTER CONVEY TO MOTORISTS THE PROPER DIRECTION OF MOVEMENT.

10. R55-1 SIGNS SHALL BE PLACED AT LEAST 1500' BUT NOT MORE THAN 1 MILE IN ADVANCE OF THE WORK ZONE. IF A SPEED LIMIT REDUCTION IS IN EFFECT, THE SIGN SHALL BE PLACED A MINIMUM OF 500' IN ADVANCE OF THE "REDUCED SPEED AHEAD" SIGN.

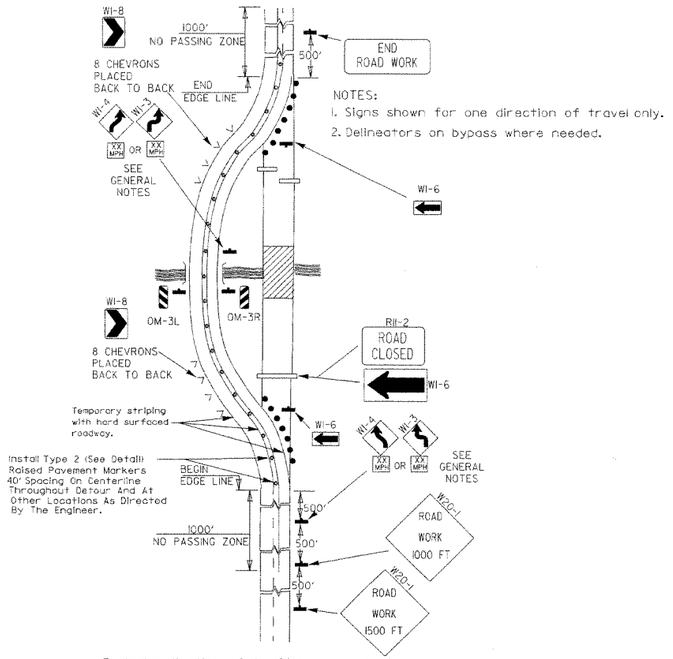
* NOTE: SUPPORTS FOR SIGNS, BARRICADES, AND VERTICAL PANELS THAT ARE DIFFERENT FROM THE REQUIREMENTS SHOWN IN NOTES 4 & 5, BUT MEET THE REQUIREMENTS OF NCHRP-350 OR MANUAL FOR ASSESSING SAFETY HARDWARE (MASH), WILL BE ACCEPTED. COMPLIANCE WITH THE REQUIREMENTS OF NCHRP-350 OR MANUAL FOR ASSESSING SAFETY HARDWARE (MASH) IS REQUIRED FOR ALL PROJECTS.

DATE	REVISION	FILMED
11-17-10	DELETED W8-9a & ADDED W8-9	
10-15-09	ADDED REFERENCE TO MASH & ADDED SIGN W24-1	
4-17-08	REVISED SIGN DESIGNATIONS	
11-8-04	REVISED NOTES	
10-9-03	REVISED NOTE 1	
11-16-01	REVISED NOTE 7	
9-28-00	REVISED NOTE	
11-18-98	ADDED NOTE	
6-26-97	REVISED NOTE 5	
4-03-97	REVISED NOTE 5	
10-18-96	ADDED CONTROLLED ACCESS HWY. SIGN & TO NOTE 7	
10-12-95	ADDED R55-1	
6-8-95	REVISED TO CORRECT SIGN ILLUSTRATIONS	6-8-95
2-2-95	REVISED PER PART VI, MUTCD SEPT. 3, 1993	
8-15-91	DRAWN AND PLACED IN USE	

ARKANSAS STATE HIGHWAY COMMISSION

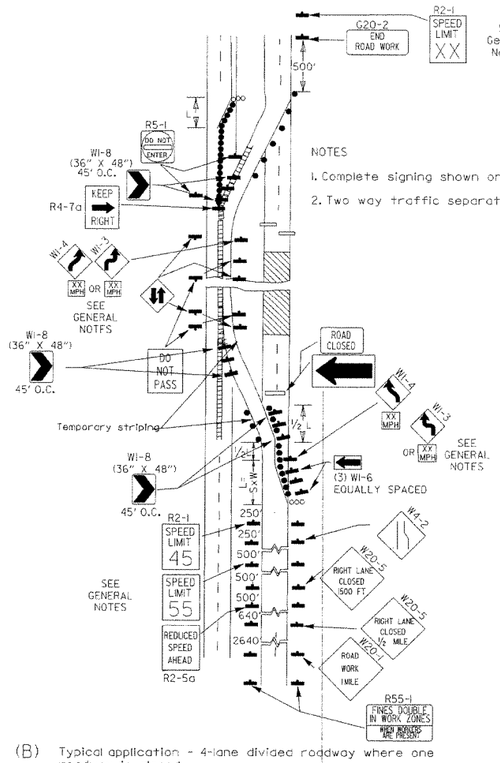
STANDARD TRAFFIC CONTROLS FOR HIGHWAY CONSTRUCTION

STANDARD DRAWING TC-1



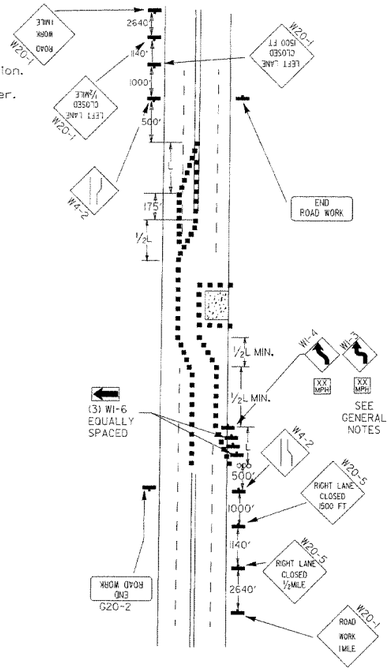
NOTES:
1. Signs shown for one direction of travel only.
2. Delineators on bypass where needed.

(A) Typical application of traffic control devices on a 2-lane highway where the entire roadway is closed and a bypass detour is provided.

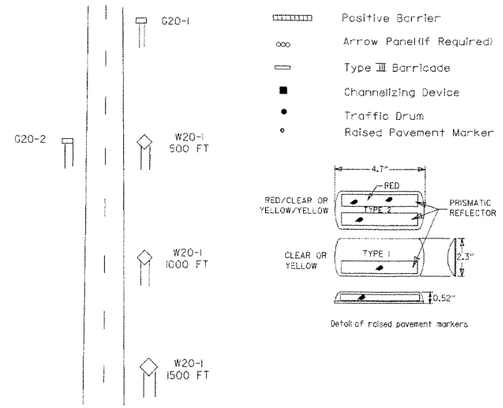


NOTES
1. Complete signing shown only in crossover direction.
2. Two way traffic separated with positive barrier.

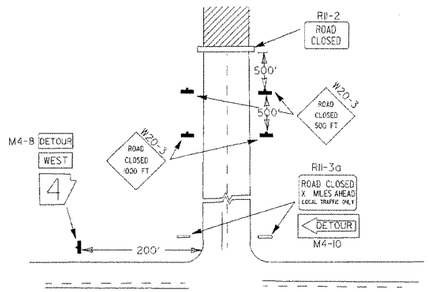
(B) Typical application - 4-lane divided roadway where one roadway is closed.



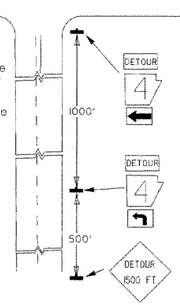
(C) Typical application - 4-lane undivided roadway where half of the roadway is closed.



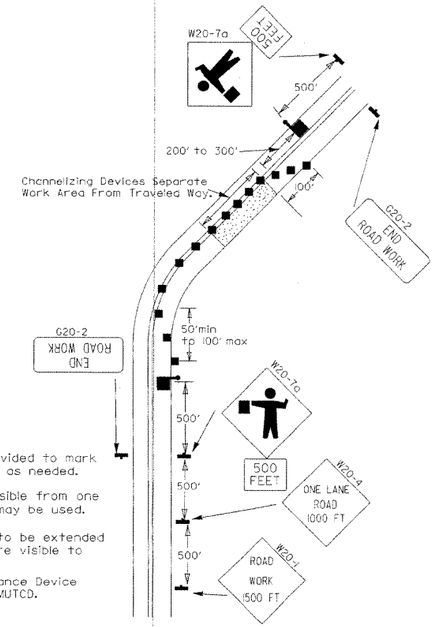
Typical advance warning sign placement



NOTES:
1. Regulatory traffic control devices to be modified as needed for the duration of the detour.
2. Street names may be used when desirable for directing detoured traffic.

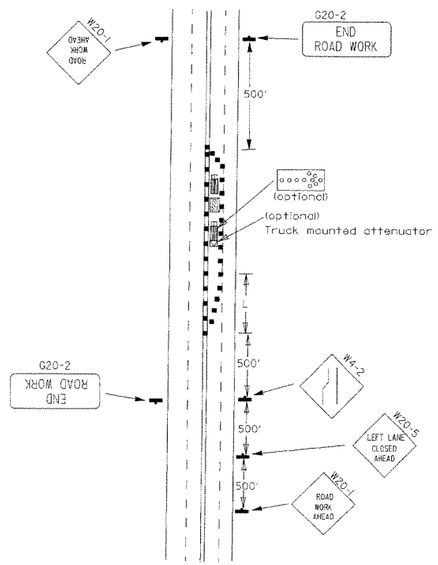


(D) Typical application - roadway closed beyond detour point.



NOTES:
1. Flood lights should be provided to mark flagger stations at night as needed.
2. If entire work area is visible from one station, a single flagger may be used.
3. Channelizing devices are to be extended to a point where they are visible to approaching traffic.
4. Automated Flagger Assistance Device (AFAD) optional. Refer to MUTCD.

(E) Typical application of traffic control devices on 2-lane highway where one lane is closed and flagging is provided.



(F) Typical application - 4-lane undivided roadway with inside lane closed.

Taper formulae:

$L = S \times W$ for speeds of 45mph or more.

$L = \frac{WS^2}{60}$ for speeds of 40mph or less.

Where:

L= Minimum length of taper.

S= Numerical value of posted speed limit prior to work or 85th percentile speed.

W= Width of offset.

GENERAL NOTES:

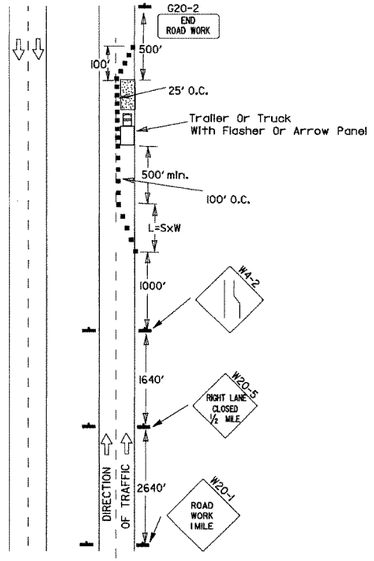
1. Advisory speed posted on W1-3 or W1-4 curve warning signs to be determined at site. Use W1-4 when speed is greater than 30mph and W1-3 when 30mph or less.
2. When the existing speed limit is 55mph and the plans require a speed limit of 45mph, the R2-1(55) shall be omitted and the R2-5A shall be installed at that location. Additional R2-1 45mph speed limit signs shall be installed at a maximum of 1mile intervals. At the end of the work area a R2-1(xx) shall be installed to match original speed limit.
3. When the existing speed limit is 65mph and the plans require a speed limit of 55mph, the R2-1(45) shall be omitted. Additional R2-1 55mph speed limit signs shall be installed at a maximum of 1mile intervals. At the end of the work area a R2-1(xx) shall be installed to match original speed limit.
4. The maximum spacing between channelizing devices in a taper should be approximately equal in feet to the speed limit. Beyond the taper, maximum spacing shall be two times the speed limit, or as directed by the Engineer.
5. Warning lights and/or flags may be mounted to signs or channelizing devices at night as needed.
6. Pavement markings no longer applicable which might create confusion in the minds of vehicle operators shall be removed or obliterated as soon as practicable.
7. Trailer mounted devices such as arrow panels and portable changeable message signs shall be delineated by affixing consplcuity material in a continuous line on the face of the trailer. When placed on or adjacent to the shoulder and not behind a positive barrier, these devices shall be delineated by placing five (5) traffic drums, equally spaced along the traffic side of the device.

DATE	REVISION	FILMED
3-8-10	ADDED (4FAD)	
11-20-08	REVISED SIGN DESIGNATIONS	
11-18-04	ADDED GENERAL NOTE	
10-18-96	ADDED R55-1	
4-26-96	CORRECTED (a) BEHIND G20-2	
6-8-95	CORRECTED SIGN IDENT. ON W1-4A	6-8-95
2-2-95	REVISED PER PART VI, MUTCD, SEPT. 3, 1993	
8-15-91	DRAWN AND PLACED IN USE	

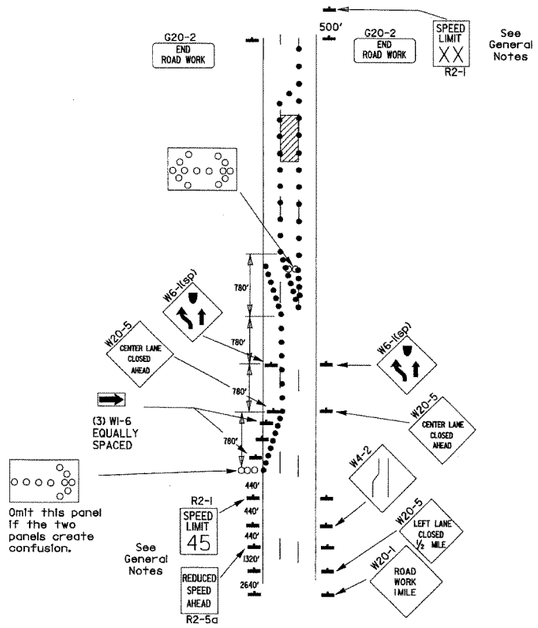
ARKANSAS STATE HIGHWAY COMMISSION

STANDARD TRAFFIC CONTROLS FOR HIGHWAY CONSTRUCTION

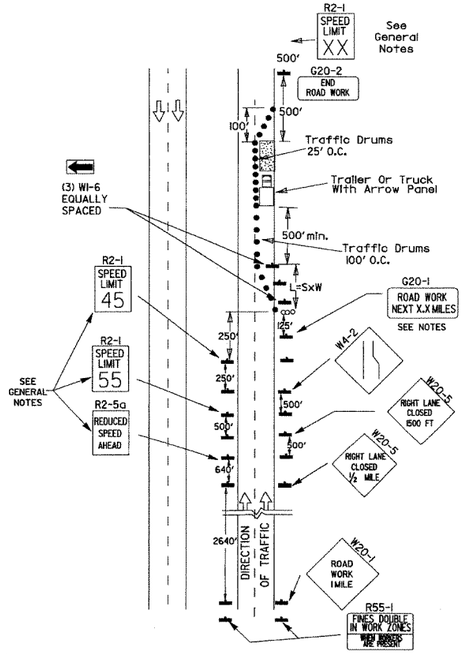
STANDARD DRAWING TC-2



(A) Typical application - daytime maintenance operations of short duration on a 4-lane divided roadway where half of the roadway is closed.



(B) Typical application - 3-lane oneway roadway where center lane is closed.



(C) Typical application - construction operations of intermediate to long term duration on a 4-lane divided roadway where half of the roadway is closed.

KEY:

ooo Arrow Panel (If Required)

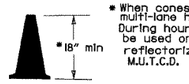
■ Channelizing Device

● Traffic drum

GENERAL NOTES:

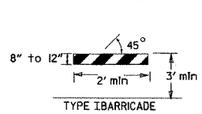
1. A speed limit reduction may be implemented ONLY when designated in the plan or when recommended by the Roadway Design Division.
2. When the existing speed limit is 55mph and the plans require a speed limit of 45mph, the R2-1(55) shall be omitted and the R2-5A shall be installed at that location. Additional R2-1 45mph speed limit signs shall be installed at a maximum of 1 mile intervals. At the end of the work area a R2-1(XX) shall be installed to match original speed limit.
3. When the existing speed limit is 65mph and the plans require a speed limit of 55mph, the R2-1(45) shall be omitted. Additional R2-1 55mph speed limit signs shall be installed at a maximum of 1 mile intervals. At the end of the work area a R2-1(XX) shall be installed to match original speed limit.
4. The maximum spacing between channelizing devices in a taper should be approximately equal in feet to the speed limit. Beyond the taper, maximum spacing shall be two times the speed limit or as directed by the Engineer.
5. Warning lights and/or flags may be mounted to signs or channelizing devices at night as needed.
6. Pavement markings no longer applicable which might create confusion in the minds of vehicle operators shall be removed or obliterated as soon as practicable.
7. The G20-1 sign will be required on jobs of over two miles in length. When the lane closure is not at the beginning of the project, the G20-1 sign shall be erected 125' in advance of the job limit. Additional W20-1 (1 MILE) signs are not required in advance of lane closures that begin inside the project limits.
8. Flaggers shall use STOP/SLOW paddles for controlling traffic through work zones. Flags may be used only for emergency situations.
9. All plastic drums and cones shall meet the requirements of NCHRP-350 or Manual For Assessing Safety Hardware (MASH).
10. Trailer mounted devices such as arrow panels and portable changeable message signs shall be delineated by affixing conspicuity material in a continuous line on the face of the trailer. When placed on or adjacent to the shoulder and not behind a positive barrier, these devices shall be delineated by placing five (5) traffic drums, equally spaced along the traffic side of the device.

Channelizing devices



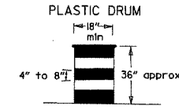
CONES

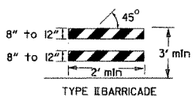
* When cones are used on freeways and multi-lane highways, they shall be 28" min. During hours of darkness, 28" cones shall be used on all roadways, and shall be reflectorized in accordance with the M.U.T.C.D.



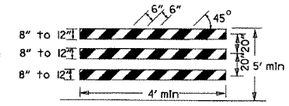
TYPE I BARRICADE

PLASTIC DRUM



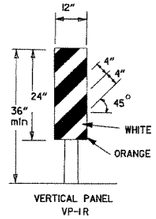


TYPE II BARRICADE



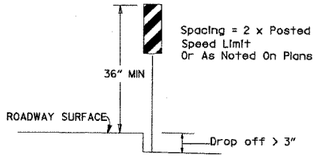
TYPE III BARRICADE

NOTE: For all road closures, the Type III barricades shall be of sufficient length to extend across entire roadway.



VERTICAL PANEL
VP-1R

VERTICAL PANEL PLACEMENT



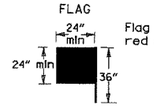
TRAFFIC CONTROL DEVICES
FOR
VERTICAL PAVEMENT DIFFERENTIALS

VERTICAL DIFFERENTIAL	LOCATIONS	TRAFFIC CONTROL
1" to 3"	Centerline, lane lines	W8-11
1" to 3"	Edge of shoulder	W8-9
Greater than 3"	Lane lines	Standard lane closure required
Greater than 3"	Edge of traveled lane	*RSP-1 and vertical panels, drums or concrete barrier
Greater than 3"	Edge of shoulder	*Vertical panels, drums or concrete barrier

* When shown on the plans concrete barrier will be used.

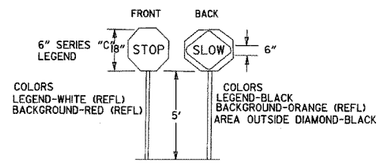
When the shoulder area is used as part of the traveled lane and there is insufficient width to place drums on the remaining shoulder width, then vertical panels shall be used.

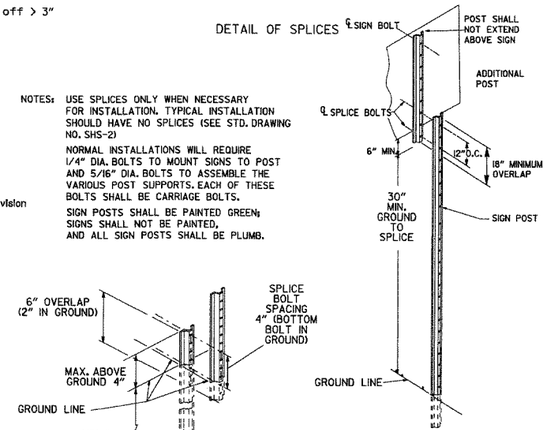
FLAG



Flag shall be of good grade red material

STOP SLOW PADDLE

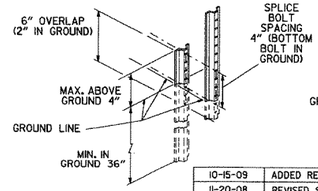


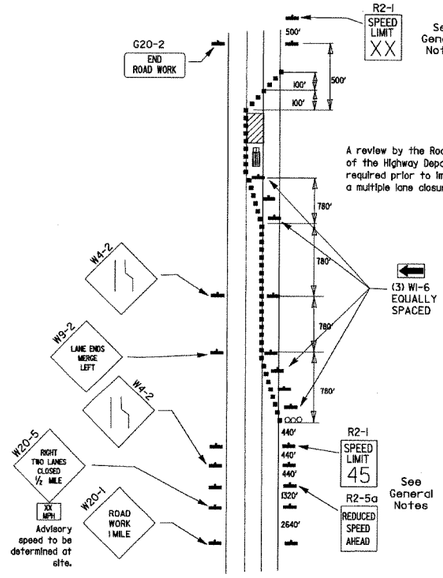


NOTES: USE SPLICES ONLY WHEN NECESSARY FOR INSTALLATION. TYPICAL INSTALLATION SHOULD HAVE NO SPLICES (SEE STD. DRAWING NO. SHS-2)

NORMAL INSTALLATIONS WILL REQUIRE 1/4" DIA. BOLTS TO MOUNT SIGNS TO POST AND 5/16" DIA. BOLTS TO ASSEMBLE THE VARIOUS POST SUPPORTS. EACH OF THESE BOLTS SHALL BE CARRIAGE BOLTS.

SIGN POSTS SHALL BE PAINTED GREEN; SIGNS SHALL NOT BE PAINTED, AND ALL SIGN POSTS SHALL BE PLUMB.





(D) Typical application - closing multiple lanes of a multilane highway.

DATE	REVISION	FILMED
10-15-09	ADDED REFERENCE TO MASH	
11-20-08	REVISED SIGN DESIGNATIONS	
8-18-04	ADDED NOTE	
10-1-98	ADDED NOTE	
4-03-97	ADDED (SP) TO W6-1 & REVISED TRAFFIC CONTROL DEVICES NOTE	
10-18-96	ADDED R55-1	
10-12-95	MOVED UPPER SPLICE	
6-8-95	REVISED SPLICE DETAIL, TEXT	6-8-95
2-2-95	REVISED PER PART VI, MUTCD, SEPT. 3, 1993	
8-15-91	DRAWN AND PLACED IN USE	

ARKANSAS STATE HIGHWAY COMMISSION

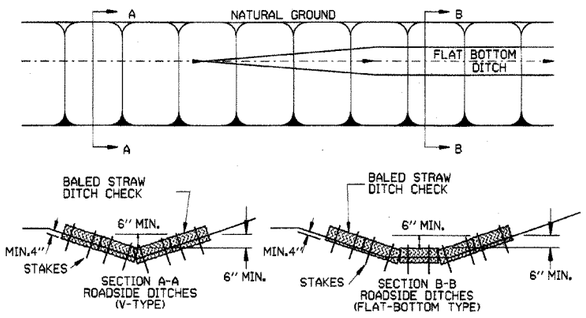
STANDARD TRAFFIC CONTROLS FOR HIGHWAY CONSTRUCTION

STANDARD DRAWING TC-3

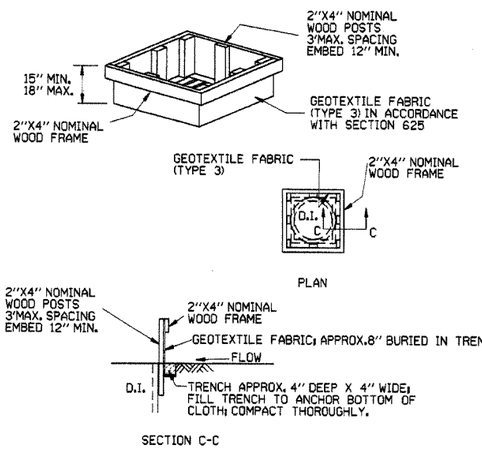
GENERAL NOTES

1. STRAW BALES SHALL BE INSTALLED SO THAT THE BINDINGS ARE ORIENTED AROUND THE SIDES RATHER THAN ALONG THE TOPS AND BOTTOMS OF THE BALES. THE BALES SHALL BE A MINIMUM OF 30 INCHES IN LENGTH.

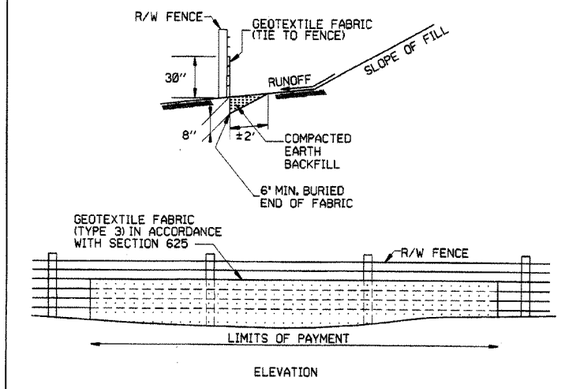
2. STRAW BALES SHALL BE KEYED INTO SOIL A MINIMUM OF 4" AND NO GAPS SHALL BE LEFT BETWEEN BALES.



BALED STRAW DITCH CHECK (E-1)



DROP INLET SILT FENCE (E-7)



SILT FENCE ON R/W FENCE (E-4)

GENERAL NOTES

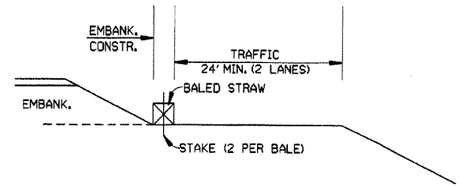
GEOTEXTILE FABRIC SHALL BE SPLICED TOGETHER WITH A SEWN SEAM ONLY AT A SUPPORT POST, OR TWO SECTIONS OF FENCE MAY BE OVERLAPPED INSTEAD. PAYMENT OF ADDITIONAL MATERIAL FOR OVERLAP WILL NOT BE MADE.

GENERAL NOTES

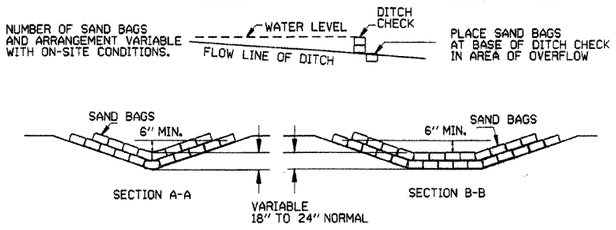
1. STRAW BALES SHALL BE INSTALLED SO THAT THE BINDINGS ARE ORIENTED AROUND THE SIDES RATHER THAN ALONG THE TOPS AND BOTTOMS OF THE BALES. THE BALES SHALL BE A MINIMUM OF 30 INCHES IN LENGTH.

2. NO GAPS SHALL BE LEFT BETWEEN BALES.

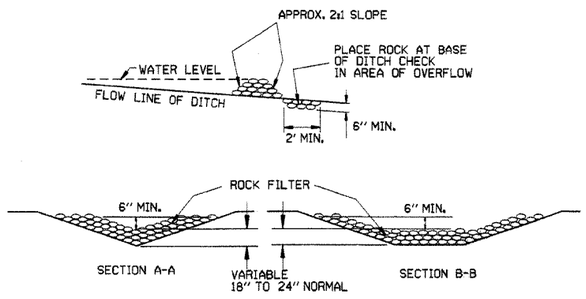
3. BALED STRAW FILTER BARRIERS COMPLETED AND ACCEPTED WILL BE MEASURED BY THE BALE IN PLACE AS AUTHORIZED BY THE ENGINEER AND WILL BE PAID FOR AT THE CONTRACT UNIT PRICE BID PER BALE FOR BALED STRAW DITCH CHECKS.



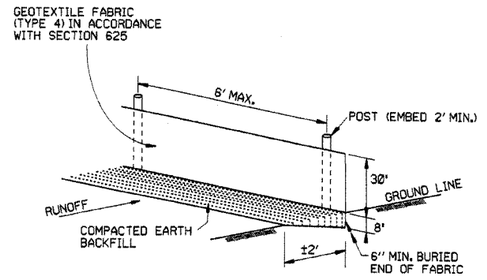
BALED STRAW FILTER BARRIER (E-2)



SAND BAG DITCH CHECK (E-5)



ROCK DITCH CHECK (E-6)



SILT FENCE (E-11)

GENERAL NOTES

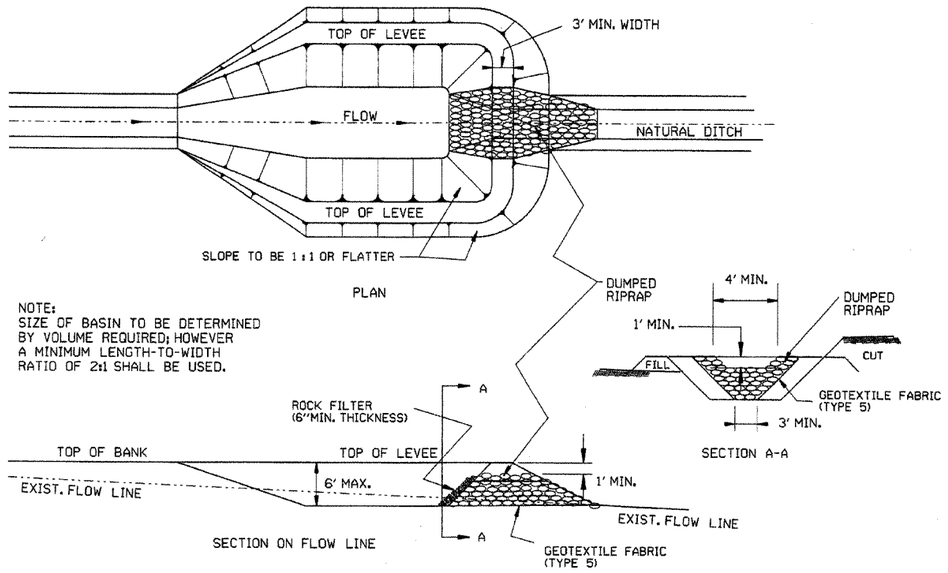
GEOTEXTILE FABRIC SHALL BE SPLICED TOGETHER WITH A SEWN SEAM ONLY AT A SUPPORT POST, OR TWO SECTIONS OF FENCE MAY BE OVERLAPPED INSTEAD. PAYMENT OF ADDITIONAL MATERIAL FOR OVERLAP WILL NOT BE MADE.

DATE	REVISION	FILMED
11-18-98	ADDED NOTES	11-18-98
7-02-98	ADDED BALED STRAW FILTER BARRIER (E-2)	
7-20-95	REVISED SILT FENCE E-4 AND E-11	7-20-95
7-15-94	Rev. E-4 & E-11 Min. 13' Buried End of Fabric	
6-2-94	Revised E-1,4,7, & 11; Deleted E-2 & 3	6-2-94
4-1-93	REDRAWN	
10-1-92	REDRAWN	
8-2-76	ISSUED R.D.M.	298-7-28-76

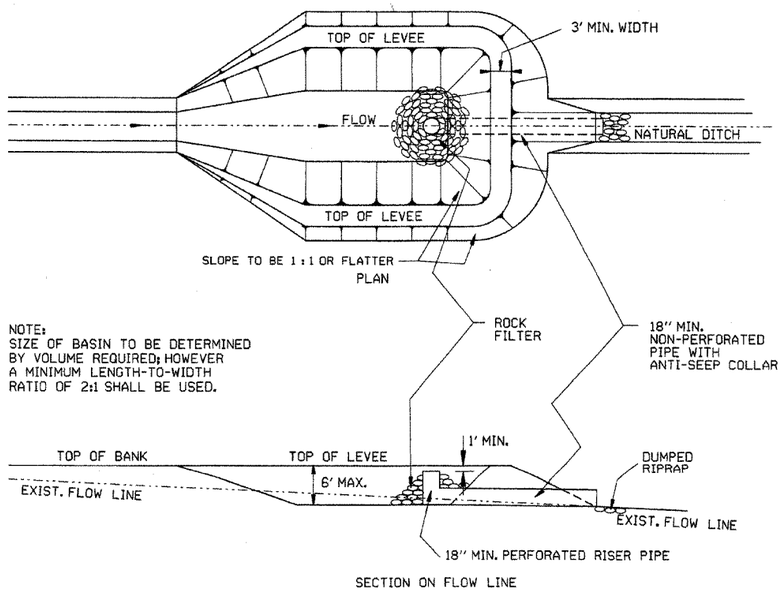
ARKANSAS STATE HIGHWAY COMMISSION

TEMPORARY EROSION CONTROL DEVICES

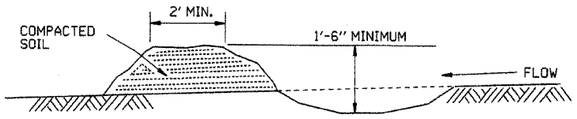
STANDARD DRAWING TEC-1



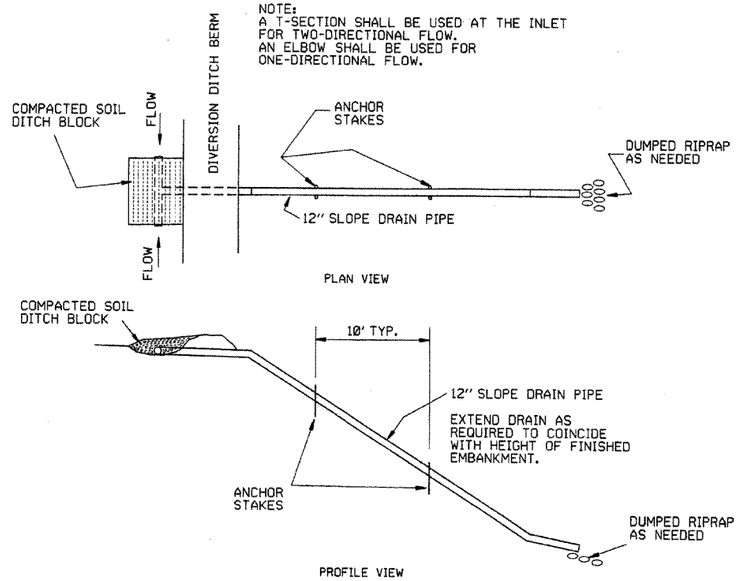
SEDIMENT BASIN WITH RIPRAP OUTLET (E-9)



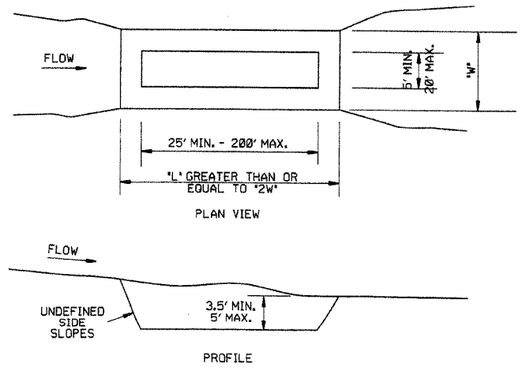
SEDIMENT BASIN WITH PIPE OUTLET (E-10)



DIVERSION DITCH (E-8)



SLOPE DRAIN (E-12)



SEDIMENT BASIN (E-14)

DATE	REVISION	FILMED
6-2-94	Revised E-8 & E-12; Added E-14 & Deleted E-13	
4-1-93	ISSUED	

ARKANSAS STATE HIGHWAY COMMISSION

TEMPORARY EROSION CONTROL DEVICES

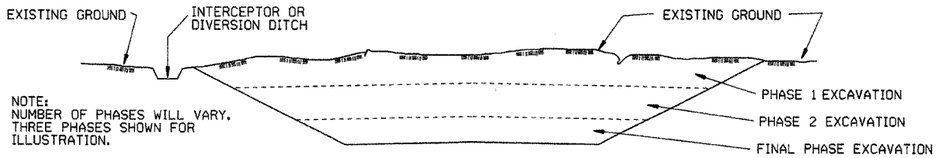
STANDARD DRAWING TEC-2

CLEARING AND GRUBBING

CONSTRUCTION SEQUENCE

1. PLACE PERIMETER CONTROLS (I.E. SILT FENCES , DIVERSION DITCHES, SEDIMENT BASINS, ETC.)
2. PERFORM CLEARING AND GRUBBING OPERATION.

EXCAVATION



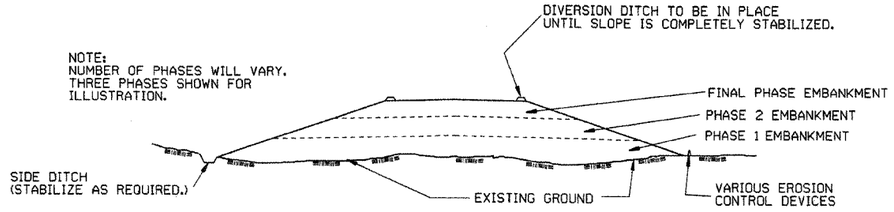
GENERAL NOTE

ALL CUT SLOPES SHALL BE DRESSED, PREPARED, SEEDED, AND MULCHED AS THE WORK PROGRESSES. SLOPES SHALL BE EXCAVATED AND STABILIZED IN EQUAL INCREMENTS NOT TO EXCEED 25 FEET, MEASURED VERTICALLY.

CONSTRUCTION SEQUENCE

1. EXCAVATE AND STABILIZE INTERCEPTOR AND/OR DIVERSION DITCHES.
2. PERFORM PHASE 1 EXCAVATION. PLACE PERMANENT OR TEMPORARY SEEDING.
3. PERFORM PHASE 2 EXCAVATION. PLACE PERMANENT OR TEMPORARY SEEDING.
4. PERFORM FINAL PHASE OF EXCAVATION. PLACE PERMANENT OR TEMPORARY SEEDING. STABILIZE DITCHES. CONSTRUCT DITCH CHECKS, DIVERSION DITCHES, SEDIMENT BASINS, OR OTHER EROSION CONTROL DEVICES AS REQUIRED.

EMBANKMENT



GENERAL NOTE

ALL EMBANKMENT SLOPES SHALL BE DRESSED, PREPARED, SEEDED, AND MULCHED AS THE WORK PROGRESSES. SLOPES SHALL BE CONSTRUCTED AND STABILIZED IN EQUAL INCREMENTS NOT TO EXCEED 25 FEET, MEASURED VERTICALLY.

CONSTRUCTION SEQUENCE

1. CONSTRUCT DIVERSION DITCHES, DITCH CHECKS, SEDIMENT BASINS, SILT FENCES, OR OTHER EROSION CONTROL DEVICES AS SPECIFIED.
2. PLACE PHASE 1 EMBANKMENT WITH PERMANENT OR TEMPORARY SEEDING. PROVIDE DIVERSION DITCHES AND SLOPE DRAINS IF EMBANKMENT CONSTRUCTION IS TO BE TEMPORARILY ABANDONED FOR A PERIOD OF GREATER THAN 21 DAYS.
3. PLACE PHASE 2 EMBANKMENT WITH PERMANENT OR TEMPORARY SEEDING. PROVIDE DIVERSION DITCHES AND SLOPE DRAINS IF EMBANKMENT CONSTRUCTION IS TO BE TEMPORARILY ABANDONED FOR A PERIOD OF GREATER THAN 21 DAYS.
4. PLACE FINAL PHASE OF EMBANKMENT WITH PERMANENT OR TEMPORARY SEEDING. PLACE DIVERSION DITCHES AND SLOPE DRAINS AND MAINTAIN UNTIL ENTIRE SLOPE IS STABILIZED.

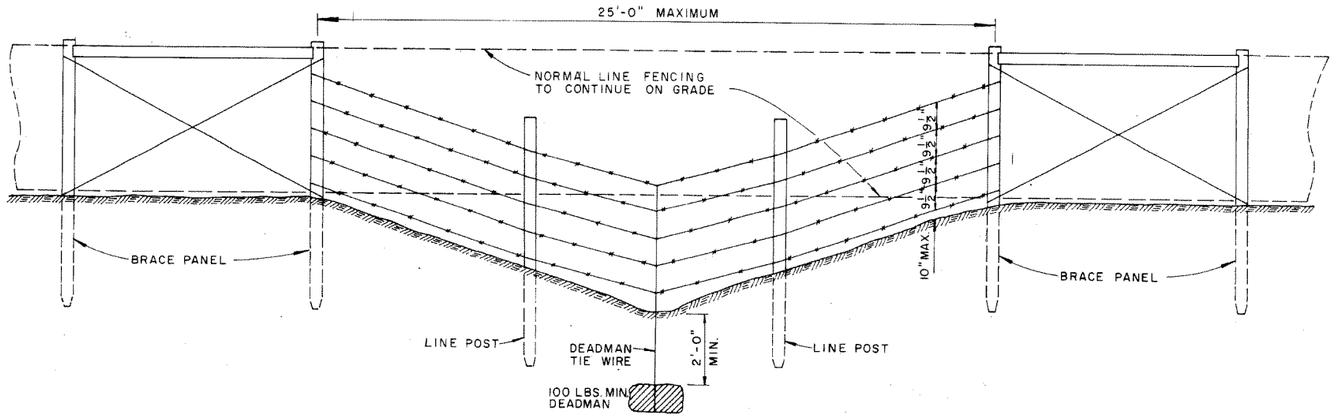
DATE	REVISION	FILMED
11-03-94	CORRECTED SPELLING	
6-2-94	Drawn & Issued	6-2-94

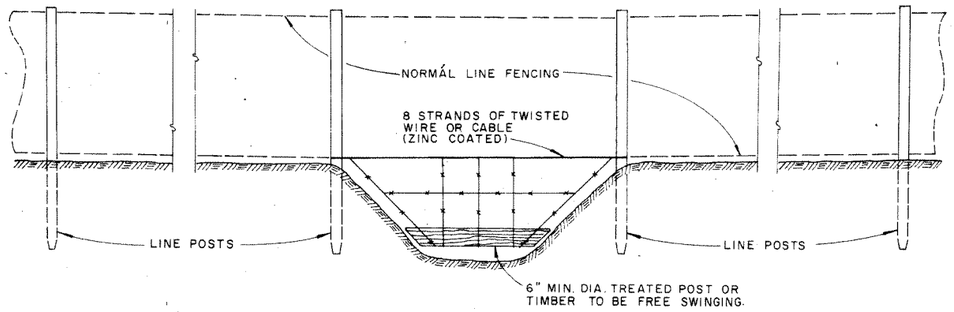
ARKANSAS STATE HIGHWAY COMMISSION

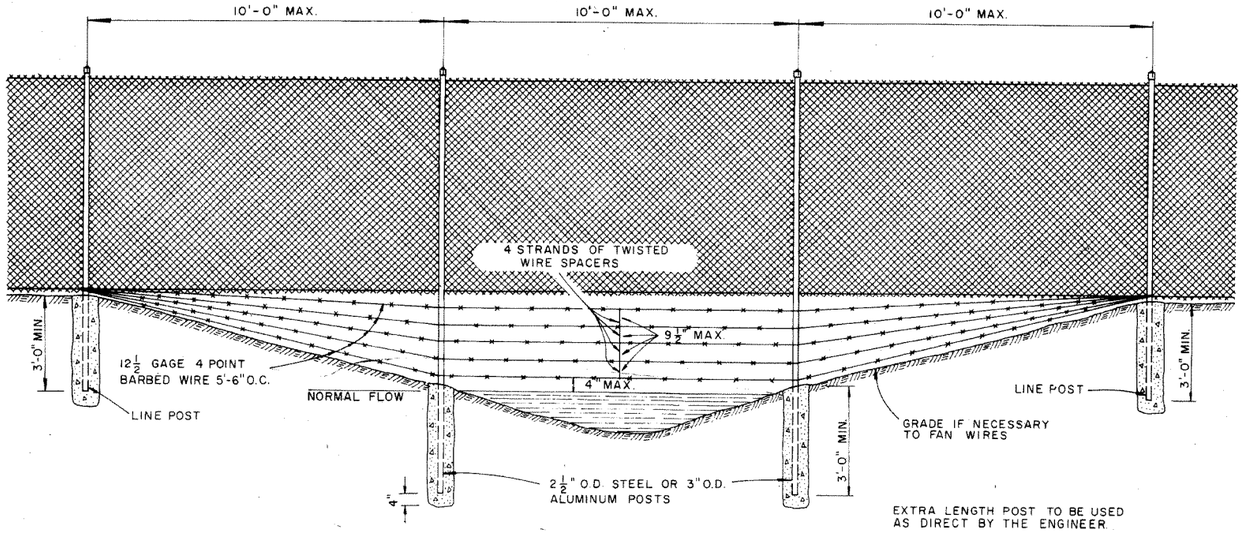
TEMPORARY EROSION CONTROL DEVICES

STANDARD DRAWING TEC-3

stdtec3.dgn







GENERAL NOTES:

THESE INSTALLATIONS TO BE USED WHERE NORMAL FENCING INSTALLATION WOULD CAUSE THE COLLECTING OF DRIFT IN THE CHANNEL OR THE DEPRESSION WILL NOT PERMIT NORMAL INSTALLATION. INSTALLATIONS WILL BE MADE ONLY WHERE DIRECTED BY THE ENGINEER.

WHEN A FENCE LINE APPROACHES A DITCH, GULLY OR DEPRESSION, THE LAST POST ON LEVEL GROUND SHALL BE PLACED CLOSE ENOUGH TO THE EDGE OF THE DROP OFF THAT THE FENCE MAY BE STRUNG TO THE POST IN THE DEPRESSION WITHOUT TOUCHING THE GROUND.

IN TERRAIN OF SUCH EXTREME IRREGULARITY THAT MINOR GRADING WILL NOT BE FEASIBLE, THE NORMAL FENCE SHALL CONTINUE ON GRADE AND THE GULLIES OR DEPRESSIONS TREATED BY AUXILIARY FENCES AS SHOWN.

PAYMENT FOR THE TYPE INSTALLATION USED WILL NOT BE MADE DIRECTLY BUT WILL BE INCLUDED IN THE CONTRACT UNIT PRICE BID FOR WIRE FENCE OR CHAIN LINK FENCE.

DATE	REVISION	DATE FILM'D
4-20-79	REVISED TOP RAIL & TENSION WIRE	696 4-20-79
10-2-72	REVISED & REDRAWN	529 10-2-72

ARKANSAS STATE HIGHWAY COMMISSION

WIRE FENCE WATER GAPS

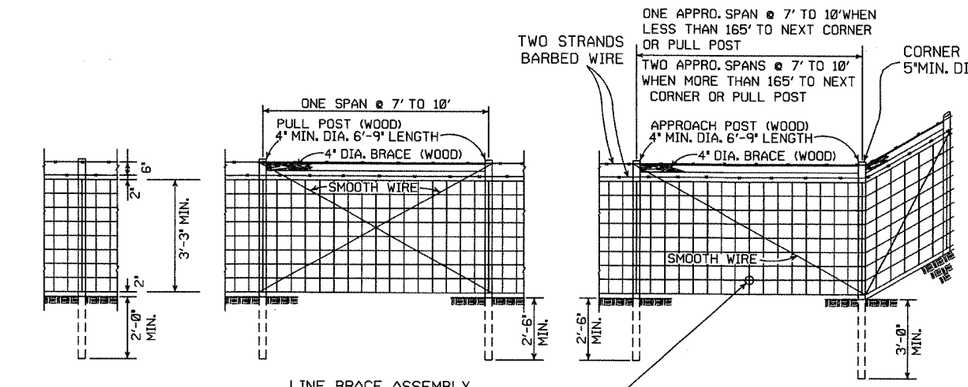
STANDARD DRAWING

WF-2

73

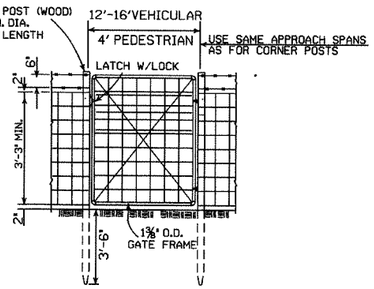
1M—11-71—67001—PPASC

TYPE C FENCE (WOOD POSTS)

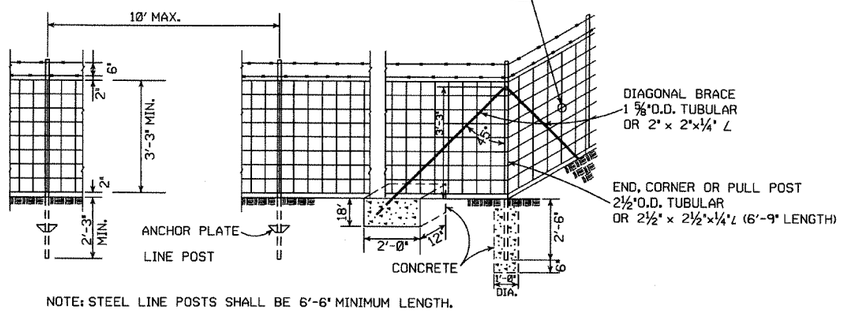


LINE POST
3" MIN. DIA. 6'-3" LENGTH
MAX. SPACING TO BE 10'-0"

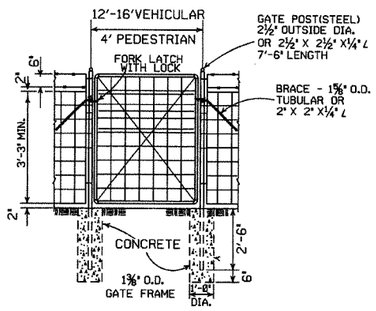
LINE BRACE ASSEMBLY
MAX. SPACING TO BE 330'

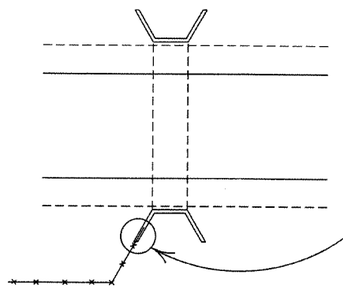


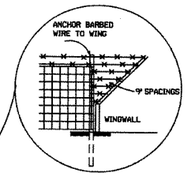
OTHER APPROVED TIES WILL BE PERMITTED



NOTE: STEEL LINE POSTS SHALL BE 6'-6" MINIMUM LENGTH.







NOTE: USE ⅜" X 1½" LAG BOLT & SHIELD OR AS APPROVED BY THE ENGINEER.

DETAIL OF FENCE CONSTRUCTION AT LARGE CULVERTS (5' IN HEIGHT AND OVER)

GENERAL NOTES:

STEEL LINE POSTS SHALL BE PAINTED OR GALVANIZED.
TUBULAR END, CORNER, PULL, OR DIAGONAL BRACES MUST CONFORM TO THE DIMENSIONS AND WEIGHTS SPECIFIED ON STANDARD DRAWING WF-3 (CHAIN LINK). APPROVED ALTERNATES ARE ACCEPTABLE.
AN ACCEPTABLE TOLERANCE IN LENGTH OF TUBULAR OR WOODEN POSTS SHALL BE - 1" TO +2".
TUBULAR POSTS MUST BE PAINTED OR GALVANIZED.

THE CONTRACTOR SHALL FURNISH AT LEAST 25% OF TIMBER LINE POSTS OF 7 FOOT LENGTHS IN ORDER TO PROVIDE SUFFICIENT SET IN SOFT GROUND OR SMALL DEPRESSIONS.

DRIVEWAY GATES, EITHER SINGLE 12' TO 16' OR DOUBLE 6' TO 8' OPENING OF THE SAME TYPE AS THE PEDESTRIAN GATE, SHALL BE INSTALLED ON THE RIGHT SIDE OF EACH THROUGH LANE ROAD AT LARGE CULVERTS OR BRIDGE CROSS FENCE, FOR USE OF MAINTENANCE EQUIPMENT. LOCATION OF GATES TO BE SHOWN ON PLANS OR AS DESIGNATED BY THE ENGINEER.

AT STREAM CROSSINGS, THE FENCE SHALL NOT BE CONSTRUCTED ACROSS LARGE STREAMS. WHERE CLEARANCE IS SUFFICIENT FROM THE TOP OF THE BANK TO THE BRIDGE STRUCTURE A CROSS CONNECTION SHALL BE CONSTRUCTED BETWEEN THE FENCE ON EACH SIDE OF THE ROAD. WHERE THE CLEARANCE IS NOT SUFFICIENT, THE FENCE SHALL BE TERMINATED WITH CROSS CONNECTIONS AND END POSTS ADJACENT TO BRIDGE ABUTMENTS OR CULVERT WINGWALLS.

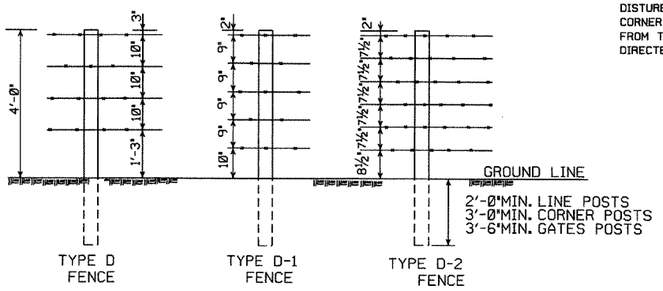
SPLICE FOR BARBED WIRE BETWEEN PULL POST ASSEMBLY SHALL BE BY THE "EYE METHOD" AS DESCRIBED AS FOLLOWS:
THE ENDS OF THE BARBED WIRE SHALL BE BENT TO FORM A LOOP. THE LOOPS SHALL BE CONNECTED. AFTER THE LOOPS ARE CONNECTED THE ENDS OF THE WIRE SHALL BE WRAPPED AROUND THE PROJECTING WIRES A MINIMUM OF 4 TIMES FOR EACH WIRE LOOP.

SPLICE FOR WOVEN WIRE BETWEEN PULL POST SHALL BE BY THE "WESTERN UNION METHOD" AS DESCRIBED AS FOLLOWS: THE VERTICAL WIRES FOR EACH END OF THE FENCE FABRIC SHALL BE PLACED SIDE BY SIDE AND THE PROJECTING HORIZONTAL WIRES SHALL BE WRAPPED A MINIMUM OF 4 TIMES AROUND THE HORIZONTAL WIRES OF THE FIRST WEB.

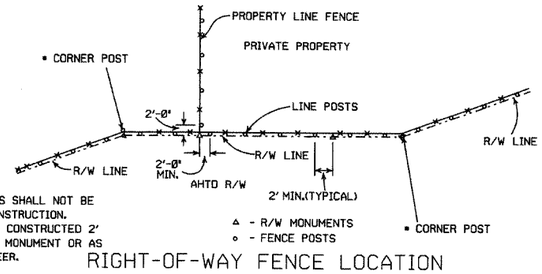
STAPLE AT LEAST TOP, BOTTOM AND ALTERNATE WIRES OF WOVEN FABRIC FOR WOOD LINE POSTS.

TYPE C FENCE (STEEL POSTS)

4 STRANDS BARBED WIRE (D)
5 STRANDS BARBED WIRE (D-1)
6 STRANDS BARBED WIRE (D-2)

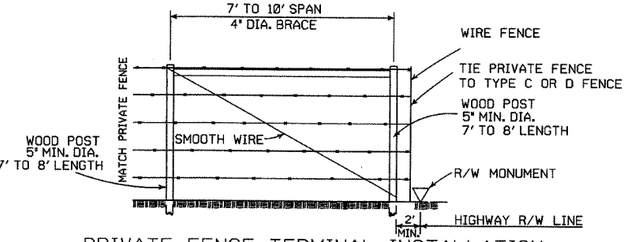


NOTE: SPACING AND SIZE (EXCEPT LENGTH) OF POSTS, APPROACH SPANS, PULL POST ASSEMBLIES, AND CORNER BRACING FOR TYPE D FENCE SHALL CONFORM TO TYPE C FENCE. USE GALVANIZED STAPLES ON WOOD POSTS AND APPROVED FASTENERS ON STEEL POSTS.

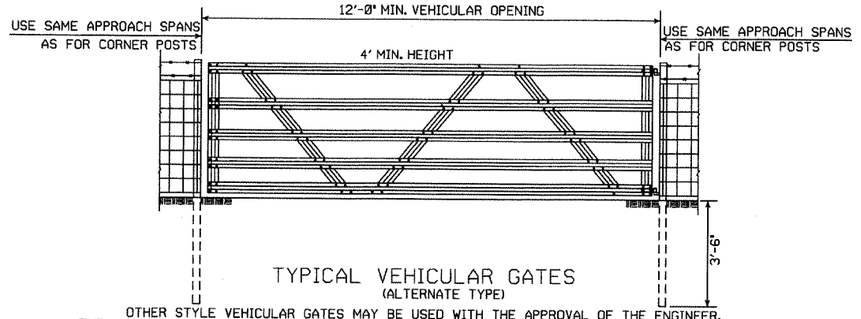


• NOTE: RIGHT-OF-WAY MONUMENTS SHALL NOT BE DISTURBED BY FENCE CONSTRUCTION. CORNER POSTS SHALL BE CONSTRUCTED 2' FROM THE RIGHT-OF-WAY MONUMENT OR AS DIRECTED BY THE ENGINEER.

RIGHT-OF-WAY FENCE LOCATION



PRIVATE FENCE TERMINAL INSTALLATION
WHERE EXISTING FENCE CONSISTS OF STEEL POSTS, USE END POST ASSEMBLY AS SHOWN IN TYPE C FENCE OR OTHER END POST ASSEMBLY AS APPROVED BY THE ENGINEER.



TYPICAL VEHICULAR GATES
(ALTERNATE TYPE)

OTHER STYLE VEHICULAR GATES MAY BE USED WITH THE APPROVAL OF THE ENGINEER.
THE METHOD OF SECURING GATE (LATCH AND/OR LOCK)SHALL MEET THE APPROVAL OF THE ENGINEER.

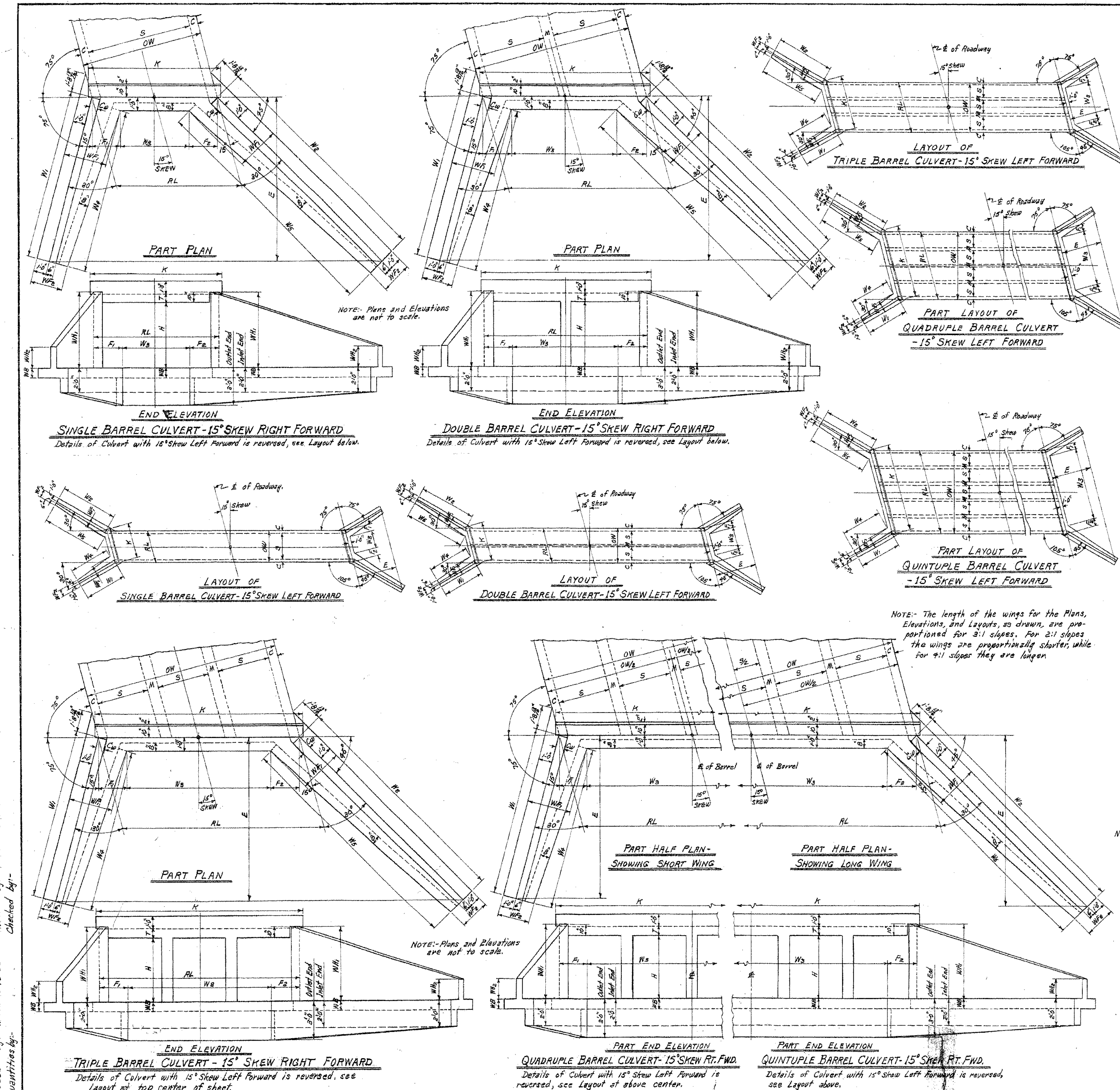
DATE	REVISION	FILMED
8-22-02	REVISED GENERAL NOTES	
10-18-96	REVISED AASHTO	
11-22-95	REVISED R-O-W LOCATION DETAIL	
6-2-94	REVISED BARB WIRE AND ADDED CORNER POST NOTES	6-2-94
8-5-93	REVISED R/W INSTALLATION FENCE	8-5-93
10-1-92	ADDED STAPLE NOTE	10-1-92
8-15-91	ADDED TYPE D-2 FENCE	8-15-91
11-30-89	DELETED CLASS CONCRETE	11-30-89
7-15-88	ADDED SPLICE NOTE	700-7-15-88
10-30-87	GENERAL REVISIONS	549-10-30-87
11-1-84	MAX. POST SPACING MIN. WIRE GAUGE	507-11-1-84
1-4-83	MIN. DIA. LINE POST	648-1-4-83
3-2-81	TOLERANCE FOR POST LENGTH	722-3-2-81
12-1-72	ADDED D-1 & FENCE INSTALLATION	564-12-1-72
10-2-72	REVISED AND REDRAWN	540-10-2-72

ARKANSAS STATE HIGHWAY COMMISSION

WIRE FENCE TYPE C AND D

STANDARD DRAWING WF-4

FED. ROAD No.	STATE	FED. AID PROJECT	FISCAL YEAR	SHEET No.	TOTAL SHEETS
6	ARK.			35	
JOB No.					



ROADWAY LENGTH RL — HEADWALL LENGTH K — APRON DIMENSION W_3

$RL = OW \times 1.035276$; $K = RL + (6\frac{1}{2}")$; $W_3 = RL - (F_1 + F_2)$

Use with Drawing No.	Clear Span S	Clear Height H	Sum of Footing Dimensions F_1 & F_2	Single OW	Single RL	Single K	Single W_3	Double OW	Double RL	Double K	Double W_3	Triple OW	Triple RL	Triple K	Triple W_3	Quadruple OW	Quadruple RL	Quadruple K	Quadruple W_3	Quintuple OW	Quintuple RL	Quintuple K	Quintuple W_3
W-X152-1, W-X153-1 or W-X154-1 (For H = 8'-0" or less)	4'	2'	2'-0"	5'-0"	5'-2 1/8"	5'-8 5/8"	3'-2 1/8"	9'-8"	10'-0"	10'-6 1/2"	8'-0"	14'-4"	14'-10"	15'-4 1/2"	12'-10"	19'-0"	19'-8"	20'-2 1/2"	17'-8"	23'-8"	24'-6"	25'-0 1/2"	22'-6"
		3'	2'-9 3/4"	5'-0"	"	"	2'-4 3/8"	9'-8"	"	"	7'-2 3/4"	14'-4"	"	"	12'-0 1/4"	19'-0"	"	"	16'-10 1/4"	23'-8"	"	"	21'-8 1/4"
		4'	3'-7 5/8"	5'-0"	"	"	1'-6 1/2"	9'-8"	"	"	6'-4 1/2"	14'-4"	"	"	11'-2 1/2"	19'-0"	"	"	16'-0 1/2"	23'-8"	"	"	20'-10 1/2"
		5'	4'-5 3/8"	5'-0"	"	"	0'-8 3/4"	9'-8"	"	"	5'-6 3/4"	14'-4"	"	"	10'-4 3/4"	19'-0"	"	"	15'-2 3/4"	23'-8"	"	"	20'-0 3/4"
		6'	5'-3 1/8"	5'-2"	5'-4 1/8"	5'-10 5/8"	0'-1"	9'-11"	10'-3 1/8"	10'-9 5/8"	5'-0"	14'-8"	15'-2 1/4"	15'-8 3/4"	9'-11"	19'-5"	20'-1 1/4"	20'-7 3/4"	14'-10"	24'-2"	25'-0 1/4"	25'-6 3/4"	19'-9"
	5'	3'	2'-9 3/4"	6'-0"	6'-2 1/2"	6'-9"	3'-4 3/4"	11'-8"	12'-1"	12'-7 1/2"	9'-3 1/4"	17'-4"	17'-11 3/8"	18'-5 3/4"	15'-1 1/2"	23'-0"	23'-9 3/4"	24'-4 1/4"	21'-0"	28'-8"	29'-8 1/8"	30'-2 1/2"	26'-10 1/4"
		4'	3'-7 5/8"	6'-0"	"	"	2'-7"	11'-8"	"	"	8'-5 3/8"	17'-4"	"	"	14'-3 3/4"	23'-0"	"	"	20'-2 1/4"	28'-8"	"	"	26'-0 1/8"
		5'	4'-5 3/8"	6'-0"	"	"	1'-9 1/2"	11'-8"	"	"	7'-7 5/8"	17'-4"	"	"	13'-6"	23'-0"	"	"	19'-4 1/4"	28'-8"	"	"	25'-2 3/4"
		6'	5'-3 1/8"	6'-2"	6'-4 5/8"	6'-11 1/8"	1'-1 1/2"	11'-11"	12'-4"	12'-10 1/2"	7'-0 7/8"	17'-8"	18'-3 1/2"	18'-10"	13'-0 1/4"	23'-5"	24'-2 7/8"	24'-9 3/8"	18'-11 3/4"	29'-2"	30'-2 3/8"	30'-8 7/8"	24'-11 1/4"
		7'	6'-5 7/8"	6'-3"	6'-5 5/8"	7'-0 1/8"	Ⓐ 0"	12'-1"	12'-6 1/8"	13'-0 1/2"	6'-0 1/4"	17'-11"	18'-6 5/8"	19'-1"	12'-0 3/4"	23'-9"	24'-7"	25'-1 1/2"	18'-1 1/4"	29'-7"	30'-7 1/4"	31'-2"	24'-1 3/8"
	6'	3'	2'-9 3/4"	7'-0"	7'-3"	7'-9 1/2"	4'-5 1/4"	13'-8"	14'-1 3/4"	14'-8 1/4"	11'-4"	20'-4"	21'-0 5/8"	21'-7"	18'-2 3/4"	27'-0"	27'-11 5/8"	28'-5 3/4"	25'-1 3/4"	33'-8"	34'-10 1/4"	35'-4 3/4"	32'-0 1/2"
		4'	3'-7 5/8"	7'-0"	"	"	3'-7 3/8"	13'-8"	"	"	10'-6 1/2"	20'-4"	"	"	17'-5"	27'-0"	"	"	24'-3 3/4"	33'-8"	"	"	31'-2 3/4"
		5'	4'-5 3/8"	7'-0"	"	"	2'-9 5/8"	13'-8"	"	"	9'-8 3/4"	20'-4"	"	"	16'-7 1/4"	27'-0"	"	"	23'-6"	33'-8"	"	"	30'-4 3/4"
		6'	5'-3 1/8"	7'-2"	7'-5"	7'-11 1/2"	2'-1 3/4"	13'-11"	14'-5"	14'-11 1/2"	9'-1 3/8"	20'-8"	21'-4 3/4"	21'-11 1/4"	16'-1 1/2"	27'-5"	28'-4 5/8"	28'-11"	23'-1 1/2"	34'-2"	35'-4 1/2"	35'-11"	30'-1 1/4"
		7'	6'-5 7/8"	7'-3"	7'-6"	8'-0 1/2"	1'-0 1/4"	14'-1"	14'-7"	15'-1 1/2"	8'-1 1/8"	20'-11"	21'-7 3/4"	22'-2 1/4"	15'-2"	27'-9"	28'-8 3/4"	29'-3 1/4"	22'-5"	34'-7"	35'-9 5/8"	36'-4"	29'-3 3/4"
		8'	7'-8 5/8"	7'-4"	7'-7 1/8"	8'-1 5/8"	Ⓐ 0"	14'-2"	14'-8"	15'-2 1/2"	6'-11 3/8"	21'-0"	21'-8 7/8"	22'-3 1/4"	14'-0 1/4"	27'-10"	28'-9 3/4"	29'-4 1/4"	21'-1 1/4"	34'-8"	35'-10 5/8"	36'-5"	28'-2"
	7'	4'	3'-7 5/8"	8'-0"	8'-3 3/8"	8'-9 7/8"	4'-7 3/4"	15'-8"	16'-2 5/8"	16'-9"	12'-7"	23'-4"	24'-1 7/8"	24'-8 1/4"	20'-6 1/4"	31'-0"	32'-1 1/8"	32'-7 1/2"	28'-5 1/2"	38'-8"	40'-0 3/8"	40'-6 3/4"	36'-4 3/4"
		5'	4'-5 3/8"	8'-0"	"	"	3'-10"	15'-8"	"	"	11'-9 1/4"	23'-4"	"	"	19'-8 1/2"	31'-0"	"	"	27'-7 3/4"	38'-8"	"	"	35'-7"
		6'	5'-3 1/8"	8'-2"	8'-5 1/2"	9'-0"	3'-2 1/4"	15'-11"	16'-5 3/4"	17'-0 1/4"	11'-2 1/2"	23'-8"	24'-6"	25'-0 1/2"	19'-2 3/4"	31'-5"	32'-6 1/4"	33'-0 3/4"	27'-3"	39'-2"	40'-6 5/8"	41'-1"	35'-3 1/2"
		7'	6'-5 7/8"	8'-3"	8'-6 1/2"	9'-1"	2'-0 3/8"	16'-1"	16'-7 3/4"	17'-2 1/4"	10'-2"	23'-11"	24'-9 3/8"	25'-3 1/2"	18'-3 1/4"	31'-9"	32'-10 1/2"	33'-5"	26'-4 1/2"	39'-7"	40'-11 3/4"	41'-6 1/4"	34'-6"
		8'	7'-8 5/8"	8'-4"	8'-7 1/2"	9'-2"	0'-11"	16'-2"	16'-8 7/8"	17'-3 1/4"	9'-0 1/4"	24'-0"	24'-10 3/8"	25'-4 7/8"	17'-1 1/4"	31'-10"	32'-11 1/2"	33'-6"	25'-3"	39'-8"	41'-0 3/4"	41'-7 1/4"	33'-4 1/4"
	8'	4'	3'-7 5/8"	9'-0"	9'-3 3/4"	9'-10 1/4"	5'-8 1/4"	17'-8"	18'-2 1/2"	18'-10"	14'-8"	26'-4"	27'-3 1/2"	27'-9 1/4"	23'-7 1/2"	35'-0"	36'-2 7/8"	36'-9 1/4"	32'-7 1/2"	43'-8"	45'-2 1/2"	45'-9"	41'-7"
		5'	4'-5 3/8"	9'-2"	9'-5 7/8"	10'-0 3/4"	5'-0 1/2"	17'-11"	18'-6 5/8"	19'-1"	14'-1 1/4"	26'-8"	27'-7 1/4"	28'-1 3/4"	23'-2"	35'-5"	36'-8"	37'-2 1/2"	32'-2 3/4"	44'-2"	45'-8 3/8"	46'-3 1/4"	41'-3 1/4"
		6'	5'-3 1/8"	9'-2"	"	"	4'-2 3/4"	17'-11"	"	"	13'-3 1/2"	26'-8"	"	"	22'-4"	35'-5"	"	"	31'-4 3/4"	44'-2"	"	"	40'-5 1/2"
		7'	6'-5 7/8"	9'-3"	9'-6 7/8"	10'-1 1/4"	3'-1"	18'-1"	18'-8 3/4"	19'-3"	12'-2 3/4"	26'-11"	27'-10 3/8"	28'-4 3/4"	21'-4 1/2"	35'-9"	37'-0 1/8"	37'-6 1/2"	30'-6 1/2"	44'-7"	46'-1 7/8"	46'-8 1/2"	39'-8"
		8'	7'-8 5/8"	9'-4"	9'-8"	10'-2 1/2"	1'-11 1/2"	18'-2"	18'-9 3/8"	19'-4 1/4"	11'-1 1/4"	27'-0"	27'-11 3/8"	28'-5 3/4"	20'-2 1/4"	35'-10"	37'-1 1/8"	37'-7 1/2"	29'-4 1/2"	44'-8"	46'-2 3/8"	46'-9 1/2"	38'-6 1/4"
	9'	5'	4'-5 3/8"	10'-2"	10'-6 1/4"	11'-0 3/4"	6'-1"	19'-11"	20'-7 1/2"	21'-2"	16'-2"	29'-8"	30'-8 1/2"	31'-3"	26'-3 1/4"	39'-5"	40'-9 3/4"	41'-4 1/4"	36'-4 1/2"	49'-2"	50'-10 3/4"	51'-5 1/4"	46'-5 1/2"
		6'	5'-3 1/8"	10'-3"	10'-7 3/8"	11'-1 3/4"	5'-4 1/2"	20'-1"	20'-9 1/2"	21'-4"	15'-6 1/2"	29'-11"	30'-11 5/8"	31'-6"	25'-8 1/2"	39'-9"	41'-1 3/8"	41'-8 1/4"	35'-10 3/4"	49'-7"	51'-4"	51'-10 1/2"	46'-0 3/4"
		7'	6'-5 7/8"	10'-3"	"	"	4'-1 1/2"	20'-1"	"	"	14'-3 3/4"	29'-11"	"	"	24'-5 3/4"	39'-9"	"	"	34'-8"	49'-7"	"	"	44'-10"
		8'	7'-8 5/8"	10'-4"	10'-8 3/4"	11'-2 3/4"	2'-11 3/4"	20'-2"	20'-10 1/2"	21'-5"	13'-2"	30'-0"	31'-0 3/4"	31'-7 1/4"	23'-4 1/2"	39'-10"	41'-2 7/8"	41'-9 1/2"	33'-6 1/4"	49'-8"	51'-5"	51'-11 1/2"	43'-8 1/2"
	10'	5'	4'-5 3/8"	11'-2"	11'-6 3/4"	12'-1 1/4"	7'-1 5/8"	21'-11"	22'-8 1/4"	23'-2 3/4"	18'-3"	32'-8"	33'-9 3/4"	34'-4 1/4"	29'-4 1/2"	43'-5"	44'-11 1/2"	45'-6"	40'-6"	54'-2"	56'-1"	56'-7 1/2"	51'-7 1/2"
		6'	5'-3 1/8"	11'-3"	11'-7 3/4"	12'-2 1/4"	6'-4 5/8"	22'-1"	22'-10 3/8"	23'-4 3/4"	17'-7 1/4"	32'-11"	34'-1"	34'-7 1/2"	28'-9 3/4"	43'-9"	45'-3 1/2"	45'-10"	40'-0 1/4"	54'-7"	56'-6"	57'-0 1/2"	51'-3"
		7'	6'-5 7/8"	11'-3"	"	"	5'-1 7/8"	22'-1"	"	"	16'-4 1/2"	32'-11"	"	"	27'-7"	43'-9"	"	"	38'-9 3/8"	54'-7"	"	"	50'-0 1/4"
		8'	7'-8 5/8"	11'-4"	11'-8 3/4"	12'-3 1/4"	4'-0 1/4"	22'-2"	22'-11 3/8"	23'-5 3/4"	15'-2 3/4"	33'-0"	34'-2"	34'-8 1/2"	26'-5 1/2"	43'-10"	45'-4 1/2"	45'-11"	37'-8"	54'-8"	56'-7 7/8"	57'-1 1/8"	48'-10 1/4"
	11'	6'	5'-3 1/8"	12'-4"	12'-9 1/4"	13'-3 3/4"	7'-6"	24'-2"	25'-0 1/4"	25'-6 3/4"	19'-9"	36'-0"	37'-3 1/4"	37'-9 3/4"	32'-0"	47'-10"	49'-6 1/4"	50'-0 3/4"	44'-3"	—	—	—	—
		7'	6'-5 7/8"	12'-4"	"	"	6'-3 3/4"	24'-2"	"	"	18'-6 1/2"	36'-0"	"	"	30'-9 1/4"	47'-10"	"	"	43'-0 1/2"	—	—	—	—
		8'	7'-8 5/8"	12'-4"	"	"	5'-0 5/8"	24'-2"	"	"	17'-3 3/4"	36'-0"	"	"	29'-6 3/4"	47'-10"	"	"	41'-9 1/4"	—	—	—	—
	12'	6'	5'-3 1/8"	13'-4"	13'-9 5/8"	14'-4"	8'-6 1/2"	26'-2"	27'-1"	27'-7 1/2"	21'-10"	39'-0"	40'-4 1/2"	40'-11"	35'-1 1/4"	51'-10"	53'-8"	54'-2 1/2"	48'-4 3/4"	—	—	—	—
		7'	6'-5 7/8"	13'-4"	"	"	7'-3 3/4"	26'-2"	"	"	20'-7 1/4"	39'-0"	"	"	33'-10 3/4"	51'-10"	"	"	47'-2"	—	—	—	—
		8'	7'-8 5/8"	13'-4"	"	"	6'-1"	26'-2"	"	"	19'-4 1/2"	39'-0"	"	"	32'-8"	51'-10"	"	"	45'-11 1/2"	—	—	—	—
W-X152-2, W-X153-2 or W-X154-2 (For H = 9'-0" & over)	7'																						
		9'	8'-11 1/4"	8'-6"	8'-9 5/8"	9'-4"	Ⓐ 0"	16'-5"	17'-0"	17'-6 1/2"	8'-0 3/4"	24'-4"	25'-2 1/2"	25'-8 3/4"	16'-3"	32'-3"	33'-4 5/8"	33'-11"	24'-5 3/4"	40'-2"	41'-7"	42'-1 1/2"	32'-7 3/4"
	8'	9'	8'-11 1/4"	9'-6"	9'-10"	10'-4 1/2"	0'-10 3/4"	18'-5"	19'-0 3/4"	19'-7 1/4"	10'-1 1/2"	27'-4"	28'-3 5/8"	28'-10"	19'-4 1/4"	36'-3"	37'-6 3/8"	38'-0 3/4"	28'-7"	45'-2"	46'-9 1/8"	47'-3 1/2"	37'-9 3/4"
		10'	10'-2"	9'-8"	10'-0 1/4"	10'-6 1/4"	Ⓐ 0"	18'-8"	19'-3 7/8"	19'-10 1/4"	9'-2"	27'-8"	28'-7 3/4"	29'-2 1/4"	18'-5 3/4"	36'-8"	37'-11 1/2"	38'-6"	27'-9 1/2"	45'-8"	47'-3 3/4"	47'-9 3/4"	37'-1 1/2"
	9'	9'	8'-11 1/4"	10'-6"	10'-10 1/2"	11'-5"	1'-11 1/4"	20'-5"	21'-1 5/8"	21'-8 1/4"	12'-2 1/2"	30'-4"	31'-4 7/8"	31'-11 1/4"	22'-5 1/2"	40'-3"	41'-8"	42'-2 1/2"	32'-8 3/4"	50'-2"	51'-11 1/4"	52'-5 3/4"	43'-0"
		10'	10'-2"	10'-8"	11'-0 1/2"	11'-7"	0'-10 1/2"	20'-8"	21'-4 3/4"	21'-11 1/4"	11'-2 3/4"	30'-8"	31'-9"	32'-3 1/2"	21'-7"	40'-8"	42'-1 1/4"	42'-7 3/4"	31'-11 1/4"	50'-8"	52'-5 1/4"	53'-0"	42'-3 1/2"
		11'	11'-4 5/8"	10'-10"	11'-2 3/4"	11'-9"	Ⓐ 0"	20'-10"	21'-6 7/8"	22'-1 1/2"	10'-2 1/4"	30'-10"	31'-11"	32'-5 1/2"	20'-6 1/2"	40'-10"	42'-3 1/4"	42'-9 3/4"	30'-10 3/4"	50'-10"	52'-7 1/2"	53'-2"	41'-2 3/4"
	10'	9'	8'-11 1/4"	11'-6"	11'-10 7/8"	12'-5 1/4"	2'-11 3/4"	22'-5"	23'-2 1/4"	23'-9"	14'-3 1/4"	33'-4"	34'-6 1/4"	35'-0 1/2"	25'-6 3/4"	44'-3"	45'-9 3/4"	46'-4 1/4"	36'-10 1/2"	55'-2"	57'-1 1/8"	57'-7 3/4"	48'-2"
		10'	10'-2"	11'-8"	12'-1"	12'-7 1/2"	1'-11"	22'-8"	23'-5 5/8"	24'-0"	13'-2 3/4"	33'-8"	34'-10 1/4"	35'-4 3/4"	24'-8 1/4"	44'-8"	46'-2 7/8"	46'-9 1/4"	36'-1"	55'-8"	57'-7 5/8"	58'-2"	47'-5 1/2"
		11'	11'-4 5/8"	11'-10"	12'-3"	12'-9 1/2"	0'-10 3/4"	22'-10"	23'-7 3/4"	24'-2"	12'-3"	33'-10"	35'-0 3/4"	35'-6 3/4"	23'-7 3/4"	44'-10"	46'-5"	46'-11 1/2"	35'-0 1/4"	55'-10"	57'-9 3/4"	58'-4"	46'-5"
		12'	12'-7 3/4"	12'-0"	12'-5 1/4"	12'-11 1/2"	Ⓐ 0"	23'-0"	23'-9 3/4"	24'-4 1/4"	11'-2 1/2"	34'-0"	35'-2 3/4"	35'-8 3/4"	22'-7"	45'-0"	46'-7"	47'-1 1/2"	33'-11 3/4"	56'-0"	57'-11 3/4"	58'-6"	45'-4 1/2"
	11'	9'	8'-11 1/4"	12'-6"	12'-11 1/4"	13'-5 3/4"	4'-0"	24'-5"	25'-3 3/4"	25'-9 3/4"	16'-4"	36'-4"	37'-7 3/4"	38'-1 3/4"	28'-8"	48'-3"	49'-11 3/4"	50'-5 3/4"	41'-0 1/4"	—	—	—	—
		10'	10'-2"	12'-8"	13'-1 3/4"	13'-7 3/4"	2'-11 3/4"	24'-8"	25'-6 1/2"	26'-1"	15'-4 1/2"	36'-8"	37'-11 1/2"	38'-6"	27'-9 1/2"	48'-8"	50'-4 5/8"	50'-11"	40'-2 3/4"	—	—	—	—
		11'	11'-4 5/8"	12'-10"	13'-3 3/4"	13'-10"	1'-10 3/4"	24'-10"	25'-8 1/2"	26'-3"	14'-3 3/4"	36'-10"	38'-1 5/8"	38'-8"	26'-9"	48'-10"	50'-6 3/4"	51'-1"	39'-2"	—	—	—	—
		12'	12'-7 3/4"	13'-0"	13'-5 1/4"	14'-0"	0'-10 1/2"	25'-0"	25'-10 3/4"	26'-5"	13'-3 1/2"	37'-0"	38'-3 5/8"	38'-10"	25'-8 1/2"	49'-0"	50'-8 3/4"	51'-3 1/4"	38'-1 1/2"	—	—	—	—
	12'	9'	8'-11 1/4"	13'-6"	13'-11 3/4"	14'-6 1/4"	5'-0 1/2"	26'-5"	27'-4 1/4"	27'-10 3/4"	18'-5"	39'-4"	40'-8 5/8"	41'-3"	31'-9 1/2"	52'-3"	54'-1 1/8"	54'-7 1/2"	45'-1 3/4"	—	—	—	—
		10'	10'-2"	13'-8"	14'-1 3/4"	14'-8 1/4"	3'-11 3/4"	26'-8"	27'-7 1/4"	28'-1 3/4"	17'-5 1/4"	39'-8"	41'-0 3/4"	41'-7 1/4"	30'-10 3/4"	52'-8"	54'-6 1/4"	55'-0 3/4"	44'-4 1/4"	—	—	—	—
		11'	11'-4 5/8"	13'-10"	14'-3 7/8"	14'-10 1/4"	2'-11 1/4"	26'-10"	27'-9 3/4"	28'-3 3/4"	16'-4 3/4"	39'-10"	41'-2 3/4"	41'-9 1/4"	29'-10 1/4"	52'-10"	54'-8 3/4"	55'-2 3/4"	43'-3 3/4"	—	—	—	—
		12'	12'-7 3/4"	14'-0"	14'-5 3/4"	15'-0 1/2"	1'-10 1/2"	27'-0"	27'-11 3/4"	28'-6"	15'-4"	40'-0"	41'-4 7/8"	41'-11 1/4"	28'-9 1/2"	53'-0"	54'-10 3/4"	55'-4 3/4"	42'-3"	—	—	—	—

Ⓐ Special case for these boxes. See Detail "A" and Table "A" for revised values of F_1, F_2, W_4 and W_5, when apron width is more than 1'-0" and W_3 = 0". For Details "A" and Tables "A" for each slope, see Drawing Nos. W-X152-1, W-X152-2, or W-X153-1, W-X153-2, or W-X154-1, W-X154-2.

Note:- This drawing to be used in conjunction with Standard Wing Drawings for 15° Skews for each slope as listed below.

2:1 Slopes	3:1 Slopes	4:1 Slopes
W-X152-1 or W-X152-2	W-X153-1 or W-X153-2	W-X154-1 or W-X154-2.

This drawing to be used in conjunction with Std. Barrel Sections, Drawing Nos.

SINGLES	DOUBLES	TRIPLES	QUADRUPLES	QUINTUPLES
R-115X-0	R-215X-0	R-315X-0	R-415X-0	R-515X-0
R-115X-1	R-215X-1	R-315X-1	R-415X-1	R-515X-1
	R-215X-2	R-315X-2		

CLASS S CONCRETE

ARKANSAS STATE HIGHWAY COMMISSION

DETAILS OF STANDARD WINGS FOR REINFORCED CONCRETE BOX CULVERTS 15° SKEW

4, 5, 6, 7, 8, 9, 10, 11 & 12 SPANS — 2:1, 3:1 & 4:1 SLOPES

SINGLES, DOUBLES, TRIPLES, QUADRUPLES & QUINTUPLES. — ALL DEPTHS OF COVER

H = 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 & 12.

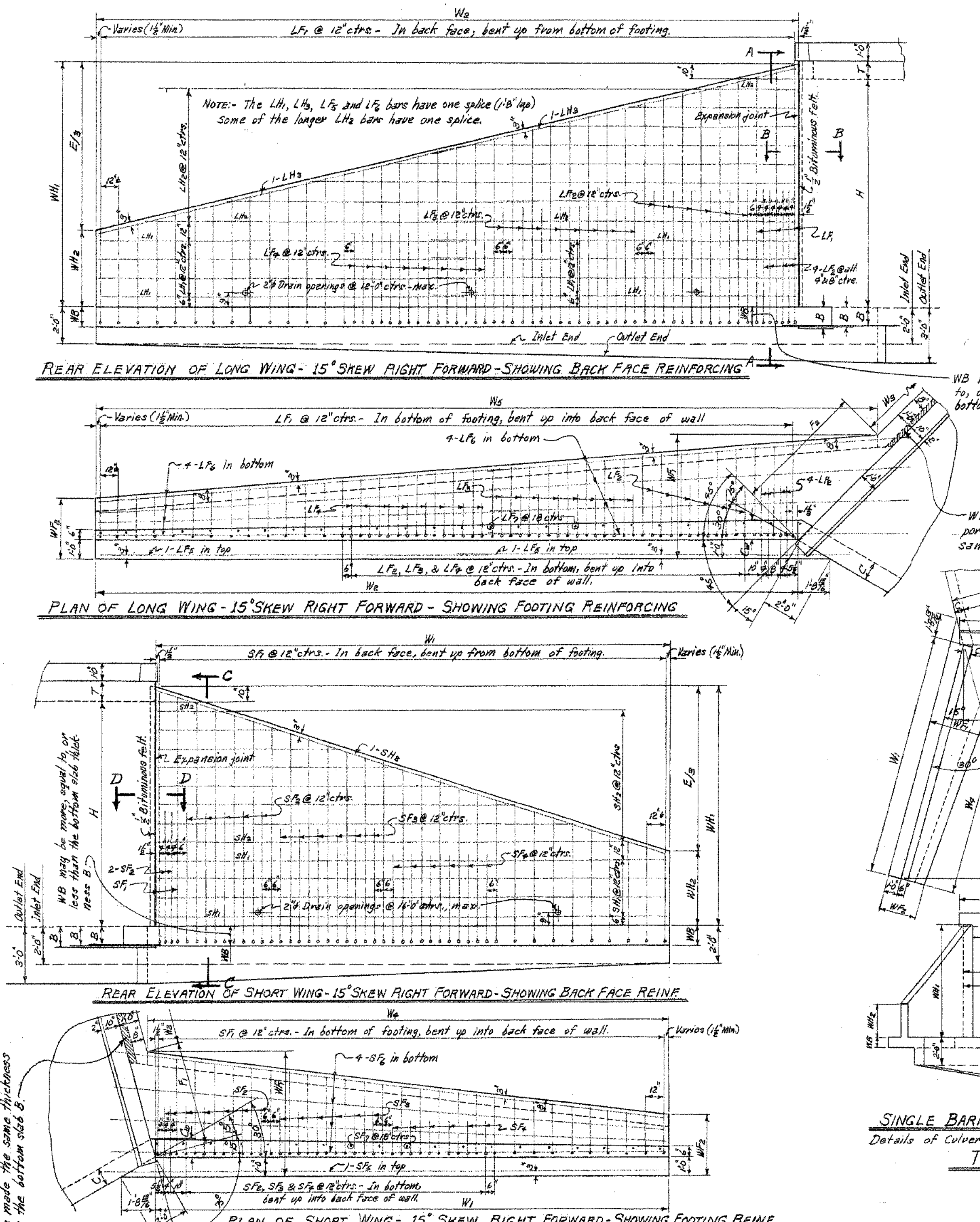
STANDARD DRAWING NO. W-X15

Designed by:- W.C.H. 5-22-63 Checked by:- J.E.M. 6-20-63
Traced by:- W.C.H. 6-13-63 Checked by:-
Quantities by:- Checked by:-

FED. ROAD No.	STATE	FED. AID PROJECT	FISCAL YEAR	SHEET No.	TOTAL SHEETS
6	ARK.			36	
JOB No.					

NOTE:- This drawing to be used in conjunction with Std. Barrel Sections, Drawing Nos.

SINGLES	DOUBLES	TRIPLES	QUADRUPLES	QUINTUPLES
R-115X-0	R-215X-0	R-315X-0	R-415X-0	R-515X-0
R-115X-1	R-215X-1	R-315X-1	R-415X-1	R-515X-1
	R-215X-2	R-315X-2		

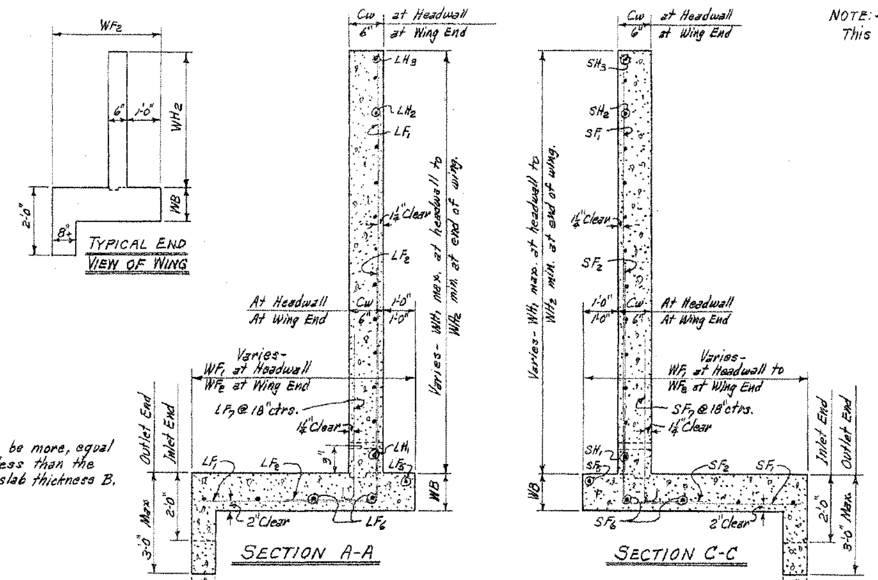


REAR ELEVATION OF LONG WING - 15° SKEW RIGHT FORWARD - SHOWING BACK FACE REINFORCING

PLAN OF LONG WING - 15° SKEW RIGHT FORWARD - SHOWING FOOTING REINFORCING

REAR ELEVATION OF SHORT WING - 15° SKEW RIGHT FORWARD - SHOWING BACK FACE REINF.

PLAN OF SHORT WING - 15° SKEW RIGHT FORWARD - SHOWING FOOTING REINF.



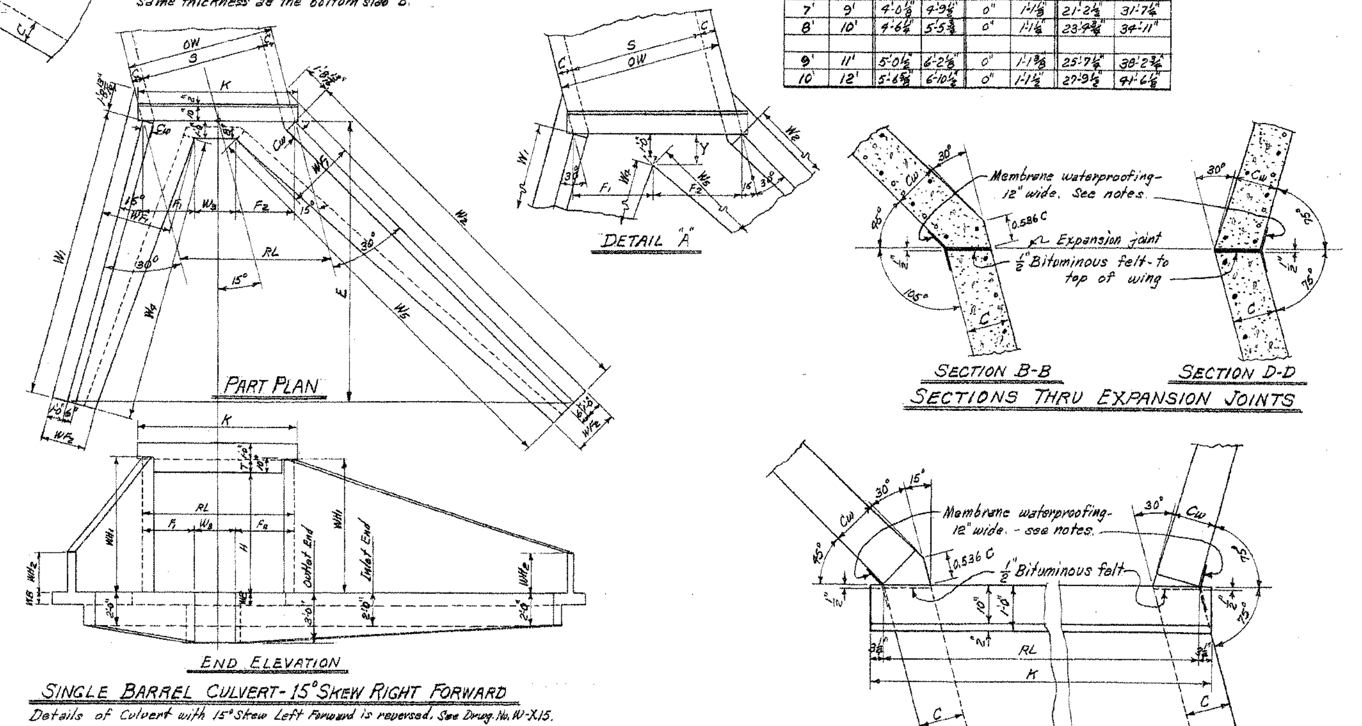
TYPICAL END VIEW OF WING

SECTION A-A

SECTION C-C

TABLE "A" - DIMENSIONS FOR DETAIL "A"

S	H	F_1	F_2	W_3	Y	W_4	W_5
7'	9'	4'-0 1/8"	4'-9 1/2"	0"	1'-1 1/8"	21'-2 1/2"	31'-7 1/4"
8'	10'	4'-6 1/4"	5'-5 3/4"	0"	1'-1 1/4"	23'-9 3/4"	34'-11"
9'	11'	5'-0 1/2"	6'-2 1/8"	0"	1'-1 3/8"	25'-7 1/4"	38'-2 3/4"
10'	12'	5'-6 5/8"	6'-10 1/2"	0"	1'-1 1/2"	27'-9 1/2"	41'-6 1/8"



DETAIL "A"

PART PLAN

END ELEVATION

SINGLE BARREL CULVERT - 15° SKEW RIGHT FORWARD

Details of Culvert with 15° Skew Left Forward is reversed. See Drwg. No. W-X15.

TYPICAL WING DETAILS

SECTION B-B

SECTION D-D

SECTIONS THRU EXPANSION JOINTS

DETAILS AT TOP OF WINGS - 15° SKEW RIGHT FORWARD

REGULAR WING DIMENSIONS - 3:1 SLOPES

CLEAR HEIGHT OF BOX	THICKNESS OF WING FOOTING	THICKNESS OF WING AT HDWL.= C.	WINGWALL HEIGHTS: AT HEADWALL	WINGWALL HEIGHTS: AT END OF WING	WIDTHS OF WING FOOTINGS: AT HEADWALL	WIDTHS OF WING FOOTINGS: AT END OF WING	FOOTING DIMENSION PARALLEL WITH HEADWALL: SHORT WING	FOOTING DIMENSION PARALLEL WITH HEADWALL: LONG WING	PERPENDICULAR DIST. FROM HDWL. TO END OF WING	LENGTHS OF WINGWALLS: SHORT WING	LENGTHS OF WINGWALLS: LONG WING	INSIDE FOOTING DIMENSIONS: SHORT WING	INSIDE FOOTING DIMENSIONS: LONG WING	* QUANTITY PER WING, CLASS S CONCRETE: INLET END SHORT WING	INLET END LONG WING	OUTLET END SHORT WING	OUTLET END LONG WING
H	WB	Cw	WH_1	WH_2	WF_1	WF_2	F_1	F_2	E	W_1	W_2	W_4	W_5	CU.YD.	CU.YD.	CU.YD.	CU.YD.
9' ✠	10"	9"	9'-10"	3'-0"	5'-2"	2'-10 1/2"	4'-0 1/2"	4'-10 3/4"	20'-6"	21'-2 3/4"	29'-0"	21'-3 3/4"	31'-9"	6.651	9.248	6.928	9.647
10' ✠	11"	10"	10'-10"	3'-4"	5'-8"	3'-0"	4'-6 3/4"	5'-7 1/4"	22'-6"	23'-3 1/2"	31'-9 3/4"	23'-6"	35'-0 3/4"	8.477	11.784	8.782	12.225
11' ✠	12"	11"	11'-10"	3'-8"	6'-2"	3'-1 1/2"	5'-1"	6'-3 5/8"	24'-6"	25'-4 1/2"	34'-7 3/4"	25'-8 1/2"	38'-4 3/4"	10.632	14.771	10.964	15.253
12' ✠	13"	12"	12'-10"	4'-0"	6'-8"	3'-3"	5'-7 1/8"	7'-0 1/8"	26'-6"	27'-5 1/4"	37'-5 3/4"	27'-11"	41'-8 3/4"	13.128	18.242	13.487	18.765

* Quantity per wing does not include headwall or that portion of apron or toewall for the length W_3.
✠ See Table "A" for special values of F_1 & F_2 and W_4 & W_5 for Single 7'x9', 8'x10', 9'x11' and 10'x12' Box Culverts.

QUANTITIES

CLEAR SPAN	CLEAR HEIGHT	THICKNESS OF WING AT HEADWALL	THICKNESS OF WING FOOTING	⊗ REINFORCING STEEL - FOR 4 WINGS	CLASS S CONCRETE - 4 WINGS (HEADWALLS, WINGWALLS, FOOTINGS, TOEWALLS AND APRONS): SINGLE BARREL CULVERT	DOUBLE BARREL CULVERT	TRIPLE BARREL CULVERT	QUADRUPLE BARREL CULVERT	QUINTUPLE BARREL CULVERT
S	H	Cw	WB	LB.	CU.YD.	CU.YD.	CU.YD.	CU.YD.	CU.YD.
7'	9'	9"	10"	2362	33.07	34.81	36.53	38.27	40.00
8'	9'	9"	10"	2362	33.30	35.26	37.21	39.17	41.11
	10'	10"	11"	2932	41.94	43.94	45.92	47.82	49.90
9'	9'	9"	10"	2362	33.53	35.72	37.88	40.06	42.22
	10'	10"	11"	2932	42.18	44.39	46.60	48.81	51.02
	11'	11"	12"	3523	52.37	54.61	56.83	59.07	61.30
10'	9'	9"	10"	2362	33.76	36.19	39.56	40.92	43.32
	10'	10"	11"	2932	42.41	44.86	47.27	49.70	52.13
	11'	11"	12"	3523	52.61	55.07	57.52	59.96	62.42
	12'	12"	13"	4482	64.45	66.94	69.40	71.87	74.36
11'	9'	9"	10"	2362	33.99	36.67	39.28	41.86	——
	10'	10"	11"	2932	42.63	45.83	47.96	50.59	——
	11'	11"	12"	3523	52.83	55.54	58.20	60.87	——
	12'	12"	13"	4482	64.68	67.40	70.09	72.79	——
12'	9'	9"	10"	2362	34.21	37.16	39.99	42.83	——
	10'	10"	11"	2932	42.86	45.82	48.67	51.53	——
	11'	11"	12"	3523	53.07	56.02	58.88	61.78	——
	12'	12"	13"	4482	64.91	67.88	70.78	73.71	——

⊗ For reinforcing steel in Headwalls and Aprons, see Drawings listed at top of sheet.

GENERAL NOTES:-

CONCRETE:- All concrete to be Class S, and shall be poured in the dry. All exposed corners to have 3/4 chamfers.

REINFORCING STEEL:- Reinforcing steel to be deformed bars of intermediate or hard grade.

CONSTRUCTION JOINTS:- Construction joints between wingwalls, footings and sidewalls shall be only where shown on plans.

MEMBRANE:- A membrane waterproofing 12" wide, consisting of three moppings of waterproofing asphalt and two alternate layers of treated cotton fabric shall be applied to the back face of wing to cover the expansion joints.

Payment for the membrane waterproofing and bituminous felt shall be included in unit price bid for Class S Concrete.

SPECIFICATIONS:- Arkansas State Highway Commission Standard Specifications for Highway Construction and applicable Special Provisions.

UNIT STRESSES:-

Class S Concrete (n=10) 1200#/□"
Reinforcing Steel 20,000#/□"

NOTE:- For remainder of General Plans and Elevations of Single, Double, Triple, Quadruple and Quintuple Span Culverts, see Std. Drawing No. W-X15. For values of RL, K and W_3 for each box, see above std. also.

BAR LIST FOR ONE SHORT AND ONE LONG WING - 2 EACH REQUIRED

CLEAR HEIGHT H	WING LOCATION SHORT OR LONG	SF_1 & LF_1 (BENT; In bottom of footing, bent up into back face of wing. One bar of each length.): SIZE	SPACING	No. REQ'D	LENGTHS VARY MIN.	LENGTHS VARY MAX.	X MIN.	X MAX.	Y MIN.	Y MAX.	SF_2 & LF_2 (BENT; In bottom of footing, bent up into back face of wing. Alt. with F_1 bars.): SIZE	⊙ SPACING	No. REQ'D	LENGTH	X	Y	SF_3 & LF_3 (BENT; In bottom of footing, bent up into back face of wing. Alt. with F_1 bars.): SIZE	SPACING	No. REQ'D	LENGTH	X	Y	SF_4 & LF_4 (BENT; In bottom of footing, bent up into back face of wing. Alt. with F_1 bars.): SIZE	SPACING	No. REQ'D	LENGTH	X	Y
9'	Short	#5	12"	22	4'-11"	14'-0"	1'-6"	3'-10"	3'-6"	10'-3"	#5	12"	4	7'-6"	2'-1"	5'-6"	#4	12"	6	6'-6"	1'-10"	4'-9"	—	—	—	—	—	—
	Long	#5	12"	30	4'-10"	13'-10"	1'-6"	3'-8"	3'-5"	10'-3"	#5	12"	6	7'-6"	2'-1"	5'-6"	#4	12"	8	6'-6"	1'-10"	4'-9"	—	—	—	—	—	—
10'	Short	#5	12"	24	5'-6"	15'-7"	1'-8"	4'-4"	3'-11"	11'-4"	#6	12"	3	8'-6"	2'-4"	6'-3"	#5	12"	4	7'-6"	2'-1"	5'-6"	#4	12"	6	6'-6"	1'-10"	4'-9"
	Long	#5	12"	33	5'-5"	15'-4"	1'-8"	4'-1"	3'-10"	11'-4"	#6	12"	4	8'-6"	2'-4"	6'-3"	#5	12"	6	7'-6"	2'-1"	5'-6"	#4	12"	8	6'-6"	1'-10"	4'-9"
11'	Short	#5	12"	26	6'-0"	17'-2"	1'-9"	4'-10"	4'-4"	12'-5"	#6	12"	6	8'-6"	2'-4"	6'-3"	#5	12"	4	7'-6"	2'-1"	5'-6"	#4	12"	6	6'-6"	1'-10"	4'-9"
	Long	#5	12"	35	6'-1"	16'-11"	1'-9"	4'-7"	4'-5"	12'-5"	#6	12"	8	8'-6"	2'-4"	6'-3"	#5	12"	6	7'-6"	2'-1"	5'-6"	#4	12"	8	6'-6"	1'-10"	4'-9"
12'	Short	#5	12"	28	6'-8"	18'-9"	1'-11"	5'-4"	4'-10"	13'-6"	#7	12"	7	9'-6"	2'-7"	7'-0"	#6	12"	6	8'-6"	2'-4"	6'-3"	#4	12"	6	6'-6"	1'-10"	4'-9"
	Long	#5	12"	38	6'-7"	18'-5"	1'-11"	5'-0"	4'-9"	13'-6"	#7	12"	10	9'-6"	2'-7"	7'-0"	#6	12"	8	8'-6"	2'-4"	6'-3"	#4	12"	8	6'-6"	1'-10"	4'-9"

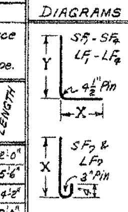
CLEAR HEIGHT H	WING LOCATION SHORT OR LONG	SF_5 & LF_5 (STRAIGHT; Longitudinal in top of wing footing heel.): SIZE	No. REQ'D	LENGTH	SF_6 & LF_6 (STRAIGHT; Longitudinal in bottom of wing footing toe.): SIZE	No. REQ'D	LENGTH	SF_7 & LF_7 (BENT; Footing dowels extending up into front face of wing.): SIZE	SPACING	No. REQ'D	LENGTH	X	SH_1 & LH_1 (STRAIGHT; Horizontal in back face of wing.): SIZE	SPACING	No. REQ'D	LENGTH	SH_2 & LH_2 (STRAIGHT; Horizontal in back face of wing. One bar of each length. *): SIZE	SPACING	No. REQ'D	LENGTHS VARY MAX.	LENGTHS VARY MIN.	SH_3 & LH_3 (STRAIGHT; In back face of wing at top-on slope.): SIZE	No. REQ'D	LENGTH	QUANTITY REINFORCING STEEL PER WING - LBS.: SHORT WING	LONG WING
9'	Short	#4	1	23'-9"	#4	4	23'-3"	#4	18"	15	4'-0"	3'-6"	#4	12"	3	20'-11"	#4	12"	6	18'-11"	3'-6"	#4	1	22'-0"	499.0	686.8
	Long	#4	2	16'-7"	#4	8	17'-8"	#4	18"	20	4'-0"	3'-6"	#4	12"	6	15'-3"	#4	12"	6	25'-11"	4'-8"	#4	2	15'-6"		
10'	Short	#4	1	25'-10"	#4	4	25'-6"	#4	18"	16	4'-4"	3'-10"	#4	12"	3	23'-0"	#4	12"	7	22'-0"	3'-6"	#4	1	24'-2"	613.1	853.0
	Long	#4	2	18'-0"	#4	8	19'-4"	#4	18"	22	4'-4"	3'-10"	#4	12"	6	16'-8"	#4	12"	7	*30'-2"	4'-8"	#4	2	17'-0"		
11'	Short	#4	1	27'-11"	#4	4	27'-9"	#4	18"	18	4'-8"	4'-2"	#4	12"	4	25'-1"	#4	12"	7	22'-0"	3'-6"	#4	1	26'-4"	741.2	1020.5
	Long	#4	2	19'-5"	#4	8	21'-0"	#4	18"	24	4'-8"	4'-2"	#4	12"	8	18'-1"	#4	12"	7	*30'-2"	4'-8"	#4	2	18'-6"		
12'	Short	#4	1	30'-0"	#4	4	30'-0"	#4	18"	19	5'-0"	4'-6"	#4	12"	4	27'-2"	#4	12"	8	25'-1"	3'-6"	#4	1	28'-6"	941.4	1299.9
	Long	#4	2	20'-10"	#4	8	22'-8"	#4	18"	26	5'-0"	4'-6"	#4	12"	8	19'-6"	#4	12"	8	*34'-5"	4'-8"	#4	2	20'-0"		

NOTE:- Bars for short wing to be marked with prefix letter "S", while those for long wing shall be marked with letter "L".

⊙ Except as shown at headwall.

* Lengths without splice. Bars over 29'-0" length may be spliced. (1'-8" lap.) Quantities include laps for LH_2 bars over 29'-0" length.

BAR BENDING DIAGRAMS



NOTE:- Dimensions are to bar centers.

CLASS S CONCRETE

ARKANSAS STATE HIGHWAY COMMISSION

DETAILS OF STANDARD WINGS FOR REINFORCED CONCRETE BOX CULVERTS 15° SKEW

7', 8', 9', 10', 11' & 12' SPANS — 3:1 SLOPES

SINGLES, DOUBLES, TRIPLES, QUADRUPLES & QUINTUPLES — ALL DEPTHS OF COVER FOR H = 9'-0" & OVER

STANDARD DRAWING NO. W-X153-2

Designed by:- W.C.H. 5-13-63 Checked by:-
Drawn by:- W.C.H. 6-12-63 Checked By: TPS 8-7-63
Quantities by:- W.C.H. 9-28-63 Checked by:-

Reshot 3-8-93

426

FED. ROAD No.	STATE	FED. AID PROJECT	FISCAL YEAR	SHEET No.	TOTAL SHEETS
6	ARK.			37	
JOB No.					

BAR LIST FOR BARREL SECTION 60'-0" IN LENGTH

"a" bars: STRAIGHT – In Top and Bottom Slab of Barrel.
"b" bars: BENT – See Diagram below. In Bottom of Top Slab bent up over Division Walls - hooked. Alternate with "a" and "c" bars.

DEPTH OF COVER D	CLEAR SPAN S	CLEAR HEIGHT H	"a" SIZE	"a" SPACING	"a" NO. REQ'D	"a" LENGTH	"b" SIZE	"b" SPACING	"b" NO. REQ'D	"b" LENGTH	W	X	Y	Z
0'-0" TO 5'-0" MAXIMUM	4 @ 4'	2'	#5	12"	120	19'-5"	#5	12"	59	20'-9"	2'-1"	0'-3"	2'-3"	3'-5½"
		3'			120	19'-5"			59	20'-9"	2'-1"	"	2'-3"	3'-5½"
		4'			120	19'-5"			59	20'-9"	2'-1"	"	2'-3"	3'-5½"
		5'			120	19'-5"			59	20'-9"	2'-1"	"	2'-3"	3'-5½"
		6'			120	19'-10"			59	21'-2"	2'-1"	0'-3"	2'-4"	3'-6½"
	4 @ 5'	3'	#6	12"	120	23'-6"	#5	12"	59	25'-0"	2'-7"	0'-3½"	2'-8"	4'-3"
		4'			120	23'-6"			59	25'-0"	2'-7"	"	2'-8"	4'-3"
		5'			120	23'-6"			59	25'-0"	2'-7"	"	2'-8"	4'-3"
		6'			120	24'-0"			59	25'-6"	2'-7"	"	2'-9"	4'-4"
		7'			120	24'-4"			59	25'-9"	2'-7"	0'-3½"	2'-10"	4'-4½"
	4 @ 6'	3'	#6	11"	132	27'-8"	#5	11"	65	29'-3"	3'-1½"	0'-4"	3'-1½"	5'-0"
		4'			132	27'-8"			65	29'-3"	3'-1½"	"	3'-1½"	5'-0"
		5'			132	27'-8"			65	29'-3"	3'-1½"	"	3'-1½"	5'-0"
		6'			132	28'-1"			65	29'-8"	3'-1½"	"	3'-2½"	5'-1"
		7'			132	28'-5"			65	30'-0"	3'-1½"	"	3'-3½"	5'-1½"
		8'			132	28'-6"			65	30'-1"	3'-1½"	0'-4"	3'-3½"	5'-2"
	4 @ 7'	4'	#6	12"	120	31'-10"	#6	12"	59	33'-9"	3'-7½"	0'-4½"	3'-7"	5'-9"
		5'			120	31'-10"			59	33'-9"	3'-7½"	"	3'-7"	5'-9"
		6'			120	32'-3"			59	34'-2"	3'-7½"	"	3'-8"	5'-10"
		7'			120	32'-7"			59	34'-6"	3'-7½"	"	3'-9"	5'-10½"
		8'			120	32'-8"			59	34'-7"	3'-7½"	"	3'-9"	5'-11"
		9'			120	33'-1"			59	35'-0"	3'-7½"	0'-4½"	3'-10"	6'-0"
	4 @ 8'	4'	#6	11"	132	36'-0"	#6	11"	65	38'-0"	4'-1½"	0'-5"	4'-0"	6'-7"
		5'			132	36'-5"			65	38'-5"	4'-1½"	"	4'-1"	6'-8"
		6'			132	36'-5"			65	38'-5"	4'-1½"	"	4'-1"	6'-8"
		7'			132	36'-9"			65	38'-9"	4'-1½"	"	4'-2"	6'-8½"
		8'			132	36'-10"			65	38'-10"	4'-1½"	"	4'-2"	6'-9"
		9'			132	37'-3"			65	39'-3"	4'-1½"	"	4'-3"	6'-10"
		10'			132	37'-8"			65	39'-8"	4'-1½"	0'-5"	4'-4"	6'-11"
	4 @ 9'	5'	⊛ #6	11"	264	21'-3"	⊛ #6	11"	130	22'-4"	4'-8"	0'-5½"	4'-6"	7'-5"
		6'			264	21'-5"			130	22'-6"	4'-8"	"	4'-7"	7'-5½"
		7'			264	21'-5"			130	22'-6"	4'-8"	"	4'-7"	7'-5½"
		8'			264	21'-6"			130	22'-6"	4'-8"	"	4'-7"	7'-6"
		9'			264	21'-8"			130	22'-9"	4'-8"	"	4'-8"	7'-7"
		10'			264	21'-11"			130	22'-11"	4'-8"	"	4'-9"	7'-8"
		11'			264	22'-0"			130	23'-0"	4'-8"	0'-5½"	4'-9"	7'-9"
	4 @ 10'	5'	⊛ #7	12"	240	23'-6"	⊛ #6	12"	118	24'-5"	5'-2"	0'-6"	4'-11"	8'-3"
		6'			240	23'-8"			118	24'-7"	5'-2"	"	5'-0"	8'-3½"
		7'			240	23'-8"			118	24'-7"	5'-2"	"	5'-0"	8'-3½"
		8'			240	23'-9"			118	24'-8"	5'-2"	"	5'-0"	8'-4"
		9'			240	23'-11"			118	24'-10"	5'-2"	"	5'-1"	8'-5"
		10'			240	24'-2"			118	25'-1"	5'-2"	"	5'-2"	8'-6"
		11'			240	24'-3"			118	25'-2"	5'-2"	"	5'-2"	8'-7"
		12'			240	24'-4"			118	25'-3"	5'-2"	0'-6"	5'-2"	8'-8"
	4 @ 11'	6'	⊛ #7	11"	264	25'-10"	⊛ #6	11"	130	26'-9"	5'-8"	0'-6½"	5'-5½"	9'-1"
		7'			264	25'-10"			130	26'-9"	5'-8"	"	5'-5½"	9'-1"
		8'			264	25'-10"			130	26'-9"	5'-8"	"	5'-5½"	9'-1"
		9'			264	26'-0"			130	27'-0"	5'-8"	"	5'-6½"	9'-2"
		10'			264	26'-3"			130	27'-2"	5'-8"	"	5'-7½"	9'-3"
		11'			264	26'-4"			130	27'-3"	5'-8"	"	5'-7½"	9'-4"
		12'			264	26'-5"			130	27'-4"	5'-8"	0'-6½"	5'-7½"	9'-5"
	4 @ 12'	6'	⊛ #7	11"	264	27'-11"	⊛ #6	11"	130	28'-11"	6'-3"	0'-7"	5'-10½"	9'-10"
		7'			264	27'-11"			130	28'-11"	6'-3"	"	5'-10½"	9'-10"
		8'			264	27'-11"			130	28'-11"	6'-3"	"	5'-10½"	9'-10"
		9'			264	28'-1"			130	29'-2"	6'-3"	"	5'-11½"	9'-11"
		10'			264	28'-4"			130	29'-4"	6'-3"	"	6'-0½"	10'-0"
		11'			264	28'-5"			130	29'-5"	6'-3"	"	6'-0½"	10'-1"
		12'			264	28'-6"			130	29'-6"	6'-3"	0'-7"	6'-0½"	10'-2"

"b₂" bars: BENT – See Diagram below. In Top of Bottom Slab bent down under Division Walls - hooked. Alternate with "a" and "c" bars.
"c" bars: STRAIGHT – In Top and Bottom Slab of Barrel. Alt. with "b" and "b₂" bars.

S	H	"b₂" SIZE	"b₂" SPACING	"b₂" NO. REQ'D	"b₂" LENGTH	W	X	Y	Z	"c" SIZE	"c" SPACING	"c" NO. REQ'D	"c" LENGTH
4 @ 4'	2'	#5	12"	59	20'-8"	2'-1"	0'-2½"	2'-4"	3'-5½"	#5	12"	120	14'-6"
	3'			59	20'-8"	2'-1"	"	2'-4"	3'-5½"			120	14'-6"
	4'			59	20'-8"	2'-1"	"	2'-4"	3'-5½"			120	14'-6"
	5'			59	20'-8"	2'-1"	"	2'-4"	3'-5½"			120	14'-6"
	6'			59	21'-1"	2'-1"	0'-2½"	2'-5"	3'-6½"			120	14'-9"
4 @ 5'	3'	#5	12"	59	24'-11"	2'-7"	0'-3"	2'-9"	4'-3"	#6	12"	120	17'-7"
	4'			59	24'-11"	2'-7"	"	2'-9"	4'-3"			120	17'-7"
	5'			59	24'-11"	2'-7"	"	2'-9"	4'-3"			120	17'-7"
	6'			59	25'-4"	2'-7"	"	2'-10"	4'-4"			120	17'-10"
	7'			59	25'-8"	2'-7"	0'-3"	2'-11"	4'-4½"			120	18'-1"
4 @ 6'	3'	#5	11"	65	29'-2"	3'-1½"	0'-3½"	3'-2½"	5'-0"	#6	11"	132	20'-9"
	4'			65	29'-2"	3'-1½"	"	3'-2½"	5'-0"			132	20'-9"
	5'			65	29'-2"	3'-1½"	"	3'-2½"	5'-0"			132	20'-9"
	6'			65	29'-7"	3'-1½"	"	3'-3½"	5'-1"			132	21'-0"
	7'			65	29'-11"	3'-1½"	"	3'-4½"	5'-1½"			132	21'-3"
	8'			65	30'-0"	3'-1½"	0'-3½"	3'-4½"	5'-2"			132	21'-3"
4 @ 7'	4'	#6	12"	59	33'-8"	3'-7½"	0'-4½"	3'-7½"	5'-9"	#6	12"	120	23'-10"
	5'			59	33'-8"	3'-7½"	"	3'-7½"	5'-9"			120	23'-10"
	6'			59	34'-1"	3'-7½"	"	3'-8½"	5'-10"			120	24'-1"
	7'			59	34'-5"	3'-7½"	"	3'-9½"	5'-10½"			120	24'-4"
	8'			59	34'-6"	3'-7½"	"	3'-9½"	5'-11"			120	24'-4"
	9'			59	34'-11"	3'-7½"	0'-4½"	3'-10½"	6'-0"			120	24'-7"
4 @ 8'	4'	#6	11"	65	38'-0"	4'-1½"	0'-5"	4'-0"	6'-7"	#6	11"	132	26'-11"
	5'			65	38'-5"	4'-1½"	"	4'-1"	6'-8"			132	27'-2"
	6'			65	38'-5"	4'-1½"	"	4'-1"	6'-8"			132	27'-2"
	7'			65	38'-9"	4'-1½"	"	4'-2"	6'-8½"			132	27'-5"
	8'			65	38'-10"	4'-1½"	"	4'-2"	6'-9"			132	27'-5"
	9'			65	39'-3"	4'-1½"	"	4'-3"	6'-10"			132	27'-8"
	10'			65	39'-8"	4'-1½"	0'-5"	4'-4"	6'-11"			132	27'-11"
4 @ 9'	5'	⊛ #6	11"	130	22'-4"	4'-8"	0'-5½"	4'-6"	7'-5"	#6	11"	132	30'-3"
	6'			130	22'-6"	4'-8"	"	4'-7"	7'-5½"			132	30'-6"
	7'			130	22'-6"	4'-8"	"	4'-7"	7'-5½"			132	30'-6"
	8'			130	22'-6"	4'-8"	"	4'-7"	7'-6"			132	30'-6"
	9'			130	22'-9"	4'-8"	"	4'-8"	7'-7"			132	30'-9"
	10'			130	22'-11"	4'-8"	"	4'-9"	7'-8"			132	31'-0"
	11'			130	23'-0"	4'-8"	0'-5½"	4'-9"	7'-9"			132	31'-0"
4 @ 10'	5'	⊛ #6	12"	118	24'-5"	5'-2"	0'-6"	4'-11"	8'-3"	#7	12"	120	33'-5"
	6'			118	24'-7"	5'-2"	"	5'-0"	8'-3½"			120	33'-8"
	7'			118	24'-7"	5'-2"	"	5'-0"	8'-3½"			120	33'-8"
	8'			118	24'-8"	5'-2"	"	5'-0"	8'-4"			120	33'-8"
	9'			118	24'-10"	5'-2"	"	5'-1"	8'-5"			120	33'-11"
	10'			118	25'-1"	5'-2"	"	5'-2"	8'-6"			120	34'-2"
	11'			118	25'-2"	5'-2"	"	5'-2"	8'-7"			120	34'-2"
	12'			118	25'-3"	5'-2"	0'-6"	5'-2"	8'-8"			120	34'-2"
4 @ 11'	6'	⊛ #6	11"	130	26'-10"	5'-8"	0'-7"	5'-4½"	9'-1"	#7	11"	132	36'-9"
	7'			130	26'-10"	5'-8"	"	5'-4½"	9'-1"			132	36'-9"
	8'			130	26'-10"	5'-8"	"	5'-4½"	9'-1"			132	36'-9"
	9'			130	27'-0"	5'-8"	"	5'-5½"	9'-2"			132	37'-0"
	10'			130	27'-3"	5'-8"	"	5'-6½"	9'-3"			132	37'-3"
	11'			130	27'-4"	5'-8"	"	5'-6½"	9'-4"			132	37'-3"
	12'			130	27'-5"	5'-8"	0'-7"	5'-6½"	9'-5"			132	37'-3"
4 @ 12'	6'	⊛ #6	11"	130	29'-0"	6'-3"	0'-8"	5'-8½"	9'-10"	#7	11"	132	39'-10"
	7'			130	29'-0"	6'-3"	"	5'-8½"	9'-10"			132	39'-10"
	8'			130	29'-0"	6'-3"	"	5'-8½"	9'-10"			132	39'-10"
	9'			130	29'-3"	6'-3"	"	5'-9½"	9'-11"			132	40'-1"
	10'			130	29'-5"	6'-3"	"	5'-10½"	10'-0"			132	40'-4"
	11'			130	29'-6"	6'-3"	"	5'-10½"	10'-1"			132	40'-4"
	12'			130	29'-7"	6'-3"	0'-8"	5'-10½"	10'-2"			132	40'-7"

STRAIGHT: "d" bars – Longitudinal in Top Slab of Barrel. "d₁" bars – Longitudinal in Sidewalls and Division Walls. "e" bars – Longitudinal in Bottom Slab of Barrel.
"f" bars: STRAIGHT – Verticals in Sidewalls and Division Walls.
"k" bars: STRAIGHT – 2 in Top of Headwalls and Aprons - Each.

S	H	"d" SIZE	"d" SPACING	"d" NO. REQ'D	"d" LENGTH	"d₁" SIZE	"d₁" SPACING	"d₁" NO. REQ'D	"d₁" LENGTH	"e" SIZE	"e" SPACING	"e" NO. REQ'D	"e" LENGTH	"f" SIZE	"f" SPACING	"f" NO. REQ'D	"f" LENGTH	"k" SIZE	"k" NO. REQ'D	"k" LENGTH
4 @ 4'	2'	#5	12"	30	2 @ 30'-8" for 60'-0" Length Barrel. (1'-8" Lap)	#4	12"	16	2 @ 30'-6" for 60'-0" Length Barrel. (1'-3" Lap)	#4	12"	30	2 @ 31'-6" for 60'-0" Length Barrel. (1'-3" Lap)	#4	12"	480	2'-10"	#5	8	19'-11"
	3'			30				24				30				480	3'-10"		8	"
	4'			30				32				30				480	4'-10"		8	"
	5'			30				40				30				480	5'-10"		8	"
	6'			30				48				30				480	6'-10"		8	20'-4"
4 @ 5'	3'	#5	11½"	34		#4	12"	24		#4	12"	34		#4	12"	480	3'-11"	#6	8	24'-1"
	4'			34				32				34				480	4'-11"		8	"
	5'			34				40				34				480	5'-11"		8	"
	6'			34				48				34				480	6'-11"		8	24'-6"
	7'			34				56				34				480	7'-11"		8	24'-10"
4 @ 6'	3'	#5	11½"	38		#4	12"	24		#4	12"	38		#4	12"	480	4'-0"	#6	8	28'-2"
	4'			38				32				38				480	5'-0"		8	"
	5'			38				40				38				480	6'-0"		8	"
	6'			38				48				38				480	7'-0"		8	28'-8"
	7'			38				56				38				480	8'-0"		8	29'-0"
	8'			38				64				38			10"	576	9'-0"		8	29'-1"
4 @ 7'	4'	#5	11½"	44		#4	12"	32		#4	12"	42		#4	12"	480	5'-1"	#6	8	32'-4"
	5'			44				40				42				480	6'-1"		8	"
	6'			44				48				42				480	7'-1"		8	32'-9"
	7'			44				56				42				480	8'-1"		8	33'-2"
	8'			44				64				42			10"	576	9'-1"		8	33'-3"
	9'			44				72				42		#5	12"	480	10'-1"		8	33'-8"
4 @ 8'	4'	#5	11½"	48		#4	12"	32		#4	12"	46		#4	12"	480	5'-2"	#6	8	36'-6"
	5'			48				40				46				480	6'-2"		8	36'-11"
	6'			48				48				46				480	7'-2"		8	"
	7'			48				56				46				480	8'-2"		8	37'-3"
	8'			48				64				46			10"	576	9'-2"		8	37'-4"
	9'			48				72				46		#5	12"	480	10'-2"		8	37'-9"
	10'			48				80				46			11"	528	11'-2"		8	38'-3"
4 @ 9'	5'	#5	11½"	55		#4	12"	40		#4	12"	53		#4	12"	480	6'-3"	⊛ #6	16	21'-7"
	6'			55				48				53				480	7'-3"		16	21'-9"
	7'			55				56				53				480	8'-3"		16	"
	8'			55				64				53			10"	576	9'-3"		16	21'-10"
	9'			55				72				53		#5	12"	480	10'-3"		16	22'-0"
	10'			55				80				53			11"	528	11'-3"		16	22'-3"
	11'			55				88				53			10"	576	12'-3"		16	22'-4"
4 @ 10'	5'	#5	11½"	59		#4	12"	40		#4	12"	57		#4	12"	480	6'-4"	⊛ #7	16	23'-10"
	6'			59				48				57				480	7'-4"		16	24'-0"
	7'			59				56				57				480	8'-4"		16	"
	8'			59				64				57			10"	576	9'-4"		16	"
	9'			59				72				57		#5	12"	480	10'-4"		16	24'-3"
	10'			59				80				57			11"	528	11'-4"		16	24'-5"
	11'			59				88				57			10"	576	12'-4"		16	24'-6"
	12'			59				96				57		#6	12"	480	13'-4"		16	24'-7"
4 @ 11'	6'	#5	11½"	63		#4	12"	48		#4	12"	61		#4	12"	480	7'-5"	⊛ #7	16	26'-1"
	7'			63				56				61				480	8'-5"		16	"
	8'			63				64				61			10"	576	9'-5"		16	"
	9'			63				72				61		#5	12"	480	10'-5"		16	26'-4"
	10'			63				80				61			11"	528	11'-5"		16	26'-6"
	11'			63				88				61			10"	576	12'-5"		16	26'-7"
	12'			63				96				61		#6	12"	480	13'-5"		16	26'-8"
4 @ 12'	6'	#5	11½"	67		#4	12"	48		#4	12"	65		#4	12"	480	7'-7"	⊛ #7	16	28'-2"
	7'			67				56				65				480	8'-7"		16	"
	8'			67				64				65			10"	576	9'-7"		16	"
	9'			67				72				65		#5	12"	480	10'-7"		16	28'-4"
	10'			67				80				65			11"	528	11'-7"		16	28'-7"
	11'			67				88				65			10"	576	12'-7"		16	28'-8"
	12'			67				96				65		#6	12"	480	13'-7"		16	28'-9"

NOTE:- The "a", "b", "b₂" and "c" bars are to be placed parallel with the headwalls, spacing to be parallel with the barrel.

⊛ These "a", "b", "b₂" and "k" bars are to be spliced at center of middle division wall to make a full length bar. Lap #6 bars 2'-0" min. and #7 bars 2'-4" min.

DIMENSIONS / QUANTITIES

MAX. DESIGN DEPTH OF COVER D	CLEAR SPAN S	CLEAR HEIGHT H	SQ.FT. OPENING A	OVERALL WIDTH OW	THICKNESS OF TOP SLAB T	THICKNESS OF SIDEWALLS C	THICKNESS OF DIVISION WALLS M	THICKNESS OF BOTTOM SLAB B	OVERALL HEIGHT OH	ROADWAY LENGTH RL	LENGTH OF HEADWALL K	CLASS S CONC. PER LIN. FT. OF BARREL CU.YD.	REINFORCING STEEL PER LIN. FT. OF BARREL LB.	ADDITIONAL PER LONG. LAP LB.	ADDITIONAL TWO HEADWALLS & APRONS LB.
5'-0"	4 @ 4'	2'	32	19'-0"	6½"	6"	8"	6"	3'-0½"	19'-8"	20'-2½"	0.955	191.11	90.56	270.84
		3'	48	19'-0"		6"	8"		4'-0½"	"	"	1.066	201.80	97.24	270.84
		4'	64	19'-0"		6"	8"		5'-0½"	"	"	1.177	212.48	103.92	270.84
		5'	80	19'-0"		6"	8"		6'-0½"	"	"	1.289	223.17	110.60	270.84
		6'	96	19'-5"		7"	9"		7'-0½"	20'-1⅛"	20'-7¾"	1.508	236.12	117.28	279.31
	4 @ 5'	3'	60	23'-0"	7"	6"	8"	6½"	4'-1½"	23'-9¾"	24'-4½"	1.292	270.61	107.53	414.97
		4'	80	23'-0"		6"	8"		5'-1½"	"	"	1.403	281.30	114.21	414.97
		5'	100	23'-0"		6"	8"		6'-1½"	"	"	1.514	291.99	120.89	414.97
		6'	120	23'-5"		7"	9"		7'-1½"	24'-2⅞"	24'-9¼"	1.735	305.80	127.57	419.98
		7'	140	23'-9"		7½"	10"		8'-1½"	24'-7"	25'-1½"	1.862	318.94	134.25	423.98
	4 @ 6'	3'	72	27'-0"	7½"	6"	8"	7"	4'-2½"	27'-11⅜"	28'-5¾"	1.542	327.56	117.83	485.86
		4'	96	27'-0"		6"	8"		5'-2½"	"	"	1.653	338.25	124.51	485.86
		5'	120	27'-0"		6"	8"		6'-2½"	"	"	1.764	348.94	131.19	485.86
		6'	144	27'-5"		7"	9"		7'-2½"	28'-4⅝"	28'-11"	1.986	362.76	137.87	491.87
		7'	168	27'-9"		7½"	10"		8'-2½"	28'-8⅝"	29'-3¼"	2.214	376.11	144.55	495.87
		8'	192	27'-10"		8"	10"		9'-2½"	28'-9¾"	29'-4¼"	2.381	396.88	151.23	496.87
	4 @ 7'	4'	112	31'-0"	8"	6"	8"	7¾"	5'-3¾"	32'-1⅛"	32'-7½"	1.951	390.97	138.28	562.20
		5'	140	31'-0"		6"	8"		6'-3¾"	"	"	2.063	401.66	144.96	562.20
		6'	168	31'-5"		7"	9"		7'-3¾"	32'-6⅛"	33'-0¾"	2.286	415.60	151.64	567.20
		7'	196	31'-9"		7½"	10"		8'-3¾"	32'-10⅛"	33'-5"	2.516	429.04	158.32	572.21
		8'	224	31'-10"		8"	10"		9'-3¾"	32'-11⅛"	33'-6"	2.688	449.94	165.00	573.21
		9'	252	32'-3"		9"	11"		10'-3¾"	33'-4⅝"	33'-11"	2.984	489.43	171.68	578.22
	4 @ 8'	4'	128	35'-0"	8½"	6"	8"	8½"	5'-5"	36'-2⅞"	36'-9⅛"	2.281	460.49	148.57	635.98
		5'	160	35'-5"		7"	9"		6'-5"	36'-8"	37'-2½"	2.491	474.73	155.25	640.98
		6'	192	35'-5"		7"	9"		7'-5"	"	"	2.618	485.42	161.93	640.98
		7'	224	35'-9"		7½"	10"		8'-5"	37'-0⅛"	37'-6½"	2.848	499.11	168.61	644.99
		8'	256	35'-10"		8"	10"		9'-5"	37'-1⅛"	37'-7½"	3.016	520.14	175.29	645.99
		9'	288	36'-3"		9"	11"		10'-5"	37'-6⅝"	38'-0⅜"	3.319	555.08	181.97	651.00
		10'	320	36'-8"		10"	12"		11'-5"	37'-11⅛"	38'-6"	3.652	580.79	188.65	657.01
	4 @ 9'	5'	180	39'-5"	9"	7"	9"	9"	6'-6"	40'-9¾"	41'-4¼"	2.823	537.67	173.26	744.70
		6'	216	39'-9"		7½"	10"		7'-6"	41'-1¾"	41'-8¼"	3.042	551.37	179.94	748.70
		7'	252	39'-9"		7½"	10"		8'-6"	"	"	3.181	562.05	186.62	748.70
		8'	288	39'-10"		8"	10"		9'-6"	41'-2⅜"	41'-9½"	3.349	583.17	193.30	750.71
		9'	324	40'-3"		9"	11"		10'-6"	41'-8"	42'-2½"	3.653	618.28	199.98	754.71
		10'	360	40'-8"		10"	12"		11'-6"	42'-1⅛"	42'-7¾"	3.988	644.05	206.66	760.72
		11'	396	40'-10"		11"	12"		12'-6"	42'-3⅛"	42'-9¾"	4.238	670.74	213.34	762.72
	4 @ 10'	5'	200	43'-5"	9½"	7"	9"	9½"	6'-7"	44'-11⅛"	45'-6"	3.179	635.62	183.56	1034.84
		6'	240	43'-9"		7½"	10"		7'-7"	45'-3⅛"	45'-10"	3.399	649.69	190.24	1040.30
		7'	280	43'-9"		7½"	10"		8'-7"	"	"	3.538	660.38	196.92	1040.30
		8'	320	43'-10"		8"	10"		9'-7"	45'-4½"	45'-11"	3.706	682.22	203.60	1040.30
		9'	360	44'-3"		9"	11"		10'-7"	45'-9¾"	46'-4¼"	4.012	717.32	210.28	1048.47
		10'	400	44'-8"		10"	12"		11'-7"	46'-2⅞"	46'-9¼"	4.348	744.18	216.96	1053.92
		11'	440	44'-10"		11"	12"		12'-7"	46'-5"	46'-11⅛"	4.598	771.03	223.64	1056.65
		12'	480	45'-0"		12"	12"		13'-7"	46'-7"	47'-1½"	4.861	814.28	230.32	1059.37
	4 @ 11'	6'	264	47'-10"	10"	8"	10"	10½"	7'-8½"	49'-6⅛"	50'-0¾"	3.878	748.06	200.53	1134.93
		7'	308	47'-10"		8"	10"		8'-8½"	"	"	4.020	758.75	207.21	1134.93
		8'	352	47'-10"		8"	10"		9'-8½"	"	"	4.162	779.50	213.89	1134.93
		9'	396	48'-3"		9"	11"		10'-8½"	49'-11⅜"	50'-5¾"	4.470	815.34	220.57	1143.10
		10'	440	48'-8"		10"	12"		11'-8½"	50'-4⅝"	50'-11"	4.808	842.40	227.25	1148.55
		11'	484	48'-10"		11"	12"		12'-8½"	50'-6⅝"	51'-1"	5.059	869.44	233.93	1151.28
		12'	528	49'-0"		12"	12"		13'-8½"	50'-8¾"	51'-3⅛"	5.323	912.96	240.61	1154.00
	4 @ 12'	6'	288	51'-10"	10½"	8"	10"	11½"	7'-10"	53'-8"	54'-2½"	4.371	802.33	210.82	1230.45
		7'	336	51'-10"		8"	10"		8'-10"	"	"	4.513	813.02	217.50	1230.45
		8'	384	51'-10"		8"	10"		9'-10"	"	"	4.655	833.95	224.18	1230.45
		9'	432	52'-3"		9"	11"		10'-10"	54'-1⅛"	54'-7½"	4.965	870.11	230.86	1235.90
		10'	480	52'-8"		10"	12"		11'-10"	54'-6⅝"	55'-0¾"	5.305	897.29	237.54	1244.07
		11'	528	52'-10"		11"	12"		12'-10"	54'-8⅜"	55'-2¾"	5.557	924.98	244.22	1246.80
		12'	576	53'-0"		12"	12"		13'-10"	54'-10⅜"	55'-4¾"	5.821	968.34	250.90	1249.52

NOTE:- For details of wings and bar list see Drawing Nos. W-X152-1 or W-X152-2 and W-X15; W-X153-1 or W-X153-2 and W-X15; and W-X154-1 or W-X154-2 and W-X15.

BAR SIZE	PIN DIAM.	K	ADD FOR HOOKS	SPAN
#5	2½"	4¼"	0'-11½"	4', 5', 6', 7' & 8'
#6	3"	5"	1'-2" (2 Hooks)	
#6	3"	5"	0'-7" (1 Hook)	9', 10', 11' & 12'

BENDING DIAGRAM FOR BARS "b" and "b₂"

NOTE:- Dimensions are to centers of bars. ("b" and "b₂")

DOWEL BARS FOR TWO HEADWALLS

# SPANS @	SIZE	SPACING	NO. REQ'D	LENGTH	X
4'	#4	12"±	40	2'-5"	1'-2½"
5'	#4	12"±	48	2'-6"	1'-3"
6'	#4	12"±	56	2'-7"	1'-3½"
7'	#4	12"±	66	2'-8"	1'-4"
8'	#4	12"±	74	2'-9"	1'-4½"
9'	#4	12"±	82	2'-10"	1'-5"
10'	#4	12"±	92	2'-11"	1'-5½"
11'	#4	12"±	100	3'-0"	1'-6"
12'	#4	12"±	108	3'-1"	1'-6½"

Bars "r" Dowel bars in Headwalls.

TOP SLAB REINFORCING

BOTTOM SLAB REINFORCING

PART PLAN AT END OF CULVERT

NOTE:- The "a", "b", "b₂" and "c" bars are to be placed parallel with the headwall. The "d" bars in top of top slab and "e" bars in bottom of bottom slab are not shown.

GENERAL NOTES:-

CONCRETE:- All concrete to be Class S, and shall be poured in the dry. All exposed corners to have ¾" chamfers.

REINFORCING STEEL:- Reinforcing to be deformed bars of intermediate or hard grade.

BAR LAP:- In computing the quantities of steel from the tables add one lap for each additional 33'-0" length of barrel over 32'-0". Lap longitudinal bars 30 diameters.

CONSTRUCTION JOINTS:- Construction joints between wingwalls, sidewalls, division walls and slabs shall be only where shown on plans.

SPECIFICATIONS:- Arkansas State Highway Commission Standard Specifications for Highway Construction and applicable Special Provisions.

DESIGN LIVE LOAD

H20-S16 LOADING A.A.S.H.O. 1961
AND
SPECIAL MILITARY LOADING
Two 24,000 Lb. Axles @ 4'-0" ctrs.

UNIT STRESSES:-

Class S Concrete	(n=10)	1200 #/□"
Reinforcing Steel		20,000 #/□"

PART LONGITUDINAL SECTION N-N

TYPICAL SECTION M-M

LONGITUDINAL SECTION N-N

LAYOUT OF QUADRUPLE BARREL CULVERT
15° SKEW LEFT FORWARD
15° Skew Right Forward is reversed.

NOTE:- This drawing to be used in conjunction with Standard Wing Drawing Nos. W-X152-1 or W-X152-2; W-X153-1 or W-X153-2 and W-X154-1 or W-X154-2. Also W-X15.

CLASS S CONCRETE

ARKANSAS STATE HIGHWAY COMMISSION

DETAILS OF STANDARD BARREL SECTIONS
FOR
REINFORCED CONCRETE BOX CULVERTS
15° SKEW

4', 5', 6', 7', 8', 9', 10', 11' & 12' SPANS — 2:1, 3:1 OR 4:1 SLOPES
QUADRUPLES — UNDER 5'-0" COVER

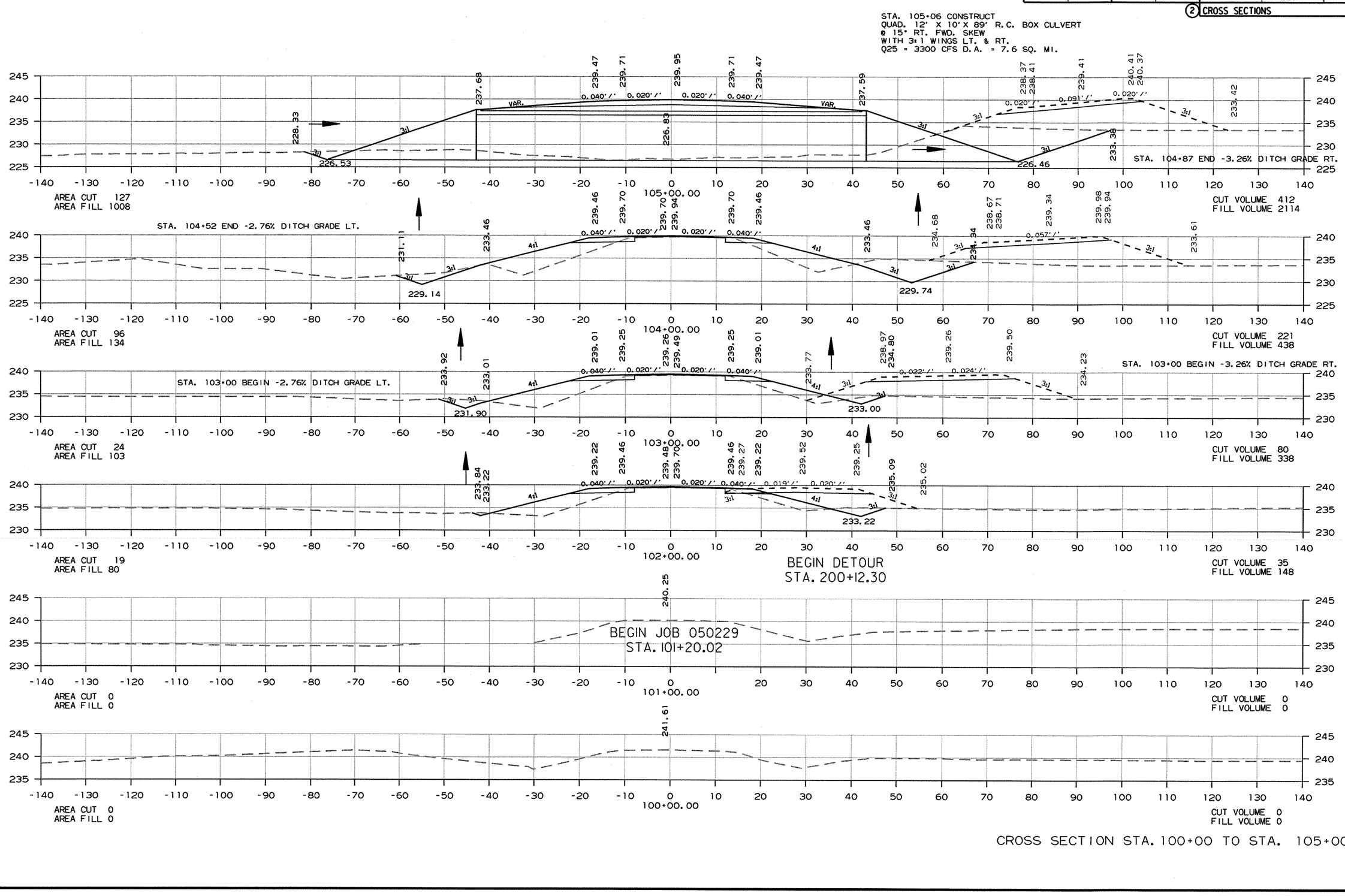
STANDARD DRAWING NO. R-415X-0

Designed By:- W.C.H. 1-23-63. Checked By:- R.H.S. 5-21-63
Drawn By:- W.C.H. 9-4-63. Checked By:- R.W.S. 10-7-63
Quantities By:- W.C.H. 9-5-63. Checked By:- R.G. 1-8-64

(46)

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		050229	38	39

(2) CROSS SECTIONS

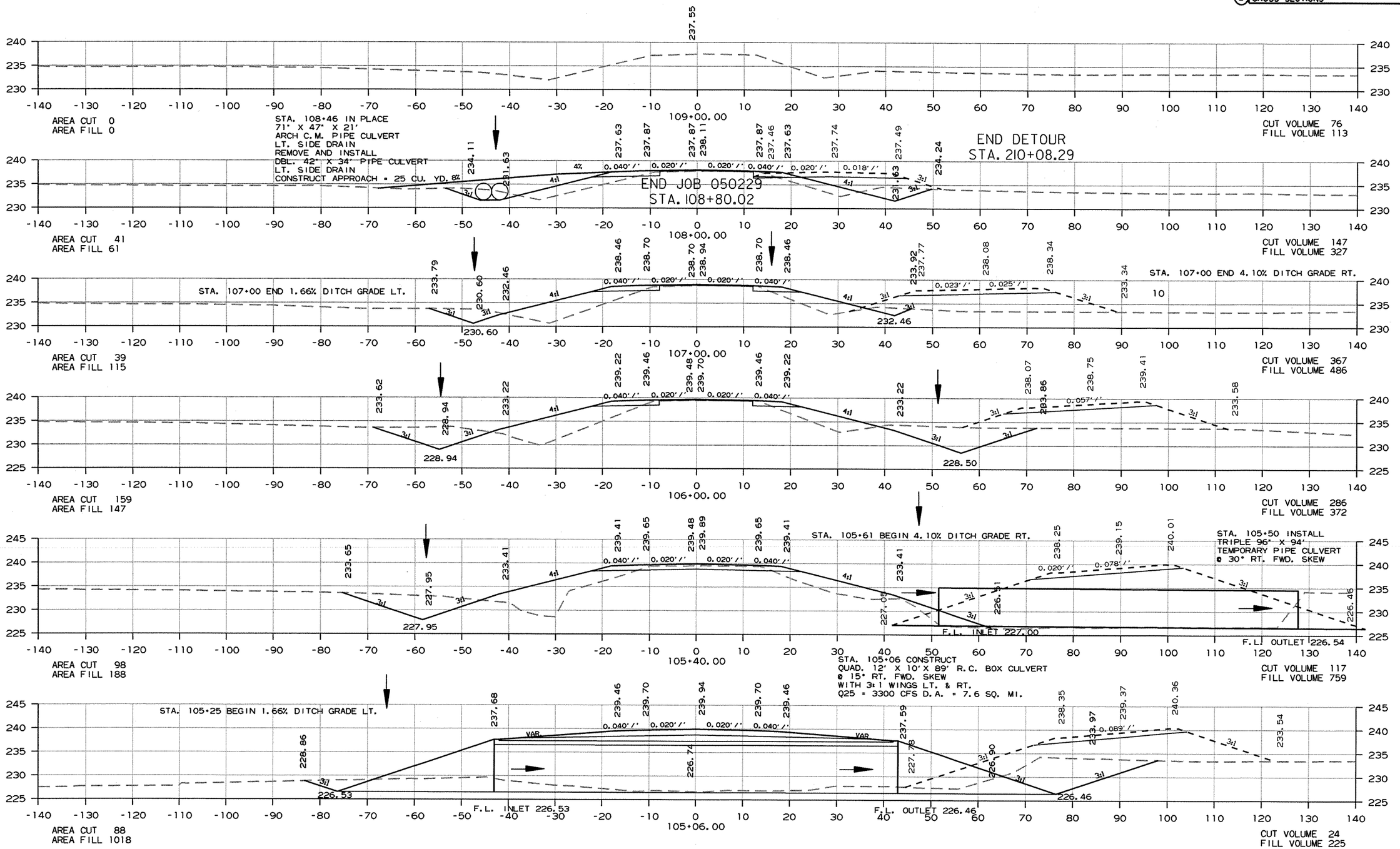


CROSS SECTION STA. 100+00 TO STA. 105+00

R050229.DGN 10/20/2011

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		050229	39	39

(2) CROSS SECTIONS



CROSS SECTION STA. 105+06 TO STA. 109+00

R050229.DGN 10/20/2011