

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.	050325		1	51

② LITTLE BRUSHY CREEK STR. & APPRS. (S)

ARKANSAS DEPARTMENT OF TRANSPORTATION  
CONSTRUCTION PLANS FOR STATE HIGHWAY

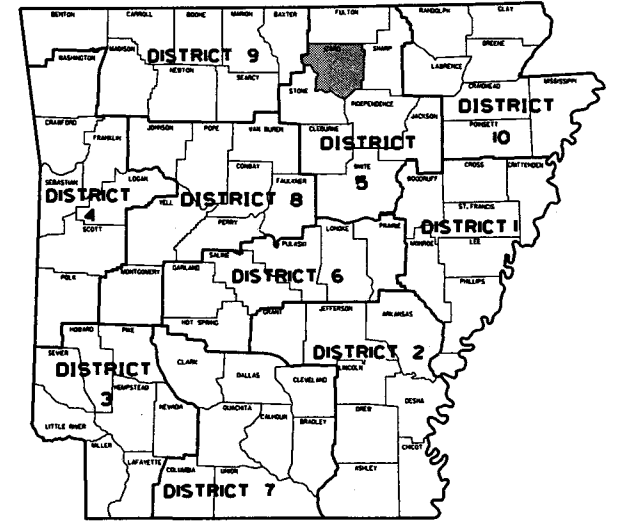
**LITTLE BRUSHY CREEK  
STR. & APPRS. (S)**

IZARD COUNTY

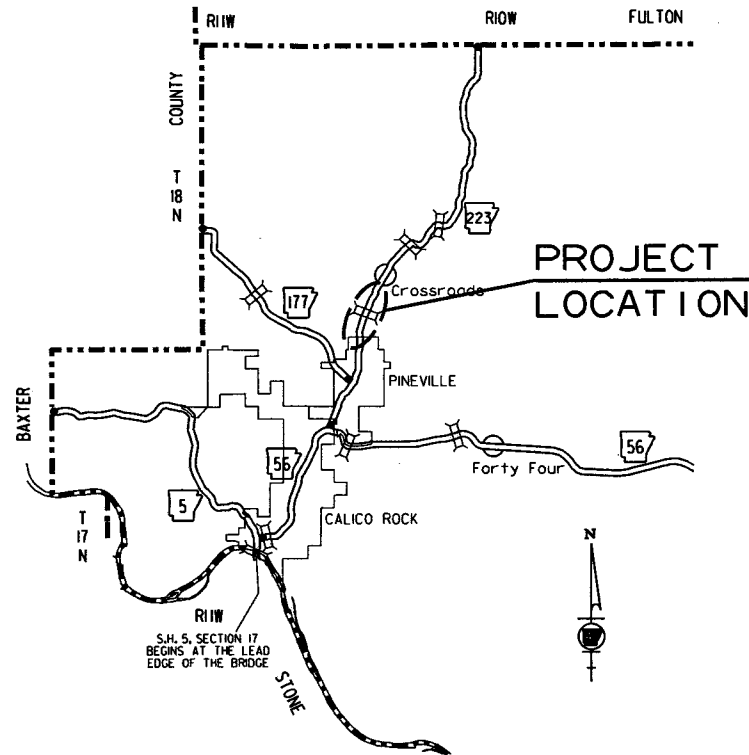
ROUTE 223 SECTION 1

**JOB 050325**

FED. AID PROJ. NHPP-0033(24)



ARK. HWY. DIST. NO. 5



VICINITY MAP

NOT TO SCALE

DESIGN TRAFFIC DATA

DESIGN YEAR	2038
2018 ADT	3250
2038 ADT	3900
2038 DHV	429
DIRECTIONAL DISTRIBUTION	0.60
TRUCKS	10%
DESIGN SPEED	55 MPH

STRUCTURES OVER 20'-0" SPAN

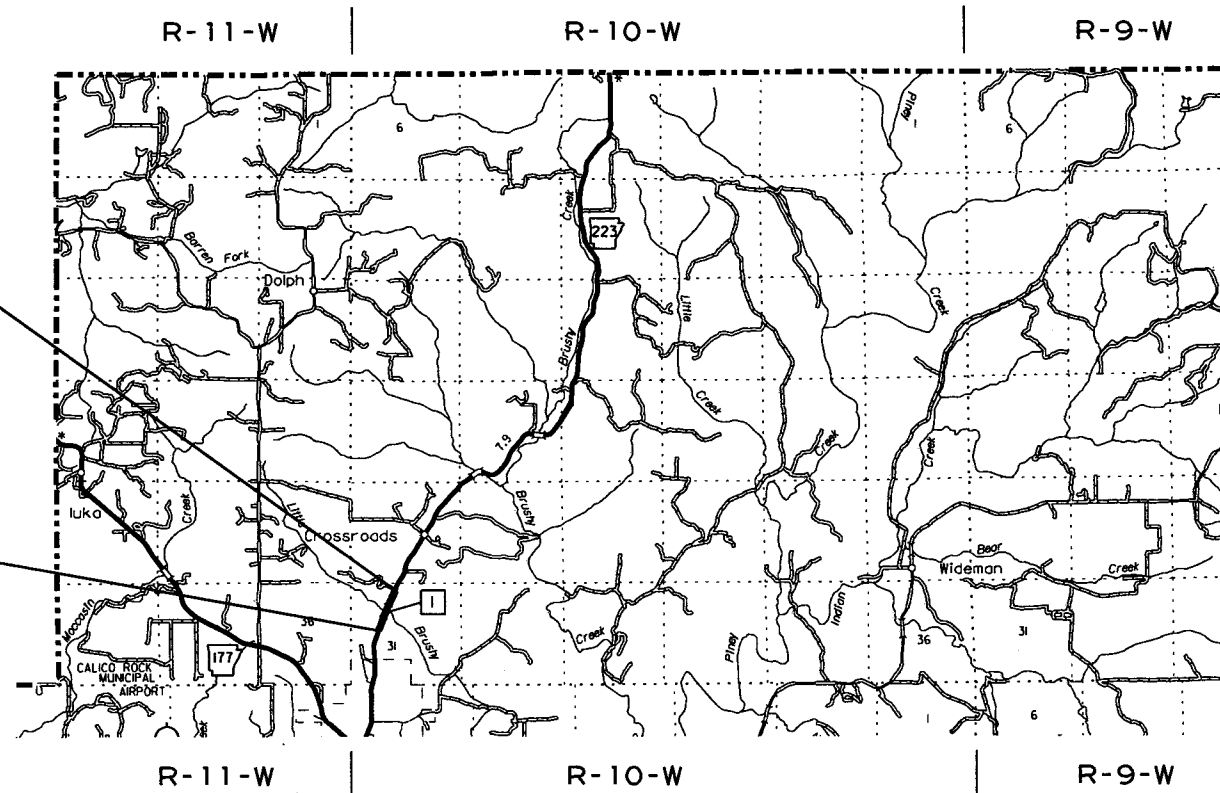
- 1 STA. 109+19 - CONSTRUCT TRP. 10' X 10' X 98' R.C. BOX WITH 3rd WINGS LT. & RT. 025 = 1460 C.F.S. D.A. = 1.8 SO. MI. SPAN = 33'-8"

STA. 119+50.00  
END JOB 050325

T  
18  
N

STA. 99+50.00  
BEGIN JOB 050325  
LOG MILE 2.35

T  
17  
N



T  
18  
N



APPROVED



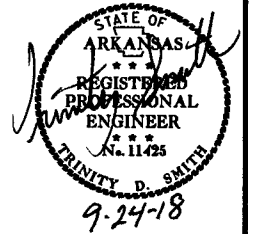
9-19-18  
DEPUTY DIRECTOR  
AND CHIEF ENGINEER

BEGINNING OF PROJECT	MID POINT OF PROJECT	END OF PROJECT
LATITUDE = N 36°10'49"	LATITUDE = N 36°10'58"	LATITUDE = N 36°11'07"
LONGITUDE = W 92°06'11"	LONGITUDE = W 92°06'07"	LONGITUDE = W 92°06'01"

GROSS LENGTH OF PROJECT	2000.00	FEET	OR	0.379	MILES
NET " " ROADWAY	1966.33	"	"	0.372	"
NET " " BRIDGES	33.67	"	"	0.007	"
NET " " PROJECT	2000.00	"	"	0.379	"

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② INDEX OF SHEETS AND STANDARD DRAWINGS



### INDEX OF SHEETS

SHEET NO.	TITLE
1	TITLE SHEET
2	INDEX OF SHEETS AND STANDARD DRAWINGS
3	GOVERNING SPECIFICATIONS AND GENERAL NOTES
4 - 6	TYPICAL SECTIONS OF IMPROVEMENT
7 - 14	SPECIAL DETAILS
15 - 18	TEMPORARY EROSION CONTROL DETAILS
19 - 23	MAINTENANCE OF TRAFFIC DETAILS
24	PERMANENT PAVEMENT MARKING DETAILS
25 - 28	QUANTITIES
29	SUMMARY OF QUANTITIES AND REVISIONS
30 - 32	SURVEY CONTROL DETAILS
33 - 36	PLAN AND PROFILE SHEETS
37 - 51	CROSS SECTIONS

NOTE: CROSS SECTIONS NOT NORMALLY INCLUDED IN PLANS SOLD TO PROSPECTIVE BIDDERS, BUT MAY BE HAD UPON REQUEST.

### ROADWAY STANDARD DRAWINGS

DRWG.NO.	TITLE	DATE
CDP-1	CONCRETE DITCH PAVING	12-08-16
FES-1	FLARED END SECTION	10-18-96
FES-2	FLARED END SECTION	10-18-96
PBC-1	PRECAST CONCRETE BOX CULVERTS	01-28-15
PCC-1	CONCRETE PIPE CULVERT FILL HEIGHTS & BEDDING	02-27-14
PCM-1	METAL PIPE CULVERT FILL HEIGHTS & BEDDING	02-27-14
PCP-1	PLASTIC PIPE CULVERT (HIGH DENSITY POLYETHYLENE)	02-27-14
PCP-2	PLASTIC PIPE CULVERT (PVC F949)	02-27-14
PM-1	PAVEMENT MARKING DETAILS	06-01-17
PU-1	DETAILS OF PIPE UNDERDRAIN	12-08-16
RCB-1	REINFORCED CONCRETE BOX CULVERT DETAILS	07-26-12
RCB-2	EXCAVATION PAY LIMITS, BACKFILL, & SOLID SODDING FOR BOX CULVERTS	11-20-03
RCB-3	METHOD OF EXTENDING EXISTING R.C. BOX CULVERTS	10-12-95
SE-2	TABLES AND METHOD OF SUPERELEVATION FOR TWO-WAY TRAFFIC	10-18-96
SI-1	DETAILS OF SPECIAL ITEMS	09-12-13
TC-1	STANDARD TRAFFIC CONTROLS FOR HIGHWAY CONSTRUCTION	04-13-17
TC-2	STANDARD TRAFFIC CONTROLS FOR HIGHWAY CONSTRUCTION	09-02-15
TC-3	STANDARD TRAFFIC CONTROLS FOR HIGHWAY CONSTRUCTION	09-02-15
TC-4	STANDARD TRAFFIC CONTROLS FOR HIGHWAY CONSTRUCTION-TEMPORARY PRECAST BARRIER	02-27-14
TC-5	STANDARD TRAFFIC CONTROLS FOR HIGHWAY CONSTRUCTION-TEMPORARY PRECAST BARRIER	10-15-09
TEC-1	TEMPORARY EROSION CONTROL DEVICES	11-16-17
TEC-2	TEMPORARY EROSION CONTROL DEVICES	06-02-94
TEC-3	TEMPORARY EROSION CONTROL DEVICES	11-03-94
TEC-4	TEMPORARY EROSION CONTROL DEVICES	07-26-12
WF-2	WIRE FENCE WATER GAPS	04-20-79
WF-4	WIRE FENCE TYPE C AND D	08-22-02

### R.C. BOX CULVERT STANDARD DRAWINGS

DRWG.NO.	TITLE	DATE
W-X15	DETAILS OF STANDARD WINGS FOR REINFORCED CONCRETE BOX CULVERTS 15° SKEW	06-13-63
W-X153-1	DETAILS OF STANDARD WINGS FOR REINFORCED CONCRETE BOX CULVERTS	05-10-66
R-115X-0	DETAILS OF STANDARD BARREL SECTIONS FOR REINFORCED CONCRETE BOX CULVERTS	08-14-63

INDEX OF SHEETS AND STANDARD DRAWINGS

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2 GOVERNING SPECS. AND GENERAL NOTES



### GOVERNING SPECIFICATIONS

ARKANSAS STATE HIGHWAY COMMISSION STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION, EDITION OF 2014, AND THE FOLLOWING SPECIAL PROVISIONS AND SUPPLEMENTAL SPECIFICATIONS:

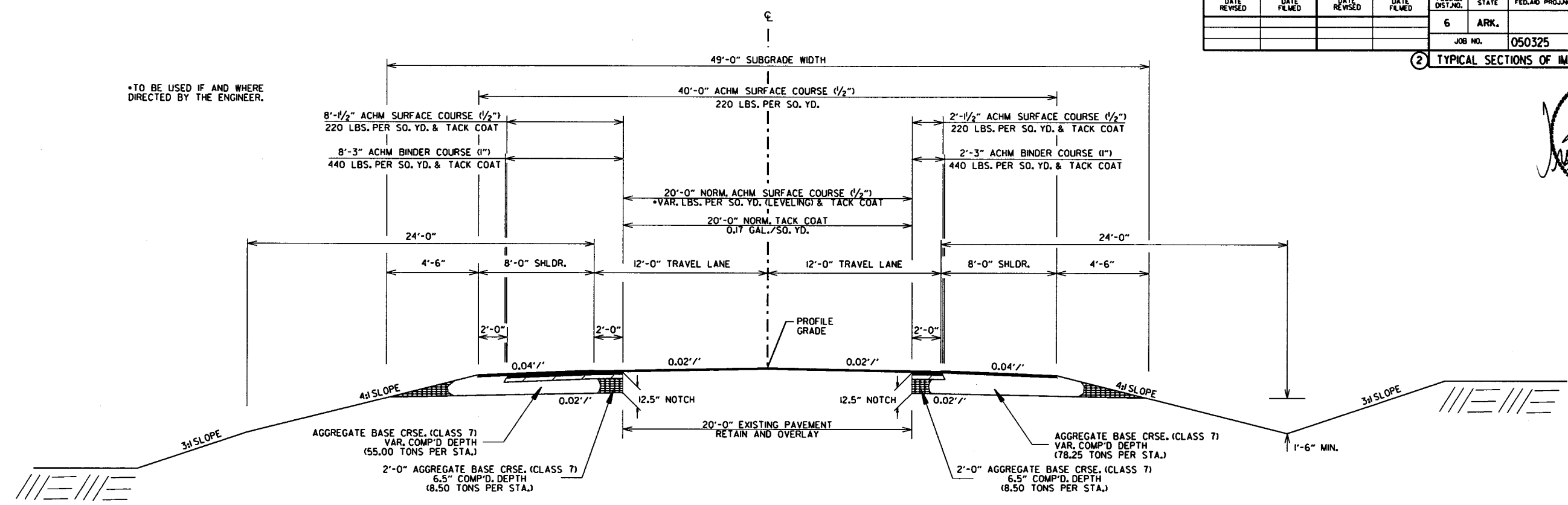
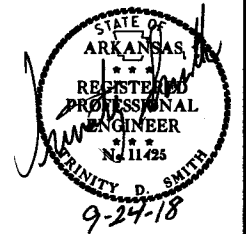
NUMBER	TITLE
ERRATA	ERRATA FOR THE BOOK OF STANDARD SPECIFICATIONS
FHWA-1273	REQUIRED CONTRACT PROVISIONS FEDERAL-AID CONSTRUCTION CONTRACTS
FHWA-1273	SUPPLEMENT - EQUAL EMPLOYMENT OPPORTUNITY - NOTICE TO CONTRACTORS
FHWA-1273	SUPPLEMENT - SPECIFIC EQUAL EMPLOYMENT OPPORTUNITY RESPONSIBILITIES (23 U.S.C. 140)
FHWA-1273	SUPPLEMENT - EQUAL EMPLOYMENT OPPORTUNITY - GOALS AND TIMETABLES
FHWA-1273	SUPPLEMENT - EQUAL EMPLOYMENT OPPORTUNITY - FEDERAL STANDARDS
FHWA-1273	SUPPLEMENT - POSTERS AND NOTICES REQUIRED FOR FEDERAL-AID PROJECTS
FHWA-1273	SUPPLEMENT - WAGE RATE DETERMINATION
100-3	CONTRACTOR'S LICENSE
100-4	DEPARTMENT NAME CHANGE
102-2	ISSUANCE OF PROPOSALS
108-1	LIQUIDATED DAMAGES
108-2	WORK ALLOWED PRIOR TO ISSUANCE OF WORK ORDER
110-1	PROTECTION OF WATER QUALITY AND WETLANDS
303-1	AGGREGATE BASE COURSE
400-1	TACK COATS
400-4	DESIGN AND QUALITY CONTROL OF ASPHALT MIXTURES
400-5	PERCENT AIR VOIDS FOR ACHM MIX DESIGNS
400-6	LIQUID ANTI-STRIP ADDITIVE
410-1	CONSTRUCTION REQUIREMENTS AND ACCEPTANCE OF ASPHALT CONCRETE PLANT MIX COURSES
604-1	RETROREFLECTIVE SHEETING FOR TRAFFIC CONTROL DEVICES IN CONSTRUCTION ZONES
605-1	CONCRETE DITCH PAVING
606-1	PIPE CULVERTS FOR SIDE DRAINS
620-1	MULCH COVER
621-1	FILTER SOCKS
800-1	STRUCTURES
JOB 050325	BIDDING REQUIREMENTS AND CONDITIONS
JOB 050325	BROADBAND INTERNET SERVICE FOR ASPHALT CONCRETE PLANT
JOB 050325	BROADBAND INTERNET SERVICE FOR FIELD OFFICE
JOB 050325	CARGO PREFERENCE ACT REQUIREMENTS
JOB 050325	CAVE DISCOVERY
JOB 050325	CLEARING AND GRUBBING
JOB 050325	DISADVANTAGED BUSINESS ENTERPRISE BIDDER'S RESPONSIBILITIES
JOB 050325	GOALS FOR DISADVANTAGED BUSINESS ENTERPRISE PARTICIPATION
JOB 050325	MANDATORY ELECTRONIC CONTRACT
JOB 050325	MANDATORY ELECTRONIC DOCUMENT SUBMITTAL
JOB 050325	NESTING SITES OF MIGRATORY BIRDS
JOB 050325	OFF-SITE RESTRAINING CONDITIONS FOR INDIANA AND NORTHERN LONG-EARED BATS
JOB 050325	PARTNERING REQUIREMENTS
JOB 050325	PLASTIC PIPE
JOB 050325	SETTLEMENT AGREEMENTS
JOB 050325	SHORING FOR CULVERTS
JOB 050325	SOIL STABILIZATION
JOB 050325	STORM WATER POLLUTION PREVENTION PLAN
JOB 050325	SUBMISSION OF ASPHALT CONCRETE HOT MIX ACCEPTANCE TEST RESULTS
JOB 050325	UTILITY ADJUSTMENTS
JOB 050325	VALUE ENGINEERING
JOB 050325	WARM MIX ASPHALT
JOB 050325	WELLHEAD PROTECTION

### GENERAL NOTES

- GRADE LINE DENOTES FINISHED GRADE WHERE SHOWN ON PLANS.
- ALL PIPE LINES, POWER, TELEPHONE, AND TELEGRAPH LINES TO BE MOVED OR LOWERED BY THE RESPECTIVE OWNERS AS PER AGREEMENT WITH SUCH OWNERS.
- 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.
- ALL LAND MONUMENTS LOCATED WITHIN THE CONSTRUCTION AREA SHALL BE PROTECTED IN ACCORDANCE WITH SECTION 107.12 OF THE STANDARD SPECIFICATIONS.
- 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.
- 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.
- THIS PROJECT IS COVERED UNDER A SECTION 404 NATIONWIDE 14 PERMIT. REFER TO SECTION 110 OF THE STANDARD SPECIFICATIONS, EDITION OF 2014, FOR PERMIT REQUIREMENTS.
- ALL FLEXIBLE BASE AND ASPHALTIC PAVEMENTS REMOVED SHALL BE PAID FOR UNDER THE ITEM NO. 210 - UNCLASSIFIED EXCAVATION.
- 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.

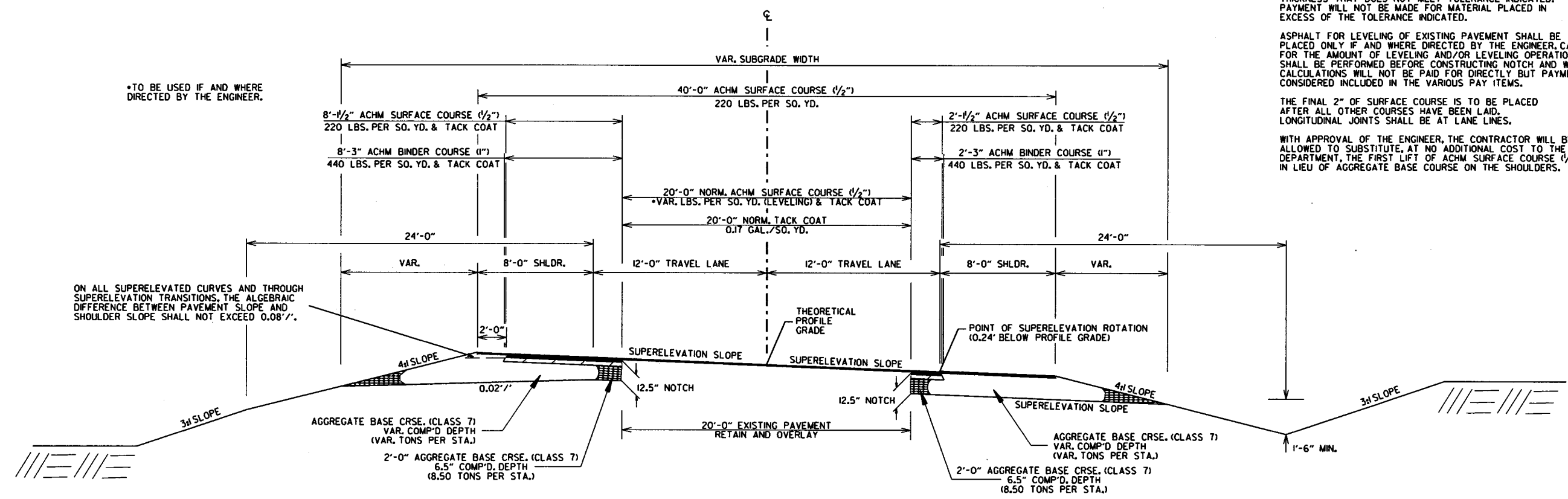
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2 TYPICAL SECTIONS OF IMPROVEMENT



HWY. 223 - NOTCH AND WIDEN SECTION  
STA. 99+50.00 TO STA. 99+81.23

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.  
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. CALCULATIONS WILL NOT BE PAID FOR DIRECTLY BUT PAYMENT WILL BE CONSIDERED INCLUDED IN THE VARIOUS PAY ITEMS.  
THE FINAL 2" OF SURFACE COURSE IS TO BE PLACED AFTER ALL OTHER COURSES HAVE BEEN LAID. LONGITUDINAL JOINTS SHALL BE AT LANE LINES.  
WITH APPROVAL OF THE ENGINEER, THE CONTRACTOR WILL BE ALLOWED TO SUBSTITUTE, AT NO ADDITIONAL COST TO THE DEPARTMENT, THE FIRST LIFT OF ACHM SURFACE COURSE (1/2") IN LIEU OF AGGREGATE BASE COURSE ON THE SHOULDERS.



HWY. 223 - NOTCH AND WIDEN SECTION (SUPERELEVATION)  
STA. 99+81.23 TO STA. 105+05.00  
STA. 117+60.00 TO STA. 119+50.00

TYPICAL SECTIONS OF IMPROVEMENT

\*TO BE USED IF AND WHERE DIRECTED BY THE ENGINEER.

\*TO BE USED IF AND WHERE DIRECTED BY THE ENGINEER.

ON ALL SUPERELEVATED CURVES AND THROUGH SUPERELEVATION TRANSITIONS, THE ALGEBRAIC DIFFERENCE BETWEEN PAVEMENT SLOPE AND SHOULDER SLOPE SHALL NOT EXCEED 0.08'/'.

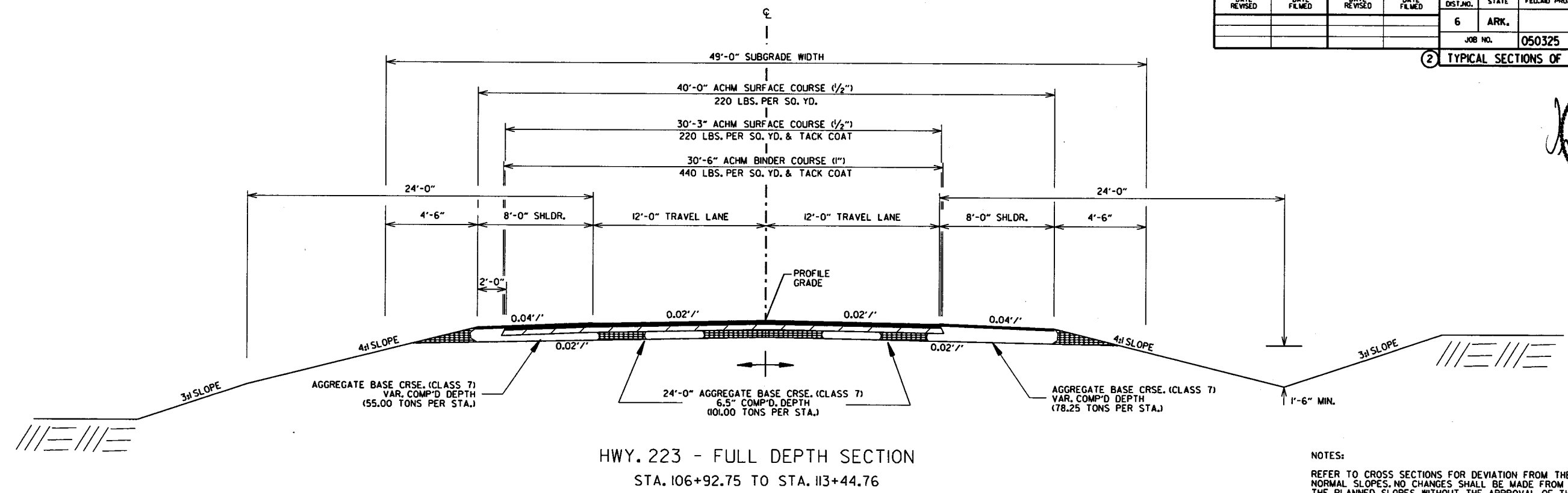
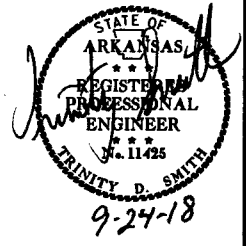
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2 TYPICAL SECTIONS OF IMPROVEMENT



HWY. 223 - FULL DEPTH SECTION  
STA. 106+92.75 TO STA. 113+44.76

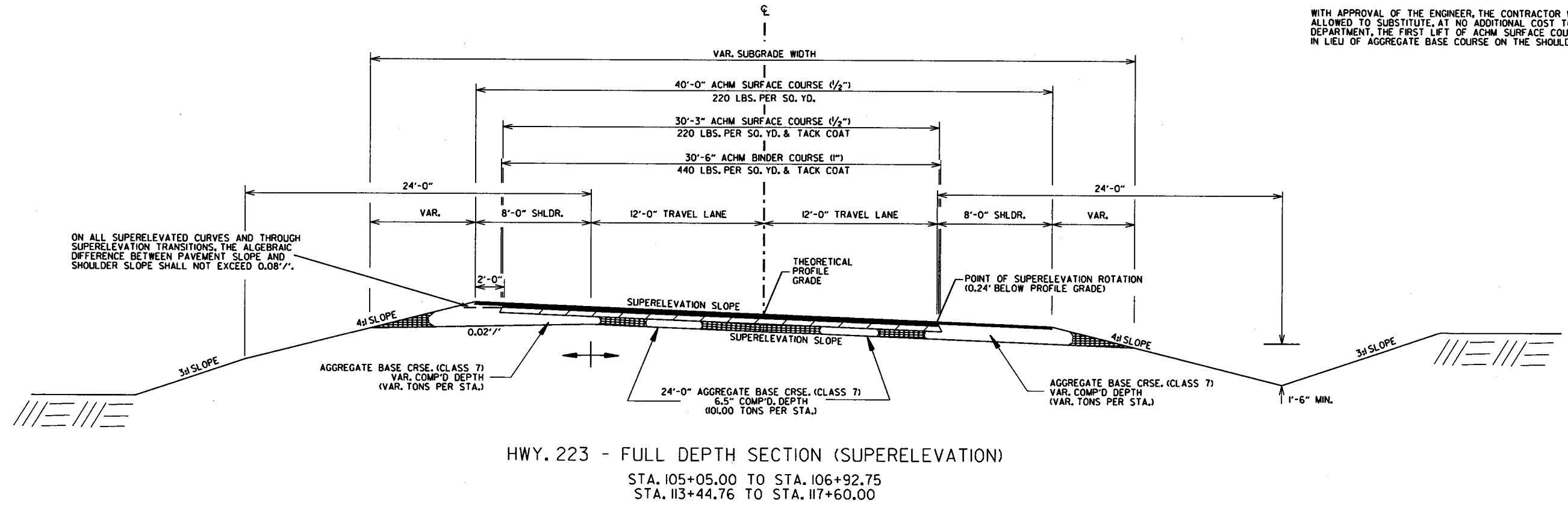
NOTES:

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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.

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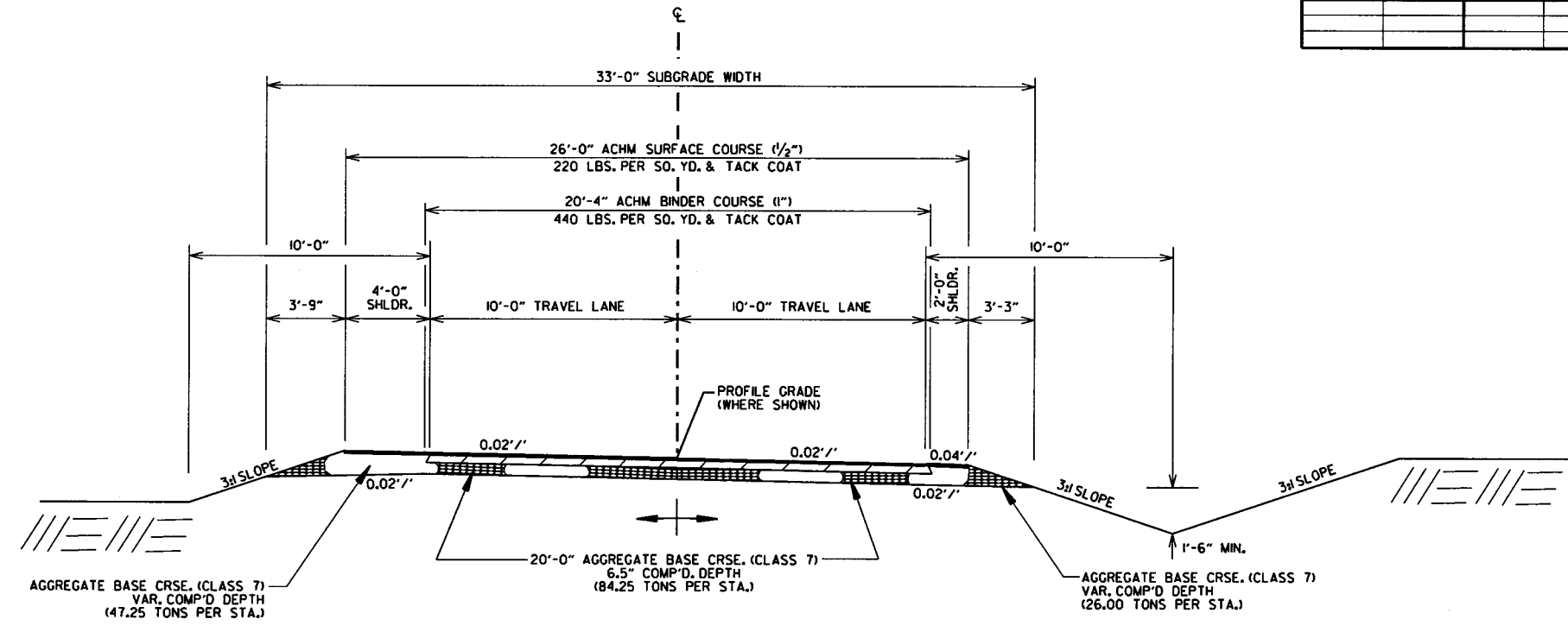
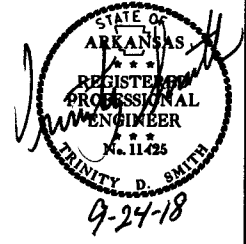


HWY. 223 - FULL DEPTH SECTION (SUPERELEVATION)  
STA. 105+05.00 TO STA. 106+92.75  
STA. 113+44.76 TO STA. 117+60.00

ON ALL SUPERELEVATED CURVES AND THROUGH SUPERELEVATION TRANSITIONS, THE ALGEBRAIC DIFFERENCE BETWEEN PAVEMENT SLOPE AND SHOULDER SLOPE SHALL NOT EXCEED 0.08'/'.

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2 TYPICAL SECTIONS OF IMPROVEMENT



DETOUR - FULL DEPTH SECTION  
 STA. 200+00.00 TO STA. 202+90.00  
 STA. 208+65.00 TO STA. 217+01.43

NOTES:

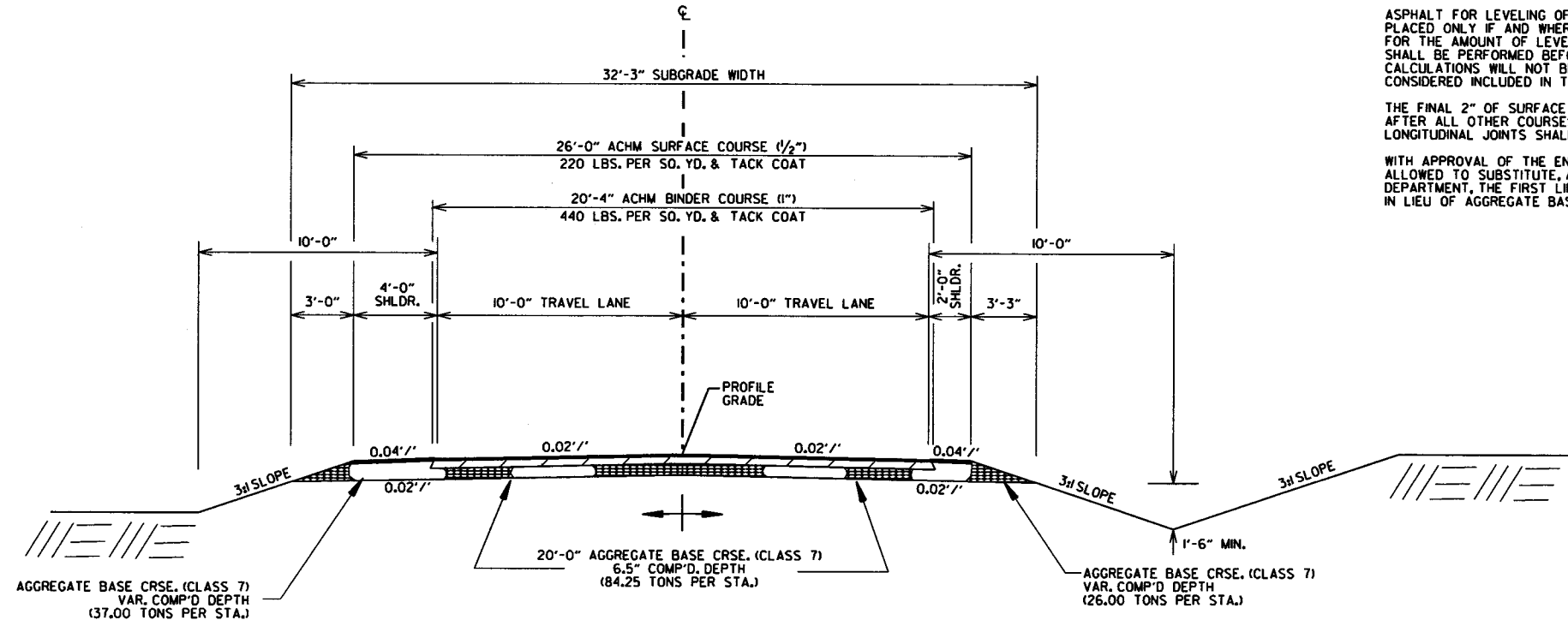
REFER TO CROSS SECTIONS FOR DEVIATION FROM THE NORMAL SLOPES. NO CHANGES SHALL BE MADE FROM THE PLANNED SLOPES WITHOUT THE APPROVAL OF THE ENGINEER.

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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. CALCULATIONS WILL NOT BE PAID FOR DIRECTLY BUT PAYMENT WILL BE CONSIDERED INCLUDED IN THE VARIOUS PAY ITEMS.

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DETOUR - FULL DEPTH SECTION  
 STA. 202+90.00 TO STA. 208+65.00

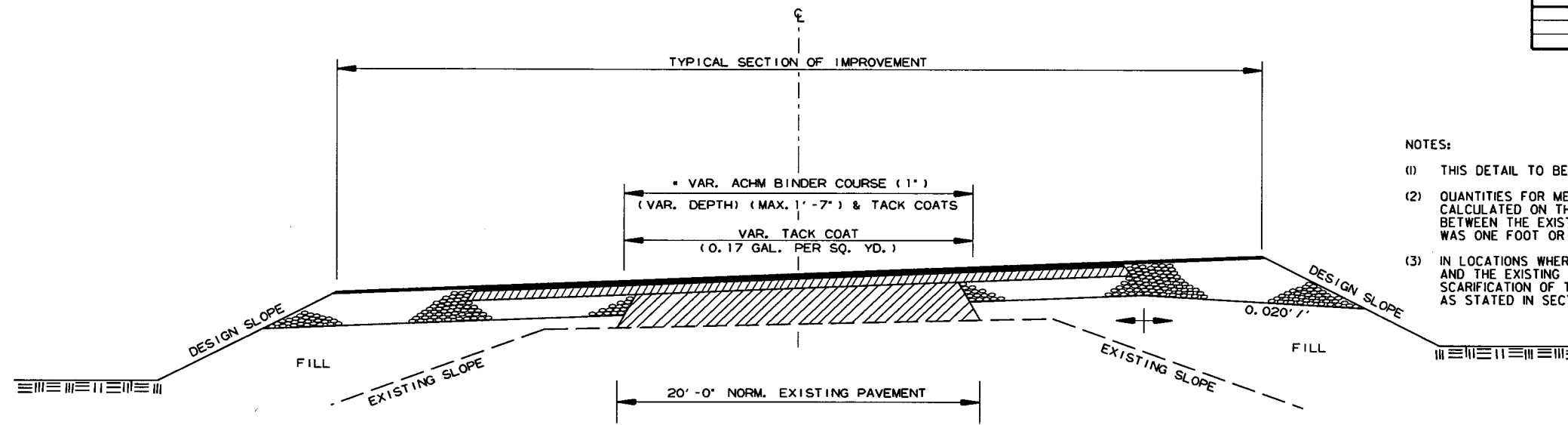
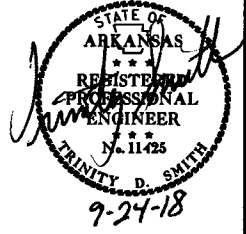
TYPICAL SECTIONS OF IMPROVEMENT

9/21/2018

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② SPECIAL DETAILS

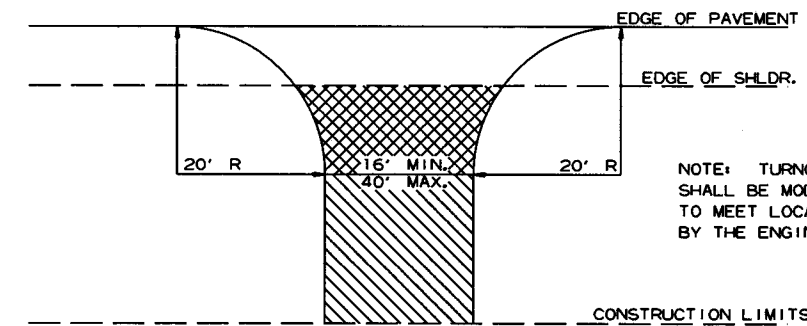


NOTES:

- (1) THIS DETAIL TO BE USED ONLY WHERE DIRECTED BY THE ENGINEER.
- (2) QUANTITIES FOR METHOD OF GRADE RAISE USING ASPHALT WERE CALCULATED ON THIS PROJECT AT LOCATIONS WHERE THE DISTANCE BETWEEN THE EXISTING ASPHALT ROADWAY AND THE PROPOSED SUBGRADE WAS ONE FOOT OR LESS.
- (3) IN LOCATIONS WHERE THE DISTANCE BETWEEN THE PROPOSED SUBGRADE AND THE EXISTING ASPHALT ROADWAY IS MORE THAN ONE FOOT, SCARIFICATION OF THE EXISTING ASPHALT ROADWAY WILL BE REQUIRED AS STATED IN SECTION 210, SUBSECTION 210.09, OF THE STANDARD SPECIFICATIONS.

\* 6.5" AGGREGATE BASE COURSE (CLASS 7)  
TO BE REPLACED WITH ACHM BINDER COURSE (1")

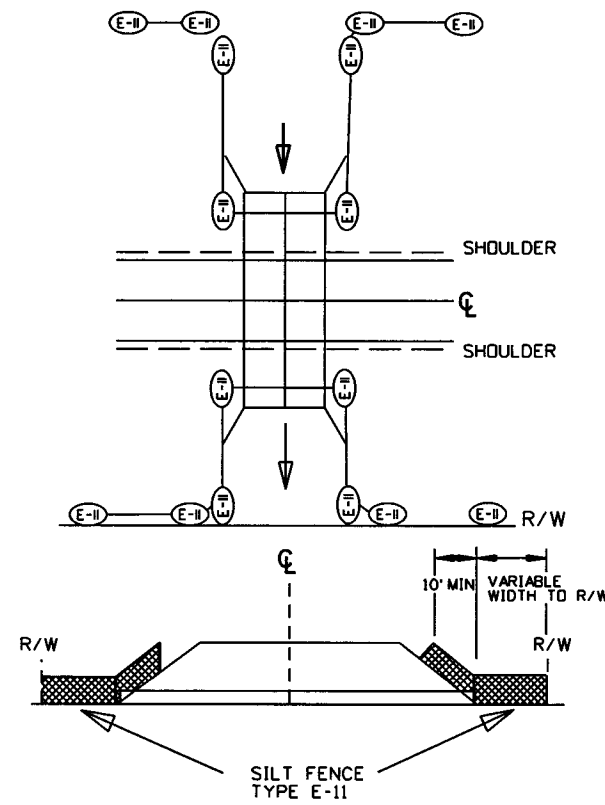
METHOD OF RAISING GRADE



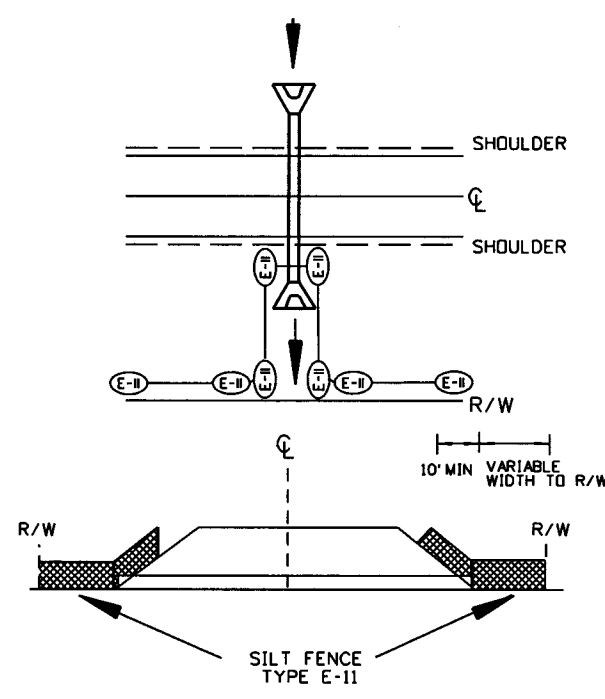
NOTE: TURNOUTS AND PRIVATE DRIVES SHALL BE MODIFIED WHERE NECESSARY TO MEET LOCAL CONDITIONS AS DIRECTED BY THE ENGINEER.

- ASPHALT CONCRETE HOT MIX SURFACE COURSE (220 LBS. PER SQ. YD.)
- AGGREGATE BASE COURSE (CLASS 7)
- 7" COMP. DEPTH IF ASPHALT DRIVE EXIST.
- AGGREGATE BASE COURSE (CLASS 7)
- 9" COMP. DEPTH OR CONFORM TO EXISTING DRIVEWAY

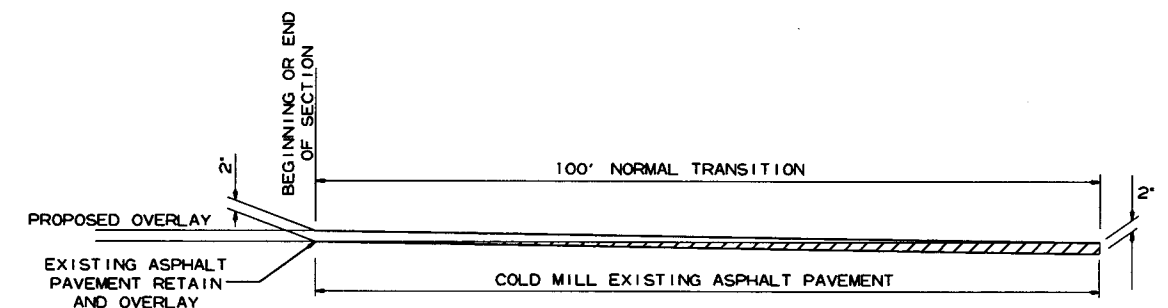
DETAIL FOR DRIVEWAY TURNOUTS



DETAIL OF SILT FENCE  
AT R.C. BOX



DETAIL OF SILT FENCE  
AT CROSS DRAINS



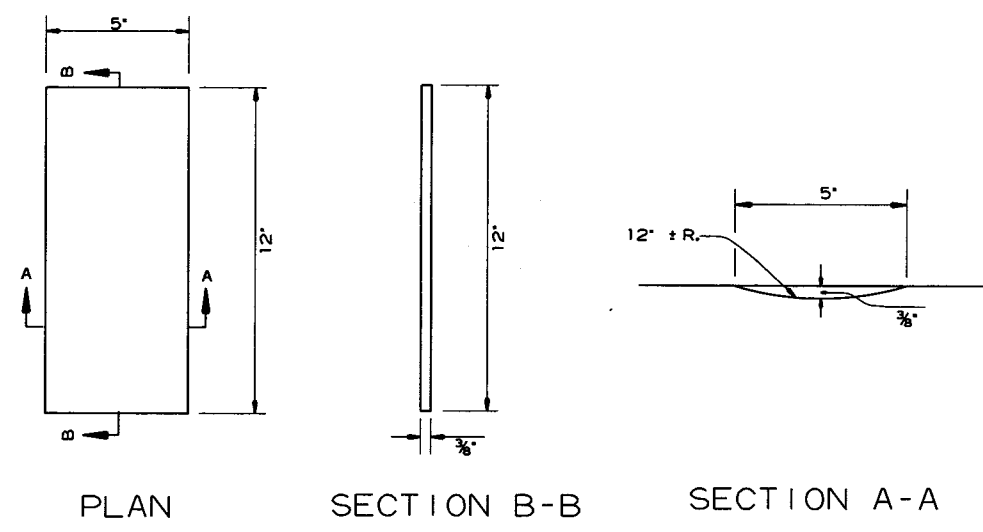
DETAIL FOR TRANSITIONS

9/21/2018

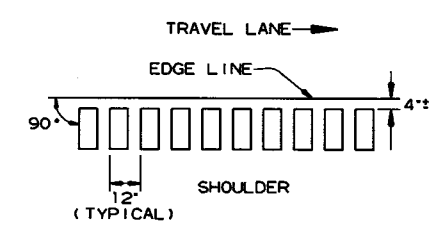
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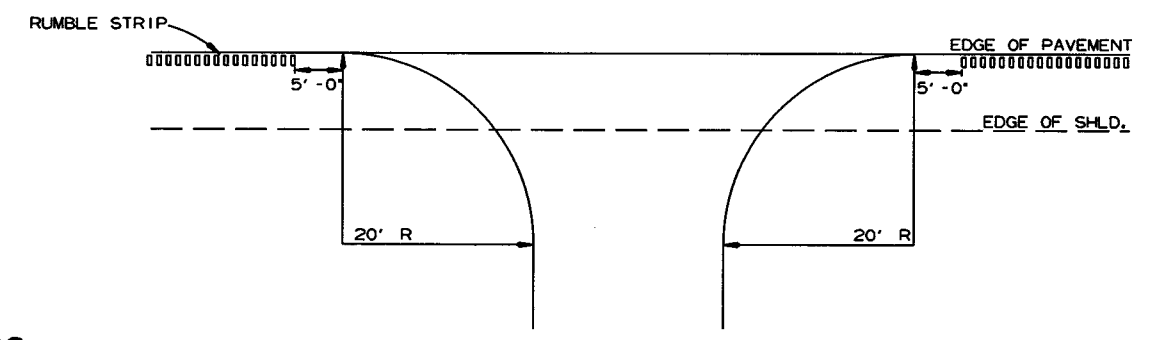
2 SPECIAL DETAILS



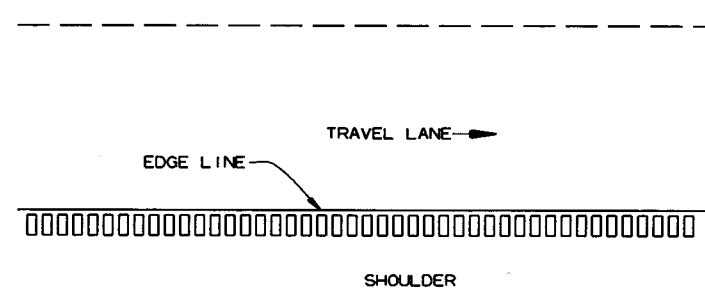
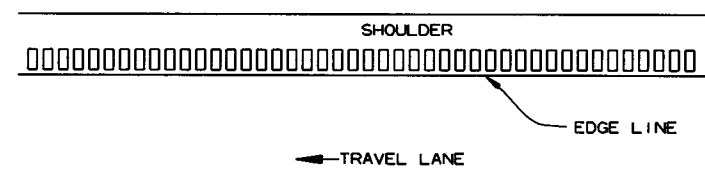
DETAILS OF RUMBLE STRIPS



LOCATION PLAN OF RUMBLE STRIPS  
LEFT OR RIGHT SHOULDER



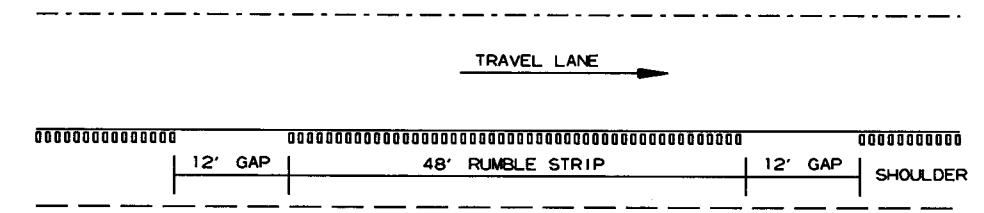
DETAIL FOR RUMBLE STRIP GAP  
AT DRIVEWAY TURNOUTS



PLAN VIEW

GENERAL NOTES

- RUMBLE STRIPS SHALL NOT BE INSTALLED ON CURB SECTIONS, BRIDGE DECKS, APPROACH SLABS, INTERSECTING STREETS OR ROADWAYS, RESIDENTIAL OR COMMERCIAL DRIVEWAYS OR ACROSS TRANSVERSE JOINTS OF CONCRETE SHOULDERS.
- RUMBLE STRIPS SHALL NOT BE INSTALLED ON A PAVED SHOULDER THAT IS USED AS A DECELERATION LANE FOR THE LENGTH DEEMED APPROPRIATE BY THE ENGINEER.
- THE 4" OFFSET FROM THE EDGE LINE MAY BE INCREASED TO AVOID LONGITUDINAL JOINTS. IN ALL CASES, THE LATERAL DEVIATION FROM THE PLANNED OFFSET SHOULD BE KEPT TO A MINIMUM.
- RUMBLE STRIPS SHALL BE MEASURED BY THE LINEAR FOOT LONGITUDINALLY ALONG THE SHOULDER. PAYMENT SHALL ONLY INCLUDE THAT PORTION OF THE SHOULDER ON WHICH RUMBLE STRIPS HAVE BEEN CONSTRUCTED. NO MEASUREMENT OR PAYMENT WILL BE MADE FOR GAPS, DRIVEWAYS, TURNOUTS, OR OTHER PUBLIC ROAD INTERSECTIONS WHERE RUMBLE STRIPS HAVE NOT BEEN CONSTRUCTED.
- THE 3/8" DEPTH SHALL GENERALLY APPLY FOR THE ENTIRE 12' LENGTH. SOME VARIATION TO SUIT SHOULDER SLOPE BREAKS MAY BE NECESSARY.



NOTE: GAP PATTERN SHALL BE ADJUSTED BY THE ENGINEER IN THE FIELD ALLOWING FOR DRIVEWAYS TO SERVE AS THE GAP.

DETAIL FOR GAP PATTERN RUMBLE STRIP

9/21/2018

R050325.DGN

MID-SECTION

R.C. BOX SECTION		DESIGN FILL DEPTH (FT.)		CLEAR SPAN (FT.)		CLEAR HEIGHT (FT.)		TOP SLAB THK.		BOTTOM SLAB THK.		SIDE WALL THK.		INTERIOR WALL THK.		OVER ALL WIDTH		OVER ALL HEIGHT		SECTION LENGTH (FT.)		TOP SLAB REINFORCING STEEL				BOTTOM SLAB REINFORCING STEEL				SIDE WALL REINFORCING STEEL		INTERIOR WALL REINFORCING STEEL		TOP SLAB DISTRIBUTION REINF. STEEL		BOTTOM SLAB DISTRIBUTION REINF. STEEL		SIDE WALL DISTRIBUTION REINF. STEEL		INTERIOR WALL DISTRIBUTION REINF. STEEL		CLASS "S" CONCRETE		REINFORCING STEEL (GR. 60)				
D	S	H	T	B	C	W	OW	OH	SL	SIZE	L	SIZE	L	SIZE	L	SIZE	L	SIZE	L	SIZE	L	SIZE	L	SIZE	L	SIZE	L	SIZE	L	SIZE	L	SIZE	L	SIZE	L	SIZE	L	SIZE	L	CU. YDS.	LBS.							
A	10	10	10	10.5	11.5	14	8	33'-8"	11'-10"	98	4	33'-4"	8	33'-11"	5	33'-4"	15	78	4	33'-4"	6	33'-11"	6	33'-4"	10	117	6	8	294	11'-6"	4	12	392	11'-6"	4	10	77	4	9	89	5	12	20	4	12	40	357.12	50260

INLET SLOPE SECTION(S)

R.C. BOX SECTION		DESIGN FILL DEPTH (FT.)		CLEAR SPAN (FT.)		CLEAR HEIGHT (FT.)		TOP SLAB THK.		BOTTOM SLAB THK.		SIDE WALL THK.		INTERIOR WALL THK.		OVER ALL WIDTH		OVER ALL HEIGHT		SECTION LENGTH (FT.)		BOTTOM SLAB REINFORCING STEEL				SIDE WALL REINFORCING STEEL		INTERIOR WALL REINFORCING STEEL		TOP SLAB DISTRIBUTION REINFORCING STEEL		BOTTOM SLAB DISTRIBUTION REINFORCING STEEL		SIDE WALL DISTRIBUTION REINFORCING STEEL		INTERIOR WALL DISTRIBUTION REINFORCING STEEL		CLASS "S" CONCRETE		REINFORCING STEEL (GR. 60)						
D	S	H	T	B	C	W	OW	OH	SL	SIZE	L	SIZE	L	SIZE	L	SIZE	L	SIZE	L	SIZE	L	SIZE	L	SIZE	L	SIZE	L	SIZE	L	SIZE	L	SIZE	L	SIZE	L	SIZE	L	CU. YDS.	LBS.							

INLET SKEWED END SECTION

SKEW (DEGREE)		SLOPE		DESIGN FILL DEPTH (FT.)		CLEAR SPAN (FT.)		CLEAR HEIGHT (FT.)		SECTION LENGTH		TOP SLAB THK.		HDWL DEPTH		BOTTOM SLAB THK.		SIDE WALL THK.		INTERIOR WALL THK.		OVER ALL WIDTH		OVER ALL HEIGHT		TOP SLAB REINFORCING STEEL				BOTTOM SLAB REINFORCING STEEL				SIDE WALL REINFORCING STEEL		INTERIOR WALL REINFORCING STEEL		TOP SLAB DISTRIBUTION REINFORCING STEEL		BOTTOM SLAB DISTRIBUTION REINFORCING STEEL		SIDE WALL DISTRIBUTION REINFORCING STEEL		INTERIOR WALL DISTRIBUTION REINFORCING STEEL		CLASS "S" CONCRETE		REINFORCING STEEL (GR. 60)	
SK	SL	D	S	H	L	T	HD	B	C	W	OW	OH	SIZE	SPACING	LENGTHS VARY	NO. REQ'D	SIZE	SPACING	LENGTHS VARY	NO. REQ'D	SIZE	SPACING	LENGTH	NO. REQ'D	SIZE	SPACING	LENGTH	NO. REQ'D	SIZE	SPACING	LENGTH	NO. REQ'D	SIZE	SPACING	LENGTH	NO. REQ'D	SIZE	SPACING	LENGTH	NO. REQ'D	SIZE	SPACING	LENGTH	NO. REQ'D	CU. YDS.	LBS.			

INLET WINGWALL TABLE

OVER ALL WIDTH		CLEAR HEIGHT		FOOTING THK.		WING WALL THK.		BOX SKEW (DEG.)		SLOPE		HDWL LENGTH		HEEL		WALL HEIGHT		WINGWALL ANGLE (DEGREE)		FOOTING WIDTH AT WALL END		WIDTH OF WING FOOTINGS AT HDWL		FOOTING DIMENSION PARALLEL WITH HDWL		LENGTH OF WINGWALLS		LENGTH OF FOOTING HEEL		CLASS "S" CONCRETE		REINFORCING STEEL	
OW	H	WB	CW	SK	SL	K	HL	WH1	WH2	AF1	AF2	WF	WF1	WF2	G1	G2	W1	W2	W3	W4	CU.YD	LBS.											
33'-8"	10'-0"	0'-11"	0'-10"	0	3.1	31'-3 7/8"	2'-0"	10'-10"	3'-4"	30	30	3'-4"	5'-4 1/4"	5'-4 1/4"	2'-4"	2'-4"	25'-6"	25'-6"	28'-0 7/8"	28'-0 7/8"	21.86	1736											

MID-SECTION BAR LAP TABLE

# of Long. Laps Req'd.	SL = Section Length	REINF. STEEL QTY. PER WING (LBS)
0	< 40.0 ft	
1	>40.0 ft - 78.0 ft	
2	>78.0 ft - 116.0 ft	
3	>116.0 ft - 154.0 ft	
4	>154.0 ft - 192.0 ft	
5	>192.0 ft - 230.0 ft	
6	>230.0 ft - 268.0 ft	
7	>268.0 ft - 306.0 ft	
8	>306.0 ft - 344.0 ft	

Min. Bar Lap Length

#4	1'-9"
#5	2'-2"
#6	2'-7"
#7	3'-6"
#8	4'-7"

Bar Pin Dia. Table

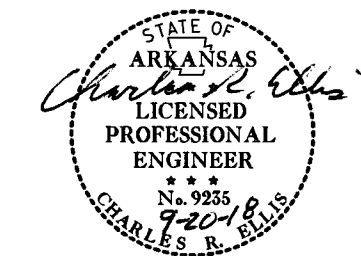
#4	3"
#5	3 3/4"
#6	4 1/2"
#7	5 1/4"
#8	6"

This drawing to be used in conjunction with SHEET 1 OF 4, "GENERAL DETAILS OF R.C. BOX CULVERT", "GENERAL NOTES & LONGITUDINAL SECTION LENGTH SCHEDULE", SHEET 3 OF 4, "GENERAL DETAILS OF R.C. BOX CULVERT", "DETAILS OF MULTI-BARREL R.C. BOX CULVERT", SHEET 4 OF 4, "GENERAL DETAILS OF R.C. BOX CULVERT", "DETAILS OF WINGWALLS", and STANDARD DRAWING RCB-2.

For additional information and outlet sections, see Sheet 2 of 2.

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.		9	51

SPECIAL DETAILS



TABULAR DATA BY: WAC DATE: 9/19/18  
CHECKED BY: EOR DATE: 9/19/18

Any Bar Lap Required for the Skewed End Section shall be considered subsidiary to the item "Reinforcing Steel - Roadway (Gr. 60)."

Design Fill Depth	Range of Actual Fill Depth
2	0.0 ft - 2.0 ft
5	>2.0 ft - 5.0 ft
10	>5.0 ft - 10.0 ft
15	>10.0 ft - 15.0 ft
20	>15.0 ft - 20.0 ft
25	>20.0 ft - 25.0 ft
30	>25.0 ft - 30.0 ft
35	>30.0 ft - 35.0 ft
40	>35.0 ft - 40.0 ft

Data shown for Mid-Section, Slope Section(s), and Skewed End Section is based on the design fill depth shown in the table, see PLAN AND PROFILE SHEETS for actual fill depth.

SHEET 1 OF 2  
DETAILS OF R.C. BOX CULVERT  
TRIPLE BARREL BOX CULVERT  
Sta. 109+19  
SPECIAL DETAILS



OUTLET SLOPE SECTIONS(S)

Table with columns for R.C. BOX SECTION (DESIGN FILL DEPTH, CLEAR SPAN, etc.), BOTTOM SLAB REINFORCING STEEL, SIDE WALL REINFORCING STEEL, INTERIOR WALL REINFORCING STEEL, TOP SLAB DISTRIBUTION, BOTTOM SLAB DISTRIBUTION, SIDE WALL DISTRIBUTION, INTERIOR WALL DISTRIBUTION, and HDWL DEPTH.

Summary table for R.C. BOX SECTION with columns for CLASS "S" CONCRETE (CU. YDS.), REINFORCING STEEL (GR. 60) (LBS.), and TOTAL values (0.31, 81).

OUTLET SKEWED END SECTION

Large table for OUTLET SKEWED END SECTION with columns for SKEW (DEGREE), SLOPE, DESIGN FILL DEPTH, CLEAR SPAN, SECTION LENGTH, TOP SLAB THK., HDWL DEPTH, BOTTOM SLAB THK., SIDE WALL THK., INTERIOR WALL THK., OVER ALL WIDTH, OVER ALL HEIGHT, and various reinforcing steel distribution parameters (a, b, c, d, e, f, g, h, i, j, k, l).

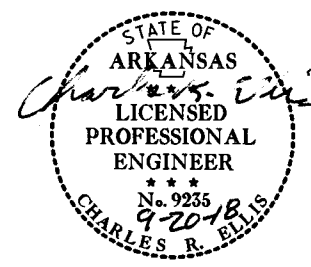
OUTLET WINGWALL TABLE

Main table for OUTLET WINGWALL TABLE with columns for OVER ALL WIDTH, CLEAR HEIGHT, FOOTING THK., WING WALL THK., BOX SKEW (DEG.), SLOPE, HDWL LENGTH, HEEL, WALL HEIGHT (AT HDWL, AT WING END), WINGWALL ANGLE (DEGREE), WINGWALL AT WING END, WIDTH OF WING FOOTINGS AT HDWL (WING A, WING B), FOOTING DIMENSION PARALLEL WITH HDWL (WING A, WING B), LENGTH OF WINGWALLS (WING A, WING B), LENGTH OF FOOTING HEEL (WING A, WING B), CLASS "S" CONCRETE, REINFORCING STEEL, and summary rows for CU. YD. and LBS.

Min. Bar Lap Length table with columns for size (#4-#8) and length (1'-9" to 4'-7").

Bar Pin Dia. Table with columns for size (#4-#8) and diameter (3" to 6").

Any Bar Lap Required for the Skewed End Section shall be considered subsidiary to the item "Reinforcing Steel - Roadway (Gr. 60)."



TABULAR DATA BY: WAC DATE: 9/19/18 CHECKED BY: EOR DATE: 9/19/18

Revision table with columns for DATE REVISED, DATE FILMED, and sheet information (JOB NO. 050325, SHEET NO. 10, TOTAL SHEETS 31).

SPECIAL DETAILS

SHEET 2 OF 2 DETAILS OF R.C. BOX CULVERT TRIPLE BARREL BOX CULVERT Sta. 109+19 SPECIAL DETAILS

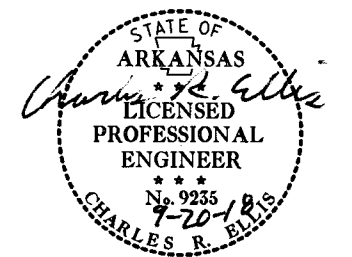
The required number of bars and lengths shown are for estimating purpose only. The actual number and length required shall be determined in field.

Unless otherwise noted, all dimensions are in inches.



DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.		11	51

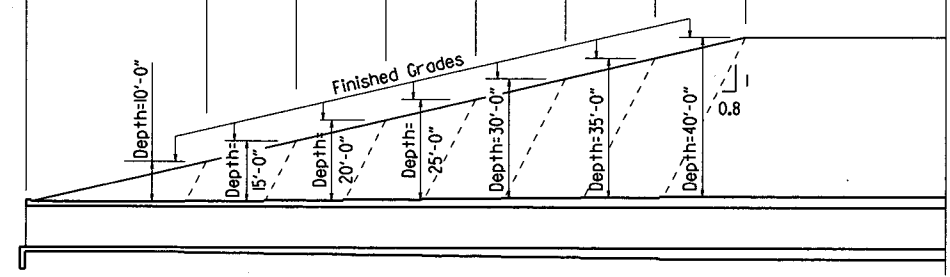
JOB NO. 050325 SPECIAL DETAILS



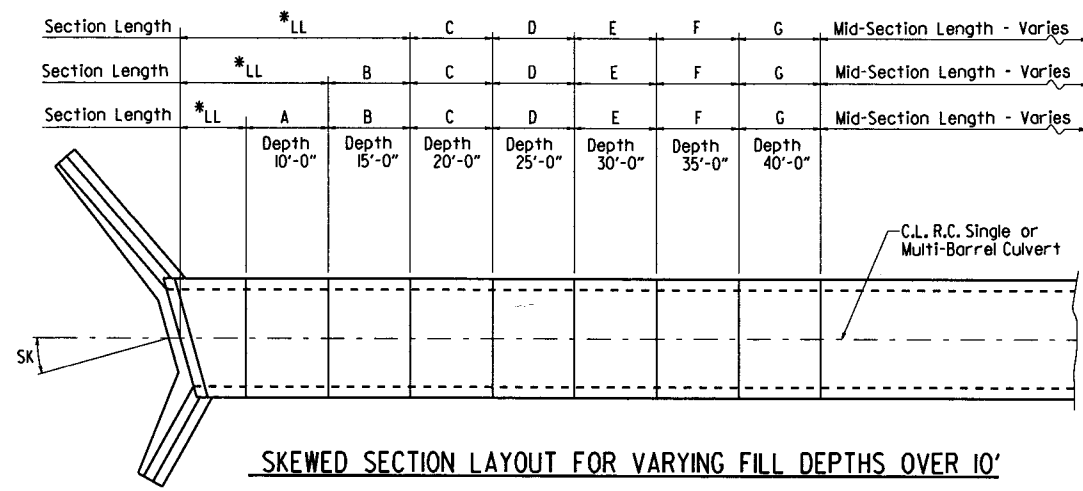
2:1 Slope	20'-0"	10'-0"	10'-0"	10'-0"	10'-0"	10'-0"	10'-0"
3:1 Slope	30'-0"	15'-0"	15'-0"	15'-0"	15'-0"	15'-0"	15'-0"
4:1 Slope	40'-0"	20'-0"	20'-0"	20'-0"	20'-0"	20'-0"	20'-0"

Note: For fill depths 10' and under, use Mid-Section full length of box culvert.

\*LL = Skewed End Section Length - See "Skewed End Section Details" Length LL varies with skew angle, overall box width and fill depth and may eliminate the need for some slope section lengths as shown.



Slope Section Length @ 2:1 Slope	A=12'-0"	B=6'-0"	C=6'-0"	D=6'-0"	E=6'-0"	F=6'-0"	G=6'-0"	Mid-Section Length - Varies
Slope Section Length @ 3:1 Slope	A=22'-0"	B=11'-0"	C=11'-0"	D=11'-0"	E=11'-0"	F=11'-0"	G=11'-0"	Mid-Section Length - Varies
Slope Section Length @ 4:1 Slope	A=32'-0"	B=16'-0"	C=16'-0"	D=16'-0"	E=16'-0"	F=16'-0"	G=16'-0"	Mid-Section Length - Varies



**LONGITUDINAL SECTION LENGTH SCHEDULE FOR VARYING FILL DEPTHS OVER 10'**  
Lengths for Non-Skewed Boxes

**GENERAL NOTES:**

**CONSTRUCTION SPECIFICATIONS:** Arkansas State Highway and Transportation Department Standard Specifications for Highway Construction (2014 edition) with applicable Supplemental Specifications and Special Provisions. Section and Subsection refer to the Standard Construction Specifications unless otherwise noted in the Plans.

**DESIGN SPECIFICATIONS:** AASHTO LRFD Bridge Design Specifications, Fifth Edition (2010) with 2010 interim revisions.

**LIVE LOADING:** HL-93

All concrete shall be Class 5 with a minimum 28-day compressive strength of 3,500 psi and shall be poured in the dry. All exposed corners to have 3/4" chamfers.

Reinforcing Steel shall be Grade 60 (yield strength = 60,000 psi) conforming to AASHTO M31 or M322, Type A, with mill test reports.

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 1/2 inch.

Excavation and backfilling shall be in accordance with the requirements of Section 801.

Membrane Waterproofing shall conform to the requirements of Section 815. Membrane Waterproofing shall be Type C and as directed by the Engineer applied to all construction joints in the top slab and the sidewalls of R.C. Box culverts and to the construction joint between wingwalls and R.C. Box culvert walls.

Weep Holes in box culvert walls shall have a maximum horizontal spacing of 10'-0" and shall be spaced to clear all reinforcing steel. The drain opening shall be 4" diameter and shall be placed 12" above the top of the bottom slab.

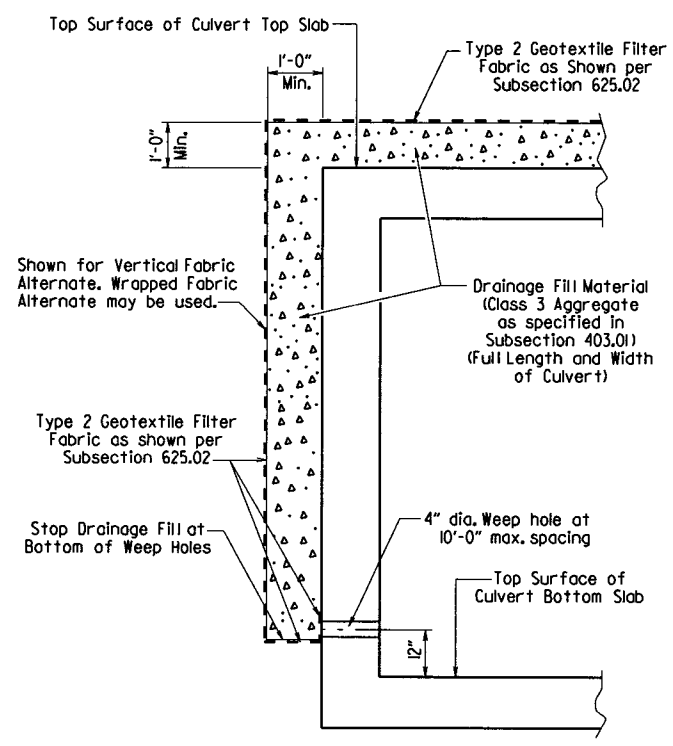
Weep Holes in wingwalls shall have a maximum horizontal spacing of 10'-0" and shall be spaced to clear all reinforcing steel. There shall be a minimum of two (2) weep holes in each wingwall. The drain opening shall be 4" diameter and shall be placed 12" above the top of the wingwall footing.

The barrel components of the culvert may be constructed using continuous pours. For longer culvert construction, the Contractor may use multiple pours with transverse construction joints spaced a minimum of 50 feet apart unless superseded by stage construction or site constraints as approved by the Engineer. Construction joints between footings and walls shall be made only where shown in the Plans. Joints shall be normal to the centerline of barrel and shall be keyed. Longitudinal reinforcing shall be continuous through joints unless shown otherwise. All longitudinal construction joints shall be submitted to the Engineer for approval.

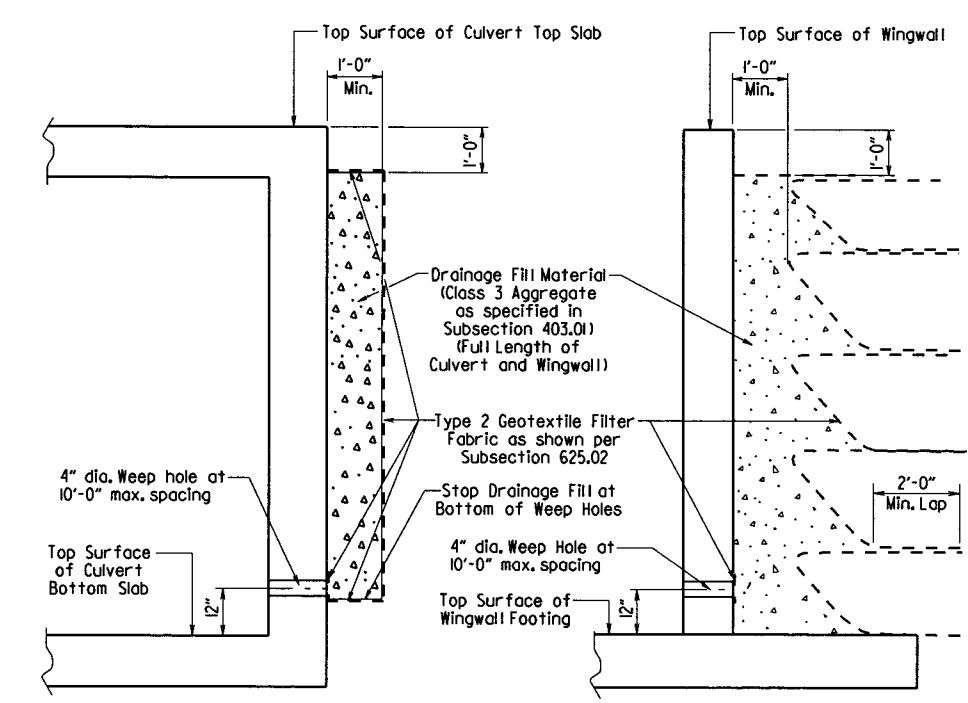
Membrane Waterproofing, Weep Holes, Geotextile Filter Fabric, and Drainage Fill Material will not be paid for directly but shall be considered subsidiary to Class 5 Concrete.

When the top slab of the box culvert serves as finished roadway surface, curing and finishing shall be in accordance with subsections 802.17 and 802.20 for bridge roadway surface and a fine finish shall be applied in accordance with subsection 802.19 for Class 5 Tined Bridge Roadway Surface Finish. Curing and finishing shall not be paid for directly, but shall be considered incidental to the item "Class 5 Concrete-Roadway". Class 1 Protective Surface Treatment shall be applied to the roadway surface and this work shall be paid for under the unit price bid for "Class 1 Protective Surface Treatment".

When precast reinforced concrete box culverts are substituted for cast in place box culverts, they shall be manufactured according to ASTM C 1577 and meet the requirements of Section 607. When the top slab of the box culvert serves as the finished roadway surface, a precast reinforced concrete box culvert substitution is not allowed.



**CULVERT DRAINAGE DETAIL FOR ROCK FILL**  
This detail shall be used when rock fill is specified for embankment construction.



**VERTICAL FABRIC ALTERNATE**  
(Shown for Culvert, Similar for Wingwall)

**WRAPPED FABRIC ALTERNATE**  
(Shown for Wingwall, Similar for Culvert)

For Details of Excavation and Pay Limits, see Standard Drawing RCB-2.

**WINGWALL & CULVERT DRAINAGE DETAIL**

SHEET 1 OF 4  
GENERAL DETAILS OF R.C. BOX CULVERT  
GENERAL NOTES &  
LONGITUDINAL SECTION LENGTH SCHEDULE  
SPECIAL DETAILS

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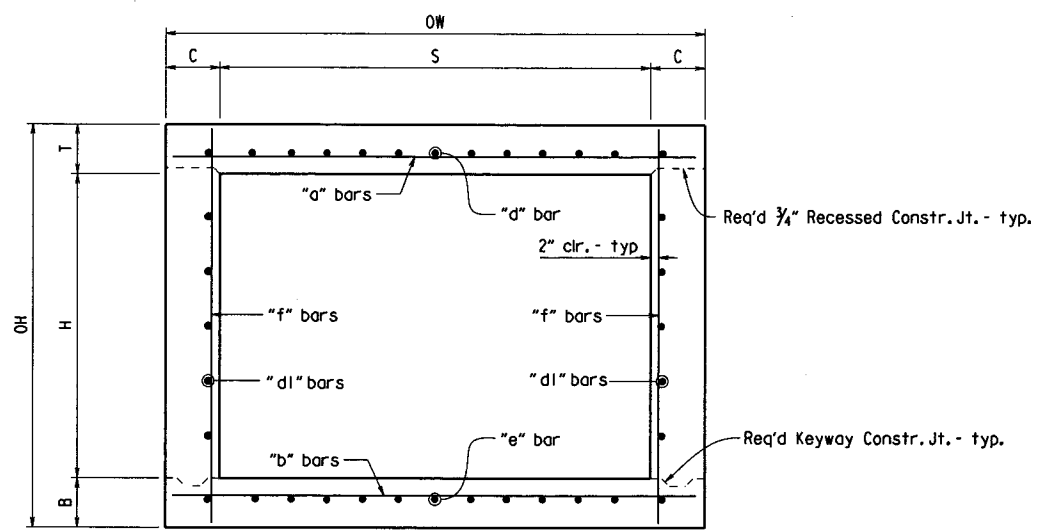


DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		050325	12	51

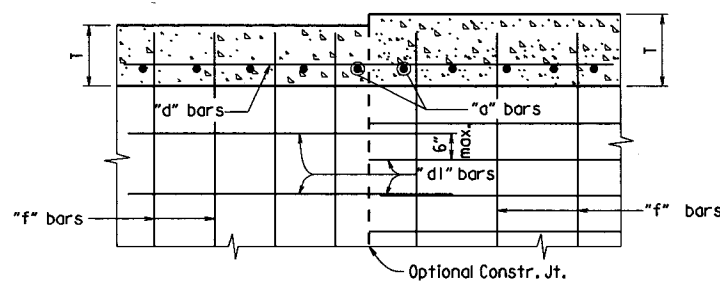
① SPECIAL DETAILS



Note: When top slab of culvert serves as finished roadway surface, see General Notes on Sheet 1 of 4.

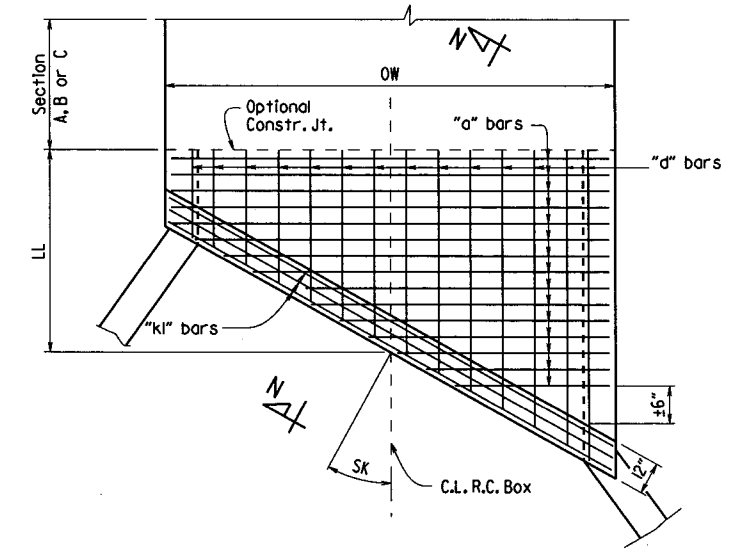


TYPICAL SECTION M-M

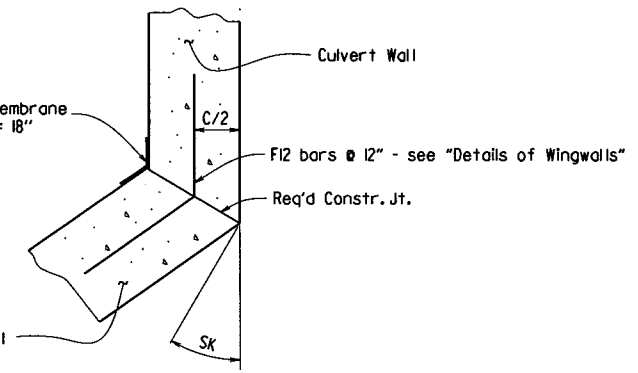


LONGITUDINAL LAP DETAIL AT CHANGE IN SECTIONS

TOP SLAB SHOWN, BOTTOM SLAB SIMILAR

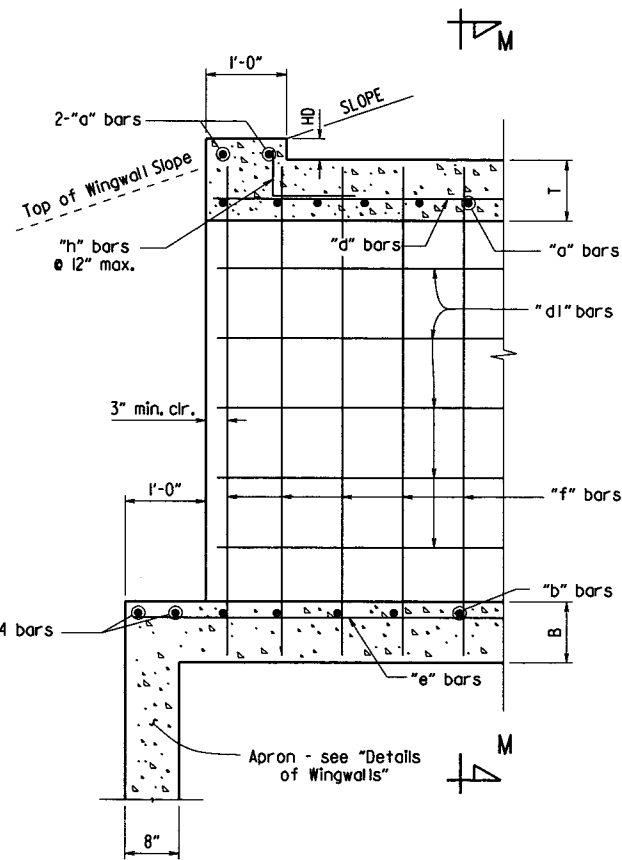


TOP SLAB REINFORCEMENT

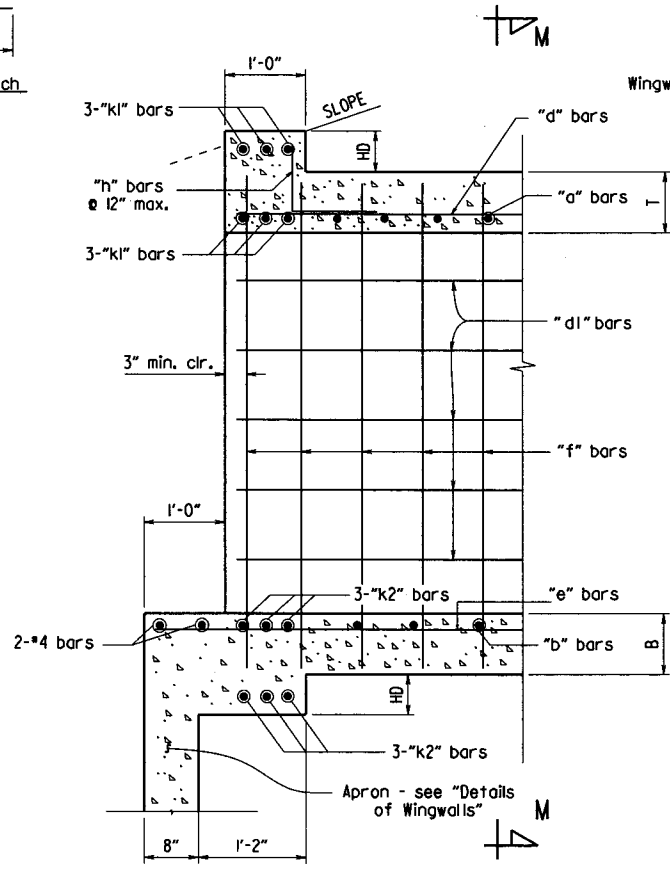
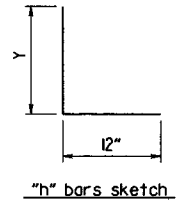


WINGWALL ATTACHMENT

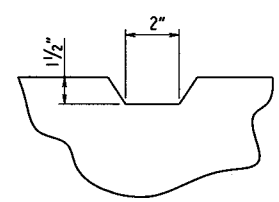
See "Details of Wingwalls" for additional information and wingwall details.



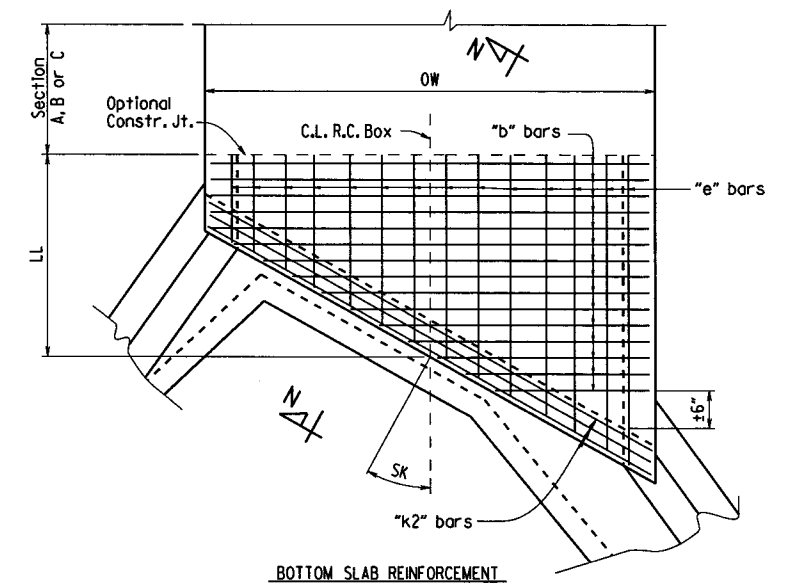
PART LONGITUDINAL SECTION  
(Non-Skewed Ends)



PART LONGITUDINAL SECTION N-N  
(Skewed Ends)



TYPICAL KEYWAY DETAIL  
(All Construction Joints)



SKewed END SECTION DETAILS

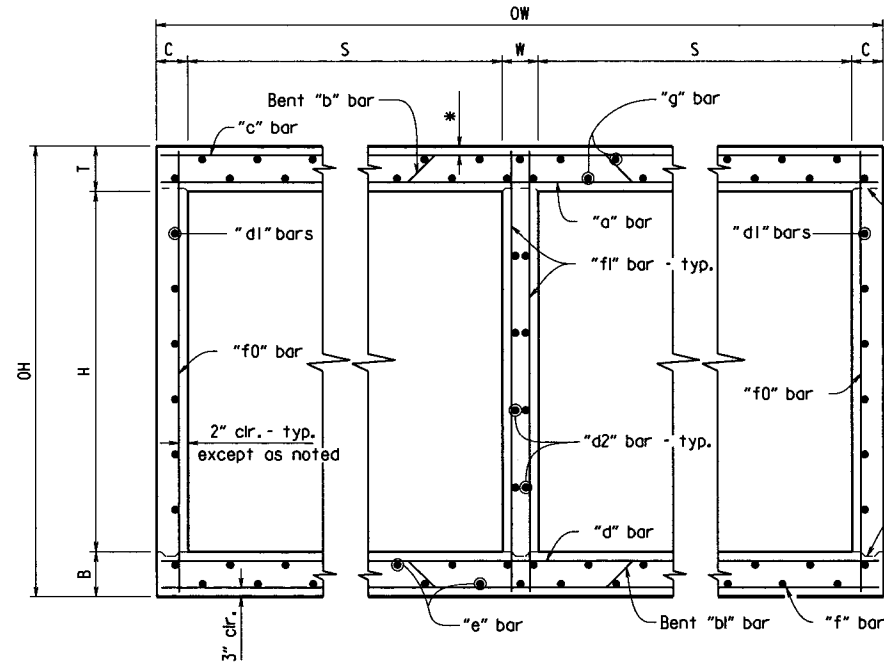
SHEET 2 OF 4  
GENERAL DETAILS OF R.C. BOX CULVERT  
DETAILS OF SINGLE BARREL  
R.C. BOX CULVERT  
SPECIAL DETAILS

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\*2" clr. for fill depth (D) greater than 2 ft.  
 2 1/2" clr. for fill depth (D) equal to or less than 2 ft.

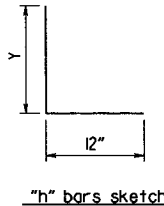
Note: When top slab of culvert serves as finished roadway surface, see General Notes on Sheet 1 of 4.



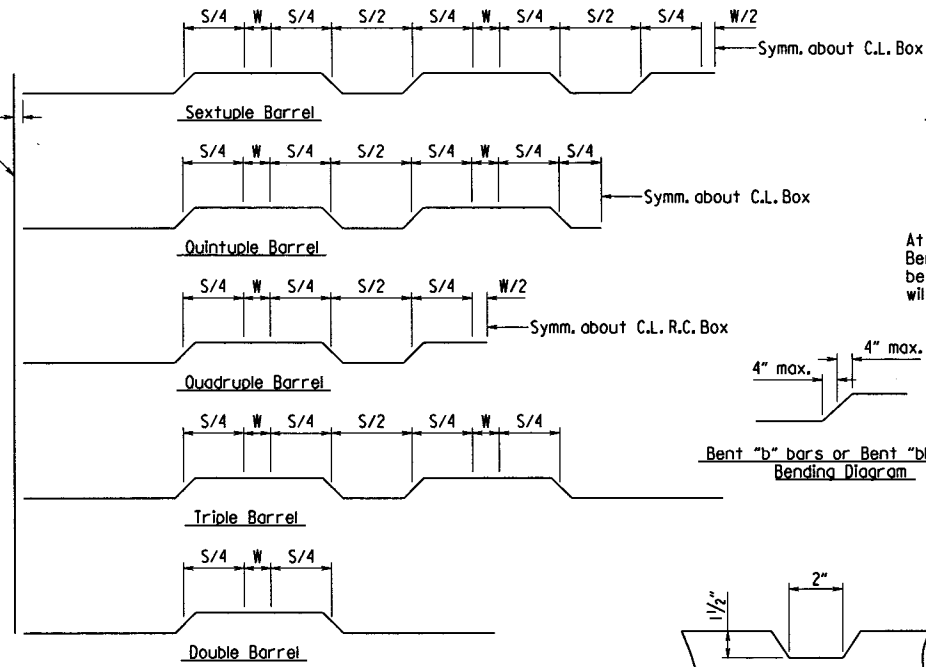
TYPICAL SECTION M-M

Top Slab  
 Straight "c" bars shall alternate with Bent "b" bars in top.  
 Straight "a" bars shall alternate with Bent "b" bars in bottom.

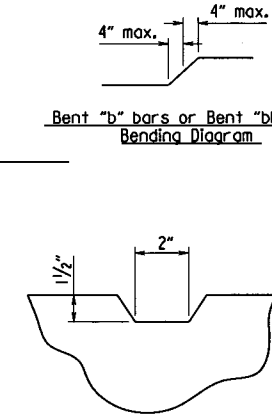
Bottom Slab  
 Straight "d" bars shall alternate with Bent "bl" bars in top.  
 Straight "f" bars shall alternate with Bent "bl" bars in bottom.



"h" bars sketch



Bent "b" bars or Bent "bl" bars sketch

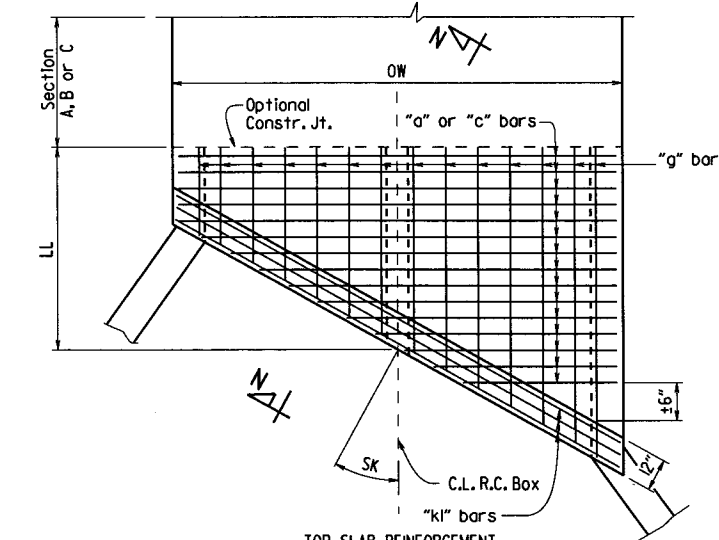
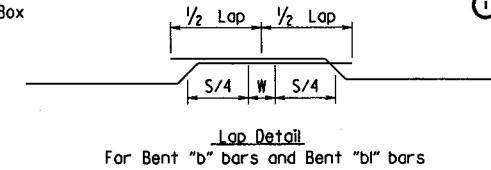


TYPICAL KEYWAY DETAIL  
 (All Construction Joints)

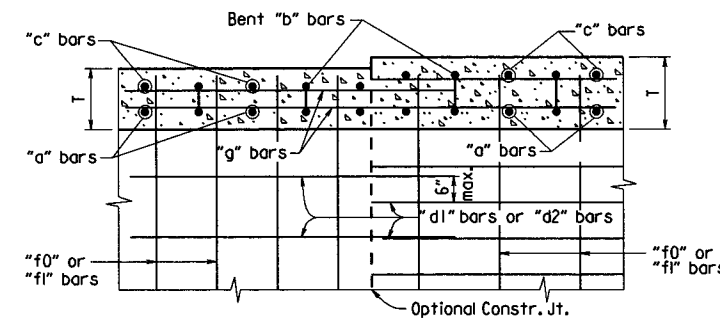
DATE REVISED	DATE FILMED	REVISED	DATE FILMED	FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.	050325	13	51	



At the Contractor's option in lieu of providing Bent "b" or Bent "bl" bars, one bar top and bottom of equivalent size may be substituted for each bent bar. Payment for the reinforcing will be based on the weight of the "b" or "bl" bar.

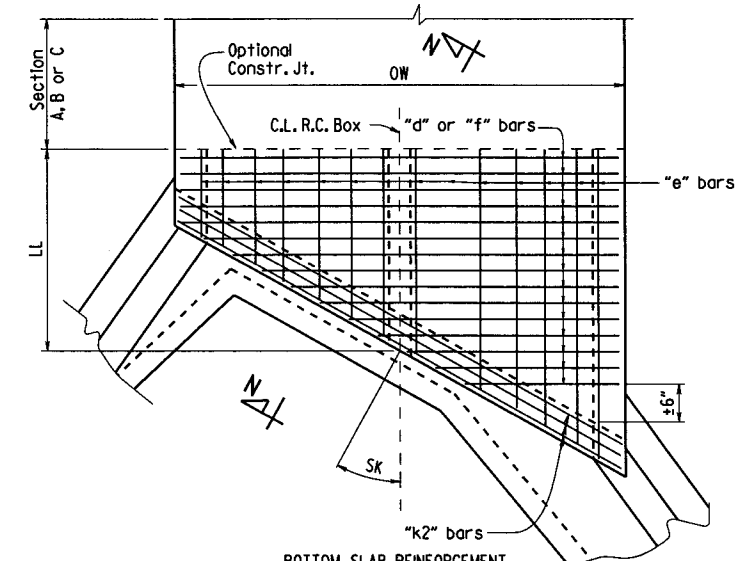


TOP SLAB REINFORCEMENT  
 Straight "c" bars in top.  
 Straight "a" bars in bottom.



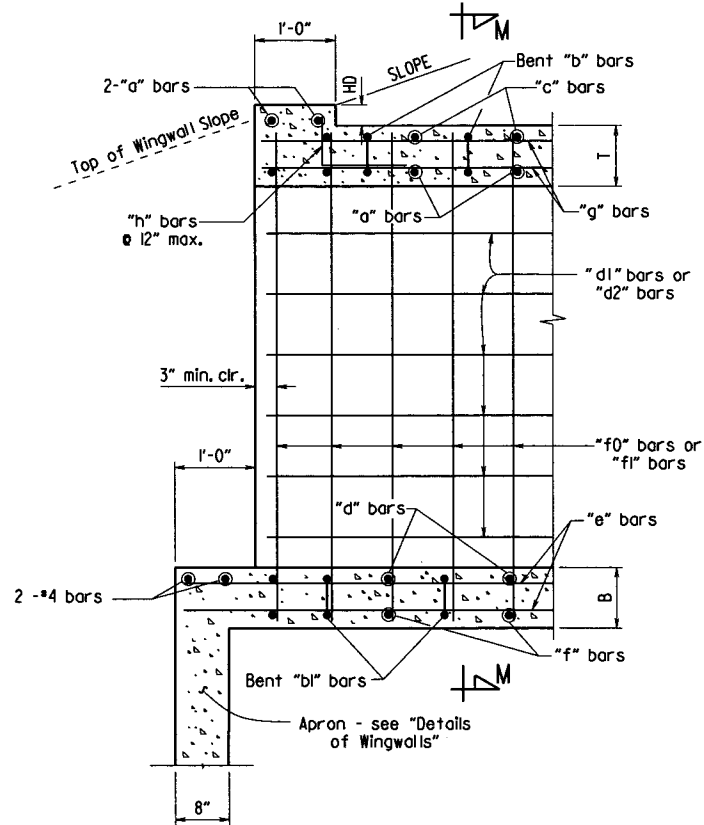
LONGITUDINAL LAP DETAIL AT CHANGE IN SECTIONS  
 TOP SLAB SHOWN, BOTTOM SLAB SIMILAR

Longitudinal Bar Spacing at individual sections shall be maintained, which may result in noncontact bar laps.

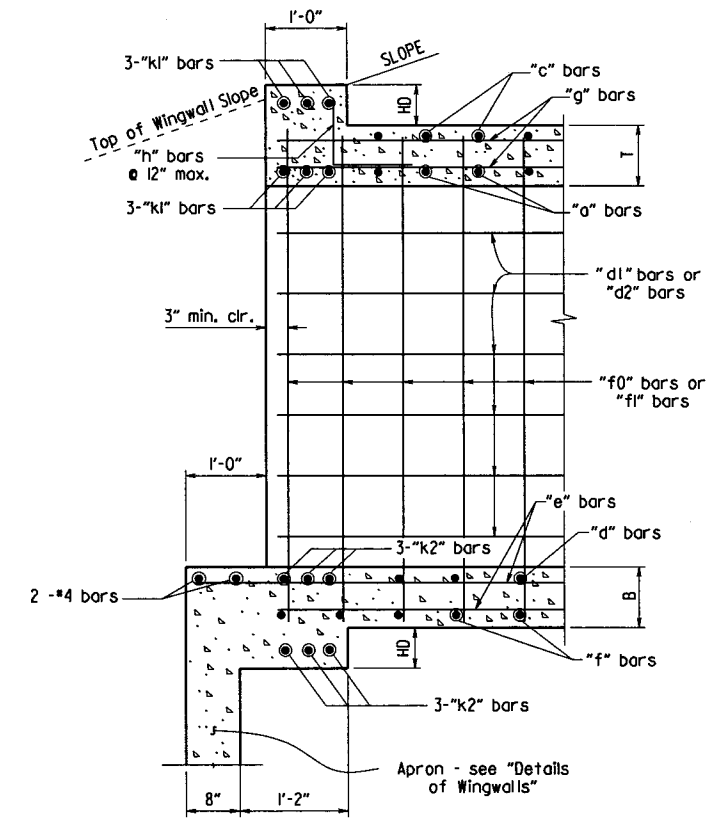


BOTTOM SLAB REINFORCEMENT  
 Straight "d" bars in top.  
 Straight "f" bars in bottom.

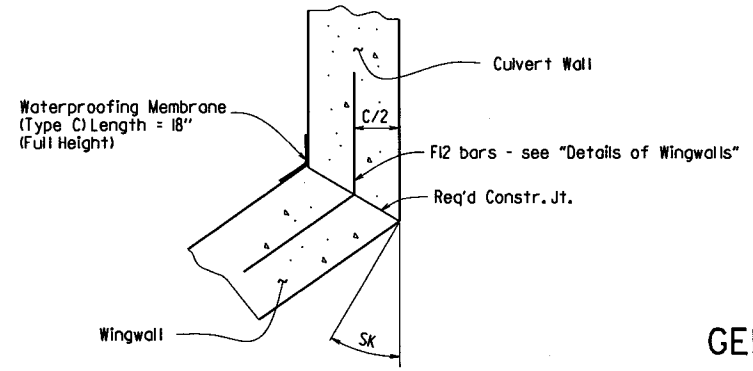
SKEWED END SECTION DETAILS



PART LONGITUDINAL SECTION  
 (Non-Skewed Ends)



PART LONGITUDINAL SECTION N-N  
 (Skewed Ends)



WINGWALL ATTACHMENT  
 See "Details of Wingwalls" for additional information and wingwall details.

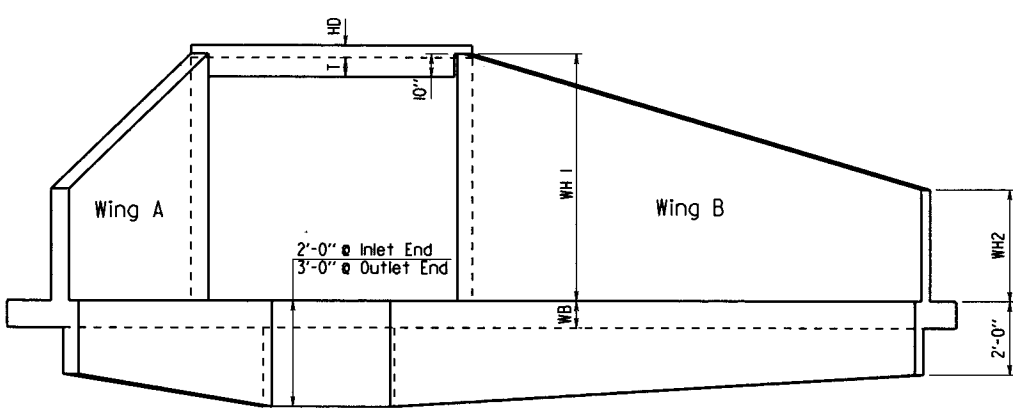
SHEET 3 OF 4  
 GENERAL DETAILS OF R.C. BOX CULVERT  
 DETAILS OF MULTI-BARREL  
 R.C. BOX CULVERT  
 SPECIAL DETAILS

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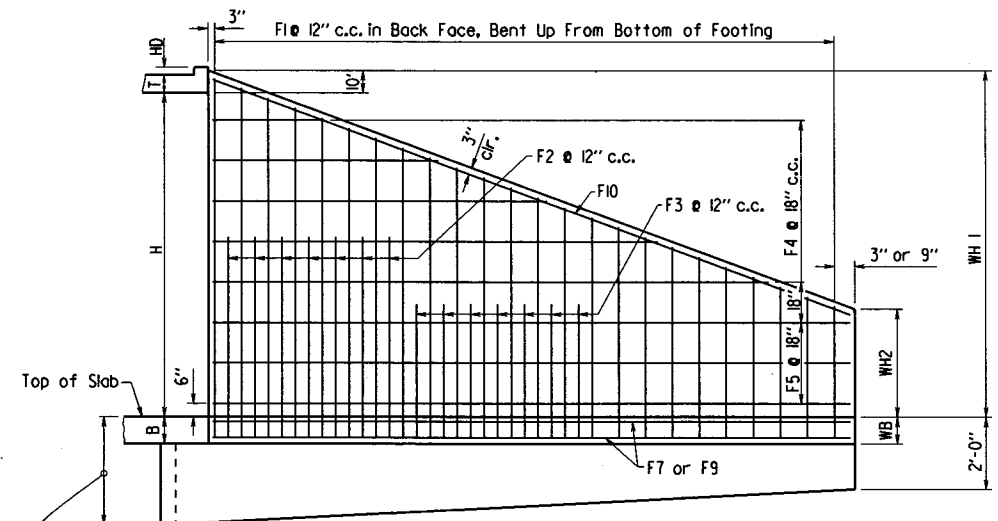
DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
JOB NO. 050325							14	51



SPECIAL DETAILS

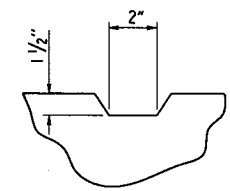


**END ELEVATION**  
Flared Wingwalls Shown

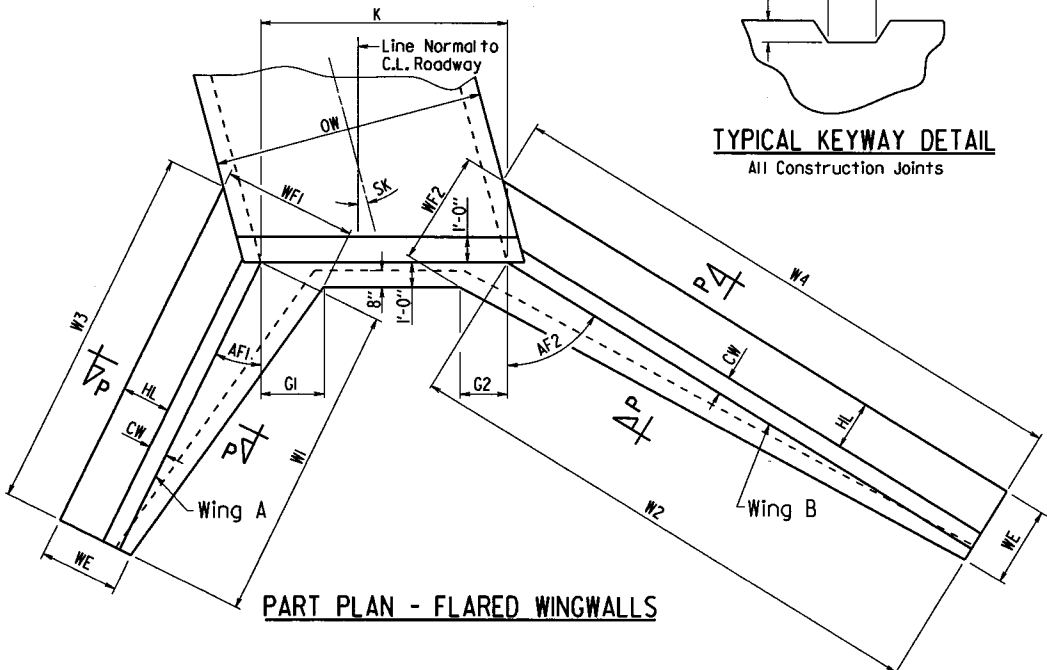


**WINGWALL ELEVATION**  
Showing Back Face Reinforcement

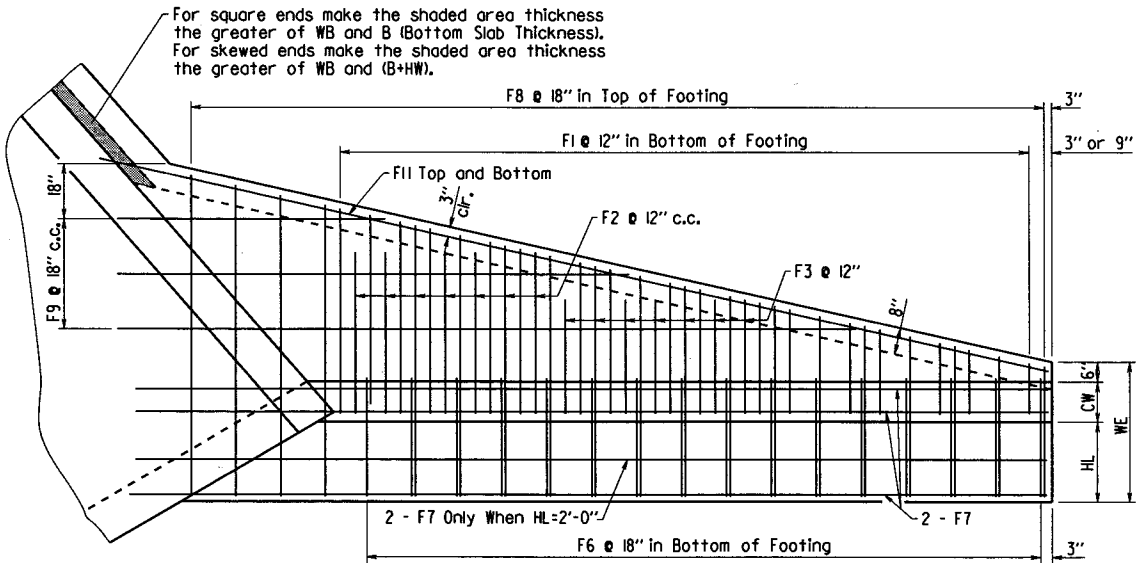
Note: See "Wingwall Section P-P" for additional details and reinforcing.



**TYPICAL KEYWAY DETAIL**  
All Construction Joints

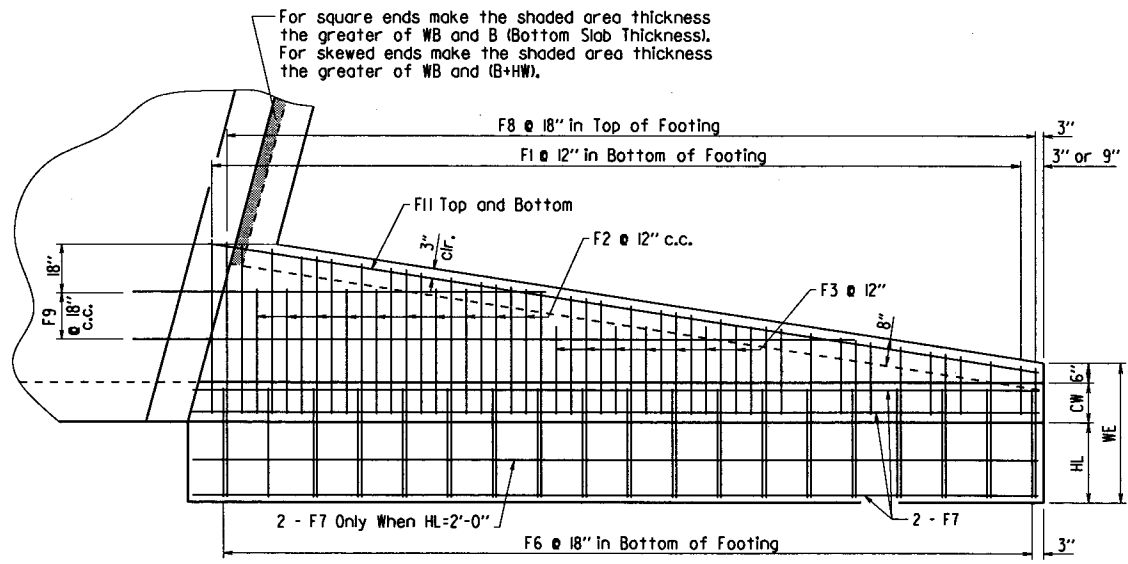


**PART PLAN - FLARED WINGWALLS**

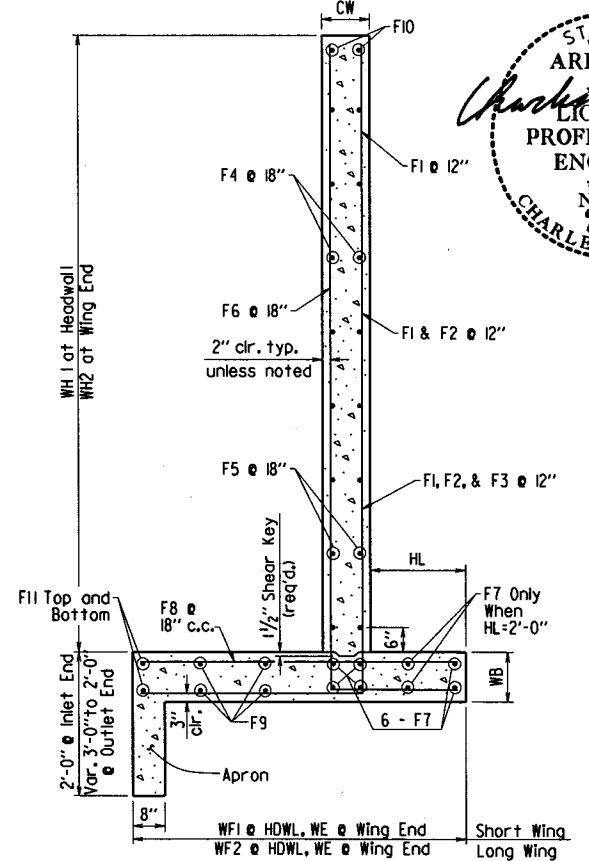


**PLAN - FLARED WINGWALLS**  
Showing Footing Reinforcement

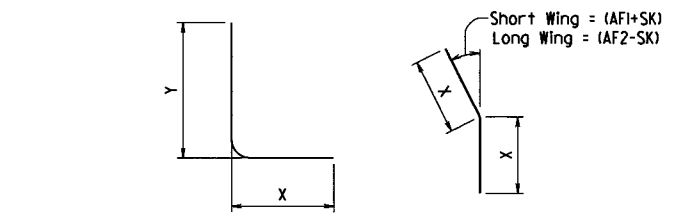
For square ends make the shaded area thickness the greater of WB and B (Bottom Slab Thickness). For skewed ends make the shaded area thickness the greater of WB and (B+HW).



**PLAN - PARALLEL WINGWALLS**  
Showing Footing Reinforcement

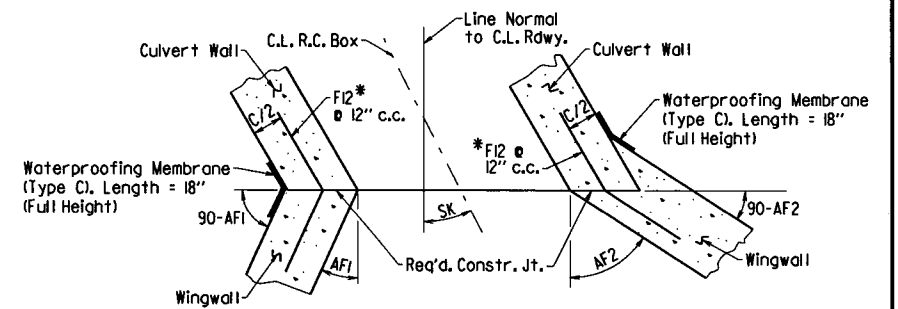


**WINGWALL SECTION P-P**



**F1, F2, F3, & F6 BARS**      **\*F12 BAR**

\*F12 is a straight bar for parallel wingwalls



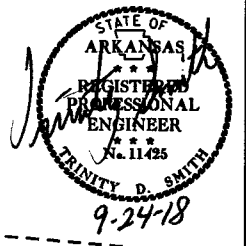
**CONSTRUCTION JOINTS**  
Flared Wingwalls Shown

SHEET 4 OF 4  
GENERAL DETAILS OF R.C. BOX CULVERT  
DETAILS OF WINGWALLS  
SPECIAL DETAILS

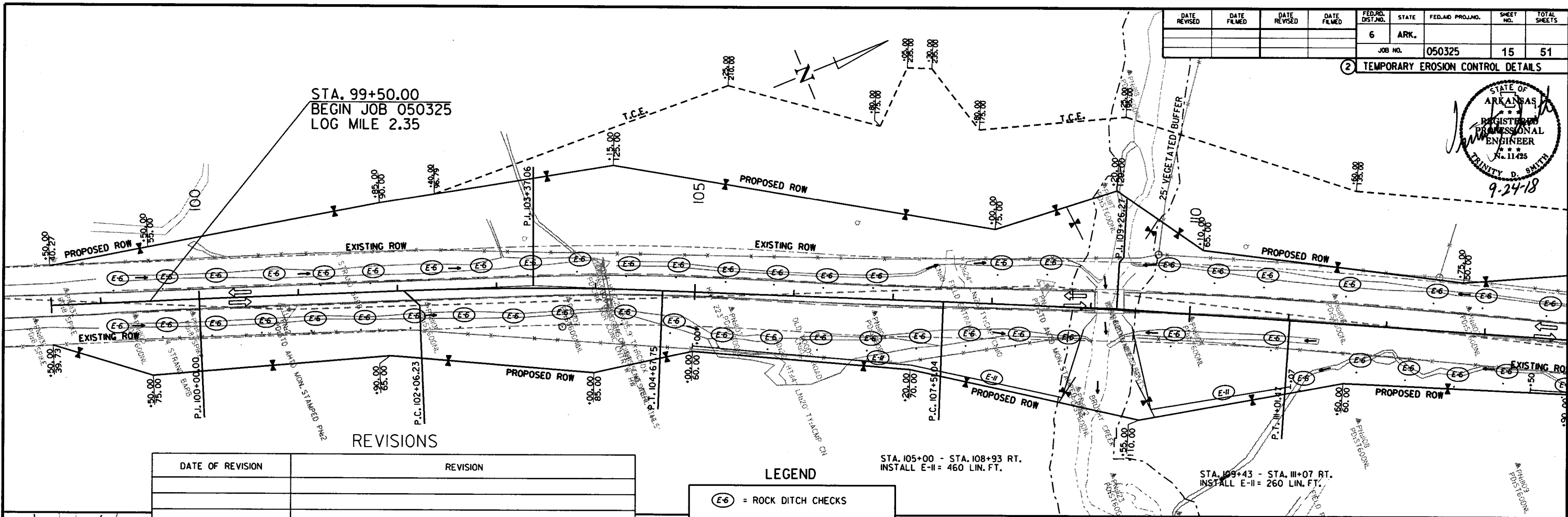
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DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED. RD. DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.		15	51

2 TEMPORARY EROSION CONTROL DETAILS



STA. 99+50.00  
BEGIN JOB 050325  
LOG MILE 2.35



DATE OF REVISION	REVISION

**LEGEND**

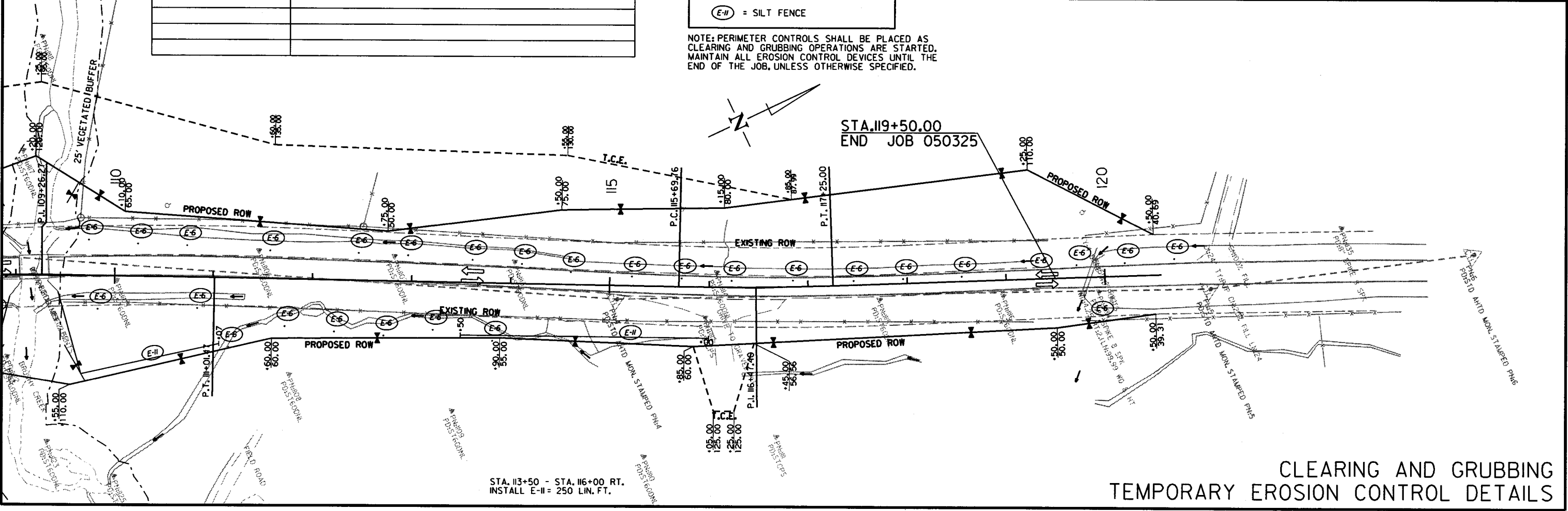
(E-6) = ROCK DITCH CHECKS

(E-II) = SILT FENCE

NOTE: PERIMETER CONTROLS SHALL BE PLACED AS CLEARING AND GRUBBING OPERATIONS ARE STARTED. MAINTAIN ALL EROSION CONTROL DEVICES UNTIL THE END OF THE JOB, UNLESS OTHERWISE SPECIFIED.

STA. 105+00 - STA. 108+93 RT.  
INSTALL E-II = 460 LIN. FT.

STA. 109+43 - STA. 110+07 RT.  
INSTALL E-II = 260 LIN. FT.



STA. 113+50 - STA. 116+00 RT.  
INSTALL E-II = 250 LIN. FT.

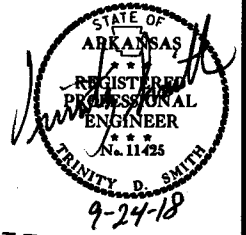
CLEARING AND GRUBBING  
TEMPORARY EROSION CONTROL DETAILS

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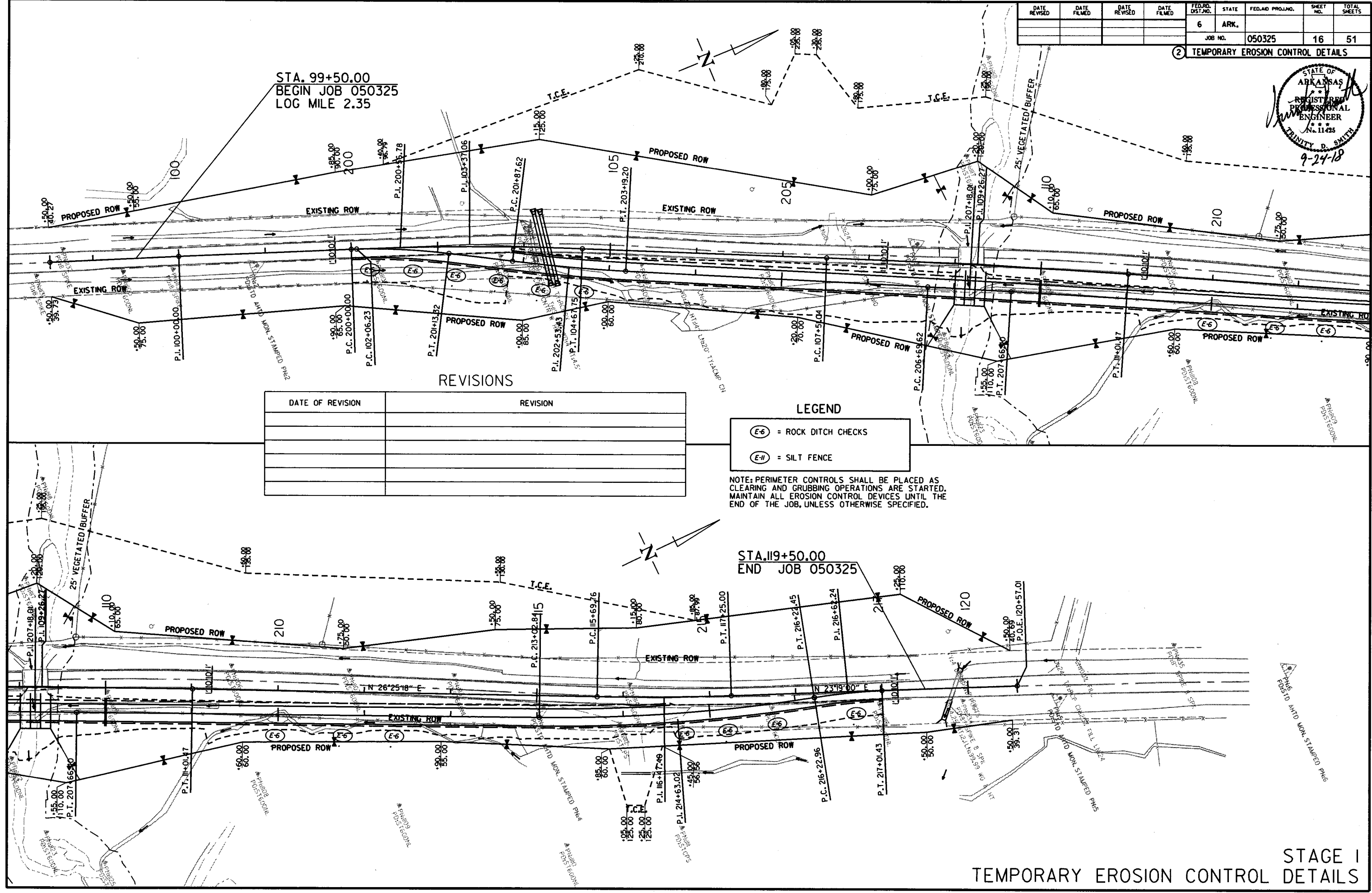
DATE REVISED	DATE FILED	DATE REVISED	DATE FILED	FED. DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.		16	51

2 TEMPORARY EROSION CONTROL DETAILS



STA. 99+50.00  
BEGIN JOB 050325  
LOG MILE 2.35

STA. 119+50.00  
END JOB 050325



DATE OF REVISION	REVISION

**LEGEND**

- (E-6) = ROCK DITCH CHECKS
- (E-11) = SILT FENCE

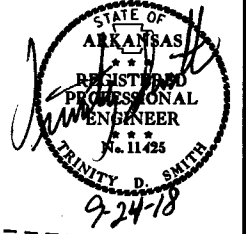
NOTE: PERIMETER CONTROLS SHALL BE PLACED AS CLEARING AND GRUBBING OPERATIONS ARE STARTED. MAINTAIN ALL EROSION CONTROL DEVICES UNTIL THE END OF THE JOB, UNLESS OTHERWISE SPECIFIED.

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STAGE I  
TEMPORARY EROSION CONTROL DETAILS

DATE REVISED	DATE FILED	DATE REVISED	DATE FILED	FED. RD. DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.		17	51

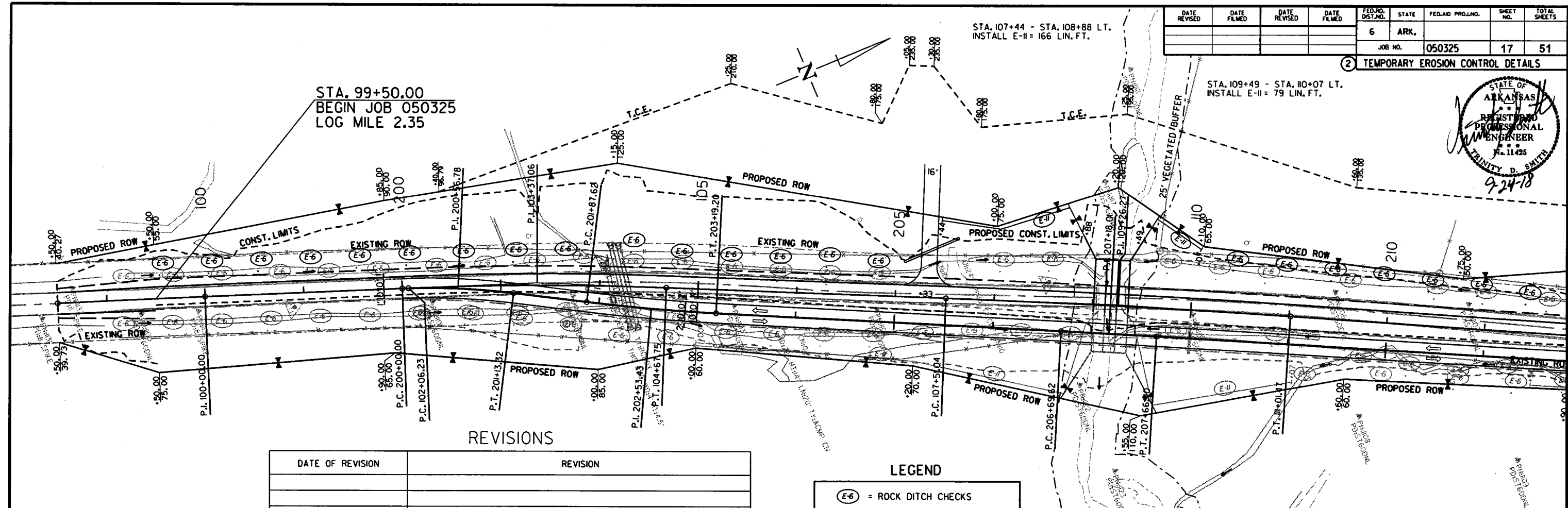
2 TEMPORARY EROSION CONTROL DETAILS



STA. 99+50.00  
BEGIN JOB 050325  
LOG MILE 2.35

STA. 107+44 - STA. 108+88 LT.  
INSTALL E-II = 166 LIN. FT.

STA. 109+49 - STA. 110+07 LT.  
INSTALL E-II = 79 LIN. FT.



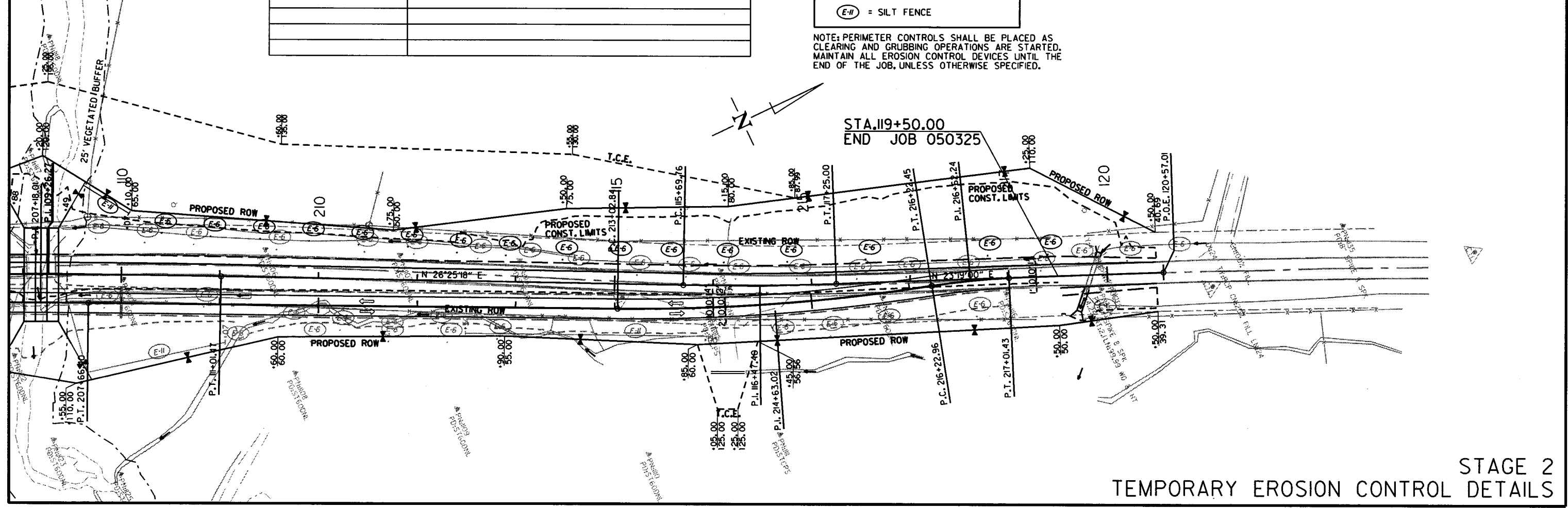
REVISIONS

DATE OF REVISION	REVISION

LEGEND

- (E-6) = ROCK DITCH CHECKS
- (E-II) = SILT FENCE

NOTE: PERIMETER CONTROLS SHALL BE PLACED AS CLEARING AND GRUBBING OPERATIONS ARE STARTED. MAINTAIN ALL EROSION CONTROL DEVICES UNTIL THE END OF THE JOB, UNLESS OTHERWISE SPECIFIED.



STA. 119+50.00  
END JOB 050325

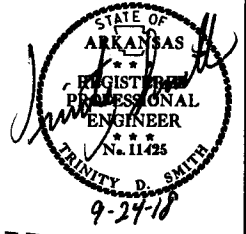
9/21/2018

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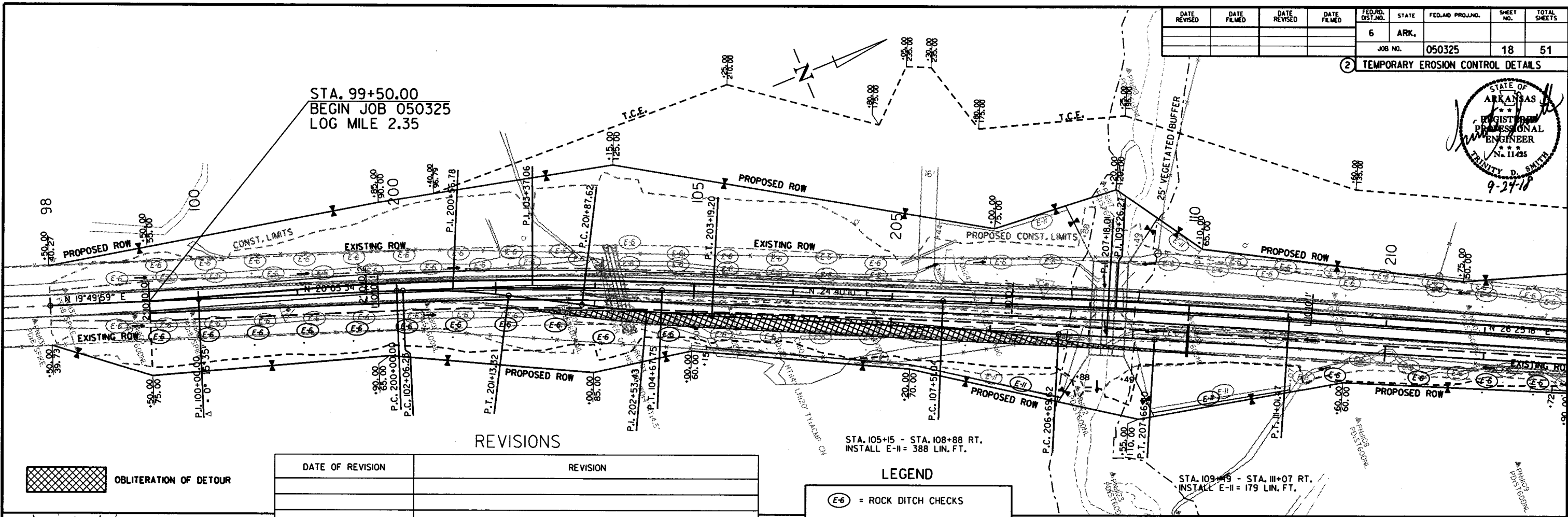


DATE REVISED	DATE FILED	DATE REVISED	DATE FILED	FED. RD. DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.		18	51

2 TEMPORARY EROSION CONTROL DETAILS



STA. 99+50.00  
BEGIN JOB 050325  
LOG MILE 2.35



REVISIONS

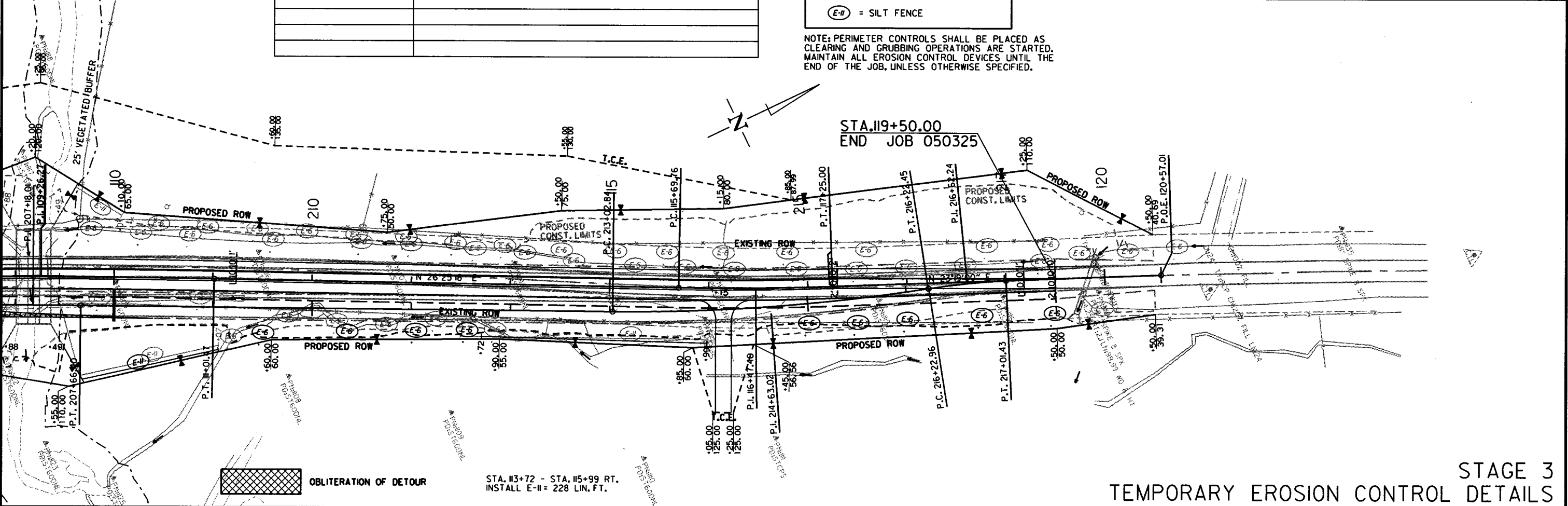
DATE OF REVISION	REVISION

LEGEND

- (E-6) = ROCK DITCH CHECKS
- (E-II) = SILT FENCE

NOTE: PERIMETER CONTROLS SHALL BE PLACED AS CLEARING AND GRUBBING OPERATIONS ARE STARTED. MAINTAIN ALL EROSION CONTROL DEVICES UNTIL THE END OF THE JOB, UNLESS OTHERWISE SPECIFIED.

STA. 109+50.00  
END JOB 050325



OBLITERATION OF DETOUR

STA. 113+72 - STA. 115+99 RT.  
INSTALL E-II = 228 LIN. FT.

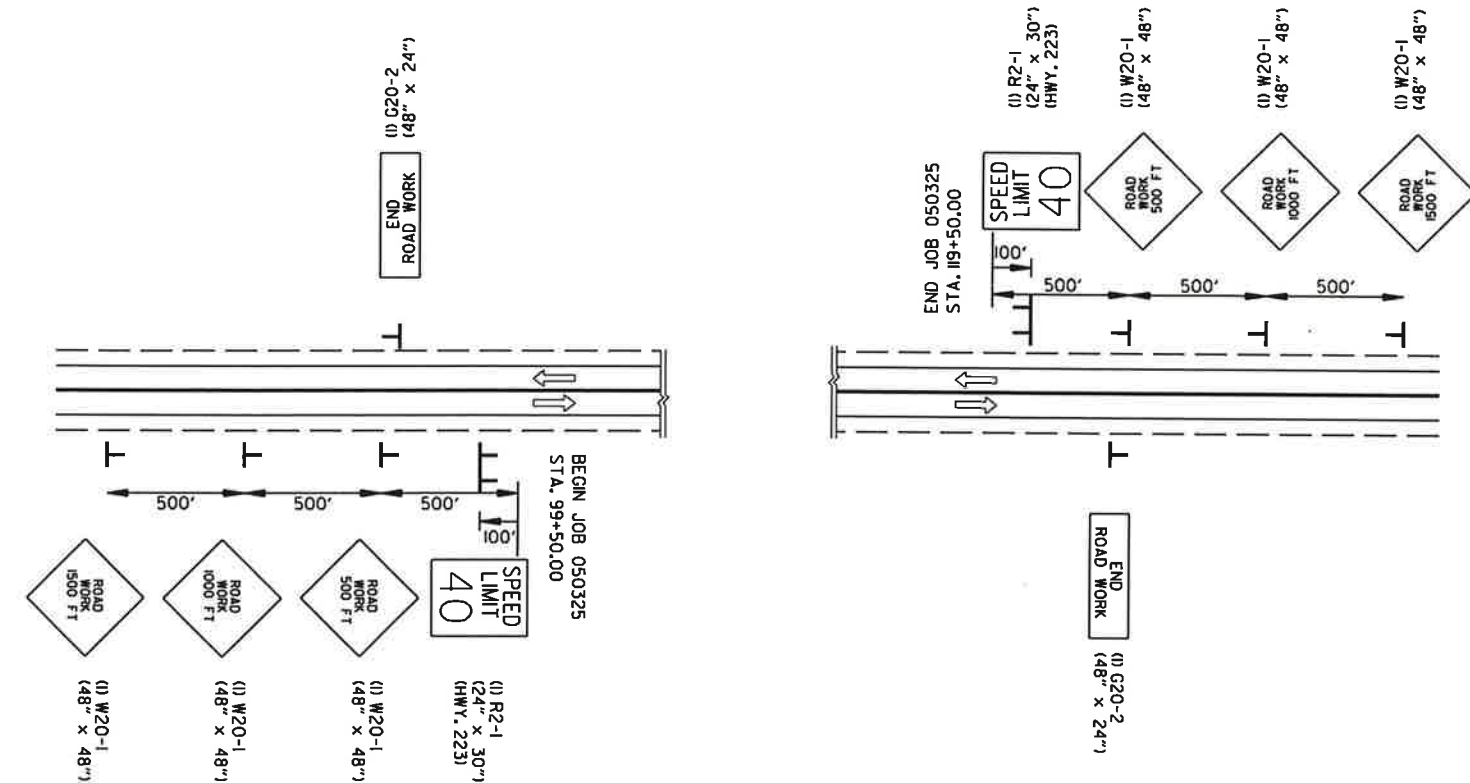
STAGE 3  
TEMPORARY EROSION CONTROL DETAILS

9/21/2018

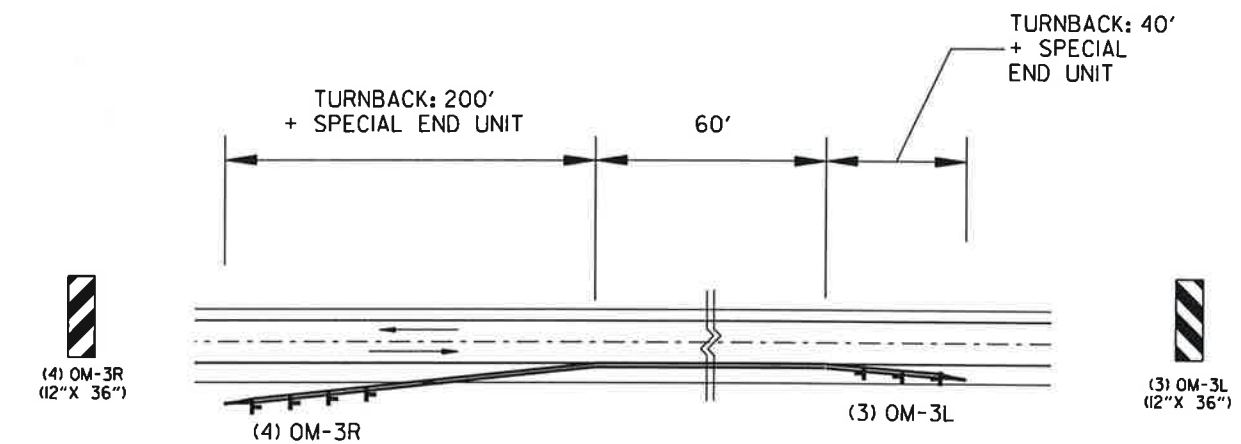
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DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED. DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
09-28-18				6	ARK.			
JOB NO. 050325							19	51

② MAINTENANCE OF TRAFFIC DETAILS



ADVANCE WARNING (ALL STAGES)



REFER ALSO TO STANDARD DRAWING TC-5 FOR DETAILS OF PLACEMENT OF PCB TURNBACKS.

NOTE: OM-3L & OM-3R SIGNS SHALL BE EQUALLY SPACED ALONG P.C.C.B. TURNBACK.

DETAIL OF BARRIER WALL FOR EXTENSION OF R.C. BOX CULVERT

STAGE 1 CONSTRUCTION SEQUENCE

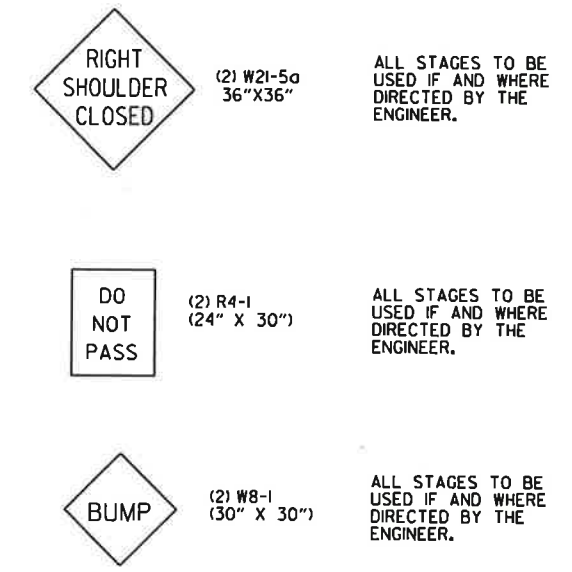
- INSTALL ADVANCE WARNING SIGNS AND INSTALL TEMPORARY PRECAST CONCRETE BARRIER AS SHOWN. USE TRAFFIC DRUMS TO DELINEATE THE WORK ZONE AND NECESSARY DRIVEWAYS.
- CONSTRUCT DBL. 36" X 23" X 94' ARCH PIPE AT STA. 104+25.
- CONSTRUCT EXTENSION FOR BOX AT STA. 119+84.
- CONSTRUCT 4' OF THE PROPOSED BOX AT STA. 109+19 WITH WINGWALLS AS SHOWN.
- CONSTRUCT DETOUR FROM STA. 200+00.00 TO STA. 217+01.43 AS SHOWN IN THE STAGE 1 MAINTENANCE OF TRAFFIC DETAILS.

STAGE 2 CONSTRUCTION SEQUENCE

- INSTALL PRECAST BARRIER, STRIPING, AND TRAFFIC DRUMS AS SHOWN IN THE STAGE 2 MAINTENANCE OF TRAFFIC DETAILS. SHIFT TRAFFIC ONTO THE DETOUR.
- REMOVE EXISTING BRIDGE STRUCTURE AND FINISH CONSTRUCTION OF PROPOSED BOX AT STA. 109+19.
- CONSTRUCT PROPOSED ROADWAY THROUGH THE FIRST LAYER OF SURFACE COURSE AND MAINTAIN TRAFFIC AS SHOWN IN METHOD OF STAGE CONSTRUCTION. USE LEVELING AND METHOD OF RAISING GRADE TO MAINTAIN TRAFFIC FOR THE FOLLOWING STATION RANGES:  
 STA. 99+50.00 TO STA. 106+00.00  
 STA. 116+50.00 TO STA. 119+50.00

STAGE 3 CONSTRUCTION SEQUENCE

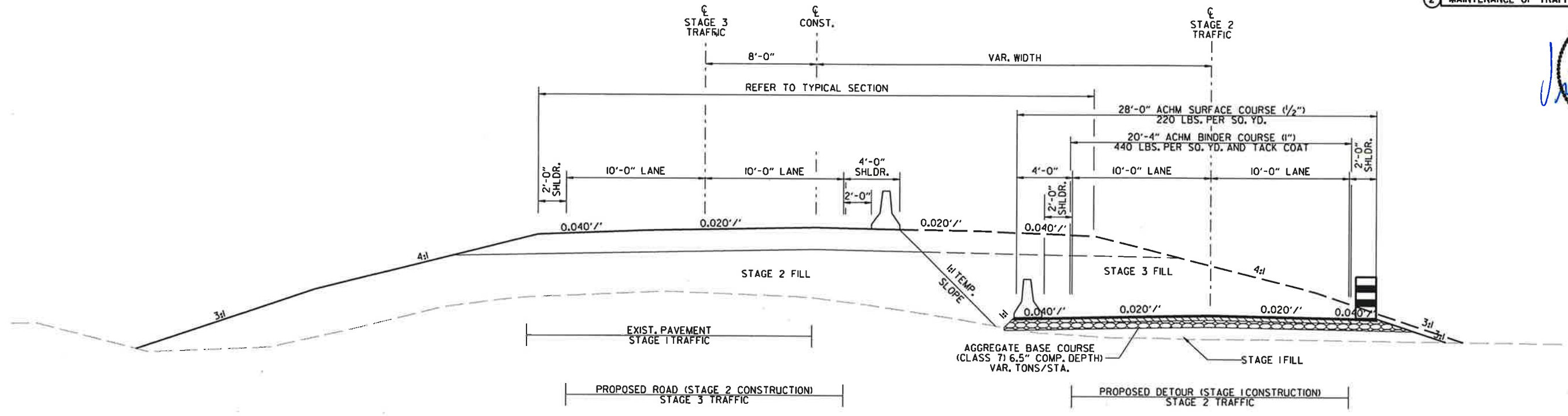
- MAINTAIN ADVANCE WARNING SIGNS. INSTALL PRECAST CONCRETE BARRIER, TRAFFIC DRUMS, AND STRIPING AS SHOWN IN THE STAGE 3 MAINTENANCE OF TRAFFIC DETAILS. SHIFT TRAFFIC ONTO THE PROPOSED ROADWAY CONSTRUCTED IN STAGE 2 AND MAINTAIN AS SHOWN ON METHOD OF STAGE CONSTRUCTION.
- CONSTRUCT REMAINDER OF PROPOSED ROADWAY THROUGH THE FIRST LAYER OF SURFACE COURSE AND FINISH ANY NECESSARY SLOPES. OBLITERATE THE DETOUR IN AREAS WHERE EXPOSED BEYOND THE FINAL SLOPES.
- INSTALL CONCRETE DITCH PAVING. PLACE THE FINAL 2" LIFT OF ACHM SURFACE COURSE. INSTALL PERMANENT PAVEMENT MARKINGS.



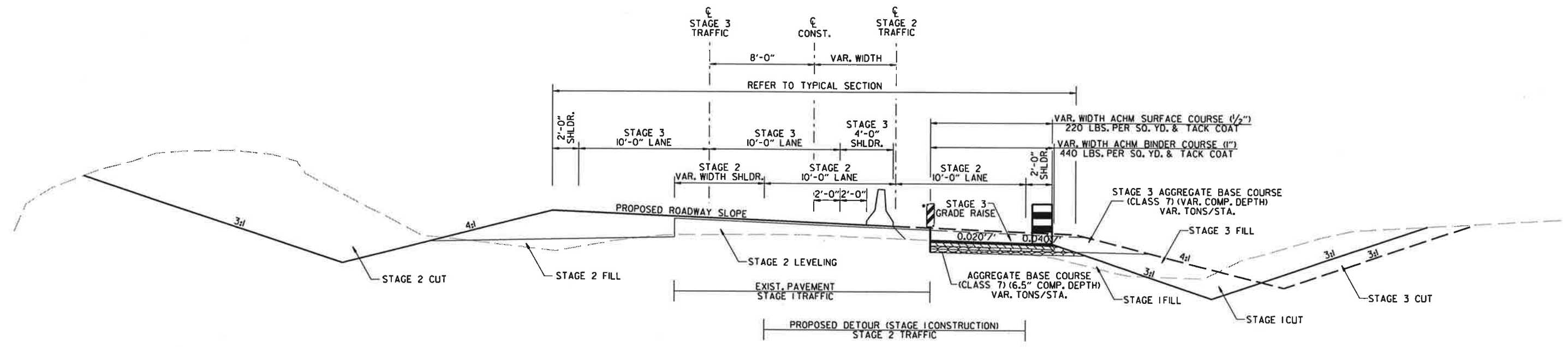
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DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED. RD. DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
09-28-18				6	ARK.			
						JOB NO. 050325	20	51

2 MAINTENANCE OF TRAFFIC DETAILS



METHOD OF STAGE CONSTRUCTION  
STA. 203+00.00 - STA. 214+00.00



METHOD OF STAGE CONSTRUCTION  
STA. 200+00.00 - STA. 203+00.00  
STA. 214+00.00 - STA. 215+20.00

\*VERTICAL PANELS TO BE USED IN STAGE ONE FOR NOTCH AND WIDEN CONSTRUCTION OF DETOUR.

MAINTENANCE OF TRAFFIC DETAILS

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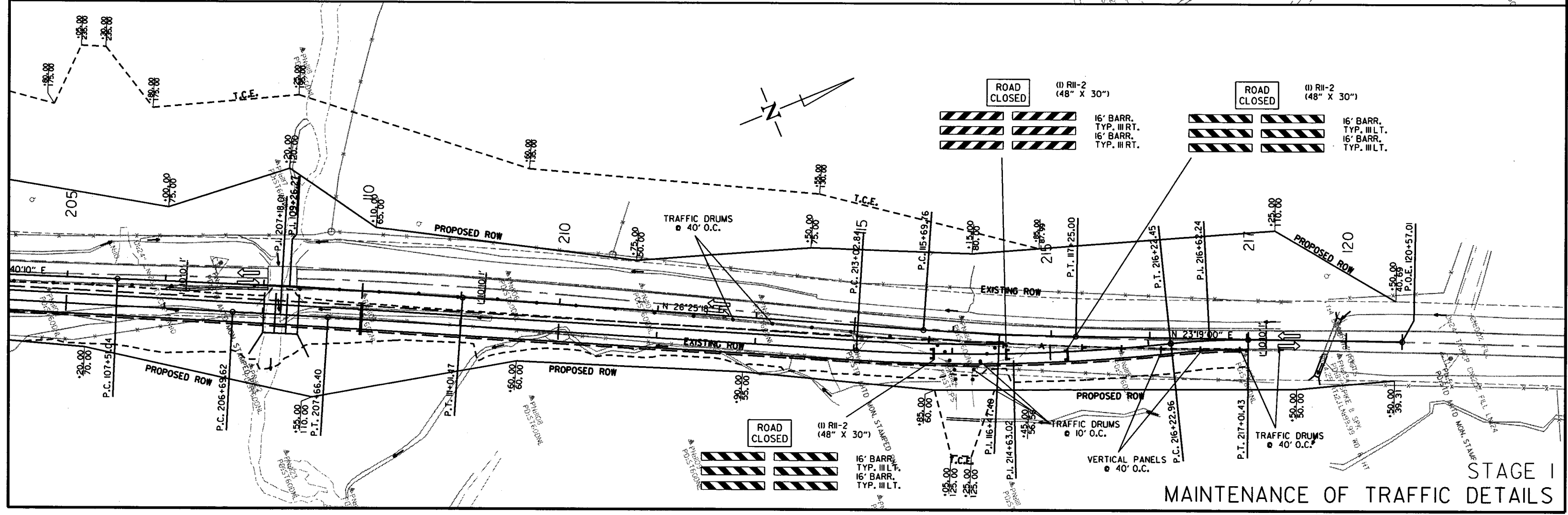
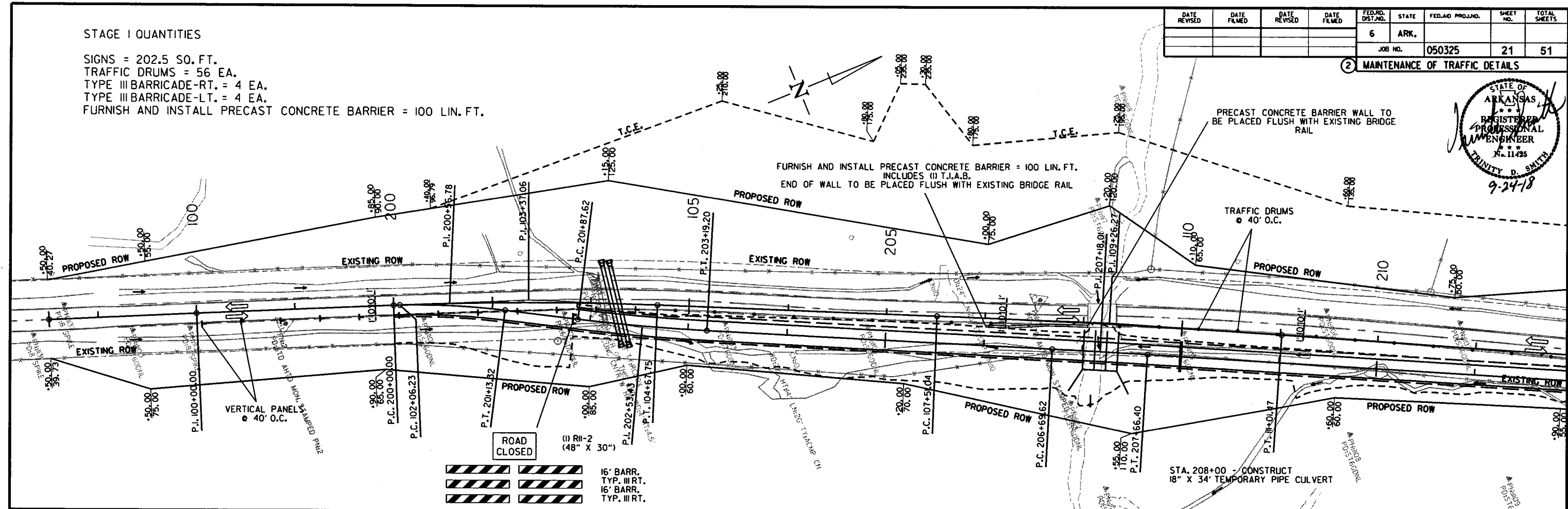
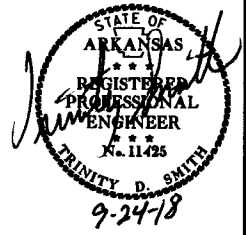


STAGE I QUANTITIES

SIGNS = 202.5 SQ. FT.  
 TRAFFIC DRUMS = 56 EA.  
 TYPE III BARRICADE-RT. = 4 EA.  
 TYPE III BARRICADE-LT. = 4 EA.  
 FURNISH AND INSTALL PRECAST CONCRETE BARRIER = 100 LIN. FT.

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				6	ARK.		21	51

2 MAINTENANCE OF TRAFFIC DETAILS



STAGE I MAINTENANCE OF TRAFFIC DETAILS

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STAGE 2 QUANTITIES

SIGNS = 198.5 SQ. FT.  
 TRAFFIC DRUMS = 40 EA.  
 TYPE III BARRICADE-RT. = 2 EA.  
 TYPE III BARRICADE-LT. = 2 EA.  
 FURNISH AND INSTALL PRECAST CONCRETE BARRIER = 1000 LIN. FT.  
 RELOCATING PRECAST CONCRETE BARRIER = 100 LIN. FT.  
 REMOVAL OF PERMANENT PAVEMENT MARKINGS = 1740 LIN. FT.  
 CONSTRUCTION PAVEMENT MARKINGS = 6804 LIN. FT.

ROAD CLOSED  
 (1) RII-2 (48" X 30")  
 (1) WI-6 (48" X 24")

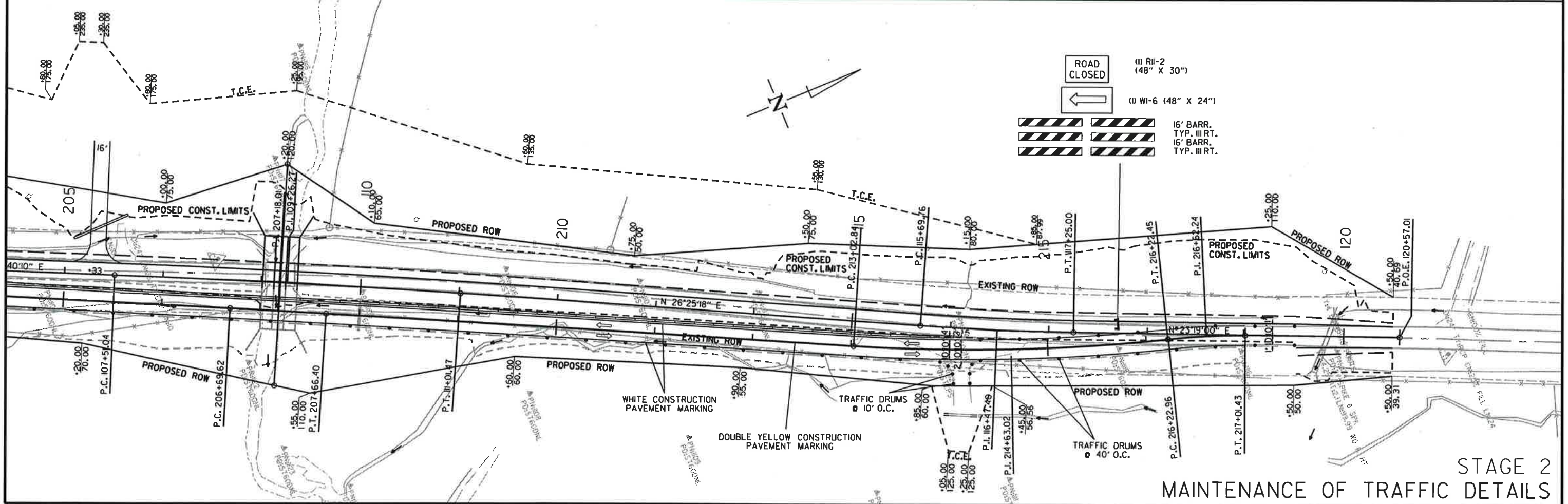
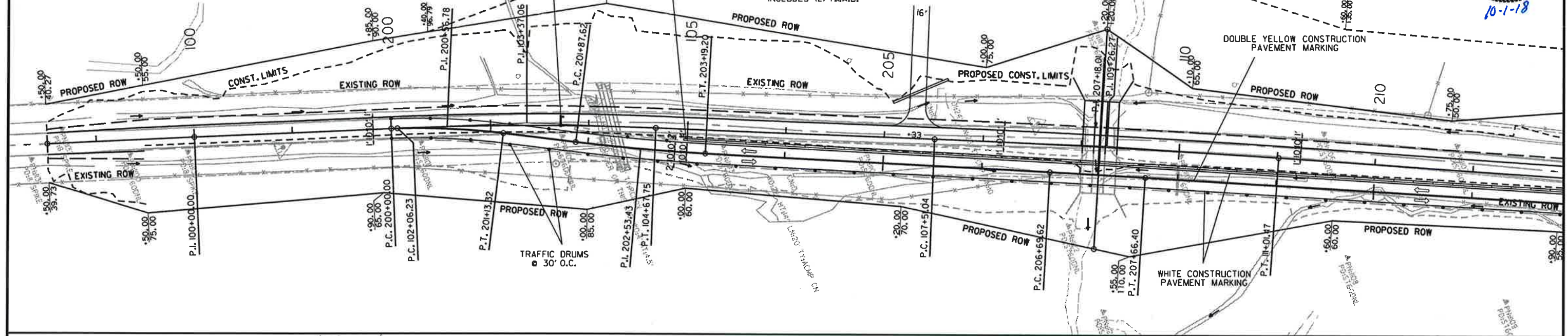
16' BARR. TYP. III RT.  
 16' BARR. TYP. III LT.

DATE REVISED	DATE FILED	DATE REVISED	DATE FILED	FED. DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
09-28-18				6	ARK.		22	51

2 MAINTENANCE OF TRAFFIC DETAILS



FURNISH AND INSTALL PRECAST CONCRETE BARRIER = 700 LIN. FT.  
 RELOCATING PRECAST CONCRETE BARRIER = 400 LIN. FT.  
 INCLUDES (2) T.I.A.B.



ROAD CLOSED  
 (1) RII-2 (48" X 30")  
 (1) WI-6 (48" X 24")

16' BARR. TYP. III RT.  
 16' BARR. TYP. III LT.

STAGE 2  
 MAINTENANCE OF TRAFFIC DETAILS

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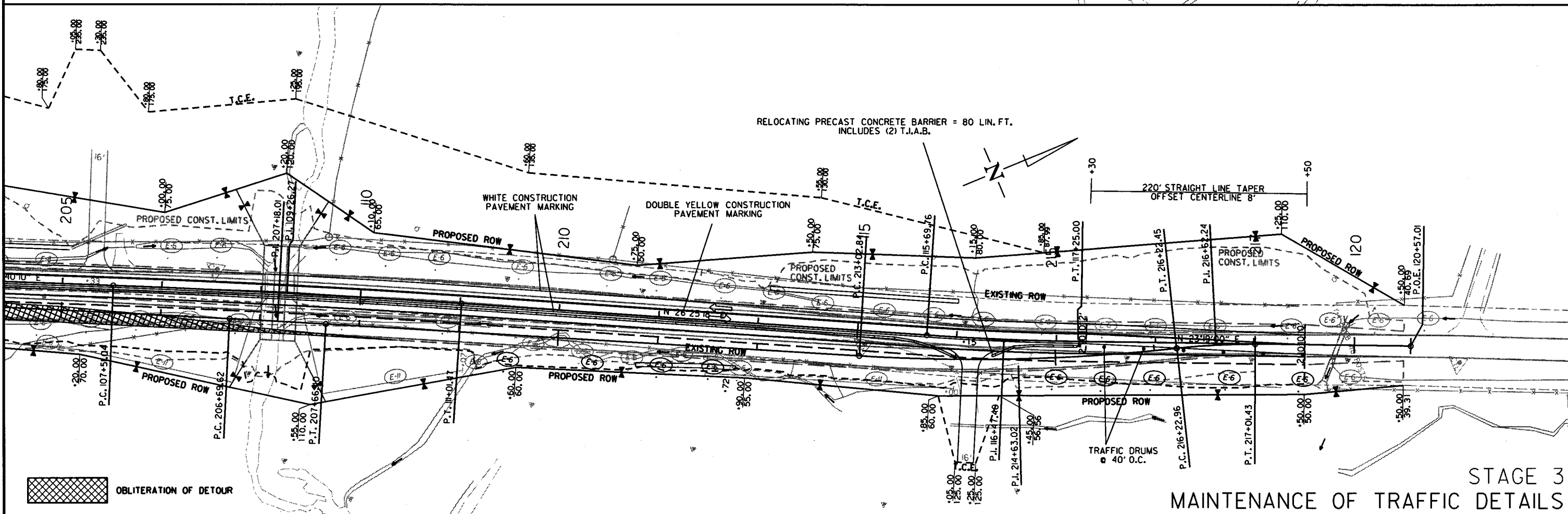
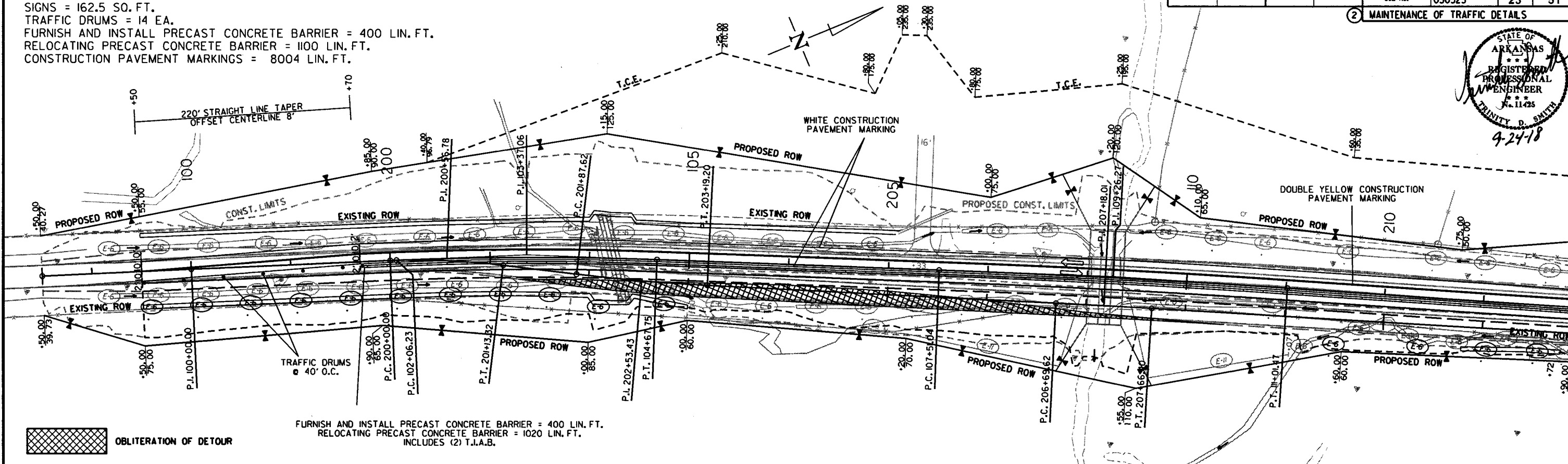
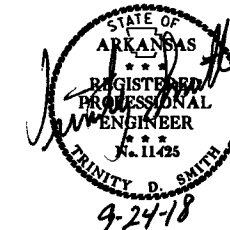


STAGE 3 QUANTITIES

SIGNS = 162.5 SQ. FT.  
 TRAFFIC DRUMS = 14 EA.  
 FURNISH AND INSTALL PRECAST CONCRETE BARRIER = 400 LIN. FT.  
 RELOCATING PRECAST CONCRETE BARRIER = 1100 LIN. FT.  
 CONSTRUCTION PAVEMENT MARKINGS = 8004 LIN. FT.

DATE REVISED	DATE FILED	DATE REVISED	DATE FILED	FED. RD. DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.		23	51

2 MAINTENANCE OF TRAFFIC DETAILS



STAGE 3  
 MAINTENANCE OF TRAFFIC DETAILS

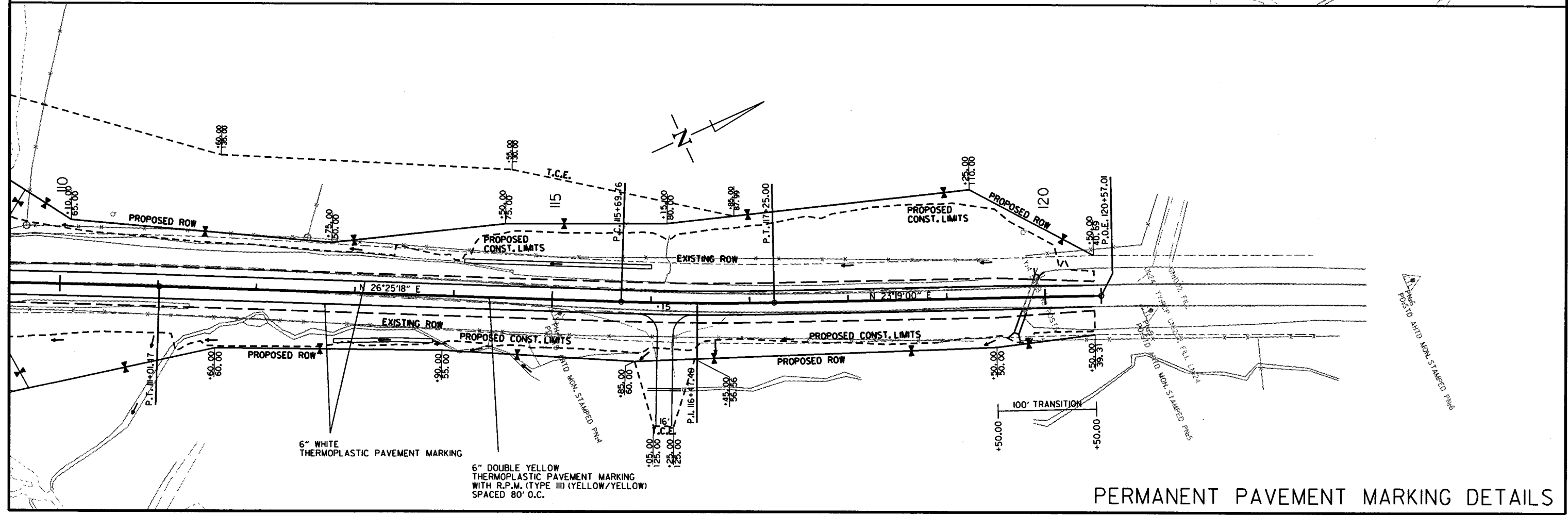
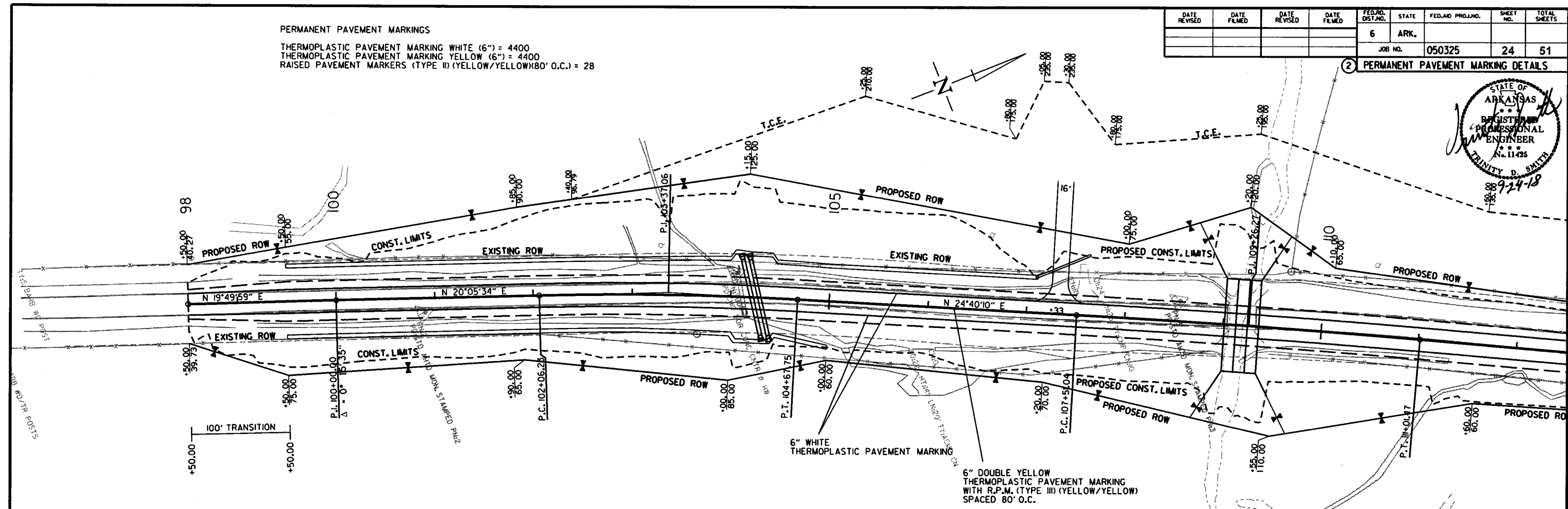
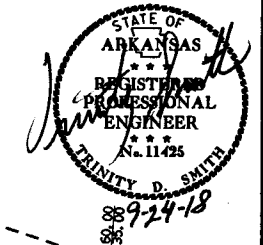
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PERMANENT PAVEMENT MARKINGS

THERMOPLASTIC PAVEMENT MARKING WHITE (6") = 4400  
 THERMOPLASTIC PAVEMENT MARKING YELLOW (6") = 4400  
 RAISED PAVEMENT MARKERS (TYPE III) (YELLOW/YELLOW) (80' O.C.) = 28

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				6	ARK.		24	51
JOB NO. 050325								

2 PERMANENT PAVEMENT MARKING DETAILS



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PERMANENT PAVEMENT MARKING DETAILS

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED. DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
09-28-18				6	ARK.			
							JOB NO. 050325	25 51

2 QUANTITIES



**CONSTRUCTION PAVEMENT MARKINGS AND PERMANENT PAVEMENT MARKINGS**

DESCRIPTION	STAGE 2	STAGE 3	END OF JOB	REMOVAL OF PERMANENT PAVEMENT MARKINGS	CONSTRUCTION PAVEMENT MARKINGS	RAISED PAVEMENT MARKERS	THERMOPLASTIC PAVEMENT MARKING			
	LIN. FT. - EACH						LIN. FT.		6"	
									WHITE	YELLOW
REMOVAL OF PERMANENT PAVEMENT MARKINGS	1740			1740						
CONSTRUCTION PAVEMENT MARKINGS	6804	8004			14808					
RAISED PAVEMENT MARKERS TYPE II (YEL/YEL)			28			28				
THERMOPLASTIC PAVEMENT MARKING WHITE (6")			4400				4400			
THERMOPLASTIC PAVEMENT MARKING YELLOW (6")			4400					4400		
<b>TOTALS:</b>				<b>1740</b>	<b>14808</b>	<b>28</b>	<b>4400</b>	<b>4400</b>		

NOTE: THIS IS A HIGH TRAFFIC VOLUME ROAD AS DEFINED IN SECTION 604.03, STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.

NOTE: THE 6" YELLOW STRIPING QUANTITY HAS BEEN ESTIMATED BASED ON A DOUBLE YELLOW CENTERLINE STRIPE FOR THE ENTIRE PROJECT. THE PROJECT MUST BE MARKED FOR PASSING/NO PASSING ZONES PRIOR TO THE PLACEMENT OF ANY FINAL STRIPING. CONTACT THE MAINTENANCE DIVISION AFTER THE FINAL LIFT OF SURFACE COURSE HAS BEEN PLACED TO SCHEDULE THE ZONING OF THE PROJECT.

**ADVANCE WARNING SIGNS AND DEVICES**

SIGN NUMBER	DESCRIPTION	SIGN SIZE	STAGE 1	STAGE 2	STAGE 3	MAXIMUM NUMBER REQUIRED	TOTAL SIGNS REQUIRED		VERTICAL PANELS	TRAFFIC DRUMS	BARRICADES (TYPE III)		FURNISHING & INSTALLING PRECAST CONC. BARRIER	RELOCATING PRECAST CONCRETE BARRIER	TEMPORARY IMPACT ATTENUATION BARRIER	TEMPORARY IMPACT ATTENUATION BARRIER (RELOCATION)	TEMP. IMPACT ATTEN. BARR. (REPAIR)
			LIN. FT. - EACH				NO.	SQ. FT.			RIGHT	LEFT					
							EACH				LIN. FT.						
W20-1	ROAD WORK 1500 FT.	48"x48"	2	2	2	2	2	32.0									
W20-1	ROAD WORK 1000 FT.	48"x48"	2	2	2	2	2	32.0									
W20-1	ROAD WORK 500 FT.	48"x48"	2	2	2	2	2	32.0									
R2-1	SPEED LIMIT 40 MPH	24"x30"	2	2	2	2	2	10.0									
G20-2	END ROAD WORK	48"x24"	2	2	2	2	2	16.0									
R11-2	ROAD CLOSED	48"x30"	4	2		4	4	40.0									
W1-6	LARGE ARROW	48"x24"		2		2	2	16.0									
R4-1	DO NOT PASS	24"x30"	2	2	2	2	2	10.0									
W21-5a	RIGHT SHOULDER CLOSED	36"x36"	2	2	2	2	2	18.0									
W8-1	BUMP	30"x30"	2	2	2	2	2	12.5									
	VERTICAL PANELS		21			21			21								
	TRAFFIC DRUMS		35	40	14	40				40							
	TYPE III BARRICADE-RT. (16')		4	2		4					64						
	TYPE III BARRICADE-LT. (16')		4	2		4						64					
	FURNISHING AND INSTALLING PRECAST CONCRETE BARRIER		400	700	400	1500						1500					
	RELOCATING PRECAST CONCRETE BARRIER		300	400	1100	1800							1800				
	TEMPORARY IMPACT ATTENUATION BARRIER		1	1		2								2			
	TEMPORARY IMPACT ATTENUATION BARRIER (RELOCATION)			1	2	3										3	
	TEMPORARY IMPACT ATTENUATION BARRIER (REPAIR)		1	2	2	5											5
<b>TOTALS:</b>								<b>218.5</b>	<b>21</b>	<b>40</b>	<b>64</b>	<b>64</b>	<b>1500</b>	<b>1800</b>	<b>2</b>	<b>3</b>	<b>5</b>

NOTE: THIS IS A HIGH TRAFFIC VOLUME ROAD AS DEFINED IN SECTION 604.03, STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.

NOTE: THE QUANTITY OF TRAFFIC DRUMS PROVIDED IS FOR ONE SIDE OF THE ROADWAY FOR THE FULL LENGTH OF THE JOB. HOWEVER, THE INSTALLATION OF TRAFFIC DRUMS SHALL NEVER EXCEED THE ACTUAL WORK AREA BY MORE THAN 1/4 MILE, UNLESS APPROVED BY THE ENGINEER.

QUANTITIES

9/27/2018

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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
09-28-18				6	ARK.			
						JOB NO. 050325	26	51

**CLEARING AND GRUBBING**

STATION	STATION	LOCATION	CLEARING STATION	GRUBBING STATION
99+00	120+00	LT. AND RT. OF HWY. 223	21	21
<b>TOTALS:</b>			<b>21</b>	<b>21</b>

**FLOWABLE SELECT MATERIAL**

STATION	LOCATION	CU. YD.
104+11	HWY. 223 - PLUG AND ABANDON EXISTING BOX	20
<b>TOTAL:</b>		<b>20</b>

**COLD MILLING ASPHALT PAVEMENT**

STATION	STATION	LOCATION	AVG. WIDTH FEET	COLD MILLING ASPHALT PAVEMENT SQ. YD.
98+50.00	99+50.00	HWY. 223	VAR.	233.03
119+50.00	120+50.00	HWY. 223	VAR.	228.52
<b>TOTAL:</b>				<b>461.55</b>

NOTE: AVERAGE MILLING DEPTH 1".

**EARTHWORK**

STATION	STATION	LOCATION / DESCRIPTION	UNCLASSIFIED EXCAVATION CU. YD.	COMPACTED EMBANKMENT	* SOIL STABILIZATION TON
ENTIRE PROJECT		STAGE 1-DETOUR	633	7684	
ENTIRE PROJECT		STAGE 2-MAIN LANES	11648	9128	
ENTIRE PROJECT		STAGE 3-MAIN LANES	3231	3305	
ENTIRE PROJECT		APPROACHES		1345	
109+84		CHANNEL CHANGE	200		
ENTIRE PROJECT		2' UNDERCUT AND BACKFILL IN DITCHES TO BE USED IF AND WHERE DIRECTED BY THE ENGINEER	2779	2779	
ENTIRE PROJECT		TO BE USED IF AND WHERE DIRECTED BY THE ENGINEER			100
<b>TOTALS:</b>			<b>18491</b>	<b>24241</b>	<b>100</b>

\* QUANTITY ESTIMATED. SEE SECTION 104.03 OF THE STD. SPECS.

NOTE: EARTHWORK QUANTITIES SHOWN ABOVE SHALL BE PAID AS PLAN QUANTITY.

**SELECTED PIPE BEDDING**

LOCATION	SELECTED PIPE BEDDING CU.YD.
ENTIRE PROJECT TO BE USED IF AND WHERE DIRECTED BY THE ENGINEER	25
<b>TOTAL:</b>	<b>25</b>

NOTE: QUANTITY ESTIMATED. SEE SECTION 104.03 OF THE STD. SPECS.

**CONCRETE DITCH PAVING**

STATION	STATION	LOCATION	LENGTH LIN. FT.	"W" FEET	CONC. DITCH PAVING (TYPE B) SQ. YD.	SOLID SODDING SQ. YD.	WATER M. GAL.
99+50.00	107+10.00	LT. OF HWY. 223	760.00	7.00	591.11	337.78	4.26
114+10.00	116+00.00	LT. OF HWY. 223	190.00	7.00	147.78	84.44	1.06
99+50.00	105+00.00	RT. OF HWY. 223	550.00	7.00	427.78	244.44	3.08
112+80.00	113+80.00	RT. OF HWY. 223	100.00	7.00	77.78	44.44	0.56
<b>TOTALS:</b>					<b>1244.45</b>	<b>711.10</b>	<b>8.96</b>

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

**DRIVEWAYS & TURNOUTS**

STATION	SIDE	LOCATION	WIDTH FEET	ACHM SURFACE COURSE (1/2") 220 LBS. PER SQ. YD. (PG 64-22)		AGGREGATE BASE COURSE (CLASS 7) TON	SIDE DRAINS		STANDARD DRAWINGS
				SQ. YD.	TON		18" LIN. FT.	24" LIN. FT.	
107+33	LT.	HWY. 223	16	44.80	4.93	114.43		62	PCC-1, PCM-1, PCP-1, PCP-2
116+15	RT.	HWY. 223	16	44.33	4.88	105.01	34		PCC-1, PCM-1, PCP-1, PCP-2
* ENTIRE PROJECT TEMPORARY DRIVES						20.00			
<b>TOTALS:</b>				<b>89.13</b>	<b>9.81</b>	<b>239.44</b>	<b>34</b>	<b>62</b>	

BASIS OF ESTIMATE: ACHM SURFACE COURSE (1/2").....94.7% MIN. AGGR.....5.3% ASPHALT BINDER MAXIMUM NUMBER OF GYRATIONS = 115 FOR PG 64-22

\* QUANTITY ESTIMATED. SEE SECTION 104.03 OF THE STD. SPECS. TO BE USED IF AND WHERE DIRECTED BY THE ENGINEER.

NOTE: FOR R.C. PIPE CULVERT INSTALLATIONS USE TYPE 3 BEDDING UNLESS OTHERWISE SPECIFIED. NOTE: FOR C.M. PIPE CULVERT INSTALLATIONS USE TYPE 2 BEDDING UNLESS OTHERWISE SPECIFIED.

**STRUCTURES**

STATION	DESCRIPTION	PIPE CULVERT ALTERNATES		FLARED END SECTION ALTERNATES FOR PIPE CULVERT ALTERNATES	TEMPORARY CULVERTS	SPAN	HEIGHT	LENGTH	CLASS S CONCRETE ROADWAY	REINF. STEEL-ROADWAY (GRADE 60)	UNCL. EXC. FOR STR.-ROADWAY	SOLID SODDING	WATER	STD. DWG. NOS.	
		ALT. 1 (CLASS III)	ALT. 2, 3, AND 4 (WITH CLASS III ALT. 1)												
		36"X23"	35"X24"												
104+25	DBL. 36" X 23" X 94' ARCH PIPE CULVERT	188	188	2	18"										FES-1, FES-2, PCC-1, PCM-1
119+84	EXTEND 4' X 2' R.C. BOX CULVERT					4	2	28	14.19	1597	11	10	0.13		R-115X-0, W-X15, W-X153-1, RCB-1, RCB-2, RCB-3
208+00	18" X 34' TEMPORARY PIPE CULVERT				34										PCC-1, PCM-1, PCP-1, PCP-2
<b>SUBTOTALS:</b>		<b>188</b>	<b>188</b>	<b>2</b>	<b>34</b>				<b>14.19</b>	<b>1597</b>	<b>11</b>	<b>38</b>	<b>0.48</b>		
<b>STRUCTURES OVER 20' - 0" SPAN</b>															
109+19	TRP. 10' X 10' X 98' R.C. BOX CULVERT					10	10	98	402.76	53894	172	39	0.49		SPECIAL DETAILS, RCB-1, RCB-2
<b>SUBTOTALS:</b>									<b>402.76</b>	<b>53894</b>	<b>172</b>	<b>39</b>	<b>0.49</b>		
<b>TOTALS:</b>		<b>188</b>	<b>188</b>	<b>2</b>	<b>34</b>				<b>416.95</b>	<b>55491</b>	<b>183</b>	<b>77</b>	<b>0.97</b>		

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

NOTE: FOR R.C. PIPE CULVERT INSTALLATIONS USE TYPE 3 BEDDING UNLESS OTHERWISE SPECIFIED.



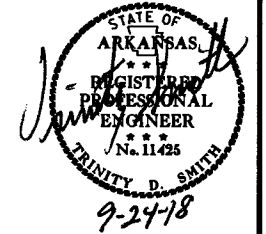
2 QUANTITIES

QUANTITIES

9/27/2018 R050325.DGN

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED. DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
						JOB NO. 050325	27	51

② QUANTITIES



4" PIPE UNDERDRAIN

STATION	STATION	LOCATIONS	4" PIPE UNDERDRAINS	UNDERDRAIN OUTLET PROTECTORS
			LIN. FT.	EACH
* ENTIRE PROJECT TO BE USED IF AND WHERE DIRECTED BY THE ENGINEER			500	4
<b>TOTALS:</b>			500	4

\* NOTE: QUANTITY ESTIMATED.  
SEE SECTION 104.03 OF THE STD. SPECS.

RUMBLE STRIPS IN ASPHALT SHOULDERS

STATION	STATION	LOCATION	* RUMBLE STRIPS IN ASPHALT SHOULDERS
			LIN. FT.
99+50	107+00	LT. OF HWY. 223	750
107+66	119+50	LT. OF HWY. 223	1184
99+50	115+82	RT. OF HWY. 223	1632
116+48	119+50	RT. OF HWY. 223	302
<b>TOTAL:</b>			3868

\* QUANTITY ESTIMATED.  
SEE SECTION 104.03 OF THE STD. SPECS.  
TO BE USED IF AND WHERE DIRECTED BY THE ENGINEER.

FENCING

STATION	STATION	LOCATION	WIRE FENCE			* 16'-0" GATES
			(TYPE C)	(TYPE D)	(TYPE D-1)	EACH
			LIN. FT.			
98+50	108+88	LT. OF HWY. 223	1081			2
109+49	120+50	LT. OF HWY. 223		1141		
98+50	108+88	RT. OF HWY. 223			1059	
109+49	120+50	RT. OF HWY. 223			1130	2
<b>TOTALS:</b>			1081	1141	2189	4

\* DENOTES ALTERNATE BID ITEM.

SOIL LOG

STATION	LATITUDE			LONGITUDE			LOCATION	DEPTH FEET	LIQUID LIMIT	PLASTICITY INDEX	AASHTO CLASSIFICATION	COLOR
	DEG	MIN	SEC	DEG	MIN	SEC						
106+00	36	10	55.30	92	6	8.10	6' RT.	0-4.5Z	ND	NP	A-4 (0)	BROWN
106+00	36	2	46.50	91	49	1.70	18' RT.	0-5	27	16	A-6 (1)	BROWN
112+00	36	10	57.60	92	6	6.90	6' LT.	0-5	ND	NP	A-2-4 (0)	BROWN
112+00	36	11	0.80	92	6	5.40	22' LT.	0-5	ND	NP	A-2-4 (0)	BROWN

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 SAME DIFFERING FROM THE ABOVE TABULATIONS.  
Z- AUGER REFUSAL  
NP - NON-PLASTIC

EROSION CONTROL MATTING

STATION	STATION	LOCATION	LENGTH	CLASS 3
			LIN. FT.	SQ. YD.
109+50.00	114+10.00	LT. OF HWY. 223	460.00	408.89
105+00.00	105+85.00	RT. OF HWY. 223	85.00	75.56
109+50.00	112+80.00	RT. OF HWY. 223	330.00	293.33
116+70.00	119+50.00	RT. OF HWY. 223	280.00	248.89
<b>TOTAL:</b>			1026.67	

NOTE: AVERAGE WIDTH = 8'-0"

REMOVAL OF EXISTING BRIDGE STRUCTURE

STATION	STATION	LOCATION	LUMP SUM
109+04	109+33	HWY. 223 (SITE NO. 1)	1.00

BENCH MARKS

STATION	LOCATION	BENCH MARKS
		EACH
109+19	HWY. 223 - HEADWALL ON RT.	1
<b>TOTAL:</b>		1

NOTE: SHOWN FOR INFORMATION ONLY. BENCH MARKS SHALL BE FURNISHED AND PLACED BY STATE FORCES.

EROSION CONTROL

STATION	STATION	LOCATION	PERMANENT EROSION CONTROL					TEMPORARY EROSION CONTROL													
			SEEDING	LIME	MULCH COVER	WATER	SECOND SEEDING APPLICATION	TEMPORARY SEEDING	MULCH COVER	WATER	WATTLE (20") DITCH CHECKS (E-1)	18" FILTER SOCK E-3	ROCK DITCH CHECKS (E-6)	TRIANGULAR SILT DIKE	SILT FENCE (E-11)	DIVERSION DITCH (E-8)	PIPE FOR SLOPE DRAINS (E-12)	SEDIMENT BASIN (E-14)	OBLITERATION OF SEDIMENT BASIN	*SEDIMENT REMOVAL & DISPOSAL	
			ACRE	TON	ACRE	M.GAL.	ACRE	ACRE	ACRE	M.GAL.	LIN. FT.	LIN. FT.	CU.YD.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	CU.YD.	CU.YD.	CU.YD.	
ENTIRE PROJECT		CLEARING AND GRUBBING							6.57	6.57	134.0									36	
ENTIRE PROJECT		STAGE 1							1.60	1.60	32.6		39							13	
ENTIRE PROJECT		STAGE 2							3.14	3.14	64.1		93							40	
ENTIRE PROJECT		STAGE 3	3.82	7.64	3.82	389.6	3.82		2.22	2.22	45.3		60							20	
* ENTIRE PROJECT TO BE USED IF AND WHERE DIRECTED BY THE ENGINEER.			0.96	1.92	0.96	97.9	0.96		3.38	3.38	69.0	500	500	48	500	304	250	250	200	200	211
<b>TOTALS:</b>			4.78	9.56	4.78	487.5	4.78		16.91	16.91	345.0	500	500	240	500	1519	250	250	200	200	320

BASIS OF ESTIMATE:  
LIME .....2 TONS / ACRE OF SEEDING  
WATER .....102.0 M.G. / ACRE OF SEEDING  
WATER .....20.4 M.G. / ACRE OF TEMPORARY SEEDING  
WATER .....12.6 GAL. / SQ. YD. OF SOLID SODDING  
WATTLE DITCH CHECKS .....9 LIN. FT. / LOCATION  
ROCK DITCH CHECKS .....3 CU.YD. / LOCATION

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

\*QUANTITIES ESTIMATED.  
SEE SECTION 104.03 OF THE STD. SPECS.

QUANTITIES



DATE REVISED	DATE FILED	DATE REVISED	DATE FILED	FED. DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
09-28-18				6	ARK.			
						JOB NO. 050325	28	51

2 QUANTITIES



**ASPHALT CONCRETE PATCHING FOR MAINTENANCE OF TRAFFIC**

LOCATION	TON	TACK COAT
		GALLON
ENTIRE PROJECT - TO BE USED IF AND WHERE DIRECTED BY THE ENGINEER	9	18
<b>TOTALS:</b>	<b>9</b>	<b>18</b>

BASIS OF ESTIMATE:  
 ASPHALT CONCRETE PATCHING FOR MAINTENANCE OF TRAFFIC...25 TON/MILE  
 TACK COAT FOR MAINTENANCE OF TRAFFIC.....50 GAL./MILE

**ACHM PATCHING OF EXISTING ROADWAY**

DESCRIPTION	TON
ENTIRE PROJECT - TO BE USED IF AND WHERE DIRECTED BY THE ENGINEER	20
<b>TOTAL:</b>	<b>20</b>

NOTE: QUANTITY ESTIMATED.  
 SEE SECTION 104.03 OF THE STD. SPECS.

**PAVEMENT REPAIR OVER CULVERTS (CONCRETE)**

STATION	LOCATION	WIDTH	LENGTH	CU.YD.
		FEET		
104+25	DBL. 36" X 23" ARCH PIPE CULVERT	20.00	10.16	5.6
<b>TOTAL:</b>				<b>5.6</b>

AVG. DEPTH = 9"

**BASE AND SURFACING**

STATION	STATION	LOCATION	LENGTH FEET	AGGREGATE BASE COURSE (CLASS 7)			TACK COAT						ACHM BINDER COURSE (1")				ACHM SURFACE COURSE (1/2")										
				TON / STATION	TON	(0.05 GAL. PER SQ. YD.)			(0.17 GAL. PER SQ. YD.)			TOTAL GALLONS	AVG. WID. FEET	SQ.YD.	POUND / SQ.YD.	PG 64-22 TON	AVG. WID. FEET	SQ.YD.	POUND / SQ.YD.	PG 64-22 TON	AVG. WID. FEET	SQ.YD.	POUND / SQ.YD.	PG 64-22 TON	TOTAL PG 64-22 TON		
						TOTAL WID. FEET	SQ.YD.	GALLON	TOTAL WID. FEET	SQ.YD.	GALLON																
<b>MAIN LANES</b>																											
98+50.00	99+50.00	MAIN LANES TRANSITION	100.00																								
99+50.00	102+00.00	NOTCH AND WIDEN	250.00	160.89	402.23	18.94	526.11	26.31																			
102+00.00	105+05.00	NOTCH AND WIDEN/OVERLAY DETOUR	305.00	140.18	427.55	11.91	403.62	20.18																			
105+05.00	107+40.00	FULL DEPTH/OVERLAY DETOUR	235.00	162.19	381.15	49.05	1280.75	64.04																			
107+40.00	116+60.00	FULL DEPTH	920.00	244.00	2244.80	60.75	6210.00	310.50																			
116+60.00	117+60.00	FULL DEPTH/OVERLAY DETOUR	100.00	138.81	138.81	60.75	675.00	33.75																			
117+60.00	119+00.00	NOTCH AND WIDEN/OVERLAY DETOUR	140.00	124.20	173.88	25.40	395.12	19.76																			
119+00.00	119+50.00	NOTCH AND WIDEN	50.00	166.60	83.30	17.92	99.56	4.98																			
119+50.00	120+50.00	MAIN LANES TRANSITION	100.00						29.92	332.44	56.51	56.51															
<b>DETOUR</b>																											
200+00.00	201+85.00	DETOUR NOTCH AND WIDEN	185.00	58.25	107.76	7.89	162.18	8.11					8.11	7.89	162.18	440.00	35.68	9.62	197.74	220.00	21.75						21.75
201+85.00	202+88.00	DETOUR FULL DEPTH	103.00	157.50	162.23	20.50	234.61	11.73					11.73	20.50	234.61	440.00	51.61	24.00	274.67	220.00	30.21						30.21
202+88.00	203+00.00	DETOUR FULL DEPTH	12.00	147.25	17.67	20.50	27.33	1.37					1.37	20.50	27.33	440.00	6.01	25.00	33.33	220.00	3.67						3.67
203+00.00	209+00.00	DETOUR FULL DEPTH	600.00	147.25	883.50	20.50	1366.67	68.33					68.33	20.50	1366.67	440.00	300.67	26.00	1733.33	220.00	190.67						190.67
209+00.00	214+00.00	DETOUR FULL DEPTH	500.00	157.50	787.50	20.50	1138.89	56.94					56.94	20.50	1138.89	440.00	250.56	26.00	1444.44	220.00	158.89						158.89
214+00.00	214+12.00	DETOUR FULL DEPTH	12.00	157.50	18.90	20.50	27.33	1.37					1.37	20.50	27.33	440.00	6.01	25.00	33.33	220.00	3.67						3.67
214+12.00	214+55.00	DETOUR FULL DEPTH	43.00	157.50	67.73	20.50	97.94	4.90					4.90	20.50	97.94	440.00	21.55	24.00	114.67	220.00	12.61						12.61
214+55.00	217+01.43	DETOUR NOTCH AND WIDEN	246.43	101.99	251.33	10.02	274.36	13.72					13.72	10.02	274.36	440.00	60.36	11.80	323.10	220.00	35.54						35.54
<b>ADDITIONAL FOR LEVELING</b>																											
99+50.00	106+00.00	STAGE 2 GRADE RAISE - EXIST. MAIN LANES	650.00						20.00	1444.44	245.55	245.55	20.00	1444.44	VAR.	94.94	20.00	1444.44	VAR.	588.46							588.46
116+50.00	119+50.00	STAGE 2 GRADE RAISE - EXIST. MAIN LANES	300.00						20.00	666.67	113.33	113.33	20.00	666.67	VAR.	133.95	20.00	666.67	VAR.	244.93							244.93
102+00.00	107+40.00	STAGE 3 GRADE RAISE - DETOUR	540.00						11.07	664.20	112.91	112.91	11.07	664.20	VAR.	226.51											
117+00.00	119+00.00	STAGE 3 GRADE RAISE - DETOUR	200.00						8.61	191.33	32.53	32.53	8.61	191.33	VAR.	182.36											
<b>ADDITIONAL FOR SUPERELEVATION</b>																											
99+81.23	102+81.23	SUPERELEVATION TRANSITION	300.00	35.04	105.12																						
102+81.23	103+92.75	MAXIMUM SUPERELEVATION	111.52	70.07	78.14																						
103+92.75	106+92.75	SUPERELEVATION TRANSITION	300.00	35.04	105.12																						
113+44.76	116+44.76	SUPERELEVATION TRANSITION	300.00	36.67	110.01																						
116+44.76	116+50.00	MAXIMUM SUPERELEVATION	5.24	73.33	3.84																						
116+50.00	119+50.00	SUPERELEVATION TRANSITION	300.00	36.67	110.01																						
<b>TOTALS:</b>				<b>6660.58</b>			<b>12919.47</b>	<b>645.99</b>			<b>3642.30</b>	<b>619.18</b>	<b>1265.17</b>		<b>11145.24</b>		<b>2437.05</b>		<b>11006.59</b>		<b>1811.90</b>		<b>9564.54</b>		<b>1052.09</b>	<b>2863.99</b>	

BASIS OF ESTIMATE:  
 ACHM SURFACE COURSE (1/2").....94.7% MIN. AGGR.....5.3% ASPHALT BINDER  
 ACHM BINDER COURSE (1").....95.6% MIN. AGGR.....4.4% ASPHALT BINDER  
 MAXIMUM NUMBER OF GYRATIONS = 115 FOR PG 64-22

9/27/2018

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QUANTITIES



**SUMMARY OF QUANTITIES**

ITEM NUMBER	ITEM	QUANTITY	UNIT
SP & 201	CLEARING	21	STATION
SP & 201	GRUBBING	21	STATION
206	FLOWABLE SELECT MATERIAL	20	CU. YD.
210	UNCLASSIFIED EXCAVATION	18491	CU. YD.
210	COMPACTED EMBANKMENT	24241	CU. YD.
SP & 210	SOIL STABILIZATION	100	TON
SS & 303	AGGREGATE BASE COURSE (CLASS 7)	6900	TON
SS & 401	TACK COAT	1283	GAL.
SP, SS, & 406	MINERAL AGGREGATE IN ACHM BINDER COURSE (1")	2330	TON
SP, SS, & 406	ASPHALT BINDER (PG 64-22) IN ACHM BINDER COURSE (1")	107	TON
SP, SS, & 407	MINERAL AGGREGATE IN ACHM SURFACE COURSE (1/2")	2722	TON
SP, SS, & 407	ASPHALT BINDER (PG 64-22) IN ACHM SURFACE COURSE (1/2")	152	TON
412	COLD MILLING ASPHALT PAVEMENT	462	SQ. YD.
SP, SS, & 414	ASPHALT CONCRETE PATCHING FOR MAINTENANCE OF TRAFFIC	9	TON
SP, SS, & 415	ACHM PATCHING OF EXISTING ROADWAY	20	TON
601	MOBILIZATION	1.00	LUMP SUM
SP & 602	FURNISHING FIELD OFFICE	1	EACH
603	MAINTENANCE OF TRAFFIC	1.00	LUMP SUM
603	18" TEMPORARY CULVERT	34	LIN. FT.
SS & 604	SIGNS	219	SQ. FT.
SS & 604	BARRICADES	128	LIN. FT.
SS & 604	TRAFFIC DRUMS	40	EACH
604	FURNISHING AND INSTALLING PRECAST CONCRETE BARRIER	1500	LIN. FT.
604	RELOCATING PRECAST CONCRETE BARRIER	1800	LIN. FT.
604	CONSTRUCTION PAVEMENT MARKINGS	14808	LIN. FT.
604	REMOVAL OF PERMANENT PAVEMENT MARKINGS	1740	LIN. FT.
SS & 604	VERTICAL PANELS	21	EACH
SS & 605	CONCRETE DITCH PAVING (TYPE B)	1244	SQ. YD.
606	36" X 23" REINFORCED CONCRETE ARCH PIPE CULVERTS (CLASS III) (ALTERNATE NO. 1)	188	LIN. FT.
606	35" X 24" ASPHALT COATED CORRUGATED STEEL ARCH PIPE CULVERTS (14 GAUGE) (ALTERNATE NO. 2)	188	LIN. FT.
606	35" X 24" ALUMINUM COATED CORRUGATED STEEL ARCH PIPE CULVERTS (14 GAUGE) (ALTERNATE NO. 3)	188	LIN. FT.
606	35" X 24" POLYMER PRECOATED METALLIC COATED CORRUGATED STEEL ARCH PIPE CULVERT (14 GAUGE) (ALTERNATE NO. 4)	188	LIN. FT.
SP, SS, & 606	18" SIDE DRAIN	34	LIN. FT.
SP, SS, & 606	24" SIDE DRAIN	62	LIN. FT.
606	36" X 23" FLARED END SECTIONS FOR REINFORCED CONCRETE ARCH PIPE CULVERTS (ALTERNATE NO. 1)	2	EACH
606	35" X 24" FLARED END SECTIONS FOR CORRUGATED STEEL ARCH PIPE CULVERT (ALTERNATE NO. 2)	2	EACH
606	SELECTED PIPE BEDDING	25	CU. YD.
611	UNDERDRAIN OUTLET PROTECTORS	4	EACH
611	4" PIPE UNDERDRAINS	500	LIN. FT.
615	PAVEMENT REPAIR OVER CULVERTS (CONCRETE)	5.6	CU. YD.
619	WIRE FENCE (TYPE C)	1081	LIN. FT.
619	WIRE FENCE (TYPE D)	1141	LIN. FT.
619	WIRE FENCE (TYPE D-1)	2189	LIN. FT.
619	16' STEEL GATES (ALTERNATE NO. 1)	4	EACH
619	16' ALUMINUM GATES (ALTERNATE NO. 2)	4	EACH
620	LIME	10	TON
620	SEEDING	4.78	ACRE
SS & 620	MULCH COVER	21.69	ACRE
620	WATER	842.4	M. GAL.
621	TEMPORARY SEEDING	16.91	ACRE
621	SILT FENCE	1519	LIN. FT.
621	DIVERSION DITCH	250	LIN. FT.
621	SEDIMENT BASIN	200	CU. YD.
621	OBLITERATION OF SEDIMENT BASIN	200	CU. YD.
621	SEDIMENT REMOVAL AND DISPOSAL	320	CU. YD.
621	PIPE FOR SLOPE DRAINS	250	LIN. FT.
621	ROCK DITCH CHECKS	240	CU. YD.
SS & 621	FILTER SOCK (18")	500	LIN. FT.
621	WATTLE (20")	500	LIN. FT.
621	TRIANGULAR SILT DIKE	500	LIN. FT.
623	SECOND SEEDING APPLICATION	4.78	ACRE
624	SOLID SODDING	788	SQ. YD.
626	EROSION CONTROL MATTING (CLASS 3)	1027	SQ. YD.
635	ROADWAY CONSTRUCTION CONTROL	1.00	LUMP SUM
642	RUMBLE STRIPS IN ASPHALT SHOULDERS	3868	LIN. FT.
719	THERMOPLASTIC PAVEMENT MARKING WHITE (6")	4400	LIN. FT.
719	THERMOPLASTIC PAVEMENT MARKING YELLOW (6")	4400	LIN. FT.
721	RAISED PAVEMENT MARKERS (TYPE II)	28	EACH
731	TEMPORARY IMPACT ATTENUATION BARRIER	2	EACH
731	TEMPORARY IMPACT ATTENUATION BARRIER (REPAIR)	5	EACH
731	TEMPORARY IMPACT ATTENUATION BARRIER (RELOCATION)	3	EACH
801	UNCLASSIFIED EXCAVATION FOR STRUCTURES-ROADWAY	11	CU. YD.
SS & 802	CLASS S CONCRETE - ROADWAY	14.19	CU. YD.
804	REINFORCING STEEL-ROADWAY (GRADE 60)	1597	POUND
<b>STRUCTURES OVER 20' SPAN</b>			
205	REMOVAL OF EXISTING BRIDGE STRUCTURE (SITE NO. 1)	1.00	LUMP SUM
801	UNCLASSIFIED EXCAVATION FOR STRUCTURES-ROADWAY	172	CU. YD.
SS & 802	CLASS S CONCRETE - ROADWAY	402.76	CU. YD.
804	REINFORCING STEEL-ROADWAY (GRADE 60)	53894	POUND

\* DENOTES ALTERNATE BID ITEMS.

**REVISIONS**

DATE	REVISION	SHEET NUMBER
9/28/2018	ADDED "DETAIL OF BARRIER WALL FOR EXTENSION OF R.C. BOX CULVERT" TO MAINTENANCE OF TRAFFIC DETAILS AND REVISED CORRESPONDING QUANTITIES, REVISED METHOD OF STAGE CONSTRUCTION TYPICAL, REVISED EARTHWORK QUANTITIES, REVISED BASE AND SURFACING QUANTITIES.	19-20, 22, 25-26, 28-29, 37-48

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED. DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
09-28-18				6	ARK.			
						JOB NO. 050325	29	51

2 SUMMARY OF QUANTITIES AND REVISIONS

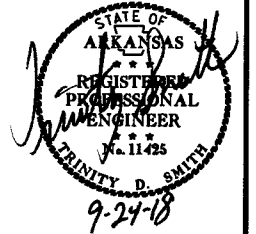


9/27/2018

R050325.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. 050325	30	51

② SURVEY CONTROL DETAILS



SURVEY CONTROL COORDINATES

Project Name: s050325  
 Date: 10/26/2016  
 Coordinate System: ARKANSAS STATE PLANE - NORTH ZONE BASED ON STATIC GPS PTS 1-6, PROJECTED TO GROUND.  
 Units: U. S. SURVEY FOOT

Point Name	Northing	Easting	Elev	Feature	Description
1	671969.4244	1281791.9276	701.773	CTL	STD AHTD MON. STAMPED PN# 1
2	672457.6994	1282015.2840	669.491	CTL	STD AHTD MON. STAMPED PN# 2
3	673174.1279	1282284.5572	636.401	CTL	STD AHTD MON. STAMPED PN# 3
4	673745.1181	1282603.7996	646.725	CTL	STD AHTD MON. STAMPED PN# 4
5	674291.6144	1282849.9009	661.530	CTL	STD AHTD MON. STAMPED PN# 5
6	674547.4210	1282932.8143	669.869	CTL	STD AHTD MON. STAMPED PN# 6
900	672767.1328	1282093.8682	658.140	TBM	CHIS SQR CONC CNTR W HW
990	709982.5914	1342629.6172	731.793	BM	NGS BM E 17
991	607507.3638	1192474.0764	1274.452	BM	NGS BM TRI COUNTY

\*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 0.9999581581 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 s050325G1.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  
 DETERMINED FROM GPS CONTROL POINTS: STATIC GPS PTS 1-6  
 CONVERGENCE ANGLE: 00 03 34 LEFT AT PN# 3 LT: N 36-10-57.5 LG: W092-06-07.2  
 GRID AZIMUTH = ASTRONOMICAL AZIMUTH - CONVERGENCE ANGLE.

HWY. 223 CL.

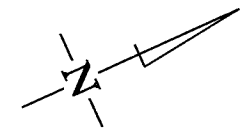
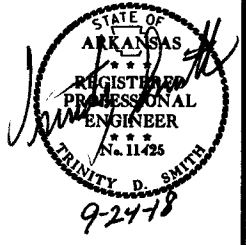
POINT NO.	TYPE	STATION	NORTHING	EASTING
8000	POB	98+49.99	672236.7529	1281919.9178
8001	PI	100+00.00	672377.8652	1281970.8132
8002	PC	102+06.23	672571.5428	1282041.6614
8004	PT	104+67.75	672813.3030	1282141.2146
8005	PC	107+51.04	673070.7315	1282259.4523
8007	PT	111+01.47	673386.8937	1282410.5625
8008	PC	115+69.76	673806.2680	1282618.9390
8010	PT	117+25.00	673947.0963	1282684.2174
8011	POE	120+57.01	674251.9883	1282815.6306

DETOUR CL.

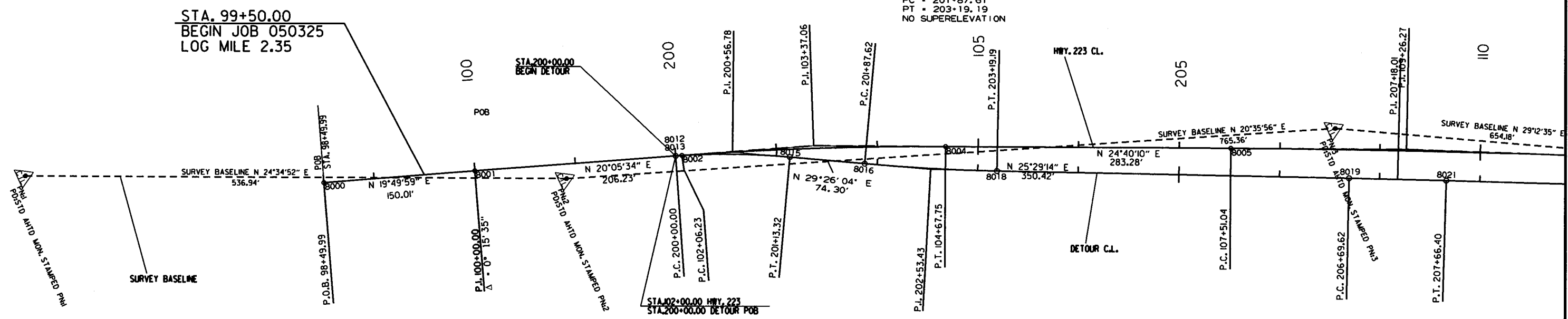
POINT NO.	TYPE	STATION	NORTHING	EASTING
8012	POB	200+00.00	672565.6968	1282039.5102
8013	PC	200+00.00	672565.6994	1282039.5111
8015	PT	201+13.32	672668.3746	1282087.1754
8016	PC	201+87.62	672733.0822	1282123.6876
8018	PT	203+19.20	672849.8145	1282184.3532
8019	PC	206+69.62	673166.1284	1282335.1399
8021	PT	207+66.40	673253.3148	1282377.1544
8022	PC	213+02.84	673735.5884	1282612.0731
8024	PT	216+22.45	674033.2667	1282727.3967
8025	PC	216+22.96	674033.7522	1282727.5394
8027	PT	217+01.43	674107.6786	1282753.7497
8028	POE	217+01.44	674107.6879	1282753.7536

DATE REVISED	DATE FILED	DATE REVISED	DATE FILED	FED. DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
JOB NO. 050325							31	51

2 SURVEY CONTROL DETAILS



DETOUR  
 PI = 202+53.43  
 Δ = 3°56'51" LT.  
 D = 3°00'00"  
 T = 65.82'  
 L = 131.58'  
 PC = 201+87.61  
 PT = 203+19.19  
 NO SUPERELEVATION



DETOUR  
 PI = 200+56.78  
 Δ = 9°03'55" RT.  
 D = 8°00'00"  
 T = 56.78'  
 L = 113.32'  
 PC = 200+00.00  
 PT = 201+13.32  
 NO SUPERELEVATION

HWY. 223  
 PI = 103+37.06  
 Δ = 4°34'36" RT.  
 D = 1°45'00"  
 T = 130.83'  
 L = 261.52'  
 PC = 102+06.23  
 PT = 104+67.75  
 e = 0.043' /'  
 Ls = 300'

DETOUR  
 PI = 207+18.01  
 Δ = 0°29'02" RT.  
 D = 0°30'00"  
 T = 48.39'  
 L = 96.78'  
 PC = 206+69.62  
 PT = 207+66.40  
 NO SUPERELEVATION

HWY. 223  
 PI = 109+26.27  
 Δ = 1°45'08" RT.  
 D = 0°30'00"  
 T = 175.23'  
 L = 350.43'  
 PC = 107+51.04  
 PT = 111+01.47  
 NO SUPERELEVATION

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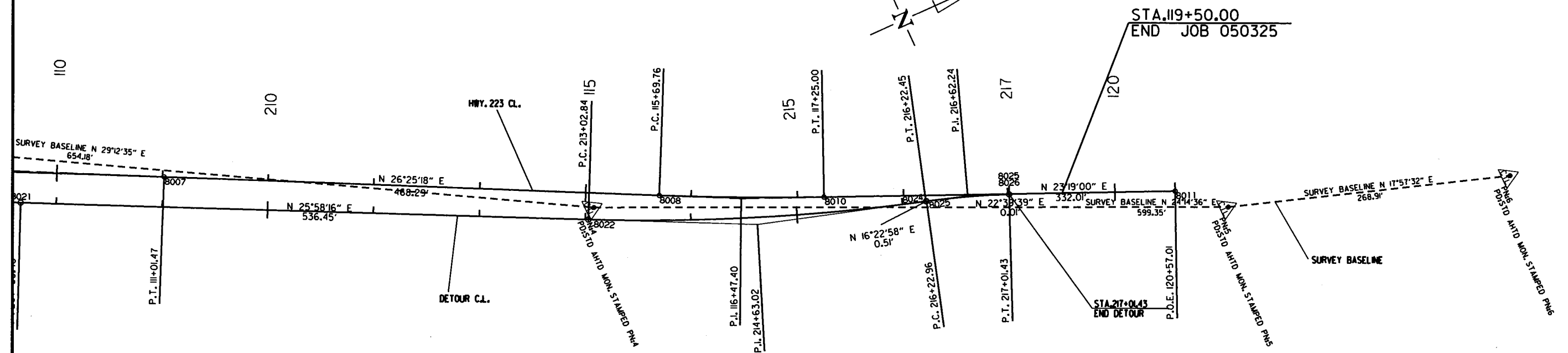
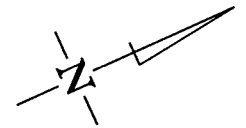
DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED. PROJ. DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.		32	51
				JOB NO. 050325				

2 SURVEY CONTROL DETAILS



HWY. 223  
 PI = 116+47.40  
 Δ = 3°06'17" LT.  
 D = 2°00'00"  
 T = 77.64'  
 L = 155.24'  
 PC = 115+69.76  
 PT = 117+25.00  
 e = 0.048' /'  
 Ls = 300'

DETOUR  
 PI = 214+63.02  
 Δ = 9°35'18" LT.  
 D = 3°00'00"  
 T = 160.18'  
 L = 319.61'  
 PC = 213+02.84  
 PT = 216+22.45  
 NO SUPERELEVATION

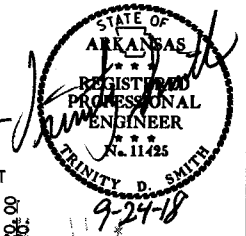


DETOUR  
 PI = 216+62.24  
 Δ = 6°16'41" RT.  
 D = 8°00'00"  
 T = 39.28'  
 L = 78.47'  
 PC = 216+22.96  
 PT = 217+01.43  
 NO SUPERELEVATION

9/21/2018  
 R050325.DGN

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED. RD. DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.		33	51
				JOB NO. 050325				

2 PLAN AND PROFILE SHEETS



STA. 99+50.00 TO STA. 107+10.00 LT. OF C.L.  
CONCRETE DITCH PAVING (TYPE B) = 337.78 SQ. YD.

STA. 104+25 - CONSTRUCT  
DBL. 36" X 23" X 80' ARCH PIPE CULVERT  
WITH F.E.S. LT. & RT.  
Q25 = 24.6 C.F.S. D.A. = 15.7 ACRES  
36" X 23" R.C. ARCH PIPE CULVERT (CLASS IV) (TYPE 3 BEDDING) = 160 LIN. FT.  
35" X 24" C.M. ARCH PIPE CULVERT (TYPE 2 BEDDING) = 160 LIN. FT.  
36" X 23" F.E.S. = 2 EA.  
35" X 24" F.E.S. = 2 EA.

STA. 107+33 - IN PLACE  
24" X 26" C.M. PIPE CULVERT  
LT. SIDE DRAIN  
REMOVE AND INSTALL  
24" X 60" PIPE CULVERT  
LT. SIDE DRAIN  
CONSTRUCT APPROACH = 815 CU. YDS.

STA. 109+03.82 TO STA. 109+32.77 - IN PLACE  
BR. NO. M2377  
29' X 20'-0" CLEAR ROADWAY WIDTH  
REMOVAL OF EXISTING BRIDGE STRUCTURE  
(SITE NO. 1) = 1.00 LUMP SUM

STA. 109+19 - CONSTRUCT  
TRP. 10' X 10' X 98' R.C. BOX CULVERT  
WITH 3:1 WINGS LT. & RT.  
Q25 = 1460 C.F.S.  
D.A. = 1.8 SQ. MI.  
SPAN = 33'-8"  
CHANNEL CHANGE = 200 CU. YDS.

STA. 104+11 - IN PLACE  
4' X 2' X 36' R.C. BOX  
WITH 3:1 WINGS LT. & RT.  
PLUG AND ABANDON

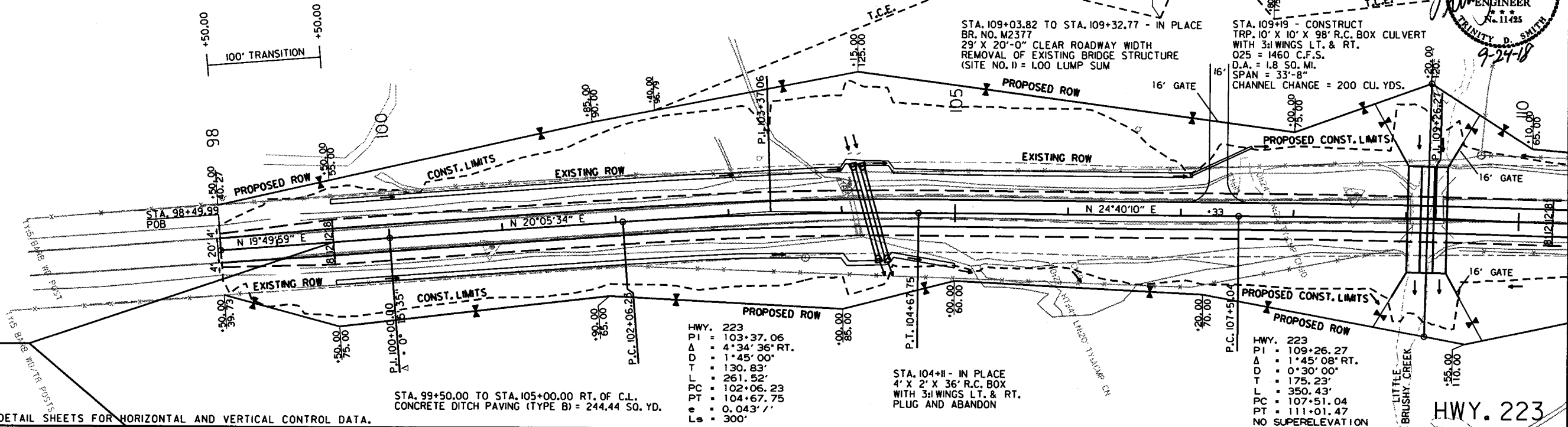
STA. 99+50.00 TO STA. 105+00.00 RT. OF C.L.  
CONCRETE DITCH PAVING (TYPE B) = 244.44 SQ. YD.

STA. 99+50.00  
BEGIN JOB 050325  
LOG MILE 2.35

REFER TO SURVEY CONTROL DETAIL SHEETS FOR HORIZONTAL AND VERTICAL CONTROL DATA.

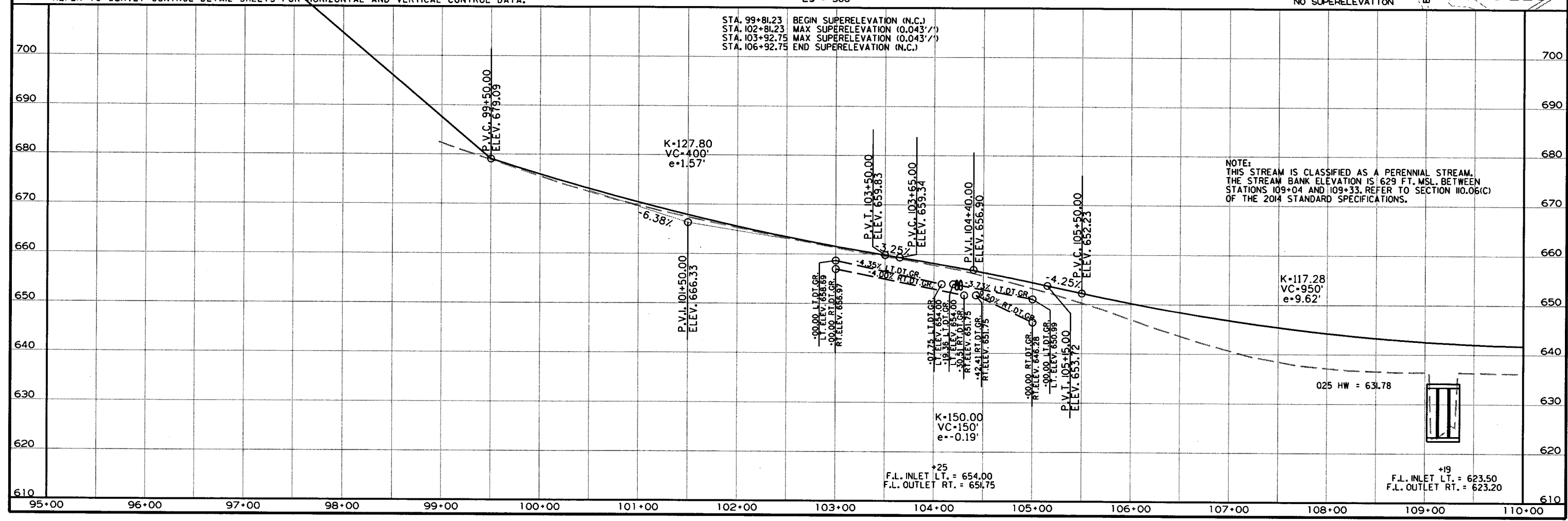
HWY. 223  
PI = 103+37.06  
Δ = 4°34'36" RT.  
D = 1'45'00"  
T = 130.83'  
L = 261.52'  
PC = 102+06.23  
PT = 104+67.75  
e = 0.043' /'  
Ls = 300'

HWY. 223  
PI = 109+26.27  
Δ = 1°45'08" RT.  
D = 0°30'00"  
T = 175.23'  
L = 350.43'  
PC = 107+51.04  
PT = 111+01.47  
NO SUPERELEVATION



STA. 99+81.23 BEGIN SUPERELEVATION (N.C.)  
STA. 102+81.23 MAX SUPERELEVATION (0.043' /')  
STA. 103+92.75 MAX SUPERELEVATION (0.043' /')  
STA. 106+92.75 END SUPERELEVATION (N.C.)

NOTE:  
THIS STREAM IS CLASSIFIED AS A PERENNIAL STREAM.  
THE STREAM BANK ELEVATION IS 629 FT. MSL. BETWEEN  
STATIONS 109+04 AND 109+33. REFER TO SECTION 110.06(C)  
OF THE 2014 STANDARD SPECIFICATIONS.



Q25 HW = 63.78

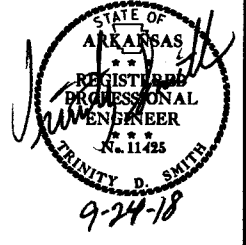
+25  
F.L. INLET LT. = 654.00  
F.L. OUTLET RT. = 651.75

+19  
F.L. INLET LT. = 623.50  
F.L. OUTLET RT. = 623.20

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DATE REVISED	DATE FILED	DATE REVISED	DATE FILED	FED. DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
JOB NO. 050325							34	51

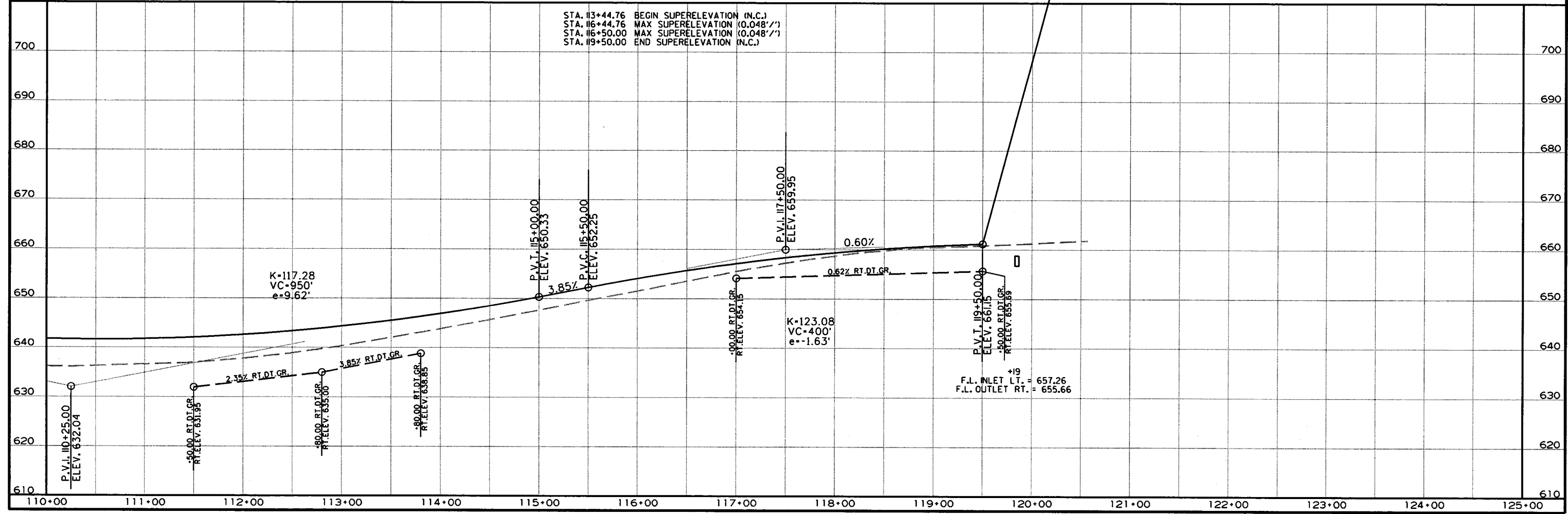
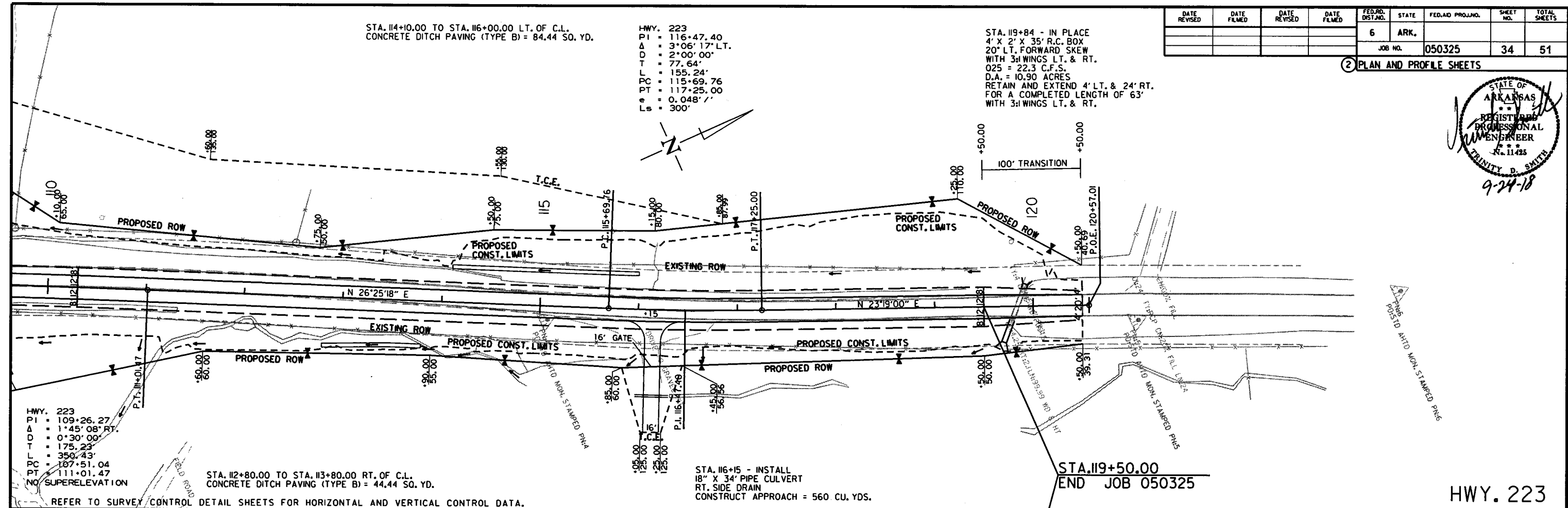
2 PLAN AND PROFILE SHEETS



STA. 114+10.00 TO STA. 116+00.00 LT. OF C.L.  
CONCRETE DITCH PAVING (TYPE B) = 84.44 SQ. YD.

HWY. 223  
 PI = 116+47.40  
 Δ = 3°06'17" LT.  
 D = 2°00'00"  
 T = 77.64'  
 L = 155.24'  
 PC = 115+69.76  
 PT = 117+25.00  
 e = 0.048'/'  
 Ls = 300'

STA. 119+84 - IN PLACE  
 4' X 2' X 35' R.C. BOX  
 20' LT. FORWARD SKEW  
 WITH 3:1 WINGS LT. & RT.  
 Q25 = 22.3 C.F.S.  
 D.A. = 10.90 ACRES  
 RETAIN AND EXTEND 4' LT. & 24' RT.  
 FOR A COMPLETED LENGTH OF 63'  
 WITH 3:1 WINGS LT. & RT.



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HWY. 223



DATE REVISED	DATE FILED	DATE REVISED	DATE FILED	FED. RD. DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
JOB NO. 050325							35	51

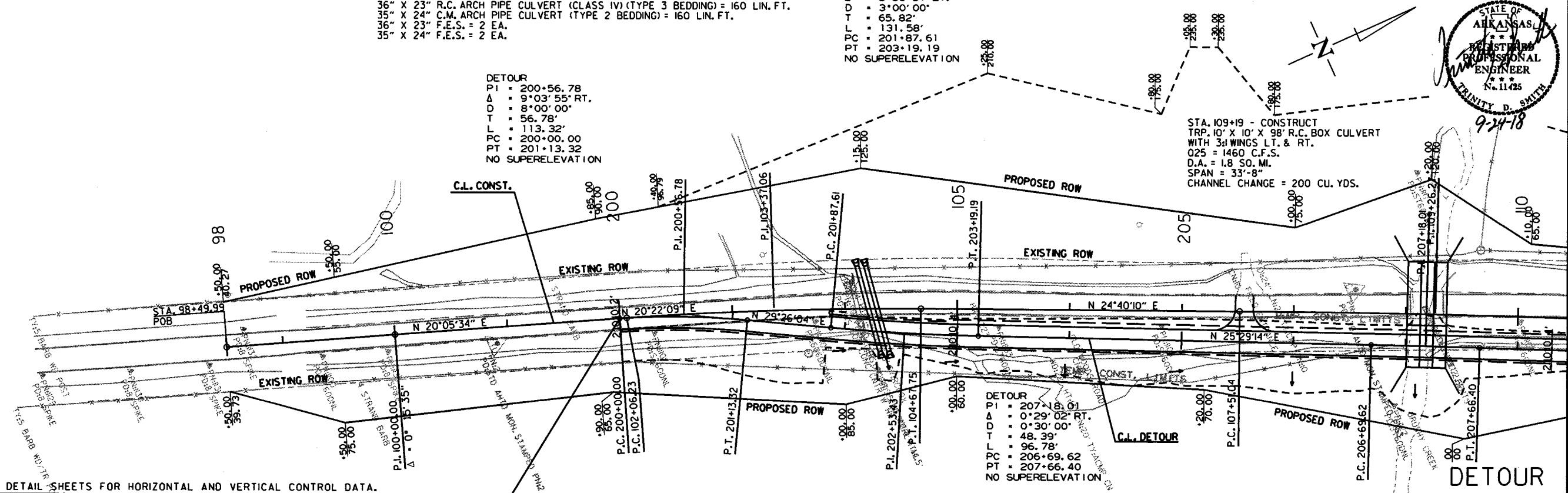
2 PLAN AND PROFILE SHEETS

STA. 104+25 - CONSTRUCT  
 DBL. 36" X 23" X 80' ARCH PIPE CULVERT  
 WITH F.E.S. LT. & RT.  
 Q25 = 24.6 C.F.S. D.A. = 15.7 ACRES  
 36" X 23" R.C. ARCH PIPE CULVERT (CLASS IV) (TYPE 3 BEDDING) = 160 LIN. FT.  
 36" X 24" C.M. ARCH PIPE CULVERT (TYPE 2 BEDDING) = 160 LIN. FT.  
 36" X 23" F.E.S. = 2 EA.  
 35" X 24" F.E.S. = 2 EA.

DETOUR  
 PI = 202+53.43  
 Δ = 3°56'51" LT.  
 D = 3°00'00"  
 T = 65.82'  
 L = 131.58'  
 PC = 201+87.61  
 PT = 203+19.19  
 NO SUPERELEVATION

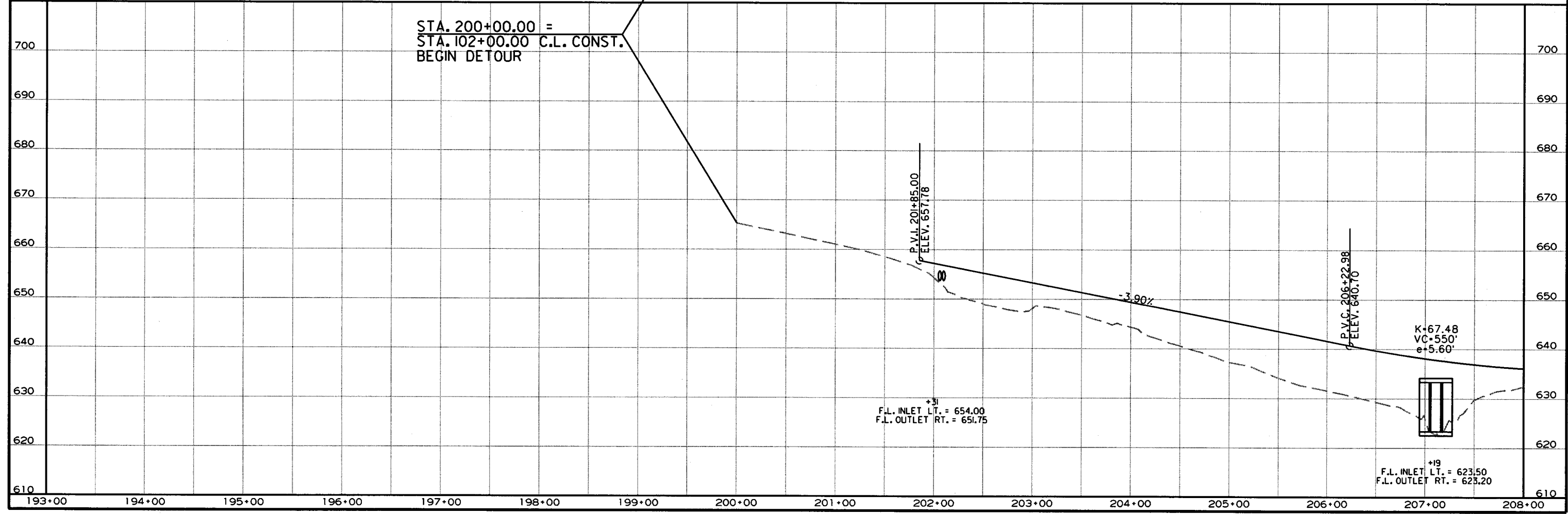
DETOUR  
 PI = 200+56.78  
 Δ = 9°03'55" RT.  
 D = 8°00'00"  
 T = 56.78'  
 L = 113.32'  
 PC = 200+00.00  
 PT = 201+13.32  
 NO SUPERELEVATION

STA. 109+19 - CONSTRUCT  
 TRP. 10' X 10' X 98' R.C. BOX CULVERT  
 WITH 3 WINGS LT. & RT.  
 Q25 = 1460 C.F.S.  
 D.A. = 1.8 SQ. MI.  
 SPAN = 33'-8"  
 CHANNEL CHANGE = 200 CU. YDS.



REFER TO SURVEY CONTROL DETAIL SHEETS FOR HORIZONTAL AND VERTICAL CONTROL DATA.

STA. 200+00.00 =  
 STA. 102+00.00 C.L. CONST.  
 BEGIN DETOUR



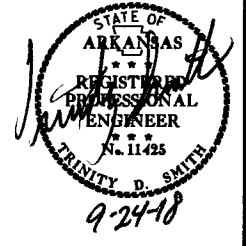
+31  
 F.L. INLET LT. = 654.00  
 F.L. OUTLET RT. = 651.75

+19  
 F.L. INLET LT. = 623.50  
 F.L. OUTLET RT. = 623.20

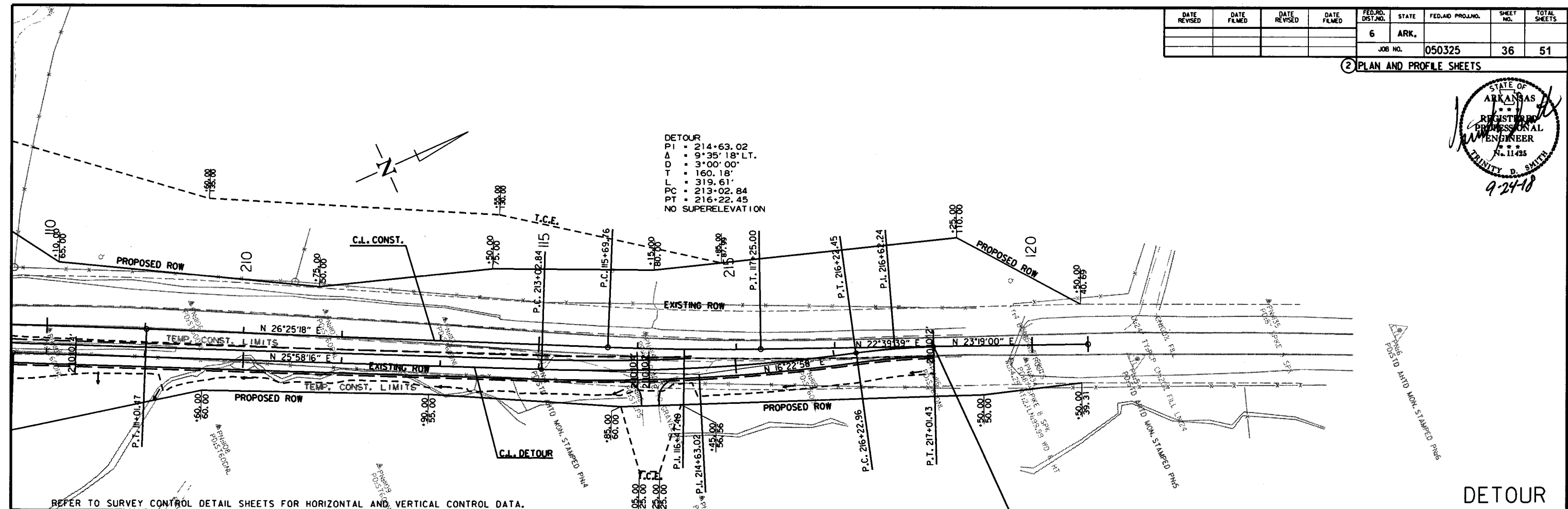
9/24/2018  
 R050325.DGN

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. 050325							36	51

2 PLAN AND PROFILE SHEETS

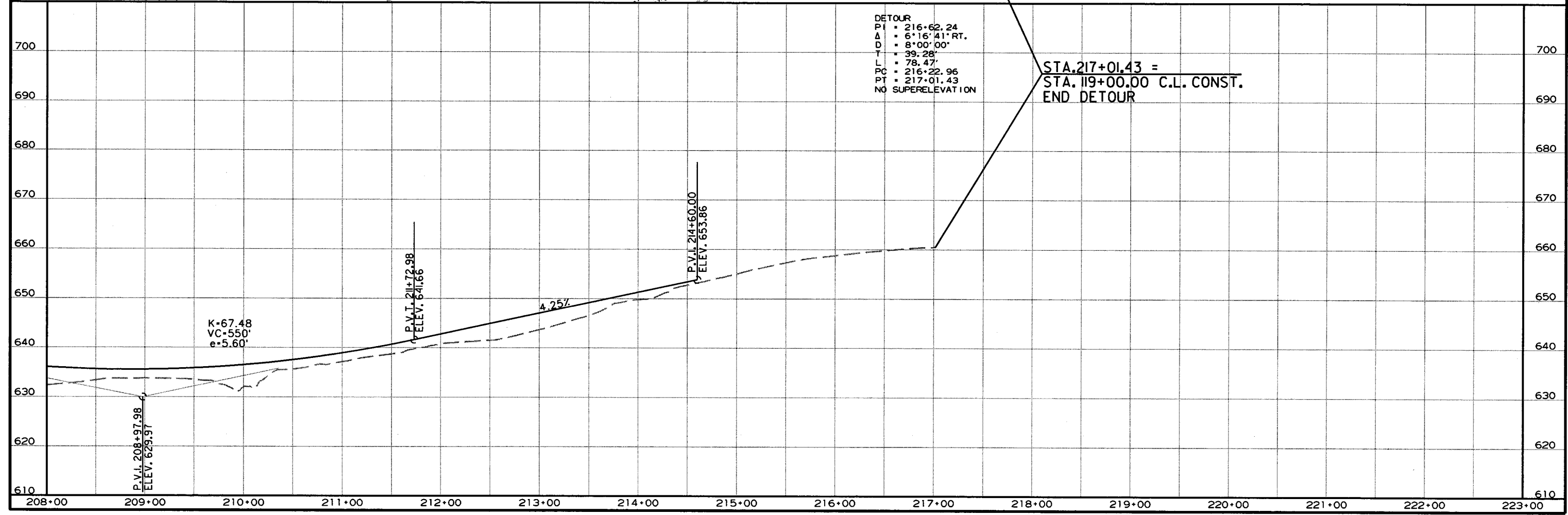


DETOUR  
 PI = 214+63.02  
 Δ = 9°35'18" LT.  
 D = 3°00'00"  
 T = 160.18'  
 L = 319.61'  
 PC = 213+02.84  
 PT = 216+22.45  
 NO SUPERELEVATION



REFER TO SURVEY CONTROL DETAIL SHEETS FOR HORIZONTAL AND VERTICAL CONTROL DATA.

DETOUR



DETOUR  
 PI = 216+62.24  
 Δ = 6°16'41" RT.  
 D = 8°00'00"  
 T = 39.28'  
 L = 78.47'  
 PC = 216+22.96  
 PT = 217+01.43  
 NO SUPERELEVATION

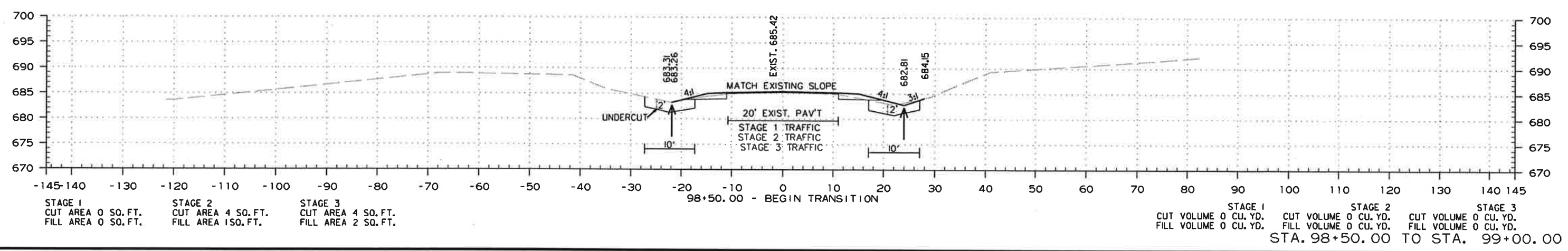
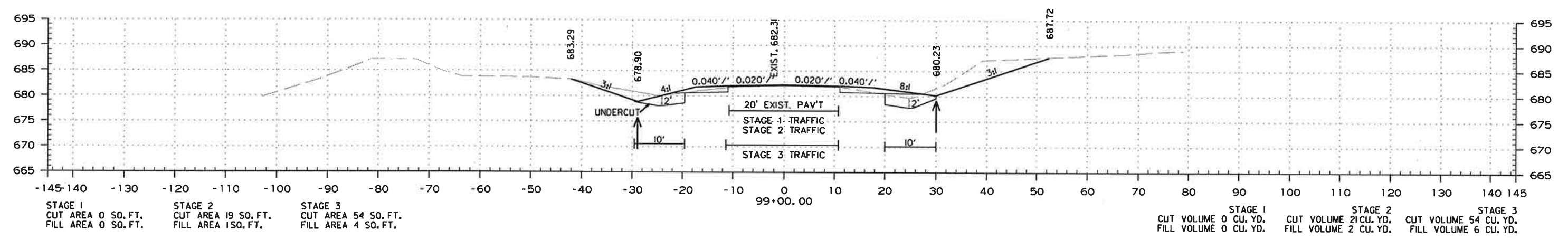
STA. 217+01.43 =  
 STA. 119+00.00 C.L. CONST.  
 END DETOUR

9/21/2018 R050325.DGN



DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED. DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
09-28-18				6	ARK.			
						JOB NO. 050325	37	51

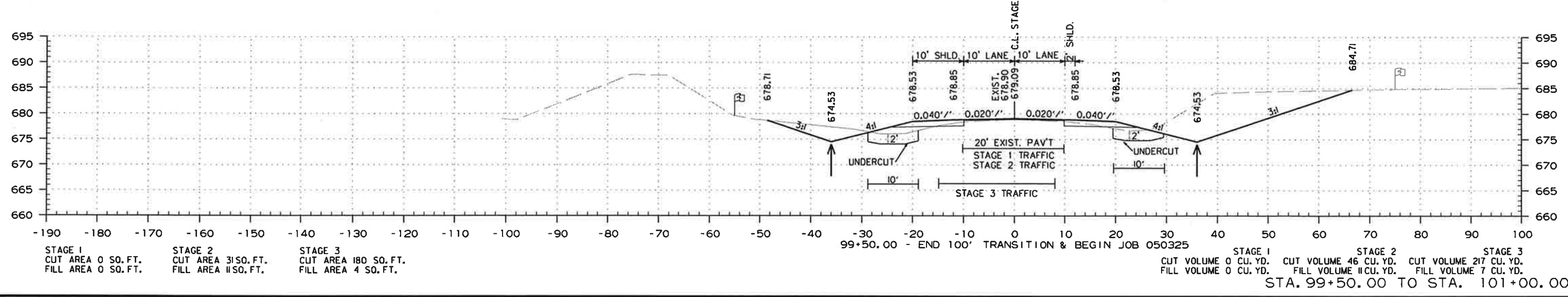
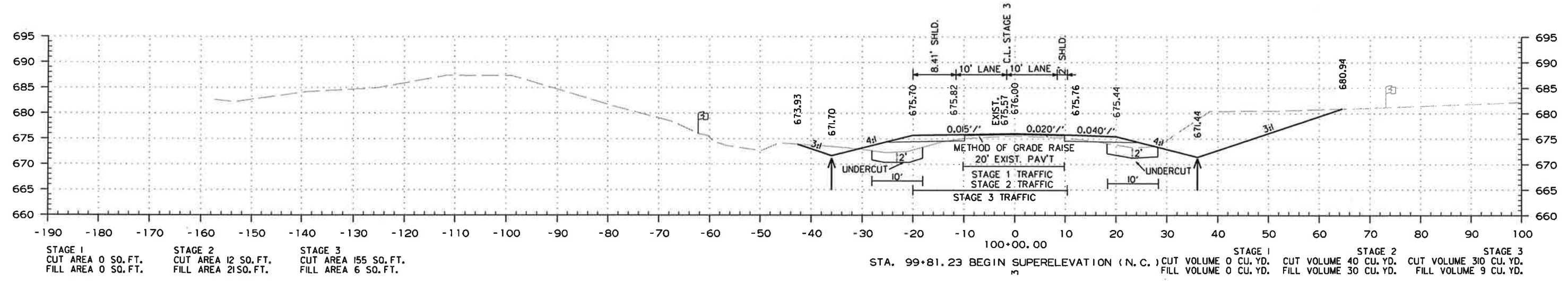
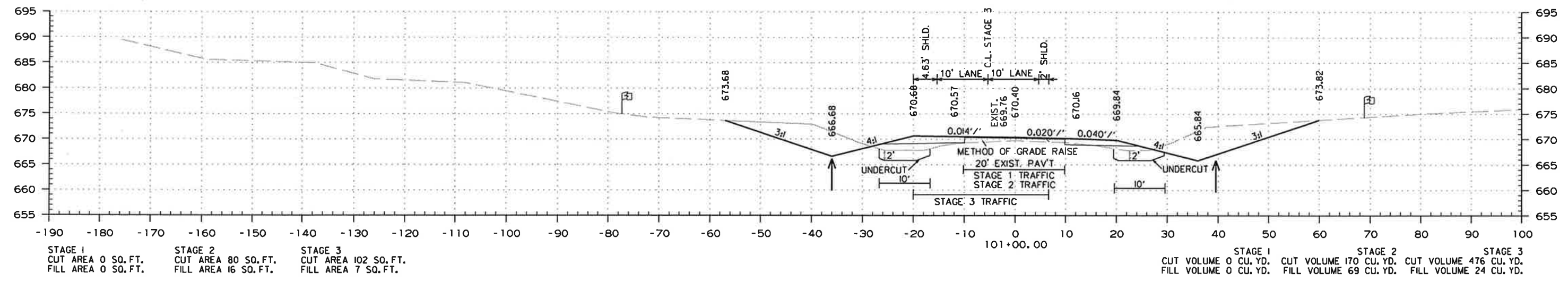
2 CROSS SECTIONS



9/27/2018  
R050325.DGN

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED. RD. DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
09-28-18				6	ARK.			
						JOB NO. 050325	38	51

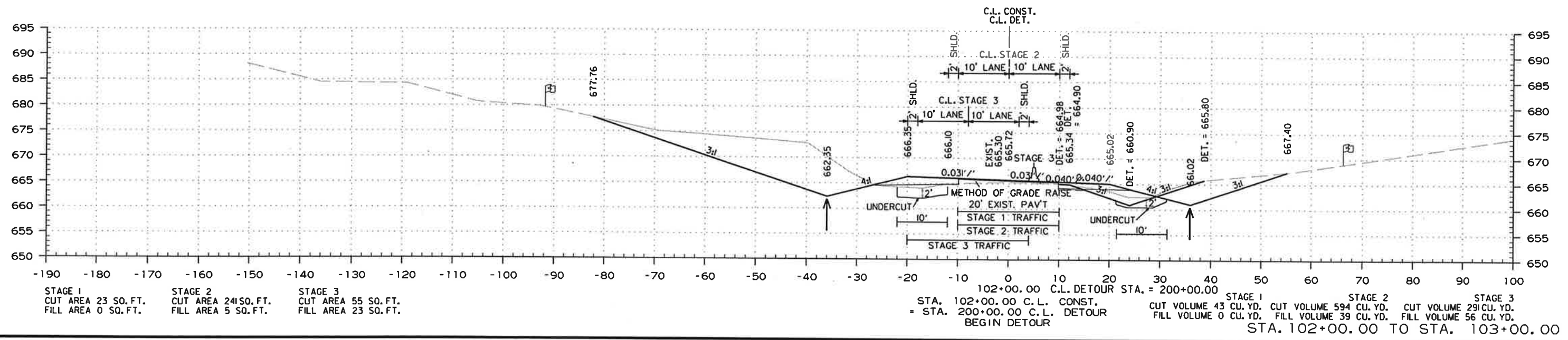
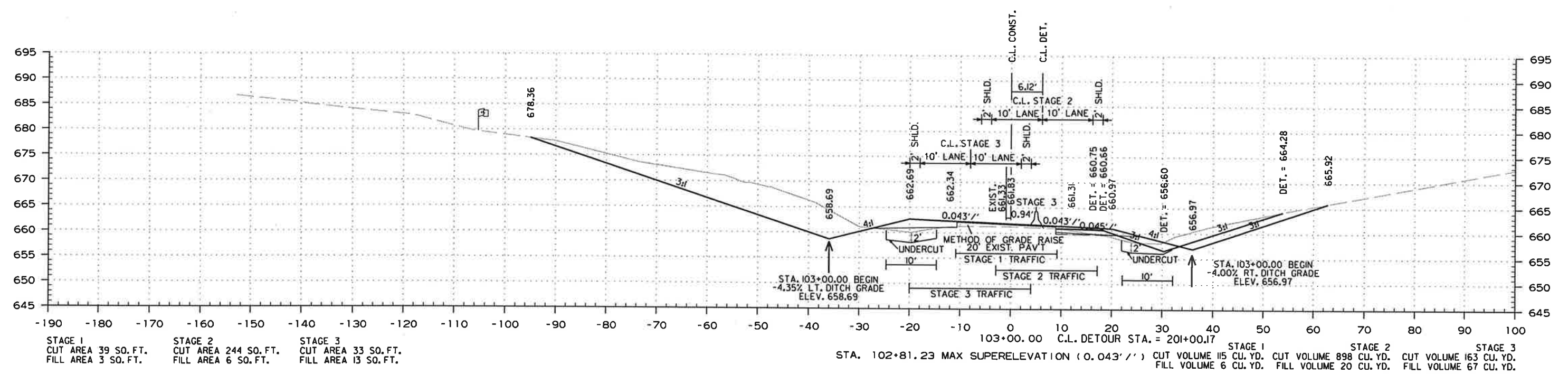
2 CROSS SECTIONS



9/27/2018  
R050325.DGN

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED. DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
09-28-18				6	ARK.			
						JOB NO. 050325	39	51

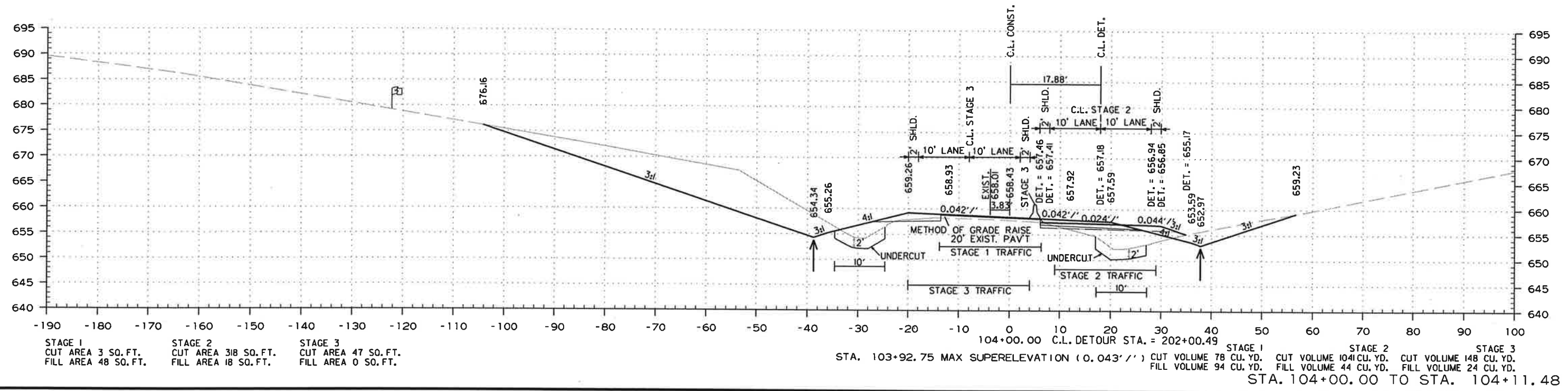
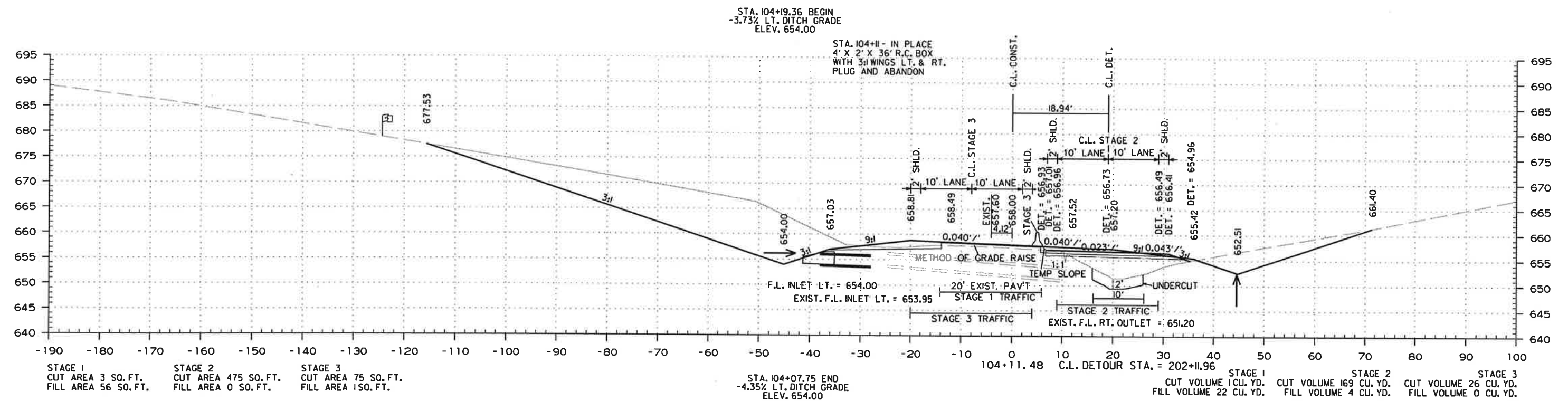
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9/27/2018  
R050325.DGN

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED. DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
09-28-18				6	ARK.			
						JOB NO. 050325	40	51

2 CROSS SECTIONS

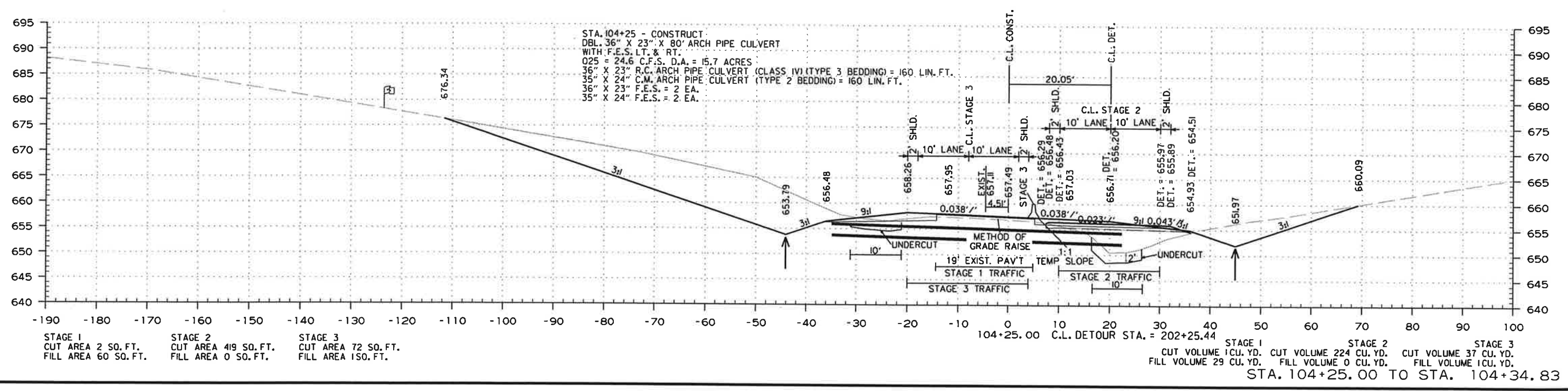
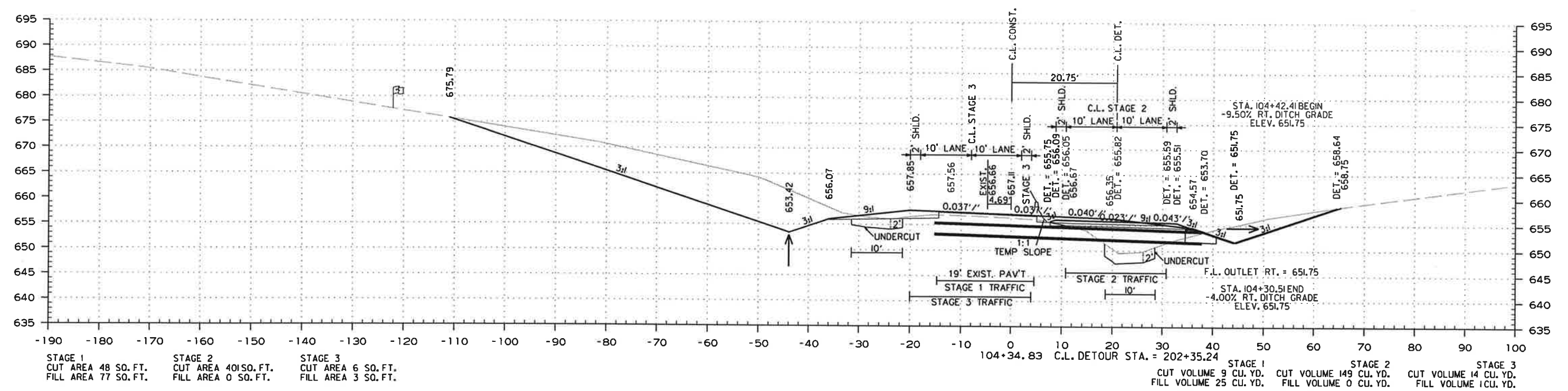


9/27/2018  
R050325.DGN



DATE REVISED	DATE FILED	DATE REVISED	DATE FILED	FED. DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
09-28-18				6	ARK.			
						JOB NO. 050325	41	51

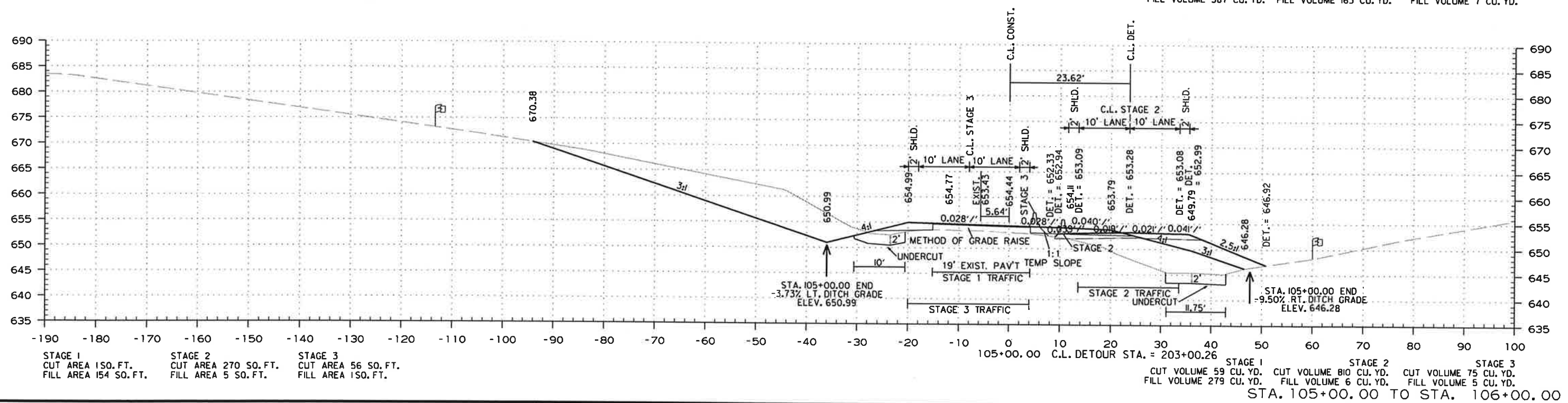
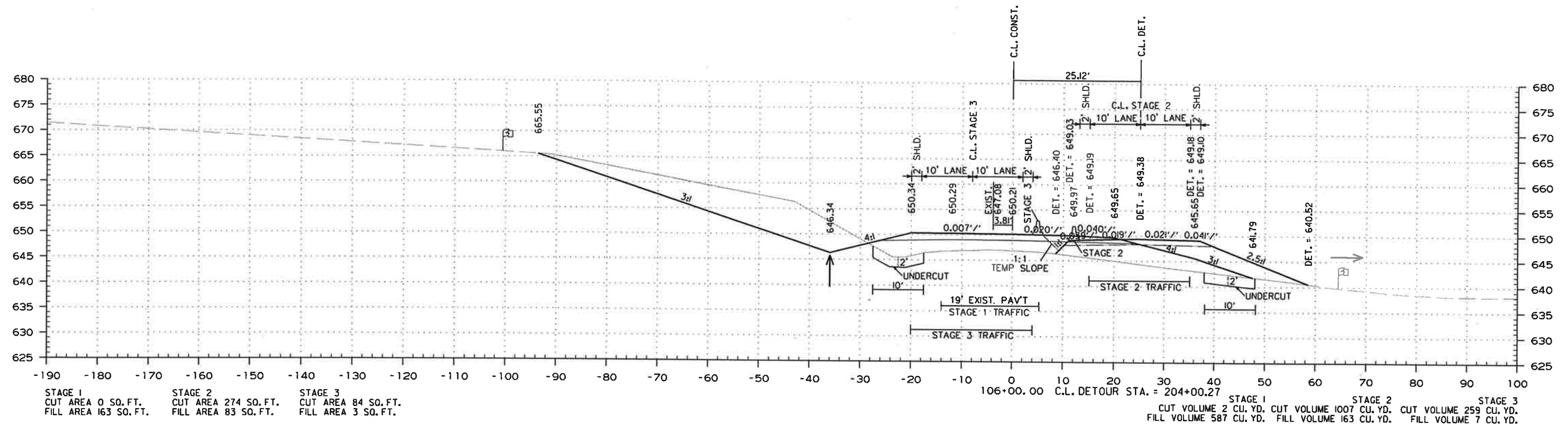
2 CROSS SECTIONS



9/27/2018  
R050325.DGN

DATE REVISED	DATE FILED	DATE REVISED	DATE FILED	FED. RD. DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
09-28-18				6	ARK.			
						JOB NO. 050325	42	51

2 CROSS SECTIONS

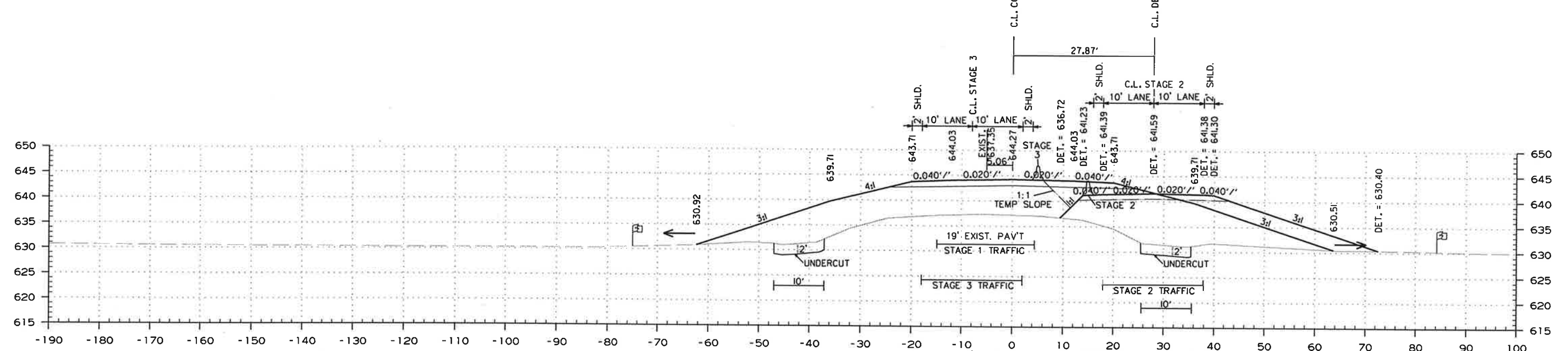


9/27/2018

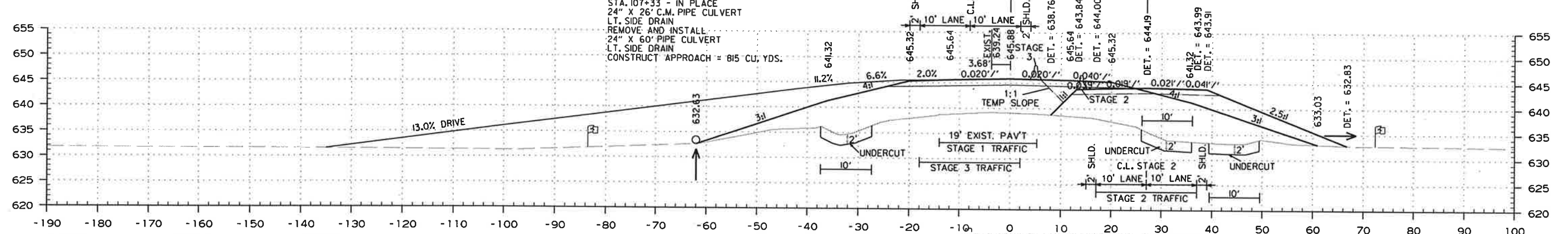
R050325.DGN

DATE REVISED	DATE FILED	DATE REVISED	DATE FILED	FED. DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
09-28-18				6	ARK.			
						JOB NO. 050325	43	51

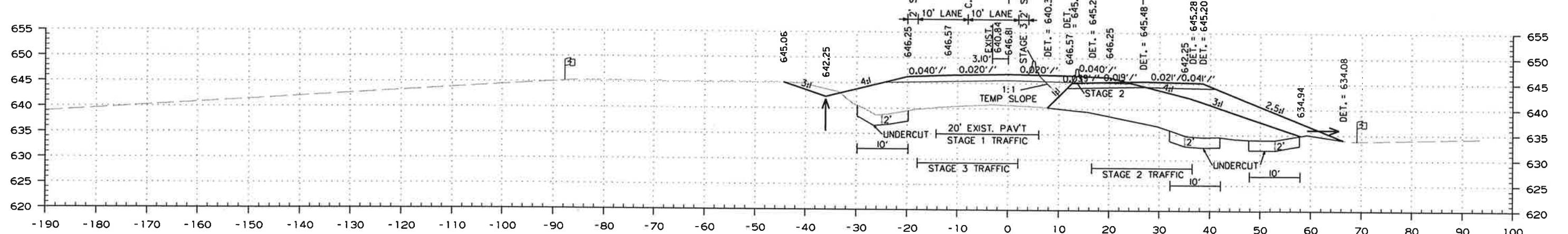
2 CROSS SECTIONS



STAGE 1 CUT AREA 0 SQ. FT. FILL AREA 370 SQ. FT.	STAGE 2 CUT AREA 0 SQ. FT. FILL AREA 376 SQ. FT.	STAGE 3 CUT AREA 97 SQ. FT. FILL AREA 315 SQ. FT.	108+00.00 C.L. CONST.	C.L. DETOUR STA. = 206+00.17	STAGE 1 CUT VOLUME 0 CU. YD. FILL VOLUME 881 CU. YD.	STAGE 2 CUT VOLUME 0 CU. YD. FILL VOLUME 880 CU. YD.	STAGE 3 CUT VOLUME 237 CU. YD. FILL VOLUME 55 CU. YD.
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STAGE 1 CUT AREA 0 SQ. FT. FILL AREA 341 SQ. FT.	STAGE 2 CUT AREA 0 SQ. FT. FILL AREA 334 SQ. FT.	STAGE 3 CUT AREA 94 SQ. FT. FILL AREA 13 SQ. FT.	107+33.06 C.L. CONST.	C.L. DETOUR STA. = 205+33.34	STAGE 1 CUT VOLUME 0 CU. YD. FILL VOLUME 416 CU. YD.	STAGE 2 CUT VOLUME 6 CU. YD. FILL VOLUME 330 CU. YD.	STAGE 3 CUT VOLUME 118 CU. YD. FILL VOLUME 13 CU. YD.
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STAGE 1 CUT AREA 0 SQ. FT. FILL AREA 337 SQ. FT.	STAGE 2 CUT AREA 10 SQ. FT. FILL AREA 204 SQ. FT.	STAGE 3 CUT AREA 99 SQ. FT. FILL AREA 8 SQ. FT.	107+00.00 C.L. CONST.	C.L. DETOUR STA. = 205+00.28	STAGE 1 CUT VOLUME 0 CU. YD. FILL VOLUME 926 CU. YD.	STAGE 2 CUT VOLUME 526 CU. YD. FILL VOLUME 532 CU. YD.	STAGE 3 CUT VOLUME 339 CU. YD. FILL VOLUME 20 CU. YD.
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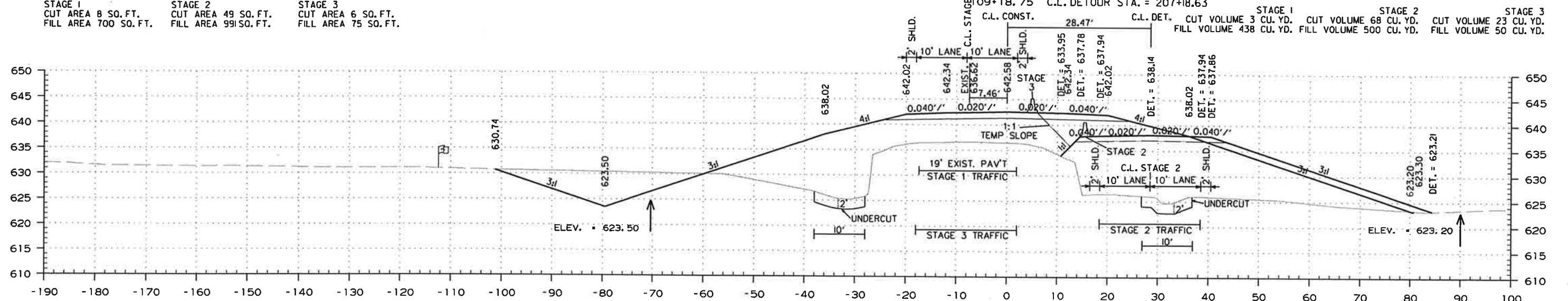
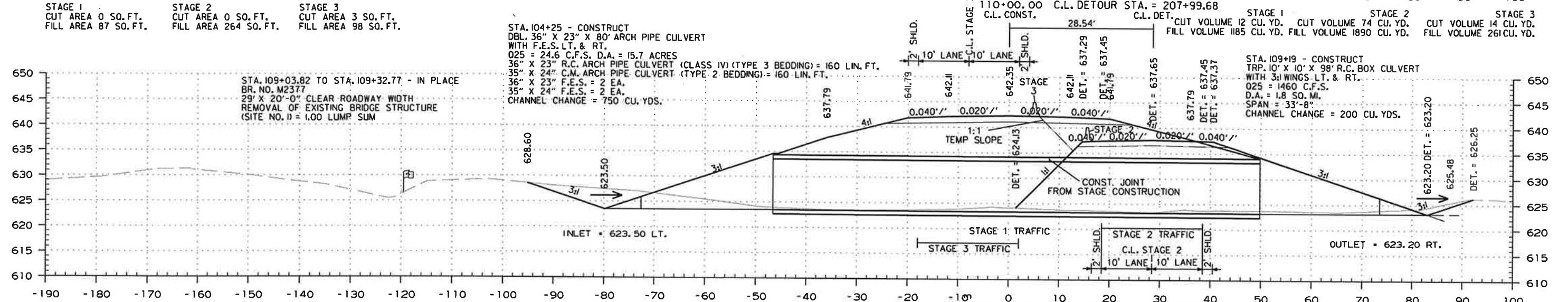
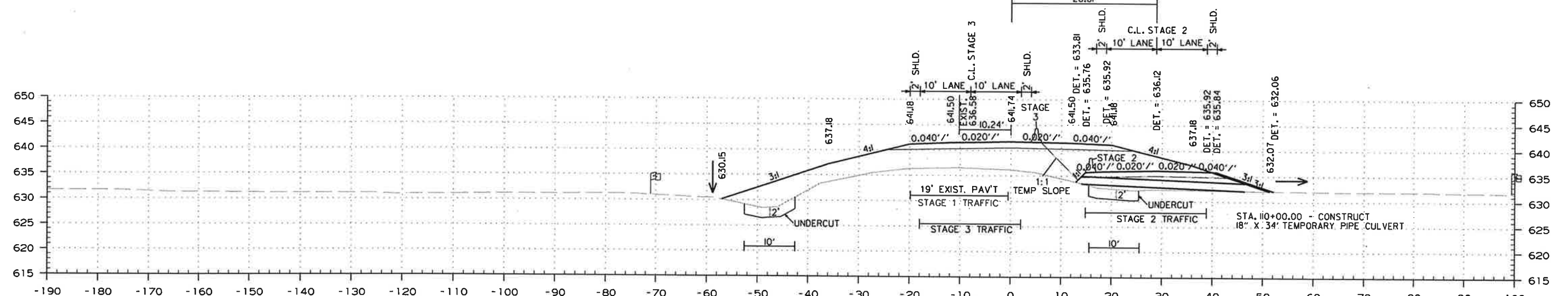
STA. 106+92.75 END SUPERELEVATION (N.C.)  
STA. 107+00.00 TO STA. 108+00.00

9/27/2018  
R050325.DGN



DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED. DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
09-28-18				6	ARK.			
						JOB NO. 050325	44	51

2 CROSS SECTIONS

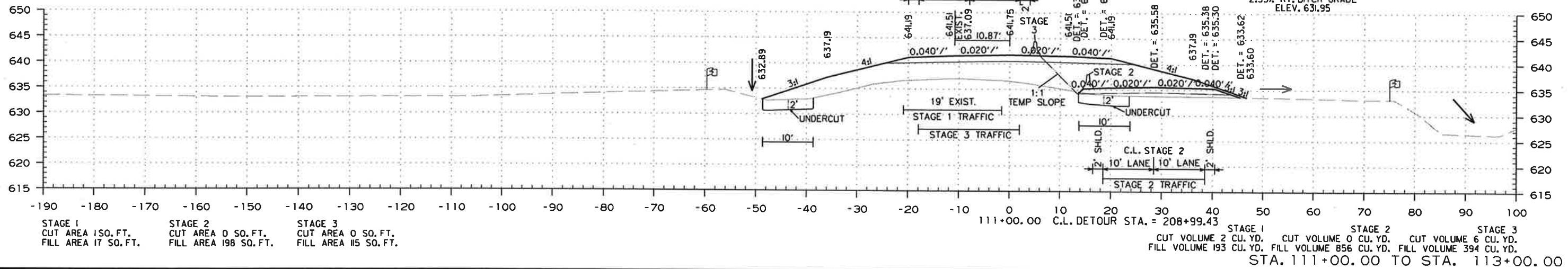
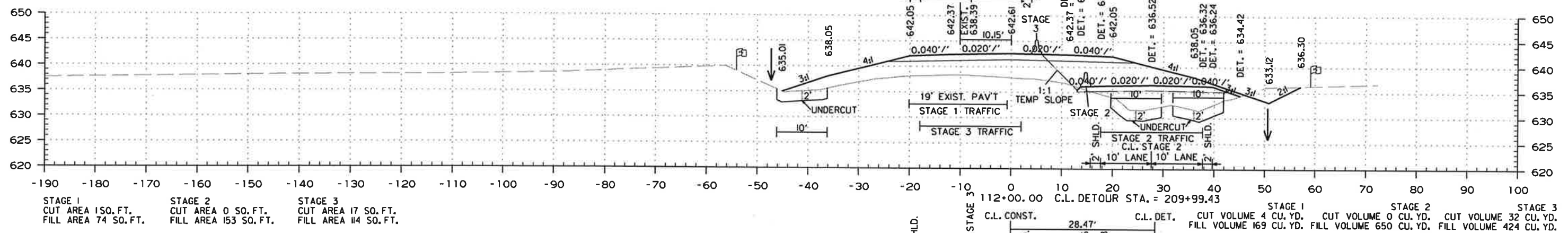
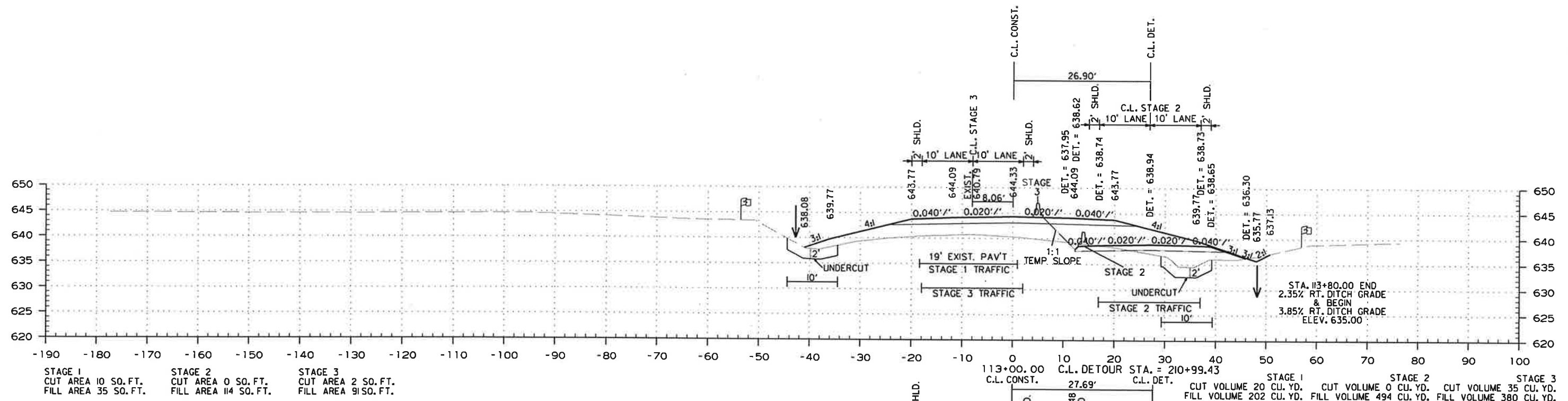


9/27/2018 R050325.DGN



DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED. DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
09-28-18				6	ARK.			
JOB NO. 050325						45	51	

2 CROSS SECTIONS

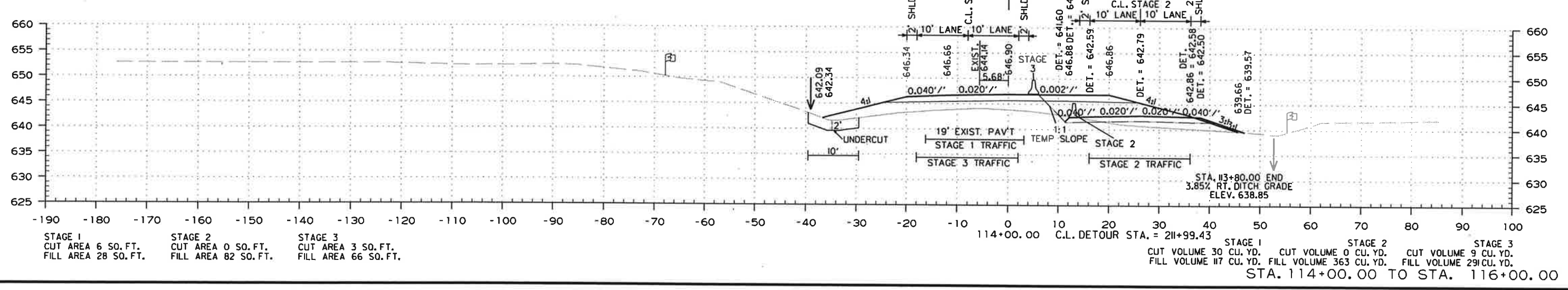
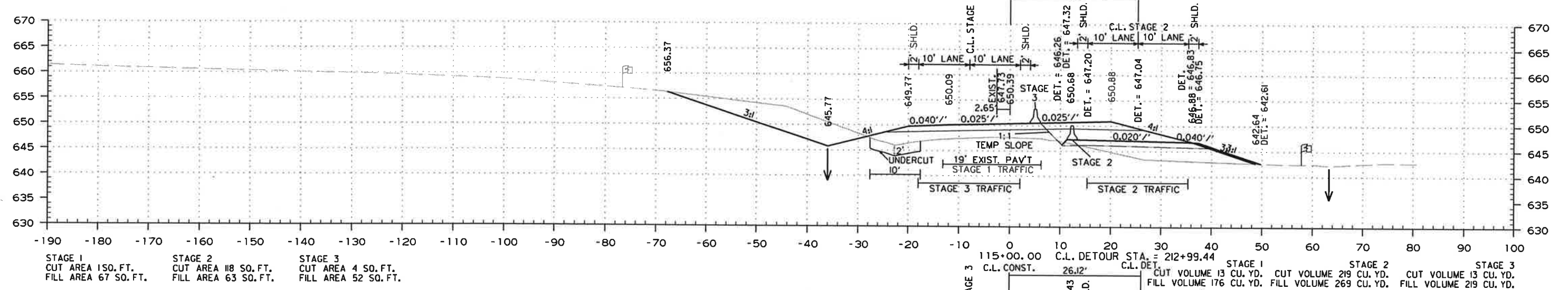
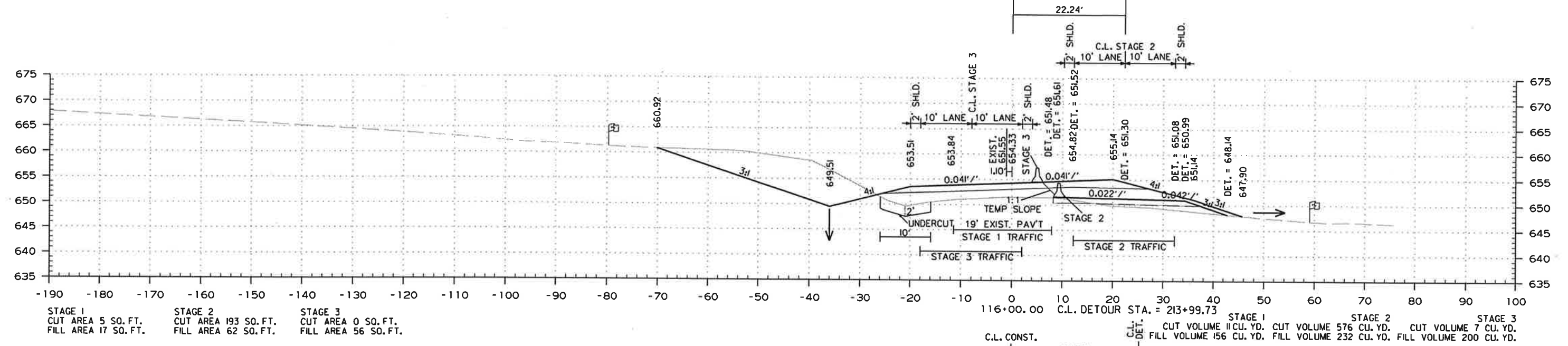


9/27/2018

RO50325.DGN

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED. AID DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
09-28-18				6	ARK.			
						JOB NO. 050325	46	51

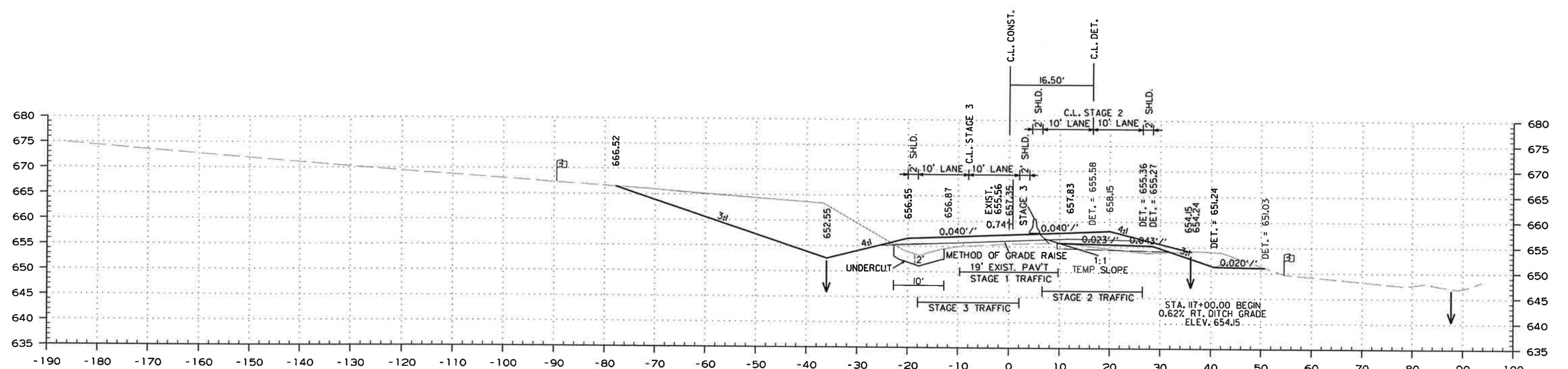
2 CROSS SECTIONS



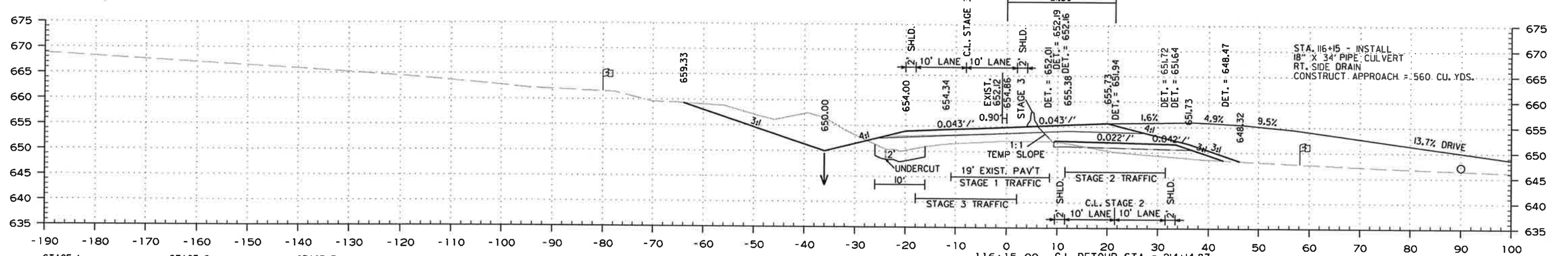
9/27/2018  
R050325.DGN

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED. RD. DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
09-28-18				6	ARK.			
						JOB NO. 050325	47	51

2 CROSS SECTIONS



STAGE 1 CUT AREA 28 SQ. FT. FILL AREA 2 SQ. FT.	STAGE 2 CUT AREA 292 SQ. FT. FILL AREA 19 SQ. FT.	STAGE 3 CUT AREA 0 SQ. FT. FILL AREA 45 SQ. FT.	117+00.00	C.L. DETOUR STA. = 215+00.58	STAGE 1 CUT VOLUME 49 CU. YD. FILL VOLUME 47 CU. YD.	STAGE 2 CUT VOLUME 634 CU. YD. FILL VOLUME 137 CU. YD.	STAGE 3 CUT VOLUME 0 CU. YD. FILL VOLUME 161 CU. YD.
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STAGE 1 CUT AREA 3 SQ. FT. FILL AREA 28 SQ. FT.	STAGE 2 CUT AREA 11 SQ. FT. FILL AREA 68 SQ. FT.	STAGE 3 CUT AREA 0 SQ. FT. FILL AREA 58 SQ. FT.	116+15.00	C.L. DETOUR STA. = 214+14.87	STAGE 1 CUT VOLUME 2 CU. YD. FILL VOLUME 13 CU. YD.	STAGE 2 CUT VOLUME 84 CU. YD. FILL VOLUME 36 CU. YD.	STAGE 3 CUT VOLUME 0 CU. YD. FILL VOLUME 31 CU. YD.
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STA. 116+15.00 TO STA. 117+00.00

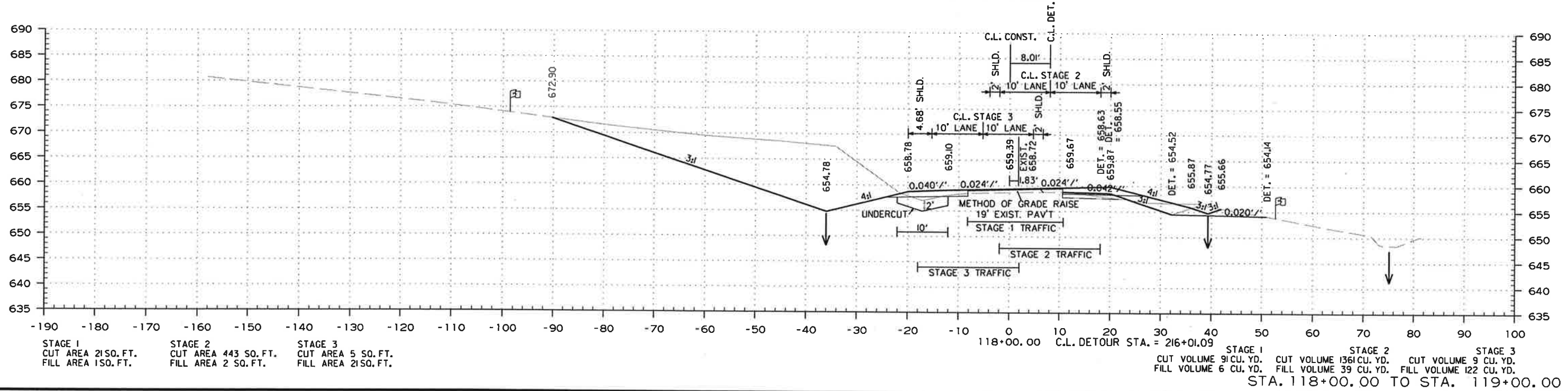
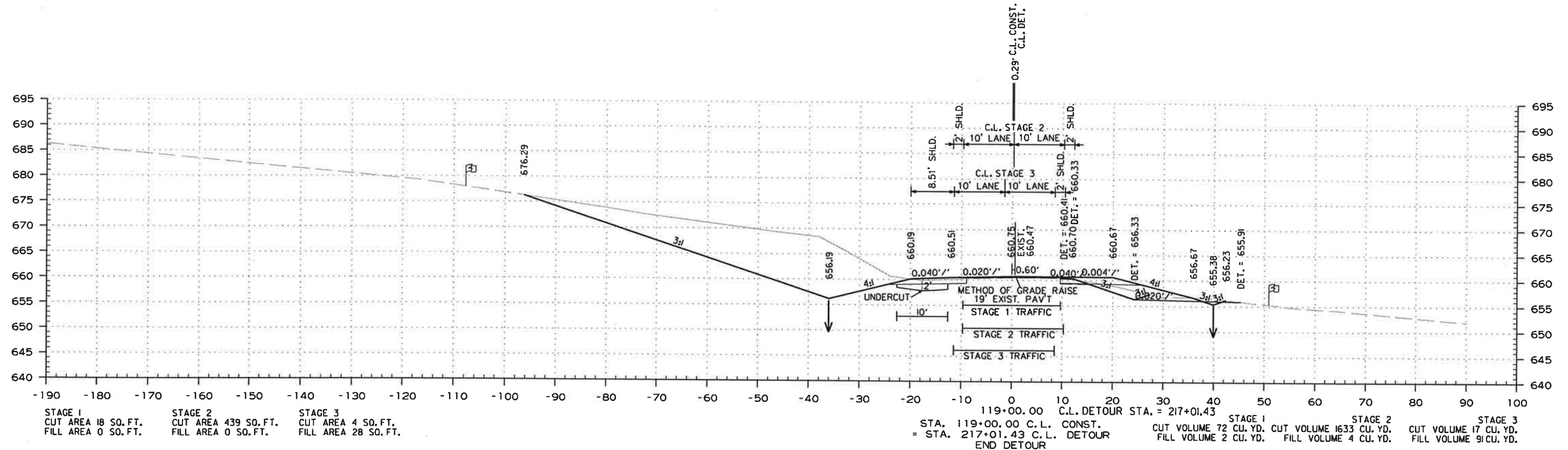
9/27/2018

R050325.DGN



DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED. RD. DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
09-28-18				6	ARK.			
						JOB NO. 050325	48	51

2 CROSS SECTIONS

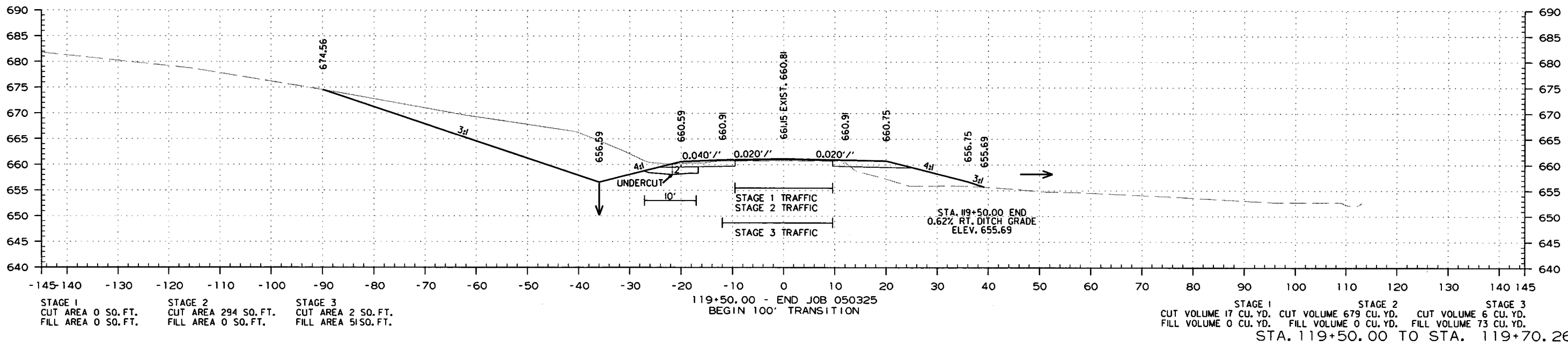
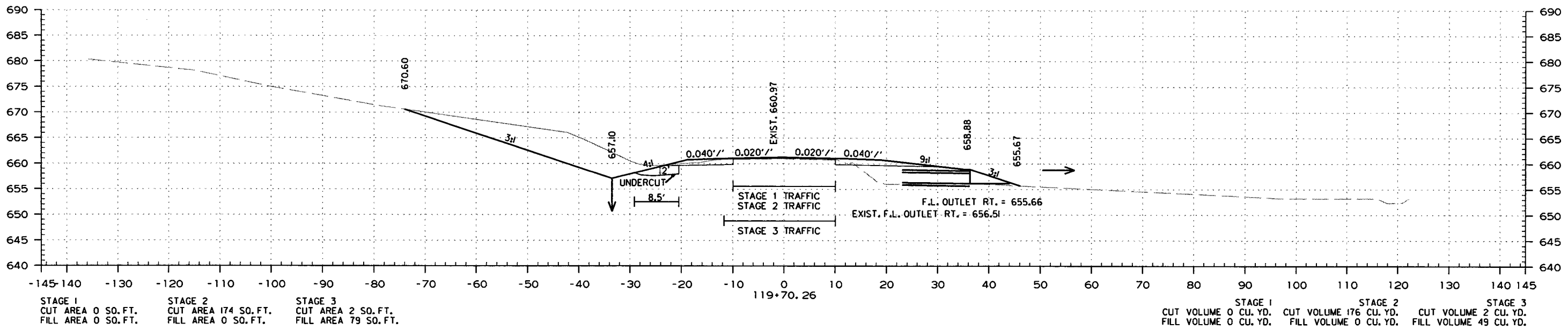


9/27/2018

R050325.DGN

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED. DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
						JOB NO. 050325	49	51

2 CROSS SECTIONS

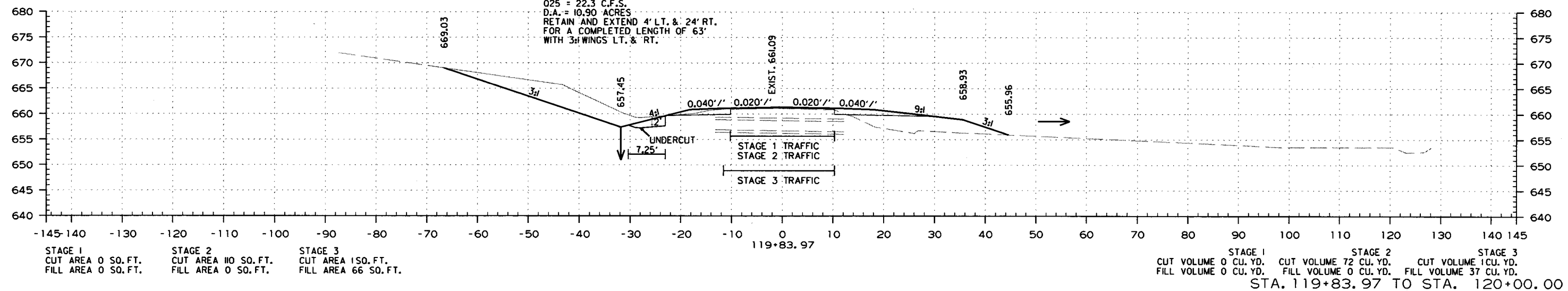
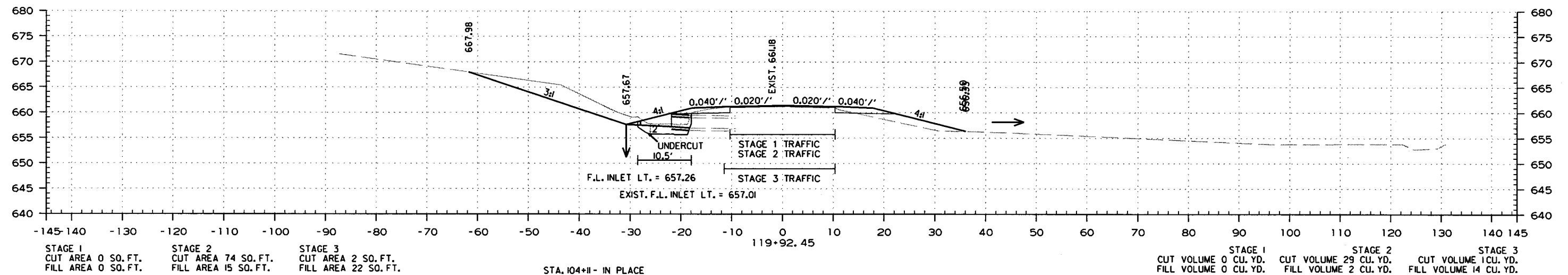
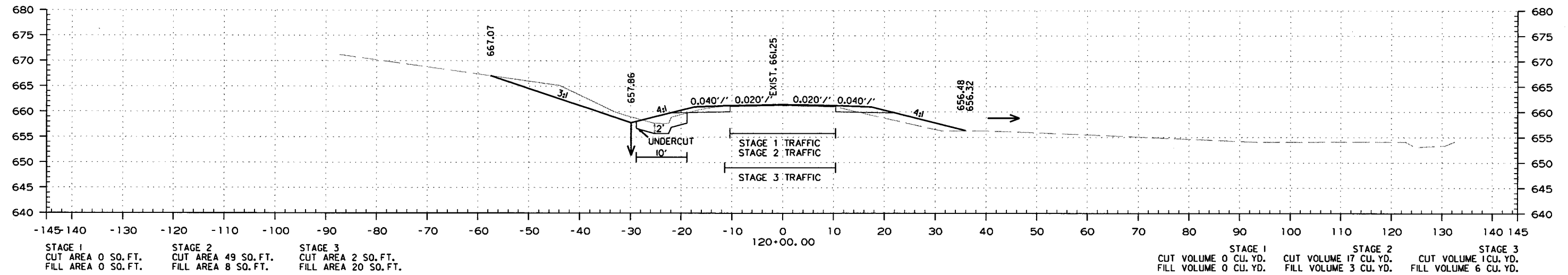


9/21/2018

R050325.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. 050325	50	51

2 CROSS SECTIONS

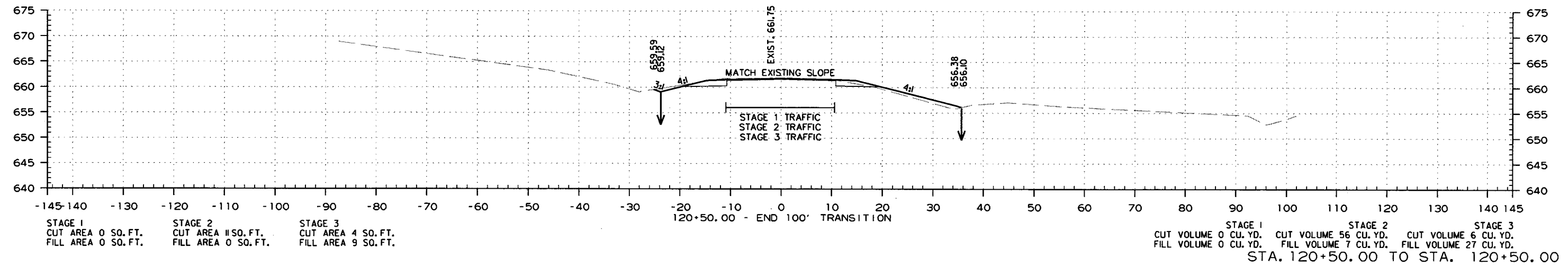


9/21/2018

R050325.DGN

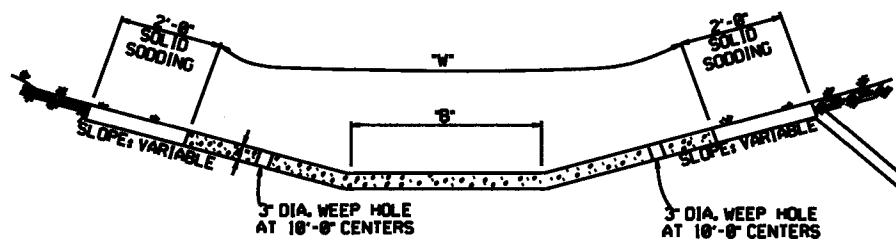
DATE REVISED	DATE FILED	DATE REVISED	DATE FILED	FED. RD. DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
						JOB NO.	050325	51

2 CROSS SECTIONS



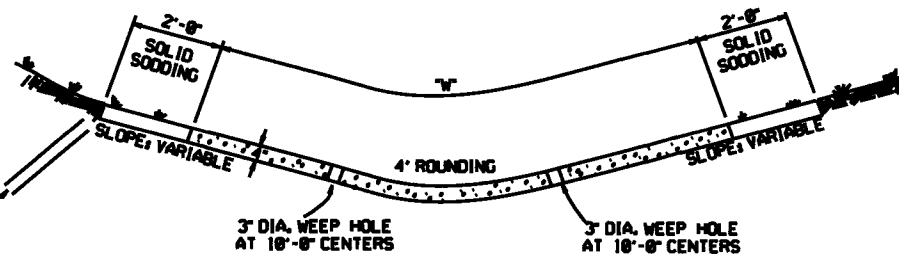
9/21/2018  
R050325.DGN

REFER TO TABULATION OF QUANTITIES FOR "W" & "S" DIMENSIONS



TYPE A

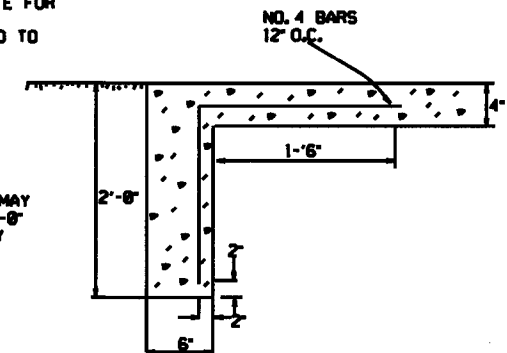
REFER TO TABULATION OF QUANTITIES FOR "W" DIMENSIONS



TYPE B

EXCAVATE TO NEAT LINES TO CONSTRUCT DITCH PAVING AND SOLID SOODING.

THE STEEL AND ADDITIONAL CONCRETE FOR THE WALLS SHALL NOT BE PAID FOR DIRECTLY, BUT SHALL BE CONSIDERED TO BE INCLUDED IN THE PRICE BID FOR "CONCRETE DITCH PAVING."



TOE WALL DEPTH MAY BE ALTERED TO 1'-0" WHEN DIRECTED BY THE ENGINEER IN ROCK EXCAVATION

TOE WALL DETAIL FOR CONCRETE DITCH PAVING

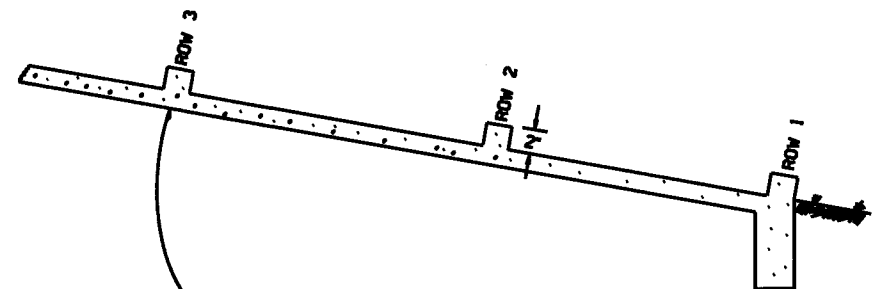
GENERAL NOTES:

THE FULL WIDTH OF EACH SECTION SHALL BE POURED MONOLITHICALLY.

TOE WALLS TO BE CONSTRUCTED FULL WIDTH AT EACH END OF DITCH PAVING, AND POURED MONOLITHICALLY.

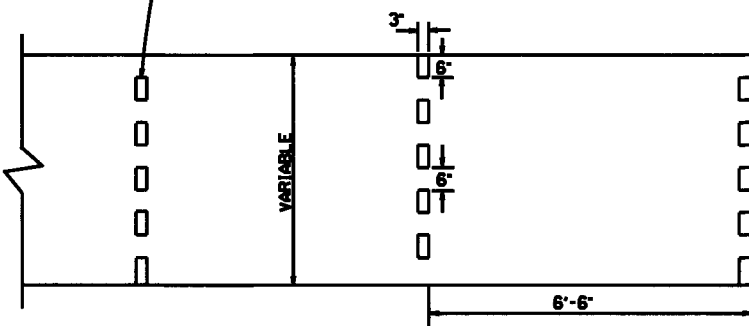
SOLID SOD ALONG DITCH PAVING TO BE PLACED WITHIN 14 DAYS OF DITCH PAVING CONSTRUCTION.

1' WIDE TRANSVERSE EXPANSION JOINTS SHALL BE PLACED IN CONCRETE DITCH PAVING AT 45' INTERVALS. THE SPACE SHALL BE FILLED WITH APPROVED JOINT FILLER COMPLYING WITH AASHTO M213.



NUMBER OF ELEMENTS PER ROW VARIES WITH WIDTH OF PAVING SPECIFIED

ENERGY DISSIPATORS TO BE USED FOR THE ENTIRE LENGTH OF DITCH WHEN SLOPE OF DITCH PAVING EXCEEDS 7%. THE DISSIPATORS WILL NOT BE PAID FOR DIRECTLY, BUT SHALL BE CONSIDERED TO BE INCLUDED IN THE PRICE BID FOR CONCRETE DITCH PAVING.



ENERGY DISSIPATORS  
(NO SCALE)

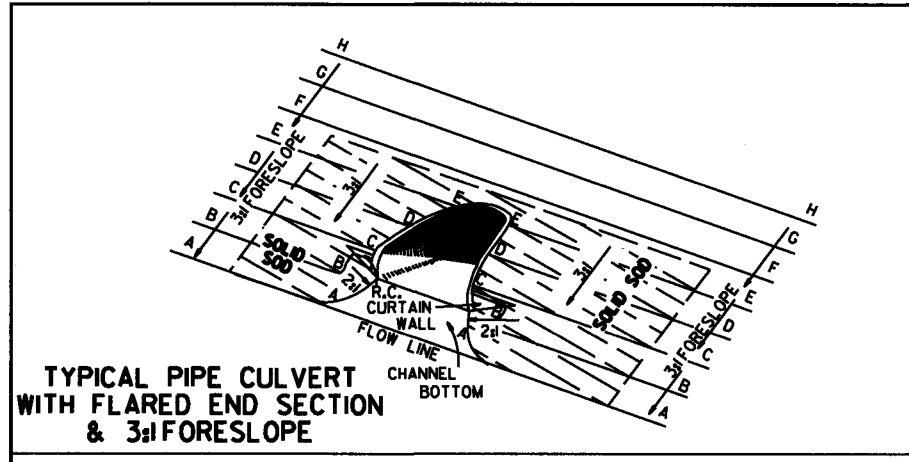
11-2-81	CORRECTED ENERGY DISSIPATOR DRAWING AND NOTE	
11-17-70	ADDED GENERAL NOTE	
6-2-44	ADDED GENERAL NOTE ABOUT SOLID SOODING	
11-30-88	ELIMINATED MIN. ROWS OF ELEMENTS	1111-30-89
7-15-89	REVISED DISSIPATOR NOTE	853-7-15-89
4-3-87	REVISED ENERGY DISSIPATOR	871-4-3-87
1-9-87	MODIFIED NOTE ON ENERGY DISS.	832-1-9-87
11-4-85	ADDED NOTE TO ENERGY DISS.	835-11-4-85
11-1-84	ENERGY DISSIPATOR DETAILS ADDED	808-11-1-84
11-1-84	EXCAVATION DETAILS ADDED	
	TYPED A & B	
10-2-72	REVISED AND REDRAWN	808-10-2-72
	DATE	REVISION
		DATE FILM'D

ARKANSAS STATE HIGHWAY COMMISSION

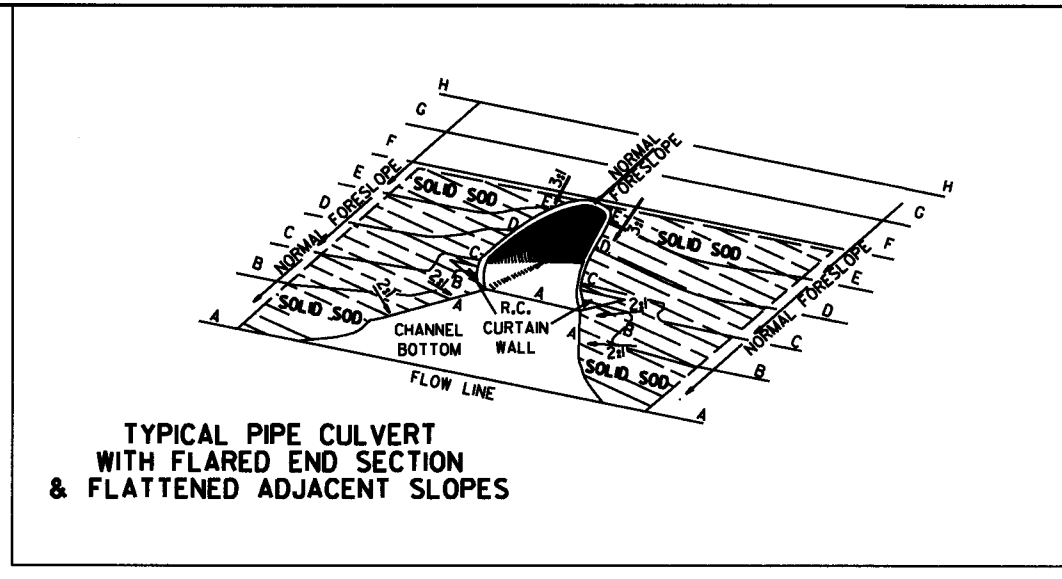
CONCRETE DITCH PAVING

STANDARD DRAWING CDP-1

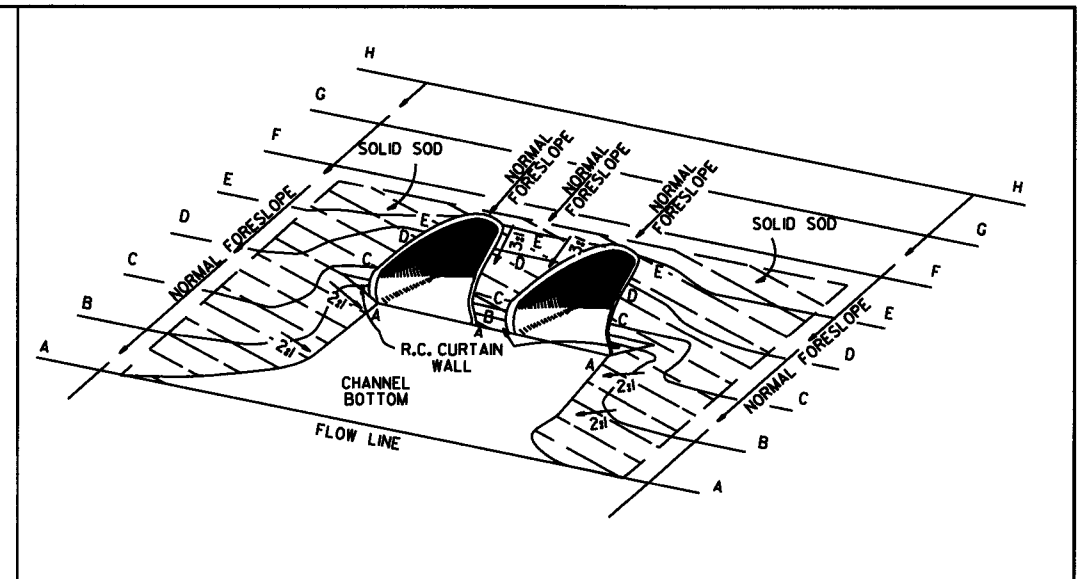




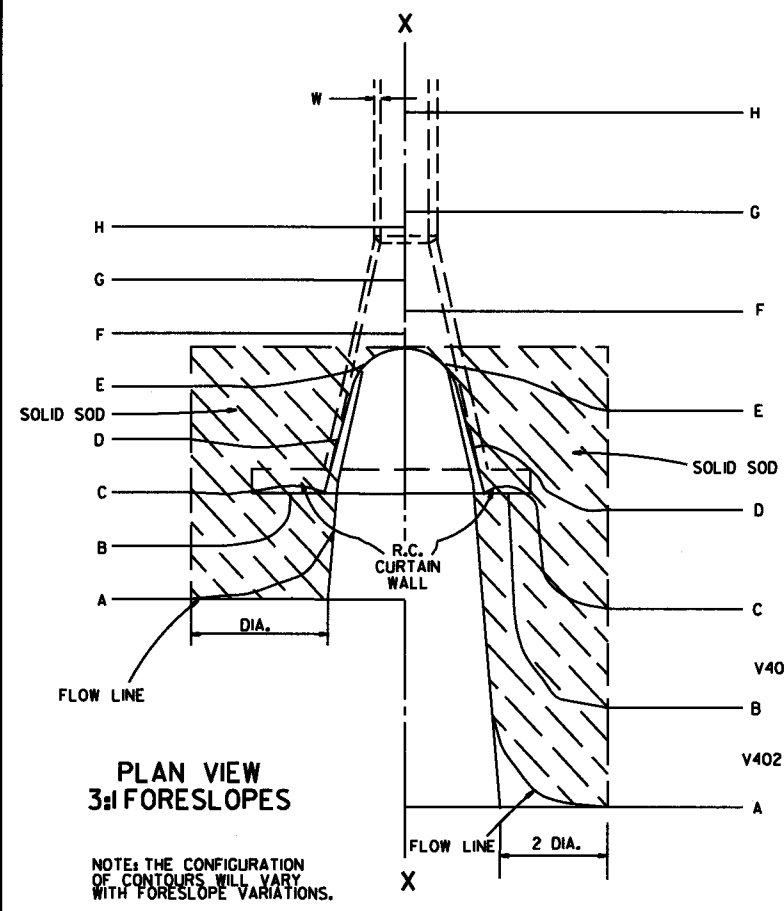
TYPICAL PIPE CULVERT WITH FLARED END SECTION & 3:1 FORESLOPE



TYPICAL PIPE CULVERT WITH FLARED END SECTION & FLATTENED ADJACENT SLOPES



TYPICAL MULTIPLE PIPE CULVERT WITH FLARED END SECTIONS & FLATTENED ADJACENT SLOPES



PLAN VIEW 3:1 FORESLOPES

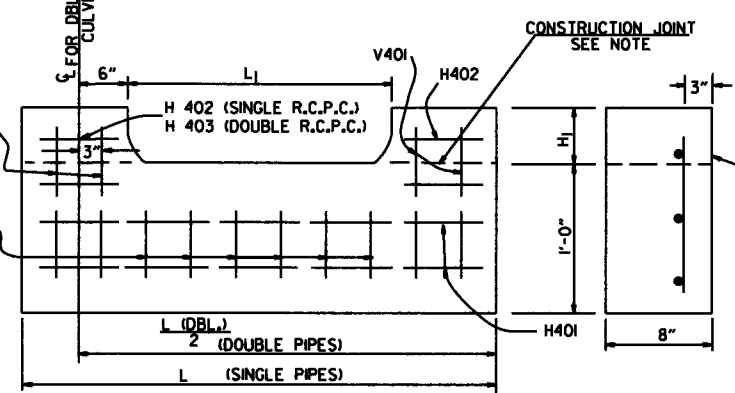
NOTE: THE CONFIGURATION OF CONTOURS WILL VARY WITH FORESLOPE VARIATIONS.

PLAN VIEW FLATTENED FORESLOPES

R.C. CURTAIN WALL DIMENSIONS & QUANTITIES

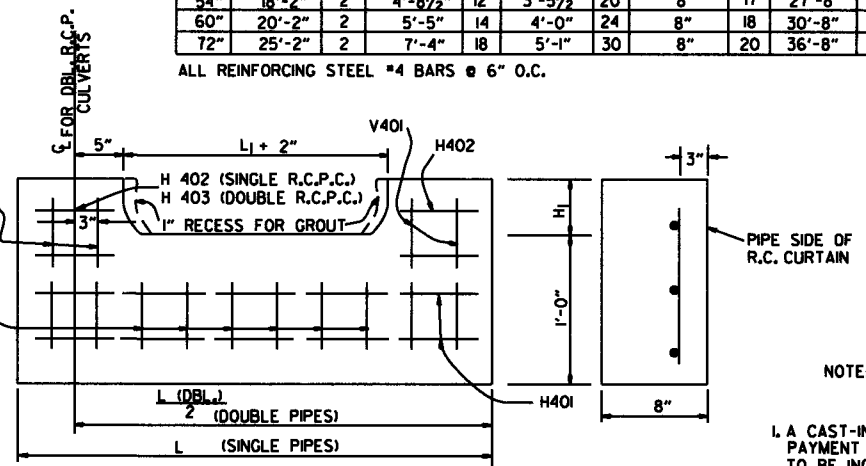
PIPE DIA.	H <sub>1</sub>	L <sub>1</sub>	L	L (DBL.) / 2	SINGLE R.C.P.C.		DOUBLE R.C.P.C.	
					CONC.	REINF. STEEL	CONC.	REINF. STEEL
18"	11/2"	3'-5"	8'-0"	6'-3"	0.31	27.7	0.45	39.5
24"	1'-0 1/2"	4'-6"	9'-6"	7'-6"	0.37	33.4	0.53	48.0
30"	1'-3 1/2"	5'-7"	11'-0"	9'-0"	0.45	39.0	0.67	59.0
36"	1'-7"	6'-8"	13'-0"	10'-6"	0.58	52.6	0.83	73.9
42"	2'-1 1/2"	7'-3"	15'-6"	12'-0"	0.82	77.1	1.10	100.7
48"	2'-5"	7'-10"	17'-0"	13'-0"	0.98	94.9	1.27	120.4
54"	2'-9 1/2"	8'-5"	18'-6"	14'-0"	1.16	115.8	1.47	143.7
60"	3'-4"	9'-0"	20'-6"	15'-6"	1.47	149.7	1.84	180.3
72"	4'-5"	10'-2"	25'-6"	18'-6"	2.31	232.6	2.73	271.0

NOTE: QUANTITIES SHOWN ARE FOR ONE (1) CURTAIN WALL.



NOTE: THE PORTION OF THE R.C. CURTAIN WALL BENEATH THE FLARED END SECTION (LOWER 1'-0") SHALL BE PLACED MONOLITHICALLY. THE FLARED END SECTION SHALL THEN BE SET IN PLACE & THE REMAINING PORTIONS OF THE R.C. CURTAIN WALL PLACED.

R.C. CURTAIN WALL DETAILS



NOTE: THE PRECAST CURTAIN WALL WILL BE SET AND BACKFILLED WITH COMPACTED MATERIAL. THE FLARED END SECTION SHALL THEN BE SET IN PLACE AND THE 1" RECESS FILLED WITH GROUT. WHERE "L" EXCEEDS 11' THE CURTAIN WALL MAY BE CAST IN TWO (2) OR MORE SECTIONS. THE METHOD OF JOINING THE SECTIONS FOR INSTALLATION SHALL BE APPROVED BY THE ENGINEER.

REINFORCING STEEL SCHEDULE

PIPE DIA.	SINGLE R.C. PIPE CULVERT								DOUBLE R.C. PIPE CULVERT									
	H401		H402		V401		V402		H401		H402		V401		V402			
	L	NO.	L	NO.	L	NO.	L	NO.	L	NO.	L	NO.	L	NO.	L	NO.		
18"	7'-8"	2	1'-11/2"	4	1'-7 1/2"	8	8"	8	12'-2"	2	1'-11/2"	4	8"	2	1'-7 1/2"	10	8"	14
24"	9'-2"	2	2'-2"	4	1'-8 1/2"	10	8"	9	14'-8"	2	2'-2"	4	8"	2	1'-8 1/2"	12	8"	18
30"	10'-8"	2	2'-4 1/2"	4	1'-11/2"	10	8"	12	17'-8"	2	2'-4 1/2"	4	8"	2	1'-11/2"	14	8"	22
36"	12'-8"	2	2'-10"	6	2'-3"	12	8"	14	20'-8"	2	2'-10"	6	8"	3	2'-3"	14	8"	28
42"	15'-2"	2	3'-9 1/2"	8	2'-9 1/2"	16	8"	15	23'-8"	2	3'-9 1/2"	8	8"	4	2'-9 1/2"	18	8"	30
48"	16'-8"	2	4'-3"	10	3'-1"	18	8"	16	25'-8"	2	4'-3"	10	8"	5	3'-1"	20	8"	32
54"	18'-2"	2	4'-8 1/2"	12	3'-5 1/2"	20	8"	17	27'-8"	2	4'-9"	12	8"	6	3'-5 1/2"	22	8"	34
60"	20'-2"	2	5'-5"	14	4'-0"	24	8"	18	30'-8"	2	5'-5"	14	8"	7	4'-0"	26	8"	36
72"	25'-2"	2	7'-4"	18	5'-1"	30	8"	20	36'-8"	2	7'-4"	18	8"	9	5'-1"	33	8"	40

ALL REINFORCING STEEL #4 BARS @ 6" O.C.

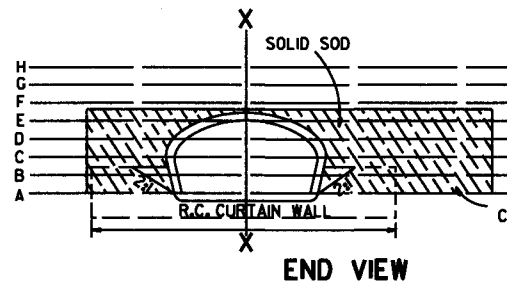
SOLID SODDING

PIPE DIA.	SINGLE R.C.P.C.			DOUBLE R.C.P.C.		
	3:1	4:1	6:1	3:1	4:1	6:1
18"	5	7	12	6	8	13
24"	8	12	19	9	13	20
30"	13	18	29	14	19	30
36"	17	26	41	18	28	43
42"	23	36	55	25	37	57
48"	29	46	68	31	48	70
54"	36	57	85	37	59	87
60"	45	67	104	48	65	107
72"	64	92	156	67	95	159

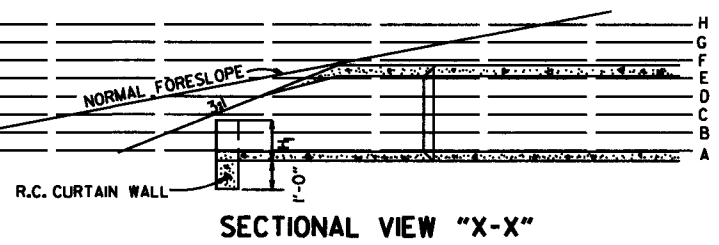
NOTE: QUANTITIES SHOWN ABOVE ARE FOR ONE (1) END OF F.E.S.

GENERAL NOTES

1. A CAST-IN-PLACE OR PRECAST CURTAIN WALL MAY BE USED. PAYMENT FOR THE CURTAIN WALL SHALL BE CONSIDERED TO BE INCLUDED IN THE UNIT PRICE BID EACH FOR FLARED END SECTIONS OF THE SEVERAL SIZES, WHICH PRICE SHALL BE FULL COMPENSATION FOR FURNISHING ALL MATERIALS INCLUDING REINFORCING STEEL AND CONCRETE; FOR FORMS, MIXING AND PLACING; FOR EXCAVATION AND BACKFILL; AND FOR ALL LABOR, TOOLS, EQUIPMENT AND INCIDENTALS NECESSARY TO COMPLETE THE WORK.
2. ALL EXPOSED EDGES SHALL BE CHAMFERED 3/4".
3. CONCRETE FOR CURTAIN WALL SHALL MEET THE REQUIREMENTS FOR CLASS A OR S CONCRETE AS PROVIDED IN SECTION 802 OF THE STANDARD SPECIFICATIONS OR FOR PAVING CONCRETE AS PROVIDED IN SECTION 501 OF THE STANDARD SPECIFICATIONS.
4. WELDED WIRE MESH 3 x 3 W/10 x W/10 MAY BE USED IN LIEU OF REINFORCING BARS.

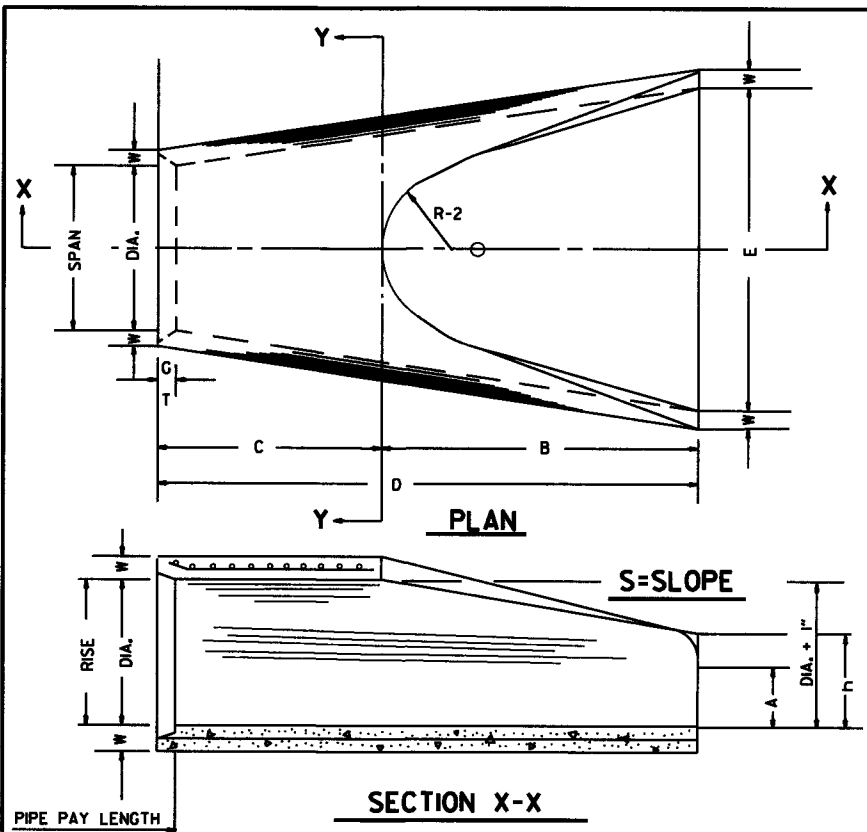


END VIEW



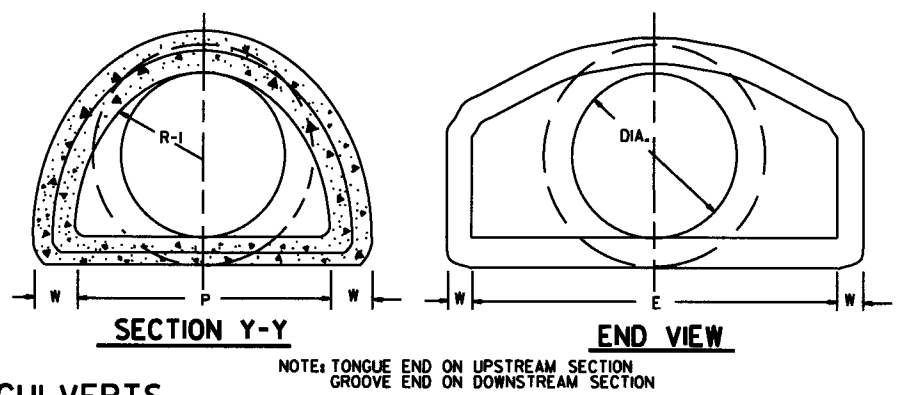
SECTIONAL VIEW "X-X"

10-18-98	ADDED NOTE TO SOLID SODDING			ARKANSAS STATE HIGHWAY COMMISSION
10-12-95	CORRECTED SPELLING			
11-3-94	ADDED GENERAL NOTE NO. 4			
8-15-91	REV. CURTAIN WALL QUANT. STEEL SCH. & SOLID SOD QUANT.			
5-2-81	ALLOW PRECAST IN 2 OR MORE PIECES CHAMFER EDGES			
5-15-80	ADDED PRECAST WALL & GENERAL NOTES			
10-2-72	REVISED AND REDRAWN			
DATE	REVISION	FILMED		STANDARD DRAWING FES-1



### TABLE OF DIMENSIONS

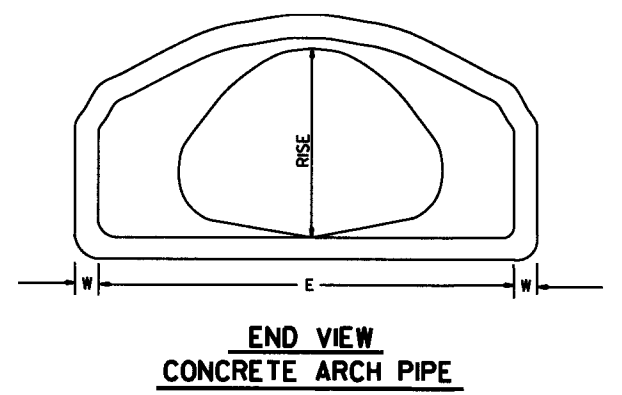
DIA.	WALL	A	B	C	D	E	S	DIA. + 1"	P	R-1	R-2	G-T	WT.	h
18"	2 1/2"	9"	2'-3"	3'-10"	6'-1"	3'-0"	3#1	19"	29"	15 1/2"	12"	2"	1000	1'-0 1/2"
24"	3"	9 1/2"	3'-7 1/2"	2'-6"	6'-1 1/2"	4'-0"	3#1	25"	33 3/4"	16 3/4"	14"	2 1/2"	1600	1'-1 1/2"
30"	3 1/2"	1'-0"	4'-6"	1'-7 3/4"	6'-1 3/4"	5'-0"	3#1	31"	37"	18 1/2"	15"	3 1/4"	1940	1'-4 3/4"
36"	4"	1'-3"	5'-3"	2'-10 3/4"	8'-1 1/4"	6'-0"	3#1	37"	47 1/4"	24 3/4"	20"	3 1/2"	4100	1'-8"
42"	4 1/2"	1'-9"	5'-3"	2'-11"	8'-2"	6'-6"	3#1	43"	53 1/8"	27 1/2"	22"	3 3/4"	5380	2'-2 1/2"
48"	5"	2'-0"	6'-0"	2'-2"	8'-2"	7'-0"	3#1	49"	56 1/2"	28 1/2"	22"	3 1/2"	6550	2'-6"
54"	5 1/2"	2'-4"	6'-6"	1'-10"	8'-4"	7'-6"	3#1	55"	65 1/2"	33 3/4"	24"	4"	8750	2'-10 1/2"
60"	6"	2'-10"	6'-6"	1'-10"	8'-4"	8'-0"	3#1	61"	72 1/2"	36 1/4"	24"	4"	9270	3'-5"
72"	7"	3'-10"	6'-6"	1'-10"	8'-4"	9'-0"	3#1	73"	77 3/4"	38 3/4"	24"	5"	13250	4'-6"



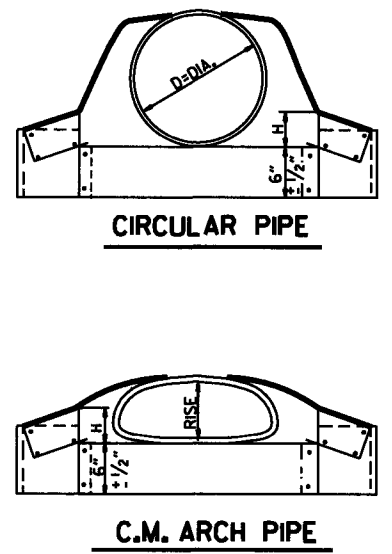
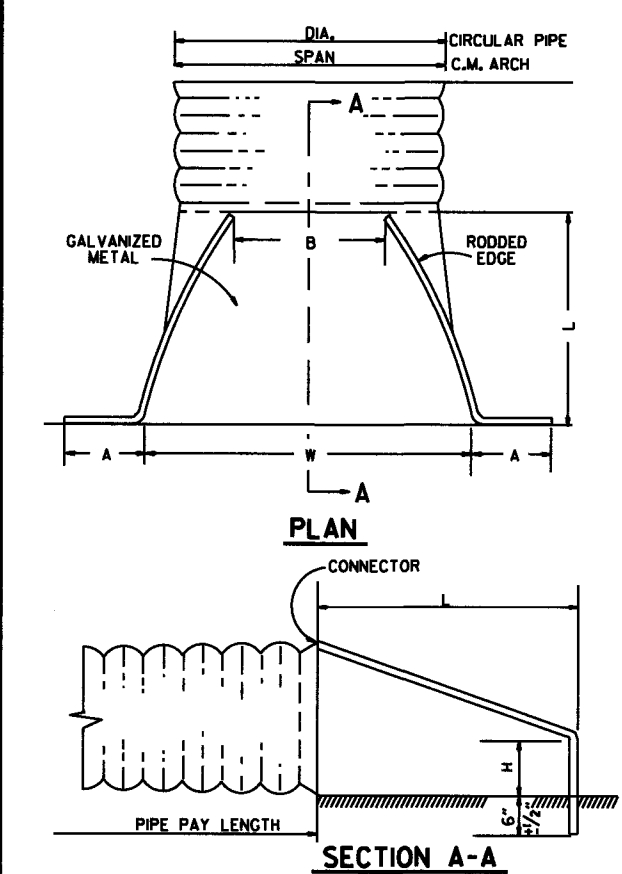
### ARCH PIPE

EQUIV. DIA.	• SPAN		• RISE		W	A	B	C	D	E	P	R2	G-T	S
	AASHTO M 206	AHD NOMINAL	AASHTO M 206	AHD NOMINAL										
INCHES														
15	18	18	11	11	2"	4"	2'-0"	4'-0"	6'-0"	3'-0"	29"	12"	1 1/2"	2 1/2#1
18	22	22	13 1/2	14	2 1/2"	5"	2'-0"	4'-1"	6'-1"	3'-6"	32 1/8"	13"	2 1/2"	2 1/2#1
21	26	26	15 1/2	16	2 3/4"	7"	2'-3"	3'-10"	6'-1"	4'-0"	34 1/4"	14"	2 1/2"	2 1/2#1
24	28 1/2	29	18	18	3"	9"	2'-3"	3'-10"	6'-1"	5'-0"	36 3/4"	15"	2 1/2"	2 1/2#1
30	36 1/4	36	22 1/2	23	3 1/2"	10"	3'-1"	3'-0 1/2"	6'-1 1/2"	6'-0"	47 1/8"	20"	3"	2 1/2#1
36	43 3/4	44	26 3/4	27	4"	10 1/2"	4'-0"	2'-1 1/2"	6'-1 1/2"	6'-6"	54 1/8"	22"	3 1/2"	2 1/2#1
42	51 1/8	51	31 3/4	31	4 1/2"	11 1/2"	4'-7"	1'-10 1/4"	6'-5 1/4"	7'-2"	59 1/2"	23"	3 3/4"	2 1/2#1
48	58 1/2	59	36	36	5"	1'-3"	5'-3"	2'-10 3/4"	8'-1 1/4"	7'-10"	70 3/4"	24"	4 1/4"	2 1/2#1
54	65	65	40	40	5 1/2"	1'-7"	5'-3"	2'-11"	8'-2"	8'-6"	72 1/8"	24"	4 3/4"	2 1/2#1
60	73	73	45	45	6"	1'-10"	5'-6"	2'-8"	8'-2"	9'-0"	77 3/4"	24"	5"	2 1/2#1

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



**END SECTION FOR REINFORCED CONCRETE PIPE CULVERTS**

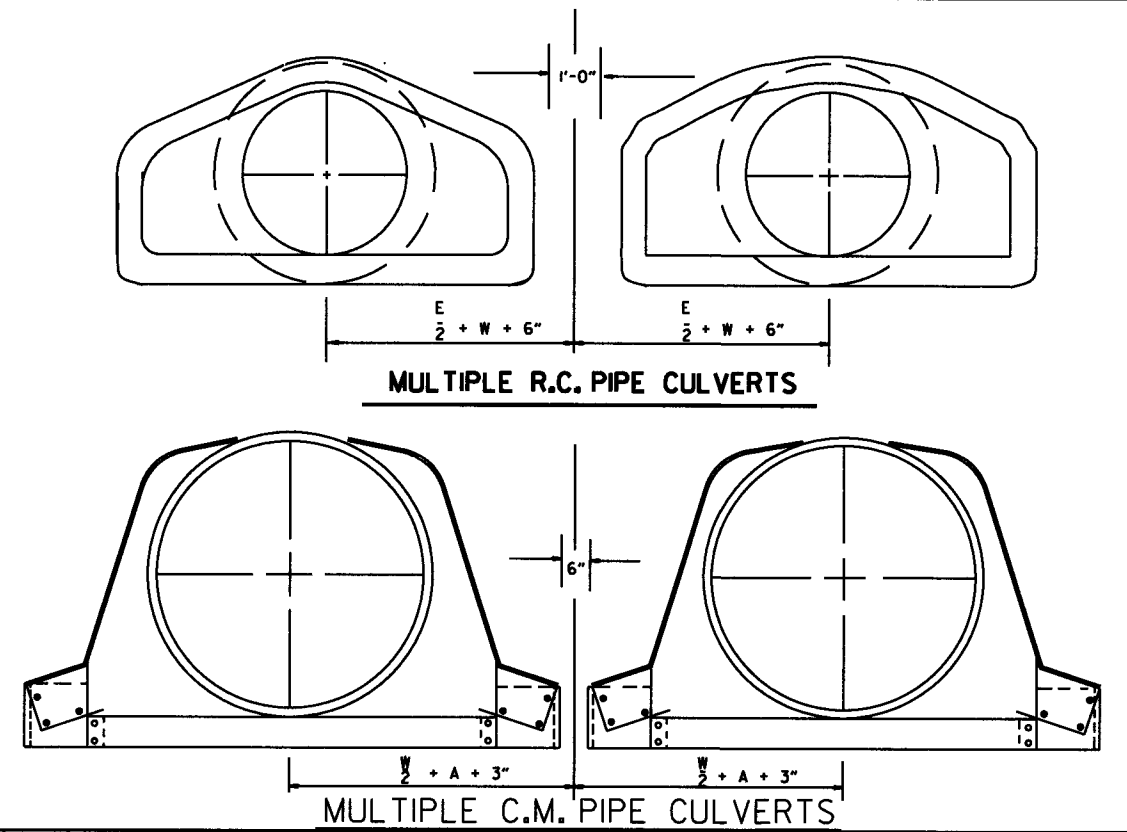


### CIRCULAR PIPE

D. DIA.	GAUGE	A 1" ±	B. MAX.	H 1" ±	L 1/2" ±	W ±	S
12	16	6	6	6	21	24	2 1/2#1
15	16	7	8	6	26	30	2 1/2#1
18	16	8	10	6	31	36	2 1/2#1
21	16	9	12	6	36	42	2 1/2#1
24	16	10	13	6	41	48	2 1/2#1
30	14	12	16	8	51	60	2 1/2#1
36	14	14	19	9	60	72	2 1/2#1
42	12	16	22	11	69	84	2 1/2#1
48	12	18	27	12	78	90	2 1/2#1
54	12	18	30	12	84	102	2#1
60	12	18	33	12	87	114	1 1/2#1
66	12	18	36	12	87	120	1 1/2#1
72	12	18	39	12	87	126	1 1/3#1

### C.M. ARCH PIPE

EQUIV. DIA.	SPAN	RISE	A 1" ±	B. MAX.	H 1" ±	L 1/2" ±	W ±	S	GAUGE
15"	17	13	7	9	6	19	30	2 1/2#1	16
18"	21	15	7	10	6	23	36	2 1/2#1	16
21"	24	18	8	12	6	28	42	2 1/2#1	16
24"	28	20	9	14	6	32	48	2 1/2#1	16
30"	35	24	10	16	6	39	60	2 1/2#1	14
36"	42	29	12	18	8	46	75	2 1/2#1	14
42"	49	33	13	21	9	53	85	2 1/2#1	12
48"	57	38	18	26	12	63	90	2 1/2#1	12
54"	64	43	18	30	12	70	102	2 1/2#1	12
60"	71	47	18	33	12	77	114	2 1/4#1	12

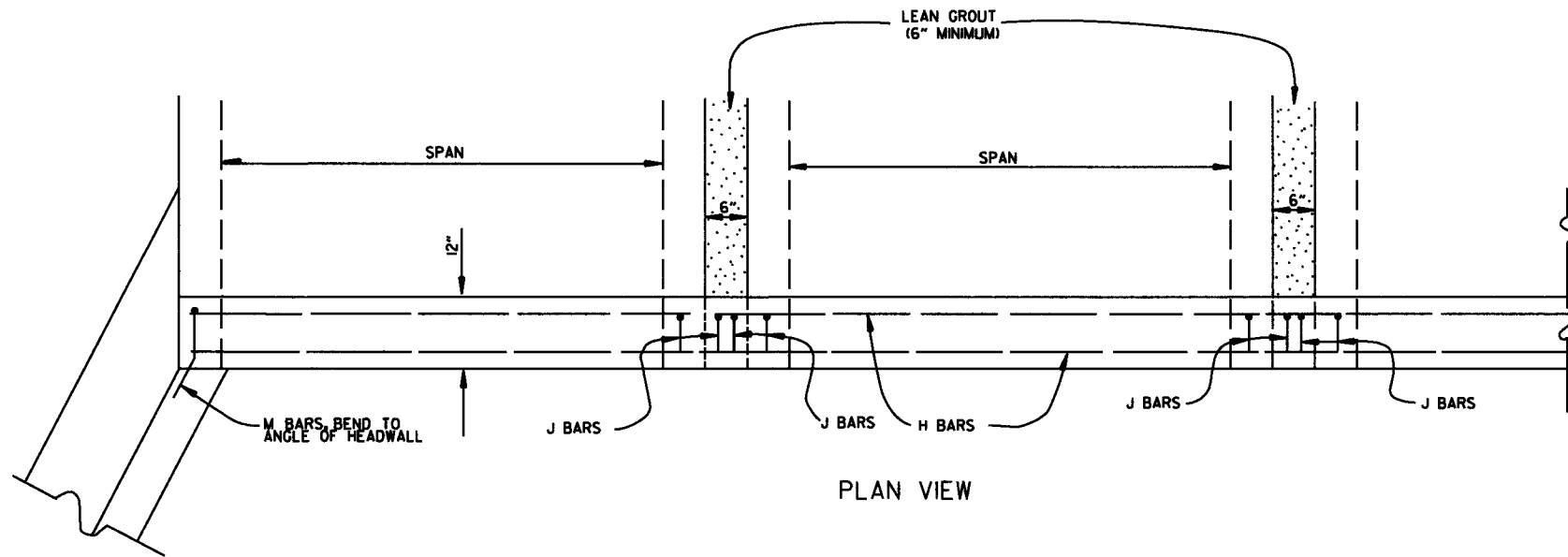


NOTE: ALTERNATE CONNECTIONS TO THE PIPE CULVERTS, IN ACCORDANCE WITH MANUFACTURER'S STANDARD PRACTICES, MAY BE MADE SUBJECT TO THE APPROVAL OF THE ENGINEER.

**END SECTIONS FOR CORRUGATED METAL PIPE CULVERTS**

10-18-96	REVISED ASTM REF. TO AASHTO		ARKANSAS STATE HIGHWAY COMMISSION
5-15-80	REVISED DISTANCE BETWEEN MULTIPLE R.C.P. F.E.S.	664-5-15-80	
7-14-78	C.M. ARCH SIZES TO CONFORM WITH AASHTO SIZES	752-7-14-78	
8-22-75	ADDED MULTIPLE PIPE CULVERTS	517-8-22-75	
12-5-74	REMOVED NOTE RE REINF. FOR R.C. F.E.S.	500-12-5-74	
5-24-73	CMP END SECTION SHOW PIPE PAY LENGTH	627-5-24-73	
10-2-72	REVISED AND REDRAWN	760-10-2-72	
DATE	REVISION	FILMED	

**FLARED END SECTION  
STANDARD DRAWING FES-2**



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

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 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 3/4" CHAMFERS.

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

ALL CONCRETE, REINFORCING STEEL, LEAN GROUT, MEMBRANE WATERPROOFING, DRAINAGE FILL MATERIAL, GEOTEXTILE FILTER FABRIC, 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.

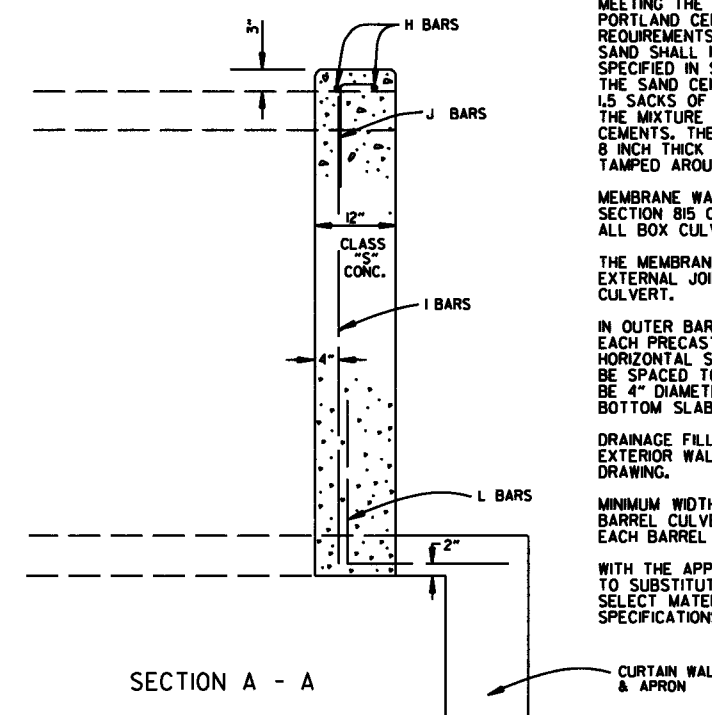
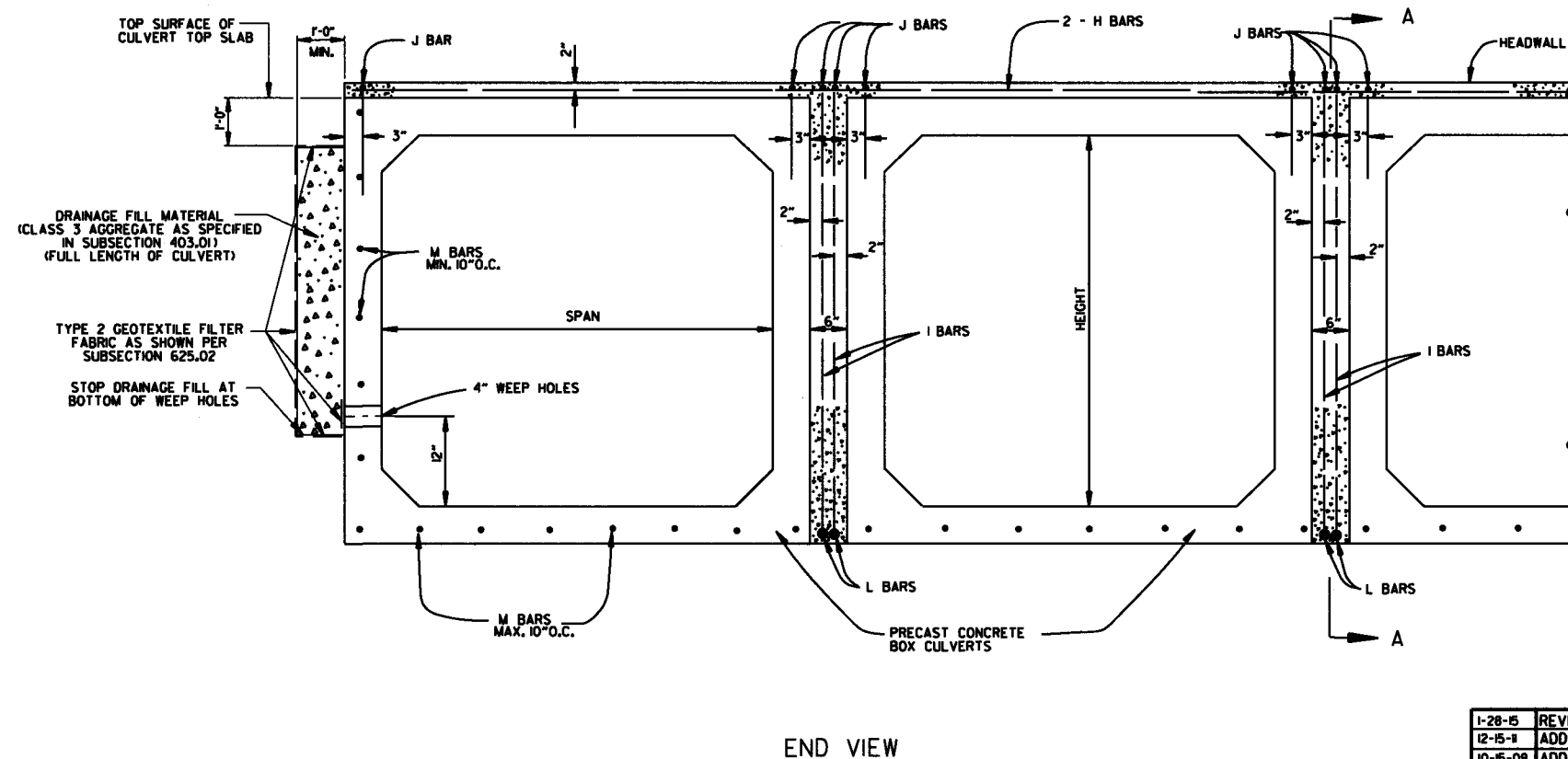
THE MEMBRANE WATERPROOFING WILL BE REQUIRED ON THE TOP EXTERNAL JOINT AND SHALL EXTEND 1 FOOT DOWN THE SIDES OF THE CULVERT.

IN OUTER BARRELS, ONE WEEP HOLE IS REQUIRED IN EXTERIOR WALLS OF EACH PRECAST CULVERT SECTION. WEEP HOLES SHALL HAVE A MAXIMUM HORIZONTAL SPACING OF 10'-0" IN THE ASSEMBLED CULVERT AND SHALL BE SPACED TO CLEAR ALL REINFORCING STEEL. THE DRAIN OPENING SHALL BE 4" DIAMETER AND SHALL BE PLACED 12" ABOVE THE TOP OF THE BOTTOM SLAB.

DRAINAGE FILL MATERIAL WITH GEOTEXTILE FABRIC IS REQUIRED AT THE EXTERIOR WALLS OF THE ASSEMBLED CULVERT, SEE DETAILS ON THIS DRAWING.

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
1-28-85	REVISED GEOTEXTILE FABRIC PLACEMENT	
12-15-81	ADDED NOTE & DTLS FOR WEEP HOLE AND DRAINAGE FILL	
10-15-09	ADDED GENERAL NOTE	
8-10-05	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

**REINFORCED CONCRETE ARCH PIPE DIMENSIONS**

EQUIV. DIA.	SPAN		RISE	
	AASHTO M 206	AHTD NOMINAL	AASHTO M 206	AHTD NOMINAL
	INCHES			
15	18	18	11	11
18	22	22	13 1/2	14
21	26	26	15 1/2	16
24	28 1/2	29	18	18
30	36 1/4	36	22 1/2	23
36	43 3/8	44	26 3/8	27
42	51 1/8	51	31 1/8	31
48	58 1/2	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	77 1/2	77
108	138	138	87 1/8	87
120	154	154	96 3/8	97
132	168 3/4	169	106 1/2	107

THE MEASURED SPAN AND RISE SHALL NOT VARY MORE THAN ± 2 PERCENT FROM THE VALUES SPECIFIED BY AASHTO M206.

**REINFORCED CONCRETE HORIZONTAL ELLIPTICAL PIPE DIMENSIONS**

EQUIV. DIA.	AASHTO M 207	
	SPAN	RISE
	INCHES	
18	23	14
24	30	19
27	34	22
30	38	24
33	42	27
36	45	29
39	49	32
42	53	34
48	60	38
54	68	43
60	76	48
66	83	53
72	91	58
78	98	63
84	106	68

THE MEASURED SPAN AND RISE SHALL NOT VARY MORE THAN ± 2 PERCENT FROM THE VALUES SPECIFIED BY AASHTO M207.

**CONSTRUCTION SEQUENCE**

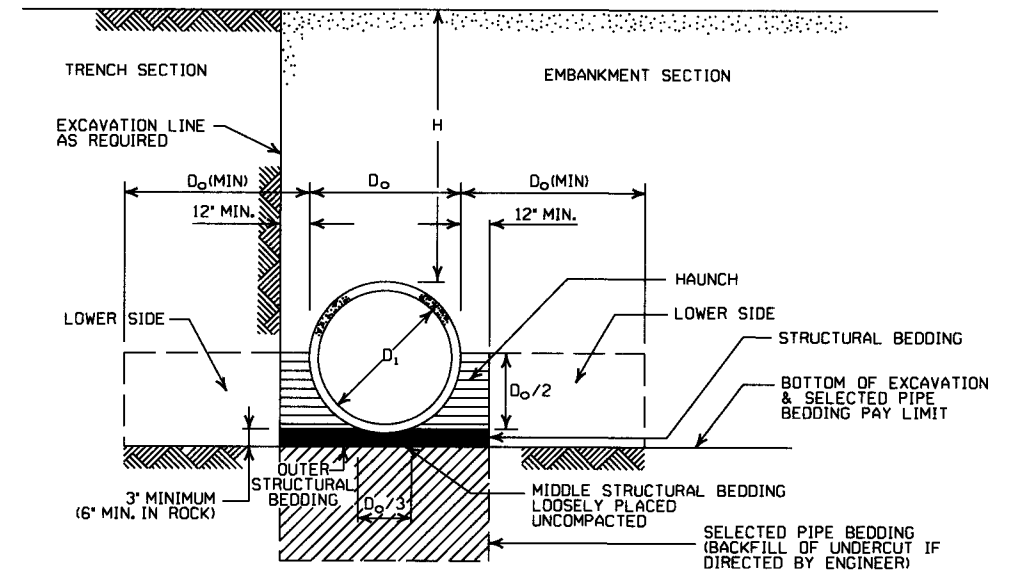
1. PLACE STRUCTURAL BEDDING MATERIAL TO GRADE. DO NOT COMPACT.
  2. INSTALL PIPE TO GRADE.
  3. COMPACT STRUCTURAL BEDDING OUTSIDE THE MIDDLE THIRD OF THE PIPE.
  4. PLACE AND COMPACT THE HAUNCH AREA UP TO THE MIDDLE OF THE PIPE.
  5. COMPLETE BACKFILL ACCORDING TO SUBSECTION 606.03.(f)(1).
- NOTE: HAUNCH 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.

**- LEGEND -**

- D<sub>1</sub> = NORMAL INSIDE DIAMETER OF PIPE
- D<sub>o</sub> = OUTSIDE DIAMETER OF PIPE
- H = FILL COVER HEIGHT OVER PIPE (FEET)
- MIN. = MINIMUM
- UNDISTURBED SOIL

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-4) OR TYPE 1 INSTALLATION MATERIAL*
TYPE 3**	AASHTO CLASSIFICATION A-1 THRU A-6 SOIL OR TYPE 1 OR 2 INSTALLATION MATERIAL

- \* SM-3 WILL NOT BE ALLOWED.
- \*\* MATERIALS SHALL NOT INCLUDE ORGANIC MATERIALS OR STONES LARGER THAN 3 INCHES.



**EMBANKMENT AND 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.
3. FOR EMBANKMENTS, THE MATERIAL IN THE LOWER SIDE ZONE SHALL BE COMPACTED TO 95% OF THE MAXIMUM DENSITY ACCORDING TO THE TYPE OR CLASS OF MATERIAL USED.

**GENERAL NOTES**

1. CONCRETE PIPE CULVERT CONSTRUCTION SHALL CONFORM TO ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION (CURRENT EDITION), WITH APPLICABLE SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS. UNLESS OTHERWISE NOTED IN THE PLANS, SECTION AND SUBSECTION REFER TO THE STANDARD CONSTRUCTION SPECIFICATIONS.
2. CONCRETE PIPE CULVERT DESIGN SHALL CONFORM TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, FIFTH EDITION (2010) WITH 2010 INTERIMS.
3. ALL PIPE SHALL CONFORM TO SECTION 606. CIRCULAR R.C. PIPE CULVERTS SHALL CONFORM TO AASHTO M170, R.C. ARCH PIPE CULVERTS SHALL CONFORM TO AASHTO M206 AND HORIZONTAL ELLIPTICAL PIPE CULVERTS SHALL CONFORM TO AASHTO M207.
4. ALL PIPE SHALL BE PROTECTED DURING CONSTRUCTION BY A COVER SUFFICIENT TO PREVENT DAMAGE FROM PASSAGE OF EQUIPMENT.
5. THE MINIMUM TRENCH WIDTH SHALL BE THE OUTSIDE DIAMETER OF THE PIPE PLUS 24 INCHES. THE MAXIMUM ALLOWABLE TRENCH WIDTH SHALL BE THE MINIMUM WIDTH PRACTICABLE FOR WORKING CONDITIONS.
6. MULTIPLE PIPE CULVERTS SHALL BE INSTALLED WITH A MINIMUM CLEARANCE OF 24 INCHES BETWEEN STRINGS OF PIPE. REFER TO STD. DWG. FES-2 FOR MINIMUM CLEARANCE WHERE FLARED END SECTIONS ARE USED.
7. 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.
8. 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.
9. 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."
10. 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."

**MINIMUM HEIGHT OF FILL "H" OVER CIRCULAR R.C. PIPE CULVERTS**

INSTALLATION TYPE	CLASS OF PIPE			
	TYPE 1 OR 2	TYPE 3	ALL	ALL
PIPE ID (IN.)	FEET			
12-15	2	2.5	2	1
18-24	2.5	3	2	1
27-33	3	4	2	1
36-42	3.5	5	2	1
48	4.5	5.5	2	1
54-60	5	7	2	1
66-78	6	8	2	1
84-108	7.5	8	2	1

NOTE: FOR MINIMUM COVER VALUES, "H" SHALL INCLUDE A MINIMUM OF 12" OF PAVEMENT AND/OR BASE.

**MAXIMUM HEIGHT OF FILL "H" OVER CIRCULAR R.C. PIPE CULVERTS**

INSTALLATION TYPE	CLASS OF PIPE		
	CLASS III	CLASS IV	CLASS V
	FEET		
TYPE 1	21	32	50
TYPE 2	16	25	39
TYPE 3	12	20	30

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

**MAXIMUM HEIGHT OF FILL "H" OVER R.C. ARCH & HORIZONTAL ELLIPTICAL PIPE CULVERTS**

INSTALLATION TYPE	CLASS OF PIPE	
	CLASS III	CLASS IV
	FEET	
TYPE 2	13	21
TYPE 3	10	16

NOTE: TYPE 1 INSTALLATION WILL NOT BE ALLOWED FOR ARCH & HORIZONTAL ELLIPTICAL PIPE CULVERTS.

**MINIMUM HEIGHT OF FILL "H" OVER R.C. ARCH & HORIZONTAL ELLIPTICAL PIPE CULVERTS**

INSTALLATION TYPE	CLASS OF PIPE	
	CLASS III	CLASS IV
	FEET	
TYPE 2 OR TYPE 3	2.5	1.5

NOTE: TYPE 1 INSTALLATION WILL NOT BE ALLOWED FOR ARCH & HORIZONTAL ELLIPTICAL PIPE CULVERTS.

NOTE: FOR MINIMUM COVER VALUES, "H" SHALL INCLUDE A MINIMUM OF 12" OF PAVEMENT AND/OR BASE.

DATE	REVISION	DATE FILMED
2-27-14	REVISED GENERAL NOTE 1.	
12-15-11	REVISED FOR LRFD DESIGN SPECIFICATIONS	
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)**

PIPE DIAMETER (INCHES)	① MINIMUM COVER TOP OF PIPE TO TOP OF GROUND "H" (FEET)	MAX. FILL HEIGHT "H" ABOVE TOP OF PIPE (FEET)				
		METAL THICKNESS (INCHES)				
		0.064	0.079	0.109	0.138	0.168
2 3/8 INCH BY 1/2 INCH CORRUGATION RIVETED, WELDED, OR HELICAL LOCK-SEAM						
12	1	84	91			
15	1	67	73			
18	1	56	61			
24	1	42	46	59		
30	2	34	36	47		
36	2		30	39	41	
42	2		43	67	70	73
48	2		37	58	61	64
② 3 INCH BY 1 INCH OR 5 INCH BY 1 INCH CORRUGATION RIVETED, WELDED, BOLTED, OR HELICAL LOCK-SEAM						
36	1	48	60	88	111	118
42	1	41	51	72	90	102
48	1	36	45	64	77	85
54	2	32	40	59	71	79
60	2	29	36	53	64	71
66	2	26	33	47	58	64
72	2	24	30	44	53	59
78	2		28	41	49	54
84	2		26	38	45	51
90	2		24	35	43	45
96	2		22	33	40	44
102	2			31	38	42
108	2			30	35	39
114	2			28	34	37
120	2			27	32	35

**CONSTRUCTION SEQUENCE**

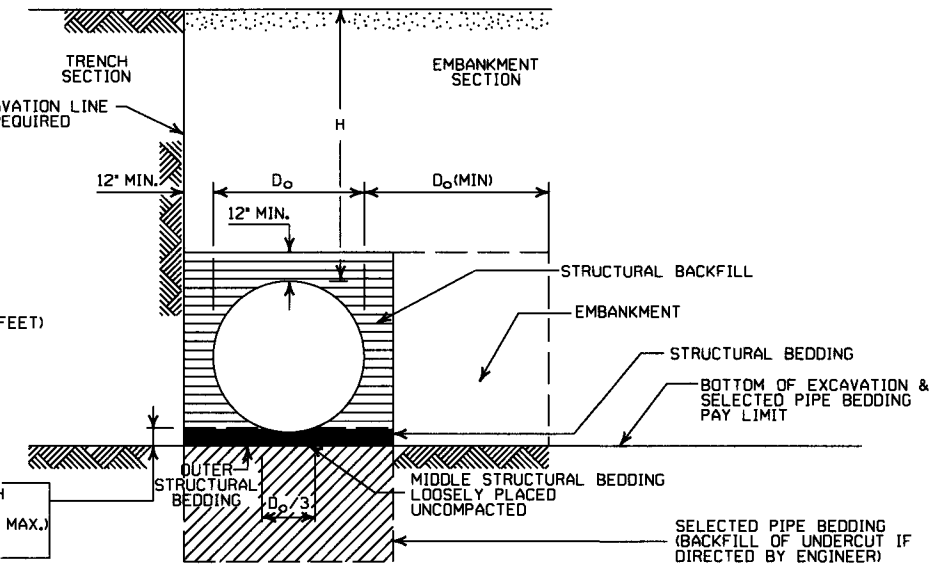
1. PLACE STRUCTURAL BEDDING MATERIAL TO GRADE. DO NOT COMPACT.
2. INSTALL PIPE TO GRADE.
3. COMPACT STRUCTURAL BEDDING OUTSIDE THE MIDDLE THIRD OF THE PIPE.
4. COMPLETE STRUCTURAL BACKFILL OPERATION BY WORKING FROM SIDE TO SIDE OF THE PIPE. THE SIDE TO SIDE STRUCTURAL BACKFILL DIFFERENTIAL SHALL NOT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

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.

INSTALLATION TYPE	MATERIAL REQUIREMENTS FOR STRUCTURAL BACKFILL AND STRUCTURAL BEDDING
TYPE 1	AGGREGATE BASE COURSE (CLASS 4, 5, 6, OR 7)
TYPE 2	SELECTED MATERIALS (CLASS SM-1, SM-2, OR SM-4) OR TYPE 1 INSTALLATION MATERIAL ③

③ SM-3 WILL NOT BE ALLOWED.

- LEGEND -**
- D<sub>o</sub> = OUTSIDE DIAMETER OF PIPE
  - MAX. = MAXIMUM
  - MIN. = MINIMUM
  - [Hatched Pattern] = STRUCTURAL BACKFILL MATERIAL
  - [Diagonal Lines] = UNDISTURBED SOIL
  - [Dotted Pattern] = EQUIV. DIA. = EQUIVALENT DIAMETER
  - H = FILL COVER HEIGHT OVER PIPE (FEET)



**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.
2. INSTALLATION TYPE 1 OR 2 MAY BE USED FOR CORRUGATED STEEL OR ALUMINUM PIPE (ROUND).
3. INSTALLATION TYPE 1 SHALL BE USED FOR CORRUGATED STEEL OR ALUMINUM PIPE ARCHES WITH 2 3/8" x 1/2" CORRUGATION.
4. INSTALLATION TYPE 1 OR 2 MAY BE USED FOR CORRUGATED STEEL OR ALUMINUM PIPE ARCHES WITH 3" x 1" OR 5" x 1" CORRUGATION.

**GENERAL NOTES**

1. METAL PIPE CULVERT CONSTRUCTION SHALL CONFORM TO ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION (CURRENT EDITION), WITH APPLICABLE SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS. UNLESS OTHERWISE NOTED IN THE PLANS, SECTION AND SUBSECTION REFER TO THE STANDARD CONSTRUCTION SPECIFICATIONS.
2. METAL PIPE CULVERT DESIGN SHALL CONFORM TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, FIFTH EDITION (2010) WITH 2010 INTERIMS.
3. METAL PIPE CULVERT MATERIALS AND INSTALLATIONS SHALL CONFORM TO SECTION 606 AND JOB SPECIAL PROVISION "METAL PIPE".
4. ALL PIPE SHALL BE PROTECTED DURING CONSTRUCTION BY A COVER SUFFICIENT TO PREVENT DAMAGE FROM PASSAGE OF EQUIPMENT.
5. THE MINIMUM TRENCH WIDTH SHALL BE THE OUTSIDE DIAMETER OF THE PIPE PLUS 24 INCHES. THE MAXIMUM ALLOWABLE TRENCH WIDTH SHALL BE THE MINIMUM WIDTH PRACTICABLE FOR WORKING CONDITIONS.
6. MULTIPLE PIPE CULVERTS SHALL BE INSTALLED WITH A MINIMUM CLEARANCE OF 24 INCHES BETWEEN STRINGS OF PIPE. REFER TO STD. DWG. FES-2 FOR MINIMUM CLEARANCE WHERE FLARED END SECTIONS ARE USED.
7. 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.
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 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."

**CORRUGATED ALUMINUM PIPE (ROUND)**

PIPE DIAMETER (INCHES)	① MINIMUM COVER TOP OF PIPE TO TOP OF GROUND "H" (FEET)	MAX. FILL HEIGHT "H" ABOVE TOP OF PIPE (FEET)				
		METAL THICKNESS IN INCHES				
		0.060	0.075	0.105	0.135	0.164
2 3/8 INCH BY 1/2 INCH CORRUGATION RIVETED OR HELICAL LOCK-SEAM						
12	1	45	45	52		
18	2	30	30	39	41	
24	2	22	22	31	32	34
30	2		18	26	27	28
36	2.5		15	26	27	28
42	2			43	43	44
48	2			40	41	43
54	2			35	37	38
60	2				33	34
66	2					31
72	2					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

**CORRUGATED METAL PIPE ARCHES**

EQUIV. DIA. (INCHES)	PIPE DIMENSION SPAN X RISE (INCHES)	MINIMUM CORNER RADIUS (INCHES)	STEEL				ALUMINUM			
			MIN. THICKNESS REQUIRED INCHES	① MIN. HEIGHT OF FILL, "H" (FT.)		MIN. THICKNESS REQUIRED INCHES	① MIN. HEIGHT OF FILL, "H" (FT.)			
				INSTALLATION TYPE 1	INSTALLATION TYPE 1		INSTALLATION TYPE 1	INSTALLATION TYPE 1		
2 3/8 INCH BY 1/2 INCH CORRUGATION RIVETED, WELDED, OR HELICAL LOCK-SEAM										
15	17x13	3	0.064	2	15	0.060	2	15		
18	21x15	3	0.064	2	15	0.060	2	15		
21	24x18	3	0.064	2,25	15	0.060	2,25	15		
24	28x20	3	0.064	2,5	15	0.075	2,5	15		
30	35x24	3	0.079	3	12	0.075	3	12		
36	42x29	3 1/2	0.079	3	12	0.105	3	12		
42	49x33	4	0.079	3	12	0.105	3	12		
48	57x38	5	0.109	3	13	0.135	3	13		
54	64x43	6	0.109	3	14	0.135	3	14		
60	71x47	7	0.138	3	15	0.135	3	14		
66	77x52	8	0.168	3	15	0.164	3	15		
72	83x57	9	0.168	3	15					
② 3 INCH BY 1 INCH OR 5 INCH BY 1 INCH CORRUGATION RIVETED, WELDED, OR HELICAL LOCK-SEAM										
			INSTALLATION				INSTALLATION			
			TYPE 2		TYPE 1		TYPE 2		TYPE 1	
36	40x31	5	0.079	3	2	12	15			
42	46x36	6	0.079	3	2	13	15			
48	53x41	7	0.079	3	2	13	15			
54	60x46	8	0.079	3	2	13	15			
60	66x51	9	0.079	3	2	13	15			
66	73x55	12	0.079	3	2	15	15			
72	81x59	14	0.079	3	2	15	15			
78	87x63	14	0.079	3	2	15	15			
84	95x67	16	0.109	3	2	15	15			
90	103x71	16	0.109	3	2	15	15			
96	112x75	18	0.109	3	2	15	15			
102	117x79	18	0.109	3	2	15	15			
108	128x83	18	0.138	3	2	15	15			

① FOR MINIMUM COVER VALUES, "H" SHALL INCLUDE A MINIMUM 12" OF PAVEMENT AND/OR BASE.

② WHERE THE STANDARD 2 2/3" x 1/2" CORRUGATION AND GAUGE IS SPECIFIED FOR A GIVEN DIAMETER, A PIPE OF THE SAME DIAMETER WITH A 3" x 1" OR 5" x 1" CORRUGATION 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.

DATE	REVISION	DATE FILMED
2-27-14	REVISED GENERAL NOTE 1	
12-15-11	REVISED FOR LRFD DESIGN SPECS	
3-30-00	REVISED INSTALLATIONS	
11-06-97	ISSUED	

ARKANSAS STATE HIGHWAY COMMISSION

**METAL PIPE CULVERT FILL HEIGHTS & BEDDING**

STANDARD DRAWING PCM-1



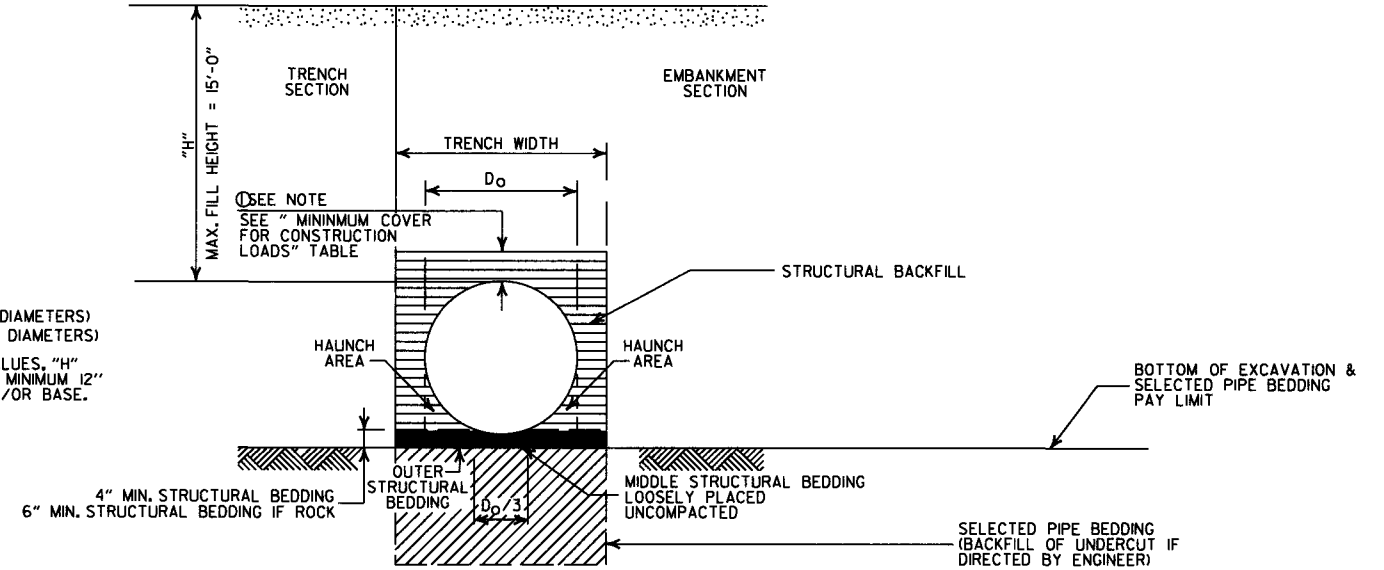
INSTALLATION TYPE	** MATERIAL REQUIREMENTS FOR STRUCTURAL BACKFILL AND STRUCTURAL BEDDING
TYPE 2	*SELECTED MATERIALS (CLASS SM-1, SM-2 OR SM-4)

- AGGREGATE BASE COURSE (CLASS 4, 5, 6, OR 7) MAY BE USED IN LIEU OF SELECTED MATERIAL.  
SM3 WILL NOT BE ALLOWED.
- STRUCTURAL BEDDING MATERIAL SHALL HAVE A MAXIMUM PARTICLE SIZE OF 1 INCH. STRUCTURAL BACKFILL MATERIAL SHALL BE FREE OF ORGANIC MATERIAL, STONES LARGER THAN 1.50 INCH IN GREATEST DIMENSION, OR FROZEN LUMPS.  
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 HDPE PIPE.

### MINIMUM TRENCH WIDTH BASED ON FILL HEIGHT "H"

PIPE DIAMETER	TRENCH WIDTH (FEET)	
	"H" < 10'-0"	"H" >OR= 10'-0"
18"	4'-6"	4'-6"
24"	5'-0"	6'-0"
30"	5'-6"	7'-6"
36"	6'-0"	9'-0"
42"	7'-0"	10'-6"
48"	8'-0"	12'-0"

NOTE:  
18" MIN. (18" - 30" DIAMETERS)  
24" MIN. (36" - 48" DIAMETERS)  
MINIMUM COVER VALUES, "H" SHALL INCLUDE A MINIMUM 12" OF PAVEMENT AND/OR BASE.



### 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.

### MULTIPLE INSTALLATION OF HIGH DENSITY POLYETHYLENE PIPES

PIPE DIAMETER	CLEAR DISTANCE BETWEEN PIPES
18"	1'-6"
24"	2'-0"
30"	2'-6"
36"	3'-0"
42"	3'-6"
48"	4'-0"

### MINIMUM COVER FOR CONSTRUCTION LOADS

PIPE DIAMETER	MIN. COVER (FEET) FOR INDICATED CONSTRUCTION LOADS			
	18.0-50.0 (KIPS)	50.0-75.0 (KIPS)	75.0-110.0 (KIPS)	110.0-175.0 (KIPS)
36" OR LESS	2'-0"	2'-6"	3'-0"	3'-0"
42" OR GREATER	3'-0"	3'-0"	3'-6"	4'-0"

MINIMUM COVER SHALL BE MEASURED FROM TOP OF PIPE TO TOP OF THE MAINTAINED CONSTRUCTION ROADWAY SURFACE. THE SURFACE SHALL BE MAINTAINED.

### 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. THE STRUCTURAL BACKFILL SHALL BE PLACED AND COMPACTED IN LAYERS NOT EXCEEDING 8". THE LAYERS SHALL BE BROUGHT UP EVENLY AND SIMULTANEOUSLY TO THE ELEVATION OF THE MINIMUM COVER.
5. PIPE INSTALLATION MAY REQUIRE THE USE OF RESTRAINTS, WEIGHTING OR OTHER APPROVED METHODS IN ORDER TO HELP MAINTAIN GRADE AND ALIGNMENT.

### - LEGEND -

H = FILL HEIGHT (FT.)  
D<sub>o</sub> = OUTSIDE DIAMETER OF PIPE  
MAX. = MAXIMUM  
MIN. = MINIMUM

==== = STRUCTURAL BACKFILL MATERIAL  
||||| = UNDISTURBED SOIL

### GENERAL NOTES

1. PIPE SHALL CONFORM TO AASHTO M294, TYPE S. INSTALLATION SHALL CONFORM TO JOB SPECIAL PROVISION "PLASTIC PIPE" AND SECTION 606 OF THE STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION (CURRENT EDITION).
2. PLASTIC PIPE CULVERT DESIGN SHALL CONFORM TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, FIFTH EDITION (2010) WITH 2010 INTERIMS.
3. THE MAXIMUM ALLOWABLE TRENCH WIDTH SHALL BE THE MINIMUM WIDTH PLUS A SUFFICIENT WIDTH TO ENSURE WORKING ROOM TO PROPERLY AND SAFELY PLACE AND COMPACT HAUNCHING AND OTHER BACKFILL MATERIAL.
4. 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.
5. 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."
6. 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."
7. FOR PIPE TYPES THAT ARE NOT SMOOTH ON THE OUTSIDE (CORRUGATED OR PROFILE WALLS), BACKFILL GRADATIONS SHOULD BE SELECTED THAT WILL PERMIT THE FILLING OF THE CORRUGATION OR PROFILE VALLEY.
8. HIGH DENSITY POLYETHYLENE PIPES OF DIAMETERS OTHER THAN SHOWN WILL NOT BE ALLOWED.
9. JOINTS FOR HDPE PIPE SHALL MEET THE REQUIREMENTS FOR SOIL TIGHTNESS AS SPECIFIED IN AASHTO SECTION 26.4.2.4 AND 30.4.2 "AASHTO LRFD BRIDGE CONSTRUCTION SPECIFICATIONS." JOINTS SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS.

DATE	REVISION	DATE FILMED
2-27-14	REVISED GENERAL NOTE 1.	
12-15-11	REVISED GENERAL NOTES & MINIMUM COVER NOTE	
11-17-10	ISSUED	

ARKANSAS STATE HIGHWAY COMMISSION

PLASTIC PIPE CULVERT  
(HIGH DENSITY POLYETHYLENE)

STANDARD DRAWING PCP-1





INSTALLATION TYPE	•• MATERIAL REQUIREMENTS FOR STRUCTURAL BACKFILL AND STRUCTURAL BEDDING
TYPE 2	•SELECTED MATERIALS (CLASS SM-1, SM-2, OR SM-4)

- AGGREGATE BASE COURSE (CLASS 4, 5, 6, OR 7) MAY BE USED IN LIEU OF SELECTED MATERIAL. SM3 WILL NOT BE ALLOWED.
  - STRUCTURAL BEDDING MATERIAL SHALL HAVE A MAXIMUM PARTICLE SIZE OF 1/4 INCH. STRUCTURAL BACKFILL MATERIAL SHALL BE FREE OF ORGANIC MATERIAL, STONES LARGER THAN 1.50 INCH IN GREATEST DIMENSION, OR FROZEN LUMPS.
- 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 PVC PIPE.

**MINIMUM TRENCH WIDTH BASED ON FILL HEIGHT "H"**

PIPE DIAMETER	TRENCH WIDTH (FEET)	
	"H" < 10'-0"	"H" > OR = 10'-0"
18"	4'-6"	4'-6"
24"	5'-0"	6'-0"
30"	5'-6"	7'-6"
36"	6'-0"	9'-0"

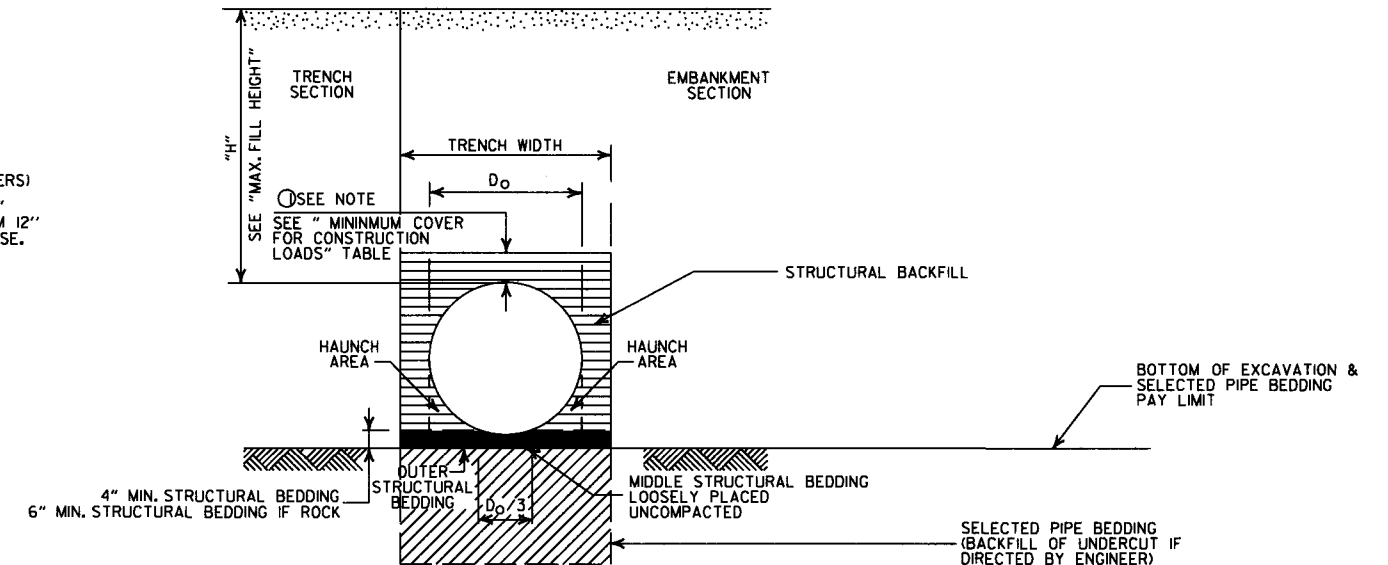
**MULTIPLE INSTALLATION OF PVC PIPES**

PIPE DIAMETER	CLEAR DISTANCE BETWEEN PIPES
18"	1'-6"
24"	2'-0"
30"	2'-6"
36"	3'-0"

**MAXIMUM FILL HEIGHT BASED ON STRUCTURAL BACKFILL**

PIPE DIAMETER	"H"
18"	45'-0"
24"	45'-0"
30"	40'-0"
36"	40'-0"

- ① NOTE:  
12" MIN. (18" - 36" DIAMETERS)  
MINIMUM COVER VALUE, "H" SHALL INCLUDE A MINIMUM 12" OF PAVEMENT AND/OR BASE.



**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. THE STRUCTURAL BACKFILL SHALL BE PLACED AND COMPACTED IN LAYERS NOT EXCEEDING 8". THE LAYERS SHALL BE BROUGHT UP EVENLY AND SIMULTANEOUSLY TO THE ELEVATION OF THE MINIMUM COVER.
5. PIPE INSTALLATION MAY REQUIRE THE USE OF RESTRAINTS, WEIGHTING OR OTHER APPROVED METHODS IN ORDER TO HELP MAINTAIN GRADE AND ALIGNMENT.

**- LEGEND -**

H = FILL HEIGHT (FT.)  
D<sub>o</sub> = OUTSIDE DIAMETER OF PIPE  
MAX. = MAXIMUM  
MIN. = MINIMUM

==== = STRUCTURAL BACKFILL MATERIAL  
===== = UNDISTURBED SOIL

**GENERAL NOTES**

1. PIPE SHALL CONFORM TO ASTM F949, CELL CLASS 12454. INSTALLATION SHALL CONFORM TO JOB SPECIAL PROVISION "PLASTIC PIPE" AND SECTION 606 OF THE STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION (CURRENT EDITION).
2. PLASTIC PIPE CULVERT DESIGN SHALL CONFORM TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, FIFTH EDITION (2010) WITH 2010 INTERIMS.
3. THE MAXIMUM ALLOWABLE TRENCH WIDTH SHALL BE THE MINIMUM WIDTH PLUS A SUFFICIENT WIDTH TO ENSURE WORKING ROOM TO PROPERLY AND SAFELY PLACE AND COMPACT HAUNCHING AND OTHER BACKFILL MATERIAL.
4. 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.
5. 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 BACKFILL."
6. 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."
7. FOR PIPE TYPES THAT ARE NOT SMOOTH ON THE OUTSIDE (CORRUGATED OR PROFILE WALLS), BACKFILL GRADATIONS SHOULD BE SELECTED THAT WILL PERMIT THE FILLING OF THE CORRUGATION OR PROFILE VALLEY.
8. PVC PIPES OF DIAMETERS OTHER THAN SHOWN WILL NOT BE ALLOWED.
9. JOINTS FOR PVC PIPE SHALL MEET THE REQUIREMENTS FOR SOIL TIGHTNESS AS SPECIFIED IN AASHTO SECTION 26.4.2.4 AND 30.4.2 "AASHTO LRFD BRIDGE CONSTRUCTION SPECIFICATIONS." JOINTS SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS.

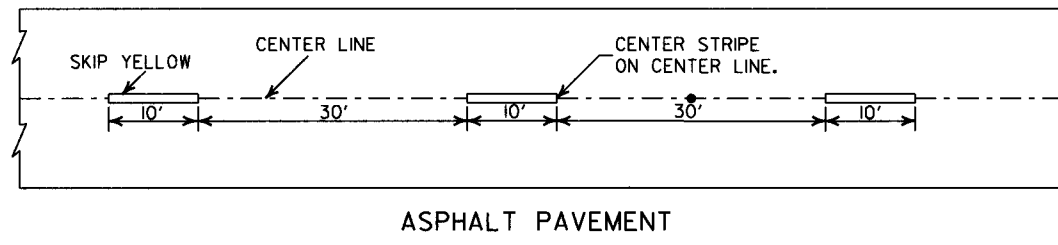
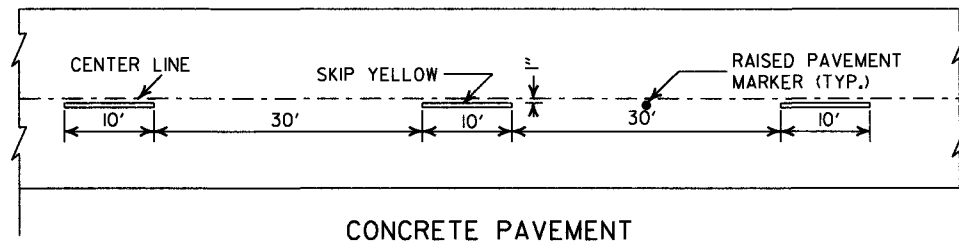
DATE	REVISION	DATE FILMED
2-27-14	REVISED GENERAL NOTE 1.	
12-15-11	REV GENERAL NOTES & MINIMUM COVER NOTE; DELETED SM3 MATERIAL	
11-17-10	ISSUED	

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PLASTIC PIPE CULVERT  
(PVC F949)

STANDARD DRAWING PCP-2

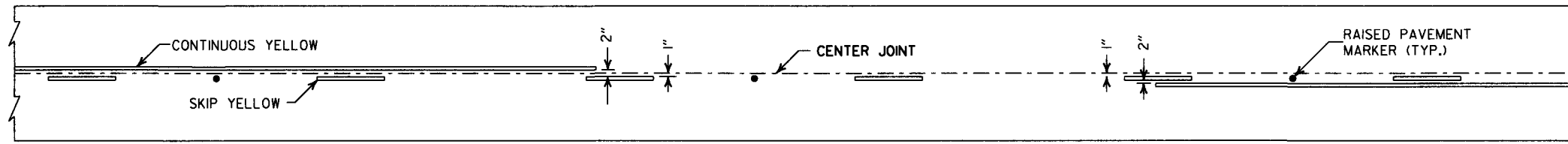




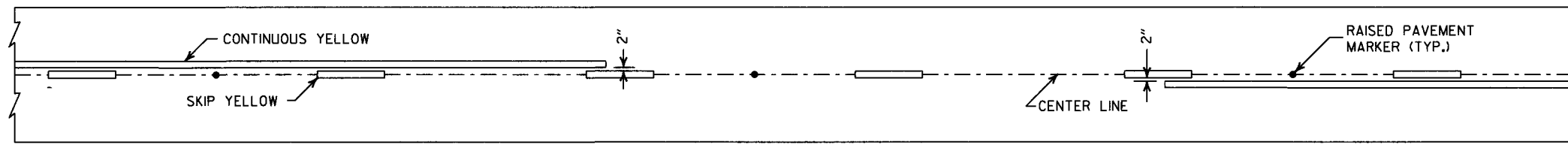
CONCRETE PAVEMENT

ASPHALT PAVEMENT

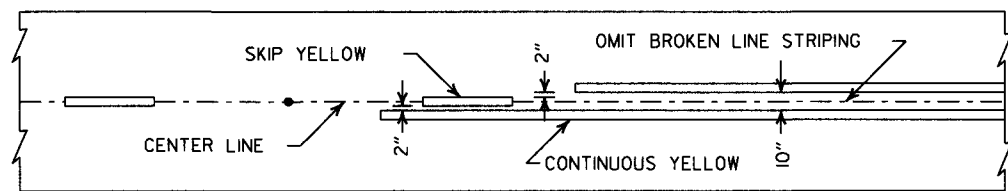
**BROKEN LINE STRIPING**



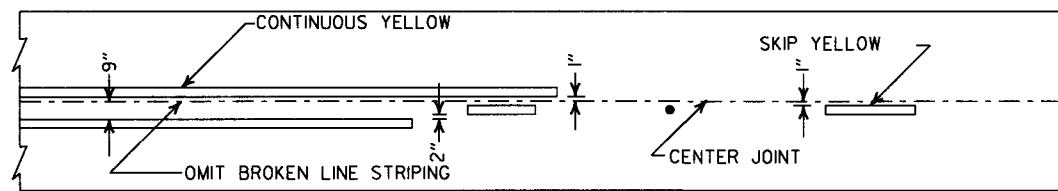
**SOLID LINE STRIPING ON CONCRETE PAVEMENT**



**SOLID LINE STRIPING ON ASPHALT PAVEMENT**

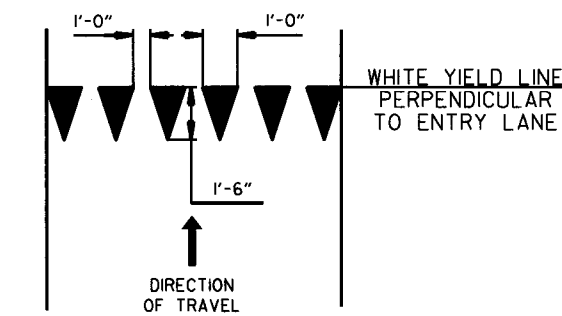


ASPHALT PAVEMENT

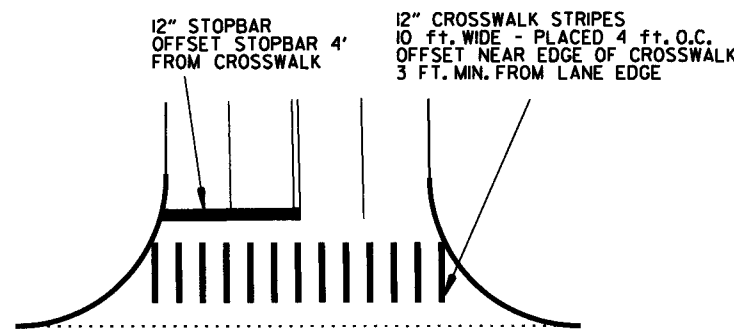


CONCRETE PAVEMENT

**STRIPING AT ADJACENT NO PASSING LANES**



**YIELD LINE DETAIL**

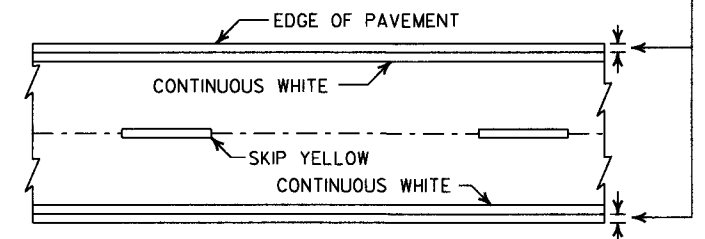


**CROSSWALK AND STOPBAR DETAILS**

**NOTES:**

1. REFER TO THE STRIPING DETAILS FOR PAVEMENT MARKING LINE WIDTHS.
2. THIS DRAWING SHALL BE USED IN CONJUNCTION WITH THE LATEST REVISED ADDITION OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES."
3. RAISED PAVEMENT MARKERS SHALL BE PLACED ON AN 80 FEET SPACING UNLESS OTHERWISE SHOWN IN THE PLANS.

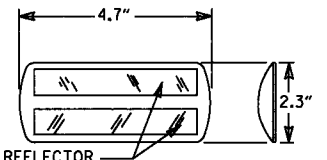
2" FOR ASPHALT OR CONCRETE PAVEMENT  
6" FOR BITUMINOUS SURFACE TREATMENT



**PAVEMENT EDGE LINE MARKING**

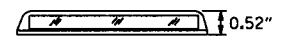
NOTE:  
THE RED LENS OF THE TYPE II R.P.M. SHALL FACE THE INCORRECT TRAFFIC MOVEMENT.

TYPE II RED/CLEAR OR YELLOW/YELLOW



PRISMATIC REFLECTOR

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.



**DETAIL OF STANDARD RAISED PAVEMENT MARKERS**

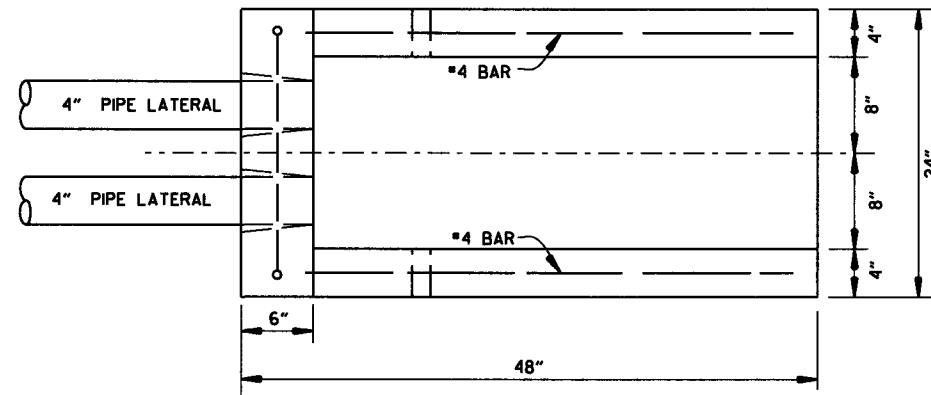
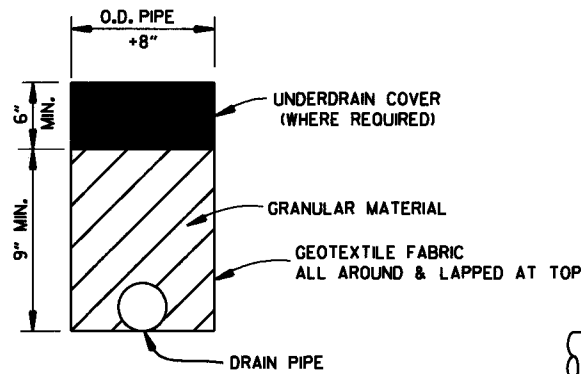
DATE	REVISION	FILMED
6-1-17	ADDED YIELD LINE DETAIL	
5-12-16	REVISED LINE WIDTHS, SPACING, & NOTES	
9-12-13	REVISED DETAIL OF STANDARD RAISED PAVEMENT MARKERS	
11-17-10	REVISED GENERAL NOTES & REMOVED PLOWABLE PAVT MRKRS	
11-18-04	REVISED NOTE 2 & GENERAL NOTES	
8-22-02	ADDED CROSSWALK & STOPBAR DTLS.	
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

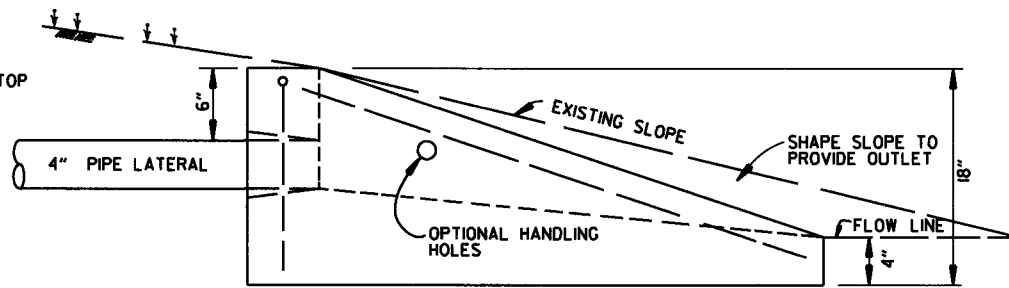
**PAVEMENT MARKING DETAILS**

STANDARD DRAWING PM-1

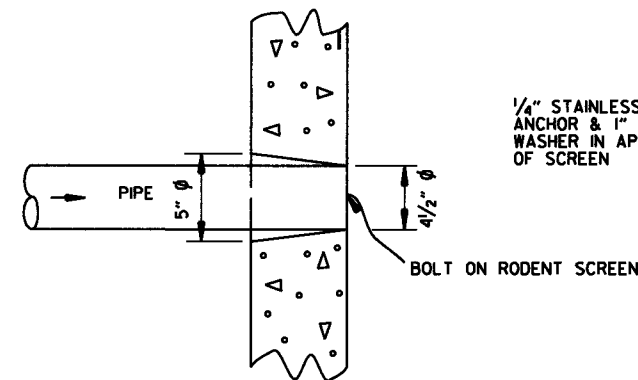
NOTE:  
 1. UNLESS OTHERWISE SPECIFIED ON THE PLANS, THE UNDERDRAIN COVER SHALL BE THOROUGHLY COMPACTED EARTH AND SHALL BE SUBSIDIARY TO PIPE UNDERDRAIN.  
 2. GRANULAR MATERIAL SHALL BE WRAPPED WITH GEOTEXTILE FABRIC, LAP FABRIC 12" OR THE WIDTH OF THE TRENCH AT THE TOP.



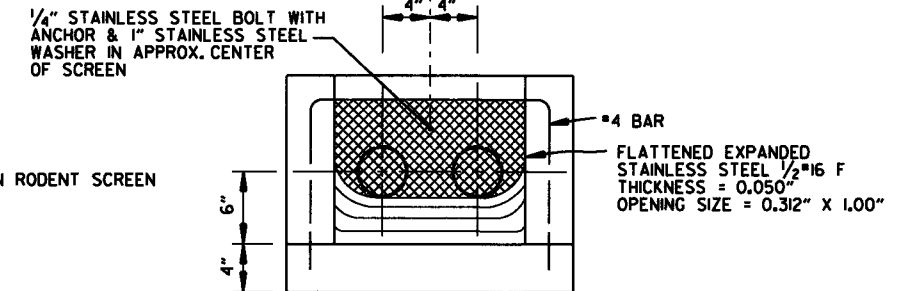
PLAN VIEW



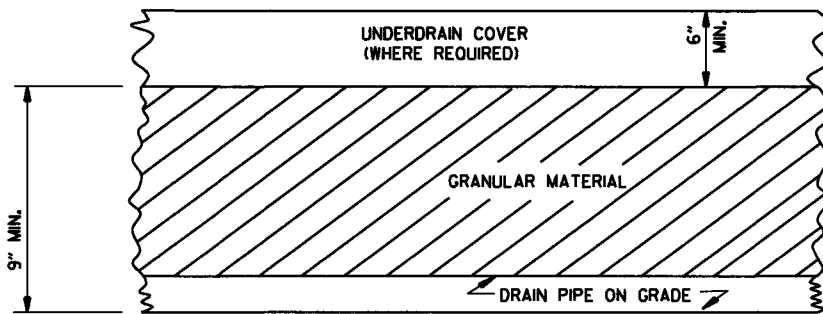
SIDE VIEW



DETAIL OF HOLE FOR 4" PIPE



FRONT VIEW (DETAIL OF RODENT SCREEN)

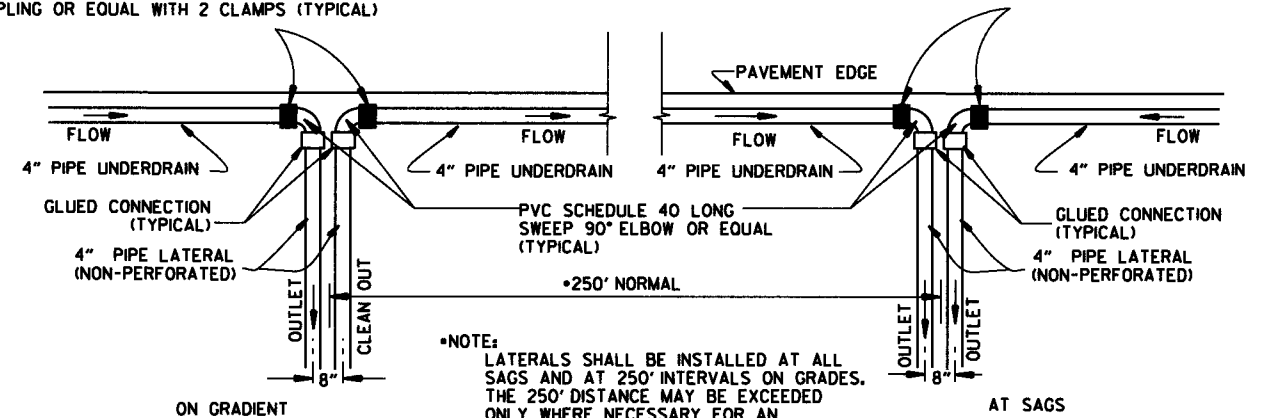


DETAILS OF PIPE UNDERDRAIN

FERNCO 1056-44 (4" CI/PLASTIC) OR FERNCO 1051-44 (4" AC/DIOR 4" CI/PLASTIC) COUPLING OR EQUAL WITH 2 CLAMPS (TYPICAL)

UNDERDRAIN OUTLET PROTECTORS

FERNCO 1056-44 (4" CI/PLASTIC) OR FERNCO 1051-44 (4" AC/DIOR 4" CI/PLASTIC) COUPLING OR EQUAL WITH 2 CLAMPS (TYPICAL)



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.

NOTES FOR PIPE UNDERDRAINS

1. GEOTEXTILE FABRIC SHALL MEET THE REQUIREMENTS OF SECTION 625 FOR TYPE I. PAYMENT FOR GEOTEXTILE FABRIC AND GRANULAR FILTER MATERIAL SHALL BE INCLUDED IN THE PRICE BID PER LIN. FT. FOR "4" PIPE UNDERDRAINS" IN ACCORDANCE WITH SECTION 610 OF THE STANDARD SPECIFICATIONS.
2. 4" NON-PERFORATED SCHEDULE 40 PVC PIPE LATERALS WITH OUTLET PROTECTORS SHALL BE INSTALLED AS SHOWN HEREON. LATERALS WILL BE MEASURED AND PAID FOR AS "4" PIPE UNDERDRAINS." UNDERDRAIN OUTLET PROTECTORS WILL BE MEASURED AND PAID FOR BY THE UNIT IN ACCORDANCE WITH SECTION 610 OF THE STANDARD SPECIFICATIONS.
3. EXISTING 4" PIPE UNDERDRAINS MAY BE CONNECTED TO PROPOSED DROP INLETS OR EXTENDED WHERE DIRECTED BY THE ENGINEER. PAYMENT FOR CONNECTING TO DROP INLETS SHALL BE CONSIDERED INCLUDED IN THE PRICE BID FOR "4" PIPE UNDERDRAINS."
4. THE LOCATION OF ALL LATERALS SHALL BE MARKED WITH 4" X 12" PERMANENT PAVEMENT MARKING TAPE (TYPE II/WHITE) AT THE OUTSIDE EDGE OF THE SHOULDER, PLACED TRANSVERSE TO TRAFFIC. PAYMENT FOR THIS WORK SHALL BE INCLUDED IN THE PRICE BID FOR THE VARIOUS CONTRACT ITEMS.
5. PAYMENT FOR THE RODENT SCREEN SHALL BE INCLUDED IN THE PRICE BID PER EACH FOR "UNDERDRAIN OUTLET PROTECTORS."
6. ANY EXISTING UNDERDRAINS THAT INTERFERE WITH INSTALLATION OF THE NEW UNDERDRAIN SYSTEM SHALL BE REMOVED AND DISPOSED OF AS DIRECTED BY THE ENGINEER. PAYMENT WILL BE CONSIDERED INCLUDED IN THE PRICE BID FOR THE VARIOUS CONTRACT ITEMS. EXISTING UNDERDRAIN OUTLET PROTECTORS SHALL BE REMOVED UNDER THE ITEM "REMOVAL AND DISPOSAL OF UNDERDRAIN OUTLET PROTECTORS."
7. AT LOCATIONS WHERE A SINGLE LATERAL IS USED THE CONTRACTOR SHALL HAVE THE FOLLOWING OPTIONS: 1. INSTALL OUTLET PROTECTOR AS SHOWN ON STANDARD DRAWING PU-1 AND GROUT THE UNUSED HOLE OR 2. INSTALL AN OUTLET PROTECTOR WITH A SINGLE HOLE.

DATE	REVISION	DATE FILMED
12-8-16	ADDED NOTES FOR PIPE UNDERDRAINS, REVISED RODENT SCREEN DETAIL AND NOTES, REMOVED NOTE 1 FOR GRANULAR MATERIAL, ADDED NOTE FOR GEOTEXTILE FABRIC	
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: 5 1/2" 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 POLYETHYLENE 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

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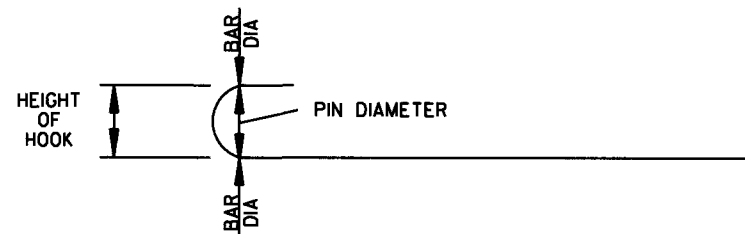
DETAILS OF PIPE UNDERDRAIN

STANDARD DRAWING PU-1

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

BAR SIZE	PIN DIAMETER	HOOK EXTENSION "K"
3	2 1/4"	4"
4	3"	4 1/2"
5	3 3/4"	5"
6	4 1/2"	6"
7	5 1/4"	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 2 3/4 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

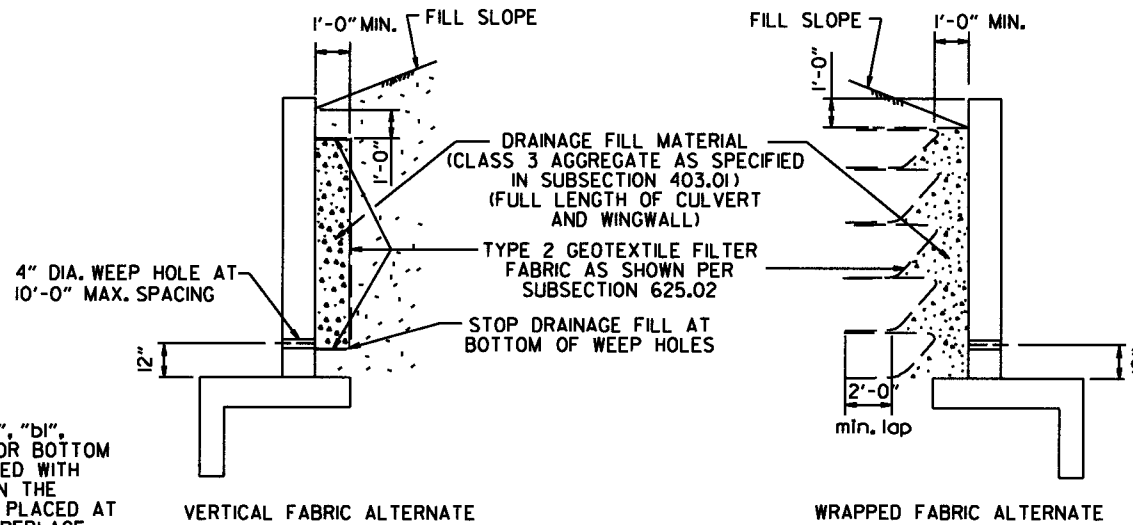
THE HOOKED BARS SHALL BE PLACED IN THE BOTTOM OF THE TOP SLAB AND THE TOP OF THE BOTTOM SLAB. THE STRAIGHT BARS SHALL BE PLACED IN THE TOP OF THE TOP SLAB AND THE BOTTOM OF THE BOTTOM SLAB. SEE TABLE BELOW FOR LENGTHS OF REPLACEMENT HOOKED AND STRAIGHT BARS.

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 & CULVERT 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 31OR M 53, GRADE 60.

CONSTRUCTION AND MATERIALS FOR WINGWALL & CULVERT 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.

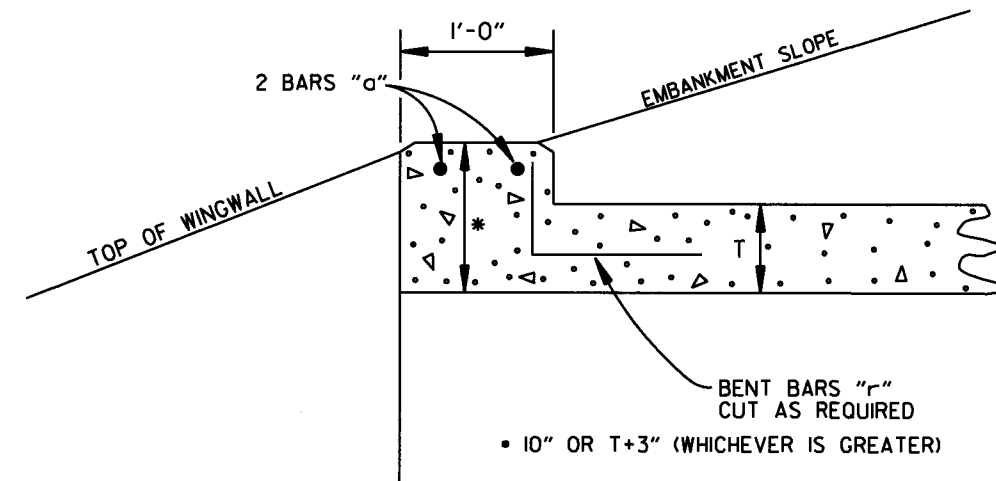
MEMBRANE WATERPROOFING SHALL BE APPLIED TO ALL CONSTRUCTION JOINTS IN THE TOP SLAB AND THE SIDEWALLS OF R.C. BOX CULVERTS AS DIRECTED BY THE ENGINEER. NO PAYMENT SHALL BE MADE FOR THIS ITEM, BUT PAYMENT WILL BE CONSIDERED TO BE INCLUDED IN THE VARIOUS ITEMS BID FOR THE R.C. BOX CULVERT.

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 1/2 INCH.

WEEP HOLES IN BOX CULVERT WALLS SHALL HAVE A MAXIMUM HORIZONTAL SPACING OF 10'-0" AND SHALL BE SPACED TO CLEAR ALL REINFORCING STEEL. THE DRAIN OPENING SHALL BE 4" DIAMETER AND SHALL BE PLACED 12" ABOVE THE TOP OF THE BOTTOM SLAB.

WEEP HOLES IN WINGWALLS SHALL HAVE A MAXIMUM HORIZONTAL SPACING OF 10'-0" AND SHALL BE SPACED TO CLEAR ALL REINFORCING STEEL. THERE SHALL BE A MINIMUM OF TWO (2) WEEP HOLES IN EACH WINGWALL. THE DRAIN OPENING SHALL BE 4" DIAMETER AND SHALL BE PLACED 12" ABOVE THE TOP OF THE WINGWALL FOOTING.

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



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.

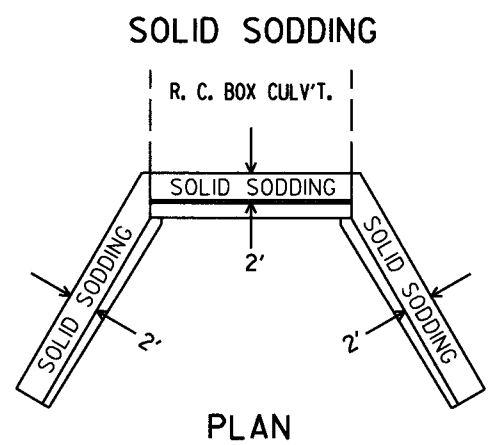
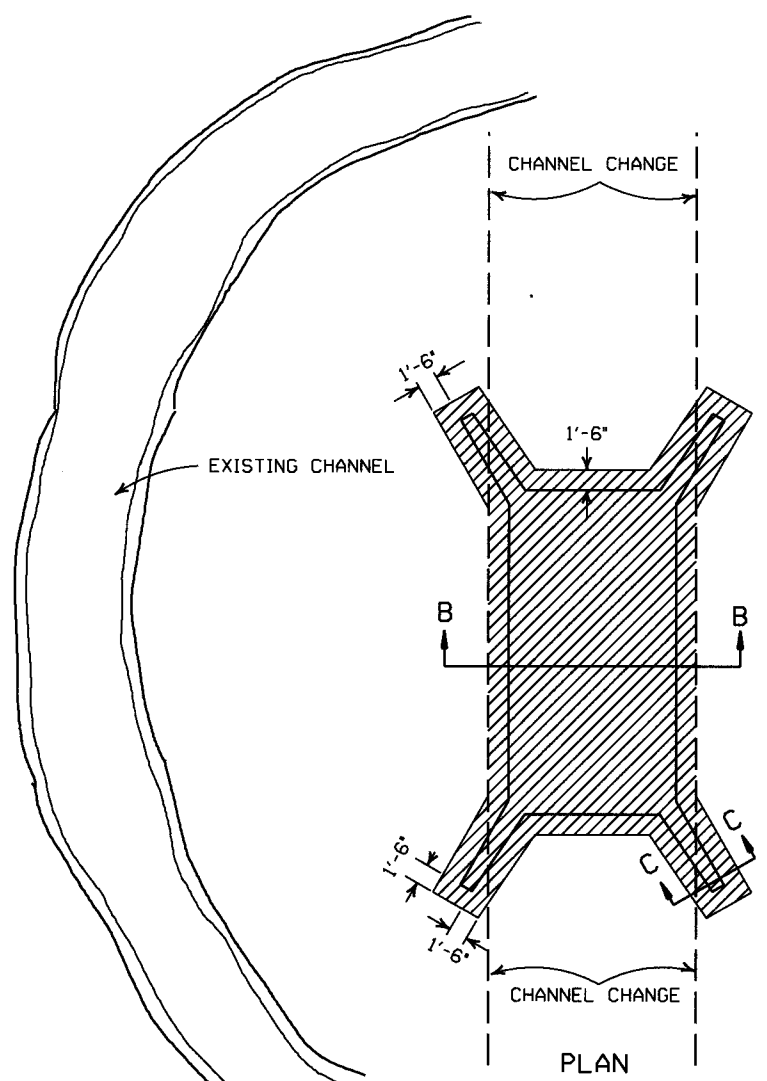
R.C. BOX CULVERT HEADWALL MODIFICATIONS

DATE	REVISION	DATE FILMED
7/26/12	REV. DRAINAGE FILL MATERIAL & DETAIL	
12/15/11	REQUIRE WEEP HOLES IN BOX CULVERT WALLS	
5-25-06	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	

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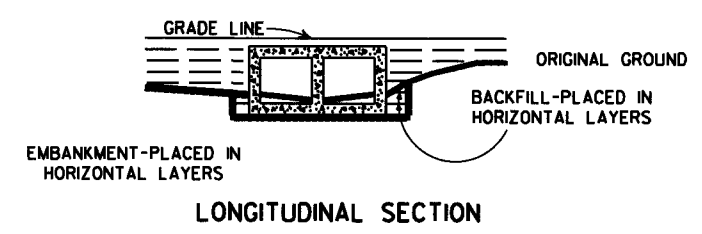
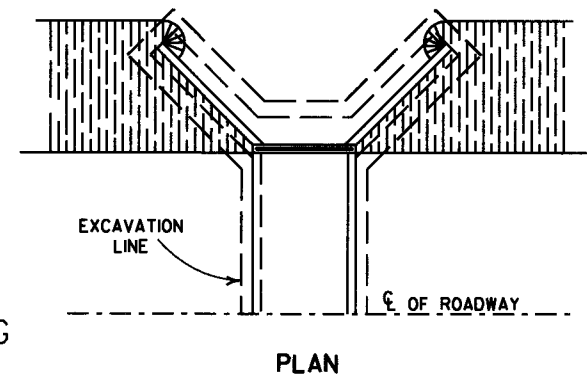
REINFORCED CONCRETE BOX CULVERT DETAILS

STANDARD DRAWING RCB-1

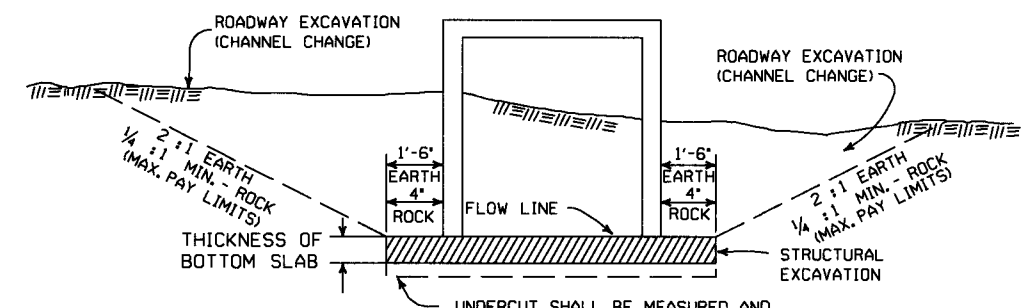
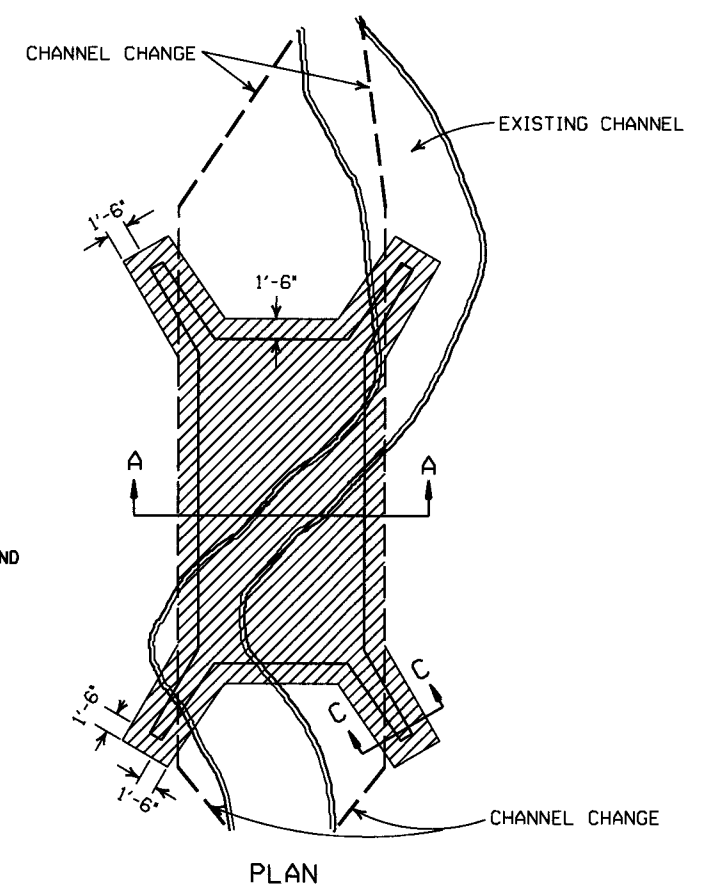


**SOLID SODDING**  
**PLAN**  
 PARTIAL SECTION SHOWING SOLID SODDING AT HEADWALLS AND WING WALLS

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

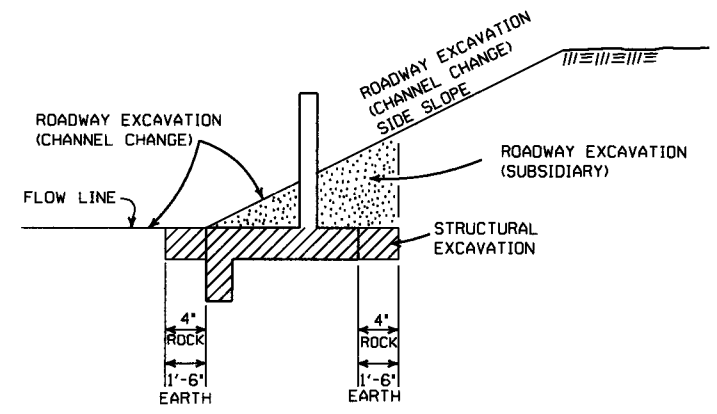


**LONGITUDINAL SECTION**  
**BACKFILL DETAILS FOR BOX CULVERT**

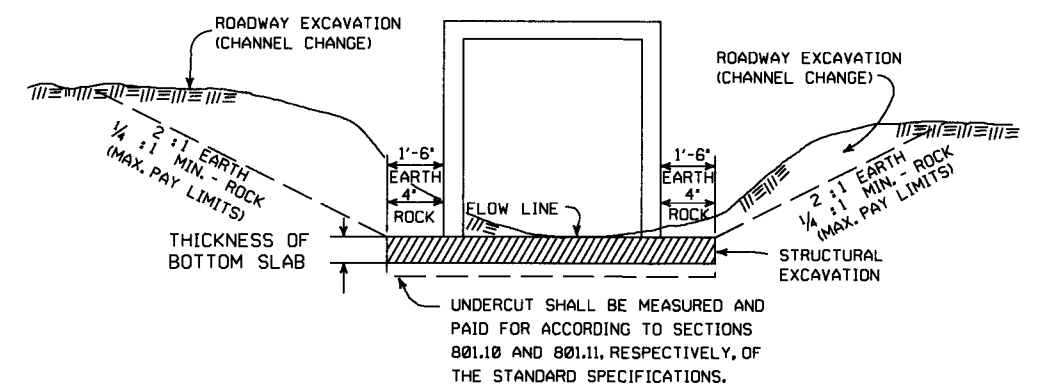


**SECTION B-B**  
**DETAILS FOR NEW CHANNELS**

UNDERCUT SHALL BE MEASURED AND PAID FOR ACCORDING TO SECTIONS 801.10 AND 801.11, RESPECTIVELY, OF THE STANDARD SPECIFICATIONS.



**SECTION C-C**



**SECTION A-A**  
**DETAILS THROUGH EXISTING CHANNELS**

UNDERCUT SHALL BE MEASURED AND PAID FOR ACCORDING TO SECTIONS 801.10 AND 801.11, RESPECTIVELY, OF THE STANDARD SPECIFICATIONS.

**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.

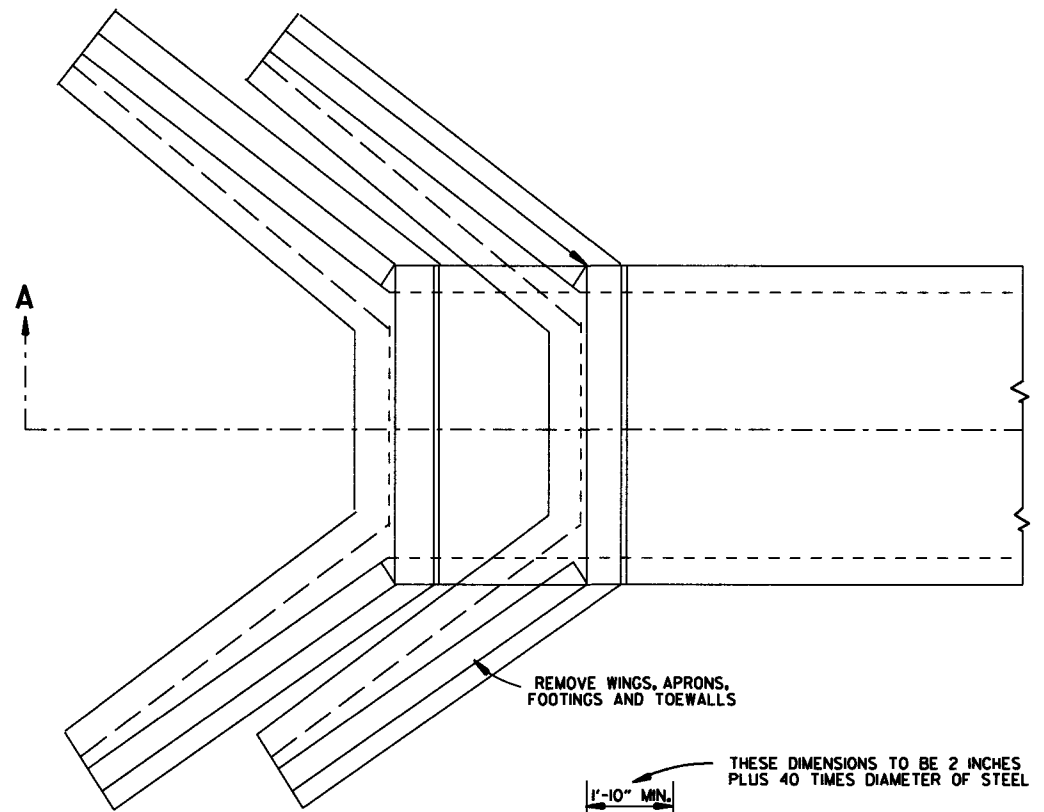
11-20-03	REVISED SECTION A-A NOTE	
8-22-02	REVISED SECTION B-B NOTE	
10-12-95	COMBINED 1891B AND 1888A	
1-4-83	REVISED GENERAL NOTES AND ADDED MAXIMUM PAY LIMIT NOTES.	674-1-4-83
2-2-76	EXCAV. PAY LIMITS	917-2-2-76
10-2-72	REVISED AND REDRAWN	564-10-16-72
DATE	REVISION	FILMED

**ARKANSAS STATE HIGHWAY COMMISSION**

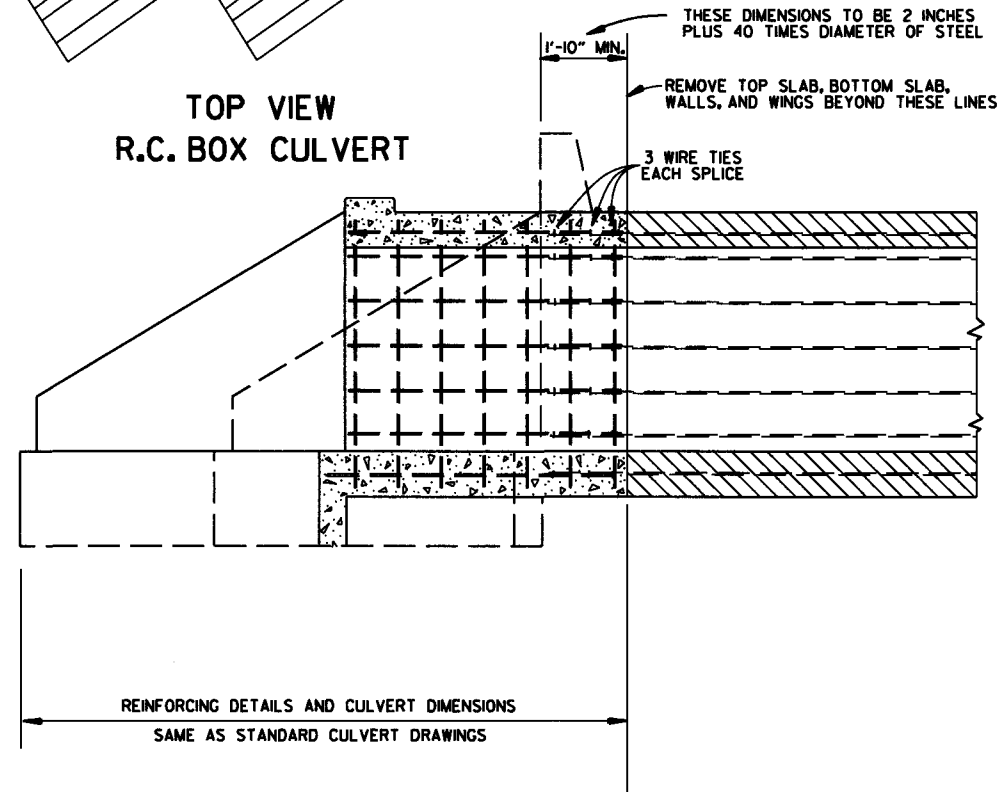
**EXCAVATION PAY LIMITS, BACKFILL, & SOLID SODDING FOR BOX CULVERTS**

**STANDARD DRAWING RCB-2**

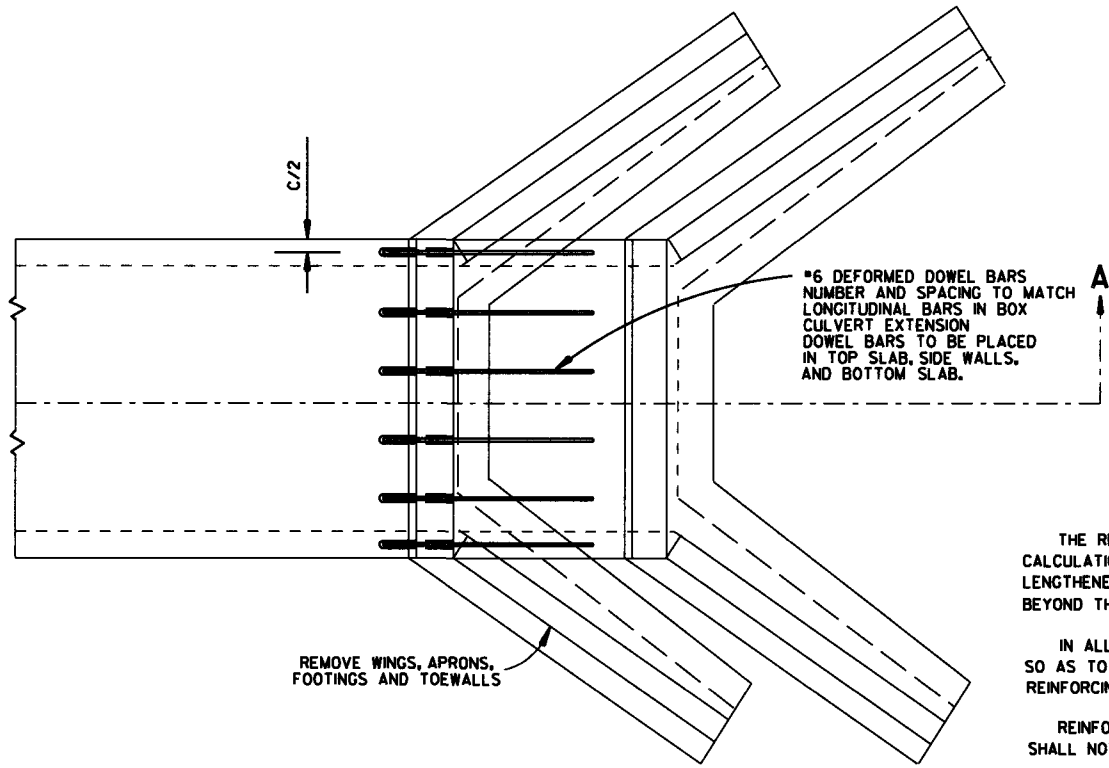




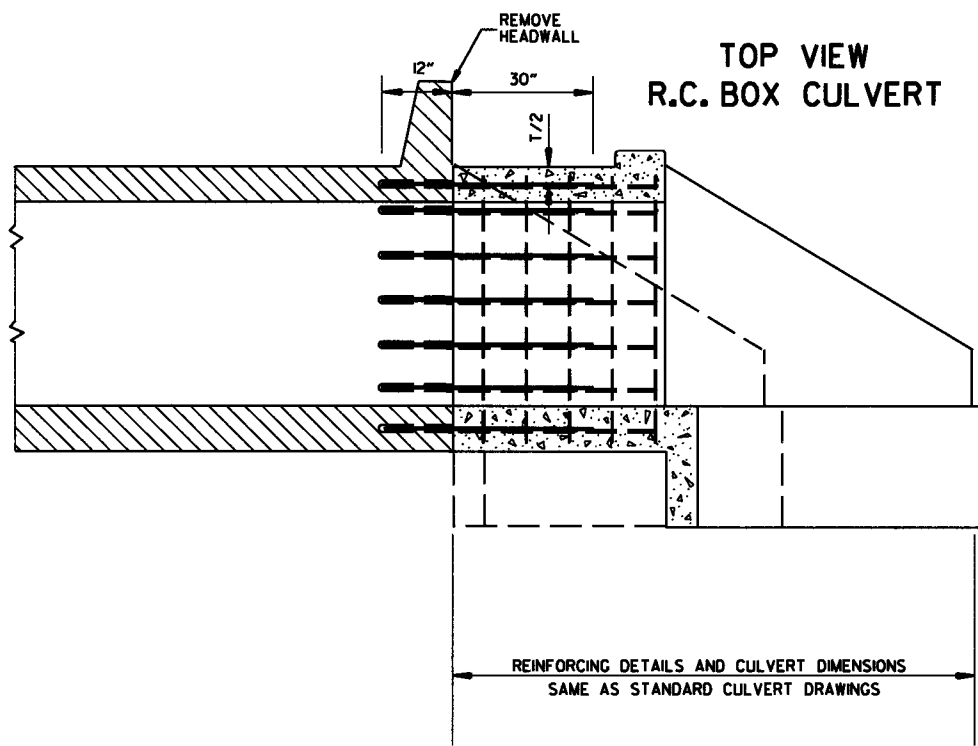
TOP VIEW  
R.C. BOX CULVERT



SECTION A-A  
METHOD 1



TOP VIEW  
R.C. BOX CULVERT



SECTION A-A  
METHOD 2

#6 DEFORMED DOWEL BARS  
NUMBER AND SPACING TO MATCH  
LONGITUDINAL BARS IN BOX  
CULVERT EXTENSION  
DOWEL BARS TO BE PLACED  
IN TOP SLAB, SIDE WALLS,  
AND BOTTOM SLAB.

GENERAL NOTES

- 1 THE RESIDENT ENGINEER WILL MAKE INDIVIDUAL CALCULATIONS OF QUANTITIES FOR EACH STRUCTURE LENGTHENED, MAKING NO ALLOWANCE FOR OVERBREAKAGE BEYOND THE LINES INDICATED.
- 1 IN ALL INSTANCES CONCRETE SHALL BE REMOVED SO AS TO PERMIT FULL 40 DIAMETER SPLICE OF REINFORCING STEEL.
- 1&2 REINFORCING STEEL REMOVED FROM EXISTING STRUCTURE SHALL NOT BE REUSED IN CONSTRUCTING EXTENSION.
- 1&2 ON R.C. BOX CULVERTS THAT HAVE AN EXISTING CONCRETE APRON, THE CONCRETE APRON SHALL BE REMOVED WITH THE WINGS. THE COST OF REMOVING ALL OLD CONCRETE WILL BE INCLUDED IN THE PRICE BID PER CUBIC YARD FOR NEW CONCRETE OF THE CLASS SPECIFIED AND NO ADDITIONAL COMPENSATION WILL BE ALLOWED.
- 2 MATERIALS FOR SECURING DOWEL BARS SHALL MEET THE REQUIREMENTS OF SECTION 507.02 OF THE STANDARD SPECIFICATIONS.
- 2 DOWEL BARS SHALL BE INSTALLED AS FOLLOWS: THE DRILLING PROCEDURE SHALL BE APPROVED BY THE ENGINEER, THE FILLING SYSTEM SHALL BE APPROVED BY THE ENGINEER, AND SHALL BE AN INJECTION-TYPE SYSTEM WHICH WILL INSURE THAT SUFFICIENT MATERIAL IS INJECTED SO IT COMPLETELY SURROUNDS THE BARS AND FILLS THE HOLES.
- 1&2 THE CONTRACTOR SHALL HAVE THE OPTION OF USING EITHER METHOD 1 OR METHOD 2, REGARDLESS OF WHICH METHOD IS USED, PAY QUANTITIES WILL BE CALCULATED BASED ON METHOD 1.

USE FOR  
METHOD

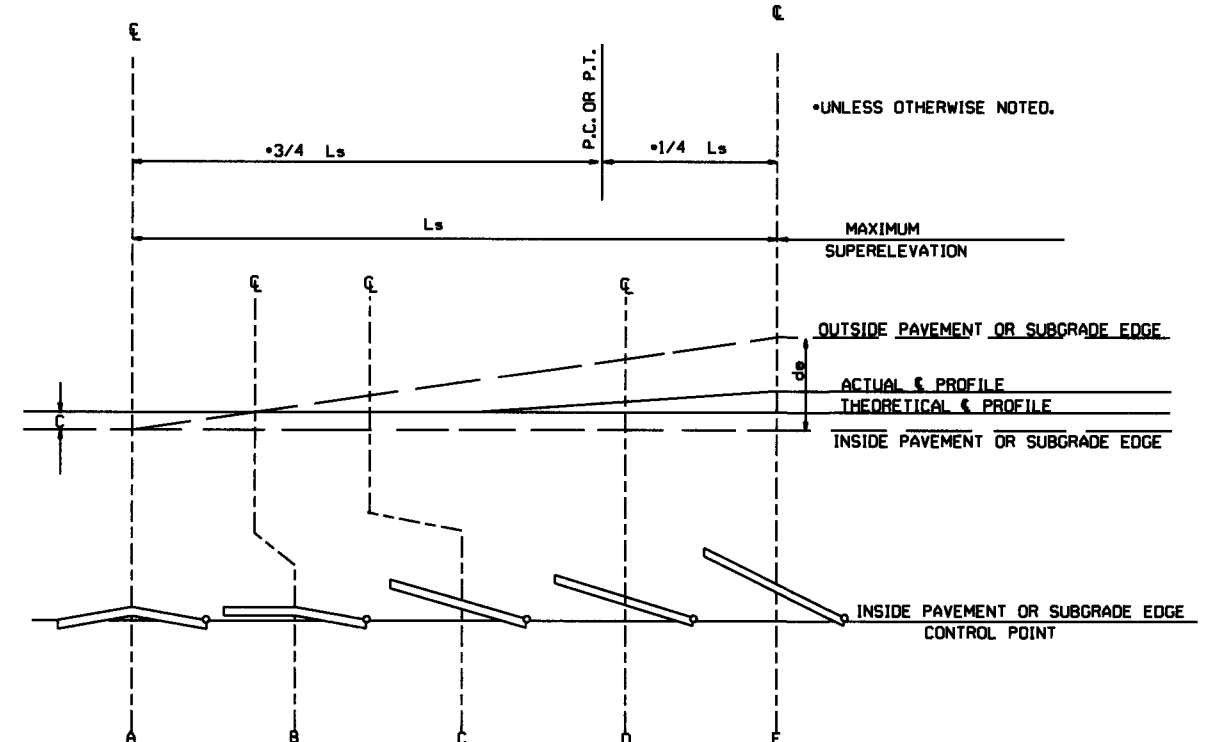
NOTE:  
NO PART OF THIS STANDARD IS TO BE USED FOR ANY DETAILS RELATIVE TO NEW CONSTRUCTION.  
SEE STANDARD DRAWING LISTED IN TABULATION OF STRUCTURES FOR ALL NEW CONSTRUCTION DETAILS.

DATE	REVISION	DATE FILED
10-12-95	CHANGED DRAWING * FROM 144-A	
4-1-95	ADDED GENERAL NOTE	
10-1-92	ADDED ALT. METHOD OF EXTENSION	
1-30-89	REDRAWN	
1-4-83	ELIMINATED CONCRETE CLASS	
12-20-56	RETRACTED	

ARKANSAS STATE HIGHWAY COMMISSION  
  
METHOD OF EXTENDING  
EXISTING R.C. BOX CULVERTS  
  
STANDARD DRAWING RCB-3

**SUPERELEVATION TABLE FOR TWO - WAY TRAFFIC**

DEGREE OF CURVE	30 MPH		40 MPH		50 MPH		55 MPH		60 MPH		70 MPH	
	Ls (FT)		Ls (FT)		Ls (FT)		Ls (FT)		Ls (FT)		Ls (FT)	
	MINIMUM	DESIRABLE	MINIMUM	DESIRABLE	MINIMUM	DESIRABLE	MINIMUM	DESIRABLE	MINIMUM	DESIRABLE	MINIMUM	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.		N.C.		N.C.		N.C.		N.C.	
1° 00'	N.C.		N.C.		N.C.		N.C.		N.C.		N.C.	
1° 15'	N.C.		N.C.		N.C.		N.C.		N.C.		N.C.	
1° 30'	N.C.		N.C.		N.C.		N.C.		N.C.		N.C.	
1° 45'	N.C.		N.C.		N.C.		N.C.		N.C.		N.C.	
2° 00'	N.C.		N.C.		N.C.		N.C.		N.C.		N.C.	
2° 15'	N.C.		N.C.		N.C.		N.C.		N.C.		N.C.	
2° 30'	N.C.		N.C.		N.C.		N.C.		N.C.		N.C.	
2° 45'	N.C.		N.C.		N.C.		N.C.		N.C.		N.C.	
3° 00'	N.C.		N.C.		N.C.		N.C.		N.C.		N.C.	
3° 15'	N.C.		N.C.		N.C.		N.C.		N.C.		N.C.	
3° 30'	N.C.		N.C.		N.C.		N.C.		N.C.		N.C.	
3° 45'	N.C.		N.C.		N.C.		N.C.		N.C.		N.C.	
4° 00'	N.C.		N.C.		N.C.		N.C.		N.C.		N.C.	
4° 15'	N.C.		N.C.		N.C.		N.C.		N.C.		N.C.	
4° 30'	N.C.		N.C.		N.C.		N.C.		N.C.		N.C.	
4° 45'	N.C.		N.C.		N.C.		N.C.		N.C.		N.C.	
5° 00'	N.C.		N.C.		N.C.		N.C.		N.C.		N.C.	
5° 15'	N.C.		N.C.		N.C.		N.C.		N.C.		N.C.	
5° 30'	N.C.		N.C.		N.C.		N.C.		N.C.		N.C.	
5° 45'	N.C.		N.C.		N.C.		N.C.		N.C.		N.C.	
6° 00'	N.C.		N.C.		N.C.		N.C.		N.C.		N.C.	
6° 15'	N.C.		N.C.		N.C.		N.C.		N.C.		N.C.	
6° 30'	N.C.		N.C.		N.C.		N.C.		N.C.		N.C.	
6° 45'	N.C.		N.C.		N.C.		N.C.		N.C.		N.C.	
7° 00'	N.C.		N.C.		N.C.		N.C.		N.C.		N.C.	
7° 15'	N.C.		N.C.		N.C.		N.C.		N.C.		N.C.	
7° 30'	N.C.		N.C.		N.C.		N.C.		N.C.		N.C.	
7° 45'	N.C.		N.C.		N.C.		N.C.		N.C.		N.C.	
8° 00'	N.C.		N.C.		N.C.		N.C.		N.C.		N.C.	
8° 15'	N.C.		N.C.		N.C.		N.C.		N.C.		N.C.	
8° 30'	N.C.		N.C.		N.C.		N.C.		N.C.		N.C.	
8° 45'	N.C.		N.C.		N.C.		N.C.		N.C.		N.C.	
9° 00'	N.C.		N.C.		N.C.		N.C.		N.C.		N.C.	
10° 00'	N.C.		N.C.		N.C.		N.C.		N.C.		N.C.	
11° 00'	N.C.		N.C.		N.C.		N.C.		N.C.		N.C.	
12° 00'	N.C.		N.C.		N.C.		N.C.		N.C.		N.C.	
13° 00'	N.C.		N.C.		N.C.		N.C.		N.C.		N.C.	
14° 00'	N.C.		N.C.		N.C.		N.C.		N.C.		N.C.	
15° 00'	N.C.		N.C.		N.C.		N.C.		N.C.		N.C.	
16° 00'	N.C.		N.C.		N.C.		N.C.		N.C.		N.C.	
17° 00'	N.C.		N.C.		N.C.		N.C.		N.C.		N.C.	
18° 00'	N.C.		N.C.		N.C.		N.C.		N.C.		N.C.	
19° 00'	N.C.		N.C.		N.C.		N.C.		N.C.		N.C.	
20° 00'	N.C.		N.C.		N.C.		N.C.		N.C.		N.C.	
21° 00'	N.C.		N.C.		N.C.		N.C.		N.C.		N.C.	
22° 00'	N.C.		N.C.		N.C.		N.C.		N.C.		N.C.	
23° 00'	N.C.		N.C.		N.C.		N.C.		N.C.		N.C.	
24° 00'	N.C.		N.C.		N.C.		N.C.		N.C.		N.C.	



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

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

**ABBREVIATIONS**

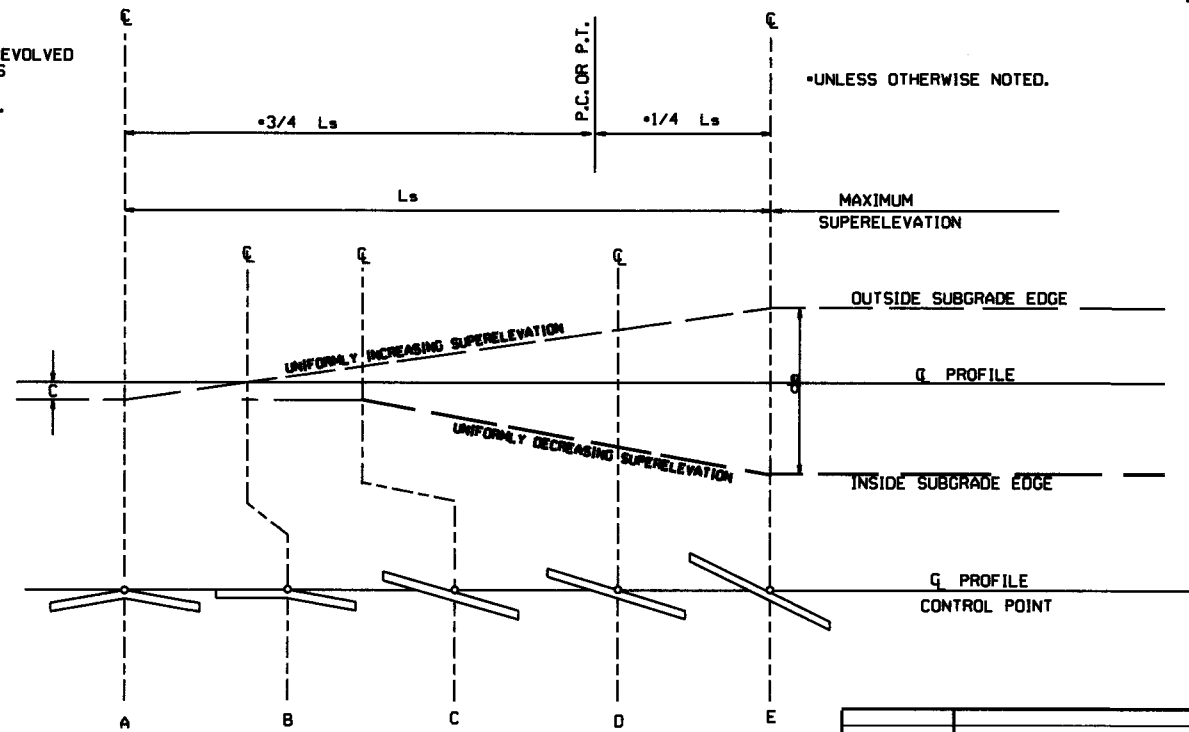
- NC - NORMAL CROWN
- RC - REVERSE CROWN, SUPERELEVATION AT NORMAL CROWN SLOPE
- e - RATE OF SUPERELEVATION (FT. PER FT.)
- Ls - LENGTH OF SUPERELEVATION TRANSITION (FT.)
- L - DISTANCE FROM BEGINNING OF SUPERELEVATION TRANSITION TO ANY POINT (FT.)
- d - WIDTH OF PAVEMENT (FT.) OR WIDTH OF SUBGRADE (FT.)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

**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**

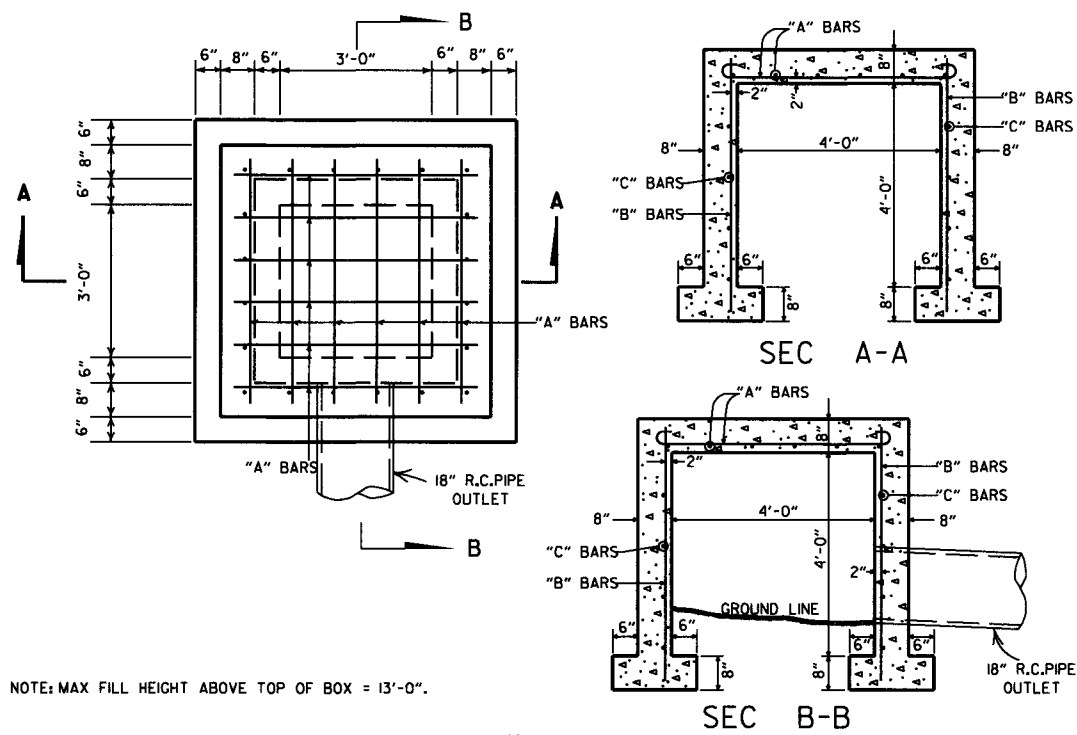
SUPERELEVATION FORMULA =  $\frac{Lde}{Ls}$

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

ARKANSAS STATE HIGHWAY COMMISSION

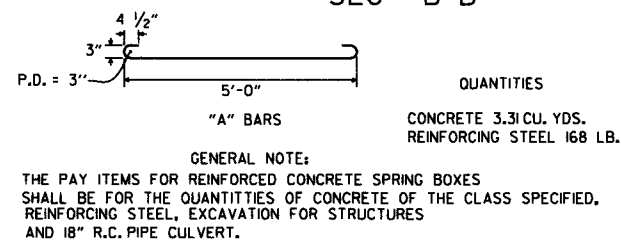
TABLES AND METHOD OF SUPERELEVATION FOR TWO-WAY TRAFFIC

STANDARD DRAWING SE-2

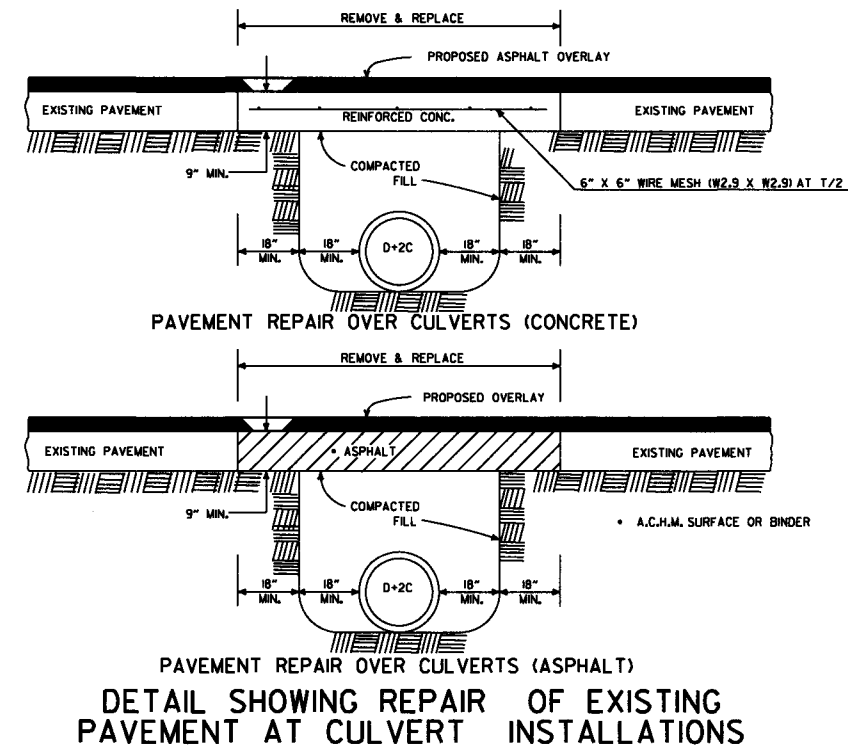


NOTE: MAX FILL HEIGHT ABOVE TOP OF BOX = 13'-0".

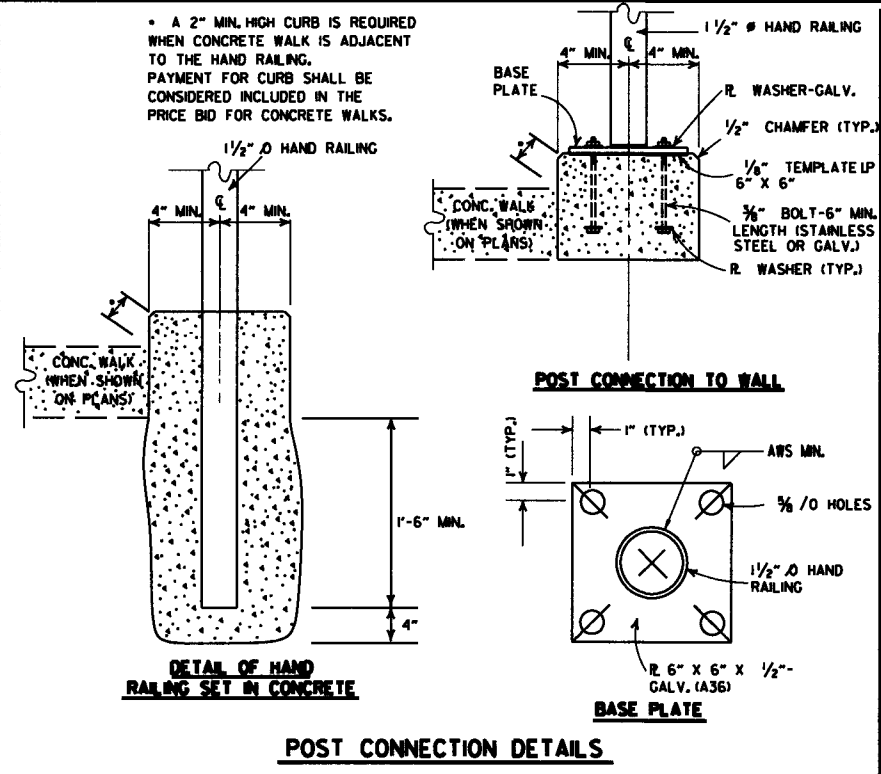
STEEL SCHEDULE			
BARS	NUMBER	LENGTH	SPACING
"A"	12	6'-0"	10"
"B"	20	5'-0"	10 1/2"
"C"	16	5'-0"	12"



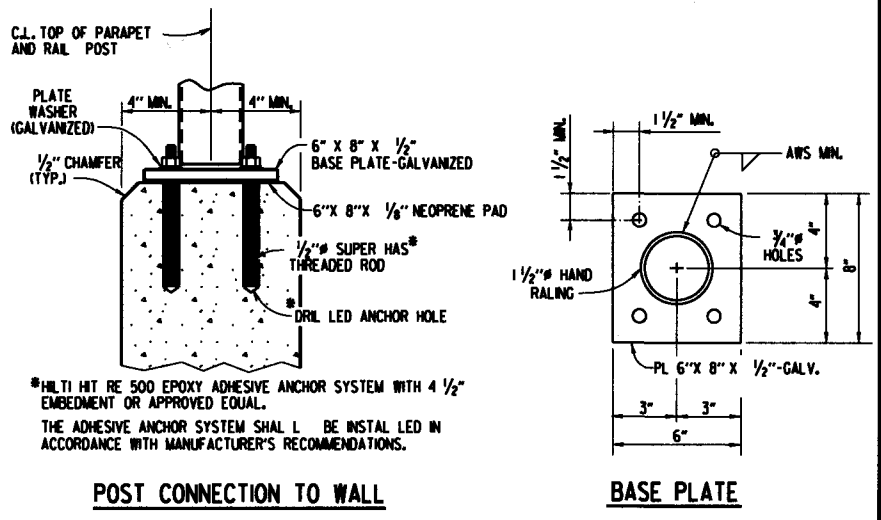
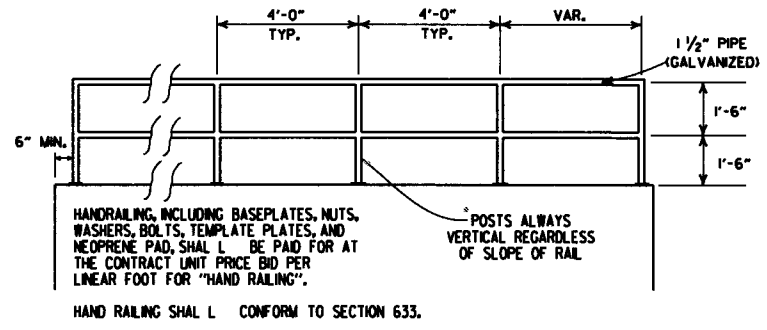
**REINFORCED CONCRETE SPRING BOX**



DETAIL SHOWING REPAIR OF EXISTING PAVEMENT AT CULVERT INSTALLATIONS



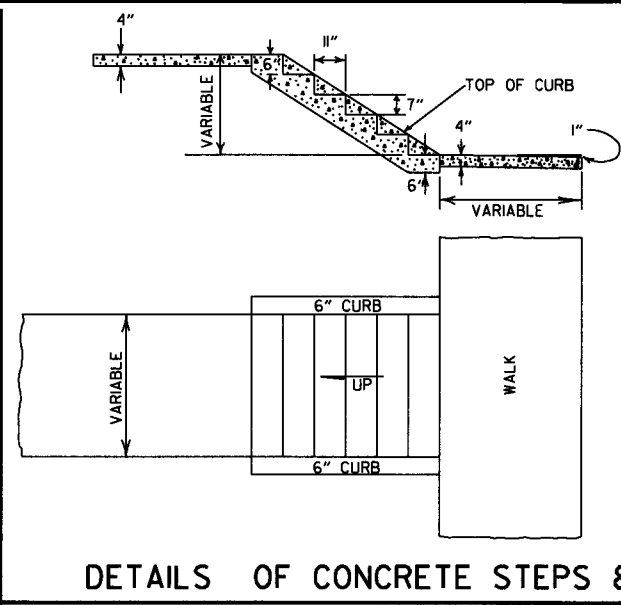
**POST CONNECTION DETAILS**



**POST CONNECTION TO WALL**

**DETAILS OF ALTERNATE POST ANCHOR SYSTEM (EPOXY ADHESIVE ANCHORS)**


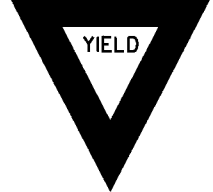
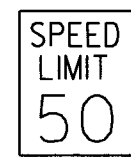


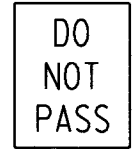



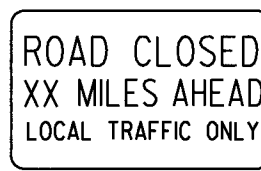








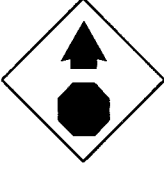
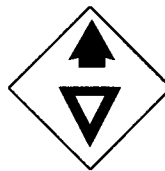
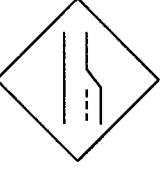

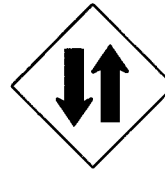
















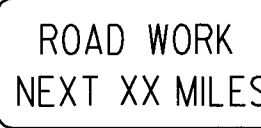
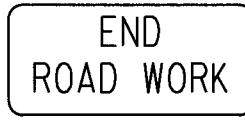
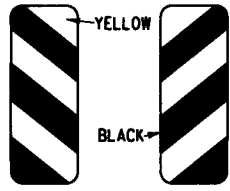


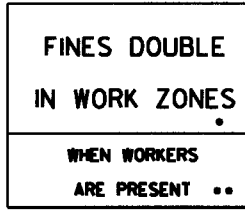
**HAND RAILING DETAILS**



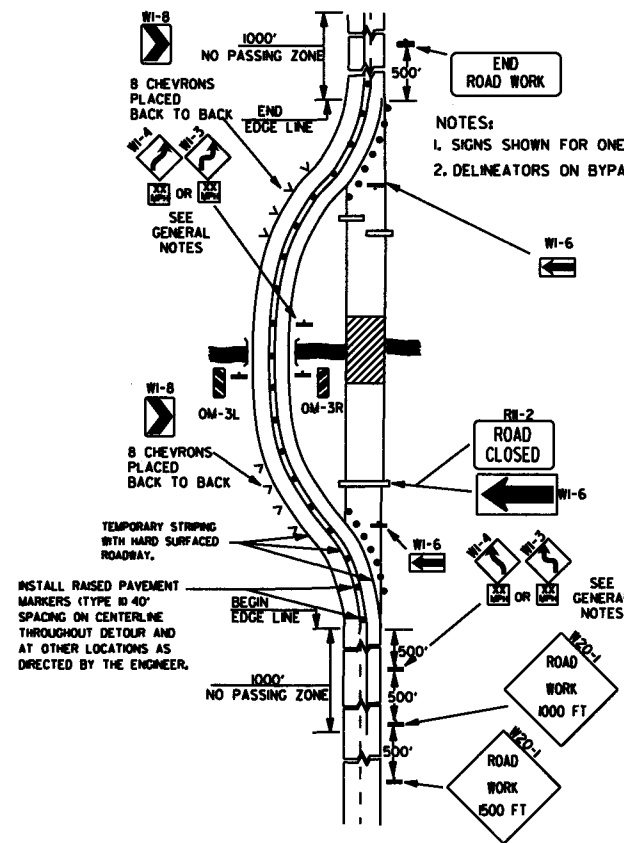
**DETAILS OF CONCRETE STEPS & WALKS**

- GENERAL NOTES**
1. RISE AND TREAD DIMENSIONS OF STEPS MAY BE VARIED AS DIRECTED BY THE ENGINEER, HOWEVER, TREAD WIDTHS SHALL BE 11" MIN. ALL STEPS IN A FLIGHT SHALL HAVE CONSISTENT TREAD & RISER DIMENSIONS.
  2. 1" TRANSVERSE EXPANSION JOINTS SHALL BE PLACED IN CONCRETE WALKS AT 45' INTERVALS.

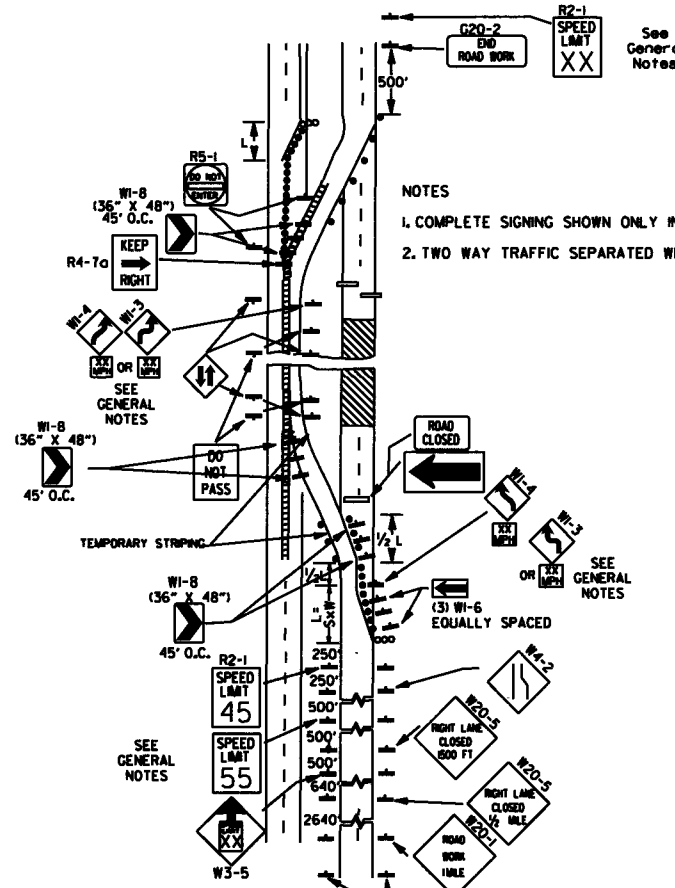
DATE	REVISION	DATE FILED
9-12-13	REVISED REINFORCED CONCRETE SPRING BOX	
7-26-12	REMOVED RETAINING WALL DETAILS & REVISED HAND RAILING DETAILS	
4-17-08	REV. JOINT & FOOTING STEP DETAILS	
11-29-07	REVISED RETAINING WALL DRAINAGE	
5-25-06	REVISED PVMT REPAIR OVER CULVERTS (CONC); REVISED REINFORCED CONC SPRING BOX	
10-9-03	REVISED PIPE RAILING DETAILS TO HAND RAILING DETAILS	
4-10-03	REVISED RETAINING WALL DRAWING	
8-22-02	ADDED HAND RAILING DETAIL	
11-16-01	REVISED PVMT REPAIR OVER CULVERTS (CONC); CORRECTED SPELLING IN GENERAL NOTES	
11-18-98	ADDED GENERAL NOTES TO CONCRETE STEPS & WALKS	
7-02-98	ENLARGED PIPE	
4-03-97	ADDED NOTE TO STEEL BAR SCHED.	
10-18-96	CORRECTED SPELLING	
4-26-96	ADD WEEP HOLE, REV. JOINT SPACING IN RET. WALL	
6-2-94	CHANGED CONST. TO CONTRACTION JOINT	
10-1-92	CHANGED MESH FABRIC TO WIRE MESH	10-1-92
8-15-91	DELETED HDWL MODIFICATION DETAIL	8-15-91
11-8-90	DELETED COLD MIX FROM CULV'T. REPAIR	11-8-90
11-30-89	REV. RETAINING WALL STEEL SCHEDULE	11-30-89
11-17-88	V. BARS BEHIND ARROW	665-11-17-88
7-15-88	REV. PAVEMENT REPAIR	649-7-15-88
11-1-84	ADDED HDWL. MODS. DEL. PIPE UNDERDRAINS	
1-4-83	REV. TRENCH FOR PIPE UNDERDRAIN	510-11-1-84
	ELIMINATED CONC. CLASS & ADDED CHAMFER NOTE	682-1-4-83
3-2-81	SPELLING OF "UNDERDRAIN"	721-3-2-81
4-20-79	REV. UNDERDRAIN DET. & PAVEMENT REPAIR	674-4-20-79
2-2-76	12" MIN. GRAN. MAT'L. OVER PIPE	919-2-2-76
4-10-75	REV. SPECS. FOR GRAN. MAT'L.	568-4-10-75-853
5-22-74	GRANULAR MAT'L. TO BE SB-3	567-5-22-74-740
10-2-72	REVISED AND REDRAWN	564-10-16-72

<p>RI-1</p>  <p>STANDARD 30"x30" EXPRESSWAY 36"x36" SPECIAL 48"x48"</p>	<p>RI-2</p>  <p>STD. 36"x36"x36" EXPWY. 48"x48"x48" FWY. 60"x60"x60"</p>	<p>R2-1</p>  <p>STD. 24"x30" EXPWY. 36"x48" FWY. 48"x60"</p>	<p>W3-5</p>  <p>STD. 36"x36" EXPWY. 48"x48" FWY. 48"x48"</p>	<p>W3-5a</p>  <p>STD. 36"x36" EXPWY. 48"x48" FWY. 48"x48"</p>	<p>R4-1</p>  <p>STD. 24"x30" EXPWY. 36"x48" FWY. 48"x60"</p>	<p>R4-2</p>  <p>STD. 24"x30" EXPWY. 36"x48" FWY. 48"x60"</p>	<p>ADVANCE DISTANCES (XXXX)</p> <p>500 FT      1/2 MILE 1000 FT     3/4 MILE 1500 FT     1 MILE                   AHEAD</p> <p>GENERAL NOTES:</p> <ol style="list-style-type: none"> <li>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.</li> <li>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.</li> <li>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.</li> <li>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.</li> <li>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.</li> <li>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.</li> <li>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.</li> <li>FLAGGERS SHALL USE REFLECTORIZED STOP-SLOW PADDLES. FLAGS MAY BE USED ONLY FOR EMERGENCY SITUATIONS.</li> <li>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.</li> <li>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.</li> </ol> <p>NOTE: SUPPORTS FOR SIGNS, BARRICADES, AND VERTICAL PANELS THAT ARE DIFFERENT FROM THE REQUIREMENTS SHOWN IN NOTES 4 &amp; 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.</p>
<p>R5-1</p>  <p>STD. 30"x30" EXPWY. 36"x36" SPECIAL 48"x48"</p>	<p>R11-2</p>  <p>48"x30"</p>	<p>R11-3A</p>  <p>60"x30"</p>	<p>R11-4</p>  <p>60"x30"</p>	<p>W21-5a</p>  <p>STD. 36"x36" FWY. 48"x48"</p>	<p>W1-1</p>  <p>STD. 36"x36" FWY. 48"x48"</p>	<p>W1-2</p>  <p>STD. 36"x36" FWY. 48"x48"</p>	
<p>W1-3</p>  <p>STD. 48"x48"</p>	<p>W1-4</p>  <p>STD. 48"x48"</p>	<p>W1-6</p>  <p>STD. 48"x24" SPECIAL 60"x30"</p>	<p>W1-8</p>  <p>STD. 18"x24" SPECIAL 24"x30" EXPWY. 30"x36" FWY. 36"x48"</p>	<p>W3-1</p>  <p>STD. 36"x36" SPECIAL 48"x48"</p>	<p>W3-2</p>  <p>STD. 36"x36" SPECIAL 48"x48"</p>	<p>W4-2</p>  <p>STD. 36"x36" FWY. 48"x48"</p>	
<p>W5-1</p>  <p>STD. 36"x36" SPECIAL 48"x48"</p>	<p>W6-3</p>  <p>EXPWY. 36"x36" SPECIAL 48"x48"</p>	<p>W8-7</p>  <p>EXPWY. 36"x36" FWY. 48"x48"</p>	<p>W9-2</p>  <p>STD. 36"x36" FWY. 48"x48"</p>	<p>W13-1</p>  <p>STD. 24"x24"</p>	<p>W20-1</p>  <p>STD. 48"x48"</p>	<p>W20-2</p>  <p>STD. 48"x48"</p>	<p>W20-3</p>  <p>STD. 48"x48"</p>
<p>W20-4</p>  <p>STD. 48"x48"</p>	<p>W20-5</p>  <p>STD. 48"x48"</p>	<p>W20-7a</p>  <p>STD. 36"x36" FWY. 48"x48"</p>	<p>W21-2</p>  <p>STD. 30"x30" SPECIAL 36"x36"</p>	<p>W21-5</p>  <p>STD. 30"x30" SPECIAL 36"x36"</p>	<p>W24-1</p>  <p>STD. 36"x36"</p>	<p>W1-4b</p>  <p>STD. 48"x48"</p>	<p>R56-1</p>  <p>STD. 18"x18"</p>
<p>W8-11</p>  <p>STD. 36"x36" FWY. 48"x48"</p>	<p>W8-9</p>  <p>STD. 36"x36" FWY. 48"x48"</p>	<p>G20-1</p>  <p>60"x24"</p>	<p>G20-2</p>  <p>48"x24"</p>	<p>OM-3L    OM-3R</p>  <p>12"x36"</p>	<p>M4-9</p>  <p>STD. 30"x24" SPECIAL 48"x36" SPECIAL 60"x48"</p>	<p>M4-10</p>  <p>48"x18"</p>	<p>R55-1</p>  <p>36"x60"</p> <p>• USE 6" C LETTERS •• USE 4" D LETTERS</p>

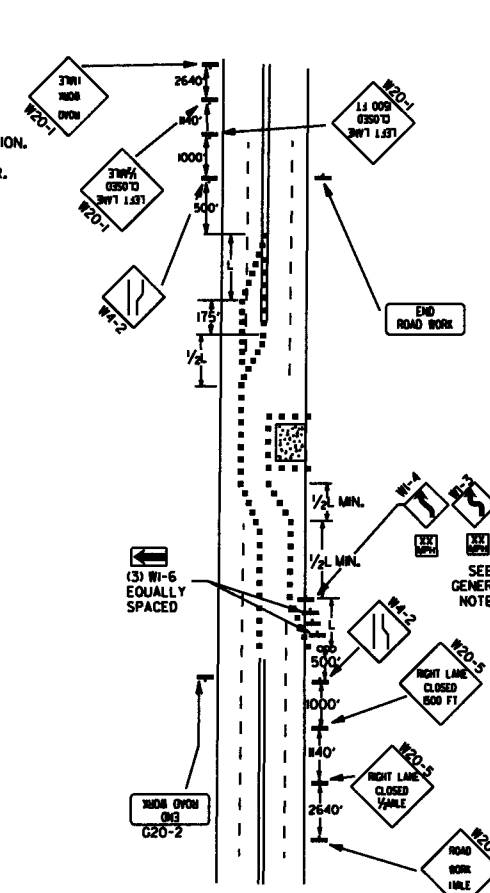
4-13-17	DELETED RSP-1 & ADDED W21-5a	
9-2-15	REVISED REDUCED SPEED LIMIT AHEAD SIGNS REVISED ROAD WORK NEXT XX MILES	
12-15-11	REVISED W24-1	
1-17-10	DELETED W8-9a & ADDED W8-9	
10-15-09	ADDED REFERENCE TO MASH & ADDED SIGN W24-1	
4-17-08	REVISED SIGN DESIGNATIONS	
1-18-04	REVISED NOTES	
10-9-03	REVISED NOTE 1	
11-16-01	REVISED NOTE 7	
9-28-00	REVISED NOTE	
1-18-98	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	
DATE	REVISION	FILMED



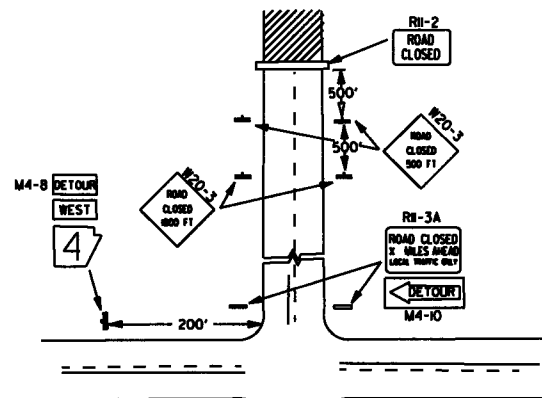
(A) TYPICAL APPLICATION OF TRAFFIC CONTROL DEVICES ON A 2-LANE HIGHWAY WHERE THE ENTIRE ROADWAY IS CLOSED AND A BYPASS DETOUR IS PROVIDED.



(B) TYPICAL APPLICATION - 4-LANE DIVIDED ROADWAY WHERE ONE ROADWAY IS CLOSED.

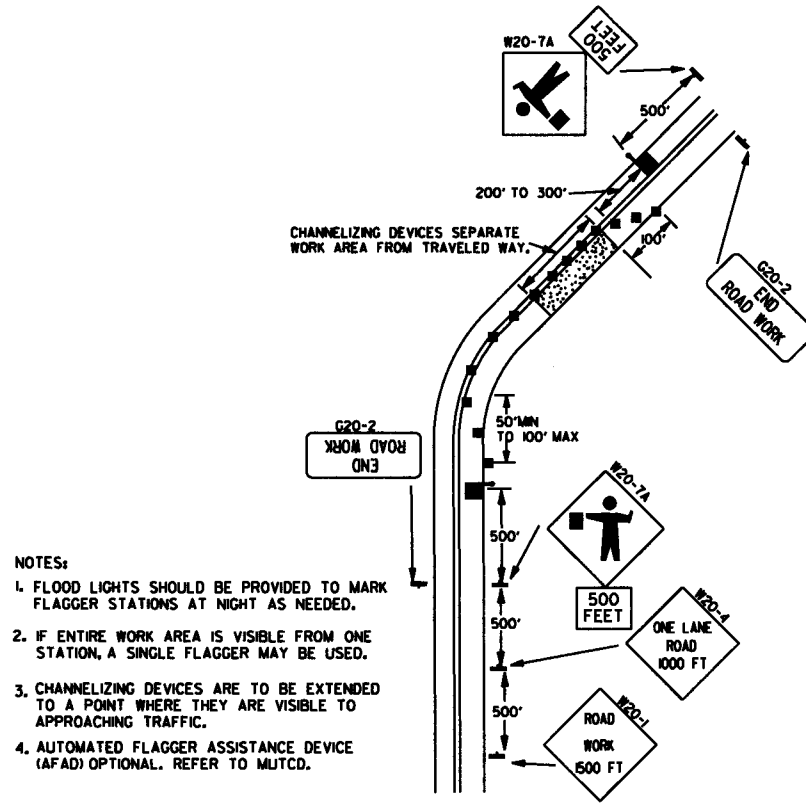


(C) TYPICAL APPLICATION - 4-LANE UNDIVIDED ROADWAY WHERE HALF OF THE ROADWAY IS CLOSED.



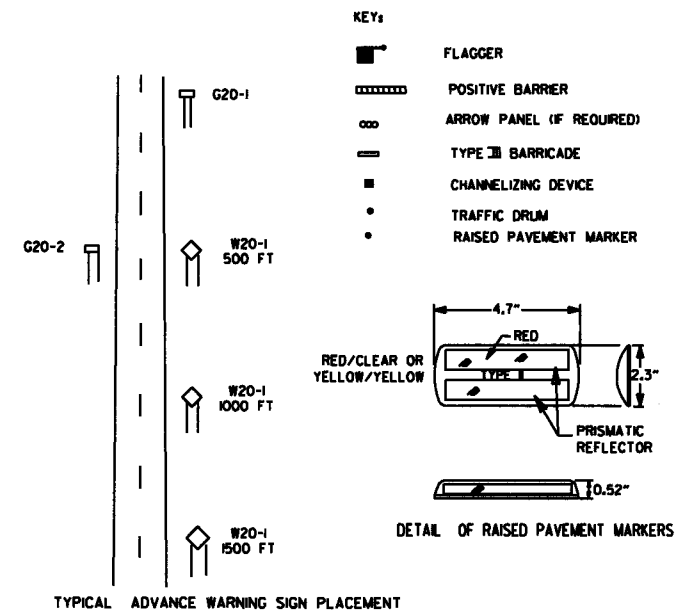
NOTES:  
1. REGULATORY TRAFFIC CONTROL DEVICES TO BE MODIFIED AS NEEDED FOR THE DURATION OF THE DETOUR.  
2. STREET NAMES MAY BE USED WHEN DESIRABLE FOR DIRECTING DETOURED TRAFFIC.

(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.

KEY:  
 FLAGGER  
 POSITIVE BARRIER  
 ARROW PANEL (IF REQUIRED)  
 TYPE III BARRICADE  
 CHANNELIZING DEVICE  
 TRAFFIC DRUM  
 RAISED PAVEMENT MARKER

DETAIL OF RAISED PAVEMENT MARKERS

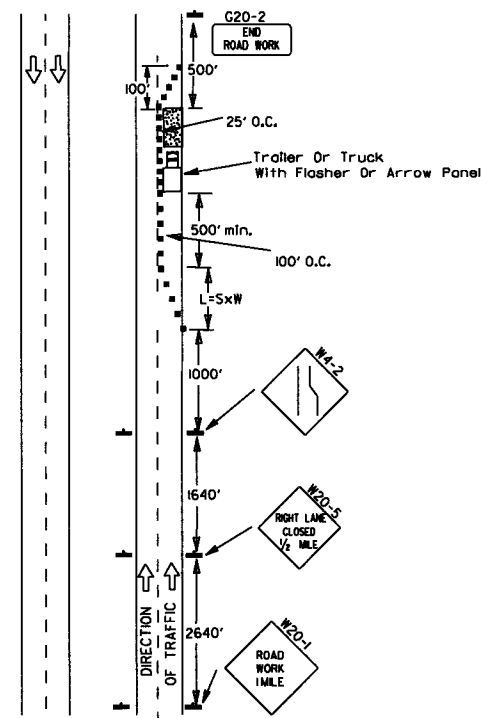
TYPICAL ADVANCE WARNING SIGN PLACEMENT

TAPER FORMULAE:  
 $L = SXW$  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.

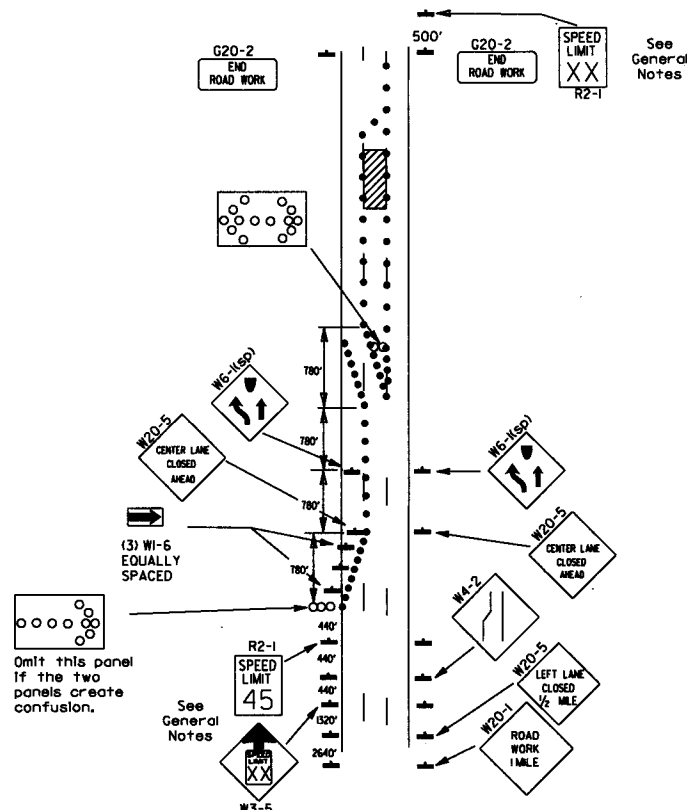
- GENERAL NOTES:  
 1. ADVISORY SPEED POSTED ON W1-3 OR W1-4 CURVE WARNING SIGNS TO BE DETERMINED AT SITE. USE W1-4 WHEN SPEED IS GREATER THAN 30MPH AND W1-3 WHEN 30MPH OR LESS.  
 2. WHEN THE EXISTING SPEED LIMIT IS 55MPH AND THE PLANS REQUIRE A SPEED LIMIT OF 45MPH, THE R2-K55 SHALL BE OMITTED AND THE W3-5 SHALL BE INSTALLED AT THAT LOCATION. ADDITIONAL R2-145MPH SPEED LIMIT SIGNS SHALL BE INSTALLED AT A MAXIMUM OF 1MILE INTERVALS. AT THE END OF THE WORK AREA A R2-KXX 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-K45 SHALL BE OMITTED. ADDITIONAL R2-155MPH SPEED LIMIT SIGNS SHALL BE INSTALLED AT A MAXIMUM OF 1MILE INTERVALS. AT THE END OF THE WORK AREA A R2-KXX 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 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.  
 8. 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.

9-2-95	REVISED NOTE 2, ADDED NOTE 8, REVISED DRAWING (A) & REPLACED R2-5A WITH W3-5	
9-12-95	REVISED DETAIL OF RAISED PAVEMENT MARKERS	
3-8-90	ADDED (AFAD)	
8-20-08	REVISED SIGN DESIGNATIONS	
8-18-04	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	
DATE	REVISION	FILMED





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

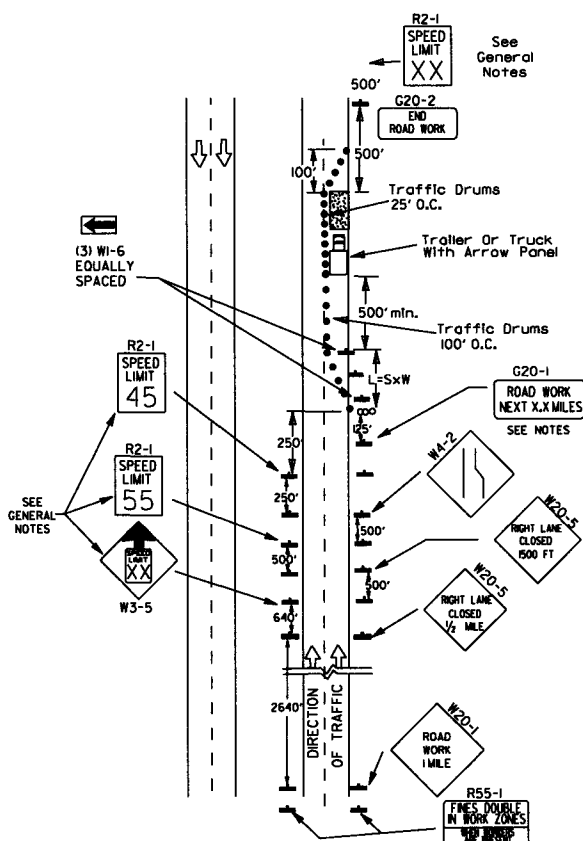


(B) Typical application - 3-lane oneway roadway where center lane is closed.

- KEY:
- Arrow Panel (if Required)
  - Channelizing Device
  - Traffic drum

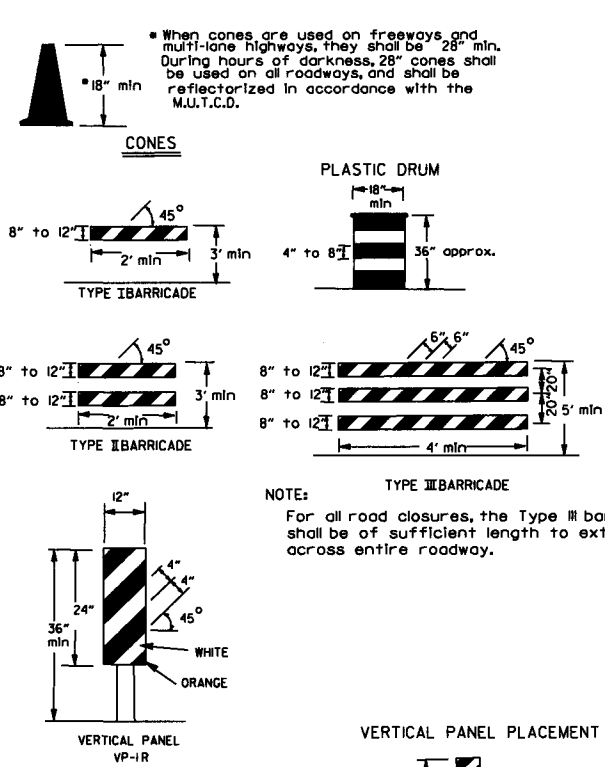
GENERAL NOTES:

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 W3-5 shall be installed at that location. Additional R2-1(45) speed limit signs shall be installed at a maximum of 1/2 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(65) shall be omitted. Additional R2-1(55) speed limit signs shall be installed at a maximum of 1/2 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(1/2 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.

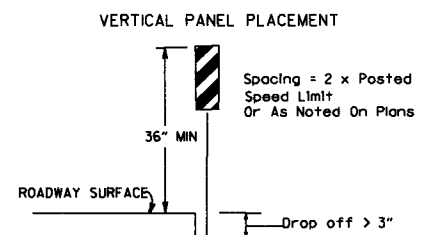


(C) Typical application - construction operations of intermediate to long term duration on a 4-lane divided roadway where half of the roadway is closed.

Channelizing devices



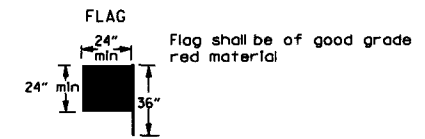
NOTE:  
For all road closures, the Type III barricades shall be of sufficient length to extend across entire roadway.



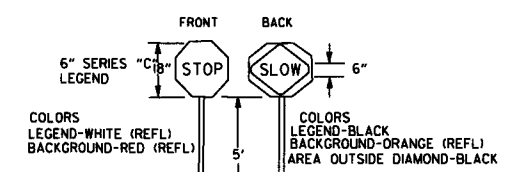
TRAFFIC CONTROL DEVICES FOR

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

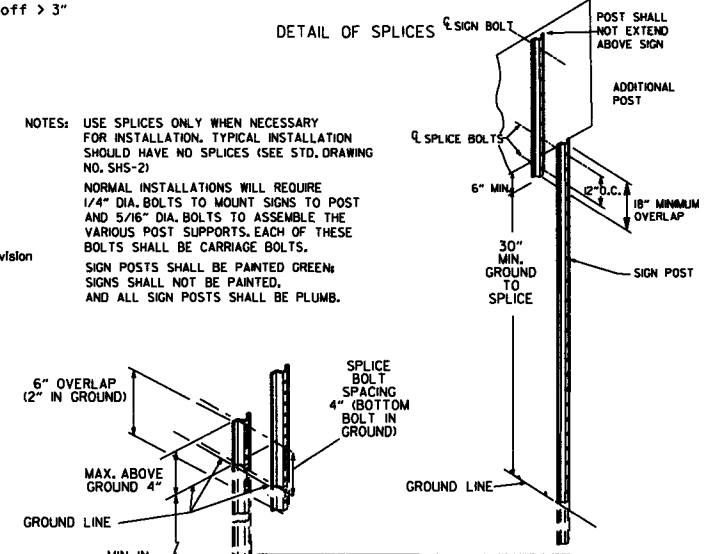
\* When shown on the plans concrete barrier will be used.  
When the shoulder area is used as part of the traveled lane and there is insufficient width to place drums on the remaining shoulder width, then vertical panels shall be used.



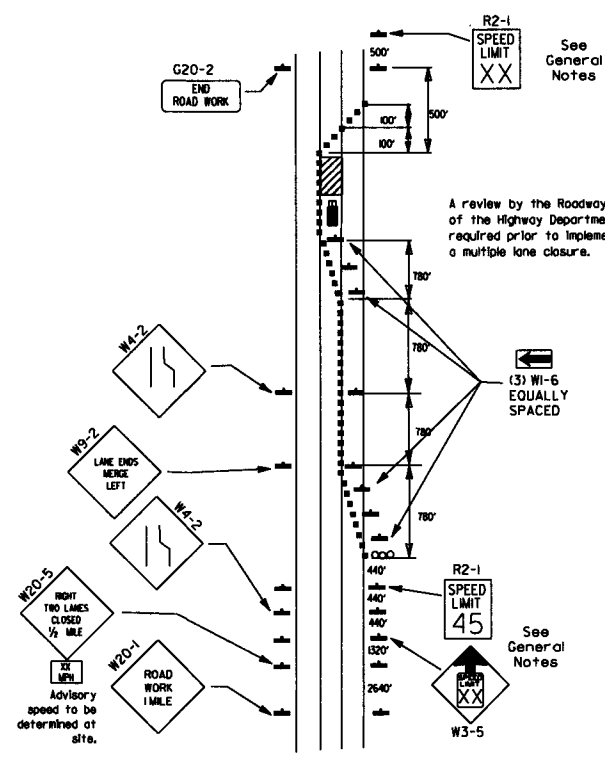
STOP SLOW PADDLE



DETAIL OF SPLICES



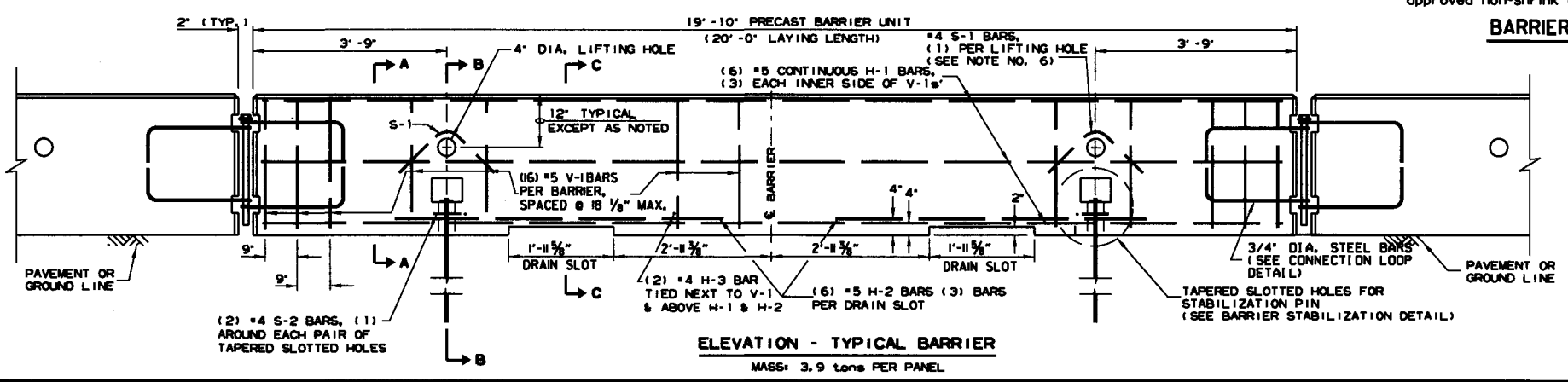
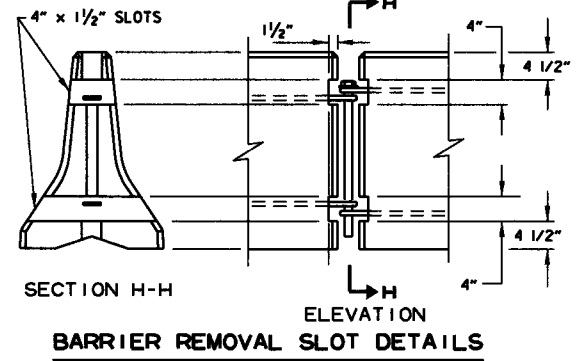
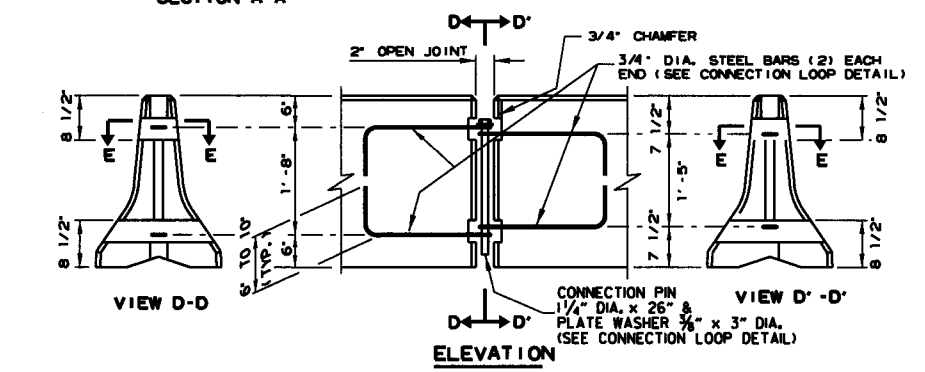
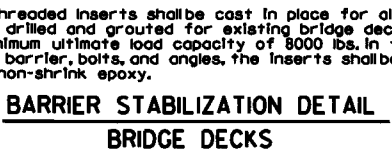
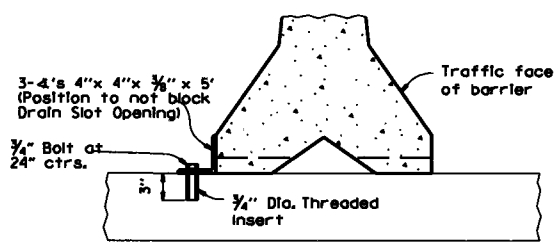
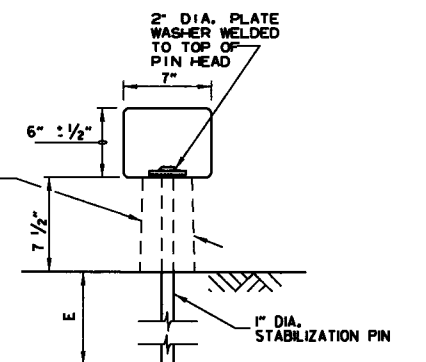
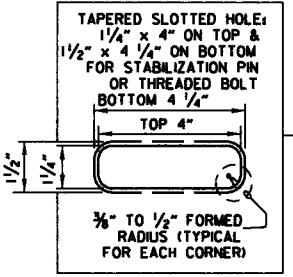
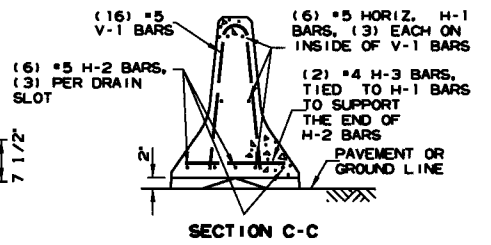
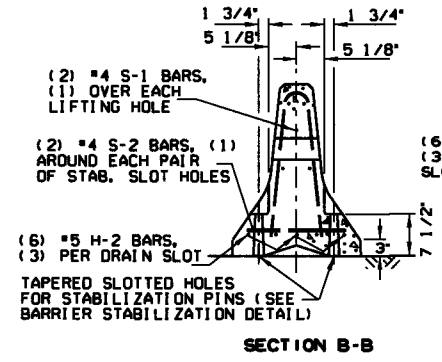
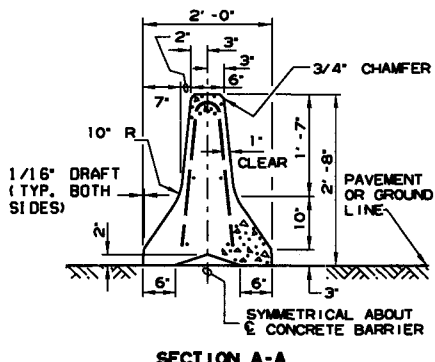
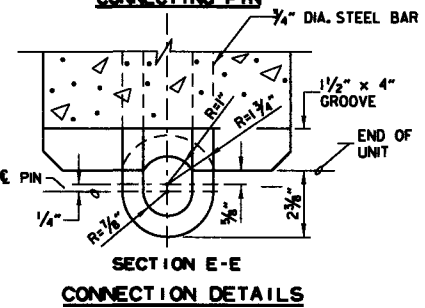
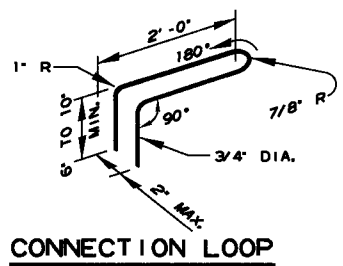
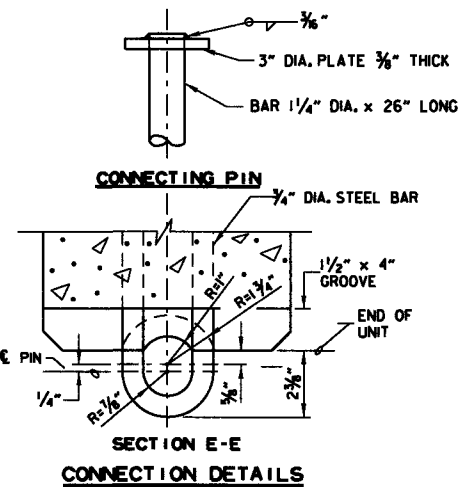
NOTES:  
USE SPLICES ONLY WHEN NECESSARY FOR INSTALLATION. TYPICAL INSTALLATION SHOULD HAVE NO SPLICES (SEE STD. DRAWING NO. SHS-2)  
NORMAL INSTALLATIONS WILL REQUIRE 1/4" DIA. BOLTS TO MOUNT SIGNS TO POST AND 5/16" DIA. BOLTS TO ASSEMBLE THE VARIOUS POST SUPPORTS. EACH OF THESE BOLTS SHALL BE CARRIAGE 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	FILED
9-2-15	REVISED NOTE 2 & REPLACED R2-5A WITH W3-5	
10-15-09	ADDED REFERENCE TO MASH	
8-20-08	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	

REINFORCING BAR TABLE PER BARRIER UNIT			
MARK	LOCATION	BAR SIZE	(NO. BARS)
H-1	HORIZONTAL IN BARRIER TIED INSIDE V-1 BARS	#5	(6)
H-2	CENTERED ABOVE DRAIN SLOTS LONG. & TRANSVERSELY	#5	(6)
H-3	TIED ABOVE H-1 BARS TO SUPPORT H-2, TIED TO V-1	#4	(2)
S-1	OVER LIFT HOLES	#4	(2)
S-2	HORIZ. AROUND SLOTS BETWEEN V-1'S & DRAIN SLOTS	#4	(2)
V-1	VERTICAL IN BARRIER (3) EACH END & (2) AT EACH DRAIN SLOTS	#5	(16)

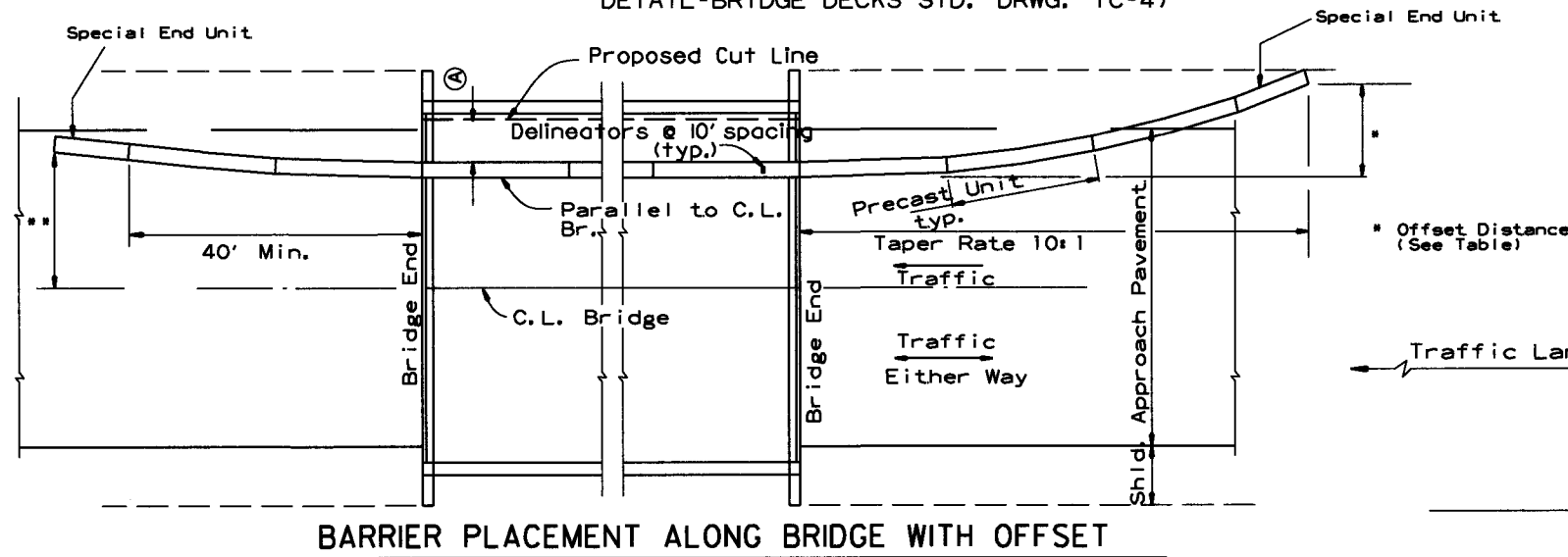


- General Notes**
- The contractor shall furnish the Precast Concrete Barrier Units and shall be responsible for the manufacture, shipment, storage, placement and removal. At the completion of the project, the precast units will remain the property of the contractor.
  - Materials shall meet the following minimum requirements:  
Concrete: 2500 psi compressive strength at 28 days.  
Reinforcing Steel: AASHTO M 31 or M 53, Grade 60  
Structural Steel: AASHTO-M270 Grade 36 shall be used for the Connection Pin, Connection Loops, and Stabilization Pins. A One Piece Pin with a 3" rounded top may be used in place of the detailed Connection Pin. Delineators: Delineators shall be mounted at 10' spacing on top of precast barrier.  
  
In applications where barrier walls within 6 feet of a traffic lane, additional delineators shall be placed on the barrier at 10' spacing approximately one (1) foot from the top of the barrier. Delineators shall be on the AHTD Qualified Products List for Construction Concrete Barrier Markers. Delineator color shall be in accordance with the Manual Uniform Traffic Control Devices. Payment for delineators shall be considered included in the price bid per Lin. Ft. for "Furnishing and installing Precast Concrete Barrier". The contractor shall certify to the Engineer that the material and the design used in the precast barrier units meets the requirements as shown on this standard drawing.
  - Other Precast Concrete Barriers that have been crash tested and approved by the Federal Highway Administration to meet the requirements of NCHRP-350 test level 3 or Manual For Assessing Safety Hardware (MASH) will be accepted in lieu of the barrier shown. Drain slots shall be provided as needed or as directed by the Engineer. The Contractor shall furnish a certification of NCHRP Report 350 or Manual For Assessing Safety Hardware (MASH) compliance for any other types of precast barrier to be used. The certification shall state that the precast concrete barrier meets the requirements of NCHRP Report 350 or Manual For Assessing Safety Hardware (MASH) and include a copy of the Federal Highway Administration's (FHWA) approval letter with all attachments. Precast concrete barrier units shall be fabricated and installed in accordance with crash testing and documentation provided in the FHWA approval letter. Mixing of shapes will not be allowed in a continuous line of units.
  - Dowel holes in pavement or bridge slabs that are to remain in place shall be filled. Holes in concrete pavement and bridge slabs shall be filled with an approved non-shrink epoxy grout. Holes in asphalt pavement shall be filled with an approved asphalt joint filler. Payment for drilling and filling holes to be included in the price for various barrier items.
  - Attach Units To Roadway Surface with Stabilization Pins and to Deck Slabs using bolts when required.
  - A 4" White PVC Sleeve may be used to form the Lifting Hole and if used the Sleeve is to be left in place.

DATE	REVISION	FILED
2-27-01	REVISED BARRIER STABILIZATION DETAIL	
10-05-09	ADDED REFERENCE TO MASH	
8-5-09	REV. NOTE 3 CONCERNING DRAIN SLOTS	
8-29-07	REVISED NOTE 3	
5-25-06	DELETED GENERAL NOTE 7	
8-18-04	REVISED BARRIER STABILIZATION DETAIL BRIDGE DECKS	
4-10-03	REVISED GENERAL NOTE 2	
8-22-02	ISSUED NEW DRAWING	

ARKANSAS STATE HIGHWAY COMMISSION  
STANDARD TRAFFIC CONTROLS  
FOR HIGHWAY CONSTRUCTION -  
TEMPORARY PRECAST BARRIER  
STANDARD DRAWING TC-4

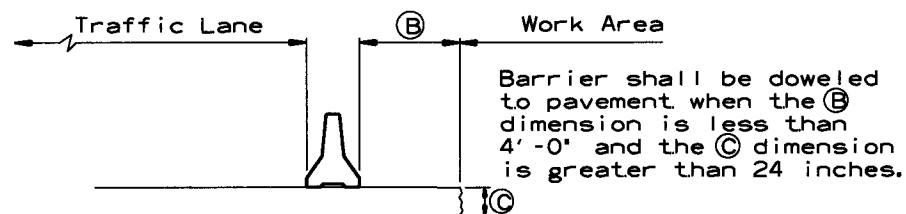
(A) 4 feet or greater preferred. If less than 4 feet, Precast Units shall be connected to slab (SEE BARRIER STABILIZATION DETAIL-BRIDGE DECKS STD. DRWG. TC-4)



**BARRIER PLACEMENT ALONG BRIDGE WITH OFFSET**

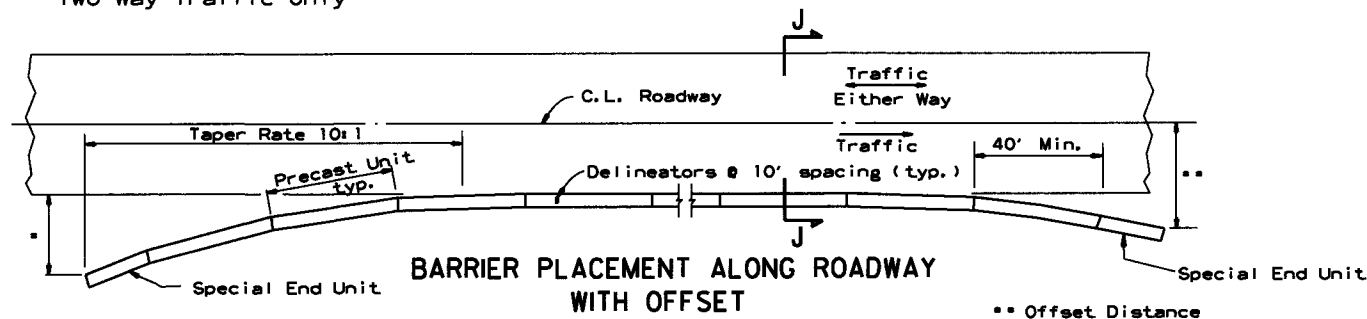
No Scale

\*\* Offset Distance for Two Way Traffic Only



**SECTION J-J**

No Scale



**BARRIER PLACEMENT ALONG ROADWAY WITH OFFSET**

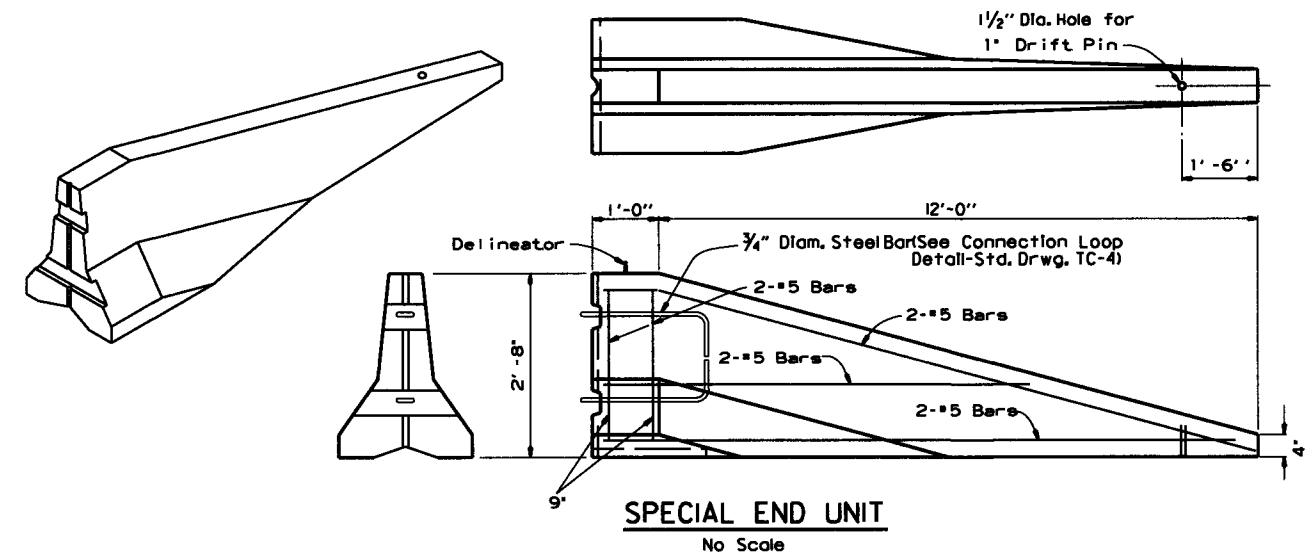
No Scale

\* Offset Distance (See Table)

\*\* Offset Distance For Two Way Traffic Only

Speed (MPH)	Offset Distance (FT.)
≤ 45	12
> 45	18

If offset distance is not attainable, then see 'Barrier Placement With Attenuator' Detail shown below.

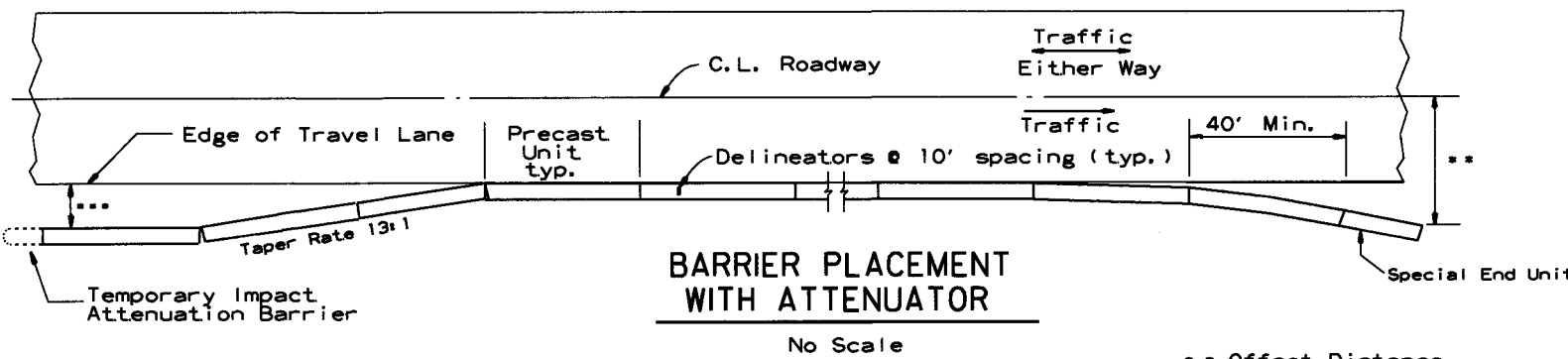


**SPECIAL END UNIT**

No Scale

**General Notes**

When shown on the Plans, the ends of the Temporary Precast Concrete Barrier shall be protected with an NCHRP-350 or Manual For Assessing Safety Hardware (MASH) approved Crash Cushion. Payment for Crash Cushions shall be made under the item of "Temporary Impact Attenuation Barrier."



**BARRIER PLACEMENT WITH ATTENUATOR**

No Scale

\*\* Offset Distance For Two Way Traffic Only

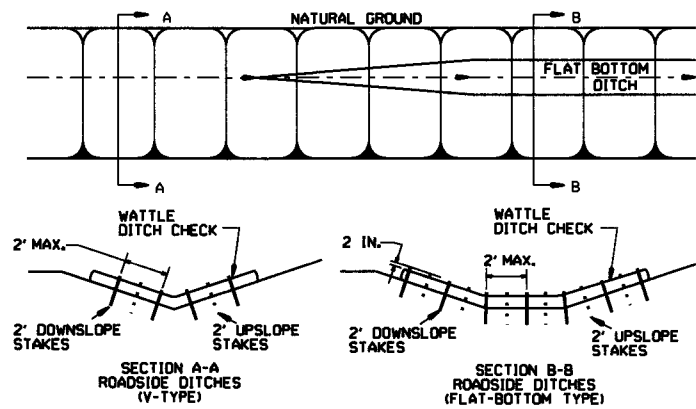
\*\*\* Min. 3'-0" From Edge of Travel Lane to Nearest Edge of Attenuator

ARKANSAS STATE HIGHWAY COMMISSION		
STANDARD TRAFFIC CONTROLS FOR HIGHWAY CONSTRUCTION - TEMPORARY PRECAST BARRIER		
DATE	REVISION	FILMED
10-15-09	ADDED REFERENCE TO MASH	
5-25-06	REVISED BARRIER PLACEMENT	
8-22-02	ISSUED NEW DRAWING	

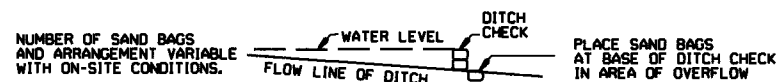
STANDARD DRAWING TC-5

**GENERAL NOTES**

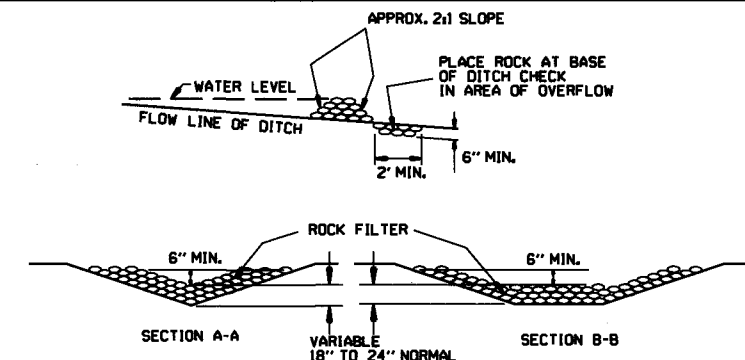
INSTALL A MINIMUM OF 2 UPSLOPE STAKES AND 4 DOWNSLOPE STAKES AT AN ANGLE TO WEDGE WATTLE TO BOTTOM OF DITCH.



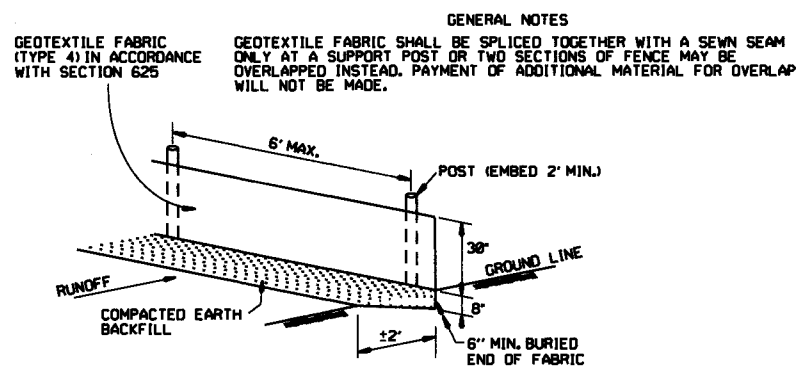
**WATTLE DITCH CHECK (E-1)**



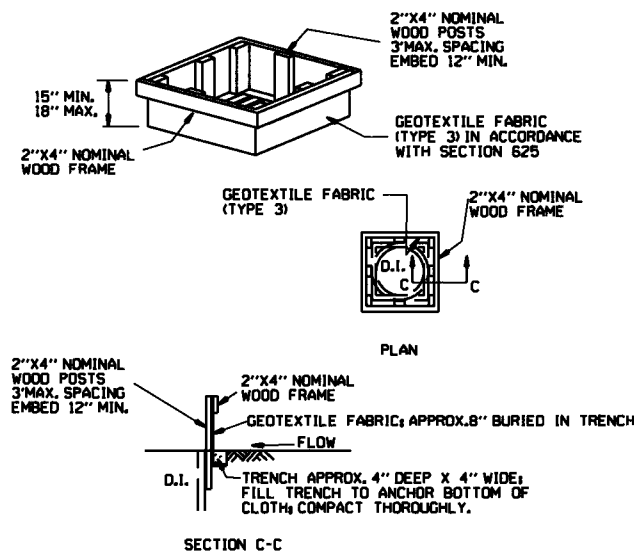
**SAND BAG DITCH CHECK (E-5)**



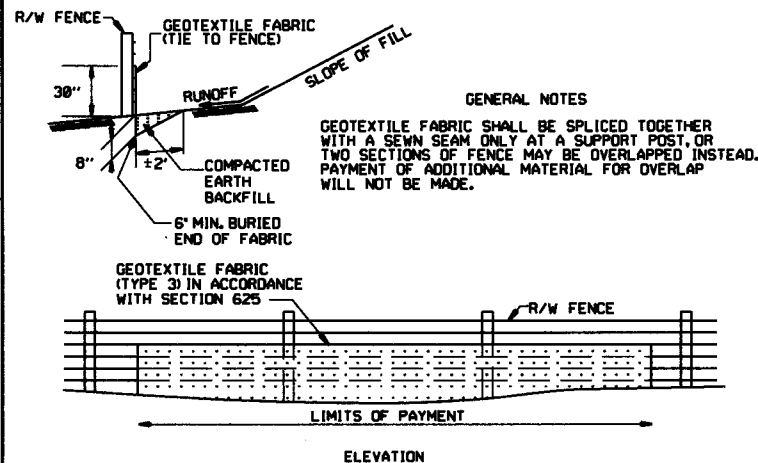
**ROCK DITCH CHECK (E-6)**



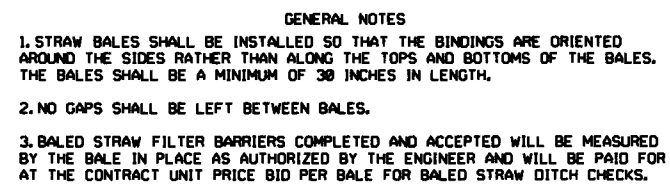
**SILTS FENCE (E-11)**



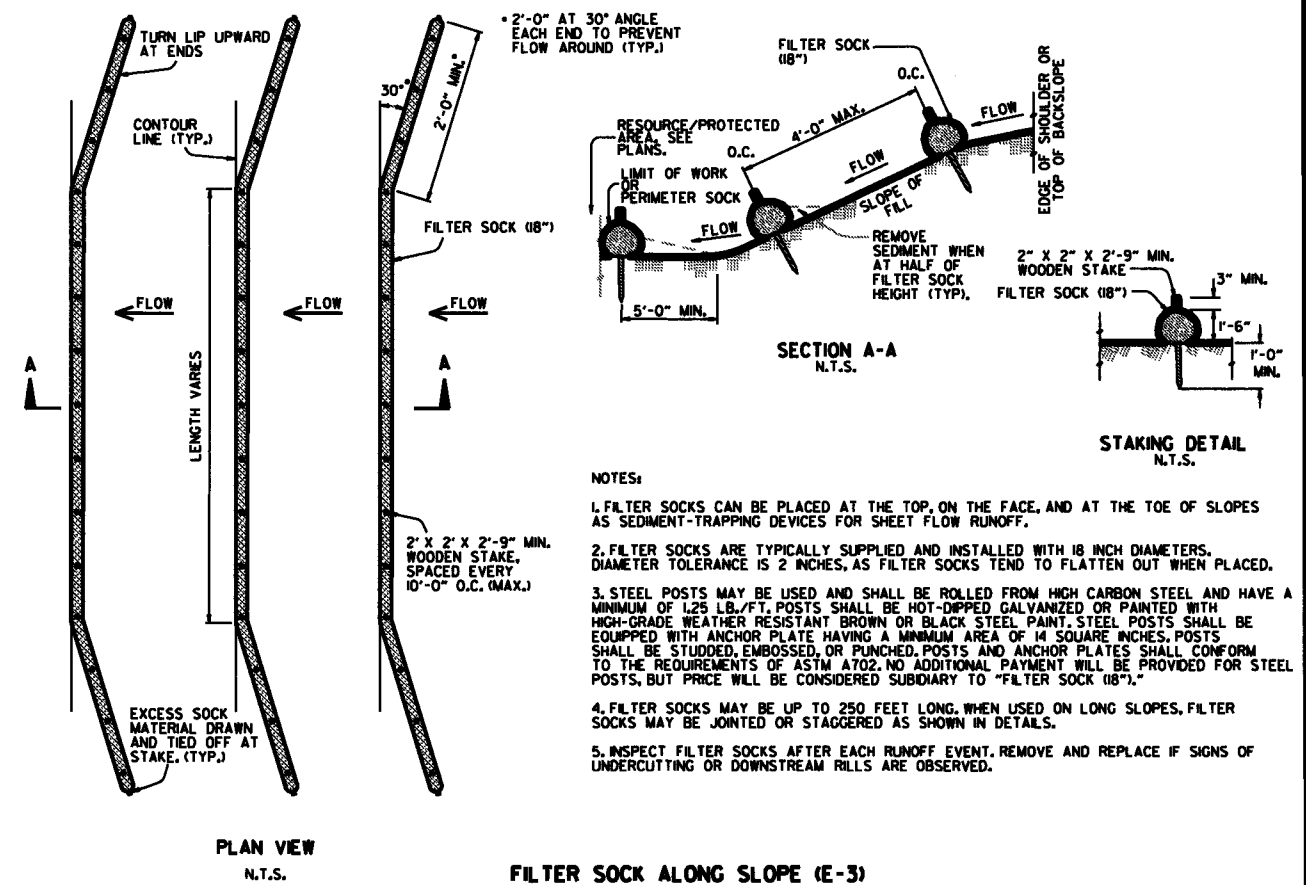
**DROP INLET SILTS FENCE (E-7)**



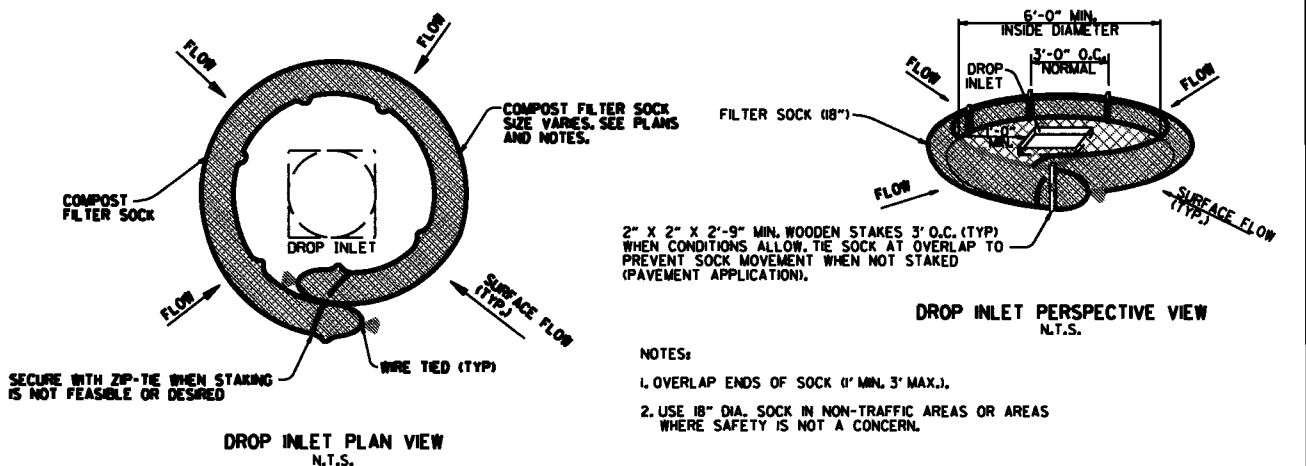
**SILTS FENCE ON R/W FENCE (E-4)**



**BALED STRAW FILTER BARRIER (E-2)**



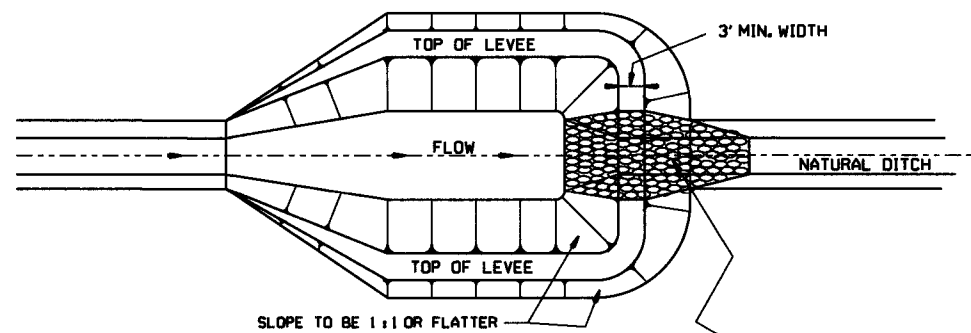
**FILTER SOCK ALONG SLOPE (E-3)**



**COMPOST FILTER SOCK DROP INLET PROTECTION (E-13)**

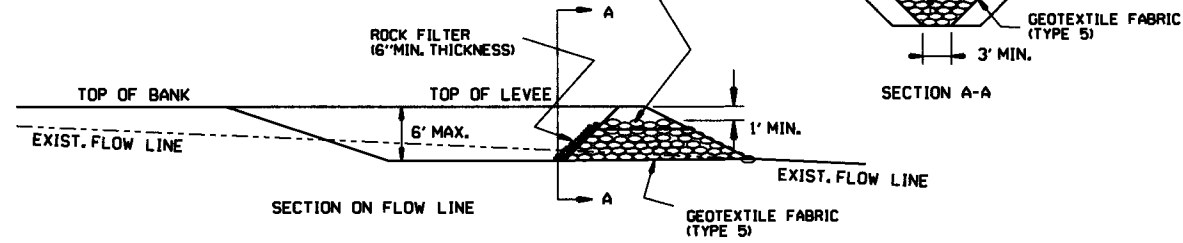
DATE	REVISION	FLMED
11-16-17	ADDED FILTER SOCK E-3 AND E-13	
12-15-11	DELETED BALED STRAW DITCH CHECK & ADDED WATTLE DITCH CHECK	
11-18-98	ADDED NOTES	
07-02-98	ADDED BALED STRAW FILTER BARRIER (E-2)	
07-20-95	REVISED SILTS FENCE E-4 AND E-11	7-20-95
07-15-94	REV. E-4 & E-11 MIN. 15\"/>	
06-02-94	REVISED E-1, 4, 7 & 11 DELETED E-2 & 3	6-2-94
04-01-93	REDRAWN	
10-01-92	REDRAWN	
08-02-76	ISSUED R.D.M.	298-7-28-76

ARKANSAS STATE HIGHWAY COMMISSION  
 TEMPORARY EROSION CONTROL DEVICES  
 STANDARD DRAWING TEC-1

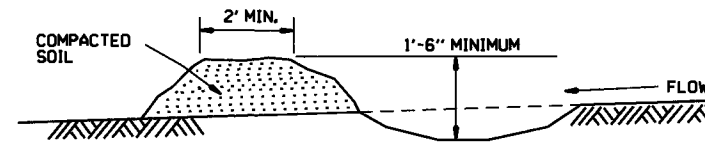


NOTE:  
SIZE OF BASIN TO BE DETERMINED  
BY VOLUME REQUIRED; HOWEVER  
A MINIMUM LENGTH-TO-WIDTH  
RATIO OF 2:1 SHALL BE USED.

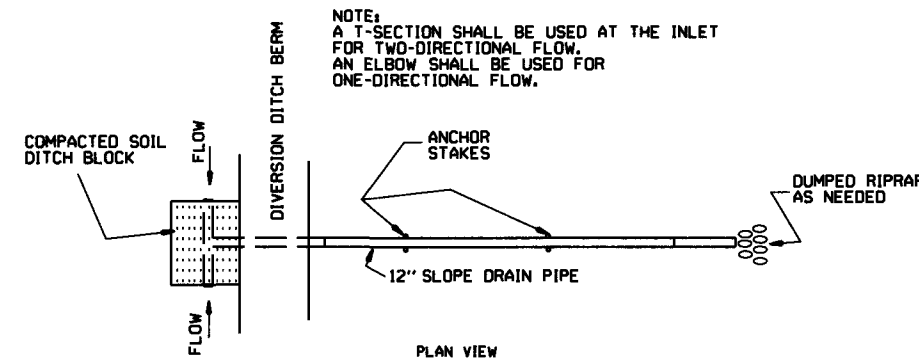
PLAN



SEDIMENT BASIN WITH RIPRAP OUTLET (E-9)

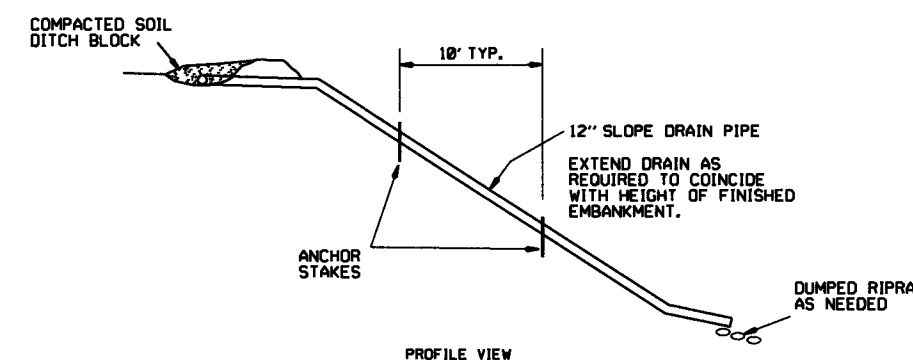


DIVERSION DITCH (E-8)



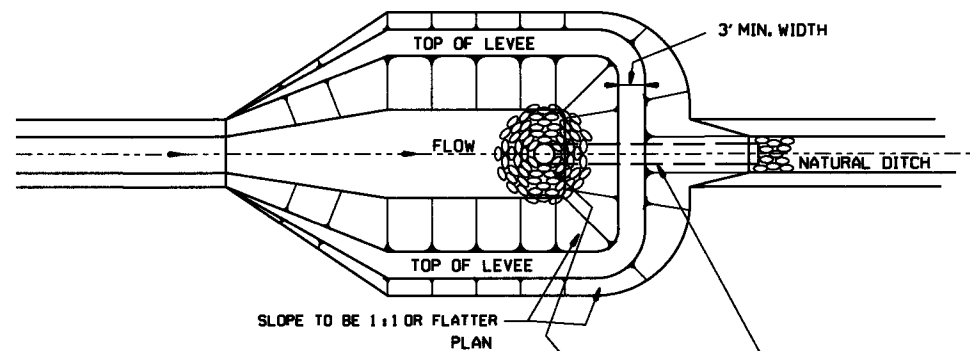
NOTE:  
A T-SECTION SHALL BE USED AT THE INLET  
FOR TWO-DIRECTIONAL FLOW.  
AN ELBOW SHALL BE USED FOR  
ONE-DIRECTIONAL FLOW.

PLAN VIEW



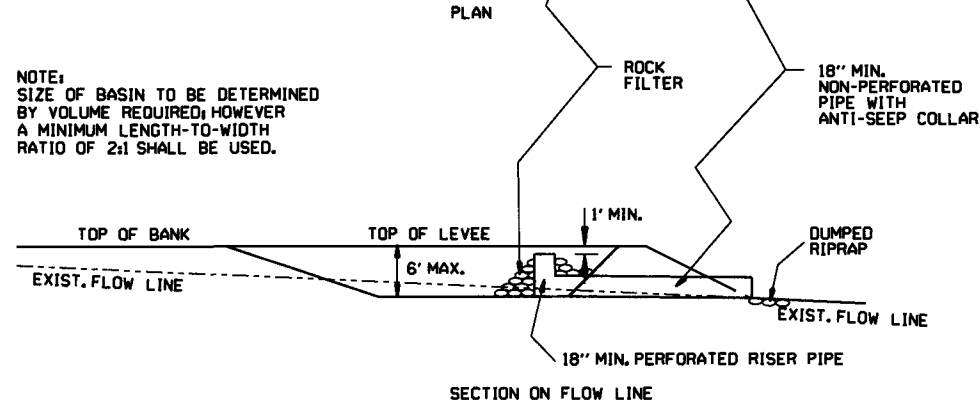
PROFILE VIEW

SLOPE DRAIN (E-12)

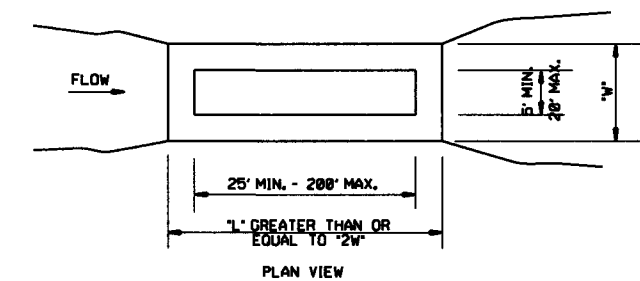


NOTE:  
SIZE OF BASIN TO BE DETERMINED  
BY VOLUME REQUIRED; HOWEVER  
A MINIMUM LENGTH-TO-WIDTH  
RATIO OF 2:1 SHALL BE USED.

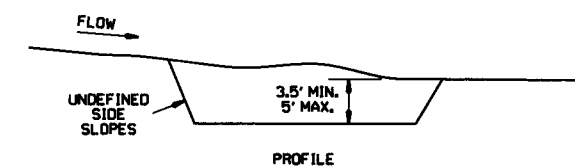
PLAN



SEDIMENT BASIN WITH PIPE OUTLET (E-10)



PLAN VIEW



PROFILE

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

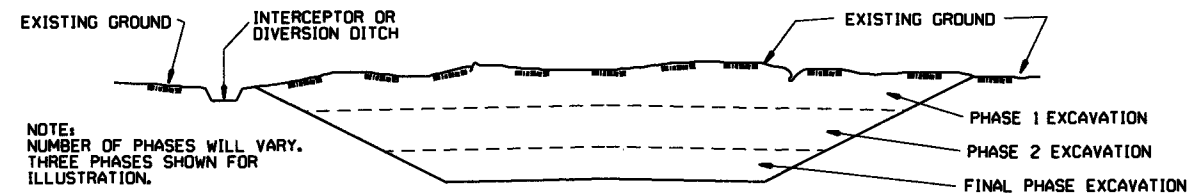


## CLEARING AND GRUBBING

### CONSTRUCTION SEQUENCE

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

## EXCAVATION



NOTE:  
NUMBER OF PHASES WILL VARY.  
THREE PHASES SHOWN FOR  
ILLUSTRATION.

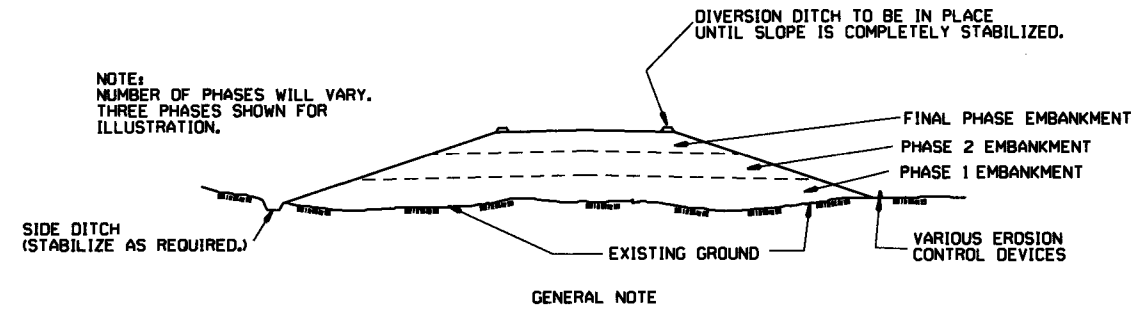
### GENERAL NOTE

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



NOTE:  
NUMBER OF PHASES WILL VARY.  
THREE PHASES SHOWN FOR  
ILLUSTRATION.

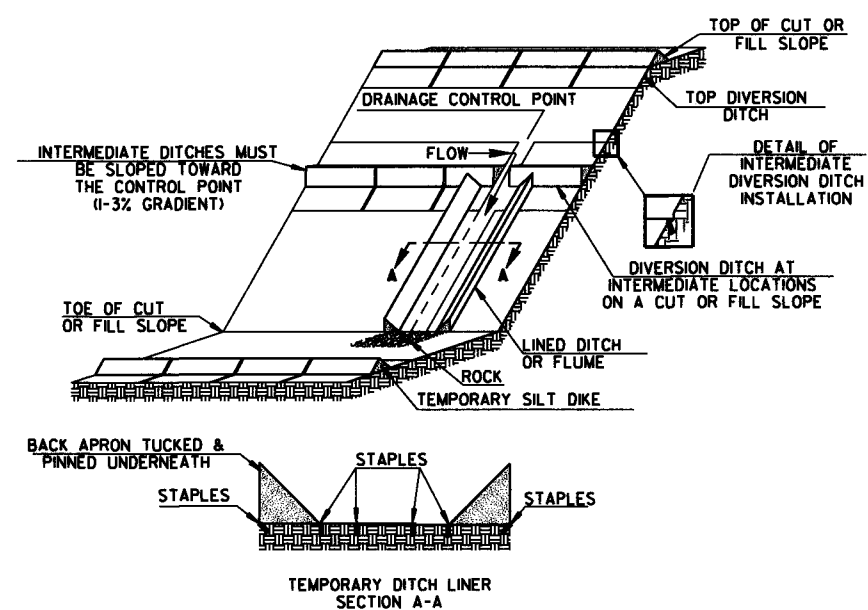
### GENERAL NOTE

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.

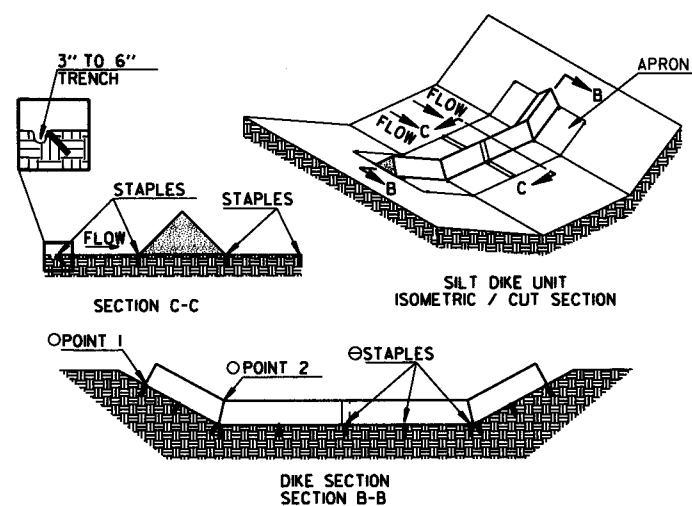
### CONSTRUCTION SEQUENCE

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.

ARKANSAS STATE HIGHWAY COMMISSION		
TEMPORARY EROSION CONTROL DEVICES		
STANDARD DRAWING TEC-3		
11-03-94	CORRECTED SPELLING	
6-2-94	Drawn & Issued	6-2-94
DATE	REVISION	FILMED

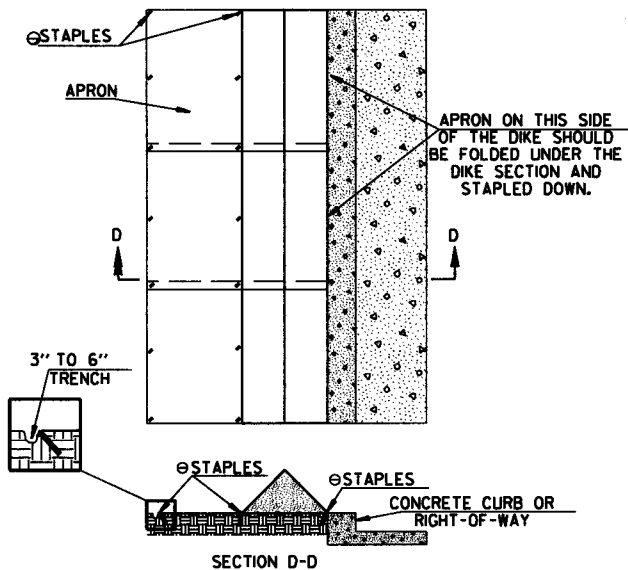


TRIANGULAR SILT DIKE INSTALLATION FOR DIVERSION DITCH AND/OR DITCH LINER

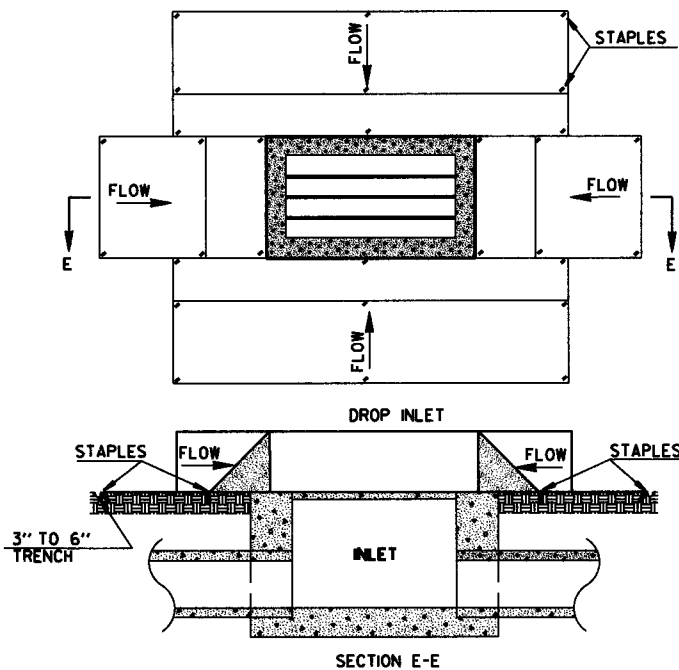


TRIANGULAR SILT DIKE INSTALLATION FOR ROADWAY DITCH OR DRAINAGE DITCH

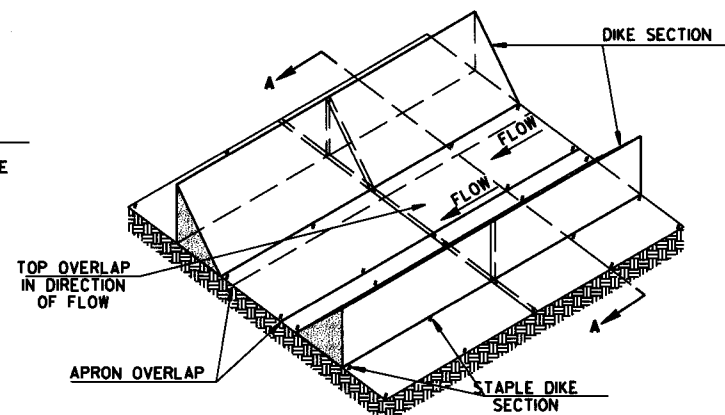
- POINT "1" MUST BE HIGHER THAN POINT "2" TO ENSURE THAT WATER FLOWS OVER THE DIKE AND NOT AROUND THE ENDS.
- ⊙ STAPLES SHALL BE PLACED WHERE THE UNITS OVERLAP AND IN THE CENTER OF THE UNIT AS SHOWN ON THE DIAGRAM.



TRIANGULAR SILT DIKE INSTALLATION FOR CONTINUOUS BARRIER



TRIANGULAR SILT DIKE INSTALLATION FOR DROP INLETS

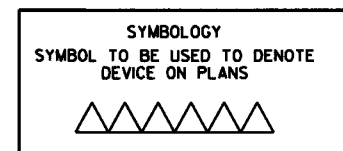


TRIANGULAR SILT DIKE INSTALLATION FOR TEMPORARY DITCH LINER

GENERAL NOTES

1. THIS WORK SHALL CONSIST OF FURNISHING, INSTALLING, AND MAINTAINING THE TRIANGULAR SILT DIKE. THE DIKES SHALL BE USED AS A CONTINUOUS LINE BARRIER AT THE TOE OF SLOPE OR ACROSS THE ROADWAY DITCH TO CONTAIN SEDIMENT AND MINIMIZE EROSION, OR AS DIRECTED BY THE ENGINEER. THESE DIKES SHALL BE INSTALLED AND LOCATED AS SOON AS CONSTRUCTION WILL ALLOW OR AS DIRECTED BY THE ENGINEER.
2. TRIANGULAR SILT DIKE SHALL BE TRIANGULAR SHAPED HAVING A HEIGHT OF AT LEAST 8" TO 10" IN THE CENTER WITH EQUAL SIDES AND A 16" TO 20" BASE. THE TRIANGULAR SHAPED INNER MATERIAL SHALL BE URETHANE FOAM. THE OUTER COVER SHALL BE A WOVEN GEOTEXTILE FABRIC PLACED AROUND THE INNER MATERIAL & ALLOWED TO EXTEND BEYOND BOTH SIDES OF THE TRIANGLE 24" TO 36". THIS FABRIC SHOULD BE MILDEW RESISTANT, ROT-PROOF AND RESISTANT TO HEAT AND ULTRAVIOLET RADIATION MEETING REQUIREMENTS FOR SEDIMENT CONTROL IN AASHTO M288. THE DIKES SHALL BE ATTACHED TO THE GROUND WITH WIRE STAPLES. THE STAPLES SHALL BE NO. 11 GAUGE WIRE AND BE AT LEAST 6" TO 8" LONG. STAPLES SHALL BE PLACED AS SHOWN ON THESE DETAILS.
3. ACCEPTED TRIANGULAR SILT DIKE, MEASURED AS PROVIDED ABOVE, WILL BE PAID FOR AT THE CONTRACT UNIT PRICE BID FOR TRIANGULAR SILT DIKE. PRICE BID WILL INCLUDE THE COST OF FURNISHING THE DIKES, INSTALLING, MAINTAINING AND REMOVAL WHEN DIRECTED BY THE ENGINEER.

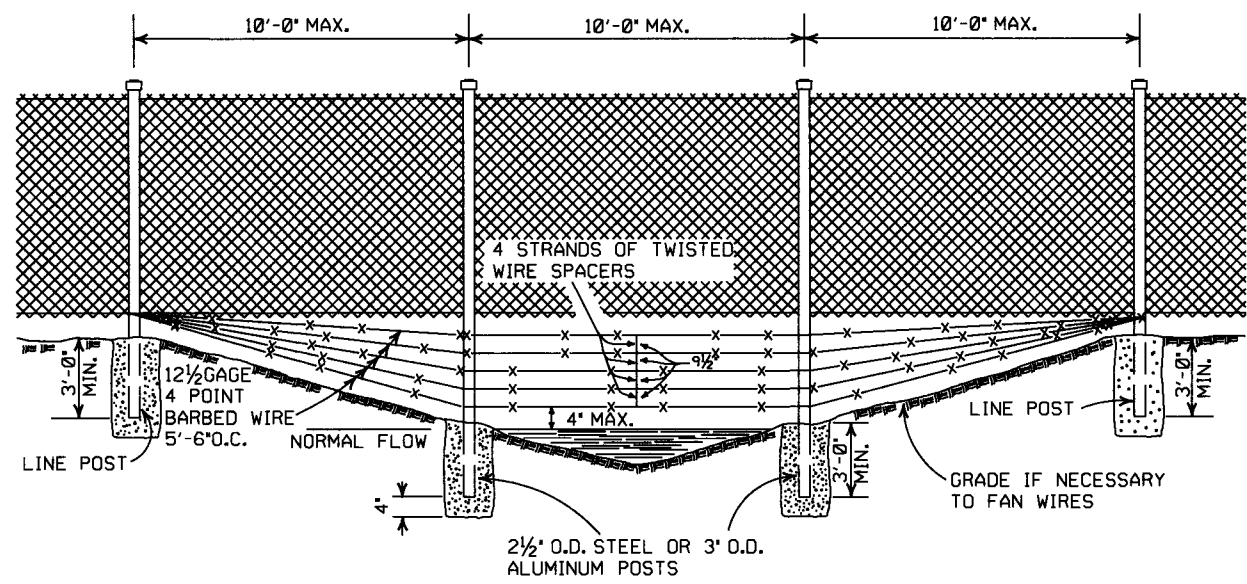
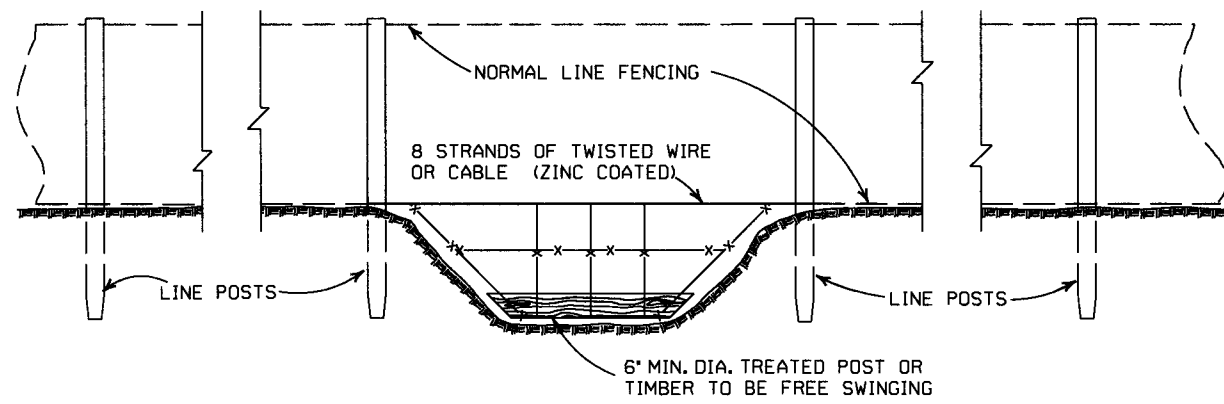
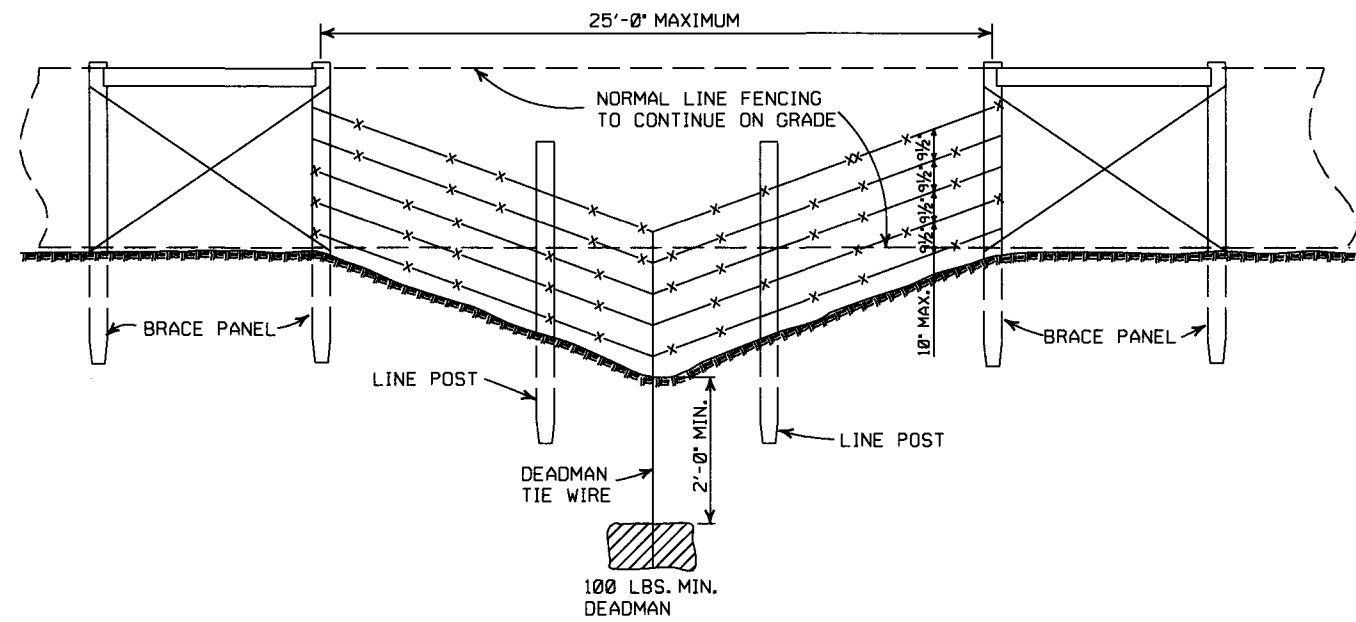
THE CONTRACTOR SHALL INSPECT ALL DIKES AFTER EACH RAINFALL EVENT OF AT LEAST 0.5" OR GREATER. ANY DEFICIENCIES OR DAMAGE SHALL BE REPAIRED BY THE CONTRACTOR. ACCUMULATED SILT OR DEBRIS SHALL BE REMOVED AND RELOCATED AS DIRECTED BY THE ENGINEER. IF THE DIKES ARE DAMAGED OR INADVERTENTLY MOVED DURING THE SILT REMOVAL PROCESS, THE CONTRACTOR SHALL IMMEDIATELY REPLACE AFTER DAMAGE OCCURS.



NOTE: SILT DIKE SHOULD ONLY BE USED FOR DROP INLETS IN SUMP LOCATIONS.

ARKANSAS STATE HIGHWAY COMMISSION	
TEMPORARY EROSION CONTROL DEVICES	
7-26-12	REvised GENERAL NOTE 2.
12-15-11	ISSUED
DATE	REVISION
	FILMED

STANDARD DRAWING TEC-4



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.

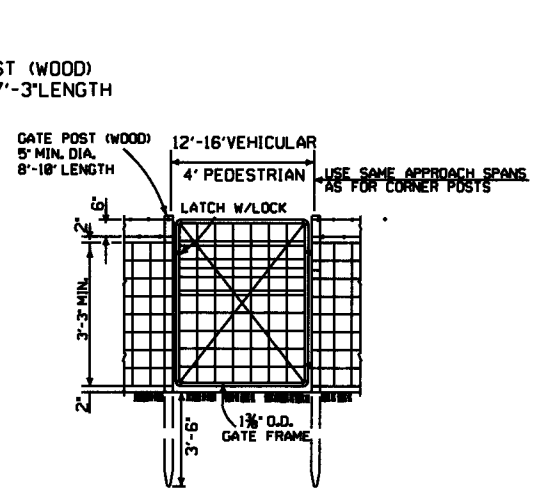
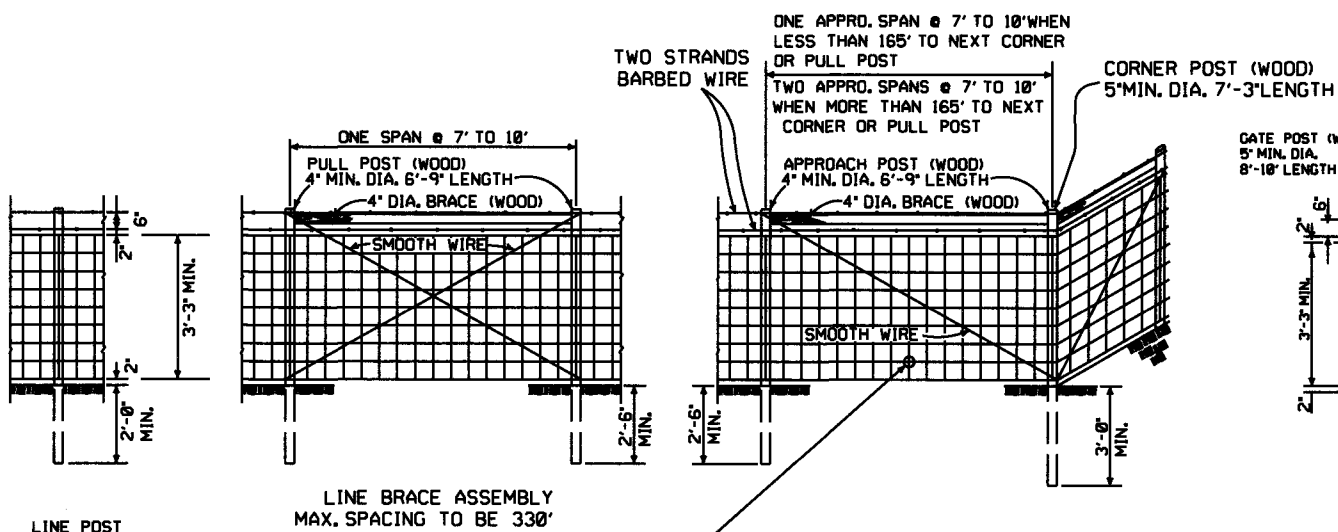
WHEN A FENCE LINE APPROACHES A DITCH, GULLY OR DEPRESSION, THE LAST POST ON LEVEL GROUND SHALL BE PLACED CLOSE ENOUGH TO THE EDGE OF THE DROP OFF THAT THE FENCE MAY BE STRUNG TO THE POST IN THE DEPRESSION WITHOUT TOUCHING THE GROUND.

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.

4-20-79	REVISED TOP RAIL & TENSION WIRE	696-4-20-79
10-2-72	REVISED AND REDRAWN	529-10-2-72
DATE	REVISION	FILMED

ARKANSAS STATE HIGHWAY COMMISSION  
**WIRE FENCE WATER GAPS**  
 STANDARD DRAWING WF-2



**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\"/>

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.

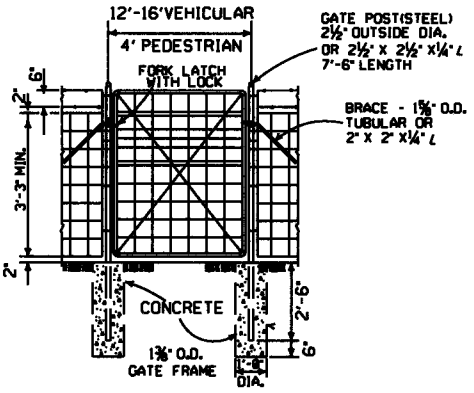
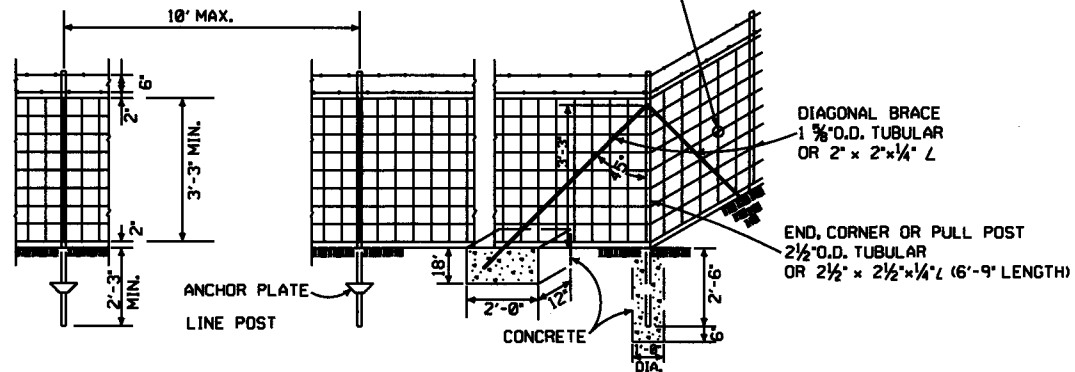
AT STREAM CROSSINGS, THE FENCE SHALL NOT BE CONSTRUCTED ACROSS LARGE STREAMS. WHERE CLEARANCE IS SUFFICIENT FROM THE TOP OF THE BANK TO THE BRIDGE STRUCTURE A CROSS CONNECTION SHALL BE CONSTRUCTED BETWEEN THE FENCE ON EACH SIDE OF THE ROAD. WHERE THE CLEARANCE IS NOT SUFFICIENT, THE FENCE SHALL BE TERMINATED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

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

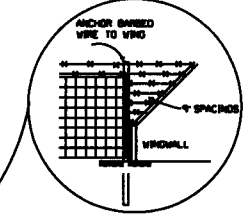
LINE BRACE ASSEMBLY  
 MAX. SPACING TO BE 33'0"

**TYPE C FENCE (WOOD POSTS)**

OTHER APPROVED TIES WILL BE PERMITTED



NOTE: USE 3/8" x 1 1/2" LAG BOLT & SHIELD OR AS APPROVED BY THE ENGINEER.



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

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.

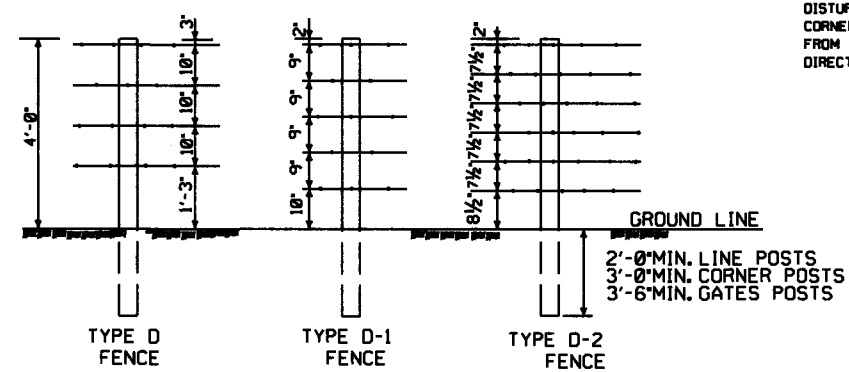
SPLICE FOR WOVEN WIRE BETWEEN PULL POST SHALL BE BY THE 'WESTERN UNION METHOD' AS DESCRIBED AS FOLLOWS: THE VERTICAL WIRES FOR EACH END OF THE FENCE FABRIC SHALL BE PLACED SIDE BY SIDE AND THE PROJECTING HORIZONTAL WIRES SHALL BE WRAPPED A MINIMUM OF 4 TIMES AROUND THE HORIZONTAL WIRES OF THE FIRST WEB.

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

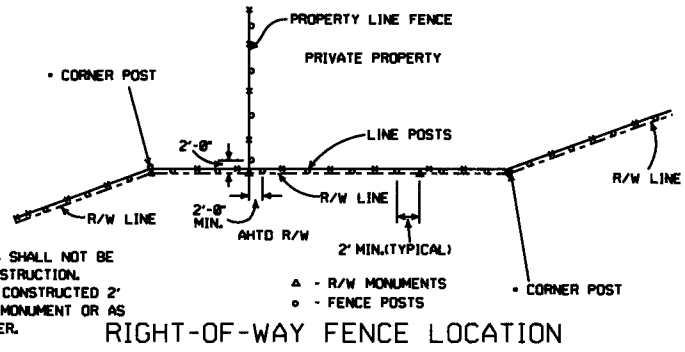
NOTE: STEEL LINE POSTS SHALL BE 6'-6" MINIMUM LENGTH.

**TYPE C FENCE (STEEL POSTS)**

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

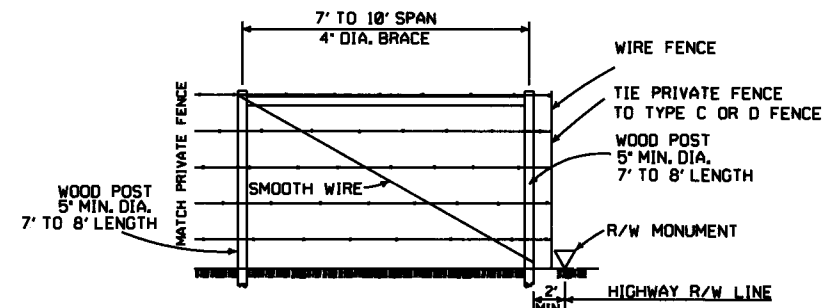


NOTE: SPACING AND SIZE (EXCEPT LENGTH) OF POSTS, APPROACH SPANS, PULL POST ASSEMBLIES, AND CORNER BRACING FOR TYPE D FENCE SHALL CONFORM TO TYPE C FENCE. USE GALVANIZED STAPLES ON WOOD POSTS AND APPROVED FASTENERS ON STEEL POSTS.

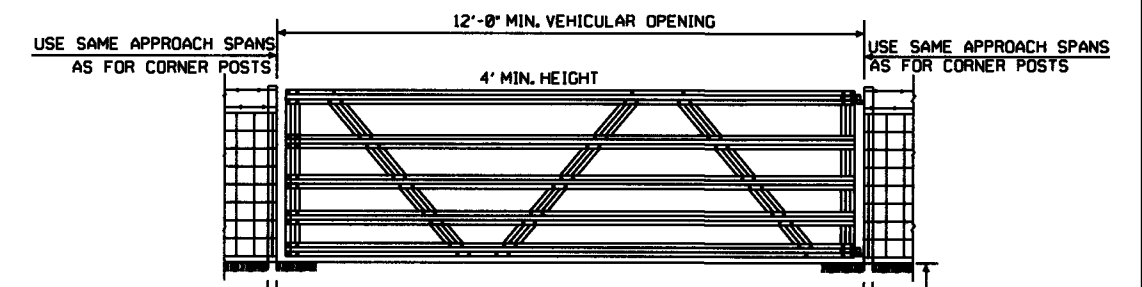


NOTE: RIGHT-OF-WAY MONUMENTS SHALL NOT BE DISTURBED BY FENCE CONSTRUCTION. CORNER POSTS SHALL BE CONSTRUCTED 2' FROM THE RIGHT-OF-WAY MONUMENT OR AS DIRECTED BY THE ENGINEER.

**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)**

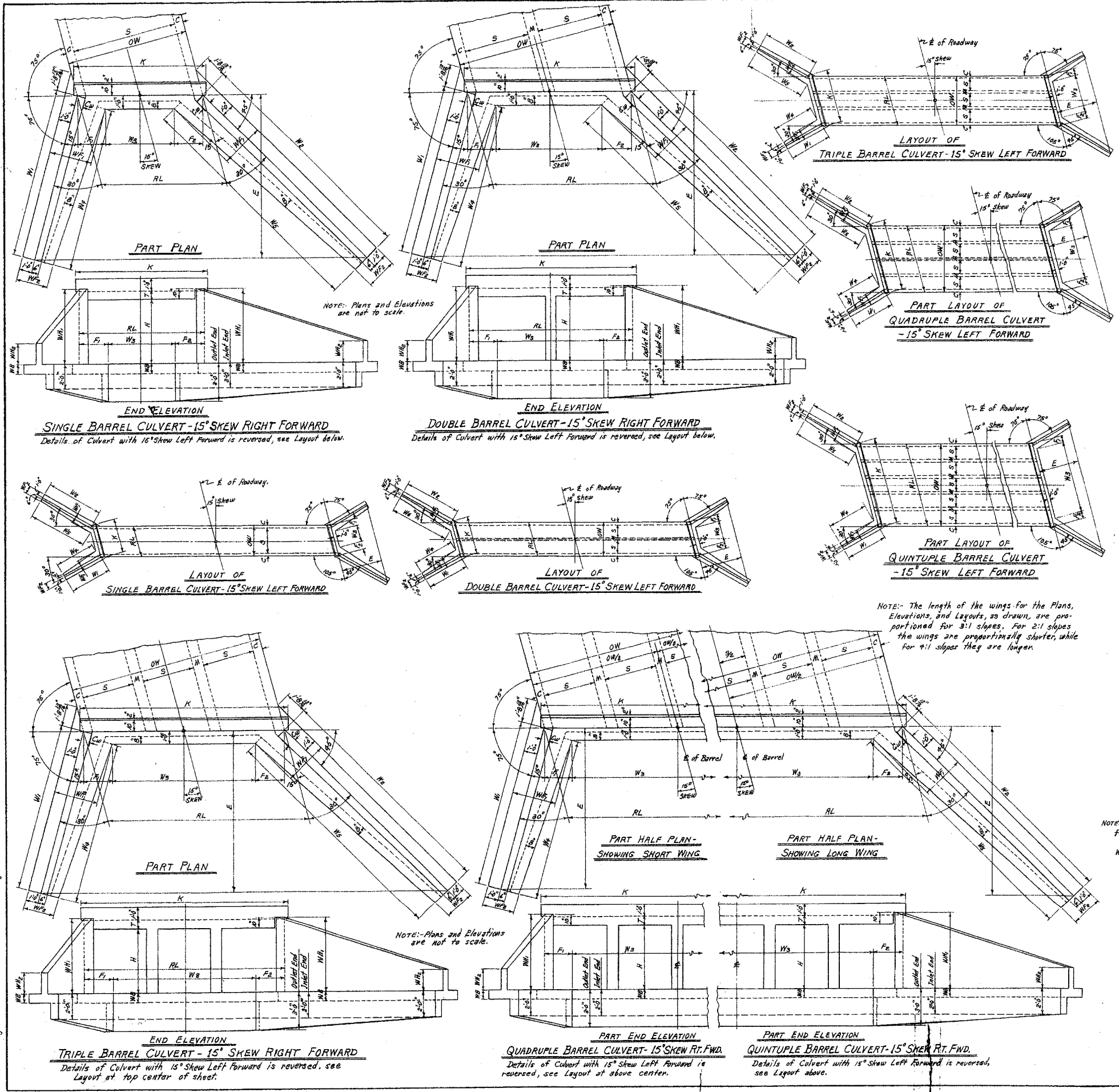
OTHER STYLE VEHICULAR GATES MAY BE USED WITH THE APPROVAL OF THE ENGINEER. THE METHOD OF SECURING GATE (LATCH AND/OR LOCK) SHALL MEET THE APPROVAL OF THE ENGINEER.

DATE	REVISION	FILMED
8-22-02	REVISED GENERAL NOTES	
10-18-96	REVISED AASHTO	
11-22-96	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
11-30-84	DELETED CLASS CONCRETE	11-30-84
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**



**ROADWAY LENGTH RL      HEADWALL LENGTH K      APRON DIMENSION W<sub>3</sub>**

$RL = OW \times 1.035276$        $K = RL \cdot (63^\circ)$        $W_3 = RL \cdot (F_1 + F_2)$

USE WITH DRAWING NO.	CLEAR SPAN	CLEAR HEIGHT	SUM OF FOOTING DIMENSIONS	SINGLE BARREL CULVERT			DOUBLE BARREL CULVERT			TRIPLE BARREL CULVERT			QUADRUPLE BARREL CULVERT			QUINTUPLE BARREL CULVERT									
				OW	RL	K	OW	RL	K	OW	RL	K	OW	RL	K	OW	RL	K	OW	RL	K				
W-X-152-1, W-X-153-1, W-X-154-1	5	2'	2'-0"	5'-0"	5'-2 1/2"	5'-8 1/2"	3'-3 1/2"	3'-9"	4'-4 1/2"	10'-0"	10'-6"	11'-1 1/2"	13'-0"	13'-6"	14'-1 1/2"	15'-0"	17'-0"	17'-6"	18'-1 1/2"	23'-0"	23'-6"	24'-1 1/2"	25'-0"	25'-6"	26'-1 1/2"
	6	3'	2'-9"	5'-0"	"	"	2'-4 1/2"	3'-0"	3'-5 1/2"	9'-0"	9'-6"	10'-1 1/2"	12'-0"	12'-6"	13'-1 1/2"	15'-0"	17'-0"	17'-6"	18'-1 1/2"	23'-0"	23'-6"	24'-1 1/2"	25'-0"	25'-6"	26'-1 1/2"
	7	4'	3'-7 1/2"	5'-0"	"	"	2'-4 1/2"	3'-0"	3'-5 1/2"	9'-0"	9'-6"	10'-1 1/2"	12'-0"	12'-6"	13'-1 1/2"	15'-0"	17'-0"	17'-6"	18'-1 1/2"	23'-0"	23'-6"	24'-1 1/2"	25'-0"	25'-6"	26'-1 1/2"
	8	5'	4'-5 1/2"	5'-0"	"	"	2'-4 1/2"	3'-0"	3'-5 1/2"	9'-0"	9'-6"	10'-1 1/2"	12'-0"	12'-6"	13'-1 1/2"	15'-0"	17'-0"	17'-6"	18'-1 1/2"	23'-0"	23'-6"	24'-1 1/2"	25'-0"	25'-6"	26'-1 1/2"
	9	6'	5'-3 1/2"	5'-0"	5'-2 1/2"	5'-8 1/2"	6'-4 1/2"	7'-0"	7'-5 1/2"	10'-0"	10'-6"	11'-1 1/2"	13'-0"	13'-6"	14'-1 1/2"	15'-0"	17'-0"	17'-6"	18'-1 1/2"	23'-0"	23'-6"	24'-1 1/2"	25'-0"	25'-6"	26'-1 1/2"
	10	7'	6'-1 1/2"	6'-0"	6'-2 1/2"	6'-8 1/2"	7'-4 1/2"	8'-0"	8'-5 1/2"	11'-0"	11'-6"	12'-1 1/2"	14'-0"	14'-6"	15'-1 1/2"	16'-0"	18'-0"	18'-6"	19'-1 1/2"	23'-0"	23'-6"	24'-1 1/2"	25'-0"	25'-6"	26'-1 1/2"
	11	8'	6'-9 1/2"	6'-0"	6'-2 1/2"	6'-8 1/2"	7'-4 1/2"	8'-0"	8'-5 1/2"	11'-0"	11'-6"	12'-1 1/2"	14'-0"	14'-6"	15'-1 1/2"	16'-0"	18'-0"	18'-6"	19'-1 1/2"	23'-0"	23'-6"	24'-1 1/2"	25'-0"	25'-6"	26'-1 1/2"
	12	9'	7'-7 1/2"	6'-0"	6'-2 1/2"	6'-8 1/2"	7'-4 1/2"	8'-0"	8'-5 1/2"	11'-0"	11'-6"	12'-1 1/2"	14'-0"	14'-6"	15'-1 1/2"	16'-0"	18'-0"	18'-6"	19'-1 1/2"	23'-0"	23'-6"	24'-1 1/2"	25'-0"	25'-6"	26'-1 1/2"
W-X-152-2, W-X-153-2, W-X-154-2	7	9'	8'-0"	8'-0"	8'-0"	8'-0"	8'-0"	8'-0"	8'-0"	8'-0"	8'-0"	8'-0"	8'-0"	8'-0"	8'-0"	8'-0"	8'-0"	8'-0"	8'-0"	8'-0"	8'-0"	8'-0"	8'-0"	8'-0"	8'-0"
	8	10'	9'-0"	9'-0"	9'-0"	9'-0"	9'-0"	9'-0"	9'-0"	9'-0"	9'-0"	9'-0"	9'-0"	9'-0"	9'-0"	9'-0"	9'-0"	9'-0"	9'-0"	9'-0"	9'-0"	9'-0"	9'-0"	9'-0"	9'-0"
	9	11'	10'-0"	10'-0"	10'-0"	10'-0"	10'-0"	10'-0"	10'-0"	10'-0"	10'-0"	10'-0"	10'-0"	10'-0"	10'-0"	10'-0"	10'-0"	10'-0"	10'-0"	10'-0"	10'-0"	10'-0"	10'-0"	10'-0"	10'-0"
	10	12'	11'-0"	11'-0"	11'-0"	11'-0"	11'-0"	11'-0"	11'-0"	11'-0"	11'-0"	11'-0"	11'-0"	11'-0"	11'-0"	11'-0"	11'-0"	11'-0"	11'-0"	11'-0"	11'-0"	11'-0"	11'-0"	11'-0"	11'-0"
	11	13'	12'-0"	12'-0"	12'-0"	12'-0"	12'-0"	12'-0"	12'-0"	12'-0"	12'-0"	12'-0"	12'-0"	12'-0"	12'-0"	12'-0"	12'-0"	12'-0"	12'-0"	12'-0"	12'-0"	12'-0"	12'-0"	12'-0"	12'-0"
	12	14'	13'-0"	13'-0"	13'-0"	13'-0"	13'-0"	13'-0"	13'-0"	13'-0"	13'-0"	13'-0"	13'-0"	13'-0"	13'-0"	13'-0"	13'-0"	13'-0"	13'-0"	13'-0"	13'-0"	13'-0"	13'-0"	13'-0"	13'-0"
	13	15'	14'-0"	14'-0"	14'-0"	14'-0"	14'-0"	14'-0"	14'-0"	14'-0"	14'-0"	14'-0"	14'-0"	14'-0"	14'-0"	14'-0"	14'-0"	14'-0"	14'-0"	14'-0"	14'-0"	14'-0"	14'-0"	14'-0"	14'-0"
	14	16'	15'-0"	15'-0"	15'-0"	15'-0"	15'-0"	15'-0"	15'-0"	15'-0"	15'-0"	15'-0"	15'-0"	15'-0"	15'-0"	15'-0"	15'-0"	15'-0"	15'-0"	15'-0"	15'-0"	15'-0"	15'-0"	15'-0"	15'-0"

Special case for these boxes, See Detail 'A' and Table 'A' for revised values of  $F_1$ ,  $F_2$ ,  $W_1$  and  $W_2$ , when apron width is more than 1'-0" and  $W_3 = 0$ . For Detail 'A' and Table 'A' for each slope, see Drawing Nos. W-X-152-1, W-X-152-2, or W-X-153-1, W-X-153-2, or W-X-154-1, W-X-154-2.

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-X-152-1 or W-X-152-2      W-X-153-1 or W-X-153-2      W-X-154-1 or W-X-154-2.

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-215X-1      R-315X-1      R-415X-1      R-515X-1  
 R-215X-2      R-315X-2

CLASS 5 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,      ALL DEPTHS OF COVER  
 QUADRUPLES & QUINTUPLES.       $H = 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 \& 12$   
 STANDARD DRAWING NO. W-X-15

Designed by: W.C.H. 5-22-62.  
 Checked by: J.E.M. 6-20-63.  
 Titled by: W.C.H. 6-18-63.  
 Checked by:



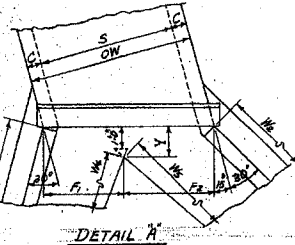
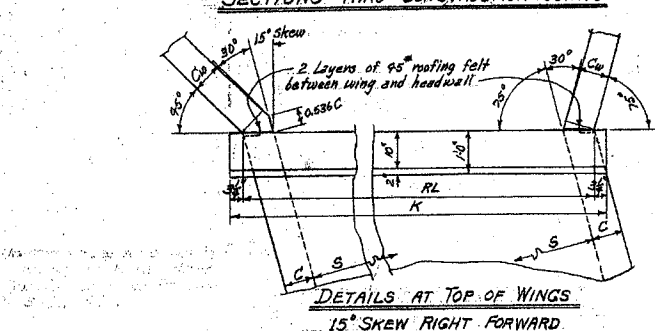
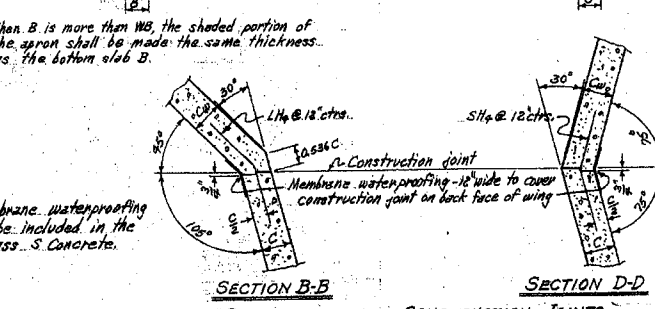
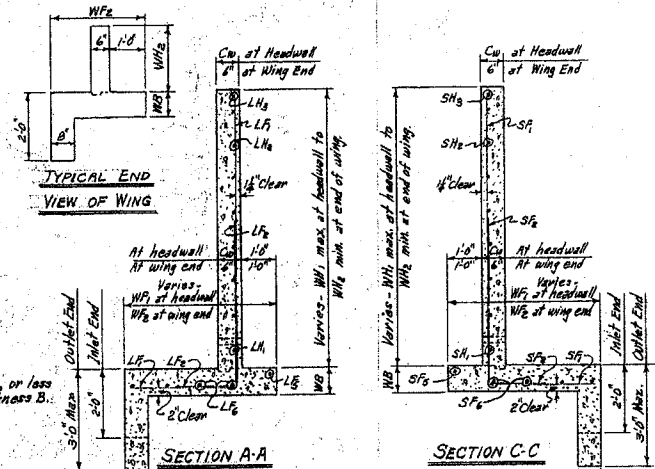
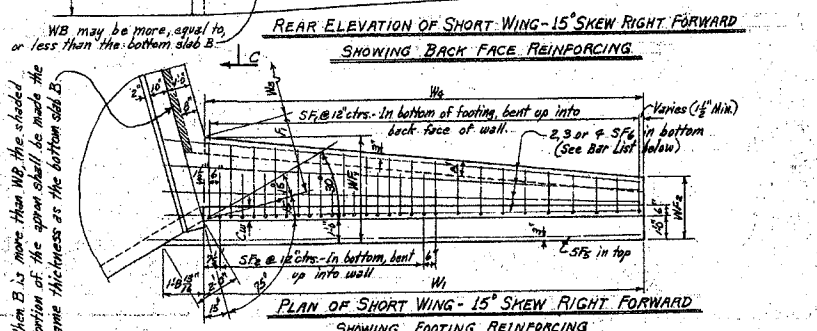
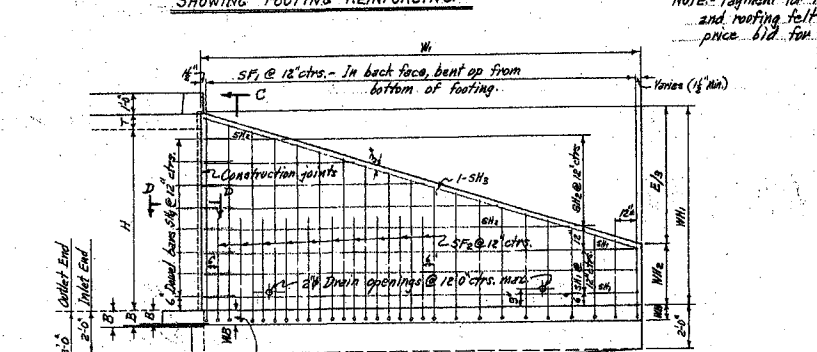
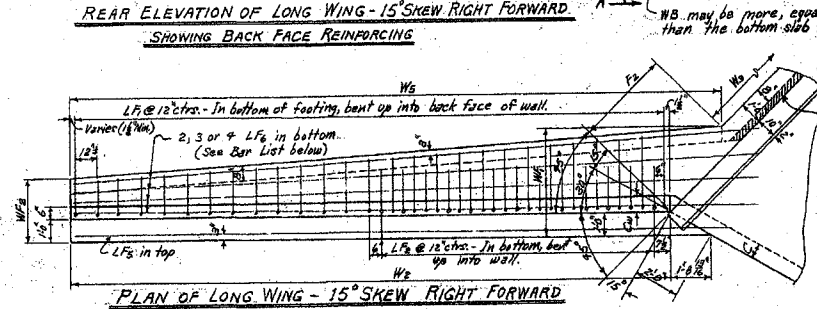
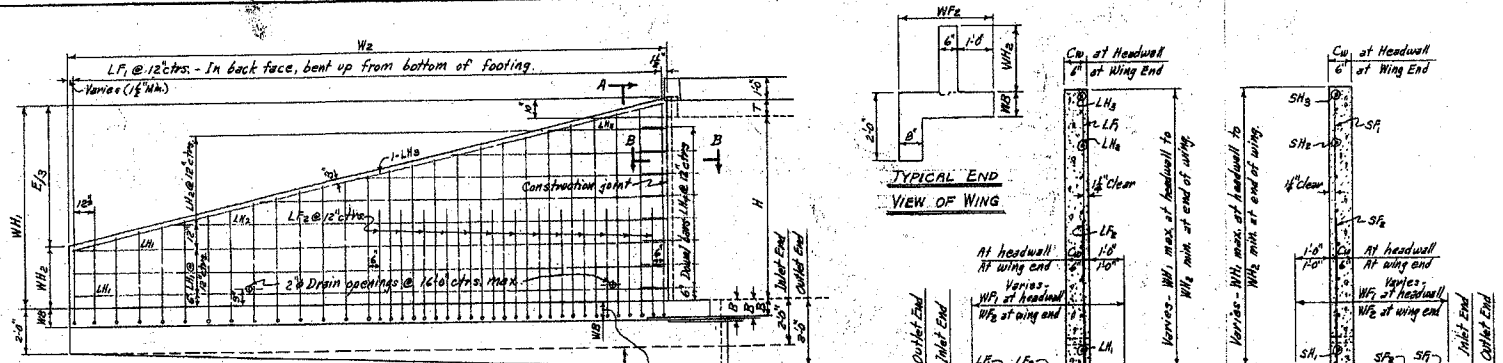


TABLE A - DIMENSIONS FOR DETAIL A

S	H	F <sub>1</sub>	F <sub>2</sub>	W <sub>1</sub>	W <sub>2</sub>	W <sub>3</sub>	Y
5'	7'	3'-0"	3'-5 1/2"	10'-0 1/2"	25'-0 1/2"	0'	1'-0 1/2"
6'	8'	3'-6"	4'-1 1/2"	11'-0 1/2"	26'-3 1/2"	0'	1'-1 1/2"

REGULAR WING DIMENSIONS - 3:1 SLOPES

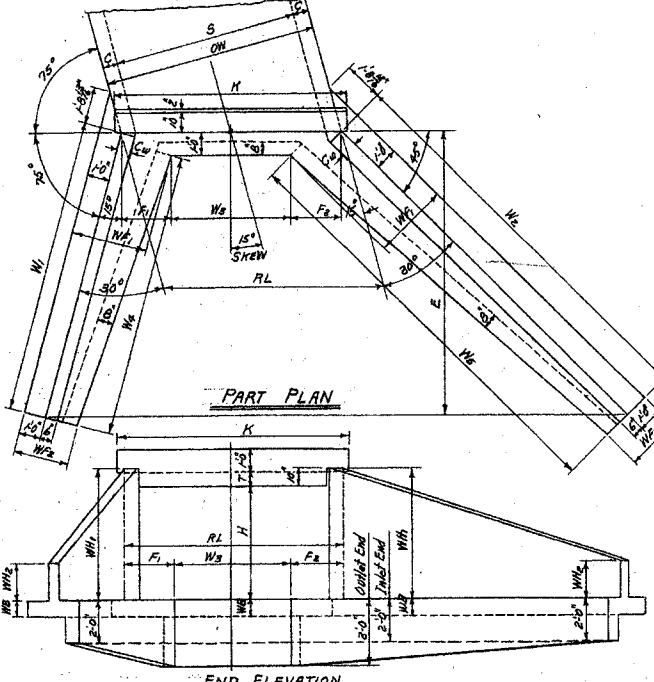
CLEAR HEIGHT OF BOX	WING WALL THICKNESS AT HEADWALL	WIDTH OF WING FOOTINGS	FOOTING DIMENSIONS PARALLEL WITH HEADWALL	PERPENDICULAR TO END OF WING	LENGTHS OF WING WALLS		INSIDE FOOTING DIMENSIONS		QUANTITY PER WING	
					SHORT WING	LONG WING	SHORT WING	LONG WING	INLET END	OUTLET END
5'	7"	6"	2'-0"	2'-4"	1'-0"	6'-0"	9'-2 1/2"	9'-1 1/2"	0.789	1.094
6'	8"	7"	2'-6"	3'-0"	1'-6"	6'-6"	9'-2 1/2"	9'-1 1/2"	1.186	1.650
7'	9"	8"	3'-0"	3'-6"	2'-0"	7'-0"	9'-2 1/2"	9'-1 1/2"	1.654	2.305
8'	10"	9"	3'-6"	4'-2"	2'-6"	7'-6"	9'-2 1/2"	9'-1 1/2"	2.287	3.188
9'	11"	10"	4'-0"	4'-8"	3'-0"	8'-0"	9'-2 1/2"	9'-1 1/2"	3.062	4.292
10'	12"	11"	4'-6"	5'-4"	3'-6"	8'-6"	9'-2 1/2"	9'-1 1/2"	3.914	5.329
11'	13"	12"	5'-0"	6'-0"	4'-0"	9'-0"	9'-2 1/2"	9'-1 1/2"	4.817	6.493
12'	14"	13"	5'-6"	6'-6"	4'-6"	9'-6"	9'-2 1/2"	9'-1 1/2"	5.764	7.777

\* Quantity per wing does not include headwall or that portion of apron or footwall for the length W<sub>3</sub>.  
 \* See Table A for special values of F<sub>1</sub>, F<sub>2</sub> and W<sub>1</sub>, W<sub>2</sub> for Single 5x7 and 6x8 Box Culverts.

QUANTITIES

CLEAR SPAN	CLEAR HEIGHT	THICKNESS OF WING WALL	THICKNESS OF WING FOOTINGS	CLASS S CONCRETE - 4 WINGS					
				HEADWALLS	WING WALLS	FOOTINGS	TOWERS	APRONS	
5'	7'	7"	6"	117	4.79	5.78	4.77	7.77	8.76
6'	8'	8"	7"	176	6.65	7.64	6.63	9.63	10.62
7'	9'	9"	8"	267	8.85	9.84	8.83	11.83	12.82
8'	10'	10"	9"	379	11.90	12.89	11.88	14.87	15.86
9'	11'	11"	10"	524	15.95	16.94	15.93	18.91	19.90
10'	12'	12"	11"	716	21.00	21.99	20.98	24.95	25.94
11'	13'	13"	12"	957	27.05	28.04	27.03	31.00	31.99
12'	14'	14"	13"	1249	34.10	35.09	34.08	38.05	39.04

\* For reinforcing steel in headwalls and aprons, see Drawings listed below.



SINGLE BARREL CULVERT - 15° SKEW RIGHT FORWARD. Details of Culvert with 15° skew Left Forward is reversed, see Drawg. No. W-X-15. TYPICAL WING DETAILS.

NOTE: For remainder of General Plans and Elevations of Single, Double, Triple, Quadruple and Quintuple Span Culverts, see Std. Drawing No. W-X-15. For values of RL, K, and W<sub>3</sub> for each box, see the above std. also.

MEMORANDUM - 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 construction joints in wings.

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 wingwall, footings and side walls shall be only where shown on plans. SPECIFICATIONS: Arkansas State Highway Commission Standard Specifications for Highway Construction and applicable special provisions. UNIT STRESSES: - Class S Concrete (n=10) 1200 psi Reinforcing steel 20000 psi.

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

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

CLEAR HEIGHT	WING LOCATION	SF <sub>1</sub> & LF <sub>1</sub>		SF <sub>2</sub> & LF <sub>2</sub>		SF <sub>3</sub> & LF <sub>3</sub>		SF <sub>4</sub> & LF <sub>4</sub>		SH <sub>1</sub> & LH <sub>1</sub>		SH <sub>2</sub> & LH <sub>2</sub>		SH <sub>3</sub> & LH <sub>3</sub>		SH <sub>4</sub> & LH <sub>4</sub>		BAR BENDING DIAGRAM	QUANTITY	
		MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.			
5'	Short	12"	7"	1'-2"	3'-11"	0'-8"	1'-0"	1'-0"	3'-0"	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3	24.9	33.4
5'	Long	12"	10"	1'-7"	3'-11"	0'-10"	1'-0"	1'-0"	3'-0"	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3	37.7	50.3
6'	Short	12"	9"	1'-2"	3'-11"	0'-8"	1'-0"	1'-0"	3'-0"	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3	57.3	76.4
6'	Long	12"	11"	1'-11"	3'-11"	0'-10"	1'-0"	1'-0"	3'-0"	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3	81.1	108.4
7'	Short	12"	13"	2'-1"	3'-11"	1'-1"	1'-1"	1'-1"	3'-0"	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3	134.8	178.1
7'	Long	12"	15"	2'-6"	3'-11"	1'-1"	1'-1"	1'-1"	3'-0"	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3	259.5	345.2
8'	Short	12"	15"	2'-6"	3'-11"	1'-1"	1'-1"	1'-1"	3'-0"	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3	328.0	438.3
8'	Long	12"	17"	3'-0"	3'-11"	1'-1"	1'-1"	1'-1"	3'-0"	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3		

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

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 3:1 SLOPES  
 SINGLES, DOUBLES, TRIPLES, ALL DEPTHS OF COVER  
 QUADRUPLES & QUINTUPLES FOR H=8'-0" OR LESS  
 STANDARD DRAWING NO. W-X-153-1

Designed By: W.C.H. 5-15-63 Checked By: W.C.H. 6-20-63  
 Drawn By: W.C.H. 6-20-63 Checked By: W.C.H. 9-23-63  
 Quantities By: W.C.H. 9-23-63

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

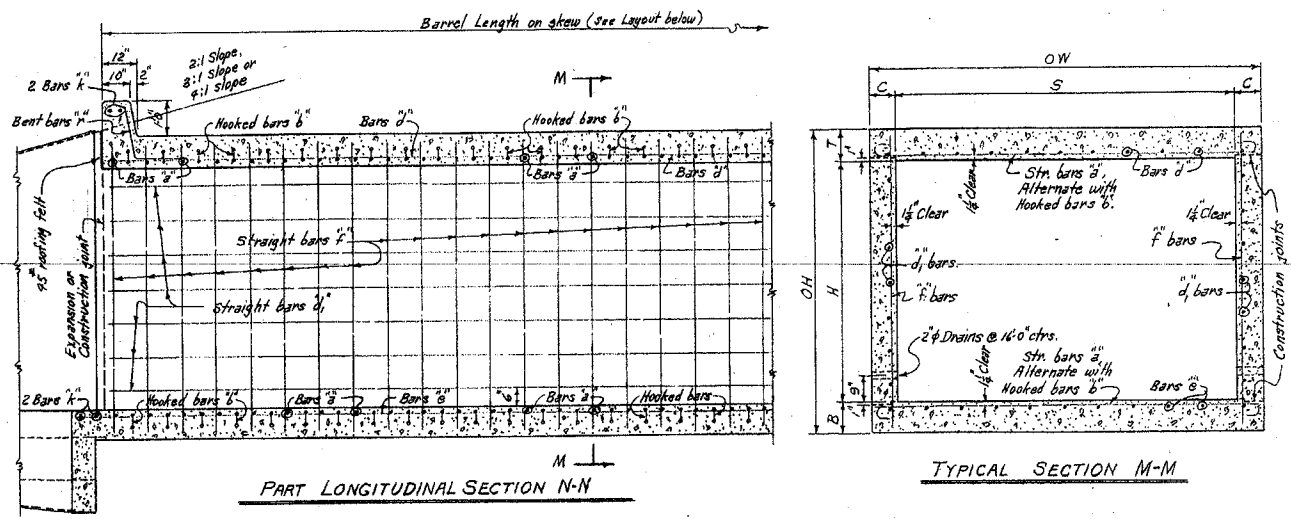
BAR LIST FOR BARREL SECTION 60'-0" IN LENGTH

DEPTH OF COVER	CLEAR SPAN	CLEAR HEIGHT	BAR LIST																								
			3" bars		4" bars		5" bars		6" bars		7" bars		8" bars														
			STRAIGHT	BENT- See Diagram	STRAIGHT	BENT- See Diagram	STRAIGHT	BENT- See Diagram	STRAIGHT	BENT- See Diagram	STRAIGHT	BENT- See Diagram	STRAIGHT	BENT- See Diagram													
D	S	H	SIZE	SPACING	NO. REB.	LENGTH	X	SIZE	SPACING	NO. REB.	LENGTH	X	SIZE	SPACING	NO. REB.	LENGTH	X	SIZE	SPACING	NO. REB.	LENGTH	X	SIZE	SPACING	NO. REB.	LENGTH	X
<p>0'-0" TO 5'-0" MAXIMUM</p> <p>2 @ 30'-6" for 60'-0" Length Barrel (1 1/2' Lap)</p> <p>2 @ 30'-5" for 60'-0" Length Barrel (1 1/2' Lap)</p> <p>2 @ 30'-6" for 60'-0" Length Barrel (1 1/2' Lap)</p> <p>2 @ 30'-5" for 60'-0" Length Barrel (1 1/2' Lap)</p>																											

DIMENSIONS QUANTITIES

MAX. DESIGN DEPTH OF COVER	BARREL DIMENSIONS												UNIT QUANTITIES				
	CLEAR SPAN	CLEAR HEIGHT	SQ. FT. OF OPENING	OVERALL WIDTH	THICKNESS OF TOP SLAB	THICKNESS OF SIDEWALLS	THICKNESS OF BOTTOM SLAB	OVERALL HEIGHT	ROADWAY LENGTH	LENGTH OF HEADWALL	CLASS 5 CONC. PER LIN. FT. OF BARREL	PER LIN. FT. OF BARREL	REINFORCING STEEL				
													PER LAP	NO. HEADWALLS	PER HEADWALL		
D	S	H	A	O	W	T	C	B	O	H	R	L	K	CU. YD.	LB.	LB.	LB.
<p>5'-0"</p>																	

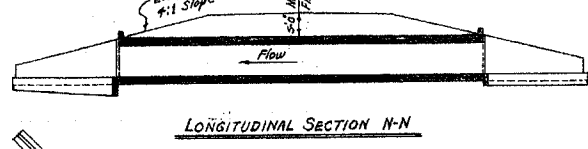
NOTE: For details of wings and lap joints see Drawing Nos. W-X152-1 or W-X152-2 and W-X153-1 or W-X153-2 or W-X154-1 or W-X154-2.



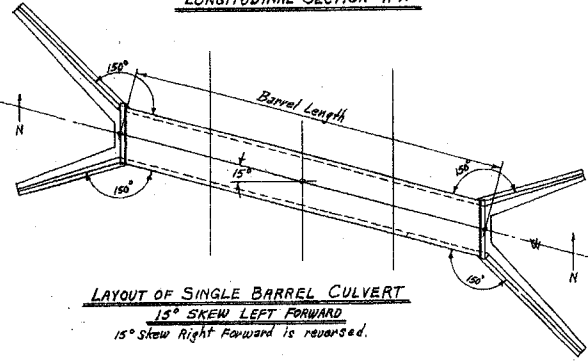
TYPICAL SECTION M-M

PART LONGITUDINAL SECTION N-N

GENERAL NOTES:-  
 CONCRETE- All concrete to be Class 5, and shall be poured in the dry.  
 All exposed corners to have 3/8" 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 33'-0". Lap longitudinal bars 30 diameters.  
 CONSTRUCTION JOINTS- Construction joints between wingwalls, side walls and slabs shall be only where shown on plans.  
 SPECIFICATIONS- Arkansas State Highway Commission Standard Specifications for Highway Construction and applicable Special Provisions.



LONGITUDINAL SECTION N-N



LAYOUT OF SINGLE BARREL CULVERT

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 5 Concrete (n=10) 1200#/'<sup>2</sup>  
 Reinforcing Steel 20,000#/'<sup>2</sup>

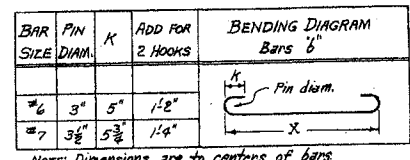
NOTE: This drawing to be used in conjunction with Standard Drawing Nos. W-X152-1 or W-X152-2; W-X153-1 or W-X153-2 and W-X154-1 or W-X154-2. Also W-X15.

CLASS 5 CONCRETE

ARKANSAS STATE HIGHWAY COMMISSION  
 DETAILS OF STANDARD BARREL SECTIONS  
 FOR  
 REINFORCED CONCRETE BOX CULVERTS  
 15° SKEW

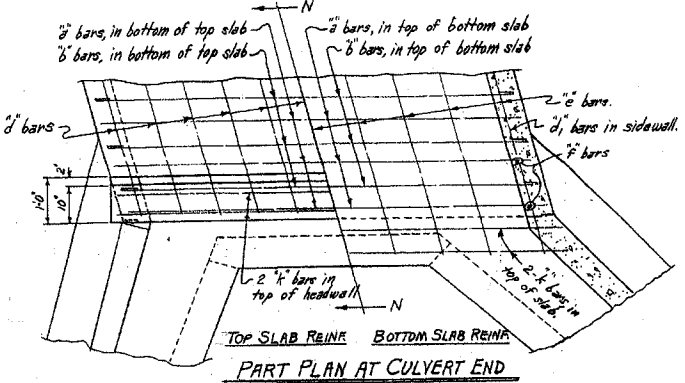
4, 5, 6, 7, 8, 9, 10, 11 & 12 SPANS 2:1, 3:1 OR 4:1 SLOPES  
 UNDER 5'-0" COVER  
 SINGLES  
 STANDARD DRAWING NO. R-115X-0

Designed By: W.C.H. 1-23-63 Checked By: R.A.S. 5-8-63  
 Drawn By: W.C.H. 8-14-63 Checked By: R.H.S. 10-7-63  
 Quantities By: W.C.H. 8-21-63 Checked By: R.G. 12-10-63



DOWEL BARS FOR TWO HEADWALLS

Span	Size	Spacing	No. Rebar	Length	X
4'	#4	12"	2	2'-6"	1'-3"
5'	#4	12"	2	2'-7"	1'-3 1/2"
6'	#4	12"	2	2'-8"	1'-4"
7'	#4	12"	2	2'-9"	1'-4 1/2"
8'	#4	12"	2	2'-11"	1'-5 1/2"
9'	#4	12"	2	3'-0"	1'-6"
10'	#4	12"	2	3'-1"	1'-6 1/2"
11'	#4	12"	2	3'-2"	1'-7"
12'	#4	12"	2	3'-3"	1'-7 1/2"



PART PLAN AT CULVERT END