DATE REVISED	DATE REVISED	FED.RD. DIST.NO.	STATE	JOB NO.	SHEET NO.	TOTAL SHEETS
		6	ARK.	040904	4	742
		INDEX OF SHEETS AND STANDARD DRAWINGS				

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No. 13640
BYRON O. LAWRENCE
7-27-2026

BRIDGE STANDARD DRAWINGS

DRWG.NO	TITLE	DATE
55000	STANDARD DETAILS FOR EMBANKMENT CONSTRUCTION AND BACKFILL AT BRIDGE ENDS	02-27-14
55001	STANDARD DETAILS FOR DUMPED RIPRAP AND FILTER BLANKET AND COMPUTING EXCAVATION FOR STRUCTURES	02-27-14
55002	STANDARD DETAILS FOR CONCRETE RIPRAP	02-27-14
55005	STANDARD DETAILS FOR PERMANENT STEEL BRIDGE DECK FORMS FOR STEEL & CONCRETE GIRDER SPANS	03-24-16
55006	STANDARD GENERAL NOTES FOR STEEL BRIDGE STRUCTURES	09-02-15
55007	STANDARD DETAILS FOR STEEL BRIDGE STRUCTURES	02-11-16
55008	STANDARD DETAILS FOR POURED SILICONE JOINTS	02-11-16
55009	STANDARD DETAILS FOR NEOPRENE STRIP SEAL JOINTS	02-11-16
55010	STANDARD DETAILS FOR TYPE D BRIDGE NAME PLATE	01-28-25
55020	STANDARD DETAILS FOR STEEL H-PILES AND PILE ENCASEMENTS	03-24-16
55030F	STANDARD DETAILS FOR TYPE F APPROACH GUTTERS	04-08-21
55040F1	STANDARD DETAILS FOR TYPE F APPROACH SLAB	09-07-23
55070	STANDARD DETAILS FOR BRIDGE TRAFFIC RAIL TYPE SSTR36	09-27-22
55071	STANDARD DETAILS FOR BRIDGE TRAFFIC RAIL TYPE SSTR42	07-06-22
55090A	STANDARD DETAILS OF 35' STEEL CANTILEVER SIGN STRUCTURE (1 OF 6)	06-18-26
55090B	STANDARD DETAILS OF 35' STEEL CANTILEVER SIGN STRUCTURE (2 OF 6)	06-18-26
55090C	STANDARD DETAILS OF 35' STEEL CANTILEVER SIGN STRUCTURE (3 OF 6)	06-18-26
55090D	STANDARD DETAILS OF 35' STEEL CANTILEVER SIGN STRUCTURE (4 OF 6)	06-18-26
55090E	STANDARD DETAILS OF 35' STEEL CANTILEVER SIGN STRUCTURE (5 OF 6)	06-18-26
55090F	STANDARD DETAILS OF 35' STEEL CANTILEVER SIGN STRUCTURE (6 OF 6)	06-18-26
55092A	STANDARD DETAILS OF 40' TO 54' STEEL OVERHEAD SIGN STRUCTURE (1 OF 6)	06-18-26
55092B	STANDARD DETAILS OF 40' TO 54' STEEL OVERHEAD SIGN STRUCTURE (2 OF 6)	06-18-26
55092C	STANDARD DETAILS OF 40' TO 54' STEEL OVERHEAD SIGN STRUCTURE (3 OF 6)	06-18-26
55092D	STANDARD DETAILS OF 40' TO 54' STEEL OVERHEAD SIGN STRUCTURE (4 OF 6)	06-18-26
55092E	STANDARD DETAILS OF 40' TO 54' STEEL OVERHEAD SIGN STRUCTURE (5 OF 6)	06-18-26
55092F	STANDARD DETAILS OF 40' TO 54' STEEL OVERHEAD SIGN STRUCTURE (6 OF 6)	06-18-26
55093A	STANDARD DETAILS OF 55' TO 69' STEEL OVERHEAD SIGN STRUCTURE (1 OF 6)	06-18-26
55093B	STANDARD DETAILS OF 55' TO 69' STEEL OVERHEAD SIGN STRUCTURE (2 OF 6)	06-18-26
55093C	STANDARD DETAILS OF 55' TO 69' STEEL OVERHEAD SIGN STRUCTURE (3 OF 6)	06-18-26
55093D	STANDARD DETAILS OF 55' TO 69' STEEL OVERHEAD SIGN STRUCTURE (4 OF 6)	06-18-26
55093E	STANDARD DETAILS OF 55' TO 69' STEEL OVERHEAD SIGN STRUCTURE (5 OF 6)	06-18-26
55093F	STANDARD DETAILS OF 55' TO 69' STEEL OVERHEAD SIGN STRUCTURE (6 OF 6)	06-18-26

ROADWAY STANDARD DRAWINGS

DRWG.NO	TITLE	DATE
CDP-1	CONCRETE DITCH PAVING	12-08-16
CPTJ-6A	TRANSVERSE & LONGITUDINAL JOINTS FOR CONCRETE PAVEMENT (NON-REINFORCED)	11-06-25
DR-1	DETAILS OF DRIVEWAYS & ISLANDS	05-22-25
DR-2	DETAILS OF DRIVEWAYS & STREET TURNOUTS	05-19-22
FES-1	FLARED END SECTION	10-18-96
FES-2	FLARED END SECTION	10-18-96
FPC-9	DETAILS OF DROP INLETS & JUNCTION BOXES	11-16-01
FPC-9D	DETAILS OF DROP INLETS	08-22-02
FPC-9N	DETAILS OF DROP INLETS AND SPILLWAY OUTLET	07-02-98
FPC-9S	DETAILS OF DROP INLET & JUNCTION BOX (TYPE ST)	07-26-12
GR-6	GUARDRAIL DETAILS	05-19-22
GR-8	GUARDRAIL DETAILS	11-07-19
GR-9	GUARDRAIL DETAILS	11-07-19
GR-10	GUARDRAIL DETAILS	11-07-19
GR-11	GUARDRAIL DETAILS	11-07-19
GR-12	GUARDRAIL DETAILS	05-14-20
GR-13	CONCRETE BARRIER WALL (PIER PROTECTION TYPE A)	11-07-19
GRT-1	GUARDRAIL DETAILS	11-07-19
MB-1	MAILBOX DETAILS	11-18-04
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
PCP-3	PLASTIC PIPE CULVERT (POLYPROPYLENE)	02-27-20
PM-1	PAVEMENT MARKING DETAILS	04-09-26
PM-2	PERMANENT PAVEMENT MARKING ON ACCESS CONTROLLED ROADWAYS	05-14-20
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
SD-6	HEAVY DUTY PULL BOX	02-13-24
SE-1	TABLES AND METHOD OF SUPERELEVATION FOR ONE-WAY TRAFFIC	11-07-19
SE-2	TABLES AND METHOD OF SUPERELEVATION FOR TWO-WAY TRAFFIC	11-07-19
SHS-1	STANDARD HIGHWAY SIGNS AND SUPPORTS ASSEMBLIES	09-12-13
SHS-2	U-CHANNEL POST ASSEMBLIES	07-25-19
SHS-3	DETAIL OF BREAKAWAY SIGN SUPPORTS FOR GUIDE SIGNS	05-19-22
SHS-4	DETAIL OF BREAKAWAY SIGN SUPPORTS FOR STANDARD SIGNS	09-12-13
SHS-5	DETAILS OF GUIDE SIGN PANELS	09-12-13
SHS-6	MOUNTING DETAILS FOR DEMOUNTABLE LEGEND ON GUIDE SIGNS	09-12-13
SHS-7	DETAIL OF OMNI-DIRECTIONAL BREAKAWAY SIGN SUPPORTS	09-12-13
SHS-8	TYPICAL DELINEATOR PLACEMENT ALONG THE INTERSTATE SYSTEM	11-16-17
TC-1	STANDARD TRAFFIC CONTROLS FOR HIGHWAY CONSTRUCTION	08-14-25
TC-1A	STANDARD TRAFFIC CONTROLS FOR HIGHWAY CONSTRUCTION	04-09-26
TC-2	STANDARD TRAFFIC CONTROLS FOR HIGHWAY CONSTRUCTION	08-14-25
TC-3	STANDARD TRAFFIC CONTROLS FOR HIGHWAY CONSTRUCTION	08-14-25
TC-4	STANDARD TRAFFIC CONTROLS FOR HIGHWAY CONSTRUCTION-TEMPORARY PRECAST BARRIER	11-07-19
TC-5	STANDARD TRAFFIC CONTROLS FOR HIGHWAY CONSTRUCTION-TEMPORARY PRECAST BARRIER	11-07-19
TC-6	STANDARD TRAFFIC CONTROLS FOR HIGHWAY CONSTRUCTION	04-09-26
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
TR-1A	DETAILS OF STANDARD TURNOUT FOR ENTRANCE & EXIT RAMPS (NON-REINFORCED)	08-22-02
WF-1	WIRE FENCE TYPE A AND B	08-22-02
W-X15	STANDARD WINGS FOR REINFORCED CONCRETE BOX CULVERTS - 15° SKEW	06-13-63
W-X-153-1	STANDARD WINGS FOR REINFORCED CONCRETE BOX CULVERTS - 15° SKEW - 3:1 SLOPES	05-10-66
R-100X-X2	STANDARD BARREL SECTIONS FOR REINFORCED CONCRETE BOX CULVERTS	01-14-63
R-115X-1	STANDARD BARREL SECTIONS FOR REINFORCED CONCRETE BOX CULVERTS - 15° SKEW SECTIONS "A" ONLY	10-24-63
W-X30	STANDARD WINGS FOR REINFORCED CONCRETE BOX CULVERTS - 30° SKEW	07-15-63
W-X303-1	STANDARD WINGS FOR REINFORCED CONCRETE BOX CULVERTS - 30° SKEW - 3:1 SLOPES	05-10-66
R-130X-1	STANDARD BARREL SECTIONS FOR REINFORCED CONCRETE BOX CULVERTS - 30° SKEW SECTIONS "A" ONLY	01-24-64
W-X45	STANDARD WINGS FOR REINFORCED CONCRETE BOX CULVERTS - 45° SKEW	06-15-64
W-X453-1	STANDARD WINGS FOR REINFORCED CONCRETE BOX CULVERTS - 45° SKEW - 3:1 SLOPES	05-10-66
R-200X-X2	STANDARD BARREL SECTIONS FOR REINFORCED CONCRETE BOX CULVERTS	01-14-63
R-245X-1	STANDARD BARREL SECTIONS FOR REINFORCED CONCRETE BOX CULVERTS - 45° SKEW SECTIONS "A" ONLY	08-12-64

INDEX OF SHEETS AND STANDARD DRAWINGS

DATE REVISED	DATE REVISED	FED.RD. DIST.NO.	STATE	JOB NO.	SHEET NO.	TOTAL SHEETS
		6	ARK.	040904	5	742
		GOVERNING SPECIFICATIONS 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
FHWA-1273	SUPPLEMENT - TRAINING PROGRAM - JOB 040904
100-3	CONTRACTOR'S LICENSE
100-4	DEPARTMENT NAME CHANGE
102-2	ISSUANCE OF PROPOSALS
102-3	PREQUALIFICATION OF BIDDERS
103-2	CONTACT INFORMATION FOR MOTORIST DAMAGE CLAIMS
105-4	MAINTENANCE DURING CONSTRUCTION
107-2	RESTRAINING CONDITIONS
108-1	LIQUIDATED DAMAGES
108-2	WORK ALLOWED PRIOR TO ISSUANCE OF WORK ORDER
110-1	PROTECTION OF WATER QUALITY AND WETLANDS
210-1	UNCLASSIFIED EXCAVATION
303-1	AGGREGATE BASE COURSE
306-1	QUALITY CONTROL AND ACCEPTANCE
307-2	CEMENT TREATED BASE COURSE
308-2	CEMENT STABILIZED CRUSHED STONE 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
400-7	TRACKLESS TACK
404-3	DESIGN OF ASPHALT MIXTURES
409-2	ASPHALT LABORATORY FACILITY
410-1	CONSTRUCTION REQUIREMENTS AND ACCEPTANCE OF ASPHALT CONCRETE PLANT MIX COURSES
410-2	DEVICES FOR MEASURING DENSITY FOR ROLLING PATTERNS
410-4	EVALUATION OF ACHM SUBLOT REPLACEMENT MATERIAL
416-1	RECYCLED ASPHALT PAVEMENT
501-3	PORTLAND CEMENT CONCRETE PAVEMENT
505-1	PORTLAND CEMENT CONCRETE DRIVEWAY
600-2	INCIDENTAL CONSTRUCTION
603-1	LANE CLOSURE NOTIFICATION
604-1	RETROREFLECTIVE SHEETING FOR TRAFFIC CONTROL DEVICES IN CONSTRUCTION ZONES
604-3	TRAFFIC CONTROL DEVICES IN CONSTRUCTION ZONES (MASH)
605-1	CONCRETE DITCH PAVING
606-1	PIPE CULVERTS FOR SIDE DRAINS
617-1	GUARDRAIL TERMINAL (TYPE 2)
617-2	GUARDRAIL DELINEATORS
619-1	FENCES
620-1	MULCH COVER
621-1	FILTER SOCKS
637-1	MAILBOXES
700-2	TRAFFIC CONTROL FACILITIES
723-1	GENERAL REQUIREMENTS FOR SIGNS
729-1	CHANNEL POST SIGN SUPPORT
730-1	BREAKAWAY SIGN SUPPORT
732-1	CRASH CUSHION
800-1	STRUCTURES
802-3	CONCRETE FOR STRUCTURES
802-5	CONCRETE FOR STRUCTURES
804-2	REINFORCING STEEL FOR STRUCTURES
807-2	STEEL STRUCTURES
808-1	INSTALLATION OF ELASTOMERIC BEARINGS
808-2	ELASTOMERIC BEARINGS
JOB 040904	ARCHEOLOGICAL MONITORING
JOB 040904	ARCHITECTURAL FINISH
JOB 040904	ARMY CORPS RESTRAINING CONDITIONS
JOB 040904	ASPHALT MIXTURES WITH PG 76-22 BINDER
JOB 040904	ASSESSMENT OF WORKING DAYS – MAINTENANCE OF TRAFFIC
JOB 040904	AUTOMATED WORK ZONE INFORMATION SYSTEM
JOB 040904	BIDDING REQUIREMENTS AND CONDITIONS
JOB 040904	BRIDGE MOUNTED GALVANIZED STEEL CONDUIT SYSTEM
JOB 040904	BROADBAND INTERNET SERVICE FOR FIELD OFFICE
JOB 040904	BUY AMERICA - CONSTRUCTION MATERIALS
JOB 040904	CARGO PREFERENCE ACT REQUIREMENTS
JOB 040904	CEMENT STABILIZED CRUSHED STONE BASE COURSE
JOB 040904	CLASS C FLY ASH IN PORTLAND CEMENT CONCRETE PAVEMENT AND CLASS S(AE) CONCRETE
JOB 040904	COLD MILLING – COUNTY PROPERTY
JOB 040904	COMPACTED EMBANKMENT ZONING
JOB 040904	CONCRETE BARRIER WALL
JOB 040904	CONCRETE BRIDGE DECK CURING AND SURFACE TREATMENT RESTRICTIONS
JOB 040904	CONCRETE DITCH PAVING
JOB 040904	CONCRETE FOR STRUCTURES
JOB 040904	CONCRETE PULL BOX
JOB 040904	CONSTRUCTION IN SPECIAL FLOOD HAZARD AREAS
JOB 040904	CONSTRUCTION PROJECT INFORMATION SIGN
JOB 040904	CONTRACTOR PROVIDED CULTURAL RESOURCES CLEARANCE FOR OFF-SITE LOCATIONS
JOB 040904	CULVERT CLEAN OUT
JOB 040904	DESIGN AND QUALITY CONTROL ASPHALT MIXTURES
JOB 040904	DESIGN OF ASPHALT MIXTURES - AGGREGATES
JOB 040904	DETAILS FOR SAFETY OF STREAM TRAFFIC
JOB 040904	DIRECT TENSION INDICATORS FOR HIGH STRENGTH BOLT ASSEMBLIES
JOB 040904	DOCUMENTATION OF PAYMENTS MADE - PROMPT PAYMENT (SIGNET)
JOB 040904	DRILLED SHAFT FOUNDATIONS
JOB 040904	DRILLED SHAFT FOUNDATIONS FOR STEEL SIGN STRUCTURES
JOB 040904	DRIVEN PILING BY METHOD A
JOB 040904	ELECTRICAL CONDUCTORS FOR LUMINAIRES (ROADWAY LIGHTING)
JOB 040904	ELECTRICAL CONDUCTORS-IN-CONDUIT (ROADWAY LIGHTING)
JOB 040904	ENHANCED THERMOPLASTIC PAVEMENT MARKING
JOB 040904	FIBER OPTIC CONCRETE PULL BOX
JOB 040904	FLEXIBLE BEGINNING OF WORK – CALENDAR DAY CONTRACT
JOB 040904	FURNISHING, INSTALLING AND LEAVING IN PLACE PRECAST CONCRETE BARRIER WALL
JOB 040904	GEOTEXTILE FABRIC
JOB 040904	HIGH MAST ILLUMINATION ASSEMBLY
JOB 040904	HIGH MAST LUMINAIRE ELEVATED SERVICE PLATFORM
JOB 040904	INSURANCE, CONSTRUCTION, AND FLAGGING REQUIREMENTS ON RAILROAD PROPERTY (UPRR)
JOB 040904	ITS ELECTRICAL JUNCTION BOX, METALLIC
JOB 040904	ITS NON-METALLIC CONDUIT SYSTEM
JOB 040904	LED ROADWAY ILLUMINATION POLE
JOB 040904	LIQUIDATED DAMAGES PROCEDURE FOR BID LETTINGS
JOB 040904	LOCAL WORK ZONE LAW ENFORCEMENT
JOB 040904	LONGITUDINAL JOINT DENSITIES FOR ACHM SURFACE COURSES
JOB 040904	LONGITUDINAL TINING
JOB 040904	MAINTENANCE OF TRAFFIC
JOB 040904	MANDATORY ELECTRONIC CONTRACT
JOB 040904	MANDATORY ELECTRONIC DOCUMENT SUBMITTAL
JOB 040904	METAL GRATING FOR PLATFORM
JOB 040904	MOBILE SPEED NOTIFICATION SYSTEM (SPECIAL)
JOB 040904	NESTING SITES OF MIGRATORY BIRDS
JOB 040904	NONDESTRUCTIVE TESTING OF DRILLED SHAFTS
JOB 040904	NONDESTRUCTIVE TESTING OF DRILLED SHAFTS FOR STEEL SIGN STRUCTURES
JOB 040904	OFF-SITE RESTRAINING CONDITIONS FOR AMERICAN BURYING BEETLE
JOB 040904	OFF-SITE RESTRAINING CONDITIONS FOR INDIANA AND NORTHERN LONG-EARED BATS
JOB 040904	OMNI-DIRECTIONAL BREAKAWAY SIGN SUPPORT
JOB 040904	PARTNERING REQUIREMENTS
JOB 040904	PCC PAVEMENT SURFACE SMOOTHNESS (IRI)
JOB 040904	PEDESTAL TYPE SERVICE POINT ASSEMBLY
JOB 040904	PERCENT WITHIN LIMITS/PAVEMENT SMOOTHNESS (IRI)
JOB 040904	PLASTIC PIPE
JOB 040904	PORTABLE CONSTRUCTION LIGHTING
JOB 040904	PORTLAND CEMENT CONCRETE PAVEMENT
JOB 040904	PRE-BID ON SITE INVESTIGATION OF SOIL CONDITIONS
JOB 040904	PRICE ADJUSTMENT FOR ASPHALT BINDER
JOB 040904	PRICE ADJUSTMENT FOR FUEL
JOB 040904	PRIME CONTRACTOR PERFORMANCE EVALUATION
JOB 040904	PROHIBITION OF CERTAIN TELECOMMUNICATIONS AND VIDEO SURVEILLANCE SERVICES OR EQUIPMENT
JOB 040904	PROSECUTION AND PROGRESS WITH BID SCHEDULE
JOB 040904	REMOVING AND REPLACING TOPSOIL
JOB 040904	RETAINING WALLS
JOB 040904	ROADWAY CONSTRUCTION CONTROL
JOB 040904	ROCK FILL
JOB 040904	SECTION 404 STANDARD INDIVIDUAL PERMIT REQUIREMENTS
JOB 040904	SEQUENCE OF CONSTRUCTION - ALTERNATE CONCEPTUAL PROPOSAL (ACP)
JOB 040904	SETTLEMENT MONITORING
JOB 040904	SHORING FOR CULVERTS
JOB 040904	SITE USE (A+C METHOD) – CALENDAR DAY CONTRACT
JOB 040904	SOIL STABILIZATION
JOB 040904	SPECIAL CLEARING REQUIREMENTS
JOB 040904	SPECIAL SAFETY REQUIREMENTS FOR BRIDGES
JOB 040904	SPECIAL SAFETY REQUIREMENTS FOR OVERHEAD SIGNS
JOB 040904	STEEL SIGN STRUCTURES
JOB 040904	STORM WATER POLLUTION PREVENTION PLAN
JOB 040904	SUBMISSION OF ASPHALT CONCRETE HOT MIX ACCEPTANCE TEST RESULTS
JOB 040904	TEMPORARY RETAINING WALLS
JOB 040904	TEXTURED COATING FINISH
JOB 040904	TRAFFIC CONTROL DEVICES IN CONSTRUCTION ZONES
JOB 040904	TRAFFIC CONTROL DEVICES IN CONSTRUCTION ZONES LEFT IN PLACE
JOB 040904	TRENCHING AND SHOULDER PREPARATION FOR TEMPORARY WIDENING
JOB 040904	UNDERDRAIN FLUSHING AND INSPECTION
JOB 040904	UTILITY ADJUSTMENTS
JOB 040904	VALUE ENGINEERING
JOB 040904	VENDOR REGISTRATION REQUIREMENT
JOB 040904	WARM MIX ASPHALT
JOB 040904	WATER POLLUTION CONTROL
JOB 040904	WIRE ROPE SAFETY FENCE (POST REPAIR)
JOB 040904	WIRE ROPE SAFETY FENCE (WRSF) SPECIFICATIONS
JOB 040904	WIRE ROPE SAFETY FENCE MAINTENANCE MATERIALS
JOB 040904	WORK ZONE LAW ENFORCEMENT
JOB 040904	WRSF TRAINING WORKSHOP

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
REG. NO. 13640
JASON O. LAWRENCE
7-29-2026

GENERAL NOTES

1. GRADE LINE DENOTES FINISHED GRADE WHERE SHOWN ON PLANS.
2. ALL PIPE LINES, POWER, TELEPHONE, AND TELEGRAPH LINES TO BE MOVED OR LOWERED BY THE RESPECTIVE OWNERS AS PER AGREEMENT WITH SUCH OWNERS.
3. ANY EQUIPMENT OR APPURTENANCE THAT INTERFERES WITH THE PROPOSED CONSTRUCTION AND WHICH MAY BE THE PROPERTY OF UTILITY SERVICE ORGANIZATIONS SHALL BE MOVED BY THE OWNERS UNLESS OTHERWISE PROVIDED.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING U. S. MAILBOXES WITHIN THE PROJECT LIMITS IN SUCH A MANNER THAT THE PUBLIC MAY RECEIVE CONTINUED MAIL SERVICE. PAYMENT WILL BE CONSIDERED INCLUDED IN THE PRICE BID FOR THE VARIOUS BID ITEMS.
5. ALL LAND MONUMENTS LOCATED WITHIN THE CONSTRUCTION AREA SHALL BE PROTECTED IN ACCORDANCE WITH SECTION 107.12 OF THE STANDARD SPECIFICATIONS.
6. 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 ENSURE THAT ALL TREES NOT TO BE REMOVED SHALL BE HARMED AS LITTLE AS POSSIBLE DURING THE CONSTRUCTION OPERATIONS.
7. 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.
8. THE SEQUENCE AS SHOWN ON THE MAINTENANCE OF TRAFFIC PLANS IS A GENERAL OUTLINE FOR THE CONSTRUCTION OF THIS PROJECT, AND IN NO WAY IS IT INTENDED TO COVER EVERY ITEM IN THE PROJECT. ITEMS NOT CRITICAL TO THE CONSTRUCTION SEQUENCE MAY BE CONSTRUCTED IN ANY STAGE AS APPROVED BY THE RESIDENT ENGINEER.
9. ALL FLEXIBLE BASE AND ASPHALTIC PAVEMENTS REMOVED SHALL BE PAID FOR UNDER THE ITEM NO. 210 - UNCLASSIFIED EXCAVATION.
10. 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.
11. 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.

7/29/2026 10:09:49 AM
R040904_03_GN_001.dgn

DATE REVISED	DATE REVISED	FED.RD. DIST.NO.	STATE	JOB NO.	SHEET NO.	TOTAL SHEETS
		6	ARK.	040904	203	742
		QUANTITY SHEETS				

DRIVEWAYS & TURNOUTS

STATION	SIDE	LOCATION	WIDTH	PORTLAND CEMENT CONCRETE DRIVEWAY	ACHM SURFACE COURSE (1/2") 220 LBS. PER SQ. YD. (PG 70-22)		AGGREGATE BASE COURSE (CLASS 7)	SIDE DRAINS		STANDARD DRAWINGS
								18"	24"	
			FEET	SQ. YD.	SQ. YD.	TON	TON	LIN. FT.		
12+80	RT.	C.L. WATERFRONT	16	62.22	37.01	4.07	15.11	32		PCC-1, PCM-1, PCP-1, PCP-2, PCP-3
13+19	LT.	C.L. WATERFRONT	16	58.54	37.01	4.07	15.11	36		PCC-1, PCM-1, PCP-1, PCP-2, PCP-3
21+00	RT.	C.L. WATERFRONT	16	125.90	37.01	4.07	15.11	44		PCC-1, PCM-1, PCP-1, PCP-2, PCP-3
21+11	RT.	C.L. WATERFRONT TEMP.	16		92.64	10.19	37.83		32	PCC-1, PCM-1, PCP-1, PCP-2, PCP-3
22+46	RT.	C.L. WATERFRONT	16	27.15	37.01	4.07	15.11			
23+00	LT.	C.L. WATERFRONT	16	29.37	46.97	5.17	19.18			
17+00	LT.	C.L. HENRY SR	16		54.04	5.94	45.30	30		PCC-1, PCM-1, PCP-1, PCP-2, PCP-3
19+80	LT.	C.L. HENRY SR	16		54.04	5.94	48.73	34		PCC-1, PCM-1, PCP-1, PCP-2, PCP-3
21+16	LT.	C.L. HENRY SR	16		54.04	5.94	47.12			
10+00	LT.	C.L. COLLUM FR	16		37.01	4.07	34.56	36		PCC-1, PCM-1, PCP-1, PCP-2, PCP-3
10+00	RT.	C.L. COLLUM FR	20		250.52	27.56	102.30			
16+00	LT.	C.L. COLLUM FR	16		37.01	4.07	43.11	42		PCC-1, PCM-1, PCP-1, PCP-2, PCP-3
25+00	LT.	C.L. COLLUM FR	16		37.01	4.07	33.81	30		PCC-1, PCM-1, PCP-1, PCP-2, PCP-3
* ENTIRE PROJECT TEMPORARY DRIVES										
TOTALS:				**303.18**	**811.32**	**89.23**	**472.38**	**284**	**32**	

BASIS OF ESTIMATE:
ACHM SURFACE COURSE (1/2").....94.7% MIN. AGGR.....5.3% ASPHALT BINDER
MAXIMUM NUMBER OF GYRATIONS = 160 FOR PG 70-22

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

RUMBLE STRIPS IN SHOULDERS

STATION	STATION	LOCATION	* RUMBLE STRIPS IN CONCRETE SHOULDERS	* RUMBLE STRIPS IN ASPHALT SHOULDERS
			LIN.FT.	
834+22	837+08	C.L. I-49 N.B. LT. SHLD.		286
842+15	854+41	C.L. I-49 N.B. LT. SHLD.		1226
835+23	854+41	C.L. I-49 S.B. LT. SHLD.		1918
833+08	841+27	C.L. I-49 S.B. RT. SHLD.		819
846+23	858+00	C.L. I-49 S.B. RT. SHLD.		1177
833+08	835+23	C.L. I-49 S.B. LT. SHLD.	215	
834+73	860+50	C.L. I-49 N.B. RT. SHLD.		2577
51+50	54+19	C.L. RAMP I49SB-I40EB	269	
TOTALS:			**484**	**8003**

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

COLD MILLING ASPHALT PAVEMENT

STATION	STATION	LOCATION	AVG. WIDTH	COLD MILLING ASPHALT PAVEMENT
			FEET	SQ. YD.
39+10.00	40+10.00	C.L. HWY 162 HENRY	36.92	410.22
41+10.00	42+10.00	C.L. HWY 162 HENRY	36.57	406.33
TOTAL:				**816.55**

NOTE: AVERAGE MILLING DEPTH 1".

MAILBOXES

LOCATION	MAILBOXES	MAILBOX SUPPORTS (SINGLE)
	EACH	
11+61 LT. OF C.L. WATERFRONT	1	1
12+94 RT. OF C.L. WATERFRONT	1	1
16+46 RT. OF C.L. WATERFRONT	1	1
17+83 RT. OF C.L. WATERFRONT	1	1
19+58 RT. OF C.L. WATERFRONT	1	1
21+01 RT. OF C.L. WATERFRONT	1	1
22+56 RT. OF C.L. WATERFRONT	1	1
22+54 LT. OF C.L. WATERFRONT	1	1
15+66 RT. OF C.L. WATERFRONT	1	1
15+66 RT. OF C.L. WATERFRONT	1	1
TOTALS:	**10**	**10**

PORTLAND CEMENT CONCRETE CORRUGATIONS

STATION	STATION	LOCATION	PORTLAND CEMENT CONCRETE CORRUGATIONS
			SQ. YDS.
835+48.93	836+34.34	C.L. I-49	116
53+79.90	53+96.12	C.L. RAMP I40WB-I49SB	13
45+93.03	46+26.72	C.L. RAMP I49SB-I40EB	34
TOTAL:			**163**

ACHM PATCHING OF EXISTING ROADWAY

DESCRIPTION	TON
ENTIRE PROJECT - TO BE USED IF AND WHERE DIRECTED BY THE ENGINEER	50
TOTAL:	**50**

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

CRASH CUSHION

STATION	LOCATION	CRASH CUSHION
		EACH
835+22.50	LT. OF C.L. I-49	1
45+66.58	LT. OF C.L. RAMP I49SB-I40EB	1
TOTAL:		**2**

BENCH MARKS

STATION	LOCATION	BENCH MARKS
		EACH
613+12	C.L. I-49	1
640+50	C.L. I-49	1
683+91	C.L. I-49	1
704+20	C.L. I-49	1
725+75	C.L. I-49	1
740+00	C.L. I-49	1
770+11	C.L. I-49	1
793+16	C.L. I-49	1
812+54	C.L. I-49	1
833+00	C.L. I-49	1
844+00	C.L. I-49	1
TOTAL:		**11**

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

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
NO. 13640
BYRON O. LAWRENCE
7-29-2026

FENCING

STATION	STATION	LOCATION	WIRE FENC (TYPE A)	16'-0" GATES
			LIN. FT.	EACH
595+00	598+90	RT. OF C.L. I-49	405	
599+07	606+53	LT. OF C.L. I-49	1013	
599+53	609+15	RT. OF C.L. I-49	991	1
607+20	608+45	LT. OF C.L. I-49	213	1
608+59	612+38	LT. OF C.L. I-49	511	1
609+48	613+38	RT. OF C.L. I-49	476	
612+40	612+85	MED. C.L. I-49	78	
618+97	639+00	LT. OF C.L. I-49	2105	
619+47	619+81	MED. C.L. I-49	72	
619+78	639+00	RT. OF C.L. I-49	2077	1
639+00	663+00	RT. OF C.L. I-49	2489	
639+00	663+00	LT. OF C.L. I-49	2338	
663+00	684+93	RT. OF C.L. I-49	2360	
663+00	682+59	LT. OF C.L. I-49	2035	1
683+08	683+86	MED. C.L. I-49	102	
685+84	687+00	LT. OF C.L. I-49	229	
686+82	687+60	MED. C.L. I-49	102	
687+00	693+36	LT. OF C.L. I-49	629	1
687+93	704+28	RT. OF C.L. I-49	1781	1
693+55	703+62	LT. OF C.L. I-49	1014	1
704+11	711+00	LT. OF C.L. I-49	696	
704+77	711+00	RT. OF C.L. I-49	614	1
711+00	723+89	LT. OF C.L. I-49	1295	1
711+00	727+14	RT. OF C.L. I-49	1672	
724+37	735+00	LT. OF C.L. I-49	1075	
727+63	735+00	RT. OF C.L. I-49	733	1
735+00	759+00	RT. OF C.L. I-49	2401	
735+00	759+00	LT. OF C.L. I-49	2390	1
759+00	761+97	RT. OF C.L. I-49	301	
763+03	770+92	LT. OF C.L. I-49	1275	1
763+16	770+92	RT. OF C.L. I-49	910	1
794+90	800+81	RT. OF C.L. I-49	612	1
801+90	807+00	RT. OF C.L. I-49	526	1
807+00	807+47	RT. OF C.L. I-49	145	
821+35	831+00	LT. OF C.L. I-49	993	
829+99	831+00	RT. OF C.L. I-49	101	
831+00	844+00	LT. OF C.L. I-49	1322	
831+00	845+99	RT. OF C.L. I-49	1475	
20+63	23+17	LT. OF C.L. CC RAMP 3	255	
10+00	21+00	RT. OF C.L. RAMP I40WB-I49NB	955	
21+00	25+90	RT. OF C.L. RAMP I40WB-I49NB	431	
57+17	58+10	LT. OF C.L. RAMP I40WB-I49SB	84	1
58+40	58+50	LT. OF C.L. RAMP I40WB-I49SB	43	
15+93	19+95	RT. OF C.L. RAMP I49NB-I40EB	420	
21+00	24+00	RT. OF C.L. RAMP I49NB-I40EB	289	1
24+00	34+90	RT. OF C.L. RAMP I49NB-I40EB	1061	
13+40	14+99	LT. OF C.L. RAMP I49SB-I40EB	158	1
15+42	19+89	LT. OF C.L. RAMP I49SB-I40EB	465	
61+08	69+00	RT. OF C.L. RAMP I49NB-I40WB	840	1
69+00	77+22	RT. OF C.L. RAMP I49NB-I40WB	847	
14+85	24+00	LT. OF C.L. RAMP I49SB-I40WB	948	1
24+00	25+76	LT. OF C.L. RAMP I49SB-I40WB	158	
27+79	28+12	LT. OF C.L. RAMP I49SB-I40WB	16	1
41+39	45+12	LT. OF HWY 162 HENRY	373	
29+40	30+00	RT. OF C.L. COLLUM FR	59	
30+00	36+95	RT. OF C.L. COLLUM FR	688	
40+90	44+00	LT. OF C.L. HWY. 64	310	
44+00	45+82	LT. OF C.L. HWY. 64	299	
45+82	57+76	LT. OF C.L. HWY. 64	1335	2
TOTALS:			**49590**	**24**

RETAINING WALLS

STATION	STATION	LOCATION	RETAINING WALL	SELECT GRANULAR BACKFILL	CONCRETE DITCH PAVING (TYPE B)	UNCLASSIFIED EXCAVATION	TEXTURED COATING FINISH
			SQ. FT.	CU. YD.	SQ. YD.	CU. YD.	SQ.YD.
16+52	16+86	C.L. WATERFRONT - LT. & RT.	2484	1891	88	906	212
19+60	20+03	C.L. WATERFRONT - LT. & RT.	2209	1761	99	2212	189
TOTALS:			**4693**	**3652**	**187**	**3118**	**401**

7/29/2026 11:31:50 AM
R040904_08_QTY007.dgn

DATE REVISED	DATE REVISED	FED.RD. DIST.NO.	STATE	JOB NO.	SHEET NO.	TOTAL SHEETS
		6	ARK.	040904	205	742
		QUANTITY SHEETS				

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No. 13640
BARON O. LAWRENCE
7-29-2026

BASE AND SURFACING - MAINTENANCE OF TRAFFIC

STATION	STATION	LOCATION	LENGTH	TRENCHING AND SHOULDER PREPERATION	AGGREGATE BASE COURSE		TACK COAT							ACHM BASE COURSE (1 1/2")				ACHM BINDER COURSE (1")				ACHM SURFACE COURSE (1/2")							
							(0.05 GAL. PER SQ. YD.)			(0.10 GAL. PER SQ. YD.)																		
					TON / STATION	TON	TOTAL WID.	SQ.YD.	GALLON	TOTAL WID.	SQ.YD.	GALLON	TOTAL GALLONS	AVG. WID.	SQ.YD.	POUND / SQ.YD.	PG 70-22	AVG. WID.	SQ.YD.	POUND / SQ.YD.	PG 70-22	AVG. WID.	SQ.YD.	POUND / SQ.YD.	PG 70-22	AVG. WID.	SQ.YD.	POUND / SQ.YD.	PG 70-22	TOTAL PG 70-22
			FEET	STATION			FEET			FEET				FEET			TON	FEET			TON	FEET			TON	FEET			TON	TON
WATERFRONT-DETOUR																													
12+97.32	14+13.40	C.L. WATERFRONT	116.08		72.00	83.58				9.15	118.01	11.80	11.80													9.15	118.01	220.00	12.98	12.98
14+13.94	21+97.49	C.L. WATERFRONT-DETOUR	783.55		214.75	1682.67																				24.00	2089.47	220.00	229.84	229.84
21+37.88	22+31.30	C.L. WATERFRONT	93.42		99.50	92.95				13.38	138.88	13.89	13.89													13.38	138.88	220.00	15.28	15.28
HENRY-DETOUR																													
34+76.57	37+69.45	C.L. HWY 162 HENRY	292.88		113.75	333.15				15.60	507.66	50.77	50.77													15.60	507.66	220.00	55.84	55.84
37+51.54	43+45.10	C.L. HENRY-DETOUR	593.56		237.25	1408.22																				26.00	1714.73	220.00	188.62	188.62
43+30.98	46+03.98	C.L. HWY 162 HENRY	273.00		101.25	276.41				13.67	414.66	41.47	41.47													13.67	414.66	220.00	45.61	45.61
MOT DETOURS																													
11+68.97	12+97.02	C.L. SB-WB MEDIAN DETOUR	128.05	2.00			41.01	583.48	29.17				29.17	13.67	194.49	495.00	48.14	13.67	194.49	660.00	64.18	13.67	194.49	220.00	21.39	13.67	194.49	220.00	21.39	42.78
12+97.02	16+43.48	C.L. SB-WB MEDIAN DETOUR	346.46	4.00	17.75	61.50	104.13	4008.54	200.43				200.43	34.92	1344.26	495.00	332.70	34.69	1335.41	660.00	440.69	34.52	1328.87	220.00	146.18	34.40	1324.25	220.00	145.67	291.85
16+43.48	20+26.83	C.L. SB-WB MEDIAN DETOUR	383.35	4.00			109.20	4651.31	232.57				232.57	36.40	1550.44	495.00	383.73	36.40	1550.44	660.00	511.65	36.40	1550.44	220.00	170.55	36.40	1550.44	220.00	170.55	341.10
16+43.48	20+26.83	C.L. SB-WB MEDIAN DETOUR	383.35	4.00	17.75	68.04	32.58	1387.73	69.39				69.39	11.07	471.52	495.00	116.70	10.84	461.72	660.00	152.37	10.67	454.48	220.00	49.99	10.54	448.95	220.00	49.38	99.37
20+26.83	39+97.81	C.L. SB-WB MEDIAN DETOUR	1970.98	20.00	17.75	349.85	108.81	23829.15	1191.46				1191.46	36.48	7989.04	495.00	1977.29	36.25	7938.67	660.00	2619.76	36.08	7901.44	220.00	869.16	35.96	7875.16	220.00	866.27	1735.43
39+97.81	41+38.09	C.L. SB-WB MEDIAN DETOUR	140.28	2.00			110.91	1728.72	86.44				86.44	36.97	576.24	495.00	142.62	36.97	576.24	660.00	190.16	36.97	576.24	220.00	63.39	36.97	576.24	220.00	63.39	126.78
39+97.81	43+89.75	C.L. SB-WB MEDIAN DETOUR	391.94	4.00	17.75	69.57	37.57	1636.13	81.81				81.81	12.73	554.38	495.00	137.21	12.50	544.36	660.00	179.64	12.34	537.39	220.00	59.11	12.21	531.73	220.00	58.49	117.60
41+38.09	43+89.75	C.L. SB-WB MEDIAN DETOUR	251.66	3.00			122.58	3427.61	171.38				171.38	40.86	1142.54	495.00	282.78	40.86	1142.54	660.00	377.04	40.86	1142.54	220.00	125.68	40.86	1142.54	220.00	125.68	251.36
43+89.75	47+47.49	C.L. SB-WB MEDIAN DETOUR	357.74	4.00	17.75	63.50	123.42	4905.81	245.29				245.29	41.35	1643.62	495.00	406.80	41.12	1634.47	660.00	539.38	40.95	1627.72	220.00	179.05	40.83	1622.95	220.00	178.52	357.57
47+47.49	49+42.54	C.L. SB-WB MEDIAN DETOUR	195.05	2.00			100.50	2178.06	108.90				108.90	33.50	726.02	495.00	179.69	33.50	726.02	660.00	239.59	33.50	726.02	220.00	79.86	33.50	726.02	220.00	79.86	159.72
47+47.49	49+42.54	C.L. SB-WB MEDIAN DETOUR	195.05	2.00	17.75	34.62	38.34	830.91	41.55				41.55	12.99	281.52	495.00	69.68	12.76	276.54	660.00	91.26	12.59	272.85	220.00	30.01	12.47	270.25	220.00	29.73	59.74
13+54.94	17+69.44	C.L. WB-NB DETOUR	414.50	5.00	35.50	147.15	76.81	3537.53	176.88				176.88	26.02	1198.37	495.00	296.60	25.56	1177.18	660.00	388.47	25.23	1161.98	220.00	127.82	24.98	1150.47	220.00	126.55	254.37
19+56.37	21+81.41	C.L. WB-NB DETOUR	225.04	3.00	17.75	39.94	103.03	2576.21	128.81				128.81	34.55	863.90	495.00	213.82	34.32	858.15	660.00	283.19	34.16	854.15	220.00	93.96	34.03	850.90	220.00	93.60	187.56
19+56.37	21+81.41	C.L. WB-NB DETOUR	225.04	3.00	17.75	39.94	11.52	288.05	14.40				14.40	4.05	101.27	495.00	25.06	3.82	95.52	660.00	31.52	3.65	91.27	220.00	10.04	3.53	88.27	220.00	9.71	19.75
21+81.41	25+04.37	C.L. WB-NB DETOUR	322.96	4.00	35.50	114.65	104.03	3733.06	186.65				186.65	35.09	1259.19	495.00	311.65	34.64	1243.04	660.00	410.20	34.30	1230.84	220.00	135.39	34.05	1221.87	220.00	134.41	269.80
15+00.73	22+69.02	C.L. SB-EB DETOUR	768.29	8.00	17.75	136.37	75.94	6482.66	324.13				324.13	25.52	2178.53	495.00	539.19	25.29	2158.89	660.00	712.43	25.13	2145.24	220.00	235.98	25.00	2134.14	220.00	234.76	470.74
22+69.02	23+98.05	C.L. SB-EB DETOUR	129.03	2.00	17.75	22.90	75.93	1088.58	54.43				54.43	25.52	365.87	495.00	90.55	25.29	362.57	660.00	119.65	25.12	360.14	220.00	39.62	25.00	358.42	220.00	39.43	79.05
14+15.41	14+26.71	C.L. SB-NB CROSSOVER A	11.30	1.00	35.50	4.01	103.81	130.34	6.52				6.52	35.02	43.97	495.00	10.88	34.56	43.39	660.00	14.32	34.23	42.98	220.00	4.73	33.98	42.66	220.00	4.69	9.42
11+95.03	12+93.99	C.L. SBNB CROSSOVER B	98.96	1.00	35.50	35.13	104.15	1145.19	57.26				57.26	35.13	386.27	495.00	95.60	34.68	381.33	660.00	125.84	34.34	377.59	220.00	41.53	34.09	374.84	220.00	41.23	82.76
ADDITIONAL FOR MOT																													
823+76.91	865+21.31	C.L. I-49 (SB ML OUTSIDE SHOULDER)	4144.40	42.00	17.75	735.63	21.57	9932.75	496.64				496.64	7.40	3407.62	495.00	843.39	7.17	3301.71	660.00	1089.56	7.00	3223.42	220.00	354.58	6.88	3168.16	220.00	348.50	703.08
859+30.71	863+74.34	C.L. I-49 (NB ML INSIDE SHOULDER)	443.63	5.00	17.75	78.74	47.85	2358.63	117.93				117.93	16.16	796.56	495.00	197.15	15.93	785.23	660.00	259.13	15.76	776.85	220.00	85.45	15.64	770.93	220.00	84.80	170.25
863+74.34	865+69.69	C.L. I-49 (NB ML INSIDE SHOULDER)	195.35	2.00	17.75	34.67	14.80	321.24	16.06				16.06	5.14	111.57	495.00	27.61	4.91	106.57	660.00	35.17	4.75	103.10	220.00	11.34	4.62	100.28	220.00	11.03	22.37
864+75.56	867+36.70	C.L. I-49 (SB ML INSIDE SHOULDER)	261.14	3.00	17.75	46.35	28.27	820.27	41.01				41.01	9.63	279.42	495.00	69.16	9.40	272.75	660.00	90.01	9.24	268.10	220.00	29.49	9.11	264.33	220.00	29.08	58.57
865+69.69	868+54.34	C.L. I-49 (NB ML INSIDE SHOULDER)	284.65	3.00	17.75	50.53	46.89	1483.03	74.15				74.15	15.84	500.98	495.00	123.99	15.61	493.71	660.00	162.92	15.44	488.33	220.00	53.72	15.32	484.54	220.00	53.30	107.02
11+88.62	12+35.50	C.L. RAMP I49SB-I40EB RT.	46.88	1.00	17.75	8.32	13.27	69.12	3.46				3.46	4.63	24.12	495.00	5.97	4.40	22.92	660.00	7.56	4.24	22.09	220.00	2.43	4.11	21.41	220.00	2.36	4.79
12+35.60	22+71.31	C.L. RAMP I49SB-I40EB RT.	1035.71	11.00	17.75	183.84	14.01	1612.26	80.61				80.61	4.88	561.58	495.00	138.99	4.65	535.12	660.00	176.59	4.48	515.55	220.00	56.71	4.36	501.74	220.00	55.19	111.90
33+35.60	38+42.41	C.L. RAMP I49SB-I40EB RT.	506.81	6.00	17.75	89.96	53.11	2990.74	149.54				149.54	17.91	1008.55	495.00	249.62	17.68	995.60	660.00	328.55	17.52	986.59	220.00	108.52	17.39	979.27	220.00	107.72	216.24
45+27.22	46+15.18	C.L. RAMP I49SB-I40EB RT.	87.96	1.00	17.75	15.61	22.62	221.07	11.05				11.05	7.75	75.74	495.00	18.75	7.52	73.50	660.00	24.26	7.35	71.83	220.00	7.90	7.22	70.56	220.00	7.76	15.66
137+77.54	140+66.50	C.L. RAMP I40EB-I49NB LT.	288.96	3.00	17.75	51.29	63.65	2043.59	102.18				102.18	21.42	687.72	495.00	170.21	21.20	680.66	660.00	224.62	21.03	675.20	220.00	74.27	20.90	671.03	220.00	73.81	148.08
138+79.51	139+97.31	C.L. RAMP I40EB-I49NB RT.	117.80	2.00	17.75	20.91	48.37	633.11	31.66				31.66	16.33	213.74	495.00	52.90	16.10	210.73	660.00	69.54	15.94	208.64	220.00	22.95	15.81	206.94	220.00	22.76	45.71
17+33.03	20+61.79	C.L. RAMP I40WB-I49NB	328.76	4.00	17.75	58.35	55.63	2032.10	101.61				101.61	18.75	684.92	495.00	169.52	18.52	676.52	660.00	223.25	18.36	670.67	220.00	73.77	18.23	665.92	220.00	73.25	147.02
21+49.75	26+87.67	C.L. RAMP I40WB-I49NB (EXIST RAMP RT.	537.92	6.00	17.75	95.48	19.89	1188.80	59.44				59.44	6.84	408.82	495.00	101.18	6.61	395.07	660.00	130.37	6.44	384.91	220.00	42.34	6.31	377.14	220.00	41.49	83.83
TOTALS:				**167**		**6533.83**		**93855.78**	**4692.81**		**1179.21**	**117.93**	**4810.74**		**31632.78**		**7829.13**		**31251.06**		**10312.87**		**30971.95**		**3406.91**		**35750.25**		**3932.53**	**7339.44**

BASIS OF ESTIMATE:
ACHM SURFACE COURSE (1/2").....94.7% MIN. AGGR.....5.3% ASPHALT BINDER
ACHM BINDER COURSE (1").....95.8% MIN. AGGR.....4.2% ASPHALT BINDER
ACHM BASE COURSE (1 1/2").....96.1% MIN. AGGR.....3.9% ASPHALT BINDER
MAXIMUM NUMBER OF GYRATIONS = 160 FOR PG 70-22
TACK COAT QUANTITIES WERE CALCULATED USING THE EMULSIFIED ASPHALT RATES. REFER TO SS-400-1 FOR THE RESIDUAL ASPHALT APPLICATION RATES.

7/29/2026 11:42:37 AM
R040904_08_QTY009.dgn

DATE REVISED	DATE REVISED	FED.RD. DIST.NO.	STATE	JOB NO.	SHEET NO.	TOTAL SHEETS
		6	ARK.	040904	211	742
		SUMMARY OF QUANTITIES				

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No. 13640
BYRON O. LAWRENCE
7-29-2026

SUMMARY OF QUANTITIES (BOX 1 OF 3)

	ITEM NUMBER	ITEM		QUANTITY	UNIT
	201	CLEARING		282	STATION
	201	GRUBBING		282	STATION
	202	REMOVAL AND DISPOSAL OF FENCE		27005	LIN. FT.
	202	REMOVAL AND DISPOSAL OF GATES		11	EACH
	202	REMOVAL AND DISPOSAL OF CONCRETE DRIVEWAYS		1834	SQ. YD.
	202	REMOVAL AND DISPOSAL OF FOUNDATIONS		3	SQ. YD.
	202	REMOVAL AND DISPOSAL OF PIPE CULVERTS		26	EACH
	202	REMOVAL AND DISPOSAL OF BOX CULVERTS		4	EACH
	202	REMOVAL AND DISPOSAL OF WIRE ROPE SAFETY FENCE		2114	LIN. FT.
	202	REMOVAL AND DISPOSAL OF GUARDRAIL		510	LIN. FT.
	202	REMOVAL AND DISPOSAL OF OVERHEAD SIGN STRUCTURE		1	EACH
	202	REMOVAL AND DISPOSAL OF BUILDINGS		9	EACH
	202	REMOVAL AND DISPOSAL OF SIGNS		43	EACH
	SP & 207	STONE BACKFILL		16315	TON
	SP, SS, & 210	UNCLASSIFIED EXCAVATION		453817	CU. YD.
	SP	SELECT GRANULAR BACKFILL		7827	CU. YD.
	SP & 210	COMPACTED EMBANKMENT		1820162	CU. YD.
	SP & 210	ROCK FILL		209970	CU. YD.
	SP	REMOVING AND REPLACING TOPSOIL		26932	CU. YD.
	SP & 210	SOIL STABILIZATION		2500	TON
	SP & 215	TRENCHING AND SHOULDER PREPARATION		167	STATION
	SP, SS, & 303	AGGREGATE BASE COURSE (CLASS 7)		53393	TON
	SP, SS, & 308	AGGREGATE IN CEMENT STABILIZED CRUSHED STONE BASE COURSE		13087	TON
	SP, SS, & 308	CEMENT IN CEMENT STABILIZED CRUSHED STONE BASE COURSE		835	TON
	SP, SS, & 308	PROCESSING CEMENT STABILIZED CRUSHED STONE BASE COURSE		39779	SQ. YD.
	SS & 401	TACK COAT		6744	GAL.
	SP, SS, & 405	MINERAL AGGREGATE IN ACHM BASE COURSE (1 1/2")		8689	TON
	SP, SS, & 405	ASPHALT BINDER (PG 70-22) IN ACHM BASE COURSE (1 1/2")		308	TON
	SP, SS, & 405	ASPHALT BINDER (PG 76-22) IN ACHM BASE COURSE (1 1/2")		45	TON
	SP, SS, & 406	MINERAL AGGREGATE IN ACHM BINDER COURSE (1")		12673	TON
	SP, SS, & 406	ASPHALT BINDER (PG 70-22) IN ACHM BINDER COURSE (1")		514	TON
	SP, SS, & 406	ASPHALT BINDER (PG 76-22) IN ACHM BINDER COURSE (1")		42	TON
	SP, SS, & 407	MINERAL AGGREGATE IN ACHM SURFACE COURSE (1/2")		13246	TON
	SP, SS, & 407	ASPHALT BINDER (PG 70-22) IN ACHM SURFACE COURSE (1/2")		552	TON
	SP, SS, & 407	ASPHALT BINDER (PG 76-22) IN ACHM SURFACE COURSE (1/2")		190	TON
	SP & 412	COLD MILLING ASPHALT PAVEMENT		817	SQ. YD.
	SP, SS, & 415	ACHM PATCHING OF EXISTING ROADWAY		50	TON
	SP, SS, & 501	PORTLAND CEMENT CONCRETE PAVEMENT (9" UNIFORM THICKNESS)		35156	SQ. YD.
	SP, SS, & 504	APPROACH SLABS		775.70	CU. YD.
	SP, SS, & 504	APPROACH GUTTERS		88.60	CU. YD.
	SP, SS, & 505	PORTLAND CEMENT CONCRETE DRIVEWAY		303	SQ. YD.
	506	PORTLAND CEMENT CONCRETE CORRUGATIONS		163	SQ. YD.
	601	MOBILIZATION		1.00	LUMP SUM
	602	FURNISHING FIELD LABORATORY		1	EACH
	SP & 602	FURNISHING FIELD OFFICE		1	EACH
	SP, SS, & 603	MAINTENANCE OF TRAFFIC		1.00	LUMP SUM
	603	24" TEMPORARY CULVERT		861	LIN. FT.
	603	48" TEMPORARY CULVERT		296	LIN. FT.
	SS & 604	SIGNS		1593	SQ. FT.
	SP, SS, & 604	SIGNS LEFT IN PLACE		20	SQ. FT.
	SP, SS, & 604	CONSTRUCTION PROJECT INFORMATION SIGN UPDATE		3	EACH
	SS & 604	BARRICADES		64	LIN. FT.
	SP, SS, & 604	BARRICADES LEFT IN PLACE		48	LIN. FT.
	SS & 604	TRAFFIC DRUMS		217	EACH
	SS & 604	FURNISHING AND INSTALLING PRECAST CONCRETE BARRIER		14257	LIN. FT.
	SP, SS, & 604	FURNISHING, INSTALLING AND LEAVING IN PLACE PRECAST CONCRETE BARRIER		640	LIN. FT.
	SS & 604	RELOCATING PRECAST CONCRETE BARRIER		22587	LIN. FT.
	604	CONSTRUCTION PAVEMENT MARKINGS		56147	LIN. FT.
	604	REMOVABLE CONSTRUCTION PAVEMENT MARKINGS		121392	LIN. FT.
	604	REMOVAL OF PERMANENT PAVEMENT MARKINGS		3222	LIN. FT.
	SP, SS, & 604	PORTABLE CHANGEABLE MESSAGE SIGN		156	WEEK
	SP	PORTABLE CONSTRUCTION LIGHTING		90	DAYS
	SP	AWIS MOBILIZATION		1.00	LUMP SUM
	SP	AWIS OPERATION		36	MONTH
	SP	DEVICE RELOCATION		60	EACH
	SP	FURNISH AND INSTALL CLOSED CIRCUIT TELEVISION SYSTEM		3	EACH
	SP	FURNISH AND INSTALL VARIABLE MESSAGE SIGN		3	EACH
	SP	FURNISH AND INSTALL VEHICLE DETECTION SYSTEM		12	EACH
	SP	MOBILE SPEED NOTIFICATION SYSTEM (SPECIAL)		1	EACH
	SP, SS, & 605	CONCRETE DITCH PAVING (TYPE B)		5747	SQ. YD.
	SS & 606	18" REINFORCED CONCRETE PIPE CULVERTS (CLASS III)		134	LIN. FT.
	SS & 606	24" REINFORCED CONCRETE PIPE CULVERTS (CLASS III)		1714	LIN. FT.
*	SS & 606	24" REINFORCED CONCRETE PIPE CULVERTS (CLASS III)	(ALTERNATE NO. 1)	124	LIN. FT.
*	SS & 606	24" ASPHALT COATED CORRUGATED STEEL PIPE CULVERTS (16 GAUGE)	(ALTERNATE NO. 2)	130	LIN. FT.
*	SS & 606	24" ALUMINUM COATED CORRUGATED STEEL PIPE CULVERTS (16 GAUGE)	(ALTERNATE NO. 3)	130	LIN. FT.
*	SS & 606	24" POLYMER PRECOATED METALLIC COATED CORRUGATED STEEL PIPE CULVERTS (16 GAUGE)	(ALTERNATE NO. 4)	130	LIN. FT.
*	SP, SS, & 606	24" HIGH DENSITY POLYETHYLENE PIPE	(ALTERNATE NO. 5)	130	LIN. FT.
*	SP, SS, & 606	24" PVC PIPE	(ALTERNATE NO. 6)	130	LIN. FT.
	SS & 606	30" REINFORCED CONCRETE PIPE CULVERTS (CLASS III)		928	LIN. FT.
	SS & 606	36" REINFORCED CONCRETE PIPE CULVERTS (CLASS III)		198	LIN. FT.
*	SS & 606	36" REINFORCED CONCRETE PIPE CULVERTS (CLASS III)	(ALTERNATE NO. 1)	166	LIN. FT.
*	SS & 606	36" ASPHALT COATED CORRUGATED STEEL PIPE CULVERTS (14 GAUGE)	(ALTERNATE NO. 2)	172	LIN. FT.
*	SS & 606	36" ALUMINUM COATED CORRUGATED STEEL PIPE CULVERTS (14 GAUGE)	(ALTERNATE NO. 3)	172	LIN. FT.
*	SS & 606	36" POLYMER PRECOATED METALLIC COATED CORRUGATED STEEL PIPE CULVERT (14 GAUGE)	(ALTERNATE NO. 4)	172	LIN. FT.
*	SP, SS, & 606	36" HIGH DENSITY POLYETHYLENE PIPE	(ALTERNATE NO. 5)	172	LIN. FT.
*	SP, SS, & 606	36" PVC PIPE	(ALTERNATE NO. 6)	172	LIN. FT.
	SS & 606	24" FLARED END SECTIONS FOR REINFORCED CONCRETE PIPE CULVERTS		24	EACH
	SS & 606	30" FLARED END SECTIONS FOR REINFORCED CONCRETE PIPE CULVERTS		12	EACH
	SS & 606	36" FLARED END SECTIONS FOR REINFORCED CONCRETE PIPE CULVERTS		2	EACH
	SP	CULVERT CLEAN OUT		7	EACH
	SS & 606	12" SIDE DRAIN		524	LIN. FT.
	SP, SS, & 606	18" SIDE DRAIN		284	LIN. FT.
	SP, SS, & 606	24" SIDE DRAIN		560	LIN. FT.

* DENOTES ALTERNATE BID ITEMS.

7/29/2026 11:31:53 AM
R040904_10_QTY1.dgn

SUMMARY OF QUANTITIES

DATE REVISED	DATE REVISED	FED.RD. DIST.NO.	STATE	JOB NO.	SHEET NO.	TOTAL SHEETS
		6	ARK.	040904	212	742
		SUMMARY OF QUANTITIES				

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No. 13640
AARON O. LAWRENCE
7-27-2026

SUMMARY OF QUANTITIES (BOX 2 OF 3)

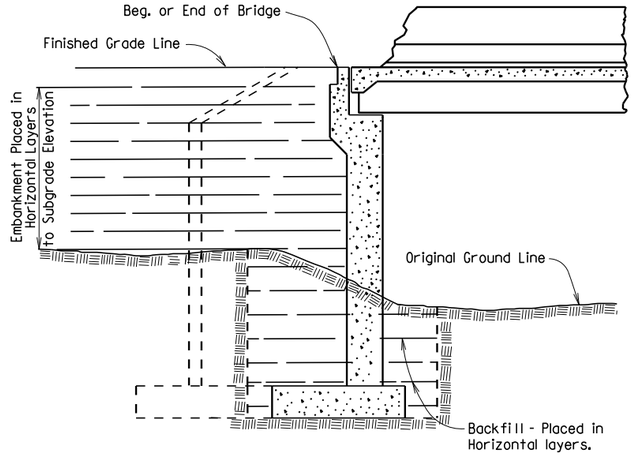
ITEM NUMBER	ITEM	QUANTITY	UNIT
SS & 606	SELECTED PIPE BEDDING	5209	CU. YD.
SS & 609	DROP INLETS (TYPE N2)	5	EACH
SS & 609	DROP INLETS (TYPE N3)	8	EACH
SS & 609	DROP INLETS (TYPE RM)	14	EACH
SS & 609	DROP INLETS (TYPE ST)	2	EACH
SS & 609	DROP INLETS (TYPE TM)	15	EACH
SS & 611	4" PIPE UNDERDRAINS	24386	LIN. FT.
SS & 611	UNDERDRAIN OUTLET PROTECTORS	112	EACH
SP, SS, & 611	UNDERDRAIN VIDEO INSPECTION	4942	LIN. FT.
SP	FLUSHING UNDERDRAIN	4942	LIN. FT.
614	CONCRETE SPILLWAY (TYPE A)	13	EACH
SS & 617	GUARDRAIL (TYPE A)	11042	LIN. FT.
SS & 617	GUARDRAIL TERMINAL (TYPE 2)	17	EACH
SS & 617	TERMINAL ANCHOR POSTS (TYPE 1)	7	EACH
SS & 617	THRIE BEAM GUARDRAIL TERMINAL	14	EACH
SP	WIRE ROPE SAFETY FENCE	1512	LIN. FT.
SP	WIRE ROPE SAFETY FENCE MAINTENANCE MATERIALS	1.00	LUMP SUM
SP	WIRE ROPE SAFETY FENCE (POST REPAIR)	50	EACH
SS & 619	WIRE FENCE (TYPE A)	49590	LIN. FT.
* SS & 619	16' STEEL GATES (ALTERNATE NO. 1)	24	EACH
* SS & 619	16' ALUMINUM GATES (ALTERNATE NO. 2)	24	EACH
620	LIME	598	TON
620	SEEDING	298.83	ACRE
SS & 620	MULCH COVER	1223.29	ACRE
620	WATER	49382.6	M. GAL.
621	TEMPORARY SEEDING	924.46	ACRE
621	SILT FENCE	56990	LIN. FT.
621	SAND BAG DITCH CHECKS	6886	BAG
621	DIVERSION DITCH	7232	LIN. FT.
621	SEDIMENT BASIN	5533	CU. YD.
621	OBLITERATION OF SEDIMENT BASIN	5533	CU. YD.
621	SEDIMENT REMOVAL AND DISPOSAL	8224	CU. YD.
621	PIPE FOR SLOPE DRAINS	1615	LIN. FT.
621	ROCK DITCH CHECKS	801	CU. YD.
SS & 621	FILTER SOCK (12")	1450	LIN. FT.
621	WATTLE (20")	25977	LIN. FT.
621	TRIANGULAR SILT DIKE	3230	LIN. FT.
623	SECOND SEEDING APPLICATION	298.83	ACRE
624	SOLID SODDING	3397	SQ. YD.
625	GEOTEXTILE FABRIC (TYPE 8)	75948	SQ. YD.
625	GEOTEXTILE FABRIC (TYPE 10)	101554	SQ. YD.
SP & 625	GEOTEXTILE FABRIC (TYPE SPECIAL)	39779	SQ. YD.
SS & 631	CONCRETE BARRIER WALL (MEDIAN TYPE SPECIAL)	101	LIN. FT.
SP, SS, & 631	CONCRETE BARRIER WALL (SIDE TYPE A)	3007	LIN. FT.
SP, SS, & 631	CONCRETE BARRIER WALL (SIDE TYPE E)	51	LIN. FT.
SP & 635	ROADWAY CONSTRUCTION CONTROL	1.00	LUMP SUM
637	MAILBOXES	10	EACH
SS & 637	MAILBOX SUPPORTS (SINGLE)	10	EACH
642	RUMBLE STRIPS IN ASPHALT SHOULDERS	8003	LIN. FT.
642	RUMBLE STRIPS IN PORTLAND CEMENT CONCRETE SHOULDERS	484	LIN. FT.
SP	ELECTRICAL CONDUCTORS-IN-CONDUIT (ROADWAY LIGHTING) (2C/3 A.W.G., E.G.C.)	3621	LIN. FT.
SP	ELECTRICAL CONDUCTORS-IN-CONDUIT (ROADWAY LIGHTING) (2C/4 A.W.G., E.G.C.)	3022	LIN. FT.
SP	ELECTRICAL CONDUCTORS-IN-CONDUIT (ROADWAY LIGHTING) (2C/8 A.W.G., E.G.C.)	4370	LIN. FT.
SP	ELECTRICAL CONDUCTORS FOR LUMINAIRES (ROADWAY LIGHTING)	504	LIN. FT.
SP & 709	GALVANIZED STEEL CONDUIT (4")	2706	LIN. FT.
710	NON-METALLIC CONDUIT (1.5")	4935	LIN. FT.
710	NON-METALLIC CONDUIT (2")	6862	LIN. FT.
SP & 710	NON-METALLIC CONDUIT (4")	224	LIN. FT.
SP, SS, & 711	CONCRETE PULL BOX (TYPE 2 HD)	63	EACH
SP, SS, & 711	FIBER OPTIC CONCRETE PULL BOX (TYPE 5 HD)	4	EACH
SP	ITS FIBER OPTIC JUNCTION BOX, METALLIC (32"X18"X18")	10	EACH
SP	HIGH MAST ILLUMINATION ASSEMBLY (150'-6 LUMINAIRE)	1	EACH
SP	HIGH MAST ILLUMINATION ASSEMBLY (120'-6 LUMINAIRE)	3	EACH
SP	HIGH MAST ILLUMINATION ASSEMBLY (120'-6 LUMINAIRE-PAD)	1	EACH
SP	HIGH MAST ILLUMINATION ASSEMBLY (120'-6 LUMINAIRE-PED)	4	EACH
SP	HIGH MAST ILLUMINATION ASSEMBLY (100'-6 LUMINAIRE)	1	EACH
SP	HIGH MAST LUMINAIRE ELEVATED SERVICE PLATFORM	4	EACH
SP	METAL GRATING FOR PLATFORM	886.2	SQ. FT.
SP	LED ROADWAY ILLUMINATION POLE (15,400 LUMEN, COBRA HEAD, BREAKAWAY BASE, 30')	6	EACH
SP	PEDESTAL TYPE SERVICE POINT ASSEMBLY (100 AMP)	5	EACH
718	REFLECTORIZED PAINT PAVEMENT MARKING YELLOW (6")	4278	LIN. FT.
SP	ENHANCED THERMOPLASTIC PAVEMENT MARKING WHITE (6")	18996	LIN. FT.
SP	ENHANCED THERMOPLASTIC PAVEMENT MARKING WHITE (12")	3066	LIN. FT.
SP	ENHANCED THERMOPLASTIC PAVEMENT MARKING YELLOW (6")	16547	LIN. FT.
721	RAISED PAVEMENT MARKERS (TYPE II)	619	EACH
SP	STEEL OVERHEAD SIGN STRUCTURE (OH-049-RAMP-100)	1	EACH
SP	STEEL OVERHEAD SIGN STRUCTURE (OH-049-101)	1	EACH
SP	STEEL CANTILEVER SIGN STRUCTURE (OC-049-102)	1	EACH
SP	STEEL OVERHEAD SIGN STRUCTURE (OH-049-103)	1	EACH
SP	STEEL CANTILEVER SIGN STRUCTURE (OC-049-104)	1	EACH
SP	STEEL OVERHEAD SIGN STRUCTURE (OH-049-RAMP-106)	1	EACH
SS & 725	GUIDE SIGN-OVERHEAD MOUNTED (DEMOUNTABLE LEGEND)	142	SQ. FT.
SS & 726	STANDARD SIGN	583	SQ. FT.
SS & 727	EXIT NUMBER PANEL (TYPE A)	20	SQ. FT.
SS & 729	CHANNEL POST SIGN SUPPORT (TYPE U-1)	6	EACH
SS & 730	BREAKAWAY SIGN SUPPORT (TYPE G-2)	3149	POUND
SP	OMNI-DIRECTIONAL BREAKAWAY SIGN SUPPORTS (TYPE G-1)	15	EACH
SP	OMNI-DIRECTIONAL BREAKAWAY SIGN SUPPORTS (TYPE G-2)	6	EACH
SP	OMNI-DIRECTIONAL BREAKAWAY SIGN SUPPORTS (TYPE G2-1)	9	EACH
SP	OMNI-DIRECTIONAL BREAKAWAY SIGN SUPPORTS (TYPE G2-2)	2	EACH

* DENOTES ALTERNATE BID ITEMS.

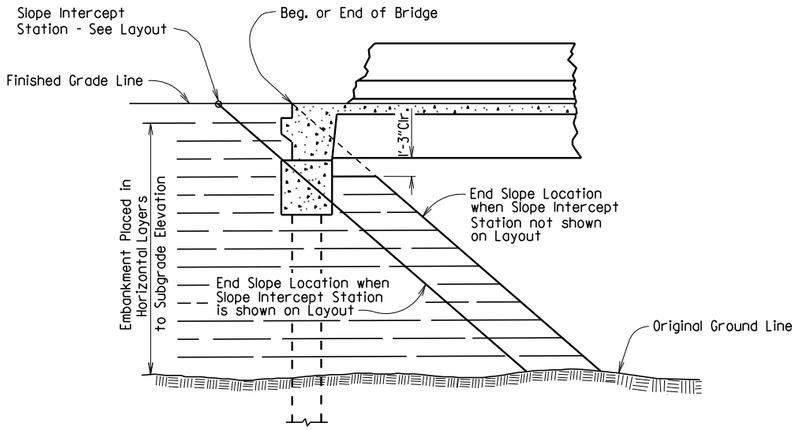
7/23/2026 9:28:41 AM
R040904_10_QTY2.dgn

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.				

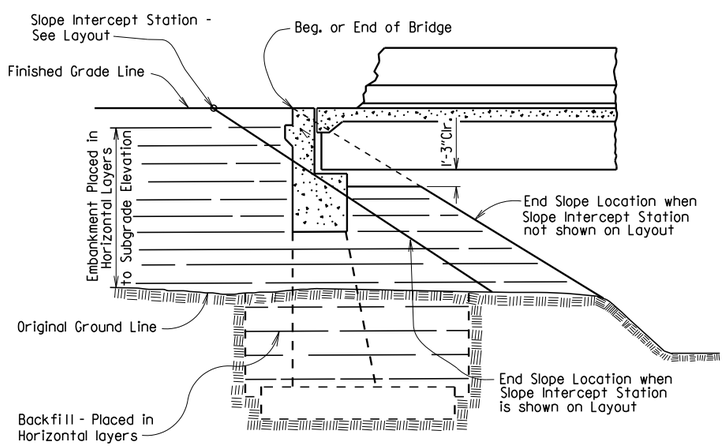
1 EMBANKMENT & BACKFILL 55000



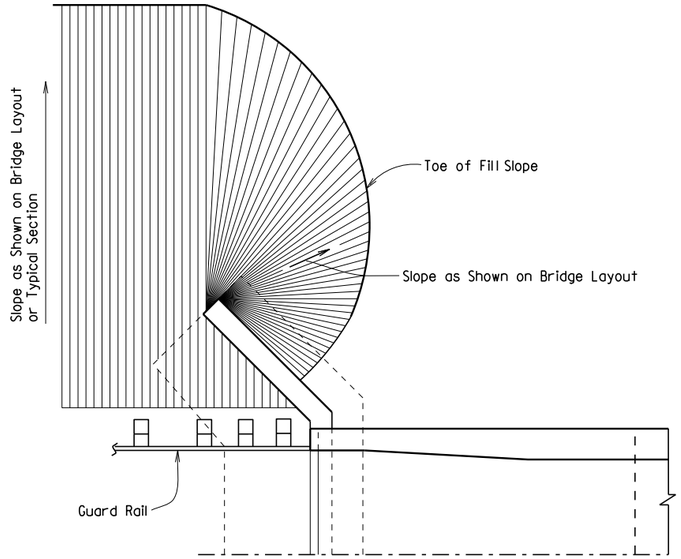
EMBANKMENT CONSTRUCTION AND FOOTING BACKFILL AT VERTICAL WALL ABUTMENTS



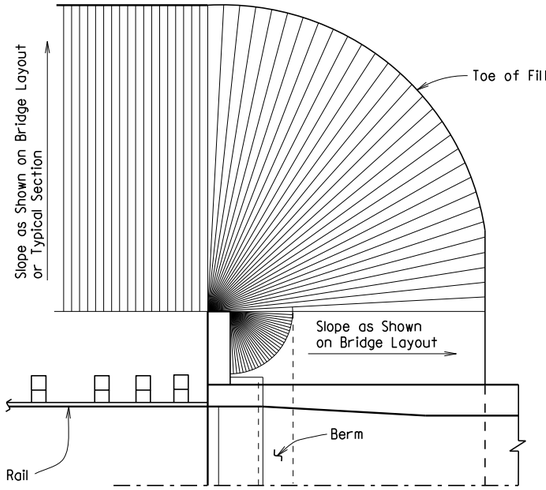
EMBANKMENT CONSTRUCTION AT SPILL-THROUGH PILE END BENTS



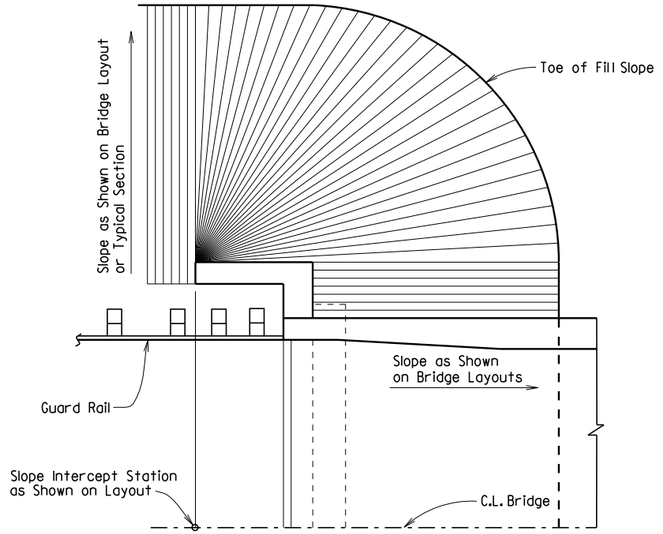
EMBANKMENT CONSTRUCTION AND FOOTING BACKFILL AT SPILL-THROUGH END BENTS



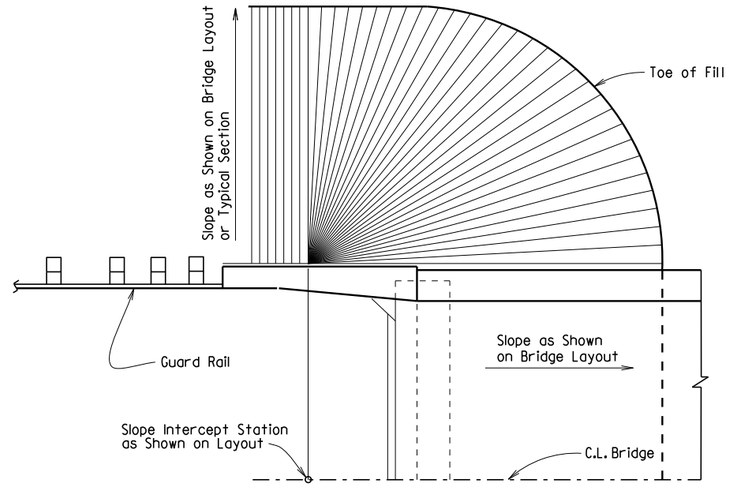
VERTICAL WALL ABUTMENTS



SPILL-THROUGH END BENTS WITH STUB WING



SPILL-THROUGH END BENTS WITH TURNBACK WING



SPILL-THROUGH END BENTS WITH TRANSITION WING

METHOD OF DETERMINING FILL SLOPE LOCATION AT BRIDGE ENDS

GENERAL NOTES

The Bridge End Embankment shall be defined as a section of embankment, not less than 20 feet long adjacent to the bridge end, together with the side slopes and slopes under the bridge end including around the end of wingwalls. Embankment adjacent to structures shall be constructed in 6 inch horizontal layers (loose measure) and compacted by the use of mechanical equipment to the satisfaction of the Engineer. Refer to Subsections 210.09, 210.10 and 801.08 for construction requirements.

STANDARD DETAILS FOR EMBANKMENT CONSTRUCTION AND BACKFILL AT BRIDGE ENDS

ARKANSAS STATE HIGHWAY COMMISSION

LITTLE ROCK, ARK.

DRAWN BY: KDH DATE: 2-27-2014 FILENAME: b55000.dgn

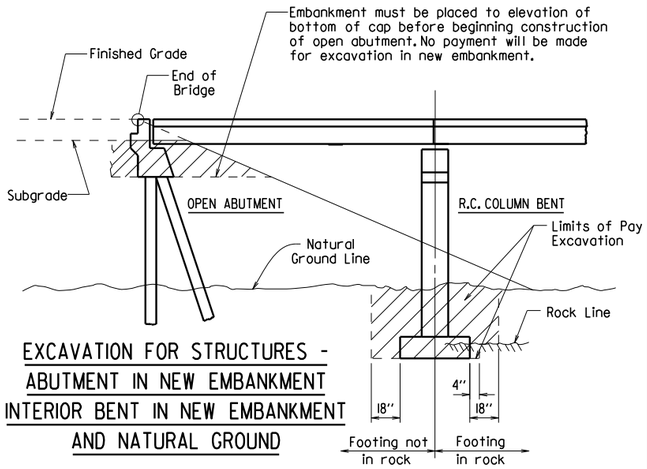
CHECKED BY: BEF DATE: 2-27-2014 SCALE: NO SCALE

DESIGNED BY: STD. DATE: -

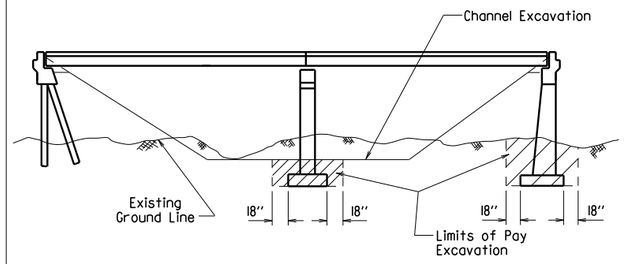
DRAWING NO. 55000

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.				

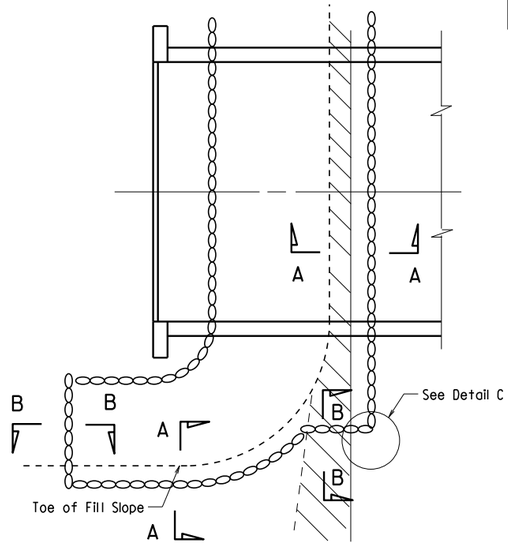
1 RIPRAP & EXCAV. 55001



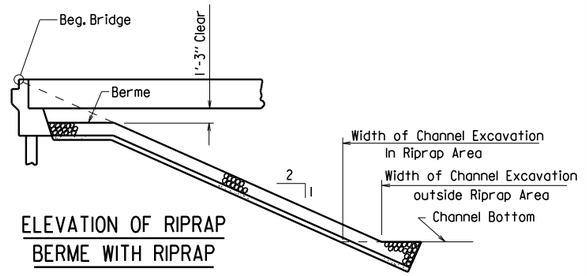
EXCAVATION FOR STRUCTURES - ABUTMENT IN NEW EMBANKMENT INTERIOR BENT IN NEW EMBANKMENT AND NATURAL GROUND



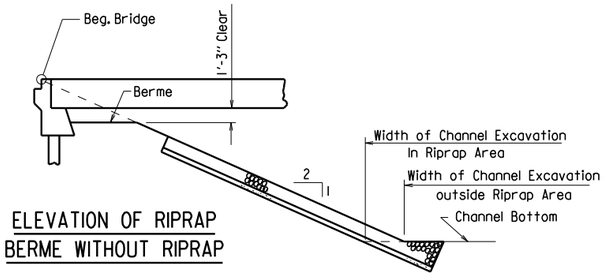
EXCAVATION FOR STRUCTURES - BRIDGE LOCATION WITH DESIGNATED CHANNEL CHANGE



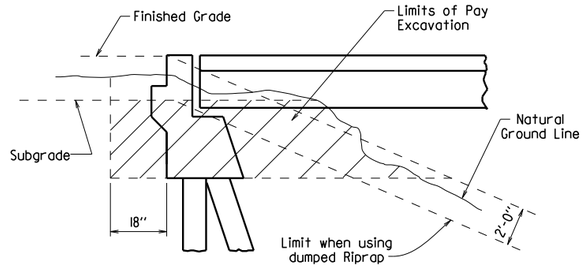
PLAN OF DUMPED RIPRAP



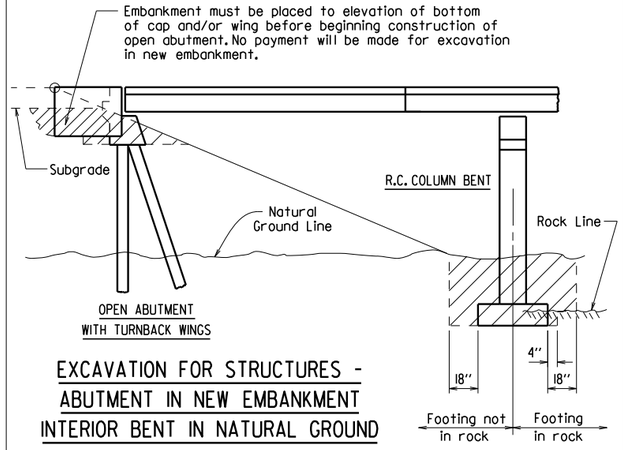
ELEVATION OF RIPRAP BERME WITH RIPRAP



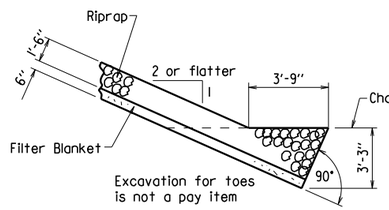
ELEVATION OF RIPRAP BERME WITHOUT RIPRAP



EXCAVATION FOR STRUCTURES - ABUTMENT IN NATURAL GROUND

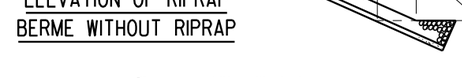


EXCAVATION FOR STRUCTURES - ABUTMENT IN NEW EMBANKMENT INTERIOR BENT IN NATURAL GROUND

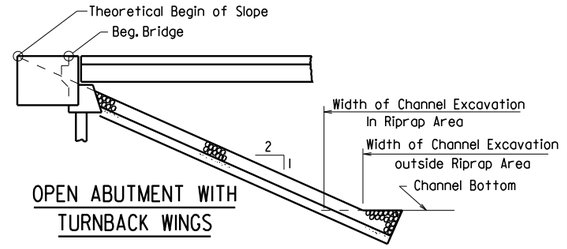


SECTION A-A

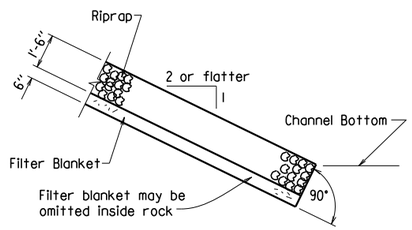
(Toe Excavation in Soil)



SECTION B-B



OPEN ABUTMENT WITH TURNBACK WINGS



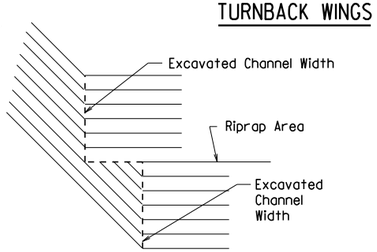
SECTION A-A

(Toe Excavation in Rock)

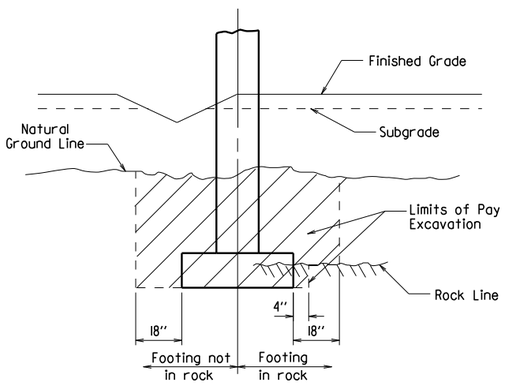
Note : Use this type of toe when rock is encountered which is in a stable condition.

Note : In lieu of an aggregate filter blanket, a synthetic fiber geotextile fabric complying with the requirements of Subsection 816.02(e) may be used.

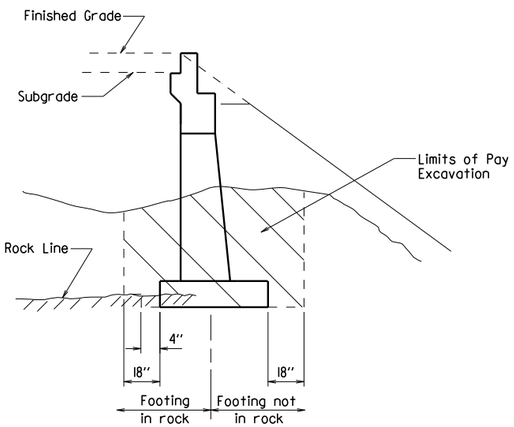
Note : Details for computing excavation for structures are included for information as to how plan quantities were calculated and for use when adjusting quantities when changing footing elevation.



DETAIL C



EXCAVATION FOR STRUCTURES - BENT IN ROADWAY FILL SECTION AND NATURAL GROUND



EXCAVATION FOR STRUCTURES - ABUTMENT IN NATURAL GROUND AND NEW EMBANKMENT

STANDARD DETAILS FOR DUMPED RIPRAP AND FILTER BLANKET AND COMPUTING EXCAVATION FOR STRUCTURES

ARKANSAS STATE HIGHWAY COMMISSION

LITTLE ROCK, ARK.

DRAWN BY: KDH DATE: 2-27-2014 FILENAME: b5500l.dgn

CHECKED BY: BEF DATE: 2-27-2014 SCALE: NO SCALE

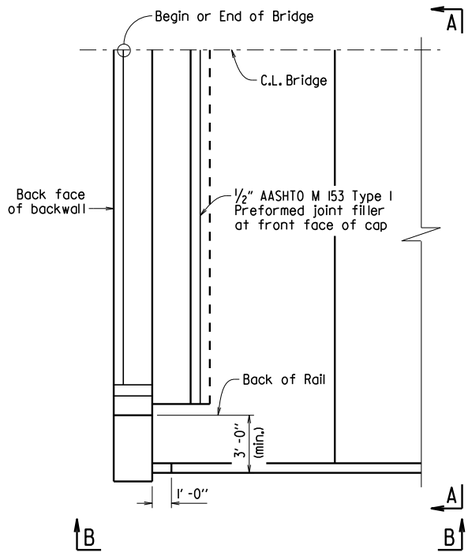
DESIGNED BY: STD. DATE:

DRAWING NO. 55001

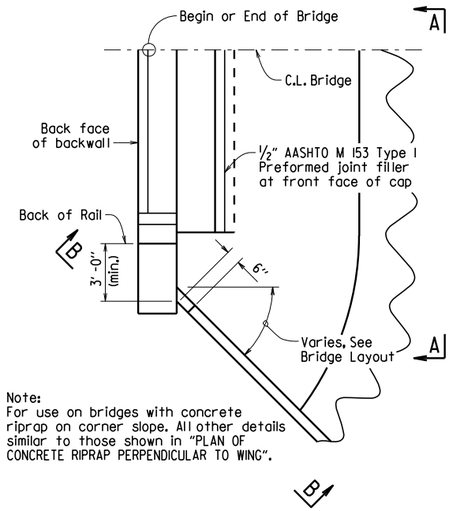
DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.				

① CONCRETE RIPRAP 55002

Note:
Sloped surfaces of concrete riprap to be marked off into blocks (construction joints optional) with an approved grooving tool, spacing the grooved lines about 5' apart.



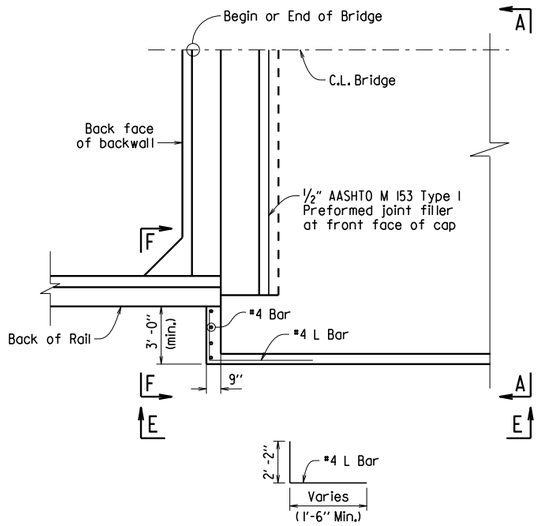
PLAN OF CONCRETE RIPRAP
PERPENDICULAR TO WING
¼" = 1'-0"



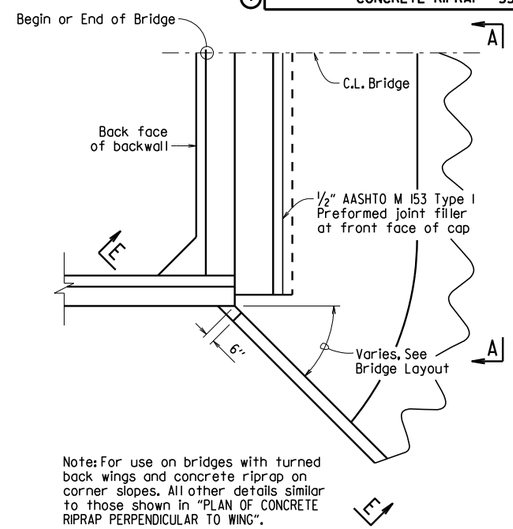
Note:
For use on bridges with concrete riprap on corner slope. All other details similar to those shown in "PLAN OF CONCRETE RIPRAP PERPENDICULAR TO WING".

PLAN OF CONCRETE RIPRAP
AT ANGLE TO WING
¼" = 1'-0"

Note:
For use on bridges with turned back wings. All other details similar to those shown in "PLAN OF CONCRETE RIPRAP PERPENDICULAR TO WING".



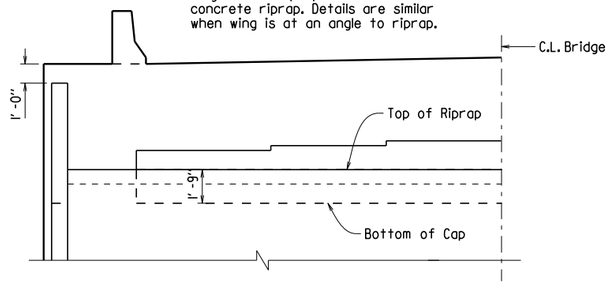
PLAN OF CONCRETE RIPRAP
PERPENDICULAR TO TURNED BACK WING
¼" = 1'-0"



Note: For use on bridges with turned back wings and concrete riprap on corner slopes. All other details similar to those shown in "PLAN OF CONCRETE RIPRAP PERPENDICULAR TO WING".

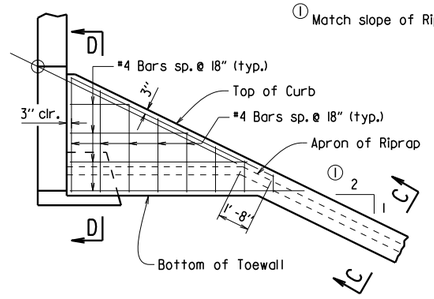
PLAN OF CONCRETE RIPRAP
AT ANGLE FROM TURNED BACK WING
¼" = 1'-0"

Note:
Wing is shown perpendicular to concrete riprap. Details are similar when wing is at an angle to riprap.

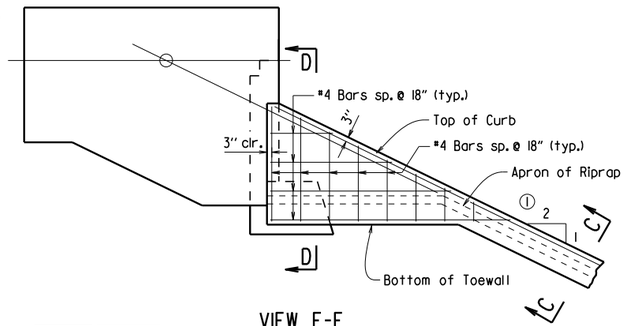


VIEW A-A
¼" = 1'-0"

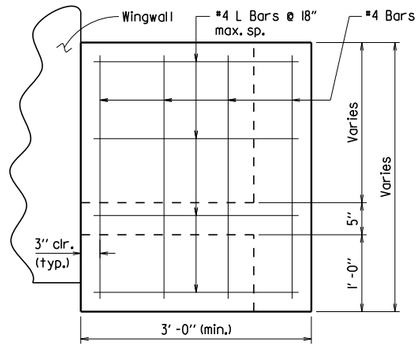
① Match slope of Riprap Apron.



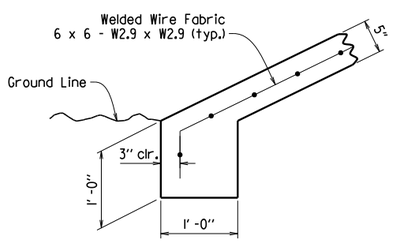
VIEW B-B
¼" = 1'-0"



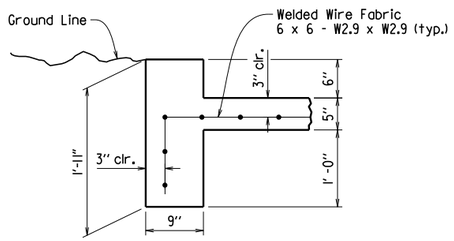
VIEW E-E
¼" = 1'-0"



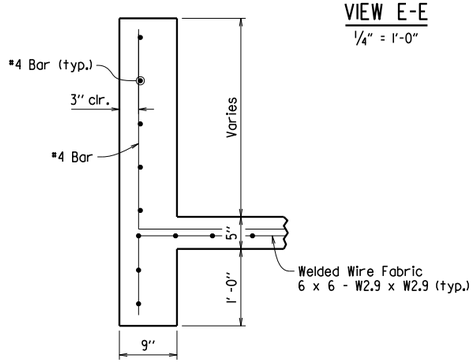
VIEW F-F
1" = 1'-0"



TOE OF CONCRETE RIPRAP
1" = 1'-0"



SECTION C-C
1" = 1'-0"



SECTION D-D
1" = 1'-0"

GENERAL NOTES

All concrete shall be Class A with a minimum compressive strength, f'c = 2,100 psi.

Welded wire fabric shall conform to AASHTO M55 or M221.

STANDARD DETAILS FOR CONCRETE RIPRAP

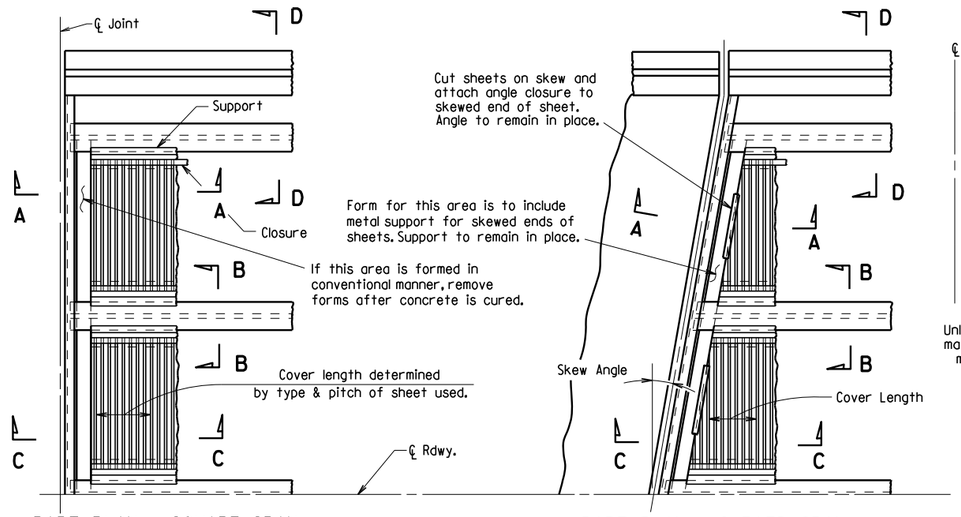
ARKANSAS STATE HIGHWAY COMMISSION

LITTLE ROCK, ARK.

DRAWN BY: ACP DATE: 2/27/2014 FILENAME: b55002.dgn
CHECKED BY: BEF DATE: 2/27/2014 SCALE: AS SHOWN
DESIGNED BY: Std. DATE: ---

DRAWING NO. 55002

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
3/24/16				6	ARK.			
				JOB NO.				
				①	BRIDGE DECK FORMS		55005	

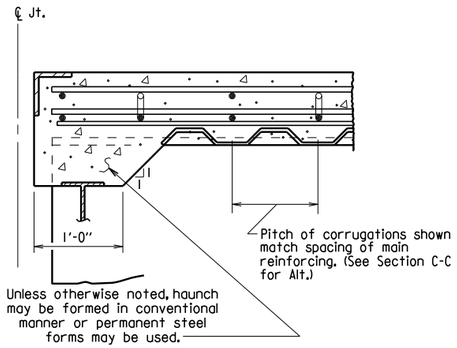


PART PLAN - SQUARE SPAN

3/8" = 1'-0"

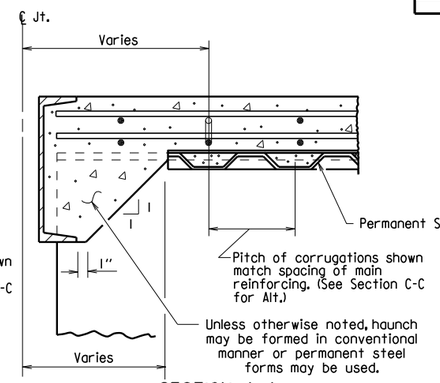
PART PLAN - SKEWED SPAN

3/8" = 1'-0"



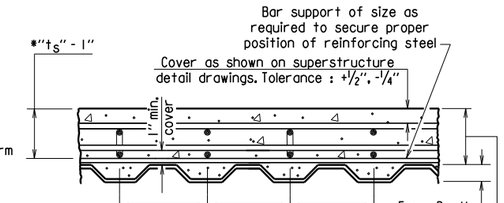
SECTION A-A

N.T.S.
(Angle at end of span)



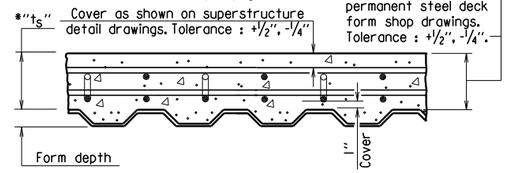
SECTION A-A

N.T.S.
(Channel at end of span)



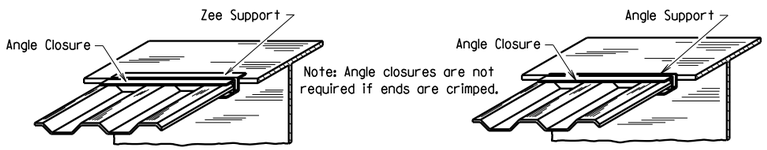
SECTION C-C

1" = 1'-0"



SECTION C-C - ALTERNATE

1" = 1'-0"
(Applicable when corrugations do not match spacing of main reinforcement)



SKETCH OF PERMISSIBLE SUPPORTS

N.T.S.

*t_s = slab thickness as shown on superstructure detail drawings.

GENERAL NOTES

Permanent steel deck forms may be used at the Contractor's option and shall be at no additional cost to the Department. Such use may result in changes to the dead load deflection of the girder. Any cost for adjustments due to a change in the dead load deflection will be borne by the Contractor. Payment for deck concrete and structural steel will not be increased due to use of permanent steel deck forms.

Permanent steel deck forms shall conform to Subsection 802.14(b). Detailed plans, including detailed calculations and manufacturer's technical brochure, shall be submitted to and approved by the Engineer before work of forming the bridge deck is started.

Welding of form supports to the tension flange of steel girders will be permitted only in areas where shear connectors are used. When welding is not allowed, the method of fastening Z or ∠ supports to the flange must be approved by the Engineer.

Form sheets shall be fastened to supporting members and to each other with galvanized metal screws sufficient in size and number to provide a secure attachment. Alternate methods of attachment must be approved by the Engineer.

When the pitch of form corrugations match the reinforcing spacing, transversely align form sheets across the bridge to maintain the correct orientation of continuous reinforcing bars in the corrugations.

Bar support rods, when used, shall be sized and spaced to adequately support the bottom reinforcing mat at the required position.

High chairs shall be sized to support the top mat of reinforcing at the proper position. High chairs shall be placed at locations shown on the detail drawings.

Specifications: Arkansas State Highway and Transportation Department Standard Specifications for Highway Construction (2014 Edition), with applicable Supplemental Specifications and Special Provisions.

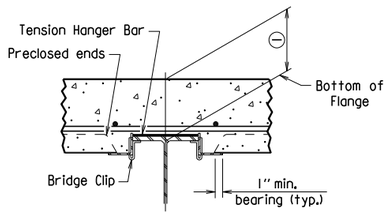
SECTION B-B

1" = 1'-0"
(Showing permissible support for tension flange where shear connectors are used, and for all compression flanges)

③ ⚠ Minimum weld: 1/8" x 1" @ 18". More weld may be required; maximum length per weld = 1 1/2" (typ.)

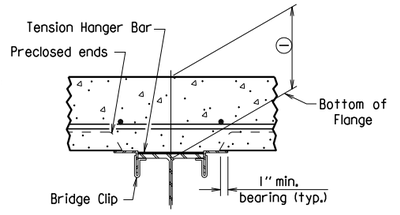
SECTION B-B

1" = 1'-0"
(Showing permissible support for tension flange where shear connectors are used and for all compression flanges)



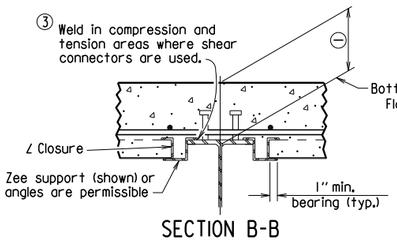
SECTION B-B

1" = 1'-0"
(Showing permissible support for tension flange where shear connectors are not used)



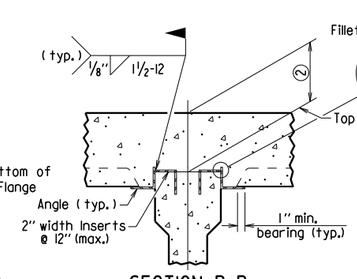
SECTION B-B

1" = 1'-0"
(Showing permissible support for tension flange where shear connectors are not used)



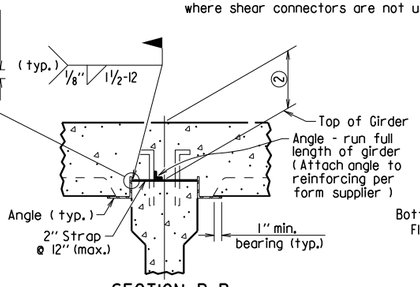
SECTION B-B

1" = 1'-0"
(Showing ∠ Closure)



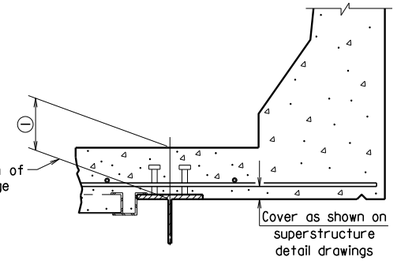
SECTION B-B (FOR CONCRETE GIRDERS)

1" = 1'-0"
(Showing support by Insert cast in girder)



SECTION B-B (FOR CONCRETE GIRDERS)

1" = 1'-0"
(Showing support by Strap)



SECTION D-D

1" = 1'-0"
Note: Only Bottom Reinforcing is shown.

① Distance from top of slab to bottom of top flange as measured at centerline girder and as shown on superstructure detail drawings. This dimension may vary within the following limits to maintain the grade and slab thickness tolerances : Minimum - occurs when either the top flange or the support angle leg contacts the bottom reinforcing steel; Maximum = t_S + 1 3/4" + flange thickness. See Section C-C for slab thickness tolerance between adjacent girder flanges.

② Distance from top of slab to top of girder as measured at centerline girder and as shown on superstructure detail drawings. This dimension may vary within the following limits to maintain the grade and slab thickness tolerances : Minimum - occurs when either the top of girder or the support angle leg contacts the bottom reinforcing steel; Maximum - value shown on the superstructure detail drawings when removable forms are used. See Section C-C for slab thickness tolerance between adjacent girder flanges.

⚠ Revised weld dimension by KWY, Ck'd. by BEF, 3/24/16.

STANDARD DETAILS FOR PERMANENT STEEL BRIDGE DECK FORMS FOR STEEL & CONCRETE GIRDER SPANS

ARKANSAS STATE HIGHWAY COMMISSION

LITTLE ROCK, ARK.

DRAWN BY:	KDH	DATE:	2-27-2014	FILENAME:	b55005.dgn
CHECKED BY:	BEF	DATE:	2-27-2014	SCALE:	NONE
DESIGNED BY:	STD.	DATE:	—		

DRAWING NO. 55005

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.				
				①		GENERAL NOTES		55006

GENERAL NOTES

These GENERAL NOTES are applicable unless otherwise shown in the Plan Details, Special Provisions, or Supplemental Specifications.

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 Specifications.

DESIGN SPECIFICATIONS: See Bridge Layout(s).

SUPERSTRUCTURE NOTES:

MATERIALS AND STRENGTHS:

Class S(AE) Concrete	f'c =	4,000 psi
Reinforcing Steel (Gr. 60, AASHTO M 31 or M 322, Type A)	fy =	60,000 psi
Structural Steel (AASHTO M 270, Gr. 36)	Fy =	36,000 psi
Structural Steel (AASHTO M 270, Gr. 50)	Fy =	50,000 psi
Structural Steel (AASHTO M 270, Gr. 50W)	Fy =	50,000 psi
Structural Steel (AASHTO M 270, Gr. HPS70W)	Fy =	70,000 psi

See Plan Details for Grade(s) of Structural Steel required.

CONCRETE:

All concrete shall be Class S(AE) with a minimum 28 day compressive strength f'c = 4,000 psi. Concrete shall be poured in the dry and all exposed corners shall be chamfered ¾" unless otherwise noted.

The superstructure details shown are for use when removable deck forming is used and are the basis for measurement of Class S(AE) Concrete. See Standard Drawing No. 55005 for allowable modifications and for tolerances when Permanent Steel Bridge Deck Forms are used.

Use of a longitudinal screed is not permitted on any span of a bridge deck with horizontal curvature.

The concrete deck (roadway surface) shall be given a tine finish in accordance with Subsection 802.19 for Class 5 Tined Bridge Roadway Surface Finish. Sidewalks shall receive a broomed finish as specified for final finishing in Subsection 802.19 for Class 6 Broomed Finish. Movement of the finishing machine across new concrete shall be on planks placed on the surface and shall be prohibited for 72 hours after finishing the pour. Sufficient concrete must be placed ahead of the strike-off to fully load the beam or girder. When permitted, the use of a longitudinal strike-off will require that a vertical camber adjustment be made in the strike-off to account for the future dead load deflection due to any railings, median barrier, and sidewalks.

REINFORCING STEEL:

All reinforcing steel shall be Grade 60 conforming to AASHTO M 31 or M 322, Type A, with mill test reports and shall be epoxy coated. The reinforcing steel is to be accurately located in the forms and firmly held in place by steel wire supports, sufficient in number and size to prevent displacement during the course of construction. The wire supports will not be paid for directly, but will be considered subsidiary to the item "Epoxy Coated Reinforcing Steel (Grade 60)".

STRUCTURAL STEEL (COMMON TO W-BEAMS AND PLATE GIRDERS):

Structural steel shall be AASHTO M 270 with grade and payment as specified in the plans. Grade 50W steel shall not be painted and all exposed surfaces shall be cleaned in accordance with Subsection 807.84(e). Grade 36 and Grade 50 steel shall be painted unless otherwise noted and all exposed surfaces shall be cleaned in accordance with Subsection 807.84. Structural steel completely embedded in concrete may be AASHTO M 270, Gr. 36, Gr. 50 or Gr. 50W unless otherwise noted.

Drawings show general features of design only. Shop drawings shall be made in accordance with the specifications, submitted and approval secured before fabrication is begun.

Requests for substitution of structural steel shapes shown with shapes of greater size must be submitted by the Contractor to the Engineer for approval. Steels of equal or greater strengths will be accepted only when shown on the approved shop drawings. Payment will be based on the basis of shapes and materials shown in the plans, and no additional compensation will be made for any adjustments due to substitutions.

All welding that is to be done during fabrication of structural steel, including temporary welds, shall be detailed on the shop drawings and submitted for approval. If additional welds are required, whether permanent or temporary, a formal request with detailed drawings shall be submitted to the Engineer for approval; however, additional welds used for attaching falsework support devices or screed rail supports to the structural steel that do not exceed the limitations of Subsection 802.13 will not require approval prior to construction. All welding shall conform to Subsection 807.26.

Unless otherwise noted, field connections shall be bolted with ¾" ø high-strength bolts using 13/16 " ø open holes. Holes for ¾" ø high-strength bolts may be 15/16 " ø if a washer is supplied for use under both the nut and head of the bolt. The use of oversized holes will not be allowed on main members unless otherwise noted. Bolts shall be placed with heads on the outside face of the exterior beam or girder webs and on the bottom of the beam or girder flanges.

All stud shear connectors shall be granular flux filled, solid fluxed, or equal and shall be automatically end welded in accordance with recommendations of the Manufacturer.

When painting is required, all structural steel except galvanized steel and steel completely encased in concrete shall be painted in accordance with Subsection 807.75. The color of paint shall be as specified in the plans.

STRUCTURAL STEEL (W-BEAMS):

All beams and field splice plates, and all diaphragms and connection plates attached to horizontally curved beams are considered main load carrying members and shall meet the Longitudinal Charpy V-Notch Test specified in Subsection 807.05. This work and material will not be paid for directly, but shall be considered subsidiary to the item "Structural Steel in Beam Spans (M 270, Gr. ___)".

All beams in continuous units and simple spans with field splices shall be blocked in their true position in the shop in groups as specified in Subsection 807.54(b)(2) with the webs horizontal. The camber, length of sections, distance between bearings, and openings of joints shall be measured and this information shall become part of the permanent records. The component parts shall be match marked in this assembly and these marks shall be shown on the erection diagram.

All beams in simple spans without field splices shall be blocked in their true position with webs horizontal. The camber, distance between bearings, and openings of joints shall be measured and this information shall become part of the permanent records.

Flange field splice plates shall be cut and fabricated so that the primary direction of rolling is parallel to the direction of the main tensile and/or compressive stresses.

All beam dimensions are based on a temperature of 60 degrees F. A tolerance of ¼" +/- is allowed for camber.

Bent plate diaphragms for horizontally curved beams shall be cut and fabricated so that the primary direction of rolling is parallel to the direction of the main tensile and/or compressive stresses. Bent plate diaphragms for straight beams may be cut and fabricated in accordance with Subsection 807.35 or as required for horizontally curved beams.

Unless otherwise noted, diaphragms shall be installed as beams are erected. All bolts in diaphragms and field splices shall be installed and tightened in accordance with Subsection 807.71 prior to pouring the concrete deck.

STRUCTURAL STEEL (PLATE GIRDERS):

All references to cross-frames shall include "X" or "K" types.

All girder web and flange plates, all field splice plates, and all diaphragms, cross-frames and connection plates attached to horizontally curved girders are considered main load carrying members and shall meet the Longitudinal Charpy V-Notch Test specified in Subsection 807.05. This work and material will not be paid for directly, but shall be considered subsidiary to the item "Structural Steel in Plate Girder Spans (M 270, Gr. ___)".

All girders in continuous units and simple spans with field splices shall be assembled in the shop as specified in Subsection 807.54(b)(2) and blocked in their true position with webs horizontal. The camber, length of sections, distance between bearings, and openings of joints shall be measured and this information shall become part of the permanent records. The component parts shall be match marked in this assembly and these marks shall be shown on the erection diagram.

All girders in simple spans without field splices shall be blocked in their true position with webs horizontal. The camber, distance between bearings, and openings of joints shall be measured and this information shall become part of the permanent records.

Web and flange plates for main members and flange splice plates for main members shall be cut and fabricated so that the primary direction of rolling is parallel to the direction of the main tensile and/or compressive stresses.

Girder webs may be made by shop splicing with minimum lengths of 25 feet for sections. Flange plates longer than 50 feet may be made by shop splicing with minimum lengths of 25 feet for sections. No additional payment will be made for shop welded splices.

All girder dimensions are based on a temperature of 60 degrees F. A tolerance of ¼" +/- is allowed for camber.

Groove welds in web and flange plates shall be Quality Control (Q.C.) tested by nondestructive testing, as required in Subsection 807.23(b). Fillet welds at flange to web plate connections shall be Q.C. tested by the magnetic particle method. All Q.C. testing shall be considered subsidiary to the item "Structural Steel in Plate Girder Spans (M 270, Gr. ___)".

Bent plate diaphragms for horizontally curved girders shall be cut and fabricated so that the primary direction of rolling is parallel to the direction of the main tensile and/or compressive stresses. Bent plate diaphragms for straight girders may be cut and fabricated in accordance with Subsection 807.35 or as required for horizontally curved girders.

Unless otherwise noted, cross-frames and diaphragms shall be installed as girders are erected. All bolts in cross-frames, diaphragms, and field splices shall be installed and tightened in accordance with Subsection 807.71 prior to pouring the concrete deck.

SUBSTRUCTURE NOTES:

CONCRETE:

Unless otherwise noted, concrete in caps, columns and footings (except seal footings) shall be Class "S" with a minimum 28 day compressive strength f'c = 3,500 psi and shall be poured in the dry. Seal Concrete for footings shall have a minimum 28 day compressive strength f'c = 2,100 psi.

Concrete in drilled shafts shall be Class "S" as modified by Job SP "Drilled Shaft Foundations".

All exposed corners shall be chamfered ¾" unless otherwise noted.

REINFORCING STEEL:

All reinforcing steel shall be Grade 60 (yield strength = 60,000 psi) conforming to AASHTO M 31 or M 322, Type A, with mill test reports.

Top reinforcing bars in cap shall be properly placed to avoid interference with anchor bolts or sheet metal sleeves.

STRUCTURAL STEEL:

Structural steel in end bents shall be AASHTO M 270 with grade and payment as specified in the plans.

FOR ADDITIONAL INFORMATION AND NOTES, SEE LAYOUT(S) AND PLAN DETAILS.

FOR ADDITIONAL INFORMATION AND NOTES, SEE LAYOUT(S) AND PLAN DETAILS.

STANDARD GENERAL NOTES
FOR STEEL BRIDGE STRUCTURES

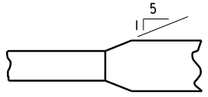
ARKANSAS STATE HIGHWAY COMMISSION
LITTLE ROCK, ARK.

DRAWN BY: A.M.S. DATE: 9-2-2015 FILENAME: b55006.dgn
CHECKED BY: B.E.F. DATE: 9-2-2015 SCALE: NO SCALE
DESIGNED BY: STD. DATE:

DRAWING NO. 55006

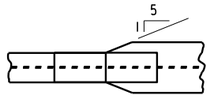
PRINT DATE: 11/7/2019

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.				
				①	STEEL BRIDGE STRUCTURES 55007			

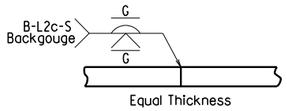


Plan-Unequal Width (Flg.)

FLANGE SPLICE

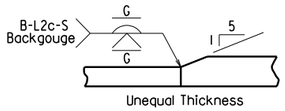


FLANGE SPLICE AT UNEQUAL BOTTOM FLANGE WIDTHS



Equal Thickness

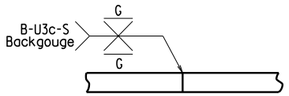
WEB & FLANGE SPLICE



Unequal Thickness

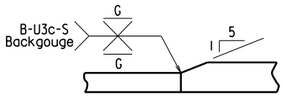
FLANGE SPLICE

(Use when Base Metal Thickness is Equal to or Less than 2")



Equal Thickness

WEB & FLANGE SPLICE

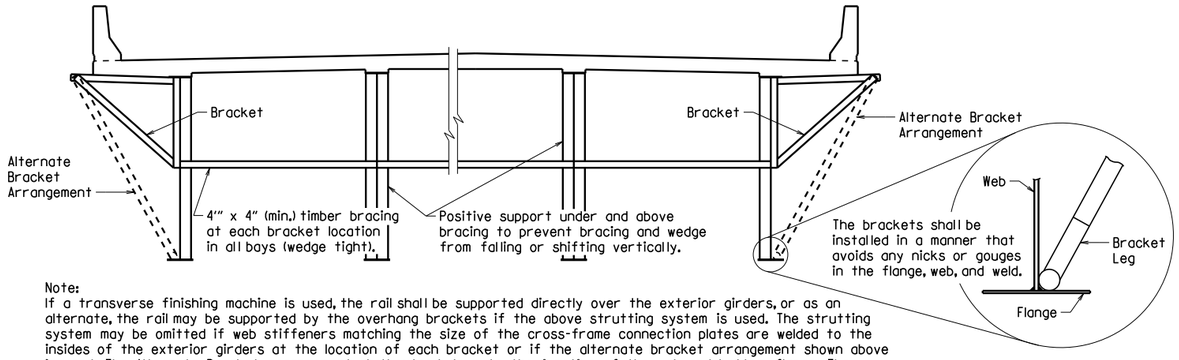


Unequal Thickness

FLANGE SPLICE

(Use when Base Metal Thickness is Greater than 2")

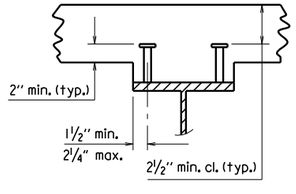
DETAILS OF WELDED SPLICES FOR PLATE GIRDERS



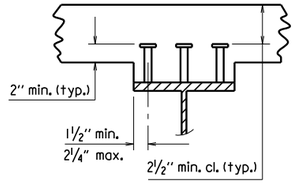
Note:
If a transverse finishing machine is used, the rail shall be supported directly over the exterior girders, or as an alternate, the rail may be supported by the overhang brackets if the above strutting system is used. The strutting system may be omitted if web stiffeners matching the size of the cross-frame connection plates are welded to the insides of the exterior girders at the location of each bracket or if the alternate bracket arrangement shown above is used. The Alternate Bracket arrangement shall extend down to the junction of the web and bottom flange. The stiffener shall conform to the details for cross frame connection plates shown on the plans. No direct payment will be made for brackets, timber bracing, supports, or welded stiffeners. Payment shall be subsidiary to "Structural Steel in Plate Girder Spans (___)".

SCREED RAIL SUPPORT FOR PLATE GIRDERS

(USE WHEN WEB DEPTHS ARE 48" OR GREATER)



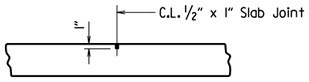
2 STUDS PER ROW



3 STUDS PER ROW

Stud Shear Connectors shall be automatically end welded to the beam or girder flange in accordance with the recommendations of the Manufacturer. See plan details for number and size.

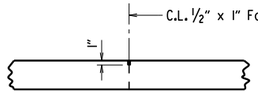
SHEAR CONNECTOR DETAIL



Use Type 3 or 4 Joint Sealer. See Subsections 501.02(h) and 501.05(j). Backer Rod filler will not be required. Joint Sealer shall be measured and paid for as Class S(AE) Concrete-Bridge. Slab Joints shall extend to the outside edge of the deck slab and shall align with open joints at the front face of the parapet. Slab joints shall be installed before the parapet railing is poured. If slab joints are to be sawed, they shall be sawed as soon as the concrete has sufficiently set to allow sawing of the joint without damage to the slab. Slab joints shall be placed at all pouring sequence construction joints and required slab joint locations. The joint sealer shall extend across the deck from gutterline to gutterline.

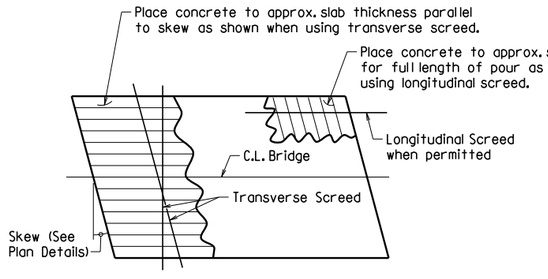
ADDITIONAL NOTES IF SIDEWALKS OR RAISED MEDIANS ARE REQUIRED:
Slab Joints shall be installed before the sidewalk or raised median is poured. After installation of the joint in the sidewalk or raised median and prior to pouring the parapet rail, the joint sealer shall be placed extending across the deck slab from gutterline to gutterline and acrosss the top of the sidwalk or raised median to the edge of the slab. No joint sealer shall be placed on the deck slab under the sidewalk or raised median.

TRANSVERSE SLAB JOINT DETAIL



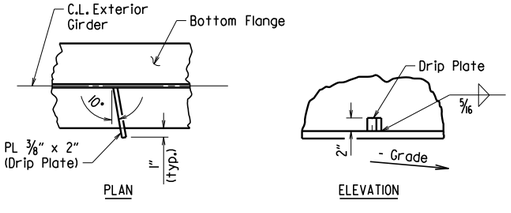
Use ½" x 1" Type 3 or 4 Joint Sealer. See Subsections 501.02(h) and 501.05(j). Backer Rod filler will not be required. Joint sealer shall be measured and paid for as Class S(AE) Concrete-Bridge. This joint shall be formed. Seal color shall be gray or other color similar to concrete.

LONGITUDINAL CONSTRUCTION JOINT



Note: At the Contractor's option, the transverse screed may be placed parallel to the skew or perpendicular to C. L. Bridge.

CONCRETE PLACEMENT PROCEDURE FOR BRIDGES WITH SKEW



PLAN

ELEVATION

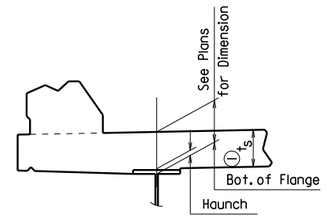
Drip Plate to be welded to the outer side of the bottom flange of the exterior girders.

Locate drip plate 5'-0" from C.L. Bearing on high side of each Bent, unless otherwise noted in the plans.

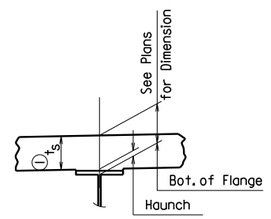
BOTTOM FLANGE DRIP PLATE

(USE WHEN WEB DEPTHS ARE 54" OR GREATER AND UNIT OR SPAN IS NOT IN LEVEL GRADE)

t_s = slab thickness. See "Typical Roadway Section" in the plans.



EXTERIOR BEAM OR GIRDER



INTERIOR BEAM OR GIRDER

① Tolerance when removable deck forming is used is + ½", - ¼". Haunch forming is required and shall be adjusted to maintain slab thickness tolerance.

NOTES:
Haunch dimension may vary within the following limits to maintain the grade and slab thickness tolerance: Minimum occurs when top flange contacts bottom reinforcing steel; Maximum = top flange thickness plus 1¾" unless otherwise noted in the plans. No increase in concrete and structural steel quantities will be made to maintain tolerances.

Tolerances shown are applicable only when removable deck forming is used. See Std. Dwg. No. 55005 for tolerances when permanent steel deck forms are used. Payment for concrete shall be based on removable deck forming.

ADJUSTMENT FOR SLAB THICKNESS TOLERANCE

NOTE: Working Point matches Theoretical Roadway Grade.

ROUNDING DETAIL

BRIDGES IN NORMAL CROWN

WELD TABLE

Material Thickness of Thicker Part Joined (Inches)	Minimum Size of Fillet Weld (Inches)	Single Pass Weld Must Be Used
To ¾" Inclusive	¼"	
Over ¾"	⅝"	

NOTE: When a fillet weld size, as shown on the plans, is larger than the minimum, the first pass shall be that specified for minimum size of fillet weld.

SECTION AND SUBSECTION REFER TO THE ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION (2014 EDITION).

THESE DETAILS ARE APPLICABLE UNLESS OTHERWISE SHOWN IN THE PLAN DETAILS, SPECIAL PROVISIONS, OR SUPPLEMENTAL SPECIFICATIONS.

STANDARD DETAILS FOR STEEL BRIDGE STRUCTURES

ARKANSAS STATE HIGHWAY COMMISSION

LITTLE ROCK, ARK.

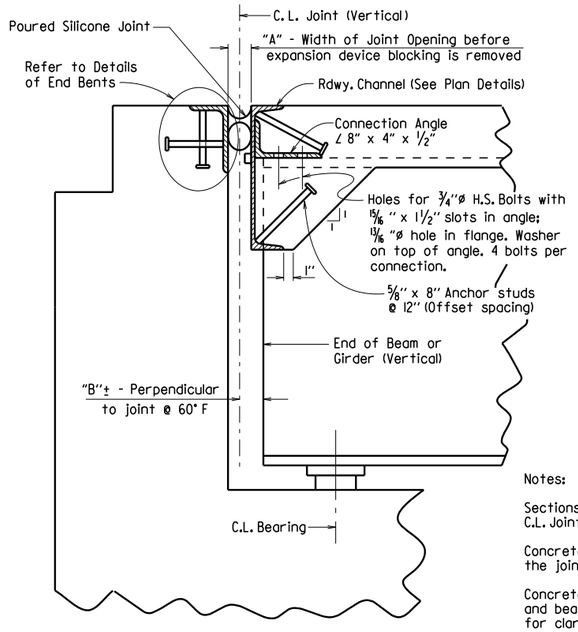
DRAWN BY: JYP DATE: 2/11/2016 FILENAME: b55007.dgn

CHECKED BY: AMS DATE: 2/11/2016 SCALE: No Scale

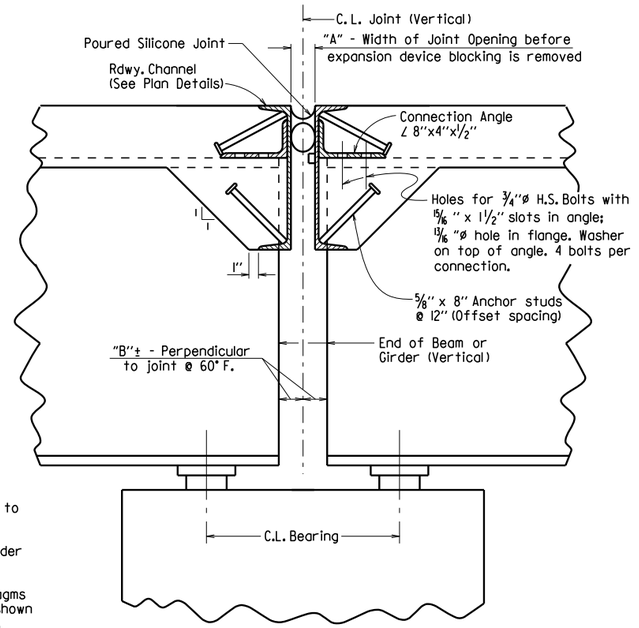
DESIGNED BY: STD. DATE: —

DRAWING NO. 55007

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.				
				①	POURED SILICONE JOINT			55008



SECTION THRU JOINT AT END BENT



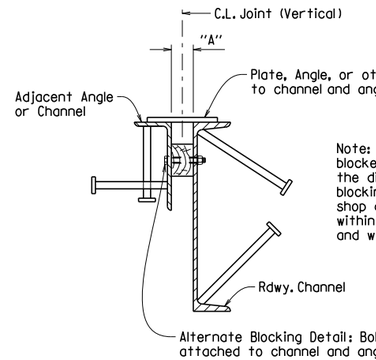
SECTION THRU JOINT AT INTERMEDIATE BENT

Notes:

Sections are taken perpendicular to C.L. Joint.

Concrete shall be hand packed under the joint armor.

Concrete diaphragms, steel diaphragms and bearing stiffeners are not shown for clarity. See plans for details.



Note: Each expansion joint device shall be blocked in the Shop by the Fabricator to the dimension "A" shown for 60° F and the blocking details shall be shown on the shop drawings. Blocking shall be placed within 2 feet of each end of the device and with a maximum spacing of 8 feet.

DETAILS FOR BLOCKING EXPANSION JOINT DEVICE

EXPANSION DEVICE INSTALLATION AT END BENTS:

The Contractor may elect to install the expansion device using one of the following two alternatives:

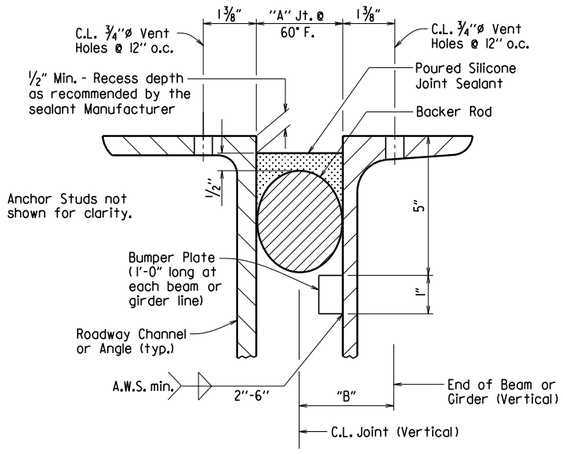
1) The concrete span pour adjacent to joint shall be placed before the end bent backwall is placed. After the end bent backwall forms are in place and the beams or girders erected, the blocked expansion device shall be installed and adjusted for grade. All connection bolts shall be fully tightened prior to placing the deck concrete adjacent to the bent. Immediately prior to pouring the backwall concrete, the blocking shall be removed, and the opening adjusted for temperature and grade.

2) The backwall shall be poured to the optional construction joint after beams or girders are erected. The blocked expansion device shall be installed and adjusted for grade. All connection bolts shall be fully tightened prior to placing the deck concrete adjacent to the bent. Immediately prior to pouring the remainder of the backwall concrete, the blocking shall be removed and the opening adjusted for temperature and grade.

EXPANSION DEVICE INSTALLATION AT INTERMEDIATE BENTS:

After all beams or girders on each side of the joint are erected the blocked expansion device shall be installed and adjusted for grade. Deck concrete shall be placed for the entire unit or span on one side of the joint before deck concrete on the other side is placed. Connection bolts for the first side to have deck concrete placed shall be completely bolted. Bolts on the other side shall be loosely installed so that thermal and rotational movements will not be restricted during concrete placement on the first side.

Connection bolts on the second side shall remain loose until the concrete pour adjacent to the joint is to be placed. Immediately prior to pouring the span concrete on the second side, the blocking shall be removed, the joint adjusted for temperature and grade, and the connection bolts tightened.



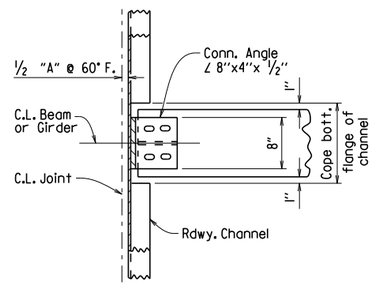
DETAIL OF POURED SILICONE JOINT

Silicone joint material and installation shall conform to Section 809. The temperature limitations recommended by the sealant Manufacturer shall be observed. The sealant shall be installed only when the average 24 hour air temperature is between 40° and 80° F.

Use an appropriately sized backer rod at the depth shown in the Manufacturer's literature based on the joint width at the time of sealing. Unless otherwise noted, do not install more backer rod than can be sealed in the same day.

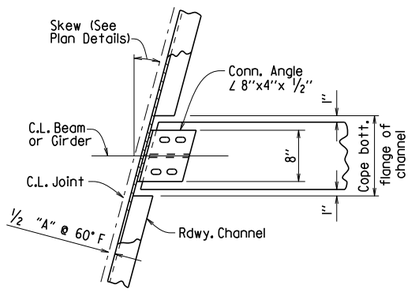
The Contractor shall verify separation of the backer rod from the joint material after the joint material has set.

When bridge deck is constructed in stages, backer rods shall be extended beyond length of poured joint in initial construction stage so that the two pieces can be properly spliced together prior to installing sealant in subsequent stages. Manufacturer's recommendations shall be followed to prevent sealant from "running out of joint" during stage construction.



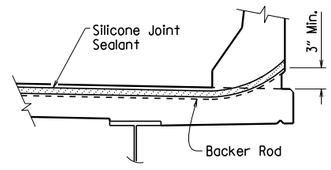
CHANNEL CONNECTION DETAIL

BENTS WITHOUT SKEW

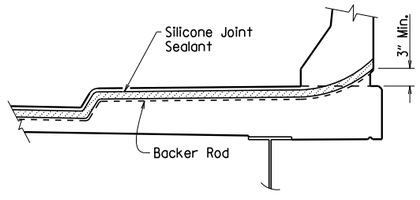


CHANNEL CONNECTION DETAIL

BENTS WITH SKEW



JOINT SEAL PLACEMENT AT RAIL



JOINT SEAL PLACEMENT AT SIDEWALK

SECTION AND SUBSECTION REFER TO THE ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION (2014 EDITION).

THESE DETAILS ARE APPLICABLE UNLESS OTHERWISE SHOWN IN THE PLAN DETAILS, SPECIAL PROVISIONS, OR SUPPLEMENTAL SPECIFICATIONS. SEE "TABLE OF SILICONE JOINT DATA" IN PLAN DETAILS FOR VARIABLES "A" AND "B", AND BUMPER PLATE SIZE.

STANDARD DETAILS FOR POURED SILICONE JOINTS

ARKANSAS STATE HIGHWAY COMMISSION

LITTLE ROCK, ARK.

DRAWN BY: A.C.P. DATE: 2/11/2016 FILENAME: b55008.dgn

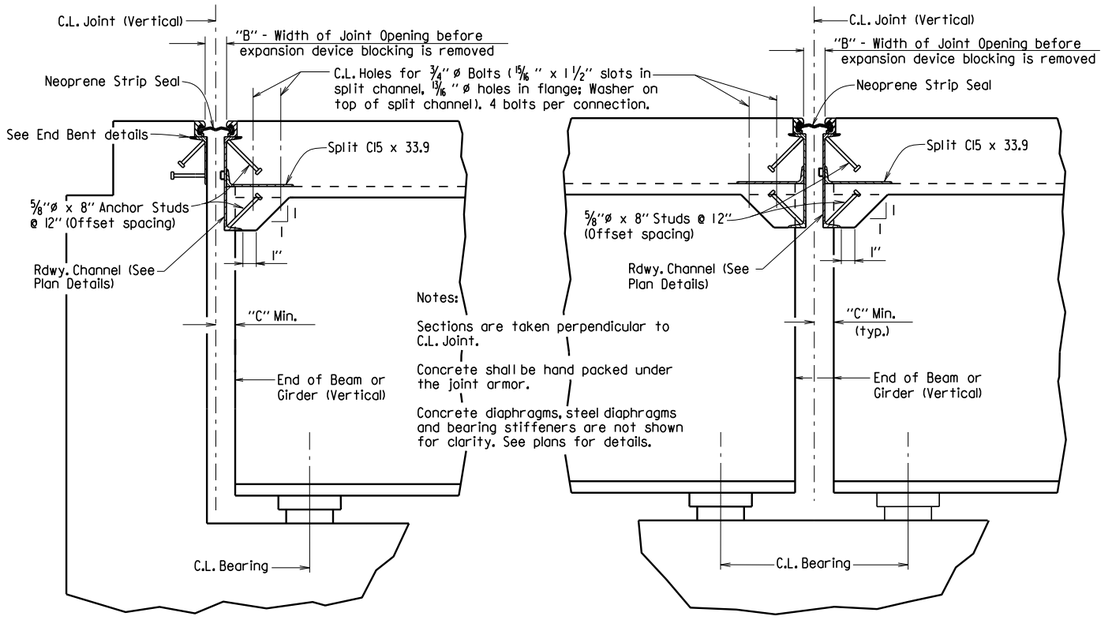
CHECKED BY: A.M.S. DATE: 2/11/2016 SCALE: No Scale

DESIGNED BY: STD. DATE: —

DRAWING NO. 55008

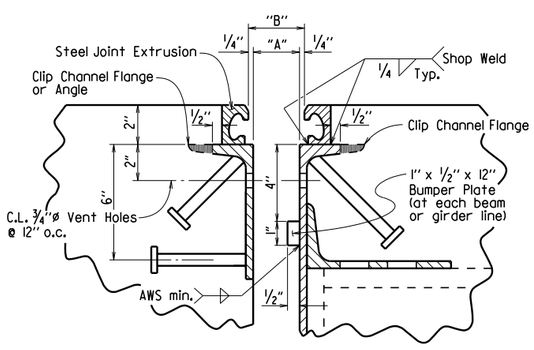
DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.				

1 STRIP SEAL JOINT 55009



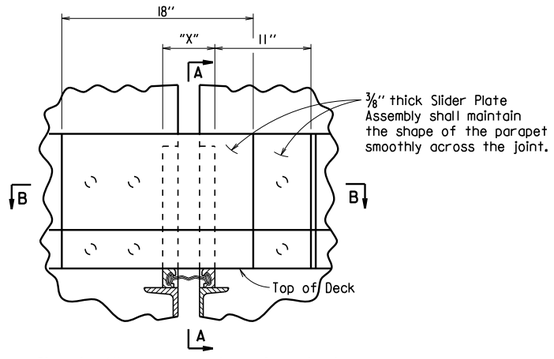
SECTION THRU JOINT AT END BENT

SECTION THRU JOINT AT INTERMEDIATE BENT



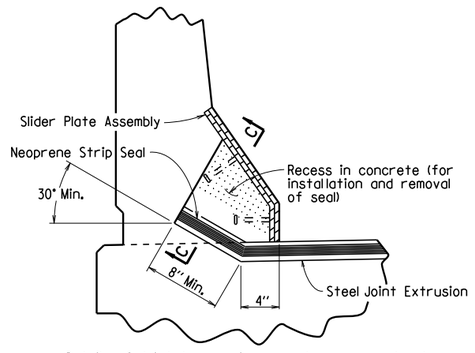
DETAIL OF STRIP SEAL JOINT

Detail shown at End Bent,
Details similar at Intermediate Bent



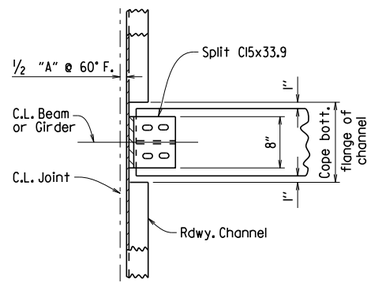
Dimension "X" equals the width of opening in parapet to allow for removal or repair of joint.

DETAIL OF PARAPET SLIDER PLATES



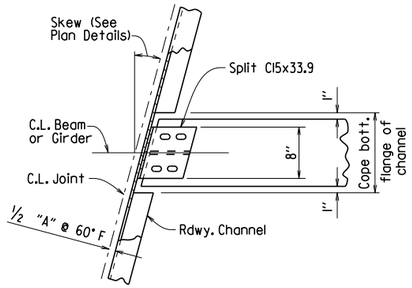
Details of Joint turn-up in parapet are general and show basic design controls only. See plan details for joint installation at sidewalks.

SECTION A-A



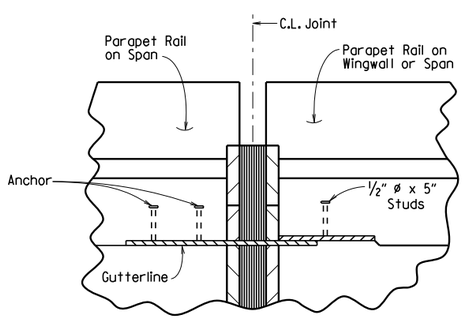
CHANNEL CONNECTION DETAIL

BENTS WITHOUT SKEW



CHANNEL CONNECTION DETAIL

BENTS WITH SKEW

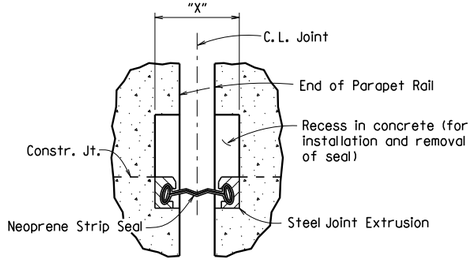


The method of attachment of the slider plate assembly shall allow for removal to provide for future replacement of the neoprene seal. Anchors shall not be paid for directly, but shall be considered subsidiary to the item "Armored Joint with Neoprene Strip Seal".

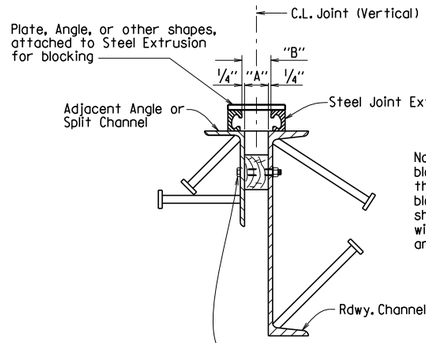
Method of installation and fabrication shall be determined by the Manufacturer.

SECTION B-B

BENTS WITHOUT SKEW SHOWN



SECTION C-C



Note: Each expansion joint device shall be blocked in the Shop by the Fabricator to the dimension "A" shown for 60° F and the blocking details shall be shown on the shop drawings. Blocking shall be placed within 2 feet of each end of the device and with a maximum spacing of 8 feet.

DETAILS FOR BLOCKING EXPANSION JOINT DEVICE

EXPANSION DEVICE INSTALLATION AT END BENTS:

The Contractor may elect to install the expansion device using one of the following two alternatives:

1) The concrete span pour adjacent to joint shall be placed before the end bent backwall is placed. After the end bent backwall forms are in place and the beams or girders erected, the blocked expansion device shall be installed and adjusted for grade. All connection bolts shall be fully tightened prior to placing the deck concrete adjacent to the bent. Immediately prior to pouring the backwall concrete, the blocking shall be removed, and the opening adjusted for temperature and grade.

2) The backwall shall be poured to the optional construction joint after beams or girders are erected. The blocked expansion device shall be installed and adjusted for grade. All connection bolts shall be fully tightened prior to placing the deck concrete adjacent to the bent. Immediately prior to pouring the remainder of the backwall concrete, the blocking shall be removed and the opening adjusted for temperature and grade.

EXPANSION DEVICE INSTALLATION AT INTERMEDIATE BENTS:

After all beams or girders on each side of the joint are erected the blocked expansion device shall be installed and adjusted for grade. Deck concrete shall be placed for the entire unit or span on one side of the joint before deck concrete on the other side is placed. Connection bolts for the first side to have deck concrete placed shall be completely bolted. Bolts on the other side shall be loosely installed so that thermal and rotational movements will not be restricted during concrete placement on the first side.

Connection bolts on the second side shall remain loose until the concrete pour adjacent to the joint is to be placed. Immediately prior to pouring the span concrete on the second side, the blocking shall be removed, the joint adjusted for temperature and grade, and the connection bolts tightened.

GENERAL NOTES FOR NEOPRENE STRIP SEAL JOINTS:

The steel extrusion and neoprene strip seal material and installation shall be in accordance with Section 809.

The expansion device shall provide for the movement rating(s) shown in the "TABLE OF STRIP SEAL JOINT DATA" in the plan details. The expansion joint shall be capable of sealing the deck surface and parapet area to prevent moisture and other contaminants from descending through the joint.

Details of proposed slider plate assembly shall be submitted to the Engineer for approval prior to the fabrication of any structural steel at the expansion device.

All structural steel shall conform to AASHTO M 270, Grade 50W and all exposed surfaces shall be cleaned in accordance with Subsection 807.84(e). The parapet slider plates and structural steel completely embedded in concrete shall conform to AASHTO M 270, Grade 36, 50 or 50W steel. Unless otherwise noted in the plans, all exposed surfaces of the parapet slider plates shall be cleaned and painted in accordance with Section 638. Painting shall not be paid for directly and structural steel completely embedded in concrete need not be painted. Payment for structural steel shall be as specified in the plans.

SECTION AND SUBSECTION REFER TO THE ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION (2014 EDITION).

THESE DETAILS ARE APPLICABLE UNLESS OTHERWISE SHOWN IN THE PLAN DETAILS, SPECIAL PROVISIONS, OR SUPPLEMENTAL SPECIFICATIONS. SEE "TABLE OF STRIP SEAL JOINT DATA" IN PLAN DETAILS FOR VARIABLES "A", "B", AND "C".

STANDARD DETAILS FOR NEOPRENE STRIP SEAL JOINTS

ARKANSAS STATE HIGHWAY COMMISSION

LITTLE ROCK, ARK.

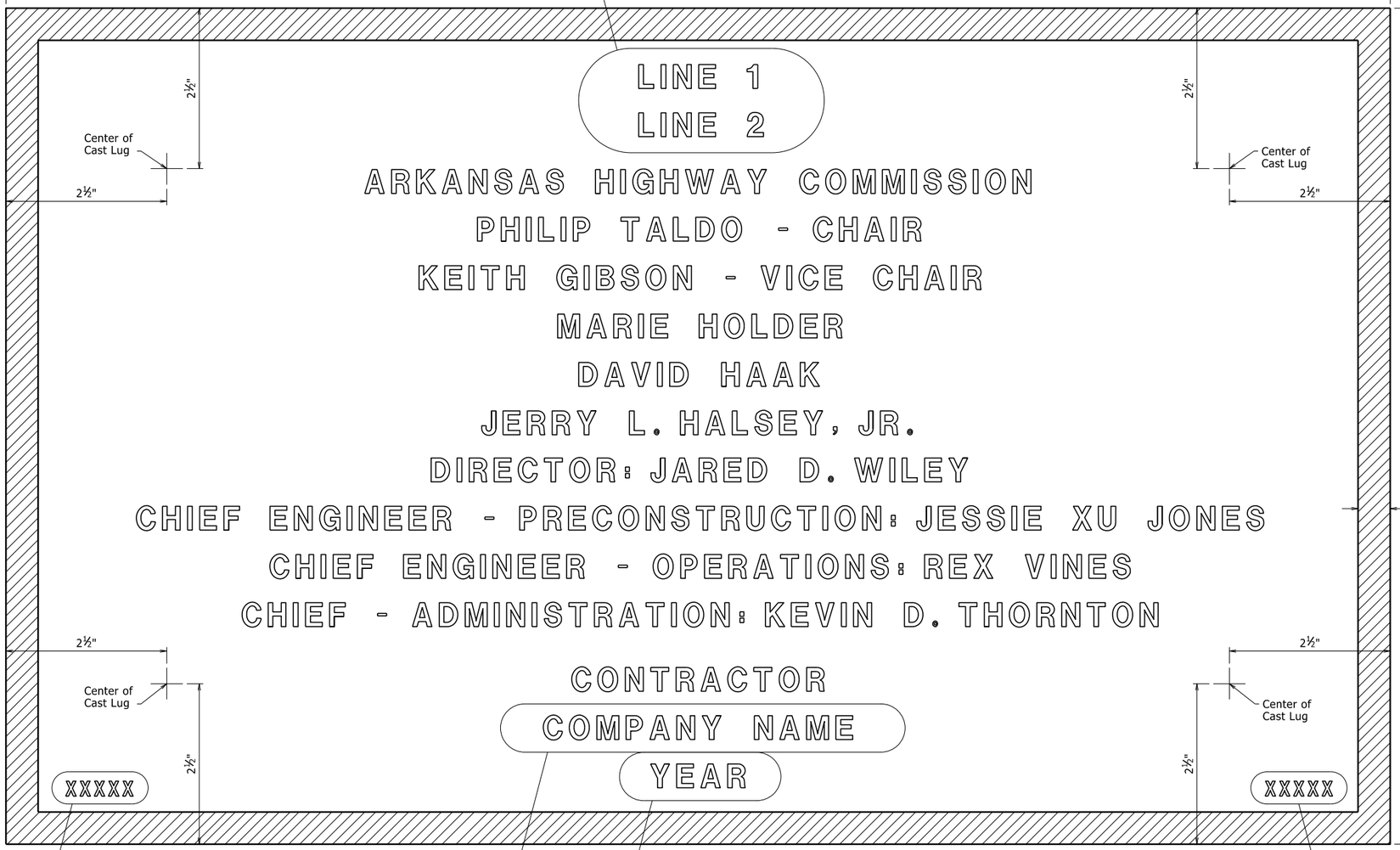
DRAWN BY: L.J.B. DATE: 2/11/2016 FILENAME: b55009.dgn
CHECKED BY: A.M.S. DATE: 2/11/2016 SCALE: No Scale
DESIGNED BY: STD. DATE: —

DRAWING NO. 55009

DATE REVISED	DATE REVISED	FED. RD. DIST. NO.	STATE	JOB NO.	SHEET NO.	TOTAL SHEETS
4-14-23		6	ARK.			
1-28-25		TYPE D NAME PLATE - 55010				

The name of the bridge as shown on the plans shall be placed on Lines 1 & 2 using ⅛" raised letters and numerals ⅜" high.

	Example 1	Example 2	Example 3	Example 4
Line 1	RED RIVER	SOUTHERN RAILROAD	SALINE RIVER	HIGHWAY 5
Line 2	RELIEF	OVERPASS		



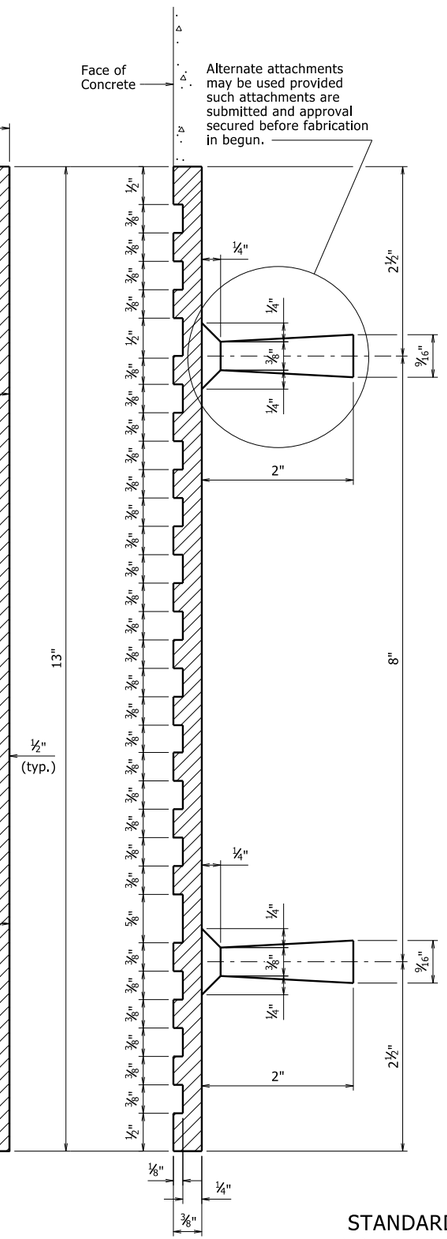
Place the design live loading here using ⅛" raised letters and numerals ¼" high. Examples: HS20 HL-93

Place the Year in which Contract was awarded here using ⅛" raised numerals ⅜" high. Example: 2001

Place the name of the company awarded the construction contract here using ⅛" raised letters and numerals ⅜" high. Example: ABCD CONSTRUCTION, INC.

Place the Bridge number here using ⅛" raised letters and numerals ¼" high. Examples: A1234 05432

TYPICAL BRIDGE NAME PLATE



GENERAL NOTES

Specifications: Arkansas State Highway and Transportation Department Standard Specifications for Highway Construction, (2014 Edition) with applicable Supplemental Specifications and Special Provisions.

Name plates shall be cast bronze and shall meet the material requirements as specified in Section 812.

Body of plate shall be ¼" thick and shall include four tapering cone lugs ⅜" to 9/16" x 2" long. The border and all lettering shall be raised ⅛" above the face of plate and shall be polished.

All lettering shall be plain gothic, square cut and not tapered.

The number of plates required and the location and name on the plate for each bridge shall be as designated on the plans.

2 Updated names
1-28-25 CGP Checked By: CRE

1 Revised and Redrawn
4-14-23 CGP Checked By: CRE

STANDARD DETAILS FOR
TYPE D BRIDGE NAME PLATE

ROUTE SEC.

ARKANSAS STATE HIGHWAY COMMISSION
LITTLE ROCK, ARK.

DRAWN BY: KDH DATE: 2-27-2014 FILENAME: b55010.dgn
CHECKED BY: BEF DATE: 2-27-2014 SCALE: NO SCALE
DESIGNED BY: STD. DATE:

DRAWING NO. 55010

PRINT DATE: 1/28/2025

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
3/24/16				6	ARK.			
				JOB NO.				
				①		STEEL H-PILES		55020

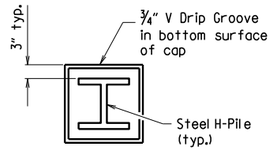
GENERAL NOTES FOR STEEL H-PILES:

Steel H-Piles shall conform to AASHTO M 270, Grade 36 or greater.

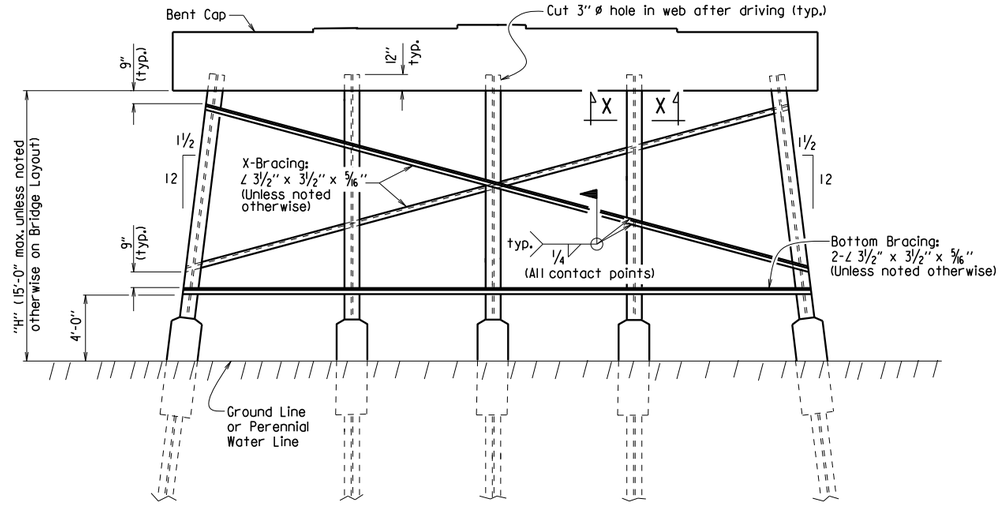
See Bridge Layout and Bent Details for pile size, estimated length, spacing, pile anchorage (if required) and for driving information.

Steel H-Piles that extend above the ground and are not protected by pile encasement shall be painted in accordance with Subsection 805.02.

Brackets, lugs, cap plates, pile tips, driving points, pile painting, splicing and welding shall not be paid for directly, but shall be considered subsidiary to the item "Steel Piling".



VIEW X-X



Notes:
All bracing shall be cut and welded in the field. Each brace shall be furnished in one piece. Payment shall be made under Item 807.

Unless noted otherwise, omit X-Bracing when "H" is less than 8 feet.

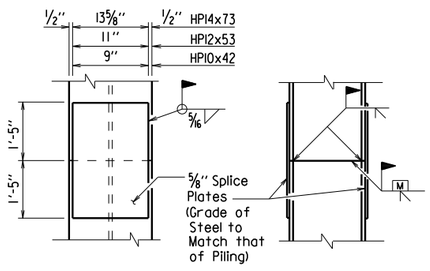
Omit X-Bracing and Bottom Bracing when "H" is 5 feet or less.

When required on the Bridge Layout sheet, pile encasements shall be constructed. See Notes and Details for H-Pile Encasements.

Omit all bracing (and V-groove in cap) when pile encasement is extended to bottom of bent cap.

TYPICAL DETAILS OF H-PILE TRESTLE INTERMEDIATE BENT

(Shown with Partial Height Encasement)



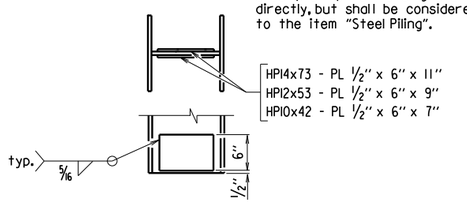
The Contractor may for his own convenience and at his own expense provide as many as three splices per pile. Minimum spacing between splices shall be 5 feet.

TYPICAL SPLICE DETAILS

⚠ H-pile splicers manufactured by Associated Pile and Fitting Corporation, LB Foster Piling, Skyline Steel or equivalent may be used in lieu of the "Typical Splice Details" shown. H-pile splicers shall match the same grade of steel specified for the piling and shall be welded to the pile with a 5/16" fillet weld around the entire perimeter of the splice. Flanges shall be welded with a complete penetration groove weld complying with AASHTO/AWS Joint Designation B-U4a or B-U4b. All welding shall conform to Subsection 807.26 of the AHTD Standard Specifcations for Highway Construction (2014 Edition).

Notes:
Steel pile tip reinforcing not required when approved H-Pile driving points are used.

Steel pile tip reinforcing shall not be paid for directly, but shall be considered subsidiary to the item "Steel Piling".



REINFORCING DETAIL FOR STEEL H-PILE TIP

GENERAL NOTES FOR H-PILE ENCASEMENTS:

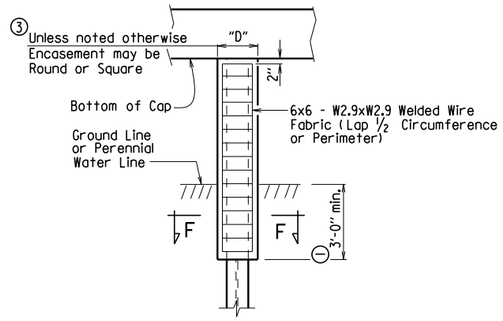
⚠ See Bridge Layout for additional notes, any pile encasement restrictions and required location of pile encasements.

All concrete shall be Class S with a minimum 28-day compressive strength, f'c = 3,500 psi. If concrete cannot be placed in the dry, Seal Concrete may be used from top to bottom of encasement.

Reinforcing steel shall be Grade 60 conforming to AASHTO M 31 or M 322, Type A.

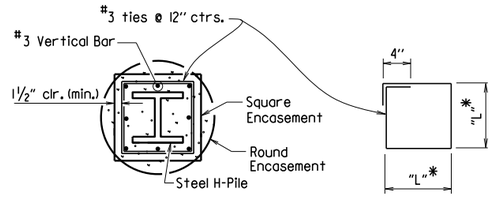
Welded Wire Fabric shall conform to AASHTO M 55 or M 221. Galvanized Corrugated Steel Pipe shall conform to AASHTO M 36 and M 218.

Concrete, welded wire fabric or reinforcing steel and galvanized pipe shall not be paid for directly, but shall be considered subsidiary to the item "Pile Encasement".



PILE ENCASEMENT DETAIL FOR STEEL H-PILES

④ (Shown with Encasement to Bottom of Cap)

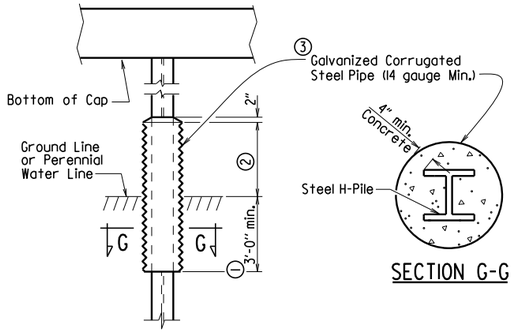


SECTION F-F

*Measured out-to-out of bar.

TABLE OF VARIABLES FOR PILE ENCASEMENT

Pile Size	"D" Square Encsmt.	"D" Round Encsmt.	"L"*
HPI0x42	1'-7"	2'-0"	1'-4"
HPI2x53	1'-8"	2'-2"	1'-5"
HPI4x73	1'-11"	2'-6"	1'-8"



SECTION G-G

① Unless otherwise noted on Bridge Layout.

② 3'-0" minimum or as shown on Bridge Layout.

③ Encasement dimensions shall be sized to maintain a minimum concrete cover of 4" from the H-Pile. Reinforcement shall be sized to provide a minimum concrete cover of 1½" and a minimum clearance of 1¼" from the pile.

④ Alternate pile encasement, when not extended to bottom of cap, shall have 2" concrete taper for water runoff as shown in the Partial Height Encasement detail.

ALTERNATE PILE ENCASEMENT DETAIL FOR STEEL H-PILES

(Shown with Partial Height Encasement)

⚠ Added alternate method of splicing H-piles and revised pile encasement note.
3/24/2016 AMS

This document was originally issued and sealed by Charles R. Ellis, PE No. 9235, on March 24, 2016. This copy is not a signed and sealed document.

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 9235
CHARLES R. ELLIS

BRIDGE ENGINEER

STANDARD DETAILS FOR STEEL H-PILES AND PILE ENCASEMENTS

ARKANSAS STATE HIGHWAY COMMISSION

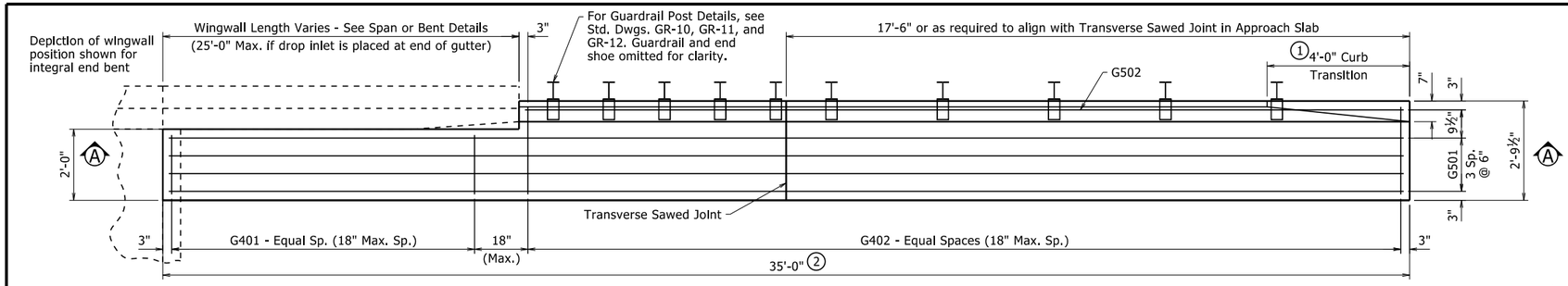
LITTLE ROCK, ARK.

DRAWN BY: A.M.S. DATE: 2/27/2014 FILENAME: b55020.dgn
CHECKED BY: B.E.F. DATE: 2/27/2014 SCALE: NO SCALE
DESIGNED BY: STD. DATE: —

DRAWING NO. 55020

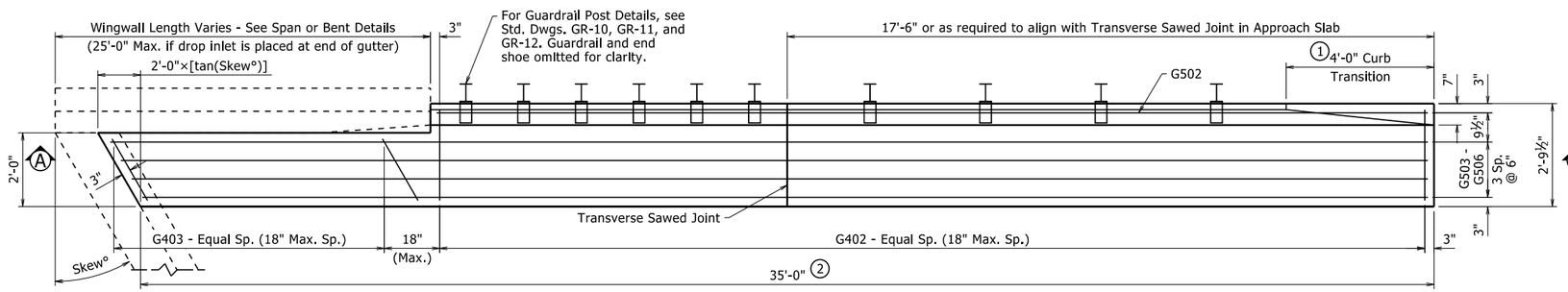
DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.				

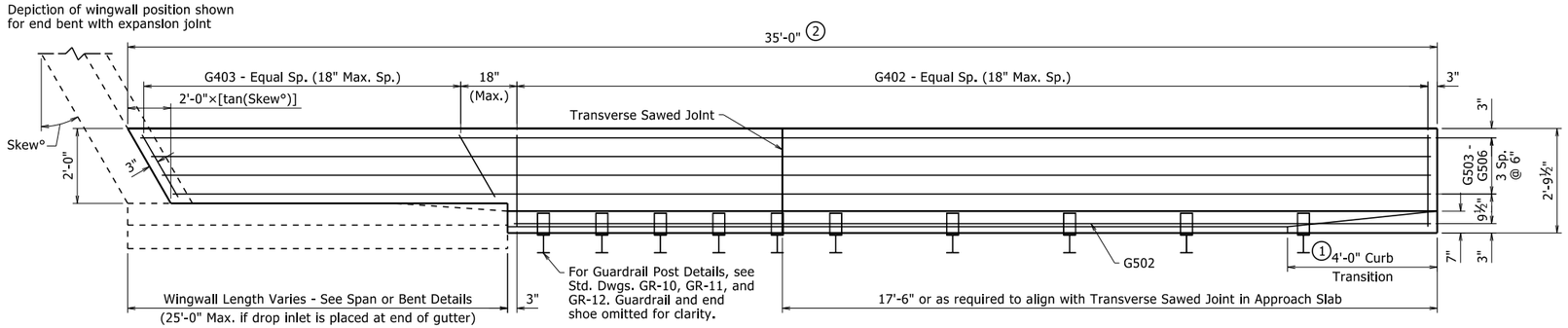
(1) Type F Approach Gutters - 55030F



HALF PLAN OF APPROACH GUTTERS FOR SQUARE END BENT

½" = 1'-0"





PLAN OF SKEWED APPROACH GUTTERS FOR SKEWED END BENT

½" = 1'-0"

QUANTITIES FOR ONE APPROACH GUTTER

(For Information Only)

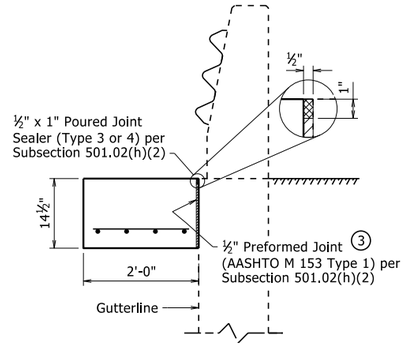
Reinforcing Steel (Lbs.)	Concrete (Cu. Yds.)
210	4.20

Quantities are based on one gutter for a square, integral end bent and a wingwall length of 10'-0"

BAR LIST FOR ONE APPROACH GUTTER

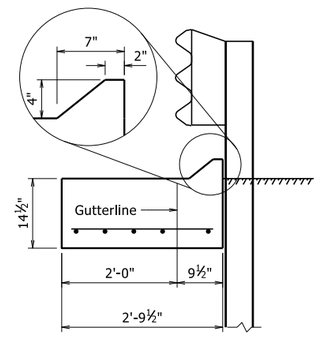
	Mark	No. Req'd.	Length
Square End Bent	G401	(4)	1'-8"
	G402	(4)	2'-5½"
	G501	4	34'-8"
	G502	1	(4)
Skewed End Bent	G402	(4)	2'-5½"
	G403	(4)	(4)
	G502	1	(4)
	G503 - G506	1 ea.	(4)

(4) Varies with Skew and/or Wingwall Length



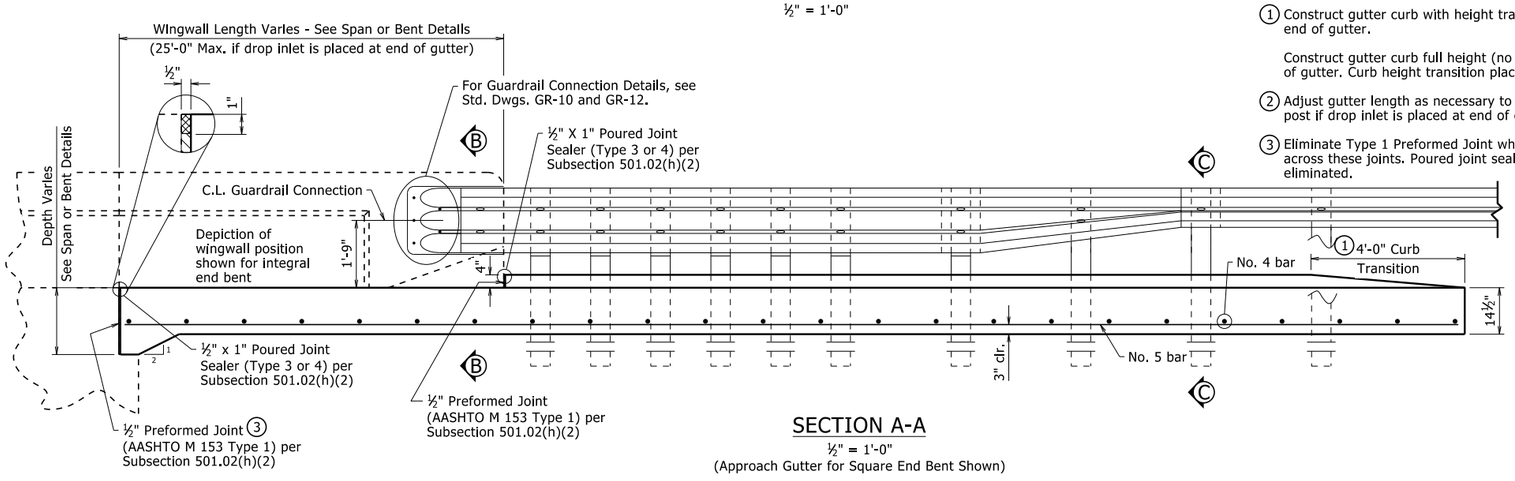
SECTION B-B

¾" = 1'-0"



SECTION C-C

¾" = 1'-0"



SECTION A-A

½" = 1'-0"

(Approach Gutter for Square End Bent Shown)

(1) Construct gutter curb with height transition as shown if drop inlet is not placed at end of gutter.

Construct gutter curb full height (no height transition) if drop inlet is placed at end of gutter. Curb height transition placed on drop inlet.

(2) Adjust gutter length as necessary to avoid outlet pipe interference with guardrail post if drop inlet is placed at end of gutter.

(3) Eliminate Type 1 Preformed Joint when bridge details show reinforcing dowels across these joints. Poured joint sealer is required, however, backer rod shall be eliminated.

GENERAL NOTES

All concrete shall be Class S(AE) with a minimum 28 day compressive strength f'c = 4,000 psi and shall be poured in the dry.

All reinforcing steel shall be Grade 60 (yield strength = 60,000 psi) conforming to AASHTO M 31 or M 322, Type A, with mill test reports.

Approach Gutters will be measured and paid for in accordance with Section 504.

All longitudinal lines within the limits of horizontal curves shall be on curves concentric to C.L. Bridge. Adjustment to longitudinal bar lengths may be required. Transverse reinforcing shall be placed on radial lines to C.L. Bridge.

Scales shown are for 22"x34" drawings. When using 11"x17" drawings, reduce scale by one half.

STANDARD DETAILS FOR TYPE F APPROACH GUTTERS

ARKANSAS STATE HIGHWAY COMMISSION

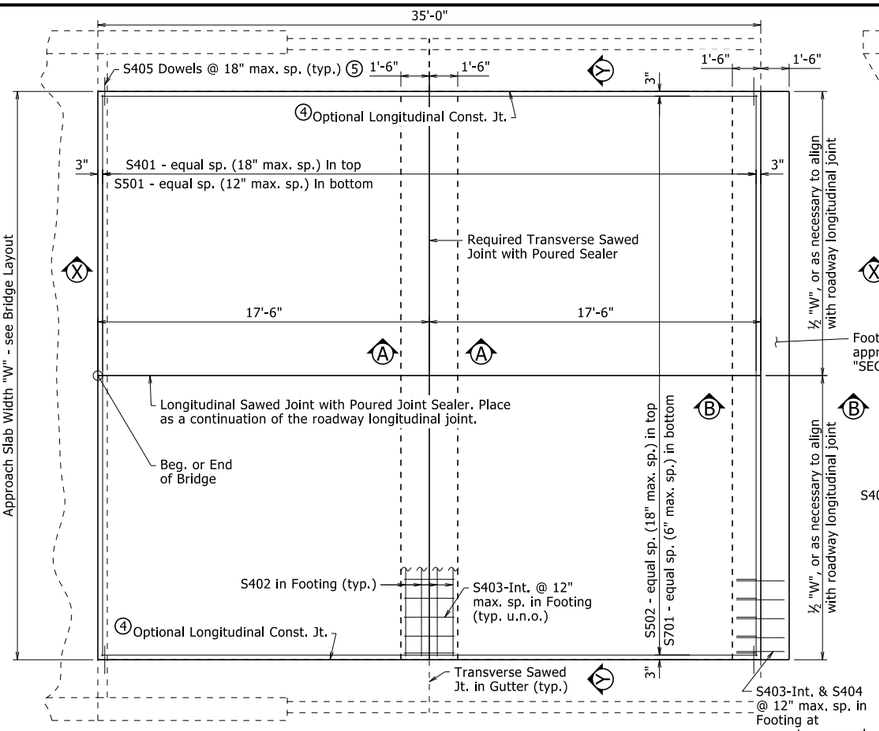
LITTLE ROCK, ARK.

DRAWN BY:	NAC	DATE:	4-8-2021	FILENAME:	b55030f.dgn
CHECKED BY:	LJB	DATE:	4-8-2021	SCALE:	AS NOTED
DESIGNED BY:	STD	DATE:	-		

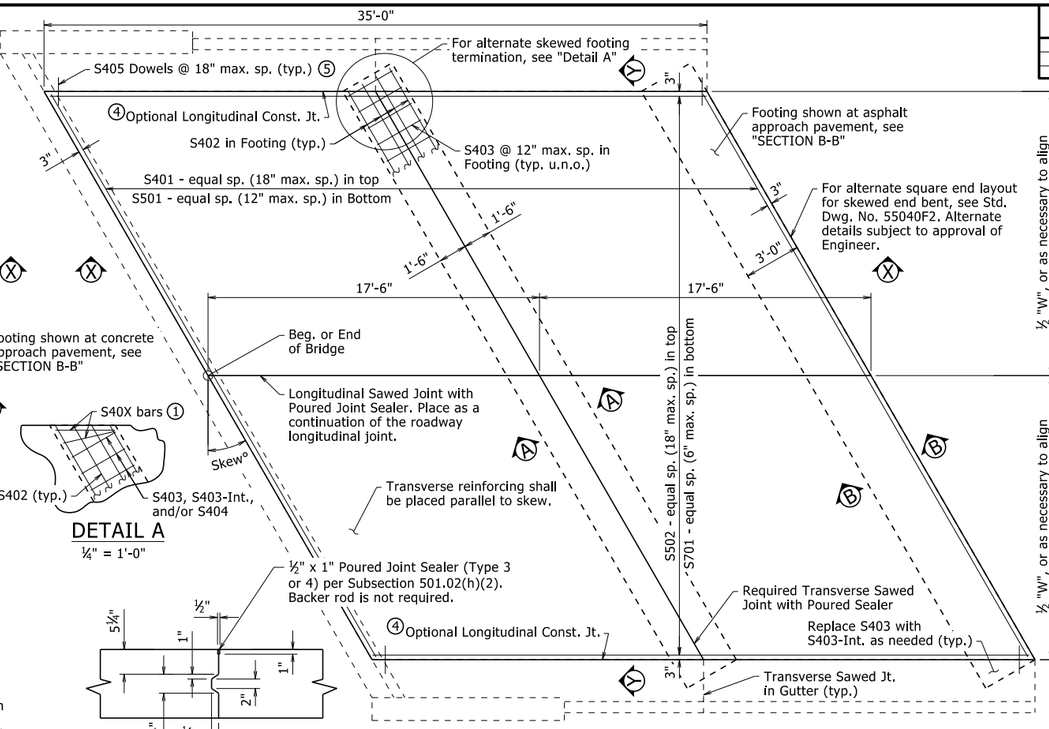
DRAWING NO. 55030F

PRINT DATE: 4/9/2021

DATE REVISED	DATE REVISED	FED. RD. DIST. NO.	STATE	JOB NO.	SHEET NO.	TOTAL SHEETS
		6	ARK.			
		Type F Approach Slab - 55040F1				

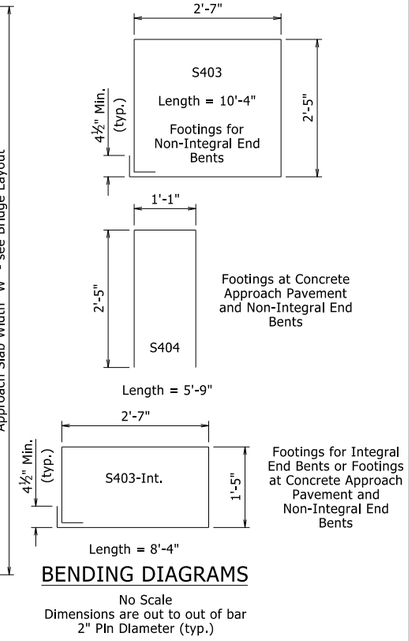


PLAN - APPROACH SLAB AT SQUARE END BENT



LONGITUDINAL CONSTRUCTION JOINT

½" = 1'-0"

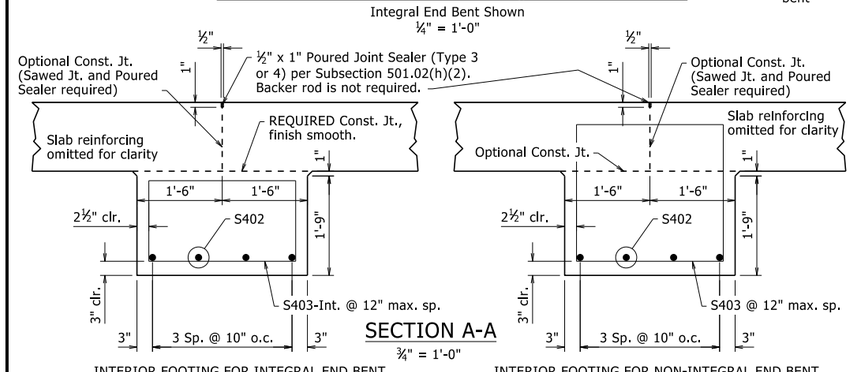


BENDING DIAGRAMS

No Scale
Dimensions are out to out of bar
2" PIn Diameter (typ.)

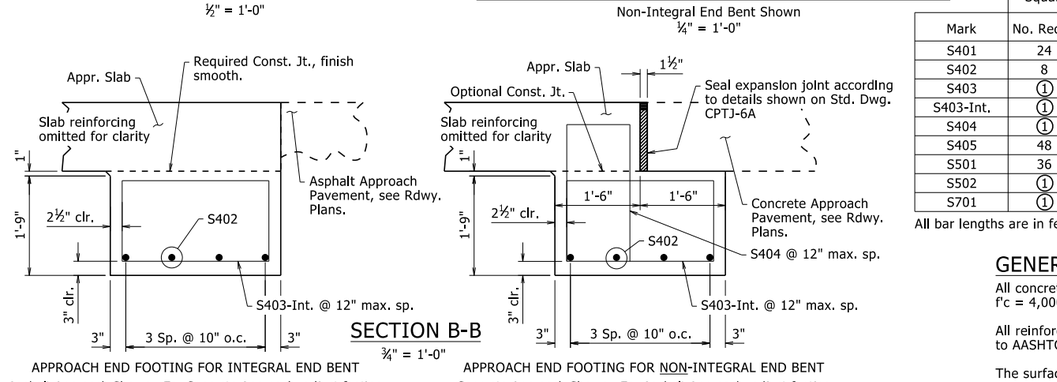
PLAN - APPROACH SLAB AT SKEWED END BENT

Non-Integral End Bent Shown
¼" = 1'-0"



INTERIOR FOOTING FOR INTEGRAL END BENT

INTERIOR FOOTING FOR NON-INTEGRAL END BENT



APPROACH END FOOTING FOR INTEGRAL END BENT

Asphalt Approach Shown. For Concrete Approach, adjust footing location by 1'-6" to add paving notch and include expansion joint.

APPROACH END FOOTING FOR NON-INTEGRAL END BENT

Concrete Approach Shown. For Asphalt Approach, adjust footing location by 1'-6", omit expansion joint, and replace bars S403-Int. & S404 with S403.

BAR LIST - PER APPROACH SLAB

	Square End Bent		Skewed End Bent	
Mark	No. Req'd.	Length	No. Req'd.	Length
S401	24	"W" - 0.33'	24	("W" - 0.33') / cos (Skew°)
S402	8	"W" - 0.33'	8	"W"/cos(Skew°) + 3.0'×tan(Skew°) - 0.33'
S403	①	②	①	②
S403-Int.	①	②	①	②
S404	①	②	①	②
S405	48	1'-6"	48	1'-6"
S501	36	"W" - 0.33'	36	("W" - 0.33') / cos (Skew°)
S502	①	34'-8"	①	34'-8"
S701	①	34'-8"	①	34'-8"

All bar lengths are in feet.

① Varies with Approach Slab Type, Width and/or Skew.
② See "BENDING DIAGRAMS"

GENERAL NOTES

All concrete shall be Class S(AE) with a minimum 28 day compressive strength f'c = 4,000 psi and shall be poured in the dry.

All reinforcing steel shall be Grade 60 (yield strength = 60,000 psi) conforming to AASHTO M 31 or M 322, Type A, with mill test reports.

The surface finish for Approach Slabs shall match that used on the bridge deck.

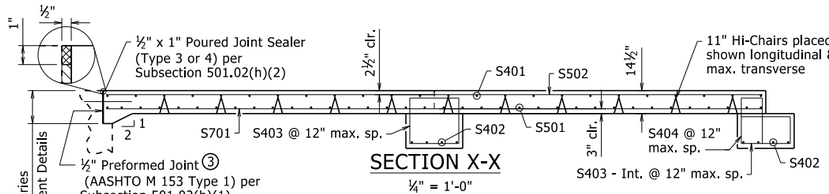
All longitudinal lines within the limits of horizontal curves shall be on curves concentric to C.L. Bridge. Adjustment to longitudinal bar lengths may be required. Transverse reinforcing shall be placed on radial lines to C.L. Bridge.

See Plans for actual Approach Slab Width, "W", end bent or span details, and approach pavement. Units of "W" are in Feet.

Approach Slabs will be measured and paid for in accordance with Section 504.

Scales shown are for full size 22"x34" drawings. When using 11"x17" drawings, reduce scale by one half.

For Table of Quantities, see "SCHEDULE OF BRIDGE QUANTITIES".



Approach Slab for Square Non-Integral End Bent at Concrete Approach Shown

MINIMUM BAR LAP LENGTH

#4	1'-8"
#5	2'-0"
#7	2'-10"

③ Eliminate Type 1 Preformed Joint when bridge details show reinforcing dowels across these joints. Poured joint sealer is required, however, backer rod shall be eliminated.

④ When construction joint is eliminated, place 1" Sawed Joint with ½" x 1" Poured Joint Sealer (Type 3 or 4) per Subsection 501.02(h)(2). Backer rod is not required.

⑤ Eliminate dowels when approach slab is adjacent to curb and gutter, or as directed by the Engineer.

The document was originally issued and sealed by Charles R. Ellis, PE No. 9235, on September 7, 2023. This copy is not a signed and sealed document.

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No. 9235
CHARLES R. ELLIS

BRIDGE ENGINEER

STANDARD DETAILS FOR TYPE F APPROACH SLAB

ARKANSAS STATE HIGHWAY COMMISSION

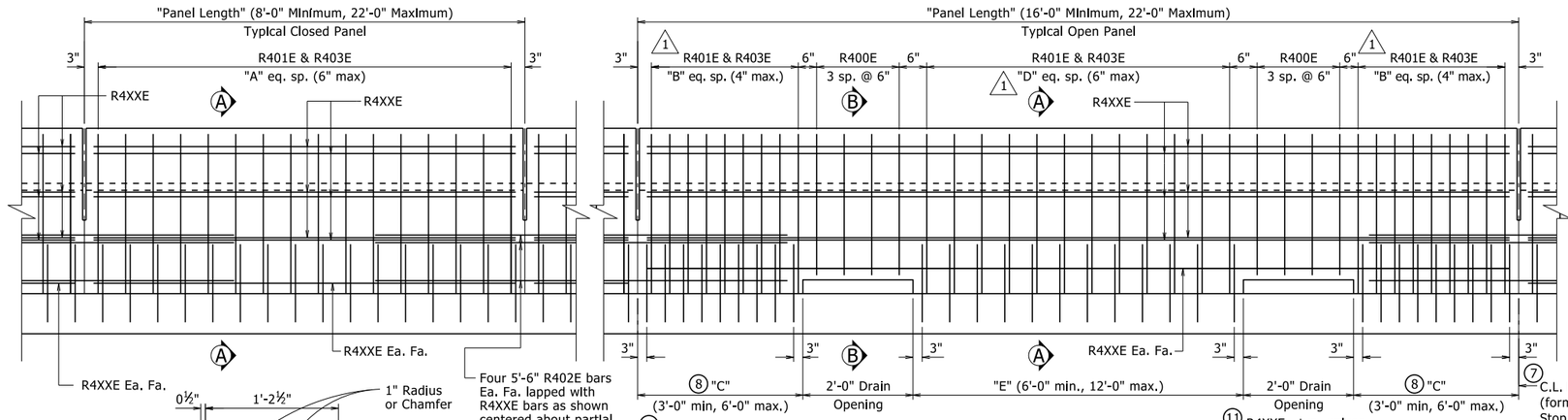
LITTLE ROCK, ARK.

DRAWN BY:	CGP	DATE:	05/12/2023	FILENAME:	b55040f.dgn
CHECKED BY:	JYP	DATE:	05/15/2023	SCALE:	AS NOTED
DESIGNED BY:	STD.	DATE:	-		

DRAWING NO. 55040F1

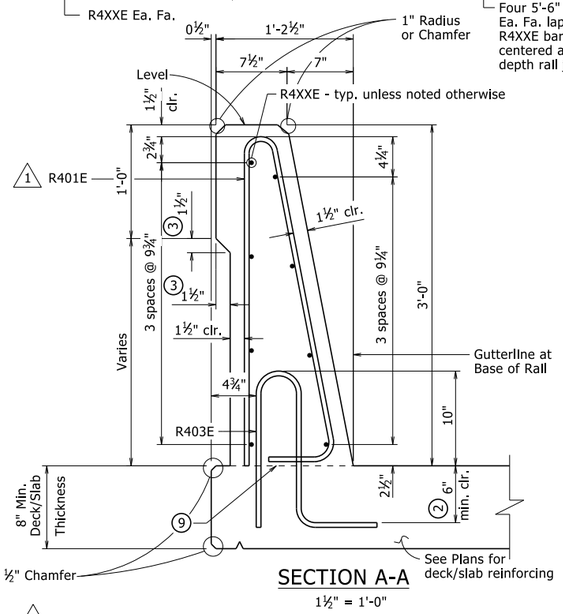
DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
09/27/2022				6	ARK.			
				JOB NO.				

TYPE SSTR36 - 55070



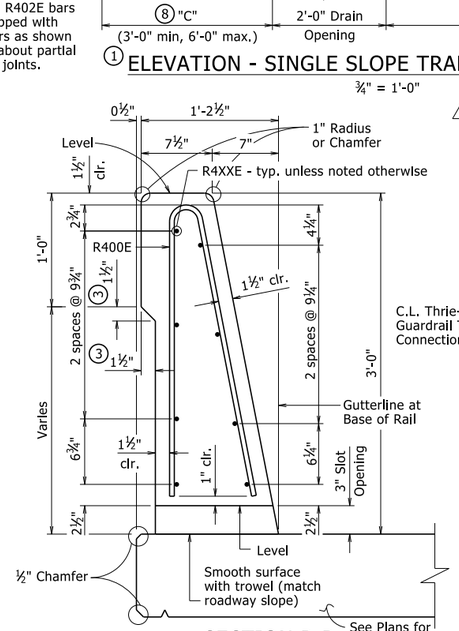
① ELEVATION - SINGLE SLOPE TRAFFIC RAIL

¾" = 1'-0"



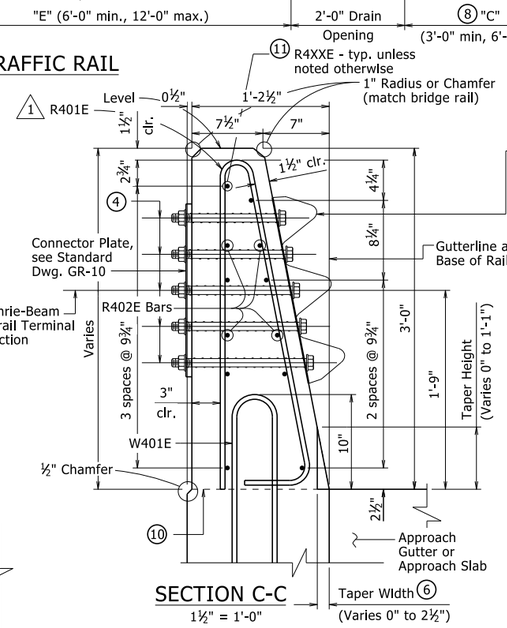
SECTION A-A

1½" = 1'-0"



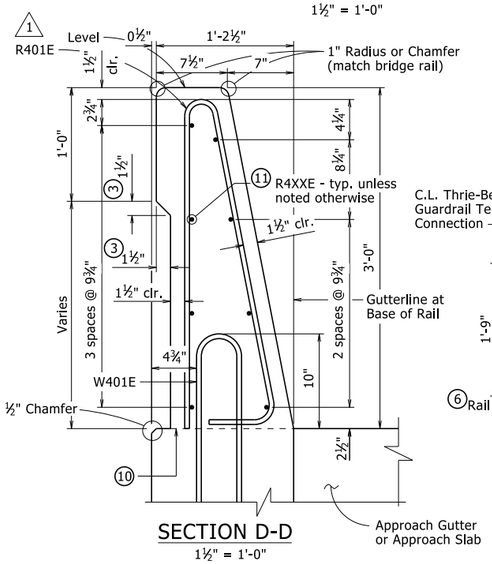
SECTION B-B

1½" = 1'-0"



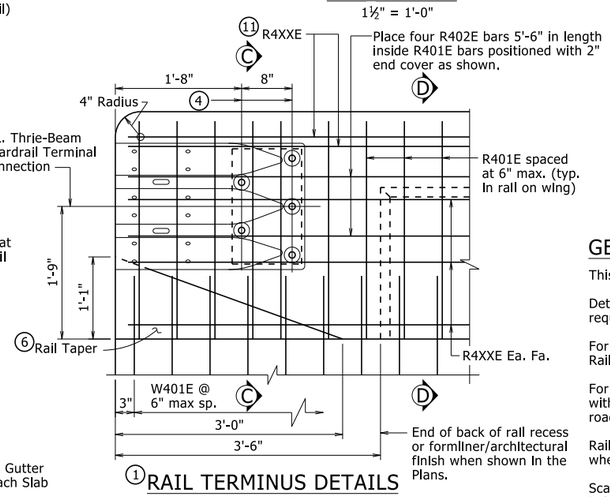
SECTION C-C

1½" = 1'-0"



SECTION D-D

1½" = 1'-0"



① RAIL TERMINUS DETAILS

1" = 1'-0"

⑦ C.L. Full-Depth Rail Joint (formed width ¼" to 1" max). Stop 6" from top of deck/slab or sidewalk. Place at all intermediate bents locations where rail is continuous.

⑦ C.L. Partial-Depth Rail Joint (formed width ¼" to 1" max). Stop 16" from top of deck/slab or sidewalk. Place at all remaining locations other than at intermediate bents.

① All measurements shown are along gutterline at base of rail.

② Minimum embedment into deck/slab.

③ Eliminate recess when formliner with architectural finish is used. See Plans for additional information.

④ C.L. 1" ø formed holes for ⅞" ø bolts. See Standard Drawings GR-10 and GR-12 for additional information.

⑤ Only applicable for bridges with rail cast directly on bridge deck/slab surface. Increase height as necessary for sidewalks, see Plans for additional information.

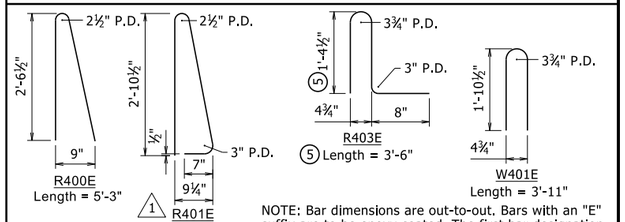
⑥ Field bend front leg of R401E bar as required to maintain minimum 1½" front face clearance within limits of taper.

⑦ When optional slip forming is used: to control cracking, all rail joints must be V-grooved around the perimeter of the rail prior to concrete set and sawing. Depth of V-groove shall be ½". Sawing of the joints shall be done as soon as practical to a width of ¼", and must be controlled so it will follow the V-Groove.

⑧ End posts shall be the same length within a panel.

Bolt Special End Shoe to face of rail as shown. Tapered washers are not required between the head of the bolts and the sloped face of the rail. Tighten the five terminal connection bolts in a well distributed pattern to prevent damage or distortion of the thrie-beam connection. Cut bolts off after installation so as to extend no more than ¾" beyond nut. Paint ends of cut-off bolts with zinc-rich paint. This work and material will not be paid for directly but shall be considered subsidiary to associated contract items.

BENDING DIAGRAM



NOTE: Bar dimensions are out-to-out. Bars with an "E" suffix are to be epoxy coated. The first bar designation number indicates the reinforcing bar size.

⑨ Required Construction Joint. Level where water flows away from rail, match roadway slope where water flows toward rail.

⑩ Top of Abutment Wing & Required Construction Joint (match bridge deck/slab construction joint slope). See Plans for Wing reinforcing.

⑪ These bars will not be included in the "Table of Variables". See Plans for details.

TABLE OF VARIABLES

Closed Rail Panels			Open Rail Panels					
Panel Length	A	R4XXE	Panel Length	B	C	D	E	R4XXE

See Plans for table with values.

GENERAL NOTES

This rail has been successfully evaluated by full-scale crash test to meet MASH TL-4 criteria.

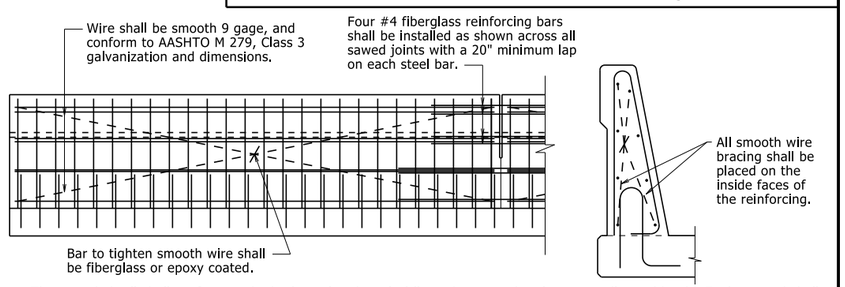
Details shown are general for bridges without sidewalks. See Plans for additional details and requirements specific to bridges with sidewalks.

For Table of Variables, Rail Bar List, locations of Full and Partial Depth Rail Joints, and Wing & Rail Bar Lists, see Plans.

For location of drain openings, see Plans. Drain openings shown are not applicable for bridges with sidewalks. Drain openings will not be allowed over Railroad Right of Way, travelled roadways, and protected waterways.

Rail Terminus details, including Rail Taper, are not applicable for bridges with sidewalks or when bridge railing is continuous with roadway railing.

Scales shown are for 22"x34" drawings. When using 11"x17" drawings, reduce scale by one half.



The extruded rail shall conform to the horizontal and vertical lines shown on the plans or as directed by the Engineer and shall present a smooth, uniform appearance and texture. Unless otherwise noted, exposed surfaces may be given a light brush finish or a Class 3, Textured Coating Finish in place of Class 2, Rubbed Finish.

All panels shall be braced as required to prevent racking.

Slip forming will not be allowed on bridges where formliner with architectural treatment is used unless approval from the Engineer is obtained.

DETAILS OF OPTIONAL SLIP FORMING OF BRIDGE TRAFFIC RAIL

No Scale

△1 Modified bending diagram and spacing for R401E bar.

By: CGP, Checked by: CMW 09/27/2022

This document was originally issued and sealed by Charles R. Ellis, PE No. 9235, on November 5, 2020. This copy is not a signed and sealed document.

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No. 9235
CHARLES R. ELLIS

BRIDGE ENGINEER

THESE DETAILS ARE APPLICABLE UNLESS OTHERWISE SHOWN IN THE PLAN DETAILS, SPECIAL PROVISIONS, OR SUPPLEMENTAL SPECIFICATIONS.

STANDARD DETAILS FOR BRIDGE TRAFFIC RAIL TYPE SSTR36

ARKANSAS STATE HIGHWAY COMMISSION

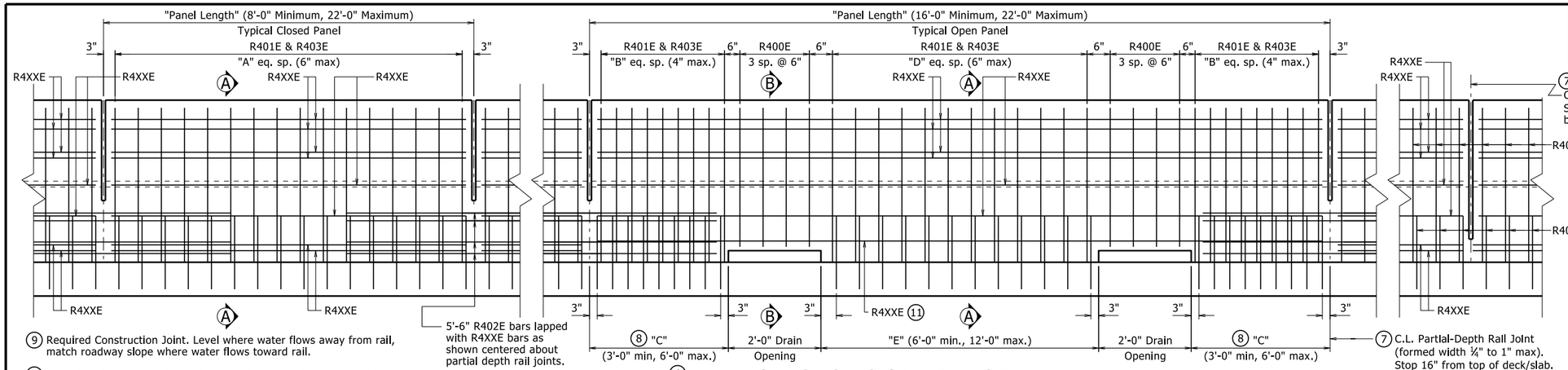
LITTLE ROCK, ARK.

DRAWN BY: KWY DATE: 11/5/2020
CHECKED BY: LJB DATE: 11/5/2020
DESIGNED BY: STD. DATE: -----
FILENAME: b55070.dgn
SCALE: As Noted

DRAWING NO. 55070

PRINT DATE: 10/6/2022

DATE REVISED	DATE REVISED	FED. ROAD DIST. NO.	STATE	JOB NO.	SHEET NO.	TOTAL SHEETS
		6	ARK.			
		TYPE SSTR42 - 55071				



1 ELEVATION - SINGLE SLOPE TRAFFIC RAIL

9 Required Construction Joint. Level where water flows away from rail, match roadway slope where water flows toward rail.

10 Top of Abutment Wing & Required Construction Joint (match bridge deck/slab construction joint slope). See Plans for Wing reinforcing.

11 These bars shall be raised up over drain opening as shown in "SECTION B-B".

1 All measurements shown are along gutterline at base of rail.

2 Minimum embedment into deck/slab.

3 Eliminate recess when formliner with architectural finish is used. See Plans for additional information.

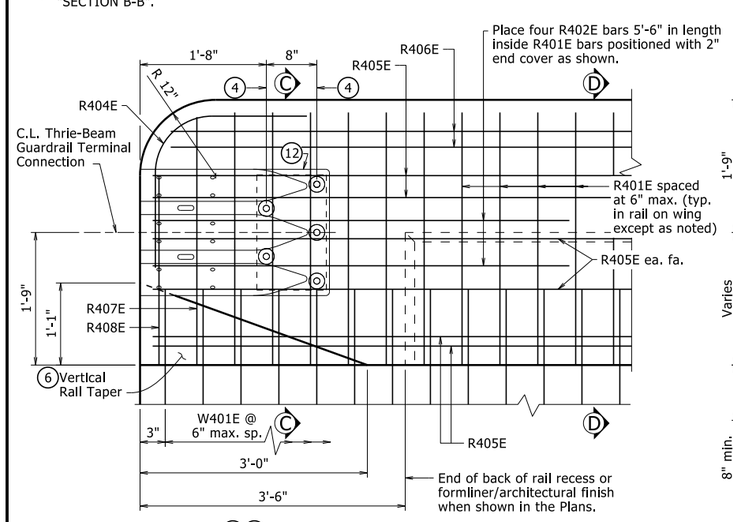
4 C.L. 1" ø formed holes for ⅞" ø bolts. See Standard Drawings GR-10 and GR-12 for additional information.

5 These bars will not be included in the "TABLE OF VARIABLES", see plans for additional information.

6 Field bend front leg of R401E bar as required to maintain minimum 1½" front face clearance within limits of taper.

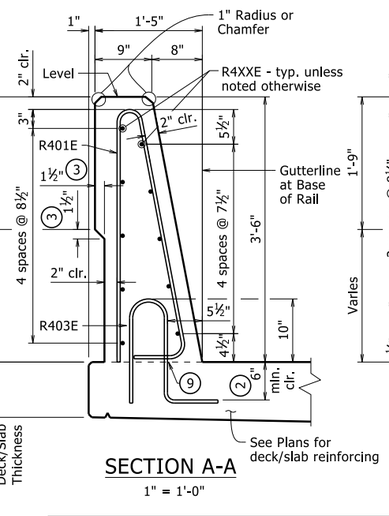
7 When optional slip forming is used: to control cracking, all rail joints must be V-grooved around the perimeter of the rail prior to concrete set and sawing. Depth of V-groove shall be ½". Sawing of the joints shall be done as soon as practical to a width of ¼", and must be controlled so it will follow the V-Groove.

8 End posts shall be the same length within a panel.



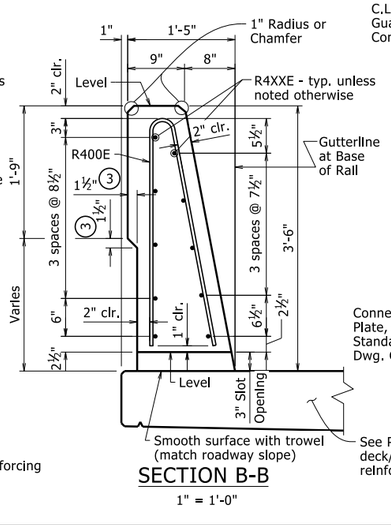
1 5 RAIL TERMINUS DETAIL

1" = 1'-0"



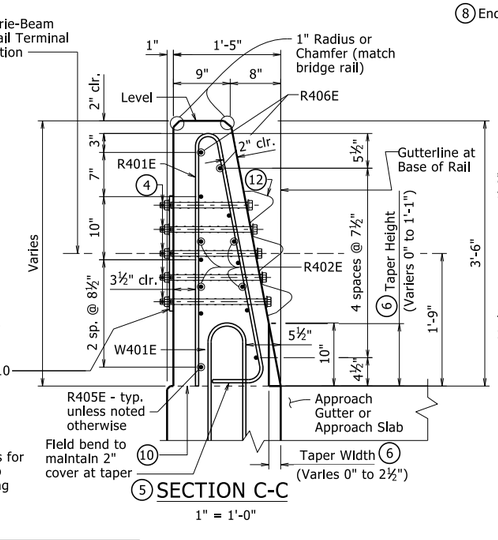
SECTION A-A

1" = 1'-0"



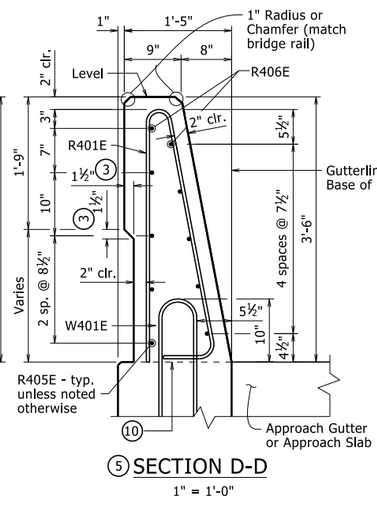
SECTION B-B

1" = 1'-0"



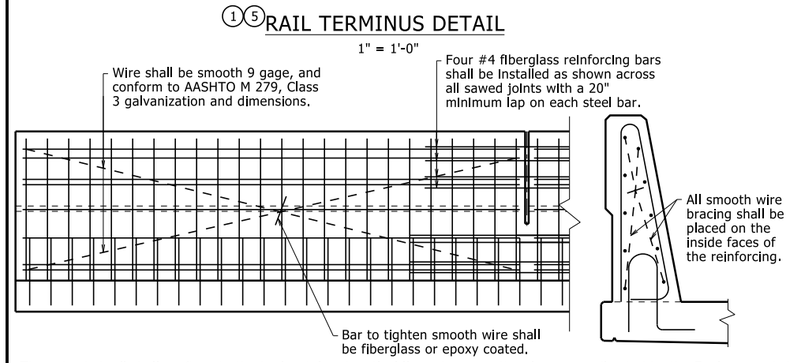
5 SECTION C-C

1" = 1'-0"



5 SECTION D-D

1" = 1'-0"



DETAILS OF OPTIONAL SLIP FORMING OF BRIDGE TRAFFIC RAIL

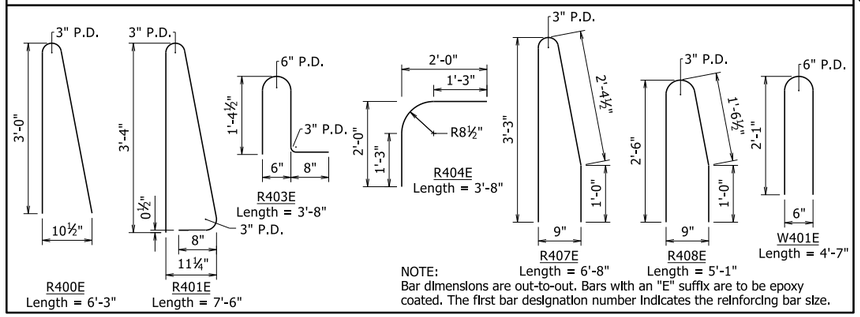
No Scale

The extruded rail shall conform to the horizontal and vertical lines shown on the plans or as directed by the Engineer and shall present a smooth, uniform appearance and texture. Unless otherwise noted, exposed surfaces may be given a light brush finish or a Class 3, Textured Coating Finish in place of Class 2, Rubbed Finish.

All panels shall be braced as required to prevent racking.

Slip forming will not be allowed on bridges where formliner with architectural treatment is used unless approval from the Engineer is obtained.

BENDING DIAGRAM



12 Bolt Special End Shoe to face of rail as shown. Tapered washers are not required between the head of the bolts and the sloped face of the rail. Tighten the five terminal connection bolts in a well distributed pattern to prevent damage or distortion of the thrie-beam connection. Cut bolts off after installation so as to extend no more than ⅜" beyond nut. Paint ends of cut-off bolts with zinc-rich paint. This work and material will not be paid for directly but shall be considered subsidiary to associated contract items.

TABLE OF VARIABLES

Closed Rail Panels			Open Rail Panels					
Panel Length	A	R4XXE	Panel Length	B	C	D	E	R4XXE

See Plans for table with values.

This document was originally issued and sealed by Charles R. Ellis, PE No. 9235, on July 06, 2022. This copy is not a signed and sealed document.

GENERAL NOTES

This rail has been evaluated and accepted to be of equal strength to railings with similar geometry, which have been evaluated by full-scale crash test to meet MASH TL-4 criteria.

For Table of Variables, Rail Bar List, locations of Full and Partial Depth Rail Joints, and Wing & Rail Bar Lists, see Plans.

For location of drain openings, see Plans. Drain openings will not be allowed over Railroad Right of Way, travelled roadways, and protected waterways.

Rail Terminus details, including Rail Taper, are not applicable when bridge railing is continuous with roadway railing.

Scales shown are for full size 22"x34" drawings. When using 11"x17" drawings, reduce scale by one half.

THESE DETAILS ARE APPLICABLE UNLESS OTHERWISE SHOWN IN THE PLAN DETAILS, SPECIAL PROVISIONS, OR SUPPLEMENTAL SPECIFICATIONS.

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No. 9235
CHARLES R. ELLIS
BRIDGE ENGINEER

STANDARD DETAILS FOR BRIDGE TRAFFIC RAIL TYPE SSTR42

ARKANSAS STATE HIGHWAY COMMISSION

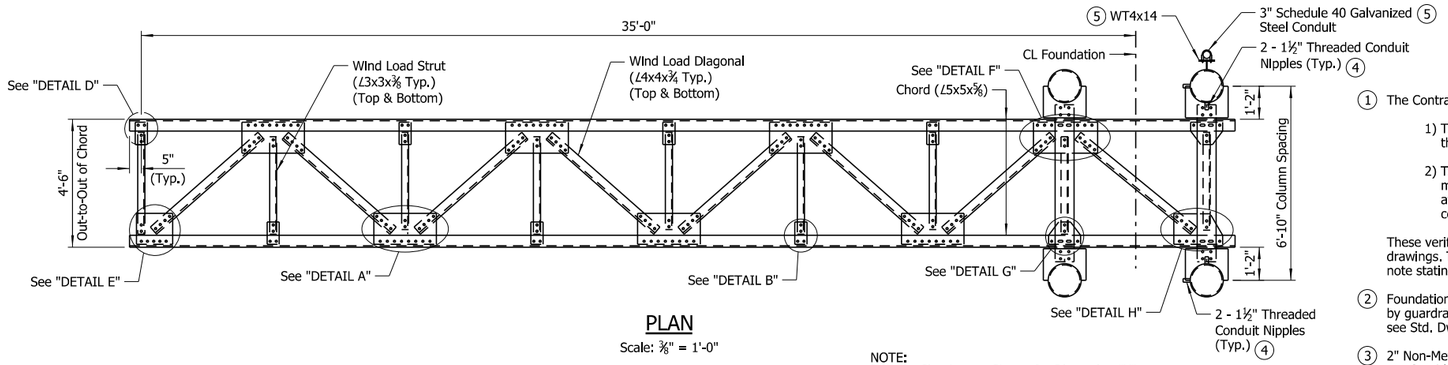
LITTLE ROCK, ARK.

DRAWN BY:	CGP	DATE:	06/30/2022	FILENAME:	b55071.dgn
CHECKED BY:	CMW	DATE:	07/01/2022	SCALE:	AS NOTED
DESIGNED BY:	STD.	DATE:	-		

DRAWING NO. 55071

PRINT DATE: 7/6/2022

DATE REVISED	DATE REVISED	FED. ROAD DIST. NO.	STATE	JOB NO.	SHEET NO.	TOTAL SHEETS
		6	ARK.			
		CANTILEVER SIGN STR. (35') - 55090A				



PLAN

Scale: ⅜" = 1'-0"

NOTE:
Refer to Sign Layout Sheets for Dimension "X" and Foundation Type required for each structure.

NOTE:
WT4x14 member at top of column not shown in "ELEVATION - FOUNDATION A1" for clarity.

1. The Contractor shall make field measurements to determine the following:

   1) To verify that dimension "X" is sufficient to center the sign over the intended lane while maintaining minimum horizontal clearances.

   2) To determine the column height "H" required to maintain the minimum vertical clearance with the centerline of the sign located at the CL of the truss. If the structure height "H" exceeds 30'-0", contact the Engineer.

   These verifications and measurements are required prior to submittal of the shop drawings. The column height "H" shall be shown on the shop drawings with a note stating that the Contractor has made the required field measurements.

2. Foundation A1 allowed only when foundation is outside clear zone or is protected by guardrail or barrier. For alternate drilled shaft foundation (Foundation A2), see Std. Dwg. 55090F.

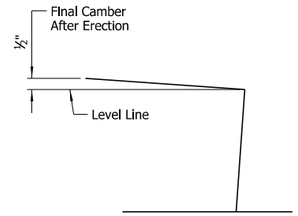
3. 2" Non-Metallic Conduit (Schedule 80) with 16" Min. Bend Radius (2 Conduits per Outside Column). If cabling in the conduit is not required per Electrical and/or ITS plans, the end of conduit in the ground shall be capped for future use with a manufactured water-tight cap.

4. Threaded Conduit Nipples shall be fitted with standard plugs until conduit is installed.

5. See "SECTION U-U" on Std. Dwg. 55090C. WT4x14 always required. 3" Conduit and Clamping U-Bolts only required when necessary to support ITS equipment or as directed by the Engineer. See ITS Plans.

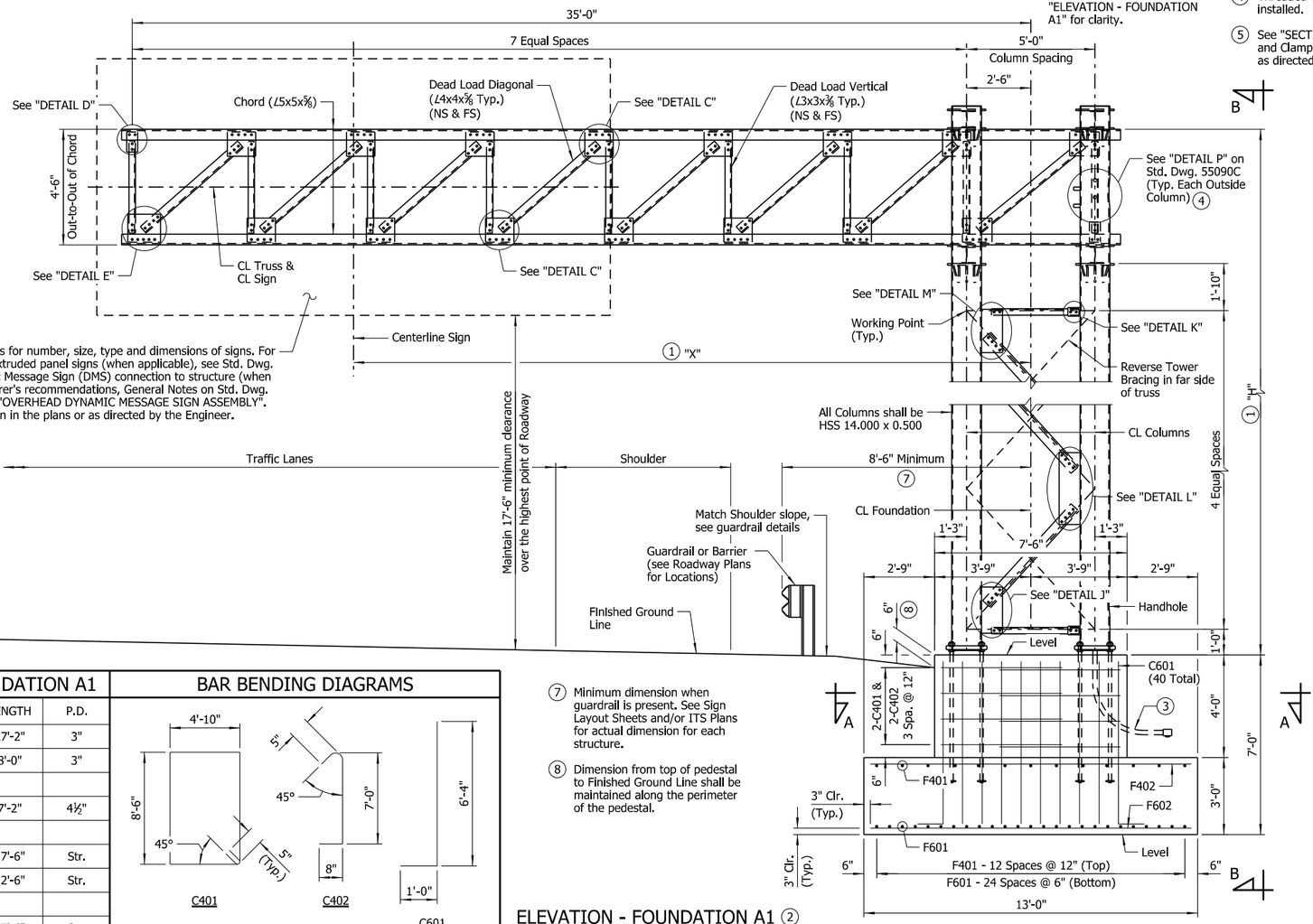
NOTES:
For "VIEW B-B" and "DETAIL J" thru "DETAIL M", see Std. Dwg. 55090B.

For "DETAIL A" thru "DETAIL H", see Std. Dwg. 55090C.



TRUSS CAMBER DIAGRAM

No Scale



See sign details and plan sheets for number, size, type and dimensions of signs. For details of hanger spacing for extruded panel signs (when applicable), see Std. Dwg. 55090E. For details of Dynamic Message Sign (DMS) connection to structure (when applicable), refer to Manufacturer's recommendations, General Notes on Std. Dwg. 55090E, and Special Provision "OVERHEAD DYNAMIC MESSAGE SIGN ASSEMBLY". Signs are to be placed as shown in the plans or as directed by the Engineer.

7 Minimum dimension when guardrail is present. See Sign Layout Sheets and/or ITS Plans for actual dimension for each structure.

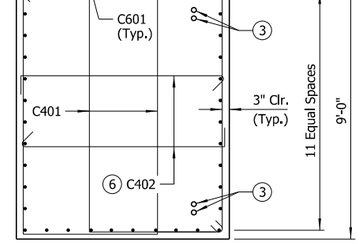
8 Dimension from top of pedestal to Finished Ground Line shall be maintained along the perimeter of the pedestal.

ELEVATION - FOUNDATION A1 2

No Scale

LEGEND

NS = Near Side
FS = Far Side



SECTION A-A

Scale: ⅜" = 1'-0"

6 Alternate C402 tles end for end at each layer of reinforcing.

BAR LIST - FOUNDATION A1

MARK	NO. REQ'D	LENGTH	P.D.
C401	8	27'-2"	3"
C402	8	8'-0"	3"
C601	40	7'-2"	4½"
F401	13	17'-6"	Str.
F402	18	12'-6"	Str.
F601	25	17'-6"	Str.
F602	35	12'-6"	Str.

BAR BENDING DIAGRAMS

NOTE:
Dimensions of bars are out-to-out.

APPROXIMATE QUANTITIES FOR FOUNDATION A1 (FOR INFORMATION ONLY)

CLASS S CONCRETE (CU. YDS.)	REINFORCING STEEL (LBS.)	EXCAVATION (CU. YDS.)
36.00	2,240	81

THESE DETAILS ARE APPLICABLE UNLESS OTHERWISE SHOWN IN THE PLAN DETAILS, SPECIAL PROVISIONS, OR SUPPLEMENTAL SPECIFICATIONS.

SHEET 1 OF 6
STANDARD DETAILS OF 35' STEEL CANTILEVER SIGN STRUCTURE
ARKANSAS STATE HIGHWAY COMMISSION
LITTLE ROCK, ARK.

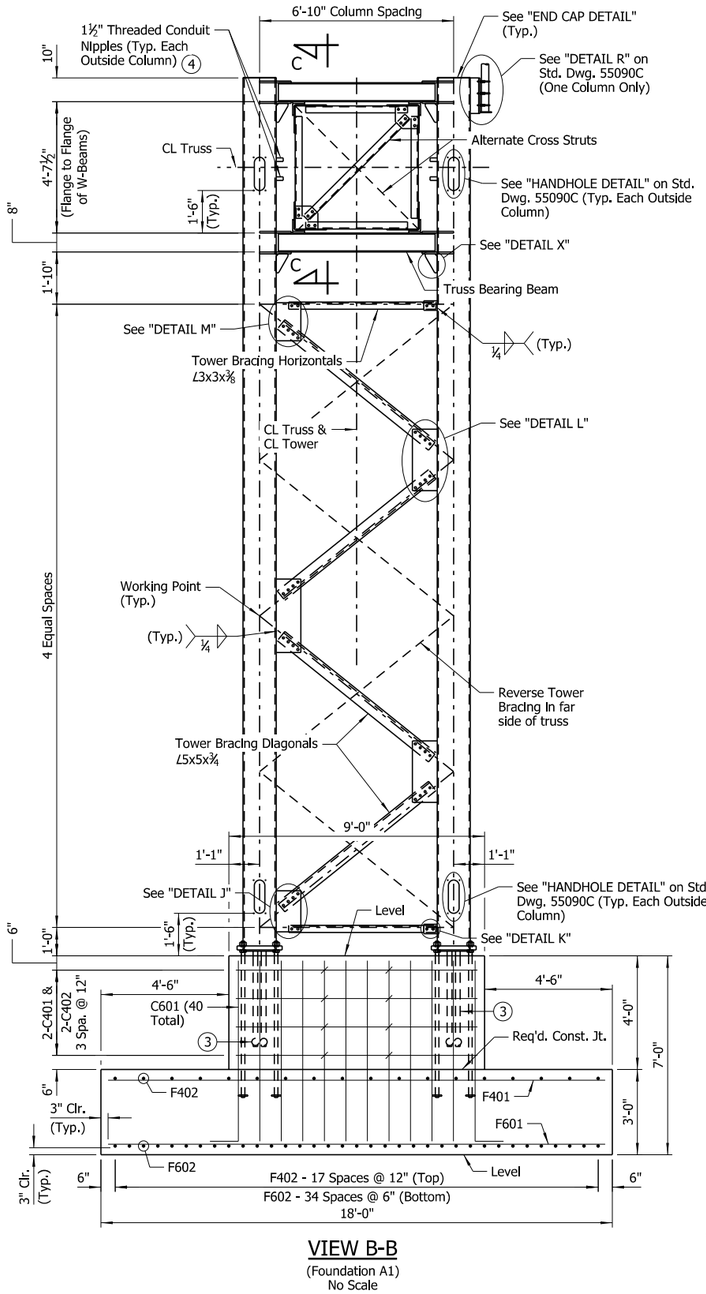
This document was originally issued by ARDOT Bridge Division. A sealed and signed original is held on file. This copy is not a signed and sealed document.

DRAWN BY: CSW DATE: DEC. 2022 FILENAME: b55090a.dgn
CHECKED BY: ABH DATE: FEB. 2023 SCALE: As Shown
DESIGNED BY: STD. DATE: -

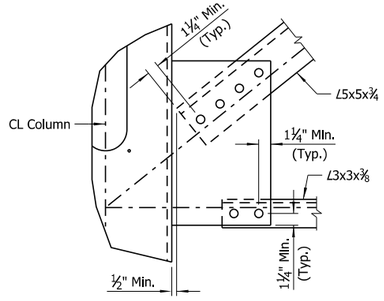
Scales shown are for full size 22"x34" drawings. When using 11"x17" drawings, reduce scale by one half. DRAWING NO. 55090A

6/17/2026

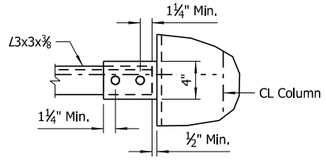
DATE REVISED	DATE REVISED	FED. ROAD DIST. NO.	STATE	JOB NO.	SHEET NO.	TOTAL SHEETS
		6	ARK.			
		CANTILEVER SIGN STR. (35') - 55090B				



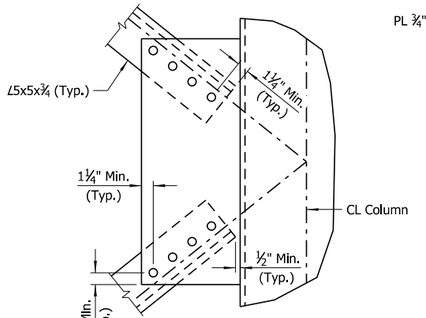
VIEW B-B
(Foundation A1)
No Scale



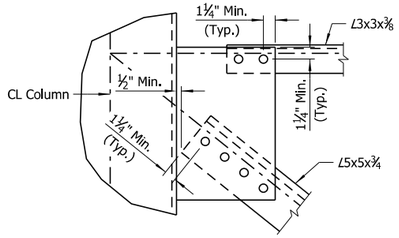
DETAIL J
No Scale



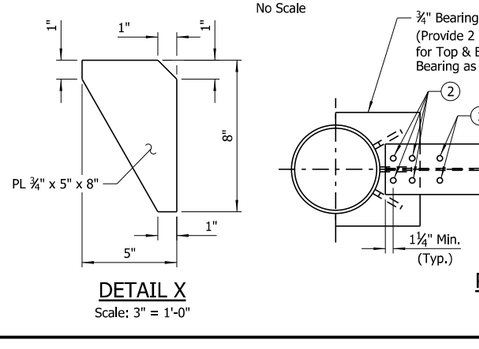
DETAIL K
No Scale



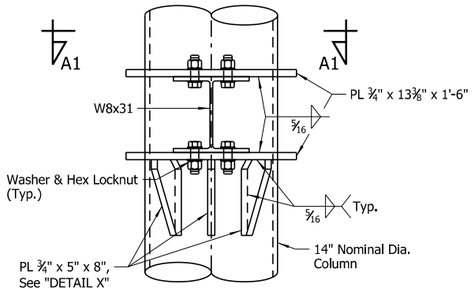
DETAIL L
No Scale



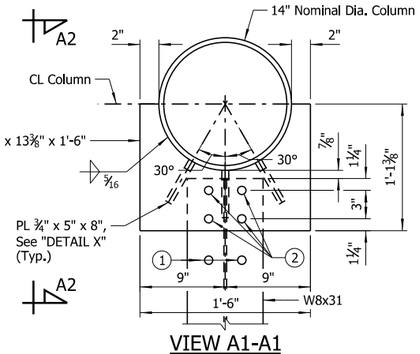
DETAIL M
No Scale



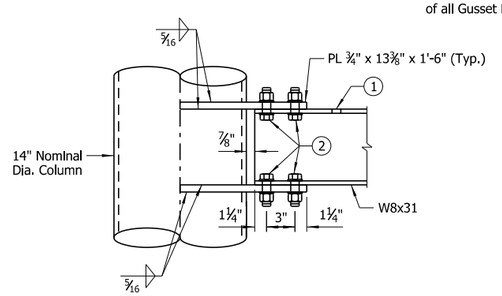
DETAIL X
Scale: 3" = 1'-0"



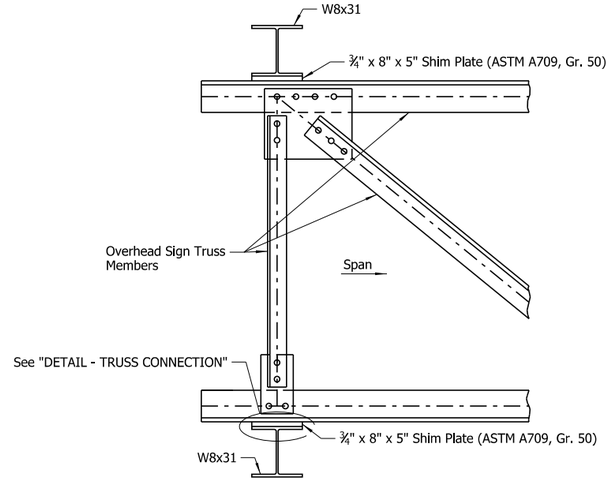
DETAIL - TRUSS BEARING SUPPORT
Scale: 1½" = 1'-0"



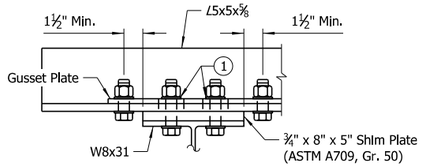
VIEW A1-A1
Scale: 1½" = 1'-0"



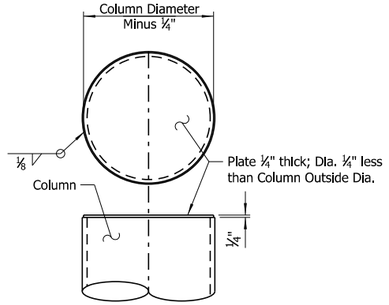
VIEW A2-A2
Scale: 1½" = 1'-0"
(¾" x 5" x 8" Plate not shown for clarity)



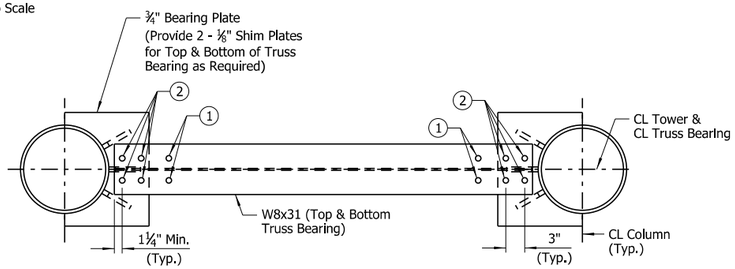
VIEW C-C
No Scale



DETAIL - TRUSS CONNECTION
No Scale



END CAP DETAIL
Scale: 1½" = 1'-0"



PLAN AT TRUSS BEARING
Scale: 1" = 1'-0"

NOTE:
Unless noted otherwsie, thickness of all Gusset Plates shall be ⅜".

(1) Bolts shall be ⅞"ø. Provide 15/16" x 2" slotted hole in gusset plate and chord angle. Use plate washer on gusset plate side. Provide 15/16"ø holes in ¾" shim plate and top or bottom beam flanges as required.

(2) Bolts shall be ⅞"ø. Provide 15/16"ø holes at top and bottom beam flanges and connection plates.

(3) 2" Non-Metallic Conduit (Schedule 80) (2 Conduits per Outside Column). An insulated bushing shall be installed at the top end of each conduit.

(4) Threaded Conduit Nipples shall be fitted with standard plugs until conduit is installed.

THESE DETAILS ARE APPLICABLE UNLESS OTHERWISE SHOWN IN THE PLAN DETAILS, SPECIAL PROVISIONS, OR SUPPLEMENTAL SPECIFICATIONS.

SHEET 2 OF 6
STANDARD DETAILS OF 35' STEEL CANTILEVER SIGN STRUCTURE
ARKANSAS STATE HIGHWAY COMMISSION

LITTLE ROCK, ARK.

DRAWN BY: CSW DATE: DEC. 2022 FILENAME: b55090b.dgn
CHECKED BY: ABH DATE: FEB. 2023 SCALE: As Shown
DESIGNED BY: STD. DATE: -

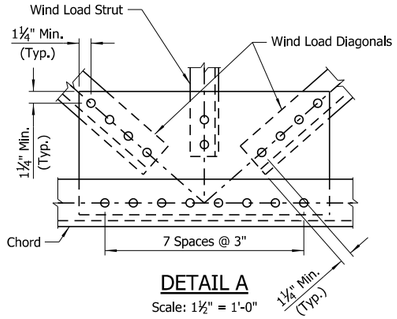
DRAWING NO. 55090B

This document was originally issued by ARDOT Bridge Division. A sealed and signed original is held on file. This copy is not a signed and sealed document.

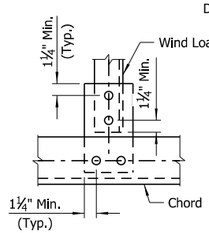
Scales shown are for full size 22"x34" drawings. When using 11"x17" drawings, reduce scale by one half.

6/17/2026

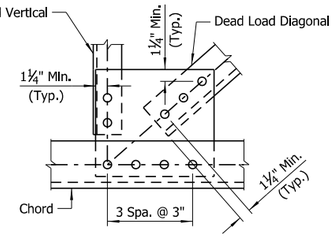
DATE REVISED	DATE REVISED	FED. ROAD DIST. NO.	STATE	JOB NO.	SHEET NO.	TOTAL SHEETS
		6	ARK.			
		CANTILEVER SIGN STR. (35') - 55090C				



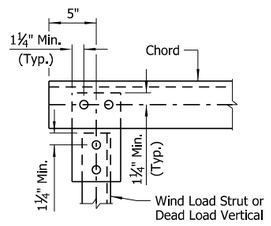
DETAIL A
Scale: 1½" = 1'-0"



DETAIL B
Scale: 1½" = 1'-0"

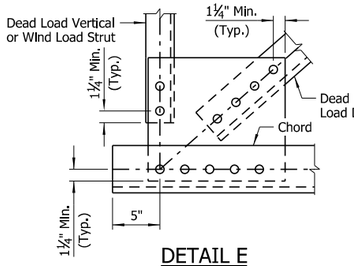


DETAIL C
Scale: 1½" = 1'-0"

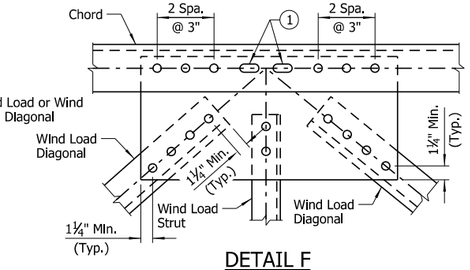


DETAIL D
Scale: 1½" = 1'-0"

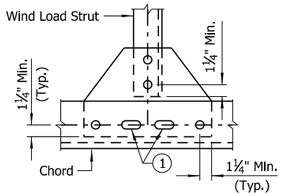
NOTE:
Unless otherwise noted, thickness of all Gusset Plates shall be ⅜".



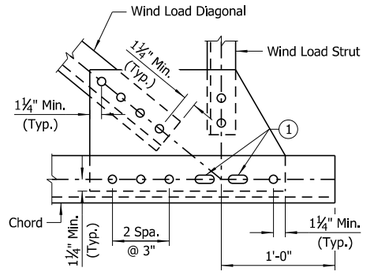
DETAIL E
Scale: 1½" = 1'-0"



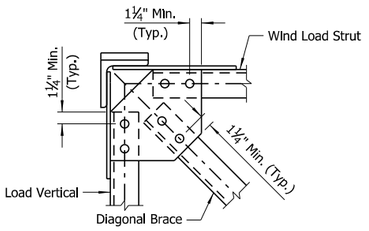
DETAIL F
Scale: 1½" = 1'-0"



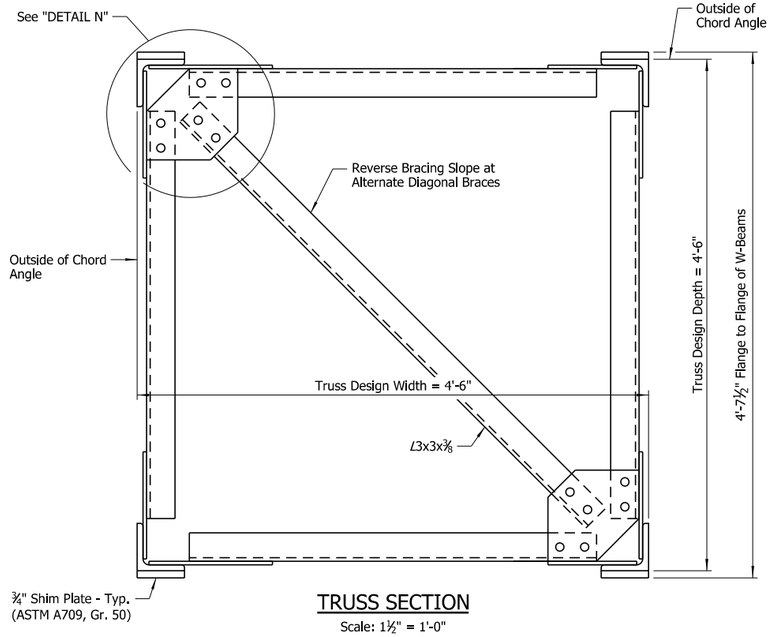
DETAIL G
Scale: 1½" = 1'-0"



DETAIL H
Scale: 1½" = 1'-0"



DETAIL N
Scale: 1½" = 1'-0"

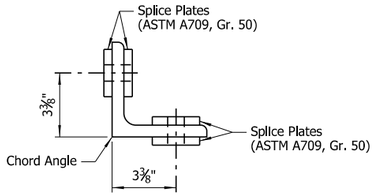


TRUSS SECTION
Scale: 1½" = 1'-0"

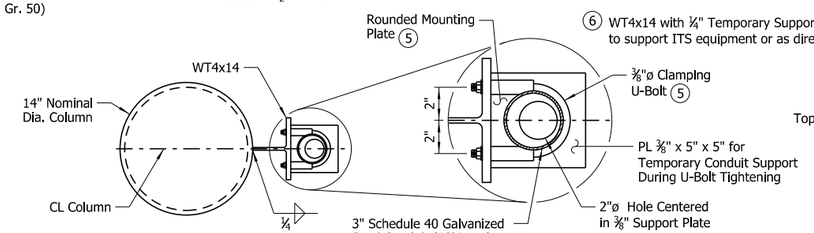
1. Bolts shall be ⅞"ø. Provide 15/16" x 2" slotted holes in gusset plate and chord angle. Clearance between end of slot and adjacent bolt hole shall be no less than 1½". Use plate washer on gusset plate side.
2. Bolts shall be ¾"ø and open holes shall be 13/16"ø.
3. See details on Std. Dwgs. 55090A & 55090B for location and orientation of handholes and threaded conduit nipples.
4. Threaded conduit nipples shall be fitted with standard plugs until conduit is installed.
5. When required per plans to support ITS equipment, or as directed by the Engineer, Clamping U-Bolt with Rounded Mounting Plate Assembly product shall be included in shop drawings for approval. Assembly shall be galvanized and shall meet the requirements of ASTM A36 at a minimum. Install per Manufacturer's instructions.
6. WT4x14 with ¼" Temporary Support Plate always required. 3" Conduit and Clamping U-Bolts only required when necessary to support ITS equipment or as directed by the Engineer. See ITS Plans.

② CHORD SPLICE
Scale: 3 = 1'-0"

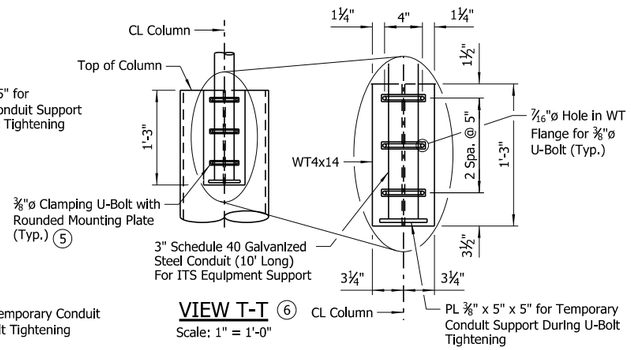
NOTE:
Chord angles may be spliced in convenient lengths for galvanizing and sign placement.



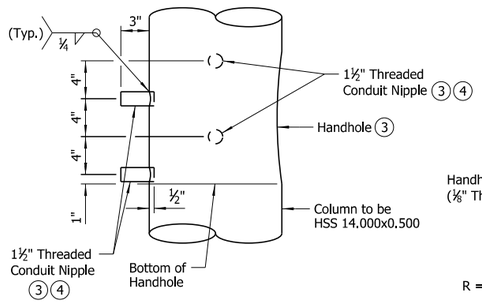
VIEW D-D
Scale: 3 = 1'-0"



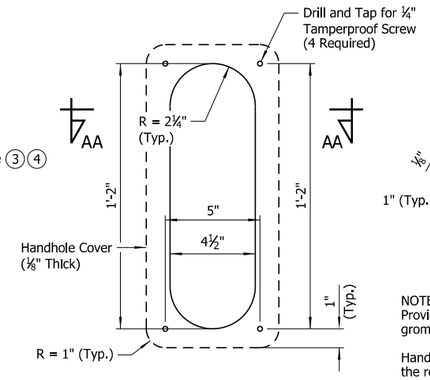
SECTION U-U (6)
Scale: 1½" = 1'-0"



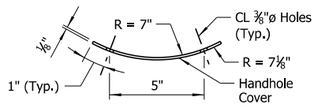
VIEW T-T (6)
Scale: 1" = 1'-0"



DETAIL P
Scale: 1½" = 1'-0"



HANDHOLE DETAIL (3)
Scale: 3" = 1'-0"



SECTION AA-AA
Scale: 3" = 1'-0"

NOTE:
Provide handhole covers with chain, waterproof grommet, and tamperproof screws.

Handhole covers shall be galvanized and meet the requirements of ASTM A36 at a minimum.

Tamperproof screws shall be galvanized and meet the requirements of ANSI/ASME B18.6.3.

DETAIL R (6)
Scale: 1" = 1'-0"

THESE DETAILS ARE APPLICABLE UNLESS OTHERWISE SHOWN IN THE PLAN DETAILS, SPECIAL PROVISIONS, OR SUPPLEMENTAL SPECIFICATIONS.

SHEET 3 OF 6
STANDARD DETAILS OF 35' STEEL CANTILEVER SIGN STRUCTURE
ARKANSAS STATE HIGHWAY COMMISSION

LITTLE ROCK, ARK.

This document was originally issued by ARDOT Bridge Division. A sealed and signed original is held on file. This copy is not a signed and sealed document.

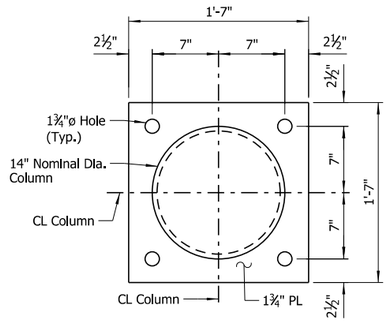
DRAWN BY:	CSW	DATE:	DEC. 2022	FILENAME:	b55090c.dgn
CHECKED BY:	ABH	DATE:	FEB. 2023	SCALE:	As Shown
DESIGNED BY:	STD.	DATE:	-		

Scales shown are for full size 22"x34" drawings. When using 11"x17" drawings, reduce scale by one half.

DRAWING NO. 55090C

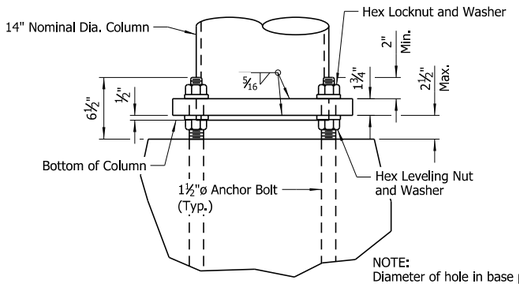
6/17/2026

DATE REVISED	DATE REVISED	FED. ROAD DIST. NO.	STATE	JOB NO.	SHEET NO.	TOTAL SHEETS
		6	ARK.			
		CANTILEVER SIGN STR. (35') - 55090D				



PLAN - COLUMN BASE

Scale: 1½" = 1'-0"



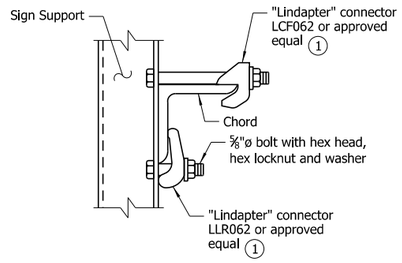
NOTE:
Diameter of hole in base plate to be ⅛" larger than column diameter.

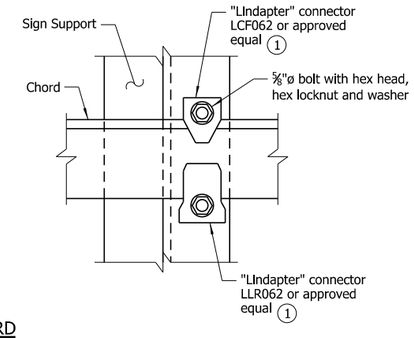
ELEVATION - COLUMN BASE

Scale: 1½" = 1'-0"

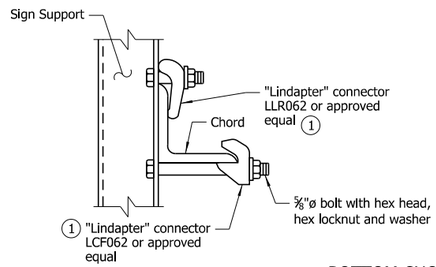
(1) All "Lindapter" connectors or approved equal shall be installed according to Manufacturer's recommendations. All connectors, bolts, nuts and washers shall be galvanized.

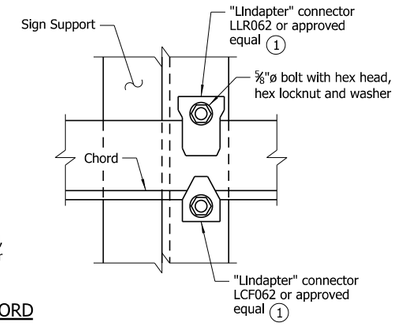
NOTE:
Install all support connectors clear of the gusset plates and splice locations.





TOP CHORD

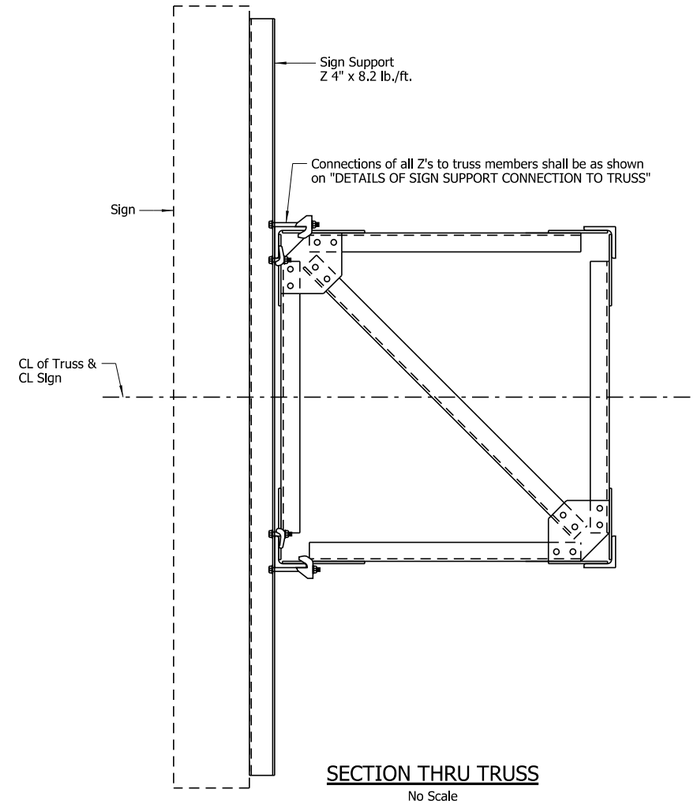




BOTTOM CHORD

DETAILS OF SIGN SUPPORT CONNECTION TO TRUSS

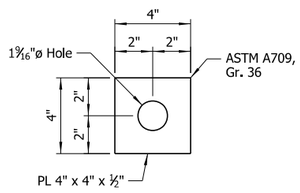
No Scale

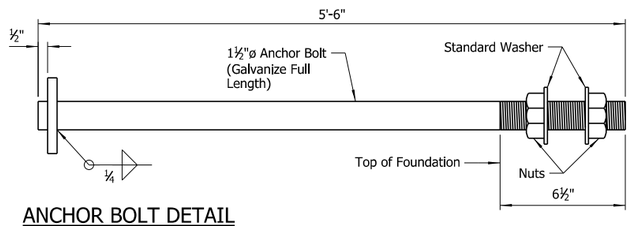


SECTION THRU TRUSS

No Scale

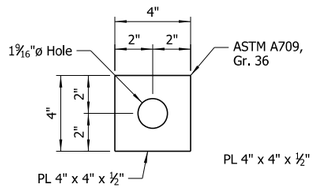
NOTE:
Unless otherwise noted, thickness of all Gusset Plates shall be ⅜".

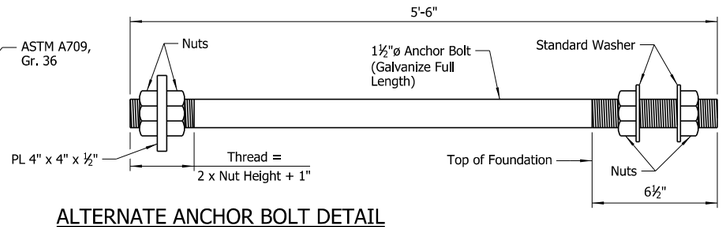




ANCHOR BOLT DETAIL

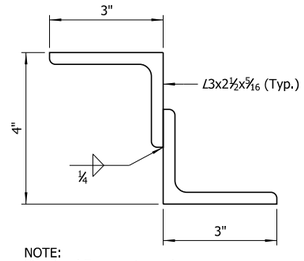
No Scale





ALTERNATE ANCHOR BOLT DETAIL

No Scale



NOTE:
Structural Z support may be fabricated from angles as shown.

DETAILS OF ALTERNATE Z SUPPORT

No Scale

THESE DETAILS ARE APPLICABLE UNLESS OTHERWISE SHOWN IN THE PLAN DETAILS, SPECIAL PROVISIONS, OR SUPPLEMENTAL SPECIFICATIONS.

SHEET 4 OF 6
STANDARD DETAILS OF 35' STEEL CANTILEVER SIGN STRUCTURE
ARKANSAS STATE HIGHWAY COMMISSION

LITTLE ROCK, ARK.

This document was originally issued by ARDOT Bridge Division. A sealed and signed original is held on file. This copy is not a signed and sealed document.

DRAWN BY:	CSW	DATE:	DEC. 2022	FILENAME:	b55090d.dgn
CHECKED BY:	ABH	DATE:	FEB. 2023	SCALE:	As Shown
DESIGNED BY:	STD.	DATE:	-		

Scales shown are for full size 22"x34" drawings. When using 11"x17" drawings, reduce scale by one half.

DRAWING NO. 55090D

6/17/2026

DATE REVISED	DATE REVISED	FED. ROAD DIST. NO.	STATE	JOB NO.	SHEET NO.	TOTAL SHEETS
		6	ARK.			
		CANTILEVER SIGN STR. (35') - 55090E				

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 Specifications unless otherwise noted in the plans.

DESIGN SPECIFICATIONS: AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, First Edition, 2015 with current interim revisions.

Basic Wind Speed = 120 mph
Fatigue Category: I

This structure is approved for 300 square feet of sign area and a maximum sign weight (total of all signs and hangers) of 3600 lbs. Use of additional sign area or a heavier sign must be approved by the Engineer. If the structure height ("H") exceeds 30'-0", contact the Engineer.

FOUNDATION MATERIALS AND STRENGTHS:

Class S Concrete	f'c = 3,500 psi
Reinforcing Steel (Gr. 60, AASHTO M 31 or M 322, Type A)	fy = 60,000 psi

Spread footings for the structure have been designed assuming a factored bearing resistance of 2.0 ksf. Contractor shall be responsible for evaluating and verifying that the foundation soils are adequate to achieve the assumed factored bearing capacity, utilizing SPT (Standard Penetration Test), CPT (Cone Penetration Test), DCP (Dynamic Cone Penetration) test, or other suitable means, prior to or after footing excavation, whichever is appropriate. If the foundation soils are verified to be adequate, then the footing shall be constructed in accordance with the planned dimensions. Otherwise, the Design Engineer shall be contacted. Costs for foundation soil evaluation and verification shall be included in the item "STEEL CANTILEVER SIGN STRUCTURE (_)".

Structural steel sign support members shall comply with the following specifications:

Angles:	ASTM A709, Grade 36 (Fy = 36,000 psi)
Plate, W-Section:	ASTM A709, Grade 50 (Fy = 50,000 psi)
(1) Pipe:	ASTM A139, Gr. C, straight-seam welded (Fy = 42,000 psi) ASTM A500, Gr. B (Fy = 42,000 psi) ASTM A501, Gr. B (Fy = 50,000 psi)
Z-Shapes:	ASTM A709, Grade 36 (Fy = 36,000 psi)
Shim Plates:	ASTM A1011, SS, Grade 36, Type 2, or Grade 40
Bolts:	ASTM F3125, Grade A325, Type 1
Locknuts - Approved Type:	ASTM A563, Grade DH or AASHTO M 292, Grade 2H
Washers:	ASTM F436
Nuts:	ASTM A563, Grade DH or AASHTO M 292, Grade 2H

The Contractor shall make check measurements in the field and make any adjustments necessary to meet the required clearances and to fit the new structure to the existing and/or proposed conditions.

Drawings show general features of design only. Shop drawings shall be made in accordance with Subsection 807.04, submitted, and approval secured before fabrication is begun.

Requests for substitution of structural steel shapes shown with shapes of greater size must be submitted by the Contractor to the Engineer for approval. Steels of equal or greater strengths will be accepted only when shown on the approved shop drawings. Shapes and materials shown in the plans will be the basis of payment and no additional compensation will be made for any adjustments due to substitutions.

All steel shall be galvanized according to Subsection 807.19. Steel completely encased in concrete may not be galvanized. Galvanized coating damaged during transport, handling or erection shall be field repaired in accordance with Subsection 807.88.

All main load carrying tension members greater than ½" in thickness shall conform to the requirements of the Longitudinal Charpy V-Notch test specified for Zone 1 minimum service temperature. This work and materials shall be paid for in accordance with Special Provision "STEEL SIGN STRUCTURES".

Field splices shall be located in order to avoid sign panel connections. There shall be a maximum of two field splices, and they shall be spaced a minimum of 15 feet apart.

Truss field sections shall be shop assembled. Entire truss shall be fully assembled and lifted into place as one unit on to tower supports. All truss member connections shall be bolted connections.

All welding that is to be done during fabrication of structural steel, including temporary welds, shall be detailed on the shop drawings and submitted for approval. If additional welds are required, whether temporary or permanent, a formal request with detailed drawings shall be submitted to the Engineer for approval. All welding shall conform to Subsection 807.26 except welding of tubular sections shall conform to AWS D1.1 Structural Welding Code.

No circumferential butt welds will be allowed in any pipe sections.

All fillet welds of critical members shall be tested according to AWS D1.1 Structural Welding Code - Steel using the magnetic particle method. Critical welds shall include: column to base plate and truss bottom support to column.

Connections shall be bolted with high-strength bolts. Unless otherwise noted, bolts shall be ⅞"ø and open holes shall be $^{15}/_{16}$"ø. Bolt spacing shall be 2⅝" for ⅞"ø bolts unless otherwise noted. Bolts shall be placed with heads on the outside face of all members.

All truss frame bolts shall comply with ASTM F3125, Grade A325, Type 1, galvanized according to Subsection 807.06. Nuts and washers for ASTM F3125, Grade A325, Type 1 bolts shall be furnished and galvanized in accordance with Subsection 807.06.

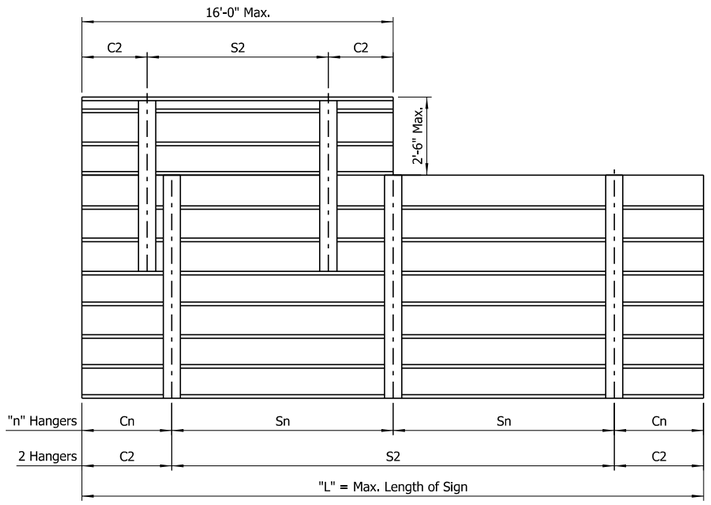
Locknuts shall be equipped with nylon locking inserts or other approved type locking system. Locknuts shall be installed according to Manufacturer's recommendations.

Anchor bolts shall comply with AASHTO M 314, Grade 55, including Supplementary Requirement S1, and shall be galvanized according to Subsection 807.07. Nuts and washers for anchor bolts shall be furnished and galvanized in accordance with Subsection 807.07. Anchor bolts shall be pretensioned in accordance with Special Provision "STEEL SIGN STRUCTURES".

Shoring may be required to protect existing shoulders or other elements during excavation. Any shoring required shall not be paid for directly, but shall be considered incidental to the item "STEEL CANTILEVER SIGN STRUCTURE (_)". The excavations for the footing shall be backfilled before the structure is attached to the foundation.

DYNAMIC MESSAGE SIGN (WHEN APPLICABLE): The Dynamic Message Sign (DMS) supplier shall be responsible for the attachment method and materials used to attach the DMS and its accessories to the structure. The method of attachment shall not facilitate any corrosion of the structure. For additional information regarding the DMS, see Special Provision "OVERHEAD DYNAMIC MESSAGE SIGN ASSEMBLY".

For location of each 35' cantilever sign structure to be used, refer to ITS and/or Sign Plans.



NOTE:
See sign details and plan sheets for number, size and dimensions of signs.

HANGER SPACING DETAILS FOR EXTRUDED PANEL SIGNS

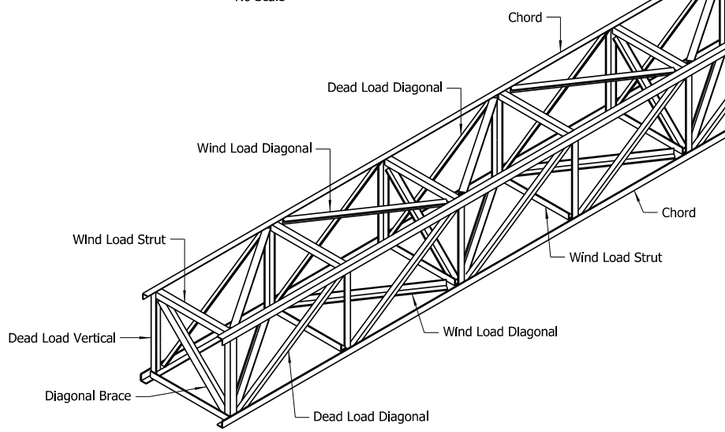
No Scale

HANGER VARIABLES

(For Extruded Panel Signs)

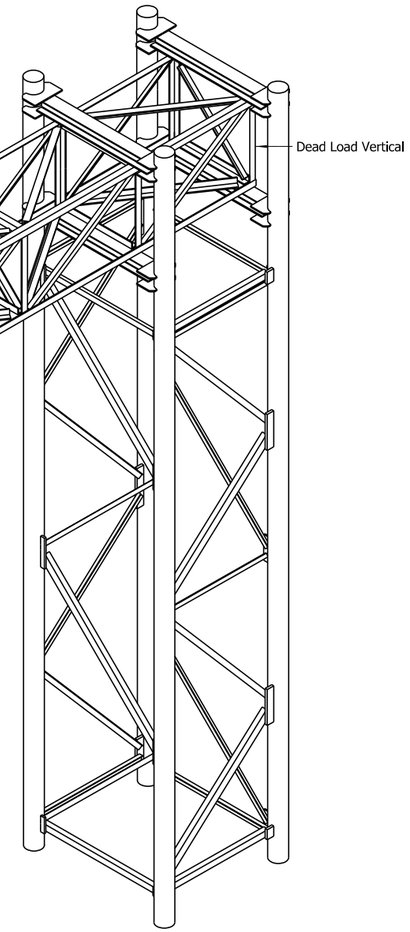
Max. Length of Sign = "L"	"n" Hangers	Cantilever Length "Cn"	Hanger Spacing "Sn"
15'-0"	2 Hangers	0.21 x "L"	0.58 x "L"
30'-0"	3 Hangers	0.145 x "L"	0.355 x "L"

NOTE:
Hanger spacing and cantilever length shall be rounded to the nearest inch.



ISOMETRIC VIEW

No Scale



(1) In addition to material requirements, all pipe used for welded applications shall have a maximum carbon equivalency (CE) of 0.4 using the following equation:

CE = %C + %Mn/6 + %Cu/40 + %Ni/20 + %Cr/10 - %Mo/50 - %V/10

THESE DETAILS ARE APPLICABLE UNLESS OTHERWISE SHOWN IN THE PLAN DETAILS, SPECIAL PROVISIONS, OR SUPPLEMENTAL SPECIFICATIONS.

SHEET 5 OF 6
STANDARD DETAILS OF 35' STEEL CANTILEVER SIGN STRUCTURE
ARKANSAS STATE HIGHWAY COMMISSION
LITTLE ROCK, ARK.

This document was originally issued by ARDOT Bridge Division. A sealed and signed original is held on file. This copy is not a signed and sealed document.

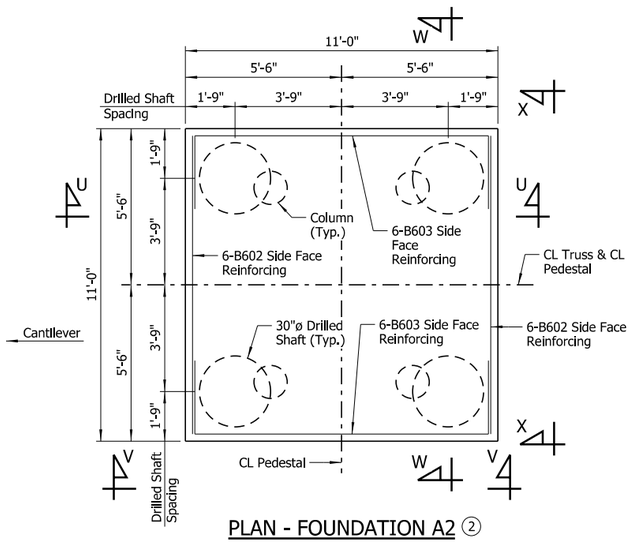
DRAWN BY:	CSW	DATE:	DEC. 2022	FILENAME:	b55090e.dgn
CHECKED BY:	ABH	DATE:	FEB. 2023	SCALE:	As Shown
DESIGNED BY:	STD.	DATE:	-		

Scales shown are for full size 22"x34" drawings. When using 11"x17" drawings, reduce scale by one half.

DRAWING NO. 55090E

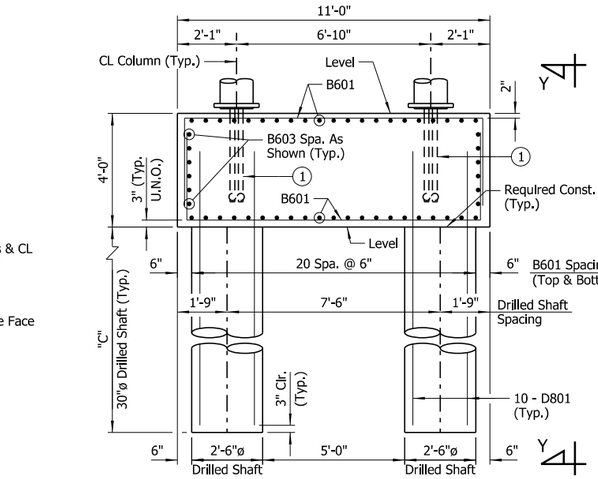
6/17/2026

DATE REVISED	DATE REVISED	FED. ROAD DIST. NO.	STATE	JOB NO.	SHEET NO.	TOTAL SHEETS
		6	ARK.			
		CANTILEVER SIGN STR. (35') - 55090F				



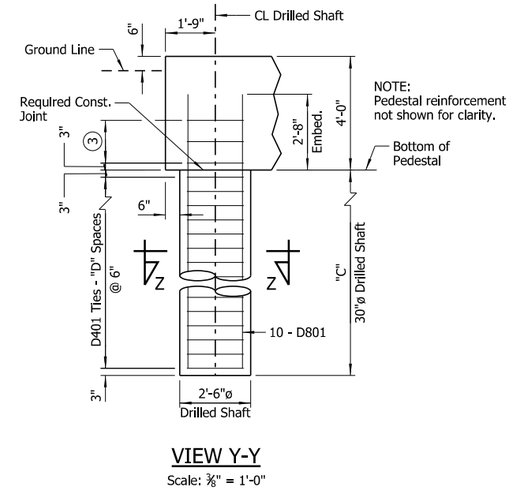
PLAN - FOUNDATION A2 (2)

Scale: 3/8" = 1'-0"



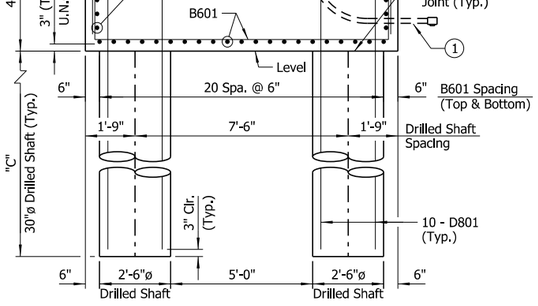
SECTION W-W

Scale: 3/8" = 1'-0"



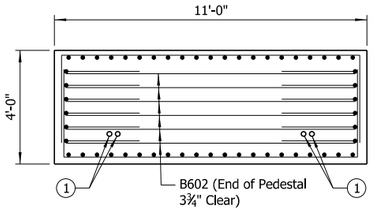
VIEW Y-Y

Scale: 3/8" = 1'-0"



SECTION U-U

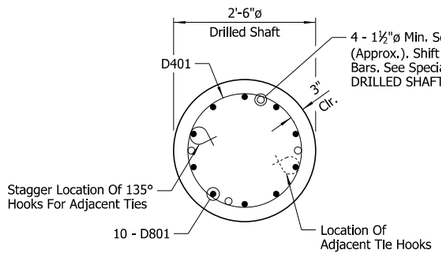
Scale: 3/8" = 1'-0"



VIEW X-X

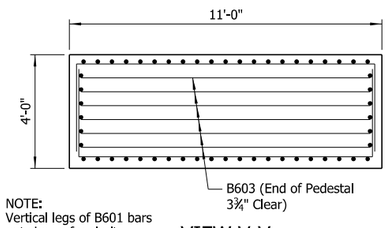
Scale: 3/8" = 1'-0"

NOTE:
Vertical legs of B601 bars not shown for clarity.



SECTION Z-Z

Scale: 3/4" = 1'-0"



NOTE:
Vertical legs of B601 bars not shown for clarity.

VIEW V-V

Scale: 3/8" = 1'-0"

DRILLED SHAFT NOTES (FOUNDATION A2)

Drilled shafts shall conform to Special Provision "DRILLED SHAFT FOUNDATIONS FOR STEEL SIGN STRUCTURES". Drilled shafts will not be paid for directly but shall be considered subsidiary to the unit price bid for "STEEL CANTILEVER SIGN STRUCTURE (_)". Temporary casing may be required. Unless approved by the Engineer, permanent steel casing shall not be used.

Crosshole Sonic Logging (CSL) shall be performed on one drilled shaft at each foundation and as directed by the Engineer. Testing shall be performed in accordance with Special Provision "NONDESTRUCTIVE TESTING OF DRILLED SHAFTS FOR STEEL SIGN STRUCTURES".

Concrete and reinforcing steel placed in drilled shafts will not be paid for directly but shall be considered subsidiary to the unit price bid for "STEEL CANTILEVER SIGN STRUCTURE (_)". No additional payment shall be made for spacers, additional splices or bracing needed for assembly, shipping, handling or erecting.

Concrete in drilled shafts shall be Class "S" as modified by Special Provision "DRILLED SHAFT FOUNDATIONS FOR STEEL SIGN STRUCTURES".

Drilled shaft lengths shall be determined based on the results of exploratory borings, which shall be performed by the Contractor prior to shaft excavation.

If competent rock is not encountered in the exploratory boring, the Standard Penetration Test (SPT) blow count corrected by the hammer efficiency, N60, shall be used to determine shaft lengths. See "TABLE OF VARIABLES".

If competent rock is encountered in the exploratory boring within 25'-0" of planned top of drilled shaft, the shafts shall be founded a minimum of 3'-0" into rock and have a minimum length of 25'-0".

If competent rock is encountered in the exploratory boring below 25'-0" from planned top of drilled shaft, the shafts shall be founded a minimum of 3'-0" into rock or to the depth based on the SPT N60 value and associated shaft length in the "TABLE OF VARIABLES", whichever is shallower.

Testing results shall be submitted to the Engineer for review. Final drilled shaft lengths shall be approved by the Engineer prior to construction.

The cost of performing exploratory borings and in-situ strength testing shall be included in the item "STEEL CANTILEVER SIGN STRUCTURE (_)".

(1) 2" Non-Metallic Conduit (Schedule 80) with 16" Min. Bend Radius (2 Conduits per Outside Column). An Insulated bushing shall be installed at the top end of each conduit. If cabling in the conduit is not required per Electrical and/or ITS plans, the end of conduit in the ground shall be capped for future use with a manufactured water-tight cap.

(2) Foundation A2 allowed only when foundation is outside clear zone or is protected by guardrail or barrier.

(3) C401 Ties - 2 Spaces @ 9"

TABLE OF VARIABLES (7)

SPT N60 (6) (blows/ft.)	Min. Depth of Exploratory Boring	Drilled Shaft Length, "C"	"D"	"E"	"F" (8)	"G"
<5	-	Contact Engineer	-	-	-	-
5 To 7	75'-0"	70'-0"	139	560	72'-5"	280'-0"
7 To 9	63'-0"	58'-0"	115	464	60'-5"	232'-0"
9 To 11	47'-0"	42'-0"	83	336	44'-5"	168'-0"
11 To 13	37'-0"	32'-0"	63	256	34'-5"	128'-0"
>13	31'-0"	26'-0"	51	208	28'-5"	104'-0"

(6) Tabulated SPT N60 values are raw SPT N values corrected by SPT hammer efficiency and represent average values along the plan shaft penetration. If the SPT N60 values in the foundation soils within 2 shaft diameters below the plan tip elevation are less than the average SPT N60 values along the plan shaft penetration, the Engineer shall be contacted.

(7) If final drilled shaft length is not shown in "TABLE OF VARIABLES" due to the presence of rock or other factors, variables "D" through "G" shall be determined as follows:

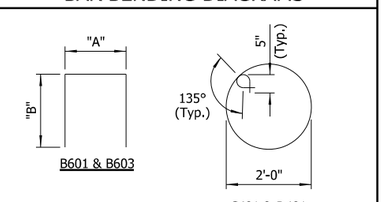
"D" = (Shaft Length in Ft. - 0.5) / 0.5
"E" = Shaft Length in Ft. x 8
"F" = Shaft Length + 2'-5"
"G" = Shaft Length x 4

(8) If "F" exceeds 60'-0", a lap splice is required for each D801 bar at the midpoint of the drilled shaft. Min. lap splice length for D801 bar = 3'-6". Length shown in table does not include the additional length required for a lap splice.

BAR LIST - FOUNDATION A2

MARK	NO. REQ'D	LENGTH	"A"	"B"	P.D.
B601	84	16'-4"	10'-6"	3'-1"	4½"
B602	12	10'-4"			Str.
B603	12	15'-2"	10'-4"	2'-7"	4½"
C401	12	7'-4"			3"
D401	"E"	7'-4"			3"
D801	40	"F"			Str.

BAR BENDING DIAGRAMS



NOTES:
Dimensions of bars are out-to-out.

Number of bars shown is for one Foundation A2.

APPROX. QUANTITIES FOR FOUNDATION A2 (FOR INFORMATION ONLY)

CLASS S CONCRETE (4) (CU. YDS.)	REINFORCING STEEL (LBS.) (5)	EXCAVATION (CU. YDS.)	DRILLED SHAFT (30" DIA.) (LIN. FT.)	CROSSHOLE SONIC LOGGING (30" DIA.) (EACH)
18.00	2,580	26	"G"	1

(4) Does not include Class S Concrete for Drilled Shafts

(5) Does not include D401 and D801 Bars in Drilled Shafts

LEGEND

U.N.O. = Unless Noted Otherwise

THESE DETAILS ARE APPLICABLE UNLESS OTHERWISE SHOWN IN THE PLAN DETAILS, SPECIAL PROVISIONS, OR SUPPLEMENTAL SPECIFICATIONS.

SHEET 6 OF 6
STANDARD DETAILS OF 35' STEEL CANTILEVER SIGN STRUCTURE
ARKANSAS STATE HIGHWAY COMMISSION

LITTLE ROCK, ARK.

DRAWN BY: CWT DATE: JAN. 2023 FILENAME: b55090f.dgn
CHECKED BY: CSW DATE: FEB. 2023 SCALE: As Shown
DESIGNED BY: STD. DATE: -

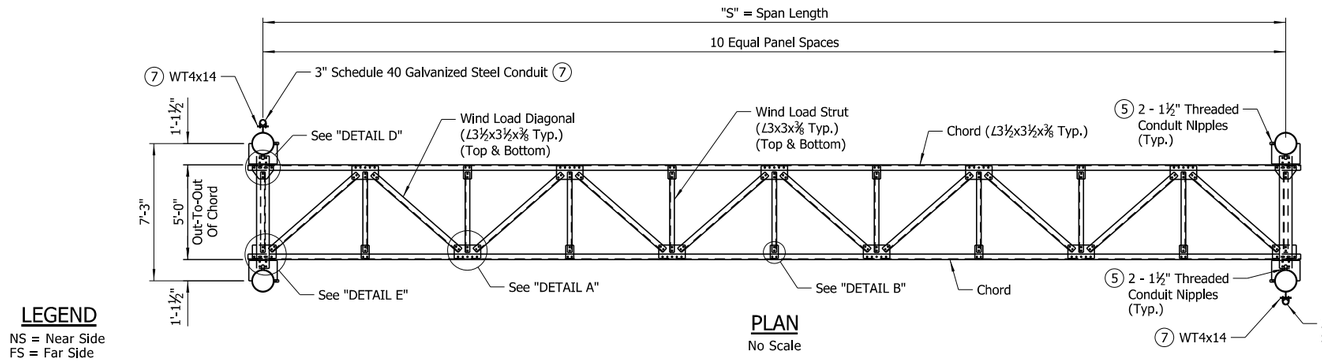
This document was originally issued by ARDOT Bridge Division. A sealed and signed original is held on file. This copy is not a signed and sealed document.

Scales shown are for full size 22"x34" drawings. When using 11"x17" drawings, reduce scale by one half.

DRAWING NO. 55090F

6/17/2026

DATE REVISED	DATE REVISED	FED. ROAD DIST. NO.	STATE	JOB NO.	SHEET NO.	TOTAL SHEETS
		6	ARK.			
		OVERHEAD SIGN STR. (40' TO 54') - 55092A				



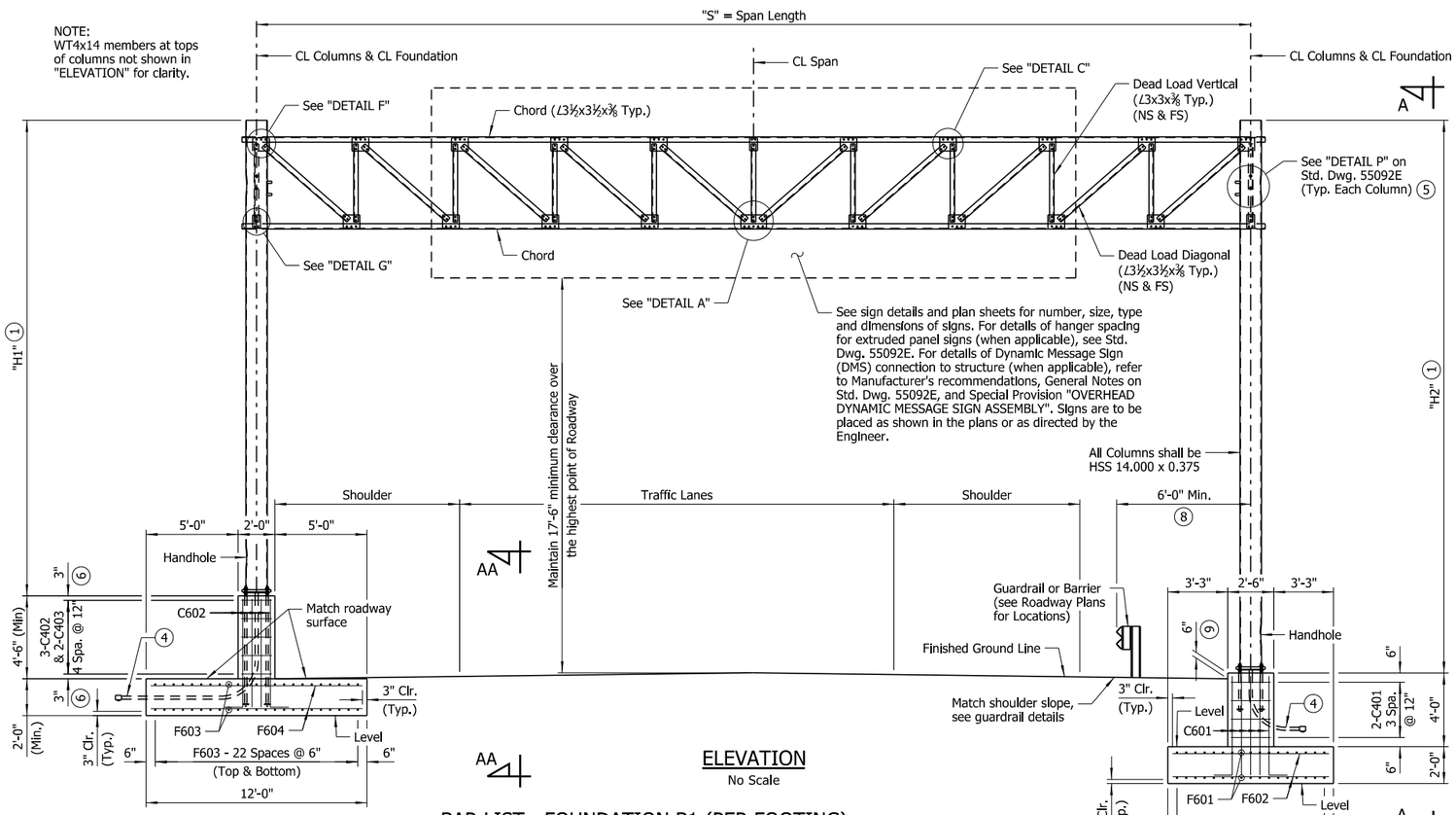
LEGEND

NS = Near Side
FS = Far Side

PLAN

No Scale

NOTE:
Refer to Sign Layout Sheets for Span Length "S" and Foundation Types required for each structure.



ELEVATION

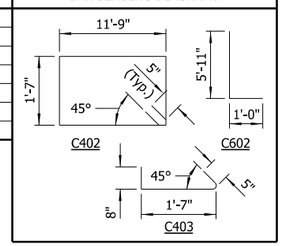
No Scale

③ FOUNDATION B1

② FOUNDATION A1

BAR LIST - FOUNDATION B1 (PER FOOTING)

MARK	NO. REQ'D	LENGTH	P.D.	BAR BENDING DIAGRAMS
C402	15	27'-2"	3"	
C403	10	2'-7"	3"	
C602	116	6'-9"	4½"	
F603	46	27'-6"	Str.	
F604	110	11'-6"	Str.	



NOTE:
Dimensions of bars are out-to-out.

APPROXIMATE QUANTITIES FOR FOUNDATION B1 PER FOOTING (FOR INFORMATION ONLY)

CLASS S CONCRETE (CU. YDS.)	REINFORCING STEEL (LBS.)	EXCAVATION (CU. YDS.)
34.30	5,270	35

(1) The Contractor shall make field measurements to determine the column heights "H1" and "H2" that are required to maintain the minimum vertical clearance with the centerline of the sign located at the centerline of the truss. These column heights shall be shown on the shop drawings with a note stating that the Contractor has made the required field measurements. If the structure height ("H1" or "H2") exceeds 30'-0", contact the Engineer. The Contractor shall also verify that the variable span length (40'-0" to 54'-0") is sufficient to meet the minimum clearances and to fit the new structure to the existing and/or proposed conditions.

(2) Foundation A1 allowed only when foundation is outside clear zone or is protected by guardrail or barrier. For alternate drilled shaft foundation (Foundation A2), see Std. Dwg. 55092F.

(3) Foundation B1 is required when the foundation is located in a median, within the clear zone, and is not protected by guardrail or barrier. Foundation B1 requires adjacent Roadway Median Barrier to transition to match the ends of the pedestal. For alternate drilled shaft foundation (Foundation B2), see Std. Dwg. 55092F.

(4) 2" Non-Metallic Conduit (Schedule 80) with 16" Min. Bend Radius (2 Conduits per Column). At Foundation B1, conduit shall not be provided if cabling on that side of the sign structure is not required per Electrical and/or ITS plans. At Foundation A1, conduit shall always be provided. If cabling in the conduit at Foundation A1 is not required per Electrical and/or ITS plans, the end of conduit in the ground shall be capped for future use with a manufactured water-tight cap.

(5) Threaded Conduit Nipples shall be fitted with standard plugs until conduit is installed.

(6) Minor adjustments are allowed to maintain C402 and C403 12" spacing for foundations located in longitudinal grades.

(7) See "SECTION U-U" on Std. Dwg. 55092C. WT4x14 always required. 3" Conduit and Clamping U-Bolts only required when necessary to support ITS equipment or as directed by the Engineer. See ITS Plans.

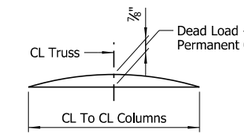
(8) Minimum dimension when guardrail is present. See Sign Layout Sheets and/or ITS Plans for actual dimension for each structure.

(9) Dimension from top of pedestal to Finished Ground Line shall be maintained along the perimeter of the pedestal.

NOTES:
For "VIEW A-A", see Std. Dwg. 55092B.

For "DETAIL A" thru "DETAIL G", see Std. Dwg. 55092C.

For "VIEW AA-AA", see Std. Dwg. 55092D.

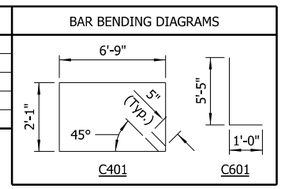


TRUSS CAMBER DIAGRAM

No Scale

BAR LIST - FOUNDATION A1 (PER FOOTING)

MARK	NO. REQ'D	LENGTH	P.D.	BAR BENDING DIAGRAMS
C401	8	18'-2"	3"	
C601	46	6'-3"	4½"	
F601	34	20'-6"	Str.	
F602	82	8'-6"	Str.	



NOTE:
Dimensions of bars are out-to-out.

APPROXIMATE QUANTITIES FOR FOUNDATION A1 PER FOOTING (FOR INFORMATION ONLY)

CLASS S CONCRETE (CU. YDS.)	REINFORCING STEEL (LBS.)	EXCAVATION (CU. YDS.)
17.70	2,630	59

THESE DETAILS ARE APPLICABLE UNLESS OTHERWISE SHOWN IN THE PLAN DETAILS, SPECIAL PROVISIONS, OR SUPPLEMENTAL SPECIFICATIONS.

SHEET 1 OF 6
STANDARD DETAILS OF 40' TO 54' STEEL OVERHEAD SIGN STRUCTURE
ARKANSAS STATE HIGHWAY COMMISSION

LITTLE ROCK, ARK.

DRAWN BY: CWT DATE: NOV. 2022 FILENAME: b55092a.dgn
CHECKED BY: ABH DATE: JAN. 2023 SCALE: As Shown
DESIGNED BY: STD. DATE: -

This document was originally issued by ARDOT Bridge Division. A sealed and signed original is held on file. This copy is not a signed and sealed document.

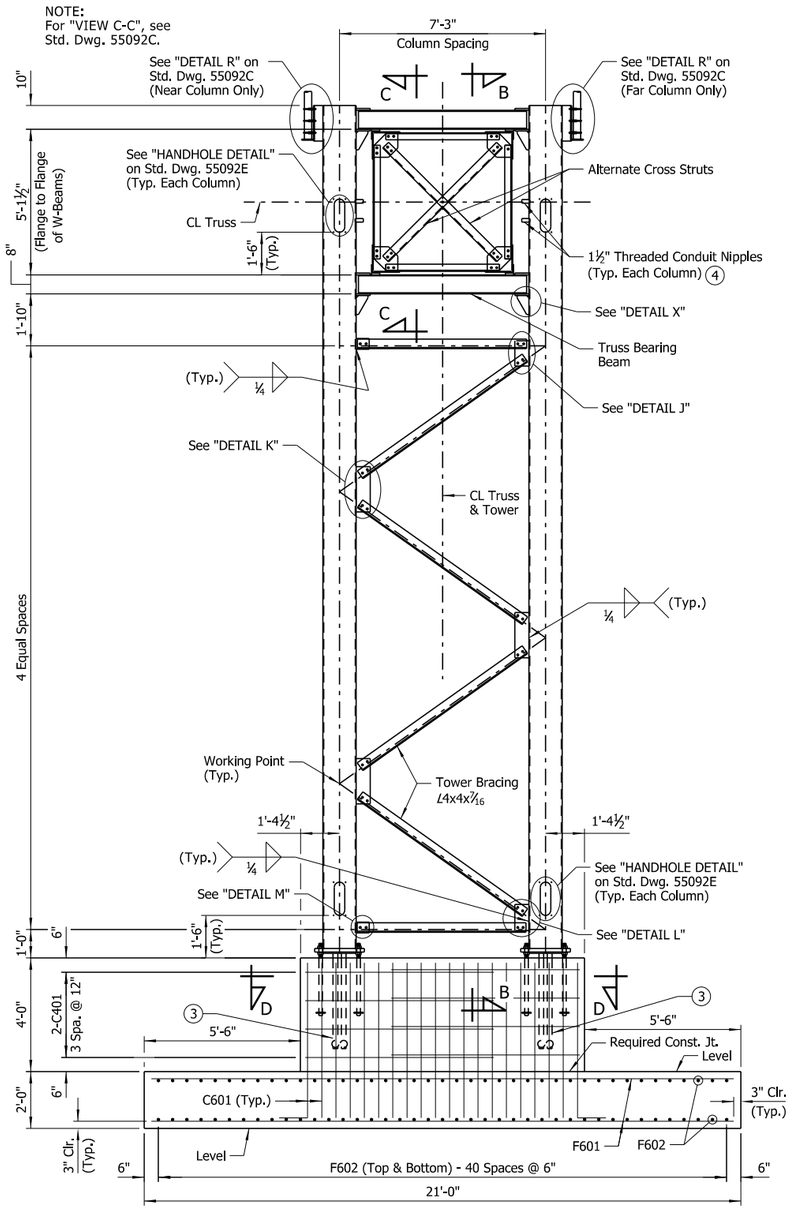
Scales shown are for full size 22"x34" drawings. When using 11"x17" drawings, reduce scale by one half.

DRAWING NO. 55092A

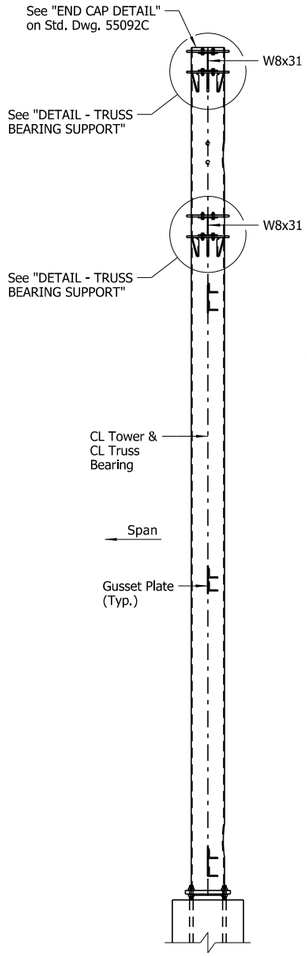
6/17/2026

DATE REVISED	DATE REVISED	FED. ROAD DIST. NO.	STATE	JOB NO.	SHEET NO.	TOTAL SHEETS
		6	ARK.			
		OVERHEAD SIGN STR. (40' TO 54') - 55092B				

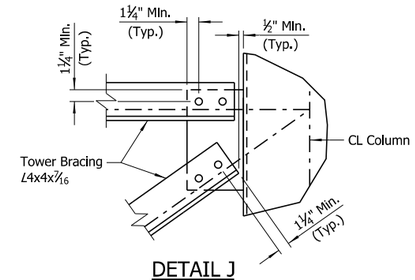
NOTE:
For "VIEW C-C", see Std. Dwg. 55092C.



VIEW A-A
(Foundation A1)
No Scale

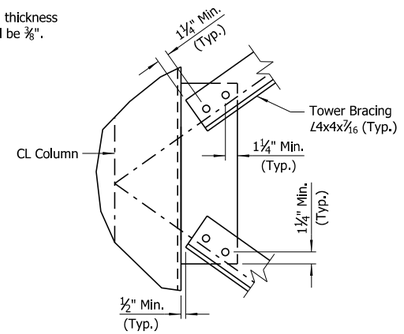


VIEW B-B
No Scale

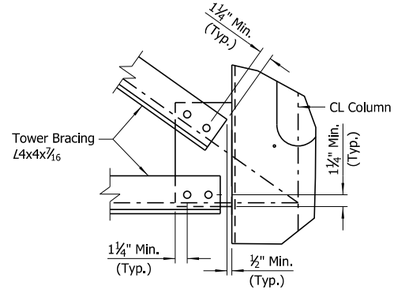


DETAIL J
No Scale

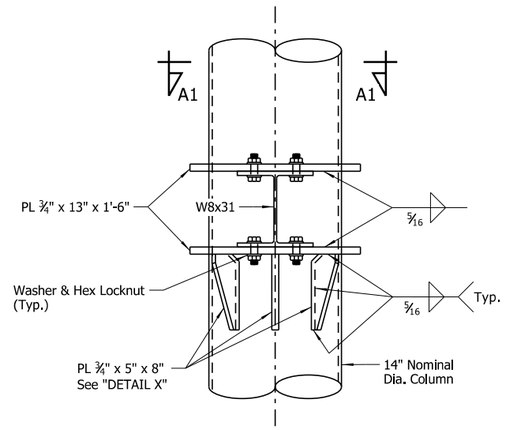
NOTE:
Unless otherwise noted, thickness of all Gusset Plates shall be ⅜".



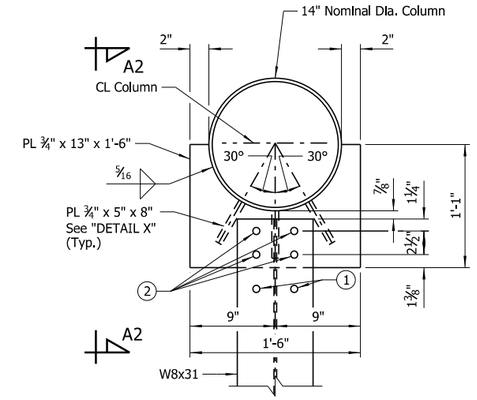
DETAIL K
No Scale



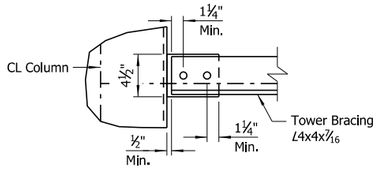
DETAIL L
No Scale



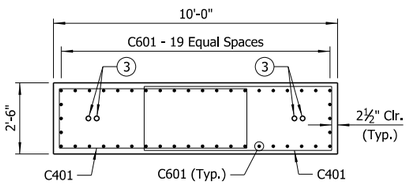
DETAIL - TRUSS BEARING SUPPORT
Scale: 1½" = 1'-0"



VIEW A1-A1
Scale: 1½" = 1'-0"

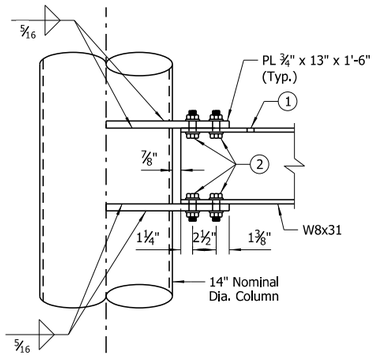


DETAIL M
No Scale

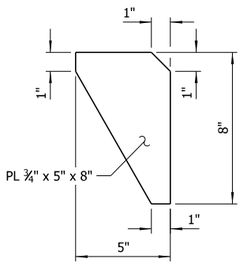


SECTION D-D
Scale: ⅜" = 1'-0"

1. Bolts shall be ¾"ø. Provide 13/16" x 2" slotted hole in gusset plate and chord angle. Use plate washer on gusset plate side. Provide 13/16"ø holes in ¾" shim plate and top or bottom beam flanges as required.
2. Bolts shall be ¾"ø. Provide 13/16"ø holes at top and bottom beam flanges and connection plates.
3. 2" Non-Metallic Conduit (Schedule 80) (2 Conduits per Column). An insulated bushing shall be installed at the top end of each conduit.
4. Threaded Conduit Nipples shall be fitted with standard plugs until conduit is installed.



VIEW A2-A2
Scale: 1½" = 1'-0"
(¾" x 5" x 8" Plate not shown for clarity)



DETAIL X
Scale: 3" = 1'-0"

THESE DETAILS ARE APPLICABLE UNLESS OTHERWISE SHOWN IN THE PLAN DETAILS, SPECIAL PROVISIONS, OR SUPPLEMENTAL SPECIFICATIONS.

SHEET 2 OF 6
STANDARD DETAILS OF 40' TO 54'
STEEL OVERHEAD SIGN STRUCTURE
ARKANSAS STATE HIGHWAY COMMISSION

LITTLE ROCK, ARK.

DRAWN BY: CWT DATE: NOV. 2022 FILENAME: b55092b.dgn
CHECKED BY: ABH DATE: JAN. 2023 SCALE: As Shown
DESIGNED BY: STD. DATE: -

DRAWING NO. 55092B

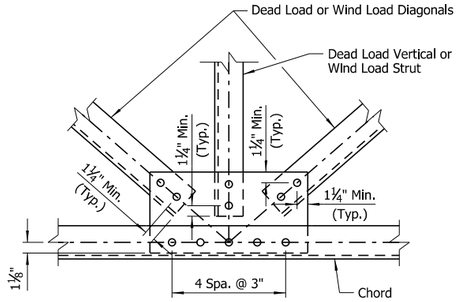
This document was originally issued by ARDOT Bridge Division. A sealed and signed original is held on file. This copy is not a signed and sealed document.

Scales shown are for full size 22"x34" drawings. When using 11"x17" drawings, reduce scale by one half.

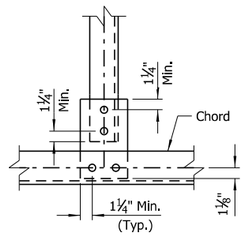
6/17/2026

DATE REVISED	DATE REVISED	FED. ROAD DIST. NO.	STATE	JOB NO.	SHEET NO.	TOTAL SHEETS
		6	ARK.			
		OVERHEAD SIGN STR. (40' TO 54') - 55092C				

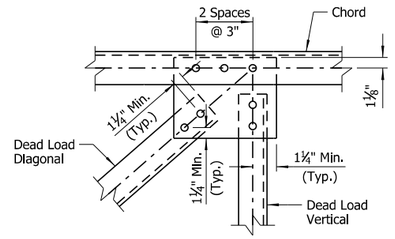
NOTE:
Unless otherwise noted, thickness of all Gusset Plates shall be ⅜".



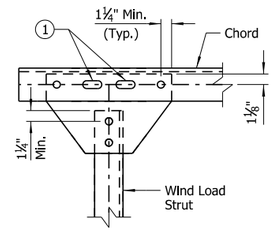
DETAIL A
No Scale



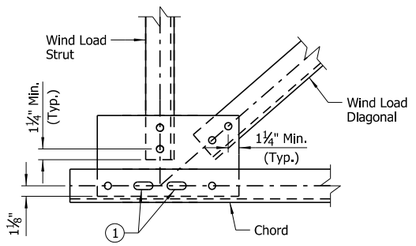
DETAIL B
No Scale



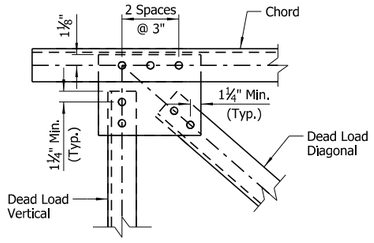
DETAIL C
No Scale



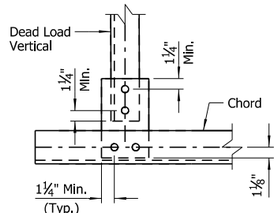
DETAIL D
No Scale



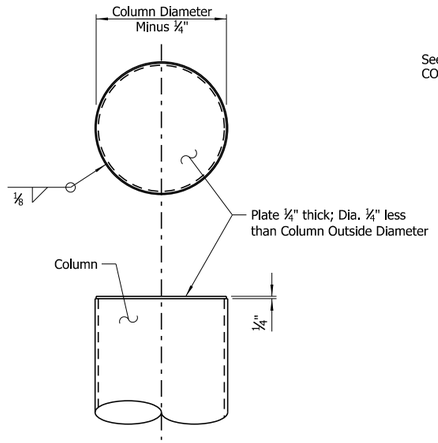
DETAIL E
No Scale



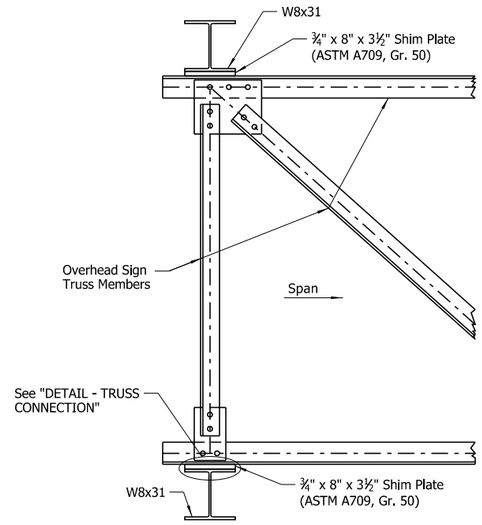
DETAIL F
No Scale



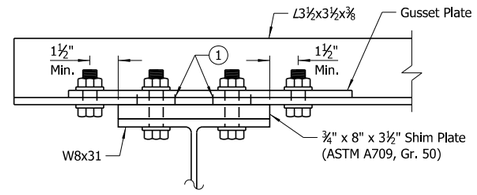
DETAIL G
No Scale



END CAP DETAIL
Scale: 1½" = 1'-0"



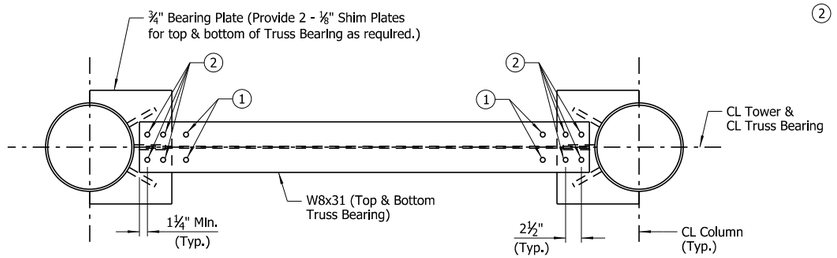
VIEW C-C
No Scale



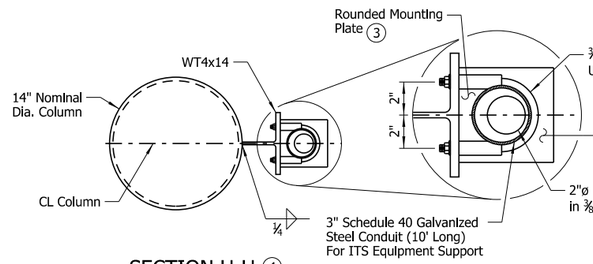
DETAIL - TRUSS CONNECTION
No Scale

① Bolts shall be ¾"ø. Provide $^{13}/_{16}$" x 2" slotted holes in gusset plate and chord angle. Clearance between end of slot and adjacent bolt hole shall be no less than 1½". Provide $^{13}/_{16}$"ø holes in ¾" shim plate and top or bottom beam flanges as required. Use plate washer on gusset plate side.

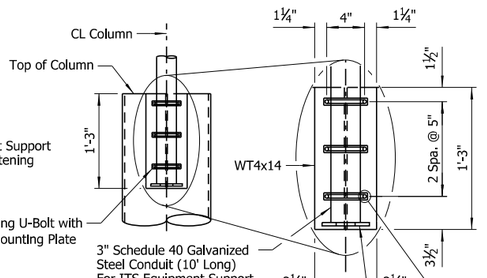
② Bolts shall be ¾"ø. Provide $^{13}/_{16}$"ø holes at top and bottom beam flanges and connection plates.



PLAN AT TRUSS BEARING
Scale: 1" = 1'-0"



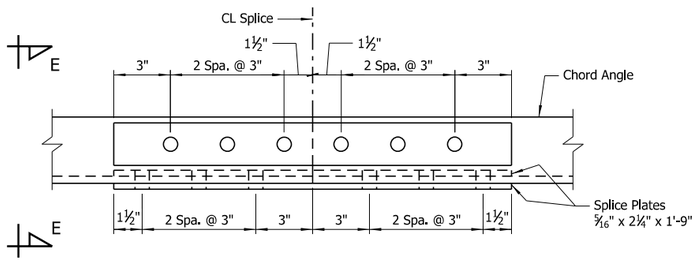
SECTION U-U ④
Scale: 1½" = 1'-0"



VIEW T-T ④
Scale: 1" = 1'-0"

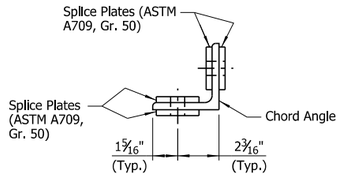
③ When required per plans to support ITS equipment, or as directed by the Engineer, Clamping U-Bolt with Rounded Mounting Plate Assembly product shall be included in shop drawings for approval. Assembly shall be galvanized and shall meet the requirements of ASTM A36 at a minimum. Install per Manufacturer's instructions.

④ WT4x14 with ⅜" Temporary Support Plate always required. 3" Conduit and Clamping U-Bolts only required when necessary to support ITS equipment or as directed by the Engineer. See ITS Plans.

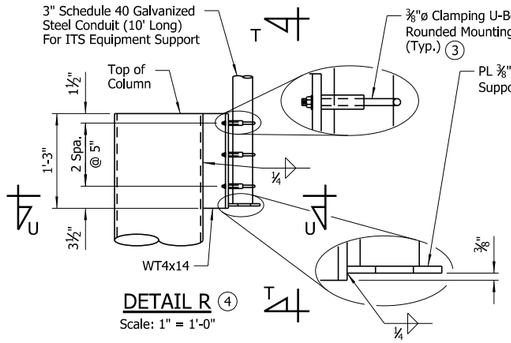


CHORD SPLICE
Scale: 3" = 1'-0"

NOTE:
Chord angles may be spliced in convenient lengths for galvanizing and sign placement.



VIEW E-E
Scale: 3" = 1'-0"



DETAIL R ④
Scale: 1" = 1'-0"

THESE DETAILS ARE APPLICABLE UNLESS OTHERWISE SHOWN IN THE PLAN DETAILS, SPECIAL PROVISIONS, OR SUPPLEMENTAL SPECIFICATIONS.

SHEET 3 OF 6
STANDARD DETAILS OF 40' TO 54'
STEEL OVERHEAD SIGN STRUCTURE
ARKANSAS STATE HIGHWAY COMMISSION
LITTLE ROCK, ARK.

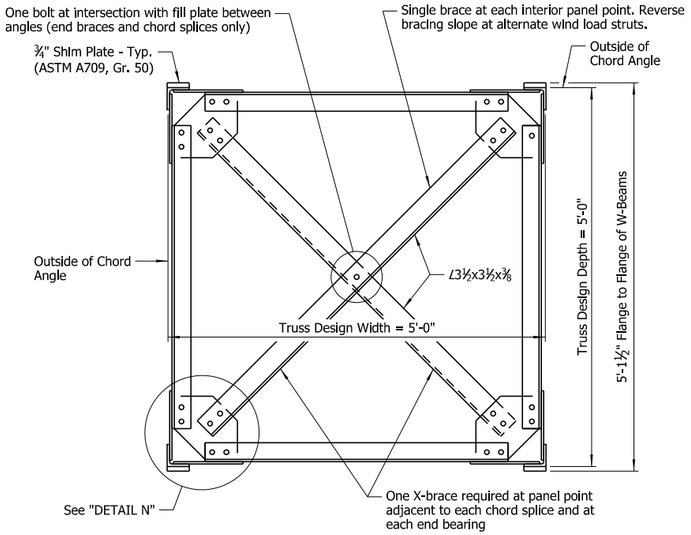
DRAWN BY: CWT DATE: NOV. 2022 FILENAME: b55092c.dgn
CHECKED BY: ABH DATE: JAN. 2023 SCALE: As Shown
DESIGNED BY: STD. DATE: -

This document was originally issued by ARDOT Bridge Division. A sealed and signed original is held on file. This copy is not a signed and sealed document.

Scales shown are for full size 22"x34" drawings. When using 11"x17" drawings, reduce scale by one half. DRAWING NO. 55092C

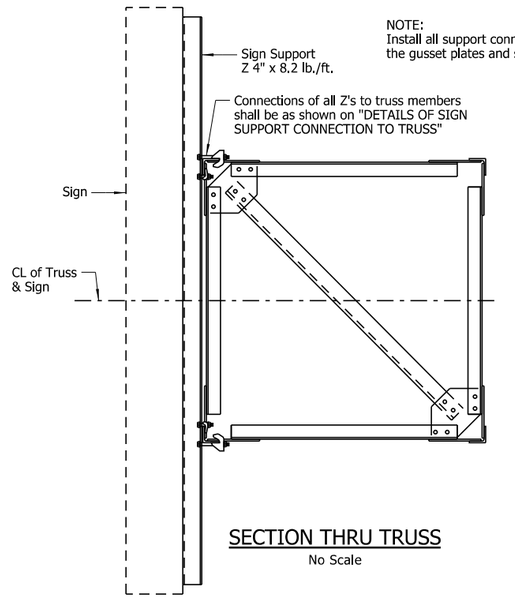
6/17/2026

DATE REVISED	DATE REVISED	FED. ROAD DIST. NO.	STATE	JOB NO.	SHEET NO.	TOTAL SHEETS
		6	ARK.			
		OVERHEAD SIGN STR. (40' TO 54') - 55092D				



TRUSS SECTION

Scale: 1" = 1'-0"

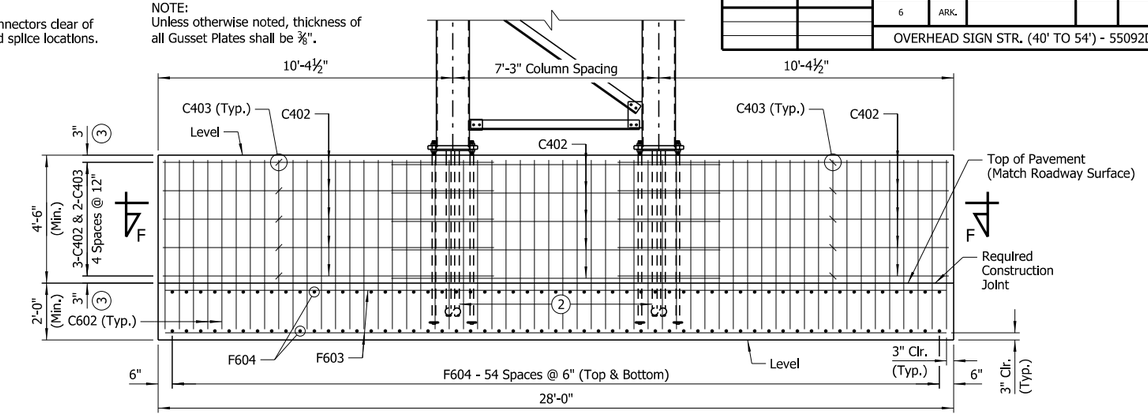


SECTION THRU TRUSS

No Scale

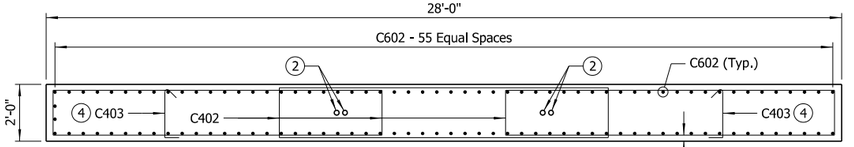
NOTE:
Install all support connectors clear of the gusset plates and splice locations.

NOTE:
Unless otherwise noted, thickness of all Gusset Plates shall be ⅜".



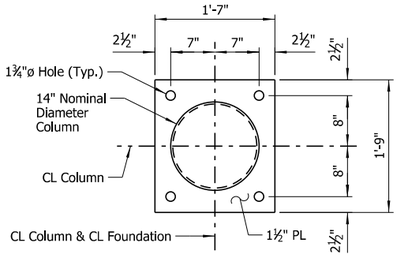
VIEW AA-AA

(Foundation B1)
Scale: ⅜" = 1'-0"



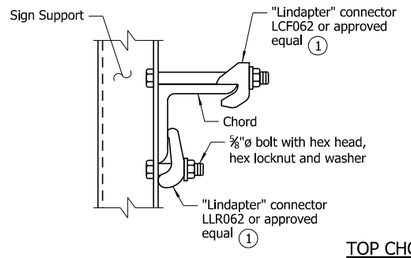
SECTION F-F

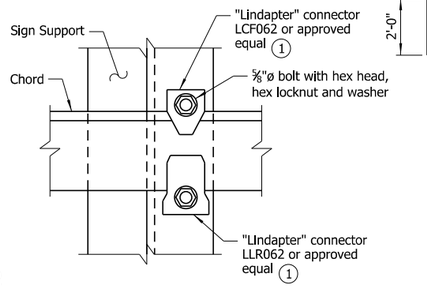
Scale: ⅜" = 1'-0"



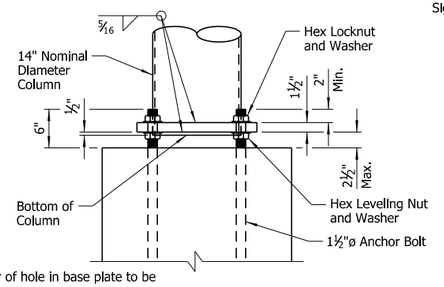
PLAN - COLUMN BASE

Scale: 1" = 1'-0"





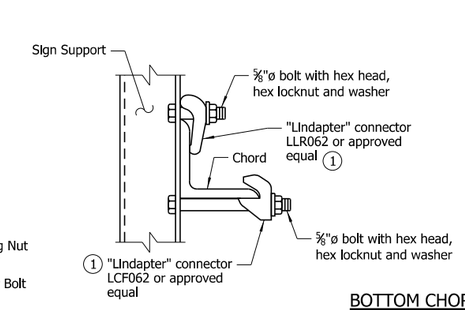
TOP CHORD

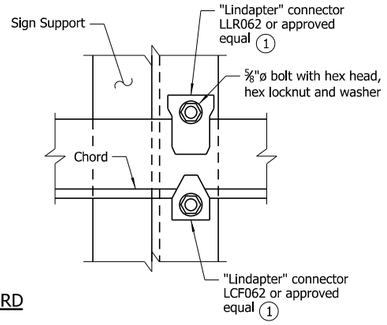


NOTE:
Diameter of hole in base plate to be ⅛" larger than column diameter.

ELEVATION - COLUMN BASE

Scale: 1" = 1'-0"

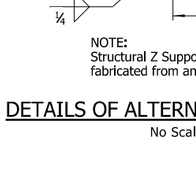




BOTTOM CHORD

DETAILS OF SIGN SUPPORT CONNECTION TO TRUSS

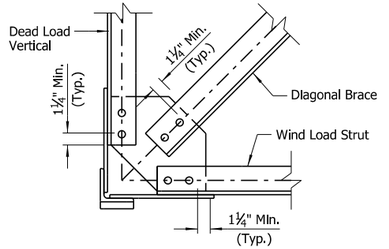
No Scale



NOTE:
Structural Z Support may be fabricated from angles as shown.

DETAILS OF ALTERNATE Z SUPPORT

No Scale



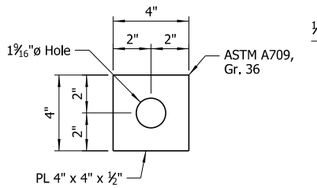
DETAIL N

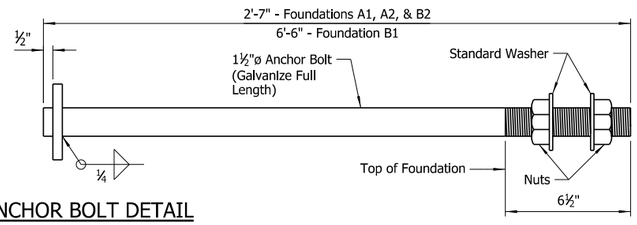
Scale: 1½" = 1'-0"

(2) 2" Non-Metallic Conduit (Schedule 80) (2 Conduits per Column). An insulated bushing shall be installed at the top end of each conduit. Conduit shall not be provided if cabling at Foundation B1 is not required per Electrical and/or ITS plans.

(3) Minor adjustments are allowed to maintain C402 and C403 12" spacing for foundations located in longitudinal grades.

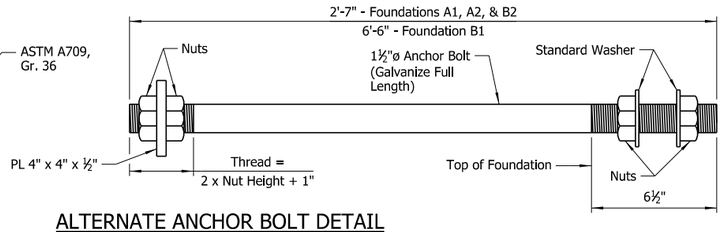
(4) Alternate C403 ties end for end at each layer of reinforcing.





ANCHOR BOLT DETAIL

No Scale



ALTERNATE ANCHOR BOLT DETAIL

No Scale

(1) All "Lindapter" connectors or approved equal shall be installed according to Manufacturer's recommendations. All connectors, bolts, nuts and washers shall be galvanized.

THESE DETAILS ARE APPLICABLE UNLESS OTHERWISE SHOWN IN THE PLAN DETAILS, SPECIAL PROVISIONS, OR SUPPLEMENTAL SPECIFICATIONS.

SHEET 4 OF 6
STANDARD DETAILS OF 40' TO 54'
STEEL OVERHEAD SIGN STRUCTURE
ARKANSAS STATE HIGHWAY COMMISSION

LITTLE ROCK, ARK.

DRAWN BY: CWT DATE: NOV. 2022 FILENAME: b55092d.dgn
CHECKED BY: ABH DATE: JAN. 2023 SCALE: As Shown
DESIGNED BY: STD. DATE: -

This document was originally issued by ARDOT Bridge Division. A sealed and signed original is held on file. This copy is not a signed and sealed document.

Scales shown are for full size 22"x34" drawings. When using 11"x17" drawings, reduce scale by one half.

DRAWING NO. 55092D

6/17/2026

DATE REVISED	DATE REVISED	FED. ROAD DIST. NO.	STATE	JOB NO.	SHEET NO.	TOTAL SHEETS
		6	ARK.			
		OVERHEAD SIGN STR. (40' TO 54') - 55092E				

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 Specifications unless otherwise noted in the plans.

DESIGN SPECIFICATIONS: AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, First Edition, 2015 with current interim revisions.

Basic Wind Speed = 120 mph
Fatigue Category: I

This structure is approved for a maximum sign area equal to 75% of the span length times a sign height of 15 feet. This structure is approved for a maximum sign weight (total of all signs and hangers) of 4,560 lbs. Use of additional sign area or a heavier sign must be approved by the Engineer. If the structure height ("H1" or "H2") exceeds 30'-0", contact the Engineer.

FOUNDATION MATERIALS AND STRENGTHS:

Class S Concrete	f'c = 3,500 psi
Reinforcing Steel (Gr. 60, AASHTO M 31 or M 322, Type A)	fy = 60,000 psi

Spread footings for the structure have been designed assuming a factored bearing resistance of 2.0 ksf. Contractor shall be responsible for evaluating and verifying that the foundation soils are adequate to achieve the assumed factored bearing capacity, utilizing SPT (Standard Penetration Test), CPT (Cone Penetration Test), DCP (Dynamic Cone Penetration) test, or other suitable means, prior to or after footing excavation, whichever is appropriate. If the foundation soils are verified to be adequate, then the footing shall be constructed in accordance with the planned dimensions. Otherwise, the Design Engineer shall be contacted. Costs for foundation soil evaluation and verification shall be included in the item "STEEL OVERHEAD SIGN STRUCTURE (_)".

Structural steel sign support members shall comply with the following specifications:

Angles:	ASTM A709, Gr. 36 (Fy = 36,000 psi)
Plate, W-Section:	ASTM A709, Gr. 50 (Fy = 50,000 psi)
(1) Pipe:	ASTM A139, Gr. C, straight-seam welded (Fy = 42,000 psi), ASTM A500, Gr. B (Fy = 42,000 psi), ASTM A501, Gr. B (Fy = 50,000 psi)
Z-Shapes:	ASTM A709, Grade 36 (Fy = 36,000 psi)
Shim Plates:	ASTM A1011, SS, Grade 36, Type 2, or Grade 40
Bolts:	ASTM F3125, Grade A325, Type 1
Locknuts - Approved Type:	ASTM A563, Grade DH or AASHTO M 292, Grade 2H
Washers:	ASTM F436
Nuts:	ASTM A563, Grade DH or AASHTO M 292, Grade 2H

The Contractor shall make check measurements in the field and make any adjustments necessary to meet the required clearances and to fit the new structure to the existing and/or proposed conditions.

Drawings show general features of design only. Shop drawings shall be made in accordance with Subsection 807.04, submitted, and approval secured before fabrication is begun.

Requests for substitution of structural steel shapes shown with shapes of greater size must be submitted by the Contractor to the Engineer for approval. Steels of equal or greater strengths will be accepted only when shown on the approved shop drawings. Shapes and materials shown in the plans will be the basis of payment and no additional compensation will be made for any adjustments due to substitutions.

All steel shall be galvanized according to Subsection 807.19. Steel completely encased in concrete may not be galvanized. Galvanized coating damaged during transport, handling or erection shall be field repaired in accordance with Subsection 807.88.

All main load carrying tension members greater than ½" in thickness shall conform to the requirements of the Longitudinal Charpy V-Notch test specified for Zone 1 minimum service temperature. This work and materials shall be paid for in accordance with Special Provision "STEEL SIGN STRUCTURES".

Field splices shall be located in order to avoid sign panel connections. There shall be a maximum of two field splices, and they shall be spaced a minimum of 15 feet apart.

Truss field sections shall be shop assembled. Entire truss shall be fully assembled and lifted into place as one unit on to tower supports. All truss member connections shall be bolted connections.

All welding that is to be done during fabrication of structural steel, including temporary welds, shall be detailed on the shop drawings and submitted for approval. If additional welds are required, whether temporary or permanent, a formal request with detailed drawings shall be submitted to the Engineer for approval. All welding shall conform to Subsection 807.26 except welding of tubular sections shall conform to AWS D1.1 Structural Welding Code.

No circumferential butt welds will be allowed in any pipe sections.

All fillet welds of critical members shall be tested according to AWS D1.1 Structural Welding Code - Steel using the magnetic particle method. Critical welds shall include: column to base plate and truss bottom support to column.

Connections shall be bolted with high-strength bolts. Unless otherwise noted, bolts shall be ¾" diameter and open holes shall be $^{13}/_{16}$" diameter. Bolt spacing shall be 2½" for ¾" diameter bolts unless otherwise noted. Bolts shall be placed with heads on the outside face of all members.

All truss frame bolts shall comply with ASTM F3125, Grade A325, Type 1, galvanized according to Subsection 807.06. Nuts and washers for ASTM F3125, Grade A325, Type 1 bolts shall be furnished and galvanized in accordance with Subsection 807.06.

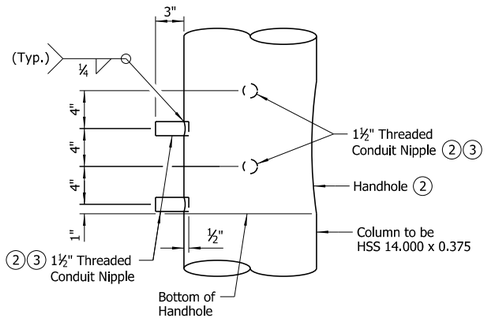
Locknuts shall be equipped with nylon locking inserts or other approved type locking system. Locknuts shall be installed according to Manufacturer's recommendations.

Anchor bolts shall comply with AASHTO M 314, Grade 55, including Supplementary Requirement S1, and shall be galvanized according to Subsection 807.07. Nuts and washers for anchor bolts shall be furnished and galvanized in accordance with Subsection 807.07. Anchor bolts shall be pretensioned in accordance with Special Provision "STEEL SIGN STRUCTURES".

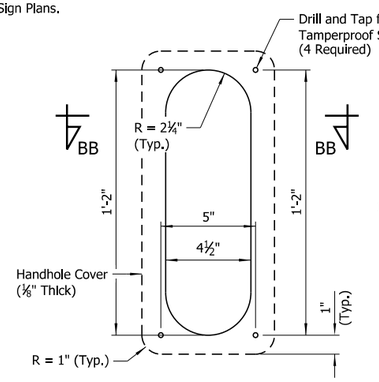
Shoring may be required to protect existing shoulders or other elements during excavation. Any shoring required shall not be paid for directly, but shall be considered incidental to the item "STEEL OVERHEAD SIGN STRUCTURE (_)". The excavations for the footings shall be backfilled before the structure is attached to the foundations.

DYNAMIC MESSAGE SIGN (WHEN APPLICABLE): The Dynamic Message Sign (DMS) supplier shall be responsible for the attachment method and materials used to attach the DMS and its accessories to the structure. The method of attachment shall not facilitate any corrosion of the structure. For additional information regarding the DMS, see Special Provision "OVERHEAD DYNAMIC MESSAGE SIGN ASSEMBLY".

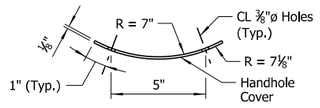
For location of each 40' to 54' overhead sign structure to be used, refer to ITS and/or Sign Plans.



DETAIL P
Scale: 1½" = 1'-0"



HANDHOLE DETAIL (2)
Scale: 3" = 1'-0"

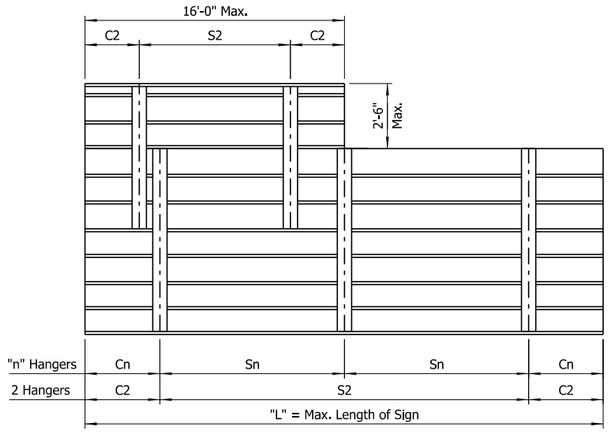


SECTION BB-BB
Scale: 3" = 1'-0"

NOTE:
Provide handhole covers with chain, waterproof grommet, and tamperproof screws.

Handhole covers shall be galvanized and meet the requirements of ASTM A36 at a minimum.

Tamperproof screws shall be galvanized and meet the requirements of ANSI/ASME B18.6.3.



NOTE:
See sign details and plan sheets for number, size and dimensions of signs.

HANGER SPACING DETAILS FOR EXTRUDED PANEL SIGNS

No Scale

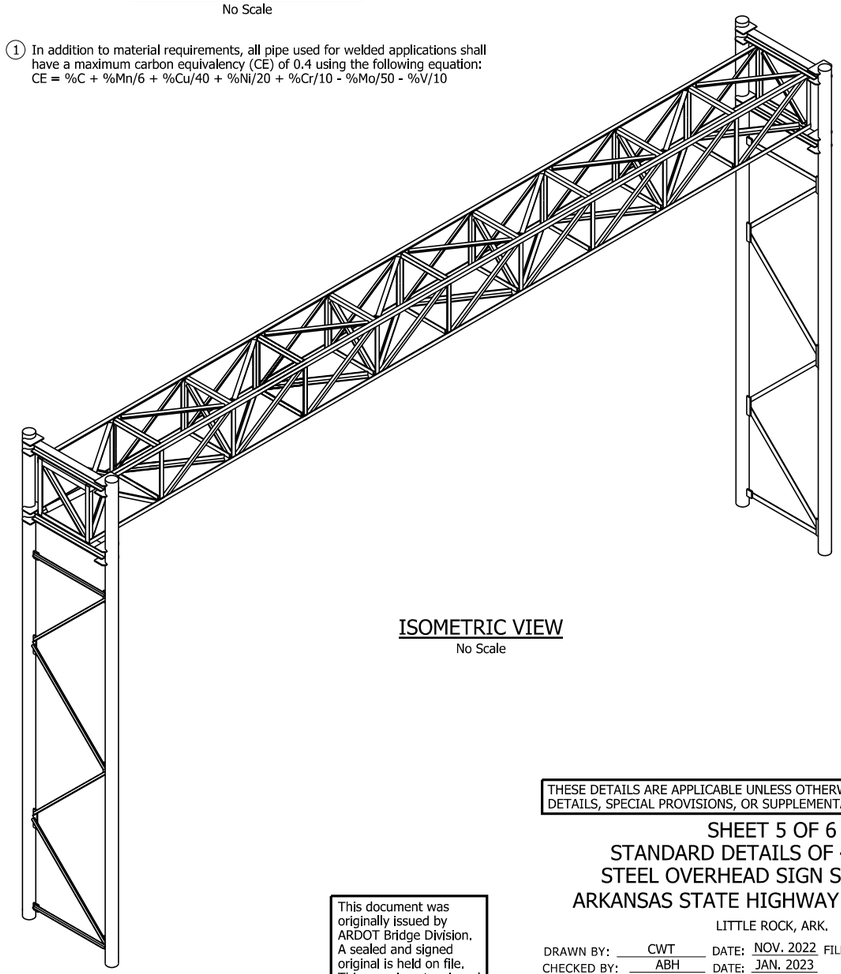
(1) In addition to material requirements, all pipe used for welded applications shall have a maximum carbon equivalency (CE) of 0.4 using the following equation:
CE = %C + %Mn/6 + %Cu/40 + %Ni/20 + %Cr/10 - %Mo/50 - %V/10

HANGER VARIABLES

(For Extruded Panel Signs)

Max. Length of Sign = "L"	"n" Hangers	Cantilever Length "Cn"	Hanger Spacing "Sn"
15'-0"	2 Hangers	0.21 x "L"	0.58 x "L"
30'-0"	3 Hangers	0.145 x "L"	0.355 x "L"
45'-0"	4 Hangers	0.107 x "L"	0.262 x "L"

NOTE:
Hanger spacing and cantilever length shall be rounded to the nearest inch.



ISOMETRIC VIEW
No Scale

(2) See details on Std. Dwgs. 55092A & 55092B for location and orientation of handholes and threaded conduit nipples.

(3) Threaded conduit nipples shall be fitted with standard plugs until conduit is installed.

THESE DETAILS ARE APPLICABLE UNLESS OTHERWISE SHOWN IN THE PLAN DETAILS, SPECIAL PROVISIONS, OR SUPPLEMENTAL SPECIFICATIONS.

SHEET 5 OF 6
STANDARD DETAILS OF 40' TO 54'
STEEL OVERHEAD SIGN STRUCTURE
ARKANSAS STATE HIGHWAY COMMISSION
LITTLE ROCK, ARK.

This document was originally issued by ARDOT Bridge Division. A sealed and signed original is held on file. This copy is not a signed and sealed document.

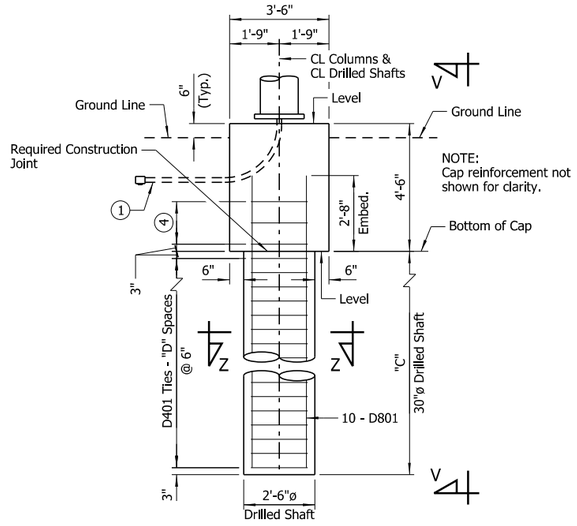
DRAWN BY:	CWT	DATE:	NOV. 2022	FILENAME:	b55092e.dgn
CHECKED BY:	ABH	DATE:	JAN. 2023	SCALE:	As Shown
DESIGNED BY:	STD.	DATE:	-		

Scales shown are for full size 22"x34" drawings. When using 11"x17" drawings, reduce scale by one half.

DRAWING NO. 55092E

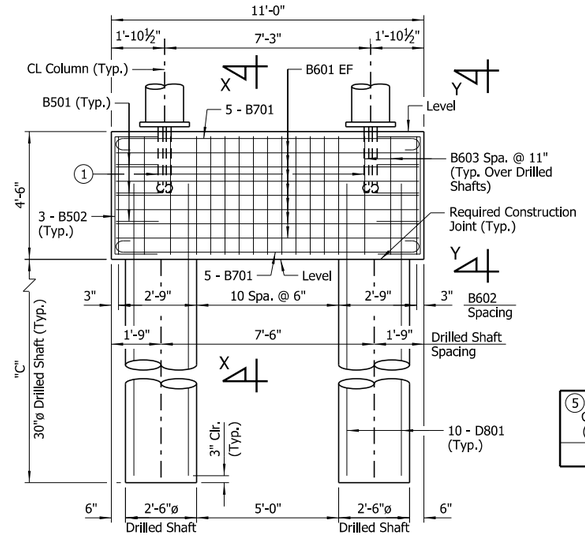
6/17/2026

DATE REVISED	DATE REVISED	FED. ROAD DIST. NO.	STATE	JOB NO.	SHEET NO.	TOTAL SHEETS
		6	ARK.			
		OVERHEAD SIGN STR. (40' TO 54') - 55092F				



ELEVATION - FOUNDATION A2 (2)

Scale: ⅜" = 1'-0"



VIEW V-V

Scale: ⅜" = 1'-0"

1. 2" Non-Metallic Conduit (Schedule 80) with 16" Min. Bend Radius (2 Conduits per Column). An insulated bushing shall be installed at the top end of each conduit. At Foundation B2, conduit shall not be provided if cabling on that side of the sign structure is not required per Electrical and/or ITS plans. At Foundation A2, conduit shall always be provided. If cabling in the conduit at Foundation A2 is not required per Electrical and/or ITS plans, the end of conduit in the ground shall be capped for future use with a manufactured water-tight cap.
2. Foundation A2 allowed only when foundation is outside clear zone or is protected by guardrail or barrier.
3. Foundation B2 is required when the foundation is located in a median, within the clear zone, and is not protected by guardrail or barrier. Foundation B2 requires adjacent Roadway Median Barrier to transition to match the ends of the cap. See Roadway Plans for additional information.
4. C401 Ties - 2 Spaces @ 9"

APPROX. QUANTITIES FOR FOUNDATION A2 (FOR INFORMATION ONLY)

(5) CLASS S CONCRETE (CU. YDS.)	(6) REINFORCING STEEL (LBS.)	EXCAVATION (CU. YDS.)	DRILLED SHAFT (30" DIA.) (LIN. FT.)	CROSSHOLE SONIC LOGGING (30" DIA.) (EACH)
6.50	970	14	"G"	1

APPROX. QUANTITIES FOR FOUNDATION B2 (FOR INFORMATION ONLY)

(5) CLASS S CONCRETE (CU. YDS.)	(6) REINFORCING STEEL (LBS.)	DRILLED SHAFT (30" DIA.) (LIN. FT.)	CROSSHOLE SONIC LOGGING (30" DIA.) (EACH)
6.50	970	"G"	1

5. Does not include Class S Concrete for Drilled Shafts
6. Does not include D401 and D801 Bars in Drilled Shafts
7. Tabulated SPT N60 values are raw SPT N values corrected by SPT hammer efficiency and represent average values along the plan shaft penetration. If the SPT N60 values in the foundation soils within 2 shaft diameters below the plan tip elevation are less than the average SPT N60 values along the plan shaft penetration, the Engineer shall be contacted.

DRILLED SHAFT NOTES (FOUNDATIONS A2 & B2)

Drilled shafts shall conform to Special Provision "DRILLED SHAFT FOUNDATIONS FOR STEEL SIGN STRUCTURES". Drilled shafts will not be paid for directly but shall be considered subsidiary to the unit price bid for "STEEL OVERHEAD SIGN STRUCTURE (_)". Temporary casing may be required. Unless approved by the Engineer, permanent steel casing shall not be used.

Crosshole Sonic Logging (CSL) shall be performed on one drilled shaft at each foundation and as directed by the Engineer. Testing shall be performed in accordance with Special Provision "NONDESTRUCTIVE TESTING OF DRILLED SHAFTS FOR STEEL SIGN STRUCTURES".

Concrete and reinforcing steel placed in drilled shafts will not be paid for directly but shall be considered subsidiary to the unit price bid for "STEEL OVERHEAD SIGN STRUCTURE (_)". No additional payment shall be made for spacers, additional splices or bracing needed for assembly, shipping, handling or erecting.

Concrete in drilled shafts shall be Class "S" as modified by Special Provision "DRILLED SHAFT FOUNDATIONS FOR STEEL SIGN STRUCTURES".

Drilled shaft lengths shall be determined based on the results of exploratory borings, which shall be performed by the Contractor prior to shaft excavation.

If competent rock is not encountered in the exploratory boring, the Standard Penetration Test (SPT) blow count corrected by the hammer efficiency, N60, shall be used to determine shaft lengths. See "TABLE OF VARIABLES".

If competent rock is encountered in the exploratory boring within 25'-0" of planned top of drilled shaft, the shafts shall be founded a minimum of 3'-0" into rock and have a minimum length of 25'-0".

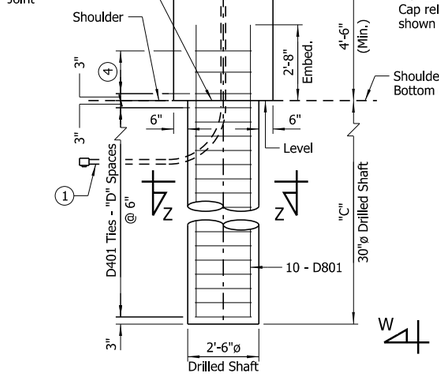
If competent rock is encountered in the exploratory boring below 25'-0" from planned top of drilled shaft, the shafts shall be founded a minimum of 3'-0" into rock or to the depth based on the SPT N60 value and associated shaft length in the "TABLE OF VARIABLES", whichever is shallower.

Testing results shall be submitted to the Engineer for review. Final drilled shaft lengths shall be approved by the Engineer prior to construction.

The cost of performing exploratory borings and in-situ strength testing shall be included in the item "STEEL OVERHEAD SIGN STRUCTURE (_)".

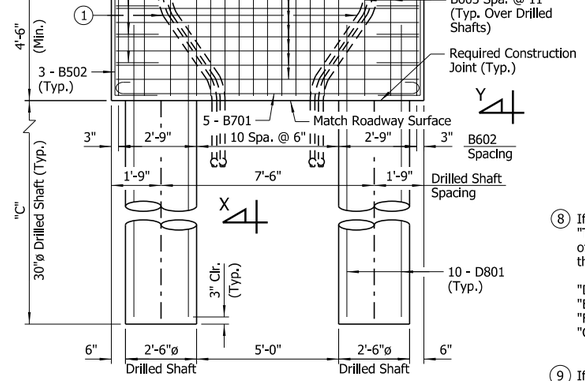
TABLE OF VARIABLES (8)

SPT N60 (7) (blows/ft.)	Min. Depth of Exploratory Boring	Drilled Shaft Length, "C"	"D"	"E"	"F" (9)	"G"
<5	-	Contact Engineer	-	-	-	-
5 To 7	75'-0"	70'-0"	139	280	72'-5"	140'-0"
7 To 9	63'-0"	58'-0"	115	232	60'-5"	116'-0"
9 To 11	47'-0"	42'-0"	83	168	44'-5"	84'-0"
11 To 13	37'-0"	32'-0"	63	128	34'-5"	64'-0"
>13	31'-0"	26'-0"	51	104	28'-5"	52'-0"



ELEVATION - FOUNDATION B2 (3)

Scale: ⅜" = 1'-0"



VIEW W-W

Scale: ⅜" = 1'-0"

8. If final drilled shaft length is not shown in "TABLE OF VARIABLES" due to the presence of rock or other factors, variables "D" through "G" shall be determined as follows:

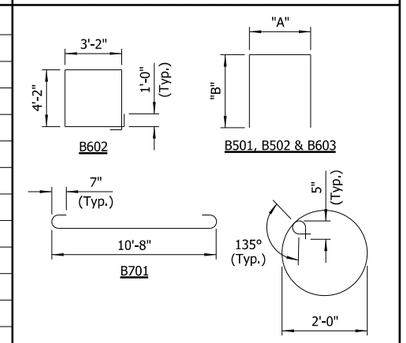
   "D" = (Shaft Length in Ft. - 0.5) / 0.5
   "E" = Shaft Length in Ft. x 4
   "F" = Shaft Length + 2'-5"
   "G" = Shaft Length x 2

9. If "F" exceeds 60'-0", a lap splice is required for each D801 bar at the midpoint of the drilled shaft. Min. lap splice length for D801 bar = 3'-6". Length shown in table does not include the additional length required for a lap splice.

BAR LIST - FOUNDATION A2 OR B2

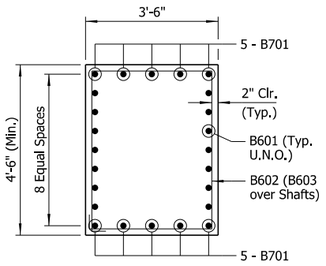
MARK	NO. REQ'D	LENGTH	"A"	"B"	P.D.
B501	6	5'-10"	3'-0"	1'-6"	2½"
B502	6	6'-10"	4'-0"	1'-6"	2½"
B601	14	10'-8"			Str.
B602	13	15'-10"			4½"
B603	4	11'-2"	3'-2"	4'-2"	4½"
B701	10	12'-4"			5¼"
C401	6	7'-4"			3"
D401	"E"	7'-4"			3"
D801	20	"F"			Str.

BAR BENDING DIAGRAMS



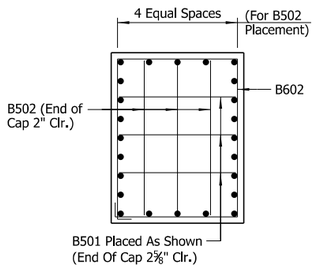
NOTES:
Dimensions of bars are out-to-out.

Number of bars shown is for one Foundation A2 or one Foundation B2.



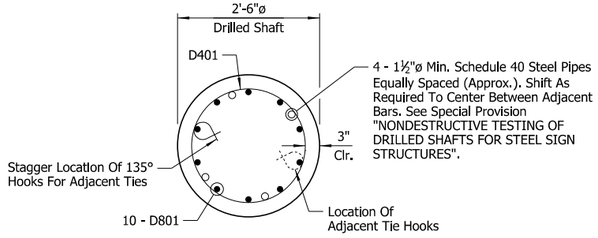
SECTION X-X

Scale: ½" = 1'-0"



VIEW Y-Y

Scale: ½" = 1'-0"



SECTION Z-Z

Scale: ¾" = 1'-0"

LEGEND

U.N.O. = Unless Noted Otherwise
EF = Each Face

This document was originally issued by ARDOT Bridge Division. A sealed and signed original is held on file. This copy is not a signed and sealed document.

THESE DETAILS ARE APPLICABLE UNLESS OTHERWISE SHOWN IN THE PLAN DETAILS, SPECIAL PROVISIONS, OR SUPPLEMENTAL SPECIFICATIONS.

SHEET 6 OF 6
STANDARD DETAILS OF 40' TO 54'
STEEL OVERHEAD SIGN STRUCTURE
ARKANSAS STATE HIGHWAY COMMISSION
LITTLE ROCK, ARK.

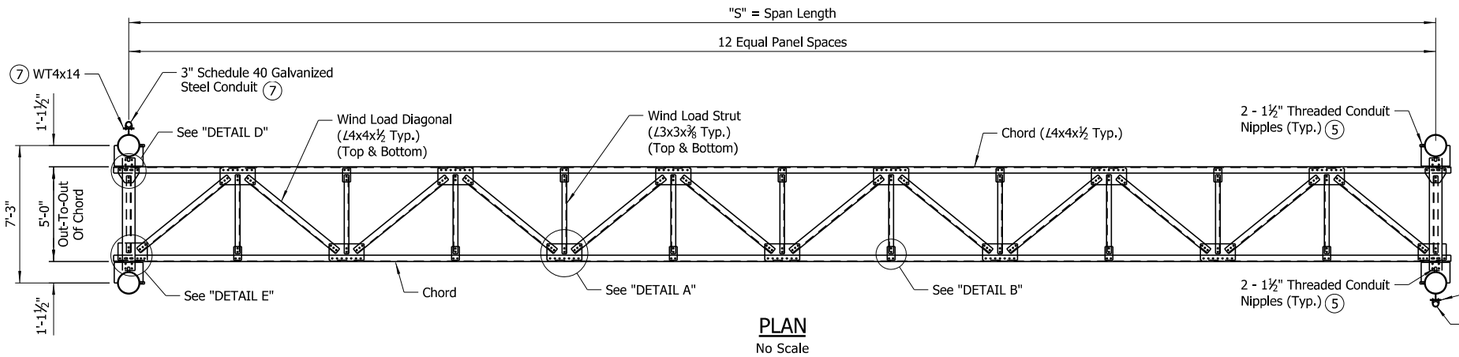
DRAWN BY: CWT DATE: JAN. 2023 FILENAME: b55092f.dgn
CHECKED BY: ABH DATE: JAN. 2023 SCALE: As Shown
DESIGNED BY: STD. DATE: -

Scales shown are for full size 22"x34" drawings. When using 11"x17" drawings, reduce scale by one half. DRAWING NO. 55092F

6/17/2026

DATE REVISED	DATE REVISED	FED. ROAD DIST. NO.	STATE	JOB NO.	SHEET NO.	TOTAL SHEETS
		6	ARK.			
		OVERHEAD SIGN STR. (55' TO 69') - 55093A				

NOTE:
Refer to Sign Layout Sheets for Span Length "S" and Foundation Types required for each structure.



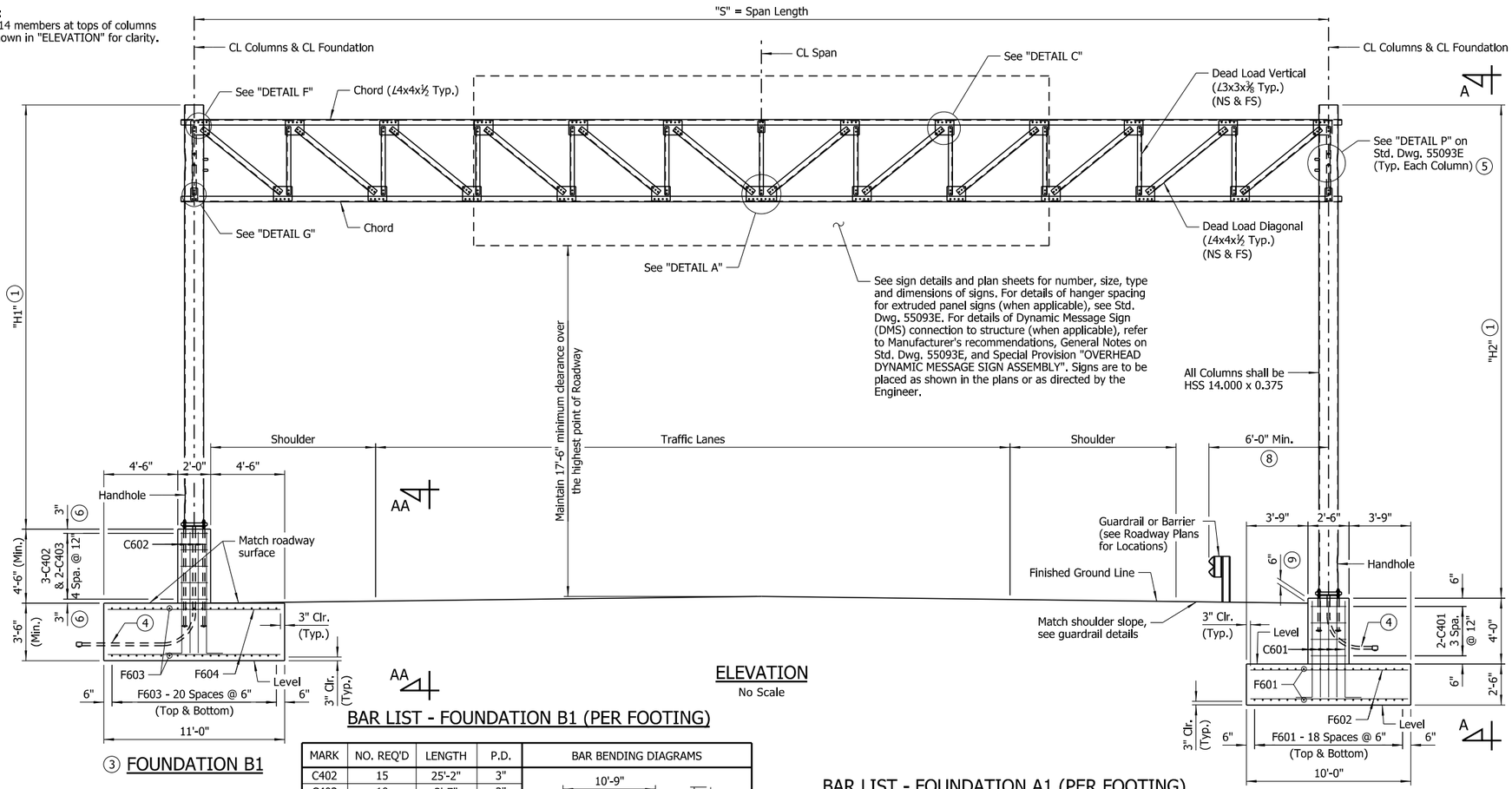
LEGEND

NS = Near Side
FS = Far Side

PLAN

No Scale

NOTE:
WT4x14 members at tops of columns not shown in "ELEVATION" for clarity.



ELEVATION

No Scale

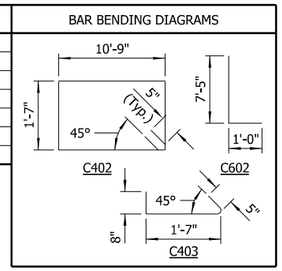
3 FOUNDATION B1

2 FOUNDATION A1

BAR LIST - FOUNDATION B1 (PER FOOTING)

MARK	NO. REQ'D	LENGTH	P.D.
C402	15	25'-2"	3"
C403	10	2'-7"	3"
C602	104	8'-3"	4½"
F603	42	24'-6"	Str.
F604	98	10'-6"	Str.

BAR BENDING DIAGRAMS

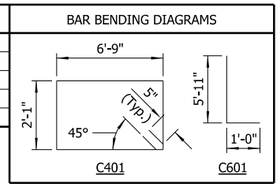


NOTE:
Dimensions of bars are out-to-out.

BAR LIST - FOUNDATION A1 (PER FOOTING)

MARK	NO. REQ'D	LENGTH	P.D.
C401	8	18'-2"	3"
C601	46	6'-9"	4½"
F601	38	20'-6"	Str.
F602	82	9'-6"	Str.

BAR BENDING DIAGRAMS



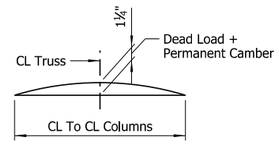
NOTE:
Dimensions of bars are out-to-out.

1. The Contractor shall make field measurements to determine the column heights "H1" and "H2" that are required to maintain the minimum vertical clearance with the centerline of the sign located at the centerline of the truss. These column heights shall be shown on the shop drawings with a note stating that the Contractor has made the required field measurements. If the structure height ("H1" or "H2") exceeds 30'-0", contact the Engineer. The Contractor shall also verify that the variable span length (55'-0" to 69'-0") is sufficient to meet the minimum clearances and to fit the new structure to the existing and/or proposed conditions.
2. Foundation A1 allowed only when foundation is outside clear zone or is protected by guardrail or barrier. For alternate drilled shaft foundation (Foundation A2), see Std. Dwg. 55093F.
3. Foundation B1 is required when the foundation is located in a median, within the clear zone, and is not protected by guardrail or barrier. Foundation B1 requires adjacent Roadway Median Barrier to transition to match the ends of the pedestal. For alternate drilled shaft foundation (Foundation B2), see Std. Dwg. 55093F.
4. 2" Non-Metallic Conduit (Schedule 80) with 16" Min. Bend Radius (2 Conduits per Column). At Foundation B1, conduit shall not be provided if cabling on that side of the sign structure is not required per Electrical and/or ITS plans. At Foundation A1, conduit shall always be provided. If cabling in the conduit at Foundation A1 is not required per Electrical and/or ITS plans, the end of conduit in the ground shall be capped for future use with a manufactured water-tight cap.
5. Threaded Conduit Nipples shall be fitted with standard plugs until conduit is installed.
6. Minor adjustments are allowed to maintain C402 and C403 12" spacing for foundations located in longitudinal grades.
7. See "SECTION U-U" on Std. Dwg. 55093C. WT4x14 always required. 3" Conduit and Clamping U-Bolts only required when necessary to support ITS equipment or as directed by the Engineer. See ITS Plans.
8. Minimum dimension when guardrail is present. See Sign Layout Sheets and/or ITS Plans for actual dimension for each structure.
9. Dimension from top of pedestal to Finished Ground Line shall be maintained along the perimeter of the pedestal.

NOTES:
For "VIEW A-A", see Std. Dwg. 55093B.

For "DETAIL A" thru "DETAIL G", see Std. Dwg. 55093C.

For "VIEW AA-AA", see Std. Dwg. 55093D.



TRUSS CAMBER DIAGRAM

No Scale

APPROXIMATE QUANTITIES FOR FOUNDATION A1 PER FOOTING (FOR INFORMATION ONLY)

CLASS S CONCRETE (CU. YDS.)	REINFORCING STEEL (LBS.)	EXCAVATION (CU. YDS.)
23.20	2,910	70

APPROXIMATE QUANTITIES FOR FOUNDATION B1 PER FOOTING (FOR INFORMATION ONLY)

CLASS S CONCRETE (CU. YDS.)	REINFORCING STEEL (LBS.)	EXCAVATION (CU. YDS.)
44.00	4,650	51

THESE DETAILS ARE APPLICABLE UNLESS OTHERWISE SHOWN IN THE PLAN DETAILS, SPECIAL PROVISIONS, OR SUPPLEMENTAL SPECIFICATIONS.

SHEET 1 OF 6
STANDARD DETAILS OF 55' TO 69'
STEEL OVERHEAD SIGN STRUCTURE
ARKANSAS STATE HIGHWAY COMMISSION
LITTLE ROCK, ARK.

DRAWN BY: CWT DATE: NOV. 2022 FILENAME: b55093a.dgn
CHECKED BY: ABH DATE: FEB. 2023 SCALE: As Shown
DESIGNED BY: STD. DATE: -

DRAWING NO. 55093A

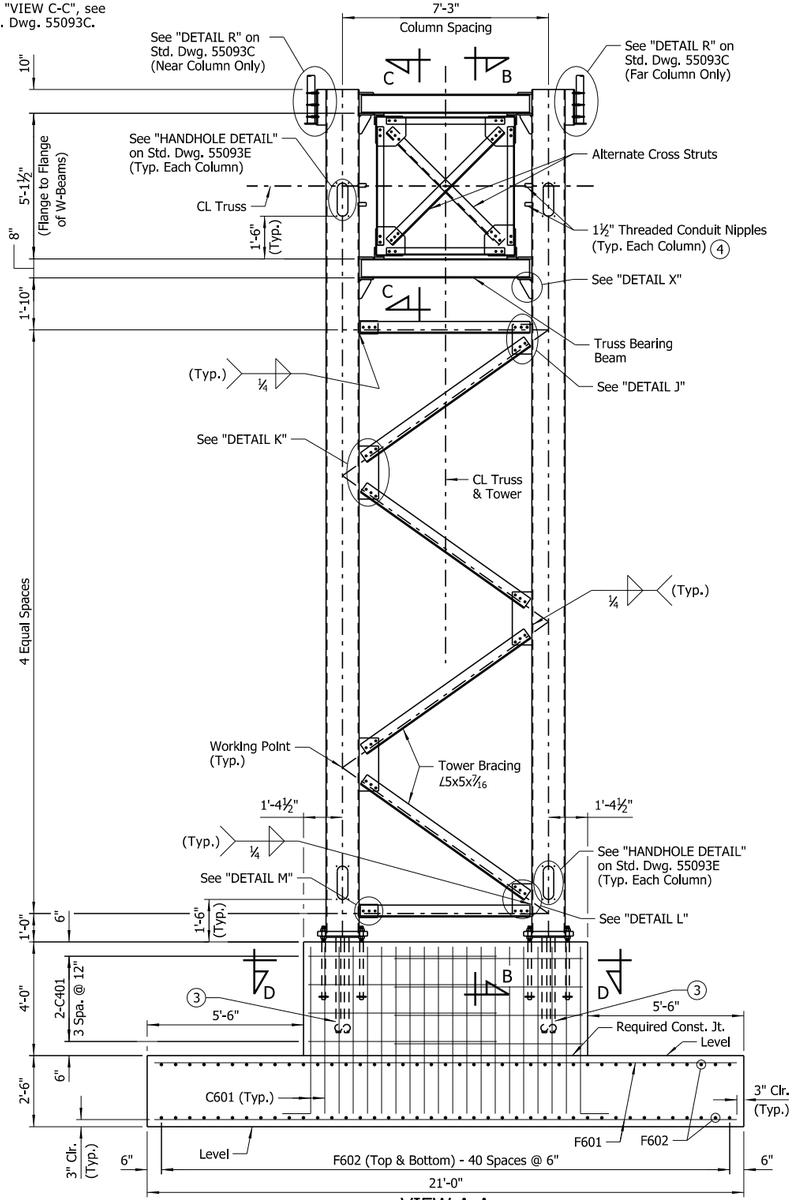
This document was originally issued by ARDOT Bridge Division. A sealed and signed original is held on file. This copy is not a signed and sealed document.

Scales shown are for full size 22"x34" drawings. When using 11"x17" drawings, reduce scale by one half.

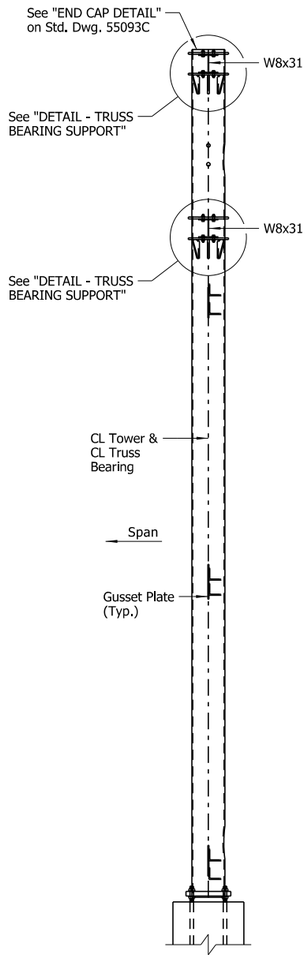
6/17/2026

DATE REVISED	DATE REVISED	FED. ROAD DIST. NO.	STATE	JOB NO.	SHEET NO.	TOTAL SHEETS
		6	ARK.			
		OVERHEAD SIGN STR. (55' TO 69') - 55093B				

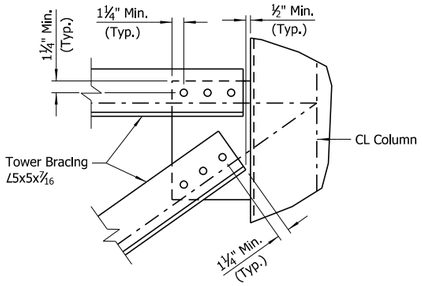
NOTE:
For "VIEW C-C", see Std. Dwg. 55093C.



VIEW A-A
(Foundation A1)
No Scale

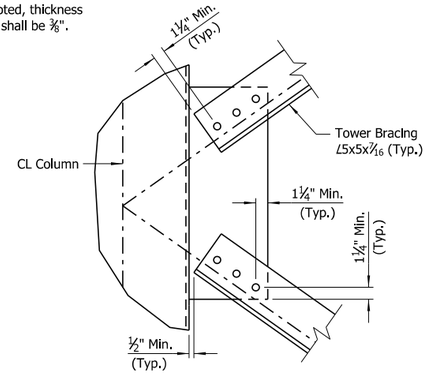


VIEW B-B
No Scale

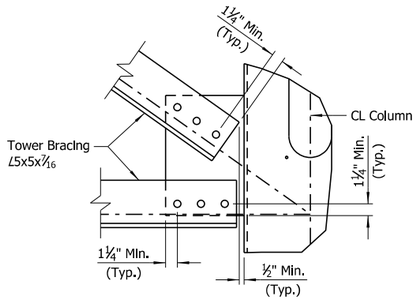


DETAIL J
No Scale

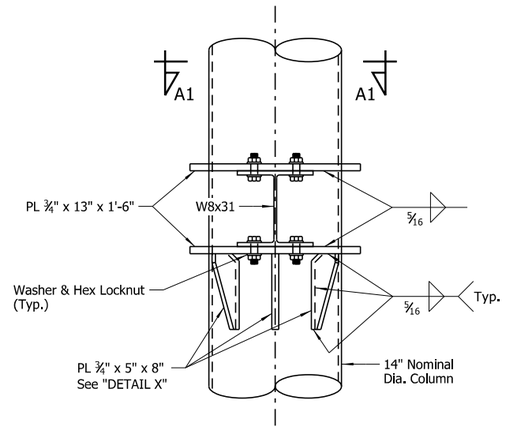
NOTE:
Unless otherwise noted, thickness of all Gusset Plates shall be ⅜".



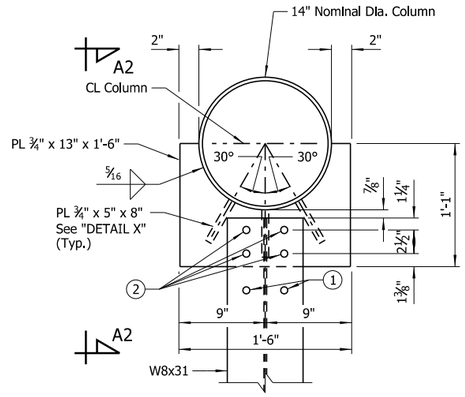
DETAIL K
No Scale



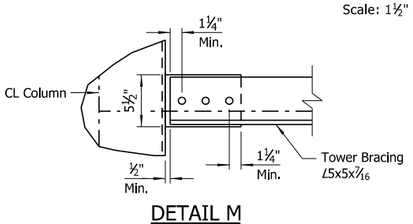
DETAIL L
No Scale



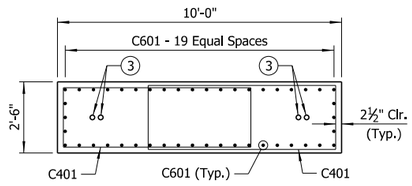
DETAIL - TRUSS BEARING SUPPORT
Scale: 1½" = 1'-0"



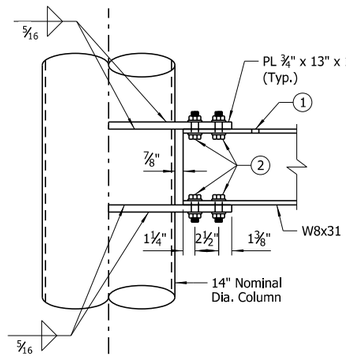
VIEW A1-A1
Scale: 1½" = 1'-0"



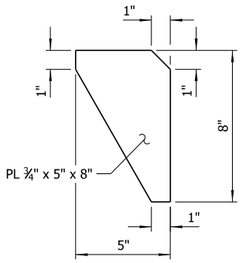
DETAIL M
No Scale



SECTION D-D
Scale: ⅜" = 1'-0"



VIEW A2-A2
Scale: 1½" = 1'-0"
(¾" x 5" x 8" Plate not shown for clarity)



DETAIL X
Scale: 3" = 1'-0"

1. Bolts shall be ¾"ø. Provide 13/16" x 2" slotted hole in gusset plate and chord angle. Use plate washer on gusset plate side. Provide 13/16"ø holes in ¾" shim plate and top or bottom beam flanges as required.
2. Bolts shall be ¾"ø. Provide 13/16"ø holes at top and bottom beam flanges and connection plates.
3. 2" Non-Metallic Conduit (Schedule 80) (2 Conduits per Column). An insulated bushing shall be installed at the top end of each conduit.
4. Threaded Conduit Nipples shall be fitted with standard plugs until conduit is installed.

THESE DETAILS ARE APPLICABLE UNLESS OTHERWISE SHOWN IN THE PLAN DETAILS, SPECIAL PROVISIONS, OR SUPPLEMENTAL SPECIFICATIONS.

SHEET 2 OF 6
STANDARD DETAILS OF 55' TO 69'
STEEL OVERHEAD SIGN STRUCTURE
ARKANSAS STATE HIGHWAY COMMISSION

LITTLE ROCK, ARK.

DRAWN BY: CWT DATE: NOV. 2022 FILENAME: b55093b.dgn
CHECKED BY: ABH DATE: FEB. 2023 SCALE: As Shown
DESIGNED BY: STD. DATE: -

DRAWING NO. 55093B

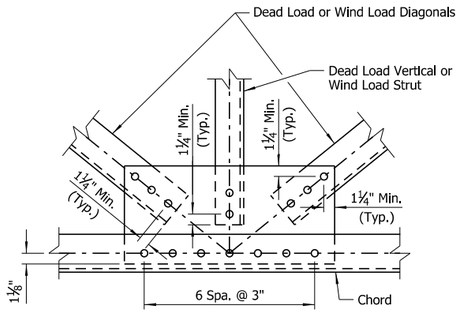
This document was originally issued by ARDOT Bridge Division. A sealed and signed original is held on file. This copy is not a signed and sealed document.

Scales shown are for full size 22"x34" drawings. When using 11"x17" drawings, reduce scale by one half.

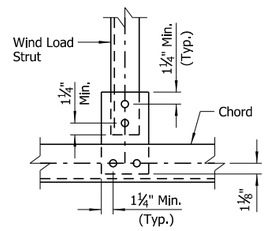
6/17/2026

DATE REVISED	DATE REVISED	FED. ROAD DIST. NO.	STATE	JOB NO.	SHEET NO.	TOTAL SHEETS
		6	ARK.			
		OVERHEAD SIGN STR. (55' TO 69') - 55093C				

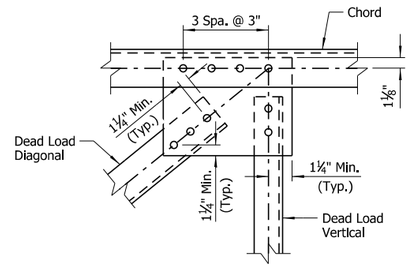
NOTE:
Unless otherwise noted, thickness of all Gusset Plates shall be ⅜".



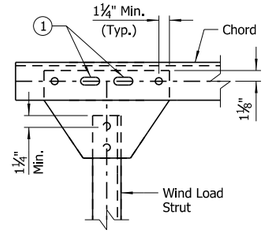
DETAIL A
No Scale



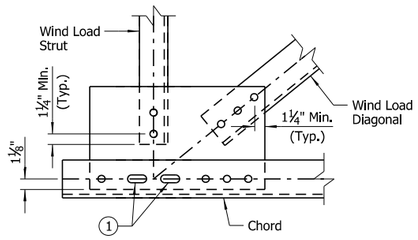
DETAIL B
No Scale



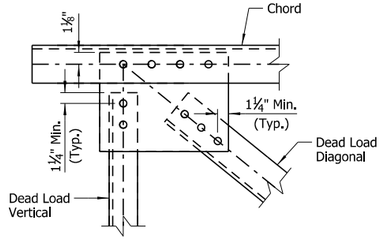
DETAIL C
No Scale



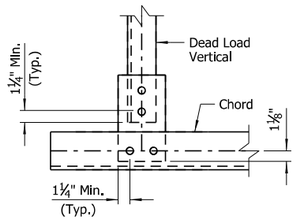
DETAIL D
No Scale



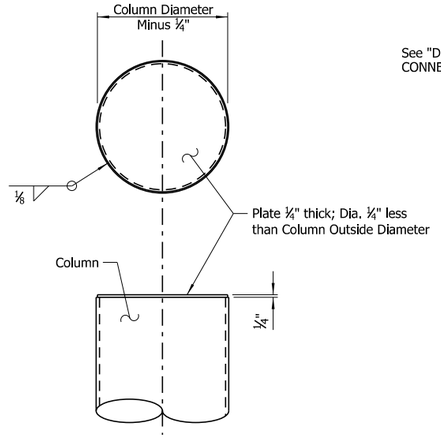
DETAIL E
No Scale



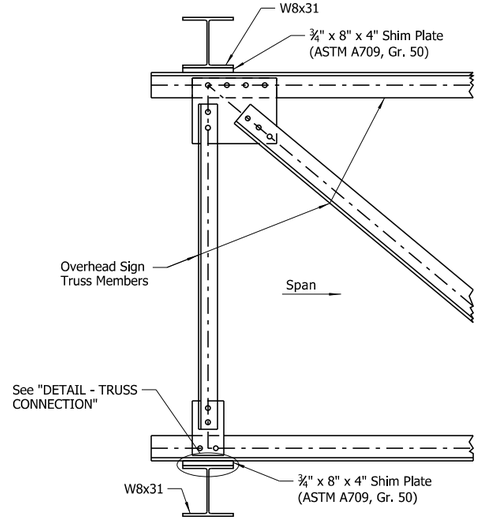
DETAIL F
No Scale



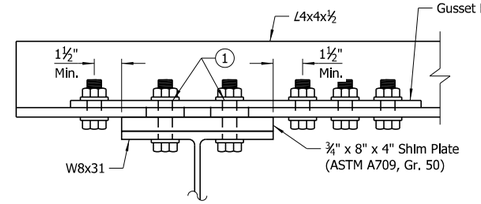
DETAIL G
No Scale



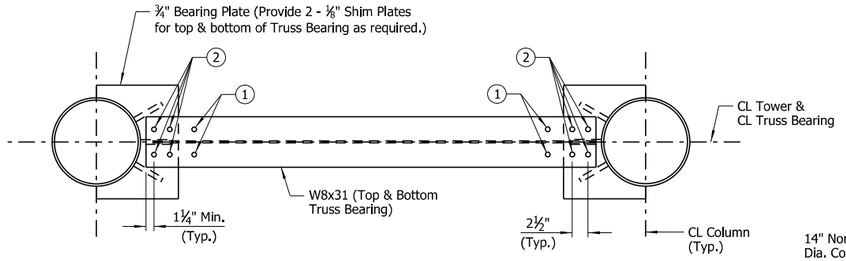
END CAP DETAIL
Scale: 1½" = 1'-0"



VIEW C-C
No Scale



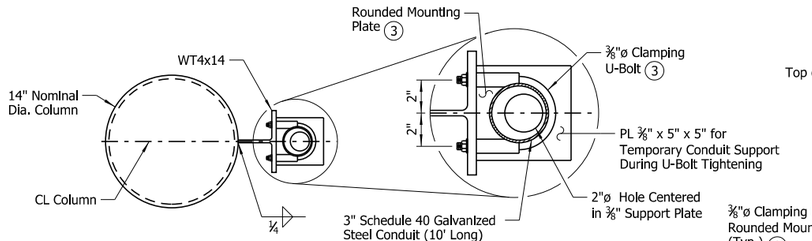
DETAIL - TRUSS CONNECTION
No Scale



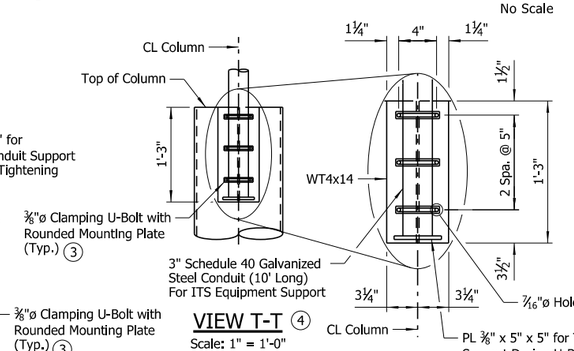
PLAN AT TRUSS BEARING
Scale: 1" = 1'-0"

1 Bolts shall be ¾"ø. Provide 13/16" x 2" slotted holes in gusset plate and chord angle. Clearance between end of slot and adjacent bolt hole shall be no less than 1½". Provide 13/16"ø holes in ¾" shim plate and top or bottom beam flanges as required. Use plate washer on gusset plate side.

2 Bolts shall be ¾"ø. Provide 13/16"ø holes at top and bottom beam flanges and connection plates.



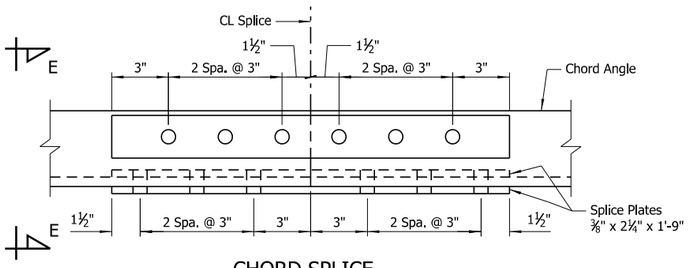
SECTION U-U 4
Scale: 1½" = 1'-0"



VIEW T-T 4
Scale: 1" = 1'-0"

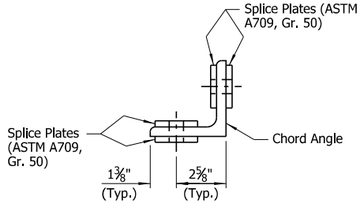
3 When required per plans to support ITS equipment, or as directed by the Engineer, Clamping U-Bolt with Rounded Mounting Plate Assembly product shall be included in shop drawings for approval. Assembly shall be galvanized and shall meet the requirements of ASTM A36 at a minimum. Install per Manufacturer's instructions.

4 WT4x14 with ¼" Temporary Support Plate always required. 3" Conduit and Clamping U-Bolts only required when necessary to support ITS equipment or as directed by the Engineer. See ITS Plans.

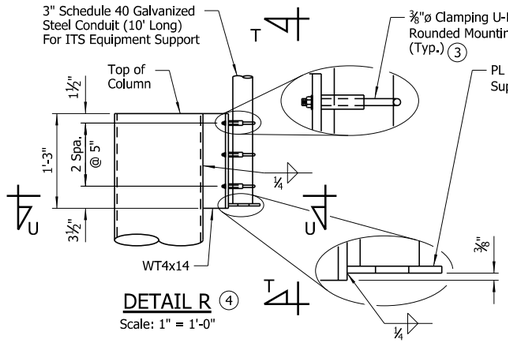


CHORD SPLICE
Scale: 3" = 1'-0"

NOTE:
Chord angles may be spliced in convenient lengths for galvanizing and sign placement.



VIEW E-E
Scale: 3" = 1'-0"



DETAIL R 4
Scale: 1" = 1'-0"

THESE DETAILS ARE APPLICABLE UNLESS OTHERWISE SHOWN IN THE PLAN DETAILS, SPECIAL PROVISIONS, OR SUPPLEMENTAL SPECIFICATIONS.

SHEET 3 OF 6
STANDARD DETAILS OF 55' TO 69'
STEEL OVERHEAD SIGN STRUCTURE
ARKANSAS STATE HIGHWAY COMMISSION

LITTLE ROCK, ARK.

This document was originally issued by ARDOT Bridge Division. A sealed and signed original is held on file. This copy is not a signed and sealed document.

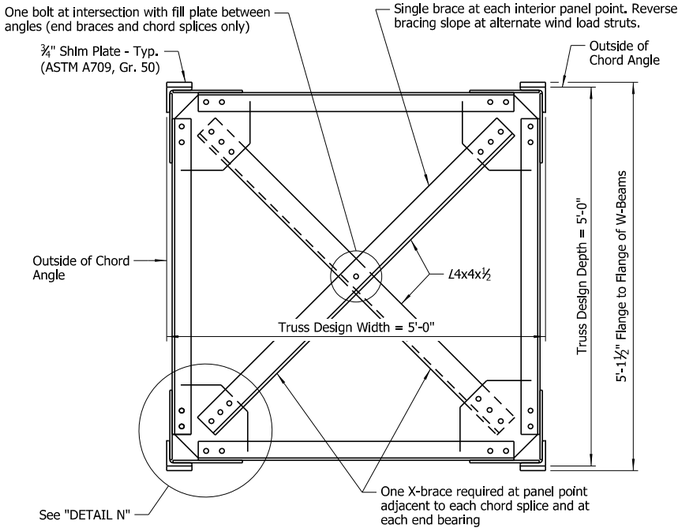
DRAWN BY:	CWT	DATE:	NOV. 2022	FILENAME:	b55093c.dgn
CHECKED BY:	ABH	DATE:	FEB. 2023	SCALE:	As Shown
DESIGNED BY:	STD.	DATE:	-		

Scales shown are for full size 22"x34" drawings. When using 11"x17" drawings, reduce scale by one half.

DRAWING NO. 55093C

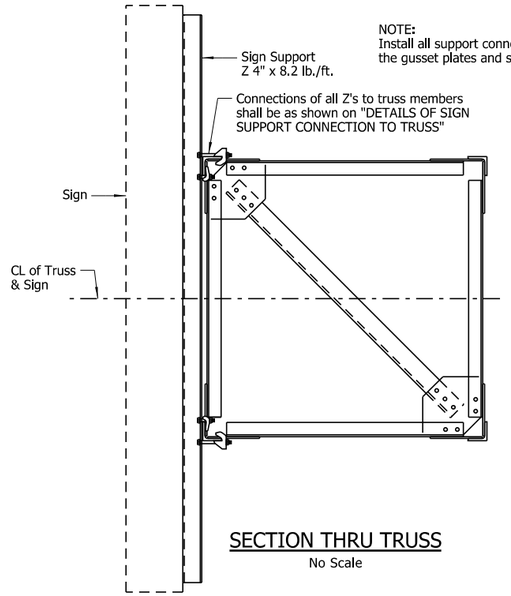
6/17/2026

DATE REVISED	DATE REVISED	FED. ROAD DIST. NO.	STATE	JOB NO.	SHEET NO.	TOTAL SHEETS
		6	ARK.			
		OVERHEAD SIGN STR. (55' TO 69') - 55093D				



TRUSS SECTION

Scale: 1" = 1'-0"

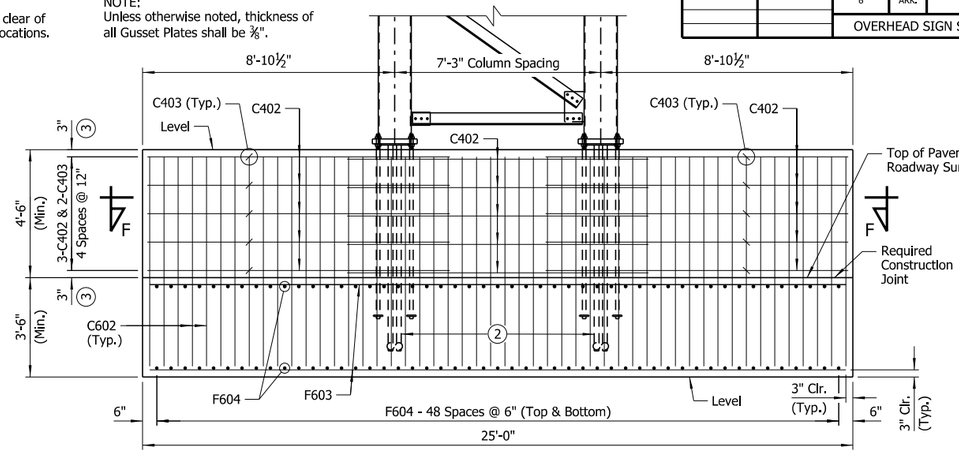


SECTION THRU TRUSS

No Scale

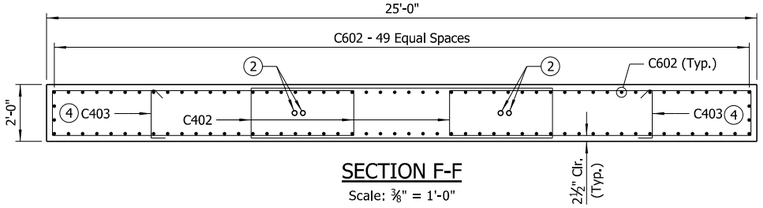
NOTE:
Install all support connectors clear of the gusset plates and splice locations.

NOTE:
Unless otherwise noted, thickness of all Gusset Plates shall be ⅜".



VIEW AA-AA

(Foundation B1)
Scale: ⅜" = 1'-0"



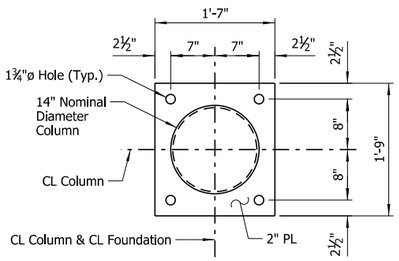
SECTION F-F

Scale: ⅜" = 1'-0"

(2) 2" Non-Metallic Conduit (Schedule 80) (2 Conduits per Column). An insulated bushing shall be installed at the top end of each conduit. Conduit shall not be provided if cabling at Foundation B1 is not required per Electrical and/or ITS plans.

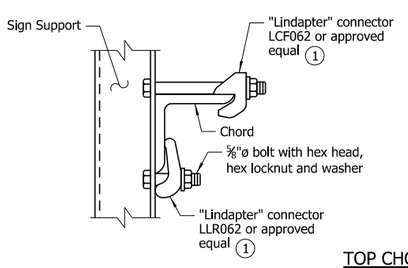
(3) Minor adjustments are allowed to maintain C402 and C403 12" spacing for foundations located in longitudinal grades.

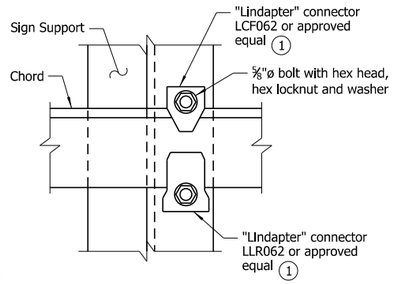
(4) Alternate C403 ties end for end at each layer of reinforcing.



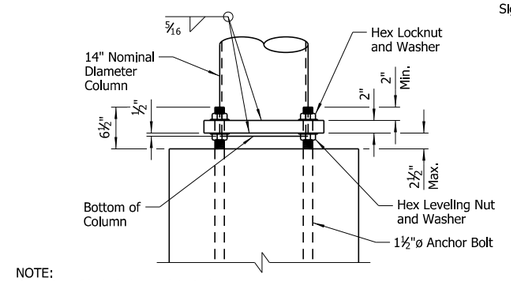
PLAN - COLUMN BASE

Scale: 1" = 1'-0"





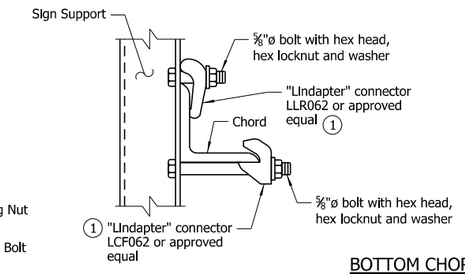
TOP CHORD

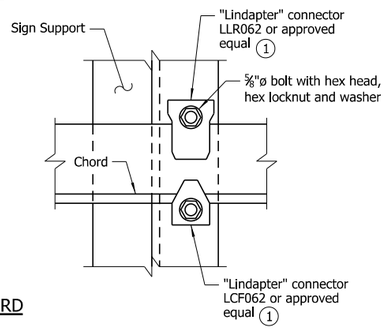


NOTE:
Diameter of hole in base plate to be ⅛" larger than column diameter.

ELEVATION - COLUMN BASE

Scale: 1" = 1'-0"

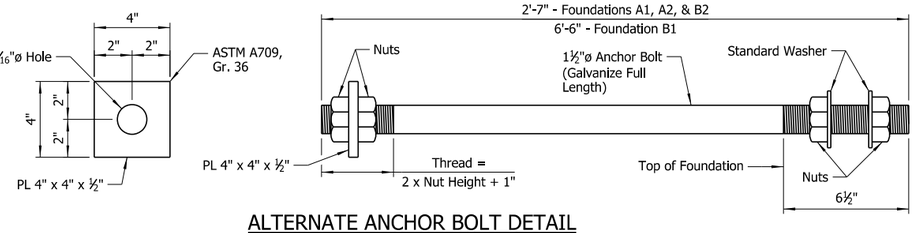




BOTTOM CHORD

DETAILS OF SIGN SUPPORT CONNECTION TO TRUSS

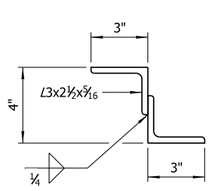
No Scale



ALTERNATE ANCHOR BOLT DETAIL

No Scale

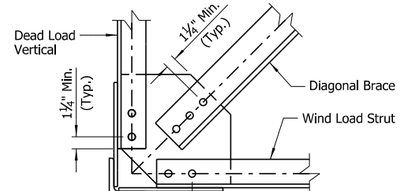
(1) All "Lindapter" connectors or approved equal shall be installed according to Manufacturer's recommendations. All connectors, bolts, nuts and washers shall be galvanized.



NOTE:
Structural Z Support may be fabricated from angles as shown.

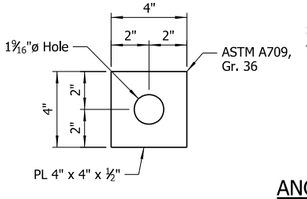
DETAILS OF ALTERNATE Z SUPPORT

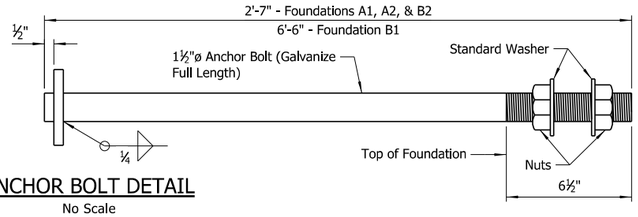
No Scale



DETAIL N

Scale: 1½" = 1'-0"





ANCHOR BOLT DETAIL

No Scale

THESE DETAILS ARE APPLICABLE UNLESS OTHERWISE SHOWN IN THE PLAN DETAILS, SPECIAL PROVISIONS, OR SUPPLEMENTAL SPECIFICATIONS.

SHEET 4 OF 6
STANDARD DETAILS OF 55' TO 69'
STEEL OVERHEAD SIGN STRUCTURE
ARKANSAS STATE HIGHWAY COMMISSION

LITTLE ROCK, ARK.

DRAWN BY: CWT DATE: NOV. 2022 FILENAME: b55093d.dgn
CHECKED BY: ABH DATE: FEB. 2023 SCALE: As Shown
DESIGNED BY: STD. DATE: -

DRAWING NO. 55093D

This document was originally issued by ARDOT Bridge Division. A sealed and signed original is held on file. This copy is not a signed and sealed document.

Scales shown are for full size 22"x34" drawings. When using 11"x17" drawings, reduce scale by one half.

6/17/2026

DATE REVISED	DATE REVISED	FED. ROAD DIST. NO.	STATE	JOB NO.	SHEET NO.	TOTAL SHEETS
		6	ARK.			
		OVERHEAD SIGN STR. (55' TO 69') - 55093E				

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 Specifications unless otherwise noted in the plans.

DESIGN SPECIFICATIONS: AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, First Edition, 2015 with current interim revisions.

Basic Wind Speed = 120 mph
Fatigue Category: I

This structure is approved for a maximum sign area equal to 75% of the span length times a sign height of 15 feet. This structure is approved for a maximum sign weight (total of all signs and hangers) of 5,025 lbs. Use of additional sign area or a heavier sign must be approved by the Engineer. If the structure height ("H1" or "H2") exceeds 30'-0", contact the Engineer.

FOUNDATION MATERIALS AND STRENGTHS:

Class S Concrete	f'c = 3,500 psi
Reinforcing Steel (Gr. 60, AASHTO M 31 or M 322, Type A)	fy = 60,000 psi

Spread footings for the structure have been designed assuming a factored bearing resistance of 2.0 ksf. Contractor shall be responsible for evaluating and verifying that the foundation soils are adequate to achieve the assumed factored bearing capacity, utilizing SPT (Standard Penetration Test), CPT (Cone Penetration Test), DCP (Dynamic Cone Penetration) test, or other suitable means, prior to or after footing excavation, whichever is appropriate. If the foundation soils are verified to be adequate, then the footing shall be constructed in accordance with the planned dimensions. Otherwise, the Design Engineer shall be contacted. Costs for foundation soil evaluation and verification shall be included in the item "STEEL OVERHEAD SIGN STRUCTURE (_)".

Structural steel sign support members shall comply with the following specifications:

Angles:	ASTM A709, Gr. 36 (Fy = 36,000 psi)
Plate, W-Section:	ASTM A709, Gr. 50 (Fy = 50,000 psi)
(1) Pipe:	ASTM A139, Gr. C, straight-seam welded (Fy = 42,000 psi), ASTM A500, Gr. B (Fy = 42,000 psi), ASTM A501, Gr. B (Fy = 50,000 psi)
Z-Shapes:	ASTM A709, Grade 36 (Fy = 36,000 psi)
Shim Plates:	ASTM A1011, SS, Grade 36, Type 2, or Grade 40
Bolts:	ASTM F3125, Grade A325, Type 1
Locknuts - Approved Type:	ASTM A563, Grade DH or AASHTO M 292, Grade 2H
Washers:	ASTM F436
Nuts:	ASTM A563, Grade DH or AASHTO M 292, Grade 2H

The Contractor shall make check measurements in the field and make any adjustments necessary to meet the required clearances and to fit the new structure to the existing and/or proposed conditions.

Drawings show general features of design only. Shop drawings shall be made in accordance with Subsection 807.04, submitted, and approval secured before fabrication is begun.

Requests for substitution of structural steel shapes shown with shapes of greater size must be submitted by the Contractor to the Engineer for approval. Steels of equal or greater strengths will be accepted only when shown on the approved shop drawings. Shapes and materials shown in the plans will be the basis of payment and no additional compensation will be made for any adjustments due to substitutions.

All steel shall be galvanized according to Subsection 807.19. Steel completely encased in concrete may not be galvanized. Galvanized coating damaged during transport, handling or erection shall be field repaired in accordance with Subsection 807.88.

All main load carrying tension members greater than ½" in thickness shall conform to the requirements of the Longitudinal Charpy V-Notch test specified for Zone 1 minimum service temperature. This work and materials shall be paid for in accordance with Special Provision "STEEL SIGN STRUCTURES".

Field splices shall be located in order to avoid sign panel connections. There shall be a maximum of two field splices, and they shall be spaced a minimum of 15 feet apart.

Truss field sections shall be shop assembled. Entire truss shall be fully assembled and lifted into place as one unit on to tower supports. All truss member connections shall be bolted connections.

All welding that is to be done during fabrication of structural steel, including temporary welds, shall be detailed on the shop drawings and submitted for approval. If additional welds are required, whether temporary or permanent, a formal request with detailed drawings shall be submitted to the Engineer for approval. All welding shall conform to Subsection 807.26 except welding of tubular sections shall conform to AWS D1.1 Structural Welding Code.

No circumferential butt welds will be allowed in any pipe sections.

All fillet welds of critical members shall be tested according to AWS D1.1 Structural Welding Code - Steel using the magnetic particle method. Critical welds shall include: column to base plate and truss bottom support to column.

Connections shall be bolted with high-strength bolts. Unless otherwise noted, bolts shall be ¾" diameter and open holes shall be $^{13}/_{16}$" diameter. Bolt spacing shall be 2½" for ¾" diameter bolts unless otherwise noted. Bolts shall be placed with heads on the outside face of all members.

All truss frame bolts shall comply with ASTM F3125, Grade A325, Type 1, galvanized according to Subsection 807.06. Nuts and washers for ASTM F3125, Grade A325, Type 1 bolts shall be furnished and galvanized in accordance with Subsection 807.06.

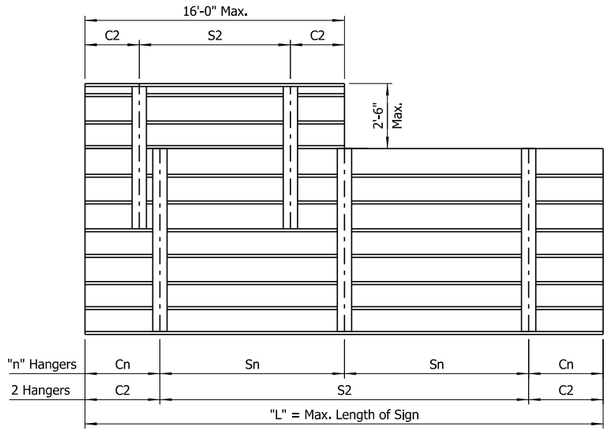
Locknuts shall be equipped with nylon locking inserts or other approved type locking system. Locknuts shall be installed according to Manufacturer's recommendations.

Anchor bolts shall comply with AASHTO M 314, Grade 55, including Supplementary Requirement S1, and shall be galvanized according to Subsection 807.07. Nuts and washers for anchor bolts shall be furnished and galvanized in accordance with Subsection 807.07. Anchor bolts shall be pretensioned in accordance with Special Provision "STEEL SIGN STRUCTURES".

Shoring may be required to protect existing shoulders or other elements during excavation. Any shoring required shall not be paid for directly, but shall be considered incidental to the item "STEEL OVERHEAD SIGN STRUCTURE (_)". The excavations for the footings shall be backfilled before the structure is attached to the foundations.

DYNAMIC MESSAGE SIGN (WHEN APPLICABLE): The Dynamic Message Sign (DMS) supplier shall be responsible for the attachment method and materials used to attach the DMS and its accessories to the structure. The method of attachment shall not facilitate any corrosion of the structure. For additional information regarding the DMS, see Special Provision "OVERHEAD DYNAMIC MESSAGE SIGN ASSEMBLY".

For location of each 55' to 69' overhead sign structure to be used, refer to ITS and/or Sign Plans.



NOTE:
See sign details and plan sheets for number, size and dimensions of signs.

HANGER SPACING DETAILS FOR EXTRUDED PANEL SIGNS

No Scale

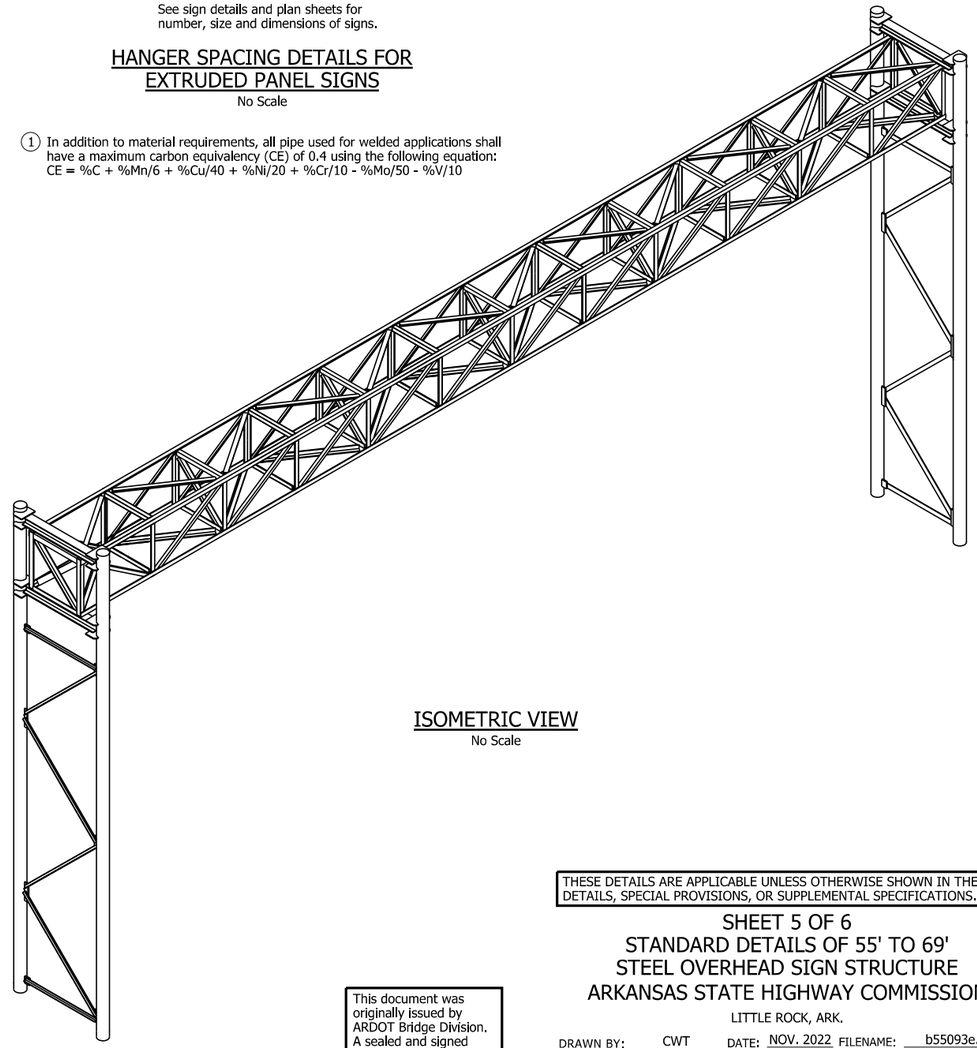
HANGER VARIABLES

(For Extruded Panel Signs)

Max. Length of Sign = "L"	"n" Hangers	Cantilever Length "Cn"	Hanger Spacing "Sn"
15'-0"	2 Hangers	0.21 x "L"	0.58 x "L"
30'-0"	3 Hangers	0.145 x "L"	0.355 x "L"
45'-0"	4 Hangers	0.107 x "L"	0.262 x "L"

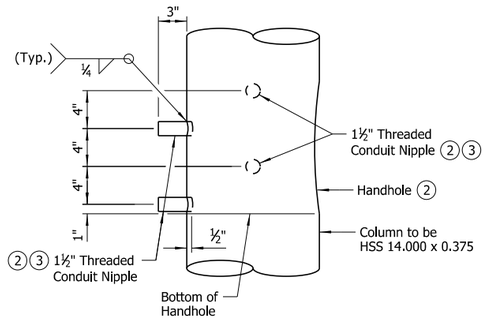
NOTE:
Hanger spacing and cantilever length shall be rounded to the nearest inch.

(1) In addition to material requirements, all pipe used for welded applications shall have a maximum carbon equivalency (CE) of 0.4 using the following equation:
CE = %C + %Mn/6 + %Cu/40 + %Ni/20 + %Cr/10 - %Mo/50 - %V/10



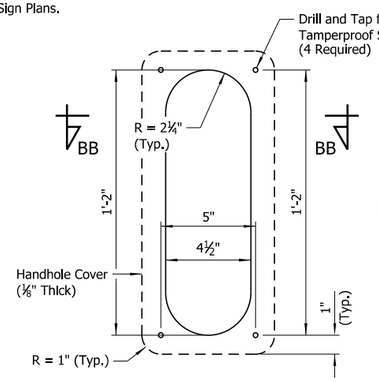
ISOMETRIC VIEW

No Scale



DETAIL P

Scale: 1½" = 1'-0"

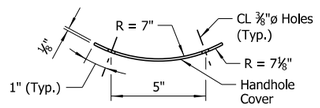


HANDHOLE DETAIL (2)

Scale: 3" = 1'-0"

(2) See details on Std. Dwgs. 55093A & 55093B for location and orientation of handholes and threaded conduit nipples.

(3) Threaded conduit nipples shall be fitted with standard plugs until conduit is installed.



SECTION BB-BB

Scale: 3" = 1'-0"

NOTE:
Provide handhole covers with chain, waterproof grommet, and tamperproof screws.

Handhole covers shall be galvanized and meet the requirements of ASTM A36 at a minimum.

Tamperproof screws shall be galvanized and meet the requirements of ANSI/ASME B18.6.3.

THESE DETAILS ARE APPLICABLE UNLESS OTHERWISE SHOWN IN THE PLAN DETAILS, SPECIAL PROVISIONS, OR SUPPLEMENTAL SPECIFICATIONS.

SHEET 5 OF 6
STANDARD DETAILS OF 55' TO 69' STEEL OVERHEAD SIGN STRUCTURE
ARKANSAS STATE HIGHWAY COMMISSION

LITTLE ROCK, ARK.

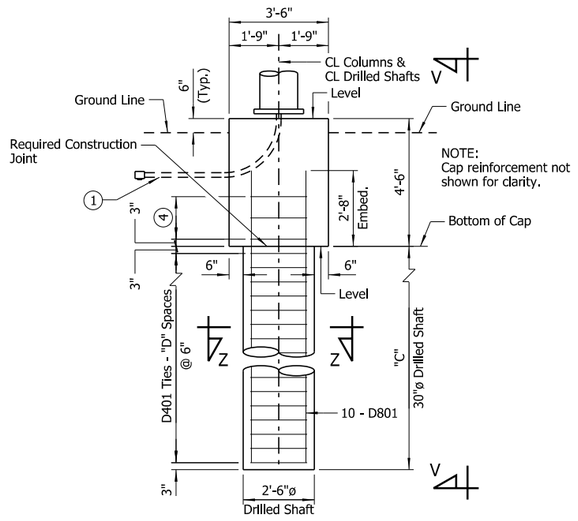
This document was originally issued by ARDOT Bridge Division. A sealed and signed original is held on file. This copy is not a signed and sealed document.

DRAWN BY:	CWT	DATE:	NOV. 2022	FILENAME:	b55093e.dgn
CHECKED BY:	ABH	DATE:	FEB. 2023	SCALE:	As Shown
DESIGNED BY:	STD.	DATE:	-		

Scales shown are for full size 22"x34" drawings. When using 11"x17" drawings, reduce scale by one half. DRAWING NO. 55093E

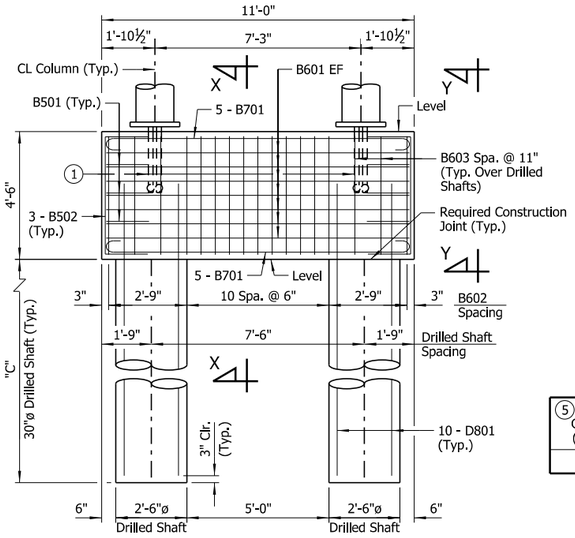
6/17/2026

DATE REVISED	DATE REVISED	FED. ROAD DIST. NO.	STATE	JOB NO.	SHEET NO.	TOTAL SHEETS
		6	ARK.			
		OVERHEAD SIGN STR. (55' TO 69') - 55093F				



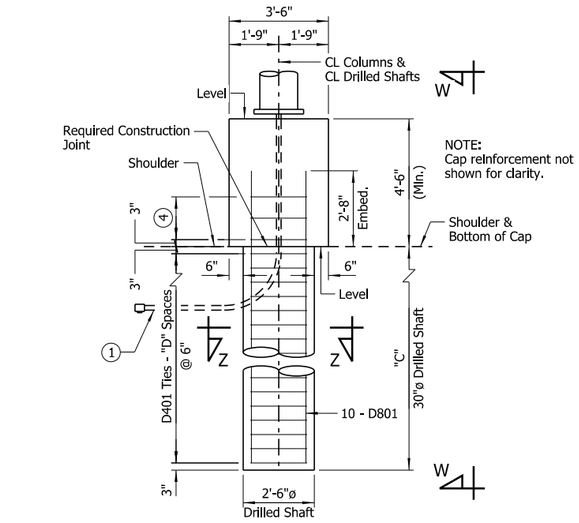
ELEVATION - FOUNDATION A2 (2)

Scale: ⅜" = 1'-0"



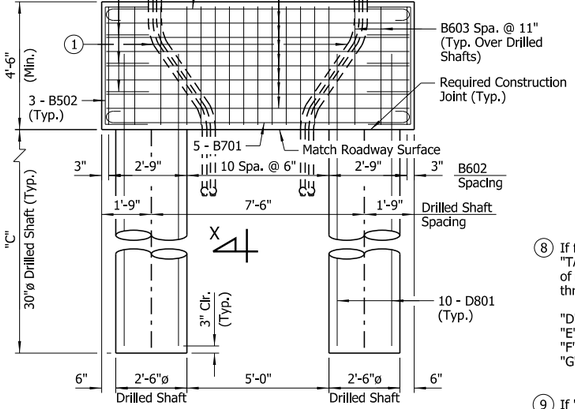
VIEW V-V

Scale: ⅜" = 1'-0"



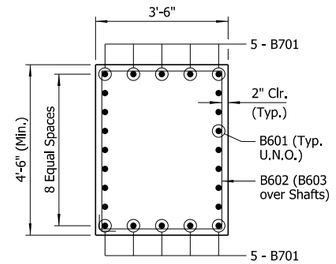
ELEVATION - FOUNDATION B2 (3)

Scale: ⅜" = 1'-0"



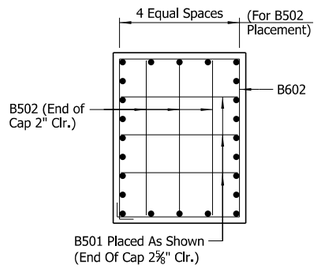
VIEW W-W

Scale: ⅜" = 1'-0"



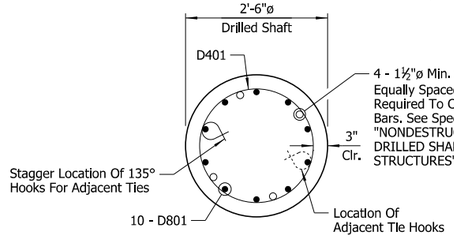
SECTION X-X

Scale: ½" = 1'-0"



VIEW Y-Y

Scale: ½" = 1'-0"



SECTION Z-Z

Scale: ¾" = 1'-0"

(1) 2" Non-Metallic Conduit (Schedule 80) with 16" Min. Bend Radius (2 Conduits per Column). An insulated bushing shall be installed at the top end of each conduit. At Foundation B2, conduit shall not be provided if cabling on that side of the sign structure is not required per Electrical and/or ITS plans. At Foundation A2, conduit shall always be provided. If cabling in the conduit at Foundation A2 is not required per Electrical and/or ITS plans, the end of conduit in the ground shall be capped for future use with a manufactured water-tight cap.

(2) Foundation A2 allowed only when foundation is outside clear zone or is protected by guardrail or barrier.

(3) Foundation B2 is required when the foundation is located in a median, within the clear zone, and is not protected by guardrail or barrier. Foundation B2 requires adjacent Roadway Median Barrier to transition to match the ends of the cap. See Roadway Plans for additional information.

(4) C401 Ties - 2 Spaces @ 9"

APPROX. QUANTITIES FOR FOUNDATION A2 (FOR INFORMATION ONLY)

(5) CLASS S CONCRETE (CU. YDS.)	(6) REINFORCING STEEL (LBS.)	EXCAVATION (CU. YDS.)	DRILLED SHAFT (30" DIA.) (LIN. FT.)	CROSSHOLE SONIC LOGGING (30" DIA.) (EACH)
6.50	970	14	"G"	1

APPROX. QUANTITIES FOR FOUNDATION B2 (FOR INFORMATION ONLY)

(5) CLASS S CONCRETE (CU. YDS.)	(6) REINFORCING STEEL (LBS.)	DRILLED SHAFT (30" DIA.) (LIN. FT.)	CROSSHOLE SONIC LOGGING (30" DIA.) (EACH)
6.50	970	"G"	1

(5) Does not include Class S Concrete for Drilled Shafts

(6) Does not include D401 and D801 Bars in Drilled Shafts

(7) Tabulated SPT N60 values are raw SPT N values corrected by SPT hammer efficiency and represent average values along the plan shaft penetration. If the SPT N60 values in the foundation soils within 2 shaft diameters below the plan tip elevation are less than the average SPT N60 values along the plan shaft penetration, the Engineer shall be contacted.

(8) If final drilled shaft length is not shown in "TABLE OF VARIABLES" due to the presence of rock or other factors, variables "D" through "G" shall be determined as follows:

"D" = (Shaft Length in Ft. - 0.5) / 0.5
"E" = Shaft Length in Ft. x 4
"F" = Shaft Length + 2'-5"
"G" = Shaft Length x 2

(9) If "F" exceeds 60'-0", a lap splice is required for each D801 bar at the midpoint of the drilled shaft. Min. lap splice length for D801 bar = 3'-6". Length shown in table does not include the additional length required for a lap splice.

DRILLED SHAFT NOTES (FOUNDATIONS A2 & B2)

Drilled shafts shall conform to Special Provision "DRILLED SHAFT FOUNDATIONS FOR STEEL SIGN STRUCTURES". Drilled shafts will not be paid for directly but shall be considered subsidiary to the unit price bid for "STEEL OVERHEAD SIGN STRUCTURE (_)". Temporary casing may be required. Unless approved by the Engineer, permanent steel casing shall not be used.

Crosshole Sonic Logging (CSL) shall be performed on one drilled shaft at each foundation and as directed by the Engineer. Testing shall be performed in accordance with Special Provision "NONDESTRUCTIVE TESTING OF DRILLED SHAFTS FOR STEEL SIGN STRUCTURES".

Concrete and reinforcing steel placed in drilled shafts will not be paid for directly but shall be considered subsidiary to the unit price bid for "STEEL OVERHEAD SIGN STRUCTURE (_)". No additional payment shall be made for spacers, additional splices or bracing needed for assembly, shipping, handling or erecting.

Concrete in drilled shafts shall be Class "S" as modified by Special Provision "DRILLED SHAFT FOUNDATIONS FOR STEEL SIGN STRUCTURES".

Drilled shaft lengths shall be determined based on the results of exploratory borings, which shall be performed by the Contractor prior to shaft excavation.

If competent rock is not encountered in the exploratory boring, the Standard Penetration Test (SPT) blow count corrected by the hammer efficiency, N60, shall be used to determine shaft lengths. See "TABLE OF VARIABLES".

If competent rock is encountered in the exploratory boring within 25'-0" of planned top of drilled shaft, the shafts shall be founded a minimum of 3'-0" into rock and have a minimum length of 25'-0".

If competent rock is encountered in the exploratory boring below 25'-0" from planned top of drilled shaft, the shafts shall be founded a minimum of 3'-0" into rock or to the depth based on the SPT N60 value and associated shaft length in the "TABLE OF VARIABLES", whichever is shallower.

Testing results shall be submitted to the Engineer for review. Final drilled shaft lengths shall be approved by the Engineer prior to construction.

The cost of performing exploratory borings and in-situ strength testing shall be included in the item "STEEL OVERHEAD SIGN STRUCTURE (_)".

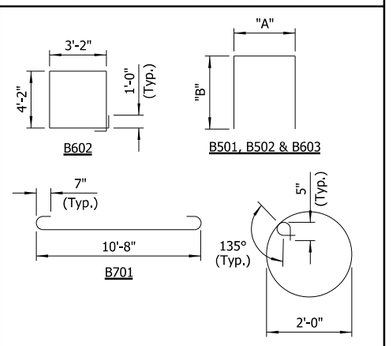
TABLE OF VARIABLES (8)

SPT N60 (blows/ft.) (7)	Min. Depth of Exploratory Boring	Drilled Shaft Length, "C"	"D"	"E"	"F" (9)	"G"
<5	-	Contact Engineer	-	-	-	-
5 To 7	92'-0"	87'-0"	173	348	89'-5"	174'-0"
7 To 9	77'-0"	72'-0"	143	288	74'-5"	144'-0"
9 To 11	58'-0"	53'-0"	105	212	55'-5"	106'-0"
11 To 13	46'-0"	41'-0"	81	164	43'-5"	82'-0"
>13	38'-0"	33'-0"	65	132	35'-5"	66'-0"

BAR LIST - FOUNDATION A2 OR B2

MARK	NO. REQ'D	LENGTH	"A"	"B"	P.D.
B501	6	5'-10"	3'-0"	1'-6"	2½"
B502	6	6'-10"	4'-0"	1'-6"	2½"
B601	14	10'-8"			Str.
B602	13	15'-10"			4½"
B603	4	11'-2"	3'-2"	4'-2"	4½"
B701	10	12'-4"			5¼"
C401	6	7'-4"			3"
D401	"E"	7'-4"			3"
D801	20	"F"			Str.

BAR BENDING DIAGRAMS



NOTES:
Dimensions of bars are out-to-out.

Number of bars shown is for one Foundation A2 or one Foundation B2.

LEGEND

U.N.O. = Unless Noted Otherwise
EF = Each Face

This document was originally issued by ARDOT Bridge Division. A sealed and signed original is held on file. This copy is not a signed and sealed document.

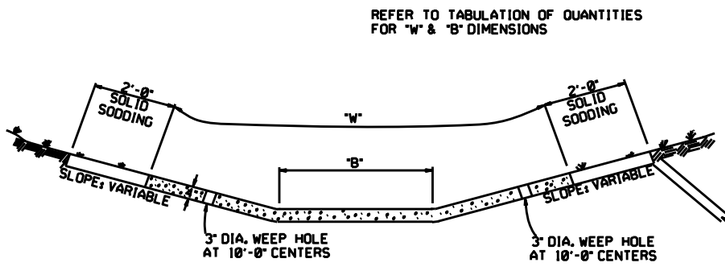
THESE DETAILS ARE APPLICABLE UNLESS OTHERWISE SHOWN IN THE PLAN DETAILS, SPECIAL PROVISIONS, OR SUPPLEMENTAL SPECIFICATIONS.

SHEET 6 OF 6
STANDARD DETAILS OF 55' TO 69'
STEEL OVERHEAD SIGN STRUCTURE
ARKANSAS STATE HIGHWAY COMMISSION
LITTLE ROCK, ARK.

DRAWN BY: CWT DATE: JAN. 2023 FILENAME: b55093f.dgn
CHECKED BY: ABH DATE: JAN. 2023 SCALE: As Shown
DESIGNED BY: STD. DATE: -

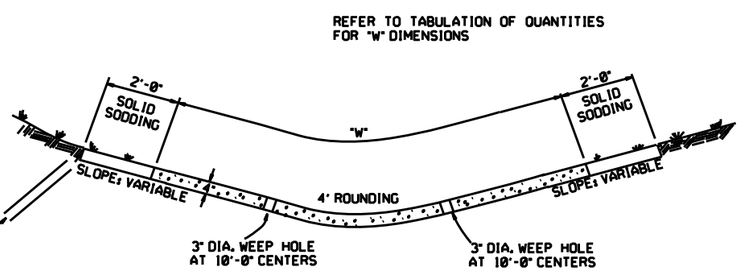
Scales shown are for full size 22"x34" drawings. When using 11"x17" drawings, reduce scale by one half. DRAWING NO. 55093F

6/17/2026



TYPE A

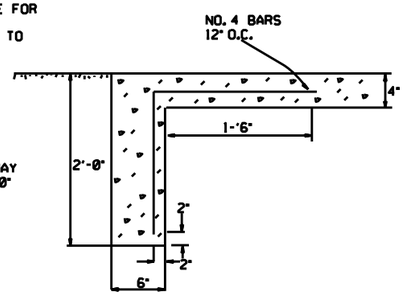
EXCAVATE TO NEAT LINES TO CONSTRUCT DITCH PAVING AND SOLID SODDING.



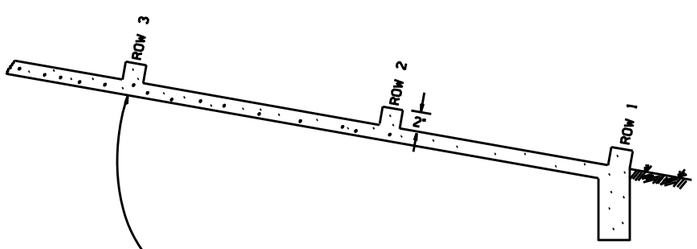
TYPE B

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

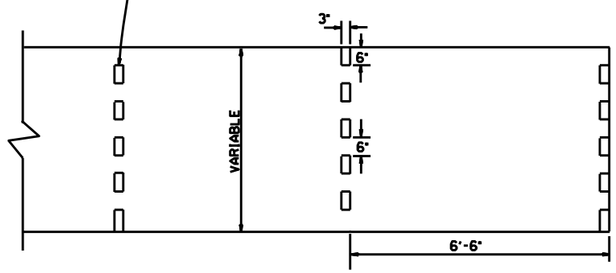


TOE WALL DETAIL FOR CONCRETE DITCH PAVING



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)

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.

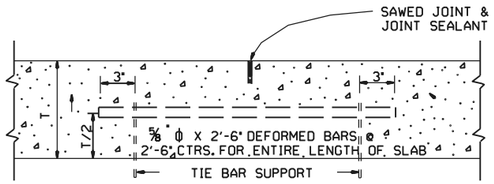
1" WIDE TRANSVERSE EXPANSION JOINTS SHALL BE PLACED IN CONCRETE DITCH PAVING AT 45° INTERVALS. THE SPACE SHALL BE FILLED WITH APPROVED JOINT FILLER COMPLYING WITH AASHTO M213.

DATE	REVISION	DATE FILM'D
12-8-16	CORRECTED ENERGY DISSIPATOR DRAWING AND NOTE	
11-17-10	ADDED GENERAL NOTE	
6-2-94	ADDED GENERAL NOTE ABOUT SOLID SODDING	
11-30-8	ELIMINATED MIN. ROWS OF ELEMENTS	111-30-89
7-15-88	REVISED DISSIPATOR NOTE	653-7-15-88
4-3-87	REVISED ENERGY DISSIPATOR	671-4-3-87
1-9-87	MODIFIED NOTE ON ENERGY DISS.	532-1-9-87
11-3-86	ADDED NOTE TO ENERGY DISS.	599-12-1-86
11-1-84	ENERGY DISSIPATOR DETAILS ADDED	508-11-1-84
11-1-84	EXCAVATION DETAILS ADDED TYPED A & B	
10-2-72	REVISED AND REDRAWN	508-10-2-72

ARKANSAS STATE HIGHWAY COMMISSION

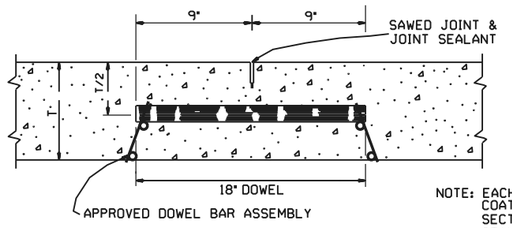
CONCRETE DITCH PAVING

STANDARD DRAWING CDP-1



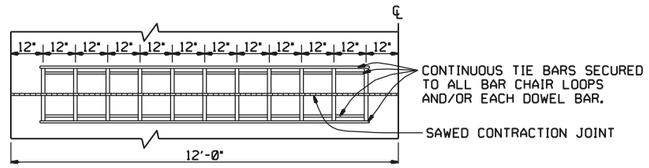
LONGITUDINAL JOINT

NOTE: THE TIE BAR SUPPORT SHOWN ABOVE MAY BE ELIMINATED IF OTHER APPROVED METHODS FOR PLACING AND SUPPORTING THE TIE BARS ARE PROVIDED.
TIE BARS SHALL BE 30" FROM TRANSVERSE JOINTS.



ROUND STEEL BAR DOWEL
1¼" DIA. WHEN T<10"
1½" DIA. WHEN T≥10"

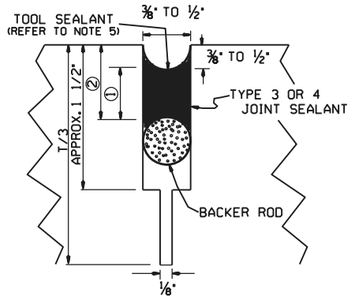
NOTE: EACH DOWEL TO BE COATED ACCORDING TO SECTION 502 OF THE STANDARD SPECIFICATIONS.



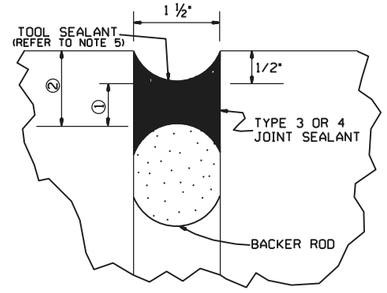
ONE-HALF 24' PAVEMENT
11 DOWELS
PLAN

NOTE: FOR 20' PAVEMENT USE 19 DOWELS @ 12" CTRS. WITH 12" SPACING FROM C.L. AND EDGE OF SLAB TO FIRST BAR. FOR 15' PAVEMENT USE 14 DOWELS @ 12" CTRS. WITH 12" SPACING FROM C.L. AND EDGE OF SLAB TO FIRST BAR. FOR 26' PAVEMENT USE 25 DOWELS @ 12" CTRS. WITH 12" SPACING FROM C.L. AND EDGE OF SLAB TO FIRST BAR. FOR PAVEMENT WIDTHS OTHER THAN THOSE SHOWN ABOVE, USE DOWELS AT 12" CTRS. WITH 12" MAX. SPACING FROM C.L. TO FIRST BAR. DISTANCE FROM EDGE OF SLAB TO FIRST BAR SHALL BE ADJUSTED TO MAINTAIN 12" DOWEL BAR SPACING

CONTRACTION JOINT DETAILS



DETAIL OF SAWED CONTRACTION JOINT



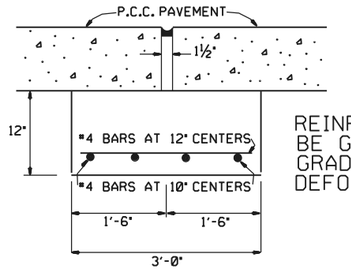
DETAIL OF EXPANSION JOINT

JOINT CONFIGURATION FOR TYPE 3 OR 4 JOINT SEALANT

JOINT WIDTH	SEALANT THICKNESS ①	BACKER ROD DIAMETER	BACKER ROD PLACEMENT DEPTH ②
INCHES			
¼	¼	⅜	½
⅜	¼	½	½
½	¼	⅝	½
⅝	5/16	¾	5/16
¾	⅜	⅞	⅜
1 ½	¾	2	1 ¼

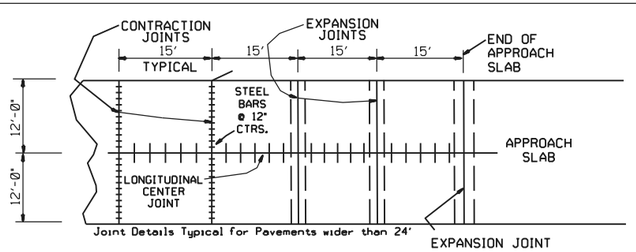
JOINT CONFIGURATION FOR TYPE 5 JOINT SEALANT

JOINT WIDTH	SEALANT THICKNESS ①	BACKER ROD DIAMETER	BACKER ROD PLACEMENT DEPTH ②
INCHES			
¼	½	⅜	¾
⅜	¾	½	1

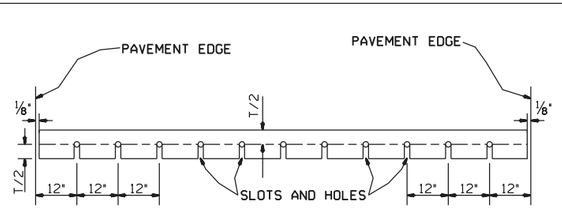


REINFORCING SHALL BE GRADE 40 OR GRADE 60 DEFORMED BARS.

DETAIL OF JOINT SUPPORT FOR EXPANSION JOINTS

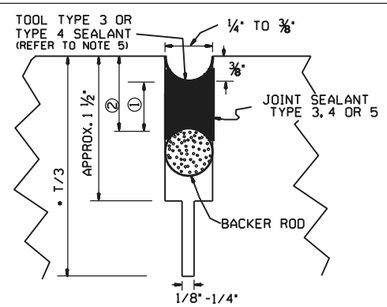


PLAN SHOWING EXPANSION JOINTS AT BRIDGE APPROACH SLABS



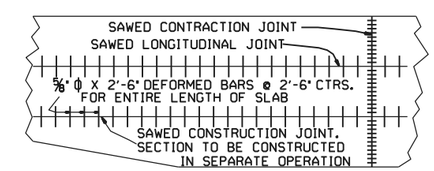
ELEVATION

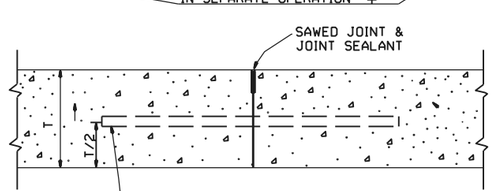
NOTE: ALL DOWEL BARS SHALL CONFORM TO THE DETAILS FOR CONTRACTION JOINTS.



•NOTE: T/3 SAW CUT NOT REQUIRED FOR LONGITUDINAL CONSTRUCTION JOINT.

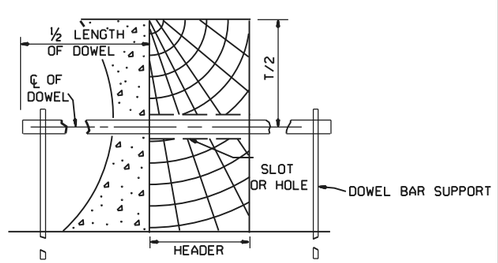
DETAIL OF SAWED LONGITUDINAL JOINT AND LONGITUDINAL CONSTRUCTION JOINT





NOTE: TIE BARS SHALL BE 30" FROM TRANSVERSE JOINTS.

LONGITUDINAL CONSTRUCTION JOINT



SECTION

TRANSVERSE CONSTRUCTION JOINT

GENERAL NOTES

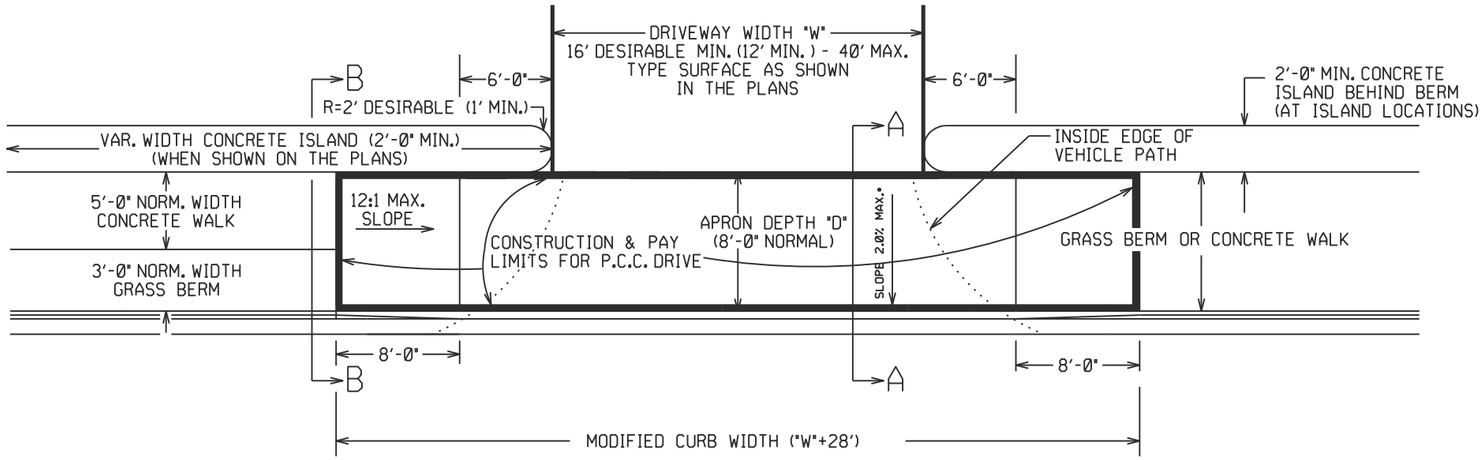
1. "T" DENOTES THICKNESS OF SLAB.
2. DOWEL BARS SHALL BE PLACED IN ACCORDANCE WITH THE DIMENSIONS SHOWN. A TOLERANCE OF PLUS OR MINUS ONE INCH WILL BE ALLOWED FOR THE VERTICAL AND LATERAL PLACEMENT AND A TOLERANCE OF PLUS OR MINUS ¼" WILL BE ALLOWED FOR THE TILT AND SKEW. DOWEL BARS SHALL BE FIELD COATED FOR A MINIMUM DISTANCE OF 2" GREATER THAN HALF THE LENGTH OF THE BAR WITH AN APPROVED GREASE AS A BOND BREAKER JUST PRIOR TO PLACEMENT OF CONCRETE.
3. THE EXPANSION JOINT SUPPORT MAY BE CONSTRUCTED WITH CLASS "A", "S" OR PAVING CONCRETE. PAYMENT FOR THE JOINT SUPPORT SHALL BE FOR THE CONTRACT UNIT PRICE BID FOR THE CLASS OF CONCRETE SPECIFIED IN THE PLANS. PAYMENT FOR ALL OTHER WORK AND MATERIALS REQUIRED FOR THE CONSTRUCTION OF THE JOINT SUPPORT SHALL BE INCLUDED IN THE PRICE BID FOR THE ABOVE ITEMS.
4. CONTRACTION JOINTS SHALL BE CONSTRUCTED ON 15' CENTERS.
5. TOOLING NOT REQUIRED FOR SELF-LEVELING SILICONE.
6. UNLESS OTHERWISE SPECIFIED IN THE PLANS, CONCRETE SHOULDERS SHALL BE CONSTRUCTED ACCORDING TO THE DETAILS SHOWN HEREON. CONTRACTION JOINTS SHALL MATCH CONTRACTION JOINTS IN THE LANES.
7. TIE WIRES IN DOWEL BAR ASSEMBLIES SHALL NOT BE CUT PRIOR TO PLACEMENT OF PAVING CONCRETE.

DATE REV	DESCRIPTION
11-06-25	REVISED TIE BAR AND DOWEL SPACING
11-07-19	REV. JOINT REF ON APP. EXP. SLAB
05-25-06	ADDED GENERAL NOTE 7
10-09-03	REMOVED TIE BAR COATING & REVISED GENERAL NOTES
11-16-01	ADDED TOOL SEALANT AND NOTE 5, REVISED NOTE 3

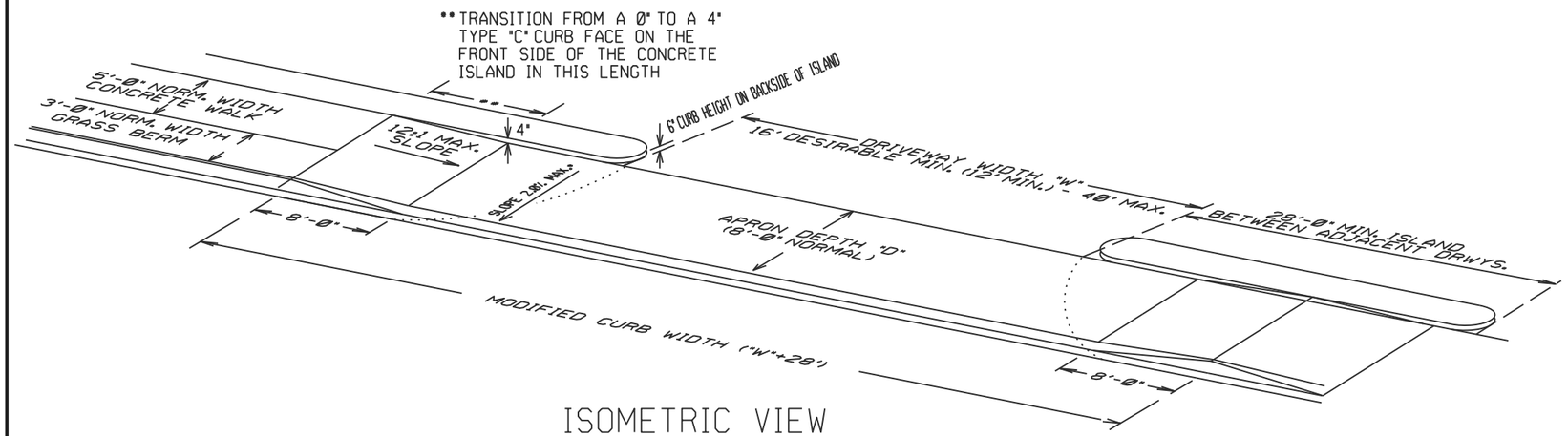
ARKANSAS STATE HIGHWAY COMMISSION

TRANSVERSE & LONGITUDINAL JOINTS FOR CONCRETE PAVEMENT (NON-REINFORCED)

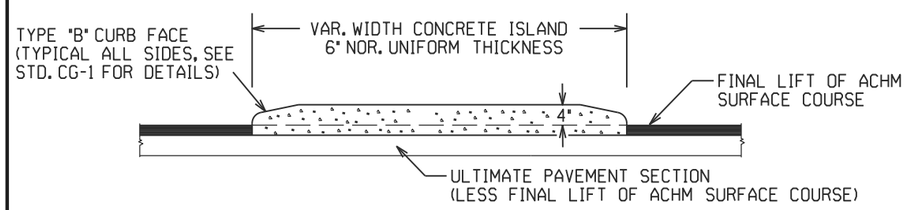
DATE EFFECTIVE	STANDARD DRAWING	CPTJ-6A
11-06-2025		



PLAN VIEW



ISOMETRIC VIEW

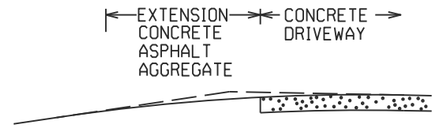


CURBED ISLANDS FOR CHANNELIZATION

CONCRETE ISLAND NOTES:

1. REFER TO PLANS FOR TYPE OF CURB FACE TO BE USED. NO DIRECT PAYMENT WILL BE MADE FOR THE CURB FACES SHOWN ON THE ISLAND DETAILS. PAYMENT FOR THE CURB FACE WILL BE INCLUDED IN THE UNIT PRICE BID FOR THE ITEM "CONCRETE ISLAND".

2. TRANSVERSE EXPANSION JOINTS, NOT LESS THAN 1/2" WIDE, SHALL BE PLACED AT MINIMUM INTERVAL OF 45'. TRANSVERSE JOINT SHALL BE CONSTRUCTED USING A JOINT FILLER COMPLYING WITH AASHTO M213.



EXTENSION TYPICAL SECTIONS

1: CONCRETE - 6" P.C. CONCRETE DRIVEWAY

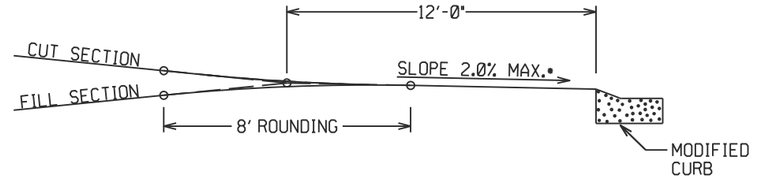
2: ASPHALT - 2" ACHM SURFACE COURSE (1/2")
4" ACHM BINDER COURSE (1") OR
4" ACHM BASE COURSE (1-1/2")

3: ASPHALT - 2" ACHM SURFACE COURSE (1/2")
7" AGGREGATE BASE COURSE

4: AGGREGATE - 6" AGGREGATE BASE COURSE

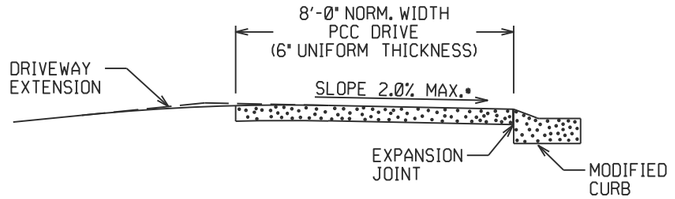
THE TYPE OF EXTENSION SHALL BE AS SHOWN IN THE PLANS. THE CONTRACTOR MAY, WITH THE APPROVAL OF THE ENGINEER, SUBSTITUTE A LOWER NUMBERED TYPE OF EXTENSION IN LIEU OF THE TYPE SPECIFIED IN THE PLANS, BUT AT NO ADDITIONAL COST TO THE DEPARTMENT.

DRIVEWAY EXTENSION DETAILS

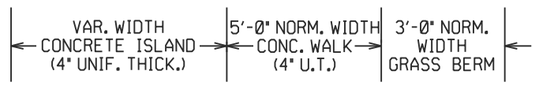


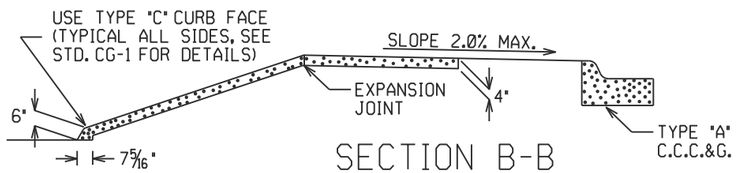
DRIVEWAY VERTICAL ALIGNMENT DETAILS

• NOTE: DRIVEWAYS MAY NOT BE SLOPED AWAY FROM THE ROADWAY UNLESS APPROVED BY THE ENGINEER.



SECTION A-A





SECTION B-B

CURBED ISLAND BEHIND WALK

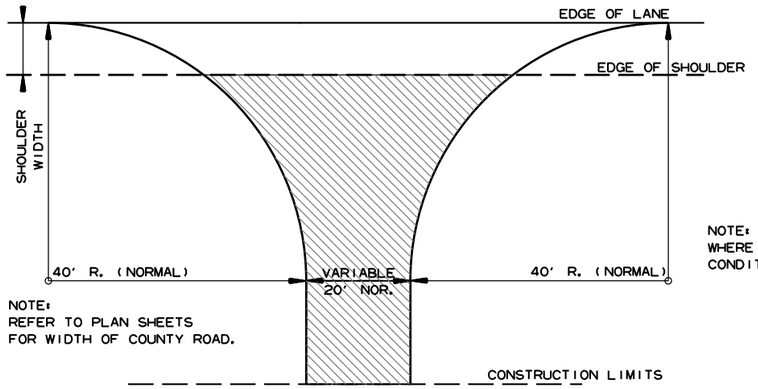
DATE REV	DESCRIPTION
05-22-25	REVISED ISLAND DETAILS & ADDED DESIRABLE MIN. DRIVEWAY WIDTH
05-19-22	REVISED ISLAND NOTES
11-07-19	REVISED WALK DETAILS
02-27-14	REVISED PLAN & ISOMETRIC VIEW
11-29-07	ADDED CHANNELIZATION ISLAND & REVISED DRIVEWAY SLOPE NOTE & VERTICAL ALIGNMENT DETAIL

ARDOT ARKANSAS DEPARTMENT OF TRANSPORTATION

ARKANSAS STATE HIGHWAY COMMISSION

DETAILS OF DRIVEWAYS & ISLANDS

DATE EFFECTIVE	STANDARD DRAWING	DR-1
05-22-2025		

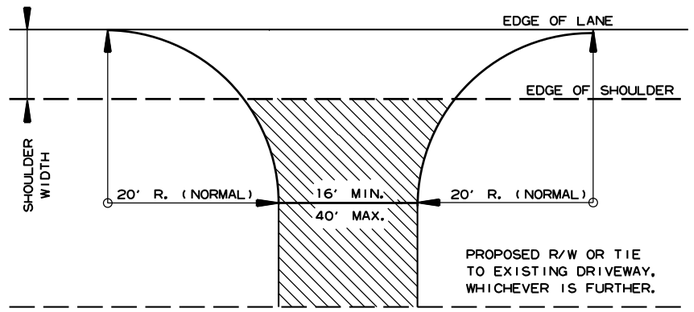


NOTE:
REFER TO PLAN SHEETS
FOR WIDTH OF COUNTY ROAD.

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

ACHM SURFACE COURSE (1/2")
(220 LBS. PER SQ. YD.) AND
AGGREGATE BASE COURSE (CLASS 7)
7" COMP. DEPTH, UNLESS OTHERWISE
SPECIFIED IN PLANS.

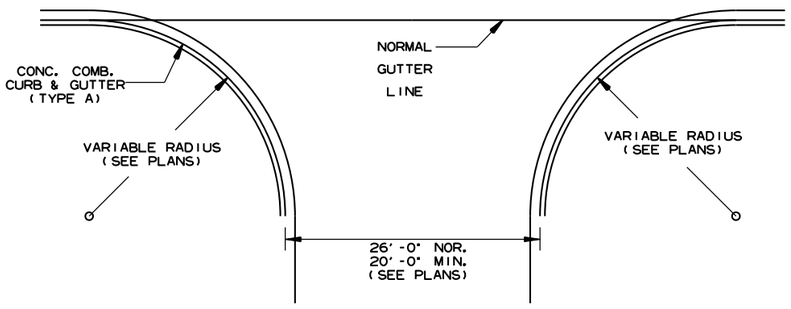
DETAIL FOR COUNTY ROAD TURNOUTS OPEN SHOULDER SECTION



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

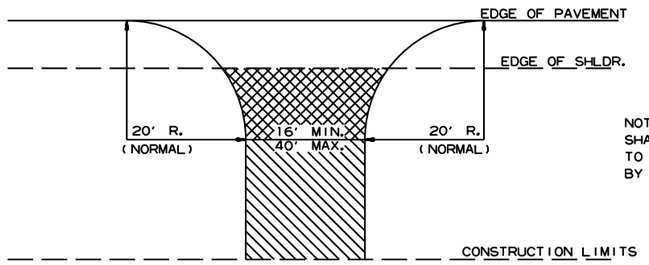
ACHM SURFACE COURSE (1/2")
(220 LBS. PER SQ. YD.) AND
AGGREGATE BASE COURSE (CLASS 7)
7" COMP. DEPTH IF ASPHALT OR
GRAVEL DRIVE EXISTING; OR 6"
CONCRETE IF CONCRETE DRIVE
EXISTING.

DETAIL FOR DRIVEWAY TURNOUTS OPEN SHOULDER SECTION (ARTERIALS)



NOTE:
PAVEMENT STRUCTURE FOR STATE HIGHWAYS, CITY STREETS,
& COUNTY ROADS TO BE SAME AS MAIN LANES.

DETAIL OF TURNOUTS, ASPHALT STREETS, COUNTY ROADS & STATE HIGHWAYS CURB & GUTTER SECTION



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 OR
6" CONCRETE IF CONCRETE DRIVE EXIST.

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

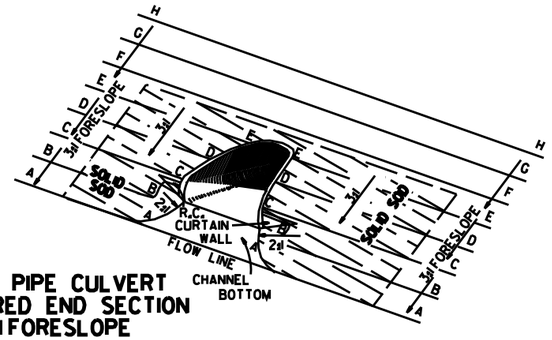
DETAIL FOR DRIVEWAY TURNOUTS (COLLECTORS)

DATE REV	DATE FILMED	DESCRIPTION
5-19-22		ISSUED

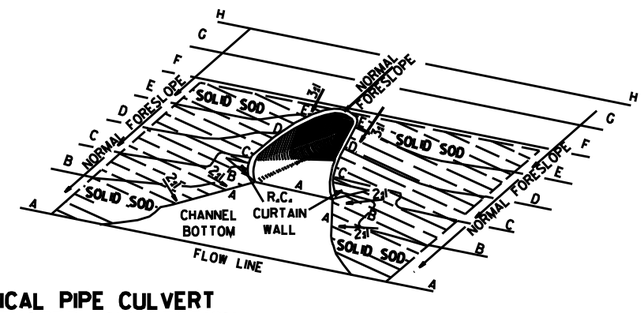
ARKANSAS STATE HIGHWAY COMMISSION

DETAILS OF DRIVEWAYS & STREET TURNOUTS

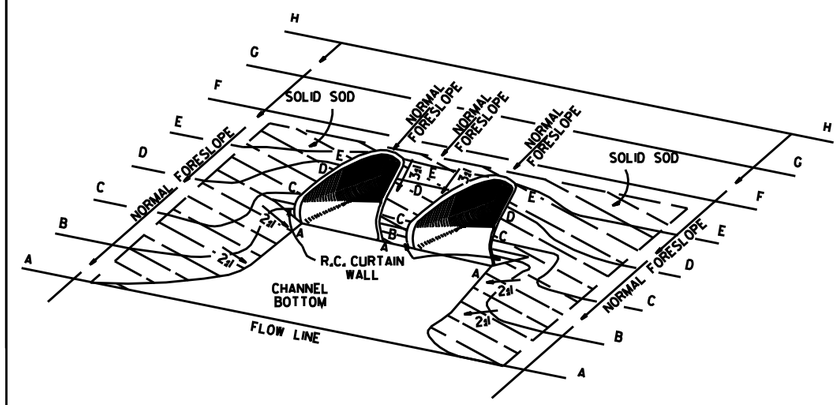
STANDARD DRAWING DR-2



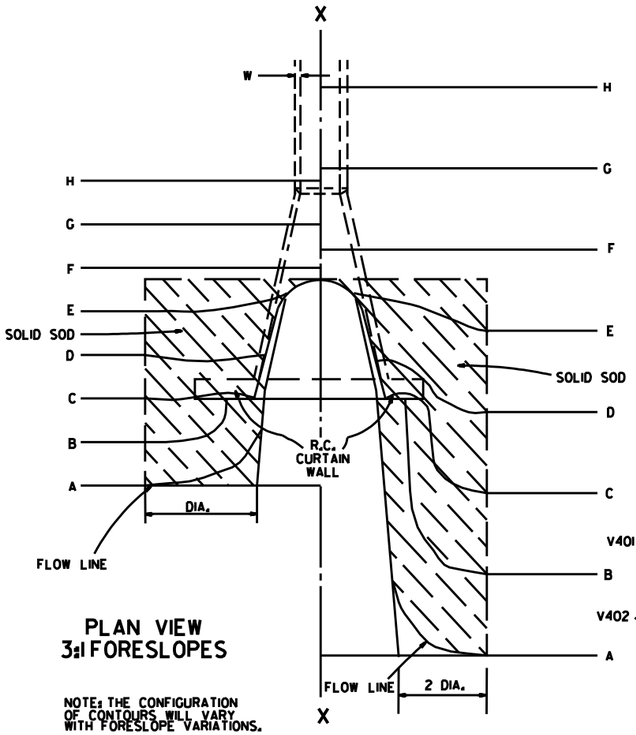
TYPICAL PIPE CULVERT
WITH FLARED END SECTION
& 3:1 FORESLOPE



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

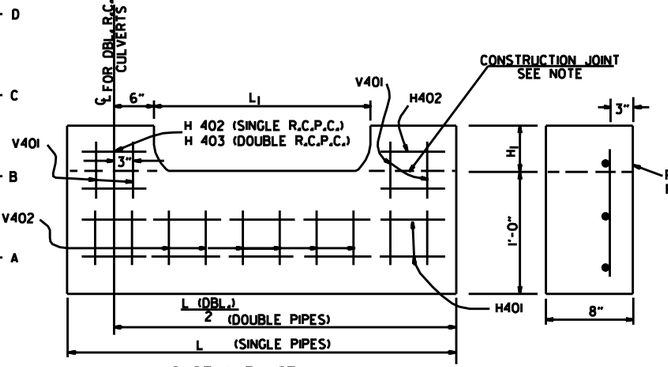
NOTE: THE CONFIGURATION OF CONTOURS WILL VARY WITH FORESLOPE VARIATIONS.

PLAN VIEW
FLATTENED FORESLOPES

R.C. CURTAIN WALL DIMENSIONS & QUANTITIES

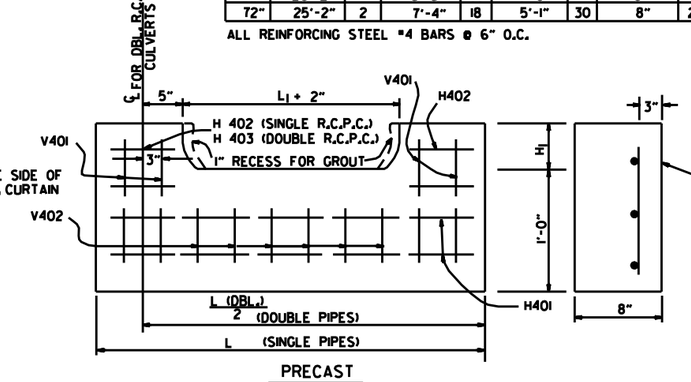
PIPE DIA.	H_1	L_1	L	L (DBL.)/2	SINGLE R.C.P.C. CONC. CU. YDS.	SINGLE R.C.P.C. REINF. STEEL LBS.	DOUBLE R.C.P.C. CONC. CU. YDS.	DOUBLE R.C.P.C. REINF. STEEL LBS.
18"	11½"	3'-5"	8'-0"	6'-3"	0.31	27.7	0.45	39.5
24"	1'-0½"	4'-6"	9'-6"	7'-6"	0.37	33.4	0.53	48.0
30"	1'-3½"	5'-7"	11'-0"	9'-0"	0.45	39.0	0.67	59.0
36"	1'-7"	6'-8"	13'-0"	10'-6"	0.58	52.6	0.83	73.9
42"	2'-1½"	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'-9½"	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.



CAST-IN-PLACE

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.



PRECAST

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.

R.C. CURTAIN WALL DETAILS

REINFORCING STEEL SCHEDULE

PIPE DIA.	SINGLE R.C. PIPE CULVERT H401 L	H401 NO.	H402 L	H402 NO.	V401 L	V401 NO.	V402 L	V402 NO.	DOUBLE R.C. PIPE CULVERT H401 L	H401 NO.	H402 L	H402 NO.	H403 L	H403 NO.	V401 L	V401 NO.	V402 L	V402 NO.
18"	7'-8"	2	1'-11½"	4	1'-7½"	8	8"	8	12'-2"	2	1'-11½"	4	8"	2	1'-7½"	10	8"	14
24"	9'-2"	2	2'-2"	4	1'-8½"	10	8"	9	14'-8"	2	2'-2"	4	8"	2	1'-8½"	12	8"	18
30"	10'-8"	2	2'-4½"	4	1'-11½"	10	8"	12	17'-8"	2	2'-4½"	4	8"	2	1'-11½"	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'-9½"	8	2'-9½"	16	8"	15	23'-8"	2	3'-9½"	8	8"	4	2'-9½"	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'-8½"	12	3'-5½"	20	8"	17	27'-8"	2	4'-9"	12	8"	6	3'-5½"	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.

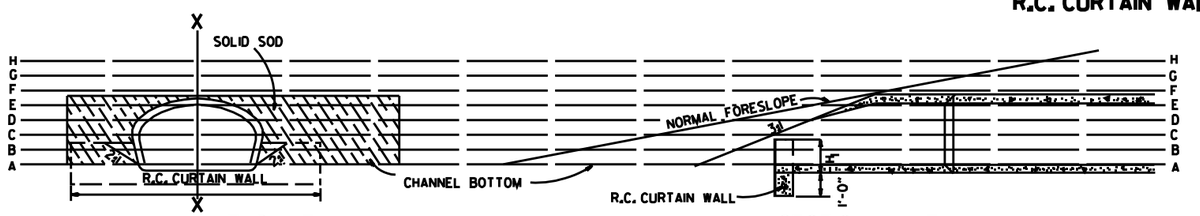
SOLID SODDING

PIPE DIA.	SINGLE R.C.P.C. 3:1	4:1	6:1	DOUBLE R.C.P.C. 3:1	4:1	6:1
	SQ. YDS.			SQ. YDS.		
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	35	55	25	37	57
48"	29	46	68	31	48	70
54"	35	57	85	37	59	87
60"	45	62	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 ¾".
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 W10 x W10 MAY BE USED IN LIEU OF REINFORCING BARS.



END VIEW

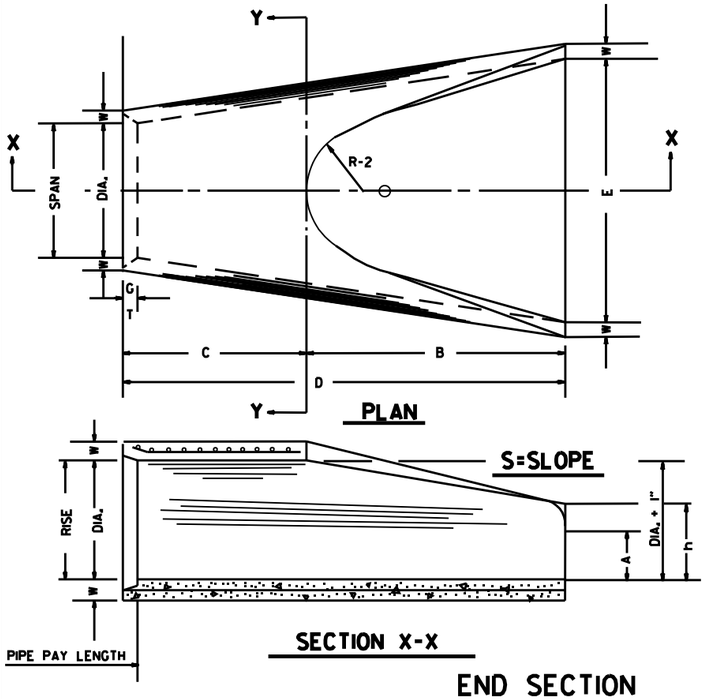
SECTIONAL VIEW "X-X"

DATE	REVISION	FILMED
10-18-96	ADDED NOTE TO SOLID SODDING	
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.	
3-2-81	ALLOW PRECAST IN 2 OR MORE PIECES CHAMFER EDGES	
5-15-80	ADDED PRECAST WALL & GENERAL NOTES	
10-2-72	REVISED AND REDRAWN	

ARKANSAS STATE HIGHWAY COMMISSION

FLARED END SECTION

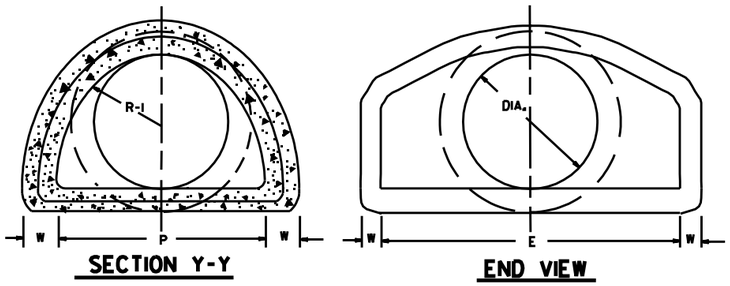
STANDARD DRAWING FES-1



END SECTION FOR REINFORCED CONCRETE PIPE CULVERTS

TABLE OF DIMENSIONS

DIA.	WALL	A	B	C	D	E	S	DIA. + 1"	P	R-1	R-2	G-T	WT.	h
18"	2½"	9"	2'-3"	3'-10"	6'-1"	3'-0"	3st	19"	29"	15½"	12"	2"	1000	1'-0½"
24"	3"	9½"	3'-7½"	2'-6"	6'-1½"	4'-0"	3st	25"	33⅜"	16⅛"	14"	2½"	1600	1'-1½"
30"	3½"	1'-0"	4'-6"	1'-7¾"	6'-1¾"	5'-0"	3st	31"	37"	18½"	15"	3¼"	1940	1'-4⅝"
36"	4"	1'-3"	5'-3"	2'-10¾"	8'-1¾"	6'-0"	3st	37"	47⅛"	24⅝"	20"	3½"	4100	1'-8"
42"	4½"	1'-9"	5'-3"	2'-11"	8'-2"	6'-6"	3st	43"	53⅞"	27½"	22"	3½"	5380	2'-2½"
48"	5"	2'-0"	6'-0"	2'-2"	8'-2"	7'-0"	3st	49"	56½"	28½"	22"	3½"	6550	2'-6"
54"	5½"	2'-4"	6'-6"	1'-10"	8'-4"	7'-6"	3st	55"	65½"	33⅛"	24"	4"	8750	2'-10½"
60"	6"	2'-10"	6'-6"	1'-10"	8'-4"	8'-0"	3st	61"	72½"	36⅛"	24"	4"	9270	3'-5"
72"	7"	3'-10"	6'-6"	1'-10"	8'-4"	9'-0"	3st	73"	77⅛"	38⅝"	24"	5"	13250	4'-6"

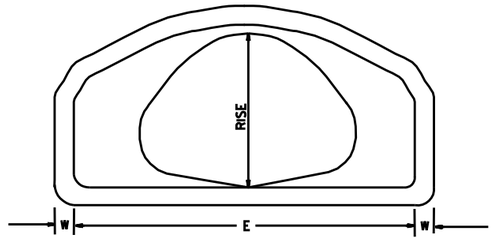


NOTE: TONGUE END ON UPSTREAM SECTION
GROOVE END ON DOWNSTREAM SECTION

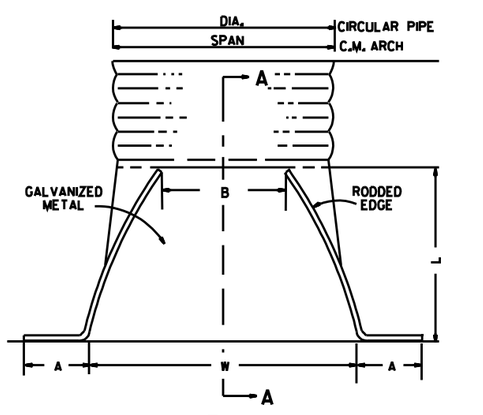
ARCH PIPE

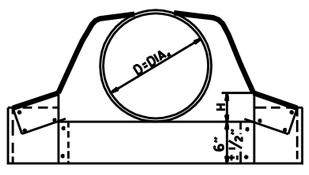
EQUIV. DIA.	• SPAN AASHTO M 206	• SPAN AHD NOMINAL	• RISE AASHTO M 206	• RISE AHD NOMINAL	W	A	B	C	D	E	P	R2	G-T	S
	INCHES													
15	18	18	11	11	2"	4"	2'-0"	4'-0"	6'-0"	3'-0"	29"	12"	1½"	2½st
18	22	22	13½	14	2½"	5"	2'-0"	4'-1"	6'-1"	3'-6"	32⅛"	13"	2½"	2½st
21	26	26	15½	16	2¾"	7"	2'-3"	3'-10"	6'-1"	4'-0"	34⅛"	14"	2½"	2½st
24	28½	29	18	18	3"	9"	2'-3"	3'-10"	6'-1"	5'-0"	36⅛"	15"	2½"	2½st
30	36¼	36	22½	23	3½"	10"	3'-1"	3'-0½"	6'-1½"	6'-0"	47⅛"	20"	3"	2½st
36	43¾	44	26⅝	27	4"	10½"	4'-0"	2'-1½"	6'-1½"	6'-6"	54⅞"	22"	3½"	2½st
42	51⅛	51	31⅝	31	4½"	11½"	4'-7"	1-10¼"	6'-5¼"	7'-2"	59½"	23"	3¾"	2½st
48	58½	59	36	36	5"	1'-3"	5'-3"	2'-10¾"	8'-1¾"	7'-10"	70⅜"	24"	4¼"	2½st
54	65	65	40	40	5½"	1'-7"	5'-3"	2'-11"	8'-2"	8'-6"	72⅛"	24"	4¾"	2¼st
60	73	73	45	45	6"	1'-10"	5'-6"	2'-8"	8'-2"	9'-0"	77⅛"	24"	5"	2¼st

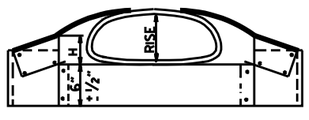
• THE MEASURED SPAN AND RISE SHALL NOT VARY MORE THAN ± 2 PER CENT FROM THE VALUES SPECIFIED BY AASHTO M 206.



END VIEW
CONCRETE ARCH PIPE







CIRCULAR PIPE

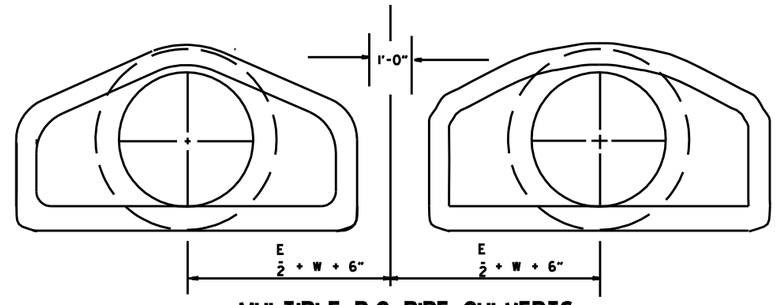
D. DIA.	GAUGE	A 1" ±	B. MAX.	H 1" ±	L 1½" ±	W 2" ±	S
		INCHES					
12	16	6	6	6	21	24	2½st
15	16	7	8	6	26	30	2½st
18	16	8	10	6	31	36	2½st
21	16	9	12	6	36	42	2½st
24	16	10	13	6	41	48	2½st
30	14	12	16	8	51	60	2½st
36	14	14	19	9	60	72	2½st
42	12	16	22	11	69	84	2½st
48	12	18	27	12	78	90	2½st
54	12	18	30	12	84	102	2st
60	12	18	33	12	87	114	1½st
66	12	18	36	12	87	120	1½st
72	12	18	39	12	87	126	1 1/3st

C.M. ARCH PIPE

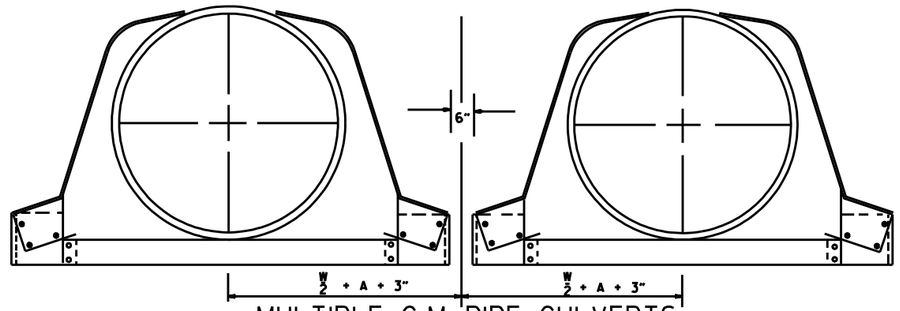
EQUIV. DIA.	SPAN	RISE	A 1" ±	B MAX.	H 1" ±	L 1½" ±	W 2" ±	S	GAUGE
	INCHES								
15"	17	13	7	9	6	19	30	2½st	16
18"	21	15	7	10	6	23	36	2½st	16
21"	24	18	8	12	6	28	42	2½st	16
24"	28	20	9	14	6	32	48	2½st	16
30"	35	24	10	16	6	39	60	2½st	14
36"	42	29	12	18	8	46	75	2½st	14
42"	49	33	13	21	9	53	85	2½st	12
48"	57	38	18	26	12	63	90	2½st	12
54"	64	43	18	30	12	70	102	2½st	12
60"	71	47	18	33	12	77	114	2½st	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



MULTIPLE R.C. PIPE CULVERTS



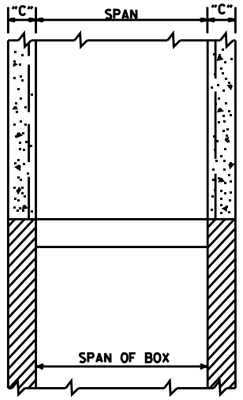
MULTIPLE C.M. PIPE CULVERTS

DATE	REVISION	FILMED
10-18-96	REVISED ASTM REF. TO AASHTO	
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

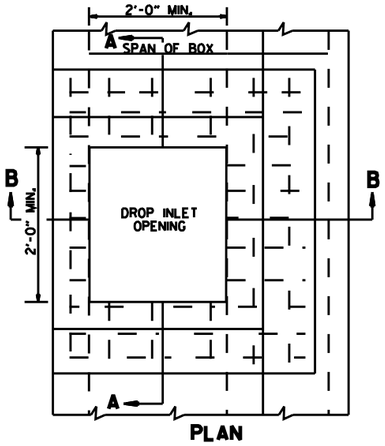
ARKANSAS STATE HIGHWAY COMMISSION

FLARED END SECTION

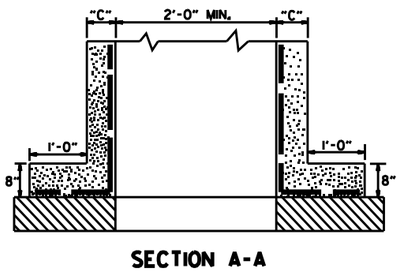
STANDARD DRAWING FES-2



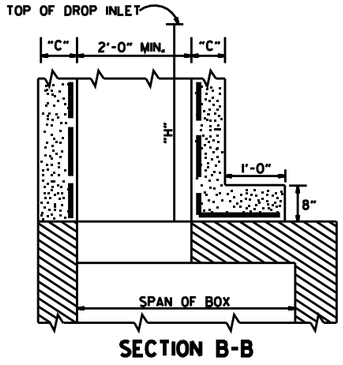
SECTION B-B



PLAN

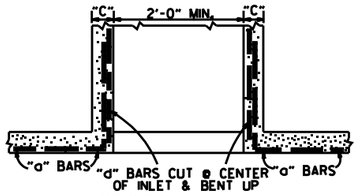


SECTION A-A

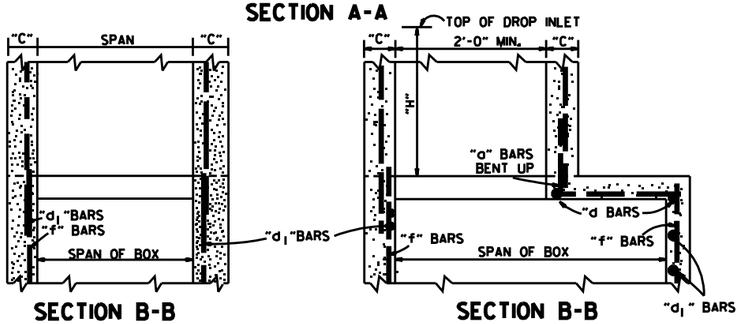


SECTION B-B

METHOD OF CONSTRUCTING DROP INLET ON EXISTING R.C. BOX CULVERT



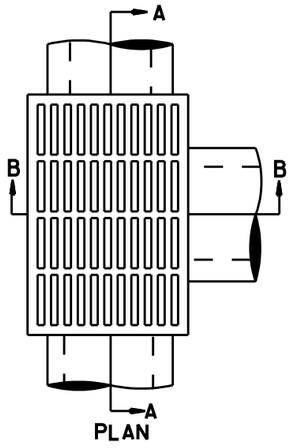
SECTION A-A



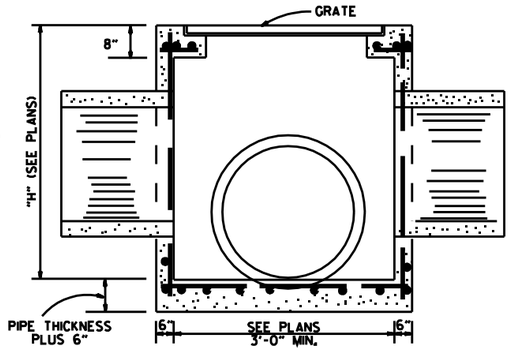
SECTION B-B SECTION B-B

METHOD OF CONSTRUCTING DROP INLET ON NEW R.C. BOX CULVERT

NOTE: "C" DIMENSIONS AND REINFORCING BAR SIZES, SHALL CONFORM TO THOSE SHOWN ON STANDARD DRAWING FOR DROP INLET.

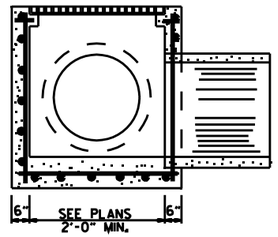


PLAN



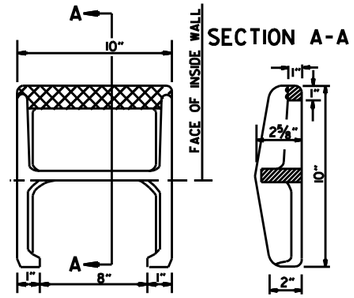
SECTION A-A

NOTE: REINF. BARS TO BE #4 BARS ON 6" CTRS. WITH 1½" MIN. COVER. THIS TYPE DROP INLET TO BE USED WHERE NOT SUBJECTED TO TRAFFIC.



SECTION B-B

DROP INLET (TYPE E)



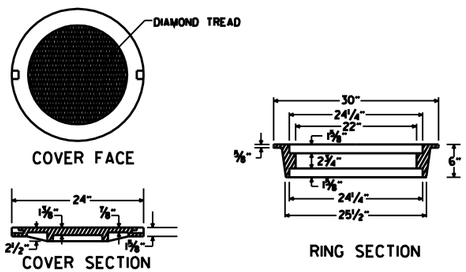
SECTION A-A

APPROX. WEIGHT = 11 LBS. (CAST IRON)

PLAN

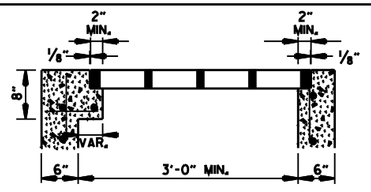
NOTE: THIS DETAIL IS TYPICAL. OTHERS MAY BE USED WITH PRIOR APPROVAL OF THE ENGINEER.

DETAIL OF STEP FOR DROP INLET

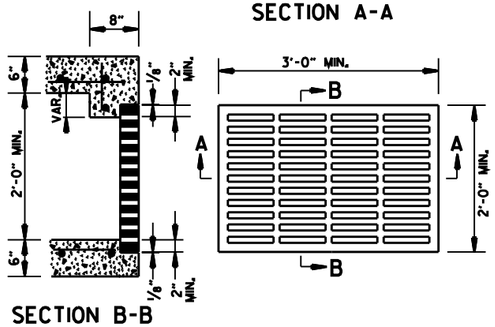


APPROXIMATE TOTAL WEIGHT = 333 LBS.

HEAVY DUTY RING & COVER



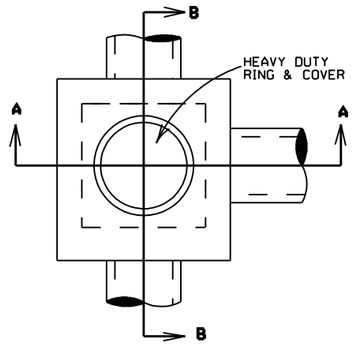
SECTION A-A



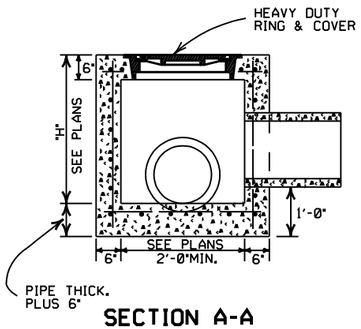
SECTION B-B

APPROXIMATE MINIMUM WATERWAY OPENING = 260 SQ. IN.

GRATE FOR TYPE E DROP INLET

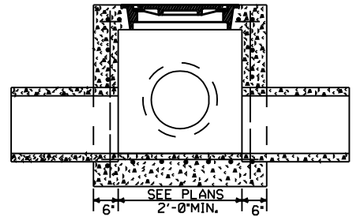


PLAN



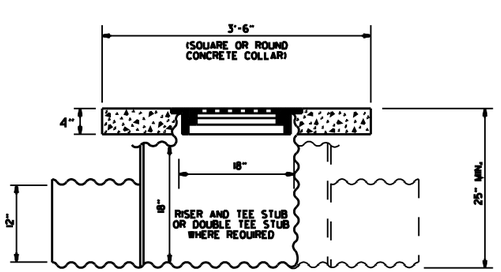
SECTION A-A

NOTE: REINF. BARS TO BE #4 BARS ON 6" CTRS. WITH 1½" MIN. COVER. THIS TYPE JUNCTION BOX TO BE USED WHERE NOT SUBJECTED TO TRAFFIC.

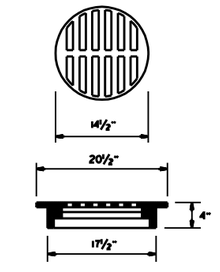


SECTION B-B

JUNCTION BOX (TYPE E)



NOTE: CONCRETE COLLAR TO BE CAST IN PLACE. 12" PIPE CULVERTS TO BE MEASURED AND PAID FOR AS " 12" SIDE DRAIN ".



USE NEENAH R-5901-C OR EQUIVALENT BICYCLE SAFE FRAME AND GRATE

DETAIL OF YARD DRAIN

GENERAL NOTES:

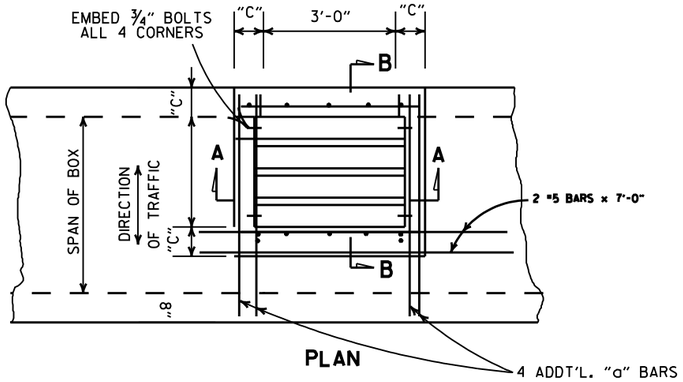
1. ALL EXPOSED CORNERS SHALL BE ¾" CHAMFERED.
2. STEPS SHALL BE INSTALLED ON 16" CENTERS ON ALL INLETS 4'-0" HIGH OR OVER, OR AS APPROVED BY THE ENGINEER.
3. EXPANSION JOINT MATERIAL SHALL BE ¾" PREFORMED FIBER.
4. GRATE OR GRATE AND FRAME SHALL BE CONSTRUCTED OF CAST IRON AND SHALL CONFORM TO THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS FOR GRAY IRON CASTINGS AASHTO M 105 CLASS 35B. GRATE MAY BE USED WITHOUT FRAME.
5. GRATE AND FRAME SHALL NOT BE PAINTED.
6. GRATE SHALL BE BICYCLE SAFE.
7. HEAVY DUTY RING SHALL ALWAYS BE INSTALLED WITH FLANGE ON TOP.
8. HEAVY DUTY RING AND COVER SHALL BE CONSTRUCTED OF CAST IRON AND SHALL CONFORM TO THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS FOR GRAY IRON CASTINGS AASHTO M105 CLASS 35B & AASHTO M306.
9. HEAVY DUTY RING AND COVER SHALL NOT BE PAINTED.
10. DIMENSIONS SHOWN FOR RING AND COVER ARE TYPICAL. THE CONTRACTOR MAY SUBSTITUTE SIMILAR CASTINGS WITH THE APPROVAL OF THE ENGINEER. REQUESTING APPROVAL FOR CASTING DESIGNS MAY BE MADE BY REFERRING TO PREVIOUSLY APPROVED DRAWINGS.

DATE REV.	REVISION	DATE FILMED
11-16-01	ADDED NOTE 10	
1-12-00	REVISED HEAVY DUTY RING & COVER	
7-02-98	CHANGED GRATE DETAIL, DELETED DI(TYPE D), REPLACED RING & COVER W/HEAVY DUTY RING & COVER, ADDED JUNCTION BOX (TYPE E)	
6-26-97	ADDED DIMENSION TO TYPE IV-A	
10-18-96	ADDED DETAIL OF YARD DRAIN	
8-15-91	DELETE TYPE IV GRATE	
7-15-88	REVISED STEP DETAIL	
5-20-83	REVISED DETAILS OF GRATES (TYPE IV & IV-A)	
2-4-83	ADDED GENERAL NOTE NO. 4	
3-2-81	ADDED TYPE IV-A GRATE	
5-22-74	DELETED INLET (TYPE F) & GRATE (TYPE III)	
10-2-72	REVISED AND REDRAWN	

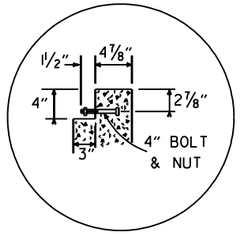
ARKANSAS STATE HIGHWAY COMMISSION

DETAILS OF DROP INLETS & JUNCTION BOXES

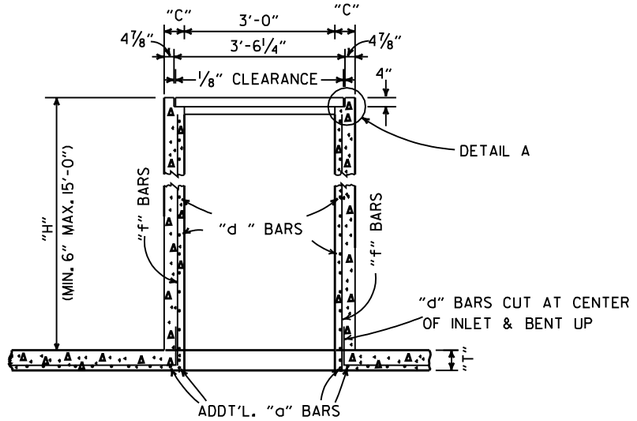
STANDARD DRAWING FPC-9



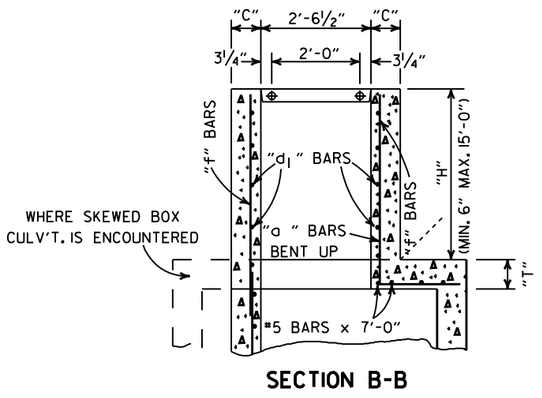
PLAN



DETAIL A



SECTION A-A

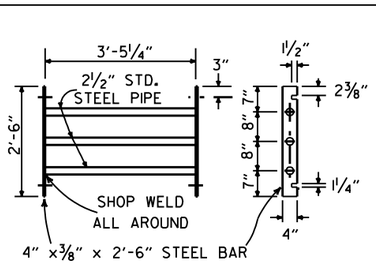


SECTION B-B

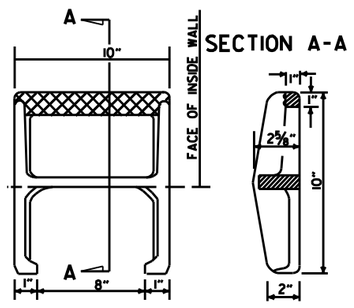
NOTE: ADDT'L.REINF. STEEL TO BE INCLUDED IN UNIT PRICE BID PER TYPE "TM" D.I.

DIMENSIONS & REINF. BARS FOR D.I. TO BE THE SAME AS THOSE SHOWN ON APPLICABLE STD. BARREL DRAWING FOR R.C. BOX CULVERTS.

DROP INLET TYPE "TM"
FOR REINFORCED CONC. BOX CULVERTS



GRATE DETAIL



APPROX. WEIGHT = 11 LBS. (CAST IRON)

PLAN

NOTE: THIS DETAIL IS TYPICAL. OTHERS MAY BE USED WITH PRIOR APPROVAL OF THE ENGINEER.

DETAIL OF STEP FOR DROP INLET

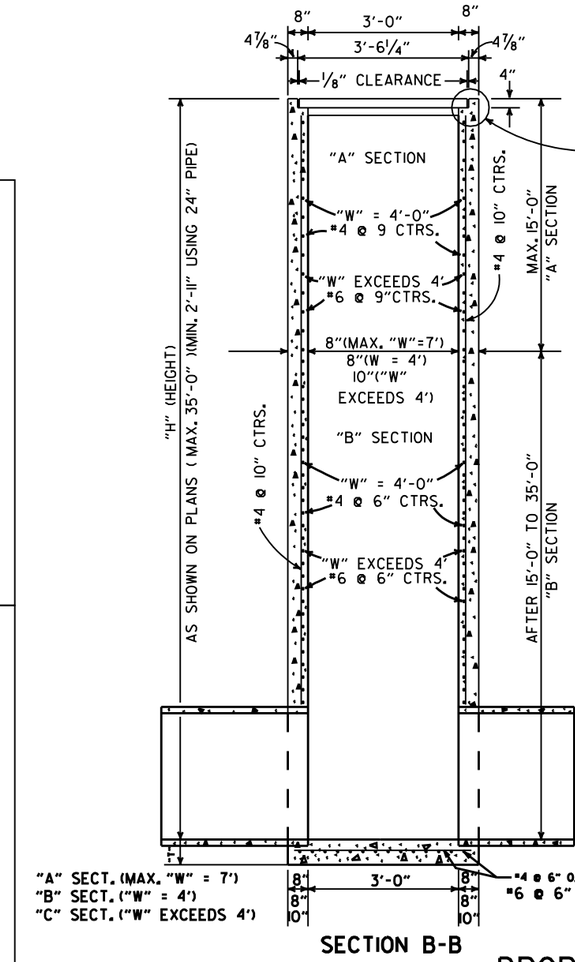
GENERAL NOTES:

1. STEEL PIPE FOR GRATES AND BOLTS SHALL CONFORM TO THE REQUIREMENTS OF SECTION 807. BOLTS SHALL CONFORM TO ONE OF THE FOLLOWING: ASTM A193, GRADE B8 CLASS 1 OR 2, ASTM A307 OR AASHTO M 164.
2. STEEL PIPE FOR GRATES SHALL BE "STANDARD WEIGHT" PIPE CONFORMING TO ASTM A53 NATIONAL STANDARD PIPE.
3. BOLTS, NUTS, WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M 232 OR AASHTO M 298, CLASS 40 OR 50.
4. ALL EXPOSED CORNERS TO HAVE ¾" CHAMFER.
5. ALL #4 AND #5 REINFORCING BARS TO HAVE 1½" COVER. LARGER SIZES TO HAVE 2" COVER.
6. THE COMPLETE PIPE GRATE SHALL BE PAINTED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

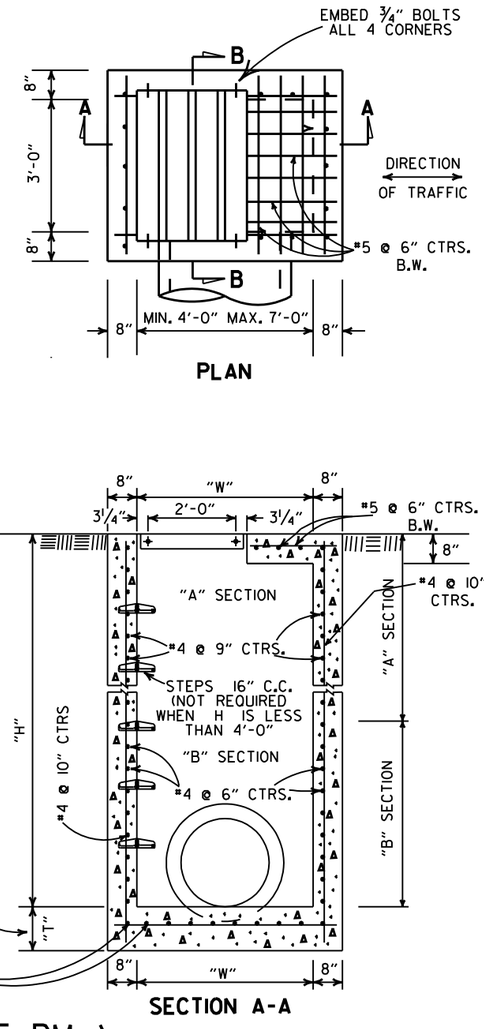
TABLE OF "W" DIMENSIONS

I.D. PIPE	SKEW OF CROSS DRAIN		
	STRAIGHT	30°	45°
	"W"	"W"	"W"
24"	4'-0"	4'-0"	4'-0"
30"	4'-0"	4'-0"	4'-5"
36"	4'-0"	4'-3"	5'-3"
42"	4'-3"	4'-11"	6'-1"
48"	4'-10"	5'-7"	6'-11"

NOTE: DIMENSIONS SHOWN ABOVE ARE FOR PIPES INTERSECTING DROP INLET ON ONE SIDE ONLY. FOR SKEWED PIPES INTERSECTING BOTH SIDES OF DROP INLET, "W" WILL NEED TO BE INCREASED OR AXIS OF INTERSECTING PIPES WILL NEED TO BE SHIFTED.



SECTION B-B



SECTION A-A

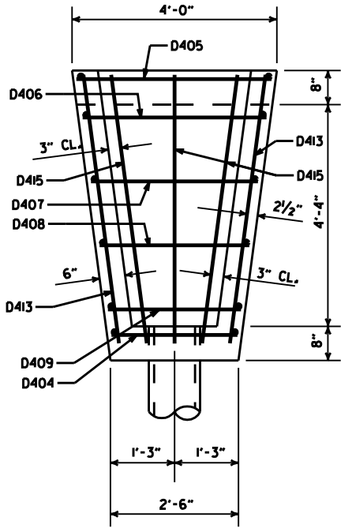
DROP INLET(TYPE RM)

REVISED		DATE FILMED
8-22-02	ADDED & REVISED DIMENSION TO SECTION A-A	
1-12-00	CORRECTED DIMENSION ON SECTION B-B	
11-06-97	ADDED DIMENSION TO SECTION A-A	
10-18-96	REVISED ASTM REF. TO AASHTO AND ADDED NOTE TO TABLE OF "W" DIMENSIONS	
10-1-92	ADDED DIRECTION OF TRAFFIC	10-1-92
8-15-91	ADDED NOTE ABOUT PAINTING OF GRATE	8-15-91
11-30-89	ALTERED DETAIL A	11-30-89
7-15-88	REVISED STEP DETAIL, TM & RM D.I. & GRATE DETAIL	719-7-15-88
10-2-72	REVISED AND REDRAWN	542-10-2-72

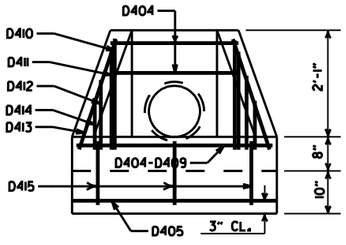
ARKANSAS STATE HIGHWAY COMMISSION

DETAILS OF DROP INLETS

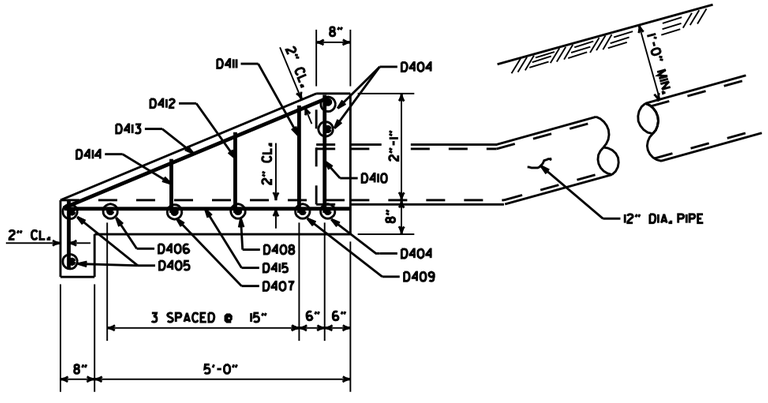
STANDARD DRAWING FPC-9D



PLAN



FRONT ELEVATION

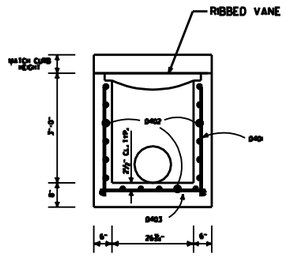


SIDE ELEVATION
CONCRETE SPILLWAY

BAR LIST (CONCRETE SPILLWAY)

MARK	NO. REQ'D.	LENGTH	BENDING DIAGRAM
D404	3	2'-2"	5'-4", 1'-2", 2" P.D., D415
D405	2	3'-8"	
D406	1	3'-5"	
D407	1	3'-1"	
D408	1	2'-9"	
D409	1	2'-5"	
D410	2	2'-5"	
D411	2	2'-2"	
D412	2	1'-9"	
D413	2	5'-6"	
D414	2	1'-2"	
D415	3	6'-5"	

DETAILS OF CONCRETE SPILLWAY (TYPE A)

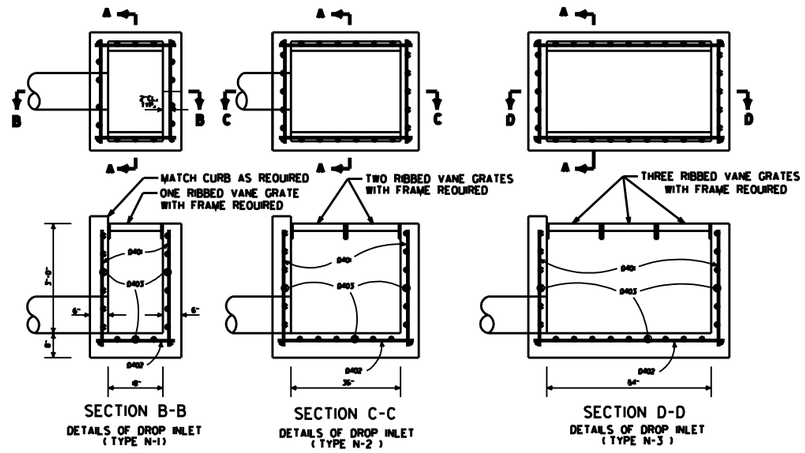


SECTION A-A

BAR LIST (DROP INLET)

MARK	TYPE N-1		TYPE N-2		TYPE N-3	
	NO. REQ'D.	LENGTH	NO. REQ'D.	LENGTH	NO. REQ'D.	LENGTH
D401	20	3'-0"	26	3'-0"	32	3'-0"
D402	19	2'-2"	19	3'-8"	19	5'-2"
D403	17	2'-11"	20	2'-11"	23	2'-11"

ALL BARS #4 @ 6" SPACING



SECTION B-B
DETAILS OF DROP INLET
(TYPE N-1)

SECTION C-C
DETAILS OF DROP INLET
(TYPE N-2)

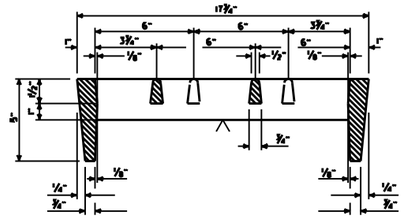
SECTION D-D
DETAILS OF DROP INLET
(TYPE N-3)

DETAILS OF DROP INLET

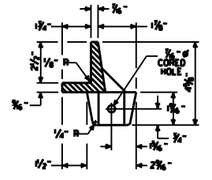
GENERAL NOTES (GRATE & FRAME)

1. RIBBED VANE GRATE AND FRAME SHALL BE CONSTRUCTED OF CAST IRON AND SHALL CONFORM TO THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS FOR GRAY IRON CASTINGS AASHTO M 105 CLASS 35B & AASHTO M 306.
2. GRATE AND FRAME SHALL NOT BE PAINTED.
3. GRATE AND FRAME SHALL BE INSTALLED IN DROP INLET IN ASSEMBLED POSITION.
4. APPROXIMATE WEIGHT OF GRATE SHALL BE 170 LBS.

SECTION A-A



SECTION B-B



SECTION THRU FRAME

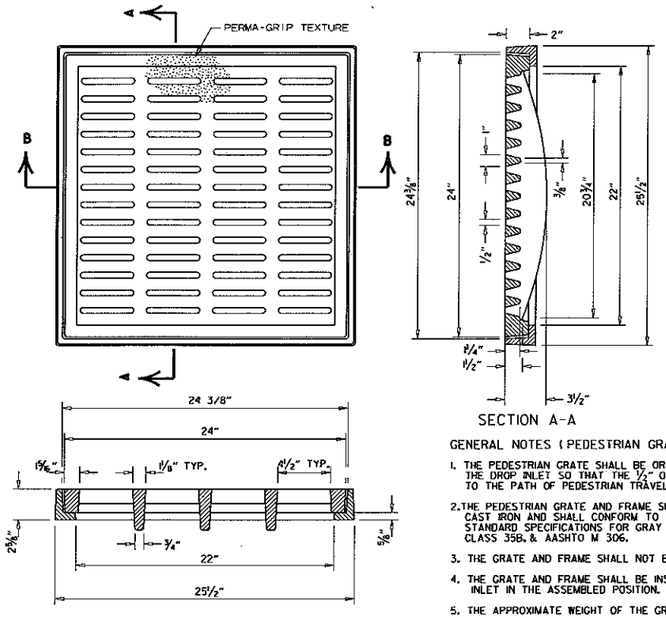
DETAILS OF RIBBED VANE GRATE AND FRAME

DATE REVISED	DATE FILMED	DESCRIPTION
7-02-98		REVISED SECT. A-A DETAIL OF DROP INLET & ADDED AASHTO REF. TO NOTE 1, REVISED GRATE
10-18-96		REVISED ASTM REF. TO AASHTO
8-15-91		ISSUED

ARKANSAS STATE HIGHWAY COMMISSION

DETAILS OF DROP INLETS AND SPILLWAY OUTLET

STANDARD DRAWING FPC-9N



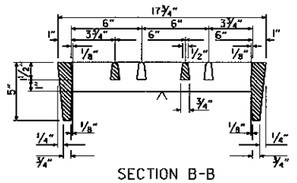
SECTION B-B

SECTION A-A

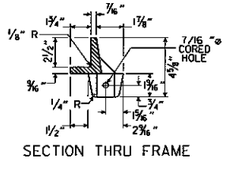
DETAILS OF PEDESTRIAN GRATE AND FRAME

GENERAL NOTES (PEDESTRIAN GRATE & FRAME)

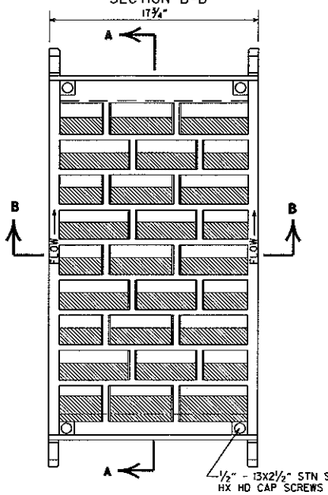
1. THE PEDESTRIAN GRATE SHALL BE ORIENTED IN THE TOP OF THE DROP INLET SO THAT THE ½" OPENINGS ARE PERPENDICULAR TO THE PATH OF PEDESTRIAN TRAVEL.
2. THE PEDESTRIAN GRATE AND FRAME SHALL BE CONSTRUCTED OF CAST IRON AND SHALL CONFORM TO THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS FOR GRAY IRON CASTINGS AASHTO M 105, CLASS 35B, & AASHTO M 306.
3. THE GRATE AND FRAME SHALL NOT BE PAINTED.
4. THE GRATE AND FRAME SHALL BE INSTALLED IN THE DROP INLET IN THE ASSEMBLED POSITION.
5. THE APPROXIMATE WEIGHT OF THE GRATE AND FRAME SHALL BE 211LBS.
6. THE MINIMUM WATERWAY OPENING SHALL BE 122 SQ. IN.

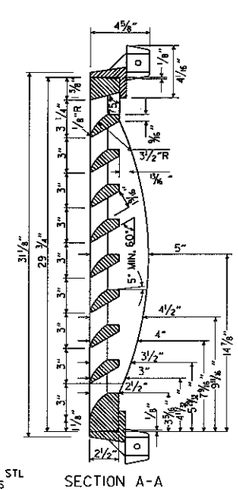


SECTION B-B



SECTION THRU FRAME



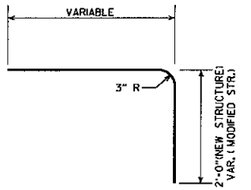


SECTION A-A

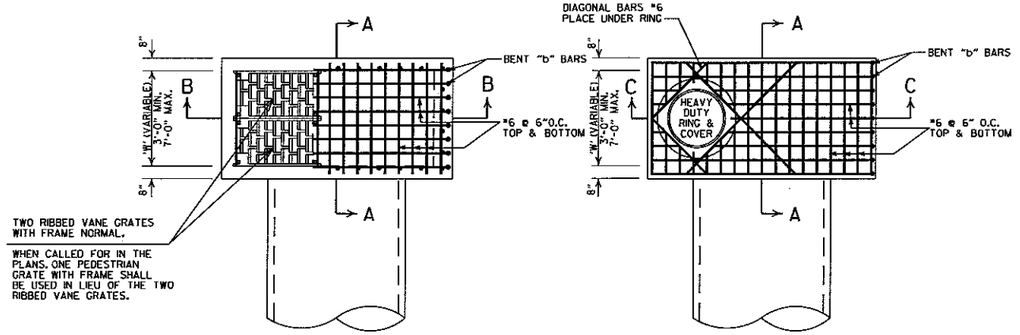
DETAILS OF RIBBED VANE GRATE AND FRAME

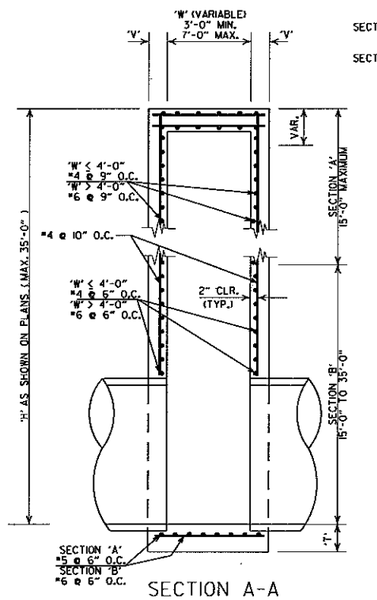
GENERAL NOTES (RIBBED VANE GRATE & FRAME)

1. RIBBED VANE GRATE AND FRAME SHALL BE CONSTRUCTED OF CAST IRON AND SHALL CONFORM TO THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS FOR GRAY IRON CASTINGS AASHTO M 105, CLASS 35B, & AASHTO M 306.
2. GRATE AND FRAME SHALL NOT BE PAINTED.
3. GRATE AND FRAME SHALL BE INSTALLED IN DROP INLET IN ASSEMBLED POSITION.
4. APPROXIMATE WEIGHT OF GRATE SHALL BE 170 LBS.



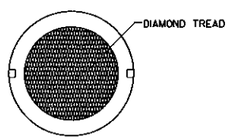
DETAIL OF BENT "b" BAR



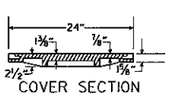


SECTION A-A

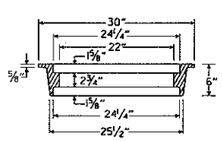
DETAILS OF DROP INLET (TYPE ST)



COVER FACE



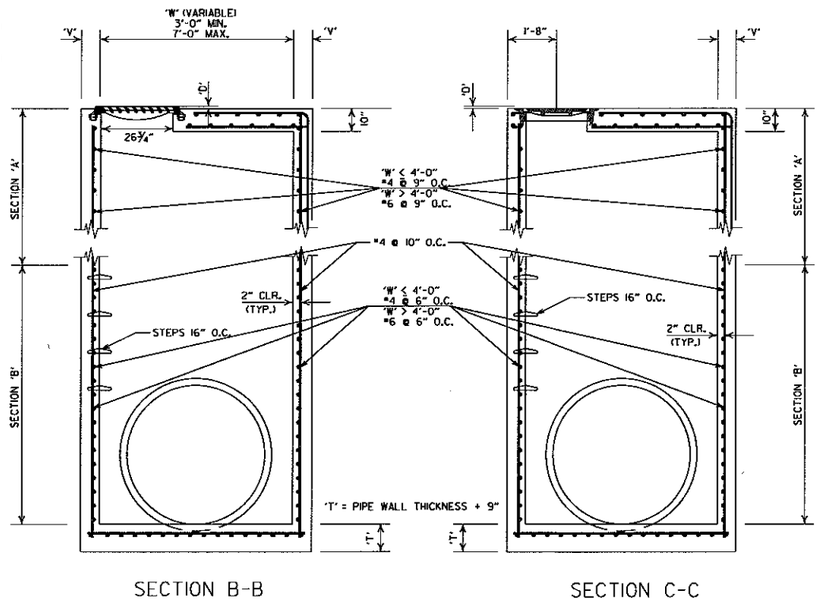
COVER SECTION



RING SECTION

HEAVY DUTY RING & COVER

APPROXIMATE TOTAL WEIGHT = 333 LBS.



SECTION B-B

SECTION C-C

DETAILS OF JUNCTION BOX (TYPE ST)

GENERAL NOTES (TYPE ST DROP INLET & JUNCTION BOX)

1. THE 'D' DIMENSION SHALL MATCH THE FINAL LIFT OF ACHM SURFACE COURSE SHOWN IN THE PLANS WHEN ASPHALT PAVING SURROUNDS THE GRATE OR RING COVER, AND SHALL BE 0" AT OTHER INSTALLATIONS.
2. THE STEPS SHALL BE OMITTED WHERE 'H' IS LESS THAN 4'-0".
3. ALL EXPOSED CORNERS ARE TO HAVE A ¾" CHAMFER.

GENERAL NOTES (HEAVY DUTY RING & COVER):

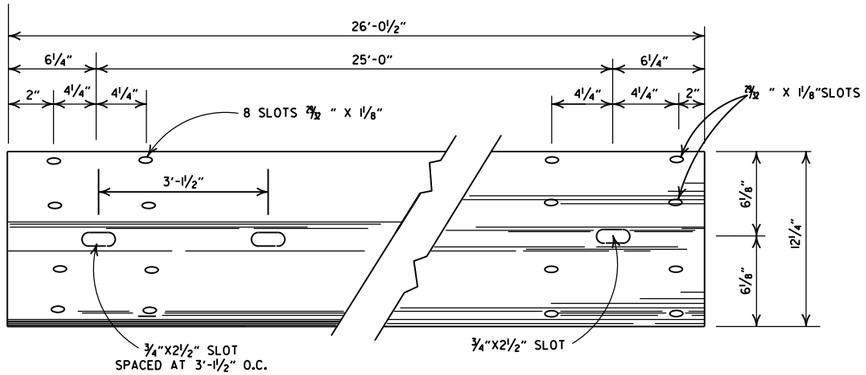
1. HEAVY DUTY RING AND COVER SHALL BE CONSTRUCTED OF CAST IRON AND SHALL CONFORM TO THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS FOR GRAY IRON CASTINGS AASHTO M 105, CLASS 35B, & AASHTO M 306.
2. HEAVY DUTY RING AND COVER SHALL NOT BE PAINTED.
3. HEAVY DUTY RING SHALL ALWAYS BE INSTALLED WITH FLANGE ON TOP.
4. DIMENSIONS SHOWN FOR RING AND COVER ARE TYPICAL. THE CONTRACTOR MAY SUBSTITUTE SIMILAR CASTINGS WITH THE APPROVAL OF THE ENGINEER. REQUESTING APPROVAL FOR CASTING DESIGNS MAY BE MADE BY REFERRING TO PREVIOUSLY APPROVED DRAWINGS.

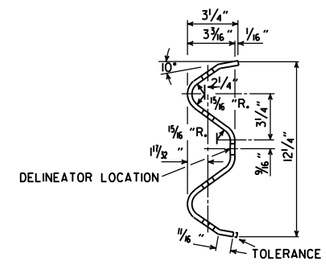
DATE REVISED	DATE FILMED	DESCRIPTION
7-26-12		REMOVED NOTE 4, REVISED 'T', REVISED BOTTOM SLAB REBAR FOR SECTION 'A', SHOWED REBAR CLEARANCE IN SECTIONS
11-16-01		ADDED NOTE 4
1-12-00		REVISED HEAVY DUTY RING & COVER
5-13-99		ADDED PEDESTRIAN FRAME & GRATE
7-02-98		REMOVED NOTE 5, REV. DIMENSIONS, ADDED HEAVY DUTY RING & COVER ADDED AASHTO REF. REVISED GRATE
10-18-96		REVISED ASTM REF. TO AASHTO
10-1-92		REVISED & REISSUED
8-15-91	8-15-91	REVISED & REISSUED

ARKANSAS STATE HIGHWAY COMMISSION

DETAILS OF DROP INLET & JUNCTION BOX (TYPE ST)

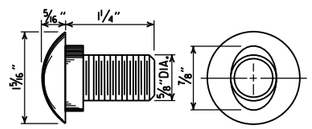
STANDARD DRAWING FPC-9S



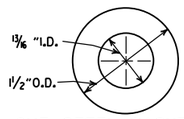


DETAILS OF W-BEAM GUARDRAIL

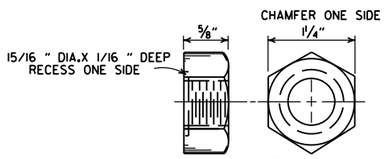
RAIL SECTION OF CLOSELY SIMILAR DIMENSIONS AND COMPARABLE STRENGTH MAY BE SUBSTITUTED IF APPROVED BY THE ENGINEER.



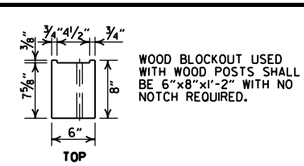
SPLICE BOLT
POST BOLT - SAME EXCEPT LENGTH



CUT STEEL WASHER

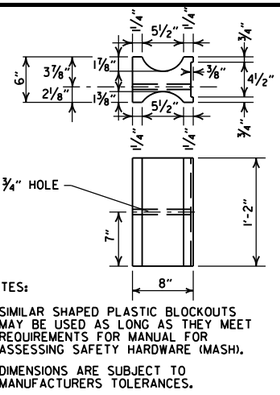


NUT



WOOD BLOCKOUT USED WITH WOOD POSTS SHALL BE 6"x8"x1'-2" WITH NO NOTCH REQUIRED.

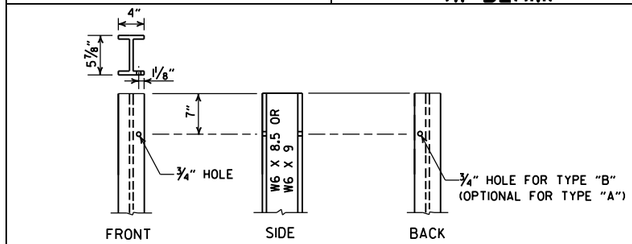
WOOD BLOCKOUT (W-BEAM)



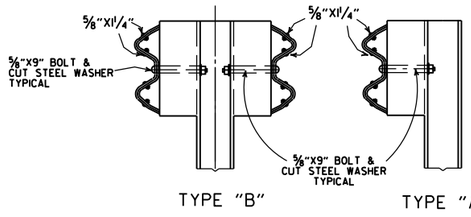
NOTES:

1. SIMILAR SHAPED PLASTIC BLOCKOUTS MAY BE USED AS LONG AS THEY MEET REQUIREMENTS FOR MANUAL FOR ASSESSING SAFETY HARDWARE (MASH).
2. DIMENSIONS ARE SUBJECT TO MANUFACTURERS TOLERANCES.

PLASTIC BLOCKOUT (W-BEAM)



STEEL POST



DETAILS OF STEEL LINE POST CONNECTIONS (W-BEAM)

-GENERAL NOTES-

ALL BOLTS SHALL BE SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND NO MORE THAN ¾" BEYOND IT.

WHERE W-BEAM GUARDRAIL CONTINUES, THE INTERMEDIATE SECTIONS SHALL HAVE A POST SPACING OF 6'-3" UNLESS OTHERWISE NOTED.

W-BEAM GUARDRAIL REPRESENTING INTERMEDIATE SECTIONS WILL BE MEASURED ALONG THE ROADWAY FACE FROM CENTERLINE OF POST TO CENTERLINE OF POST.

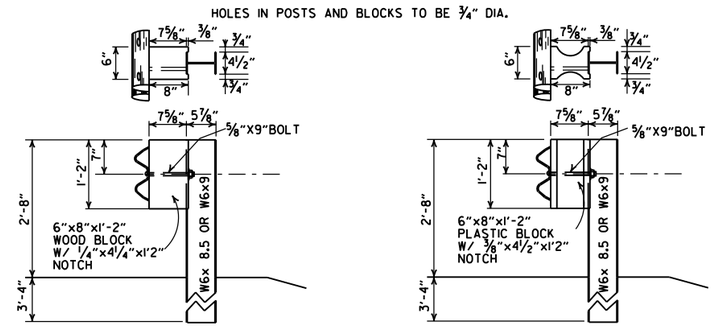
USE W-BEAM GUARDRAIL COMPONENTS OF SAME MATERIAL FOR ENTIRE JOB. FOR EXTENSIONS OR MODIFICATION OF EXISTING GUARDRAIL, W-BEAM GUARDRAIL COMPONENTS OF THE SAME TYPE AS THOSE EXISTING SHALL BE USED.

ANY BACKFILLING UNDER OR AROUND POST SHALL BE DAMP SAND THOROUGHLY TAMPED IN PLACE.

WOOD POSTS & WOOD BLOCKS SHALL BE EITHER DENSE NO. 1 STRUCTURAL OR BETTER 9.7 f (1400 f) OR NO. 1 1350 f SOUTHERN PINE.

CONTRACTOR SHALL HAVE THE OPTION OF USING WOOD BLOCKOUTS FOR W-BEAM GUARDRAIL OR PLASTIC BLOCKOUTS, AS LONG AS BLOCKOUT USED MEETS REQUIREMENTS FOR MANUAL FOR ASSESSING SAFETY HARDWARE (MASH) FOR W-BEAM GUARDRAIL.

DELINEATORS SHALL BE MOUNTED AT 37.5' SPACING ON THE FRONT FACE OF THE GUARDRAIL. SPACING MAY BE REDUCED IN CURVES, AS DIRECTED BY THE ENGINEER. COLOR SHALL BE IN ACCORDANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES. PAYMENT FOR DELINEATORS SHALL BE CONSIDERED INCLUDED IN THE PRICE BID PER LIN. FT. FOR GUARDRAIL.



WOOD BLOCKOUT CONNECTIONS

PLASTIC BLOCKOUT CONNECTIONS

DETAILS OF STEEL LINE POST CONNECTIONS (W-BEAM)

POSTS AND BLOCKS TO BE ROUGH SAWN 6"X8" WITH A TOLERANCE OF + OR - ¼".

WOOD BLOCKOUT CONNECTIONS

PLASTIC BLOCKOUT CONNECTIONS

DETAILS OF WOOD LINE POST CONNECTIONS (W-BEAM)

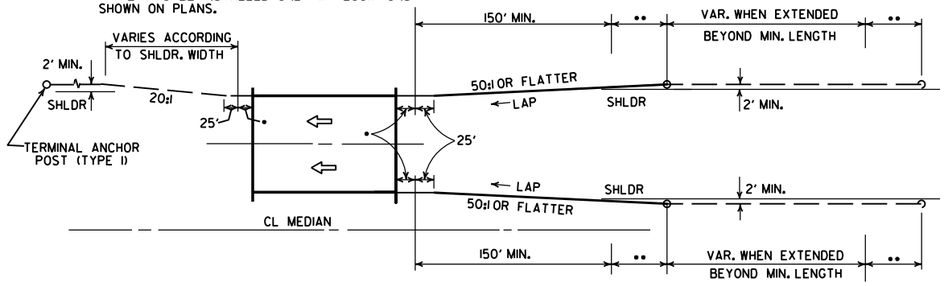
DATE	REVISION	FILMED
05-19-22	REVISED GENERAL NOTES, ADDED DELINEATOR LOCATION.	
11-07-19	RENUMBERED AND RENAMED	
11-16-17	REVISED GENERAL NOTES AND RAISED GUARDRAIL HEIGHT 3"	
07-14-10	RAISED HEIGHT OF GUARDRAIL 1"	
10-15-09	ADDED REFERENCE TO MASH	
04-10-03	REVISED GENERAL NOTES	
08-22-02	REVISED DIMENSION ON WOOD & PLASTIC BLOCKOUT CONNECTIONS & STEEL POST	
11-16-01	REVISED WOOD BLOCKOUT & DETAILS OF WOOD LINE POST CONNECTIONS	
03-30-00	REMOVED GUARDRAIL AT BRIDGE ENDS	
01-12-00	ADDED PLASTIC BLOCKOUT	
08-12-98	REV. BLOCKOUTS TO WOOD, DELETED CONC. POST & REV. GENERAL NOTE, DELETED DET. OF GUARDRAIL REPLACE. BEHIND CURB & DET. OF POST PLACE. IN SOLID ROCK, & ADDED DETAILS OF STEEL LINE POST CONN. REMOVED BACK-UP PLATE, REVISED HOLES IN STEEL POLES	
04-03-97	REMOVED "LAP IN DIRECTION OF TRAFFIC" NOTE & PLACED ARROWS ON WASHERS	
10-18-96	REVISED WOOD POST NOTE	
06-02-94	ADDED ALT. STEEL POST SIZE	
08-05-93	REVISED STEEL POST SIZE	8-5-93
10-01-92	REDRAWN & REVISED	10-1-92
08-15-91	REVISED WASHER NOTE	8-15-91
08-02-90	REV. GEN. NOTE & DEPTH OF ANC. POST IN ROCK	8-2-90
07-15-88	REVISED SECTION 3 & GENERAL NOTES	
03-04-88	REV. ANCHOR POST, ELEV. NOTES & POST IN ROCK	780-3-4-88
10-30-87	REVISED WOOD LINE POST DETAIL	546-10-30-87
10-09-87	REDRAWN & REVISED	802-10-9-87

ARKANSAS STATE HIGHWAY COMMISSION

GUARDRAIL DETAILS

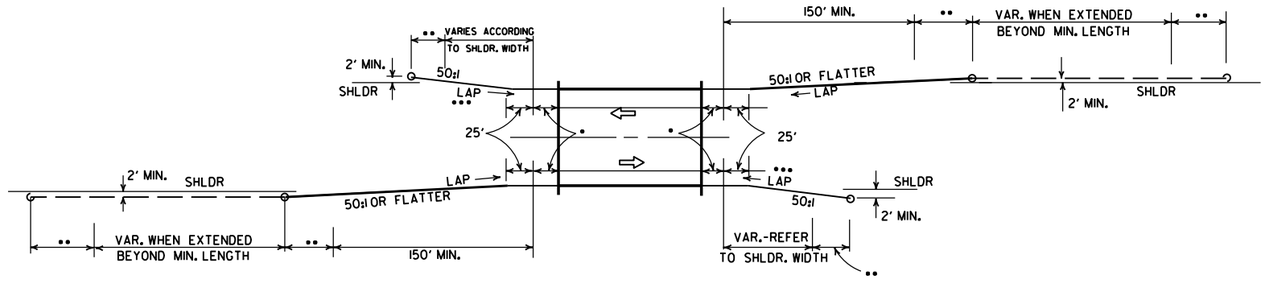
STANDARD DRAWING GR-6

NOTE: GUARDRAIL WITH GUARDRAIL TERMINAL (TYPE 1) TO BE INSTALLED ONLY AT LOCATIONS SHOWN ON PLANS.



ONE-WAY TRAFFIC

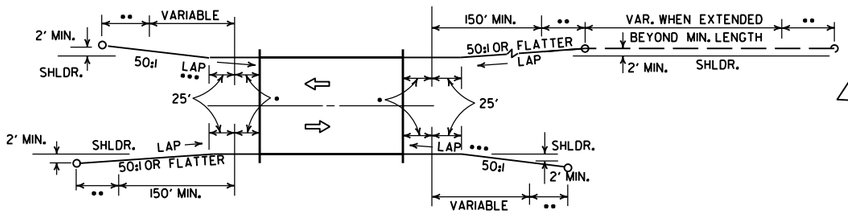
••• LAP OF GUARDRAIL SHALL BE AS SHOWN FOR A DISTANCE OF UP TO 200'. CHANGE TO LAP IN DIRECTION OF TRAVEL.



TWO-WAY TRAFFIC

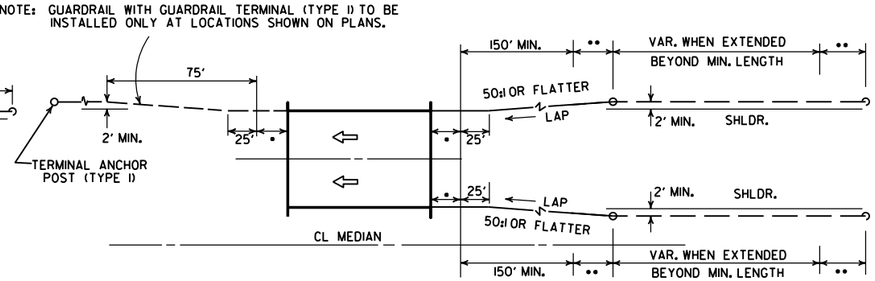
METHODS OF INSTALLATION OF GUARDRAIL AT LESS THAN FULL SHOULDER WIDTH BRIDGES USING GUARDRAIL TERMINAL (TYPE 2)

••• LAP OF GUARDRAIL SHALL BE AS SHOWN FOR A DISTANCE OF UP TO 200'. CHANGE TO LAP IN DIRECTION OF TRAVEL.



TWO-WAY TRAFFIC

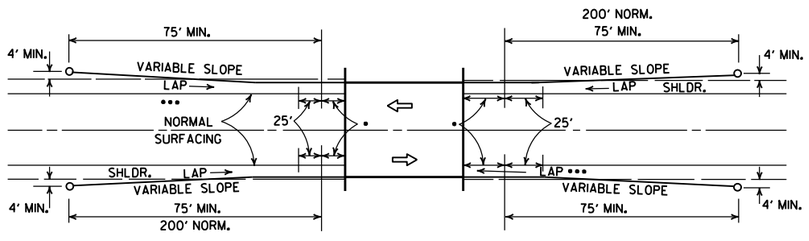
NOTE: GUARDRAIL WITH GUARDRAIL TERMINAL (TYPE 1) TO BE INSTALLED ONLY AT LOCATIONS SHOWN ON PLANS.



ONE-WAY TRAFFIC

METHOD OF INSTALLATION OF GUARDRAIL AT FULL SHOULDER WIDTH BRIDGES USING GUARDRAIL TERMINAL (TYPE 2)

••• LAP OF GUARDRAIL SHALL BE AS SHOWN FOR A DISTANCE OF UP TO 200'. CHANGE TO LAP IN DIRECTION OF TRAVEL.



METHOD OF INSTALLATION OF GUARDRAIL USING GUARDRAIL TERMINAL (TYPE 1) (FULL SHOULDER WIDTH OR LESS BRIDGES)

LEGEND

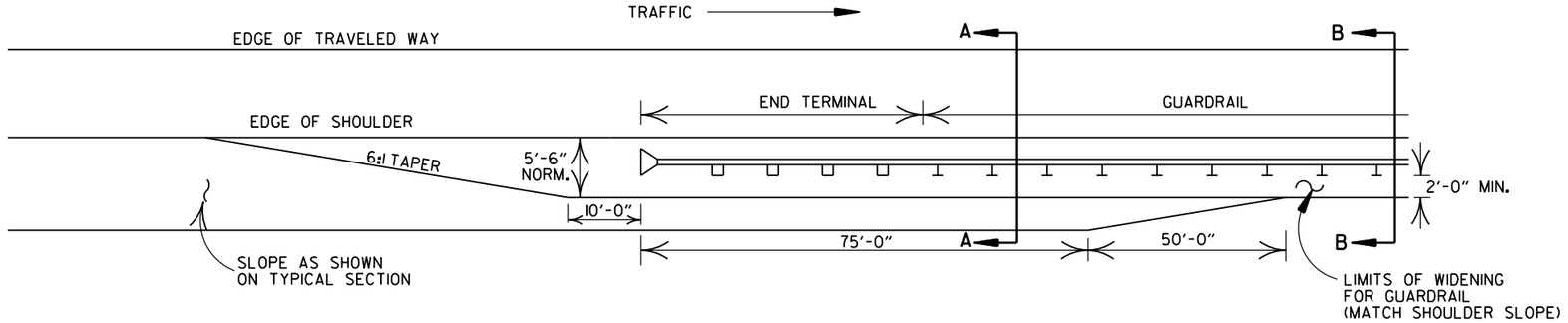
- • THRIE BEAM GUARDRAIL TERMINAL
- •• GUARDRAIL TERMINAL (TYPE 2)

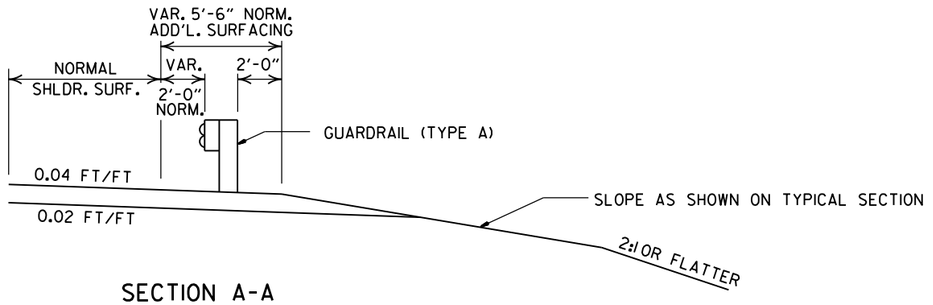
DATE	REVISION	DATE FILM
11-07-19	RENUMBERED AND RENAMED	
4-17-08	REVISED LAYOUTS	
11-10-05	REMOVED GUARDRAIL NOTES AND DETAILS	
11-16-01	DELETED NOTE-METHOD OF INSTALLATION OF GUARDRAIL USING GUARDRAIL TERM. (TY. 1)	
1-12-00	ADDED CONSTRUCTION NOTE	1-12-00
6-26-97	REVISED LAYOUT	
10-1-92	REDRAWN & REVISED	10-1-92
	ADDED NOTE	
10-9-87	REDRAWN & REVISED	

ARKANSAS STATE HIGHWAY COMMISSION

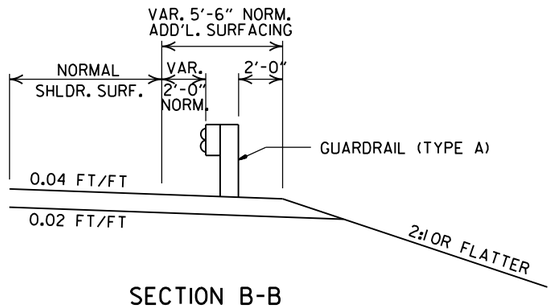
GUARDRAIL DETAILS

STANDARD DRAWING GR-8



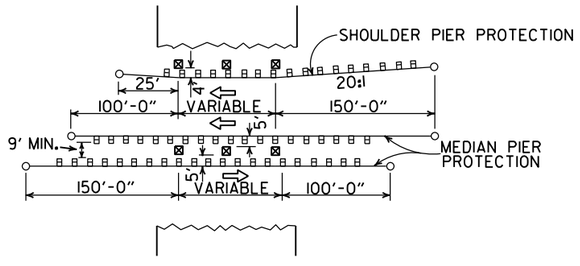


SECTION A-A



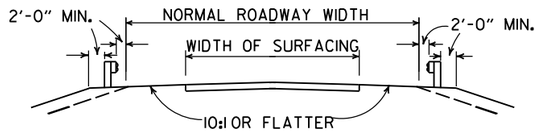
SECTION B-B

DETAILS OF WIDENING FOR GUARDRAIL

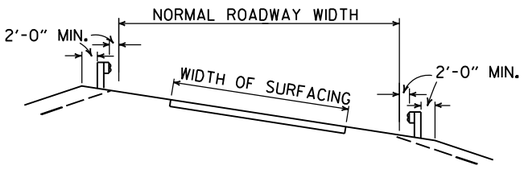


METHOD OF INSTALLATION OF GUARDRAIL AT FIXED OBSTACLE

NOTE: NORMAL SECTION TO BE WIDENED APPROX. 5'-6" EACH SIDE TO SUPPORT GUARDRAIL.



SECTION ON TANGENT



SECTION ON CURVE

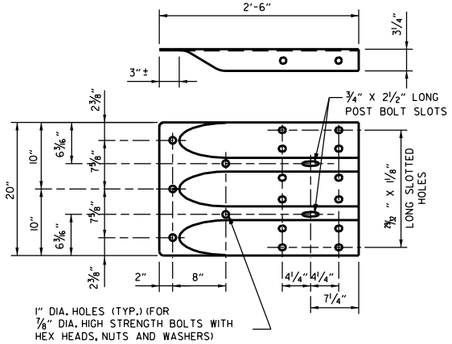
DETAILS SHOWING POSITION OF GUARDRAIL ON HIGHWAY

DATE	REVISION	DATE FILM
11-07-19	RENUMBERED AND RENAMED	
4-17-08	MINOR REVISION	
11-10-05	DRAWN	

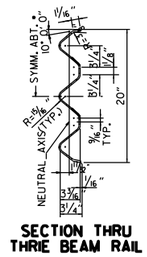
ARKANSAS STATE HIGHWAY COMMISSION

GUARDRAIL DETAILS

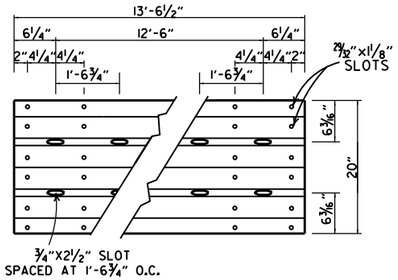
STANDARD DRAWING GR-9



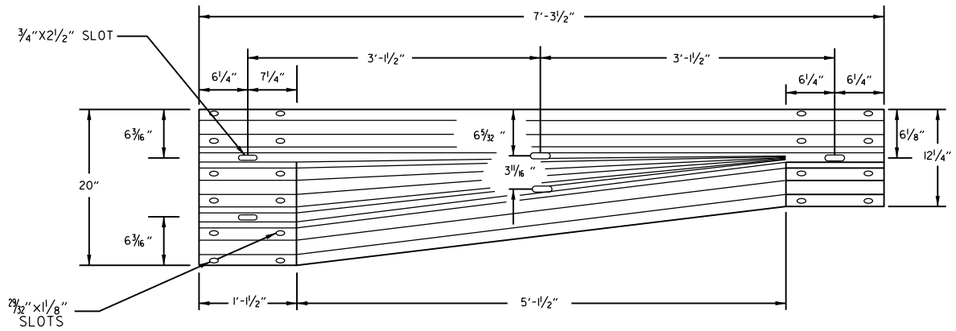
SPECIAL END SHOE



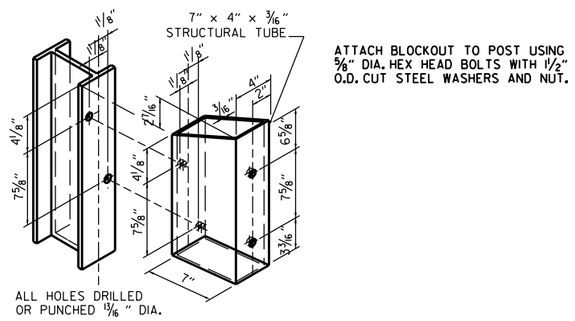
SECTION THRU THRIE BEAM RAIL



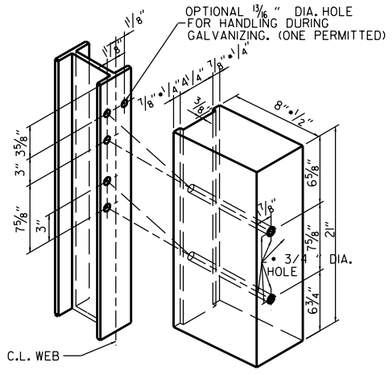
THRIE BEAM RAIL



TRANSITION SECTION



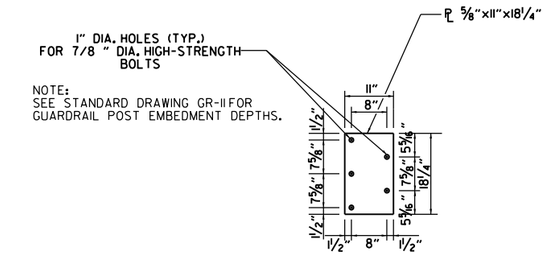
STRUCTURAL STEEL TUBING BLOCKOUT DETAIL



ALL HOLES 13/16" DIAMETER EXCEPT AS NOTED

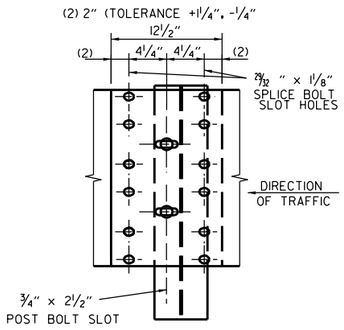
HOLE PUNCHING DETAIL FOR STEEL POST & WOOD OR PLASTIC BLOCKOUTS

NOTE: BLOCKS SHALL BE THE SAME TYPE THROUGHOUT THE PROJECT LIMITS.



CONNECTOR PLATE

CONNECTOR PLATE SHALL BE AASHTO M270, GR. 36 AND SHALL BE GALVANIZED AFTER FABRICATION. GALVANIZING SHALL CONFORM TO SUBSECTION 807.19 OF THE STANDARD SPECIFICATIONS. CONNECTOR PLATE TO BE BOLTED TO SPECIAL END SHOE USING ⅞" DIA. HIGH STRENGTH BOLTS, WITH THE HEADS PLACED ON THE TRAFFIC FACE. WASHERS SHALL BE USED UNDER THE HEAD AND NUT. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED AND SHALL CONFORM TO SUBSECTION 807.06.



THRIE BEAM RAIL SPLICE AT POST

GENERAL NOTES:

THE THRIE BEAM RAIL, SPECIAL END SHOE, AND THE TRANSITION SECTION SHALL BE MADE OF STEEL AND SHALL BE 12 GAGE. ZINC COATING SHALL BE TYPE 1.

RAIL POSTS SHALL BE SET PERPENDICULAR TO THE ROADWAY PROFILE GRADE AND VERTICALLY IN CROSS SECTION.

ALL BOLTS SHALL BE SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND NO MORE THAN 3"4" BEYOND IT.

ALL LAP SPLICES, INCLUDING SPECIAL END SHOES, SHALL BE MADE IN THE DIRECTION SHOWN ON STANDARD DRAWINGS GR-8 & GR-13.

REFER TO STD. DRWG. GR-11 FOR POST DETAILS.

USE THRIE BEAM GUARDRAIL COMPONENTS OF SAME MATERIAL FOR ENTIRE JOB.

THRIE BEAM POSTS SHALL BE SAME MATERIAL AS W-BEAM POSTS FOR ENTIRE JOB.

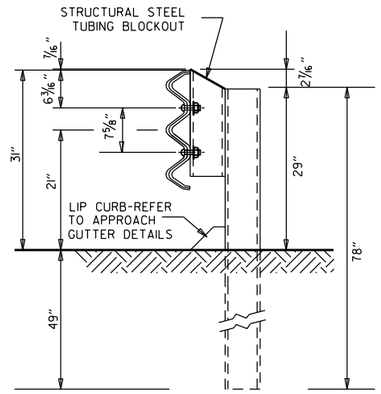
WOOD POSTS & WOOD BLOCKS SHALL BE EITHER DENSE NO. 1 STRUCTURAL OR BETTER 9.7 f (1400 f) OR NO. 1 1350 f SOUTHERN PINE.

DATE	REVISION	FILMED
11-07-19	RENAMED AND REVISED REFERENCES	
11-16-17	REVISED TRANSITION SECTION, GUARD RAIL HEIGHT, AND GENERAL NOTES; MOVED THRIE BEAM GUARD RAIL CONNECTIONS AT BRIDGES ENDS TO STD. DRWG. GR-12	
07-14-10	RAISED HEIGHT OF W-BEAM 1"	
11-29-07	ADDED PLASTIC BLOCKOUTS	
11-10-05	ADDED NOTE FOR ATTACHING STEEL BLOCKOUT	
11-18-04	REVISED GENERAL NOTES	
10-9-03	REVISED GENERAL NOTES	
04-10-03	REVISED GENERAL NOTES	
08-22-02	REVISED NOTE (2)	
06-29-00	MOVED DIMENSION LINES	
05-18-00	ADDED NOTE	
03-30-00	DRAWN & ISSUED	

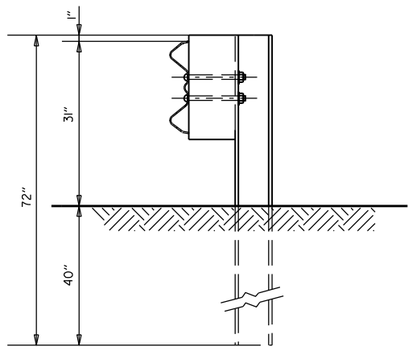
ARKANSAS STATE HIGHWAY COMMISSION

GUARDRAIL DETAILS

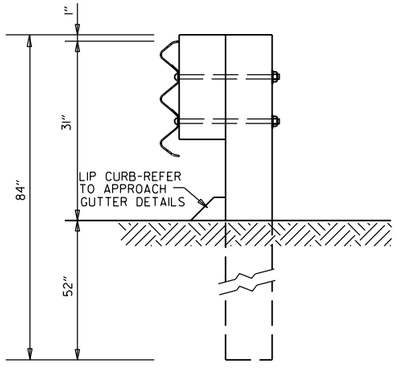
STANDARD DRAWING GR-10



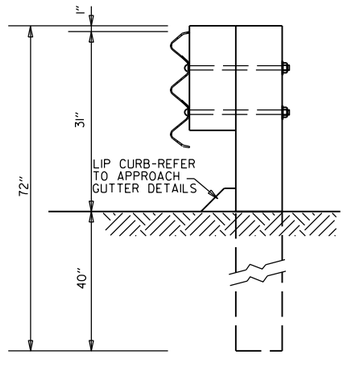
THRIE BEAM RAIL WITH STEEL TUBING BLOCKOUT
AND STEEL POST
POSTS 1-7



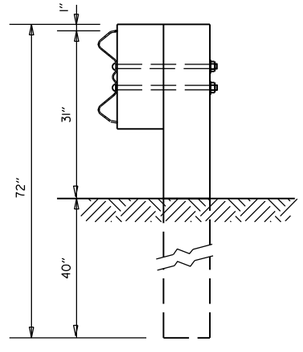
W-BEAM TO THRIE BEAM TRANSITION RAIL
WITH WOOD OR PLASTIC BLOCKOUT AND STEEL POST
POST 8



THRIE BEAM RAIL
WITH WOOD OR PLASTIC
BLOCKOUTS & WOOD POSTS
POSTS 1-6



THRIE BEAM RAIL
WITH WOOD OR PLASTIC
BLOCKOUT & WOOD POST
POST 7



W-BEAM TO THRIE BEAM
TRANSITION RAIL WITH WOOD OR
PLASTIC BLOCKOUT & WOOD POST
POST 8

GENERAL NOTES:

RAIL POSTS SHALL BE SET PERPENDICULAR TO THE ROADWAY PROFILE GRADE AND VERTICALLY IN CROSS SECTION.

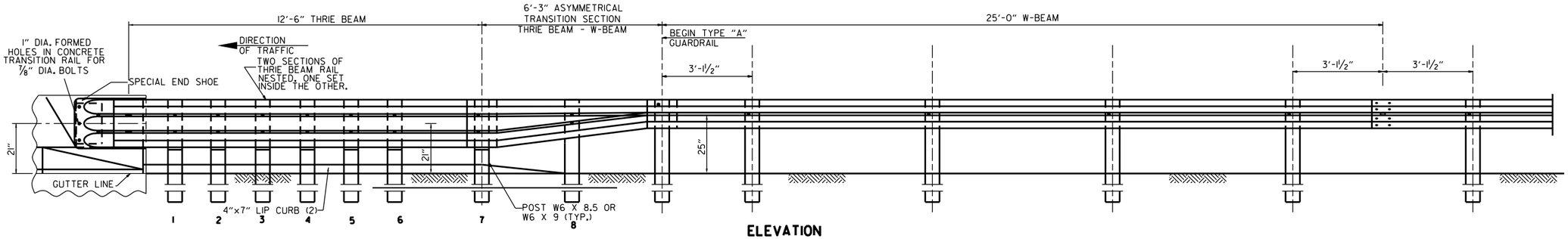
WOOD POSTS & WOOD BLOCKS SHALL BE EITHER DENSE NO. 1STRUCTURAL OR BETTER 9.7f (1400 f) OR NO.1 1350 f SOUTHERN PINE.

DATE	REVISION	FILMED
11-07-19	RENAMED	
11-16-17	REVISED GUARDRAIL HEIGHT, CHANGED STD. DWG. NUMBER FROM GR-10A TO GR-11	
07-14-10	REVISED POST 8 DIMENSIONS	
11-29-07	ADDED PLASTIC BLOCKOUTS	
08-22-02	REVISED LIP CURB NOTE	
03-30-00	DRAWN & ISSUED	

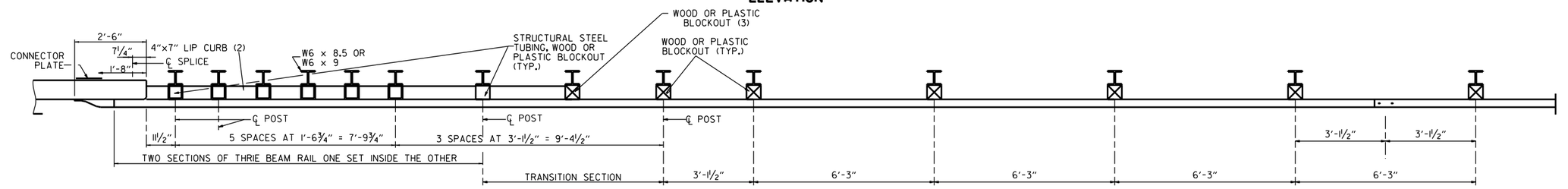
ARKANSAS STATE HIGHWAY COMMISSION

GUARDRAIL DETAILS

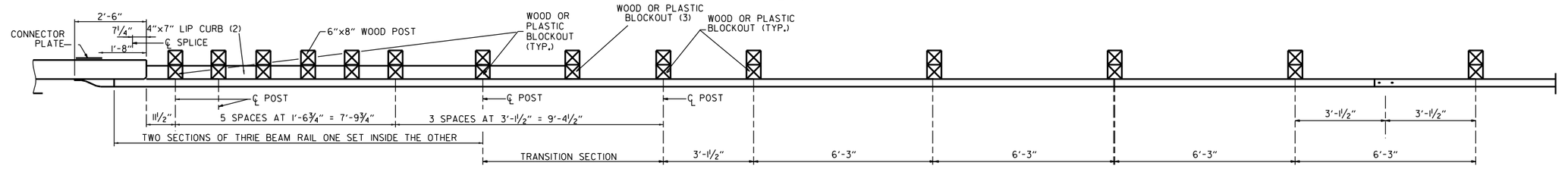
STANDARD DRAWING GR-11



ELEVATION



PLAN



PLAN

(1) VERIFY BOLT SPACING FROM RAIL TRANSITION PRODUCER.
(2) REFER TO APPROACH GUTTER DETAILS.
(3) LENGTH OF BLOCKOUT ON POST 8 TO BE MODIFIED TO FIT RAIL WIDTH.

THRIE BEAM GUARDRAIL CONNECTION AT BRIDGE ENDS

GENERAL NOTES:

THE THRIE BEAM RAIL, SPECIAL END SHOE, AND THE TRANSITION SECTION SHALL BE MADE OF STEEL AND SHALL BE 12 GAGE. ZINC COATING SHALL BE TYPE I.

RAIL POSTS SHALL BE SET PERPENDICULAR TO THE ROADWAY PROFILE GRADE AND VERTICALLY IN CROSS SECTION.

ALL BOLTS SHALL BE SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND NO MORE THAN 3/4" BEYOND IT.

ALL LAP SPLICES, INCLUDING SPECIAL END SHOES, SHALL BE MADE IN THE DIRECTION SHOWN ON STANDARD DRAWINGS GR-8 & GR-13.

REFER TO STD. DRWG. GR-11 FOR POST DETAILS.

USE THRIE BEAM GUARDRAIL COMPONENTS OF SAME MATERIAL FOR ENTIRE JOB.

THRIE BEAM POSTS SHALL BE SAME MATERIAL AS W-BEAM POSTS FOR ENTIRE JOB.

POSTS SHALL NOT BE PLACED AT SPLICE LOCATIONS ALONG W-BEAM RAILS.

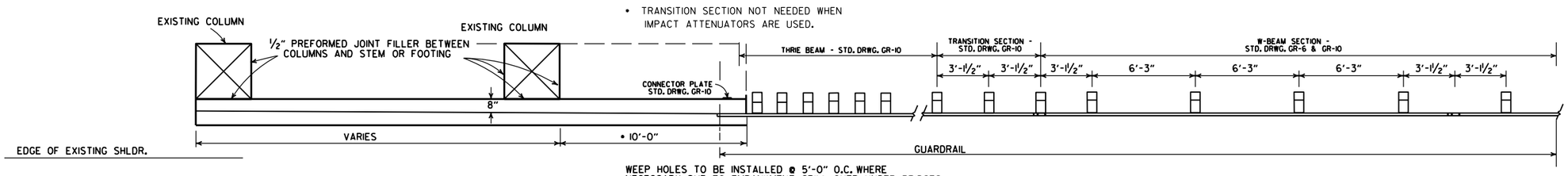
WOOD POSTS & WOOD BLOCKS SHALL BE EITHER DENSE NO. 1 STRUCTURAL OR BETTER 9.7f (1400 f) OR NO. 1 1350 f SOUTHERN PINE.

DATE	REVISION	FILMED
05-14-20	REVISED NOTES	
11-07-19	RENAMED & REVISED REFERENCES	
11-16-17	RE-DRAWN FROM STD. DWG. GR-10 & ISSUED	

ARKANSAS STATE HIGHWAY COMMISSION

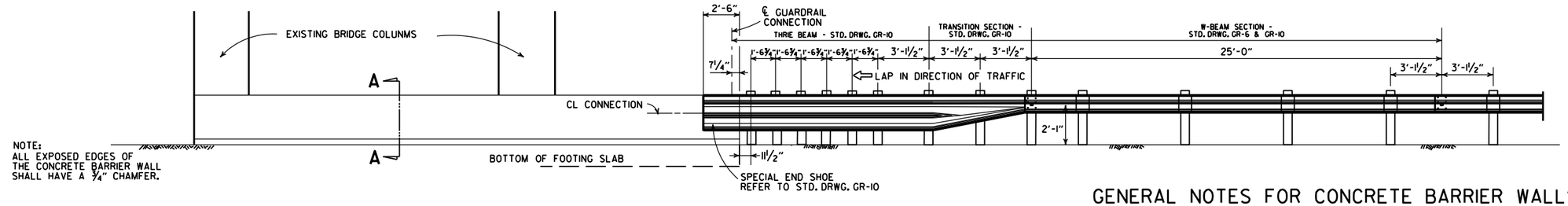
GUARDRAIL DETAILS

STANDARD DRAWING GR-12



AT LEAST ONE 1/2" JOINT SHALL BE CONSTRUCTED IN THE CONCRETE BARRIER WALL. JOINTS SHALL BE EQUALLY SPACED AT A MAXIMUM OF 25'-0" O.C. FILL JOINT WITH PREFORMED JOINT FILLER.

PLAN OF CONCRETE BARRIER WALL



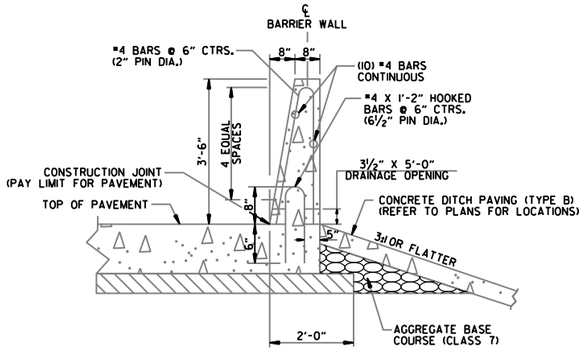
NOTE:
ALL EXPOSED EDGES OF THE CONCRETE BARRIER WALL SHALL HAVE A 3/4" CHAMFER.

ELEVATION OF CONCRETE BARRIER WALL

GENERAL NOTES FOR CONCRETE BARRIER WALLS

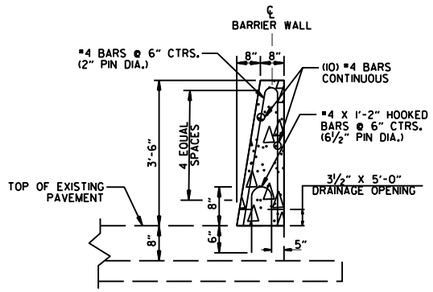
1. ALL BARRIER WALLS SHALL BE CONSTRUCTED IN ACCORDANCE WITH SECTION 631 OF THE STANDARD SPECIFICATIONS, 2014 EDITION.
2. CONTRACTION JOINTS REQUIRED @ 15'-0" MAXIMUM SPACING FOR BARRIER TYPES MEDIAN A, SIDE A. A 30'-0" MAXIMUM SPACING IS REQUIRED FOR TYPES MEDIAN C, SIDE C, D & E.
3. ALL CONTRACTION JOINTS TO BE FORMED IN FRESH CONCRETE ON TOP AND IN SIDES OF BARRIER WALL.
4. DOWEL BARS FOR BARRIER TYPES MEDIAN A, SIDE A WILL NOT BE REQUIRED IF BARRIER AND MINIMUM 4' WIDE BASE ARE CAST AS A COMPLETE UNIT.
5. CONTRACTION JOINTS ARE NOT PERMITTED AT THE DOWEL BAR LOCATIONS.
6. ALL EXPOSED EDGES OF CONCRETE BARRIER WALL SHALL HAVE A 3/4" CHAMFER.
7. THE DESIGN OF BARRIER WALL TYPES SIDE C, D & E IS BASED ON A MINIMUM FOUNDATION BEARING CAPACITY OF ONE TON PER SQUARE FOOT. UNSTABLE FOUNDATION MATERIAL SHALL BE REMOVED AND REPLACED TO PROVIDE A FIRM FOUNDATION AS DIRECTED BY THE ENGINEER.
8. SPACING BETWEEN EXPANSION JOINTS SHALL NOT EXCEED 400 FT FOR BARRIER TYPES MEDIAN A AND SIDE A OR 120 FT FOR BARRIER TYPES SIDE C, D & E. EXPANSION JOINTS SHALL BE FORMED USING 1" PREFORMED JOINT FILLER. CONTINUOUS REINFORCEMENT SHALL BE CUT 2" CLEAR OF EXPANSION JOINTS.
9. CONSTRUCT DRAINAGE OPENINGS AT EVERY 50' O.C. AND AT SAGS IF SHOWN ON THE PLANS. DOWEL BARS SHALL NOT BE PLACED WITHIN 3" OF DRAINAGE OPENINGS.
10. MAINTAIN 3" CLEARANCE ON ALL FOOTING REINFORCEMENT AND 2" CLEARANCE ON ALL OTHER REINFORCEMENT.
11. REFER TO BARRIER MOUNTED LUMINARE SPECIAL DETAILS FOR INFORMATION REGARDING CONDUIT IN CONCRETE BARRIER WALLS. REFER TO ILLUMINATION LAYOUT FOR LOCATIONS OF CONDUIT RUNS.
12. BARRIER REINFORCING BARS ANCHORED INTO EXISTING CONCRETE PAVEMENT SHALL BE INSTALLED AND SECURED ACCORDING TO 804.06 USING AN APPROVED ANCHORING SYSTEM FROM OPL.

NOTE:
THE COST FOR THE MODIFICATION OF THE BARRIERS AND DROP INLETS ARE TO BE SUBSIDIARY TO CONCRETE BARRIER WALLS AND CURBS.



SECTION A-A CONCRETE BARRIER WALL (SIDE TYPE A)

NOTE: SIDE TYPE A IS FOR USE WITH PROPOSED PAVEMENT.



SECTION A-A CONCRETE BARRIER WALL (SIDE TYPE A-1)

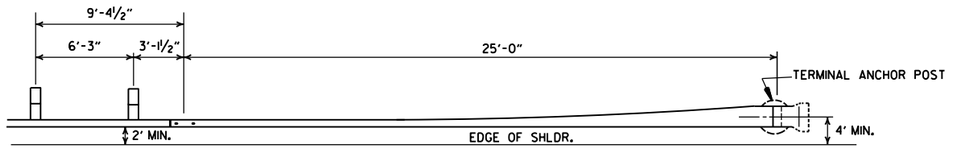
NOTE: SIDE TYPE A-1 IS FOR USE WITH EXISTING PAVEMENT.

DATE	REVISION	FILMED
11-07-19	ADDED GENERAL NOTES.	
11-16-17	REVISED CONCRETE BARRIER WALL, RAISED GUARDRAIL HEIGHT 3" AND REVISED POST SPACING, CHANGED STD. DWG. NUMBER FROM GR-11 TO GR-13	
07-14-10	RAISED HEIGHT OF W-BEAM 1"	
08-22-02	REV. SECTION A-A OF DETAILS OF CONCRETE BARRIER WALL	
06-29-00	MOVED DIMENSION LINE	
05-18-00	ADDED NOTE	
03-30-00	REVISED TO INCLUDE THRIE BEAM	
06-02-94	ADDED TRANSITION SECTION NOTE	
10-01-92	REDRAWN & REVISED	10-1-92
08-15-91	REVISED DRAWING PLAN CONC. BARR.	8-15-91
02-16-89	ADDED SKEWED DETAILS	594-2-16-89
07-14-88	CHANGED TITLE	
10-09-87	REDRAWN & REVISED	

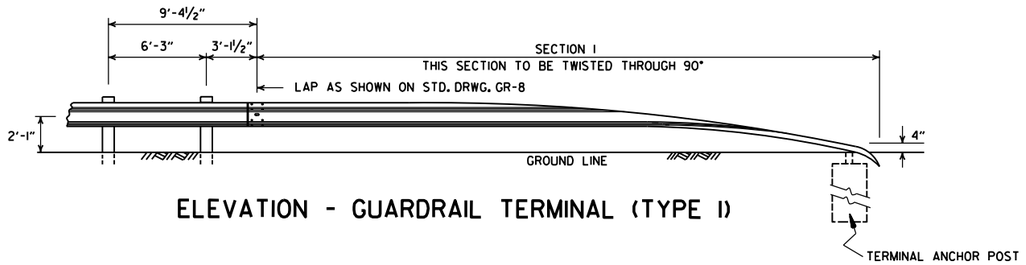
ARKANSAS STATE HIGHWAY COMMISSION

CONCRETE BARRIER WALL (PIER PROTECTION TYPE A)

STANDARD DRAWING GR-13

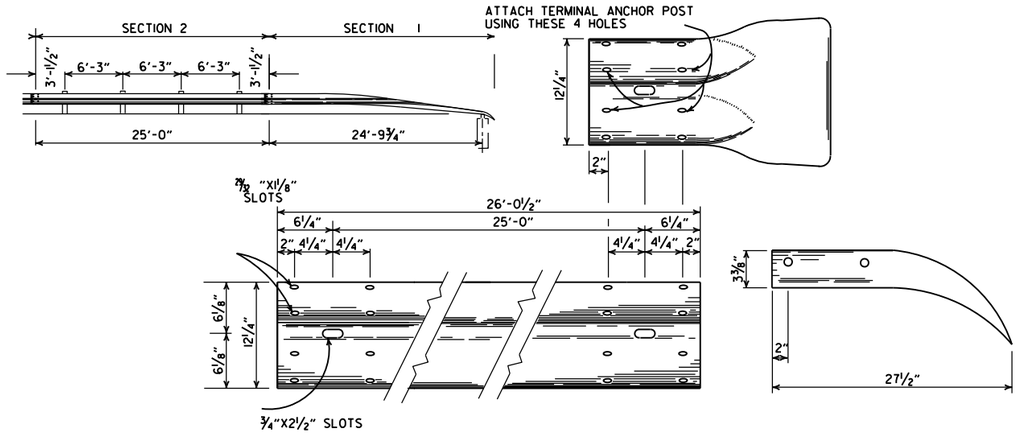


PLAN - GUARDRAIL TERMINAL (TYPE I)



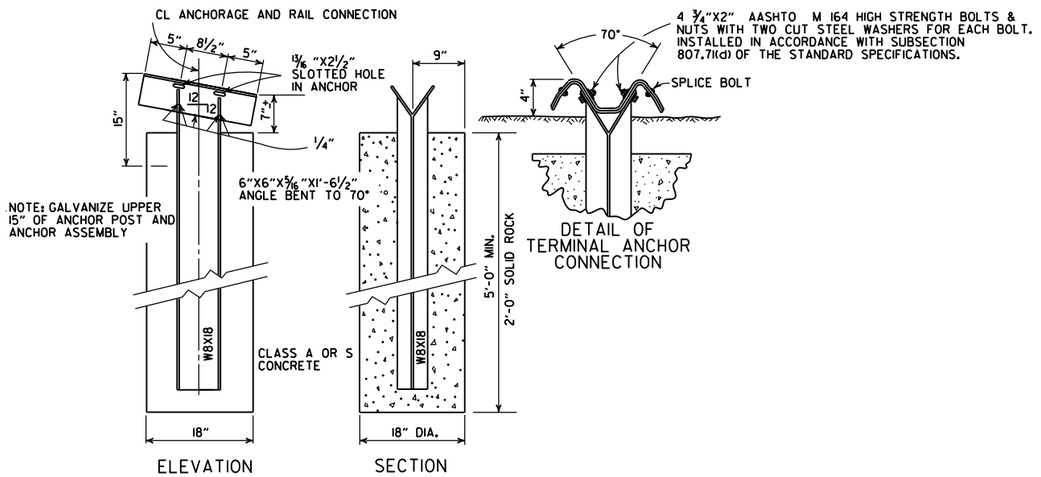
ELEVATION - GUARDRAIL TERMINAL (TYPE I)

NOTE:
SECTIONS I AND 2 OF GUARDRAIL TERMINAL SHALL BE PAID FOR AT THE PRICE BID PER LINEAR FOOT OF THE TYPE OF GUARDRAIL SPECIFIED.



SECTION I

TERMINAL SECTION



NOTE: RAIL MEMBERS MAY BE BOLTED TO ANGLE AT TERMINAL ANCHOR AND THE TWO ASSEMBLIES POSITIONED TO PROPER ALIGNMENT PRIOR TO PLACING CONCRETE AROUND 8 WF 17 POST IF CONTRACTOR SO DESIRES.

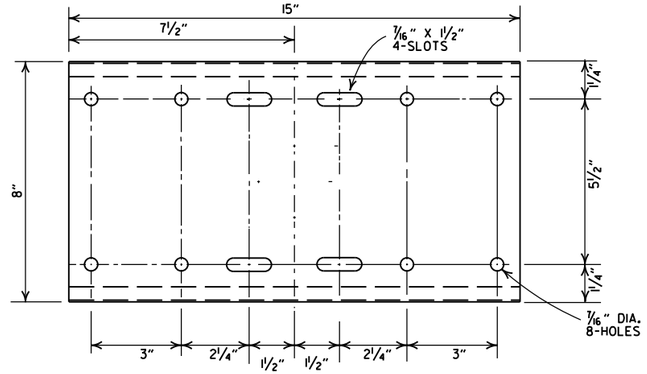
DETAIL OF TERMINAL ANCHOR POST (TYPE I)

DATE	REVISION	FILMED
11-07-19	RENAMED & REVISED REFERENCE.	
11-16-17	REVISED GUARDRAIL HEIGHT AND LOCATION OF POSTS	
07-14-10	RAISED HEIGHT OF GUARDRAIL 1"	
06-26-97	REVISED LAP NOTE	
10-18-96	REVISED ASTM REF. TO AASHTO	
11-03-94	DIMENSION TERMINAL DETAIL	
11-11-92	ADDED NOTE FOR PAYMENT	11-11-92
10-01-92	DRAWN & ISSUED	10-1-92

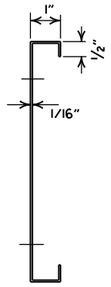
ARKANSAS STATE HIGHWAY COMMISSION

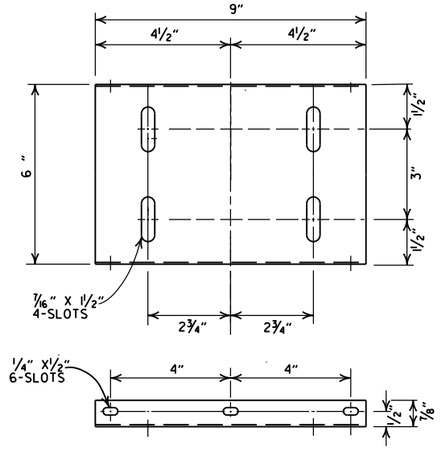
GUARDRAIL DETAILS

STANDARD DRAWING GRT-1

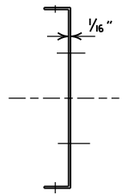


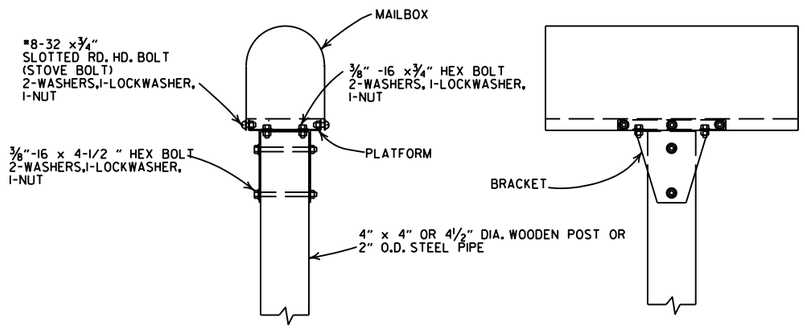
SHELF



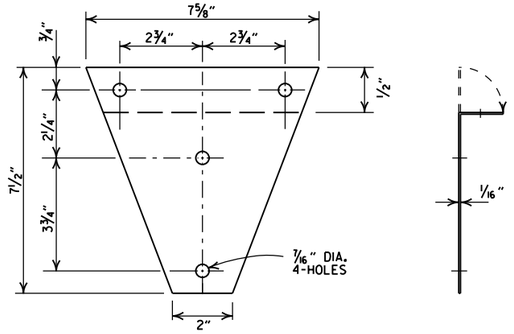


PLATFORM





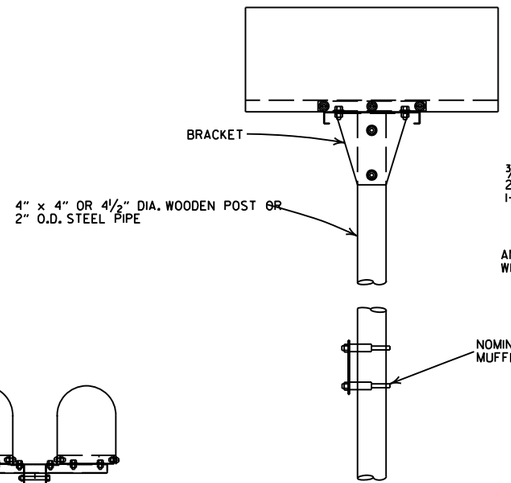
SINGLE INSTALLATION



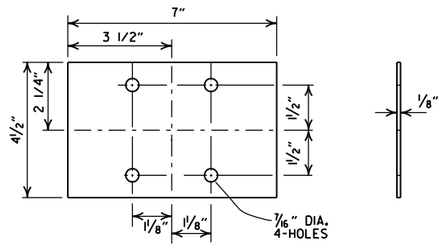
BRACKET

GENERAL NOTES

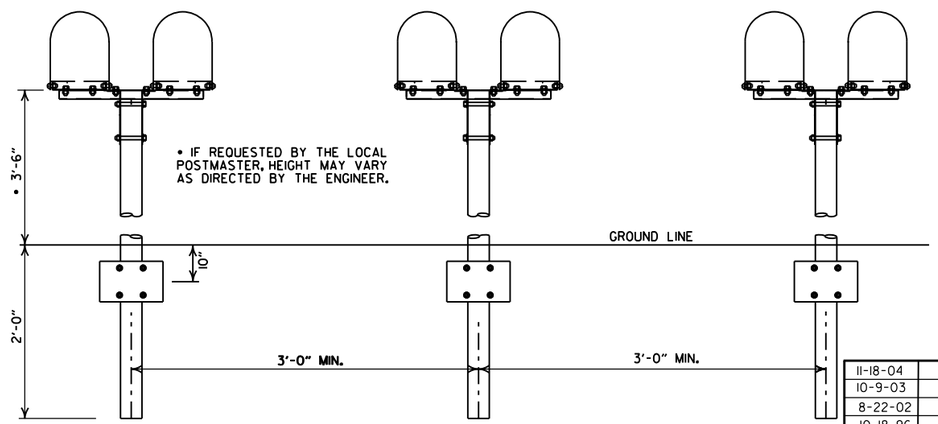
1. MAILBOX POSTS MAY BE WOOD OR METAL. WOOD POSTS SHALL BE PRESSURE TREATED FOR GROUND CONTACT IN ACCORDANCE WITH SECTION 637.02 OF THE STANDARD SPECIFICATIONS.
2. ANTI-TWIST PLATES SHALL BE USED ONLY ON METAL POSTS.
3. MAILBOX SHELF, BRACKET & PLATFORM SHALL BE GALVANIZED OR PAINTED STEEL, HOWEVER TREATED WOOD MAY BE USED WITH WOODEN POSTS. THE WOODEN SHELF, BRACKET & PLATFORM SHALL BE A MINIMUM OF ¾" THICK AND SHALL BE ASSEMBLED WITH BOLTS OF THE APPROPRIATE LENGTH WITH SIX 8 X¾" FLATHEAD WOOD SCREWS USED TO ATTACH THE MAILBOX TO THE PLATFORM.
4. THE MAILBOX SHELF AND PLATFORM THAT IS SHOWN IS FOR STANDARD SIZE MAILBOXES. THE SHELF AND PLATFORM SIZE SHALL BE MODIFIED TO FIT MAILBOXES OF A DIFFERENT SIZE.
5. METAL PIPE FOR MAILBOX SUPPORT SHALL BE 2" OUTSIDE DIAMETER STEEL WITH A WALL THICKNESS OF 0.145" AND A WEIGHT OF 2.72 LBS PER FT. OUTSIDE DIAMETER AND WEIGHT SHALL HAVE A TOLERANCE OF +/- 5% ACCORDING TO AASHTO M 181.
6. MAILBOX SUPPORT SYSTEM DIFFERING FROM THOSE SHOWN MAY BE USED, PROVIDED THEY ARE ON THE ARDOT QUALIFIED PRODUCTS LIST FOR MAILBOX SUPPORTS.



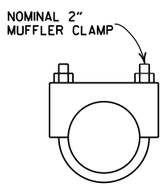
DOUBLE INSTALLATION



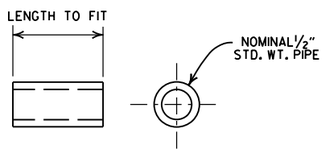
ANTI-TWIST PLATE



SPACING FOR MULTIPLE POST INSTALLATION



CLAMP



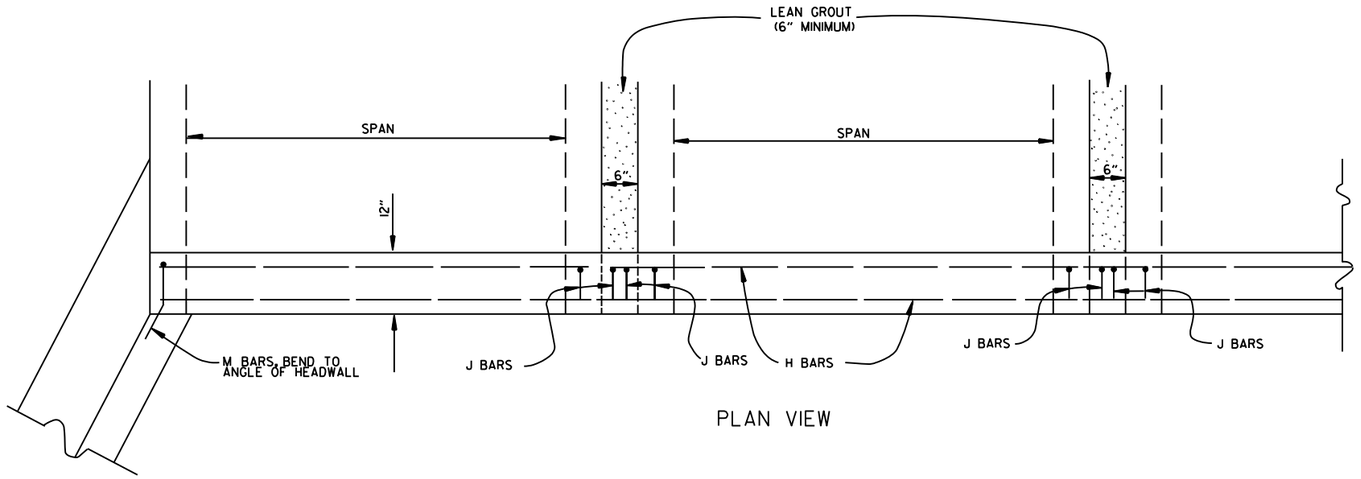
SPACER

DATE	FILMED	REVISION
11-18-04		REVISED NOTES
10-9-03		REVISED NOTE 6
8-22-02		REVISED NOTE 6
10-18-96		CORRECTED AASHTO
10-1-92		CORRECTED SPELLING
9-26-91		NEW PHONE NUMBER
8-15-91		ADDED NOTE
11-30-89		ADJUSTED HEIGHT & ADDED NOTE
2-16-89		DELETED SLOTS FROM SHELF & PLTF
11-17-88	10-1-92	ADJUSTED DIMENSIONS OF STEEL POSTS
7-15-88	20-7-15-88	ISSUED

ARKANSAS STATE HIGHWAY COMMISSION

MAILBOX DETAILS

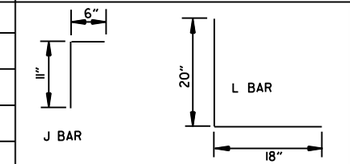
STANDARD DRAWING MB-1



PLAN VIEW

BAR LIST

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



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

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 ¾" 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.

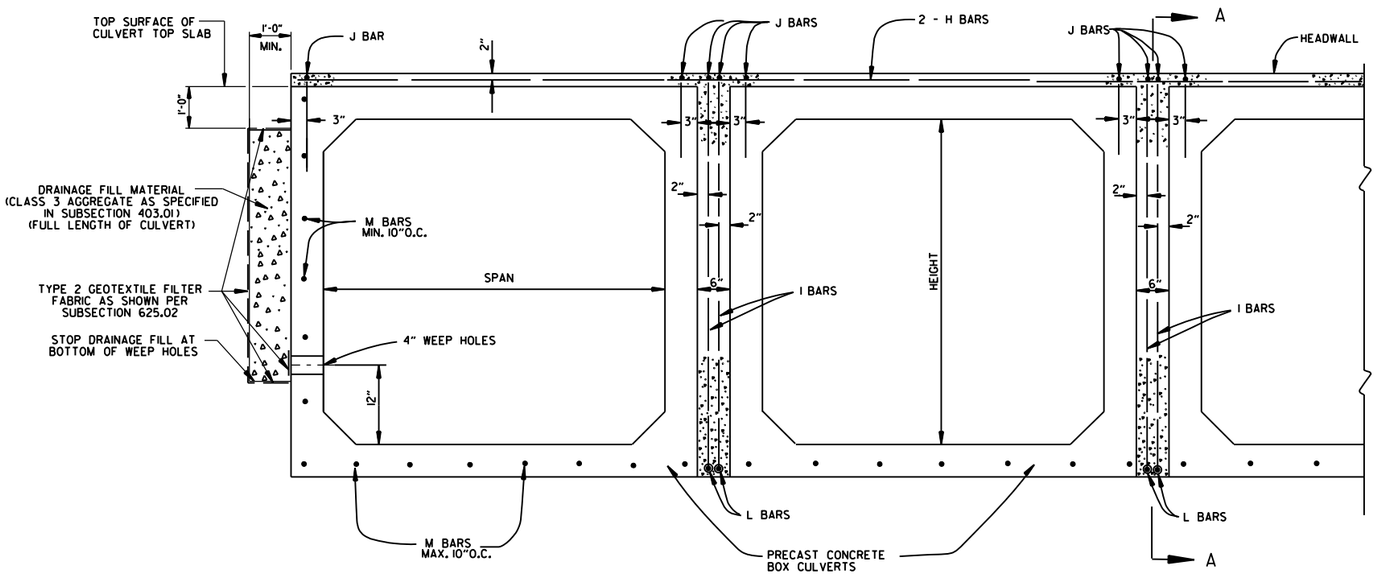
THE MEMBRANE WATERPROOFING WILL BE REQUIRED ON THE TOP EXTERNAL JOINT AND SHALL EXTEND 1 FOOT DOWN THE SIDES OF THE CULVERT.

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.

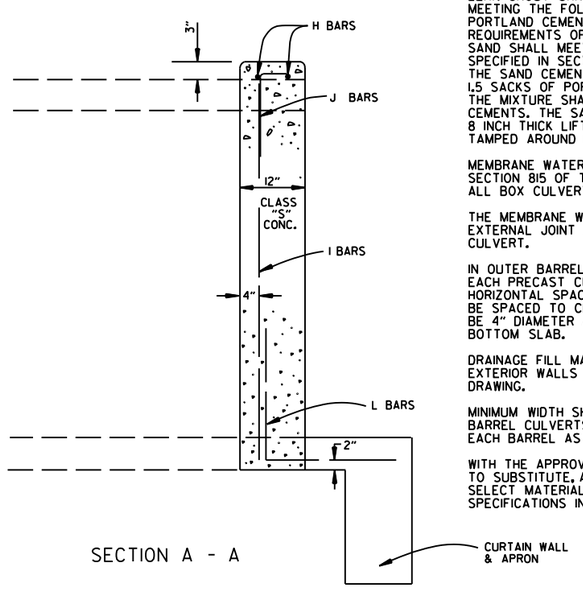
DRAINAGE FILL MATERIAL WITH GEOTEXTILE FABRIC IS REQUIRED AT THE EXTERIOR WALLS OF THE ASSEMBLED CULVERT, SEE DETAILS ON THIS DRAWING.

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.



END VIEW



SECTION A - A

DATE	REVISION	DATE FILMED
1-28-15	REVISED GEOTEXTILE FABRIC PLACEMENT	
12-15-11	ADDED NOTE & DTLS FOR WEEP HOLE AND DRAINAGE FILL	
10-15-09	ADDED GENERAL NOTE	
11-10-05	REVISED SPACING OF "M" BARS	
4-10-03	REVISED GENERAL NOTES	
10-18-96	CORRECTED AASHTO REF.	
10-1-92	ADDED NOTE FOR MEMBRANE WATERPROOFING	
8-15-91	ADDED NOTE FOR LEAN GROUT	
11- 8-90	REVISED FOR 1991 SPECS	
11-30-89	ISSUED; JABE	

ARKANSAS STATE HIGHWAY COMMISSION

PRECAST CONCRETE BOX CULVERTS

STANDARD DRAWING PBC-1

REINFORCED CONCRETE ARCH PIPE DIMENSIONS

EQUIV. DIA.	SPAN		RISE	
	AASHTO M 206	ARDOT NOMINAL	AASHTO M 206	ARDOT NOMINAL
INCHES	INCHES			
15	18	18	11	11
18	22	22	13½	14
21	26	26	15½	16
24	28½	29	18	18
30	36¼	36	22½	23
36	43⅜	44	26⅝	27
42	51⅛	51	31⅜	31
48	58½	59	36	36
54	65	65	40	40
60	73	73	45	45
72	88	88	54	54
84	102	102	62	62
90	115	115	72	72
96	122	122	77½	77
108	138	138	87⅛	87
120	154	154	96⅞	97
132	168¾	169	106½	107

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

REINFORCED CONCRETE HORIZONTAL ELLIPTICAL PIPE DIMENSIONS

EQUIV. DIA.	AASHTO M 207	
	SPAN	RISE
INCHES	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.

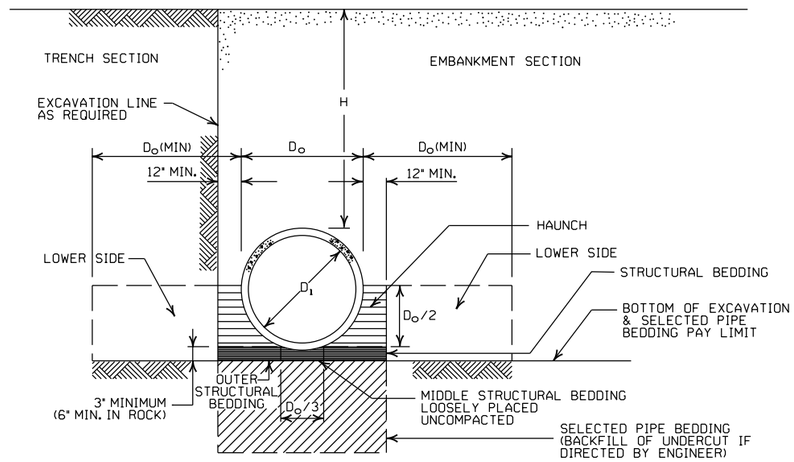
- LEGEND -

D_1 = NORMAL INSIDE DIAMETER OF PIPE
D_O = 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 DEPARTMENT OF TRANSPORTATION 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

	CLASS OF PIPE			
	CLASS III		CLASS IV	CLASS V
INSTALLATION TYPE	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.

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.

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.

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 MINUMUM 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
2⅔ INCH BY ½ 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

CORRUGATED ALUMINUM PIPE (ROUND)

PIPE DIAMETER (INCHES)	① MINUMUM 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 ⅔ INCH BY ½ INCH CORRUGATION RIVETED OR HELICAL LOCK-SEAM				
12	1	45	45			
18	2	30	30	52		
24	2	22	22	39	41	
30	2		18	31	32	34
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

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.

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

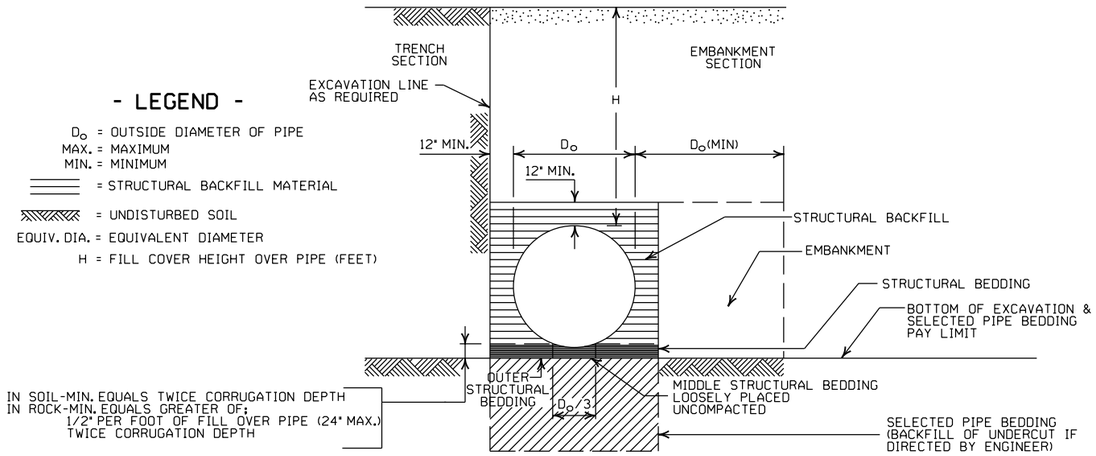
EQUIV. DIA. (INCHES)	PIPE DIMENSION SPAN X RISE (INCHES)	MINUMUM CORNER RADIUS (INCHES)	STEEL				ALUMINUM			
			MIN. THICKNESS REQUIRED INCHES	① MIN. HEIGHT OF FILL, "H" (FT.)	MAX. HEIGHT OF FILL, "H" (FT.)		MIN. THICKNESS REQUIRED INCHES	① MIN. HEIGHT OF FILL, "H" (FT.)	MAX. HEIGHT OF FILL, "H" (FT.)	
				INSTALLATION	INSTALLATION			INSTALLATION	INSTALLATION	
				TYPE 1	TYPE 1			TYPE 1	TYPE 1	
			2 ⅔ INCH BY ½ INCH CORRUGATION RIVETED, WELDED, OR HELICAL LOCK-SEAM				2 ⅔ INCH BY ½ INCH CORRUGATION RIVETED 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	3½	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		0.164	3	15	
66	77x52	8	0.168	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 ½" 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.

- LEGEND -

D_o = OUTSIDE DIAMETER OF PIPE
MAX. = MAXIMUM
MIN. = MINIMUM
= STRUCTURAL BACKFILL MATERIAL
= UNDISTURBED SOIL
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. INSTALALTION TYPE 1 SHALL BE USED FOR CORRUGATED STEEL OR ALUMINUM PIPE ARCHES WITH 2⅔" X ½" 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 DEPARTMENT OF TRANSPORTATION 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."

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 1INCH. 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.

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 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"

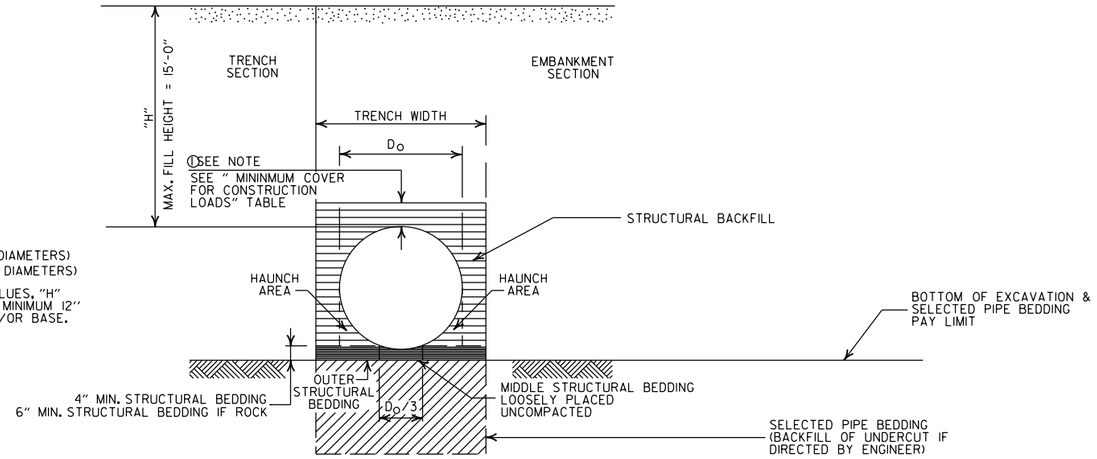
①NOTE:
18" MIN. (18" - 30" DIAMETERS)
24" MIN. (36" - 48" DIAMETERS)

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

MINIMUM COVER FOR CONSTRUCTION LOADS

PIPE DIAMETER	② 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"

②MINIMUM COVER SHALL BE MEASURED FROM TOP OF PIPE TO TOP OF THE MAINTAINED CONSTRUCTION ROADWAY SURFACE. THE SURFACE SHALL BE MAINTAINED.



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.

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 SPECIFICIATIONS 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.

- LEGEND -

H = FILL HEIGHT (FT.)
D = OUTSIDE DIAMETER OF PIPE
MAX. = MAXIMUM
MIN. = MINIMUM

= STRUCTURAL BACKFILL MATERIAL

= UNDISTURBED SOIL

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 1INCH. 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

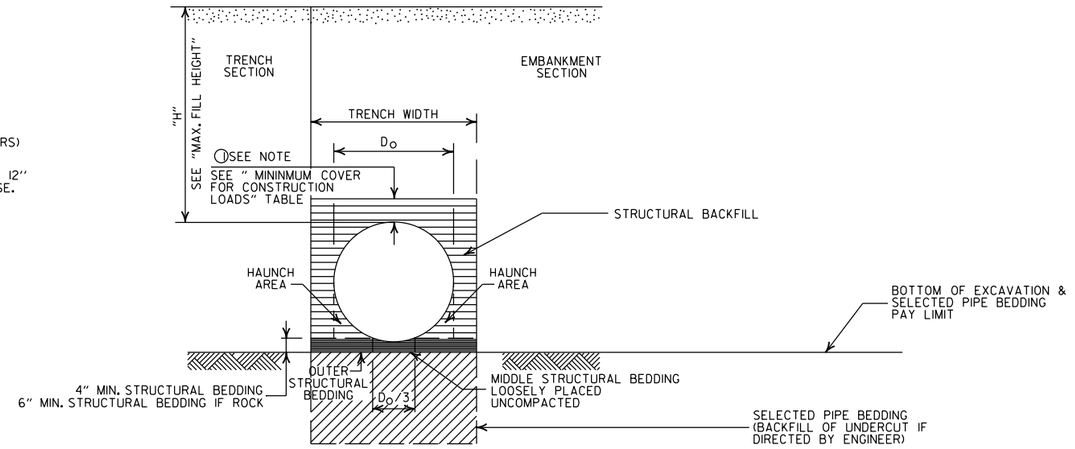
PIPE DIAMETER	"H"
18"	45'-0"
24"	45'-0"
30"	40'-0"
36"	40'-0"

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

MINIMUM COVER FOR CONSTRUCTION LOADS

PIPE DIAMETER	② 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)
18" THRU 36"	2'-0"	2'-6"	3'-0"	3'-0"

②MINIMUM COVER SHALL BE MEASURED FROM TOP OF PIPE TO TOP OF THE MAINTAINED CONSTRUCTION ROADWAY SURFACE. THE SURFACE SHALL BE MAINTAINED.



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.

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 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. 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.

- LEGEND -

H = FILL HEIGHT (FT.)
D_O = OUTSIDE DIAMETER OF PIPE
MAX. = MAXIMUM
MIN. = MINIMUM

= STRUCTURAL BACKFILL MATERIAL
= UNDISTURBED SOIL

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	

ARKANSAS STATE HIGHWAY COMMISSION

PLASTIC PIPE CULVERT (PVC F949)

STANDARD DRAWING PCP-2

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

*SM3 WILL NOT BE ALLOWED.

** STRUCTURAL BEDDING MATERIAL SHALL HAVE A MAXIMUM PARTICLE SIZE OF 1INCH. 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 POLYPROPYLENE PIPE.

MULTIPLE INSTALLATION OF POLYPROPYLENE 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"
60"	5'-0"

MINIMUM TRENCH WIDTH BASED ON FILL HEIGHT "H"

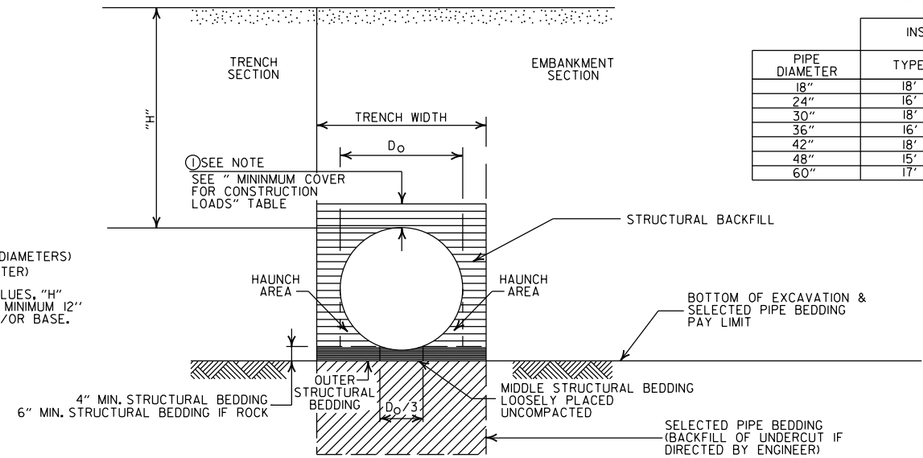
PIPE DIAMETER	TRENCH WIDTH (FEET)	
	"H" < 10'-0"	"H" >OR= 10'-0"
18"	4'-6"	4'-6"
24"	5'-0"	6'-0"
30"	5'-6"	7'-6"
36"	6'-0"	9'-0"
42"	7'-0"	10'-6"
48"	8'-0"	12'-0"
60"	10'-0"	15'-0"

①NOTE:
12" MIN. (18" - 42" DIAMETERS)
24" MIN. (60" DIAMETER)

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

MAXIMUM HEIGHT OF FILL "H"

PIPE DIAMETER	INSTALLATION TYPE	
	TYPE 1	TYPE 2
18"	18'	14'
24"	16'	12'
30"	18'	14'
36"	16'	12'
42"	18'	13'
48"	15'	11'
60"	17'	12'



MINIMUM COVER FOR CONSTRUCTION LOADS

PIPE DIAMETER	② MIN. COVER (FEET) FOR INDICATED CONSTRUCTION LOADS			
	18.0-50.0 (KIPS)	50.0-75.0 (KIPS)	75.0-110.0 (KIPS)	110.0-150.0 (KIPS)
36" OR LESS	2'-0"	2'-6"	3'-0"	3'-0"
42" OR GREATER	3'-0"	3'-0"	3'-6"	4'-0"

②MINIMUM COVER SHALL BE MEASURED FROM TOP OF PIPE TO TOP OF THE MAINTAINED CONSTRUCTION ROADWAY SURFACE. THE SURFACE SHALL BE MAINTAINED.

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.

GENERAL NOTES

1. PIPE SHALL CONFORM TO AASHTO M330, TYPE S, INSTALLATION SHALL CONFORM TO JOB SPECIAL PROVISION "PLASTIC PIPE" AND SECTION 606 OF THE STANDARD SPECIFICIATIONS FOR HIGHWAY CONSTRUCTION (CURRENT EDITION).
2. PLASTIC PIPE CULVERT DESIGN SHALL CONFORM TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SIXTH EDITION (2012) WITH 2013 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. POLYPROPYLENE PIPES OF DIAMETERS OTHER THAN SHOWN WILL NOT BE ALLOWED.
9. JOINTS FOR POLYPROPYLENE PIPE SHALL MEET THE REQUIREMENTS FOR SOIL TIGHTNESS AS SPECIFIED IN SECTION 26.4.2.4 AND 30.4.2 OF THE AASHTO LRFD BRIDGE CONSTRUCTION SPECIFICATIONS 3RD EDITION (2010) WITH 2012 INTERIMS. JOINTS SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS.

- LEGEND -

H = FILL HEIGHT (FT.)
D_O = OUTSIDE DIAMETER OF PIPE
MAX. = MAXIMUM
MIN. = MINIMUM

= STRUCTURAL BACKFILL MATERIAL

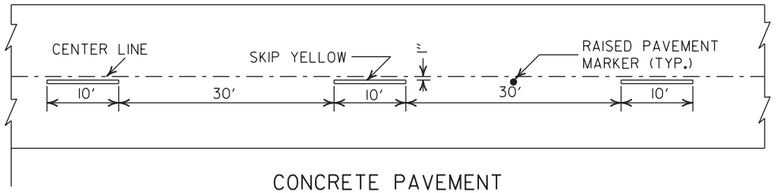
= UNDISTURBED SOIL

DATE	REVISION	DATE FILMED
02-27-20	REVISED	
11-07-19	ISSUED	

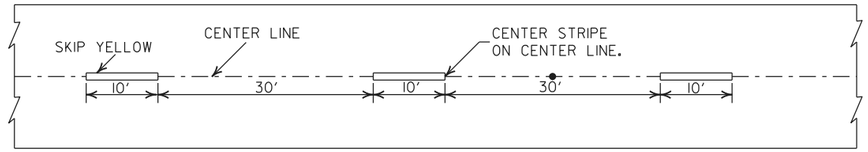
ARKANSAS STATE HIGHWAY COMMISSION

PLASTIC PIPE CULVERT (POLYPROPYLENE)

STANDARD DRAWING PCP-3



CONCRETE PAVEMENT

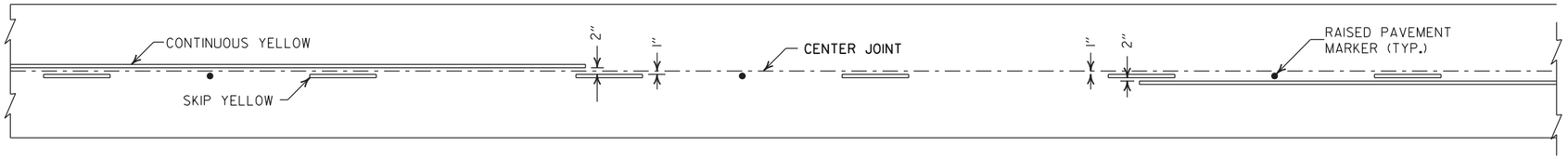


ASPHALT PAVEMENT

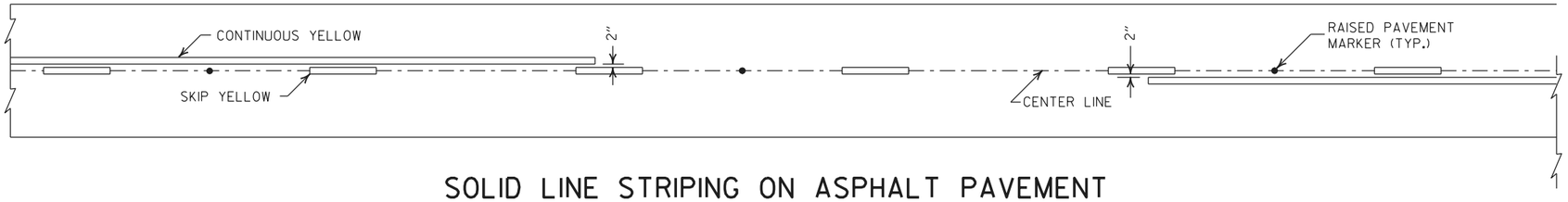
BROKEN LINE STRIPING

NOTES:

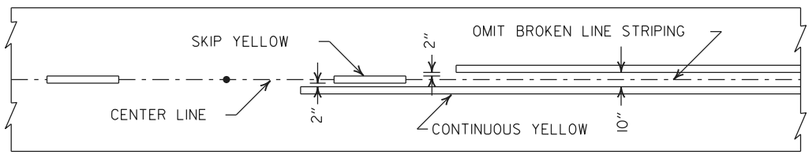
1. REFER TO THE STRIPING DETAILS FOR PAVEMENT MARKING LINE WIDTHS.
2. THIS DRAWING SHALL BE USED IN CONJUNCTION WITH THE LATEST REVISED ADDITION OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES."
3. RAISED PAVEMENT MARKERS SHALL BE PLACED ON AN 80 FEET SPACING UNLESS OTHERWISE SHOWN IN THE PLANS.



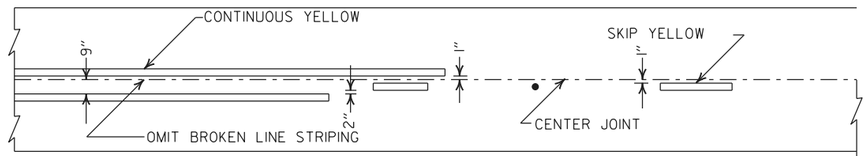
SOLID LINE STRIPING ON CONCRETE PAVEMENT



SOLID LINE STRIPING ON ASPHALT PAVEMENT

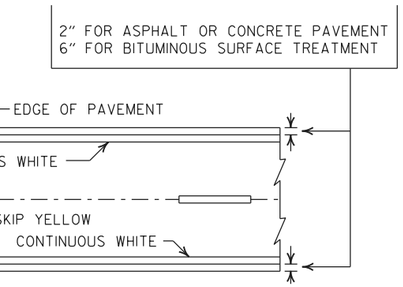


ASPHALT PAVEMENT

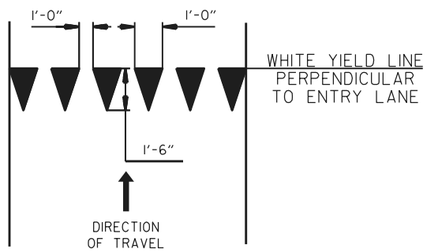


CONCRETE PAVEMENT

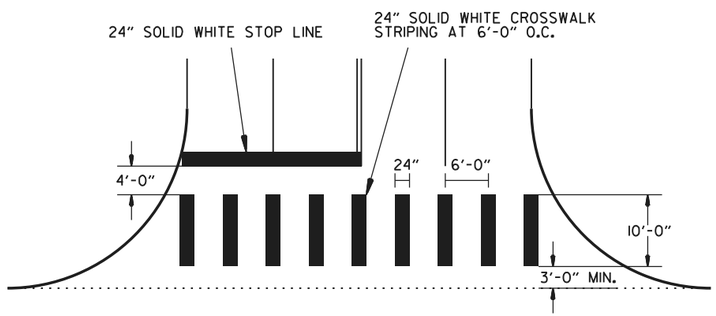
STRIPING AT ADJACENT NO PASSING LANES



PAVEMENT EDGE LINE MARKING



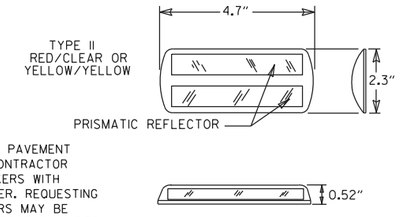
YIELD LINE DETAIL



CROSSWALK AND STOP LINE DETAILS

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

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 ARDOT QUALIFIED PRODUCTS LIST.



DETAIL OF STANDARD RAISED PAVEMENT MARKERS

DATE	REV	DESCRIPTION
04-09-26		REV. CROSSWALK & STOP LINE DETAILS
02-27-20		REV. STOP LINE DETAILS
06-01-17		ADDED YIELD LINE DETAIL
05-12-16		REVISED LINE WIDTHS, SPACING, & NOTES
09-12-13		REVISED DETAIL OF STANDARD RAISED PAVEMENT MARKERS

ARKANSAS STATE HIGHWAY COMMISSION

PAVEMENT MARKING DETAILS

DATE EFFECTIVE 04-09-2026 | STANDARD DRAWING | PM-1

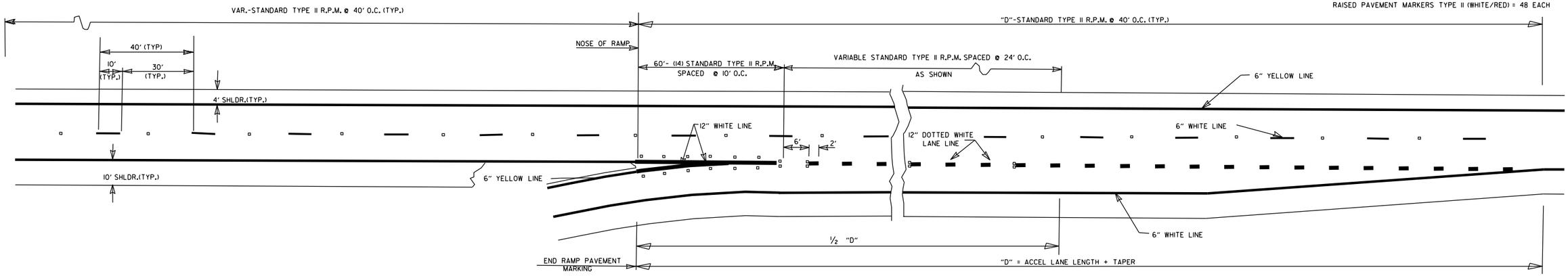
PAVEMENT MARKING QUANTITIES
(BASED ON 700' ACCEL. LANE + 300' TAPER)

ENTRANCE RAMP

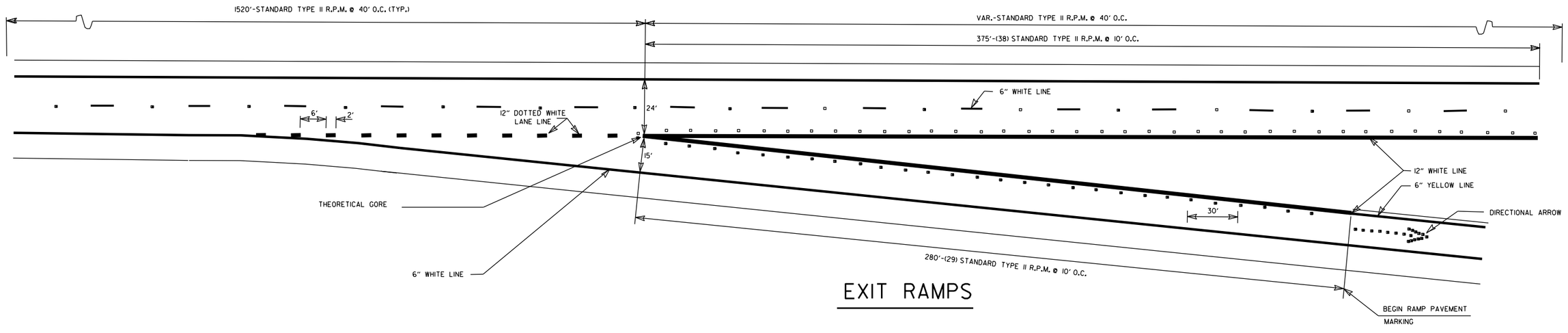
12" WHITE = 370 LIN. FT.
RAISED PAVEMENT MARKERS TYPE II (WHITE/RED) = 38 EACH

EXIT RAMP

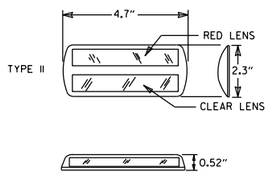
6" WHITE = 280 LIN. FT.
12" WHITE = 815 LIN. FT.
RAISED PAVEMENT MARKERS TYPE II (WHITE/RED) = 38 EACH
RAISED PAVEMENT MARKERS TYPE II (WHITE/RED) = 48 EACH



ENTRANCE RAMPS

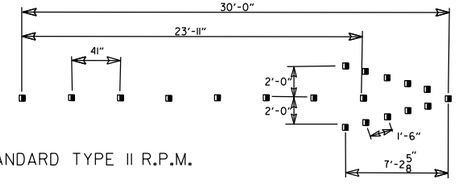


EXIT RAMPS



DETAIL OF
STANDARD
RAISED PAVEMENT MARKERS

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



(19) STANDARD TYPE II R.P.M.

DIRECTIONAL ARROWS

GENERAL NOTES:

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

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

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

DATE	REVISION	FILMED
05-14-20	REMOVED CROSSHATCH MARKINGS ON EXIT RAMPS	
11-07-19	REVISED DOTTED PAV'T MARKINGS; ADDED CROSSHATCH MARKINGS ON EXIT RAMPS	
12-8-16	REVISED RAISED PAV'T MARKERS FOR 80' SPACING; REVISED WIDTH OF STRIPING	
9-12-13	REVISED DETAIL OF STANDARD RAISED PAVEMENT MARKERS	
7-26-12	REVISED RPM NOTATION	
12-15-11	REVISED RPMs ACCORDING TO LATEST POLICY	
11-17-10	REMOVED PLOWABLE PAVEMENT MARKERS	
6-3-10	REVISED PER 2009 MUTCD	
11-18-04	REVISED NOTES	
8-22-02	ADDED & REVISED NOTES; REV. ENTRANCE & EXIT RAMPS	
5-18-00	REMOVED HASHMARKS	
7-02-98	CHANGED TYPES TO ROMAN NUMERALS	
4-26-96	ADDED DIMENSIONS & QUANTITIES; REVISED LANE WIDTH ON EXIT RAMP	
2-2-95	PLACED IN USE	2-2-95

ARKANSAS STATE HIGHWAY COMMISSION

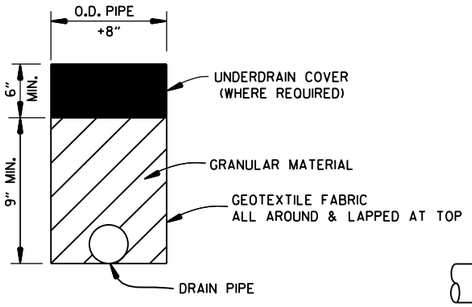
PAVEMENT MARKING DETAILS ON ACCESS CONTROLLED ROADWAYS

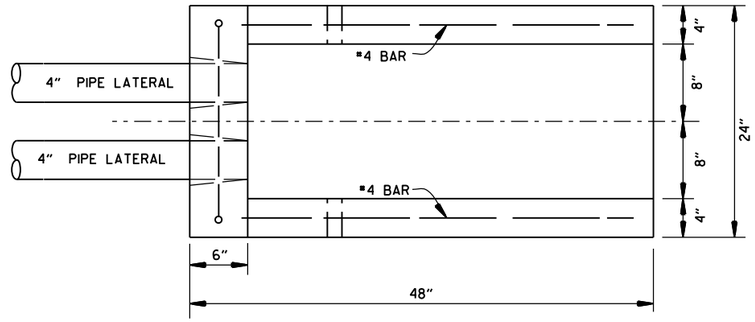
STANDARD DRAWING PM-2

NOTE:

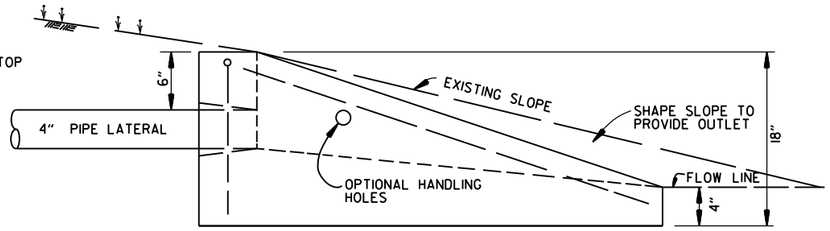
1. UNLESS OTHERWISE SPECIFIED ON THE PLANS, THE UNDERDRAIN COVER SHALL BE THOROUGHLY COMPACTED EARTH AND SHALL BE SUBSIDIARY TO PIPE UNDERDRAIN.

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

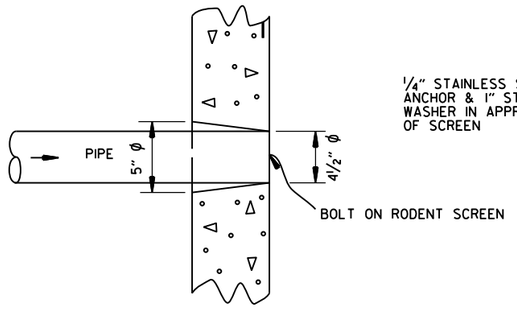




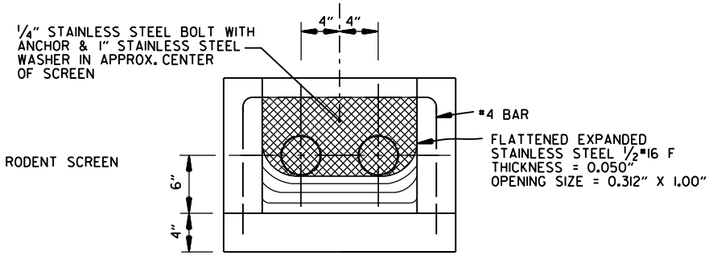
PLAN VIEW



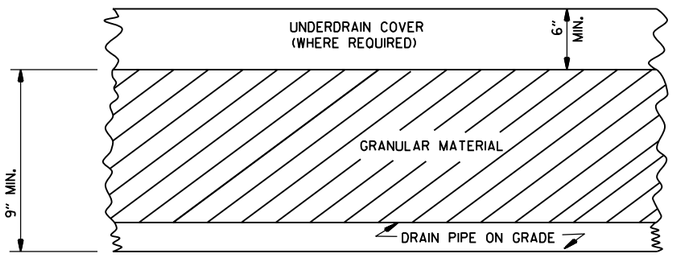
SIDE VIEW



DETAIL OF HOLE
FOR 4" PIPE



FRONT VIEW
(DETAIL OF RODENT SCREEN)



DETAILS OF PIPE UNDERDRAIN

NOTES FOR PIPE UNDERDRAINS

1. GEOTEXTILE FABRIC SHALL MEET THE REQUIREMENTS OF SECTION 625 FOR TYPE 1. 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 611 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 611 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."

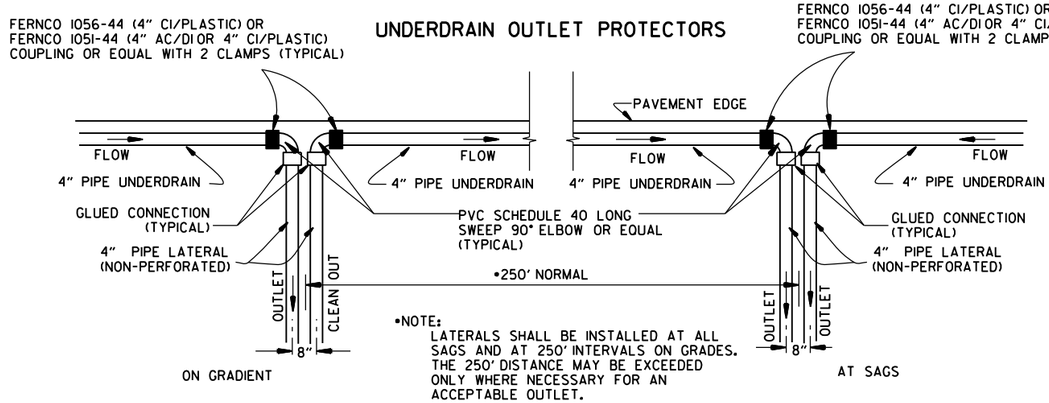
4. THE LOCATION OF ALL LATERALS SHALL BE MARKED WITH 4" X 12" PERMANENT PAVEMENT MARKING TAPE (TYPE III WHITE) AT THE OUTSIDE EDGE OF THE SHOULDER, PLACED TRANSVERSE TO TRAFFIC. PAYMENT FOR THIS WORK SHALL BE INCLUDED IN THE PRICE BID FOR THE VARIOUS CONTRACT ITEMS.

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.

UNDERDRAIN OUTLET PROTECTORS



DETAIL OF PIPE UNDERDRAIN LATERALS
WHEN PLACED ALONG PAVEMENT EDGE

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

DATE	REVISION	DATE FILMED
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; 5½" TO 5"	
11-22-95	REVISED LATERALS	
7-20-95	REVISED LATERALS & ADDED NOTE	
11- 3-94	REVISED FOR DUAL LATERALS	11- 3-94
10- 1-92	SUBSTITUTED GEOTEXTILE	10- 1-92
8-15-91	ADDED POLYEDTHYLENE PIPE	8-15-91
11- 8-90	DELETED ALTERNATE NOTE	11- 8-90
1-25-90	ADDED 4" SNAP ADAPTER	1-25-90
11-30-89	DEL. (SUBGRADE); ADDED (WHERE REQUIRED)	11-30-89
7-15-88	ISSUED P.L.M.	647-7-15-88

ARKANSAS STATE HIGHWAY COMMISSION

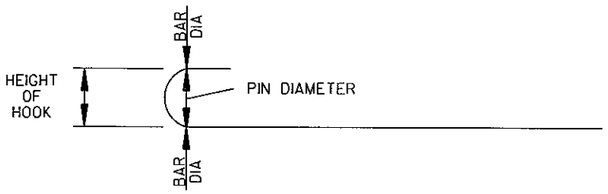
DETAILS OF PIPE UNDERDRAIN

STANDARD DRAWING PU-1

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

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

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



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

OVERALL HEIGHT OF HOOKED BAR DIAGRAM

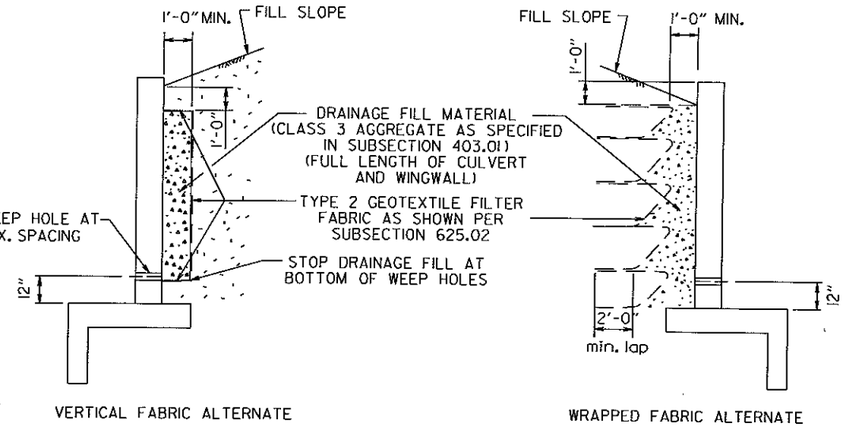
THE HOOKED BARS SHALL BE PLACED IN THE BOTTOM OF THE TOP SLAB AND THE TOP OF THE BOTTOM SLAB. THE STRAIGHT BARS SHALL BE PLACED IN THE TOP OF THE TOP SLAB AND THE BOTTOM OF THE BOTTOM SLAB. SEE TABLE BELOW FOR LENGTHS OF REPLACEMENT HOOKED AND STRAIGHT BARS.

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

REPLACEMENT BAR LENGTHS TABLE

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

L = "OW" - 3 INCHES



WINGWALL & 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 31 OR 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.

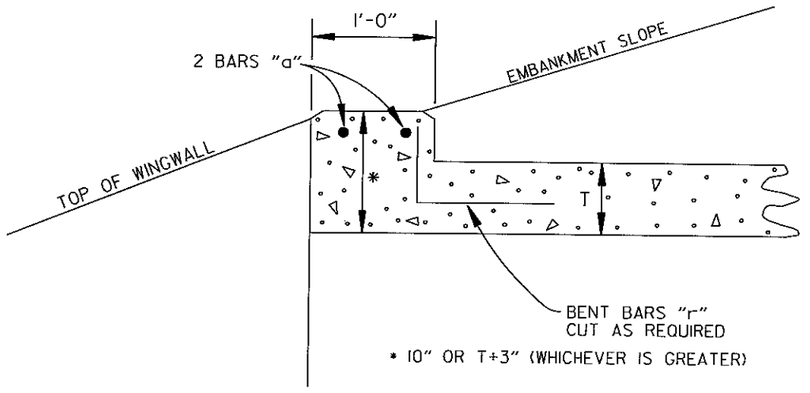
MEMBRANE WATERPROOFING SHALL BE APPLIED TO ALL CONSTRUCTION JOINTS IN THE TOP SLAB AND THE SIDEWALLS OF R.C. BOX CULVERTS AS DIRECTED BY THE ENGINEER. NO PAYMENT SHALL BE MADE FOR THIS ITEM, BUT PAYMENT WILL BE CONSIDERED TO BE INCLUDED IN THE VARIOUS ITEMS BID FOR THE R.C. BOX CULVERT.

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 ½ 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.

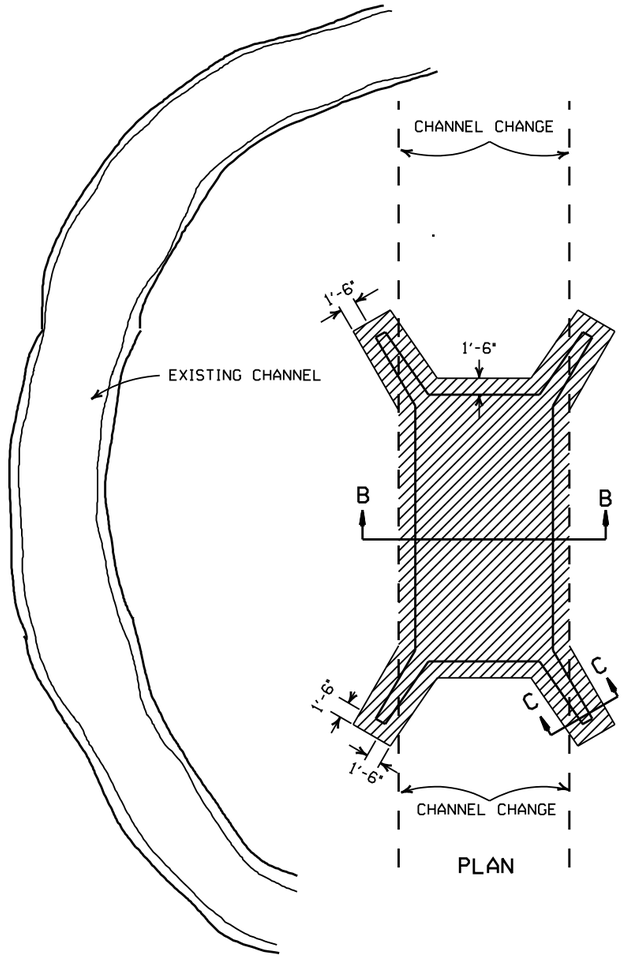
R.C. BOX CULVERT HEADWALL MODIFICATIONS

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	

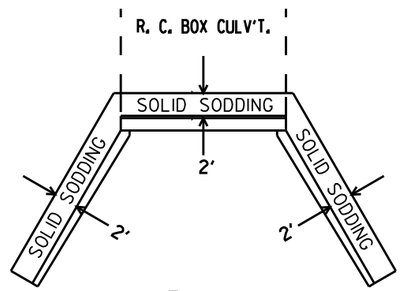
ARKANSAS STATE HIGHWAY COMMISSION

REINFORCED CONCRETE BOX CULVERT DETAILS

STANDARD DRAWING RCB-1



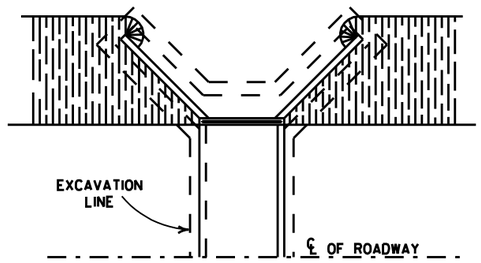
PLAN



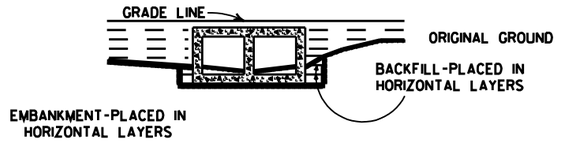
PLAN

PARTIAL SECTION SHOWING SOLID SODDING AT HEADWALLS AND WING WALLS

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

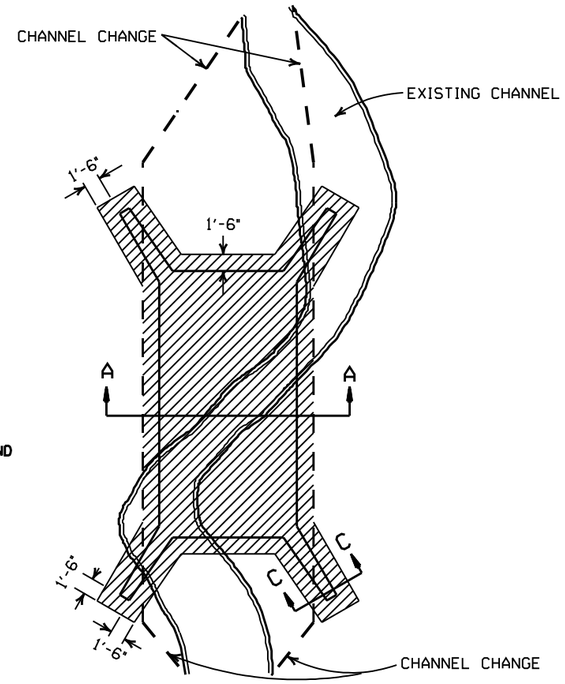


PLAN

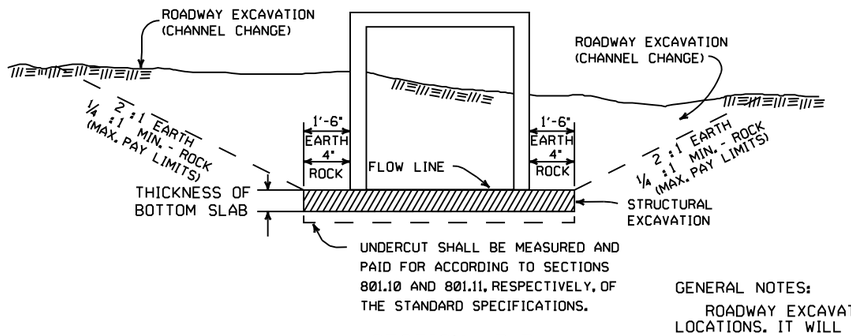


LONGITUDINAL SECTION

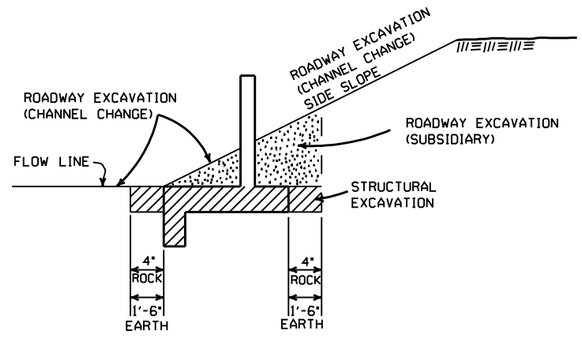
BACKFILL DETAILS FOR BOX CULVERT



PLAN

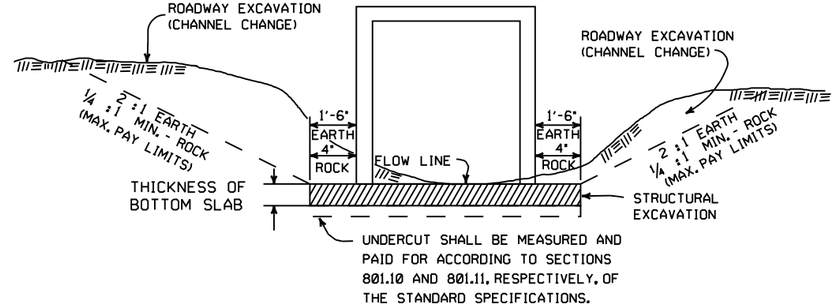


SECTION B-B



SECTION C-C

DETAILS FOR NEW CHANNELS



SECTION A-A

DETAILS THROUGH EXISTING CHANNELS

GENERAL NOTES:

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

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

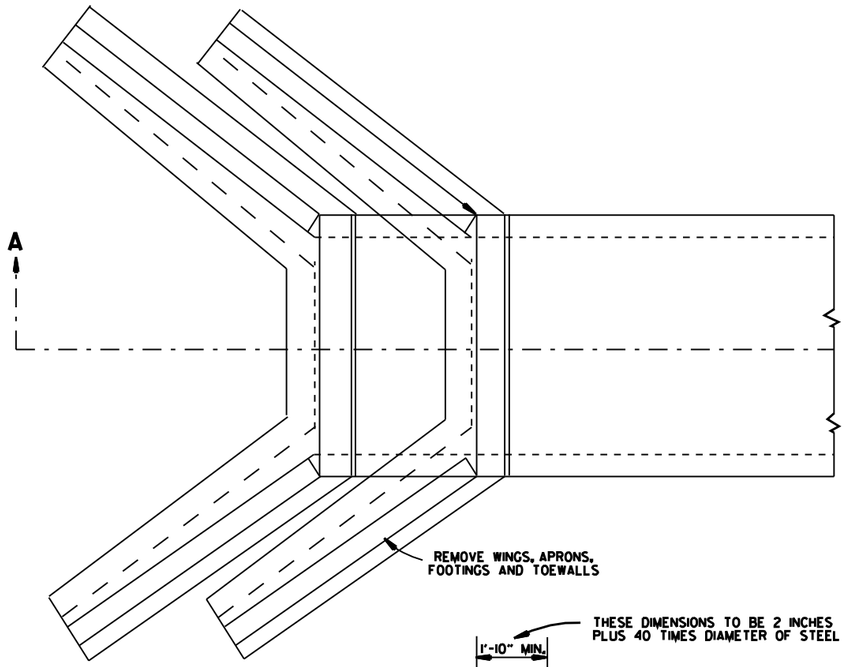
ROADWAY EXCAVATION SHOWN IN SECTION C-C ABOVE AS SUBSIDIARY WILL NOT BE MEASURED OR PAID FOR DIRECTLY, BUT PAYMENT WILL BE CONSIDERED TO BE INCLUDED IN THE VARIOUS ITEMS OF EXCAVATION.

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

ARKANSAS STATE HIGHWAY COMMISSION

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

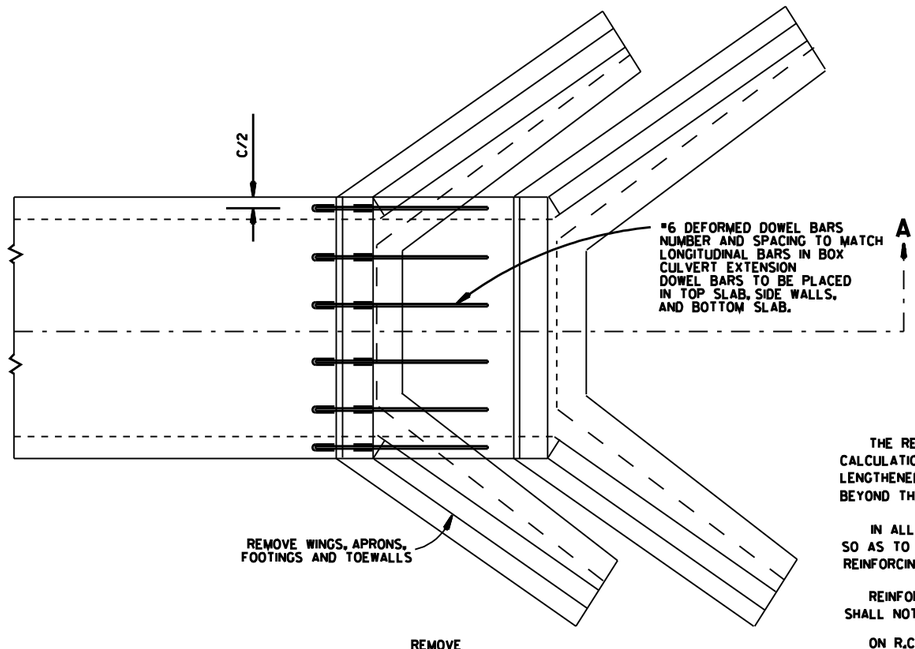
STANDARD DRAWING RCB-2



TOP VIEW
R.C. BOX CULVERT

SECTION A-A

METHOD 1



TOP VIEW
R.C. BOX CULVERT

SECTION A-A

METHOD 2

GENERAL NOTES

	USE FOR METHOD
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
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.	1&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.	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.	1&2

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.

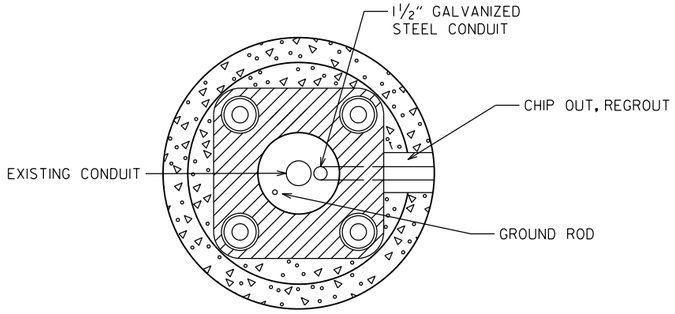
DATE	REVISION	DATE FILM
10-12-95	CHANGED DRAWING # FROM 144-A	
4-1-93	ADDED GENERAL NOTE	
10-1-92	ADDED ALT. METHOD OF EXTENSION	
11-30-89	REDRAWN	
1-4-83	ELIMINATED CONCRETE CLASS	
12-20-56	RETRACED	

ARKANSAS STATE HIGHWAY COMMISSION

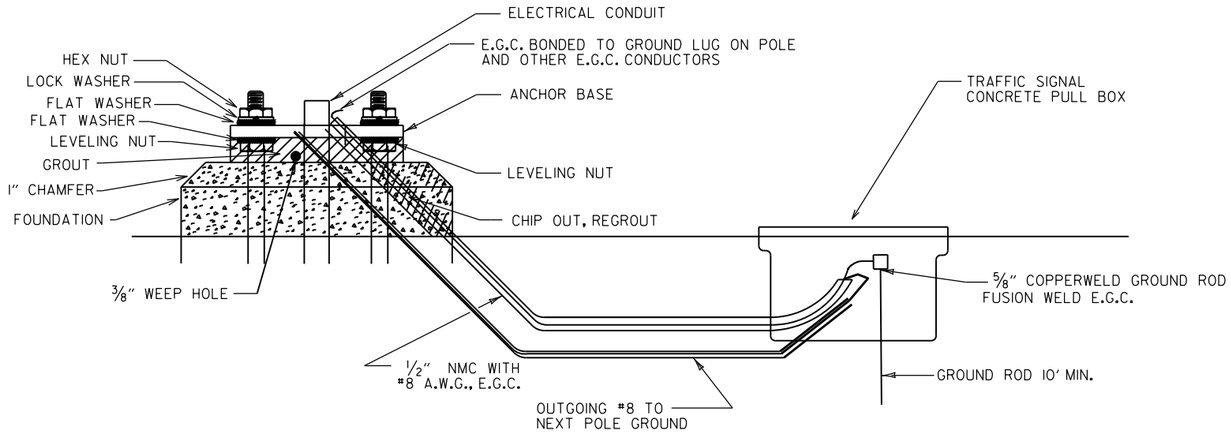
METHOD OF EXTENDING EXISTING R.C. BOX CULVERTS

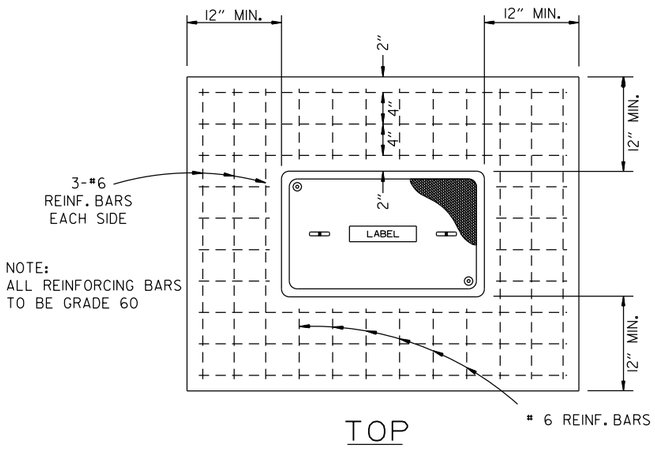
STANDARD DRAWING RCB-3

CONDUIT ENTRY TO EXISTING POLE BASE

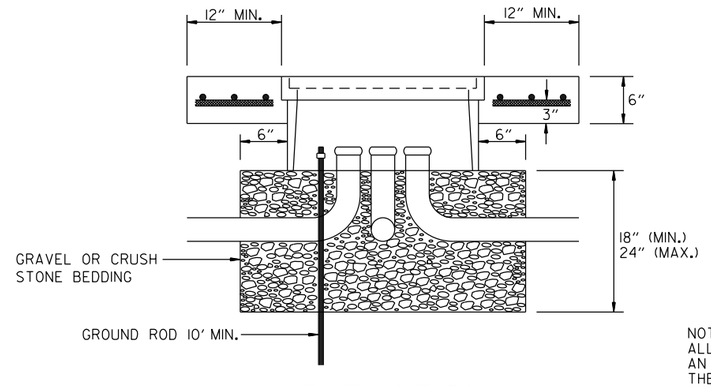


ANCHOR BASE



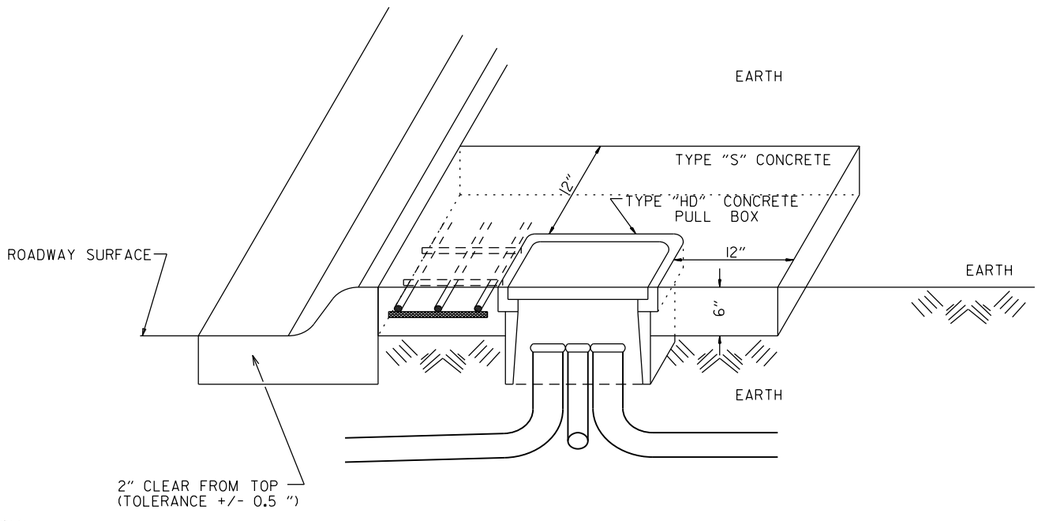


TOP



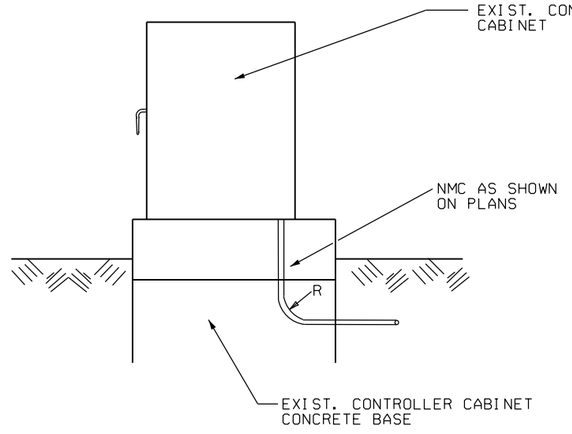
ELEVATION

TYPE "HD" CONCRETE PULL BOX DETAIL



NOTE:
ALL TYPE 1 HD, TYPE 2 HD, AND TYPE 3 HD CONCRETE PULL BOXES ARE INSTALLED WITH AN APRON OF CONCRETE 12" WIDE AND 6" IN DEPTH. ALL PAYMENT SHALL BE INCLUDED IN THE PRICE OF THE TYPE HD CONCRETE PULL BOX. THE CONCRETE PULL BOX SHALL BE INSTALLED FLUSH TO SURROUNDING GRADE UNLESS OTHERWISE INSTRUCTED BY THE ENGINEER. THE CONCRETE SHALL BE CLASS "S". THREE #6 REINFORCING BARS IN THE APRON ON ALL SIDES OF THE CONCRETE PULL BOX IS REQUIRED IN CONCRETE.

CONDUIT ENTRY TO EXISTING CONTROLLER CABINET



NOTE: ENTRY TO CABINET SHALL BE THROUGH A CUT IN THE BASE SUFFICIENT TO PROVIDE ADEQUATE CONDUIT RADIUS FOR ITEM.

DATE	REVISION	FILMED
02-13-24	REVISED NOTES AND TYPE "HD" CONCRETE PULL BOX DETAILS	
11-16-17	REVISED NOTES	
09-02-15	REVISED PULL BOX DEPTH	
09-12-13	ISSUED AS STANDARD DRAWING	
05-21-09	REVISED GROUNDING	
07-31-08	ADDED & REVISED CONDUIT ENTRY	
06-23-04	REVISED CLEARANCE AT CURB ENTRY	
01-04-02	ADDED REINFORCING TO BOX APRON	
07-02-01	REVISED	
12-27-99	REVISED NOTES	
11-18-98	ISSUED	

ARKANSAS STATE HIGHWAY COMMISSION

HEAVY DUTY PULL BOX

STANDARD DRAWING SD-6

SUPERELEVATION TABLE FOR ONE - WAY TRAFFIC

DEGREE OF CURVE	30 MPH			35 MPH			40 MPH			45 MPH			50 MPH			55 MPH			60 MPH			65 MPH			70 MPH			75 MPH		
	e	Ls (FT)		e	Ls (FT)		e	Ls (FT)		e	Ls (FT)		e	Ls (FT)		e	Ls (FT)		e	Ls (FT)		e	Ls (FT)		e	Ls (FT)		e	Ls (FT)	
		MINIMUM	DESIRABLE		MINIMUM	DESIRABLE		MINIMUM	DESIRABLE		MINIMUM	DESIRABLE		MINIMUM	DESIRABLE		MINIMUM	DESIRABLE		MINIMUM	DESIRABLE		MINIMUM	DESIRABLE		MINIMUM	DESIRABLE		MINIMUM	DESIRABLE
0° 15'	NC			NC			NC			NC			NC			NC			NC			NC			NC			NC		
0° 30'	NC			NC			NC			NC			NC			NC			RC	115		RC	115		RC	115		0.022	121	
0° 45'	NC			NC			NC			NC			RC	115		RC	115		0.024	127		0.026	132		0.030	144		0.032	150	
1° 00'	NC			NC			NC			RC	108		0.022	121		0.026	132		0.030	144		0.034	156		0.038	167		0.042	179	350
1° 15'	NC			NC			RC	101		0.022	114		0.028	138		0.032	150		0.038	167		0.042	179		0.046	190	350	0.052	208	
1° 30'	NC			RC	94		0.022	106		0.028	130		0.032	150		0.038	167		0.044	185		0.050	202	350	0.056	218		0.062	236	
1° 45'	RC	86		RC	94		0.026	116		0.030	136		0.036	161		0.044	185		0.050	202	350	0.056	218		0.064	242		0.070	259	
2° 00'	RC	86		0.024	103		0.028	121		0.034	146		0.042	179		0.048	196		0.056	218		0.064	242		0.070	259		0.080	288	400
2° 15'	RC	86		0.026	108		0.032	131		0.038	157		0.046	190		0.054	214		0.062	236		0.070	259		0.078	282	400	0.088	311	
2° 30'	0.022	90		0.028	113		0.034	136		0.042	168		0.050	202		0.058	224	350	0.068	253		0.076	276		0.086	305		0.096	334	450
2° 45'	0.024	95		0.030	118		0.038	146		0.046	179		0.054	214		0.064	242		0.072	265		0.082	294		0.092	323		0.100	346	
3° 00'	0.026	100		0.034	126		0.040	151		0.050	190	300	0.058	224		0.068	253		0.078	282		0.088	311		0.098	340	450	D MAX = 2° 45'		
3° 15'	0.028	103		0.036	131		0.044	161		0.052	194		0.062	236		0.072	265		0.082	294		0.092	323		0.100	346				
3° 30'	0.030	108		0.038	136		0.046	167	250	0.056	205		0.066	247		0.076	276		0.086	305		0.096	334		D MAX = 3° 30'					
3° 45'	0.032	112		0.040	140		0.050	176		0.058	211		0.070	259		0.080	288		0.090	317		0.098	340							
4° 00'	0.034	116		0.042	145	250	0.052	181		0.062	222		0.072	265		0.084	300		0.094	329	400	0.100	346							
4° 15'	0.036	120		0.044	150		0.054	186		0.064	227		0.076	276		0.086	305		0.096	334		D MAX = 4° 15'								
4° 30'	0.036	120		0.046	155		0.056	192		0.068	238		0.078	282		0.090	317	400	0.098	340										
4° 45'	0.038	125		0.048	160		0.060	202		0.070	244		0.082	294		0.092	323		0.100	346										
5° 00'	0.040	130		0.050	164		0.062	206		0.072	248		0.084	300		0.094	329		D MAX = 5° 15'										
5° 30'	0.044	138		0.054	173		0.066	217		0.078	265		0.088	311		0.098	340												
6° 00'	0.046	143	250	0.058	182		0.070	227		0.082	276		0.092	323		0.100	346												
6° 30'	0.050	151		0.062	192		0.074	238		0.086	287		0.096	334	350	D MAX = 6° 30'													
7° 00'	0.052	156		0.064	197		0.078	247		0.090	298		0.098	340															
7° 30'	0.054	160		0.068	206		0.080	252		0.092	302	350	0.100	346															
8° 00'	0.058	168		0.070	211		0.084	263		0.094	308		D MAX = 8° 25'																
8° 30'	0.060	173		0.072	215		0.086	268	300	0.096	313																		
9° 00'	0.062	178		0.076	224		0.088	272		0.098	319																		
9° 30'	0.064	181		0.078	229		0.092	282		0.100	324																		
10° 00'	0.066	186		0.080	234		0.094	288		D MAX = 10° 30'																			
11° 00'	0.070	194		0.084	244		0.096	293																					
12° 00'	0.074	203		0.088	253	300	0.098	298																					
13° 00'	0.076	208		0.090	258		0.100	302	350																				
14° 00'	0.080	216		0.094	266		D MAX = 13° 45'																						
15° 00'	0.082	221		0.096	271																								
16° 00'	0.086	229		0.098	276																								
17° 00'	0.088	233		0.100	281																								
18° 00'	0.090	238		D MAX = 19° 30'																									
19° 00'	0.092	242																											
20° 00'	0.094	246																											
21° 00'	0.096	251	300																										
22° 00'	0.096	251																											
23° 00'	0.098	254																											
24° 00'	0.098	254																											
25° 00'	0.100	259																											
D MAX = 28° 30'																													

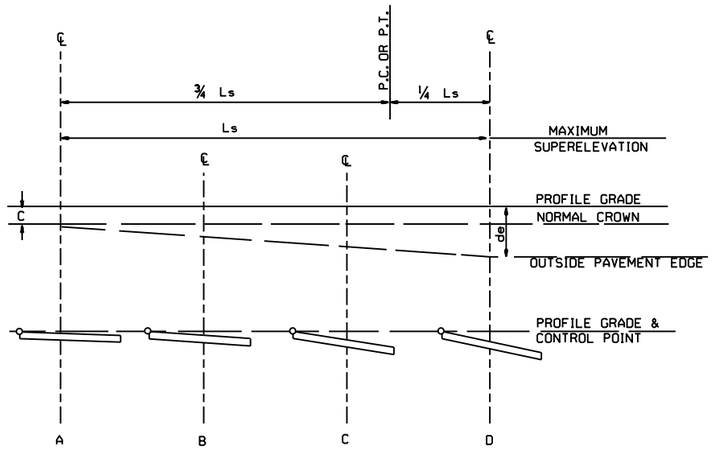
GENERAL NOTES

1. ON PAVEMENT WITH ONE-WAY TRAFFIC, THE SUPERELEVATION SHALL BE REVOLVED ON THE PROFILE GRADE POINT.
2. SUPERELEVATION VALUES SHOWN ON THE CROSS SECTIONS ARE VALUES (+) OR (-) TO BE ADDED OR SUBTRACTED FROM THE POINT OF CONTROL.
3. LENGTHS FOR Ls MAY BE ROUNDED IN MULTIPLES OF 25 FT. OR 50 FT. TO PERMIT SIMPLER CALCULATIONS.
4. MINIMUM Ls VALUES MAY BE USED FOR RAMPS; DESIRABLE VALUES SHALL APPLY TO MAIN LANES.
5. DIVIDED PAVEMENTS WIDER THAN 4 LANES SHALL HAVE ADDITIONAL TRANSITION LENGTHS AS FOLOWS:

6 LANE DIVIDED---------+20%
8 LANE DIVIDED---------+50%

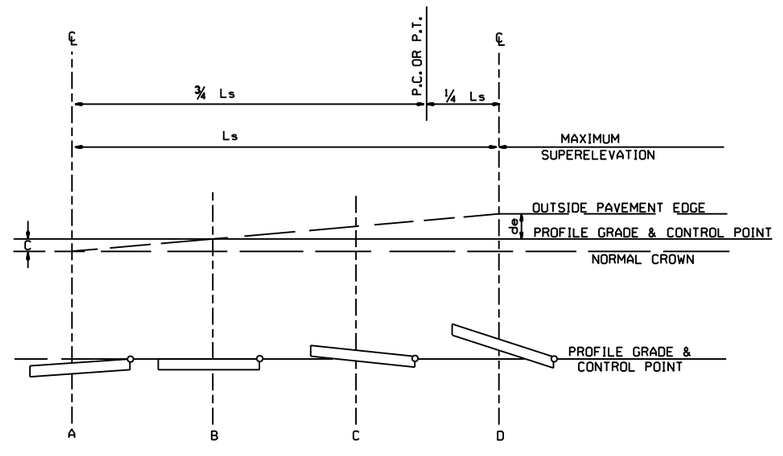
ABBREVIATIONS

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



ONE-WAY TRAFFIC
INSIDE LANE

SUPERELEVATION FORMULA = $S = -\frac{L(de-C)}{Ls} - C$



ONE-WAY TRAFFIC
OUTSIDE LANE

SUPERELEVATION FORMULA = $S = +\frac{L(de+C)}{Ls} - C$

DATE	REVISION	DATE FILLMED
11-07-19	REVISED SUPERELEVATION TABLE	
01-09-87	ISSUED	578-1-15-87

ARKANSAS STATE HIGHWAY COMMISSION

TABLES AND METHOD OF SUPERELEVATION FOR ONE-WAY TRAFFIC

STANDARD DRAWING SE-1

SUPERELEVATION TABLE FOR TWO - WAY TRAFFIC

DEGREE OF CURVE	30 MPH			35 MPH			40 MPH			45 MPH			50 MPH			55 MPH			60 MPH			65 MPH			70 MPH			75 MPH		
	e	Ls (FT)		e	Ls (FT)		e	Ls (FT)		e	Ls (FT)		e	Ls (FT)		e	Ls (FT)		e	Ls (FT)		e	Ls (FT)		e	Ls (FT)		e	Ls (FT)	
		MINIMUM	DESIRABLE		MINIMUM	DESIRABLE		MINIMUM	DESIRABLE		MINIMUM	DESIRABLE		MINIMUM	DESIRABLE		MINIMUM	DESIRABLE		MINIMUM	DESIRABLE		MINIMUM	DESIRABLE		MINIMUM	DESIRABLE		MINIMUM	DESIRABLE
0° 15'	NC			NC			NC			NC			NC			NC			NC			NC			NC			NC		
0° 30'	NC			NC			NC			NC			NC			NC			RC	96		RC	96		RC	96		0.022	101	
0° 45'	NC			NC			NC			NC			RC	96		RC	96		0.024	106		0.026	110		0.030	120		0.032	125	
1° 00'	NC			NC			NC			RC	90		0.022	101		0.026	110		0.030	120		0.034	130		0.038	139	300	0.042	149	300
1° 15'	NC			NC			RC	84		0.022	95		0.028	115		0.032	125		0.038	139		0.042	149		0.046	158		0.052	173	
1° 30'	NC			RC	78		0.022	88		0.028	108		0.032	125		0.038	139		0.044	154		0.050	168	300	0.056	182		0.062	197	
1° 45'	RC	72		RC	78		0.026	97		0.030	113		0.036	134		0.044	154		0.050	168	300	0.056	182		0.064	202		0.070	216	
2° 00'	RC	72		0.024	86		0.028	101		0.034	122		0.042	149		0.048	163		0.056	182		0.064	202		0.070	216		0.080	240	
2° 15'	RC	72		0.026	90		0.032	109		0.038	131		0.046	158		0.054	178	300	0.062	197		0.070	216		0.078	235	350	0.088	259	350
2° 30'	0.022	75		0.028	94		0.034	113		0.042	140		0.050	168		0.058	187		0.068	211		0.076	230		0.086	254		0.096	278	
2° 45'	0.024	79		0.030	98		0.038	122		0.046	149	200	0.054	178		0.064	202		0.072	221		0.082	245		0.092	269		0.100	288	400
3° 00'	0.026	83		0.034	105		0.040	126		0.050	158		0.058	187	250	0.068	211		0.078	235		0.088	259		0.098	283	400	D MAX = 2° 45'		
3° 15'	0.028	86		0.036	109		0.044	134		0.052	162		0.062	197		0.072	221		0.082	245		0.092	269		0.100	288				
3° 30'	0.030	90		0.038	113		0.046	139	200	0.056	171		0.066	206		0.076	230		0.086	254		0.096	278	350	D MAX = 3° 30'					
3° 45'	0.032	93		0.040	117		0.050	147		0.058	176		0.070	216		0.080	240		0.090	264		0.098	283							
4° 00'	0.034	97		0.042	121	200	0.052	151		0.062	185		0.072	221		0.084	250		0.094	274	350	0.100	288							
4° 15'	0.036	100		0.044	125		0.054	155		0.064	189		0.076	230		0.086	254	350	0.096	278		D MAX = 4° 15'								
4° 30'	0.036	100		0.046	129		0.056	160		0.068	198		0.078	235		0.090	264		0.098	283										
4° 45'	0.038	104	200	0.048	133		0.060	168		0.070	203		0.082	245		0.092	269		0.100	288										
5° 00'	0.040	108		0.050	137		0.062	172		0.072	207		0.084	250		0.094	274		D MAX = 5° 15'										
5° 30'	0.044	115		0.054	144		0.066	181		0.078	221	250	0.088	259		0.098	283												
6° 00'	0.046	119		0.058	152		0.070	189		0.082	230		0.092	269		0.100	288												
6° 30'	0.050	126		0.062	160		0.074	198		0.086	239		0.096	278	300	D MAX = 6° 30'													
7° 00'	0.052	130		0.064	164		0.078	206		0.090	248		0.098	283															
7° 30'	0.054	133		0.068	172		0.080	210		0.092	252		0.100	288															
8° 00'	0.058	140		0.070	176		0.084	219		0.094	257	300	D MAX = 8° 25'																
8° 30'	0.060	144		0.072	179		0.086	223	250	0.096	261																		
9° 00'	0.062	148		0.076	187		0.088	227		0.098	266																		
9° 30'	0.064	151		0.078	191		0.092	235		0.100	270																		
10° 00'	0.066	155		0.080	195		0.094	240		D MAX = 10° 30'																			
11° 00'	0.070	162		0.084	203		0.096	244																					
12° 00'	0.074	169		0.088	211	250	0.098	248																					
13° 00'	0.076	173		0.090	215		0.100	252	300	D MAX = 13° 45'																			
14° 00'	0.080	180		0.094	222																								
15° 00'	0.082	184		0.096	226																								
16° 00'	0.086	191		0.098	230																								
17° 00'	0.088	194		0.100	234																								
18° 00'	0.090	198	250	D MAX = 19° 30'																									
19° 00'	0.092	202																											
20° 00'	0.094	205																											
21° 00'	0.096	209																											
22° 00'	0.096	209																											
23° 00'	0.098	212																											
24° 00'	0.098	212																											
25° 00'	0.100	216																											
D MAX = 28° 30'																													

ABBREVIATIONS

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

GENERAL NOTES

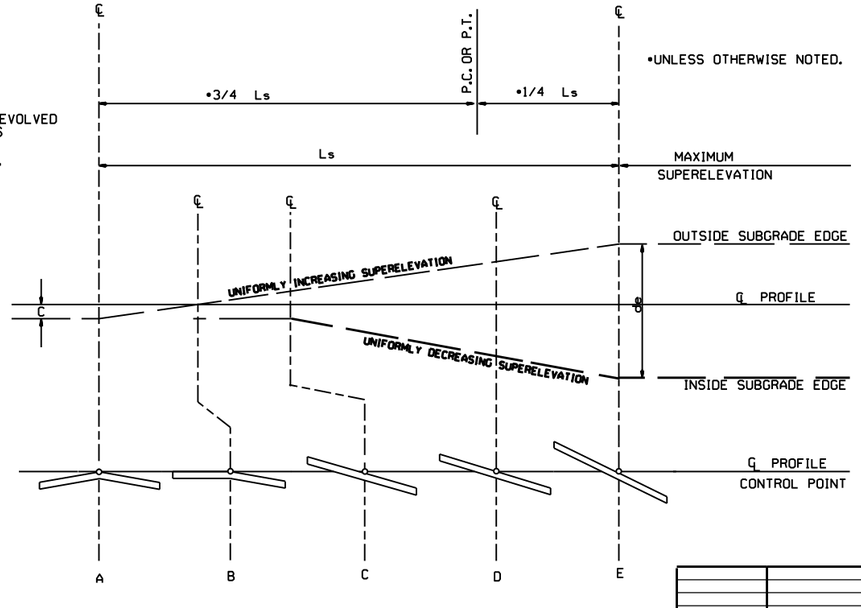
1. ON PAVEMENT WITH TWO-WAY TRAFFIC, THE SUPERELEVATION SHALL BE REVOLVED ON THE INSIDE PAVEMENT EDGE UNLESS OTHERWISE NOTED ON THE PLANS
2. SUPERELEVATION VALUES SHOWN ON THE CROSS SECTIONS ARE VALUES (+) OR (-) TO BE ADDED TO OR SUBTRACTED FROM THE POINT OF CONTROL.
3. LENGTHS FOR L MAY BE ROUNDED 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%

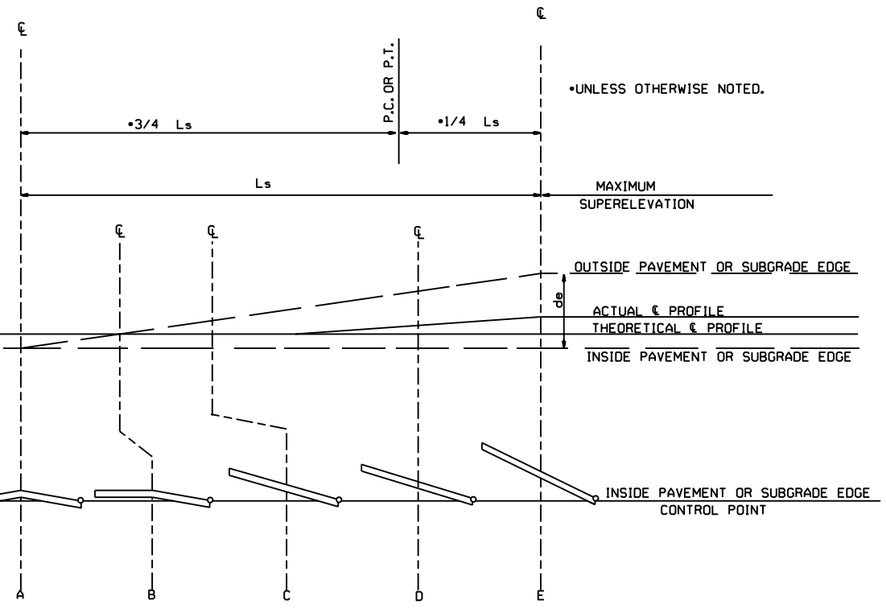
NOTE: MAINTAIN NORMAL CROWN ON INSIDE UNTIL SUPERELEVATION EXCEEDS 2C.

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

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



STANDARD METHOD WHEN SUPERELEVATION REVOLVES AROUND CENTER LINE



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

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

DATE	REVISION	DATE FILLMED
11-07-19	REVISED SUPERELEVATION TABLE	
10-18-96	ADDED FORMULA	
01-09-87	ISSUED	534-1-9-87

ARKANSAS STATE HIGHWAY COMMISSION

TABLES AND METHOD OF SUPERELEVATION FOR TWO-WAY TRAFFIC

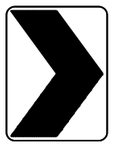
STANDARD DRAWING SE-2



R1-1
30"X30"



W1-3
30"X30"
(LT. OR RT.)



W1-8
18"X24"



W2-5
30"X30"



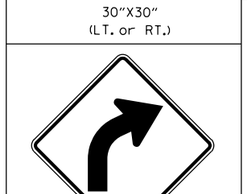
W3-1
36"X36"



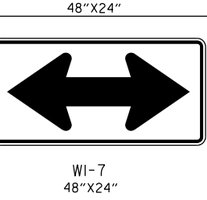
W5-1
36"X36"



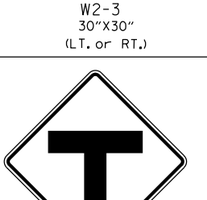
M6-3
21"X15"



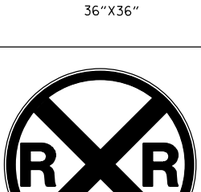
R1-2
36"X36"X36"



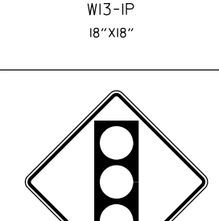
W1-4
30"X30"
(LT. or RT.)



W2-1
30"X30"



S1-1
36"X36"



W3-2
36"X36"

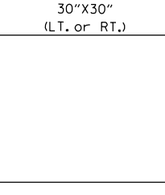


County
Route Marker
M1-6
24"X24"

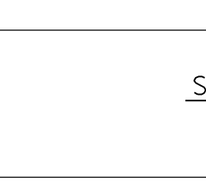
NOTE: REFLECTORIZED YELLOW LEGEND (COUNTY NAME, ROUTE LETTER & NUMBER) & BORDER ON A BLUE BACKGROUND.



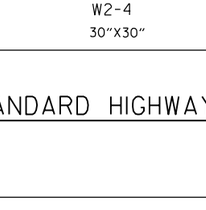
M6-4
21"X15"



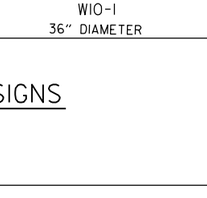
R2-1
24"X30"



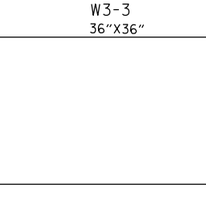
W1-5
30"X30"
(LT. or RT.)



W2-2
30"X30"

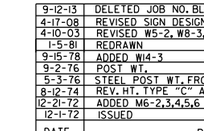


W5-2
36"X36"



W8-3
36"X36"

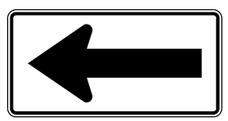
R1-3P
18"X6"



M6-5
21"X15"

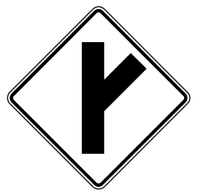


W1-1
30"X30"
(LT. or RT.)



W1-6
48"X24"

W1-7
48"X24"



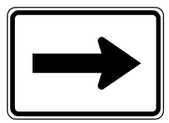
W2-3
30"X30"
(LT. or RT.)



W5-3
36"X36"

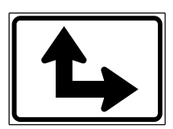


W13-1P
18"X18"



M6-1
21"X15"

NOTE: ALL M6 SIGNS TO BE MADE WITH REFLECTORIZED YELLOW ARROW & BORDER WITH BLUE BACKGROUND.



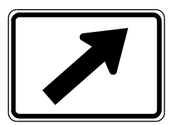
M6-6
21"X15"

W1-2
30"X30"
(LT. or RT.)

W2-4
30"X30"

W10-1
36" DIAMETER

W3-3
36"X36"

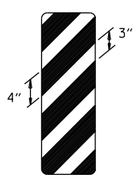


M6-2
21"X15"

S4-3P
24"X8"



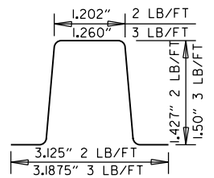
S4-2P
24"X10"



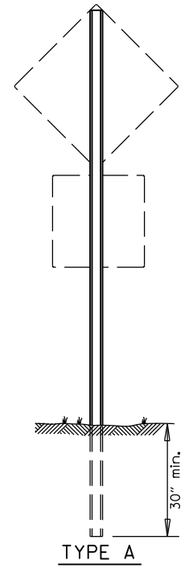
OM-3
12"X36"
(LT. or RT.)

MINIMUM DIMENSIONS SHOWN

SUPPORT SECTION

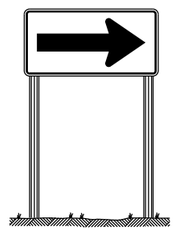


(U-CHANNEL)
STANDARD SUPPORT
ASSEMBLIES

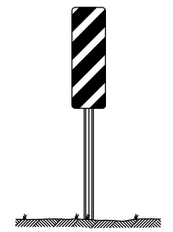


TYPE A

NOTE: LENGTH OF SIGN POSTS SHALL BE DETERMINED SO AS TO PROVIDE FOR MINIMUM VERTICAL CLEARANCES AS CALLED FOR IN THE SPECIFICATIONS PLUS A MINIMUM VERTICAL PENETRATION OF 30" IN THE SOIL.



TYPE B



TYPE C

MINIMUM WEIGHT

TYPE A & B = 3 LBS./FT.
TYPE C = 2 LBS./FT.

STANDARD HIGHWAY SIGNS

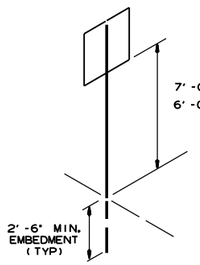
DATE	REVISION	DATE FILMED
9-12-13	DELETED JOB NO. BLOCK; REVISED RI-3 TO RI-3P	
4-17-08	REVISED SIGN DESIGNATION - W3-1 & W3-2	
4-10-03	REVISED W5-2, W8-3, OM-3; ADDED WI-8	
1-5-81	REDRAWN	960-1-15-81
9-15-78	ADDED WI4-3	877-9-15-78
9-2-76	POST WT.	623-9-3-76
5-3-76	STEEL POST WT. FROM 2"-3"; ADDED S4-2 & S4-3	504-5-3-76
8-12-74	REV. HT. TYPE "C" ASSEMBLY	500-8-21-74
12-21-72	ADDED M6-2,3,4,5,6	500-12-21-72
12-1-72	ISSUED	562-12-1-72

SUPPORT ASSEMBLIES

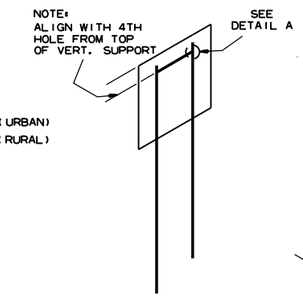
ARKANSAS STATE HIGHWAY COMMISSION

STANDARD HIGHWAY SIGNS AND SUPPORT ASSEMBLIES

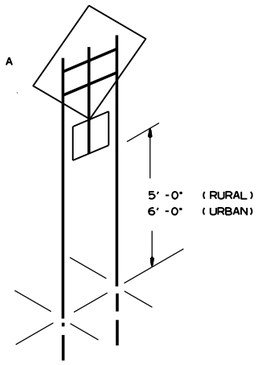
STANDARD DRAWING SHS-1



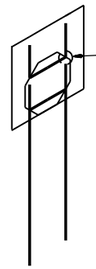
U-1



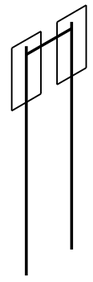
U-2



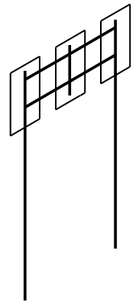
U-2 (A)



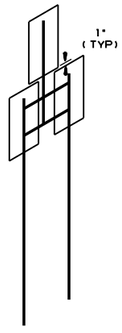
U-2 (B)



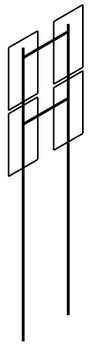
U-2 (1)



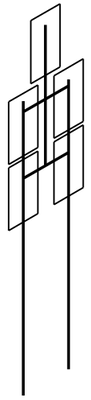
U-2 (2)



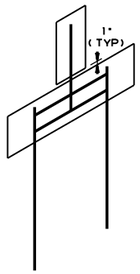
U-2 (3)



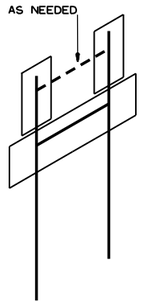
U-2 (4)



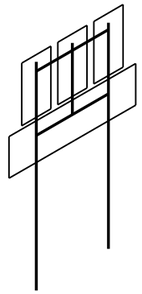
U-2 (5)



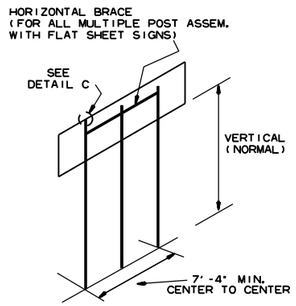
U-2 (6)



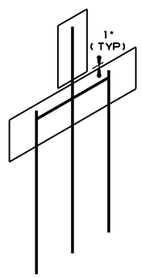
U-2 (7)



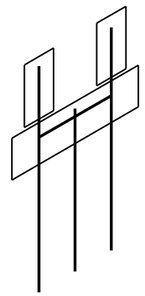
U-2 (8)



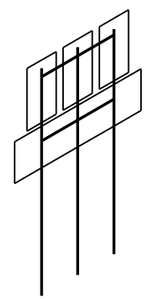
U-3



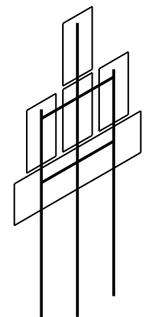
U-3 (1)



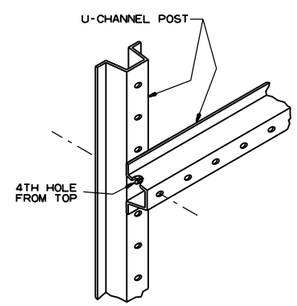
U-3 (2)



U-3 (3)

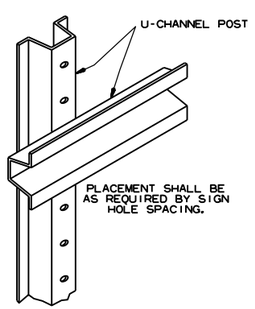


U-3 (4)



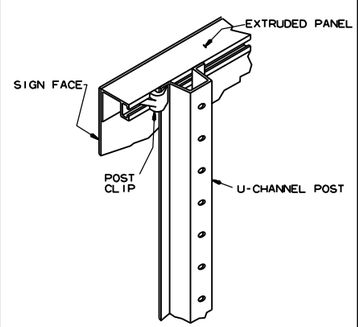
DETAIL A

SHOWING HORIZONTAL BRACE



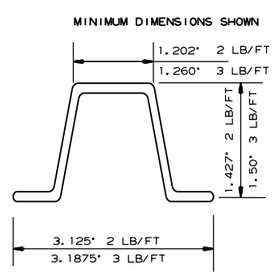
DETAIL B

SHOWING BACK-TO-BACK INSTALLATION



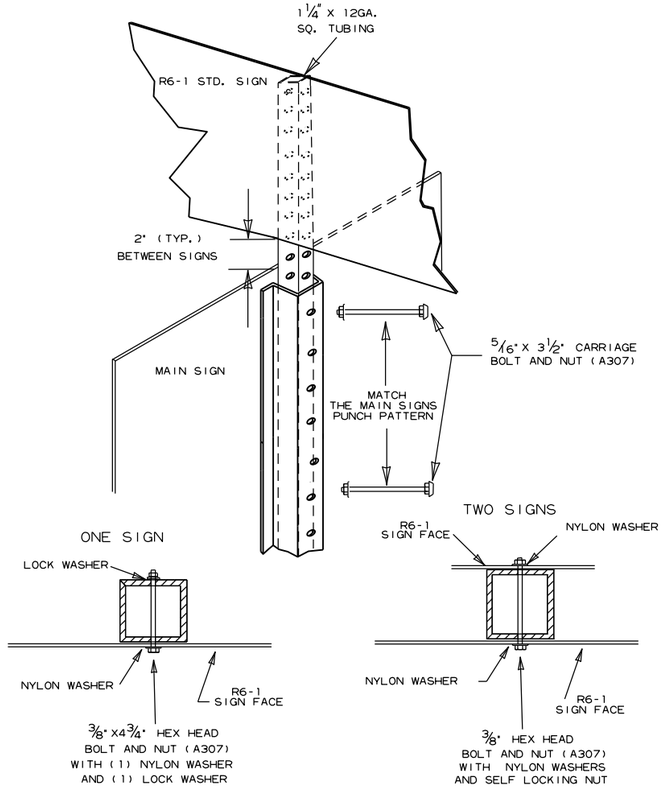
DETAIL C

SHOWING GUIDE SIGN MOUNTING WITH EXTRUDED PANELS



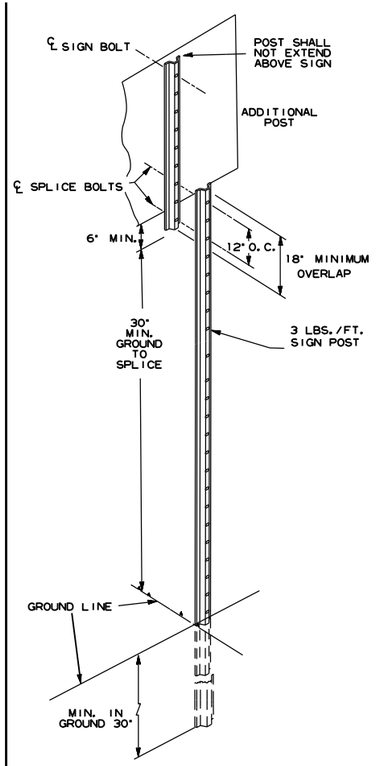
DETAIL C

U-CHANNEL POST



DETAIL E

R6-1 EXTENSION FOR U-CHANNEL POST



DETAIL F

DETAIL OF SPLICES

NOTES:

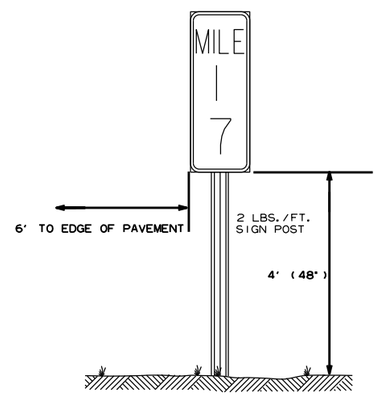
SIGNS AT LEAST 8' IN LENGTH MAY BE INSTALLED ON THREE 3 LB. POST. IN NO CASE SHALL THERE BE MORE THAN TWO 3 LB. POSTS WITHIN A 7' PATH.

SPLICES NECESSARY TO ATTAIN PROPER MOUNTING HEIGHT SHALL BE AS SHOWN IN DETAIL (F).

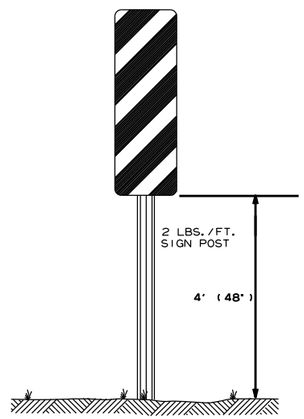
NORMAL INSTALLATIONS WILL REQUIRE 5/16" DIA. CARRIAGE BOLTS TO MOUNT SIGNS TO POST AND TO ASSEMBLE THE VARIOUS POST SUPPORTS.

ALL SIGN POSTS SHALL BE PLUMB.

THE POST FOR "TYPE U" SUPPORTS SHALL BE HOT DIP GALVANIZED.



TYPICAL MILE MARKER INSTALLATION



TYPICAL OM-3 INSTALLATION AT EDGE OF OBSTRUCTION

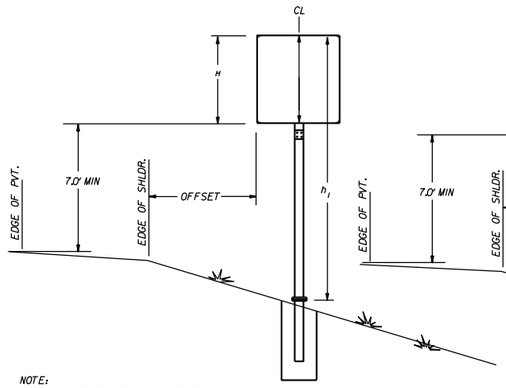
DATE	REVISION	FILMED
7-25-19	REVISED CARRIAGE BOLT WITH MATERIAL REQUIREMENT	
2-27-14	REVISED NOTES.	
9-12-13	REVISED U-2(3), U-2(6), U-3(1), DETAIL D; ADDED DETAILS E & F; ADDED TYPICAL MARKERS	
10-9-03	REMOVED ROUND POST & REVISED SPACING	
10-12-95	MOVED UPPER SPLICE	
6-8-95	REVISED SPLICE DETAIL	6-8-95
2-2-95	REDRAWN	2-2-95

ARKANSAS STATE HIGHWAY COMMISSION

U-CHANNEL POST ASSEMBLIES

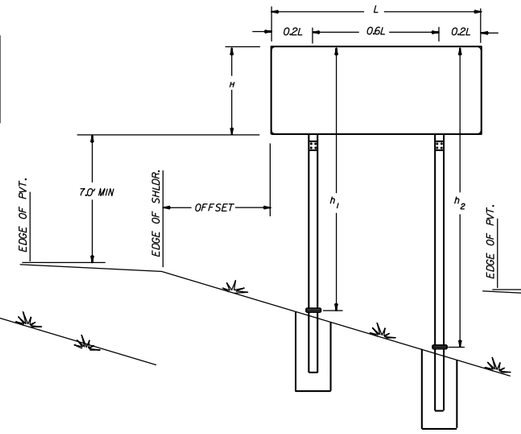
STANDARD DRAWING SHS-2

POST SIZE	BASE CONNECTION DATA											FUSE PLATE DATA									
	BOLT SIZE	BOLT TORQUE (INCH/LBS)	A	B	C	D	E	t_1	t_2	W	R	F	G		J	K	M	d_1	d_2	t_3	BOLT SIZE	WT.OF EACH FUSE PLATE LBS.
W 6X9																						
W 6X12	5/8" x 2 3/4"	450"-680"	5"	2"	1 1/4"	2 3/4"	1 1/8"	3/4"	1/2"	1/4"	11/32"	4 1/4"	2"		4"	2 1/4"	1"	9/16"	3/4"	1/4"	1/2" x 1 1/2"	1.01
W 6X15												5"	2 1/2"		6"	3 1/2"	1 1/2"	11/16"	1 1/4"	3/8"	5/8" x 2 1/4"	2.51
W 8X18												5"	2 1/2"		5 1/4"	2 3/4"	1 1/4"	13/16"	1 11/16"	3/8"	3/4" x 2 1/4"	2.26
W 8X21												5 1/2"	2 1/2"		5 1/4"	2 3/4"	1 1/4"	13/16"	1"	1/2"	3/4" x 2 1/4"	3.35
W 10X22	3/4" x 3 1/2"	750"-1050"	6"	2 1/4"	1 3/8"	3 1/2"	1 1/4"	1"	3/4"	5/16"	11/32"	6"	3"		5 3/4"	2 3/4"	1 3/8"	1 3/16"	1 1/8"	1/2"	3/4" x 2 1/4"	4.03
W 10X26																						
W 12X26												6"	3"		6 1/2"	3 1/2"	1 5/8"	1 3/16"	1 15/16"	1/2"	3/4" x 2 1/4"	4.47

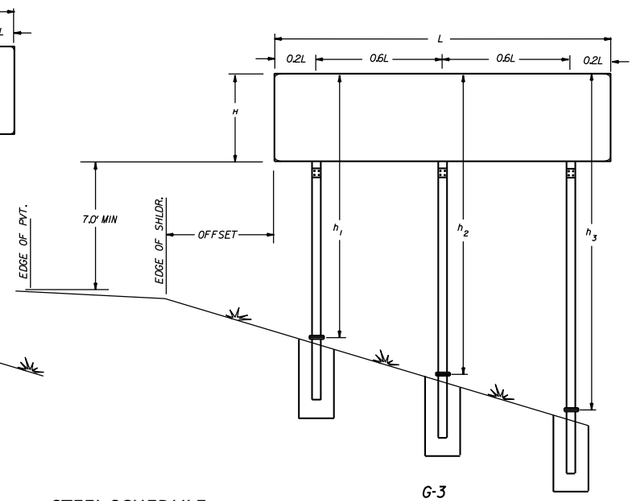


NOTE:
THE OFFSET WILL BE A MINIMUM OF 10' FROM THE EDGE OF PAVED SURFACE OR AS DIRECTED BY THE ENGINEER

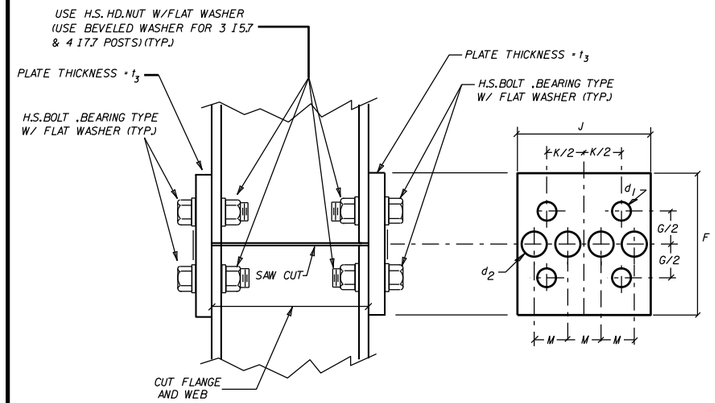
G-1



G-2

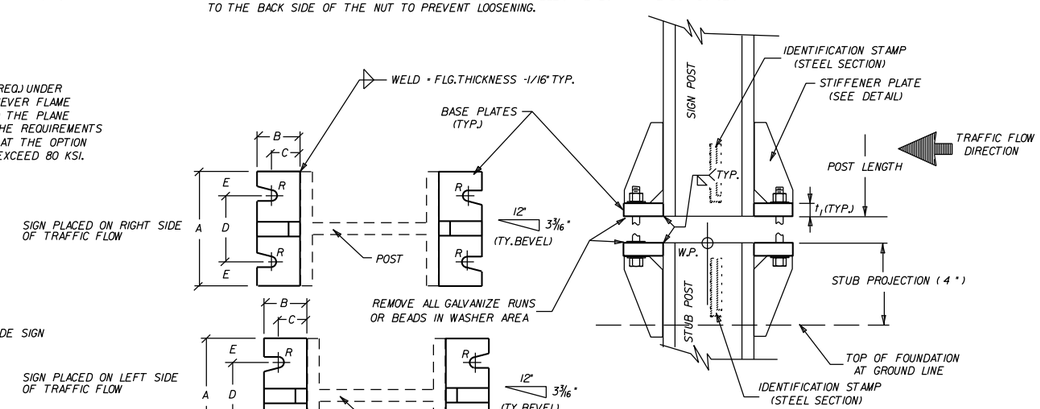


G-3

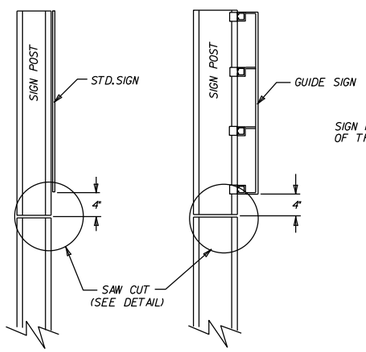


NOTE: USE H.S.HEX HEAD BOLTS,HEX HEAD NUTS AND BEVEL OR FLAT WASHERS (WHERE REQ.) UNDER NUTS. ALL HOLES SHALL BE DRILLED.ALL PLATE CUTS SHALL PREFERABLY BE SAW CUTS,HOWEVER FLAME CUTTING WILL BE PERMITTED PROVIDED ALL EDGES ARE GROUND. METAL PROJECTING BEYOND THE PLANE OF THE PLATE FACE WILL NOT BE PERMITTED. STEEL FUSE PLATES SHALL CONFORM TO THE REQUIREMENTS OF ASTM-A36,ASTM-A441,ASTM-572 GRADE 50,OR ASTM-A588 MAY BE SUBSTITUTED FOR A36 AT THE OPTION OF THE FABRICATOR. STEEL USED SHALL HAVE AN ULTIMATE TENSILE STRENGTH NOT TO EXCEED 80 KSI.

NOTE: SECTIONS SHOWN ARE FOR INSTALLATION ON THE RIGHT SHOULDER AND IN THE GORE. BOLT HOLES IN BASE PLATE ARE SLOTTED AND BEVELED AS SHOWN. USE H.S.BOLTS WITH HEX HD.,HEX NUT AND THREE FLAT WASHERS FOR EACH BOLT.SEE TABLE FOR BOLT DIA. AND TORQUE.
NOTE: ASSEMBLE SIGN POST TO STUB POST USING THE BOLTS SPEC.IN THE TABLE AND AS SHOWN IN THE ELEVATION DETAILS. THERE SHALL BE THREE FLAT WASHERS ON EACH BOLT LOCATED AS SHOWN IN THE ELEVATIONS. USE A SHIM TO PLUMB THE SIGN POST. THEN TIGHTEN THE BOLTS USING A 12" TO 15" WRENCH UNTIL THE WASHERS AND SHIMS ARE SEATED AND THE BOLT THREADS ARE CLEAR ,THEN LOOSEN EACH BOLT IN TURN AND RETIGHTEN IN A SYSTEMATIC ORDER TO THE PRESCRIBED TORQUE (SEE TABLE). THE BURR THREADS ADJACENT TO THE BACK SIDE OF THE NUT TO PREVENT LOOSENING.



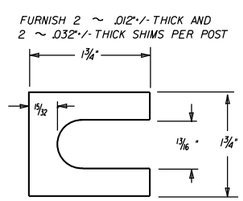
NOTE: BOLT HOLES,USED IN THE MOUNTING OF STANDARD SIGNS SHALL BE LOCATED IN THE FLANGE ADJACENT TO THE NEAR EDGE OF PAVEMENT FOR SINGLE POST ASSEMBLIES AND IN THE OUTSIDE FLANGES FOR MULTIPLE POST ASSEMBLIES.



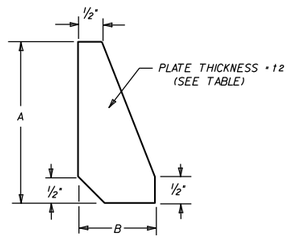
NOTE: POST SHALL BE SAW CUT AFTER GALVANIZING AND THE CUT SURFACE TREATED. AFTER PLATE IS INSTALLED AND ALL BOLTS FULLY TIGHTENED. REPAIR OF CUT SURFACES AFTER GALVANIZING SHALL BE IN ACCORDANCE WITH ASTM A123.

STANDARD SIGNS GUIDE SIGNS

FUSE PLATE DETAILS



SHIM DETAIL



STIFFENER PLATE DETAIL

GENERAL NOTES

TIGHTEN THE HIGH STRENGTH BOLTS IN THE BASE CONNECTION ONLY TO THE TORQUE SHOWN. DO NOT OVERTIGHTEN.

BASE PLATES AND STIFFENER PLATES SHALL BE OF THE SAME MATERIAL AS THE PRIMARY SUPPORT POSTS WHICH THEY ARE WELDED.

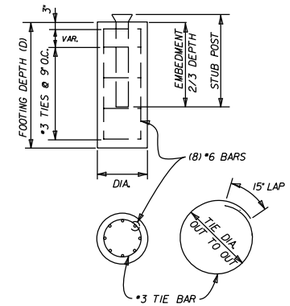
REFER TO THE PLANS FOR FOOTING DIMENSIONS.

EACH STUB POST AND SIGN POST SHALL HAVE A PERMANENT IDENTIFYING STAMP WHICH SPECIFIES THE STEEL SECTION USED. IF THE CONTRACTOR ELECTS TO SHIP THE STUB POST SEPARATE FROM THE SIGN POST A MATCH MARK SYSTEM WILL BE REQUIRED.

STEEL SCHEDULE

FOOTING DIAMETER	#3 TIE BARS		
	DIAMETER	BAR LENGTH	POUNDS
INCHES	INCHES	FEET	
18	12	4.39	1.65
24	18	5.96	2.24
30	24	7.53	2.83
36	30	9.1	3.42

FOOTINIG DEPTH	#6 STRAIGHT BARS		
	BAR LENGTH	NUMBER REQ'D.	POUNDS
FEET	FEET		
2.50	2.00	8	24.03
3.00	2.50	8	30.04
3.50	3.00	8	36.05
4.00	3.50	8	42.06
4.50	4.00	8	48.06
5.00	4.50	8	54.07
5.50	5.00	8	60.08
6.00	5.50	8	66.09
6.50	6.00	8	72.10
7.00	6.50	8	78.10
7.50	7.00	8	84.11
8.00	7.50	8	90.12



FOOTING QUANTITIES

FOOTING DEPTH	NUMBER TIE BARS REQ'D	18" DIAMETER		24" DIAMETER		30" DIAMETER		36" DIAMETER	
		CLASS S CONCRETE	REINF STEEL	CLASS S CONCRETE	REINF STEEL	CLASS S CONCRETE	REINF STEEL	CLASS S CONCRETE	REINF STEEL
FEET		CU. YD.	(GRADE 60)	CU. YD.	(GRADE 60)	CU. YD.	(GRADE 60)	CU. YD.	(GRADE 60)
2.50	4	0.16	31						
3.00	4	0.20	37						
3.50	5	0.23	44						
4.00	6	0.26	52	0.47	56				
4.50	6	0.29	58	0.52	62				
5.00	7	0.33	66	0.58	70	0.91	74		
5.50	8			0.64	78	1.00	83		
6.00	8			0.70	84	1.09	89	1.57	93
6.50	9					1.18	98	1.70	103
7.00	10					1.27	106	1.83	112
7.50	10							1.96	118
8.00	11							2.09	128

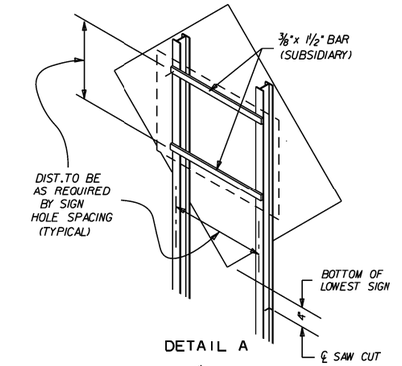
SIGN POST AND STUB POST

DATE	REVISION	FILMED
5-19-22	REVISED FUSE PLATE DETIALS' NOTE.	
9-12-13	ISSUED	

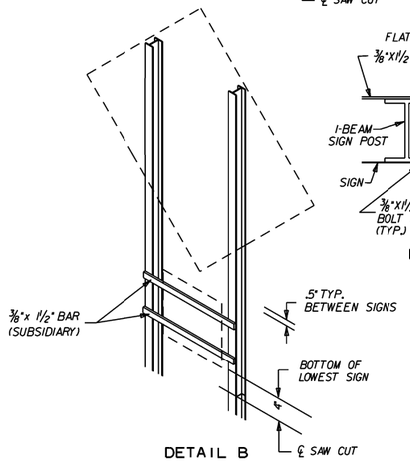
ARKANSAS STATE HIGHWAY COMMISSION

DETAIL OF BREAKAWAY SIGN SUPPORTS FOR GUIDE SIGNS

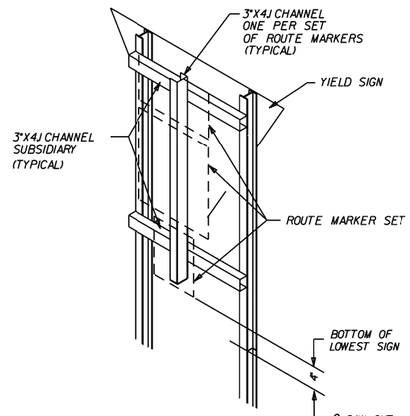
STANDARD DRAWING SHS-3



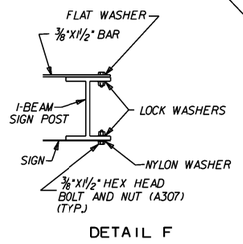
DETAIL A



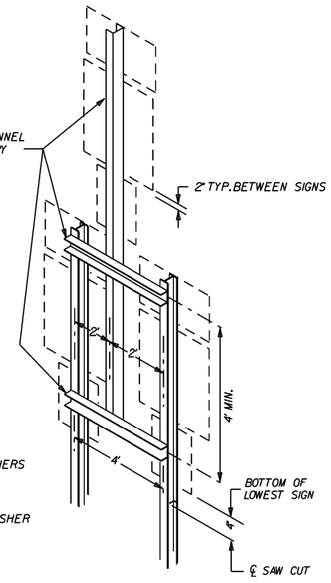
DETAIL B



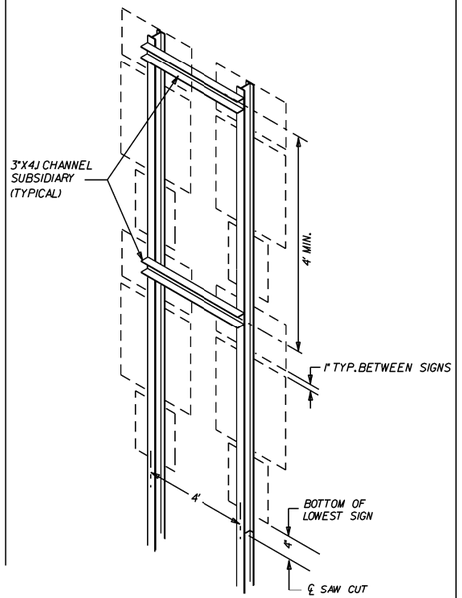
DETAIL C



DETAIL F



DETAIL D



DETAIL E

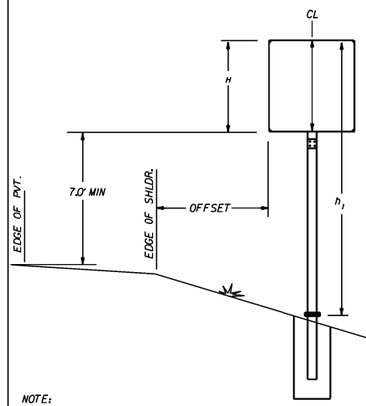
NOTE

ALL ADDITIONAL MOUNTING HARDWARE, BOLTS, NUTS, CHANNELS AND BAR STRAPS REQUIRED TO MOUNT SECONDARY SIGNS WILL BE CONSIDERED TO BE SUPPLEMENTAL TO THE MAIN SIGN SUPPORT SPECIFIED. PAYMENT WILL BE CONSIDERED SUBSIDIARY TO THE MAIN SUPPORT.

THE GALVANIZED STEEL CHANNEL AND BAR SUPPORTS MAY BE ASTM A-36.

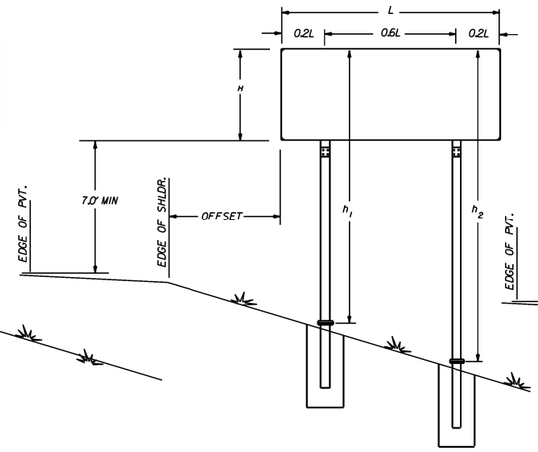
REFER TO THE P.C. RUTLEDGE FORMULA ON PAGE 58 OF THE AASHTO PUBLICATION "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES, AND TRAFFIC SIGNALS.

ALL BOLT HOLES SHALL BE 1/8" DIA. UNLESS OTHERWISE SHOWN.

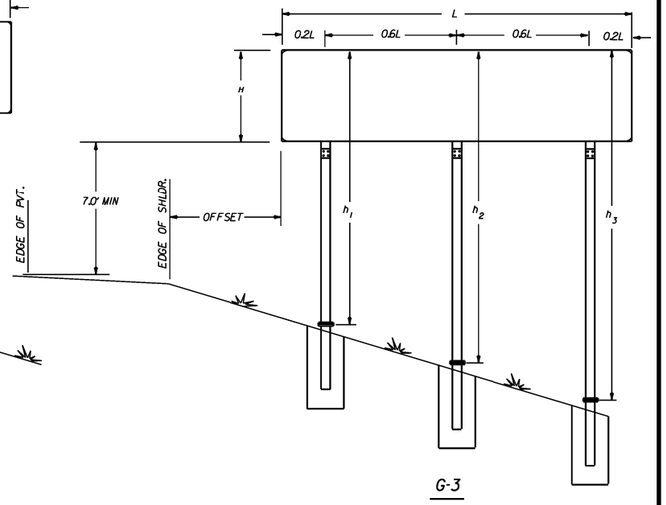


G-1

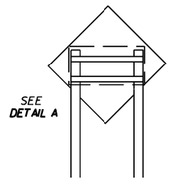
NOTE:
THE OFFSET WILL BE A MINIMUM OF 10' FROM THE EDGE OF PAVED SURFACE OR AS DIRECTED BY THE ENGINEER.



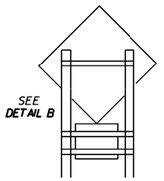
G-2



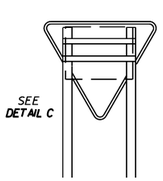
G-3



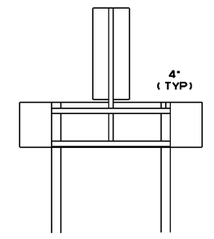
G2-1



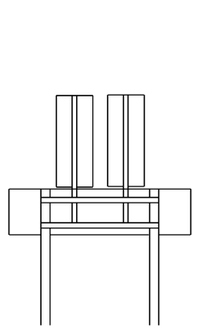
G2-2



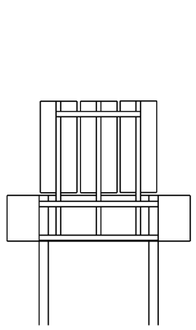
G2-3



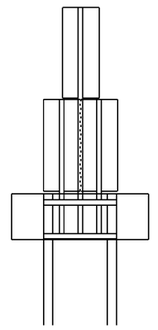
G2-4



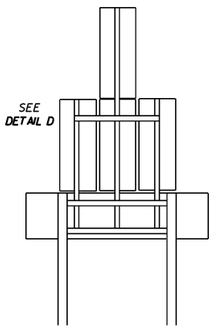
G2-5



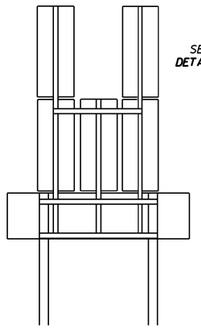
G2-6



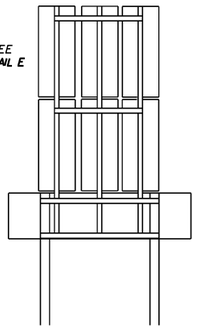
G2-7



G2-8



G2-9



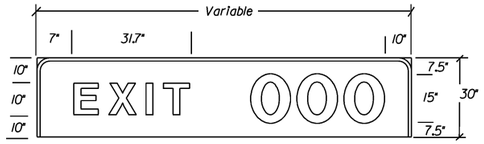
G2-10

			ARKANSAS STATE HIGHWAY COMMISSION
			DETAIL OF BREAKAWAY SIGN SUPPORTS FOR STANDARD SIGNS
9-12-13	ISSUED		STANDARD DRAWING SHS-4
DATE	REVISION	FILMED	



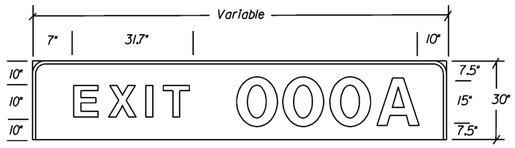
TYPICAL DETAIL

TYPE A



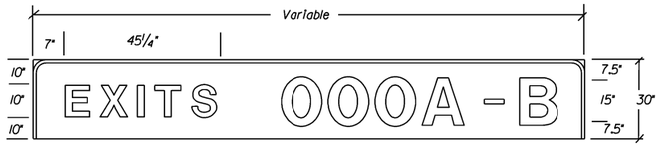
EXIT WITH 1 DIGIT 84"X30"=17.50 SF
EXIT WITH 2 DIGITS 96"X30"=20.0 SF
EXIT WITH 3 DIGITS 114"X30"=23.57 SF

TYPE B



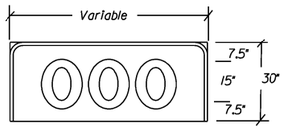
EXIT WITH 1 DIGIT PLUS "A"OR"B" 96"X30"=20.0 SF
EXIT WITH 2 DIGITS PLUS "A"OR"B" 114"X30"=23.57 SF
EXIT WITH 3 DIGITS PLUS "A"OR"B" 126"X30"=26.25 SF

TYPE C



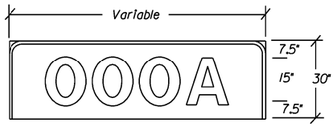
EXITS WITH 1 DIGIT PLUS "A"&"B" 132"X30"=27.50 SF
EXITS WITH 2 DIGITS PLUS "A"&"B" 150"X30"=31.25 SF
EXITS WITH 3 DIGITS PLUS "A"&"B" 168"X30"=35.00 SF

TYPE D



1 DIGIT 24"X30"=5.0 SF
2 DIGITS 42"X30"=8.75 SF
3 DIGITS 60"X30"=12.50 SF

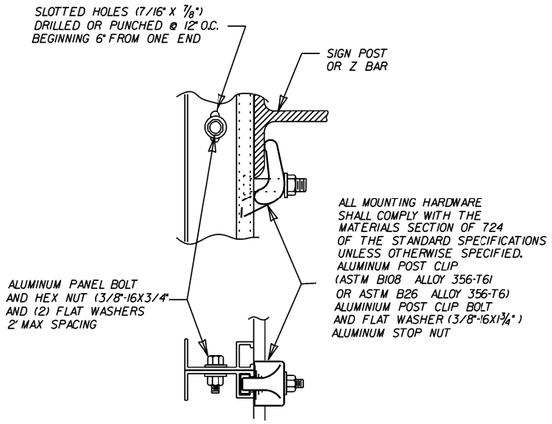
TYPE E

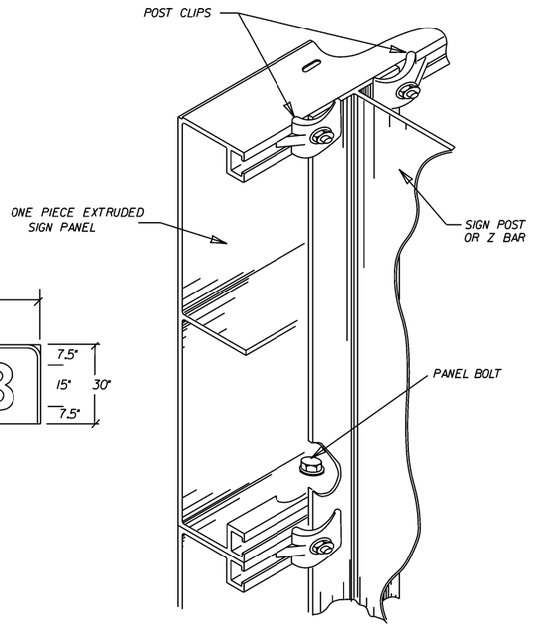


1 DIGIT PLUS "A"OR"B" 42"X30"=8.75 SF
2 DIGITS PLUS "A"OR"B" 60"X30"=12.50 SF
3 DIGITS PLUS "A"OR"B" 78"X30"=16.25 SF

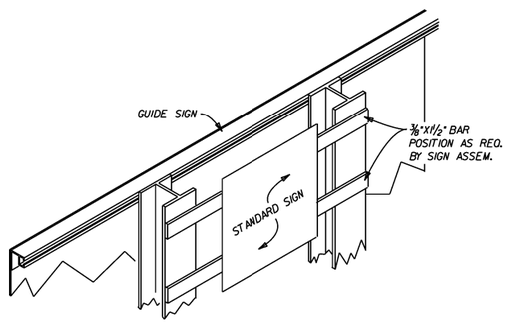
EXIT PANEL DETAILS

NOTE: EXIT NUMBER PANELS SHALL HAVE WHITE LEGENDS AND BORDERS. THE BACK GROUND COLOR WILL BE AS USE SPECIFIES. SHEETING TYPE WILL BE THE SAME AS THE GUIDE SIGN WHICH THE EXIT PANEL IS ATTACHED OR AS SPECIFIED IN THE PLANS. PAYMENT FOR ALL POST CLIPS, BOLTS, AND ANGLES SHALL BE SUBSIDIARY TO THE ITEM "EXIT NUMBER PANEL".

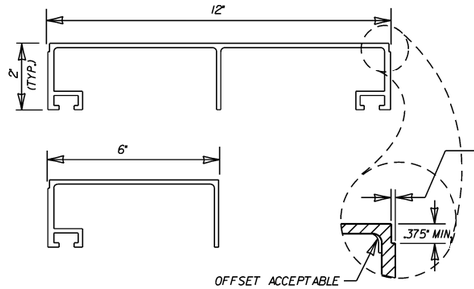




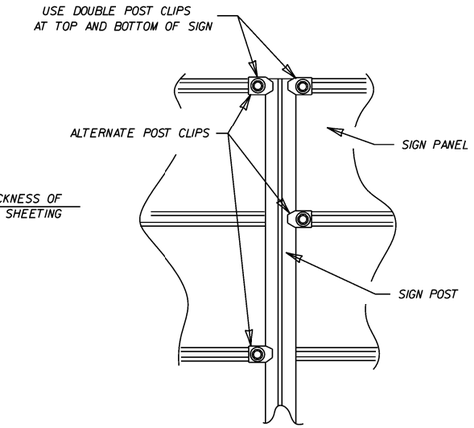
MOUNTING HARDWARE



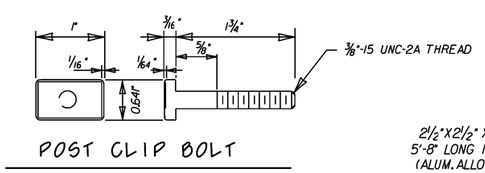
SECONDARY SIGN INSTALLATION ON BACKSIDE OF GUIDE SIGN



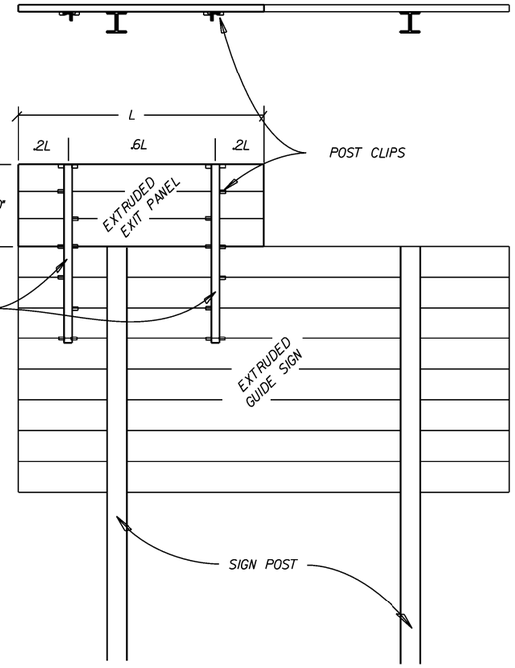
ONE PIECE EXTRUDED SIGN PANELS



POST CLIP PLACEMENT



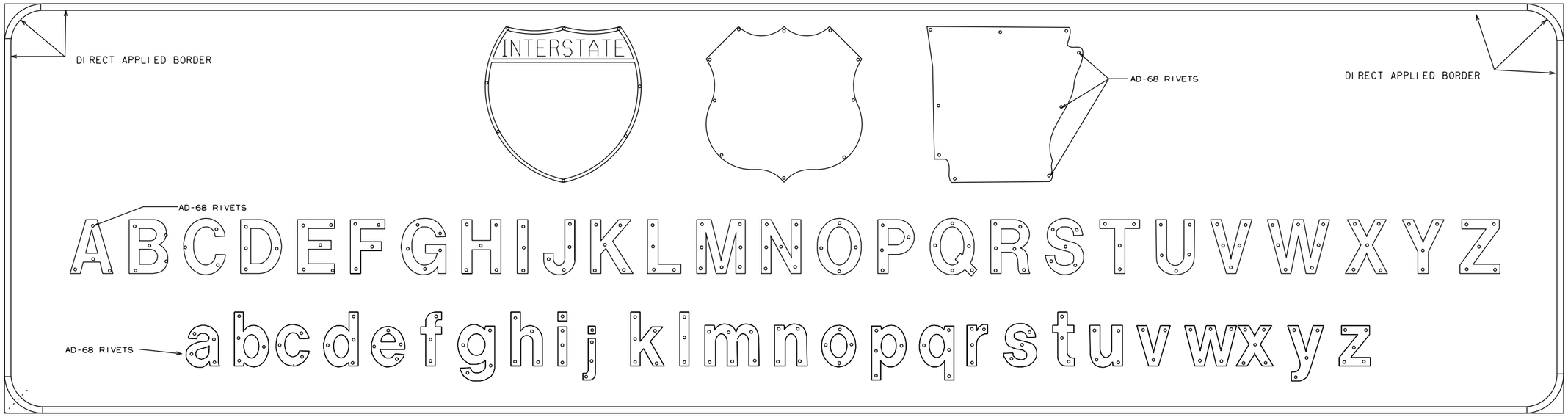
POST CLIP BOLT

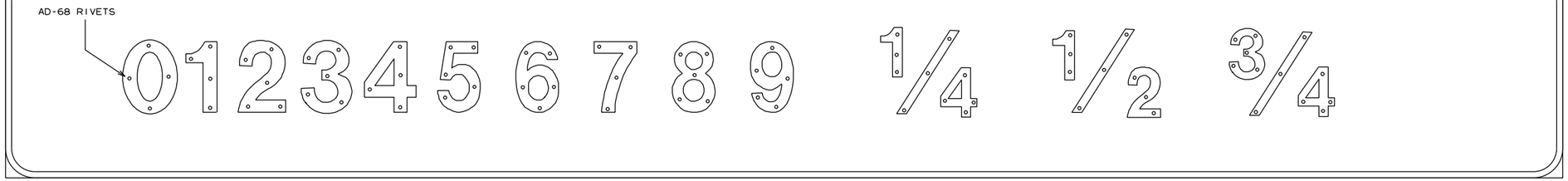


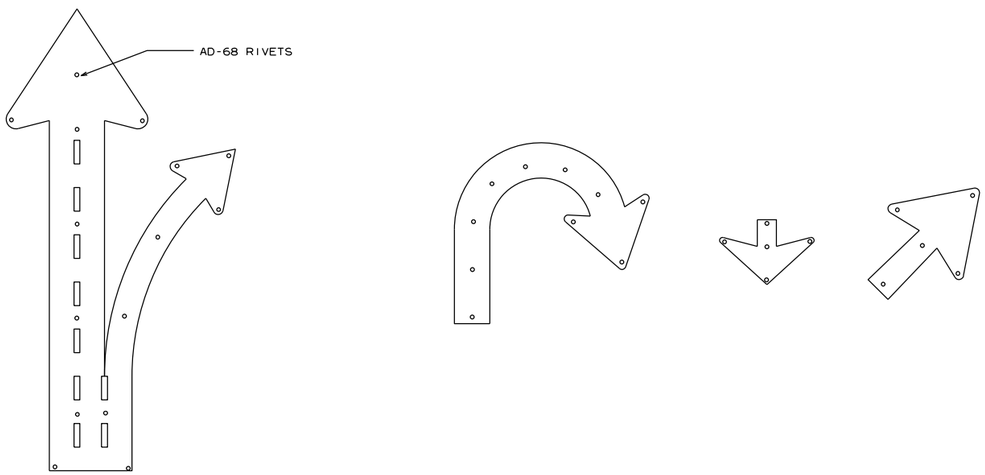
			ARKANSAS STATE HIGHWAY COMMISSION
			DETAILS OF GUIDE SIGN PANELS
9-12-13	ISSUED		STANDARD DRAWING SHS-5
DATE	REVISION	FILMED	

THE CONTRACTOR SHALL DRILL AND POP-RIVET LEGEND, SHIELDS, ARROWS, OR OTHER COPY AS SHOWN.

MOUNTING DETAILS FOR DEMOUNTABLE LEGEND ON GUIDE SIGNS







NOTES:

LEGEND ON GUIDE SIGNS ON THE MAIN LANES SHALL BE DEMOUNTABLE LEGEND.
LEGEND ON GUIDE SIGNS ON CROSS ROADS AND RAMPS SHALL BE DIRECT APPLIED.
THE DEMOUNTABLE AND DIRECT APPLIED LEGENDS SHALL BE TYPE IX SHEETING.

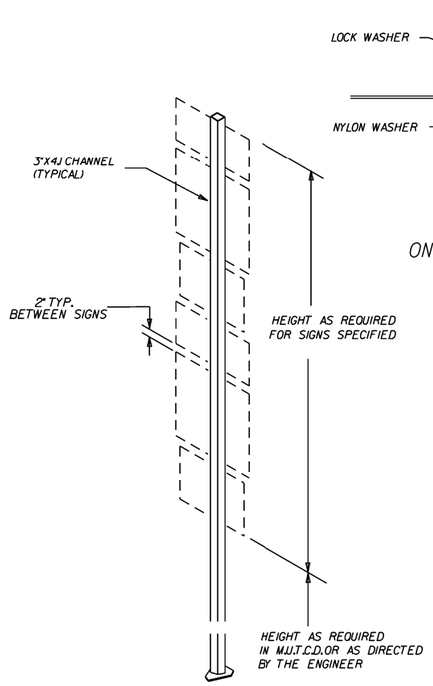
THE BACKGROUND ON ALL GUIDE SIGNS AND STANDARD SIGNS SHALL BE CONSTRUCTED USING TYPE III SHEETING.

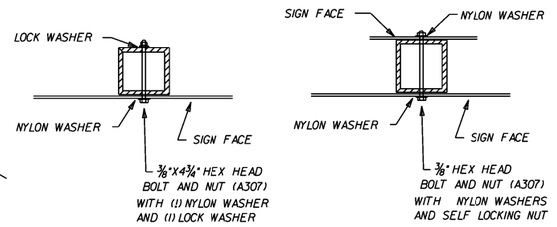
TYPE IX SHEETING FOR BORDER, LEGEND, SHIELDS, ARROWS, OR OTHER COPY SHALL BE ORIENTED VERTICALLY AS PER MANUFACTURERS' DATUM MARKS, ORIENTATION MARKS, OR OTHER RECOMMENDATIONS.

SIGN LEGEND, SHIELDS, ARROWS OR OTHER COPY SHALL BE APPLIED WITH RIVETS ONLY.

NO OTHER METHOD OF APPLYING CHARACTERS IS ALLOWED.

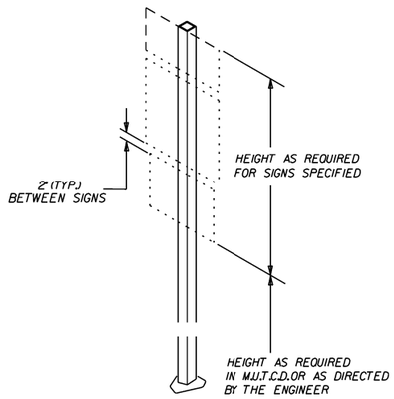
			ARKANSAS STATE HIGHWAY COMMISSION
			MOUNTING DETAILS FOR DEMOUNTABLE LEGEND ON GUIDE SIGNS
9-12-13	ISSUED		STANDARD DRAWING SHS-6
DATE	REVISION	FILMED	





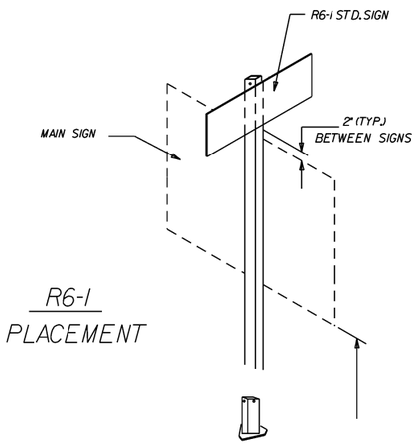
CHANNEL SHALL BE FULL LENGTH OF RECTANGULAR AND SQUARE SIGNS AND SHALL EXTEND 1 1/2" BEYOND BOLT HOLES ON DIAMOND OR IRREGULAR SHAPED SIGNS.

MOUNTING HARDWARE

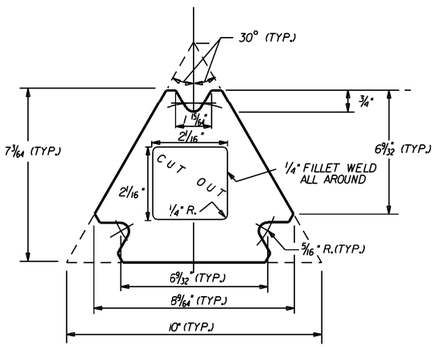


TYPE-I

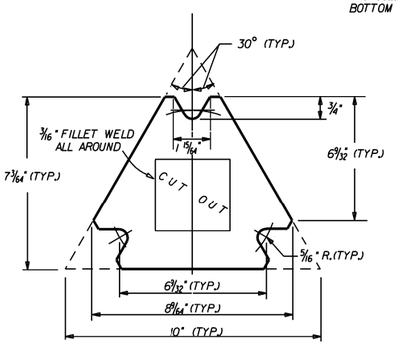
BASIS OF ESTIMATE
APPROX. 100 lbs STEEL



R6-1 PLACEMENT



TOP PLATE



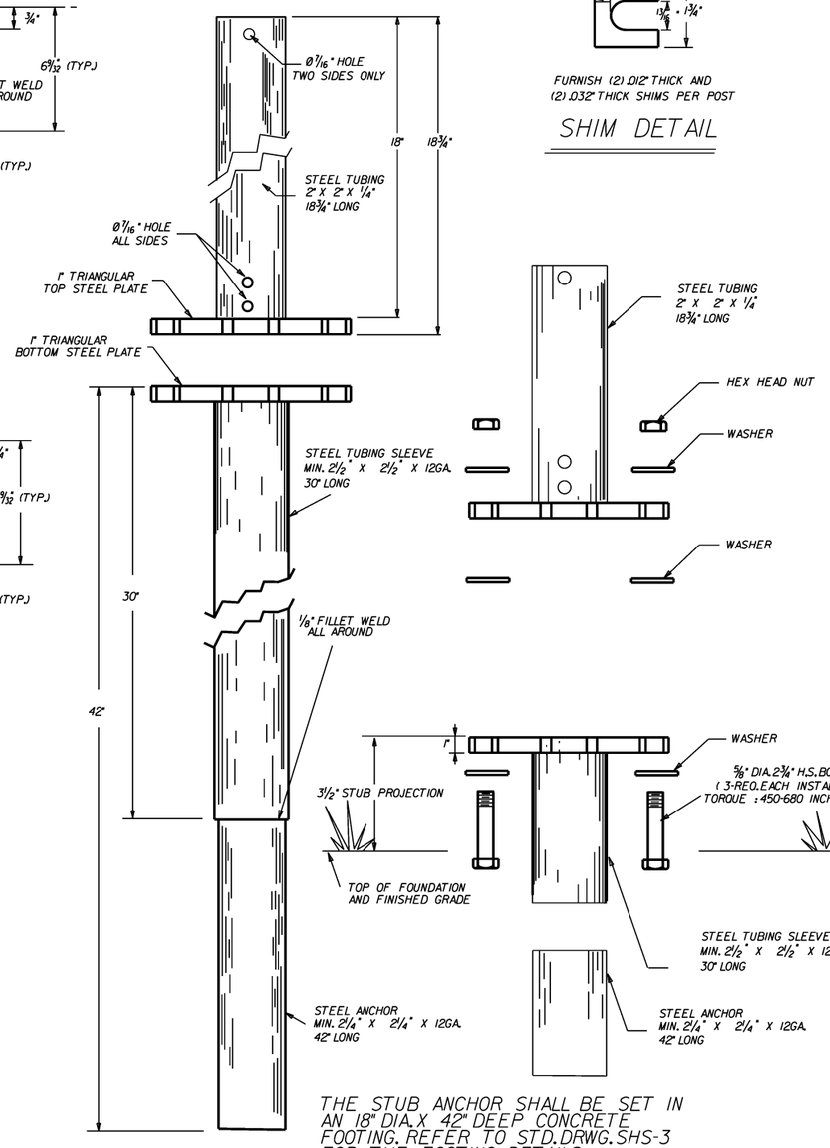
BOTTOM PLATE

GENERAL NOTES:

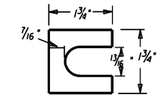
THE TOP PLATE OF TRIANGULAR SLIP BASES SHALL HAVE THE SAME EXTERIOR DIMENSIONS AS THE BOTTOM PLATE.

INSIDE DIAMETER OF THE SIGN POST SHALL BE CUT THROUGH THE CENTER OF THE TOP PLATE WITH THE HOLE EDGE BEVELED AS SHOWN. THE BEVEL END SHALL BE TANGENT TO THE BOLT HOLE. ANY MISALIGNMENT SHALL BE REMOVED BY GRINDING. FACE OF BEVEL SHALL BE FINISHED TO A MINIMUM SMOOTHNESS OF 1-500.

OTHER MASH COMPLIANT BREAKAWAY SIGN SUPPORTS THAT HAVE THE SAME TOP PLATE DIMENSIONS AND SUPPORT 2" X 2 1/4" SQUARE TUBE SIGN POSTS MAY BE SUBSTITUTED AS APPROVED BY THE ENGINEER.



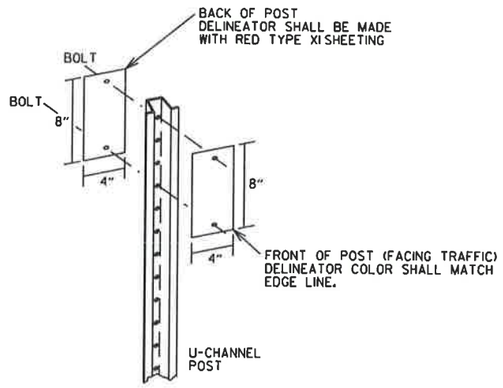
THE STUB ANCHOR SHALL BE SET IN AN 18" DIA. X 42" DEEP CONCRETE FOOTING. REFER TO STD. DRWG. SHS-3 FOR THE FOOTING DETAILS.



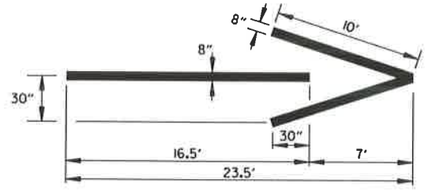
FURNISH (2) .012" THICK AND (2) .032" THICK SHIMS PER POST

SHIM DETAIL

			ARKANSAS STATE HIGHWAY COMMISSION
			DETAIL OF OMNI-DIRECTIONAL BREAKAWAY SIGN SUPPORTS
9-12-13 DATE	ISSUED REVISION	FILMED	STANDARD DRAWING SHS-7



TYPE 2 DELINEATOR DETAILS



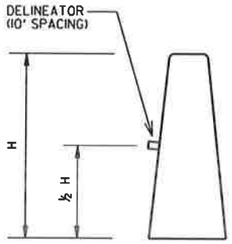
THERMOPLASTIC WRONG-WAY
PAVEMENT ARROWS

NOTE: THERMOPLASTIC WRONG-WAY PAVEMENT ARROWS TO BE PAID FOR AS THERMOPLASTIC PAVEMENT MARKING (ARROWS).

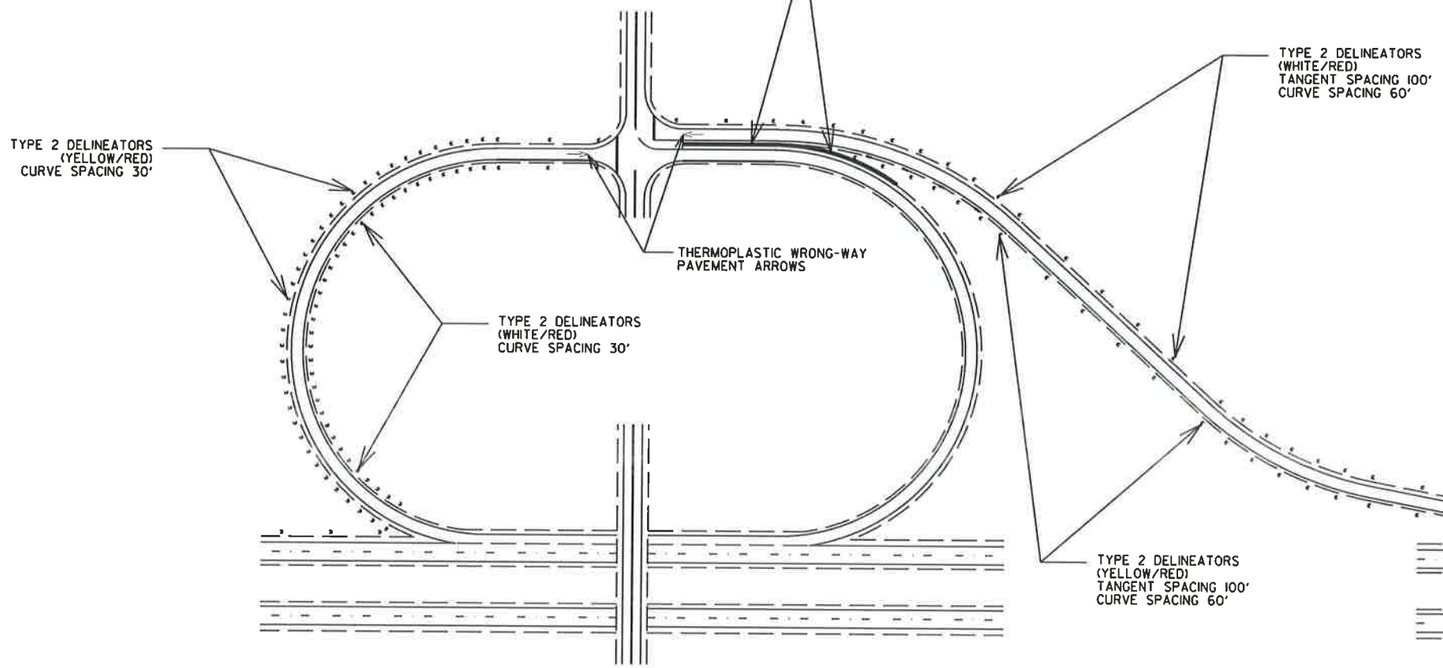
LEGEND

DELINEATOR

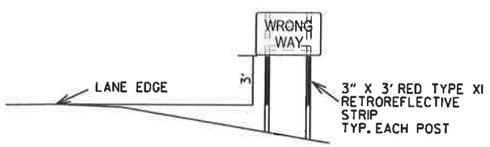
NOTE: WHEN UNIFORM SPACING IS INTERRUPTED BY ROADSIDE OBSTACLES, DELINEATORS ADJACENT TO THE ROADSIDE OBSTACLES MAY BE RELOCATED IN EITHER DIRECTION FOR A DISTANCE NOT EXCEEDING ONE QUARTER OF THE UNIFORM SPACING OR MAY BE ELIMINATED AS DIRECTED BY THE ENGINEER.



PERMANENT BARRIER WALL
DELINEATOR DETAIL

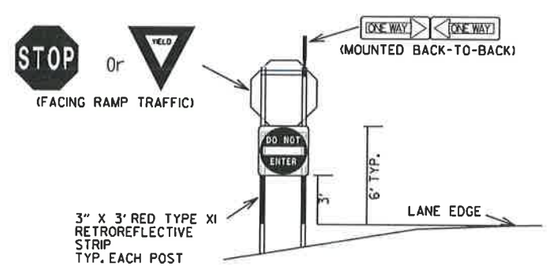


TYPICAL EXIT RAMP DELINEATOR PLACEMENT



WRONG-WAY SIGN ASSEMBLY DETAILS

NOTES
1. WRONG-WAY SIGNS MAY BE MOUNTED ON THE BACK SIDE OF EXISTING SIGN SUPPORTS WHERE POSSIBLE.
2. WRONG-WAY SIGNS ARE NORMALLY GATED, BUT MAY BE OFFSET WHEN BARRIER WALLS ARE PRESENT ON THE INSIDE SHOULDER. IN SUCH CASES, THE SIGN ON THE INSIDE SHOULDER SIDE MAY BE LOCATED PAST THE END OF THE BARRIER WALL. IN RARE CASES WHERE THE BARRIER WALL EXTENDS TO OR NEAR THE MAIN LANES, BOTH SIGNS MAY BE LOCATED ON THE OUTSIDE SHOULDER SIDE OF THE RAMP, WITH APPROXIMATELY 300' SPACING BETWEEN THE SIGNS.



RAMP INTERSECTION SIGN ASSEMBLY DETAILS

THE DELINEATORS SHALL BE PLACED AT A 4' HEIGHT MEASURED FROM THE PAVEMENT EDGE TO THE BOTTOM OF THE DELINEATOR. DELINEATOR POSTS SHALL BE PLACED 2 TO 8 FT. OUTSIDE THE OUTER EDGE OF THE SHOULDER, OR IF APPROPRIATE, IN LINE WITH THE ROADSIDE BARRIER THAT IS 8 FT. OR LESS OUTSIDE THE OUTER EDGE OF THE SHOULDER.

DELINEATOR SPACING IN CURVES SHALL BE REDUCED TO 30' WHEN THE RAMP ADVISORY SPEED IS 30 MPH OR LESS.

IF MULTIPLE LANES EXIST AT THE RAMP TERMINAL, THE THERMOPLASTIC WRONG-WAY ARROW SHALL BE PLACED AS CLOSE TO THE RAMP TERMINAL TURNOUT AS POSSIBLE.

DATE	REVISION	FILMED
11-16-17	ADDED NOTES	
06-01-17	RE-DRAWN	
09-12-13	ISSUED AS STANDARD DRAWING	

ARKANSAS STATE HIGHWAY COMMISSION

TYPICAL EXIT RAMP SIGN AND DELINEATOR DETAILS

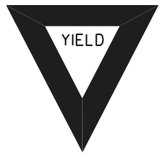
STANDARD DRAWING SHS-8

R1-1



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

R1-2



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

R2-1



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

W3-5



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

W3-5a



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

R4-1



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

R4-2



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

R2-6aP



48"X36"

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

R5-1



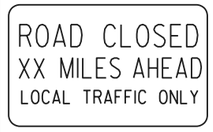
STD. 30"X30"
EXPWY. 36"X36"
SPECIAL 48"X48"

RII-2



48"X30"

RII-3A



60"X30"

RII-4



60"X30"

W21-5a



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

W1-1



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

W1-2



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

R2-11



36"X48"

W1-3



STD. 48"X48"

W1-4



STD. 48"X48"

W1-6



STD. 48"X24"
SPECIAL 60"X30"

W1-8



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

W3-1



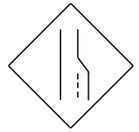
STD. 36"X36"
SPECIAL 48"X48"

W3-2



STD. 36"X36"
SPECIAL 48"X48"

W4-2



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

R56-1



STD. 18"X18"

W5-1



STD. 36"X36"
SPECIAL 48"X48"

W6-3



EXPWY. 36"X36"
SPECIAL 48"X48"

W8-7



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

W9-2



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

W13-1



STD. 24"X24"

W20-1



STD. 48"X48"

W20-2



STD. 48"X48"

W20-3



STD. 48"X48"

W20-4



STD. 48"X48"

W20-5



STD. 48"X48"

W20-7a



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

W21-2



STD. 30"X30"
SPECIAL 36"X36"

W21-5



STD. 30"X30"
SPECIAL 36"X36"

W24-1



STD. 36"X36"

W1-4b



STD. 48"X48"

W8-11



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

W8-9



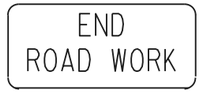
STD. 36"X36"
FWY. 48"X48"

G20-1



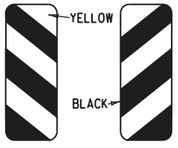
60"X24"

G20-2



48"X24"

OM-3L OM-3R



12"X36"

M4-9



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

M4-10



48"X18"

GENERAL NOTES:

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

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

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

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

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

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

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

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

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

10. R2-6aP PLAQUES SHALL BE MOUNTED BELOW AN APPLICABLE ADVANCE WARNING SIGN THAT IS LOCATED AT LEAST 1500' BUT NOT MORE THAN 1 MILE IN ADVANCE OF THE WORK ZONE. IF A SPEED LIMIT REDUCTION IS IN EFFECT, THE PLAQUE SHALL BE PLACED A MINIMUM OF 500' IN ADVANCE OF THE W3-5 "REDUCED SPEED AHEAD" SIGN. R2-11 SIGNS SHALL BE INSTALLED AT OR NEAR THE DOWNSTREAM END OF THE WORK ZONE. SEE STANDARD DRAWINGS TC-2, TC-3, AND TC-6 FOR TYPICAL PLACEMENT LOCATIONS.

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

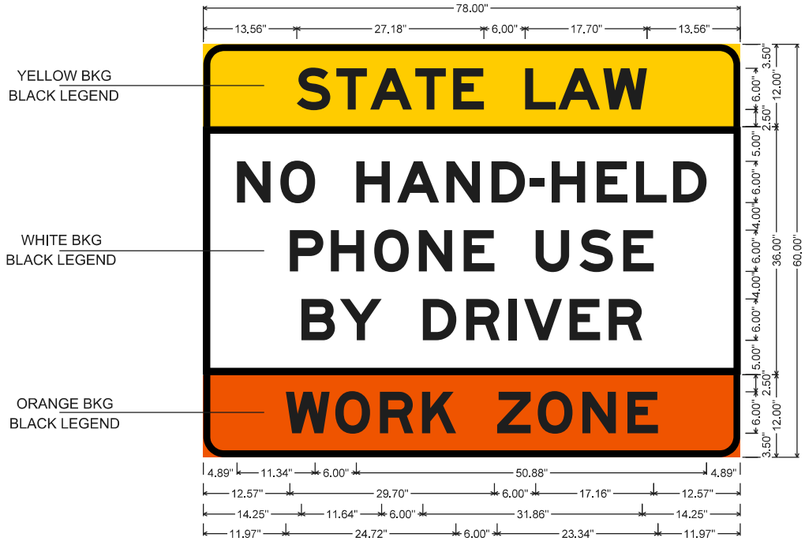
DATE REV	DESCRIPTION
08-14-25	REPLACED R55-1 WITH R2-6aP, ADDED R2-11 & REVISED NOTE 10
11-07-19	REVISED FOR MASH
04-13-17	DELETED RSP-1 & ADDED W21-5a
09-02-15	REVISED REDUCED SPEED LIMIT AHEAD SIGNS, REVISED ROAD WORK NEXT XX MILES
12-15-11	REVISED W24-1

ARDOT ARKANSAS DEPARTMENT OF TRANSPORTATION

ARKANSAS STATE HIGHWAY COMMISSION

STANDARD TRAFFIC CONTROLS FOR HIGHWAY CONSTRUCTION

DATE EFFECTIVE	STANDARD DRAWING	TC-1
08-14-2025		

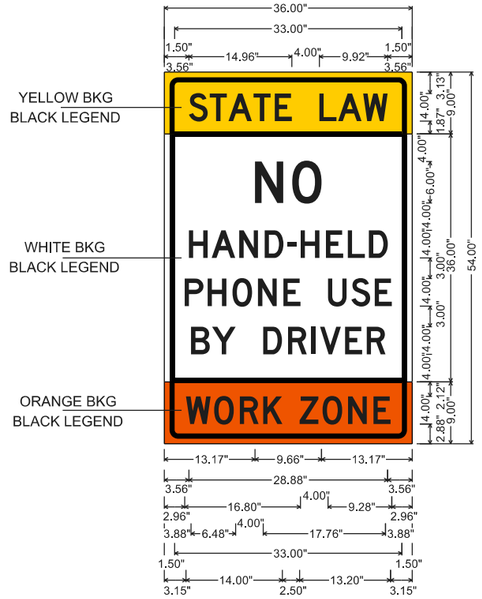


3.0" Radius, 1.0" Border, Black on Yellow;
"STATE LAW", E Mod 2K;

3.0" Radius, 1.0" Border, Black on White;
"NO HAND-HELD", E Mod 2K; "PHONE USE", E Mod 2K; "BY DRIVER", E Mod 2K;

3.0" Radius, 1.0" Border, Black on Orange;
"WORK ZONE", E Mod 2K;

WZ-4 (INTERSTATE) SIGN

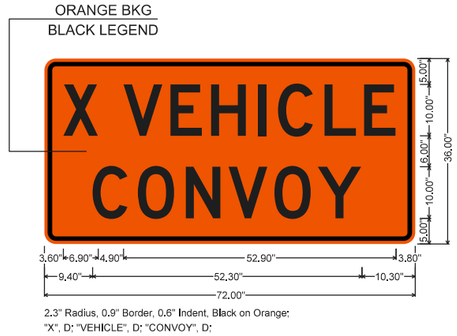


2.00" Radius, 0.75" Border, 0.75" Indent, Black on Yellow;
"STATE LAW", D 2K;

3.00" Radius, 0.75" Border, 0.75" Indent, Black on White;
"NO", D 2K; "HAND-HELD", D 2K;
"PHONE USE", D 2K;
"BY DRIVER", D 2K;

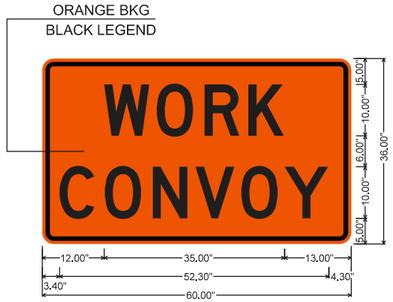
2.00" Radius, 0.75" Border, 0.75" Indent, Black on Orange;
"WORK", D 2K; "ZONE", D 2K;

WZ-4 (NON-INTERSTATE) SIGN



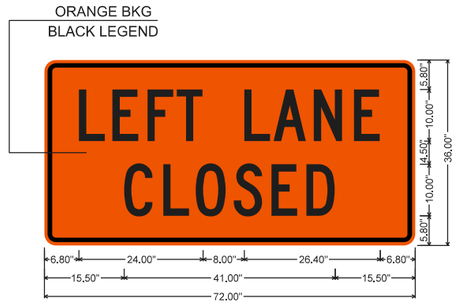
2.3" Radius, 0.9" Border, 0.6" Indent, Black on Orange;
"X", D; "VEHICLE", D; "CONVOY", D;

WZ-2 SIGN



2.3" Radius, 0.9" Border, 0.6" Indent, Black on Orange;
"WORK", D; "CONVOY", D;

WZ-3 SIGN



2.3" Radius, 0.9" Border, 0.6" Indent, Black on Orange;
"LEFT LANE", C; "CLOSED", C;

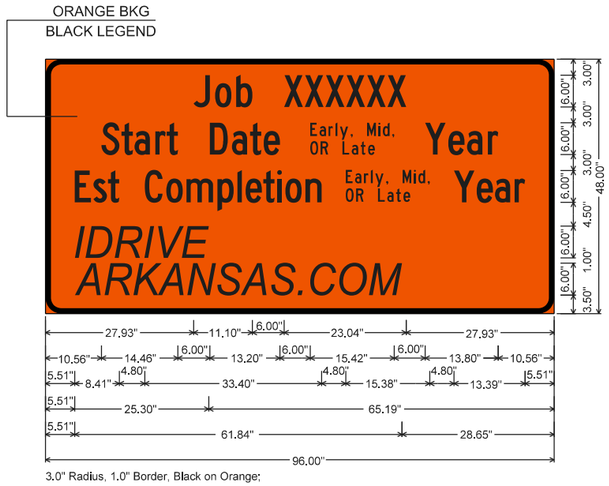
WZ-W20-5L SIGN



2.3" Radius, 0.9" Border, 0.6" Indent, Black on Orange;
"RIGHT", C specified length; "LANE", C specified length;
"CLOSED", C specified length;

WZ-W20-5R SIGN

NOTE: REFER TO STANDARD DRAWING TC-1 FOR GENERAL NOTES.



3.0" Radius, 1.0" Border, Black on Orange;
"Job XXXXXX" C 2K; "Start Date Xxxx Year" C 2K;
"Est Completion Xxxx Year" C 2K 80% spacing;
"IDRIVE" Arial, Italic; "ARKANSAS.COM" Arial, Italic;

CONSTRUCTION PROJECT INFORMATION SIGN



WZ-1 (INTERSTATE) SIGN



2.3" Radius, 0.9" Border, 0.6" Indent, Black on Orange;
"CENTER LANE", B 2K; "CLOSED", C;

WZ-W20-5C SIGN

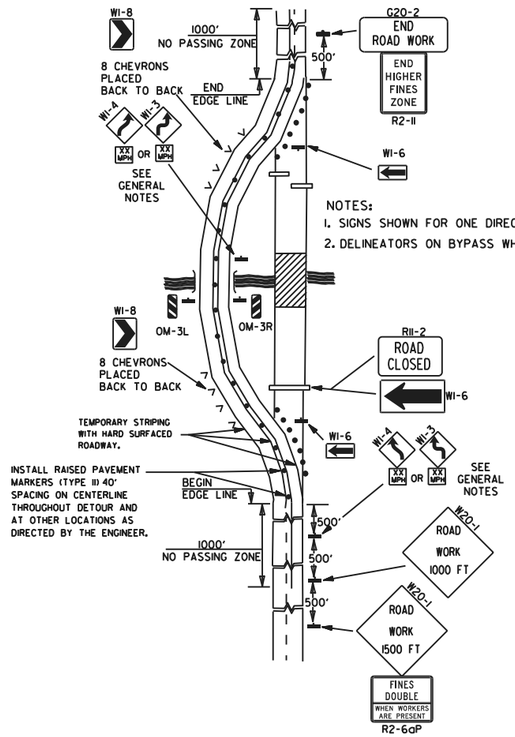
MOBILE WORK ZONE SIGNS

DATE REV	DESCRIPTION
04-09-26	ISSUED

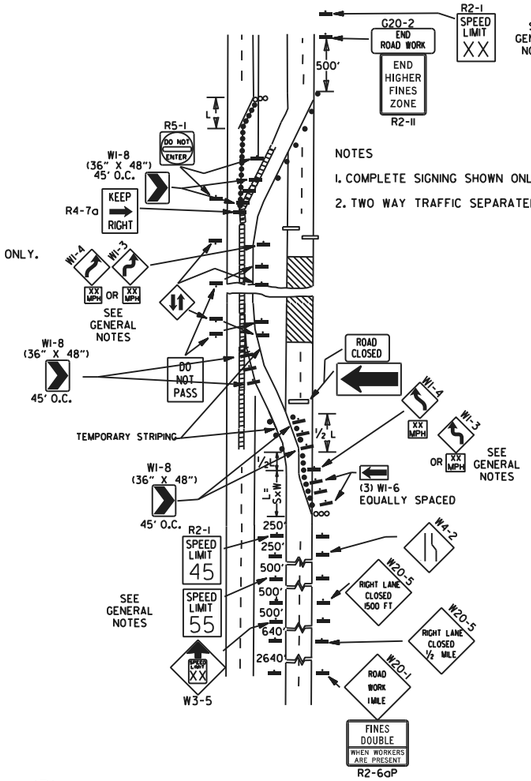
ARKANSAS STATE HIGHWAY COMMISSION

STANDARD TRAFFIC CONTROLS FOR HIGHWAY CONSTRUCTION

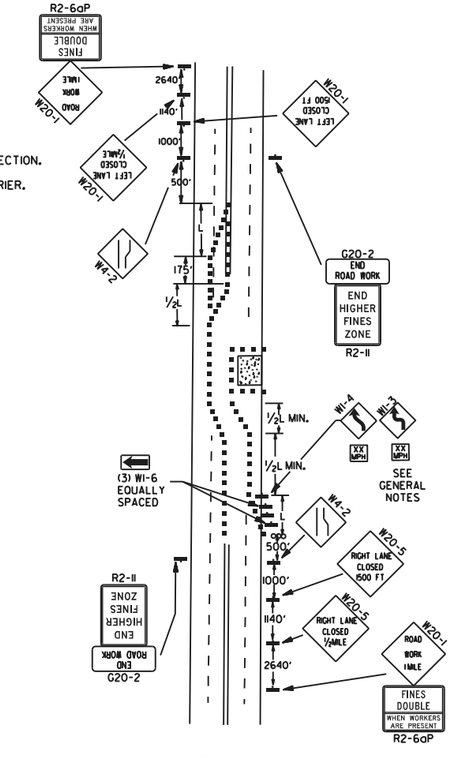
DATE EFFECTIVE	STANDARD DRAWING	TC-1A
04-09-2026		



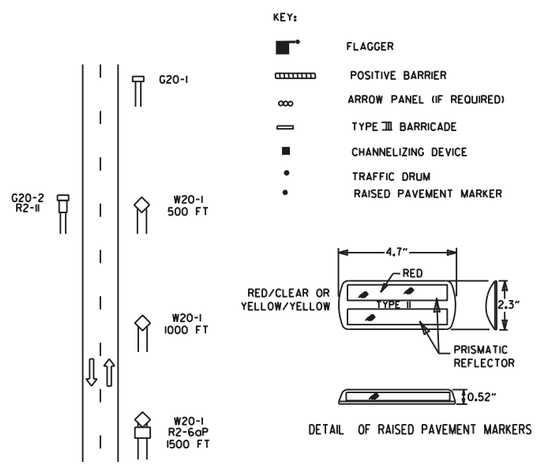
(A) TYPICAL APPLICATION OF TRAFFIC CONTROL DEVICES ON A 2-LANE HIGHWAY WHERE THE ENTIRE ROADWAY IS CLOSED AND A BYPASS DETOUR IS PROVIDED.



(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.



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:

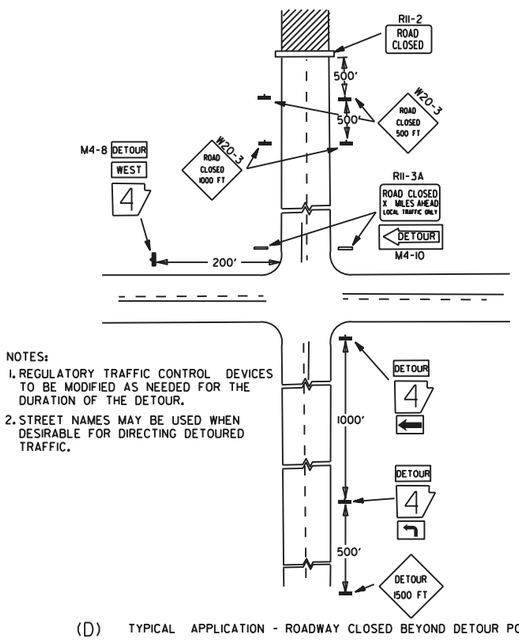
L= MINIMUM LENGTH OF TAPER.

S= NUMERICAL VALUE OF POSTED SPEED LIMIT PRIOR TO WORK OR 85TH PERCENTILE SPEED.

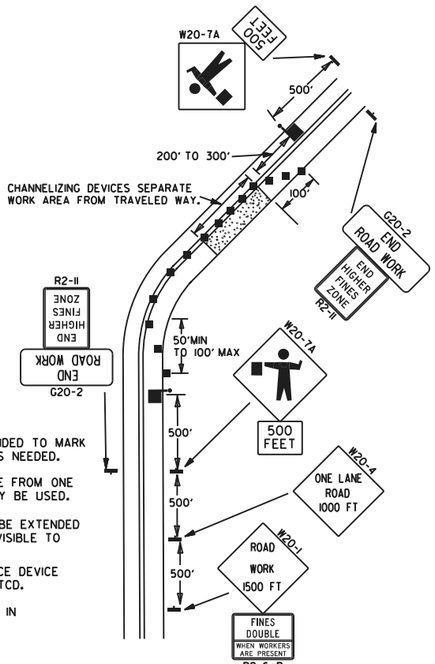
W= WIDTH OF OFFSET.

GENERAL NOTES:

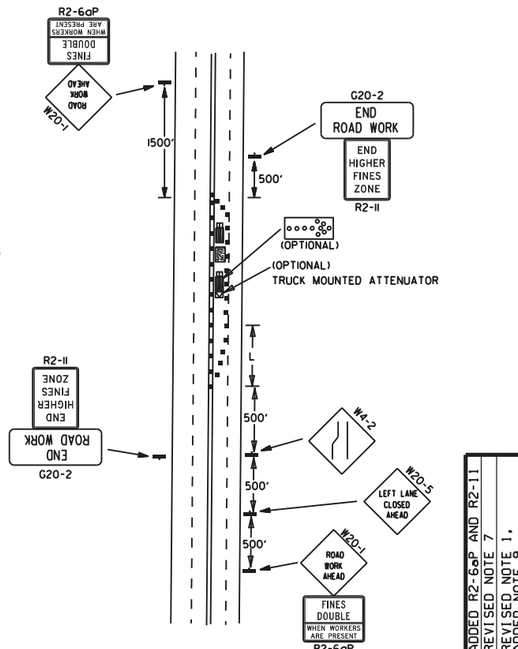
1. THE MAINTENANCE DIVISION SHALL CONDUCT A BALL BANK STUDY TO DETERMINE THE ADVISORY SPEED LIMIT PRIOR TO OPENING TO TRAFFIC. THE ADVISORY SPEED WILL BE POSTED ON W1-3 OR W1-4 CURVE WARNING SIGNS. USE W1-4 WHEN SPEED IS GREATER THAN 30MPH AND W1-3 WHEN 30MPH OR LESS
2. WHEN THE EXISTING SPEED LIMIT IS 55MPH AND THE PLANS REQUIRE A SPEED LIMIT OF 45MPH, THE R2-1(55) SHALL BE OMITTED AND THE W3-5 SHALL BE INSTALLED AT THAT LOCATION. ADDITIONAL R2-1 45MPH SPEED LIMIT SIGNS SHALL BE INSTALLED AT A MAXIMUM OF 1MILE INTERVALS. AT THE END OF THE WORK AREA A R2-1(XX) SHALL BE INSTALLED TO MATCH ORIGINAL SPEED LIMIT.
3. WHEN THE EXISTING SPEED LIMIT IS 65MPH AND THE PLANS REQUIRE A SPEED LIMIT OF 55MPH, THE R2-1(45) SHALL BE OMITTED. ADDITIONAL R2-1 55MPH SPEED LIMIT SIGNS SHALL BE INSTALLED AT A MAXIMUM OF 1MILE INTERVALS. AT THE END OF THE WORK AREA A R2-1(XX) SHALL BE INSTALLED TO MATCH ORIGINAL SPEED LIMIT.
4. THE MAXIMUM SPACING BETWEEN CHANNELIZING DEVICES IN A TAPER SHOULD BE APPROXIMATELY EQUAL IN FEET TO THE SPEED LIMIT. BEYOND THE TAPER, MAXIMUM SPACING SHALL BE TWO TIMES THE SPEED LIMIT, OR AS DIRECTED BY THE ENGINEER.
5. WARNING LIGHTS AND/OR FLAGS MAY BE MOUNTED TO SIGNS OR CHANNELIZING DEVICES AT NIGHT AS NEEDED.
6. PAVEMENT MARKINGS NO LONGER APPLICABLE WHICH MIGHT CREATE CONFUSION IN THE MINDS OF VEHICLE OPERATORS SHALL BE REMOVED OR OBLITERATED AS SOON AS PRACTICABLE.
7. TRAILER MOUNTED DEVICES SUCH AS ARROW PANELS AND PORTABLE CHANGEABLE MESSAGE SIGNS SHALL BE DELINEATED BY AFFIXING 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. PAYMENT FOR TRAFFIC DRUMS SHALL BE CONSIDERED INCLUDED IN THE PRICE BID FOR VARIOUS TRAILER MOUNTED DEVICES.
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 ARDOT QUALIFIED PRODUCTS LIST.
9. ALL TRAILER MOUNTED DEVICES SUCH AS ARROW PANELS AND PORTABLE CHANGEABLE MESSAGE SIGNS SHALL MEET THE REQUIREMENTS OF THE MANUAL FOR ASSESSING SAFETY HARDWARE (MASH).



(D) TYPICAL APPLICATION - ROADWAY CLOSED BEYOND DETOUR POINT.



(E) TYPICAL APPLICATION OF TRAFFIC CONTROL DEVICES ON 2-LANE HIGHWAY WHERE ONE LANE IS CLOSED AND FLAGGING IS PROVIDED.



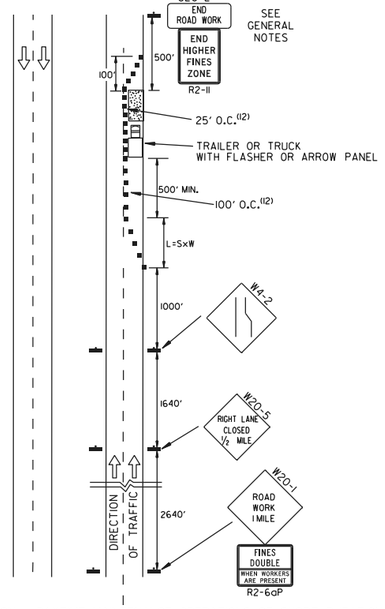
(F) TYPICAL APPLICATION - 4-LANE UNDIVIDED ROADWAY WITH INSIDE LANE CLOSED.

DATE REV	DESCRIPTION
08-14-25	ADDED R2-6aP AND R2-11
05-20-21	REVISED NOTE 7
11-07-19	REVISED NOTE 1. ADDED NOTE 9
09-02-15	REVISED NOTE 2, ADDED NOTE 8, REVISED DRAWING (AT & REPLACED R2-5A WITH W3-5
09-12-13	REVISED DETAIL OF RAISED PAVEMENT MARKINGS

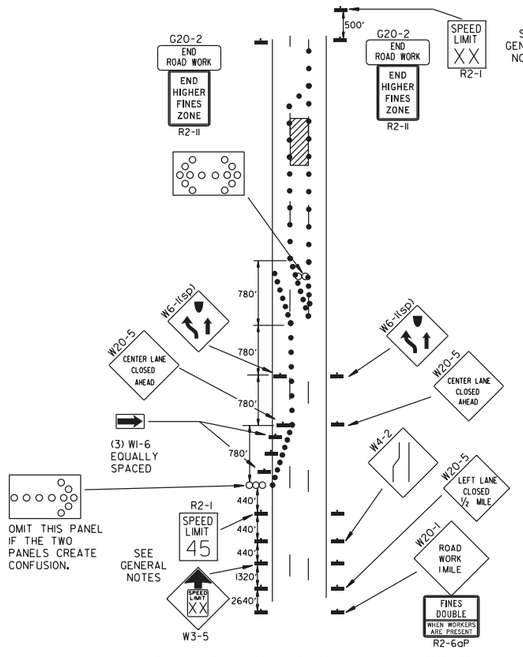
ARKANSAS STATE HIGHWAY COMMISSION

STANDARD TRAFFIC CONTROLS FOR HIGHWAY CONSTRUCTION

DATE EFFECTIVE	STANDARD DRAWING	TC-2
08-14-2025		



(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:

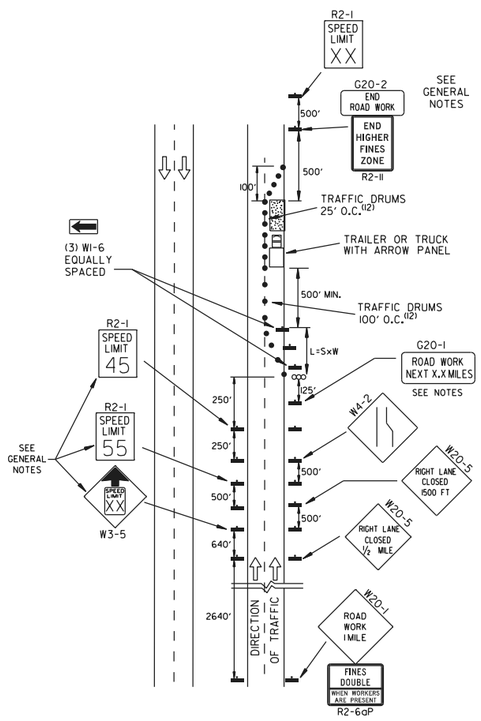
○○○ ARROW PANEL (IF REQUIRED)

■ CHANNELIZING DEVICE

● TRAFFIC DRUM

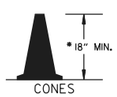
GENERAL NOTES:

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-I(55) SHALL BE OMITTED AND THE W3-5 SHALL BE INSTALLED AT THAT LOCATION. ADDITIONAL R2-I 45MPH SPEED LIMIT SIGNS SHALL BE INSTALLED AT A MAXIMUM OF 1MILE INTERVALS. AT THE END OF THE WORK AREA A R2-I(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-I(45) SHALL BE OMITTED. ADDITIONAL R2-I 55MPH SPEED LIMIT SIGNS SHALL BE INSTALLED AT A MAXIMUM OF 1MILE INTERVALS. AT THE END OF THE WORK AREA A R2-I(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 SHOULD BE INSTALLED ON JOBS OF OVER TWO MILES IN LENGTH. WHEN THE LANE CLOSURE IS NOT AT THE BEGINNING OF THE PROJECT, THE G20-1 SIGN SHALL BE ERECTED 125' IN ADVANCE OF THE JOB LIMIT. ADDITIONAL W20-1 (1 MILE) SIGNS ARE NOT REQUIRED IN ADVANCE OF LANE CLOSURES THAT BEGIN INSIDE THE PROJECT LIMITS. THE DISTANCE DISPLAYED ON THE G20-1 SIGN SHALL BE STATED TO THE NEAREST WHOLE MILE.
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 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. PAYMENT FOR TRAFFIC DRUMS SHALL BE CONSIDERED INCLUDED IN THE PRICE BID FOR VARIOUS TRAILER MOUNTED DEVICES.
11. ALL TRAILER MOUNTED DEVICES SUCH AS ARROW PANELS AND PORTABLE CHANGEABLE MESSAGE SIGNS SHALL MEET THE REQUIREMENTS OF THE MANUAL FOR ASSESSING SAFETY HARDWARE (MASH).
12. ONLY WHERE SPACE RESTRICTIONS DO NOT ALLOW FOR TRAFFIC DRUMS, TUBULAR MARKERS MAY BE USED AT 50' O.C. IN STABILIZATION ZONES AND AT 10' O.C. DIRECTLY ADJACENT TO CONSTRUCTION OPERATIONS AND AT EXIT TAPERS. TUBULAR MARKERS SHALL BE STABILIZED WITH WEIGHTED BASES IN ACCORDANCE WITH THE M.U.T.C.D.

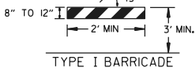


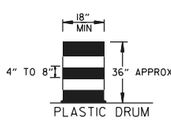
(C) TYPICAL APPLICATION - CONSTRUCTION OPERATIONS OF INTERMEDIATE TO LONG TERM DURATION ON A 4-LANE DIVIDED ROADWAY WHERE HALF OF THE ROADWAY IS CLOSED.

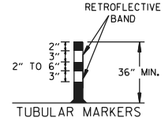
CHANNELIZING DEVICES

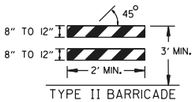


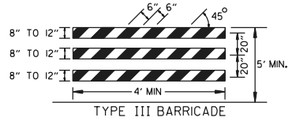
* WHEN CONES ARE USED ON FREEWAYS AND MULTI-LANE HIGHWAYS, THEY SHALL BE 28" MIN. DURING HOURS OF DARKNESS, 28" CONES SHALL BE USED ON ALL ROADWAYS, AND SHALL BE REFLECTORIZED IN ACCORDANCE WITH THE M.U.T.C.D.



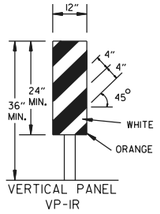


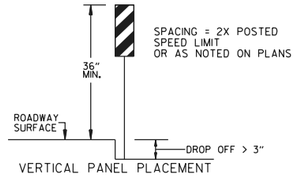


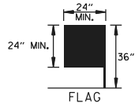




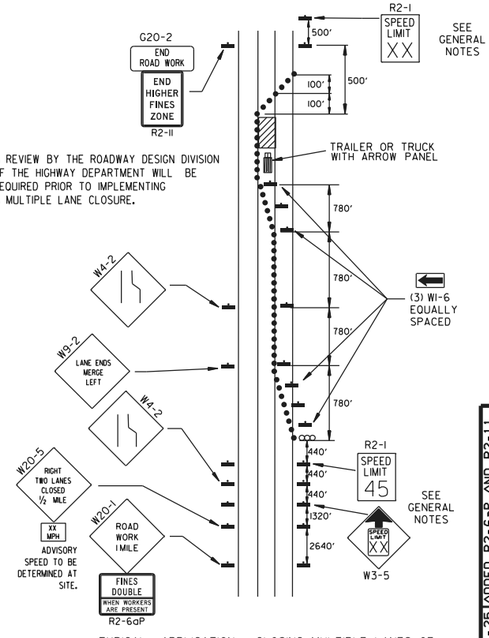
NOTE:
FOR ALL ROAD CLOSURES, THE TYPE III BARRICADES SHALL BE OF SUFFICIENT LENGTH TO EXTEND ACROSS ENTIRE ROADWAY.







FLAG SHALL BE OF GOOD GRADE RED MATERIAL



(D) TYPICAL APPLICATION - CLOSING MULTIPLE LANES OF A MULTILANE HIGHWAY.

TRAFFIC CONTROL DEVICES

NON-INTERSTATE

VERTICAL DIFFERENTIAL	LOCATION	TRAFFIC CONTROL ≤ 45 MPH	TRAFFIC CONTROL > 45 MPH
≤ 1"	CENTERLINE	W8-11	W8-11
> 1" ≤ 3"	CENTERLINE	W8-11 AND CENTERLINE LANE STRIPING	W8-11 AND CENTERLINE LANE STRIPING
> 3"	CENTERLINE	STANDARD LANE CLOSURE(6)	STANDARD LANE CLOSURE(6)
≤ 3"	EDGE OF TRAVELED LANE OR EDGE OF SHOULDER	W8-9 AND TRAFFIC DRUMS(1)	W8-9 AND TRAFFIC DRUMS(1)
> 3" ≤ 6"	EDGE OF TRAVELED LANE OR EDGE OF SHOULDER	W8-17, EDGE LINE STRIPING, AND TRAFFIC DRUMS(1)	W8-17, EDGE LINE STRIPING, AND TRAFFIC DRUMS(1)
> 6" ≤ 18"	EDGE OF TRAVELED LANE OR EDGE OF SHOULDER	W8-17, EDGE LINE STRIPING, AND TRAFFIC DRUMS(1)	W8-17, EDGE LINE STRIPING, AND TRAFFIC DRUMS(2)
> 18" ≤ 24"	EDGE OF TRAVELED LANE OR EDGE OF SHOULDER	W8-17, EDGE LINE STRIPING, AND TRAFFIC DRUMS(1)	A STABILIZED WEDGE, W8-17, EDGE LINE STRIPING, AND TRAFFIC DRUMS(3)
> 24"	EDGE OF TRAVELED LANE OR EDGE OF SHOULDER	PRECAST CONCRETE BARRIER(4) & EDGE LINES	PRECAST CONCRETE BARRIER(4) & EDGE LINES

INTERSTATE

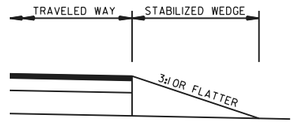
VERTICAL DIFFERENTIAL	LOCATION	TRAFFIC CONTROL
≤ 3"	CENTERLINE	W8-11 AND LANE STRIPING
≤ 3"	EDGE OF TRAVELED LANE OR EDGE OF SHOULDER	W8-9, EDGE LINE STRIPING, AND TRAFFIC DRUMS(2)
> 3" ≤ 6"	EDGE OF TRAVELED LANE OR EDGE OF SHOULDER	W8-17, EDGE LINE STRIPING, AND TRAFFIC DRUMS(2)
> 6"	EDGE OF TRAVELED LANE OR EDGE OF SHOULDER	PRECAST CONCRETE BARRIER & EDGE LINES

INTERSTATE AND NON-INTERSTATE

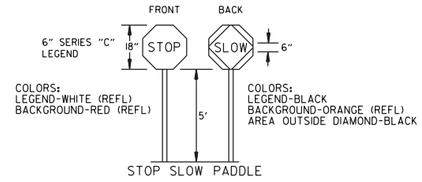
FORESLOPE	HEIGHT	TRAFFIC CONTROL
1:1	> 2 FT	PRECAST CONCRETE BARRIER
2:1	≤ 5 FT	TRAFFIC DRUMS
2:1	> 5 FT	PRECAST CONCRETE BARRIER
Flatter than 2:1	N/A	TRAFFIC DRUMS

GENERAL NOTES:

1. WHEN THE SHOULDER AREA IS USED AS PART OF THE TRAVELED LANE AND THERE IS INSUFFICIENT WIDTH TO PLACE TRAFFIC DRUMS ON THE REMAINING SHOULDER WIDTH, THEN VERTICAL PANELS SHALL BE USED.
2. WHEN THERE IS INSUFFICIENT WIDTH TO PLACE TRAFFIC DRUMS ON THE REMAINING SHOULDER WIDTH, A STABILIZED WEDGE SHALL BE USED.
3. PRECAST CONCRETE BARRIER WALL CAN BE USED IN LIEU OF A STABILIZED WEDGE, W8-17 SIGN, EDGE LINE STRIPING, AND TRAFFIC DRUMS, IF AND WHERE DIRECTED BY THE ENGINEER.
4. A STABILIZED WEDGE, W8-17 SIGN, EDGE LINE STRIPING, AND TRAFFIC DRUMS CAN BE USED IN LIEU OF PRECAST CONCRETE BARRIER WALL, IF AND WHERE DIRECTED BY THE ENGINEER.
5. W21-5, W21-5a, AND/OR W21-5b SIGNS SHALL BE USED WHERE THE ROADWAY IS UNOBSTRUCTED IF AND WHERE DIRECTED BY THE ENGINEER.
6. TIME LIMITATIONS MUST CONFORM TO SECTION 603 OF THE STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION (CURRENT EDITION).



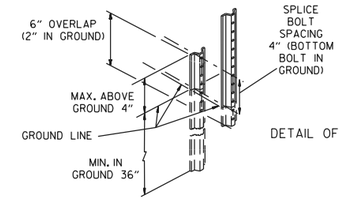
NOTE:
MATERIALS FOR THE STABILIZED WEDGE SHALL MEET THE REQUIREMENTS PROVIDED IN SECTION 603.02 OF THE STANDARD SPECIFICATIONS.

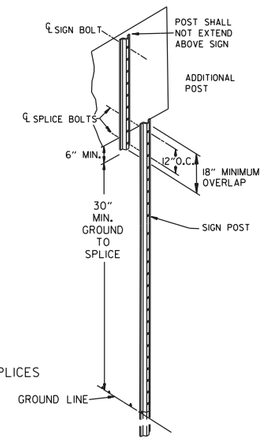


NOTES:
USE SPLICES ONLY WHEN NECESSARY FOR INSTALLATION. TYPICAL INSTALLATION SHOULD HAVE NO SPLICES (SEE STD. DRAWING NO. SHS-2)

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.





DATE REV	DESCRIPTION
08-14-25	ADDED R2-6aP AND R2-11
05-22-25	REVISED TRAFFIC CONTROL DEVICES AND NOTES. ADDED NOTE 12
08-12-21	REVISED TRAFFIC CONTROL DEVICES AND NOTES
05-20-21	REVISED NOTE 10
02-27-20	REVISED TRAFFIC CONTROL DEVICES DETAILS

ARKANSAS STATE HIGHWAY COMMISSION

STANDARD TRAFFIC CONTROLS FOR HIGHWAY CONSTRUCTION

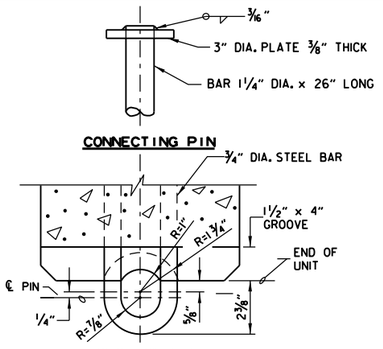
DATE EFFECTIVE 08-14-2025

STANDARD DRAWING

TC-3

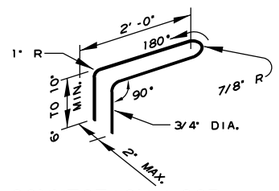
REINFORCING BAR TABLE PER BARRIER UNIT

MARK	LOCATION	BAR SIZE	(NO. BARS)	SKETCH
H-1	HORIZONTAL IN BARRIER TIED INSIDE V-1 BARS	#5	(6)	19'-3"
H-2	CENTERED ABOVE DRAIN SLOTS LONG. & TRANSVERSELY	#5	(6)	6'-6"
H-3	TIED ABOVE H-1 BARS TO SUPPORT H-2, TIED TO V-1	#4	(2)	1'-6"
S-1	OVER LIFT HOLES	#4	(2)	2'-5", LIFTING HOLE, 90°, 3 3/8" R
S-2	HORIZ. AROUND SLOTS BETWEEN V-1'S @ DRAIN SLOTS	#4	(2)	1 1/2" R, SLOTS, 7", 1'-6", 1" MIN. CLEAR TO BAR; 5'-1" BAR W/(4) 1 1/2" R BENDS & MIN. 1'-0" OVERLAP
V-1	VERTICAL IN BARRIER(3) EACH END & (2) AT EACH DRAIN SLOTS	#5	(16)	TOTAL LENGTH 4'-9"; 2 3/16" R; 12°; 1 1/2"; 9"; 2'-1 3/8"; 4 3/8"

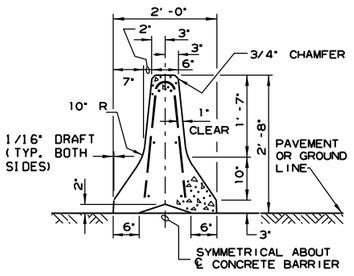


SECTION E-E

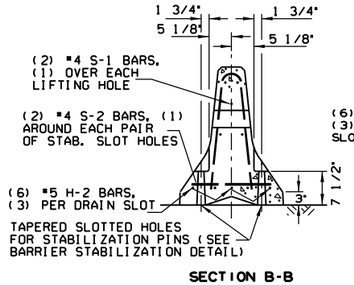
CONNECTION DETAILS



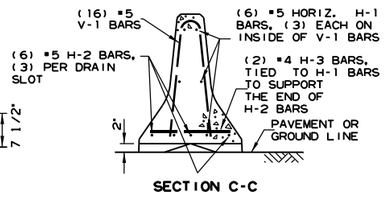
CONNECTION LOOP



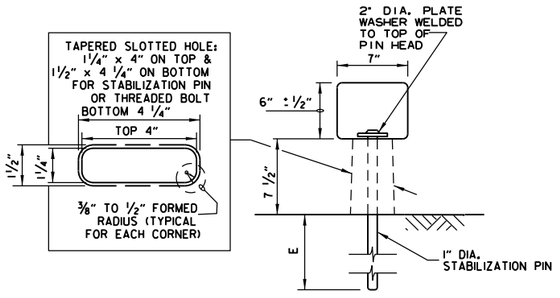
SECTION A-A



SECTION B-B



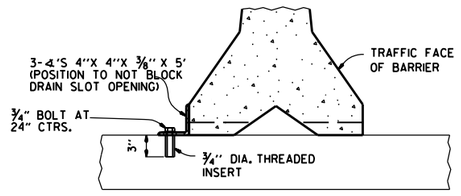
SECTION C-C



BARRIER STABILIZATION DETAIL

ROADWAY SECTION

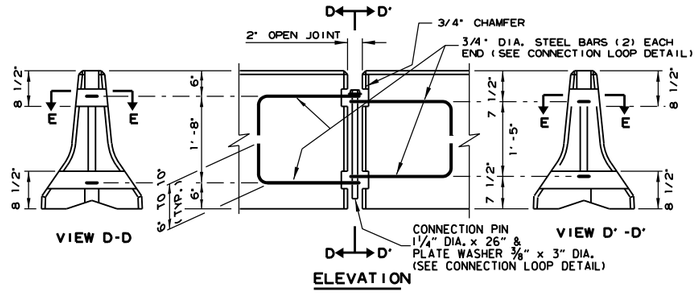
(E) 4" - CONCRETE PAVEMENT
8" - ASPHALT PAVEMENT
12" - SHOULDER AREAS



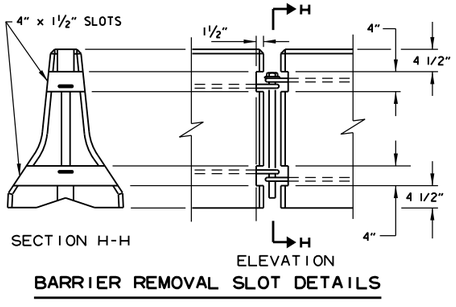
NOTE: " THREADED INSERTS SHALL BE CAST IN PLACE FOR ALL NEW BRIDGE DECKS AND DRILLED AND GROUTED FOR EXISTING BRIDGE DECKS. INSERTS SHALL HAVE A MINIMUM ULTIMATE LOAD CAPACITY OF 8000 LBS. IN TENSION. AFTER REMOVAL OF BARRIER, BOLTS, AND ANGLES, THE INSERTS SHALL BE FILLED WITH APPROVED NON-SHRINK EPOXY.

BARRIER STABILIZATION DETAIL

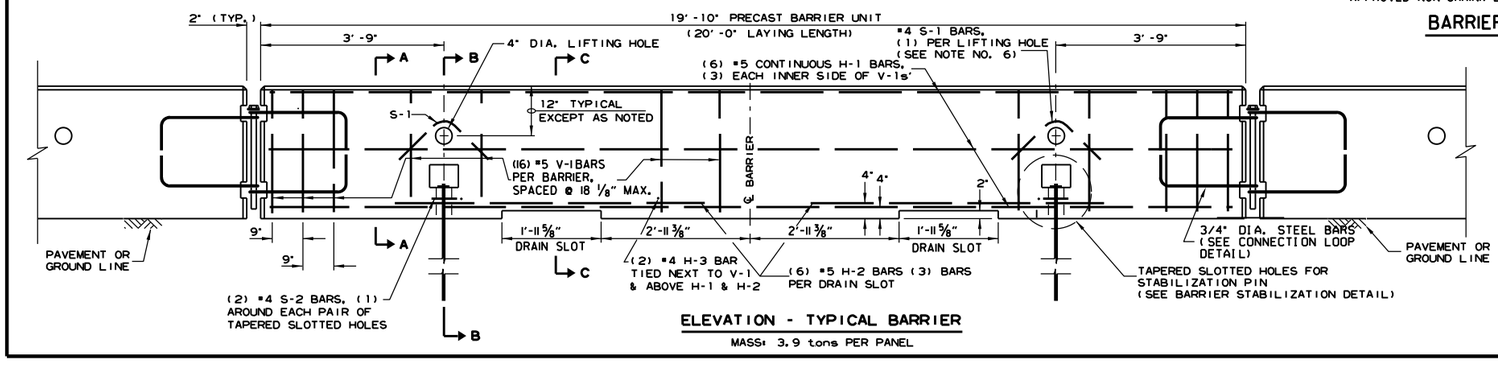
BRIDGE DECKS



ELEVATION



BARRIER REMOVAL SLOT DETAILS



ELEVATION - TYPICAL BARRIER

MASS: 3.9 tons PER PANEL

GENERAL NOTES

(1) 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.

(2) 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 WALL IS 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 ARDOT QUALIFIED PRODUCTS LIST FOR CONSTRUCTION CONCRETE BARRIER MARKERS.
DELINEATOR COLOR SHALL BE IN ACCORDANCE WITH THE MANUAL ON 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.

(3) OTHER PRECAST CONCRETE BARRIERS THAT HAVE BEEN CRASH TESTED AND APPROVED BY THE FEDERAL HIGHWAY ADMINISTRATION TO MEET THE REQUIREMENTS OF 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 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 MANUAL FOR ASSESSING SAFETY HARDWARE (MASH). MIXING OF SHAPES WILL NOT BE ALLOWED IN A CONTINUOUS LINE OF UNITS.

(4) 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.

(5) ATTACH UNITS TO ROADWAY SURFACE WITH STABILIZATION PINS AND TO DECK SLABS USING BOLTS WHEN REQUIRED.

(6) A 4" WHITE PVC SLEEVE MAY BE USED TO FORM THE LIFTING HOLE AND IF USED THE SLEEVE IS TO BE LEFT IN PLACE.

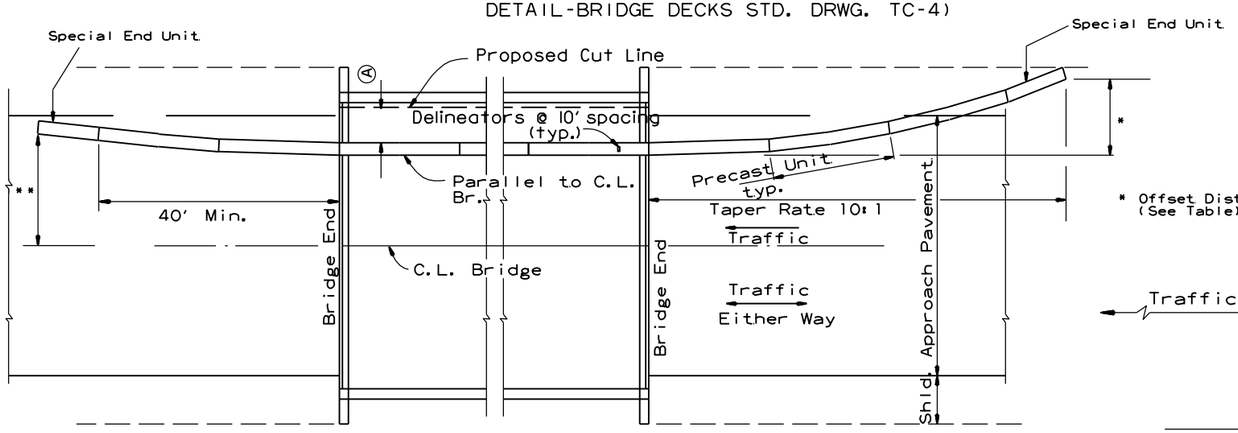
DATE	REVISION	FILMED
11-07-19	REVISED NOTE 3	
2-27-14	REVISED BARRIER STABILIZATION DETAIL	
10-15-09	ADDED REFERENCE TO WASH	
8-5-09	REV. NOTE 3 CONCERNING DRAIN SLOTS	
11-29-07	REVISED NOTE 3	
5-25-06	DELETED GENERAL NOTE 7	
11-18-04	REVISED BARRIER STABILIZATION DETAIL BRIDGE DECKS	
4-10-03	REVISED 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

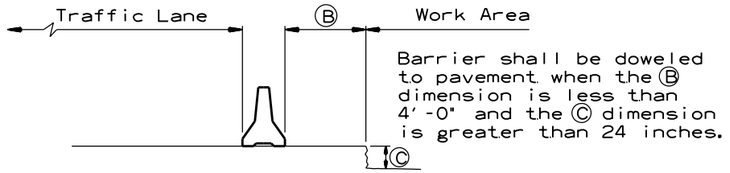
Ⓐ 4 feet or greater preferred. If less than 4 feet, Precast Units shall be connected to slab (SEE BARRIER STABILIZATION DETAIL-BRIDGE DECKS STD. DRWG. TC-4)



* Offset Distance (See Table)

BARRIER PLACEMENT ALONG BRIDGE WITH OFFSET

No Scale

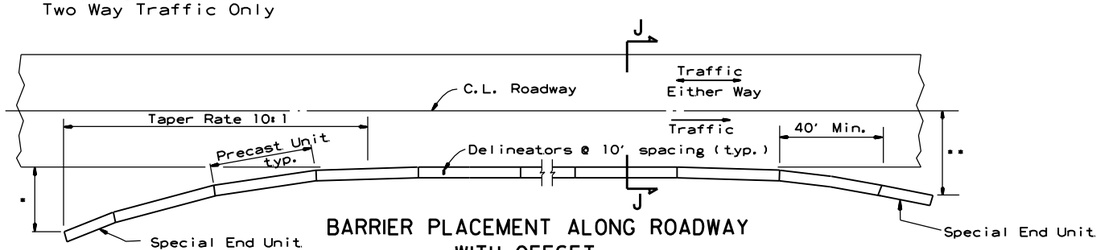


Barrier shall be doweled to pavement when the Ⓑ dimension is less than 4'-0" and the Ⓒ dimension is greater than 24 inches.

SECTION J-J

No Scale

** Offset Distance for Two Way Traffic Only



BARRIER PLACEMENT ALONG ROADWAY WITH OFFSET

No Scale

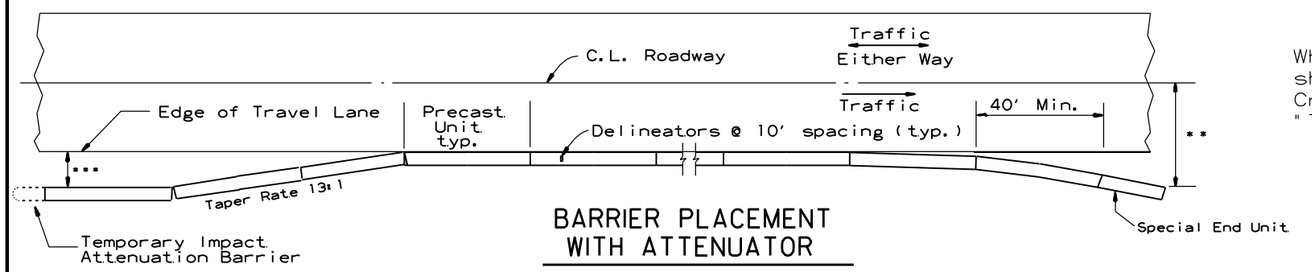
* Offset Distance (See Table)

** Offset Distance For Two Way Traffic Only

Offset Distance Table

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

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

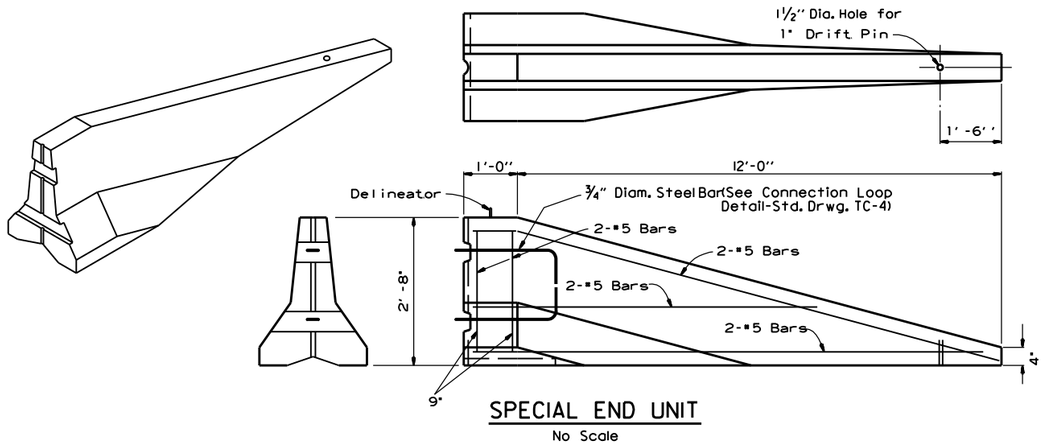


BARRIER PLACEMENT WITH ATTENUATOR

No Scale

** Offset Distance For Two Way Traffic Only

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



SPECIAL END UNIT

No Scale

General Notes

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

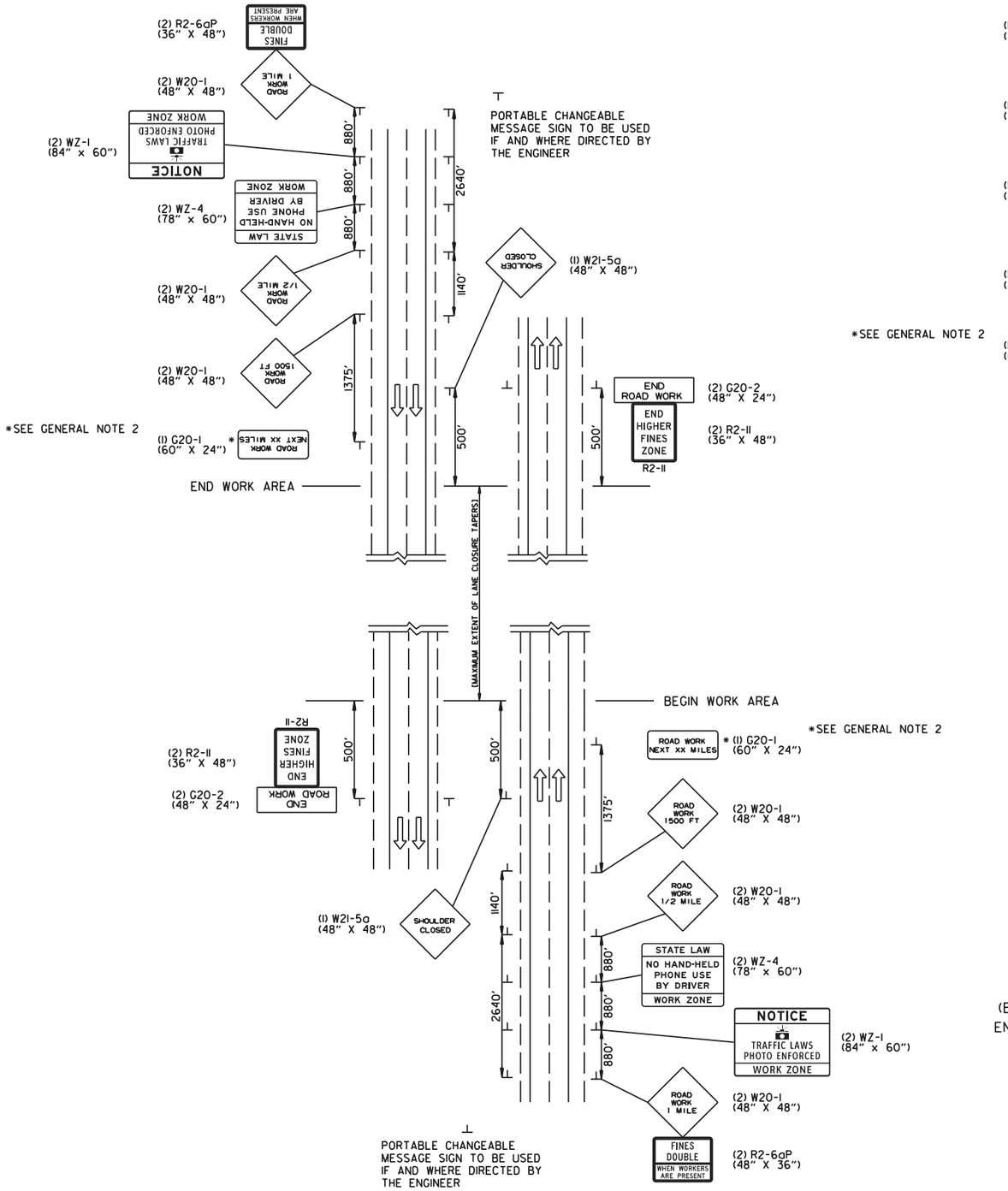
DATE	REVISION	FILMED
11-07-19	REVISED NOTE	
10-15-09	ADDED REFERENCE TO MASH	
5-25-06	REVISED BARRIER PLACEMENT	
8-22-02	ISSUED NEW DRAWING	

ARKANSAS STATE HIGHWAY COMMISSION

STANDARD TRAFFIC CONTROLS FOR HIGHWAY CONSTRUCTION - TEMPORARY PRECAST BARRIER

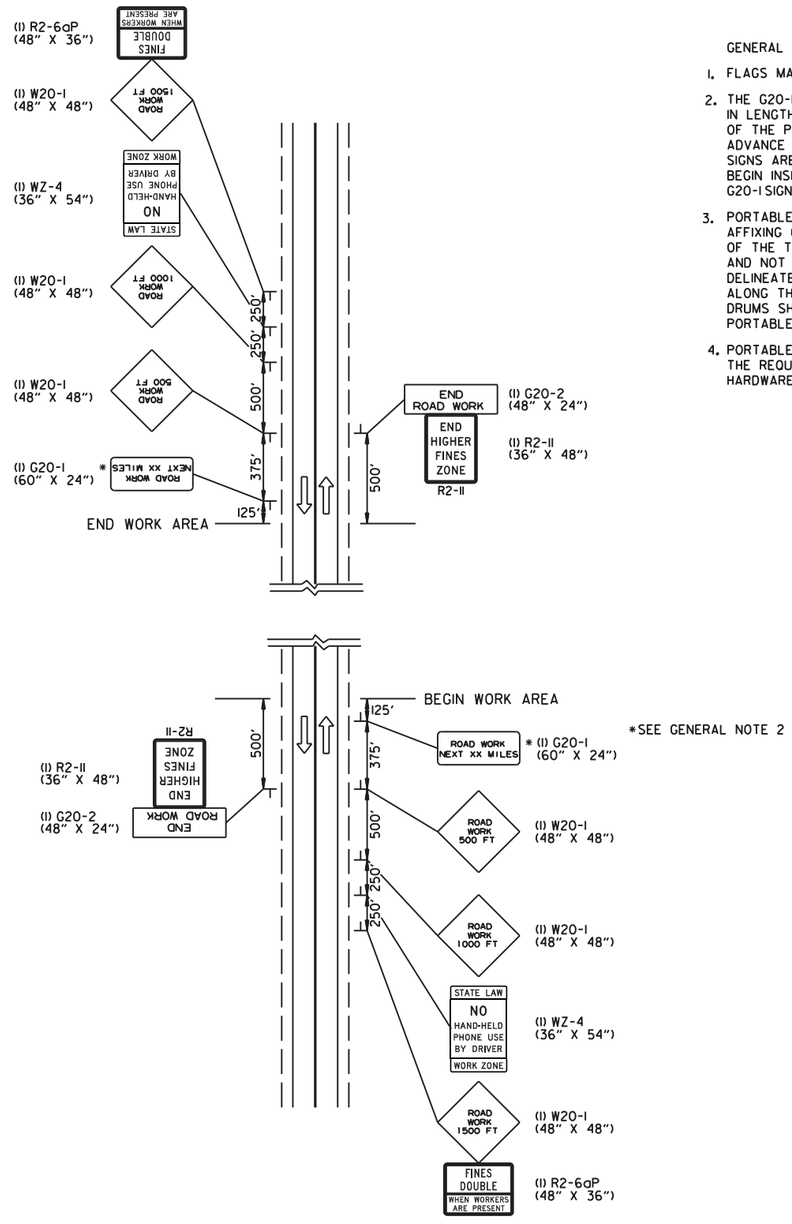
STANDARD DRAWING TC-5

NOTE : W20-1(VARIOUS DISTANCE) ADVANCE SIGNS TO BE REPLACED AS NEEDED BY EQUIVALENT W20-5 SIGNS AS WORKING AREA SHIFTS.



NOTE : W20-1(VARIOUS DISTANCE) ADVANCE SIGNS TO BE REPLACED AS NEEDED BY EQUIVALENT W20-5 SIGNS AS WORKING AREA SHIFTS.

(A) TYPICAL APPLICATION - ADVANCE WARNING SIGNS AT BEGINNING AND END OF JOB (FULLY CONTROLLED ACCESS FACILITIES) (ALL STAGES)



(B) TYPICAL APPLICATION - ADVANCE WARNING SIGNS AT BEGINNING AND END OF JOB (NON-FULLY CONTROLLED ACCESS FACILITIES) (ALL STAGES)

GENERAL NOTES:

1. FLAGS MAY BE MOUNTED TO SIGNS AT NIGHT AS NEEDED.
2. THE G20-1 SIGN SHOULD BE INSTALLED ON JOBS OF OVER TWO MILES IN LENGTH. WHEN THE LANE CLOSURE IS NOT AT THE BEGINNING OF THE PROJECT, THE G20-1 SIGN SHALL BE ERECTED 125' IN ADVANCE OF THE JOB LIMIT. ADDITIONAL W20-1 (1 MILE OR 1500 FT) SIGNS ARE NOT REQUIRED IN ADVANCE OF LANE CLOSURES THAT BEGIN INSIDE THE PROJECT LIMITS. THE DISTANCE DISPLAYED ON THE G20-1 SIGN SHALL BE STATED TO THE NEAREST WHOLE MILE.
3. 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, THIS DEVICE SHALL BE DELINEATED BY PLACING FIVE (5) TRAFFIC DRUMS, EQUALLY SPACED ALONG THE TRAFFIC SIDE OF THE DEVICE. PAYMENT FOR TRAFFIC DRUMS SHALL BE CONSIDERED INCLUDED IN THE PRICE BID FOR PORTABLE CHANGEABLE MESSAGE SIGNS.
4. PORTABLE CHANGEABLE MESSAGE SIGNS SHALL MEET THE REQUIREMENTS OF THE MANUAL FOR ASSESSING SAFETY HARDWARE (MASH).

DATE REV	DESCRIPTION
08-14-25	ISSUED
11-06-25	REPLACED "SPEED" WITH "TRAFFIC LAWS" ON WZ-1
01-22-26	ADDED WZ-4 AND REVISED GENERAL NOTE 1
04-09-26	CORRECTED WZ-4 SIGN DIMENSIONS

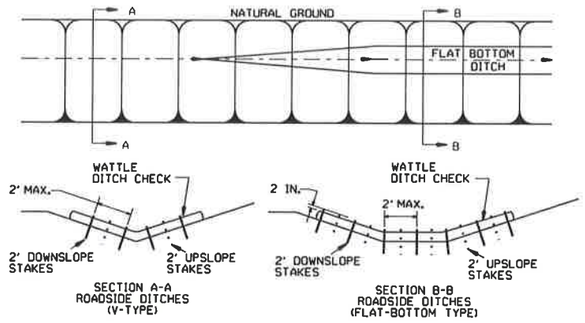
ARKANSAS STATE HIGHWAY COMMISSION

STANDARD TRAFFIC CONTROLS FOR HIGHWAY CONSTRUCTION

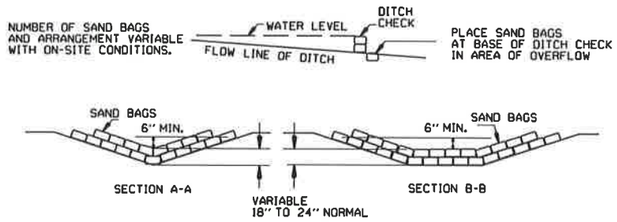
DATE EFFECTIVE	STANDARD DRAWING	TC-6
04-09-2026		

GENERAL NOTES

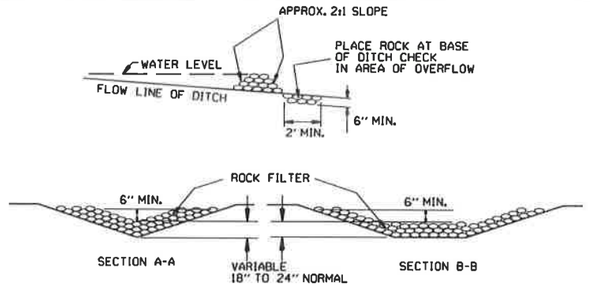
INSTALL A MINIMUM OF 2 UPSLOPE STAKES AND 4 DOWNSLOPE STAKES AT AN ANGLE TO WEDGE WATTLE TO BOTTOM OF DITCH.



WATTLE DITCH CHECK (E-1)



SAND BAG DITCH CHECK (E-5)

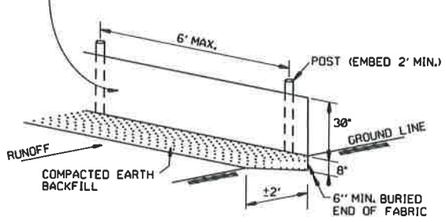


ROCK DITCH CHECK (E-6)

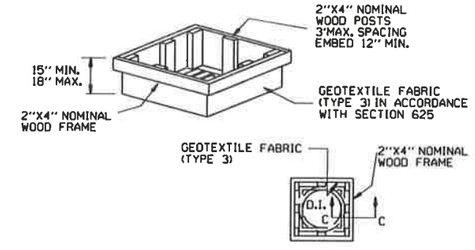
GENERAL NOTES

GEOTEXTILE FABRIC (TYPE 4) IN ACCORDANCE WITH SECTION 625

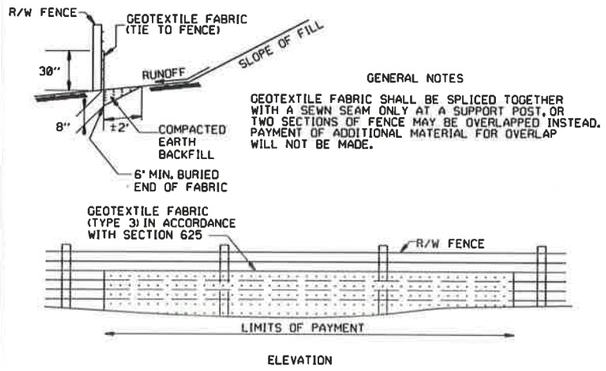
GEOTEXTILE FABRIC SHALL BE SPLICED TOGETHER WITH A SEWN SEAM ONLY AT A SUPPORT POST OR TWO SECTIONS OF FENCE MAY BE OVERLAPPED INSTEAD. PAYMENT OF ADDITIONAL MATERIAL FOR OVERLAP WILL NOT BE MADE.



SILT FENCE (E-11)



DROP INLET SILT FENCE (E-7)



GENERAL NOTES

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

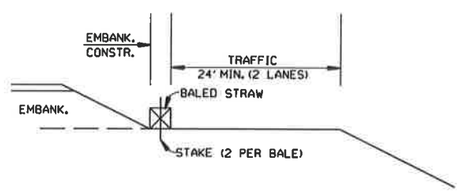
SILT FENCE ON R/W FENCE (E-4)

GENERAL NOTES

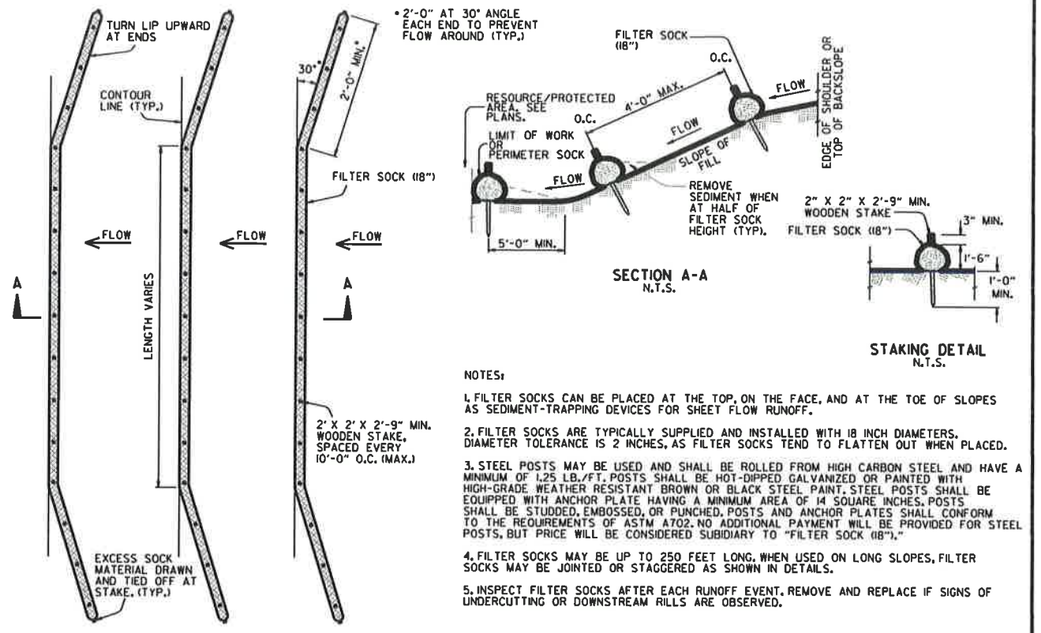
1. STRAW BALES SHALL BE INSTALLED SO THAT THE BINDINGS ARE ORIENTED AROUND THE SIDES RATHER THAN ALONG THE TOPS AND BOTTOMS OF THE BALES. THE BALES SHALL BE A MINIMUM OF 30 INCHES IN LENGTH.

2. NO GAPS SHALL BE LEFT BETWEEN BALES.

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



BALED STRAW FILTER BARRIER (E-2)



NOTES:

1. FILTER SOCKS CAN BE PLACED AT THE TOP, ON THE FACE, AND AT THE TOE OF SLOPES AS SEDIMENT-TRAPPING DEVICES FOR SHEET FLOW RUNOFF.

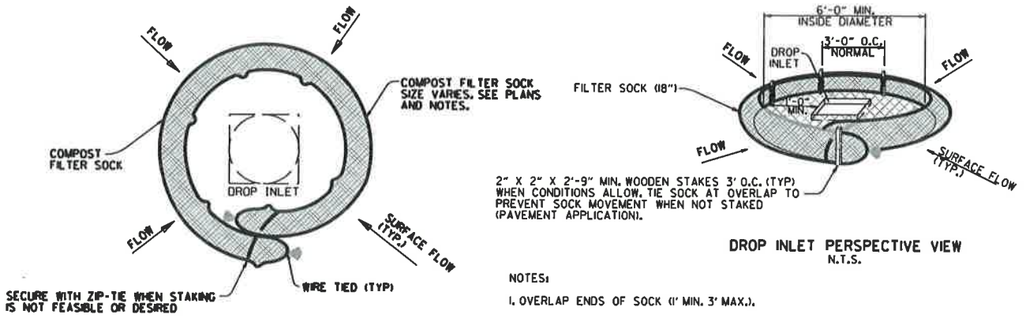
2. FILTER SOCKS ARE TYPICALLY SUPPLIED AND INSTALLED WITH 18 INCH DIAMETERS. DIAMETER TOLERANCE IS 2 INCHES, AS FILTER SOCKS TEND TO FLATTEN OUT WHEN PLACED.

3. STEEL POSTS MAY BE USED AND SHALL BE ROLLED FROM HIGH CARBON STEEL AND HAVE A MINIMUM OF 1.25 LB./FT. POSTS SHALL BE HOT-DIPPED GALVANIZED OR PAINTED WITH HIGH-GRADE WEATHER RESISTANT BROWN OR BLACK STEEL PAINT. STEEL POSTS SHALL BE EQUIPPED WITH ANCHOR PLATE HAVING A MINIMUM AREA OF 14 SQUARE INCHES. POSTS SHALL BE STUDDED, EMBOSSED, OR PUNCHED. POSTS AND ANCHOR PLATES SHALL CONFORM TO THE REQUIREMENTS OF ASTM A702. NO ADDITIONAL PAYMENT WILL BE PROVIDED FOR STEEL POSTS, BUT PRICE WILL BE CONSIDERED SUBIDIARY TO "FILTER SOCK (18")."

4. FILTER SOCKS MAY BE UP TO 250 FEET LONG. WHEN USED ON LONG SLOPES, FILTER SOCKS MAY BE JOINTED OR STAGGERED AS SHOWN IN DETAILS.

5. INSPECT FILTER SOCKS AFTER EACH RUNOFF EVENT. REMOVE AND REPLACE IF SIGNS OF UNDERCUTTING OR DOWNSTREAM RILLS ARE OBSERVED.

FILTER SOCK ALONG SLOPE (E-3)



NOTES:

1. OVERLAP ENDS OF SOCK (1' MIN. 3' MAX.).

2. USE 18" DIA. SOCK IN NON-TRAFFIC AREAS OR AREAS WHERE SAFETY IS NOT A CONCERN.

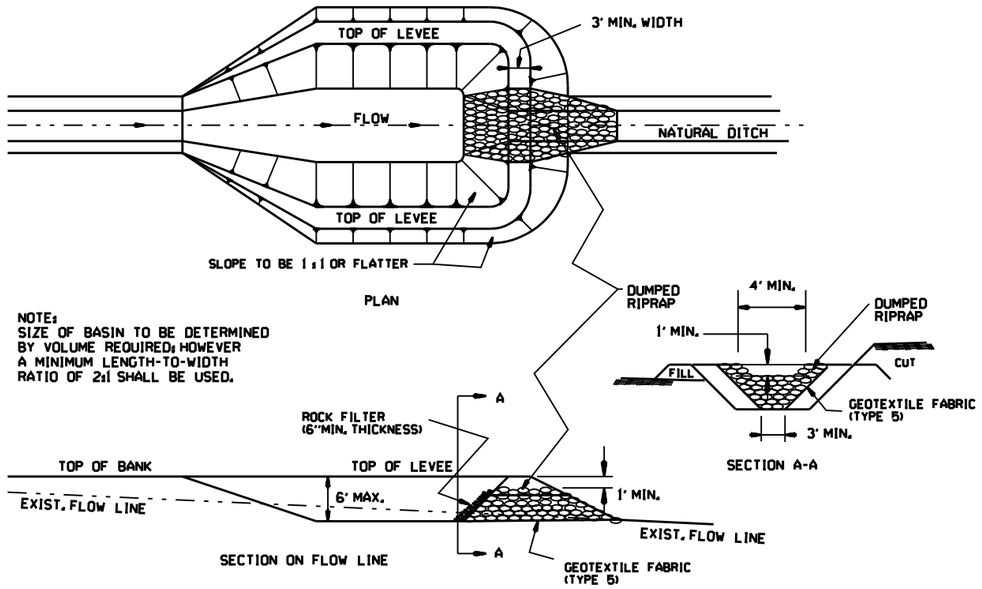
COMPOST FILTER SOCK DROP INLET PROTECTION (E-13)

DATE	REVISION	FILMED
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 SILT FENCE E-4 AND E-11	7-20-95
07-15-94	REV. E-4 & E-11 MIN. 13" BURIED END OF FABRIC	
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

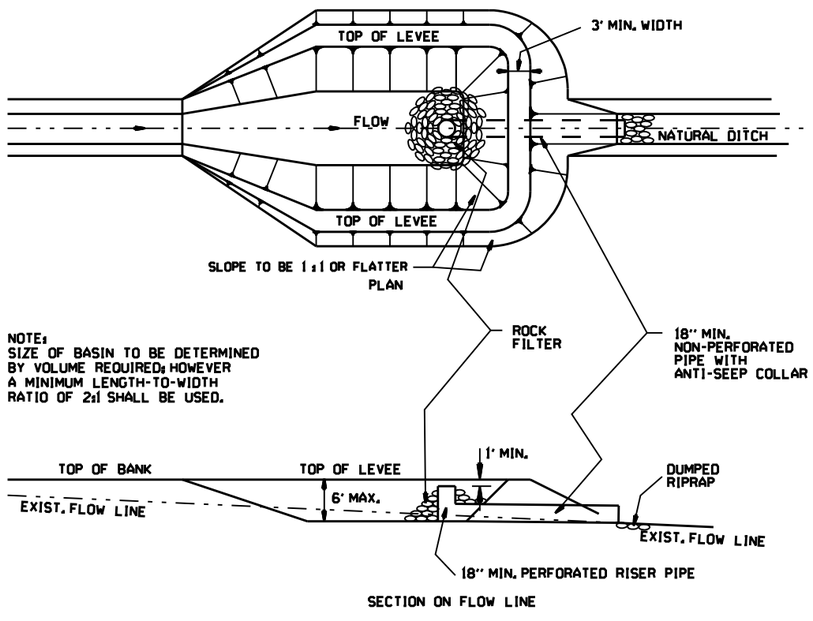
ARKANSAS STATE HIGHWAY COMMISSION

TEMPORARY EROSION CONTROL DEVICES

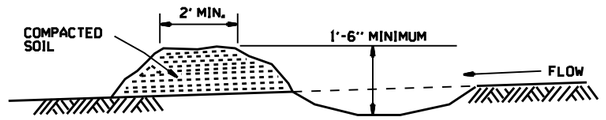
STANDARD DRAWING TEC-1



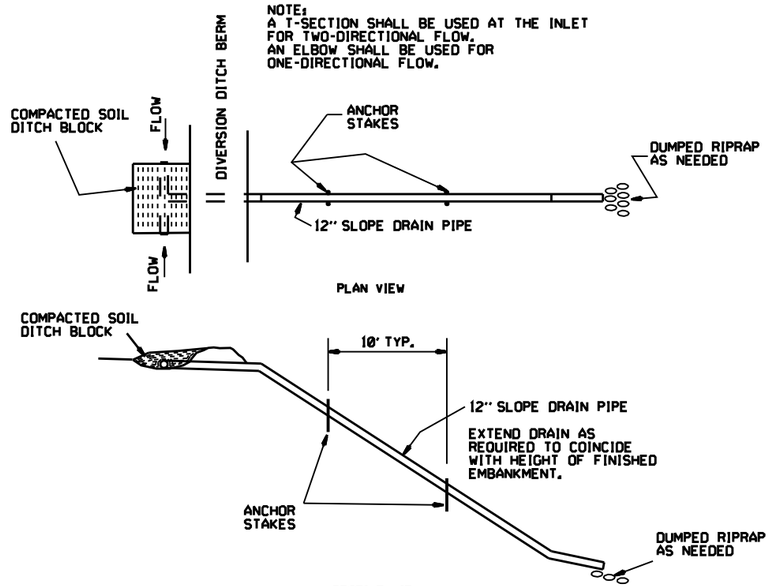
SEDIMENT BASIN WITH RIPRAP OUTLET (E-9)



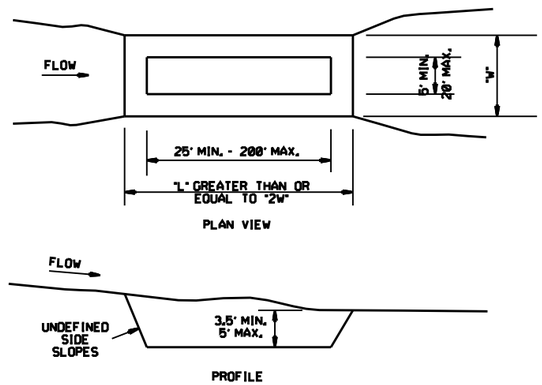
SEDIMENT BASIN WITH PIPE OUTLET (E-10)



DIVERSION DITCH (E-8)



SLOPE DRAIN (E-12)



SEDIMENT BASIN (E-14)

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

ARKANSAS STATE HIGHWAY COMMISSION

TEMPORARY EROSION CONTROL DEVICES

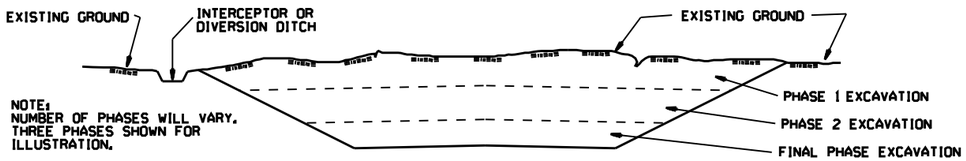
STANDARD DRAWING TEC-2

CLEARING AND GRUBBING

CONSTRUCTION SEQUENCE

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

EXCAVATION



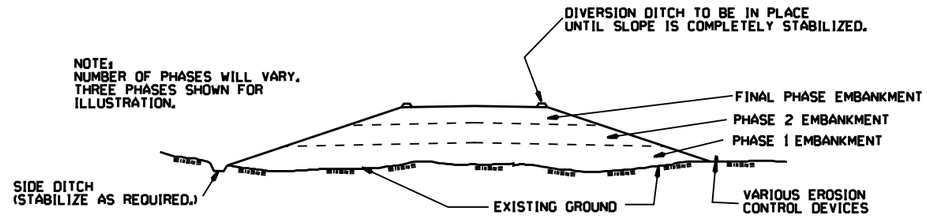
GENERAL NOTE

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

CONSTRUCTION SEQUENCE

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

EMBANKMENT



GENERAL NOTE

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

CONSTRUCTION SEQUENCE

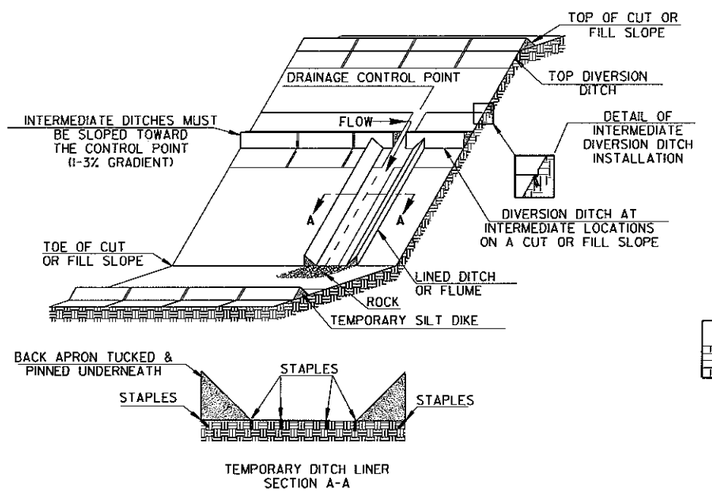
1. CONSTRUCT DIVERSION DITCHES, DITCH CHECKS, SEDIMENT BASINS, SILT FENCES, OR OTHER EROSION CONTROL DEVICES AS SPECIFIED.
2. PLACE PHASE 1 EMBANKMENT WITH PERMANENT OR TEMPORARY SEEDING. PROVIDE DIVERSION DITCHES AND SLOPE DRAINS IF EMBANKMENT CONSTRUCTION IS TO BE TEMPORARILY ABANDONED FOR A PERIOD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

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

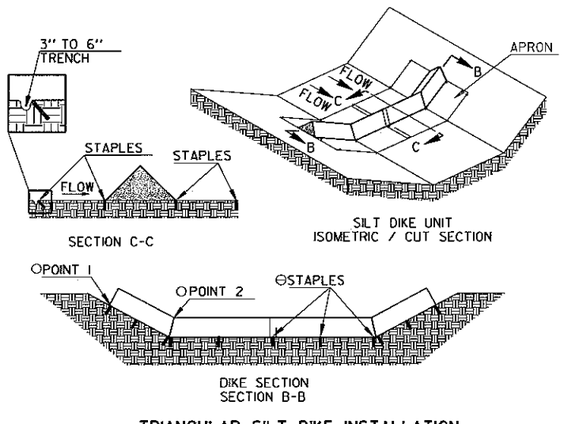
ARKANSAS STATE HIGHWAY COMMISSION

TEMPORARY EROSION CONTROL DEVICES

STANDARD DRAWING TEC-3



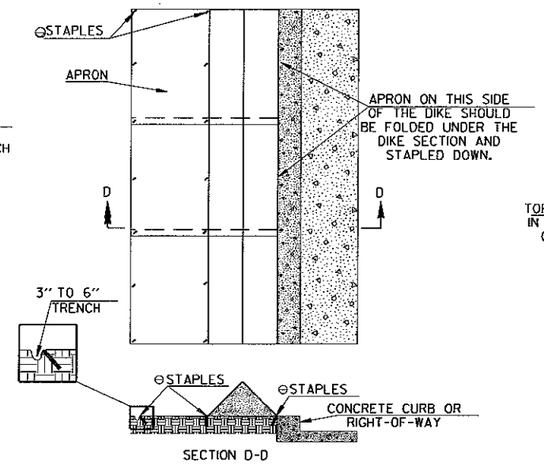
TRIANGULAR SILT DIKE INSTALLATION
FOR
DIVERSION DITCH AND/OR DITCH LINER



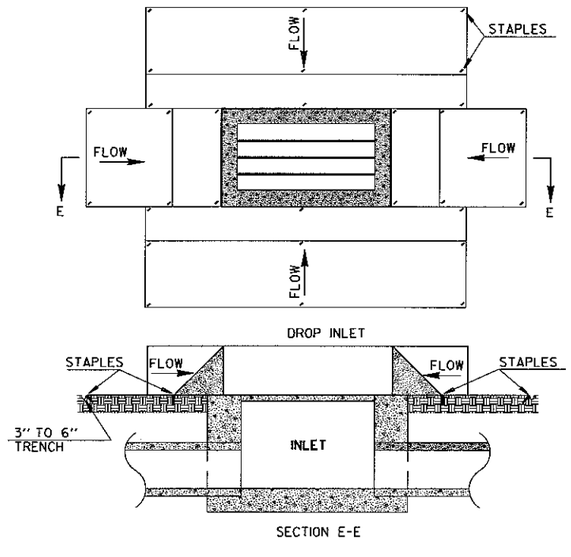
TRIANGULAR SILT DIKE INSTALLATION
FOR
ROADWAY DITCH OR DRAINAGE DITCH

○ POINT "1" MUST BE HIGHER THAN POINT "2" TO ENSURE THAT WATER FLOWS OVER THE DIKE AND NOT AROUND THE ENDS.

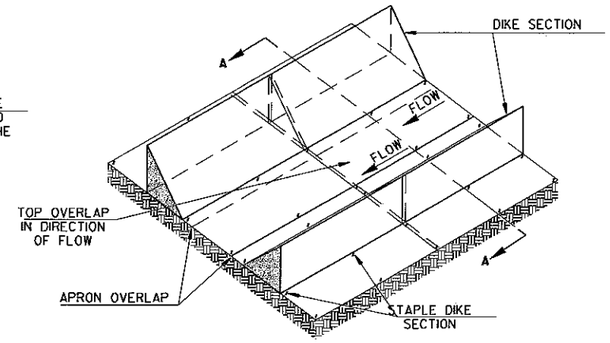
⊖ STAPLES SHALL BE PLACED WHERE THE UNITS OVERLAP AND IN THE CENTER OF THE UNIT AS SHOWN ON THE DIAGRAM.



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.

   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.

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.

SYMBOLOGY

SYMBOL TO BE USED TO DENOTE DEVICE ON PLANS

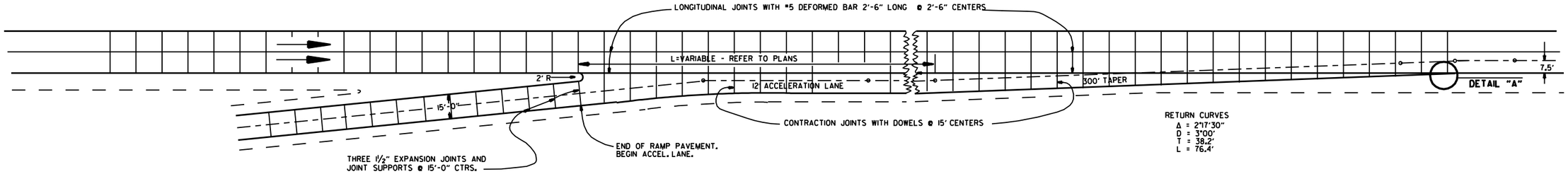
NOTE: SILT DIKE SHOULD ONLY BE USED FOR DROP INLETS IN SUMP LOCATIONS.

DATE	REVISION	FILMED
7-26-12	REVISED GENERAL NOTE 2.	
12-15-11	ISSUED	

ARKANSAS STATE HIGHWAY COMMISSION

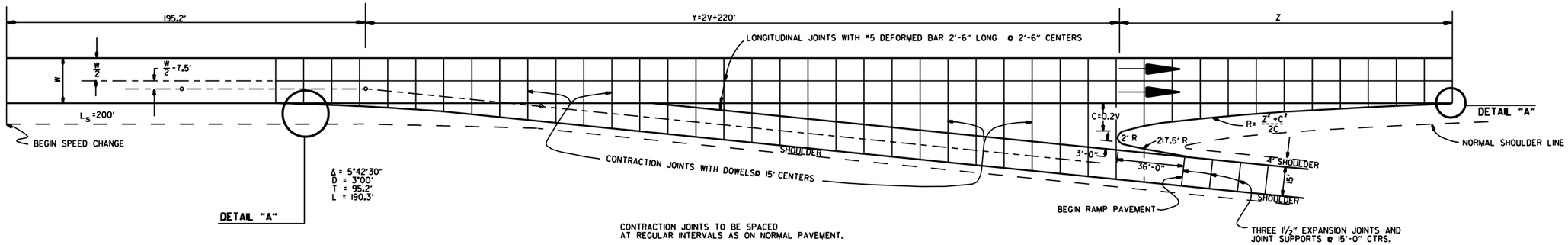
TEMPORARY EROSION CONTROL DEVICES

STANDARD DRAWING TEC-4



ENTRANCE RAMP

NOTE: JOINT SPACING ON THE MAIN LANES SHALL BE ADJUSTED AS NECESSARY TO CONFORM TO THESE JOINT LAYOUTS. THE MAIN LANE JOINT SPACING MAY BE REDUCED TO A 12' MINIMUM.

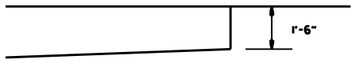


CONTRACTION JOINTS TO BE SPACED AT REGULAR INTERVALS AS ON NORMAL PAVEMENT.

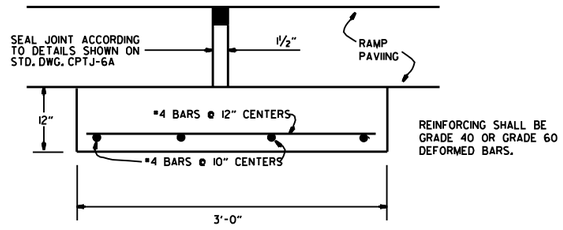
EXIT RAMP

EXIT RAMP

DESIGN SPEED V	Y	NOSE OFFSET C	LENGTH NOSE TAPER Z	RETURN RADIUS R	ADDITIONAL SURFACING SQ. YDS.
40	300.0	8.0	96.0	580.0	602.43
50	320.0	10.0	120.0	725.0	687.25
60	340.0	12.0	168.0	1182.0	790.55
70	360.0	14.0	210.0	1582.0	902.27



DETAIL "A"



DETAIL OF EXPANSION JOINT & JOINT SUPPORT

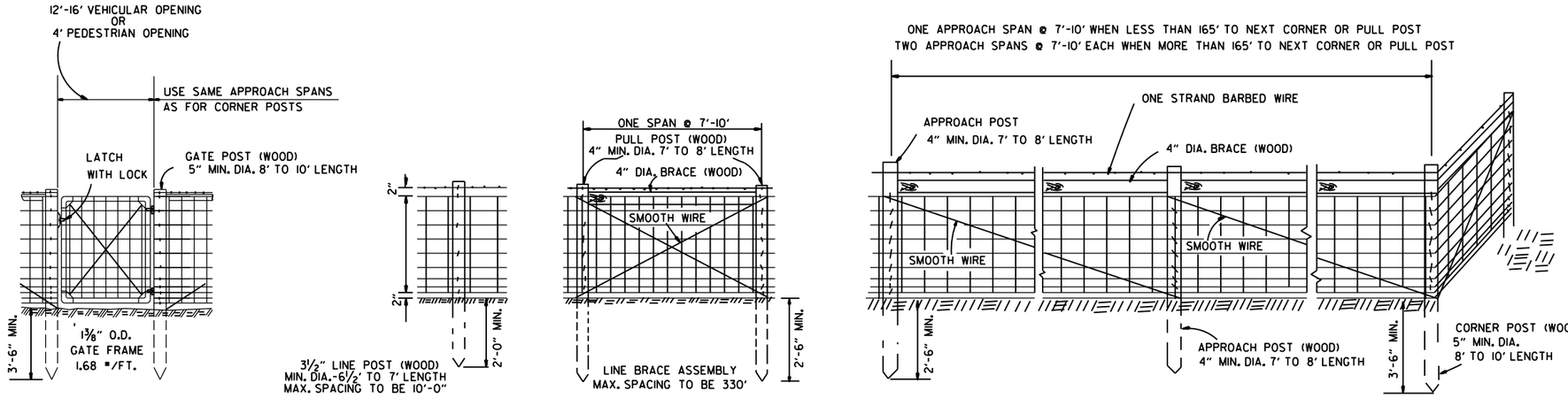
NOTE: THE EXPANSION JOINTS SHALL BE MEASURED AND PAID FOR AS P.C.C. PAVEMENT (RAMP THICKNESS). WHEN RAMP PAVING IS ASPHALT, EXPANSION JOINT IS NOT REQUIRED.
THE JOINT SUPPORT MAY BE CONSTRUCTED WITH CLASS "A", "S", OR PAVING CONCRETE. PAYMENT FOR THE JOINT SUPPORT SHALL BE FOR THE CONTRACT UNIT PRICE BID FOR THE CLASS OF CONCRETE USED. ALL OTHER WORK AND MATERIALS REQUIRED FOR THE CONSTRUCTION OF THE JOINT SUPPORT SHALL BE INCLUDED IN THE PRICE BID FOR THE ABOVE ITEMS.

DATE	REVISION	DATE FILM'D
8-22-02	DELETED NOTE	
11-16-01	CORRECTED SPELLING ON ENTRANCE RAMP NOTE	
5-13-99	ADDED, EDITED AND DELETED NOTES	
11-03-94	ADDED NOTE RE: REINF. BARS	
10-1-92	ADDED DETAIL A & OTHER MINOR CHANGES	10-1-92
1-25-90	REVISED EXPANSION JOINT	1-25-90
7-15-88	CONFORM'D TO 1988 SPECIFICATIONS	65C-7-15-88
3-2-81	ISSUED	511-10-2-72

ARKANSAS STATE HIGHWAY COMMISSION

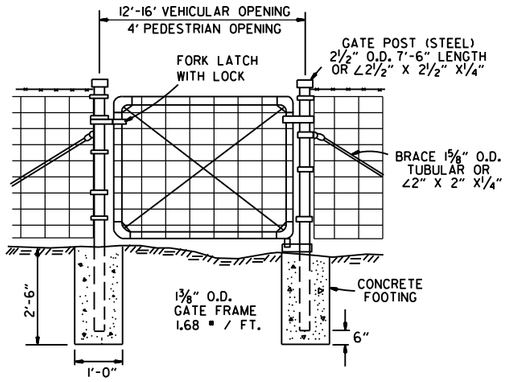
DETAILS OF STANDARD TURNOUT FOR ENTRANCE & EXIT RAMPS (NON-REINFORCED)

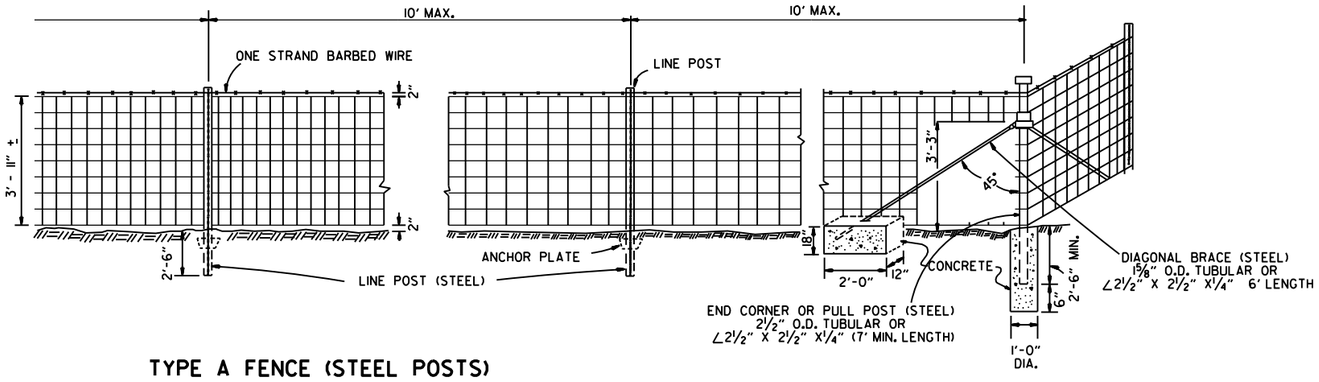
STANDARD DRAWING TR-1A



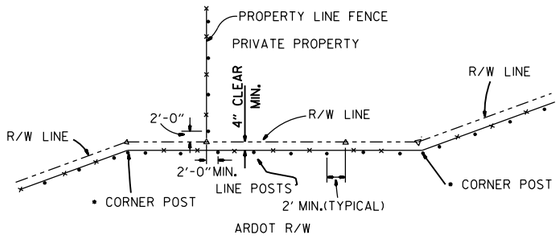
NOTE: STAPLE AT LEAST TOP, BOTTOM AND ALTERNATE WIRES OF WOVEN FABRIC FOR WOOD LINE POSTS.

TYPE A FENCE (WOOD POSTS)





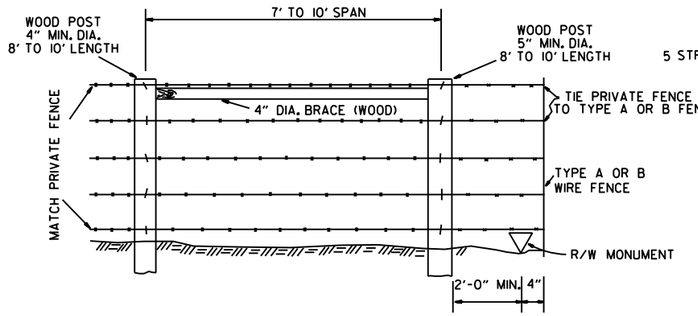
TYPE A FENCE (STEEL POSTS)



•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.

△ - R/W MONUMENTS
• - FENCE POSTS

RIGHT-OF-WAY FENCE LOCATION



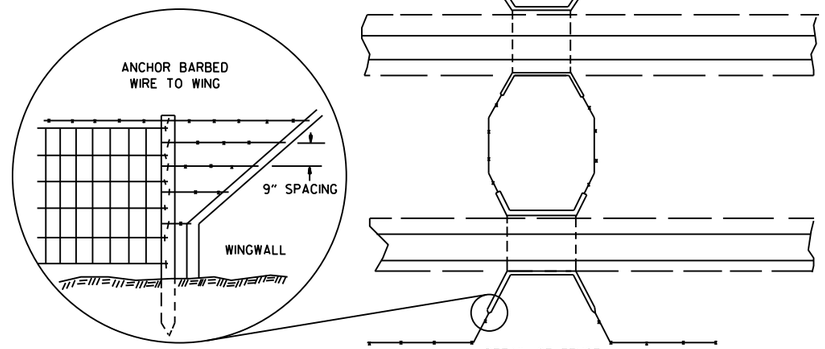
WHERE EXISTING PRIVATE FENCE CONSISTS OF STEEL POSTS, USE END POST ASSEMBLY AS SHOWN WITH TYPE A FENCE OR OTHER END POST ASSEMBLY AS APPROVED BY THE ENGINEER.

PRIVATE FENCE TERMINAL INSTALLATION



SPACING AND SIZE OF POSTS FOR TYPE B FENCE SHALL BE THE SAME AS TYPE A FENCE.

TYPE B FENCE



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

GENERAL NOTES:

STEEL LINE POSTS SHALL BE GALVANIZED, 7 FT. IN LENGTH.

TUBULAR END, CORNER, PULL, OR DIAGONAL BRACES MUST CONFORM TO THE DIMENSIONS AND WEIGHTS SPECIFIED ON STANDARD DRAWING WF-3 (CHAIN LINK).

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

GATE HINGES AND LATCHES WITH LOCKS TO BE OF A TYPE APPROVED BY THE ENGINEER. DRIVEWAY GATES, EITHER SINGLE 12' OR 16' OR DOUBLE 6' TO 8' OPENINGS 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 BY MAINTENANCE EQUIPMENT. LOCATION OF GATES TO BE SHOWN ON THE 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 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 SUFFIEICNT, THE FENCE SHALL BE TERMINATED WITH CROSS CONNECTIONS AND END POSTS ADJACENT TO THE BRIDGE ABUTMENTS OR CULVERT WINGWALLS.

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.

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 WIRE A MINIMUM OF 4 TIMES FOR EACH WIRE LOOP.

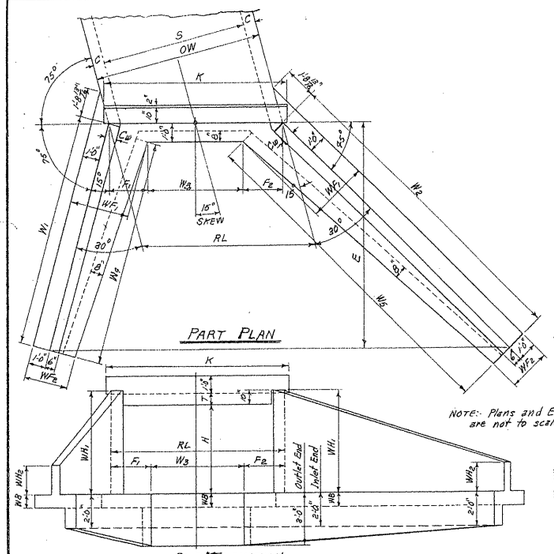
DATE	REVISION	DATE FILMED
8-22-02	REVISED GENERAL NOTES	
10-18-96	REVISED ASTM REF. TO AASHTO	
11-22-95	REVISED R-O-W LOCATION DETAIL	
6-2-94	ADDED CORNER POST NOTE	6-2-94
8-5-93	REVISED R-O-W LOCATION DETAIL	8-5-93
10-1-92	ADDED STAPLE NOTE	
8-2-90	REV'D PULL POST LENGTH	
11-30-89	DELETED CLASS CONC.	
7-15-88	ADDED SPLICE NOTES	
7-15-88	ADDED HEIGHT DIMENSION	
4-3-87	REVISED VARIOUS NOTES	
	AND GENERAL NOTES	
11-1-84	MAX. POST SPACING	
1-4-83	MIN. DIA. LINE POST	
10-2-72	REVISED & REDRAWN	

ARKANSAS STATE HIGHWAY COMMISSION

WIRE FENCE
TYPE A AND B

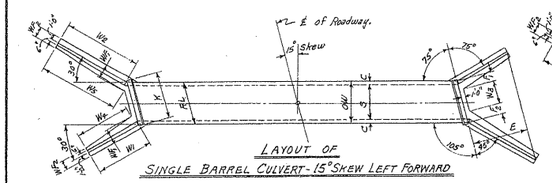
STANDARD DRAWING WF-1

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

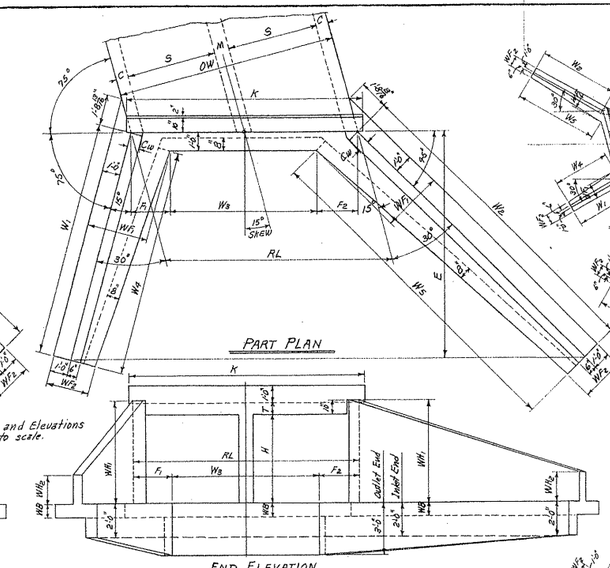


SINGLE BARREL CULVERT - 15° SKEW RIGHT FORWARD

Details of Culvert with 15° Skew Left Forward is reversed, see Layout below.

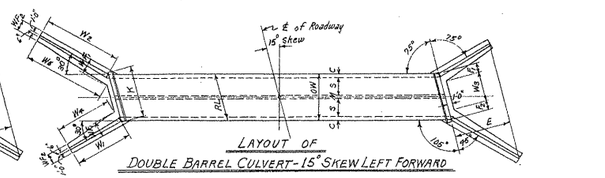


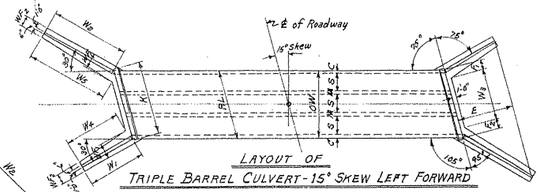
NOTE:- Plans and Elevations are not to scale.

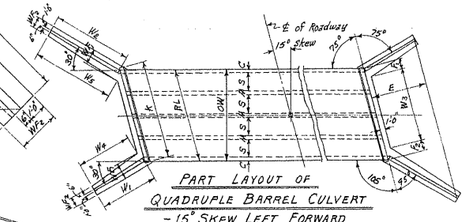


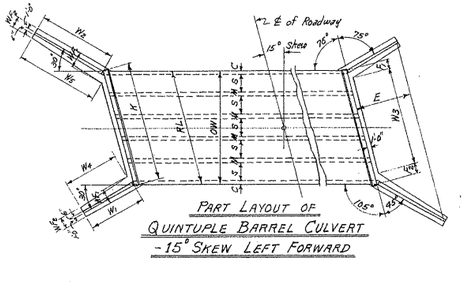
DOUBLE BARREL CULVERT - 15° SKEW RIGHT FORWARD

Details of Culvert with 15° Skew Left Forward is reversed, see Layout below.

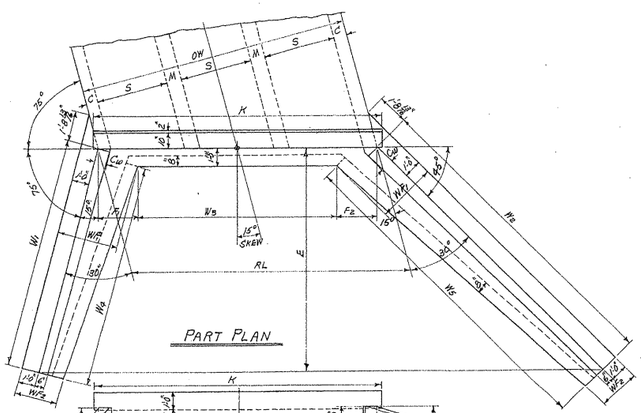








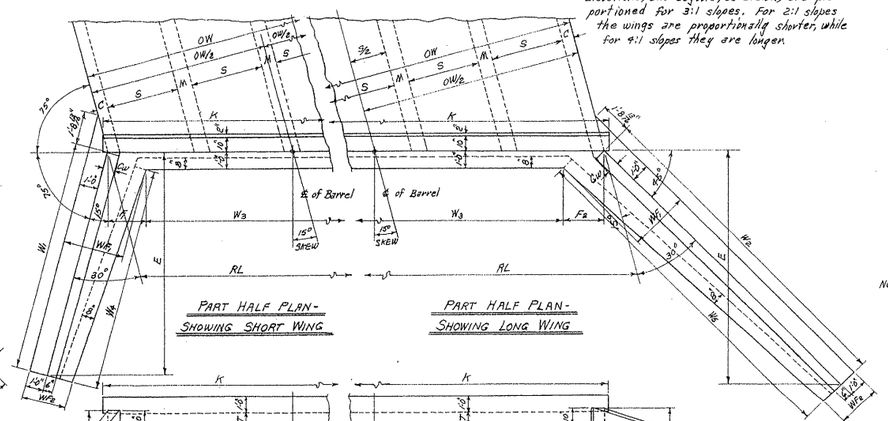
NOTE:- The length of the wings for the Plans, Elevations, and Layouts, as drawn, are proportioned for 3:1 slopes. For 2:1 slopes the wings are proportionally shorter, while for 4:1 slopes they are longer.



TRIPLE BARREL CULVERT - 15° SKEW RIGHT FORWARD

Details of Culvert with 15° Skew Left Forward is reversed, see Layout at top center of sheet.

NOTE:-Plans and Elevations are not to scale.



QUADRUPLE BARREL CULVERT - 15° SKEW RT. FWD.

Details of Culvert with 15° Skew Left Forward is reversed, see Layout at above center.

QUINTUPLE BARREL CULVERT - 15° SKEW RT. FWD.

Details of Culvert with 15° Skew Left Forward is reversed, see Layout above.

ROADWAY LENGTH RL — HEADWALL LENGTH K — APRON DIMENSION W_3

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

USE WITH DRAWING No.	CLEAR SPAN S	CLEAR HEIGHT H	SUM OF SLOPING DIMENSIONS F_1 & F_2	SINGLE BARREL CULVERT OW	SINGLE BARREL CULVERT RL	SINGLE BARREL CULVERT K	SINGLE BARREL CULVERT W_3	DOUBLE BARREL CULVERT OW	DOUBLE BARREL CULVERT RL	DOUBLE BARREL CULVERT K	DOUBLE BARREL CULVERT W_3	TRIPLE BARREL CULVERT OW	TRIPLE BARREL CULVERT RL	TRIPLE BARREL CULVERT K	TRIPLE BARREL CULVERT W_3	QUADRUPLE BARREL CULVERT OW	QUADRUPLE BARREL CULVERT RL	QUADRUPLE BARREL CULVERT K	QUADRUPLE BARREL CULVERT W_3	QUINTUPLE BARREL CULVERT OW	QUINTUPLE BARREL CULVERT RL	QUINTUPLE BARREL CULVERT K	QUINTUPLE BARREL CULVERT W_3
W-X152-1, W-X153-1 OR W-X154-1. (FOR H=8'0" OR LESS)	2'	2'-0"	5'-0"	5'-2⅛"	5'-8⅝"	3'-2⅛"	9'-8"	10'-0"	10'-6⅛"	8'-0"	14'-4"	14'-10⅝"	15'-4½"	12'-10"	19'-0"	19'-8"	20'-2½"	17'-8"	23'-8"	24'-6"	25'-0½"	22'-6"
	3'	2'-9⅜"	5'-0"	"	"	2'-9⅜"	9'-8"	"	"	7'-2⅜"	14'-4"	"	"	12'-0⅜"	19'-0"	"	"	16'-10⅜"	23'-8"	"	"	21'-8⅜"
	4'	3'-7½"	5'-0"	"	"	11'-6½"	9'-8"	"	"	6'-2⅝"	14'-4"	"	"	11'-2⅝"	19'-0"	"	"	16'-0⅛"	23'-8"	"	"	20'-10⅝"
	5'	4'-5⅝"	5'-0"	"	0'-0⅜"	9'-8"	"	"	5'-1⅝"	14'-4"	"	"	10'-1⅝"	19'-0"	"	"	15'-2⅝"	23'-8"	"	"	20'-0⅜"
	6'	5'-3⅞"	5'-2"	5'-10⅜"	0'-1"	9'-11"	10'-3⅝"	10'-3⅝"	5'-0"	14'-8"	15'-2⅛"	16'-0⅜"	9'-11"	19'-5"	20'-1¼"	14'-10"	24'-2"	25'-0⅛"	25'-4⅜"	19'-9"
	3'	2'-9⅜"	6'-0"	6'-2½"	6'-9"	3'-4⅜"	11'-8"	12'-1"	12'-7½"	9'-3⅜"	17'-4"	17'-11⅜"	18'-5⅜"	15'-1½"	23'-0"	23'-9⅜"	24'-4⅜"	21'-0"	28'-8"	29'-6⅛"	30'-2⅛"	26'-10⅜"
	4'	3'-7½"	6'-0"	"	"	2'-7"	11'-8"	"	"	8'-5⅛"	17'-4"	"	"	14'-3⅜"	23'-0"	"	"	20'-2⅜"	28'-8"	"	"	26'-0⅝"
	5'	4'-5⅝"	6'-0"	"	"	1'-9⅛"	11'-8"	"	"	7'-1⅞"	17'-4"	"	"	13'-6"	23'-0"	"	"	19'-4½"	28'-8"	"	"	25'-2⅝"
	6'	5'-3⅞"	6'-2"	6'-6⅝"	6'-11⅛"	1'-1½"	11'-11"	12'-5"	12'-10⅝"	7'-10⅜"	17'-8"	18'-3½"	18'-10"	13'-10⅝"	23'-5"	24'-2⅝"	24'-9⅛"	18'-11⅝"	29'-2"	30'-1⅝"	30'-8½"	24'-11⅝"
	7'	6'-5⅝"	6'-3"	7'-0⅝"	Ⓐ 0"	12'-1"	12'-6⅝"	13'-0½"	6'-0⅛"	17'-11"	18'-6⅝"	19'-1"	12'-0⅛"	23'-9"	24'-7"	25'-1½"	18'-1⅛"	29'-7"	30'-7½"	31'-2⅝"	24'-1⅜"
	3'	2'-9⅜"	7'-0"	7'-3"	7'-9½"	4'-1⅝"	13'-8"	14'-1⅝"	14'-8⅜"	11'-0"	20'-0"	21'-0½"	21'-7"	18'-2¾"	27'-0"	27'-11⅜"	28'-5⅝"	25'-1⅜"	33'-8"	34'-10⅛"	35'-4⅜"	32'-0⅝"
	4'	3'-7½"	7'-0"	"	"	3'-7⅜"	13'-8"	"	"	10'-6⅝"	20'-0"	"	"	17'-5"	27'-0"	"	"	24'-3⅜"	33'-8"	"	"	31'-2⅝"
	5'	4'-5⅝"	7'-0"	"	"	2'-5⅝"	13'-8"	"	"	9'-8⅜"	20'-0"	"	"	16'-7⅝"	27'-0"	"	"	23'-6"	33'-8"	"	"	30'-4⅝"
	6'	5'-3⅞"	7'-2"	7'-7"	7'-11⅝"	2'-1½"	13'-11"	14'-5"	14'-11⅝"	9'-11⅜"	20'-8"	21'-4⅝"	21'-11¼"	16'-11½"	27'-5"	28'-2⅝"	28'-11"	23'-1½"	34'-2"	35'-1¼"	35'-11"	30'-11⅝"
	7'	6'-5⅝"	7'-3"	7'-11"	8'-0⅝"	1'-0⅝"	14'-1"	14'-7"	15'-1⅛"	8'-11⅝"	20'-11"	21'-7⅜"	22'-2⅝"	15'-2"	27'-9"	28'-8⅝"	29'-3⅜"	22'-3"	34'-7"	35'-5⅜"	36'-4"	29'-3⅝"
	8'	7'-5⅝"	7'-4"	7'-7½"	8'-1⅝"	Ⓐ 0"	14'-2"	14'-8"	15'-2⅝"	6'-11⅝"	21'-0"	21'-8⅝"	22'-3⅝"	14'-0⅝"	27'-10"	28'-8⅝"	29'-4⅝"	21'-1½"	34'-8"	35'-6⅝"	36'-5"	28'-2"
	4'	3'-7⅝"	8'-0"	8'-3⅜"	8'-9⅝"	4'-7⅜"	15'-8"	16'-2⅝"	16'-9"	12'-7"	23'-4"	24'-1⅝"	24'-10⅛"	20'-6⅛"	31'-0"	32'-1⅛"	32'-7½"	28'-5½"	38'-8"	40'-0⅜"	40'-6⅝"	36'-4⅜"
	5'	4'-5⅝"	8'-0"	"	"	3'-10"	15'-8"	"	"	11'-3⅝"	23'-4"	"	"	19'-1⅝"	31'-0"	"	"	27'-0⅜"	38'-8"	"	"	35'-7"
	6'	5'-3⅞"	8'-2"	8'-5⅝"	9'-1"	3'-2⅝"	15'-11"	16'-5⅜"	17'-0⅛"	11'-2⅝"	23'-8"	24'-6"	25'-0⅛"	19'-2⅜"	31'-5"	32'-6⅝"	33'-0⅛"	27'-3"	39'-2"	40'-6⅜"	41'-1"	35'-3⅝"
	7'	6'-5⅝"	8'-3"	8'-6⅛"	9'-1"	2'-0⅜"	16'-1"	16'-7⅜"	17'-2⅝"	10'-2"	23'-11"	24'-9⅜"	25'-3½"	18'-3⅛"	31'-9"	32'-10⅜"	33'-5"	26'-4⅛"	39'-7"	40'-11⅛"	41'-6⅜"	34'-10⅝"
	8'	7'-5⅝"	8'-4"	8'-7½"	9'-2"	0'-11"	16'-2"	16'-8⅜"	17'-3⅜"	9'-10⅛"	24'-0"	24'-10⅝"	25'-5"	17'-4⅛"	31'-10"	32'-11½"	33'-6"	25'-5"	39'-8"	41'-0⅜"	41'-7⅝"	33'-9⅛"
	4'	3'-7⅝"	9'-0"	9'-3⅜"	9'-10⅛"	5'-0⅜"	17'-8"	18'-2⅝"	18'-10"	14'-8"	26'-4"	27'-3⅜"	27'-10½"	23'-7⅛"	35'-0"	36'-2⅛"	36'-9⅜"	32'-7½"	43'-8"	45'-2½"	45'-9"	41'-7"
	5'	4'-5⅝"	9'-2"	9'-5⅜"	10'-0⅛"	5'-10⅜"	17'-11"	18'-6⅝"	19'-1"	14'-11⅛"	26'-8"	27'-7⅛"	28'-1⅜"	23'-8"	35'-5"	36'-8"	37'-2⅝"	32'-8⅜"	44'-2"	45'-8⅜"	46'-3⅛"	41'-11⅝"
	6'	5'-3⅞"	9'-2"	"	"	4'-2⅜"	17'-11"	"	"	13'-3⅝"	26'-8"	"	"	22'-4"	35'-5"	"	"	31'-9⅝"	44'-2"	"	"	41'-5⅜"
	7'	6'-5⅝"	9'-3"	9'-6⅝"	10'-1⅛"	3'-1"	18'-1"	18'-8⅝"	19'-3"	12'-2⅝"	26'-11"	27'-10⅜"	28'-4⅝"	21'-11⅝"	35'-9"	37'-0⅜"	37'-6⅛"	30'-6⅛"	44'-7"	46'-2⅝"	46'-8½"	39'-8"
	8'	7'-5⅝"	9'-4"	9'-8"	10'-2⅝"	1'-11½"	18'-2"	18'-8⅝"	19'-3½"	11'-1⅝"	27'-0"	27'-11⅝"	28'-5⅝"	20'-2⅜"	35'-10"	37'-1⅛"	37'-7½"	29'-4½"	44'-8"	46'-3½"	46'-9½"	38'-6⅝"
	5'	4'-5⅝"	10'-2"	10'-6⅝"	11'-0⅜"	6'-1"	19'-11"	20'-7½"	21'-2"	16'-2"	29'-8"	30'-8⅛"	31'-3"	26'-3⅝"	39'-5"	40'-9⅝"	41'-4½"	36'-9½"	49'-8"	51'-3⅛"	51'-9"	46'-5⅛"
	6'	5'-3⅞"	10'-3"	10'-7⅜"	11'-1⅝"	5'-0⅛"	20'-1"	20'-8½"	21'-4"	15'-6⅛"	29'-11"	30'-11⅜"	31'-6"	25'-8½"	39'-9"	41'-1⅜"	41'-8⅛"	35'-10⅜"	49'-11"	51'-6"	51'-10½"	46'-0⅜"
	7'	6'-5⅞"	10'-3"	"	"	4'-1⅝"	20'-1"	"	"	14'-3⅜"	29'-11"	"	"	24'-5⅝"	39'-9"	"	"	34'-1⅞"	49'-7"	"	"	44'-1⅛"
	8'	7'-5⅞"	10'-4"	10'-8⅜"	11'-2⅝"	3'-2⅛"	20'-2"	20'-10⅛"	21'-5"	13'-2"	30'-0"	31'-0⅝"	31'-7½"	23'-4⅝"	39'-10"	41'-2⅝"	41'-9⅛"	33'-6⅛"	49'-8"	51'-5"	51'-11½"	43'-2⅝"
	5'	4'-5⅝"	11'-2"	11'-6⅝"	12'-1⅛"	7'-1⅜"	21'-9"	22'-5⅝"	23'-0⅜"	18'-0"	32'-8"	33'-9⅜"	34'-4⅛"	29'-4½"	43'-5"	44'-11½"	45'-6"	40'-0⅛"	54'-2"	56'-1"	56'-7½"	51'-7½"
	6'	5'-3⅞"	11'-3"	11'-7⅜"	12'-2⅝"	6'-0⅛"	22'-1"	22'-10⅛"	23'-4⅝"	17'-1⅝"	32'-11"	34'-1"	34'-7⅛"	28'-3⅝"	43'-9"	45'-3½"	45'-10"	40'-0⅛"	54'-7"	56'-6"	57'-0⅛"	51'-7"
	7'	6'-5⅞"	11'-3"	"	"	5'-1⅞"	22'-1"	"	"	16'-4⅜"	32'-11"	"	"	27'-7"	43'-9"	"	"	38'-3⅝"	54'-7"	"	"	50'-6"
	8'	7'-5⅞"	11'-4"	11'-8⅜"	12'-3⅝"	4'-2⅝"	22'-2"	22'-10⅛"	23'-5⅝"	15'-2⅝"	33'-0"	34'-2"	34'-8⅝"	26'-5⅝"	43'-10"	45'-4½"	45'-11"	37'-8"	54'-8"	56'-7⅛"	57'-1⅛"	49'-10⅝"
	6'	5'-3⅞"	12'-0"	12'-4⅝"	12'-11⅛"	7'-6"	24'-0"	25'-0⅛"	25'-6⅝"	19'-3"	36'-0"	37'-3⅜"	37'-9⅝"	32'-0"	47'-10"	49'-5⅛"	50'-0⅝"	44'-3"	——	——	——	——
	7'	6'-5⅞"	12'-0"	"	"	6'-3⅜"	24'-0"	"	"	18'-1⅝"	36'-0"	"	"	30'-7⅝"	47'-10"	"	"	43'-0⅛"	——	——	——	——
	8'	7'-5⅞"	12'-0"	"	"	5'-0⅜"	24'-0"	"	"	17'-0⅝"	36'-0"	"	"	29'-6⅛"	47'-10"	"	"	41'-9⅝"	——	——	——	——
	6'	5'-3⅞"	13'-9"	13'-9⅝"	14'-4"	8'-6⅛"	26'-8"	27'-1"	27'-7½"	21'-10"	39'-0"	40'-0⅝"	40'-11"	35'-1⅛"	51'-10"	53'-8"	54'-3½"	48'-6⅝"	——	——	——	——
	7'	6'-5⅞"	13'-9"	"	"	7'-3⅜"	26'-8"	"	"	20'-7⅛"	39'-0"	"	"	33'-10⅝"	51'-10"	"	"	47'-1⅜"	——	——	——	——
	8'	7'-5⅞"	13'-9"	"	"	6'-1"	26'-8"	"	"	19'-5⅝"	39'-0"	"	"	32'-8"	51'-10"	"	"	45'-11⅝"	——	——	——	——
	7'																					
	9'	8'-11⅝"	8'-6"	8'-9⅜"	9'-4"	Ⓐ 0"	16'-5"	17'-0"	17'-6½"	8'-0⅝"	24'-9"	25'-8⅜"	25'-0⅛"	16'-3"	32'-8"	33'-9⅜"	33'-11"	24'-5½"	40'-8"	41'-7"	42'-1½"	32'-7⅜"
	8'	8'-11½"	9'-6"	9'-10"	10'-5⅝"	0'-10⅜"	18'-5"	19'-0⅜"	19'-7⅛"	10'-1⅝"	27'-9"	28'-10⅜"	28'-10"	19'-9⅛"	36'-9"	37'-10⅝"	38'-0"	28'-7"	45'-2"	46'-3⅛"	47'-3½"	37'-9⅝"
	10'	10'-2"	9'-8"	10'-0⅝"	10'-6½"	Ⓐ 0"	18'-8"	19'-3⅝"	19'-10⅝"	9'-2"	27'-8"	28'-7⅝"	29'-2⅛"	18'-5⅝"	36'-8"	37'-11⅝"	38'-6"	27'-3½"	45'-8"	47'-3⅜"	47'-9⅝"	37'-1⅝"
	9'	8'-11⅝"	10'-6"	10'-10⅜"	11'-5"	1'-11⅝"	20'-5"	21'-1⅝"	21'-8⅛"	12'-2½"	30'-4"	31'-5⅝"	31'-11⅛"	22'-5½"	40'-3"	41'-8"	42'-2⅝"	32'-8⅜"	50'-2"	51'-11⅛"	52'-5½"	43'-0"
	10'	10'-2"	10'-8"	11'-0⅜"	11'-7"	0'-10⅜"	20'-8"	21'-4⅜"	21'-11⅛"	11'-2⅝"	30'-8"	31'-9⅛"	32'-3½"	21'-7"	40'-8"	42'-1⅛"	42'-7⅝"	31'-11⅝"	50'-8"	52'-5½"	53'-0"	42'-3⅝"
	11'	11'-0⅝"	10'-10"	11'-2⅝"	11'-9"	Ⓐ 0"	20'-10"	21'-6⅜"	22'-1⅝"	10'-2⅝"	30'-10"	31'-11"	32'-5½"	20'-10½"	40'-10"	42'-3⅛"	42'-9⅝"	30'-10⅜"	50'-10"	52'-7½"	53'-2"	41'-2⅜"
	9'	8'-11⅝"	11'-6"	11'-10⅜"	12'-5⅝"	2'-11⅝"	22'-5"	23'-1⅝"	23'-9"	14'-3⅛"	33'-0"	34'-1⅝"	35'-0⅜"	25'-0⅝"	44'-3"	45'-9½"	46'-4⅜"	36'-10⅝"	55'-2"	57'-1⅜"	57'-9⅜"	48'-2"
	10'	10'-2"	11'-8"	12'-1"	12'-7⅝"	1'-11"	22'-8"	23'-4⅝"	24'-0"	13'-5⅜"	33'-3"	34'-4⅝"	35'-3⅝"	24'-8⅛"	44'-6"	46'-1⅝"	46'-9"	36'-1"	55'-5"	57'-4⅜"	58'-0"	47'-5½"
	11'	11'-4⅝"	11'-10"	12'-3"	12'-9⅝"	0'-10⅜"	22'-10"	23'-7"	24'-2"	12'-8"	33'-6"	34'-8"	35'-6⅝"	23'-7⅜"	44'-9"	46'-5"	46'-11⅛"	35'-4⅛"	55'-10"	57'-9⅝"	58'-4"	46'-5"
	12'	12'-7⅜"	12'-0"	12'-5⅛"	12'-11⅝"	Ⓐ 0"	23'-0"	23'-9⅝"	24'-4⅝"	11'-2½"	33'-10"	35'-0"	35'-10⅝"	22'-7"	45'-0"	46'-7"	47'-1½"	33'-11⅝"	56'-0"	57'-11⅝"	58'-6"	45'-9⅛"
	9'	8'-11⅝"	12'-6"	12'-10⅜"	13'-5⅝"	4'-0"	24'-5"	25'-1⅝"	25'-9⅛"	16'-4"	34'-4"	35'-7⅜"	36'-3⅛"	26'-8"	46'-8"	48'-3⅛"	48'-10⅜"	38'-5⅝"	58'-0"	59'-11⅜"	60'-5⅝"	49'-0⅜"
	10'	10'-2"	12'-8"	13'-1⅜"	13'-8⅝"	2'-11⅜"	24'-8"	25'-5⅛"	26'-1"	15'-9⅛"	34'-8"	35'-11⅜"	36'-8"	27'-3⅛"	46'-11"	48'-7⅝"	49'-3"	38'-10"	58'-5"	60'-4⅝"	60'-10"	49'-4⅝"
	11'	11'-4⅝"	12'-10"	13'-3⅜"	13'-10"	1'-10⅜"	24'-10"	25'-8"	26'-3"	14'-3⅜"	34'-10"	36'-1⅝"	36'-10"	28'-0"	47'-2"	48'-11⅛"	49'-6⅝"	39'-3"	58'-10"	60'-9⅛"	61'-3"	49'-8⅝"
	12'	12'-7⅜"	13'-0"	13'-5⅝"	14'-0"	0'-10⅜"	25'-0"	25'-10⅝"	26'-5"	13'-3⅝"	35'-0"	36'-3⅝"	37'-0"	28'-5⅝"	47'-5"	49'-0"	49'-8⅝"	39'-7⅝"	59'-2"	61'-1⅝"	61'-7½"	49'-11⅝"
	9'	8'-11⅝"	13'-1"	13'-5⅜"	14'-0⅝"	5'-0⅛"	25'-5"	26'-1⅝"	26'-9"	16'-8"	35'-0"	36'-3⅜"	37'-0⅛"	27'-0⅝"	47'-5"	49'-0⅛"	49'-8⅝"	38'-9⅝"	58'-4"	60'-3⅛"	60'-9"	48'-10⅜"
	10'	10'-2"	13'-3"	13'-7⅜"	14'-2⅝"	3'-11⅜"	25'-8"	26'-5⅛"	27'-1"	17'-5⅛"	35'-4"	36'-7⅜"	37'-4⅛"	27'-11⅝"	47'-10"	49'-5⅛"	50'-0⅝"	39'-8⅝"	58'-8"	60'-7⅛"	61'-1"	49'-3⅝"
	11'	11'-0⅝"	13'-10"	14'-3⅜"	14'-10⅝"	2'-11⅛"	26'-10"	27'-7⅜"	28'-3⅝"	16'-0⅝"	36'-4"	37'-8⅛"	38'-5"	28'-10⅝"	49'-2"	50'-10⅝"	51'-6"	40'-8⅝"	60'-0"	62'-0⅛"	62'-6"	50'-5⅝"
	12'	12'-7⅜"	14'-0"	14'-5⅝"	15'-0⅝"	1'-10⅝"	27'-0"	27'-10⅝"	28'-6"	15'-0"	37'-0"	38'-3⅝"	39'-0"	29'-9⅝"	50'-3"	51'-10⅝"	52'-6"	41'-8⅜"	61'-4"	63'-4⅛"	63'-10"	51'-7⅝"

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

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

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

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

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

CLASS S CONCRETE

ARKANSAS STATE HIGHWAY COMMISSION

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

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

SINGLES, DOUBLES, TRIPLES, QUADRUPLES & QUINTUPLES. — ALL DEPTHS OF COVER H=2, 3, 4, 5, 6, 7, 8, 9, 10, 11 & 12.

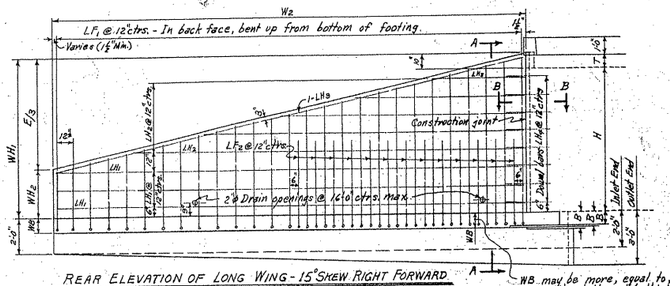
STANDARD DRAWING NO. W-X15

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

Traced by:- W.C.H. 6-13-63 — Checked by:-

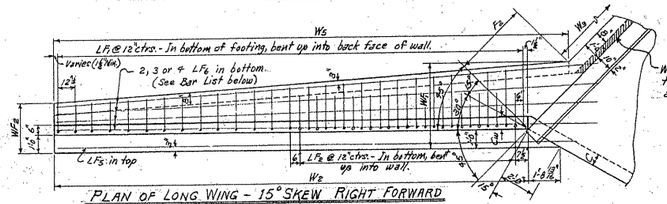
Quantities by:-

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



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

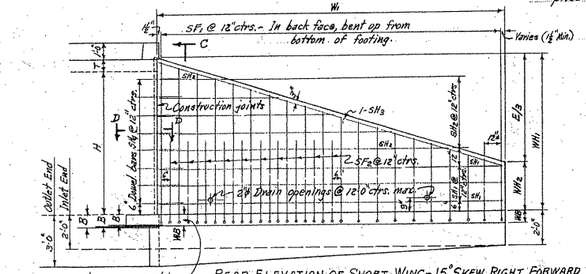
WB may be more, equal to, or less than the bottom slab thickness B.



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

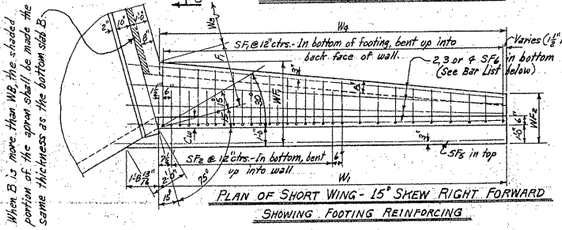
When B is more than WB, the shaded portion of the apron shall be made the same thickness as the bottom slab B.

NOTE:- Payment for membrane waterproofing and roofing felt to be included in the price bid for Class S Concrete.



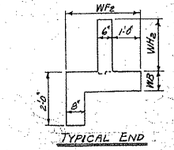
REAR ELEVATION OF SHORT WING - 15° SKEW RIGHT FORWARD
SHOWING BACK FACE REINFORCING

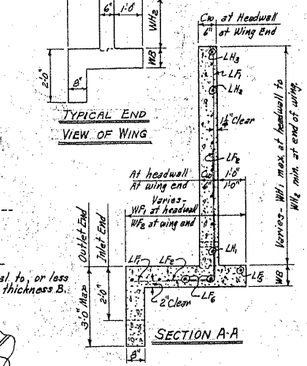
WB may be more, equal to, or less than the bottom slab B.



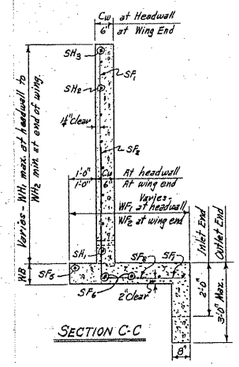
PLAN OF SHORT WING - 15° SKEW RIGHT FORWARD
SHOWING FOOTING REINFORCING

When B is more than WB the shaded portion of the apron shall be made the same thickness as the bottom slab B.

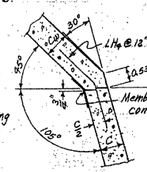




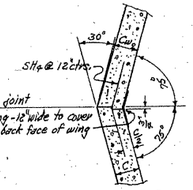
SECTION A-A



SECTION C-C

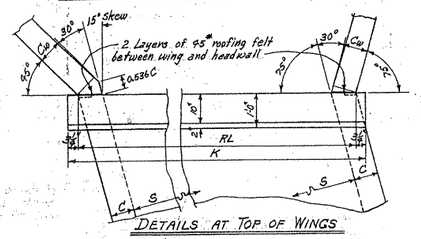


SECTION B-B

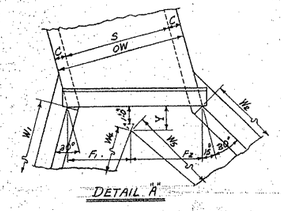


SECTION D-D

SECTIONS THRU CONSTRUCTION JOINTS



DETAILS AT TOP OF WINGS
15° SKEW RIGHT FORWARD



DETAIL "A"

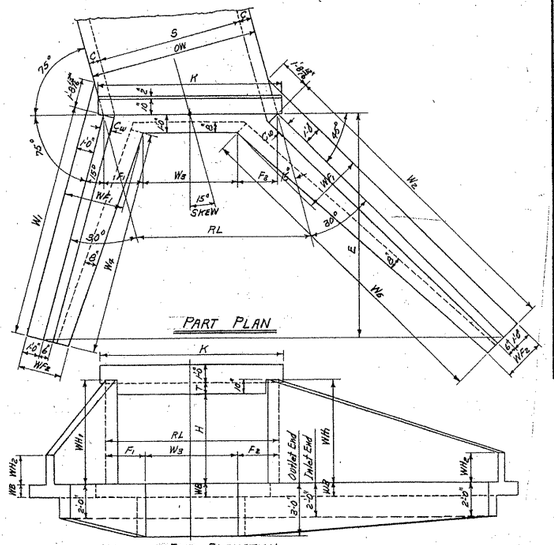
TABLE "A" - DIMENSIONS FOR DETAIL "A"

S	H	F1	F2	W4	W5	W3	Y
5'	7'	3'-0"	3'-5⅝"	16'-10⅛"	23'-0⅜"	0"	1'-0⅜"
6'	8'	3'-6"	4'-1⅛"	19'-0⅛"	28'-3⅞"	0"	1'-1"

REGULAR WING DIMENSIONS - 3:1 SLOPES

CLEAR HEIGHT OF BOX	THICKNESS OF WING FOOTING	THICKNESS OF WING AT HEADWALL	WINGWALL HEIGHTS AT HEADWALL	WINGWALL HEIGHTS AT END OF WING	WIDTHS OF WING FOOTINGS AT HEADWALL	WIDTHS OF WING FOOTINGS AT END OF WING	FOOTING DIMENSION PARALLEL WITH HEADWALL SHORT WING	FOOTING DIMENSION PARALLEL WITH HEADWALL LONG WING	PERPENDICULAR DIST. FROM HDWL. TO END OF WING	LENGTHS OF WINGWALLS SHORT WING	LENGTHS OF WINGWALLS LONG WING	INSIDE FOOTING DIMENSIONS SHORT WING	INSIDE FOOTING DIMENSIONS LONG WING	* QUANTITY PER WING CLASS S CONCRETE INLET END SHORT WING	INLET END LONG WING	OUTLET END SHORT WING	OUTLET END LONG WING
H	WB	Cw	WH1	WH2	WF1	WF2	F1	F2	E	W1	W2	W4	W5	Cu.Yd.	Cu.Yd.	Cu.Yd.	Cu.Yd.
2'	7"	6"	2'-10"	0'-8"	2'-4"	2'-0"	1'-1⅜"	0'-10⅜"	6'-6"	6'-8⅜"	9'-2⅛"	6'-0⅝"	9'-1⅝"	0.789	1.094	0.876	1.212
3'	7"	6"	3'-10"	1'-0"	2'-8"	2'-1⅝"	1'-5⅝"	1'-1⅜"	8'-6"	8'-9⅜"	12'-0⅝"	8'-2⅝"	12'-3⅛"	1.186	1.650	1.300	1.808
4'	7"	6"	4'-10"	1'-4"	3'-0"	2'-3"	1'-9⅜"	1'-1'0"	10'-6"	10'-10⅝"	14'-10⅛"	10'-4⅛"	15'-5⅝"	1.656	2.305	1.797	2.502
5'	7'	6"	5'-10"	1'-8"	3'-4"	2'-4⅝"	2'-1⅜"	2'-3⅜"	12'-6"	12'-11⅛"	17'-8⅛"	12'-6⅛"	18'-7⅛"	2.196	3.059	2.343	3.295
		7"	5'-10"	1'-8"	3'-4"	2'-6⅝"	2'-1⅜"	2'-3⅜"	12'-6"	12'-11⅛"	17'-8⅛"	12'-6⅛"	18'-7⅛"	2.287	3.188	2.955	3.429
6'	8'	7"	6'-8"	2'-0"	3'-8"	2'-6"	2'-5⅜"	2'-7⅜"	14'-6"	15'-0⅝"	20'-6"	14'-8⅝"	21'-9"	3.052	4.242	3.296	4.517
		7½"	6'-10"	2'-0"	3'-8"	2'-6"	2'-5⅜"	2'-7⅜"	14'-6"	15'-0⅝"	20'-6"	14'-8⅝"	21'-9"	3.114	4.329	3.309	4.605
		8"	6'-10"	2'-0"	3'-8"	2'-6"	2'-5⅜"	2'-7⅜"	14'-6"	15'-0⅝"	20'-6"	14'-8⅝"	21'-9"	3.177	4.417	3.371	4.693
@ 7'	8½"	7½"	7'-10"	2'-4"	4'-2"	2'-7⅞"	3'-0⅞"	3'-5⅜"	16'-6"	17'-1"	23'-4"	16'-10⅜"	25'-1"	3.998	5.560	4.220	5.877
		8"	7'-10"	2'-4"	4'-2"	2'-7⅞"	3'-0⅞"	3'-5⅜"	16'-6"	17'-1"	23'-4"	16'-10⅜"	25'-1"	4.079	5.675	4.301	5.991
@ 8'	9"	8"	8'-10"	2'-8"	4'-8"	2'-9"	3'-4⅝"	4'-2⅜"	18'-6"	19'-1⅜"	26'-2"	19'-1⅛"	28'-5"	5.111	7.111	5.360	7.470

* Quantity per wing does not include headwall or that portion of apron or toewall for the length W5.
@ See Table "A" for special values of F1 & F2 and W4 & W5 for Single 5'x5' and 6'x6' Box Culverts.



PART PLAN

END ELEVATION

SINGLE BARREL CULVERT - 15° SKEW RIGHT FORWARD
Details of Culvert with 15° Skew Left Forward is reversed, see Drwg. No. W-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 W5 for each box, see the above Std. also.

MEMBRANE:- A membrane waterproofing 18" 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.

QUANTITIES

CLEAR SPAN	CLEAR HEIGHT	THICKNESS OF WING AT HEADWALL	THICKNESS OF WING AT END OF WING	REINFORCING STEEL FOR 4 WINGS @	CLASS S CONCRETE - 4 WINGS HEADWALLS, WINGWALLS, FOOTINGS, TOEWALLS AND APRONS				
					SINGLE BARREL CULVERT	DOUBLE BARREL CULVERT	TRIPLE BARREL CULVERT	QUADRUPLE BARREL CULVERT	QUINTUPLE BARREL CULVERT
S	H	Cw	WB	LB.	Cu.Yd.	Cu.Yd.	Cu.Yd.	Cu.Yd.	Cu.Yd.
4'	2'	6"	7"	117	4.79	5.78	6.77	7.77	8.76
	3'	6"	7"	176	6.65	7.64	8.63	9.63	10.62
	4'	6"	7"	267	8.85	9.84	10.84	11.83	12.82
	5'	6"	7"	379	11.40	12.38	13.38	14.37	15.36
	6'	7"	8"	626	15.95	16.96	17.98	18.51	19.53
5'	3'	6"	7"	176	6.87	8.07	9.28	10.48	11.69
	4'	6"	7"	267	9.08	10.28	11.48	12.69	13.90
	5'	6"	7"	379	11.61	12.81	14.02	15.23	16.44
	6'	7"	8"	626	15.67	16.90	18.14	19.38	20.61
	7'	7½"	8½"	1210	20.11	21.36	22.62	23.88	25.14
6'	3'	6"	7"	176	7.09	8.52	9.92	11.36	12.78
	4'	6"	7"	267	9.29	10.73	12.13	13.56	14.98
	5'	6"	7"	379	11.83	13.26	14.67	16.10	17.53
	6'	7"	8"	626	15.89	17.35	18.79	20.25	21.70
	7'	7½"	8½"	1210	20.33	21.81	23.28	24.76	26.24
	8'	8"	9"	1533	25.56	27.05	28.53	30.02	31.50
7'	4'	6"	7"	267	9.52	11.18	12.81	14.47	16.09
	5'	6"	7"	379	12.05	13.72	15.35	17.01	18.63
	6'	7"	8"	626	16.12	17.80	19.45	21.13	22.78
	7'	7½"	8½"	1210	20.56	22.26	23.94	25.64	27.33
	8'	8"	9"	1533	25.80	27.50	29.20	30.90	32.60
8'	4'	6"	7"	267	9.75	11.65	13.51	15.41	17.23
	5'	7"	7"	379	12.74	14.68	16.55	18.47	20.31
	6'	7"	8"	626	16.34	18.26	20.14	22.06	23.90
	7'	7½"	8½"	1210	20.78	22.72	24.62	26.55	28.42
	8'	8"	9"	1533	26.03	27.96	29.86	31.80	33.71
9'	5'	7"	7"	379	12.99	15.15	17.25	19.40	21.95
	6'	7½"	8"	626	16.89	18.07	21.19	23.34	25.42
	7'	7½"	8½"	1210	21.01	23.19	25.31	27.48	29.58
	8'	8"	9"	1533	26.25	28.42	30.55	32.72	34.78
10'	5'	7"	7"	379	18.23	16.62	17.95	20.24	22.59
	6'	7½"	8"	626	17.19	19.54	21.89	24.20	26.56
	7'	7½"	8½"	1210	21.44	23.66	26.01	28.32	30.68
	8'	8"	9"	1533	26.48	28.88	31.25	33.56	35.92
11'	6'	8"	8"	626	17.67	20.34	22.92	25.48	———
	7'	8"	8½"	1210	21.88	24.55	27.13	29.69	———
	8'	8"	9"	1533	26.70	29.37	31.96	34.52	———
12'	6'	8"	8"	626	17.91	20.84	23.64	26.46	———
	7'	8"	8½"	1210	22.11	25.04	27.85	30.67	———
	8'	8"	9"	1533	26.93	29.86	32.67	35.49	———

@ For reinforcing steel in Headwalls and Aprons, see Drawings listed below.

GENERAL NOTES:-
CONCRETE:- All concrete to be Class S, and shall be poured in the dry. All exposed corners to have ¾" chamfers.
REINFORCING STEEL:- Reinforcing steel to be deformed bars of intermediate or hard grade.
CONSTRUCTION JOINTS:- Construction joints between wingwall, footings and sidewalls 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 #/□"
Reinforcing Steel 20,000 #/□"

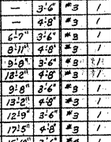
NOTE:-
This drawing to be used in conjunction with Std. Barrel Sections, Drawing Nos.

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	SF1 & LF1 BENT: In bottom of footing, bent up into back face of wing. One bar of each length. SIZE	SPACING	NO. REQD	LENGTHS VARY MIN.	MAX.	X MIN.	X MAX.	Y MIN.	Y MAX.	SF2 & LF2 BENT: In bottom of footing, bent up into back face of wing. Alt. with F1 bars. SIZE	SPACING	NO. REQD	LENGTH	X	Y	SF3 & LF3 STRAIGHT: Longitudinal in top of wing footing heel. SIZE	NO. REQD	LENGTH	SF4 & LF4 STRAIGHT: Longitudinal in bottom of wing footing Pos. SIZE	NO. REQD	LENGTH	SH1 & LH1 STRAIGHT: Horizontal in back face of wing. SIZE	SPACING	NO. REQD	LENGTH	SH2 & LH2 STRAIGHT: Horizontal in back face of wing. One bar of each length. BAR	SPACING	NO. REQD	LENGTHS VARY MAX.	MIN.	SH3 & LH3 STRAIGHT: In back face of wing at top - on slope. SIZE	NO. REQD	LENGTH	SH4 & LH4 BENT: Dowels thru construction joint at headwall. SIZE	SPACING	NO. REQD	LENGTH	X
H	Short or Long	Size	Spacing	No. Reqd	Min.	Max.	Min.	Max.	Min.	Max.	Size	Spacing	No. Reqd	Length	X	Y	Size	No. Reqd	Length	Size	No. Reqd	Length	Size	Spacing	No. Reqd	Length	Bar	Spacing	No. Reqd	Max.	Min.	Size	No. Reqd	Length	Size	Spacing	No. Reqd	Length	X
2'	Short	#3	12"	7	1'-7"	3'-11"	0'-8"	1'-0"	3'-0"	3'-0"	—	—	—	—	—	—	#3	1	9'-2"	#3	2	7'-10"	#3	18"	1	6'-5"	#4	12"	1	3'-6"	#3	1	6'-10"	#3	12"	2	2'-8"	1'-4"
	Long	#3	12"	10	1'-7"	3'-11"	0'-8"	1'-0"	0'-10"	3'-0"	—	—	—	—	—	—	#3	1	11'-8"	#3	2	10'-10"	#3	18"	1	8'-11"	#3	12"	1	4'-8"	#3	1	9'-1"	#3	12"	2	"	"
3'	Short	#3	12"	9	2'-2"	3'-8"	0'-10"	1'-4"	1'-5"	4'-0"	—	—	—	—	—	—	#3	2	10'-0"	#3	2	10'-0"	#3	18"	1	8'-6"	#3	12"	2	6'-7"	#3	1	9'-0"	#3	12"	3	"	"
	Long	#3	12"	13	1'-11"	3'-8"	0'-10"	1'-3"	1'-2"	4'-0"	—	—	—	—	—	—	#3	1	14'-6"	#3	2	14'-6"	#3	18"	1	11'-9"	#3	12"	2	8'-11"	#3	1	12'-0"	#3	12"	3	"	"
4'	Short	#3	12"	11	2'-7"	4'-7"	0'-11"	1'-8"	1'-9"	5'-0"	—	—	—	—	—	—	#3	1	13'-4"	#3	3	13'-2"	#3	12"	1	10'-5"	#3	12"	3	8'-8"	#3	1	11'-2"	#3	12"	4	"	"
	Long	#3	12"	15	2'-6"	4'-6"	0'-11"	1'-7"	1'-8"	5'-0"	—	—	—	—	—	—	#3	1	17'-4"	#3	3	17'-2"	#3	12"	1	14'-1"	#3	12"	3	11'-2"	#3	1	14'-11"	#3	12"	4	"	"
5'	Short	#3	12"	13	3'-1"	5'-1"	1'-1"	2'-0"	2'-1"	6'0"	#3	12"	4	3'-6"	1'-1"	2'-6"	#3	1	15'-5"	#3	3	14'-9"	#3	12"	2	12'-8"	#3	12"	2	10'-5"	#3	1	13'-8"	#3	12"	5	"	"
	Long	#3	12"	18	3'-10"	5'-10"	1'-1"	1'-11"	2'-0"	6'-0"	#3	12"	5	3'-6"	1'-1"	2'-6"	#3	1	20'-2"	#3	3	20'-6"	#3	12"	2	17'-5"	#3	12"	3	13'-11"	#3	1	17'-10"	#3	12"	5	"	"
6'	Short	#4	12"	16	3'-6"	5'-9"	1'-2"	2'-4"	2'-5"	7'-1"	#3	12"	4	4'-2"	1'-6"	3'-0"	#3	1	17'-6"	#3	3	16'-6"	#3	18"	2	14'-8"	#3	12"	4	12'-9"	#3	1	15'-6"	#3	12"	6	2'-8"	1'-4"
	Long	#4	12"	21	3'-5"	5'-8"	1'-2"	2'-3"	2'-4"	7'-1"	#3	12"	5	4'-2"	1'-6"	3'-0"	#3	1	23'-0"	#3	3	23'-6"	#3	18"	2	20'-2"	#3	12"	4	16'-3"	#3	1	20'-3"	#3	12"	6	2'-8"	1'-4"
7'	Short	#4	12"	18	3'-9"	6'-0"	1'-3"	2'-5"	2'-7"	8'-1"	#4	12"	7	5'-1"	1'-7"	4'-0"	#4	1	19'-7"	#4	4	18'-9"	#4	12"	2	14'-10"	#4	12"	5	15'-10"	#4	1	17'-8"	#4	12"	7	3'-6"	1'-9"
	Long	#4	12"	24	3'-10"	6'-0"	1'-3"	2'-5"	2'-8"	8'-1"	#4	12"	9	5'-1"	1'-7"	4'-0"	#4	1	25'-10"	#4	4	26'-0"	#4	12"	2	23'-1"	#4	12"	5	20'-11"	#4	1	23'-0"	#4	12"	8	"	"
8'	Short	#4	12"	20	4'-0"	6'-2"	1'-5"	2'-6"	2'-10"	9'-2"	#4	12"	10	6'-6"	1'-10"	4'-9"	#4	1	21'-8"	#4	4	21'-0"	#4	12"	2	21'-3"	#4	12"	5	21'-8"	#4	1	20'-7"	#4	12"	8	3'-6"	1'-9"
	Long	#4	12"	27	4'-3"	12'-8"	1'-5"	3'-2"	3'-0"	9'-2"	#4	12"	13	6'-6"	1'-10"	4'-9"	#4	1	28'-8"	#4	4	30'-3"	#4	12"	2	25'-11"	#4	12"	5	27'-1"	#4	1	26'-7"	#4	12"	8	3'-6"	1'-9"

BAR BENDING DIAGRAM



QUANTITY REINFORCING STEEL PER WING - LBS. SHORT WING	LONG WING
24.9	33.4
37.7	50.3
57.3	76.4
81.1	108.4
134.8	178.1
259.5	345.2
328.0	438.3

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

REVISIONS:- Membrane Added. 5-10-66 W.C.H.

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, QUADRUPLES & QUINTUPLES — ALL DEPTHS OF COVER FOR H = 8'-0" OR LESS

STANDARD DRAWING NO. W-X153-1

Designed By- W.C.H. 5-13-63 Checked By- [illegible]
Drawn By- W.C.H. 6-20-63 Checked By- [illegible]
Quantities By- W.C.H. 9-23-63 Checked By- [illegible]

BAR LIST FOR VARIOUS SECTIONS OF BARREL

SECTION & BAR GROUP	LENGTH OF SECTIONS	DEPTH OF COVER	CLEAR SPAN	CLEAR HEIGHT	"a" bars STRAIGHT In Top and Bottom Slabs of Barrel. 2 Add'l. in Apron and Headwall - Each.				"b" bars BENT - See Diagram at Right. In Top and Bottom Slabs of Barrel. Alternate with "a" bars.					"d" bars STRAIGHT Longitudinal in Top Slab of Barrel			"d" bars STRAIGHT Longitudinal in Sidewalls			"d" bars STRAIGHT Longitudinal in Bottom Slab of Barrel			"f" bars STRAIGHT Verticals in Sidewalls		
		D	S	H	SIZE	SPACING	NUMBER REQ'D 3:1	NUMBER REQ'D 4:1	SIZE	SPACING	NUMBER REQ'D 3:1	NUMBER REQ'D 4:1	X	SIZE	SPACING	LENGTH	SIZE	SPACING	NO. REQ'D	LENGTH	SIZE	SPACING	NUMBER REQ'D 3:1	NUMBER REQ'D 4:1	LENGTH
SECTION "A" & BAR GROUP "A"	4:1 = 32'-0"	10'-0"	5'	5'			98	68			44	64	8'-10"								#4	12"	44	64	6'-1"
	3:1 = 22'-0"	0' TO	6'	6'			98	68			44	64	9'-0"									11"	98	70	8'-1"
			7'	7'-1"	#5	12"	98	68	#6	12"	44	64	9'-1"	#4	12"	8	#4	12"	14	10		12"	44	64	9'-2"
			8'	8'-1"			98	68			44	64	9'-2"						16		#5				
			9'	8'-3"			98	68			44	64	9'-4"						18			11"	98	70	10'-1"
		1 @ 8'	6'				98	68			44	64	10'-0"								#4	12"	44	64	7'-3"
			7'	8'-11"			98	68			44	64	10'-1"						12	9			44	64	8'-3"
		1 @ 8'	8'				98	68			44	64	10'-2"						14			12"	44	64	9'-3"
			9'	9'-1"			98	68			44	64	10'-3"						16						
			10'	9'-3"			98	68			44	64	10'-4"						18						
																			20						
		1 @ 9'	7'				98	70			98	70	11'-3"						10		#4	12"	44	64	8'-5"
			8'	10'-1"			98	70			98	70	11'-4"						12						
			9'	10'-3"			98	70			98	70	11'-5"						16						
			10'	10'-5"			98	70			98	70	11'-7"						18						
			11'	10'-7"			98	70			98	70	11'-10"						20						
																			22						
		1 @ 10'	8'				98	68			44	64	12'-2"						16		#5	12"	44	64	9'-7"
			9'	11'-1"			98	68			44	64	12'-6"						18						
			10'	11'-3"			98	68			44	64	12'-8"						20			10"	44	64	9'-8"
			11'	11'-5"			98	68			44	64	12'-10"						22						
			12'	11'-7"			98	68			44	64	13'-0"						24						
				11'-9"																					
SECTION "B" & BAR GROUP "B"	4:1 = 16'-0"	0' TO	5'	5'			24	36			24	38	8'-10"								#4	12"	22	32	6'-3"
	3:1 = 11'-0"	10'-0"	6'	6'-1"			24	36			24	38	9'-0"												
			7'	7'-1"	#6	11"	24	36	#6	12"	24	38	9'-1"	#4	12"	8	#4	12"	14	9	#5	12"	22	32	8'-3"
			8'	8'-1"			24	36			24	38	9'-2"						16						
			9'	8'-3"			24	36			24	38	9'-4"						18						
		1 @ 8'	7'				22	32			22	32	10'-0"						12		#4	12"	22	32	7'-5"
			8'	9'-1"			22	32			22	32	10'-1"						14						
			9'	9'-3"			22	32			22	32	10'-2"						16						
			10'	9'-5"			22	32			22	32	10'-3"						18						
																			20						
		1 @ 9'	7'				22	32			22	32	11'-3"						10		#5	12"	22	32	8'-10"
			8'	10'-1"			22	32			22	32	11'-4"						12						
			9'	10'-3"			22	32			22	32	11'-6"						16						
			10'	10'-5"			22	32			22	32	11'-8"						18						
			11'	10'-7"			22	32			22	32	11'-10"						20						
																			22						
		1 @ 10'	8'				22	32			22	32	12'-2"						16		#5	12"	22	32	9'-7"
			9'	11'-1"			22	32			22	32	12'-6"						18						
			10'	11'-3"			22	32			22	32	12'-8"						20			10"	22	32	9'-8"
			11'	11'-5"			22	32			22	32	12'-10"						22						
			12'	11'-7"			22	32			22	32	13'-0"						24						
				11'-9"																					
SECTION "C" & BAR GROUP "C"	4:1 = 16'-0"	0' TO	5'	5'			20	30			20	30	9'-0"								#4	12"	22	32	6'-5"
	3:1 = 11'-0"	10'-0"	6'	6'-1"			20	30			20	30	9'-2"												
			7'	7'-1"	#7	13"	20	30	#7	13"	20	30	9'-3"	#4	12"	8	#4	12"	14	8	#5	12"	22	32	8'-5"
			8'	8'-1"			20	30			20	30	9'-4"						16						
			9'	8'-3"			20	30			20	30	9'-6"						18						
		1 @ 8'	6'				22	32			22	32	10'-2"						12		#4	12"	22	32	7'-7"
			7'	8'-11"			22	32			22	32	10'-3"						14						
			8'	9'-1"			22	32			22	32	10'-5"						16						
			9'	9'-3"			22	32			22	32	10'-6"						18						
			10'	9'-5"			22	32			22	32	10'-8"						20						
		1 @ 9'	7'				22	32			22	32	11'-4"						10		#5	12"	22	32	8'-10"
			8'	10'-1"			22	32			22	32	11'-5"						12						
			9'	10'-3"			22	32			22	32	11'-6"						16						
			10'	10'-5"			22	32			22	32	11'-8"						18						
			11'	10'-7"			22	32			22	32	11'-10"						20						
																			22						
		1 @ 10'	8'				22	32			22	32	12'-2"						16		#5	12"	22	32	9'-7"
			9'	11'-1"			22	32			22	32	12'-6"						18						
			10'	11'-3"			22	32			22	32	12'-8"						20			10"	22	32	9'-8"
			11'	11'-5"			22	32			22	32	12'-10"						22						
			12'	11'-7"			22	32			22	32	13'-0"						24						
				11'-9"																					
SECTION "D" & BAR GROUP "D"	3:1 = 11'-0"	15'-0" TO	5'	7'-10"			22	32			22	32	9'-1"						9		#4	12"	22	32	7'-9"
	4:1 = 16'-0"	25'-0"	6'	8'-0"			22	32			22	32	9'-3"						12		#5	12"	22	32	7'-11"
			7'	8'-1"	#7	12"	22	32	#7	12"	22	32	9'-4"	#4	11"	9	#4	12"	14	9	#6	12"	22	32	8'-1"
			8'	8'-3"			22	32			22	32	9'-6"						16						
			9'	8'-5"			22	32			22	32	9'-8"						18		#7	12"	22	32	8'-3"
		1 @ 8'	6'				22	32			22	32	10'-0"						12		#5	12"	22	32	8'-4"
			7'	9'-1"			22	32			22	32	10'-1"						14						
			8'	9'-3"			22	32			22	32	10'-3"						16		#6	12"	22	32	8'-6"
			9'	9'-5"			22	32			22	32	10'-4"						18						
			10'	9'-7"			22	32			22	32	10'-6"						20		#7	12"	22	32	8'-7"
		1 @ 9'	7'				22	32			22	32	11'-2"						10		#5	12"	22	32	8'-10"
			8'	10'-1"			22	32			22	32	11'-3"						12						
			9'	10'-3"			22	32			22	32	11'-4"						16		#6	12"	22	32	8'-11"
			10'	10'-5"			22	32			22	32	11'-6"						18						
			11'	10'-7"			22	32			22	32	11'-8"						20		#7	12"	22	32	9'-0"
		1 @ 10'	8'				22	32			22	32	12'-2"						14		#5	12"	22	32	9'-1"
			9'	11'-1"			22	32			22	32	12'-4"						16						
			10'	11'-3"			22	32			22	32	12'-6"						18		#6	12"	22	32	9'-3"
			11'	11'-5"			22	32			22	32	12'-8"						20						
			12'	11'-7"			22	32			22	32	12'-10"						22		#7	12"	22	32	9'-4"
				11'-9"																					
SECTION "E" & BAR GROUP "E"	3:1 = 11'-0"	20'-0" TO	5'	8'-1"			22	32			22	32	10'-2"						12		#4	12"	22	32	8'-1"
	4:1 = 16'-0"	25'-0"	6'	8'-3"			22	32			22	32	10'-3"						14						
			7'	8'-5"	#7	12"	22	32	#7	12"	22	32	10'-4"	#4	11"	9	#4	12"	16	9	#5	12"	22	32	8'-3"
			8'	8'-7"			22	32			22	32	10'-5"						18						
			9'	8'-9"			22	32			22	32	10'-6"						20		#6	12"	22	32	8'-5"
		1 @ 8'	6'				22	32			22	32	11'-2"						10		#5	12"	22	32	8'-6"
			7'	9'-1"			22	32			22	32	11'-3"						12						
			8'	9'-3"			22	32			22	32	11'-4"						16		#6	12"	22	32	8'-7"
			9'	9'-5"			22	32			22	32	11'-6"						18						
			10'	9'-7"			22	32			22	32	11'-8"						20		#7	12"	22	32	8'-8"
		1 @ 9'	6'				22	32			22	32	12'-2"						12		#5	12"	22	32	8'-9"
			7'	10'-3"			22	32			22	32	12'-3"						14						
			8'	10'-5"			22	32			22	32	12'-4"						16		#6	12"	22	32	8'-10"
			9'	10'-7"			22	32			22	32	12'-6"						18						
			10'	10'-9"			22	32			22	32	12'-8"						20		#7	12"	22	32	8'-11"
		1 @ 10'	8'				22	32			22	32	13'-2"						14		#5	12"	22	32	9'-0"
			9'	11'-1"			22	32			22	32	13'-4"						16						
			10'	11'-3"			22	32			22	32	13'-6"						18		#6	12"	22	32	9'-2"
			11'	11'-5"			22	32			22	32	13'-8"						20						
			12'	11'-7"			22	32			22	32	13'-10"						22		#7	12"	22	32	9'-3"
				11'-9"																					

NOTE:- Bars for each Section to be marked with the Section letter thus for Section B, the bars should be marked Ba, Bb, Bd, Be and Bf.

Varies with Length of Barrel

Designed By:- W.C.H. 7-18-62. Checked By:- RMS 7-25-62
Drawn By:- N.C.H. 8-3-62. Checked By:- RMS 8-10-62
Quantities By:- W.C.H. 8-1-62. Checked By:- RMS 8-10-62

DIMENSIONS

MAX. DESIGN DEPTH OF COVER	BARREL DIMENSIONS CLEAR SPAN	CLEAR HEIGHT	SQ.FT. OPENING	OVERALL WIDTH	THICKNESS OF TOP SLAB	THICKNESS OF SIDEWALLS	THICKNESS OF BOTTOM SLAB	OVERALL HEIGHT
D	S	H	A	OW	T	C	B	OH
SECTION "A" - 10'-0"	1 @ 7'	5'	35	8'-0"	8"	6"	8½"	6'-4½"
		6'	42	8'-2"		7"		7'-4½"
		7'	49	8'-3"		7½"		8'-4½"
		8'	56	8'-4"		8"		9'-4½"
		9'	63	8'-5"		9"		10'-4½"
	1 @ 8'	6'	48	9'-2"	8½"	7"	9½"	7'-6"
		7'	56	9'-3"		7½"		8'-6"
		8'	64	9'-4"		8"		9'-6"
		9'	72	9'-6"		9"		10'-6"
		10'	80	9'-8"		10"		11'-6"
	1 @ 9'	7'	63	10'-3"	9½"	7½"	10½"	8'-8"
		8'	72	10'-4"		8"		9'-8"
		9'	81	10'-6"		9"		10'-8"
		10'	90	10'-8"		10"		11'-8"
		11'	99	10'-10"		11"		12'-8"
	1 @ 10'	8'	80	11'-2"	10½"	8"	11½"	9'-10"
		9'	90	11'-4"		9"		10'-10"
		10'	100	11'-6"		10"		11'-10"
		11'	110	11'-8"		11"		12'-10"
		12'	120	11'-10"		12"		13'-10"
SECTION "B" - 15'-0"	1 @ 7'	5'	35	8'-0"	8½"	6"	9½"	6'-6"
		6'	42	8'-2"		7"		7'-6"
		7'	49	8'-3"		7½"		8'-6"
		8'	56	8'-4"		8"		9'-6"
		9'	63	8'-6"		9"		10'-6"
	1 @ 8'	6'	48	9'-2"	9"	7"	10½"	7'-8½"
		7'	56	9'-3"		7½"		8'-8½"
		8'	64	9'-4"		8"		9'-8½"
		9'	72	9'-6"		9"		10'-8½"
		10'	80	9'-8"		10"		11'-8½"
	1 @ 9'	7'	63	10'-3"	9½"	7½"	10½"	8'-10½"
		8'	72	10'-4"		8"		9'-10½"
		9'	81	10'-6"		9"		10'-10½"
		10'	90	10'-8"		10"		11'-10½"
		11'	99	10'-10"		11"		12'-10½"
	1 @ 10'	8'	80	11'-2"	10½"	8"	11½"	9'-12½"
		9'	90	11'-4"		9"		10'-12½"
		10'	100	11'-6"		10"		11'-12½"
		11'	110	11'-8"		11"		12'-12½"
		12'	120	11'-10"		12"		13'-12½"
SECTION "C" - 20'-0"	1 @ 8'	5'	35	8'-0"	9½"	6"	10½"	6'-8"
		6'	42	8'-2"		7"		7'-8"
		7'	49	8'-3"		7½"		8'-8"
		8'	56	8'-4"		8"		9'-8"
		9'	63	8'-6"		9"		10'-8"
	1 @ 9'	6'	48	9'-2"	10"	7"	11½"	7'-10½"
		7'	56	9'-3"		7½"		8'-10½"
		8'	64	9'-4"		8"		9'-10½"
		9'	72	9'-6"		9"		10'-10½"
		10'	80	9'-8"		10"		11'-10½"
	1 @ 10'	7'	63	10'-3"	10½"	8"	12½"	9'-12½"
		8'	72	10'-4"		8½"		10'-12½"
		9'	81	10'-6"		9½"		11'-12½"
		10'	90	10'-8"		10½"		12'-12½"
		11'	99	10'-10"		11½"		13'-12½"
		12'	108	11'-0"		12½"		14'-12½"
SECTION "D" - 25'-0"	1 @ 8'	5'	35	8'-1"	10"	6½"	11½"	6'-10"
		6'	42	8'-3"		7½"		7'-10"
		7'	49	8'-4"		8½"		8'-10"
		8'	56	8'-6"		9½"		9'-10"
		9'	63	8'-8"		10½"		10'-10"
	1 @ 9'	6'	48	9'-3"	10½"	7½"	12"	8'-0½"
		7'	56	9'-4½"		8½"		9'-0½"
		8'	64	9'-6"		9½"		10'-0½"
		9'	72	9'-8"		10½"		11'-0½"
		10'	80	9'-10½"		11½"		12'-0½"
	1 @ 10'	7'	63	10'-5"	11"	8½"	12½"	9'-2½"
		8'	72	10'-7"		9½"		10'-2½"
		9'	81	10'-8½"		10½"		11'-2½"
		10'	90	10'-10½"		11½"		12'-2½"
		11'	99	11'-0½"		12½"		13'-2½"
		12'	108	11'-2½"		13½"		14'-2½"
SECTION "E" - 30'-0"	1 @ 8'	5'	35	8'-2"	11½"	7"	13"	6'-11½"
		6'	42	8'-3"		8"		7'-11½"
		7'	49	8'-4"		9"		8'-11½"
		8'	56	8'-5½"		9¾"		9'-11½"
		9'	63	8'-6½"		10¾"		10'-11½"
	1 @ 9'	6'	48	9'-4"	12"	9"	14"	8'-2½"
		7'	56	9'-5"		10"		9'-2½"
		8'	64	9'-6"		11"		10'-2½"
		9'	72	9'-7½"		12"		11'-2½"
		10'	80	9'-9½"		13"		12'-2½"
	1 @ 10'	7'	63	10'-6"	12½"	9½"	15"	9'-5½"
		8'	72	10'-7"		10½"		10'-5½"
		9'	81	10'-9"		11½"		11'-5½"
		10'	90	11'-0"		12½"		12'-5½"
		11'	99	11'-2"		13½"		13'-5½"

QUANTITIES

UNIT QUANTITIES	REINFORCING STEEL			
		ADDITIONAL		
CLASS S CONC. PER LIN. FT. OF BARREL	PER LIN. FT. OF BARREL	PER LAP	TWO HEADWALLS & WINGS	
CU.YD.	LB.	LB.	LB	
0.593	68.20	21.71	107.42	
0.676	71.72	23.38	108.81	
0.794	75.80	23.05	109.50	
0.819	89.72	26.72	110.20	
0.933	90.91	28.39	111.59	
0.769	86.55	25.05	157.02	
0.838	89.72	26.72	158.02	
0.914	99.84	28.39	159.02	
1.028	106.20	30.06	161.03	
1.154	113.38	31.73	163.03	
0.957	116.90	28.39	177.61	
1.033	127.28	30.06	178.61	
1.148	138.97	31.73	180.61	
1.276	141.46	33.40	182.62	
1.416	152.81	35.07	184.62	
1.165	141.10	31.73	249.37	
1.281	145.89	33.40	252.10	
1.909	155.50	35.07	254.82	
1.550	167.01	36.74	257.55	
1.704	176.92	38.41	260.27	
0.630	80.06	21.71		
0.713	89.88	23.38		
0.782	93.23	25.05		
0.858	105.69	26.72		
0.972	111.13	28.39		
0.839	96.99	25.05		
0.909	106.02	26.72		
0.986	113.96	28.39		
1.101	129.80	30.06		
1.229	136.58	31.73		
1.036	127.99	28.39		
1.113	135.59	30.06		
1.229	146.09	31.73		
1.358	158.75	33.40		
1.499	171.14	35.07		
1.252	160.13	33.40		
1.370	171.52	35.07		
1.499	180.64	36.74		
1.642	197.17	38.41		
1.796	203.27	40.08		
0.679	89.15	21.71		
0.763	98.64	23.38		
0.833	106.20	25.05		
0.924	117.96	26.72		
1.041	132.28	28.39		
0.896	111.55	26.72		
0.966	122.89	28.39		
1.074	132.89	30.06		
1.177	149.87	31.73		
1.307	156.17	33.40		
1.193	192.65	30.06		
1.284	159.60	31.73		
1.327	167.52	33.40		
1.459	179.75	35.07		
1.603	197.28	36.74		
1.905	173.91	35.07		
1.511	194.05	36.74		
1.626	203.28	38.41		
1.772	221.81	40.08		
1.929	241.22	41.75		
0.749	96.65	23.38		
0.838	106.38	25.05		
0.925	114.06	26.72		
1.022	126.68	28.39		
1.184	141.84	30.06		
0.977	128.84	28.39		
1.065	136.70	30.06		
1.178	146.99	31.73		
1.304	159.36	33.40		
1.441	173.92	35.07		
1.251	160.30	31.73		
1.367	179.69	33.40		
1.478	186.52	35.07		
1.617	199.04	36.74		
1.769	216.88	38.41		
1.542	200.20	36.74		
1.671	214.77	38.41		
1.794	230.33	40.08		
1.947	248.61	41.75		
2.112	268.06	43.42		
0.808	102.80	23.38		
0.901	113.71	25.05		
1.005	122.23	26.72		
1.107	134.29	28.39		
1.235	149.04	30.06		
1.060	138.22	28.39		
1.166	147.08	30.06		
1.284	159.60	31.73		
1.415	170.21	33.40		
1.559	187.05	35.07		
1.360	173.52	33.40		
1.491	188.21	35.07		
1.597	201.20	36.74		
1.742	218.99	38.41		
1.899	232.10	40.08		

DOWEL BARS FOR TWO HEADWALLS

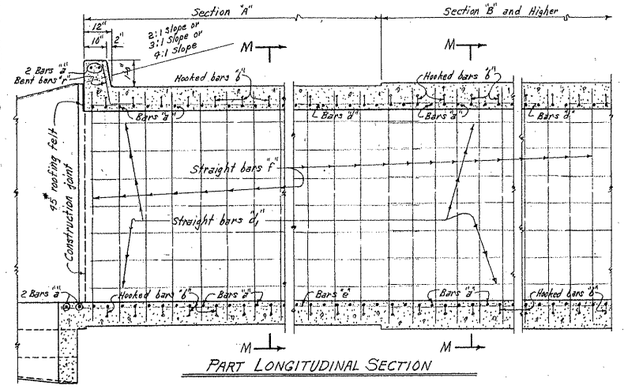
BAR SIZE	PIN DIAM.	K	ADD FOR 2 HOOKS	Bars "b"
#6	3"	5"	1'-2"	K, Pin Diam., X
#7	3½"	5⅝"	1'-4"	
#8	4"	6⅜"	1'-6"	

SPAN	SIZE	SPACING	No. REQ'D	LENGTH	X	Bars "f" Dowel bars in Headwalls
7'	#4	11"	19	2'-8"	1'-4"	2, 12, X, r= 2" Pin, X
8'	#4	12"	20	2'-10"	1'-5"	
9'	#4	12"	22	3'-0"	1'-6"	
10'	#4	12"	24	3'-4"	1'-7"	

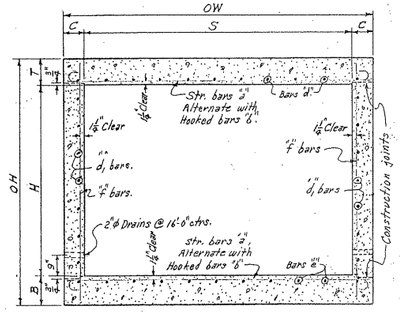
NOTE:- Dimensions are to centers of bars.

W-X002-2, W-X003-2, W-X004-2. or W-X003-1 or W-X004-1 or W-X004-2.

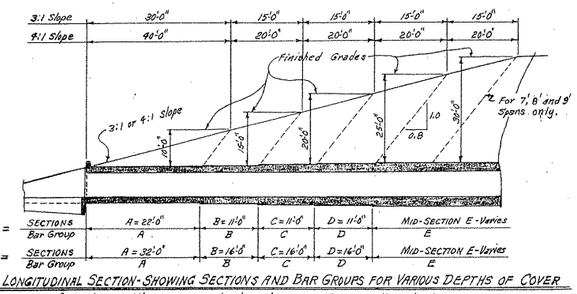
Note:- For details of wings and bar lists, see Drawing Nos. and



PART LONGITUDINAL SECTION



TYPICAL SECTION M-M



		A	B	C	D	
3:1 Slope =	SECTIONS	A=22'-0"	B=11'-0"	C=11'-0"	D=11'-0"	MID-SECTION E-Varies
	Bar Group	A	B	C	D	E
4:1 Slope =	SECTIONS	A=32'-0"	B=16'-0"	C=16'-0"	D=16'-0"	MID-SECTION E-Varies
	Bar Group	A	B	C	D	E

TYPICAL LONGITUDINAL SECTION-SHOWING SECTIONS AND BAR GROUPS FOR VARIOUS DEPTHS OF COVER

NOTE:- Lengths of Sections, with Bar Groups to be shown on Cross Section Sheets.

GENERAL NOTES:-

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

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

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

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

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

DESIGN LIVE LOAD

H20-S16 LOADING A.A.S.H.O. 1961 AND SPECIAL MILITARY LOADING Two 24,000 Lb. Axles @ 9'-0" ctrs.

UNIT STRESSES:-

Class S Concrete (n=10) 1800 #/in²
Reinforcing Steel 20000 #/in²

REVISIONS:- Wing Dwg. Nos.- W.C.H. 1-14-63.

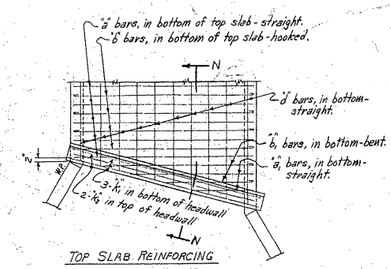
SECTIONS AND BAR GROUPS TO BE USED FOR VARIOUS DEPTHS OF COVER

DEPTHS OF COVER	SECTIONS & BAR GROUPS FOR END SECTIONS A	B	C	D	MID-SECTION AND BAR GROUP
5.0 to 9.5'	✓				A
10.0 to 14.5'	✓				B
15.0 to 19.5'	✓	✓			C
20.0 to 24.5'	✓	✓	✓		D
25.0 to 30.0'	✓	✓	✓	✓	E

LENGTH OF SECTIONS FOR SKEWED CULVERTS

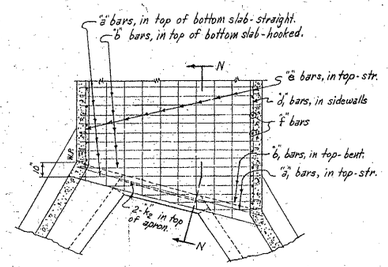
| SKEW ANGLE | SEC. OF SKEW ANGLE | 3:1 SLOPES SECTIONS A | 3:1 SLOPES SECTIONS B,C or D | 4:1 SLOPES SECTIONS A | 4:1 SLOPES SECTIONS B,C or D |
|---|---|---|---|---

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



TOP SLAB REINFORCING

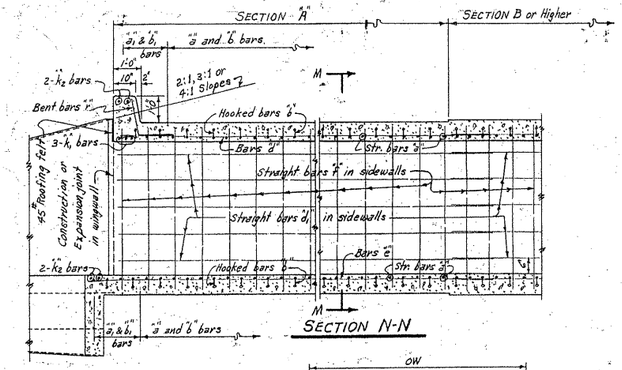
PART PLAN AT END OF CULVERT

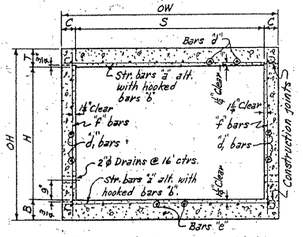


BOTTOM SLAB REINFORCING

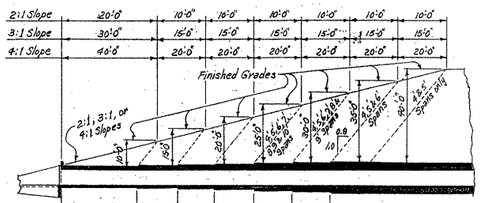
PART PLAN AT END OF CULVERT

NOTE:- The "d", "d" and "e" bars vary in length. They should extend 1'-9" into SECTION B.





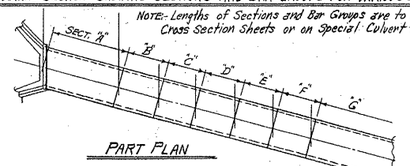
TYPICAL SECTION M-M



		A	B	C	D	E	F	MID-SECTION G	
2:1 Slope =	SECTIONS	A	B	C	D	E	F	G - Varies	These lengths are perpendicular to ℄ of roadway. See Table of Skew Lengths below.
	Bar Group	A	B	C	D	E	F	G	
3:1 Slope =	SECTIONS	A	B	C	D	E	F	G - Varies	
	Bar Group	A	B	C	D	E	F	G	
4:1 Slope =	SECTIONS	A	B	C	D	E	F	G - Varies	
	Bar Group	A	B	C	D	E	F	G	
		2:1 = 12'-0"	6'-0"	6'-0"	6'-0"	6'-0"	6'-0"	Varies	
		3:1 = 22'-0"	11'-0"	11'-0"	11'-0"	11'-0"	11'-0"	Varies	
		4:1 = 32'-0"	16'-0"	16'-0"	16'-0"	16'-0"	16'-0"	Varies	

TYPICAL LONGITUDINAL SECTION - SHOWING SECTIONS AND BAR GROUPS FOR VARIOUS DEPTHS OF COVER

NOTE:- Lengths of Sections and Bar Groups are to be shown on Cross Section Sheets or on Special Culvert Layout Sheet.



PART PLAN

LENGTH OF SECTIONS ON 15° SKEW

SLOPE	2:1		3:1		4:1	
SECTIONS	A	B, C, D, E, & F	A	B, C, D, E, & F	A	B, C, D, E, & F
LENGTHS	12'-5"	6'-2½"	22'-9½"	11'-4⅝"	33'-1⅝"	16'-6⅜"

NOTE:- For Details and Bar Lists for Sections B thru G, see Barrel Drawing Nos. R-100X-X.1 or R-100X-X.2.

SECTIONS AND BAR GROUPS TO BE USED FOR VARIOUS DEPTHS OF COVER

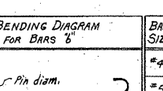
DEPTHS OF COVER	SECTIONS & BAR GROUPS FOR END SECTIONS						MID-SECTION AND BAR GROUP
	A	B	C	D	E	F	
5.0' to 9.5'	A						A
10.0' to 14.5'	A						B
15.0' to 19.5'	A	B					C
20.0' to 24.5'	A	B	C				D
25.0' to 29.5'	A	B	C	D			E
30.0' to 34.5'	A	B	C	D	E		F
35.0' to 40.0'	A	B	C	D	E	F	G

OR ALT.

DEPTHS OF COVER	SECTIONS & BAR GROUPS FOR END SECTIONS						MID-SECTION AND BAR GROUP
	A	B	C	D	E	F	
5.0' to 9.5'	A						A
10.0' to 14.5'	A						B
15.0' to 19.5'	A	B					C
20.0' to 24.5'	A	2@C					D
25.0' to 29.5'	A	B	2@D				E
30.0' to 34.5'	A	2@C		2@E			F
35.0' to 40.0'	A	B	2@D		2@F		G

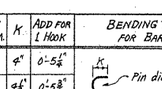
BAR SIZE	PIN DIAM.	K	ADD FOR 2 HOOKS
#4	2"	4"	0'-10⅝"
#5	2½"	4½"	0'-11⅞"
#6	3"	5"	1'-2"
#7	3½"	5⅝"	1'-4"

BENDING DIAGRAM FOR BARS "b"



BAR SIZE	PIN DIAM.	K	ADD FOR 1 HOOK
#4	2"	4"	0'-5¼"
#5	2½"	4½"	0'-5⅝"
#6	3"	5"	0'-7"
#7	3½"	5⅝"	0'-8"

BENDING DIAGRAM FOR BARS "b,"

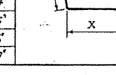


NOTE:- Dimensions are to centers of bars ("b" and "b,").

DOWEL BARS FOR ONE HEADWALL

SPAN	SIZE	SPACING	No. REQ'D	LENGTH	X
4'	#4	12"c.	6	2'-5"	1'-2½"
5'	#4	12"c.	7	2'-6"	1'-3"
6'	#4	12"c.	8	2'-7"	1'-3½"
7'	#4	12"c.	9	2'-8"	1'-4"
8'	#4	12"c.	10	2'-10"	1'-5"
9'	#4	12"c.	11	3'-0"	1'-6"
10'	#4	12"c.	12	3'-2"	1'-7"

Dowel bars "x" in One Headwall.



DESIGN LIVE LOAD

H20-S16 LOADING A.A.S.H.O. 1961

AND

SPECIAL MILITARY LOADING

Two 24,000 Lb. Axles @ 4'-0" ctrs.

UNIT STRESSES:-

Class S Concrete (n=10) 1200#/□"

Reinforcing Steel 20,000#/□"

GENERAL NOTES

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

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

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

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

BAR LIST FOR SECTION "A" ON 15° SKEW - ONE END ONLY.

SECTION & BAR GROUP	LENGTH OF SECTION	DEPTH OF COVER	CLEAR SPAN	CLEAR HEIGHT	"a" bars STRAIGHT In Top and Bottom Slabs of Barrel.					"a," bars STRAIGHT In Top and Bottom Slab of Barrel - (two of each Length.)					"b" bars BENT - See Diagrams at Right. In Top and Bottom Slabs of Barrel - hooked. Alternate with "a" bars.							"b" bars In Top and Bottom Slabs of Barrel - one end hooked - (two of each Length.) Alternate with "a" bars.							"d" bars STRAIGHT Longitudinal in Top Slab of Barrel.			"d," bars STRAIGHT Longitudinal in Sidewalls			"e" bars STRAIGHT Longitudinal in Bottom Slab of Barrel.			"f" bars STRAIGHT Verticals in Sidewalls.				"k1" bars STRAIGHT In Bottom of Headwall.			"k2" bars STRAIGHT In Top of Headwall and Apron. (2 Each)		
					SIZE	SPACING	NUMBER REQ'D 2:1	NUMBER REQ'D 3:1	NUMBER REQ'D 4:1	LENGTH	SIZE	SPACING	NUMBER REQ'D	LENGTH	SIZE	SPACING	NUMBER REQ'D 2:1	NUMBER REQ'D 3:1	NUMBER REQ'D 4:1	LENGTH	X	SIZE	SPACING	NUMBER REQ'D	LENGTH	X	SIZE	SPACING	NUMBER REQ'D	LENGTH	SIZE	SPACING	NUMBER REQ'D	LENGTH	SIZE	SPACING	NUMBER REQ'D	LENGTH	SIZE	SPACING	NUMBER REQ'D 2:1	NUMBER REQ'D 3:1	NUMBER REQ'D 4:1	LENGTH	SIZE	NO. REQ'D	LENGTH	SIZE	NO. REQ'D	LENGTH
										MAX.	MIN.			MAX.	MIN.					MAX.	MIN.																														
SECTION "A" & BAR GROUP "A"	0'-0" TO 10'-0" MAXIMUM.	2:1 = 12'-5"	3:1 = 22'-9½"	4:1 = 33'-1⅝"																																											
		1 @ 4'	4'		#4	12"	25	25	25	4'-9"	—	—	—	—	—	—	—	—	—	—	—	#4	12"	25	25	5'-7"	6'-8½"			2	3'-3"	—	2'-10"	—			5			4								#4	12"	5	#4	12"	5
			5'				25	25	25	"	"	"	"	"	"	"	"	"	"	"	"			25	25	"	"			2	"	—	"	—			5			6										5			6
			6'				25	25	25	"	"	"	"	"	"	"	"	"	"	"	"			25	25	"	"			2	"	—	"	—			5			8										5			8
			7'				25	25	25	"	"	"	"	"	"	"	"	"	"	"	"			25	25	"	"			2	"	—	"	—			5			10										5			10
			8'				25	25	25	4'-11"	"	"	"	"	"	"	"	"	"	"	"			25	25	5'-9"	9'-10½"			2	3'-5"	—	3'-0"	—			5			12										5			12
		1 @ 5'	3'		#5	12"	25	25	25	5'-9"	—	—	—	—	—	—	—	—	—	—	—	#5	12"	23	23	6'-8"	8'-10½"			2	4'-2"	—	3'-10"	—			6			6								#4	12"	6	#4	12"	6
			4'				25	25	25	"	"	"	"	"	"	"	"	"	"	"	"			23	23	"	"			2	"	—	"	—			6			8										6			8
			5'				25	25	25	"	"	"	"	"	"	"	"	"	"	"	"			23	23	"	"			2	"	—	"	—			6			10										6			10
			6'				25	25	25	"	"	"	"	"	"	"	"	"	"	"	"			23	23	"	"			2	"	—	"	—			6			12										6			12
			7'				25	25	25	6'-10"	8'-0"	"	"	"	"	"	"	"	"	"	"			23	23	6'-11"	8'-1½"			2	4'-7"	—	4'-1"	—			6			14										6			14
		1 @ 6'	3'		#5	12"	25	25	25	6'-9"	—	—	—	—	—	—	—	—	—	—	—	#5	12"	23	23	7'-10"	9'-0"			2	5'-5"	—	4'-10"	—			7			6								#4	12"	7	#4	12"	7
			4'				25	25	25	"	"	"	"	"	"	"	"	"	"	"	"			23	23	"	"			2	"	—	"	—			7			8										7			8
			5'				25	25	25	"	"	"	"	"	"	"	"	"	"	"	"			23	23	"	"			2	"	—	"	—			7			10										7			10
			6'				25	25	25	"	"	"	"	"	"	"	"	"	"	"	"			23	23	"	"			2	"	—	"	—			7			12										7			12
			7'				25	25	25	7'-11"	9'-2"	"	"	"	"	"	"	"	"	"	"			23	23	8'-0"	9'-1"			2	5'-7"	—	5'-0"	—			7			14										7			14
			8'				25	25	25	8'-0"	9'-1"	"	"	"	"	"	"	"	"	"	"			23	23	8'-1"	9'-2"			2	5'-8"	—	5'-1"	—			7			16										7			16
			9'				25	25	25	8'-3"	9'-4"	"	"	"	"	"	"	"	"	"	"			23	23	8'-2"	9'-3"			2	5'-9"	—	5'-2"	—			7			18										7			18
		1 @ 7'	4'		#5	12"	25	25	25	7'-9"	—	—	—	—	—	—	—	—	—	—	—	#5	12"	23	23	8'-10"	10'-0"			2	6'-0"	—	5'-5"	—			8			8								#4	12"	8	#4	12"	8
			5'				25	25	25	"	"	"	"	"	"	"	"	"	"	"	"			23	23	"	"			2	"	—	"	—			8			10										8			10
			6'				25	25	25	"	"	"	"	"	"	"	"	"	"	"	"			23	23	"	"			2	"	—	"	—			8			12										8			12
			7'				25	25	25	8'-1"	9'-2"	"	"	"	"	"	"	"	"	"	"			23	23	9'-1"	10'-2"			2	6'-6"	—	5'-10"	—			8			14										8			14
			8'				25	25	25	8'-3"	9'-4"	"	"	"	"	"	"	"	"	"	"			23	23	9'-2"	10'-3"			2	6'-11"	—	6'-4"	—			8			16										8			16
			9'				25	25	25	8'-6"	9'-7"	"	"	"	"	"	"	"	"	"	"			23	23	9'-4"	10'-5"			2	7'-5"	—	6'-10"	—			8			18										8			18
		1 @ 8'	4'		#5	12"	25	25	25	8'-8"	—	—	—	—	—	—	—	—	—	—	—	#5	12"	23	23	9'-10"	10'-11"			2	6'-11"	—	6'-4"	—			9			8								#4	12"	9	#4	12"	9
			5'				25	25	25	8'-11"	10'-0"	"	"	"	"	"	"	"	"	"	"			23	23	10'-0"	11'-1"			2	7'-11"	—	7'-3"	—			9			10										9			10
			6'				25	25	25	"	"	"	"	"	"	"	"	"	"	"	"			23	23	"	"			2	8'-11"	—	8'-3"	—			9			12										9			12
			7'				25	25	25	9'-0"	10'-1"	"	"	"	"	"	"	"	"	"	"			23	23	10'-1"	11'-2"			2	8'-11"	—	8'-3"	—			9			14										9			14
			8'				25	25	25	9'-1"	10'-2"	"	"	"	"	"	"	"	"	"	"			23	23	10'-2"	11'-3"			2	9'-11"	—	9'-2"	—			9			16										9			16
			9'				25	25	25	9'-3"	10'-4"	"	"	"	"	"	"	"	"	"	"			23	23	10'-4"	11'-5"			2	10'-11"	—	10'-1"	—			9			18										9			18
			10'				25	25	25	9'-5"	10'-6"	"	"	"	"	"	"	"	"	"	"			23	23	10'-6"	11'-7"			2	12'-0"	—	11'-1"	—			9			20										9			20
		1 @ 9'	5'		#6	11"	25	99	71	9'-11"	—	—	—	—	—	—	—	—	—	—	—	#6	11"	25	97	69	11'-2"	9'-10"			4	7'-5"	3'-8"	6'-10"	3'-1"			10			10								#4	12"	10	#4	12"	10
			6'				25	99	71	10'-0"	9'-11"	"	"	"	"	"	"	"	"	"	"			25	97	69	11'-3"	9'-11"			4	7'-11"	3'-10"	7'-3"	3'-4"			10			12										10			12
			7'				25	99	71	"	"	"	"	"	"	"	"	"	"	"	"			25	97	69	"	"			4	"	"	"	"			10			14										10			14
			8'				25	99	71	10'-1"	10'-3"	"	"	"	"	"	"	"	"	"	"			25	97	69	11'-4"	10'-6"			4	8'-10"	5'-5"	8'-2"	4'-9"			10			16										10			16
			9'				25	99	71	10'-2"	10'-4"	"	"	"	"	"	"	"	"	"	"			25	97	69	11'-6"	10'-8"			4	9'-2"	5'-7"	8'-6"	4'-11"			10			18										10			18
			10'				25	99	71	10'-3"	10'-5"	"	"	"	"	"	"	"	"	"	"			25	97	69	11'-8"	10'-9"			4	9'-5"	5'-9"	8'-10"	5'-1"			10			20										10			20
			11'				25	99	71	10'-5"	10'-7"	"	"	"	"	"	"	"	"	"	"			25	97	69	11'-10"	10'-11"			4	9'-8"	5'-11"	9'-0"	5'-3"			10			22										10			22
		1 @ 10'	5'		#7	12"	23	95	65	10'-11"	—	—	—	—	—	—	—	—	—	—	—	#7	12"	23	93	63	12'-2"	10'-10"			4	9'-8"	6'-1"	9'-0"	5'-3"			11			10								#4	12"	11	#4	12"	11
			6'				23	95	65	11'-5"	"	"	"	"	"	"	"	"	"	"	"			23	93	63	12'-3"	10'-11"			4	9'-9"	6'-0"	9'-1"	5'-4"			11			12										11			12
			7'				23	95	65	"	"	"	"	"	"	"	"	"	"	"	"			23	93	63	"	"			4	"	"	"	"			11			14										11			14
			8'				23	95	65	11'-6"	11'-8"	"	"	"	"	"	"	"	"	"	"			23	93	63	12'-4"	11'-0"			4	9'-10"	6'-2"	9'-2"	5'-5"			11			16										11			16
			9'				23	95	65	11'-7"	11'-9"	"	"	"	"	"	"	"	"	"	"			23	93	63	12'-4"	11'-2"			4	10'-0"	6'-3"	9'-4"	5'-7"			11			18										11			18
			10'				23	95	65	11'-8"	11'-10"	"	"	"	"	"	"	"	"	"	"			23	93	63	12'-5"	11'-3"			4	10'-1"	6'-4"	9'-5"	5'-8"			11			20										11			20
			11'				23	95	65	11'-9"	11'-11"	"	"	"	"	"	"	"	"	"	"			23	93	63	12'-5"	11'-4"			4	10'-2"	6'-5"	9'-6"	5'-9"			11			22										11			22
			12'				23	95	65	11'-9"	11'-11"	"	"	"	"	"	"	"	"	"	"			23	93	63	12'-5"	11'-5"			4	10'-3"	6'-6"	9'-7"	5'-10"			11			24										11			24

Lengths Vary - Ave. Lengths: 2:1 = 14'-2", 3:1 = 24'-6", 4:1 = 35'-0"

Lengths Vary - Ave. Lengths: 2:1 = 14'-2", 3:1 = 25'-4", 4:1 = 37'-10"

These bars are in the skewed portion of barrel only. The length of "a" bars and overall length X of "b" bars vary by 3'-9" for 12" spacing and 3'-5" for 11" spacing.

Designed by:- W.C.H. 9-5-62. Checked by:- R.H.S. 11-8-62.
Drawn by:- W.C.H. 10-29-63. Checked by:-
Quantities by:- W.C.H. 12-6-63. Checked by:-

MAX. DESIGN DEPTH OF COVER	BARREL DIMENSIONS: CLEAR SPANS	CLEAR HEIGHT	SQ. FT. OPENING	OVERALL WIDTH OF SLAB	THICKNESS OF TOP SLAB	THICKNESS OF SIDEWALLS	THICKNESS OF BOTTOM SLAB	OVERALL HEIGHT	ROADWAY LENGTH	LENGTH OF HEADWALL	* QUANTITIES - ONE SECTION "A": CLASS S CONCRETE BARREL ONLY 2:1	3:1	4:1	REINFORCING STEEL BARREL, APRON AND HEADWALL 2:1	3:1	4:1
D	S	H	A	OW	T	C	B	OH	RL	K	CU.YD.	CU.YD.	CU.YD.	LB.	LB.	LB.
		2'	8	5'-0"		6"		3'-1"	5'-2⅜"	5'-0⅝"	3.41	6.24	9.11	410	682	963
	1 @ 4'	3'	12	5'-0"		6"		4'-1"	"	"	3.87	7.10	10.34	446	796	1054
		4'	16	5'-0"	6½"	6"	6½"	5'-1"	"	"	4.33	7.95	11.56	482	809	1146
		5'	20	5'-0"		6"		6'-1"	"	"	4.79	8.79	12.79	518	873	1237
		6'	24	5'-2"		7"		7'-1"	5'-4⅞"	5'-8⅝"	5.80	10.63	15.47	562	947	1344
		3'	15	6'-0"		6"		4'-2"	6'-2⅝"	6'-9"	4.59	8.43	12.26	619	1068	1518
	1 @ 5'	4'	20	6'-0"		6"		5'-2"	"	"	5.05	9.27	13.48	655	1132	1610
		5'	25	6'-0"	7"	6"	7"	6'-2"	"	"	5.51	10.11	14.71	691	1195	1701
		6'	30	6'-2"		7"		7'-2"	6'-9⅜"	6'-11⅛"	6.53	11.98	17.42	747	1287	1827
		7'	35	6'-3"		7½"		8'-2"	6'-5⅝"	7'-0⅝"	7.38	13.53	19.68	800	1395	1989
		3'	18	7'-0"		6"		4'-3"	7'-3"	7'-9⅝"	5.40	9.91	14.91	800	1391	1975
	1 @ 6'	4'	24	7'-0"		6"		5'-3"	"	"	5.86	10.75	15.64	836	1454	2066
		5'	30	7'-1"	7½"	6"	8"	6'-3"	"	"	6.32	11.59	16.86	872	1518	2158
		6'	36	7'-2"		7"		7'-3"	7'-5"	7'-11½"	7.34	13.46	19.58	921	1602	2279
		7'	42	7'-3"		7½"		8'-3"	7'-6"	8'-0⅝"	8.20	15.03	21.86	974	1714	2449
		8'	48	7'-4"		8"		9'-3"	7'-7⅝"	8'-1⅝"	9.13	16.74	24.35	1112	1943	2774
		4'	28	8'-0"		6"		5'-4⅜"	8'-3⅝"	8'-9⅝"	6.90	12.66	18.42	959	1696	2310
	1 @ 7'	5'	35	8'-0"		6"		6'-4⅜"	"	"	7.36	13.50	19.64	996	1710	2402
		6'	42	8'-2"	7½"	7"	8½"	7'-4⅜"	8'-5½"	9'-0"	8.38	15.37	22.36	1045	1795	2523
		7'	49	8'-3"		7½"		8'-4⅜"	8'-6⅝"	9'-1"	9.24	16.96	24.65	1098	1891	2662
		8'	56	8'-4"		8"		9'-4⅜"	8'-7½"	9'-2"	10.17	18.66	27.13	1218	2100	2964
		9'	63	8'-6"		9"		10'-4⅜"	8'-9⅜"	9'-9"	11.59	21.25	30.91	1298	2244	3173
		4'	32	9'-0"		6"		5'-6"	9'-3⅜"	9'-10⅛"	8.05	14.76	21.47	1177	1985	2826
	1 @ 8'	5'	40	9'-2"		7"		6'-6"	9'-5⅝"	10'-0⅝"	9.00	16.51	24.02	1229	2074	2953
		6'	48	9'-2"	8½"	7"	9½"	7'-6"	"	"	9.55	17.51	25.87	1265	2137	3044
		7'	56	9'-3"		7½"		8'-6"	9'-6⅝"	10'-1⅝"	10.41	19.08	27.76	1309	2213	3154
		8'	64	9'-4"		8"		9'-6"	9'-8"	10'-3½"	11.35	20.81	30.28	1443	2449	3495
		9'	72	9'-6"		9"		10'-6"	9'-10"	10'-4⅝"	12.76	23.61	34.05	1526	2574	3669
		10'	80	9'-8"		10"		11'-6"	10'-0⅝"	10'-6⅛"	14.33	26.28	38.23	1613	2708	3847
		5'	45	10'-1"		7"		6'-8"	10'-6⅝"	11'-0⅝"	10.98	19.22	27.96	1549	2716	3883
	1 @ 9'	6'	54	10'-3"	9½"	7½"	10½"	7'-8"	10'-7⅜"	11'-1⅜"	11.80	20.72	30.16	1609	2796	3957
		7'	63	10'-3"		7½"		8'-8"	"	"	11.88	21.29	31.20	1696	2859	4098
		8'	72	10'-4"		8"		9'-8"	10'-8⅝"	11'-2⅝"	12.88	23.52	34.22	1783	3101	4238
		9'	81	10'-6"		9"		10'-8"	10'-10⅝"	11'-5"	14.25	26.14	38.03	1870	3258	4626
		10'	90	10'-8"		10"		11'-8"	11'-0⅝"	11'-7"	15.84	29.06	42.27	1961	3435	4878
		11'	99	10'-10"		11"		12'-8"	11'-2⅝"	11'-9"	17.58	32.24	46.91	2127	3703	5267
		5'	50	11'-2"		7"		6'-10"	11'-6⅜"	12'-1⅛"	12.09	22.18	32.26	1808	3105	4362
	1 @ 10'	6'	60	11'-3"	10½"	7½"	11½"	7'-10"	11'-7⅜"	12'-2⅝"	12.94	23.73	34.52	1854	3186	4477
		7'	70	11'-3"		7½"		8'-10"	"	"	13.51	24.78	36.04	1902	3272	4592
		8'	80	11'-4"		8"		9'-10"	11'-8⅜"	12'-3⅜"	14.49	26.53	38.59	2031	3496	4925
		9'	90	11'-6"		9"		10'-10"	11'-10⅜"	12'-5⅜"	15.91	29.17	42.43	2098	3612	5091
		10'	100	11'-8"		10"		11'-10"	12'-1"	12'-7⅜"	17.50	32.08	46.67	2213	3837	5418
		11'	110	11'-10"		11"		12'-10"	12'-3"	12'-9⅜"	19.25	35.30	51.36	2382	4079	5746
		12'	120	12'-0"		12"		13'-10"	12'-5⅜"	12'-11⅜"	21.16	38.80	56.45	2502	4328	6124

* For remainder of quantities see Std. Wing and Barrel Drawings listed below.

NOTE:- This drawing to be used in conjunction with Standard Wing Drawing Nos. W-X152-1 or W-X152-2, W-X153-1 or W-X153-2, and W-X154-1 or W-X154-2. Also W-X15.
For Barrels of 4', 5' & 6' Spans, See Drawing No. R-100X-X1.
For Barrels of 7', 8', 9' & 10' Spans, See Drawing No. R-100X-X.2.

CLASS S CONCRETE

ARKANSAS STATE HIGHWAY COMMISSION

DETAILS OF STANDARD BARREL SECTIONS FOR REINFORCED CONCRETE BOX CULVERTS

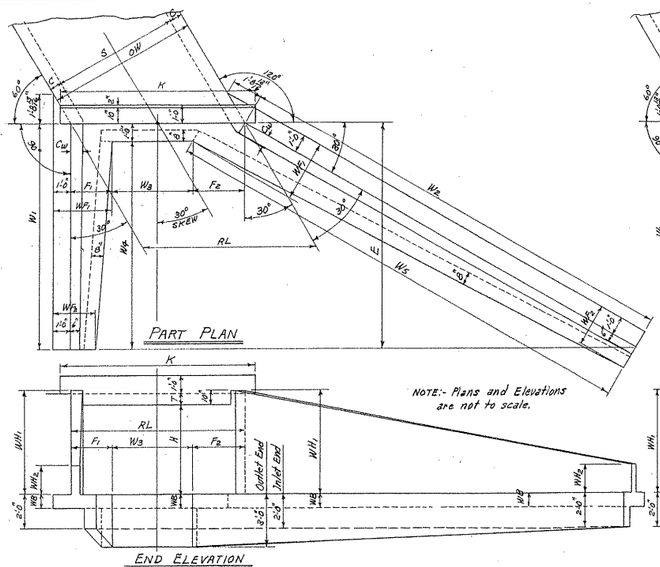
15° SKEW ~ SECTIONS "A" ONLY

4', 5', 6', 7', 8', 9' & 10' SPANS 2:1, 3:1 or 4:1 SLOPES

SINGLES OVER 5'-0" COVER

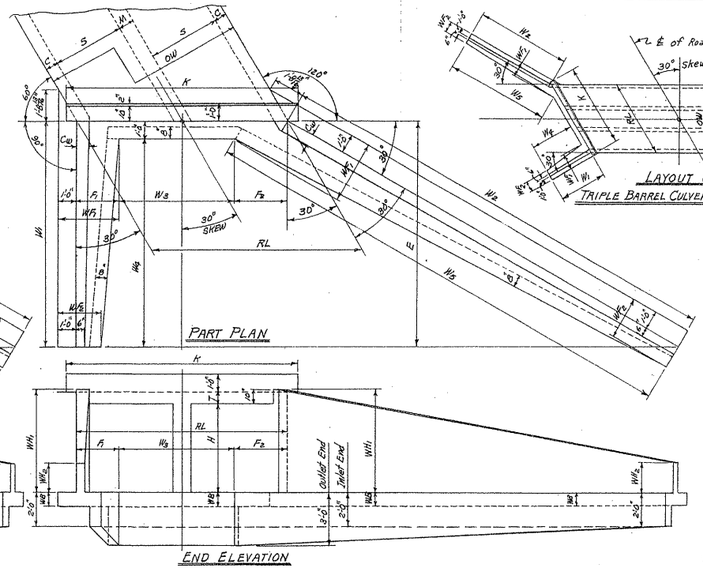
STANDARD DRAWING NO. R-115X-1

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



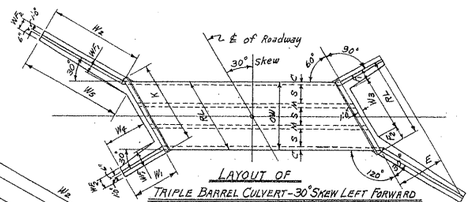
SINGLE BARREL CULVERT-30°SKEW RIGHT FORWARD

Details of Culvert with 30° Skew Left Forward is reversed, see Layout below.

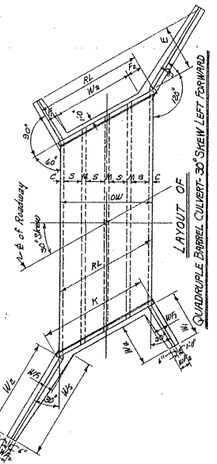


DOUBLE BARREL CULVERT-30°SKEW RIGHT FORWARD

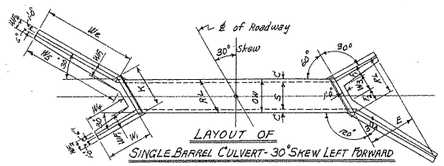
Details of Culvert with 30° Skew Left Forward is reversed, see Layout below.



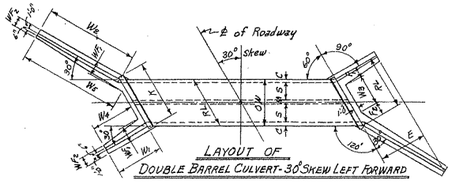
LAYOUT OF TRIPLE BARREL CULVERT-30°SKEW LEFT FORWARD



LAYOUT OF QUADRUPLE BARREL CULVERT-30°SKEW LEFT FORWARD

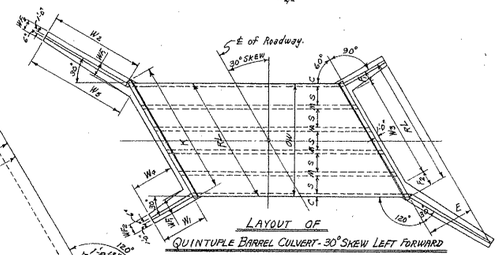


LAYOUT OF SINGLE BARREL CULVERT-30°SKEW LEFT FORWARD

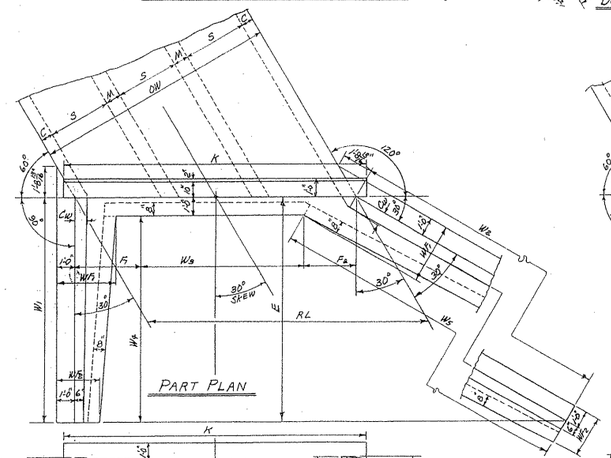


LAYOUT OF DOUBLE BARREL CULVERT-30°SKEW LEFT FORWARD

NOTE:- The length of the wings for the Plans, Elevations, and Layouts, as drawn, are proportioned for 3:1 slopes. For 2:1 slopes the wings are proportionally shorten, while for 4:1 slopes they are longer.

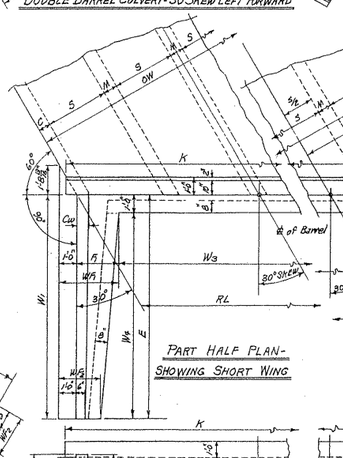


LAYOUT OF QUINTUPLE BARREL CULVERT-30°SKEW LEFT FORWARD



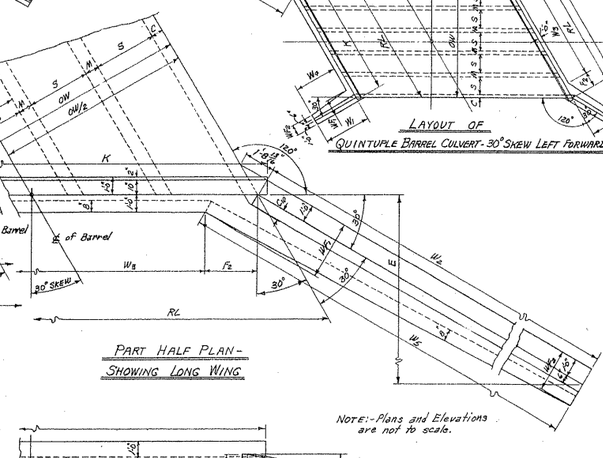
TRIPLE BARREL CULVERT-30°SKEW RIGHT FORWARD

Details of Culvert with 30° Skew Left Forward is reversed, see Layout at top center of sheet.



QUADRUPLE BARREL CULVERT-30°SKEW RT. FWD.

Details of Culvert with 30° Skew Left Forward is reversed, see Layout at above center.



QUINTUPLE BARREL CULVERT-30°SKEW RT. FWD.

Details of Culvert with 30° Skew Left Forward is reversed, see Layout above.

ROADWAY LENGTH RL — HEADWALL LENGTH K — APRON DIMENSION W_3

$RL = OW \times 1.154 + 7$ — $K = RL + (I' - I\frac{1}{2}^{28})$ — $W_3 = RL - (F_1 + F_2)$

USE WITH DRAWING No.	CLEAR SPAN S	CLEAR HEIGHT H	SUM OF EQUAL DIMENSIONS $F_1 \& F_2$	SINGLE BARREL CULVERT OW	RL	K	W_3	DOUBLE BARREL CULVERT OW	RL	K	W_3	TRIPLE BARREL CULVERT OW	RL	K	W_3	QUADRUPLE BARREL CULVERT OW	RL	K	W_3	QUINTUPLE BARREL CULVERT OW	RL	K	W_3
W-X302-1, W-X303-1 or W-X304-1. (FOR H=9'0" OR LESS)	4'	2'	2'-3½"	5'-0"	5'-5⅞"	6'-11⅞"	3'-1⅝"	9'-8"	11'-2"	12'-3⅜"	8'-10⅜"	14'-6"	16'-6⅝"	17'-10⅜"	14'-3⅜"	19'-0"	21'-11⅝"	23'-1"	19'-5⅝"	23'-8"	27'-4"	28'-5⅜"	25'-0⅜"
		3'	2'-3½"	5'-0"	"	"	2'-1 6/16"	9'-8"	"	"	7'-10⅜"	14'-9"	"	"	13'-3⅜"	19'-0"	"	"	18'-8"	23'-8"	"	"	29'-0⅜"
		4'	2'-3½"	5'-0"	"	"	1'-6"	9'-8"	"	"	6'-10⅜"	14'-9"	"	"	12'-3⅜"	19'-0"	"	"	17'-8"	23'-8"	"	"	23'-0⅜"
		5'	5'-3½"	5'-0"	5'-5⅞"	6'-11⅞"	0'-6" Ⓐ	9'-8"	11'-2"	12'-3⅜"	5'-10⅜"	14'-9"	16'-6⅝"	17'-10⅜"	11'-3⅜"	19'-0"	21'-10⅛"	23'-1"	16'-8"	23'-8"	27'-4"	28'-5⅜"	22'-0⅜"
		6'	6'-3½"	5'-2"	5'-11⅝"	7'-1⅛"	0'-6" Ⓐ	9'-11"	11'-5⅛"	12'-7⅝"	5'-2⅜"	19'-8"	16'-11⅝"	18'-1"	10'-8"	19'-5"	22'-5"	23'-7"	16'-3⅜"	24'-2"	27'-10⅜"	29'-0⅜"	21'-7⅜"
	5'	3'	3'-3½"	6'-0"	6'-11⅝"	8'-1"	3'-7⅛"	11'-8"	13'-5⅜"	14'-7⅝"	10'-2⅝"	17'-4"	20'-0⅛"	21'-2"	16'-9"	23'-8"	26'-6⅜"	27'-8⅝"	23'-3⅜"	28'-8"	33'-1½"	34'-3"	29'-10"
		4'	3'-3½"	6'-0"	"	"	2'-7⅛"	11'-8"	"	"	9'-2⅝"	17'-4"	"	"	15'-9"	23'-8"	"	"	22'-3⅜"	28'-8"	"	"	28'-10"
		5'	5'-3½"	6'-0"	6'-11⅝"	8'-1"	1'-7⅝"	11'-8"	13'-5⅜"	14'-7⅝"	8'-2⅝"	17'-4"	20'-0⅛"	21'-2"	14'-9"	23'-8"	26'-6⅜"	27'-8½"	21'-3½"	28'-8"	33'-1⅛"	34'-3"	27'-10"
		6'	6'-3½"	6'-2"	7'-1⅝"	8'-3⅝"	0'-10⅝"	11'-11"	13'-9⅛"	14'-11"	7'-5⅜"	17'-8"	20'-4⅜"	21'-6⅜"	13'-1½"	23'-5"	27'-0⅜"	28'-2⅝"	20'-9⅝"	29'-0"	33'-8½"	34'-10"	27'-5"
		7'	7'-3½"	6'-3"	7'-2⅝"	8'-4⅝"	Ⓐ 0"	12'-1"	13'-11⅝"	15'-1⅛"	6'-2⅝"	17'-11"	20'-8⅜"	21'-10"	12'-11"	23'-9"	27'-4½"	28'-7"	19'-8"	29'-1"	34'-2"	35'-3⅜"	26'-0⅜"
	6'	3'	3'-3½"	7'-0"	8'-1"	9'-2⅛"	4'-9⅜"	13'-8"	15'-5⅜"	16'-11⅝"	12'-6⅜"	20'-4"	23'-5⅝"	24'-7⅝"	20'-2⅝"	27'-0"	31'-2⅛"	32'-4"	27'-1½"	33'-8"	38'-10⅝"	40'-0⅝"	35'-2⅜"
		4'	3'-3½"	7'-0"	"	"	3'-9⅜"	13'-8"	"	"	11'-6⅜"	20'-4"	"	"	18'-2⅝"	27'-0"	"	"	26'-1½"	33'-8"	"	"	34'-7½"
		5'	5'-3½"	7'-0"	8'-1"	9'-2⅛"	2'-9⅜"	13'-8"	15'-5⅜"	16'-11⅝"	10'-6⅜"	20'-4"	23'-5⅝"	24'-7⅝"	18'-2⅝"	27'-0"	31'-2⅛"	32'-4"	25'-1½"	33'-8"	38'-10⅝"	40'-0⅝"	33'-7½"
		6'	6'-3½"	7'-2"	8'-3½"	9'-5⅝"	2'-1.0"	13'-11"	16'-0⅜"	17'-2⅝"	9'-10⅝"	20'-8"	23'-10⅛"	25'-0⅛"	17'-7½"	27'-5"	31'-7⅞"	32'-9⅝"	23'-11½"	34'-3"	39'-5⅝"	40'-7⅝"	32'-5"
		7'	7'-3½"	7'-3"	8'-4⅝"	9'-6⅞"	0'-7⅝"	14'-1"	16'-3⅜"	17'-5"	8'-4"	20'-11"	24'-1⅛"	25'-3⅜"	16'-4½"	27'-9"	32'-0½"	33'-2⅝"	22'-3½"	34'-7"	39'-11⅛"	41'-1"	32'-2"
		8'	9'-3½"	7'-9"	8'-10⅝"	9'-12⅞"	Ⓐ 0"	14'-2"	16'-5⅝"	17'-8"	7'-1"	21'-0"	24'-3"	25'-5⅝"	14'-11⅝"	27'-10"	32'-1⅝"	33'-3⅝"	20'-8"	34'-10"	39'-11⅝"	41'-2⅝"	30'-9⅝"
	7'	4'	4'-3⅝"	8'-0"	9'-2⅝"	10'-4⅝"	4'-11⅝"	15'-8"	18'-1½"	19'-3"	13'-9⅜"	23'-4"	26'-11⅜"	28'-1⅛"	22'-8"	31'-0"	35'-5½"	36'-11⅝"	31'-4⅝"	38'-6"	44'-2⅞"	45'-5⅜"	40'-4½"
		5'	5'-3⅝"	8'-0"	9'-2⅝"	10'-4⅝"	3'-11⅝"	15'-8"	18'-1½"	19'-3"	12'-9⅜"	23'-4"	26'-11⅜"	28'-1⅛"	21'-8"	31'-0"	35'-5½"	36'-11⅝"	30'-4⅝"	38'-6"	44'-2⅞"	45'-5⅜"	39'-4½"
		6'	6'-3⅜"	8'-2"	9'-5⅝"	10'-7"	3'-2"	15'-11"	18'-4½"	19'-6½"	12'-1⅛"	23'-8"	27'-1"	28'-2⅝"	21'-0⅜"	31'-5"	36'-0⅜"	37'-5⅝"	30'-0"	39'-0"	44'-7⅞"	46'-0⅜"	38'-11⅝"
		7'	7'-3⅝"	8'-3"	9'-6⅛"	10'-8⅝"	1'-5"	16'-1"	18'-6⅛"	19'-8⅝"	10'-3⅜"	23'-11"	27'-3⅜"	28'-4⅝"	19'-1⅜"	31'-9"	36'-3⅝"	37'-7⅝"	28'-10⅜"	39'-3"	44'-10⅝"	46'-3⅛"	37'-11⅛"
		8'	9'-3⅝"	8'-4"	9'-7½"	10'-9⅞"	0'-4⅝"	16'-2"	18'-6"	19'-9⅜"	9'-4⅝"	24'-0"	27'-8⅝"	28'-10⅛"	18'-5⅝"	31'-10"	36'-5⅜"	37'-11"	27'-8"	39'-5"	45'-0⅜"	46'-5⅛"	36'-6⅛"
	8'	4'	4'-3⅜"	9'-0"	10'-0⅝"	11'-2⅝"	6'-1⅛"	17'-8"	20'-0⅝"	21'-2⅛"	16'-1⅝"	26'-4"	30'-1⅜"	31'-2⅝"	26'-1⅝"	35'-0"	40'-5"	41'-6⅝"	36'-1⅝"	43'-8"	50'-2⅝"	51'-5⅛"	46'-1⅜"
		5'	5'-3⅜"	9'-2"	10'-2"	11'-4⅝"	5'-3⅜"	17'-11"	20'-2⅝"	21'-3⅝"	15'-5"	26'-8"	30'-5¼"	31'-6⅝"	25'-6⅜"	35'-2½"	40'-10⅜"	42'-0⅛"	35'-7½"	44'-2"	51'-0"	52'-1⅜"	45'-8⅜"
		6'	6'-3⅜"	9'-2"	10'-2"	11'-4⅝"	4'-3⅜"	17'-11"	20'-2⅝"	21'-3⅝"	14'-5"	26'-8"	30'-5¼"	31'-6⅝"	24'-6⅜"	35'-5"	40'-10⅜"	42'-0⅛"	34'-7½"	44'-2"	51'-0"	52'-1⅜"	44'-8⅜"
		7'	7'-3⅜"	9'-3"	10'-3⅝"	11'-6"	3'-1⅜"	18'-1"	20'-5⅛"	22'-0⅛"	13'-1⅛"	26'-11"	30'-8⅝"	32'-0⅜"	23'-3⅜"	35'-9"	41'-3⅛"	42'-5⅝"	33'-7½"	44'-7"	51'-5"	52'-7⅜"	43'-7½"
		8'	9'-3⅜"	9'-4"	10'-5⅜"	11'-7⅝"	1'-6⅜"	18'-2"	20'-7⅛"	22'-1⅛"	11'-8⅛"	27'-1"	31'-2⅜"	32'-4"	21'-11"	35'-10"	41'-7½"	42'-10"	32'-7½"	44'-8"	51'-7"	52'-10⅜"	42'-7½"
	9'	5'	5'-3⅜"	10'-2"	11'-5⅜"	12'-10⅝"	6'-5⅜"	19'-1"	21'-8⅛"	23'-0"	17'-0⅜"	28'-11"	33'-0"	34'-3⅜"	28'-11"	39'-5"	45'-4½"	46'-8"	40'-3"	49'-9"	56'-10⅜"	58'-1⅝"	51'-1⅛"
		6'	6'-3⅜"	10'-3"	11'-6"	13'-0"	5'-6⅜"	20'-1"	22'-8⅛"	24'-0⅛"	16'-1⅛"	29'-11"	34'-2⅝"	35'-5⅜"	28'-3⅝"	39'-9"	45'-10⅜"	47'-0⅝"	39'-7½"	50'-1"	57'-2⅜"	58'-5⅝"	50'-4⅜"
		7'	7'-3⅜"	10'-3"	11'-6"	13'-0"	4'-6⅜"	20'-1"	22'-8⅛"	24'-0⅛"	15'-2⅝"	29'-11"	34'-2⅝"	35'-5⅜"	27'-4⅜"	39'-9"	45'-10⅜"	47'-0⅝"	38'-11½"	49'-11"	57'-1⅜"	58'-5⅝"	49'-8⅛"
		8'	9'-3⅜"	10'-4"	11'-7⅛"	13'-1"	2'-8"	20'-2"	22'-9⅝"	24'-1⅝"	14'-4⅝"	30'-0"	34'-3⅝"	35'-5⅜"	25'-9⅜"	39'-10"	46'-0"	47'-1⅜"	36'-8⅝"	49'-8"	57'-0⅝"	58'-4"	48'-1"
	10'	5'	5'-3⅝"	11'-2"	12'-5⅝"	14'-0⅝"	7'-7⅜"	21'-4"	25'-3⅜"	26'-5⅛"	20'-0⅝"	32'-8"	37'-8⅜"	38'-10⅝"	32'-5"	43'-5"	50'-1⅜"	51'-3⅝"	44'-1⅜"	54'-2"	62'-6⅜"	63'-8⅝"	57'-3⅜"
		6'	6'-3⅜"	11'-3"	12'-6⅛"	14'-1⅝"	6'-8⅝"	22'-1"	25'-6"	26'-7⅜"	19'-2⅜"	32'-11"	38'-0⅜"	39'-2"	31'-9"	43'-9"	50'-6⅝"	51'-8"	44'-1⅜"	54'-7"	63'-0⅜"	64'-2⅝"	56'-9"
		7'	7'-3⅜"	11'-3"	12'-6⅛"	14'-1⅝"	5'-8⅜"	22'-1"	25'-6"	26'-7⅜"	17'-8⅜"	32'-11"	38'-0⅜"	39'-2"	30'-3"	43'-9"	50'-6⅝"	51'-8"	42'-5"	54'-7"	63'-0⅜"	64'-2⅝"	55'-8"
		8'	9'-3⅜"	11'-4"	12'-7"	14'-2"	3'-9⅜"	22'-2"	25'-7⅛"	26'-8"	16'-4"	33'-0"	38'-1⅛"	39'-2"	28'-10"	43'-10"	50'-7⅜"	51'-9⅝"	41'-0⅝"	54'-8"	63'-1⅞"	64'-3⅜"	53'-10⅛"
	11'	6'	6'-3⅜"	12'-0"	13'-5⅜"	15'-0⅝"	7'-11⅝"	24'-2"	27'-10⅜"	29'-0⅜"	21'-7⅜"	36'-10"	41'-6⅜"	42'-8⅛"	35'-3⅜"	47'-10"	55'-2⅜"	56'-4⅝"	48'-0⅜"	———	———	———	———
		7'	7'-3⅜"	12'-1"	"	"	6'-5⅜"	24'-2"	"	"	20'-1⅜"	36'-10"	"	"	33'-3⅜"	47'-10"	"	"	47'-1⅝"	———	———	———	———
		8'	9'-3⅜"	12'-1"	"	"	4'-11⅜"	24'-2"	"	"	18'-7⅛"	36'-10"	"	"	32'-1⅜"	47'-10"	"	"	45'-11⅝"	———	———	———	———
	12'	6'	6'-3⅜"	13'-4"	15'-0⅝"	16'-4⅝"	9'-1⅛"	26'-2"	30'-0⅝"	31'-0⅝"	23'-11⅝"	39'-10"	45'-0⅜"	46'-2"	38'-9⅝"	51'-10"	59'-10⅝"	61'-0"	53'-2"	———	———	———	———
		7'	7'-3⅜"	13'-4"	"	"	7'-7⅛"	26'-2"	"	"	22'-5⅜"	39'-10"	"	"	37'-3⅜"	51'-10"	"	"	52'-1"	———	———	———	———
		8'	9'-3⅜"	13'-4"	"	"	6'-1⅛"	26'-2"	"	"	20'-11⅛"	39'-10"	"	"	35'-9⅜"	51'-10"	"	"	50'-7"	———	———	———	———
W-X302-2, W-X303-2 OR W-X309-2. (FOR H=9'0" & OVER)	7'	9'	10'-9⅛"	8'-6"	9'-9⅜"	10'-11⅝"	Ⓐ 0"	16'-5"	18'-11½"	20'-1⅛"	8'-2⅝"	28'-9"	33'-1⅛"	34'-3⅝"	26'-5⅝"	40'-2"	46'-5⅝"	47'-6⅝"	36'-7½"	———	———	———	———
	8'	9'	10'-9⅛"	9'-6"	10'-11½"	12'-1½"	0'-2⅝"	18'-5"	21'-3½"	22'-5"	10'-6"	27'-9"	31'-11⅝"	32'-10⅝"	20'-9½"	36'-3"	41'-10⅝"	43'-0⅛"	31'-1"	45'-2"	52'-1⅝"	53'-3⅜"	41'-9⅝"
		10'	12'-3⅛"	9'-8"	11'-2"	12'-3⅜"	Ⓐ 0"	18'-8"	21'-6⅝"	22'-8⅜"	9'-3⅜"	27'-8"	31'-11⅝"	33'-1⅛"	19'-8½"	36'-8"	42'-4½"	43'-6"	30'-0⅜"	45'-8"	52'-8⅜"	53'-10⅝"	40'-5½"
	9'	9'	10'-9⅛"	10'-6"	12'-1½"	13'-3⅜"	1'-9⅛"	20'-5"	23'-6⅝"	24'-10⅜"	12'-9⅜"	30'-9"	35'-0⅛"	36'-2⅝"	23'-3"	40'-3"	46'-5⅜"	47'-7½"	35'-0½"	50'-2"	57'-1⅛"	58'-1"	47'-2"
		10'	12'-3⅛"	10'-8"	12'-3⅜"	13'-5⅜"	0'-0⅝"	20'-8"	23'-10⅜"	25'-0⅜"	11'-7⅜"	30'-8"	35'-0⅛"	36'-2⅝"	23'-1⅜"	40'-8"	46'-11⅛"	48'-1⅛"	34'-8½"	50'-8"	58'-1"	59'-1"	46'-12⅜"
		11'	13'-9⅜"	10'-10"	12'-6⅛"	13'-8"	Ⓐ 0"	20'10"	24'-0⅜"	25'-2⅝"	10'-3⅝"	30'-10"	35'-2⅛"	36'-3"	21'-10"	40'-10"	47'-1⅜"	48'-3⅜"	33'-9½"	50'-10"	58'-3⅛"	59'-3⅛"	44'-11⅛"
	10'	9'	10'-9⅛"	11'-6"	13'-2⅜"	14'-5½"	2'-6⅛"	22'-5"	25'-10⅜"	27'-0⅜"	15'-3⅛"	32'-4"	38'-2⅜"	39'-5⅜"	27'-8⅜"	44'-3"	51'-1⅛"	52'-3"	40'-0"	55'-2"	63'-0⅜"	64'-2⅝"	52'-11⅝"
		10'	12'-3⅛"	11'-8"	13'-5⅝"	14'-7⅞"	1'-2⅝"	22'-8"	26'-1⅜"	27'-3"	13'-9⅜"	32'-8"	38'-7"	40'-0⅛"	26'-7⅛"	44'-8"	51'-7"	52'-8⅝"	39'-3⅜"	55'-8"	63'-7⅜"	64'-10⅝"	52'-5"
		11'	13'-9⅜"	11'-10"	13'-8"	14'-10⅜"	Ⓐ 0"	22'-10"	26'-3⅜"	27'-6⅛"	12'-7⅝"	33'-0"	39'-0⅝"	40'-2⅝"	25'-7⅜"	44'-10"	51'-9⅝"	52'-11"	38'-6"	55'-11"	64'-0⅝"	65'-2⅞"	52'-10⅝"
		12'	15'-3⅜"	12'-0"	13'-10⅝"	15'-0⅝"	Ⓐ 0"	23'-0"	26'-5⅜"	27'-8⅝"	11'-5⅜"	33'-4"	39'-5⅜"	40'-5"	24'-0"	45'-0"	51'-11⅝"	53'-1⅞"	36'-8⅝"	56'-0"	64'-1"	65'-3⅜"	49'-10⅝"
	11'	9'	10'-9⅛"	12'-6"	14'-5⅛"	15'-7"	3'-8"	24'-5"	28'-2⅜"	29'-4⅝"	17'-5"	36'-4"	41'-11⅝"	43'-1⅛"	31'-2⅝"	48'-3"	55'-0⅜"	56'-2⅝"	44'-1⅛"	———	———	———	———
		10'	12'-3⅛"	12'-8"	14'-7⅝"	15'-9⅛"	2'-9⅝"	24'-8"	28'-5⅞"	29'-7⅝"	16'-2⅝"	36'-8"	42'-3⅛"	43'-4⅝"	30'-0⅜"	48'-8"	55'-4⅜"	56'-6⅞"	43'-11⅜"	———	———	———	———
		11'	13'-9⅜"	13'-0"	14'-9⅜"	15'-11⅞"	1'-0⅝"	24'-10"	28'-8⅜"	29'-11"	14'-10"	36'-10"	42'-6⅜"	43'-8"	28'-9⅜"	48'-10"	55'-7⅝"	56'-10⅜"	43'-7½"	———	———	———	———
		12'	15'-3⅜"	13'-0"	15'-0⅝"	16'-2"	Ⓐ 0"	25'-0"	28'-10⅜"	30'-0⅜"	13'-7⅜"	37'-0"	42'-9⅝"	43'-10⅝"	27'-5⅜"	49'-0"	55'-7"	57'-0⅜"	41'-3⅜"	———	———	———	———
	12'	9'	10'-9⅛"	13'-6"	15'-7⅛"	16'-9"	4'-9⅜"	26'-5"	30'-2"	31'-0"	19'-0⅝"	39'-4"	45'-1"	46'-2"	34'-0⅝"	51'-3"	60'-0"	61'-3½"	47'-9⅝"	———	———	———	———
		10'	12'-3⅛"	13'-8"	15'-9⅜"	16'-11⅛"	3'-6⅝"	26'-8"	30'-5½"	31'-3⅛"	18'-1⅝"	39'-8"	45'-5⅜"	46'-6⅛"	33'-6⅝"	52'-8"	60'-3⅜"	61'-6⅛"	48'-1⅝"	———	———	———	———
		11'	13'-9⅜"	13'-10"	15'-11⅝"	17'-1⅞"	2'-2⅝"	26'-10"	30'-11⅛"	32'-1⅜"	17'-2⅝"	39'-10"	46'-0"	47'-1⅛"	32'-12⅜"	52'-10"	60'-6"	62'-2"	47'-2⅜"	———	———	———	———
		12'	15'-3⅜"	14'-0"	16'-2"	17'-3⅝"	0'-10⅝"	27'-0"	31'-2⅝"	32'-4"	15'-11"	40'-0"	46'-2⅛"	47'-3"	30'-11"	53'-0"	61'-2⅜"	62'-8½"	45'-11½"	———	———	———	———

Ⓐ Special case for these boxes, See Detail 'A' and Table 'A' for revised values of F_1, F_2, W_2 and W_5, when apron width is more than 1'-0" and W_3=0". For Details 'A' and Tables 'A' for each slope, see Drawing Nos. W-X302-1, W-X302-2, or W-X303-1, W-X303-2, or W-X309-1, W-X309-2.

NOTE:- This drawing to be used in conjunction with Standard Wing Drawings for 30°Skews for each slope as listed below.

2:1 Slopes	3:1 Slopes	4:1 Slopes
W-X302-1 or W-X302-2	W-X303-1 or W-X303-2	W-X309-1 or W-X309-2.

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

SINGLES	DOUBLES	TRIPLES	QUADRUPLES	QUINTUPLES
R-130X-0	R-230X-01	R-330X-01	R-430X-01	R-530X-01
	R-230X-02	R-330X-02	R-430X-02	R-530X-02
R-130X-1	R-230X-1	R-330X-1	R-430X-1	R-530X-1
	R-230X-2	R-330X-2		

CLASS S CONCRETE

ARKANSAS STATE HIGHWAY COMMISSION
DETAILS OF STANDARD WINGS
FOR
REINFORCED CONCRETE BOX CULVERTS
30° SKEW

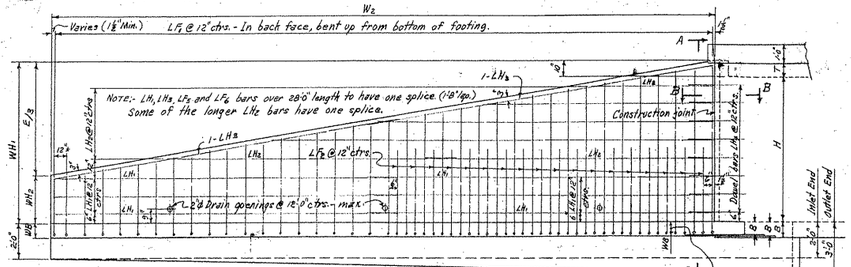
4', 5', 6', 7', 8', 9', 10', 11' & 12' SPANS — 2:1, 3:1 & 4:1 SLOPES

SINGLES, DOUBLES, TRIPLES, QUADRUPLES & QUINTUPLES. — ALL DEPTHS OF COVER H=2', 3', 4', 5', 6', 7', 8', 9', 10', 11' & 12'.

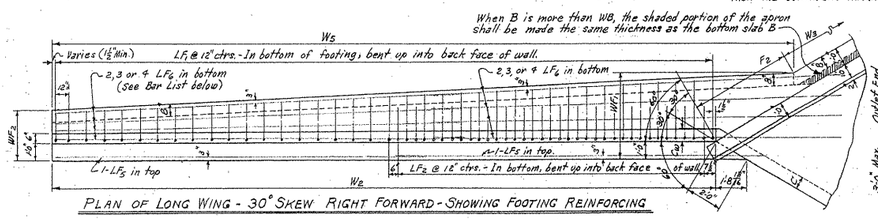
STANDARD DRAWING NO. W-X30

Designed by:- W.C.H. 5-16-63 Checked by:-
Drawn by:- W.C.H. 7-15-63 Checked by:- RHS - 8-21-63
Quantities by:- Checked by:-

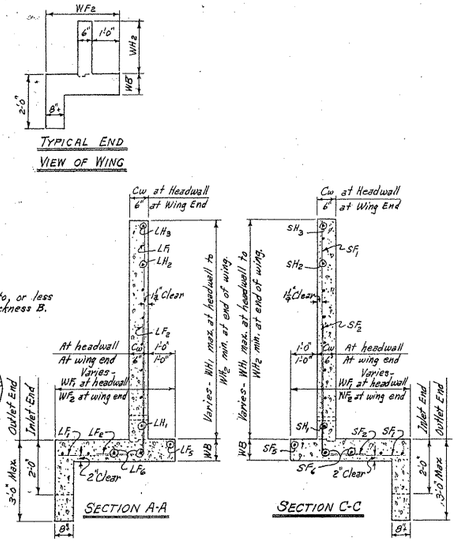
FED. ROAD No.	STATE	FED. AID PROJECT	FISCAL YEAR	SHEET No.	TOTAL SHEETS
6	ARK.				
JOB No.					



REAR ELEVATION OF LONG WING - 30° SKEW RIGHT FORWARD - SHOWING BACK FACE REINFORCING



PLAN OF LONG WING - 30° SKEW RIGHT FORWARD - SHOWING FOOTING REINFORCING



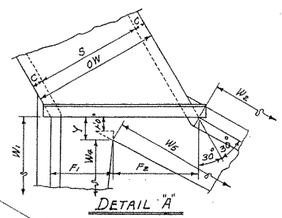
REGULAR WING DIMENSIONS - 3:1 SLOPES

CLEAR HEIGHT OF BOX	THICKNESS OF WING FOOTING	THICKNESS OF WING AT HEAD = C	WINGWALL HEIGHTS		WIDTHS OF WING FOOTINGS		FOOTING EXPANSION PARALLEL WITH HEADWALL		PERPENDICULAR DIST. FROM HEAD TO END OF WING	LENGTHS OF WINGWALLS		INSIDE FOOTING DIMENSION		* QUANTITY PER WING CLASS S CONCRETE			
			AT HEADWALL	AT END OF WING	AT HEAD WALL	AT END OF WING	SHORT WING	LONG WING		SHORT WING	LONG WING	SHORT WING	LONG WING	INLET END SHORT WING	INLET END LONG WING	OUTLET END SHORT WING	OUTLET END LONG WING
H	WB	Cw	WH1	WH2	WF1	WF2	F1	F2	E	W1	W2	WF	WS	CU.YD.	CU.YD.	CU.YD.	CU.YD.
2'	7"	6"	2'-10	0'-8"	2'-4"	2'-0"	1'-4"	0'-11⅝"	6'-6"	6'-6"	13'-0"	5'-6"	19'-3⅜"	0.752	1.599	0.836	1.717
3'	7"	6"	3'-10"	1'-0"	2'-8"	2'-1½"	1'-8"	1'-7⅛"	8'-6"	9'-6"	17'-0"	7'-6"	17'-10⅜"	1.130	2.340	1.239	2.565
4'	7"	6"	4'-10"	1'-6"	3'-0"	2'-3"	2'-0"	2'-3⅜	10'-6"	10'-6"	21'-0"	9'-6"	22'-5½"	1.577	3.270	1.711	3.552
5'	7"	6"	5'-10"	1'-8"	3'-4"	2'-4½"	2'-4"	2'-11⅝"	12'-6"	12'-6"	25'-0"	11'-6"	27'-0½"	2.093	4.341	2.252	4.680
		7"	5'-10"	1'-8"	3'-4"	2'-4½"	2'-4"	2'-11⅝"	12'-6"	12'-6"	25'-0"	11'-6"	27'-0½"	2.179	4.529	2.337	4.862
◎ 6'	8"	7"	6'-10	2'-0"	3'-8"	2'-6"	2'-8"	3'-7⅛"	14'-6"	14'-6"	29'-0"	13'-6"	31'-7½"	2.908	6.029	3.092	6.419
		7½"	6'-10"	2'-0"	3'-8"	2'-6"	2'-8"	3'-7⅛"	14'-6"	14'-6"	29'-0"	13'-6"	31'-7½"	2.966	6.147	3.150	6.593
		8"	6'-10	2'-0"	3'-8"	2'-6"	2'-8"	3'-7⅛"	14'-6"	14'-6"	29'-0"	13'-6"	31'-7½"	3.025	6.272	3.208	6.667
◎ 7'	8½"	7½"	7'-10	2'-4"	4'-2"	2'-11½"	3'-2"	4'-7⅛"	16'-6"	16'-6"	33'-0"	15'-6"	36'-5⅜"	3.811	7.895	4.019	8.350
		8"	7'-10"	2'-4"	4'-2"	2'-7⅛"	3'-2"	4'-7⅛"	16'-6"	16'-6"	33'-0"	15'-6"	36'-5⅜"	3.887	8.057	4.095	8.512
◎ 8'	9"	8"	8'-10"	2'-8"	4'-8"	2'-9"	3'-8"	5'-7⅛"	18'-6"	18'-6"	37'-0"	17'-6"	41'-4⅛"	4.874	10.097	5.107	10.612

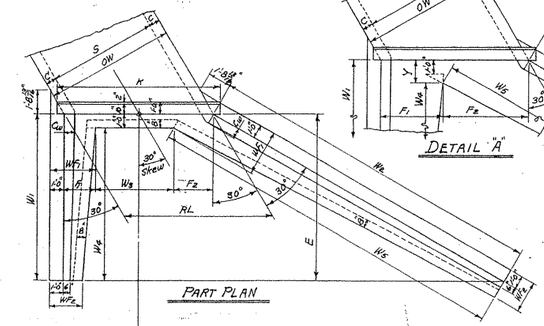
* Quantity per wing does not include headwall or that portion of apron or toewall for the length Ws.
◎ See Table A for special values of F1 & F2 and Wp & Ws for Single 4'x6', 5'x7' and 6'x8' Box Culverts.

TABLE "A" - DIMENSIONS FOR DETAIL "A"

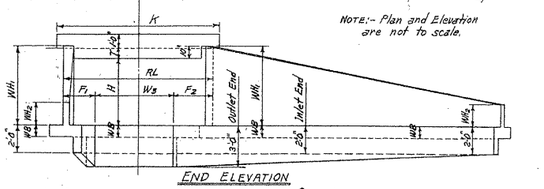
S	H	F1	F2	W3	Y	W4	W5
4'	6'	2'-7⅞	3'-3⅜"	0"	1'-1⅝	13'-4⅛	31'-3⅛
5'	7'	3'-1⅞	4'-1"	0"	1'-3⅜	15'-2⅜	35'-10⅝
6'	8'	3'-7⅞	4'-10⅛"	0"	1'-4⅝	17'-1⅛"	40'-6"



DETAIL "A"



PART PLAN



END ELEVATION

NOTE:- Plan and Elevation are not to scale.

SINGLE BARREL CULVERT - 30° SKEW RIGHT FORWARD

Details of Culvert with 30° Skew Left Forward is reversed, see Drawing No. W-X30.

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-X30.
For values of RL, K and Wx for each box, see above Std. also.

MEMBRANE:- A membrane waterproofing 12" wide, consisting of three mopings 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 of wings.

QUANTITIES

CLEAR SPAN	CLEAR HEIGHT	THICKNESS OF WING AT HEADWALL	THICKNESS OF WING FOOTING	REINFORCING STEEL - LBS.	CLASS S CONCRETE - 4 WINGS HEADWALLS, WINGWALLS, FOOTINGS, TOEWALLS AND APRONS				
					SINGLE BARREL CULVERT	DOUBLE BARREL CULVERT	TRIPLE BARREL CULVERT	QUADRUPLE BARREL CULVERT	QUINTUPLE BARREL CULVERT
S	H	Cw	WB	LB.	CU.YD.	CU.YD.	CU.YD.	CU.YD.	CU.YD.
4'	2'	6"	7"	141	5.80	6.90	8.01	9.12	10.23
	3'	6"	7"	213	8.08	9.18	10.29	11.40	12.51
	4'	6"	7"	327	10.78	11.88	12.99	14.10	15.21
	5'	6"	7"	460	13.90	15.00	16.11	17.22	18.32
	6'	7"	8"	762	18.85	19.99	21.13	22.27	23.41
5'	3'	6"	7"	213	8.33	9.47	11.01	12.36	13.70
	4'	6"	7"	327	11.08	12.36	13.71	15.06	16.40
	5'	6"	7"	460	14.14	15.98	16.83	18.17	19.52
	6'	7"	8"	762	19.11	20.98	21.86	23.24	24.62
	7'	7½"	8½"	1474	24.51	25.94	27.35	28.75	30.16
6'	3'	6"	7"	213	8.57	10.17	11.73	13.33	14.92
	4'	6"	7"	327	11.27	12.86	14.93	16.03	17.62
	5'	6"	7"	460	14.38	15.98	17.55	19.15	20.73
	6'	7"	8"	762	19.35	20.98	22.59	24.21	25.83
	7'	7½"	8½"	1474	24.79	26.44	28.08	29.73	31.38
	8'	8"	9"	1870	31.15	32.87	34.51	36.17	37.83
7'	4'	6"	7"	327	11.52	13.37	15.19	17.05	18.85
	5'	6"	7"	460	14.63	16.49	18.31	20.16	21.97
	6'	7"	8"	762	19.61	21.98	23.32	25.20	27.04
	7'	7½"	8½"	1474	25.05	26.94	28.82	30.71	32.59
	8'	8'	9'	1870	31.47	33.37	35.25	37.16	39.05
8'	4'	6"	7"	327	11.77	13.89	15.97	18.09	20.12
	5'	7"	7"	460	15.96	17.60	19.70	21.83	23.89
	6'	7"	8"	762	19.86	21.98	24.05	26.17	28.20
	7'	7½"	8½"	1474	25.30	27.46	29.58	31.73	33.81
	8'	8'	9"	1870	31.72	33.88	36.00	38.16	40.27
9'	5'	7"	7"	460	15.72	18.13	20.47	22.87	25.15
	6'	7½"	8"	762	20.50	22.93	25.29	27.71	30.01
	7'	7½"	8½"	1474	25.55	27.98	30.34	32.76	35.07
	8'	8"	9"	1870	31.97	34.39	36.76	39.18	41.49
10'	5'	7"	7"	460	15.98	18.45	21.25	23.80	26.92
	6'	7½"	8"	762	20.74	23.45	26.07	28.69	31.28
	7'	7½"	8½"	1474	25.81	28.50	31.12	33.70	36.34
	8'	8"	9"	1870	32.22	34.91	37.54	40.12	42.76
11'	6'	8"	8"	762	21.39	24.38	27.25	30.11	———
	7'	8"	8½"	1474	26.55	29.53	32.41	35.27	———
	8'	8"	9"	1870	32.97	35.95	38.83	41.19	———
12'	6'	8"	8"	762	21.46	24.93	28.05	31.20	———
	7'	8"	8½"	1474	26.81	30.08	33.21	36.36	———
	8'	8"	9"	1870	32.73	35.99	39.13	42.28	———

* For reinforcing steel in Headwalls and Aprons, see Drawing Nos. of Barrel Sections listed below.

GENERAL NOTES:-

CONCRETE:- All concrete to be Class S, and shall be poured in the dry. All exposed corners to have ¾" chamfers.
REINFORCING STEEL:- Reinforcing steel to be deformed bars of intermediate or hard grade.
CONSTRUCTION JOINTS:- Construction joints between wingwall, footings and sidewalls 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#/□"
Reinforcing Steel 20,000#/□"

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

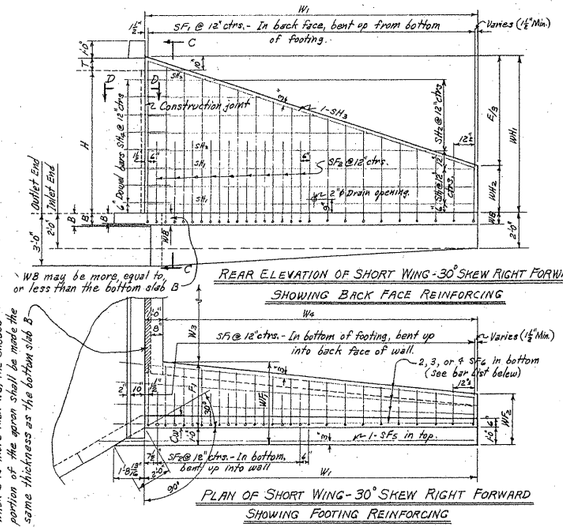
SINGLES	DOUBLES	TRIPLES	QUADRUPLES	QUINTUPLES
R-130X-0	R-230X-01	R-330X-01	R-430X-01	R-530X-01
	R-230X-02	R-330X-02	R-430X-02	R-530X-02
R-130X-1	R-230X-1	R-330X-1	R-430X-1	R-530X-1
	R-230X-2	R-330X-2		

CLASS S CONCRETE

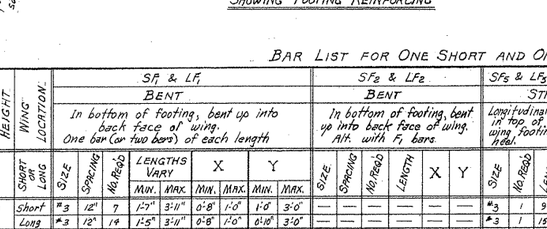
ARKANSAS STATE HIGHWAY COMMISSION
DETAILS OF STANDARD WINGS
FOR
REINFORCED CONCRETE BOX CULVERTS
30° SKEW

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

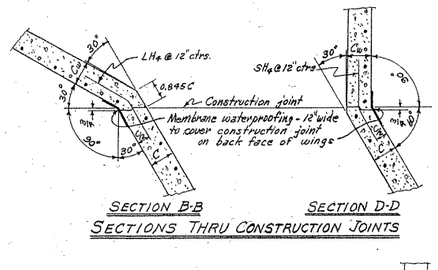
STANDARD DRAWING NO. W-X303-1



REAR ELEVATION OF SHORT WING - 30° SKEW RIGHT FORWARD SHOWING BACK FACE REINFORCING



PLAN OF SHORT WING - 30° SKEW RIGHT FORWARD SHOWING FOOTING REINFORCING



SECTIONS THRU CONSTRUCTION JOINTS

NOTE:- Payment for membrane waterproofing and roofing felt to be included in the price bid for Class S Concrete.

DETAILS AT TOP OF WINGS - 30° SKEW RIGHT FORWARD

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

CLEAR HEIGHT	WING LOCATION	SF1 & LF1 BENT: In bottom of footing, bent up into back face of wing. One bar (or two bars) of each length						SF2 & LF2 BENT: In bottom of footing, bent up into back face of wing. Alt. with F1 bars.						SF3 & LF3 STRAIGHT: Longitudinal in top of wing footing (typ.)			SF4 & LF4 STRAIGHT: Longitudinal in bottom of wing footing (typ.)		
H	SHORT OR LONG	SIZE	SPACING	NO. REQD	LENGTHS VARY MIN.	X MIN.	X MAX.	SIZE	SPACING	NO. REQD	LENGTH	X	Y	SIZE	NO. REQD	LENGTH	SIZE	NO. REQD	LENGTH
2'	Short	#3	12"	7	1'-7"	3'-11"	0'-8"	#3	12"	3	3'-4"	1'-0"	1'-0"	#3	1	9'-0"	#3	2	8'-0"
	Long	#3	12"	14	1'-5"	3'-11"	0'-8"	#3	12"	6	3'-6"	1'-0"	0'-10"	#3	1	15'-6"	#3	2	15'-6"
3'	Short	#3	12"	9	2'-1"	5'-3"	0'-10"	#3	12"	4	4'-0"	1'-4"	1'-2"	#3	1	11'-0"	#3	2	10'-6"
	Long	#3	12"	18	1'-11"	5'-3"	0'-10"	#3	12"	8	4'-2"	1'-4"	1'-2"	#3	1	19'-6"	#3	2	20'-2"
4'	Short	#3	12"	11	2'-6"	6'-7"	0'-11"	#3	12"	5	4'-8"	1'-8"	1'-9"	#3	1	13'-0"	#3	3	12'-0"
	Long	#3	12"	22	2'-4"	6'-6"	0'-11"	#3	12"	10	4'-10"	1'-8"	1'-6"	#3	1	23'-6"	#3	3	24'-6"
5'	Short	#3	12"	13	2'-11"	7'-11"	1'-0"	#3	12"	3	3'-4"	1'-1"	2'-4"	#3	1	15'-0"	#3	3	14'-0"
	Long	#3	12"	26	2'-9"	7'-10"	1'-0"	#3	12"	6	3'-6"	1'-1"	2'-4"	#3	1	27'-6"	#3	6	18'-0"
6'	Short	#3	12"	15	3'-6"	9'-3"	1'-2"	#3	12"	3	4'-6"	1'-4"	3'-3"	#3	1	17'-0"	#3	3	16'-0"
	Long	#3	12"	30	3'-4"	9'-3"	1'-2"	#3	12"	6	4'-6"	1'-4"	3'-3"	#3	1	31'-6"	#3	6	18'-0"
7'	Short	#4	12"	17	3'-11"	10'-10"	1'-3"	#4	12"	4	5'-6"	1'-7"	4'-1"	#4	1	19'-0"	#4	4	18'-0"
	Long	#4	12"	34	3'-9"	10'-8"	1'-3"	#4	12"	8	5'-6"	1'-7"	4'-1"	#4	2	18'-0"	#4	4	20'-6"
8'	Short	#4	12"	19	4'-6"	12'-5"	1'-5"	#4	12"	5	6'-6"	1'-10"	4'-9"	#4	1	21'-0"	#4	4	20'-0"
	Long	#4	12"	38	4'-4"	12'-3"	1'-5"	#4	12"	10	6'-6"	1'-10"	4'-9"	#4	2	20'-8"	#4	8	22'-9"

CLEAR HEIGHT	WING LOCATION	SF5 & LF5 STRAIGHT: Longitudinal in top of wing footing (typ.)			SF6 & LF6 STRAIGHT: Longitudinal in bottom of wing footing (typ.)			SH1 & LH1 BENT: Horizontal in back face of wing.				SH2 & LH2 STRAIGHT: Horizontal in back face of wing. One bar of each length.				SH3 & LH3 BENT: In back face of wing at top - on slope.			SH4 & LH4 BENT: Dowels thru construction joint at headwall.				BAR BENDING DIAGRAM	QUANTITY: REINFORCING STEEL PER WING - LBS.	
H	SHORT OR LONG	SIZE	NO. REQD	LENGTH	SIZE	NO. REQD	LENGTH	SIZE	SPACING	NO. REQD	LENGTH	SIZE	SPACING	NO. REQD	LENGTH	SIZE	NO. REQD	LENGTH	SIZE	SPACING	NO. REQD	LENGTH	X		SHORT WING	LONG WING
2'	Short	#3	1	6'-3"	#3	1	6'-3"	#3	12"	1	6'-3"	#3	12"	1	—	#3	1	3'-3"	#3	12"	2	2'-8"	1'-4"	SF1 & SF2 LF1 & LF2 Y, 1½"-3" Pin, +X	29.7	95.6
	Long	#3	1	15'-6"	#3	2	15'-6"	#3	12"	1	12'-8"	#3	12"	1	—	#3	1	6'-6"	#3	12"	2	5'-4"	2'-8"			
3'	Short	#3	1	8'-3"	#3	2	10'-6"	#3	12"	1	8'-3"	#3	12"	2	6'-3"	#3	1	3'-3"	#3	12"	3	8'-0"	1'-4"		37.0	69.5
	Long	#3	1	19'-6"	#3	2	20'-2"	#3	12"	1	16'-8"	#3	12"	2	12'-6"	#3	1	6'-6"	#3	12"	3	14'-11"	2'-8"			
4'	Short	#3	1	13'-0"	#3	3	12'-0"	#3	12"	1	10'-3"	#3	12"	3	9'-3"	#3	1	3'-3"	#3	12"	3	10'-9"	#3	12"	4	" "	56.2	107.2
	Long	#3	1	23'-6"	#3	3	24'-6"	#3	12"	1	20'-8"	#3	12"	3	18'-6"	#3	1	6'-6"	#3	12"	3	21'-0"	#3	12"	4	" "		
5'	Short	#3	1	15'-0"	#3	3	14'-0"	#3	12"	2	12'-3"	#3	12"	3	9'-3"	#3	1	3'-3"	#3	12"	3	12'-11"	#3	12"	5	" "	78.0	152.2
	Long	#3	1	27'-6"	#3	6	18'-0"	#3	12"	2	24'-9"	#3	12"	3	18'-6"	#3	1	6'-6"	#3	12"	3	25'-1"	#3	12"	5	" "		
6'	Short	#3	1	17'-0"	#3	3	16'-0"	#3	12"	2	14'-3"	#3	12"	4	12'-3"	#3	1	3'-3"	#3	12"	4	15'-0"	#3	12"	6	" "	127.8	253.1
	Long	#3	1	31'-6"	#3	6	18'-0"	#3	12"	2	16'-8"	#3	12"	4	24'-6"	#3	2	15'-6"	#3	12"	4	29'-0"	1'-4"			
7'	Short	#4	1	19'-0"	#4	4	18'-0"	#4	12"	2	16'-3"	#4	12"	5	15'-3"	#4	1	3'-9"	#4	12"	7	3'-6"	1'-9"		267.0	989.8
	Long	#4	1	21'-0"	#4	4	20'-6"	#4	12"	3	18'-3"	#4	12"	5	15'-3"	#4	2	17'-5"	#4	12"	7	" "	"			
8'	Short	#4	1	21'-0"	#4	4	20'-0"	#4	12"	3	19'-2"	#4	12"	5	19'-2"	#4	2	19'-6"	#4	12"	8	3'-6"	1'-9"		312.9	622.3
	Long	#4	1	22'-9"	#4	8	22'-9"	#4	12"	6	19'-2"	#4	12"	5	30'-6"	#4	2	19'-6"	#4	12"	8	" "	"			

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

* Length without splice. Bars over 28'-0" length may be spliced. (1'-8" lap).

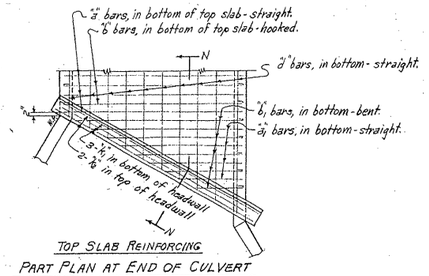
SH4 & LH4: Y, 2 to 1/2, +X

NOTE:- Dimensions are to bar centers.

REVISIONS:- Membrane Added. 5-10-66 W.C.H.

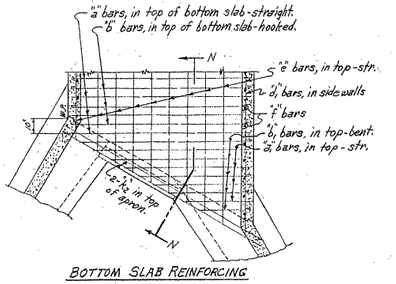
Designed By:- W.C.H. 5-13-63 Checked By:- [illegible] 8-19-63
Drawn By:- W.C.H. 7-26-63 Checked By:- DMT 7-15-64
Quantities By:- W.C.H. 1-7-64

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



TOP SLAB REINFORCING

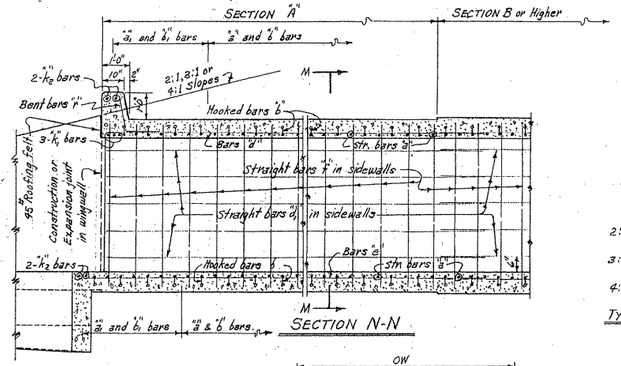
PART PLAN AT END OF CULVERT

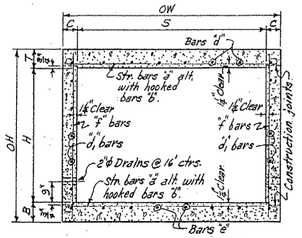


BOTTOM SLAB REINFORCING

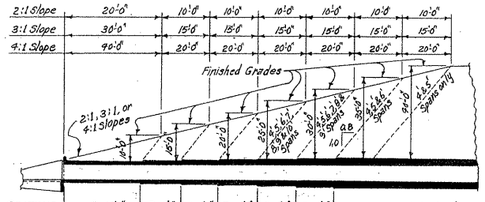
PART PLAN AT END OF CULVERT

NOTE:- The "d", "d1" and "a" bars vary in length. They should extend 1'-0" min. into SECTION "B".





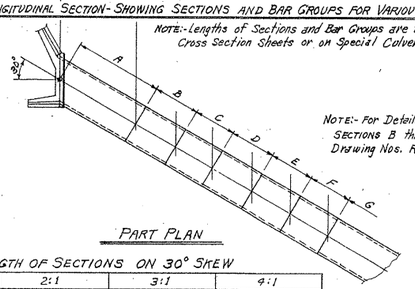
TYPICAL SECTION M-M



2:1 Slope =	SECTIONS	A=12'-0"	B=6'-0"	C=6'-0"	D=6'-0"	E=6'-0"	F=6'-0"	MID-SECTION G-Varies	These lengths are perpendicular to ℄ of roadway. See Table of Skew Lengths below.
	Bar Group	A	B	C	D	E	F	G	
3:1 Slope =	SECTIONS	A=22'-0"	B=11'-0"	C=11'-0"	D=11'-0"	E=11'-0"	F=11'-0"	MID-SECTION G-Varies	
	Bar Groups	A	B	C	D	E	F	G	
4:1 Slope =	SECTIONS	A=32'-0"	B=16'-0"	C=16'-0"	D=16'-0"	E=16'-0"	F=16'-0"	MID-SECTION G-Varies	
	Bar Groups	A	B	C	D	E	F	G	

TYPICAL LONGITUDINAL SECTION - SHOWING SECTIONS AND BAR GROUPS FOR VARIOUS DEPTHS OF COVER

NOTE:- Lengths of Sections and Bar Groups are to be shown on Cross Section Sheets or on Special Culvert Layout Sheet.



PART PLAN

NOTE:- For Details and Bar Lists for SECTIONS B thru G, see Barrel Drawing Nos. R-100X-X.1 or R-100X-X.2.

LENGTH OF SECTIONS ON 30° SKEW

SLOPE	2:1		3:1		4:1	
SECTIONS	A	B,C,D, E&F	A	B,C,D, E&F	A	B,C,D, E&F
LENGTHS	13'-10⅝"	6'-11⅝"	25'-4⅜"	12'-8⅜"	36'-11⅝"	18'-5⅞"

NOTE:- Minimum ℄ Length of SECTION "A" on 30° Skew = (0.886475 OW+2").

SECTIONS AND BAR GROUPS TO BE USED FOR VARIOUS DEPTHS OF COVER

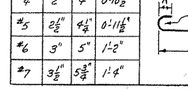
DEPTHS OF COVER	SECTIONS & BAR GROUPS FOR END SECTIONS						MID-SECTION AND BAR GROUP
	A	B	C	D	E	F	
5.0' to 9.5'	A						A
10.0' to 19.5'	A						B
15.0' to 19.5'	A	B					C
20.0' to 29.5'	A	B	C				D
25.0' to 29.5'	A	B	C	D			E
30.0' to 39.5'	A	B	C	D	E		F
35.0' to 90.0'	A	B	C	D	E	F	G

OR ALT.

DEPTHS OF COVER	SECTIONS & BAR GROUPS FOR END SECTIONS						MID-SECTION AND BAR GROUP
	A	B	C	D	E	F	
5.0' to 9.5'	A						A
10.0' to 19.5'	A						B
15.0' to 19.5'	A	B					C
20.0' to 29.5'	A	2@C					D
25.0' to 29.5'	A	B	2@D				E
30.0' to 39.5'	A	2@C		2@E			F
35.0' to 90.0'	A	B	2@D		2@F		G

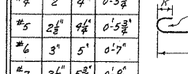
BAR SIZE	PIN DIAM.	K	ADD FOR 2 HOOKS
#4	2"	4"	0'-10⅝"
#5	2½"	4½"	0'-11⅞"
#6	3"	5"	1'-2"
#7	3½"	5½"	1'-4"

BENDING DIAGRAM FOR BARS "b"



BAR SIZE	PIN DIAM.	K	ADD FOR 1 HOOK
#4	2"	4"	0'-5⅜"
#5	2½"	4½"	0'-5¾"
#6	3"	5"	0'-7"
#7	3½"	5½"	0'-8"

BENDING DIAGRAM FOR BARS "b1"

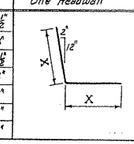


Note:- Dimensions are to centers of bars. ("b" and "b1")

DOWEL BARS FOR ONE HEADWALL

SPAN	SIZE	SPACING	No. REQ'D	LENGTH	X
4'	#4	12"c	6	2'-5"	1'-2½"
5'	#4	12"c	8	2'-6"	1'-3"
6'	#4	12"c	9	2'-7"	1'-3½"
7'	#4	12"c	10	2'-8"	1'-4"
8'	#4	12"c	11	2'-10"	1'-5"
9'	#4	12"c	13	3'-0"	1'-6"
10'	#4	12"c	14	3'-2"	1'-7"

Dowel bars "X" in One Headwall



DESIGN LIVE LOAD

H20-S16 LOADING A.A.S.H.O. 1961

AND

SPECIAL MILITARY LOADING

Two 24,000 Lb. Axles @ 4'-0" ctrs.

UNIT STRESSES:-

Class S Concrete (n=10) 1200#/□"

Reinforcing Steel 20,000#/□"

GENERAL NOTES

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

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

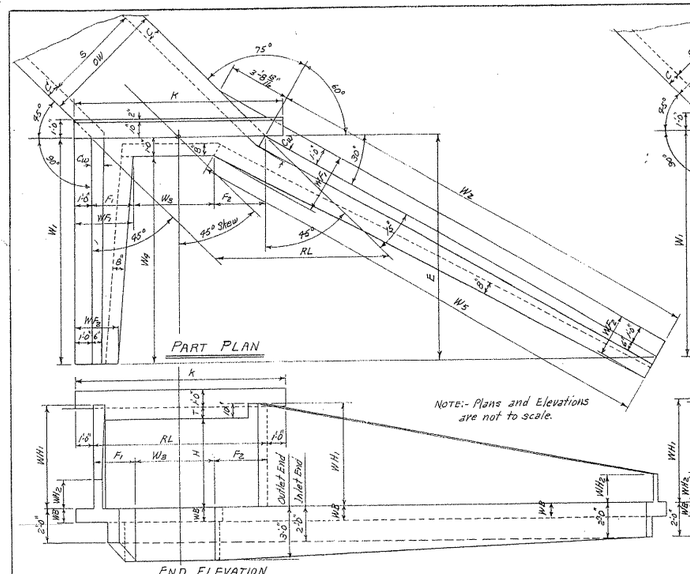
CONSTRUCTION JOINTS:- Construction joints between wingwalls, sidewalls and slabs shall be only where shown on plans.

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

BAR LIST FOR SECTION "A" ON 30° SKEW - ONE END ONLY.

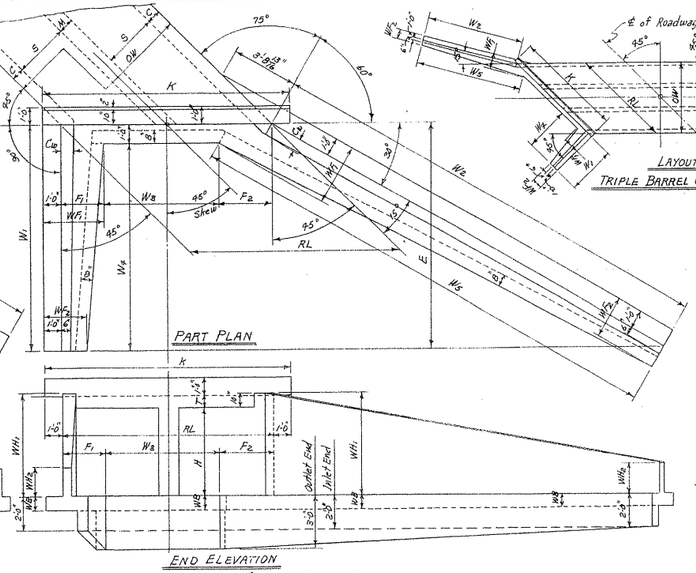
| SECTION "A" & BAR GROUP "A" | LENGTH OF SECTION | DEPTH OF ℄ | CLEAR SPANS | CLEAR HEIGHT | "a" bars STRAIGHT In Top and Bottom Slabs of Barrel. SIZE | SPACING | NUMBER REQ'D 2:1 | 3:1 | 4:1 | LENGTH | "a1" bars STRAIGHT In Top and Bottom Slab of Barrel-(two of each Length.) SIZE | SPACING | NO. REQ'D | LENGTH MAX. | MIN. | "b" bars BENT - See Diagrams at Right. In Top and Bottom Slabs of Barrel-hooked. Alternate with "a" bars SIZE | SPACING | NUMBER REQ'D 2:1 | 3:1 | 4:1 | LENGTH | X | "b1" bars In Top and Bottom Slabs of Barrel-one end hooked. (Two of each Length) Alternate with "a1" bars. SIZE | SPACING | NO. REQ'D | LENGTH MAX. | MIN. | X MAX. | MIN. | "d" bars STRAIGHT Longitudinal in Top Slab of Barrel. SIZE | SPACING | NO. REQ'D | LENGTH | "d1" bars STRAIGHT Longitudinal in Sidewalls SIZE | SPACING | NO. REQ'D | LENGTH | "e" bars STRAIGHT Longitudinal in Bottom Slab of Barrel. SIZE | SPACING | NO. REQ'D | LENGTH | "f" bars STRAIGHT Verticals in Sidewalls. SIZE | SPACING | NUMBER REQ'D 2:1 | 3:1 | 4:1 | LENGTH | "k1" bars STRAIGHT In Bottom of Headwall. SIZE | NO. REQ'D | LENGTH | "k2" bars STRAIGHT In Top of Headwall and Apron. (2 Each) SIZE | NO. REQ'D | LENGTH |
|---|---|---|---|---|---|---|---|---|---

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



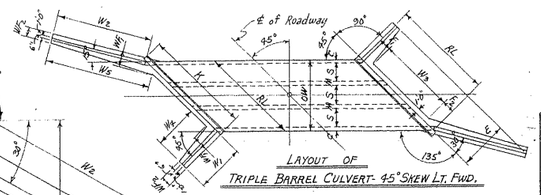
SINGLE BARREL CULVERT - 45° SKEW RIGHT FORWARD

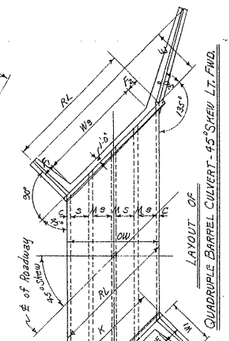
Details of Culvert with 45° Skew Left Forward is reversed, see Layout below.

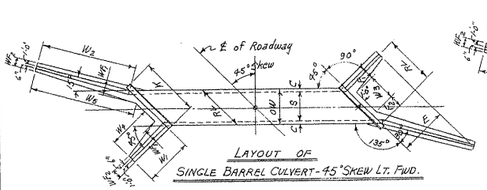


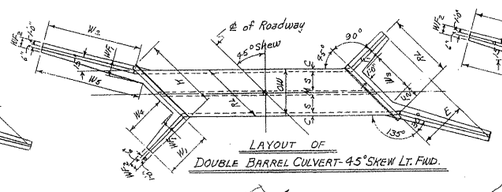
DOUBLE BARREL CULVERT - 45° SKEW RIGHT FORWARD

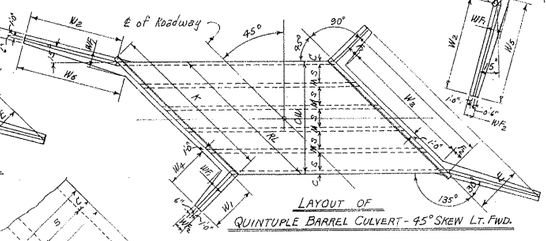
Details of Culvert with 45° Skew Left Forward is reversed, see Layout below.

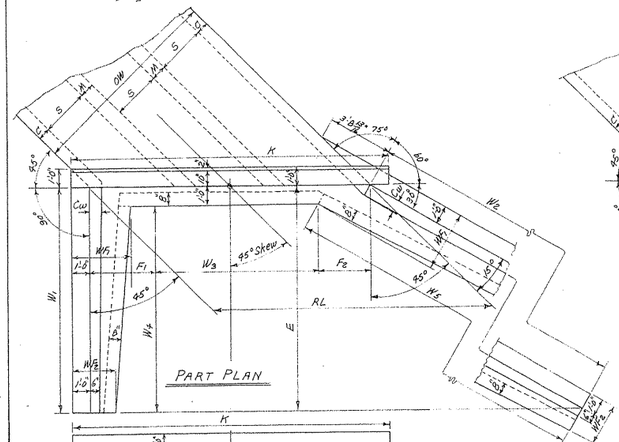










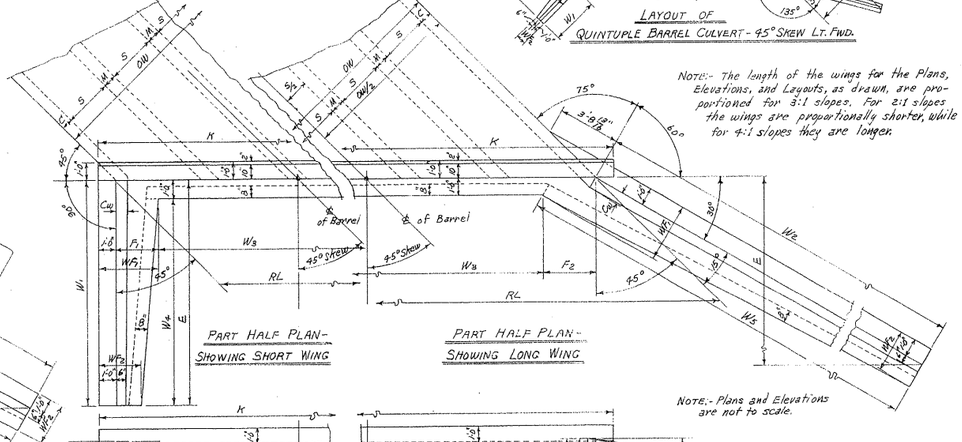


TRIPLE BARREL CULVERT - 45° SKEW RIGHT FORWARD

Details of Culvert with 45° Skew Left Forward is reversed, see Layout at top center of sheet.

QUADRUPLE BARREL CULVERT - 45° SKEW RT. FWD.

Details of Culvert with 45° Skew Left Forward is reversed, see Layout at above center.



QUINTUPLE BARREL CULVERT - 45° SKEW RT. FWD.

Details of Culvert with 45° Skew Left Forward is reversed, see Layout above.

ROADWAY LENGTH RL — RL = OW x 1.4142 1

HEADWALL LENGTH K — K = RL + (2'0")

APRON DIMENSION W3 — W3 = RL - (F1 + F2)

USE WITH DRAWING NO.	CLEAR SPAN S	CLEAR HEIGHT H	SUM OF DIMENSIONS F1 & F2	SINGLE BARREL CULVERT OW	SINGLE BARREL CULVERT RL	SINGLE BARREL CULVERT K	SINGLE BARREL CULVERT W3	DOUBLE BARREL CULVERT OW	DOUBLE BARREL CULVERT RL	DOUBLE BARREL CULVERT K	DOUBLE BARREL CULVERT W3	TRIPLE BARREL CULVERT OW	TRIPLE BARREL CULVERT RL	TRIPLE BARREL CULVERT K	TRIPLE BARREL CULVERT W3	QUADRUPLE BARREL CULVERT OW	QUADRUPLE BARREL CULVERT RL	QUADRUPLE BARREL CULVERT K	QUADRUPLE BARREL CULVERT W3	QUINTUPLE BARREL CULVERT OW	QUINTUPLE BARREL CULVERT RL	QUINTUPLE BARREL CULVERT K	QUINTUPLE BARREL CULVERT W3
W-X452-1, W-X453-1 OR W-X454-1. (FOR H=8'0" OR LESS)	4'	2'	2'3"	5'-0"	7'-0"	9'-0"	4'-9"	9'-8"	13'-8"	15'-8"	11'-4"	14'-4"	20'-3"	22'-3"	18'-0"	19'-0"	26'-10"	28'-10"	24'-7"	23'-8"	33'-5"	35'-5"	31'-2"
		3'	3'3"	5'-0"	"	"	3'-9"	9'-8"	"	"	10'-4"	14'-4"	"	"	17'-0"	19'-0"	"	"	23'-7"	23'-8"	"	"	30'-2"
		4'	4'3"	5'-0"	"	"	2'-9"	9'-8"	"	"	9'-4"	14'-4"	"	"	16'-0"	19'-0"	"	"	22'-7"	23'-8"	"	"	29'-2"
		5'	5'3"	5'-0"	7'-0"	9'-0"	1'-9"	9'-8"	13'-8"	15'-8"	8'-4"	14'-4"	20'-3"	22'-3"	15'-0"	19'-0"	26'-10"	28'-10"	21'-7"	23'-8"	33'-5"	35'-5"	28'-2"
		6'	6'3"	5'-0"	7'-3"	9'-3"	1'-0"	9'-11"	14'-0"	16'-0"	7'-0"	14'-8"	20'-8"	22'-9"	14'-3"	19'-5"	27'-5"	29'-5"	21'-2"	24'-2"	34'-2"	36'-2"	27'-10"
	5'	3'	3'3"	6'-0"	8'-3"	10'-3"	5'-2"	11'-8"	16'-6"	18'-6"	13'-2"	17'-4"	24'-6"	26'-6"	21'-3"	23'-0"	32'-6"	34'-6"	29'-3"	28'-8"	40'-6"	42'-6"	37'-3"
		4'	4'3"	6'-0"	"	"	4'-2"	11'-8"	"	"	12'-8"	17'-4"	"	"	20'-3"	23'-0"	"	"	28'-3"	28'-8"	"	"	36'-3"
		5'	5'3"	6'-0"	8'-5"	10'-5"	5'-2"	11'-8"	16'-6"	18'-6"	11'-2"	17'-4"	24'-6"	26'-6"	19'-3"	23'-0"	32'-6"	34'-6"	27'-3"	28'-8"	40'-6"	42'-6"	35'-3"
		6'	6'3"	6'-0"	8'-5"	10'-5"	4'-2"	11'-11"	16'-10"	18'-10"	10'-7"	17'-8"	24'-10"	26'-10"	17'-7"	23'-2"	33'-2"	35'-2"	25'-11"	29'-2"	41'-3"	43'-3"	34'-11"
		7'	7'3"	6'-3"	8'-10"	10'-10"	3'-10"	12'-5"	17'-1"	19'-1"	9'-3"	17'-11"	25'-4"	27'-4"	17'-4"	23'-9"	33'-7"	35'-7"	24'-2"	29'-7"	41'-10"	43'-10"	34'-6"
	6'	3'	3'3"	7'-0"	9'-10"	11'-10"	6'-7"	13'-8"	19'-2"	21'-2"	16'-0"	20'-4"	28'-9"	30'-9"	25'-5"	27'-0"	38'-2"	40'-2"	34'-11"	33'-8"	47'-7"	49'-7"	43'-4"
		4'	4'3"	7'-0"	"	"	5'-7"	13'-8"	"	"	15'-0"	20'-4"	"	"	24'-5"	27'-0"	"	"	33'-11"	33'-8"	"	"	43'-4"
		5'	5'3"	7'-0"	9'-10"	11'-10"	4'-7"	13'-8"	19'-2"	21'-2"	14'-0"	20'-4"	28'-9"	30'-9"	23'-5"	27'-0"	38'-2"	40'-2"	32'-11"	33'-9"	47'-8"	49'-8"	42'-5"
		6'	6'3"	7'-2"	10'-1"	12'-1"	3'-10"	13'-11"	19'-8"	21'-8"	13'-5"	20'-8"	29'-2"	31'-2"	22'-1"	27'-5"	38'-5"	40'-5"	32'-6"	34'-2"	48'-5"	50'-5"	42'-2"
		7'	7'3"	7'-3"	10'-3"	12'-3"	2'-5"	14'-1"	19'-11"	21'-11"	12'-1"	20'-11"	29'-7"	31'-7"	21'-0"	27'-9"	38'-9"	40'-9"	31'-5"	34'-7"	48'-10"	50'-11"	41'-7"
		8'	8'3"	7'-4"	10'-4"	12'-4"	1'-1"	14'-2"	20'-0"	22'-0"	10'-9"	21'-0"	29'-8"	31'-8"	20'-5"	27'-10"	39'-0"	41'-0"	30'-1"	34'-8"	49'-0"	51'-0"	39'-9"
	7'	4'	4'3"	8'-0"	11'-3"	13'-3"	7'-0"	15'-8"	22'-1"	24'-1"	17'-0"	23'-4"	33'-0"	35'-0"	28'-0"	31'-0"	43'-10"	45'-10"	39'-6"	39'-8"	54'-8"	56'-8"	50'-5"
		5'	5'3"	8'-0"	11'-3"	13'-3"	6'-0"	15'-9"	22'-2"	24'-2"	16'-0"	23'-4"	33'-0"	35'-0"	27'-0"	31'-0"	43'-10"	45'-10"	38'-6"	39'-8"	54'-8"	56'-8"	49'-5"
		6'	6'3"	8'-2"	11'-6"	13'-6"	5'-3"	15'-11"	22'-6"	24'-6"	16'-2"	23'-8"	33'-5"	35'-5"	27'-2"	31'-5"	44'-5"	46'-5"	38'-2"	39'-10"	55'-4"	57'-4"	49'-11"
		7'	7'-3"	8'-3"	11'-8"	13'-8"	3'-10"	16'-1"	22'-9"	24'-9"	14'-11"	23'-11"	33'-9"	35'-10"	26'-0"	31'-9"	44'-10"	46'-10"	37'-11"	39'-11"	55'-11"	57'-11"	49'-8"
		8'	8'3"	8'-4"	11'-9"	13'-9"	2'-6"	16'-2"	22'-10"	24'-10"	13'-7"	24'-0"	33'-11"	35'-11"	24'-8"	31'-10"	45'-0"	47'-0"	35'-9"	39'-8"	56'-2"	58'-2"	48'-10"
	8'	4'	4'3"	9'-0"	12'-9"	14'-9"	8'-5"	17'-8"	24'-11"	26'-11"	18'-9"	26'-9"	37'-8"	39'-8"	30'-8"	35'-0"	49'-6"	51'-6"	43'-3"	43'-8"	61'-9"	63'-9"	57'-6"
		5'	5'3"	9'-2"	12'-11"	14'-11"	7'-8"	17'-11"	25'-2"	27'-2"	20'-0"	26'-8"	37'-8"	39'-8"	32'-5"	35'-5"	50'-1"	52'-1"	44'-9"	44'-8"	62'-5"	64'-5"	57'-2"
		6'	6'3"	9'-2"	12'-11"	14'-11"	6'-10"	17'-11"	25'-2"	27'-2"	19'-0"	26'-11"	38'-0"	39'-10"	31'-5"	35'-5"	50'-1"	52'-1"	43'-10"	44'-8"	62'-5"	64'-5"	56'-11"
		7'	7'3"	9'-3"	13'-1"	15'-1"	5'-11"	18'-1"	25'-5"	27'-5"	17'-9"	26'-11"	38'-0"	40'-0"	30'-5"	35'-6"	50'-6"	52'-6"	42'-10"	44'-7"	63'-0"	65'-0"	55'-5"
		8'	9'3"	9'-4"	13'-2"	15'-2"	5'-1"	19'-2"	25'-8"	27'-8"	16'-5"	27'-0"	38'-2"	40'-2"	28'-11"	35'-10"	50'-10"	52'-9"	41'-5"	44'-8"	63'-2"	65'-2"	53'-10"
	9'	5'	5'3"	10'-2"	14'-5"	16'-4"	9'-1"	19'-11"	28'-2"	30'-2"	22'-0"	28'-9"	41'-0"	43'-0"	34'-0"	39'-5"	55'-0"	57'-0"	50'-5"	49'-2"	69'-6"	71'-6"	64'-3"
		6'	6'3"	10'-3"	14'-6"	16'-6"	8'-2"	20'-1"	28'-4"	30'-4"	22'-1"	29'-11"	42'-3"	44'-3"	34'-6"	39'-9"	56'-2"	58'-2"	49'-11"	49'-7"	70'-1"	72'-1"	63'-10"
		7'	7'3"	10'-3"	14'-6"	16'-6"	6'-8"	20'-1"	28'-4"	30'-4"	20'-7"	29'-11"	42'-3"	44'-3"	34'-6"	39'-9"	56'-2"	58'-2"	48'-8"	49'-7"	70'-1"	72'-1"	62'-8"
		8'	9'3"	10'-4"	14'-7"	16'-7"	5'-5"	20'-2"	28'-6"	30'-6"	19'-3"	30'-0"	42'-5"	44'-5"	33'-2"	39'-10"	56'-4"	58'-4"	47'-10"	49'-8"	70'-2"	72'-3"	60'-11"
	10'	5'	5'3"	11'-2"	15'-9"	17'-9"	10'-1"	21'-11"	31'-0"	33'-0"	25'-0"	32'-8"	46'-2"	48'-2"	36'-11"	43'-5"	61'-9"	63'-9"	56'-6"	56'-2"	76'-7"	78'-7"	71'-4"
		6'	6'3"	11'-3"	15'-11"	17'-11"	9'-7"	22'-1"	31'-2"	33'-2"	24'-6"	32'-11"	46'-6"	48'-6"	36'-3"	43'-9"	61'-10"	63'-10"	55'-10"	56'-7"	77'-0"	79'-0"	70'-7"
		7'	7'3"	11'-3"	15'-11"	17'-11"	8'-11"	22'-1"	31'-2"	33'-2"	23'-11"	33'-2"	46'-9"	48'-9"	38'-0"	43'-9"	61'-10"	63'-10"	54'-11"	56'-7"	77'-0"	79'-0"	69'-5"
		8'	9'3"	11'-4"	16'-0"	18'-0"	8'-2"	22'-2"	31'-4"	33'-4"	22'-1"	33'-0"	46'-9"	48'-9"	37'-9"	43'-10"	61'-11"	63'-11"	53'-8"	56'-8"	77'-3"	79'-3"	68'-10"
	11'	6'	6'3"	12'-4"	17'-5"	19'-5"	11'-2"	24'-2"	34'-2"	36'-2"	27'-11"	36'-0"	50'-11"	52'-11"	41'-7"	47'-10"	67'-11"	69'-11"	61'-4"	—	—	—	—
		7'	7'3"	12'-5"	"	"	9'-8"	24'-2"	"	"	26'-5"	36'-0"	"	"	40'-1"	47'-10"	"	"	59'-10"	—	—	—	—
		8'	9'3"	12'-5"	"	"	8'-2"	24'-2"	"	"	24'-11"	36'-0"	"	"	39'-0"	47'-10"	"	"	58'-9"	—	—	—	—
	12'	6'	6'3"	13'-4"	18'-10"	20'-10"	12'-7"	26'-2"	37'-0"	39'-0"	30'-8"	39'-8"	55'-1"	57'-1"	45'-1"	51'-10"	73'-3"	75'-3"	67'-0"	—	—	—	—
		7'	7'3"	13'-4"	"	"	11'-7"	26'-2"	"	"	29'-2"	39'-8"	"	"	44'-3"	51'-10"	"	"	65'-6"	—	—	—	—
		8'	9'3"	13'-4"	"	"	9'-7"	26'-2"	"	"	27'-8"	39'-8"	"	"	42'-10"	51'-10"	"	"	64'-0"	—	—	—	—
	7'	9'	10'-9"	8'-6"	12'-0"	14'-0"	1'-3"	16'-5"	23'-2"	25'-2"	12'-5"	24'-4"	33'-5"	34'-5"	23'-7"	32'-3"	45'-7"	47'-7"	34'-10"	40'-2"	56'-9"	58'-9"	46'-4"
	8'	9'	10'-9"	9'-6"	13'-5"	15'-5"	2'-8"	18'-5"	26'-0"	28'-0"	15'-3"	27'-4"	38'-7"	40'-7"	27'-10"	36'-3"	51'-3"	53'-3"	40'-6"	45'-2"	63'-10"	65'-10"	53'-7"
		10'	12'-3"	9'-8"	13'-8"	15'-8"	1'-8"	18'-8"	26'-8"	28'-8"	18'-1"	27'-8"	39'-1"	41'-1"	26'-10"	36'-8"	51'-10"	53'-10"	39'-7"	45'-8"	64'-7"	66'-7"	52'-3"
	9'	9'	10'-9"	10'-6"	14'-10"	16'-10"	4'-1"	20'-5"	28'-10"	30'-10"	18'-8"	30'-8"	43'-10"	45'-10"	32'-1"	40'-3"	56'-11"	58'-11"	46'-1"	50'-2"	70'-11"	72'-11"	60'-2"
		10'	12'-3"	10'-8"	15'-1"	17'-1"	2'-9"	20'-8"	29'-2"	31'-2"	19'-5"	30'-8"	43'-10"	45'-10"	31'-6"	40'-8"	57'-0"	59'-0"	45'-3"	50'-8"	71'-7"	73'-7"	59'-4"
		11'	13'-9"	10'-10"	15'-3"	17'-3"	1'-6"	20'-10"	29'-5"	31'-5"	19'-8"	30'-10"	43'-7"	45'-7"	29'-10"	40'-10"	57'-9"	59'-9"	43'-11"	50'-10"	71'-10"	73'-10"	58'-7"
	10'	9'	10'-9"	11'-6"	16'-3"	18'-3"	5'-6"	22'-5"	31'-8"	33'-8"	20'-11"	33'-4"	47'-1"	49'-1"	34'-4"	44'-3"	62'-7"	64'-7"	51'-9"	55'-2"	78'-6"	80'-6"	67'-3"
		10'	12'-3"	11'-8"	16'-6"	18'-6"	4'-2"	22'-10"	32'-0"	34'-0"	19'-9"	33'-8"	47'-7"	49'-7"	35'-4"	44'-8"	63'-2"	65'-2"	50'-10"	55'-8"	78'-8"	80'-8"	66'-5"
		11'	13'-9"	11'-10"	16'-8"	18'-8"	2'-11"	22'-10"	32'-2"	34'-2"	19'-6"	33'-10"	47'-10"	49'-10"	34'-1"	44'-10"	63'-0"	65'-0"	49'-7"	55'-10"	78'-11"	80'-11"	65'-6"
		12'	15'-3"	12'-0"	16'-11"	18'-11"	1'-8"	23'-0"	32'-5"	34'-5"	17'-3"	34'-0"	48'-1"	50'-1"	32'-9"	45'-0"	63'-2"	65'-2"	48'-4"	56'-0"	79'-2"	81'-2"	63'-11"
	11'	9'	10'-9"	12'-6"	17'-5"	19'-5"	6'-10"	24'-5"	34'-6"	36'-6"	23'-4"	34'-8"	49'-0"	51'-0"	36'-7"	45'-7"	64'-0"	66'-0"	51'-6"	—	—	—	—
		10'	12'-3"	12'-8"	"	"	5'-11"	24'-5"	"	"	22'-7"	34'-8"	"	"	35'-0"	45'-7"	"	"	49'-11"	—	—	—	—
		11'	13'-9"	12'-10"	18'-1"	20'-1"	5'-1"	24'-10"	36'-1"	38'-1"	21'-10"	34'-8"	49'-3"	51'-3"	33'-11"	45'-10"	64'-2"	66'-2"	48'-10"	—	—	—	—
		12'	15'-3"	13'-0"	18'-3"	20'-3"	3'-7"	25'-0"	35'-8"	37'-8"	20'-1"	37'-0"	52'-3"	54'-3"	37'-0"	49'-0"	69'-3"	69'-3"	51'-3"	59'-0"	—	—	—
	12'	9'	10'-9"	13'-6"	19'-1"	21'-1"	8'-3"	26'-5"	37'-4"	39'-4"	26'-2"	39'-4"	55'-5"	57'-5"	44'-10"	52'-3"	73'-5"	75'-5"	67'-1"	—	—	—	—
		10'	12'-3"	13'-8"	19'-3"	21'-3"	7'-0"	26'-7"	37'-6"	39'-6"	25'-5"	39'-8"	56'-1"	58'-1"	43'-10"	52'-8"	74'-5"	76'-5"	66'-5"	—	—	—	—
		11'	13'-9"	13'-10"	19'-5"	21'-5"	5'-10"	26'-10"	37'-11"	39'-11"	24'-2"	39'-10"	56'-4"	58'-4"	42'-6"	52'-10"	74'-10"	76'-10"	65'-8"	—	—	—	—
		12'	15'-3"	14'-0"	19'-8"	21'-8"	4'-6"	27'-0"	38'-2"	40'-2"	22'-11"	40'-0"	56'-6"	58'-6"	41'-5"	53'-0"	74'-11"	76'-11"	64'-11"	—	—	—	—

NOTE:- This drawing to be used in conjunction with Standard Wing Drawings for 45° Skews for each slope as listed below.

2:1 Slopes	3:1 Slopes	4:1 Slopes
W-X452-1 or W-X452-2	W-X453-1 or W-X453-2	W-X454-1 or W-X454-2.

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

SINGLES	DOUBLES	TRIPLES	QUADRUPLES	QUINTUPLES
R-145X-0	R-245X-01	R-345X-01	R-445X-01	R-545X-01
	R-245X-02	R-345X-02	R-445X-02	R-545X-02
R-145X-1	R-245X-1	R-345X-1	R-445X-1	
	R-245X-2	R-345X-2		

CLASS S CONCRETE

ARKANSAS STATE HIGHWAY COMMISSION

DETAILS OF STANDARD WINGS FOR REINFORCED CONCRETE BOX CULVERTS 45° SKEW

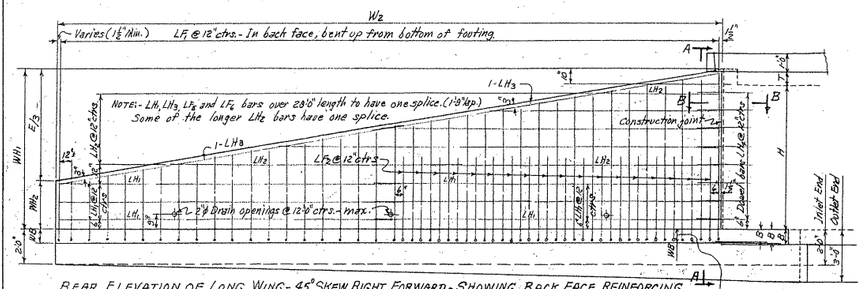
4', 5', 6', 7', 8', 9', 10', 11' & 12' SPANS — 2:1, 3:1 & 4:1 SLOPES

SINGLES, DOUBLES, TRIPLES, QUADRUPLES & QUINTUPLES — ALL DEPTHS OF COVER H = 2', 3', 4', 5', 6', 7', 8', 9', 10', 11' & 12'

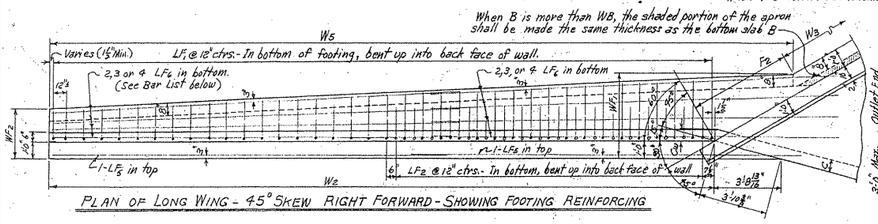
STANDARD DRAWING No. W-X45

Designed by:- W.C.H. 5-16-63 Checked by:-
Drawn by:- W.C.H. 6-15-64 Checked by:- J.E.M. 6-23-64
Quantities by:- Checked by:-

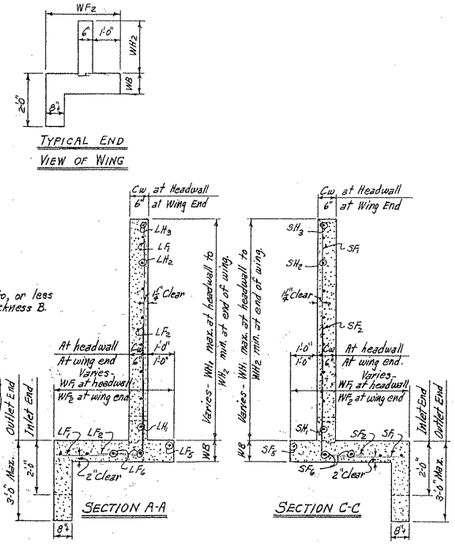
FED. ROAD No.	STATE	FED. AID PROJECT	FISCAL YEAR	SHEET No.	TOTAL SHEETS
6	ARK.				
JOB No.					

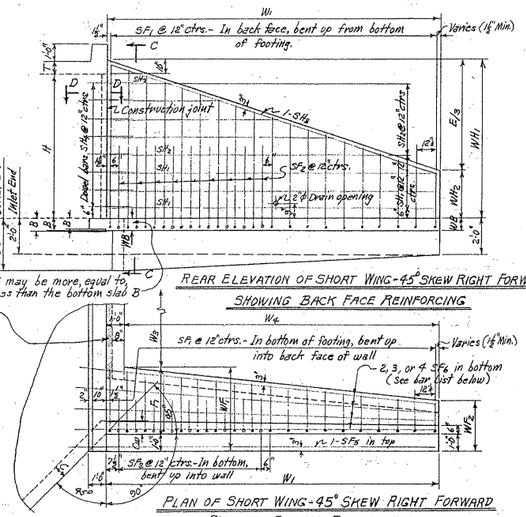


REAR ELEVATION OF LONG WING - 45° SKEW RIGHT FORWARD - SHOWING BACK FACE REINFORCING

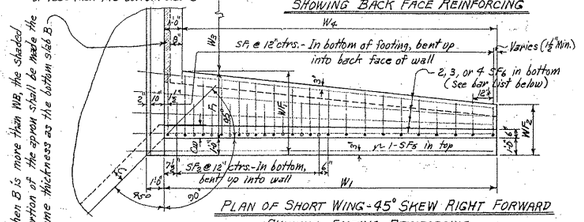


PLAN OF LONG WING - 45° SKEW RIGHT FORWARD - SHOWING FOOTING REINFORCING

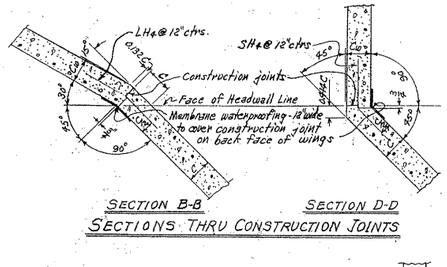




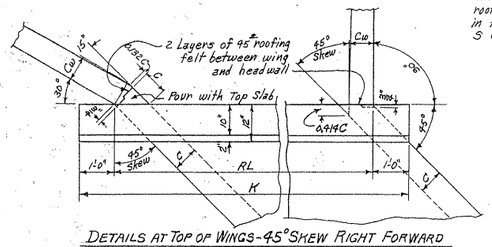
REAR ELEVATION OF SHORT WING - 45° SKEW RIGHT FORWARD - SHOWING BACK FACE REINFORCING



PLAN OF SHORT WING - 45° SKEW RIGHT FORWARD SHOWING FOOTING REINFORCING



SECTIONS THRU CONSTRUCTION JOINTS



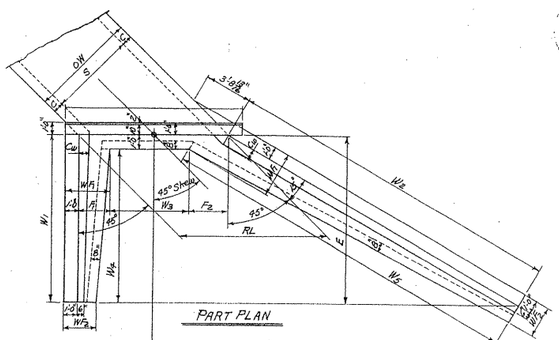
DETAILS AT TOP OF WINGS - 45° SKEW RIGHT FORWARD

NOTE:- Payment for the membrane waterproofing and roofing felt to be included in the price bid for Class S Concrete.

REGULAR WING DIMENSIONS - 3:1 SLOPES

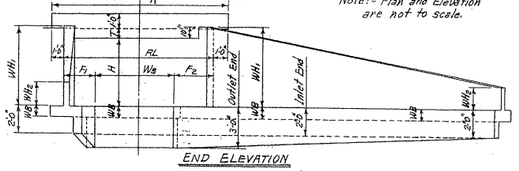
CLEAR HEIGHT OF BOX	THICKNESS OF WING FOOTING	THICKNESS OF WING AT HEADWALL & C	WINGWALL HEIGHTS AT HEADWALL	WINGWALL HEIGHTS AT END OF WING	WIDTHS OF WING FOOTINGS AT HEADWALL	WIDTHS OF WING FOOTINGS AT END OF WING	FOOTING DIMENSION PERPENDICULAR TO WALL SHORT WING	FOOTING DIMENSION PERPENDICULAR TO WALL LONG WING	PERPENDICULAR CAST FROM ADJUST TO END OF WING	LENGTHS OF WINGWALLS SHORT WING	LENGTHS OF WINGWALLS LONG WING	INSIDE FOOTING DIMENSION SHORT WING	INSIDE FOOTING DIMENSION LONG WING	* QUANTITY PER WING CLASS S CONCRETE INLET END SHORT WING	INLET END LONG WING	OUTLET END SHORT WING	OUTLET END LONG WING
H	WB	Cw	WH1	WH2	WF1	WF2	F1	F2	E	W1	W2	W4	W5	CU.YD.	CU.YD.	CU.YD.	CU.YD.
2'	7"	6"	2'-10"	0'-10"	2'-9"	2'-10"	1'-4"	0'-11½"	6'-1½"	6'-6"	13'-0"	5'-6"	13'-3⅜"	0.743	1.572	0.829	1.741
3'	7"	6"	3'-10"	1'-0"	2'-8"	2'-11½"	1'-8"	1'-7½"	8'-1½"	8'-6"	17'-0"	7'-6"	17'-10⅝"	1.180	2.369	1.289	2.590
4'	7"	6"	4'-10"	1'-1"	3'-0"	2'-3"	2'-0"	2'-3½"	10'-6"	10'-6"	21'-0"	9'-6"	22'-5½"	1.547	3.295	1.700	3.577
5'	7"	6"	5'-10"	1'-0"	3'-3"	2'-4½"	2'-4"	2'-11⅛"	12'-6"	12'-6"	25'-0"	11'-6"	27'-0⅝"	2.088	4.367	2.241	4.705
		7"	5'-10"	1'-0"	3'-3"	2'-4½"	2'-4"	2'-11⅛"	12'-6"	12'-6"	25'-6"	11'-6"	27'-10⅝"	2.166	4.551	2.325	4.889
6'	8"	7"	6'-10"	2'-0"	3'-8"	2'-6"	2'-8"	3'-7⅛"	14'-6"	14'-6"	29'-0"	13'-6"	31'-7½"	2.894	6.055	3.078	6.450
		8"	6'-10"	2'-0"	3'-8"	2'-6"	2'-8"	3'-7⅛"	14'-6"	14'-6"	29'-0"	13'-6"	31'-7½"	3.009	6.306	3.192	6.700
7'	8½"	7½"	7'-10"	2'-8"	4'-2"	2'-10½"	3'-2"	4'-2⅝"	16'-6"	16'-6"	33'-0"	15'-6"	36'-5⅝"	3.794	7.930	9.003	8.385
		8"	7'-10"	2'-8"	4'-2"	2'-10½"	3'-2"	4'-2⅝"	16'-6"	16'-6"	33'-0"	15'-6"	36'-5⅝"	3.870	8.093	9.078	8.598
8'	9"	8"	8'-10"	2'-8"	4'-8"	2'-9"	3'-8"	5'-2½"	18'-6"	18'-6"	37'-0"	17'-6"	41'-4⅝"	9.855	10.136	5.088	10.651

* Quantity per wing does not include headwall or that portion of apron or toewall for the length W_3.



PART PLAN

NOTE:- Plan and Elevation are not to scale.



END ELEVATION

SINGLE BARREL CULVERT - 45° SKEW RIGHT FORWARD

Details of Culvert with 45° Skew Left Forward is reversed, see Drawing No. W-X45.

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-X45.
For values of RL, K and W_3 for each box, see above Std. also.

MEMBRANE:- A membrane waterproofing 12" wide, consisting of three applications 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.

QUANTITIES

CLEAR SPAN	CLEAR HEIGHT	THICKNESS OF WING AT HEADWALL	THICKNESS OF WING FOOTING	REINFORCING STEEL ⊕ FOR 4 WINGS	CLASS S CONCRETE - 4 WINGS HEADWALLS, WINGWALLS, FOOTINGS, TOEWALLS AND APRONS				
					SINGLE BARREL CULVERT	DOUBLE BARREL CULVERT	TRIPLE BARREL CULVERT	QUADRUPLE BARREL CULVERT	QUINTUPLE BARREL CULVERT
S	H	Cw	WB	LB.	CU.YD.	CU.YD.	CU.YD.	CU.YD.	CU.YD.
4'	2'	6"	7"	142	6.15	7.50	8.86	10.22	11.58
	3'	6"	7"	214	8.44	9.79	11.14	12.50	13.86
	4'	6"	7"	328	11.13	12.48	13.84	15.20	16.56
	5'	6"	7"	463	14.25	15.60	16.96	18.32	19.68
	6'	7"	8"	763	19.23	20.62	22.02	23.41	24.81
5'	3'	6"	7"	214	8.74	10.38	12.03	13.67	15.32
	4'	6"	7"	328	11.98	13.07	14.72	16.37	18.02
	5'	6"	7"	463	14.55	16.19	17.84	19.49	21.14
	6'	7"	8"	763	19.53	21.21	22.90	24.59	26.28
	7'	7½"	8½"	1475	26.98	26.69	28.91	30.14	31.86
6'	3'	6"	7"	214	9.03	10.99	12.91	14.86	16.79
	4'	6"	7"	328	11.73	13.49	15.60	17.54	19.48
	5'	6"	7"	463	14.85	16.80	18.72	20.68	22.60
	6'	7"	8"	763	19.83	21.82	23.79	25.78	27.76
	7'	7½"	8½"	1475	25.28	27.30	29.31	31.33	33.35
	8'	8"	9"	1872	31.70	33.74	35.75	37.79	39.81
7'	4'	6"	7"	328	12.04	14.21	16.54	18.81	21.02
	5'	6"	7"	463	15.15	17.93	19.65	21.93	24.13
	6'	7"	8"	763	20.19	22.94	24.69	26.98	29.24
	7'	7½"	8½"	1475	25.59	27.91	30.21	32.58	34.83
	8'	8"	9"	1872	32.02	34.36	36.66	38.99	41.31
8'	4'	6"	7"	328	12.35	14.95	17.49	20.08	22.57
	5'	7"	7"	463	16.05	18.47	21.07	23.86	26.37
	6'	7"	8"	763	20.95	23.07	25.66	28.24	30.77
	7'	7½"	8½"	1475	25.90	28.58	31.13	33.78	36.32
	8'	8"	9"	1872	32.33	34.97	37.56	40.21	42.80
9'	5'	7"	7"	463	16.32	19.32	22.18	25.02	27.91
	6'	7½"	8"	763	21.16	24.18	27.02	29.99	32.81
	7'	7½"	8½"	1475	26.21	29.18	32.08	34.94	37.86
	8'	8"	9"	1872	32.63	35.61	38.51	41.37	44.29
10'	5'	7"	7"	463	16.69	19.96	23.14	26.27	29.47
	6'	7½"	8"	763	21.98	24.77	27.99	31.13	34.34
	7'	7½"	8½"	1475	26.53	29.82	33.04	36.19	39.42
	8'	8"	9"	1872	32.95	36.25	39.46	42.62	45.85
11'	6'	8"	8"	763	22.18	25.83	29.35	32.84	
	7'	8"	8½"	1475	27.33	30.99	34.51	38.01	
	8'	8"	9"	1872	33.26	36.91	40.43	43.93	
12'	6'	8"	8"	763	22.50	26.51	30.33	34.19	
	7'	8"	8½"	1475	27.66	31.66	35.49	39.35	
	8'	8"	9"	1872	33.58	37.58	41.41	45.27	

⊕ For reinforcing steel in Headwalls and Aprons, see Drawing Nos. of Barrel Sections listed below.

GENERAL NOTES:-
CONCRETE:- All concrete to be Class S, and shall be poured in the dry. All exposed corners to have ¾" chamfers.
REINFORCING STEEL:- Reinforcing steel to be deformed bars of intermediate or hard grade.
CONSTRUCTION JOINTS:- Construction joints between wingwall, footings and sidewalls 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#/□"
Reinforcing Steel 20,000#/□"

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

SINGLES	DOUBLES	TRIPLES	QUADRUPLES	QUINTUPLES
R-145X-0	R-245X-01	R-345X-01	R-445X-01	R-545X-01
	R-245X-02	R-345X-02	R-445X-02	R-545X-02
R-145X-1	R-245X-1	R-345X-1	R-445X-1	
	R-245X-2	R-345X-2		

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

CLEAR HEIGHT	WING LOCATION	SF1 & LF1 BENT: In bottom of footing, bent up into back face of wing. One bar (or two bars) of each length. SIZE	SPACING	NO. READ	LENGTHS VARY MIN.	MAX.	X MIN.	X MAX.	Y MIN.	Y MAX.	SF2 & LF2 BENT: In bottom of footing, bent up into back face of wing. Alt. with F1 bars SIZE	SPACING	NO. READ	LENGTH	X	Y	SF5 & LF5 STRAIGHT: Longitudinal in top of wing footing heel SIZE	NO. READ	LENGTH	SF6 & LF6 STRAIGHT: Longitudinal in bottom of wing footing toe SIZE	NO. READ	LENGTH	SH1 & LH1 Horizontal in back face of wing. SIZE	SPACING	NO. READ	LENGTH	SH2 & LH2 STRAIGHT: Horizontal in back face of wing One bar of each length.* SIZE	SPACING	NO. READ	LENGTHS VARY MAX.	MIN.	SH3 & LH3 In back face of wing at top - on slope SIZE	NO. READ	LENGTH	SH4 & LH4 BENT: Dowels thru construction joint at headwall. SIZE	SPACING	NO. READ	LENGTH	X
H	SHORT & LONG																																									
2'	Short	#3	12"	7	1'-7"	3'-1"	0'-9"	1'-0"	1'-0"	3'-0"	—	—	—	—	—	—	#3	1	8'-9"	#3	2	8'-0"	#3	12"	1	4'-3"	#3	12"	1	—	3'-3"	#3	1	6'-7"	#3	12"	2	2'-8"	1'-9"
	Long	#3	12"	14	1'-5"	3'-1"	0'-8"	1'-0"	0'-10"	3'-0"	#3	1	17'-6"	#3	2	15'-6"	#3	1	12'-8"	#3	2	11'-8"	#3	12"	1	6'-6"	#3	12"	1	—	6'-6"	#3	1	12'-11"	#3	12"	2	"	"
3'	Short	#3	12"	9	2'-1"	5'-3"	0'-10"	1'-4"	1'-4"	4'-0"	#3	1	10'-9"	#3	2	10'-0"	#3	1	21'-6"	#3	2	20'-8"	#3	12"	1	8'-3"	#3	12"	2	6'-3"	3'-3"	#3	1	8'-8"	#3	12"	3	"	"
	Long	#3	12"	18	1'-11"	5'-3"	0'-10"	1'-3"	1'-2"	4'-0"	#3	1	21'-6"	#3	2	20'-8"	#3	1	16'-8"	#3	2	15'-8"	#3	12"	1	10'-6"	#3	12"	2	8'-6"	6'-6"	#3	1	14'-11"	#3	12"	3	"	"
4'	Short	#3	12"	11	2'-6"	6'-7"	0'-11"	1'-8"	1'-8"	5'-0"	—	—	—	—	—	—	#3	1	12'-9"	#3	3	12'-0"	#3	12"	1	10'-3"	#3	12"	3	9'-3"	3'-3"	#3	1	10'-9"	#3	12"	4	"	"
	Long	#3	12"	22	2'-4"	6'-6"	0'-11"	1'-7"	1'-6"	5'-0"	#3	1	25'-6"	#3	3	24'-10"	#3	1	20'-8"	#3	3	19'-8"	#3	12"	1	12'-9"	#3	12"	3	11'-3"	3'-3"	#3	1	12'-11"	#3	12"	4	"	"
5'	Short	#3	12"	13	2'-11"	7'-11"	1'-0"	2'-0"	2'-0"	6'-0"	#3	12"	3	14'-6"	1'-1"	2'-6"	#3	1	14'-6"	#3	3	14'-0"	#3	12"	2	12'-9"	#3	12"	3	11'-3"	3'-3"	#3	1	12'-11"	#3	12"	5	"	"
	Long	#3	12"	26	2'-9"	7'-10"	1'-0"	1'-11"	1'-10"	6'-0"	#3	12"	6	25'-8"	1'-1"	2'-6"	#3	2	15'-8"	#3	3	15'-0"	#3	12"	3	18'-6"	6'-6"	#3	1	15'-11"	#3	12"	5	"	"
6'	Short	#4	12"	15	3'-6"	9'-4"	1'-2"	2'-4"	2'-4"	7'-1"	#3	12"	8	9'-6"	1'-4"	3'-8"	#3	1	14'-8"	#3	3	14'-0"	#3	12"	2	16'-3"	#3	12"	4	12'-3"	3'-3"	#3	1	15'-0"	#3	12"	6	"	"
	Long	#4	12"	30	3'-4"	9'-3"	1'-2"	2'-3"	2'-3"	7'-1"	#3	12"	6	9'-6"	1'-4"	3'-8"	#3	2	17'-8"	#3	3	17'-0"	#3	12"	4	15'-2"	6'-6"	#3	2	15'-5"	#3	12"	6	2'-8"	1'-4"
7'	Short	#4	12"	17	3'-11"	10'-10"	1'-3"	2'-10"	2'-9"	8'-1"	#4	12"	6	5'-6"	1'-7"	4'-0"	#4	1	18'-4"	#4	4	18'-8"	#4	12"	2	16'-3"	#4	12"	5	15'-3"	3'-3"	#4	1	17'-1"	#4	12"	7	3'-6"	1'-9"
	Long	#4	12"	34	3'-9"	10'-9"	1'-3"	2'-9"	2'-7"	8'-1"	#4	12"	12	5'-6"	1'-7"	4'-0"	#4	2	19'-9"	#4	4	20'-8"	#4	12"	4	17'-2"	#4	12"	5	16'-11"	6'-6"	#4	2	17'-5"	#4	12"	7	"	"
8'	Short	#4	12"	19	4'-6"	12'-5"	1'-5"	3'-4"	3'-2"	9'-2"	#4	12"	9	6'-6"	1'-10"	4'-8"	#4	2	20'-8"	#4	4	20'-0"	#4	12"	3	18'-3"	#4	12"	5	18'-3"	3'-3"	#4	1	19'-5"	#4	12"	8	"	"
	Long	#4	12"	38	4'-4"	12'-3"	1'-5"	3'-2"	3'-0"	9'-2"	#4	12"	18	6'-6"	1'-10"	4'-8"	#4	2	22'-9"	#4	8	22'-9"	#4	12"	6	19'-3"	#4	12"	5	30'-0"	6'-6"	#4	2	19'-6"	#4	12"	8	3'-6"	1'-9"

BAR BENDING DIAGRAM: SF1 & SF5, LF1 & LF2; SH4; LH4; Note:- Dimensions are to bar centers.

QUANTITY REINFORCING STEEL PER WING - LBS.	SHORT WING	LONG WING
	29.4	96.3
	36.8	70.3
	55.9	102.9
	72.7	153.7
	127.6	253.9
	246.5	491.1
	312.5	623.6

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

* Length without splice. Bars over 28'0" length may be spliced. (1'-8"lap)

REVISIONS:- Membrane Added. 5-10-66 W.C.H.

Designed By:- W.C.H. 5-13-64 Checked By:- JEM 7-21-64
Drawn By:- W.C.H. 6-5-64 Checked By:- JEM 7-21-64
Quantities By:- W.C.H. 7-2-64 Checked By:- JEM 7-21-64

CLASS S CONCRETE

ARKANSAS STATE HIGHWAY COMMISSION
DETAILS OF STANDARD WINGS
FOR
REINFORCED CONCRETE BOX CULVERTS
45° 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-X453-1

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

BAR LIST FOR VARIOUS SECTIONS OF BARREL

SECTION & BAR GROUP	LENGTHS OF SECTION	DEPTH OF COVER	CLEAR SPAN	CLEAR HEIGHT	"a" bars STRAIGHT: In Top and Bottom Slab of Barrel & Adj'n Apron and Headwall - Each. SIZE	SPACING	NUMBER REQ'D 3:1	NUMBER REQ'D 4:1	LENGTH
SECTION "A" & BAR GROUP "A"	3:1 = 32'-0"	0' TO 10'-0"	2 @ 8'	5'	#5	12"	46	64	17'-8"
	4:1 = 22'-0"			6'			46	64	17'-8"
				7'			46	64	17'-10"
				8'			46	64	17'-11"
				9'			46	64	18'-2"
				10'			46	64	18'-5"
			2 @ 10'	6'	#5	12"	48	68	21'-10"
				7'			48	68	21'-10"
				8'			48	68	21'-11"
				9'			48	68	22'-2"
				10'			48	68	22'-5"
				11'			48	68	22'-7"
				12'			48	68	22'-9"
SECTION "B" & BAR GROUP "B"	3:1 = 11'-0"	0' TO 15'-0"	2 @ 8'	6'	#5	12"	52	74	25'-1"
	4:1 = 14'-0"			7'			52	74	25'-1"
				8'			52	74	25'-1"
				9'			52	74	25'-2"
			2 @ 10'	10'			52	74	26'-3"
				11'			52	74	26'-5"
				12'			52	74	26'-9"
SECTION "C" & BAR GROUP "C"	3:1 = 11'-0"	15'-0" TO 20'-0"	2 @ 8'	5'	#5	12"	22	32	17'-8"
	4:1 = 14'-0"			6'			22	32	17'-8"
				7'			22	32	17'-10"
				8'			22	32	17'-11"
				9'			22	32	18'-2"
				10'			22	32	18'-5"
			2 @ 10'	6'	#5	12"	22	32	21'-10"
				7'			22	32	21'-10"
				8'			22	32	21'-11"
				9'			22	32	22'-2"
				10'			22	32	22'-5"
				11'			22	32	22'-7"
				12'			22	32	22'-9"
SECTION "D" & BAR GROUP "D"	3:1 = 11'-0"	20'-0" TO 25'-0"	2 @ 8'	6'	#6	12"	20	30	25'-11"
	4:1 = 14'-0"			7'			20	30	25'-11"
				8'			20	30	26'-0"
				9'			20	30	26'-5"
			2 @ 10'	10'			20	30	26'-7"
				11'			20	30	26'-9"
				12'			20	30	26'-9"

NOTE:- Bars for each Section to be marked with the Section letter. Thus for Section B, the bars should be marked Ba, Bb, Bc, Bd, Be, Bf, Bg, and Bh.

Designed by:- W.C. Haigh 6-26-62 Checked by:- R.M.S. 7-16-62
Drawn by:- W.C. Haigh 7-6-62 Checked by:- R.H.S. 7-20-62
Quantities by:- W.C. Haigh 7-5-62 Checked by:- R.H.S. 7-19-62

SECTION & BAR GROUP	"b" bars BENT - See Diagram below. In Bottom of Top Slab bent up over Division Wall - hooked. Alternate with "a" and "c" bars. SIZE	SPACING	NUMBER REQ'D 3:1	NUMBER REQ'D 4:1	LENGTH	X	Y	Z
SECTION "A" & BAR GROUP "A"	#6	13"	20	29	19'-1"	0'-5⅞"	3'-8"	6'-6"
			20	29	19'-1"	0'-5⅞"	3'-8"	6'-6"
			20	29	19'-9"	0'-5⅞"	3'-8"	6'-7"
			20	29	19'-7"	0'-5⅞"	3'-10"	6'-8"
			20	29	19'-10"	0'-5⅞"	3'-10"	6'-9"
	#6	12"	22	32	23'-5"	0'-7⅛"	4'-2½"	7'-11½"
			22	32	23'-5"	0'-7⅛"	4'-2½"	7'-11½"
			22	32	23'-6"	0'-7⅛"	4'-2½"	8'-0"
			22	32	23'-8"	0'-7⅛"	4'-2½"	8'-0"
			22	32	24'-0"	0'-7⅛"	4'-2½"	8'-1"
			22	32	24'-3"	0'-7⅛"	4'-2½"	8'-2"
	#7	11"	24	35	27'-8"	0'-8⅜"	5'-0½"	9'-6"
			24	35	27'-9"	0'-8⅜"	5'-0½"	9'-6"
			24	35	27'-10"	0'-8⅜"	5'-0½"	9'-7"
			24	35	28'-0"	0'-8⅜"	5'-0½"	9'-7"
			24	35	28'-2"	0'-8⅜"	5'-0½"	9'-8"
			24	35	28'-3"	0'-8⅜"	5'-0½"	9'-9"
	#8	11"	24	35	28'-7"	0'-8⅜"	5'-0½"	9'-9"
			24	35	28'-8"	0'-8⅜"	5'-0½"	9'-10"
			24	35	28'-10"	0'-8⅜"	5'-0½"	9'-10"
			24	35	29'-0"	0'-8⅜"	5'-0½"	9'-11"
			24	35	29'-2"	0'-8⅜"	5'-0½"	9'-11"
			24	35	29'-3"	0'-8⅜"	5'-0½"	10'-0"
SECTION "B" & BAR GROUP "B"	#6	12"	11	16	19'-2"	0'-5⅞"	3'-3"	6'-6"
			11	16	19'-3"	0'-5⅞"	3'-3"	6'-6"
			11	16	19'-5"	0'-5⅞"	3'-4"	6'-6½"
			11	16	19'-6"	0'-5⅞"	3'-4"	6'-7"
			11	16	19'-9"	0'-5⅞"	3'-4"	6'-8"
			11	16	20'-0"	0'-5⅞"	3'-5"	6'-8"
	#7	12"	11	16	22'-6"	0'-6½"	3'-10"	7'-11½"
			11	16	22'-7"	0'-6½"	3'-10"	7'-11½"
			11	16	22'-8"	0'-6½"	3'-10"	8'-0"
			11	16	22'-11"	0'-6½"	4'-0½"	8'-1"
			11	16	23'-1"	0'-6½"	4'-0½"	8'-2"
			11	16	23'-2"	0'-6½"	4'-0½"	8'-2"
	#8	12"	11	16	23'-6"	0'-6½"	4'-0½"	8'-3"
			11	16	23'-7"	0'-6½"	4'-0½"	8'-3"
			11	16	23'-9"	0'-6½"	4'-0½"	8'-4"
			11	16	24'-0"	0'-6½"	4'-0½"	8'-5"
			11	16	24'-2"	0'-6½"	4'-0½"	8'-5"
			11	16	24'-3"	0'-6½"	4'-0½"	8'-6"
SECTION "C" & BAR GROUP "C"	#6	12"	10	15	22'-8"	0'-7⅛"	3'-9"	7'-11½"
			10	15	22'-9"	0'-7⅛"	3'-9"	7'-11½"
			10	15	22'-10"	0'-7⅛"	3'-9"	8'-0"
			10	15	23'-0"	0'-7⅛"	3'-9"	8'-0"
			10	15	23'-2"	0'-7⅛"	3'-9"	8'-1"
			10	15	23'-3"	0'-7⅛"	3'-9"	8'-2"
	#8	13"	10	15	23'-7"	0'-7⅛"	3'-9"	8'-2"
			10	15	23'-8"	0'-7⅛"	3'-9"	8'-3"
			10	15	23'-10"	0'-7⅛"	3'-9"	8'-3"
			10	15	24'-0"	0'-7⅛"	3'-9"	8'-4"
			10	15	24'-1"	0'-7⅛"	3'-9"	8'-4"
			10	15	24'-3"	0'-7⅛"	3'-9"	8'-5"
SECTION "D" & BAR GROUP "D"	#6	11"	8	12	25'-10"	0'-7⅞"	4'-2"	8'-4"
			8	12	25'-11"	0'-7⅞"	4'-2"	8'-4"
			8	12	26'-0"	0'-7⅞"	4'-2"	8'-5"
			8	12	26'-2"	0'-7⅞"	4'-2"	8'-5"
			8	12	26'-3"	0'-7⅞"	4'-2"	8'-6"
			8	12	26'-5"	0'-7⅞"	4'-2"	8'-6"
	#8	10"	8	12	26'-7"	0'-7⅞"	4'-2"	8'-7"
			8	12	26'-9"	0'-7⅞"	4'-2"	8'-7"
			8	12	26'-11"	0'-7⅞"	4'-2"	8'-8"

SECTION & BAR GROUP	"b2" bars BENT - See Diagram below. In Top of Bottom Slab bent down under Division Wall - hooked. Alternate with "a" and "c" bars. SIZE	SPACING	NUMBER REQ'D 3:1	NUMBER REQ'D 4:1	LENGTH	X	Y	Z
SECTION "A" & BAR GROUP "A"	#6	13"	20	29	19'-2"	0'-6⅝"	3'-7"	6'-6"
			20	29	19'-2"	0'-6⅝"	3'-7"	6'-6"
			20	29	19'-5"	0'-6⅝"	3'-8"	6'-6½"
			20	29	19'-6"	0'-6⅝"	3'-8"	6'-7"
			20	29	19'-9"	0'-6⅝"	3'-8"	6'-8"
	#6	12"	22	32	23'-5"	0'-8"	4'-6"	7'-11½"
			22	32	23'-5"	0'-8"	4'-6"	7'-11½"
			22	32	23'-6"	0'-8"	4'-6"	8'-0"
			22	32	23'-9"	0'-8"	4'-6"	8'-0"
			22	32	24'-1"	0'-8"	4'-6"	8'-1"
			22	32	24'-3"	0'-8"	4'-6"	8'-2"
	#7	11"	24	35	27'-9"	0'-9⅜"	5'-2½"	9'-6"
			24	35	27'-9"	0'-9⅜"	5'-2½"	9'-6"
			24	35	28'-0"	0'-9⅜"	5'-2½"	9'-7"
			24	35	28'-2"	0'-9⅜"	5'-2½"	9'-7"
			24	35	28'-3"	0'-9⅜"	5'-2½"	9'-8"
			24	35	28'-5"	0'-9⅜"	5'-2½"	9'-8"
	#8	11"	24	35	28'-10"	0'-9⅜"	5'-2½"	9'-9"
			24	35	29'-0"	0'-9⅜"	5'-2½"	9'-9"
			24	35	29'-1"	0'-9⅜"	5'-2½"	9'-10"
			24	35	29'-3"	0'-9⅜"	5'-2½"	9'-10"
			24	35	29'-5"	0'-9⅜"	5'-2½"	9'-11"
			24	35	29'-6"	0'-9⅜"	5'-2½"	9'-11"
SECTION "B" & BAR GROUP "B"	#6	12"	11	16	19'-3"	0'-7⅛"	3'-5"	6'-6"
			11	16	19'-3"	0'-7⅛"	3'-5"	6'-6"
			11	16	19'-5"	0'-7⅛"	3'-6"	6'-6½"
			11	16	19'-6"	0'-7⅛"	3'-6"	6'-7"
			11	16	19'-9"	0'-7⅛"	3'-6"	6'-8"
			11	16	20'-0"	0'-7⅛"	3'-6"	6'-8"
	#7	12"	11	16	22'-6"	0'-8½"	4'-3½"	7'-11½"
			11	16	22'-7"	0'-8½"	4'-3½"	7'-11½"
			11	16	22'-8"	0'-8½"	4'-3½"	8'-0"
			11	16	23'-0"	0'-8½"	4'-3½"	8'-1"
			11	16	23'-2"	0'-8½"	4'-3½"	8'-2"
			11	16	23'-3"	0'-8½"	4'-3½"	8'-2"
	#8	12"	11	16	23'-7"	0'-8½"	4'-3½"	8'-3"
			11	16	23'-8"	0'-8½"	4'-3½"	8'-3"
			11	16	24'-0"	0'-8½"	4'-3½"	8'-4"
			11	16	24'-1"	0'-8½"	4'-3½"	8'-4"
			11	16	24'-3"	0'-8½"	4'-3½"	8'-5"
SECTION "C" & BAR GROUP "C"	#6	12"	10	15	22'-8"	0'-8⅝"	4'-1½"	7'-11½"
			10	15	22'-9"	0'-8⅝"	4'-1½"	7'-11½"
			10	15	22'-10"	0'-8⅝"	4'-1½"	8'-0"
			10	15	23'-0"	0'-8⅝"	4'-1½"	8'-0"
			10	15	23'-2"	0'-8⅝"	4'-1½"	8'-1"
			10	15	23'-3"	0'-8⅝"	4'-1½"	8'-2"
	#8	13"	10	15	23'-7"	0'-8⅝"	4'-1½"	8'-2"
			10	15	23'-8"	0'-8⅝"	4'-1½"	8'-3"
			10	15	23'-10"	0'-8⅝"	4'-1½"	8'-3"
			10	15	24'-0"	0'-8⅝"	4'-1½"	8'-4"
			10	15	24'-1"	0'-8⅝"	4'-1½"	8'-4"
			10	15	24'-3"	0'-8⅝"	4'-1½"	8'-5"
SECTION "D" & BAR GROUP "D"	#6	11"	8	12	25'-10"	0'-8⅞"	4'-4"	8'-4"
			8	12	25'-11"	0'-8⅞"	4'-4"	8'-4"
			8	12	26'-0"	0'-8⅞"	4'-4"	8'-5"
			8	12	26'-2"	0'-8⅞"	4'-4"	8'-5"
			8	12	26'-3"	0'-8⅞"	4'-4"	8'-6"
			8	12	26'-5"	0'-8⅞"	4'-4"	8'-6"
	#8	10"	8	12	26'-7"	0'-8⅞"	4'-4"	8'-7"
			8	12	26'-9"	0'-8⅞"	4'-4"	8'-7"
			8	12	26'-11"	0'-8⅞"	4'-4"	8'-8"

SECTION & BAR GROUP	"c" bars STRAIGHT: In Top and Bottom Slab of Barrel & Adj'n Apron and Headwall - Each. SIZE	SPACING	NUMBER REQ'D 3:1	NUMBER REQ'D 4:1	LENGTH
SECTION "A" & BAR GROUP "A"	#6	13"	20	29	19'-2"
			20	29	19'-2"
			20	29	19'-5"
			20	29	19'-6"
			20	29	19'-9"
	#6	12"	22	32	23'-5"
			22	32	23'-5"
			22	32	23'-6"
			22	32	23'-9"
			22	32	24'-1"
			22	32	24'-3"
	#7	11"	24	35	27'-9"
			24	35	27'-9"
			24	35	28'-0"
			24	35	28'-2"
			24	35	28'-3"
			24	35	28'-5"
	#8	11"	24	35	28'-10"
			24	35	29'-0"
			24	35	29'-1"
			24	35	29'-3"
			24	35	29'-5"
			24	35	29'-6"
SECTION "B" & BAR GROUP "B"	#6	12"	11	16	19'-3"
			11	16	19'-3"
			11	16	19'-5"
			11	16	19'-6"
			11	16	19'-9"
			11	16	20'-0"
	#7	12"	11	16	22'-6"
			11	16	22'-7"
			11	16	22'-8"
			11	16	23'-0"
			11	16	23'-2"
			11	16	23'-3"
	#8	12"	11	16	23'-7"
			11	16	23'-8"
			11	16	24'-0"
			11	16	24'-1"
			11	16	24'-3"
SECTION "C" & BAR GROUP "C"	#6	12"	10	15	22'-8"
			10	15	22'-9"
			10	15	22'-10"
			10	15	23'-0"
			10	15	23'-2"
			10	15	23'-3"
	#8	13"	10	15	23'-7"
			10	15	23'-8"
			10	15	23'-10"
			10	15	24'-0"
			10	15	24'-1"
			10	15	24'-3"
SECTION "D" & BAR GROUP "D"	#6	11"	8	12	25'-10"
			8	12	25'-11"
			8	12	26'-0"
			8	12	26'-2"
			8	12	26'-3"
			8	12	26'-5"
	#8	10"	8	12	26'-7"
			8	12	26'-9"
			8	12	26'-11"

SECTION & BAR GROUP	"d" bars STRAIGHT: Longitudinal in Top Slab of Barrel. SIZE	SPACING	No. REQ'D	LENGTH
SECTION "A" & BAR GROUP "A"	#4	12"	23	8'-9"
			23	8'-9"
			23	8'-10"
			23	8'-11"
			23	9'-0"
			23	9'-0"
	#5	12"	27	10'-10"
			27	10'-10"
			27	10'-11"
			27	11'-0"
			27	11'-0"
			27	11'-1"
	#6	12"	31	12'-10"
			31	12'-10"
			31	12'-11"
			31	13'-0"
			31	13'-0"
			31	13'-1"
	#7	12"	35	14'-10"
			35	14'-10"
			35	14'-11"
			35	15'-0"
			35	15'-0"
			35	15'-1"
	#8	12"	39	16'-10"
			39	16'-10"
			39	16'-11"
			39	17'-0"
			39	17'-0"
			39	17'-1"
SECTION "B" & BAR GROUP "B"	#4	12"	23	8'-9"
			23	8'-9"
			23	8'-10"
			23	8'-11"
			23	9'-0"
			23	9'-0"
	#5	12"	27	10'-10"
			27	10'-10"
			27	10'-11"
			27	11'-0"
			27	11'-0"
			27	11'-1"
	#6	12"	31	12'-10"
			31	12'-10"
			31	12'-11"
			31	13'-0"
			31	13'-0"
			31	13'-1"
	#7	12"	35	14'-10"
			35	14'-10"
			35	14'-11"
			35	15'-0"
			35	15'-0"
			35	15'-1"
	#8	12"	39	16'-10"
			39	16'-10"
			39	16'-11"
			39	17'-0"
			39	17'-0"
			39	17'-1"
SECTION "C" & BAR GROUP "C"	#4	12"	27	11'-0"
			27	11'-0"
			27	11'-1"
			27	11'-2"
			27	11'-2"
			27	11'-3"
	#5	12"	31	12'-10"
			31	12'-10"
			31	12'-11"
			31	13'-0"
			31	13'-0"
			31	13'-1"
	#6	12"	35	14'-10"
			35	14'-10"
			35	14'-11"
			35	15'-0"
			35	15'-0"
			35	15'-1"
	#7	12"	39	16'-10"
			39	16'-10"
			39	16'-11"
			39	17'-0"
			39	17'-0"
			39	17'-1"
SECTION "D" & BAR GROUP "D"	#4	12"	24	11'-0"
			24	11'-0"
			24	11'-1"
			24	11'-2"
			24	11'-2"
			24	11'-3"
	#5	12"	28	12'-10"
			28	12'-10"
			28	12'-11"
			28	13'-0"
			28	13'-0"
			28	13'-1"
	#6	12"	32	14'-10"
			32	14'-10"
			32	14'-11"
			32	15'-0"
			32	15'-0"
			32	15'-1"
	#7	12"	36	16'-10"
			36	16'-10"
			36	16'-11"
			36	17'-0"
			36	17'-0"
			36	17'-1"

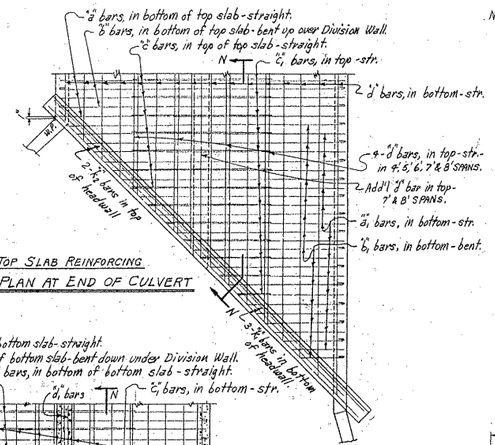
SECTION & BAR GROUP	"d1" bars STRAIGHT: Longitudinal in Sidewalls and Division Walls. SIZE	SPACING	No. REQ'D	LENGTH
SECTION "A" & BAR GROUP "A"	#4	12"	20	
			24	
			28	
			32	
			36	
			40	
	#5	12"	23	
			27	
			32	
			36	
			40	
			44	
	#6	12"	27	
			32	
			36	
			40	
			44	
			48	
	#7	12"	31	
			36	
			40	
			44	
			48	
			52	
	#8	12"	35	
			40	
			44	
			48	
			52	
			56	
SECTION "B" & BAR GROUP "B"	#4	12"	20	
			24	
			28	
			32	
			36	
			40	
	#5	12"	23	
			27	
			32	
			36	
			40	
			44	
	#6	12"	27	
			32	
			36	
			40	
			44	
			48	
	#7	12"	31	
			36	
			40	
			44	
			48	
			52	
	#8	12"	35	
			40	
			44	
			48	
			52	
			56	
SECTION "C" & BAR GROUP "C"	#4	12"	24	
			28	
			32	
			36	
			40	
			44	
			48	
	#5	12"	27	
			32	
			36	
			40	
			44	
			48	
			52	
	#6	12"	31	
			36	
			40	
			44	
			48	
			52	
			56	
	#7	12"	35	
			40	
			44	
			48	
			52	
			56	
			60	
	#8	12"	39	
			44	
			48	
			52	
			56	
			60	
			64	
SECTION "D" & BAR GROUP "D"	#4	12"	28	
			32	
			36	
			40	
			44	
			48	
	#5	12"	32	
			36	
			40	
			44	
			48	
			52	
	#6	12"	36	
			40	
			44	
			48	
			52	
			56	
	#7	12"	40	
			44	
			48	
			52	
			56	
			60	
	#8	12"	44	
			48	
			52	
			56	
			60	
			64	

SECTION & BAR GROUP	"e" bars Longitudinal in Bottom Slab of Barrel. SIZE	SPACING	No. REQ'D	LENGTH
SECTION "A" & BAR GROUP "A"	#4	12"	20	
			24	
			28	
			32	
			36	
			40	
	#5	12"	23	
			27	
			32	
			36	
			40	
			44	
	#6	12"	27	
			32	
			36	
			40	
			44	
			48	
	#7	12"	31	
			36	
			40	
			44	
			48	
			52	
	#8	12"	35	
			40	
			44	
			48	
			52	
			56	
SECTION "B" & BAR GROUP "B"	#4	12"	20	
			24	
			28	
			32	
			36	
			40	
	#5	12"	23	
			27	
			32	
			36	
			40	
			44	
	#6	12"	27	
			32	
			36	
			40	
			44	
			48	
	#7	12"	31	
			36	
			40	
			44	
			48	
			52	
	#8	12"	35	
			40	
			44	
			48	
			52	
			56	
SECTION "C" & BAR GROUP "C"	#4	12"	24	
			28	
			32	
			36	
			40	
			44	
			48	
	#5	12"	27	
			32	
			36	
			40	
			44	
			48	
			52	
	#6	12"	31	
			36	
			40	
			44	
			48	
			52	
			56	
	#7	12"	35	
			40	
			44	
			48	
			52	
			56	
			60	
	#8	12"	39	
			44	
			48	
			52	
			56	
			60	
			64	
SECTION "D" & BAR GROUP "D"	#4	12"	28	
			32	
			36	
			40	
			44	
			48	
	#5	12"	32	
			36	
			40	
			44	
			48	
			52	
	#6	12"	36	
			40	
			44	
			48	
			52	
			56	
	#7	12"	40	
			44	
			48	
			52	
			56	
			60	
	#8	12"	44	
			48	
			52	
			56	
			60	
			64	

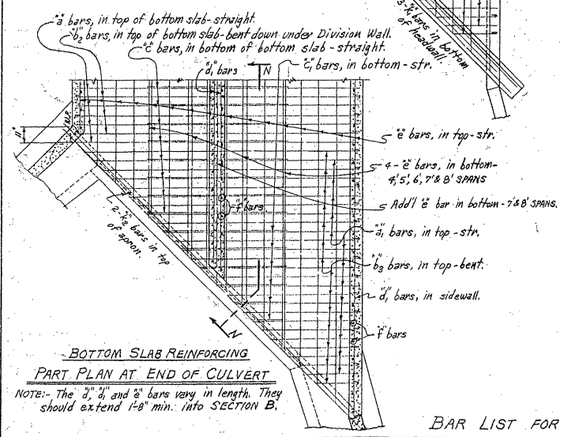
SECTION & BAR GROUP	"f" bars STRAIGHT: Vertical in Sidewalls and Division Walls. SIZE	SPACING	NUMBER REQ'D 3:1	NUMBER REQ'D 4:1	LENGTH
SECTION "A" & BAR GROUP "A"	#4	12"	88	128	6'-8"
		10"	108	156	8'-2"
		8"	128	184	9'-8"
	#5	12"	88	128	7'-7"
		10"	108	156	8'-2"
		8"	128	184	9'-8"
	#6	12"	88	128	8'-7"
		10"	108	156	10'-1"
		8"	128	184	11'-7"
	#7	12"	88	128	9'-6"
		10"	108	156	11'-2"
		8"	128	184	13'-0"
	#8	12"	88	128	10'-5"
		10"	108	156	12'-10"
		8"	128	184	14'-10"
SECTION "B" & BAR GROUP "B"	#4	12"	88	128	7'-10"
		10"	108	156	9'-6"
		8"	128	184	11'-2"
	#5	12"	88	128	9'-2"
		10"	108	156	11'-0"
		8"	128	184	12'-10"
	#6	12"	88	128	10'-6"
		10"	108	156	12'-11"
		8"	128	184	14'-10"
	#7	12"	88	128	11'-10"
		10"	108	156	14'-7"
		8"	128	184	16'-10"
	#8	12"	88	128	13'-2"
		10"	108	156	16'-3"
		8"	128	184	18'-8"
SECTION "C" & BAR GROUP "C"	#4	12"	88	128	9'-5"
		10"	108	156	11'-3"
		8"	128	184	13'-2"
	#5	12"	88	128	11'-1"
		10"	108	156	13'-0"
		8"	128	184	15'-0"
	#6	12"	88	128	12'-10"
		10"	108	156	15'-0"
		8"	128	184	17'-3"
	#7	12"	88	128	14'-7"
		10"	108	156	17'-0"
		8"	128	184	19'-6"
	#8	12"	88	128	16'-3"
		10"	108	156	18'-11"
		8"	128	184	21'-10"
SECTION "D" & BAR GROUP "D"	#4	12"	88	128	10'-8"
		10"	108	156	12'-6"
		8"	128	184	14'-6"
	#5	12"	88	128	12'-6"
		10"	108	156	14'-5"
		8"	128	184	16'-6"
	#6	12"	88	128	14'-5"
		10"	108	156	16'-5"
		8"	128	184	18'-10"
	#7	12"	88	128	16'-5"
		10"	108	156	18'-4"
		8"	128	184	20'-10"
	#8	12"	88	128	18'-4"
		10"	108	156	20

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

NOTE:- For Details of Standard Wings and bar lists, see Drawing No. W-X452-1 or W-X452-2; W-X453-1 or W-X453-2, and W-X454-1 or W-X454-2. Also W-X45.

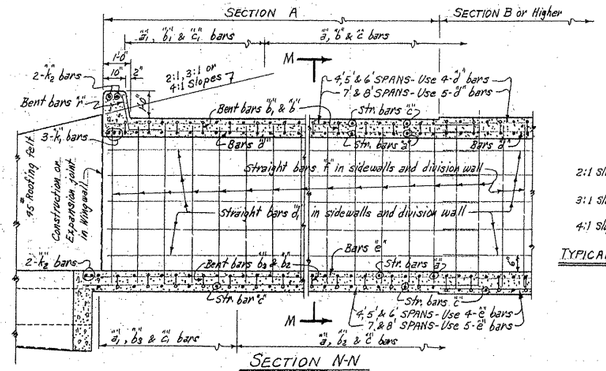


TOP SLAB REINFORCING
PART PLAN AT END OF CULVERT

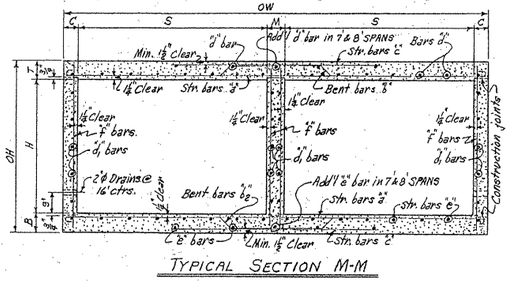


BOTTOM SLAB REINFORCING
PART PLAN AT END OF CULVERT

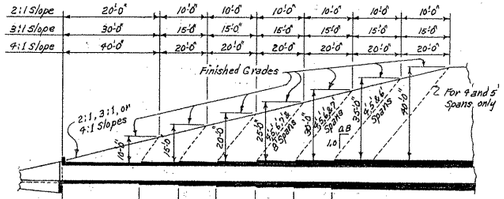
NOTE:- The "j", "a1" and "a" bars vary in length. They should extend 1'-8" min. into SECTION B.



SECTION N-N



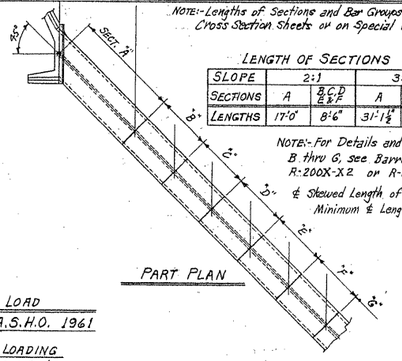
TYPICAL SECTION M-M



2:1 Slope - Sections	A=12'-0"	B=6'-0"	C=6'-0"	D=6'-0"	E=6'-0"	F=6'-0"	MID-SECTION G- Varies	These lengths are perpendicular to ℄ of roadway. See Table of Skew Lengths below.
Bar Group	A	B	C	D	E	F	G	
3:1 Slope - Sections	A=22'-0"	B=11'-0"	C=11'-0"	D=11'-0"	E=11'-0"	F=11'-0"	MID-SECTION G- Varies	
Bar Group	A	B	C	D	E	F	G	
4:1 Slope - Sections	A=32'-0"	B=16'-0"	C=16'-0"	D=16'-0"	E=16'-0"	F=16'-0"	MID-SECTION G- Varies	
Bar Group	A	B	C	D	E	F	G	

TYPICAL LONGITUDINAL SECTION - SHOWING SECTIONS AND BAR GROUPS FOR VARIOUS DEPTHS OF COVER

NOTE:- Lengths of Sections and Bar Groups are to be shown on Cross Section Sheets or on Special Culvert Layout Sheet.



PART PLAN

LENGTH OF SECTIONS ON 45° SKEW

SLOPE	2:1		3:1		4:1	
SECTIONS	A	B,C,D E&F	A	B,C,D E&F	A	B,C,D E&F
LENGTHS	17'-0"	8'-6"	31'-1½"	15'-6⅜"	45'-3"	22'-7½"

NOTE:- For Details and Bar Lists for SECTION B thru G, see Barrel Drawing Nos. R-200X-X1, R-200X-X2 or R-200X-X3.

℄ Skewed Length of A = 1.41421 A. Minimum ℄ Length on skews (0.5 on 1').

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

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

BARREL DIMENSIONS — * QUANTITIES - ONE SECTION "A"

MAX. DESIGN DEPTH OF COVER	CLEAR SPANS	CLEAR HEIGHT	OVERALL WIDTH	THICKNESS OF TOP SLAB	THICKNESS OF SIDEWALLS	THICKNESS OF DIVISION WALL	THICKNESS OF BOTTOM SLAB	OVERALL HEIGHT	ROADWAY LENGTH	LENGTH OF HEADWALL	CLASS S CONCRETE BARREL ONLY 2:1	CLASS S CONCRETE BARREL ONLY 3:1	CLASS S CONCRETE BARREL ONLY 4:1	REINFORCING STEEL BARREL, APRON AND HEADWALL 2:1	REINFORCING STEEL BARREL, APRON AND HEADWALL 3:1	REINFORCING STEEL BARREL, APRON AND HEADWALL 4:1
D	S	H	A	OW	T	C	M	B	OH	RL	K	CU.YD.	CU.YD.	CU.YD.	LB.	LB.	LB.
SECTION "A" @ 10'-0"	4@4'-0"	2'	16	9'-8"	6"	8"			3'-0"	13'-8"	15'-8"	8.18	14.97	21.77	1288	2203	3197
		3'	24	9'-8"	6"	8"			4'-0"	"	"	9.23	16.90	24.57	1384	2374	3397
		4'	32	9'-8"	6"	8"			5'-0"	"	"	10.28	18.83	27.38	1479	2545	3697
		5'	40	9'-8"	6"	8"			6'-0"	"	"	11.34	20.76	30.18	1575	2716	3897
		6'	48	9'-11"	7"	9"			7'-0"	14'-0½"	16'-0½"	13.98	24.68	35.88	1689	2916	4187
	5@5'-0"	3'	30	11'-8"	6"	8"			4'-1"	14'-6"	16'-6"	11.10	20.33	29.55	1935	3292	4712
		4'	40	11'-8"	6"	8"			5'-1"	"	"	12.16	22.25	32.35	2030	3463	4962
		5'	50	11'-8"	6"	8"			6'-1"	"	"	13.21	24.18	35.16	2126	3634	5212
		6'	60	11'-11"	7"	9"			7'-1"	16'-10½"	18'-10½"	15.37	28.14	40.91	2229	3855	5528
		7'	70	12'-1"	7½"	10"			8'-1"	17'-1"	19'-1"	17.92	31.30	46.38	2547	4408	6339
	6@6'-0"	3'	36	13'-8"	6"	8"			4'-3"	19'-3½"	21'-4"	13.91	25.96	37.01	2216	3777	5378
		4'	48	13'-8"	6"	8"			5'-3"	"	"	14.96	27.39	39.82	2312	3998	5628
		5'	60	13'-8"	6"	8"			6'-3"	"	"	16.00	29.29	42.58	2407	4119	5878
		6'	72	13'-11"	7"	9"			7'-3"	19'-10⅝"	21'-10⅝"	18.19	33.30	48.42	2494	4337	6192
		7'	84	14'-1"	7½"	10"			8'-3"	19'-11"	21'-11"	20.26	37.10	53.94	2821	4899	7033
		8'	96	14'-2"	8"	10"			9'-3"	20'-0⅛"	22'-0⅛"	22.07	40.90	58.78	3017	5232	7536
	7@7'-0"	4'	56	15'-8"	6"	8"			5'-5"	22'-1⅝"	24'-1⅝"	18.17	33.27	48.37	2952	5013	7123
		5'	70	15'-8"	6"	8"			6'-5"	"	"	19.23	35.20	51.18	3098	5184	7373
		6'	84	15'-11"	7"	9"			7'-5"	22'-6⅝"	24'-6"	21.44	39.25	57.06	3125	5909	7496
		7'	98	16'-1"	7½"	10"			8'-5"	22'-7"	24'-7"	23.59	43.08	62.63	3467	5957	8535
		8'	112	16'-2"	8"	10"			9'-5"	22'-10⅜"	24'-10⅜"	25.33	46.38	67.42	3666	6296	9066
		9'	126	16'-5"	9"	11"			10'-5"	23'-2⅝"	25'-2⅝"	28.84	51.88	75.43	3914	6798	9632
	8@8'-0"	4'	64	17'-8"	6"	8"			5'-7"	24'-9⅜"	26'-11⅜"	21.81	38.93	58.06	3415	5871	8461
		5'	80	17'-11"	7"	9"			6'-7"	25'-4"	27'-4"	23.90	43.76	63.62	3585	6237	8845
		6'	96	17'-11"	7"	9"			7'-7"	"	"	25.11	45.97	66.83	3680	6408	9095
		7'	112	18'-1"	7½"	10"			8'-7"	25'-6⅝"	27'-7"	27.22	49.85	72.44	3882	6667	9505
		8'	128	18'-2"	8"	10"			9'-7"	25'-10⅝"	27'-10½"	29.02	53.13	77.24	4154	7149	10,215
		9'	144	18'-5"	9"	11"			10'-7"	26'-0⅝"	28'-0⅝"	32.06	58.70	85.34	4401	7557	10,819
		10'	160	18'-8"	10"	12"			11'-7"	26'-4⅜"	28'-4⅜"	35.39	64.80	94.21	4847	8368	11,973

* For remainder of quantities see Std. Wing and Barrel Drawings listed below.

BAR LIST FOR SECTION "A" ON 45° SKEW - ONE END ONLY.

SECTION & BAR GROUP	LENGTH OF SECTION	DEPTH OF COVER	CLEAR SPAN	CLEAR HEIGHT	"a" bars STRAIGHT In Top and Bottom Slab of Barrel. SIZE	SPACING	NUMBER REQ'D 2:1	3:1	4:1	LENGTH
SECTION "A" & BAR GROUP "A"	4:1 = 45'-3"	6'-0" TO 10'-0" MAXIMUM	4@4'-0"	2'	#4	13"	25	51	77	9'-5"
	3:1 = 31'-1½"			3'			25	51	77	"
	2:1 = 17'-0"			4'			25	51	77	"
				5'			25	51	77	"
				6'			25	51	77	9'-8"
			5@5'-0"	3'	#4	11"	27	57	87	11'-5"
				4'			27	57	87	"
				5'			27	57	87	"
				6'			25	57	87	11'-8"
				7'			27	57	87	11'-10"
			6@6'-0"	3'	#4	12"	23	51	79	13'-5"
				4'			23	51	79	"
				5'			23	51	79	"
				6'			21	49	79	13'-8"
				7'			21	49	79	13'-10"
				8'			21	49	79	13'-11"
			7@7'-0"	4'	#4	12"	21	49	77	15'-5"
				5'			21	49	77	"
				6'			19	49	77	15'-8"
				7'			19	49	77	15'-10"
				8'			19	49	77	15'-11"
				9'			19	49	77	15'-11"
			8@8'-0"	4'	#4	12"	17	43	69	17'-5"
				5'			17	43	69	17'-8"
				6'			17	43	69	"
				7'			17	43	69	17'-10"
				8'			17	43	69	17'-11"
				9'			17	43	69	18'-0"
				10'			17	43	69	18'-5"

"b" bars BENT - See Diagrams below. In Bottom of Top Slab bent up over Division Wall - hooked. Alternate with "a1" and "c" bars.	SIZE	SPACING	NUMBER REQ'D 2:1	3:1	4:1	LENGTH	X	Y	Z
	#4	13"	11	24	37	10'-5"	0'-2⅝"	2'-1"	3'-5"
			11	24	37	"	"	"	"
			11	24	37	"	"	"	"
			11	24	37	"	"	"	"
			11	24	37	10'-8"	0'-2⅝"	2'-2"	3'-6"
	#4	11"	12	27	43	12'-6"	0'-3"	2'-6⅛"	4'-2"
			12	27	43	"	"	"	"
			12	27	43	"	"	"	"
			12	27	43	12'-9"	"	2'-7⅛"	4'-3"
			12	27	43	12'-11"	0'-3"	2'-8⅛"	4'-3½"
	#4	12"	10	24	38	14'-7"	0'-3⅝"	2'-11"	4'-11"
			10	24	38	"	"	"	"
			10	24	38	"	"	"	"
			10	24	38	14'-10"	"	3'-0"	5'-0"
			10	24	38	15'-0"	"	3'-0"	5'-0⅛"
			10	24	38	15'-1"	0'-3⅝"	3'-0"	5'-1"
	#4	12"	9	23	37	16'-10"	0'-3⅝"	3'-4⅛"	5'-7"
			9	23	37	"	"	"	"
			9	23	37	17'-1"	"	3'-5⅛"	5'-8"
			9	23	37	17'-3"	"	3'-5⅛"	5'-8½"
			9	23	37	17'-4"	"	"	5'-9"
	#4	12"	7	20	33	18'-10"	0'-3⅝"	3'-7"	6'-0"
			7	20	33	19'-1"	"	3'-8"	6'-0"
			7	20	33	"	"	"	"
			7	20	33	19'-3"	"	3'-8"	6'-0⅜"
			7	20	33	19'-5"	0'-3⅝"	3'-8"	6'-0⅜"
			7	20	33	19'-6"	0'-3⅝"	3'-8"	6'-0⅜"

"b2" bars BENT - See Diagrams below. In Top of Bottom Slab bent down under Division Wall - hooked. Alternate with "a" and "c" bars.	SIZE	SPACING	NUMBER REQ'D 2:1	3:1	4:1	LENGTH	X	Y	Z
	#4	13"	12	25	38	10'-5"	0'-2⅝"	2'-1"	3'-5"
			12	25	38	"	"	"	"
			12	25	38	"	"	"	"
			12	25	38	"	"	"	"
			12	25	38	10'-8"	0'-2⅝"	2'-2"	3'-6"
	#4	11"	13	28	44	12'-6"	0'-3"	2'-6⅛"	4'-2"
			13	28	44	"	"	"	"
			13	28	44	"	"	"	"
			13	28	44	12'-9"	"	2'-7⅛"	4'-3"
			13	28	44	12'-11"	0'-3"	2'-8⅛"	4'-3½"
	#4	12"	11	25	39	14'-7"	0'-3⅝"	2'-10"	4'-11"
			11	25	39	"	"	"	"
			11	25	39	"	"	"	"
			11	25	39	14'-10"	"	3'-0"	5'-0"
			11	25	39	15'-0"	"	3'-0"	5'-0⅛"
			11	25	39	15'-1"	0'-3⅝"	3'-0"	5'-1"
	#4	12"	10	24	38	16'-10"	0'-3⅝"	3'-3⅛"	5'-7"
			10	24	38	"	"	"	"
			10	24	38	17'-1"	"	3'-3⅛"	5'-8"
			10	24	38	17'-3"	"	3'-3⅛"	5'-8½"
			10	24	38	17'-4"	"	"	5'-9"
	#4	12"	8	21	35	18'-11"	0'-3⅝"	3'-6"	6'-0"
			8	21	34	19'-2"	"	3'-6"	6'-0"
			8	21	34	"	"	"	"
			8	21	34	19'-5"	"	"	6'-0"
			8	21	34	19'-6"	"	3'-6"	6'-0"
			8	21	34	19'-11"	0'-3⅝"	3'-6"	6'-0"

"b3" bars. Bent - See Diagrams below. In Bottom of Top Slab - some bent up over Division Wall - one end hooked. Alternate with "b1" and "c1" bars.	SIZE	SPACING	NUMBER REQ'D	LENGTH MAX.	LENGTH MIN.	L MAX.	L MIN.
	#4	13"	7	9'-5"	2'-9"	8'-10"	2'-8"
			7	"	"	"	"
			7	"	"	"	"
			7	"	"	"	"
			7	9'-8"	3'-0"	9'-1"	2'-7"
	#4	11"	10	11'-7"	3'-2"	10'-11"	2'-8"
			10	"	"	"	"
			10	"	"	"	"
			10	11'-10"	3'-5"	11'-2"	2'-11"
			10	12'-0"	3'-7"	11'-4"	3'-1"
	#4	12"	11	13'-7"	3'-4"	12'-10"	2'-10"
			11	"	"	"	"
			11	"	"	"	"
			11	13'-10"	3'-7"	13'-1"	3'-1"
			11	14'-0"	3'-9"	13'-3"	3'-3"
	#4	12"	10	15'-0"	3'-10"	14'-2"	3'-4"
			10	15'-2"	3'-11"	14'-4"	3'-5"
			10	15'-3"	4'-0"	14'-5"	3'-6"
	#4	12"	9	16'-5"	4'-1"	15'-6"	3'-7"
			9	16'-6"	4'-2"	15'-7"	3'-8"
			9	16'-8"	4'-3"	15'-8"	3'-9"
	#4	12"	8	17'-9"	4'-4"	16'-8"	3'-9"
			8	17'-11"	4'-5"	16'-10"	3'-10"
			8	18'-0"	4'-6"	17'-0"	3'-11"
	#4	12"	7	19'-1"	4'-7"	17'-11"	4'-0"
			7	19'-3"	4'-8"	18'-1"	4'-1"
			7	19'-4"	4'-9"	18'-2"	4'-2"
	#4	12"	6	20'-5"	4'-10"	19'-3"	4'-3"
			6	20'-7"	4'-11"	19'-5"	4'-4"
			6	20'-8"	5'-0"	19'-6"	4'-5"

"c" bars STRAIGHT In Top and Bottom Slab of Barrel. Alternate with "b" and "b2" bars.	SIZE	SPACING	NUMBER REQ'D	LENGTH
	#5	15"	29	55	81	4'-8"
			29	55	81	"
			29	55	81	"
			29	55	81	4'-9"
	#5	13"	33	63	93	5'-8"
			33	63	93	"
			33	63	93	"
			33	63	93	5'-10"
	#5	11"	29	57	85	6'-8"
			29	57	85	"
			29	57	85	"
			29	57	85	6'-10"
			29	57	85	7'-0"
	#5	12"	27	55	85	7'-8"
			27	55	85	7'-10"
			27	55	85	7'-10"
			27	55	85	7'-11"
	#5	12"	25	51	77	8'-8"
			25	51	77	8'-9"
			25	51	77	"
			25	51	77	8'-10"
			25	51	77	8'-11"
			25	51	77	9'-0"

"d" bars STRAIGHT Longitudinal in Top Slab of Barrel. SIZE	SPACING	NUMBER REQ'D	LENGTH
	12"	16	
		14	
		16	
		14	
		16	
		14	
		16	
		14	
		18	
		16	
		18	
		16	
		18	
		16	
		18	
		16	
		21	
		18	
		21	
		18	
		21	
		18	
		21	
		18	
		23	
		20	
		23	
		20	
		23	
		20