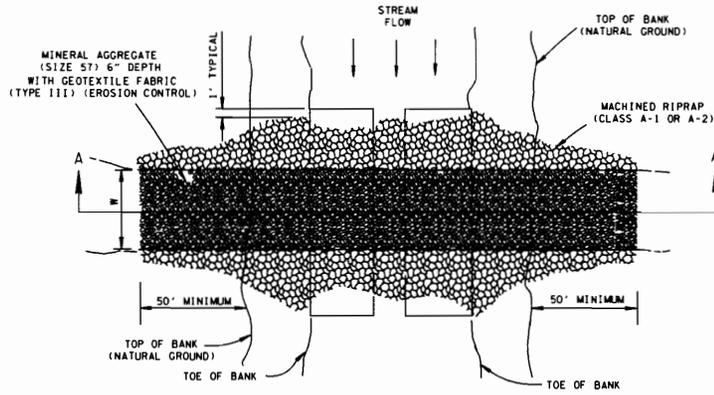


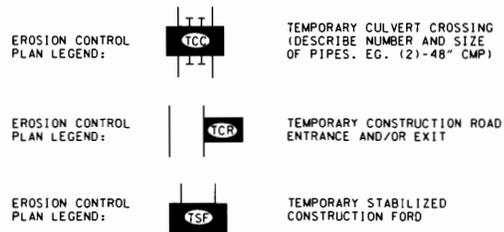
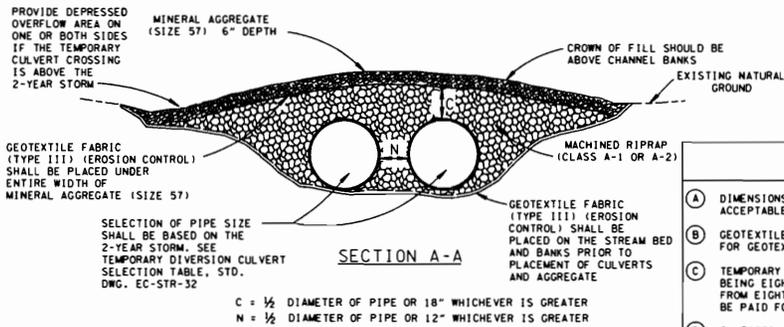
### TEMPORARY CULVERT CROSSING

(ITEM NOS. 203-01, 303-10.01, 621-03.02 THRU 621-03.11, 709-05.06 or 709-05.07 & 740-10.03)



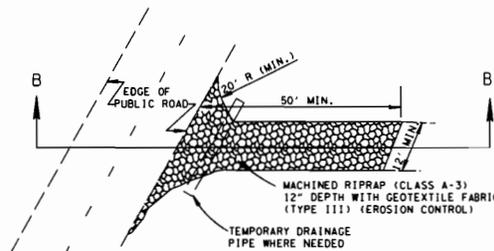
PLAN VIEW OF TEMPORARY CULVERT CROSSING

W = MINIMUM WIDTH OF 12' TO A MAXIMUM WIDTH OF 20'

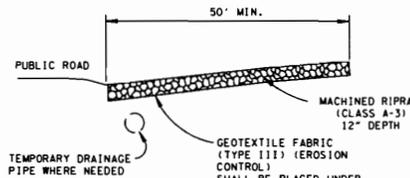


### TEMPORARY CONSTRUCTION ROAD ENTRANCE AND/OR EXIT

(ITEM NOS. 203-01, 709-05.05 & 740-10.03)

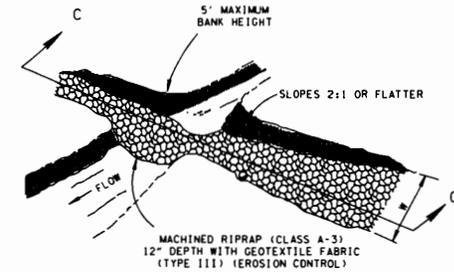


PLAN VIEW OF TEMPORARY CONSTRUCTION ROAD ENTRANCE AND/OR EXIT



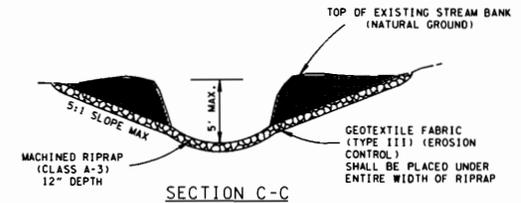
### TEMPORARY STABILIZED CONSTRUCTION FORD

(ITEM NOS. 203-01, 709-05.05 & 740-10.03)



PLAN VIEW OF TEMPORARY STABILIZED CONSTRUCTION FORD

W = FORD WIDTH SHALL VARY FROM A MINIMUM WIDTH OF 12' TO A MAXIMUM WIDTH OF 20'



### GENERAL NOTES

- (A) DIMENSIONS SHOWN ON THESE DETAILS ARE THE MINIMUM THAT WILL BE ACCEPTABLE UNLESS OTHERWISE SPECIFIED BY THE PROJECT ENGINEER.
- (B) GEOTEXTILE FABRIC SHALL MEET REQUIREMENTS OF THE STANDARD SPECIFICATION FOR GEOTEXTILES, AASHTO DESIGNATION M-288, EROSION CONTROL.
- (C) TEMPORARY CULVERT CROSSINGS SHALL CONSIST OF ONE OR MORE CULVERTS BEING EIGHTEEN INCHES IN DIAMETER OR GREATER. CULVERT SIZE WILL VARY FROM EIGHTEEN TO SEVENTY-TWO INCHES IN DIAMETER. THE CULVERTS SHALL BE PAID FOR AS TEMPORARY DRAINAGE PIPE.
- (D) ON SITES WHICH DRAIN TO HIGH-QUALITY OR SEDIMENT-IMPAIRED STREAMS, A 9-INCH LAYER OF MACHINED RIPRAP (CLASS A-3) SHALL BE SUBSTITUTED FOR THE MINERAL AGGREGATE (SIZE 57) USED TO TOP-DRESS A TEMPORARY CULVERT CROSSING.
- (E) TEMPORARY CULVERT CROSSINGS SHALL BE BID UNDER THE FOLLOWING PAY ITEMS:  
 203-01 ROAD AND DRAINAGE EXCAVATION (UNCLASSIFIED) PER CUBIC YARD  
 303-10.01 MINERAL AGGREGATE (SIZE 57) PER TON  
 621-03.02 18" TEMPORARY DRAINAGE PIPE PER LINEAR FOOT  
 621-03.03 24" TEMPORARY DRAINAGE PIPE PER LINEAR FOOT  
 621-03.04 30" TEMPORARY DRAINAGE PIPE PER LINEAR FOOT  
 621-03.05 36" TEMPORARY DRAINAGE PIPE PER LINEAR FOOT  
 621-03.06 42" TEMPORARY DRAINAGE PIPE PER LINEAR FOOT  
 621-03.07 48" TEMPORARY DRAINAGE PIPE PER LINEAR FOOT  
 621-03.08 54" TEMPORARY DRAINAGE PIPE PER LINEAR FOOT  
 621-03.09 60" TEMPORARY DRAINAGE PIPE PER LINEAR FOOT  
 621-03.10 66" TEMPORARY DRAINAGE PIPE PER LINEAR FOOT  
 621-03.11 72" TEMPORARY DRAINAGE PIPE PER LINEAR FOOT  
 709-05.05 MACHINED RIPRAP (CLASS A-3) PER TON  
 709-05.06 MACHINED RIPRAP (CLASS A-1) PER TON  
 709-05.07 MACHINED RIPRAP (CLASS A-2) PER TON  
 740-10.03 GEOTEXTILE (TYPE III) (EROSION CONTROL) PER SQUARE YARD
- (F) ALL TEMPORARY STREAM CROSSINGS SHALL BE PERPENDICULAR TO THE STREAM. WHERE POSSIBLE, CROSSINGS MAY DEVIATE AS MUCH AS 15' FROM PERPENDICULAR, IF NECESSARY.
- (G) COFFER DAMS SHOULD BE USED SO THAT CONSTRUCTION AND REMOVAL OF TEMPORARY STREAM CROSSINGS MAY BE CONSTRUCTED, WHILE SEPARATED FROM FLOWING WATER. AGGREGATE AND GEOTEXTILE USED TO CONSTRUCT THE CROSSING SHOULD BE REMOVED AS SOON AS POSSIBLE AFTER THE CROSSING IS NO LONGER REQUIRED. ANY EXPOSED AREAS SHOULD BE IMMEDIATELY STABILIZED.
- (H) MINIMIZE CLEARING OF VEGETATION FROM STREAM BANKS.
- (I) TEMPORARY STREAM CROSSINGS SHALL BE INSPECTED WEEKLY AND ANY DAMAGES SHOULD BE REPAIRED IMMEDIATELY. ANY DEBRIS WHICH HAS ACCUMULATED AT THE TEMPORARY CULVERT SHALL ALSO BE REMOVED.
- (J) TEMPORARY CONSTRUCTION ROAD ENTRANCES AND/OR EXITS SHALL BE BUILT TO REDUCE SEDIMENT LEAVING THE CONSTRUCTION SITE VIA CONSTRUCTION VEHICLES AND TO REDUCE SEDIMENT TRACKING ON PUBLIC ROADS.
- (K) TEMPORARY CONSTRUCTION ROAD ENTRANCES AND/OR EXITS SHALL BE BID UNDER THE FOLLOWING PAY ITEMS:  
 203-01 ROAD AND DRAINAGE EXCAVATION (UNCLASSIFIED) PER CUBIC YARD  
 709-05.05 MACHINED RIPRAP (CLASS A-3) PER TON  
 740-10.03 GEOTEXTILE (TYPE III) (EROSION CONTROL) PER SQUARE YARD
- (L) TEMPORARY STABILIZED CONSTRUCTION FORDS ARE EFFECTIVE FOR INFREQUENT CROSSING OF WIDE SHALLOW DEPRESSIONS. THEY ARE BEST SUITED FOR STREAMS WITH A ROCK CHANNEL BOTTOM AND INTERMITTENT FLOWS.
- (M) TEMPORARY STABILIZED CONSTRUCTION FORDS SHALL BE BID UNDER THE FOLLOWING PAY ITEMS:  
 203-01 ROAD AND DRAINAGE EXCAVATION (UNCLASSIFIED) PER CUBIC YARD  
 709-05.05 MACHINED RIPRAP (CLASS A-3) PER TON  
 740-10.03 GEOTEXTILE (TYPE III) (EROSION CONTROL) PER SQUARE YARD

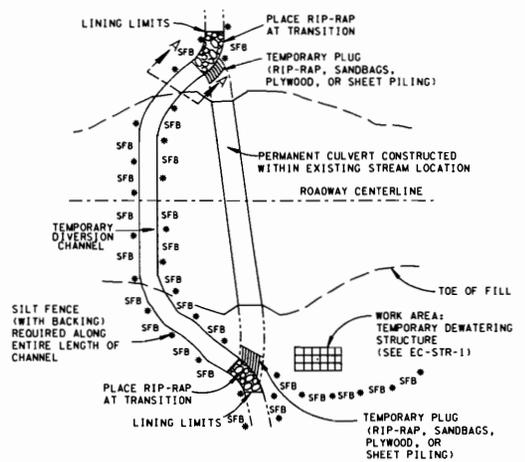
- REV. 12-18-95: CHANGED DRAWING NO. FROM EC-STR-25 TO EC-STR-25.
- REV. 5-27-01: CHANGED ITEM NO. 303-10.01 TO 303-10.01. CHANGED DESCRIPTIONS IN ITEM NOS. 621-03.02 TO 621-03.10, AND 709-05.05 TO 709-05.07.
- REV. 12-18-02: CHANGED GENERAL NOTE (D).
- REV. 1-22-03: CORRECTED GENERAL NOTE (D).
- REV. 7-29-03: ADDED GEOTEXTILE FABRIC TO TEMPORARY CULVERT CROSSING AND TEMPORARY CONSTRUCTION ROAD ENTRANCE DETAILS. CHANGED MINERAL AGGREGATE TO CLASS A-3 RIPRAP IN TEMPORARY CONSTRUCTION ROAD ENTRANCE DETAIL. CHANGED GENERAL NOTES (D) AND (E).
- REV. 4-15-06: REFORMATTED SHEET, REVISED NOTES, MISC. EDITS TO DRAWING.

MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

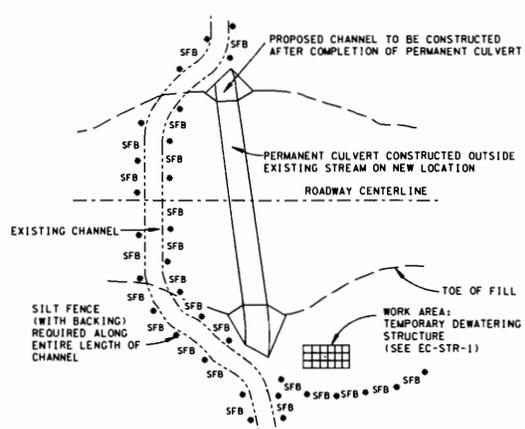
STATE OF TENNESSEE  
 DEPARTMENT OF TRANSPORTATION  
 TEMPORARY ROAD STABILIZATION AND TEMPORARY CULVERT CROSSING  
 10-26-92 EC-STR-25

REV. 12-18-95: CHANGED DRAWING NO. FROM EC-STR-31 TO EC-STR-31.  
 □ REV. 5-27-01: CHANGED ITEM NO. 740-03.01 TO 740-10.03. CHANGED REFERENCE OF TEMPORARY EROSION CONTROL PIPE TO TEMPORARY PIPE.  
 □ REV. 12-18-02: CHANGED ALL SILT FENCE IN DETAILS TO ENHANCED SILT FENCE. CHANGED GENERAL NOTE (E).

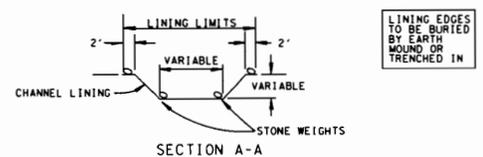
### CULVERT CONSTRUCTED WITHIN EXISTING STREAM



### CULVERT CONSTRUCTED OUTSIDE EXISTING STREAM



### TEMPORARY DIVERSION CHANNEL WITH GEOTEXTILE FABRIC LINING

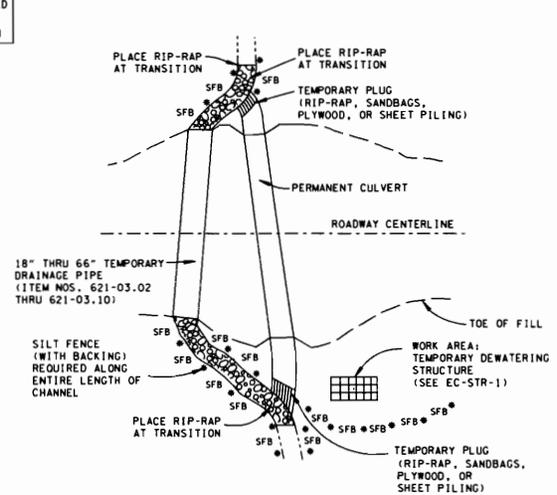


### PIPE DIAMETER FOR STREAM CROSSINGS OR TEMPORARY DIVERSION CHANNELS (INCHES)

DRAINAGE AREA (ACRES)	AVERAGE SLOPE OF WATERSHED			
	1%	2%	3%	4%
1-25	24	24	30	30
26-50	24	30	36	36
51-100	30	36	42	48
101-150	30	42	48	48
151-200	36	42	48	54
201-250	36	48	54	54
251-300	36	48	54	60
301-350	42	48	60	60
351-400	42	54	60	60
401-450	42	54	60	72
451-500	42	54	60	72
501-550	48	60	60	72
551-600	48	60	60	72
601-640	48	60	72	72

NOTE:  
 ASSUMPTIONS FOR DETERMINING THE TABLE: USDA-SCS PEAK DISCHARGE METHOD: CN=65 RAINFALL DEPTH=3.5" FOR A 2-YEAR FREQUENCY STORM.

### TEMPORARY CULVERT USED DURING CONSTRUCTION



### TEMPORARY DIVERSION CHANNELS GENERAL NOTES

- (A) TEMPORARY DIVERSION CHANNELS SHALL BE USED TO DIVERT NORMAL STREAM PATH FLOW FROM AN ERODIBLE AREA UNTIL SUCH AREAS CAN BE STABILIZED.
- (B) DESIGNER SHALL PROVIDE CULVERT SECTIONS FOR TEMPORARY CULVERT CROSSINGS.
- (C) ITEM NO. 740-10.03, GEOTEXTILE (TYPE III) (EROSION CONTROL) SHALL BE USED WITHOUT RIP-RAP FOR CHANNEL FLOW VELOCITIES OF LESS THAN 3.0 FPS.
- (D) ITEM NO. 740-10.03, GEOTEXTILE (TYPE III) (EROSION CONTROL) SHALL BE USED WITH RIP-RAP FOR CHANNEL FLOW VELOCITIES OF 3.0 FPS TO 9.0 FPS. THE RIP-RAP SHALL BE SIZED USING FHWA HEC-15 DESIGN OF ROADSIDE CHANNELS WITH FLEXIBLE LININGS.
- (E) GEOTEXTILE FABRIC SHALL MEET REQUIREMENTS OF THE STANDARD SPECIFICATION FOR GEOTEXTILES AASHTO DESIGNATION M-288, EROSION CONTROL.
- (F) DIVERSION CHANNEL SHALL BE STABILIZED AND INSPECTED BY THE PROJECT ENGINEER BEFORE FLOW IS DIVERTED.
- (G) DIVERSION CHANNEL SHALL BE INSPECTED AFTER EVERY RAIN EVENT OR WEEKLY AND ANY NEEDED REPAIRS SHALL BE DONE IMMEDIATELY TO PREVENT WATER POLLUTION DUE TO SEDIMENT.
- (H) DURING CONSTRUCTION OF THE DIVERSION CHANNEL, DAMAGE TO THE EXISTING STREAM, CANOPY REMOVAL, AND DEPTH OF THE CHANNEL CONSTRUCTION SHALL BE MINIMIZED. INLET-OUTLET PROTECTION SHALL ALSO BE PROVIDED, AS SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER.
- (I) GEOTEXTILE FABRIC LINING IN THE TEMPORARY DIVERSION CHANNELS SHOULD BE USED ONLY ON INTERMITTENT FLOW STREAMS OR DITCHES. USE RIP-RAP OR CULVERTS IF STREAM FLOWS YEAR ROUND.
- (J) NEW CHANNEL CONSTRUCTION SHALL BE COMPLETED IN THE DRY BEFORE DIVERTING WATER FROM THE EXISTING CHANNEL. WHERE THIS IS NOT FEASIBLE, TEMPORARY FLOW DIVERSION STRUCTURES CAN BE USED UNTIL WORK IS COMPLETE. THESE STRUCTURES CAN BE ANY NON-ERODIBLE MATERIAL.
- (K) ALL EXISTING VEGETATION OUTSIDE THE CUT AND FILL LINES BUT INSIDE THE RIGHT-OF-WAY SHALL NOT BE DISTURBED UNLESS IT INTERFERES WITH SAFETY STANDARDS.
- (L) CONSTRUCTION OF THE CHANNEL RELOCATIONS AND BOX CULVERTS AND BOX BRIDGES SHALL PROCEED AS FOLLOWS:
  - (L1) CONSTRUCT A MEANDERING TEMPORARY CHANNEL CHANGE ADJACENT TO THE PROPOSED BOX BRIDGE OR CULVERT TO DIVERT WATER TEMPORARILY DURING THE BOX CONSTRUCTION. TEMPORARY EROSION CONTROL MEASURES SHALL BE INSTALLED IN ACCORDANCE WITH SECTION 209 OF THE STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION.
  - (L2) RELOCATE CHANNEL AND CONSTRUCT BOXES SIMULTANEOUSLY.
  - (L3) SOD AND/OR RIP-RAP RECONSTRUCTED BANKS. THE UPPER CHANNEL PLUG IS TO REMAIN IN PLACE UNTIL SUBNOTES (L1) THROUGH (L3) UNDER THIS HEADING ARE COMPLETED TO INSURE THAT ALL CONSTRUCTION IS IN THE DRY.
  - (L4) IF AN EARTH PLUG IS NECESSARY AT THE DOWNSTREAM END OF THE CHANNEL IT SHOULD BE REMOVED FIRST, THEN REMOVE THE UPPER PLUG TO RELEASE WATER INTO THE RECONSTRUCTED CHANNEL.
- (M) DIVERSION CHANNELS, LININGS, CULVERTS, TEMPORARY DEWATERING STRUCTURES, AND SILT FENCES, SHALL BE PAID FOR UNDER THEIR RESPECTIVE PAY ITEMS.
- (N) TEMPORARY DIVERSION CHANNELS SHALL BE DESIGNED USING A 2 YEAR FREQUENCY RUNOFF WHEN REMAINING IN USE FOR 3 WEEKS OR LESS; USE A 10 YEAR FREQUENCY FOR MORE THAN 3 WEEKS. MAXIMUM DRAINAGE AREA IS 640 ACRES.

EROSION CONTROL PLAN LEGEND: TEMPORARY DIVERSION CHANNEL (DESCRIBE - SIZE AND TYPE OF LINING)

STATE OF TENNESSEE  
 DEPARTMENT OF TRANSPORTATION  
 TEMPORARY DIVERSION CHANNELS  
 10-26-92 EC-STR-31



"K" VALUES FOR TEMPORARY DIVERSION CHANNEL DEPTH HYDROLOGIC AREA 1

DRAINAGE AREA (ACRES)	FLOW RATE (cfs)	INCREASING CHANNEL SLOPE →					
		0.5%	1.0%	1.5%	2.0%	2.5%	3.0%
10.0	3.8	53.3	37.7	30.8	26.7	23.9	21.8
25.0	9.4	133.4	94.3	77.0	66.7	59.6	54.4
50.0	18.9	266.7	188.6	154.0	133.4	119.3	108.9
100.0	37.7	533.5	377.2	308.0	266.7	238.6	217.8
150.0	47.5	671.9	475.1	387.9	336.0	300.5	274.3
200.0	55.2	780.0	551.6	450.3	390.0	348.8	318.4
250.0	58.5	826.9	584.7	477.4	413.4	369.8	337.6
300.0	61.2	850.4	612.0	508.7	445.2	400.0	368.0
400.0	83.5	1180.9	835.0	681.9	590.4	528.1	482.1
500.0	98.8	1397.2	988.0	806.7	698.6	624.9	570.4
600.0	113.3	1602.8	1133.3	925.4	801.4	716.8	654.3
700.0	127.3	1800.9	1273.4	1039.7	900.4	805.4	735.2
800.0	140.8	1991.2	1408.0	1149.6	995.6	890.5	812.9
900.0	153.9	2176.5	1539.0	1256.6	1088.2	973.3	888.5
1000.0	166.7	2357.5	1667.0	1361.1	1178.7	1054.3	962.4
1100.0	179.1	2532.9	1791.0	1462.3	1266.4	1132.7	1034.0
1200.0	191.3	2705.4	1913.0	1562.0	1352.7	1209.9	1104.5
1300.0	203.2	2873.7	2032.0	1659.1	1436.8	1285.1	1173.2

"K" VALUES FOR TEMPORARY DIVERSION CHANNEL DEPTH HYDROLOGIC AREA 3

DRAINAGE AREA (ACRES)	FLOW RATE (cfs)	INCREASING CHANNEL SLOPE →					
		0.5%	1.0%	1.5%	2.0%	2.5%	3.0%
10.0	10.2	144.2	102.0	83.3	72.1	64.5	58.9
25.0	25.5	360.6	255.0	208.2	180.3	161.3	147.2
50.0	51.0	721.2	510.0	416.4	360.6	322.6	294.4
100.0	64.7	915.0	647.0	528.3	457.5	409.2	373.5
150.0	89.1	1260.1	891.0	727.5	630.0	563.5	514.4
200.0	111.8	1581.1	1118.0	912.8	790.5	707.1	645.5
250.0	133.4	1886.6	1334.0	1089.2	943.3	843.7	770.2
300.0	154.0	2177.9	1540.0	1257.4	1088.9	974.0	889.1
400.0	193.2	2732.3	1932.0	1577.5	1366.1	1221.9	1115.4
500.0	230.4	3258.3	2304.0	1881.2	1629.2	1457.2	1330.2
600.0	266.1	3763.2	2661.0	2172.7	1881.6	1683.0	1536.3
700.0	300.5	4249.7	3005.0	2453.6	2124.9	1900.5	1734.9
800.0	333.9	4722.1	3339.0	2726.3	2361.0	2111.8	1927.8
900.0	366.4	5181.7	3664.0	2991.6	2590.8	2317.3	2115.4
1000.0	398.2	5631.4	3982.0	3251.3	2815.7	2518.4	2299.0
1100.0	429.3	6071.2	4293.0	3505.2	3035.6	2715.1	2478.6
1200.0	459.8	6502.6	4598.0	3754.3	3251.3	2908.0	2654.7
1300.0	489.8	6926.8	4898.0	3999.2	3463.4	3097.8	2827.9

DIVERSION CHANNEL DEPTH TABLES GENERAL NOTES

- A THE TABLES ON THIS DRAWING MAY BE USED TO DESIGN TEMPORARY DIVERSION CHANNELS AS SHOWN ON STANDARD DRAWING EC-STR-31.
- B THE "K" VALUES PROVIDED IN THE TABLES REPRESENT "CONVEYANCE" WHICH MEASURES THE CAPACITY OF A CHANNEL TO PASS THE FLOW OF WATER. CONVEYANCE IS A TERM IN MANNING'S EQUATION AND IS CONSIDERED TO BE DIMENSIONLESS.
- C FOR EACH COMBINATION OF DRAINAGE AREA AND CHANNEL SLOPE IN THE TABLES, THE CORRESPONDING "K" VALUE IS THE CONVEYANCE REQUIRED TO PASS THE FLOW RATE SHOWN ON THE TABLE.
- D FLOW RATES ARE BASED UPON THE 2-YEAR 24-HOUR STORM EVENT, AS COMPUTED FROM THE TDOT/USGS REGRESSION EQUATIONS FOR RURAL AREAS (2000 EDITION).
- E AS DESCRIBED IN THE PROCEDURE BELOW, THESE TABLES MAY BE USED TO DETERMINE THE 2-YEAR FLOW DEPTH IN A DIVERSION CHANNEL FOR THE FLOW RATES SHOWN. THE FLOW DEPTHS DETERMINED BY THIS PROCEDURE ACCOUNT FOR DIFFERENCES IN HYDRAULIC ROUGHNESS DUE TO THE DIFFERENT CLASSES OF RIPRAP REQUIRED. THE PROCEDURE IS A SIMPLE ALTERNATIVE TO ITERATIVE ANALYSIS USING MANNING EQUATION.
- F ALL TEMPORARY DIVERSION CHANNELS SHALL HAVE A TRAPEZOIDAL SHAPE AND THE BOTTOM WIDTH SHALL BE EQUAL TO OR GREATER THAN THE NATURAL CHANNEL BOTTOM WIDTH.

"K" VALUES FOR TEMPORARY DIVERSION CHANNEL DEPTH HYDROLOGIC AREA 2

DRAINAGE AREA (ACRES)	FLOW RATE (cfs)	INCREASING CHANNEL SLOPE →					
		0.5%	1.0%	1.5%	2.0%	2.5%	3.0%
10.0	5.5	78.2	55.3	45.1	39.1	35.0	31.9
25.0	13.8	195.4	138.2	112.8	97.7	87.4	79.8
50.0	27.6	390.8	276.3	225.6	195.4	174.8	159.5
100.0	55.3	781.5	552.6	451.2	390.8	349.5	319.1
150.0	72.7	1027.4	726.5	593.2	513.7	459.5	419.5
200.0	87.6	1238.2	875.6	714.9	619.1	553.8	505.5
250.0	100.7	1424.1	1007.0	822.2	712.1	636.9	581.4
300.0	117.6	1663.1	1176.0	960.2	831.6	743.8	679.0
400.0	145.0	2050.6	1450.0	1183.9	1025.3	917.1	837.2
500.0	170.5	2411.2	1705.0	1392.1	1205.6	1078.3	984.4
600.0	194.6	2752.1	1946.0	1588.9	1376.0	1230.8	1123.5
700.0	217.7	3078.7	2177.0	1777.5	1539.4	1376.9	1256.9
800.0	239.9	3392.7	2399.0	1959.8	1696.3	1517.3	1385.1
900.0	261.4	3696.8	2614.0	2134.3	1848.4	1653.2	1509.2
1000.0	282.2	3990.9	2822.0	2304.2	1995.5	1784.8	1629.3
1100.0	302.4	4276.6	3024.0	2469.1	2138.3	1912.5	1745.9
1200.0	322.2	4556.6	3222.0	2630.8	2278.3	2037.8	1860.2
1300.0	341.5	4829.5	3415.0	2788.3	2414.8	2159.8	1971.7

"K" VALUES FOR TEMPORARY DIVERSION CHANNEL DEPTH HYDROLOGIC AREA 4

DRAINAGE AREA (ACRES)	FLOW RATE (cfs)	INCREASING CHANNEL SLOPE →					
		0.5%	1.0%	1.5%	2.0%	2.5%	3.0%
10.0	12.0	169.6	119.9	97.9	84.8	75.9	69.2
25.0	30.0	424.0	299.8	244.8	212.0	189.6	173.1
50.0	60.0	848.1	599.7	489.6	424.0	379.3	346.2
100.0	119.9	1696.1	1199.4	979.3	848.1	758.5	692.4
150.0	157.3	2224.9	1573.3	1284.6	1112.5	995.0	908.3
200.0	236.2	3340.4	2362.0	1928.6	1670.2	1493.9	1363.7
250.0	265.7	3757.6	2657.0	2169.4	1878.8	1680.4	1534.0
300.0	292.5	4136.6	2925.0	2388.3	2068.3	1849.9	1688.7
400.0	340.3	4812.6	3403.0	2778.5	2406.3	2152.2	1964.7
500.0	382.8	5413.6	3828.0	3125.5	2706.8	2421.0	2210.1
600.0	421.4	5959.5	4214.0	3440.7	2979.7	2665.2	2433.0
700.0	457.1	6464.4	4571.0	3732.2	3232.2	2891.0	2639.1
800.0	490.4	6935.3	4904.0	4004.1	3467.7	3101.6	2831.3
900.0	521.8	7379.4	5218.0	4260.5	3689.7	3300.2	3012.6
1000.0	551.6	7800.8	5516.0	4503.8	3900.4	3488.6	3184.7
1100.0	580.0	8202.4	5800.0	4735.7	4101.2	3668.2	3348.6
1200.0	607.2	8587.1	6072.0	4957.8	4293.8	3840.3	3505.7
1300.0	633.4	8957.6	6334.0	5171.7	4478.8	4006.0	3656.9

PROCEDURE FOR TEMPORARY DIVERSION CHANNEL DESIGN

- 1 USING THE FIGURE PROVIDED ON THIS DRAWING DETERMINE THE HYDROLOGIC AREA IN WHICH THE PROJECT SITE IS LOCATED.
- 2 INTERPOLATE THE REQUIRED "K" VALUE USING THE APPROPRIATE "K" VALUE TABLE, BASED ON THE DRAINAGE AREA AND AVERAGE STREAM SLOPE AT THE SITE. WHERE A PROJECT FALLS ON THE BOUNDARY BETWEEN TWO HYDROLOGIC AREAS, USE THE GREATER "K" VALUE, BASED ON THIS "K" VALUE. INTERPOLATE "A" AND "B" VALUES FROM THE TABLE "PARAMETERS FOR DEPTH OF FLOW EQUATION".
- 3 DETERMINE THE BOTTOM WIDTH OF THE EXISTING NATURAL CHANNEL. USE THIS AS THE BOTTOM WIDTH IN THE DEPTH OF FLOW EQUATION PRESENTED ON THIS DRAWING IN ORDER TO COMPUTE THE 2-YEAR FLOW DEPTH IN DIVERSION CHANNEL.
- 4 THE HEIGHT OF THE RIPRAP IN THE CHANNEL WILL BE EQUAL TO THE 2-YEAR FLOW DEPTH PLUS THE REQUIRED FREEBOARD. THE REQUIRED FREEBOARD WILL EITHER BE EQUAL TO THE FLOW DEPTH OR ONE FOOT, WHICHEVER IS LESS. THE TOP OF THE CHANNEL MUST BE EQUAL TO OR GREATER THAN THE HEIGHT OF THE RIPRAP. SEE THE FIGURE PROVIDED ON STANDARD DRAWING EC-STR-31.
- 5 COMPUTE FLOW AREA AS ( DEPTH X BOTTOM WIDTH ) + ( 2 X DEPTH<sup>2</sup> )
- 6 COMPUTE VELOCITY AS ( FLOW RATE / FLOW AREA ). USE COMPUTED VELOCITY TO SELECT RIPRAP CLASS BASED ON APPROVED TDOT METHODS. IF THE COMPUTED VELOCITY IS LESS THAN 2.5 FEET PER SECOND, RIPRAP WILL NOT BE REQUIRED.

PARAMETERS FOR DEPTH OF FLOW EQUATION

K VALUE	A	B
20	-0.213	0.856
30	-0.238	0.998
60	-0.291	1.311
100	-0.323	1.545
175	-0.360	1.846
275	-0.373	2.064
350	-0.378	2.183
400	-0.384	2.260
500	-0.380	2.356
650	-0.401	2.535
750	-0.464	2.796
850	-0.494	2.944
1000	-0.540	3.162
2000	-0.812	4.406
3000	-1.000	5.321
4000	-1.100	5.960
5000	-1.176	6.567
6000	-1.241	7.072
7000	-1.300	7.515
8000	-1.323	7.895

DEPTH OF FLOW EQUATION

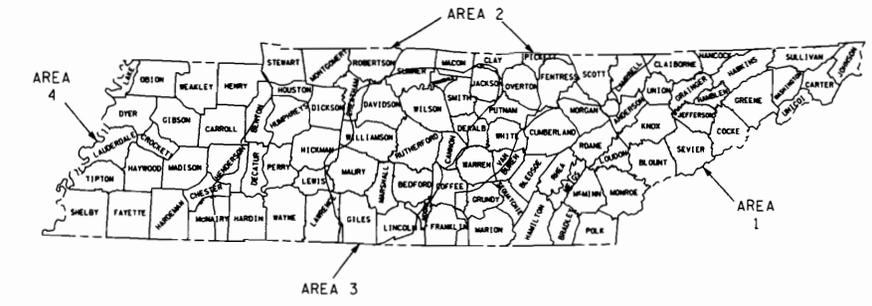
FLOW DEPTH = A X ln (BOTTOM WIDTH) + B

ln IS THE NATURAL LOG FUNCTION OF THE BOTTOM WIDTH OF THE CHANNEL.

MINOR REVISION -- FINAL APPROVAL NOT REQUIRED.

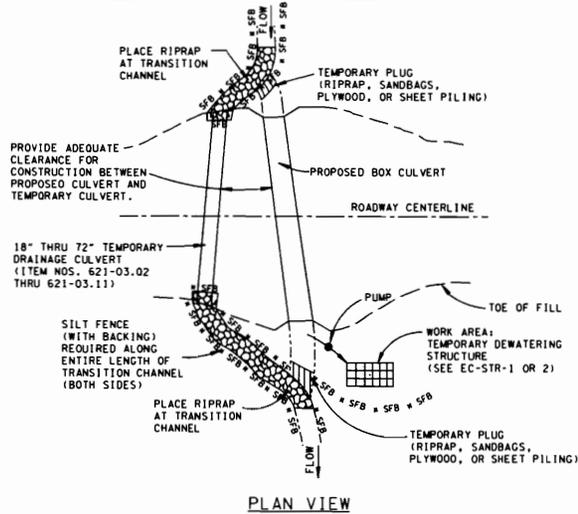
STATE OF TENNESSEE DEPARTMENT OF TRANSPORTATION

TEMPORARY DIVERSION CHANNEL DESIGN



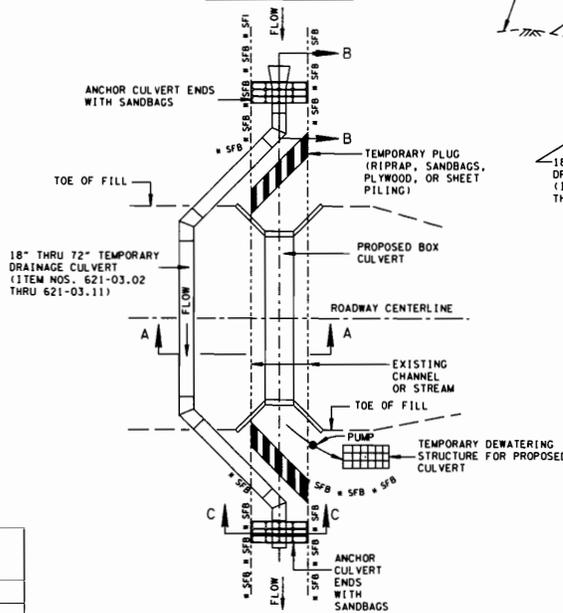
SOURCE: "FLOOD FREQUENCY PREDICTION METHODS FOR UNREGULATED STREAMS OF TENNESSEE" WATER RESOURCES INVESTIGATIONS REPORT 03-4176. USGS 2000.

**TEMPORARY DIVERSION CULVERT WITH CHANNEL TRANSITIONS**

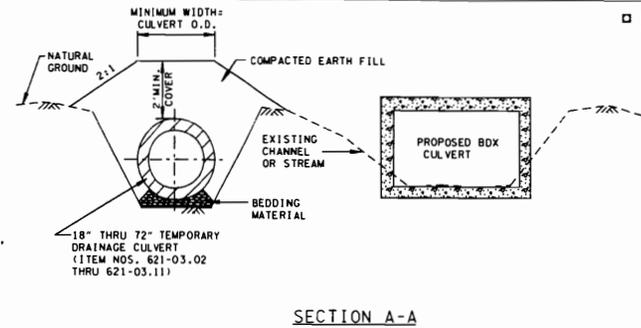


PLAN VIEW

**TEMPORARY DIVERSION CULVERT WITH ELBOWS**



PLAN VIEW



SECTION A-A

**TEMPORARY DIVERSION CULVERTS GENERAL NOTES**

1. TEMPORARY DIVERSION CULVERTS SHALL BE USED TO DIVERT NORMAL STREAM FLOW FROM AN ERODIBLE AREA IN ORDER TO PREVENT POLLUTION OF THE STREAM DUE TO EROSION. TEMPORARY CULVERTS MAY BE USED WHERE IT IS NECESSARY TO MAINTAIN TRAFFIC DURING CONSTRUCTION.
2. THE DESIGNER SHALL PROVIDE CULVERT SECTIONS FOR TEMPORARY CULVERT CROSSINGS. MINIMUM COVER FOR CONSTRUCTION LOADS IS 2 FEET.
3. EXAMPLE SHOWN IS FOR CULVERT REPLACEMENT OR NEW CONSTRUCTION. OTHER PROJECTS WOULD BE CONSTRUCTED IN A SIMILAR MANNER.
4. TEMPORARY DIVERSION CULVERTS SHALL BE DESIGNED USING A 2-YEAR FREQUENCY STORM FLOW RATE. AT SITES WHICH INVOLVE HIGH-QUALITY OR SEDIMENT-IMPAIRED STREAM, THE PIPE SHALL BE ADEQUATE TO CONVEY THE 5-YEAR, PEAK FLOW. THE TABLE "TEMPORARY DIVERSION CULVERT SELECTION" MAY BE USED AS A GUIDELINE FOR DETERMINING THE PIPE SIZE. FOR ANY SITE WHERE Q50 EXCEEDS 500 CFS, THE DESIGN OF THIS MEASURE SHOULD BE COMPLETED BY THE HYDRAULICS SECTION OF THE STRUCTURES DIVISION.
5. THE RIPRAP TRANSITION AT THE ENTRANCE OF THE DIVERSION CULVERT SHALL BE DESIGNED IN ACCORDANCE WITH APPROVED TDOT METHODS. THE RIPRAP TRANSITION AT THE TEMPORARY CULVERT OUTFALL SHALL BE DESIGNED IN ACCORDANCE WITH APPROVED TDOT METHODS.
6. GEOTEXTILE FABRIC FOR CHANNEL TRANSITIONS SHALL MEET REQUIREMENTS OF THE STANDARD SPECIFICATION FOR GEOTEXTILES AASHTO DESIGNATION M-288, EROSION CONTROL.
7. WHERE EXCAVATION FOR A DIVERSION TRANSITION EXPOSES BEDROCK, GEOTEXTILE FABRIC AND RIPRAP SHALL BE USED ONLY ON THE SIDES OF THE CHANNEL.
8. IN ORDER TO PROVIDE THE BEST POSSIBLE SEAL, THE POLYETHYLENE SHEETING USED IN AN UPSTREAM PIPE ANCHOR SHOULD BE FITTED AROUND THE PIPE. SANDBAGS ON THE DOWNSTREAM SIDE OF THE SHEETING SHOULD BE PLACED FIRST, AND THE SHEETING PLACED ON THESE BAGS. THE REMAINING SANDBAGS WOULD THEN BE PLACED ON THE SHEETING. WHERE MULTIPLE SHEETS ARE USED, THEY SHOULD OVERLAP A MINIMUM OF 18 INCHES.
9. DURING CONSTRUCTION OF THE TEMPORARY CULVERT, DAMAGE TO THE EXISTING STREAM AND CANOPY SHALL BE MINIMIZED. ALL EXISTING VEGETATION OUTSIDE THE CUT AND FILL LINES BUT INSIDE THE RIGHT-OF-WAY SHALL NOT BE DISTURBED UNLESS IT INTERFERES WITH SAFETY STANDARDS. THE TEMPORARY CULVERT SHOULD BE LOCATED SO AS TO MINIMIZE THE LENGTH OF ANY TRANSITIONS REQUIRED.
10. DIVERSION CULVERT CONSTRUCTION SHALL BE COMPLETED IN THE DRY BEFORE DIVERTING WATER FROM THE EXISTING CHANNEL. WHERE THIS IS NOT FEASIBLE, TEMPORARY FLOW DIVERSION STRUCTURES CAN BE USED UNTIL WORK IS COMPLETE. THESE STRUCTURES CAN BE ANY NON-ERODIBLE MATERIAL.
11. CONSTRUCTION SHALL PROCEED AS FOLLOWS:
  1. CONSTRUCT THE TEMPORARY CULVERT ADJACENT TO THE PROPOSED PROJECT. ISOLATE THE TEMPORARY CHANNEL FROM THE EXISTING CHANNEL WITH TEMPORARY PLUGS. TEMPORARY EROSION CONTROL MEASURES SHALL BE INSTALLED IN ACCORDANCE WITH SECTION 209 OF THE STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION.
  2. DIVERT FLOW BY MOVING THE TEMPORARY PLUGS FROM THE TEMPORARY CHANNEL TO THE EXISTING CHANNEL. A COFFER DAM MAY BE USED UPSTREAM TO PREVENT STREAM FLOW DURING THIS OPERATION.
  3. CONSTRUCT THE PROJECT IN THE EXISTING STREAM AND PLACE PERMANENT EROSION CONTROL ON THE EXISTING STREAM BANKS.
  4. WHERE A TEMPORARY PLUG IS REQUIRED AT THE DOWNSTREAM END OF THE DIVERSION, IT SHOULD BE REMOVED FIRST. THEN REMOVE THE UPPER PLUG IN ORDER TO RELEASE FLOW INTO THE RECONSTRUCTED CHANNEL.
  5. REMOVE LINING MATERIALS FROM THE DIVERSION TRANSITIONS, RESTORE THE AREA TO GRADE AND STABILIZE EXPOSED SOILS.
  6. DIVERSION CULVERT, SANDBAG ANCHORS AND TRANSITIONS SHALL BE INSPECTED WEEKLY OR AFTER EVERY RAIN EVENT. ANY NEEDED REPAIRS SHALL BE DONE IMMEDIATELY.
  7. DIVERSION CULVERTS, LININGS, TEMPORARY DEWATERING STRUCTURES, SILT FENCES, AND TEMPORARY PLUG SHALL BE PAID FOR UNDER THEIR RESPECTIVE PAY ITEMS.

MINOR REVISION -- FIRM APPROVAL NOT REQUIRED.

STATE OF TENNESSEE DEPARTMENT OF TRANSPORTATION

**TEMPORARY DIVERSION CULVERTS**

1-20-06 EC-STR-32

**TEMPORARY DIVERSION CULVERT SELECTION**  
FLOW CAPACITY IN CFS OF A GIVEN PIPE AT A GIVEN CHANNEL SLOPE

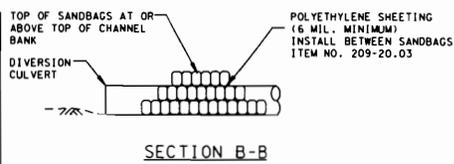
PIPE DIAMETER (INCHES)	AVERAGE CHANNEL SLOPE					
	0.5%	1%	1.5%	2.0%	2.5%	3.0%
18	8.5	9.1	9.8	10.4	11.0	11.3
24	17.4	18.8	20.0	21.4	21.5	21.7
30	30.1	32.3	33.9	34.1	33.5	33.0
36	46.8	50.4	49.5	47.8	46.6	45.8
42	67.7	69.0	65.5	62.8	61.0	59.6
48	92.6	88.1	76.8	78.6	75.8	73.7
54	127.2	107.0	91.9	94.9	91.1	88.1
60	146.5	121.1	118.4	111.1	106.1	101.9
72	194.9	142.2	153.6	141.3	133.3	127.9
RIPRAP	B	B	B	B	B/C	B/C

NOTES: FLOW RATES BASED ON 2.5-FOOT INCREASE IN WATER SURFACE ELEVATION ABOVE NORMAL LEVEL FOR THE 2-YEAR, 24 HOUR STORM EVENT

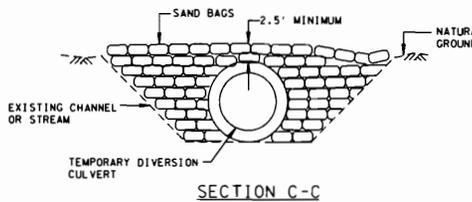
ASSUMES CORRUGATED PIPE (n = 0.024)

EXAMPLE:  
DRAINAGE AREA = 200 ACRES  
HYDROLOGIC AREA 2  
Q2 = 87.6 CFS  
(SEE CH. 4 DRAINAGE MANUAL)  
CHANNEL SLOPE 1%

SELECT EITHER:  
SINGLE 48-INCH PIPE OR  
TWIN 36-INCH PIPES



SECTION B-B



SECTION C-C

EROSION CONTROL PLAN LEGEND: [Symbol] TEMPORARY DIVERSION CULVERT (DESCRIBE - NUMBER & SIZE)