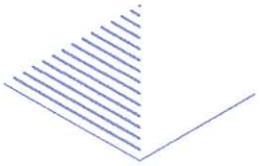
GREENE COUNTY CONSERVATION DISTRICT
GREENE COUNTY OFFICE BLDG., ROOM 215
93 EAST HIGH STREET
WAYNESBURG, PA 15370-1839



COBALT PROFESSIONAL SERVICES, INC.

JACKSON RUN FLOOD STUDY

FRANKLIN TOWNSHIP & WAYNESBURG BOROUGH
GREENE COUNTY, PA

JULY 27, 2004

PREPARED FOR:

GREENE COUNTY CONSERVATION DISTRICT
GREENE COUNTY OFFICE BUILDING
ROOM 215
93 EAST HIGH STREET
WAYNESBURG, PA 15370

COBALT PROFESSIONAL SERVICES, INC.
150 VALLEY ROAD
EIGHTY FOUR, PA 15330

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JACKSON RUN FLOOD STUDY

FRANKLIN TOWNSHIP & WAYNESBURG BOROUGH
GREENE COUNTY, PA

Prepared By:

Bruce E. Konsugar, P.E.

Cobalt Professional Services, Inc.
150 Valley Road
Eighty Four, PA 15330

(724) 942-6675

Scope

Cobalt Professional Services, Inc. was retained by the Greene County Conservation District to perform a study of the flooding problems that currently exist along a reach of Jackson Run located in Franklin Township and Waynesburg Borough, Greene County, PA. The area in question begins at the existing railroad embankment south of Greene Street and runs north approximately 2,200 l.f. to a point near the intersection of Woodland Avenue and 7th Street. More specifically, three discreet areas were studied within this reach: 1.)The reach just upstream of the existing 8 ft. x 8 ft. concrete box culvert through the existing railroad embankment south of Greene Street. 2.) The existing 60 in. RCP that intercepts Jackson Run approximately 170 l.f. north of High Street and routes the stream flow under and across High Street. 3.) An existing bridge over Jackson Run that provides access to apartment buildings near the intersection of Woodland Avenue and 7th Street. The study includes a topographic and planimetric survey of pertinent existing surface features, a hydrologic and hydraulic analysis of the study area, engineering design and preliminary design drawings.

Analysis

The existing drainage structures and stream channel were analyzed using the 25 yr./24 hr. storm as the design storm, a storm having a 4% probability of occurring every year. The analysis was performed working from downstream to upstream. Because of their proximity, the area upstream of the 8 ft. x 8 ft. railroad box culvert to the area upstream of the existing 60 in. RCP under High Street were analyzed as one. The bridge near the intersection of Woodland Avenue and 7th Street was analyzed separately.

I. Stream Sta. 11+50 to Sta. 21+87.94
8 ft. x 8 ft. Concrete Box Culvert to Inlet of 60 in. RCP

Analysis for this reach started at the 8 ft. x 8 ft. concrete box culvert that drains water through the existing railroad embankment. The contributing watershed at the inlet to the culvert is 600 acres and the estimated peak flow for the 25 yr./24 hr. storm is 570 cfs. Assuming normal flow occurs at the outfall of the culvert, the FHWA computer program HY-8 was used to estimate the water surface elevation at the inlet to the box culvert. Assuming an entrance loss of 0.5 velocity head, the estimated water surface elevation at the entrance to the 8 ft. x 8 ft. box culvert for the 25 yr./24 hr. storm is El. 928.97 ft.; approximately 1 ft. higher than the top of bank of the inlet channel and the surrounding out of bank area. Consequently, for the 25 yr./24 hr. storm, the configuration and alignment of the inlet channel are not factors controlling flooding in this area. However, the existing channel does have obstructions that will impede lower flows. By re-aligning and re-grading the channel to a trapezoidal section with an 8 ft. bottom width, 2:1(H:V) side slopes and a bed slope of 1.45%, the channel and culvert could handle an estimated flow of approximately 500 cfs, between the 10 yr./24 hr. storm and the 25 yr./24 hr.

storm. (See Dwg. No. P-5, Plan View, Dwg. No. PR-1, Stream Profile, and Dwg. No. SS-3, Stream Sections.)

The existing 10 ft. x 7 ft. concrete arch culvert under Greene Street was analyzed next to determine the estimated water surface elevation at its inlet. From the previous analysis, a tailwater elevation of 928.97 ft. was assumed at the culvert outfall. The computer program HY-8 was used to estimate the upstream water surface elevation. Assuming a peak flow of 560 cfs and an entrance loss of 0.5 velocity head, the estimated water surface elevation at the inlet of the 10 ft. x 7 ft. concrete arch culvert is 934.35 ft., which would be contained by the existing channel upstream of the arch culvert.

Next, an analysis was run on the channel upstream of the 10 ft. x 7 ft. concrete arch culvert to the outfall of the existing 60 in. RCP for the 25 yr./24 hr. storm. Using the estimated water surface elevation of 934.35 ft. at the inlet of the 10 ft. x 7 ft. concrete arch culvert, a water surface profile was created using the Army Corps of Engineers computer program Hec-Ras. This estimated water surface profile, which is shown on Dwg. No. PR-1, Stream Profile, stays in bank.

Next, an analysis of the existing 60 in. RCP was performed. The analysis of this structure was somewhat problematic due to unknown underground conditions associated with the pipe, which include but are not limited to: 1.) A buried bridge section for High Street. 2.) Varying types and diameters of buried pipes/conduits. 3.) Obstructions in the pipe/conduit. An analysis was run using the computer program HY-8 assuming the 60 in. RCP was continuous and unobstructed. From this run, the existing 60 in. RCP, at best will handle approximately 160 cfs, between a 1 yr./24 hr. storm and a 2 yr./24 hr. storm, storms with a probability of occurrence of 50% to almost 100% every year. The existing 60 in. RCP is the hydraulic control at this stream location. To increase the flow capacity in this section of Jackson Run to handle the 25 yr./24 hr. storm, the combination of channel/conduit needs to be modified. One alternative, albeit improbable, is to remove the existing pipe and create an open channel large enough to handle the 25 yr./24 hr. storm. Another alternative would be to remove the existing pipe/conduit system and replace it with a larger structure with increased capacity.

The contributing watershed upstream of the existing 60 in. RCP is 560 acres. Using the 25 yr./24 hr. storm as the design storm, the estimated peak flow is 560 cfs. (251,328 gpm) For this peak flow, a concrete box culvert, 12 ft. wide x 6 ft. high with an invert slope of 1.4% was assumed. The upstream invert elevation would be 935.50 ft., 1.96 ft. lower than the existing 60 in. RCP invert. Using the computer program HY-8 and an assumed tailwater elevation of 934.00 ft., the estimated water surface elevation at the inlet assuming an entrance loss of 0.5 velocity head would be 942.95 ft. This water surface elevation would provide approximately 1 ft. of freeboard from overtopping.

As an alternate to the concrete box culvert, a CSP arch culvert, 11 ft.-7 in. wide x 7 ft.-7 in. high was also analyzed. With an upstream invert of 934.50 ft., 2.96 ft. lower than the existing 60 in. RCP, the estimated water surface elevation at the inlet to the CSP arch would be 942.75 ft. which provides approximately 1.2 ft. of freeboard.

Because both proposed structures are wider and have lower inverts than the existing 60 in. RCP, the inlet channel would have to be modified. See Dwg. No. P-4, Plan View and Dwg. No. PR-1, Stream Profile for the proposed re-alignment and re-grading for the 12 ft. x 6 ft. box culvert scenario.

II. Bridge at Stream Sta. 2+59.60

The bridge located at Stream Sta. 2+59.60 provides access across Jackson Run to apartment buildings. The bridge is a clear span concrete structure. Accumulated sediment has built up under the bridge and restricted the flow area. The contributing watershed upstream of the bridge is 545 acres. Currently, the bridge and channel will handle approximately 150 cfs to 200 cfs, between a
2 yr./24 hr. storm and a 5 yr./24 hr. storm. By re-aligning and re-grading the upstream and downstream channel and removing the accumulated sediment in the bridge, the capacity of the bridge and channel could be increased to handle approximately 350 cfs, just under a 10 yr./24 hr. storm. The proposed channel re-grading would extend approximately 115 l.f. upstream and downstream from the bridge. The proposed channel section would be trapezoidal with a 6 ft. bottom width, 2:1(H:V) side slopes and a bottom slope of 1.06 %. See Dwg. No. P-3, Plan View, Dwg. No. PR-1, Stream Profile, Dwg. No. SS-1, Stream Sections and Dwg. No. SS-2, Stream Sections.

To increase the capacity of this section of Jackson Run to handle the peak flow from a 25 yr./24 hr. storm, approximately 460 cfs, the existing bridge would need to be replaced with a structure that would not restrict the flow area of the stream, either a new bridge, a concrete box culvert or a CSP culvert section. However, a CSP culvert large enough to handle the peak flow from the 25 yr./24 hr. storm would have a crown that was higher than Woodland Avenue. When cover requirements are factored in, the physical characteristics of the stream at this location make the use of a CSP culvert inappropriate.

III. Recommendations

To lessen the incidence of flooding in the study reach of Jackson Run, the following modifications are recommended:

1. For the open channel section between the existing 8 ft. x 8 ft. concrete box culvert through the railroad embankment and the outfall of the existing 10 ft. x 7 ft concrete arch culvert under Greene Street, re-align and re-grade the channel to the lines and grades shown on Dwg. No. P-5, Plan View, Dwg. No. PR-1, Stream Profile and Dwg. No. SS-3, Stream Sections.

2. For the open channel section between the existing 10 ft x 7 ft. concrete arch culvert under Greene Street and the 72 in. CMP outfall for the 60 in. RCP under High Street, trim the vegetation along the channel banks and remove any debris or rubbish in the channel.

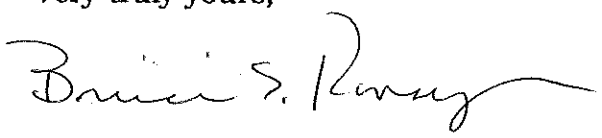
3. Replace the existing 60 in. RCP under High Street with a 12 ft. x 6 ft. concrete box culvert. Modify the inlet channel to accommodate the wider and deeper culvert.

4. Re-align and re-grade the channel upstream and downstream of the existing bridge over Jackson Run near the intersection of Woodland Avenue and 7th Street. Remove accumulated sediment under the bridge.

Copies of the watershed map, estimated peak rainfall amounts and computer program output are contained in the Appendix.

I appreciate the opportunity to provide this study. If you should have any questions or require any further information, please do not hesitate to call me.

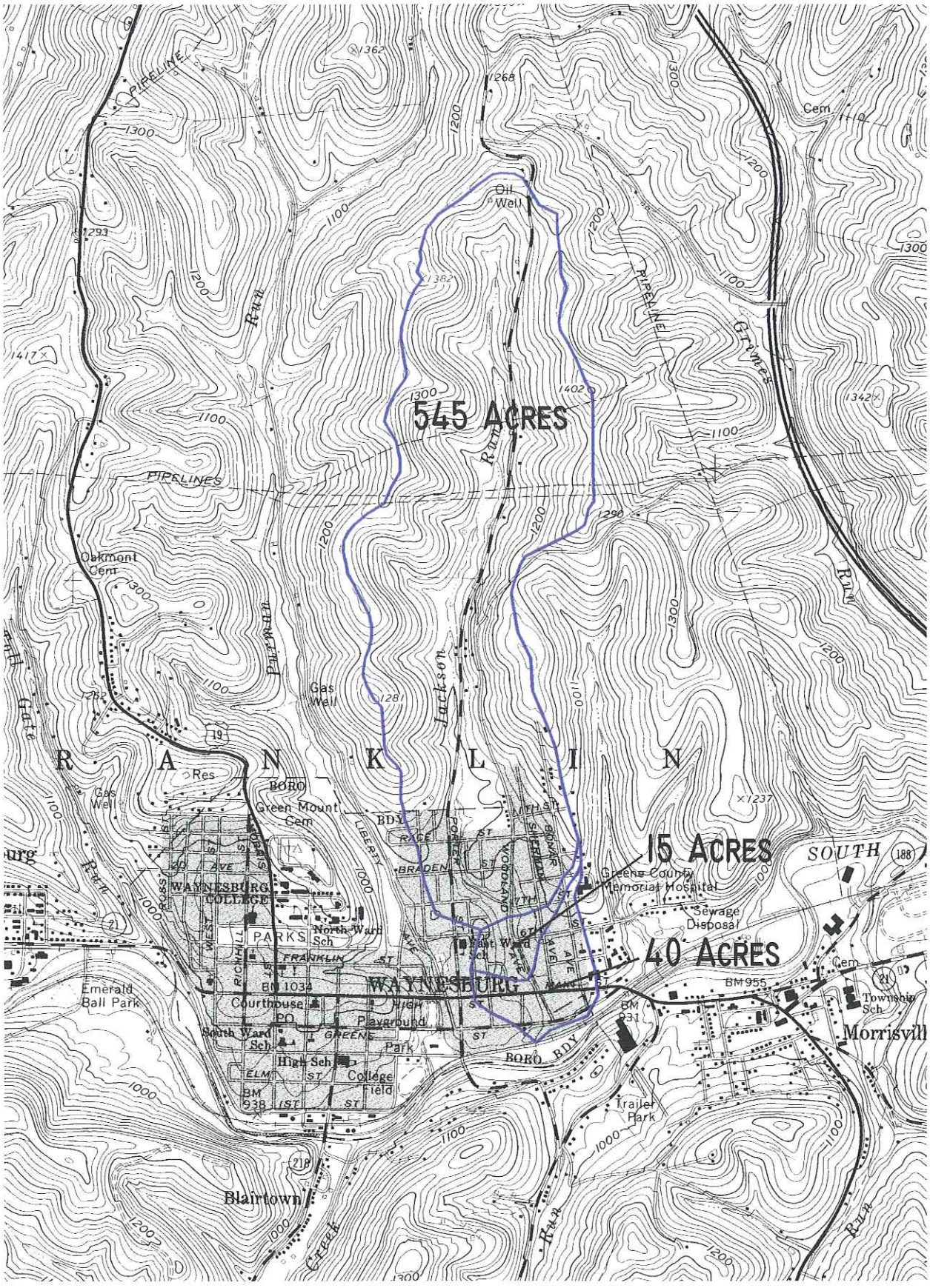
Very truly yours,



Bruce E. Konsugar, P.E.

APPENDIX

WATERSHED MAP



SCALE: 1"=2000'

JACKSON RUN FLOOD STUDY

ESTIMATED PEAK RAINFALL AMOUNTS

Storm Return Periods

LOCATION	1 yr	2 yr	5 yr	10 yr	25 yr	50 yr	100 yr
Bridge @ Apartment Building	90 cfs	130 cfs	260 cfs	360 cfs	460 cfs	565 cfs	630 cfs
60" Pipe	130 cfs	180 cfs	340 cfs	450 cfs	560 cfs	680 cfs	760 cfs
8'x8' Conc. Box Culvert	130 cfs	180 cfs	340 cfs	450 cfs	570 cfs	690 cfs	770 cfs

EXISTING 8 FT. x 8 FT. CONCRETE BOX CULVERT

FHWA HY-8
PROGRAM OUTPUT

CURRENT DATE: 07-07-2004 FILE DATE: 07-07-2004
CURRENT TIME: 07:45:08 FILE NAME: JR2197

FHWA CULVERT ANALYSIS
HY-8, VERSION 6.1

SITE DATA

INLET ELEV. (ft)	OUTLET ELEV. (ft)	CULVERT LENGTH (ft)
920.11	919.91	50.00

CULVERT SHAPE, MATERIAL, INLET

BARRELS	SHAPE	SPAN (ft)	RISE (ft)	MANNING n	INLET TYPE
1	IRCP	8.00	8.00	.012	CONVENTIONAL

SUMMARY OF CULVERT FLOWS (cfs) FILE: JR2197 DATE: 07-07-2004

ELEV (ft)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
925.16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
925.31	57.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
925.45	114.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
925.68	171.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
926.01	228.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
926.38	285.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
925.76	342.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
926.38	399.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
926.97	456.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
927.57	513.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
928.31	570.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	OVERTOPPING	

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: JR2197 DATE: 07-07-2004

HEAD ELEV (ft)	HEAD ERROR (ft)	TOTAL FLOW (cfs)	FLOW ERROR (cfs)	% FLOW ERROR
925.16	0.000	0.00	0.00	0.00
925.31	0.000	57.00	0.00	0.00
925.45	0.000	114.00	0.00	0.00
925.68	0.000	171.00	0.00	0.00
926.01	0.000	228.00	0.00	0.00
926.38	0.000	285.00	0.00	0.00
925.76	0.000	342.00	0.00	0.00
926.38	0.000	399.00	0.00	0.00
926.97	0.000	456.00	0.00	0.00
927.57	0.000	513.00	0.00	0.00
928.31	0.000	570.00	0.00	0.00

<1> TOLERANCE (ft) = 0.010 <2> TOLERANCE (%) = 1.000

CURRENT DATE: 07-07-2004 FILE DATE: 07-07-2004
CURRENT TIME: 07:45:08 FILE NAME: JR2197

PERFORMANCE CURVE FOR CULVERT 1 - 1(8.00 (ft) BY 8.00 (ft)) IRCP

DISCHARGE FLOW (cfs)	HEADWATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRIT. DEPTH (ft)	OUTLET DEPTH (ft)	TW DEPTH (ft)	OUTLET VEL. (fps)	TW VEL. (fps)
0.00	925.16	0.00	5.05	0-NF	0.00	0.00	0.00	5.25	0.00	0.00
57.00	925.31	1.75	5.20	3-M1t	1.08	1.25	5.25	5.25	1.39	0.00
114.00	925.45	2.72	5.34	3-M1t	1.70	1.95	5.25	5.25	2.78	0.00
171.00	925.68	3.53	5.57	3-M1t	2.21	2.54	5.25	5.25	4.17	0.00
228.00	926.01	4.25	5.90	3-M1t	2.69	3.05	5.25	5.25	5.56	0.00
285.00	926.38	4.95	6.27	3-M1t	3.14	3.52	5.25	5.25	6.95	0.00
342.00	925.76	5.65	5.65	1-S2n	3.58	3.97	3.72	5.25	11.90	0.00
399.00	926.38	6.27	6.27	1-S2n	4.01	4.37	4.13	5.25	12.44	0.00
456.00	926.97	6.86	6.86	1-S2n	4.42	4.78	4.54	5.25	12.91	0.00
513.00	927.57	7.46	7.46	1-S2n	4.84	5.15	4.93	5.25	13.34	0.00
570.00	928.31	8.20	8.20	5-S2n	5.24	5.52	5.32	5.25	13.71	0.00

El. inlet face invert 920.11 ft El. outlet invert 919.91 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT **********

INLET STATION	2196.60 ft
INLET ELEVATION	920.11 ft
OUTLET STATION	2246.60 ft
OUTLET ELEVATION	919.91 ft
NUMBER OF BARRELS	1
SLOPE (V/H)	0.0040
CULVERT LENGTH ALONG SLOPE	50.00 ft

***** CULVERT DATA SUMMARY **********

BARREL SHAPE	USER DEFINED
BARREL SPAN	8.00 ft
BARREL RISE	8.00 ft
BARREL MATERIAL	CONCRETE
BARREL MANNING'S n	0.012 FOR SIDES AND TOP
	0.012 FOR BOTTOM
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	HEADWALL
INLET DEPRESSION	NONE

***** USER DEFINED CULVERT CROSS-SECTION - CULVERT # 1

COORDINATE NUMBER	X (ft)	Y-TOP (ft)	Y-BOTTOM (ft)
1	0.00	7.00	1.00
2	1.00	8.00	0.00
3	7.00	8.00	0.00
4	8.00	7.00	1.00

URRENT DATE: 07-07-2004 FILE DATE: 07-07-2004
CURRENT TIME: 07:45:08 FILE NAME: JR2197

DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD
DDDDDDDDDDDDDDDDDDDDDDDDDD TAILWATER DDDDDDDDDDDDDDDDDDDDDDDDDD
DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD
DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD

CONSTANT WATER SURFACE ELEVATION
925.16

DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD
DDDDDDDDDDDDDDDDDDDDDDDDDD ROADWAY OVERTOPPING DATA DDDDDDDDDDDDDDDDDDDDDDDDDD
DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD

ROADWAY SURFACE	PAVED
EMBANKMENT TOP WIDTH	25.00 ft
CREST LENGTH	50.00 ft
OVERTOPPING CREST ELEVATION	950.00 ft

DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD

Jackson Run Study
Worksheet for Irregular Channel

Project Description	
Worksheet	8'x8' Railroad Culvert
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Slope	0.004000	ft/ft
Discharge	570.00	cfs

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Method	Improved Lotter's Method
Closed Channel Weighting Method	Horton's Method

Results		
Mannings Coefficient	0.012	
Water Surface Elevation	5.25	ft
Elevation Range	0.00 to 8.00	
Flow Area	41.0	ft²
Wetted Perimeter	17.33	ft
Top Width	8.00	ft
Actual Depth	5.25	ft
Critical Elevation	5.53	ft
Critical Slope	0.003496	ft/ft
Velocity	13.91	ft/s
Velocity Head	3.00	ft
Specific Energy	8.25	ft
Froude Number	1.08	
Flow Type	Supercritical	

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00	0+08	0.012

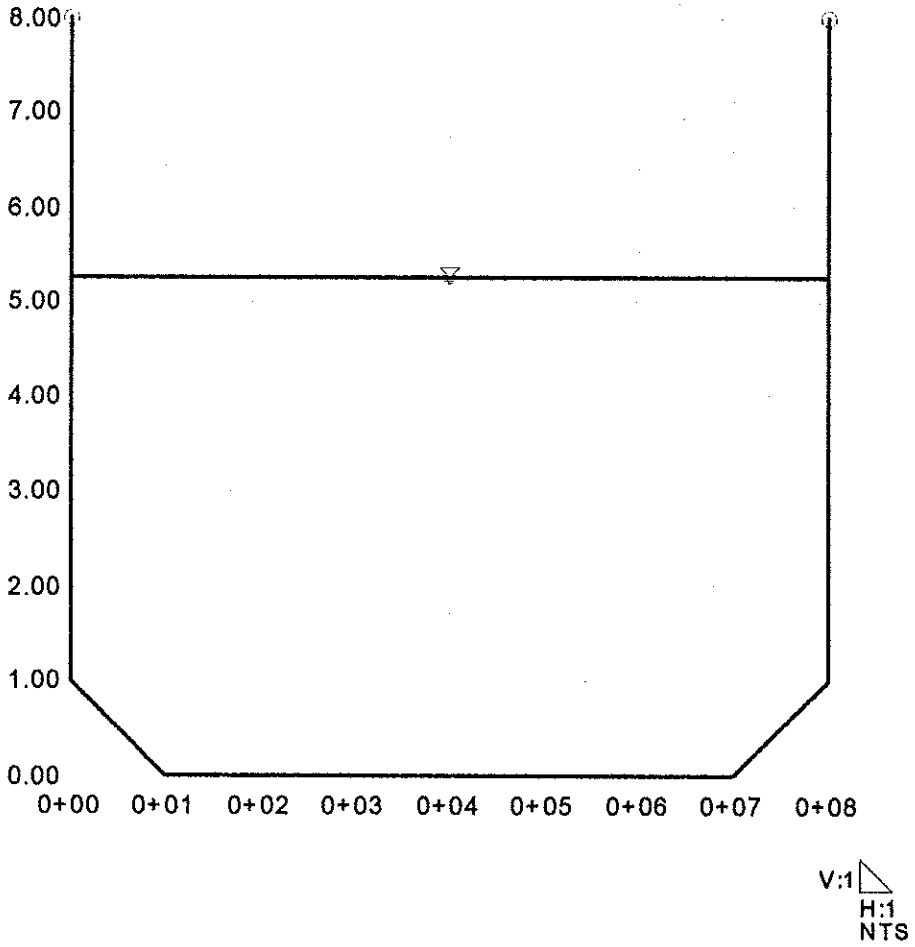
Natural Channel Points	
Station (ft)	Elevation (ft)
0+00	8.00
0+00	1.00
0+01	0.00
0+07	0.00
0+08	1.00
0+08	8.00

Cobalt Professional Services, Inc.
37 Brookside Road Waterbury, CT 06708 USA (203) 755-1666

Cross Section
Cross Section for Irregular Channel

Project Description	
Worksheet	8'x8' Railroad Culvert
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.012	
Slope	0.004000	ft/ft
Water Surface Elevation	5.25	ft
Elevation Range	0.00 to 8.00	
Discharge	570.00	cfs



Cobalt Professional Services, Inc.
37 Brookside Road Waterbury, CT 06708 USA (203) 755-1666

EXISTING 10 FT. x 7 FT. CONCRETE ARCH CULVERT

FHWA HY-8
PROGRAM OUTPUT

CURRENT DATE: 07-07-2004
CURRENT TIME: 15:03:39

FILE DATE: 07-07-2004
FILE NAME: JR1869

FHWA CULVERT ANALYSIS
HY-8, VERSION 6.1

SITE DATA

CULVERT SHAPE, MATERIAL, INLET

NO.	INLET ELEV. (ft)	OUTLET ELEV. (ft)	CULVERT LENGTH (ft)	BARRELS SHAPE MATERIAL	SPAN (ft)	RISE (ft)	MANNING n	INLET TYPE
1	925.63	924.14	107.01	1 IRCP	10.00	7.00	.012	CONVENTIONAL
2								
3								
4								
5								
6								

SUMMARY OF CULVERT FLOWS (cfs) FILE: JR1869 DATE: 07-07-2004

ELEV (ft)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
928.97	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
929.12	56.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
929.32	112.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
929.58	168.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
929.65	224.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
930.34	280.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
930.98	336.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
931.57	392.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
932.15	448.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
932.88	504.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
933.65	560.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	OVERTOPPING	

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: JR1869 DATE: 07-07-2004

HEAD ELEV (ft)	HEAD ERROR (ft)	TOTAL FLOW (cfs)	FLOW ERROR (cfs)	% FLOW ERROR
928.97	0.000	0.00	0.00	0.00
929.12	0.000	56.00	0.00	0.00
929.32	0.000	112.00	0.00	0.00
929.58	0.000	168.00	0.00	0.00
929.65	0.000	224.00	0.00	0.00
930.34	0.000	280.00	0.00	0.00
930.98	0.000	336.00	0.00	0.00
931.57	0.000	392.00	0.00	0.00
932.15	0.000	448.00	0.00	0.00
932.88	0.000	504.00	0.00	0.00
933.65	0.000	560.00	0.00	0.00

<1> TOLERANCE (ft) = 0.010 <2> TOLERANCE (%) = 1.000

CURRENT DATE: 07-07-2004 FILE DATE: 07-07-2004
CURRENT TIME: 15:03:39 FILE NAME: JR1869

PERFORMANCE CURVE FOR CULVERT 1 - 1(10.00 (ft) BY 7.00 (ft)) IRCP

DIS-CHARGE FLOW (cfs)	HEAD-WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRIT. DEPTH (ft)	OUTLET DEPTH (ft)	TW DEPTH (ft)	OUTLET VEL. (fps)	TW VEL. (fps)
0.00	928.97	0.00	3.34	0-NF	0.00	0.00	0.00	4.83	0.00	0.00
56.00	929.12	1.60	3.49	3-M1t	0.53	0.96	4.83	4.83	1.23	0.00
112.00	929.32	2.53	3.69	3-M1t	0.89	1.56	4.83	4.83	2.46	0.00
168.00	929.58	3.32	3.95	3-M1t	1.16	2.05	4.83	4.83	3.68	0.00
224.00	929.65	4.02	4.02	1-S2n	1.43	2.47	1.65	4.83	13.60	0.00
280.00	930.34	4.71	4.71	1-S2n	1.64	2.86	1.95	4.83	14.34	0.00
336.00	930.98	5.35	5.35	1-S2n	1.86	3.22	2.22	4.83	15.14	0.00
392.00	931.57	5.94	5.94	1-S2n	2.07	3.58	2.52	4.83	15.66	0.00
448.00	932.15	6.52	6.52	1-S2n	2.28	3.90	2.78	4.83	16.22	0.00
504.00	932.88	7.25	7.25	5-S2n	2.48	4.23	3.03	4.83	16.85	0.00
560.00	933.65	8.02	8.02	5-S2n	2.68	4.53	3.31	4.83	17.21	0.00

El. inlet face invert 925.63 ft El. outlet invert 924.14 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT **********

INLET STATION	1869.40 ft
INLET ELEVATION	925.63 ft
OUTLET STATION	1976.40 ft
OUTLET ELEVATION	924.14 ft
NUMBER OF BARRELS	1
SLOPE (V/H)	0.0139
CULVERT LENGTH ALONG SLOPE	107.01 ft

***** CULVERT DATA SUMMARY **********

BARREL SHAPE	USER DEFINED
BARREL SPAN	10.00 ft
BARREL RISE	7.00 ft
BARREL MATERIAL	CONCRETE
BARREL MANNING'S n	0.012 FOR SIDES AND TOP
	0.012 FOR BOTTOM
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	HEADWALL
INLET DEPRESSION	NONE

CURRENT DATE: 07-07-2004
CURRENT TIME: 15:03:39

FILE DATE: 07-07-2004
FILE NAME: JR1869

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***** USER DEFINED CULVERT CROSS-SECTION - CULVERT # 1

COORDINATE NUMBER	X (ft)	Y-TOP (ft)	Y-BOTTOM (ft)
1	0.00	2.00	0.00
2	1.00	5.00	0.00
3	2.00	6.00	0.00
4	3.00	6.58	0.00
5	4.00	6.90	0.00
6	5.00	7.00	0.00
7	6.00	6.90	0.00
8	7.00	6.58	0.00
9	8.00	6.00	0.00
10	9.00	5.00	0.00
11	10.00	2.00	0.00

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CURRENT DATE: 07-07-2004
CURRENT TIME: 15:03:39

FILE DATE: 07-07-2004
FILE NAME: JR1869

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DDDDDDDDDDDDDDDDDDDDDDDDDD TAILWATER DDDDDDDDDDDDDDDDDDDDDDDDDD
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CONSTANT WATER SURFACE ELEVATION
928.97

DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD
DDDDDDDDDDDDDDDDDDDDDDDDDD ROADWAY OVERTOPPING DATA DDDDDDDDDDDDDDDDDDDDDDDDDD
DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD

ROADWAY SURFACE	PAVED
EMBANKMENT TOP WIDTH	25.00 ft
CREST LENGTH	80.00 ft
OVERTOPPING CREST ELEVATION	950.00 ft

DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD

STREAM STA. 17+06.40 to STREAM STA. 18+69.40

HEC-RAS
PROGRAM OUTPUT

HEC-RAS Plan: JR1869 River: JACKSON RUN Reach: REACH2 Profile: PF 1

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
REACH2	150	560.00	928.62	933.94		935.13	0.009920	8.73	64.14	17.30	0.80
REACH2	125	560.00	928.29	934.23		934.78	0.003911	5.96	94.03	24.51	0.54
REACH2	100	560.00	927.90	934.29		934.65	0.002269	4.82	116.08	27.17	0.41
REACH2	75	560.00	927.67	934.30		934.58	0.001599	4.25	131.76	29.07	0.35
REACH2	50	560.00	926.78	934.36		934.52	0.000750	3.17	176.87	35.19	0.25
REACH2	25	560.00	926.00	934.36		934.49	0.000574	2.82	198.52	38.69	0.22
REACH2	0	560.00	925.63	934.35	929.44	934.48	0.000562	2.88	194.47	34.60	0.21

EXISTING 60 IN. REINFORCED CONCRETE PIPE

FHWA HY-8
PROGRAM OUTPUT

CURRENT DATE: 07-29-2004
CURRENT TIME: 09:47:30

FILE DATE: 07-29-2004
FILE NAME: JR60IN

FHWA CULVERT ANALYSIS
HY-8, VERSION 6.1

SITE DATA

CULVERT SHAPE, MATERIAL, INLET

NO.	INLET ELEV. (ft)	OUTLET ELEV. (ft)	CULVERT LENGTH (ft)	BARRELS SHAPE	MATERIAL	SPAN (ft)	RISE (ft)	MANNING n	INLET TYPE
1	937.46	928.84	474.50	1	RCP	5.00	5.00	.012	CONVENTIONAL
2									
3									
4									
5									
6									

SUMMARY OF CULVERT FLOWS (cfs) FILE: JR60IN DATE: 07-29-2004

ELEV (ft)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
937.46	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
940.42	56.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
942.04	112.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
943.69	168.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
945.90	224.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
948.81	280.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
952.40	336.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
956.60	392.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
961.44	448.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
967.23	504.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
974.67	560.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	OVERTOPPING	

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: JR60IN DATE: 07-29-2004

HEAD ELEV (ft)	HEAD ERROR (ft)	TOTAL FLOW (cfs)	FLOW ERROR (cfs)	% FLOW ERROR
937.46	0.000	0.00	0.00	0.00
940.42	0.000	56.00	0.00	0.00
942.04	0.000	112.00	0.00	0.00
943.69	0.000	168.00	0.00	0.00
945.90	0.000	224.00	0.00	0.00
948.81	0.000	280.00	0.00	0.00
952.40	0.000	336.00	0.00	0.00
956.60	0.000	392.00	0.00	0.00
961.44	0.000	448.00	0.00	0.00
967.23	0.000	504.00	0.00	0.00
974.67	0.000	560.00	0.00	0.00

<1> TOLERANCE (ft) = 0.010 <2> TOLERANCE (%) = 1.000

URRENT DATE: 07-29-2004
URRENT TIME: 09:47:30
FILE DATE: 07-29-2004
FILE NAME: JR60IN

PERFORMANCE CURVE FOR CULVERT 1 - 1(5.00 (ft) BY 5.00 (ft)) RCP

DIS-CHARGE FLOW (cfs)	HEAD-WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRIT. DEPTH (ft)	OUTLET DEPTH (ft)	TW DEPTH (ft)	OUTLET VEL. (fps)	TW VEL. (fps)
0.00	937.46	0.00	0.00	0-NF	0.00	0.00	0.00	5.16	0.00	0.00
56.00	940.42	2.96	2.96	1-S1f	1.27	2.09	2.20	5.16	6.72	0.00
112.00	942.04	4.58	4.58	1-S1f	1.85	3.02	3.20	5.16	8.45	0.00
168.00	943.69	6.23	6.23	1-S1f	2.32	3.70	3.90	5.16	10.24	0.00
224.00	945.90	8.44	8.44	1-S1f	2.75	4.21	4.40	5.16	12.27	0.00
280.00	948.81	11.35	5.91	4-FFt	3.19	4.63	3.19	5.16	21.22	0.00
336.00	952.40	14.94	10.04	4-S2n	3.66	5.00	3.75	5.16	21.32	0.00
392.00	956.60	19.14	14.92	4-S2n	4.28	5.00	4.90	5.16	20.17	0.00
448.00	961.44	23.98	20.55	4-S2n	5.00	5.00	4.90	5.16	23.06	0.00
504.00	967.23	29.77	26.93	4-S2n	5.00	5.00	4.90	5.16	25.94	0.00
560.00	974.67	37.21	34.06	4-S2n	5.00	5.00	4.90	5.16	28.82	0.00

El. inlet face invert 937.46 ft El. outlet invert 928.84 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT **********

INLET STATION	1231.98 ft
INLET ELEVATION	937.46 ft
OUTLET STATION	1706.40 ft
OUTLET ELEVATION	928.84 ft
NUMBER OF BARRELS	1
SLOPE (V/H)	0.0182
CULVERT LENGTH ALONG SLOPE	474.50 ft

***** CULVERT DATA SUMMARY **********

BARREL SHAPE	CIRCULAR
BARREL DIAMETER	5.00 ft
BARREL MATERIAL	CONCRETE
BARREL MANNING'S n	0.012
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	SQUARE EDGE WITH HEADWALL
INLET DEPRESSION	NONE

URRENT DATE: 07-29-2004
URRENT TIME: 09:47:30

FILE DATE: 07-29-2004
FILE NAME: JR60IN

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DDDDDDDDDDDDDDDDDDDDDDDDD TAILWATER DDDDDDDDDDDDDDDDDDDDDDDDDDD
DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD
DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD

CONSTANT WATER SURFACE ELEVATION
934.00

DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD
DDDDDDDDDDDDDDDDDDDDDDDDDDD ROADWAY OVERTOPPING DATA DDDDDDDDDDDDDDDDDDDDDDDDDD
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ROADWAY SURFACE	GRAVEL
EMBANKMENT TOP WIDTH	100.00 ft
CREST LENGTH	50.00 ft
OVERTOPPING CREST ELEVATION	944.00 ft

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PROPOSED 12 FT. x 6 FT. CONCRETE BOX CULVERT

FHWA HY-8
PROGRAM OUTPUT

CURRENT DATE: 07-29-2004
CURRENT TIME: 13:29:33

FILE DATE: 07-29-2004
FILE NAME: JR12X6

FHWA CULVERT ANALYSIS
HY-8, VERSION 6.1

SITE DATA

CULVERT SHAPE, MATERIAL, INLET

NO.	INLET ELEV. (ft)	OUTLET ELEV. (ft)	CULVERT LENGTH (ft)	BARRELS SHAPE MATERIAL	SPAN (ft)	RISE (ft)	MANNING n	INLET TYPE
1	935.50	928.40	474.47	1 RCB	12.00	6.00	.012	CONVENTIONAL
2								
3								
4								
5								
6								

SUMMARY OF CULVERT FLOWS (cfs) FILE: JR12X6 DATE: 07-29-2004

ELEV (ft)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
935.50	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
937.00	56.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
937.86	112.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
938.59	168.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
939.22	224.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
939.81	280.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
940.36	336.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
940.89	392.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
941.41	448.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
941.94	504.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
942.47	560.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	OVERTOPPING	

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: JR12X6 DATE: 07-29-2004

HEAD ELEV (ft)	HEAD ERROR (ft)	TOTAL FLOW (cfs)	FLOW ERROR (cfs)	% FLOW ERROR
935.50	0.000	0.00	0.00	0.00
937.00	0.000	56.00	0.00	0.00
937.86	0.000	112.00	0.00	0.00
938.59	0.000	168.00	0.00	0.00
939.22	0.000	224.00	0.00	0.00
939.81	0.000	280.00	0.00	0.00
940.36	0.000	336.00	0.00	0.00
940.89	0.000	392.00	0.00	0.00
941.41	0.000	448.00	0.00	0.00
941.94	0.000	504.00	0.00	0.00
942.47	0.000	560.00	0.00	0.00

<1> TOLERANCE (ft) = 0.010 <2> TOLERANCE (%) = 1.000

URRENT DATE: 07-29-2004 FILE DATE: 07-29-2004
CURRENT TIME: 13:29:33 FILE NAME: JR12X6

PERFORMANCE CURVE FOR CULVERT 1 - 1(12.00 (ft) BY 6.00 (ft)) RCB

DIS-CHARGE FLOW (cfs)	HEAD-WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRIT. DEPTH (ft)	OUTLET DEPTH (ft)	TW DEPTH (ft)	OUTLET VEL. (fps)	TW VEL. (fps)
0.00	935.50	0.00	0.00	0-NF	0.00	0.00	0.00	5.60	0.00	0.00
56.00	937.00	1.50	1.50	1-S2n	0.46	0.88	0.38	5.60	12.29	0.00
112.00	937.86	2.36	2.36	1-S2n	0.76	1.40	0.70	5.60	13.40	0.00
168.00	938.59	3.09	3.09	1-S2n	0.99	1.83	0.93	5.60	15.06	0.00
224.00	939.22	3.72	3.72	1-S2n	1.22	2.22	1.12	5.60	16.72	0.00
280.00	939.81	4.31	4.31	1-S2n	1.39	2.57	1.43	5.60	16.35	0.00
336.00	940.36	4.86	4.86	1-S2n	1.57	2.90	1.60	5.60	17.45	0.00
392.00	940.89	5.39	5.39	1-S2n	1.75	3.22	1.80	5.60	18.16	0.00
448.00	941.41	5.91	5.91	1-S2n	1.91	3.52	1.98	5.60	18.87	0.00
504.00	941.94	6.44	6.44	5-S2n	2.06	3.81	2.16	5.60	19.48	0.00
560.00	942.47	6.97	6.97	5-S2n	2.22	4.08	2.33	5.60	20.00	0.00

El. inlet face invert 935.50 ft El. outlet invert 928.40 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT **********

INLET STATION	1231.98 ft
INLET ELEVATION	935.50 ft
OUTLET STATION	1706.40 ft
OUTLET ELEVATION	928.40 ft
NUMBER OF BARRELS	1
SLOPE (V/H)	0.0150
CULVERT LENGTH ALONG SLOPE	474.47 ft

***** CULVERT DATA SUMMARY **********

BARREL SHAPE	BOX
BARREL SPAN	12.00 ft
BARREL RISE	6.00 ft
BARREL MATERIAL	CONCRETE
BARREL MANNING'S n	0.012
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	SQUARE EDGE (90-45 DEG.)
INLET DEPRESSION	NONE

URRENT DATE: 07-29-2004 FILE DATE: 07-29-2004
URRENT TIME: 13:29:33 FILE NAME: JR12X6

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DDDDDDDDDDDDDDDDDDDDDDDDD TAILWATER DDDDDDDDDDDDDDDDDDDDDDDDD
DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD
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CONSTANT WATER SURFACE ELEVATION
934.00

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DDDDDDDDDDDDDDDDDDDDDDDDDD ROADWAY OVERTOPPING DATA DDDDDDDDDDDDDDDDDDDDDDDDD
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ROADWAY SURFACE	GRAVEL
EMBANKMENT TOP WIDTH	100.00 ft
CREST LENGTH	50.00 ft
OVERTOPPING CREST ELEVATION	944.00 ft

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PROPOSED 11 FT.-10 IN. x 7 FT.-7 IN. CORRUGATED STEEL PLATE ARCH PIPE

FHWA HY-8
PROGRAM OUTPUT

CURRENT DATE: 07-29-2004
CURRENT TIME: 09:41:17

FILE DATE: 07-23-2004
FILE NAME: JR-ARCH

FHWA CULVERT ANALYSIS
HY-8, VERSION 6.1

SITE DATA

CULVERT SHAPE, MATERIAL, INLET

NO.	INLET ELEV. (ft)	OUTLET ELEV. (ft)	CULVERT LENGTH (ft)	BARRELS SHAPE	MATERIAL	SPAN (ft)	RISE (ft)	MANNING n	INLET TYPE
1	934.50	928.84	474.45	1	CSPA	11.82	7.61	.033	CONVENTIONAL
2									
3									
4									
5									
6									

SUMMARY OF CULVERT FLOWS (cfs) FILE: JR-ARCH DATE: 07-23-2004

ELEV (ft)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
934.50	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
936.38	56.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
937.28	112.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
938.04	168.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
938.72	224.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
939.34	280.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
939.94	336.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
940.51	392.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
941.07	448.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
941.65	504.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
942.27	560.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	OVERTOPPING	

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: JR-ARCH DATE: 07-23-2004

HEAD ELEV (ft)	HEAD ERROR (ft)	TOTAL FLOW (cfs)	FLOW ERROR (cfs)	% FLOW ERROR
934.50	0.000	0.00	0.00	0.00
936.38	0.000	56.00	0.00	0.00
937.28	0.000	112.00	0.00	0.00
938.04	0.000	168.00	0.00	0.00
938.72	0.000	224.00	0.00	0.00
939.34	0.000	280.00	0.00	0.00
939.94	0.000	336.00	0.00	0.00
940.51	0.000	392.00	0.00	0.00
941.07	0.000	448.00	0.00	0.00
941.65	0.000	504.00	0.00	0.00
942.27	0.000	560.00	0.00	0.00

<1> TOLERANCE (ft) = 0.010 <2> TOLERANCE (%) = 1.000

URRENT DATE: 07-29-2004
URRENT TIME: 09:41:17
FILE DATE: 07-23-2004
FILE NAME: JR-ARCH

PERFORMANCE CURVE FOR CULVERT 1 - 1(11.82 (ft) BY 7.61 (ft)) CSPA

DIS-CHARGE FLOW (cfs)	HEAD-WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRIT. DEPTH (ft)	OUTLET DEPTH (ft)	TW DEPTH (ft)	OUTLET VEL. (fps)	TW VEL. (fps)
0.00	934.50	0.00	0.00	0-NF	0.00	0.00	0.00	5.16	0.00	0.00
56.00	936.38	1.82	1.88	3-M1t	1.31	1.18	5.16	5.16	1.03	0.00
112.00	937.28	2.68	2.78	3-M1t	1.90	1.75	5.16	5.16	2.07	0.00
168.00	938.04	3.40	3.54	3-M1t	2.40	2.20	5.16	5.16	3.10	0.00
224.00	938.72	4.05	4.22	3-M1t	2.85	2.58	5.16	5.16	4.14	0.00
280.00	939.34	4.66	4.84	3-M1t	3.29	2.94	5.16	5.16	5.17	0.00
336.00	939.94	5.23	5.44	3-M1t	3.71	3.27	5.16	5.16	6.20	0.00
392.00	940.51	5.76	6.01	3-M1t	4.15	3.58	5.16	5.16	7.24	0.00
448.00	941.07	6.29	6.57	3-M1t	4.59	3.87	5.16	5.16	8.27	0.00
504.00	941.65	6.81	7.15	3-M1t	5.08	4.14	5.16	5.16	9.31	0.00
560.00	942.27	7.35	7.77	3-M2t	5.63	4.41	5.16	5.16	10.34	0.00

El. inlet face invert 934.50 ft El. outlet invert 928.84 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT **********

INLET STATION	1231.98 ft
INLET ELEVATION	934.50 ft
OUTLET STATION	1706.40 ft
OUTLET ELEVATION	928.84 ft
NUMBER OF BARRELS	1
SLOPE (V/H)	0.0119
CULVERT LENGTH ALONG SLOPE	474.45 ft

***** CULVERT DATA SUMMARY **********

BARREL SHAPE	PIPE ARCH
BARREL SPAN	11.82 ft
BARREL RISE	7.61 ft
BARREL MATERIAL	STEEL STRUCTURAL PLATE
BARREL MANNING'S n	0.033
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	HEADWALL
INLET DEPRESSION	NONE

URRENT DATE: 07-29-2004
URRENT TIME: 09:41:17

FILE DATE: 07-23-2004
FILE NAME: JR-ARCH

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CONSTANT WATER SURFACE ELEVATION
934.00

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DDDDDDDDDDDDDDDDDDDDDDDDDD ROADWAY OVERTOPPING DATA DDDDDDDDDDDDDDDDDDDDDDDDDD
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ROADWAY SURFACE	GRAVEL
EMBANKMENT TOP WIDTH	50.00 ft
CREST LENGTH	50.00 ft
OVERTOPPING CREST ELEVATION	950.00 ft

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