HYDROLOGY REPORT

The drainage basin characteristics for Meddybemps Bridge #3736 in Meddybemps over Dennys River were provided by the Maine Department of Transportation Office of the Environmental Hydrology. Due to the dam immediately upstream from the bridge and a second outlet from Meddybemps Lake the flows computed based on the 1999 USGS full regression equation were deemed inaccurate. Flows were scaled from the annual maxima at the Dennys River gage (#01021200; Dennys River at Dennysville, ME). Hydrology data was used as provided:

Summary

Drainage Area	44.7	mi^2
April	200	ft^3 / s
$Q_{1.1}$	532	ft^3 / s
Q_{10}	1,506	ft^3 / s
Q_{25}	1,935	ft^3 / s
Q_{50}	2,297	ft^3 / s
Q_{100}	2,700	ft^3 / s
Q_{500}	3,820	ft^3 / s

Reported By: Brian Reeves
Date: April 23, 2014

Meddybemps Bridge #3736 is located in the town of Meddybemps on Main Street (ME 191) over the Dennys River. The existing bridge built in 1940 consists of reinforced concrete rigid frame with a span of 25' founded on bedrock.

The project site of Meddybemps Bridge is complex hydraulically. Upstream of the existing bridge are three dams. The furthest upstream dam is at the outlet of Meddybemps Lake followed by an inactive rock dam, and an inactive hydroelectric dam. Both inactive dams have been partially removed. At the lake outlet Denny's River is a narrow channel cut into bedrock. Just 100 feet downstream the river widens into a large pool created by the rock dam remains. Some of the boulders from the rock dam are still in the river downstream creating a narrow, shallow and swift section. The old hydroelectric dam chokes the river to approximately twelve feet and has a five foot drop in elevation from upstream to the downstream end (~20 feet). The channel is lined by steep, mortared riprap slopes between the hydroelectric dam and existing bridge. For 100 feet below the bridge the channel is nearly straight with limited channel slope, appears to have been dredged. Streambed is characteristically cobble and gravel with little debris or growth in the channel. As the channel slope levels off toward the downstream limits of survey some grass encroaches on the channel.

Over bank conditions vary significantly from left bank to right bank and upstream to downstream. From the lake outlet to the rock dam the right bank has light to medium dense brush and small trees (maple, birch, oak and pine) near the river bank followed by an overgrown grass field with a few scattered trees. Between the rock dam and hydroelectric dam the shoreline is armored with stone riprap with saplings (birch and pine) growing through. The overgrown grass field extends along the armored bank to the dam and up to the road. Downstream of the bridge the right bank is similar to that of upstream with a wider area of more mature trees in the bank area, some undergrowth with a fair amount of fallen branches and boulders followed by an overgrown grass field with a few scattered trees. The farther from the bridge and flatter the river gets the more brush is found in the right bank. The left bank of the river at the lake outlet consists of a mowed lawn. The remainder of the left bank above the hydroelectric dam is a fairly dense stand of trees (primarily birch and maple) with thick undergrowth. Immediately adjacent to the hydroelectric dam are the foundation remains of several structures overgrown by trees (birch and maple) and light brush. Immediately downstream from the bridge the left bank is a mix of large and young trees with limited undergrowth. Toward the downstream extent of survey larger trees (oak) and young trees exist with a greater extent of brush and grass undergrowth.

Existing Bridge

The existing bridge is located in the expansion zone following the restriction caused by the old hydroelectric dam. The opening of the existing concrete rigid frame is approximately twice that of the old hydroelectric dam and is therefore not a significant constriction to flow on the Denny's River.

Analysis was performed using the HEC-RAS program version 4.1.0. The existing structure was modeled as a 25' span bridge with varying superstructure depth. Superstructure depth varied from 2'-1" at the abutments to 11" at the center. Low chords for the Left abutment, center and right abutment are 168.94, 169.71, 168.98 respectively based on NAVD of 1988. The Denny's River was modeled with a natural stream bottom based on cross-sections cut from the CADD survey file. Downstream

reach boundary conditions were based on normal depth analysis with a stream slope of 0.0165 ft/ft. The initial run, modeling the partially removed hydroelectric dam as an inline structure with an open gate, was inaccurate based on site visits for Q1.1 to Q2 flows. Two additional runs were made modeling the dam as a box culvert which proved more favorable results to observed conditions. The existing bridge is adequate in terms of hydraulics having a freeboard at Q50 of 10.27' and no scour.

70' Bridge Alternative

The 70' bridge alternative was analyzed using the HEC-RAS program version 4.1.0. The proposed alternative is a 70' simple span steel or precast, prestressed concrete NEXT E beam. Knowing that freeboard is not a problem at this location the 70' alternative was modeled with a constant superstructure depth of 4.17', representing the deeper steel superstructure, and a low chord of 169.92' based on NAVD of 1988. The substructure consists of integral abutments founded on pile rock socketed in bedrock. The Denny's River was modeled with a natural stream bottom based on cross-sections cut from the CADD survey file. Downstream reach boundary conditions were based on normal depth analysis with a stream slope of 0.0165 ft/ft. The cross-sections upstream of the bridge were modified to account for the removal of the existing bridge and placement of plain riprap slope protection. Freeboard at Q50 is 10.89'. Headwater decreases 0.28' at Q50 while outlet velocity decreases 7.33 ft/s.

40' Bridge Alternative

The proposed bridge was analyzed using the HEC-RAS program version 4.1.0. The proposed alternative is a 40' simple span precast, prestressed concrete voided slab with a constant superstructure depth of 2.75' and a low chord of 171.47' based on NAVD of 1988. The substructure will be cantilever abutments founded on bedrock. The Denny's River was modeled with a natural stream bottom based on cross-sections cut from the CADD survey file. Downstream reach boundary conditions were based on normal depth analysis with a stream slope of 0.0165 ft/ft. The cross-sections upstream of the bridge were modified to account for the removal of the existing bridge and placement of plain riprap slope protection. Freeboard at Q50 is 11.8'. Headwater increases 0.27' at Q50 while outlet velocity decreases 5.11 ft/s.

Fish Passage

The Denny's River is critical habitat for Atlantic Salmon, as such it was important to not only look at the typical hydraulics but also low flows associated with fish migration and spawning. Water velocities at the discharges of the monthly median flows in August (10 CFS), March and June (100 CFS) and peak flows in April (180 CFS) were analyzed for their potential effect on Atlantic salmon passage and Atlantic salmon use of the area as habitat. High quality Atlantic salmon juvenile habitat contains water velocities between 1 FPS and 4 FPS. Atlantic salmon adults have swimming capabilities that allow them to migrate against water velocities of up to 9.3 FPS. Both replacement alternatives performed similarly. The minimum velocities during low flows were 1.1 FPS and the maximum velocities in April were 4.5 FPS.

Summary

Either replacement alternative is acceptable as both improve hydraulic conditions compared to existing conditions. The 70' alternative performs better at high flows, but is comparable at low flows to the 40' alternative. The increased hydraulic opening of the new structure will reduce flow velocity and increase freeboard. The final decision on which alternative to use will be based on other factors besides hydraulics such as initial cost, constructability, and traffic control.

		Existing Structure	Recommended Structure	70' Span Steel or NEXT E
		25' Span Rigid Frame	40' Span Voided Slab	
Total Area of Waterway Opening	ft^2	391	665	900
Headwater elevation @ April Flow	ft	154.09	153.20	153.20
Headwater elevation @ $Q_{1.1}$	ft	156.32	154.84	154.84
Headwater elevation @ Q_{10}	ft	157.82	157.88	157.62
Headwater elevation @ Q_{25}	ft	158.73	158.91	158.50
Headwater elevation @ Q_{50}	ft	159.44	159.67	159.16
Headwater elevation @ Q_{100}	ft	160.20	160.42	159.80
Headwater elevation @ Q_{500}	ft	162.13	162.33	161.28
Freeboard @ Q_{50}	ft	10.27	11.80	10.89
Freeboard @ Q_{100}	ft	8.74	11.05	10.25
Outlet Velocity @ April Flow	ft/s	5.41	3.90	3.90
Outlet Velocity @ $Q_{1.1}$	ft/s	8.88	5.75	5.70
Outlet Velocity @ Q_{10}	ft/s	12.71	8.14	6.96
Outlet Velocity @ Q_{25}	ft/s	13.85	8.93	7.20
Outlet Velocity @ Q_{50}	ft/s	14.72	9.61	7.39
Outlet Velocity @ Q_{100}	ft/s	15.59	10.40	7.62
Outlet Velocity @ Q_{500}	ft/s	17.65	12.97	8.43

Reported By: Brian Reeves
Date: April 23, 2014

Note: -All elevations based on North American Vertical Datum (NAVD) of 1988.
-Headwater elevation for new alternatives taken at different cross-section than existing.

APPENDIX E

Hydrology & Hydraulic Data

Environmental Office – Hydrology Section
16 State House Station
Augusta ME 04333-0016
207.557.1052
Charles.Hebson@maine.gov

Maine Department of Transportation

Memo

To: Brian Reeves

From: Charles Hebson

CC:

Date: 22 September 2013; rev. 10 February 2014

Re: 20506 Meddybemps Bridge #3736 - Dennys River

The final recommended design hydrology is summarized in Table 1 and Figure 1 (triangular points) below.

Table 1. Design Hydrology Summary

Area (mi^2)			44.7	92.8	
NWI (%) (actual)			43.9	--	
NWI (%) (fit)			14.8*		
Return Period T	**Exceedance Prob P_{ex}**	**Area exponent "a"**	***Final Recommended Q_T (ft^3/s)***	**USGS gage (1955-2012) Bull. 17B Est.**	**USGS gage (1955-2012) Systematic Record**
1.005	0.995	0.855	***383***	635	720
1.01	0.990	0.855	***404***	687	759
1.05	0.952	0.852	***479***	860	898
1.1	0.909	0.850	***532***	975	994
1.5	0.667	0.836	***706***	1328	1307
2	0.500	0.825	***835***	1567	1533
5	0.200	0.797	***1212***	2204	2181
10	0.100	0.783	***1506***	2659	2683
25	0.040	0.767	***1935***	3271	3406
50	0.020	0.757	***2297***	2754	4014
100	0.010	0.748	***2700***	4261	4686
500	0.002	0.729	***3820***	5549	6538

Notes: Q_T at project = $(A_{ws}/A_{gage})^a \times Q_{T\text{-}gage}$, using "systematic record" results at gage

USGS Gage #01021200, "Dennys River at Dennysville, Maine"

NWI fitted value of 14.8% has no physical significance

Project Name:	Meddybemps Lake Outlet	**PIN:**	20506
Stream Name:	Dennys River	**Town:**	Meddybemps
Bridge Name:	0	**Bridge No.**	3987
Route No.	ME 191	**USGS Quad:**	
Analysis by:	CSH	**Date:**	12/1/2008

DO NOT ENTER ANY DATA ON THIS PAGE; EVERYTHING IS CALCULATED

MAINE MONTHLY MEDIAN FLOWS BY USGS REGRESSION EQUATIONS (2004)

Worksheet prepared by:
Charles S. Hebson, PE
Chief Hydrologist
Maine Dept. Transportation
Augusta, ME 04333-0016
207-624-3073
Charles.Hebson@maine.gov

	Value	Variable	Explanation
	44.402	*A*	Area (mi^2)
625521	4992008	P_c	Watershed centroid (E,N; UTM; Zone 19; meters)
	48.08	*DIST*	Distance from Coastal reference line (mi)
	44.2	*pptA*	Mean Annual Precipitation (inches)
	0.00	*SG*	Sand & Gravel Aquifer (decimal fraction of watershed area)

Month	Q_{median} (ft3/s)	(m^3/s)
Jan	**55.11**	1.5619
Feb	**55.11**	1.5619
Mar	**97.52**	2.7637
Apr	**180.92**	5.1272
May	**90.44**	2.5631
Jun	**43.48**	1.2322
Jul	**16.41**	0.4650
Aug	**10.64**	0.3015
Sep	**10.68**	0.3026
Oct	**18.05**	0.5115
Nov	**55.09**	1.5611
Dec	**73.07**	2.0708

Q_{bf}	**278.6**
ann avg	**88.7**
ann med	**46.3**
$Q_{1.002}$	**142.3**
$Q_{1.01}$	177.9

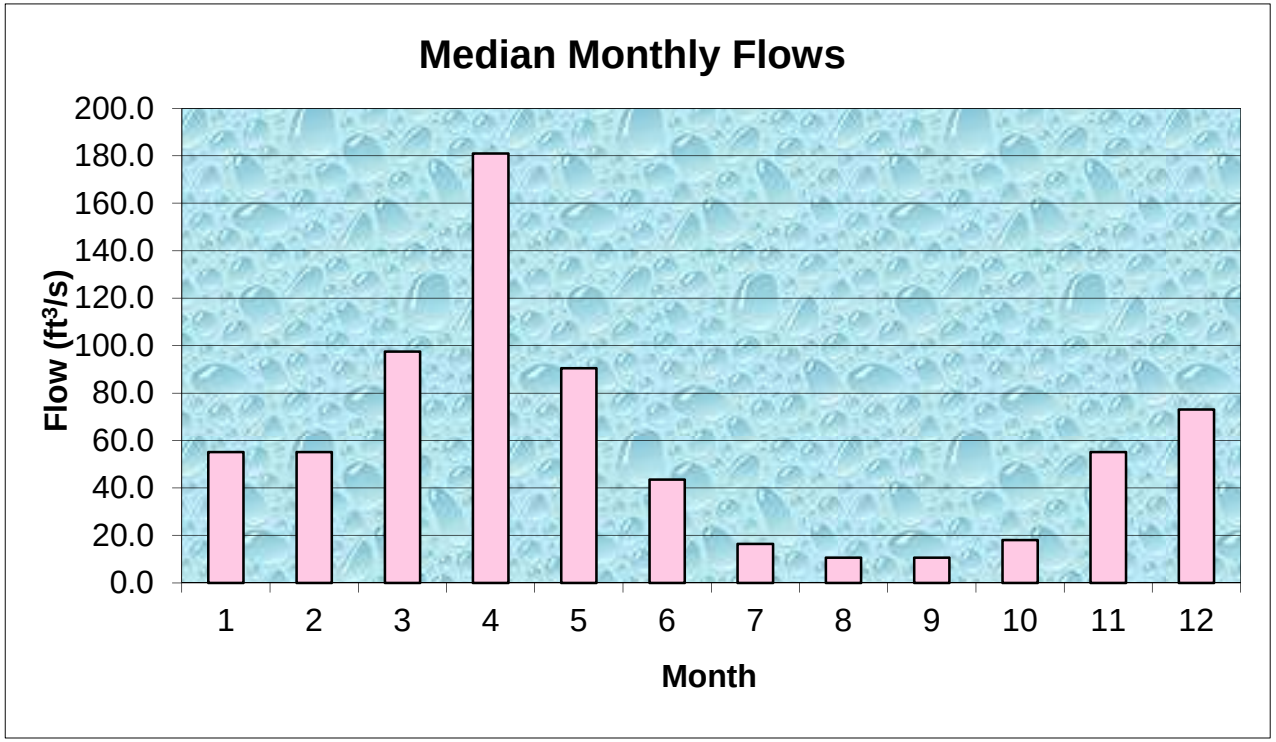
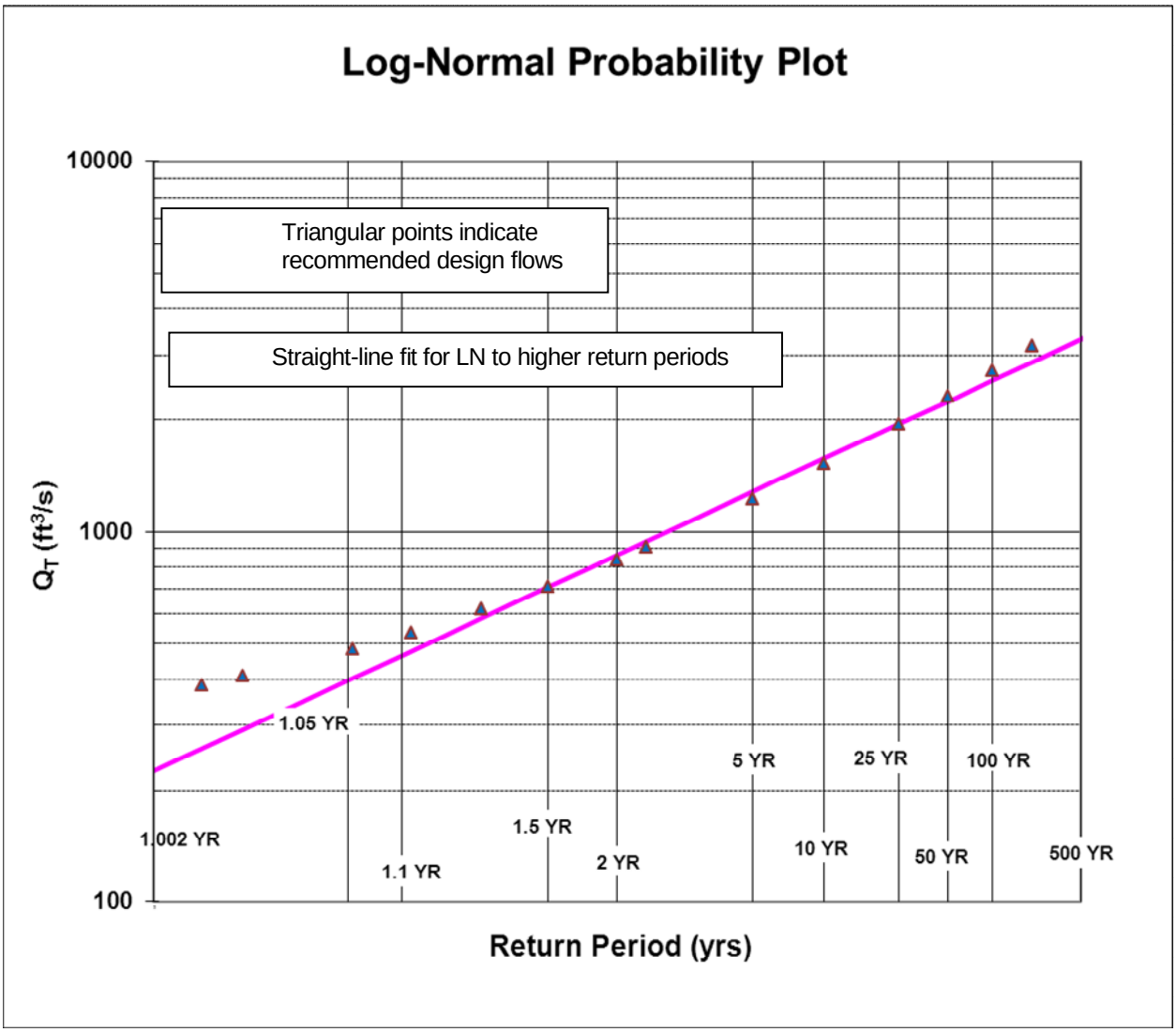


Figure 1. Probability Plot – Dennys River at Meddybemps Bridge #3736



Discussion

MaineDOT design hydrology for larger structures is ordinarily calculated with statewide peak flow regression equations (Hodgkins, 1999). However, this is not recommended for the Meddybemps Bridge location for two reasons:

1) Meddybemps Lake, the source of the Dennys River, is heavily regulated, whereas the statewide equations are intended for undeveloped, unregulated watersheds

2) The NWI wetlands percentage (43.9%) is outside the range of values used to develop the regression equations.

Fortunately, there is a USGS gage (01021200, "Dennys River at Dennysville, Maine", discontinued as of 01 June 2013) downstream of the bridge. The watershed area at the gage A_g is just over twice the ungaged watershed area A_u at the bridge, and therefore under most conditions the gage data would not be used to estimate site design hydrology. However, due to the limitations identified above, the gage data is the best basis for developing peak flow estimates for project design.

The standard site regression equations Q_r are of the form

$$Q_r = cA^a 10^{wW}$$

where the parameters c, a, and w vary according to return period (Hodgkins, Table 3); A is watershed area and W is the percentage of watershed area that is mapped as NWI wetlands. The watershed area A at the bridge was determined in ArcGIS from available watershed delineations; the watershed map is shown in Figure 2. The bridge is located on ME191 just downstream of the Meddybemps Lake outlet.

Using this form of regression equation, a site estimate is calculated from the gage estimates Q_g by area scaling:

$$Q_u = (A_u/A_g)^a Q_g$$

where "a" is the same area exponent in Q_r above; "u" corresponds to the ungaged project site and "g" corresponds to the gaged watershed. Values of "a" are listed in Table 1 above; they are also shown graphically in Figure 3. Hodgkins does not give "a" values for all return period (T) values, so the missing values have been interpolated/extrapolated as needed.

The peak flow estimates Q_g at the Dennysville gage were calculated from the gage data using the USGS program PeakFQ (Flynn et al, 2006). Program output is reproduced in Appendix A. This program produces estimates according to the standard "Bulletin 17b" procedures, fitting the annual maximum data to the Log-Pearson III (LP-III) probability distribution. A generalized statewide skew value of 0.029 was used (Hodgkins, 1999). This skew value is so small that the LP-III distribution is closely approximated by the simpler log-Normal (LN) distribution, as evidenced by a straight-line plot on LN-probability sale. PeakFQ also produces estimates using plotting positions applied to the systematic record. These "systematic record" estimates were ultimately chosen as the basis for project design hydrology because the lake regulation appears to produce significant deviations from straight-line (regression) behavior at lower return periods (see Figure 1). The straight line in Figure 1 corresponds to a rough fitting of the standard regression equations to the gage data; this fit yielded a "wetlands" value of 14.8%, significantly less than the measured value of 43.9% (most of which is lake surface water). The fitted value has no physical significance.

References:

Hodgkins, 1999. Estimating the Magnitude of Peak Flows for Stream in Maine for Selected Recurrence Intervals, US Geological Survey, *WRIR 99-4408*.

Flynn, K., W.H. Kirby, & P.R. Hummel, 2006. User's Manual for Program PeakFQ, Annual Flood Frequency Analysis Using Bulletin 17B Guidelines. US Geological Survey, *Techniques & Methods 4-B4*.

Figure 2. Dennys River Watershed at Lake Outlet

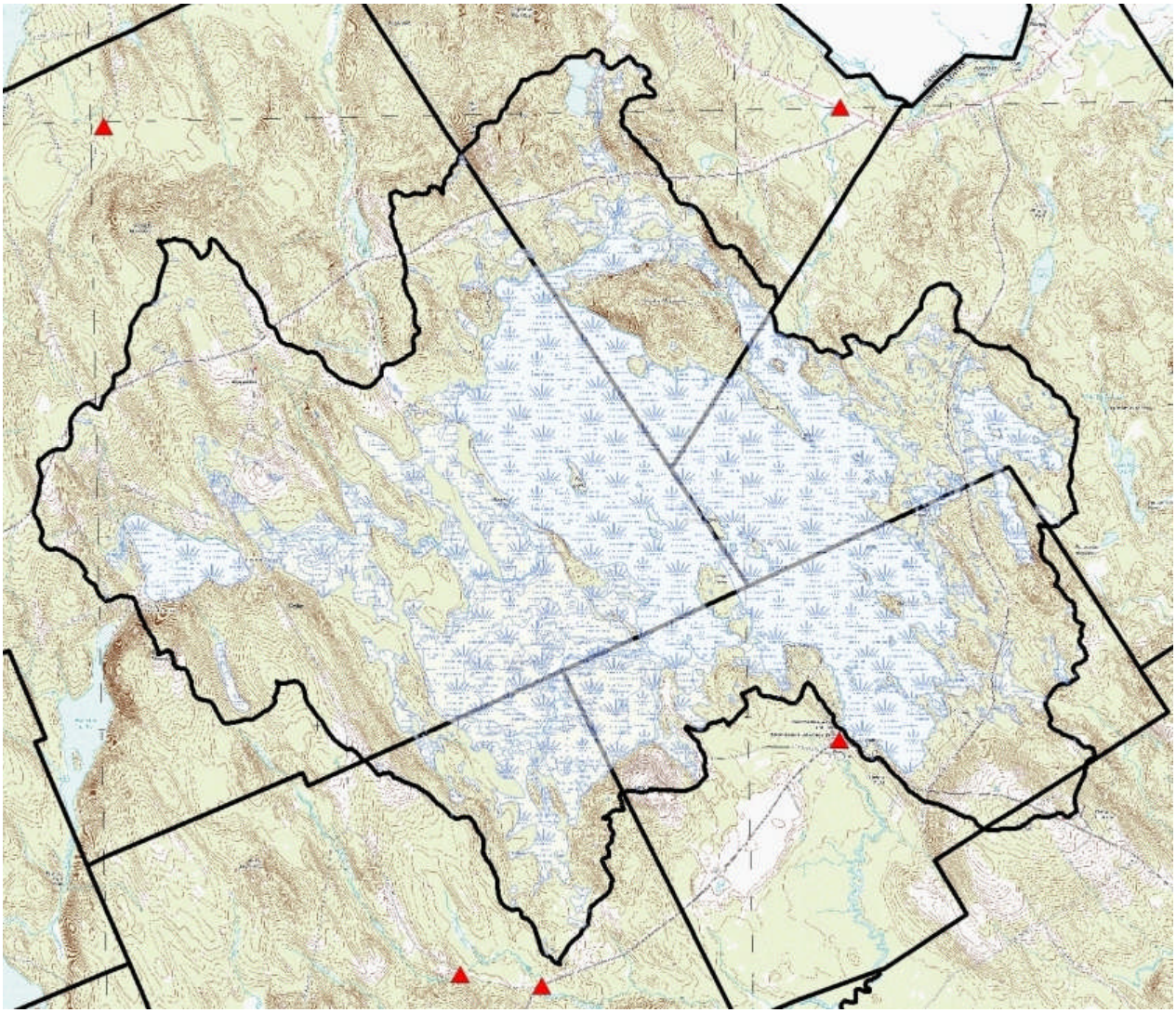
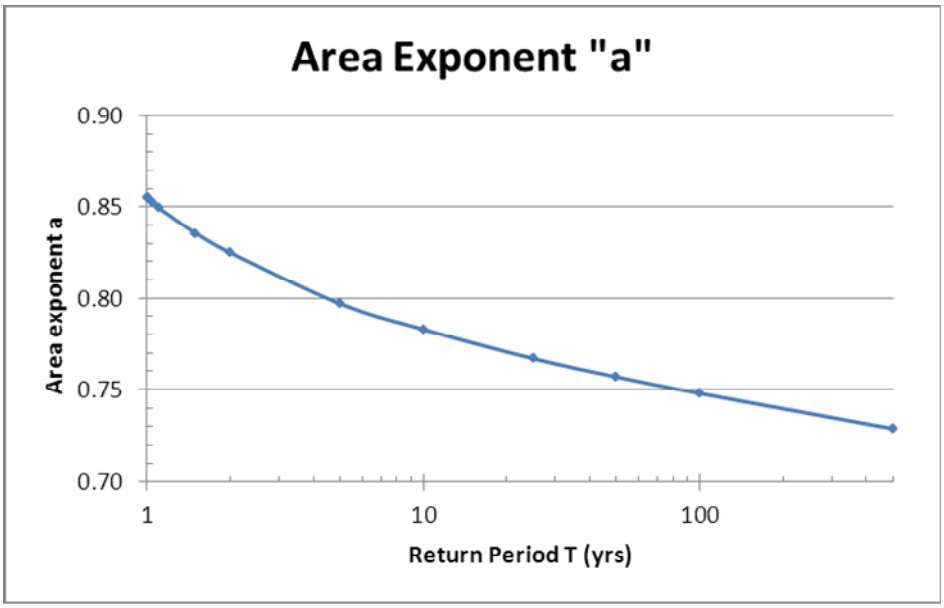


Figure 3. Area Exponent "a" for Watershed Scaling of Peak Flow Estimates



Appendix:

Output for Dennys River - Dennysville Gage from USGS Program PeakFQ

```
Program PeakFq          U. S. GEOLOGICAL SURVEY            Seq.000.000
Ver. 5.2            Annual peak flow frequency analysis     Run Date / Time
11/01/2007          following Bulletin 17-B Guidelines      08/16/2013 12:52

                       --- PROCESSING OPTIONS ---

                    Plot option         = Graphics device
                    Basin char output   = None
                    Print option        = Yes
                    Debug print         = No
                    Input peaks listing = Long
                    Input peaks format  = WATSTORE peak file

                    Input files used:
                    peaks (ascii)  - D:\PROGFILS\PEAKFQ\TEST\DATA_IN\MEDDY-PKQ-INP.TXT
                       specifications - PKFQWPSF.TMP
                    Output file(s):
                       main - D:\PROGFILS\PEAKFQ\TEST\DATA_IN\MEDDY-PKQ-INP.PRT
```

```
Program PeakFq          U. S. GEOLOGICAL SURVEY            Seq.001.001
Ver. 5.2           Annual peak flow frequency analysis     Run Date / Time
11/01/2007         following Bulletin 17-B Guidelines      08/16/2013 12:52

          Station - 01021200  Dennys River at Dennysville, Maine


                I N P U T   D A T A   S U M M A R Y

             Number of peaks in record            =       54
             Peaks not used in analysis           =        0
             Systematic peaks in analysis         =       54
             Historic peaks in analysis           =        0
             Years of historic record             =        0
             Generalized skew                     =    0.029
                  Standard error                  =    0.297
                  Mean Square error               =    0.088
             Skew option                          =   WEIGHTED
             Gage base discharge                  =      0.0
             User supplied high outlier threshold =   --
             User supplied low outlier criterion  =   --
             Plotting position parameter          =     0.40


*********  NOTICE  --  Preliminary machine computations.        *********
*********  User responsible for assessment and interpretation.  *********

  WCF134I-NO SYSTEMATIC PEAKS WERE BELOW GAGE BASE.                   0.0
  WCF162I-SYSTEMATIC PEAKS EXCEEDED HIGH-OUTLIER CRITERION.   1    4777.2
  WCF195I-NO LOW OUTLIERS WERE DETECTED BELOW CRITERION.            531.2
```

Program PeakFq U. S. GEOLOGICAL SURVEY Seq.001.002
Ver. 5.2 Annual peak flow frequency analysis Run Date / Time
11/01/2007 following Bulletin 17-B Guidelines 08/16/2013 12:52

Station - 01021200 Dennys River at Dennysville, Maine

ANNUAL FREQUENCY CURVE PARAMETERS -- LOG-PEARSON TYPE III

	FLOOD BASE		LOGARITHMIC		
	DISCHARGE	EXCEEDANCE PROBABILITY	MEAN	STANDARD DEVIATION	SKEW
SYSTEMATIC RECORD	0.0	1.0000	3.2022	0.1705	0.591
BULL.17B ESTIMATE	0.0	1.0000	3.2022	0.1705	0.248

ANNUAL FREQUENCY CURVE -- DISCHARGES AT SELECTED EXCEEDANCE PROBABILITIES

ANNUAL EXCEEDANCE PROBABILITY	BULL.17B ESTIMATE	SYSTEMATIC RECORD	'EXPECTED PROBABILITY' ESTIMATE	95-PCT CONFIDENCE LIMITS FOR BULL. 17B ESTIMATES LOWER	UPPER
0.9950	635.0	719.5	611.6	520.3	738.5
0.9900	686.9	759.4	666.5	570.2	791.8
0.9500	859.6	897.8	846.6	739.2	967.9
0.9000	974.5	993.9	964.8	853.1	1085.0
0.8000	1141.0	1138.0	1135.0	1018.0	1255.0
0.6667	1328.0	1307.0	1325.0	1203.0	1452.0
0.5000	1567.0	1533.0	1567.0	1433.0	1713.0
0.4292	1682.0	1644.0	1683.0	1540.0	1842.0
0.2000	2204.0	2181.0	2218.0	2004.0	2466.0
0.1000	2659.0	2683.0	2692.0	2384.0	3046.0
0.0400	3271.0	3406.0	3347.0	2875.0	3864.0
0.0200	3754.0	4014.0	3880.0	3251.0	4534.0
0.0100	4261.0	4686.0	4456.0	3636.0	5257.0
0.0050	4795.0	5429.0	5082.0	4035.0	6037.0
0.0020	5549.0	6538.0	6001.0	4587.0	7168.0

```
Program PeakFq          U. S. GEOLOGICAL SURVEY            Seq.001.003
Ver. 5.2           Annual peak flow frequency analysis     Run Date / Time
11/01/2007         following Bulletin 17-B Guidelines      08/16/2013 12:52
```

Station - 01021200 Dennys River at Dennysville, Maine

I N P U T D A T A L I S T I N G

WATER YEAR	DISCHARGE	CODES	WATER YEAR	DISCHARGE	CODES
1956	1460.0	K	1983	1680.0	K
1957	806.0	K	1984	2430.0	K
1958	1520.0	K	1985	1710.0	K
1959	1640.0	K	1986	1050.0	K
1960	1340.0	K	1987	1380.0	K
1961	2700.0	K	1988	2150.0	K
1962	2690.0	K	1989	1540.0	K
1963	1640.0	K	1990	975.0	K
1964	1670.0	K	1991	1220.0	K
1965	1240.0	K	1992	999.0	K
1966	866.0	K	1993	1670.0	K
1967	1340.0	K	1994	1630.0	K
1968	1500.0	K	1995	822.0	K
1969	1230.0	K	1996	1330.0	K
1970	2000.0	K	1997	898.0	K
1971	870.0	K	1998	3440.0	K
1972	2000.0	K	2002	1830.0	K
1973	3930.0	K	2003	1630.0	K
1974	1540.0	K	2004	1440.0	K
1975	902.0	K	2005	2190.0	K
1976	2510.0	K	2006	1740.0	K
1977	1030.0	K	2007	1880.0	
1978	1490.0	K	2008	1750.0	K
1979	2230.0	K	2009	2520.0	K
1980	1450.0	K	2010	2160.0	K
1981	1580.0	K	2011	5390.0	K
1982	1210.0	K	2012	1530.0	K

Explanation of peak discharge qualification codes

PeakFQ CODE	NWIS CODE	DEFINITION
D	3	Dam failure, non-recurrent flow anomaly
G	8	Discharge greater than stated value
X	3+8	Both of the above
L	4	Discharge less than stated value
K	6 OR C	Known effect of regulation or urbanization
H	7	Historic peak

- Minus-flagged discharge -- Not used in computation
  -8888.0 -- No discharge value given
- Minus-flagged water year -- Historic peak used in computation

```
Program PeakFq           U. S. GEOLOGICAL SURVEY            Seq.001.004
Ver. 5.2            Annual peak flow frequency analysis     Run Date / Time
11/01/2007          following Bulletin 17-B Guidelines      08/16/2013 12:52
```

Station - 01021200 Dennys River at Dennysville, Maine

EMPIRICAL FREQUENCY CURVES -- WEIBXXX PLOTTING POSITIONS
*** WEIBA = 0.400 ***

WATER YEAR	RANKED DISCHARGE	SYSTEMATIC RECORD	BULL.17B ESTIMATE
2011	5390.0	0.0111	0.0111
1973	3930.0	0.0295	0.0295
1998	3440.0	0.0480	0.0480
1961	2700.0	0.0664	0.0664
1962	2690.0	0.0849	0.0849
2009	2520.0	0.1033	0.1033
1976	2510.0	0.1218	0.1218
1984	2430.0	0.1402	0.1402
1979	2230.0	0.1587	0.1587
2005	2190.0	0.1771	0.1771
2010	2160.0	0.1956	0.1956
1988	2150.0	0.2140	0.2140
1970	2000.0	0.2325	0.2325
1972	2000.0	0.2509	0.2509
2007	1880.0	0.2694	0.2694
2002	1830.0	0.2878	0.2878
2008	1750.0	0.3063	0.3063
2006	1740.0	0.3247	0.3247
1985	1710.0	0.3432	0.3432
1983	1680.0	0.3616	0.3616
1964	1670.0	0.3801	0.3801
1993	1670.0	0.3985	0.3985
1959	1640.0	0.4170	0.4170
1963	1640.0	0.4354	0.4354
1994	1630.0	0.4539	0.4539
2003	1630.0	0.4723	0.4723
1981	1580.0	0.4908	0.4908
1974	1540.0	0.5092	0.5092
1989	1540.0	0.5277	0.5277
2012	1530.0	0.5461	0.5461
1958	1520.0	0.5646	0.5646
1968	1500.0	0.5830	0.5830
1978	1490.0	0.6015	0.6015
1956	1460.0	0.6199	0.6199
1980	1450.0	0.6384	0.6384
2004	1440.0	0.6568	0.6568
1987	1380.0	0.6753	0.6753
1960	1340.0	0.6937	0.6937
1967	1340.0	0.7122	0.7122
1996	1330.0	0.7306	0.7306
1965	1240.0	0.7491	0.7491
1969	1230.0	0.7675	0.7675
1991	1220.0	0.7860	0.7860
1982	1210.0	0.8044	0.8044
1986	1050.0	0.8229	0.8229
1977	1030.0	0.8413	0.8413
1992	999.0	0.8598	0.8598

```
       1990          975.0         0.8782         0.8782
       1975          902.0         0.8967         0.8967
       1997          898.0         0.9151         0.9151
       1971          870.0         0.9336         0.9336
       1966          866.0         0.9520         0.9520
       1995          822.0         0.9705         0.9705
       1957          806.0         0.9889         0.9889


 End PeakFQ analysis.
   Stations processed :       1
   Number of errors   :       0
   Stations skipped   :       0
   Station years      :      54


Data records may have been ignored for the stations listed below.
(Card type must be Y, Z, N, H, I, 2, 3, 4,  or *.)
(2, 4, and * records are ignored.)

 For the station below, the following records were ignored:
* WCF2.DATA  1/9/89 -- BULLETIN 17 EXAMPLES
*---+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8

FINISHED PROCESSING STATION:  01021200       USGS Dennys River at Dennysville,

 For the station below, the following records were ignored:
 FINISHED PROCESSING STATION:
```

Table 3-1 Manning's 'n' Values

Type of Channel and Description	Minimum	Normal	Maximum	
A. *Natural Streams*				
1. **Main Channels**				
a. Clean, straight, full, no rifts or deep pools	0.025	0.030	0.033	
b. Same as above, but more stones and weeds	0.030	0.035	0.040	
c. Clean, winding, some pools and shoals	0.033	0.040	0.045	
d. Same as above, but some weeds and stones	0.035	0.045	0.050	
e. Same as above, lower stages, more ineffective slopes and sections	0.040	0.048	0.055	
f. Same as "d" but more stones	0.045	0.050	0.060	
g. Sluggish reaches, weedy. deep pools	0.050	0.070	0.080	
h. Very weedy reaches, deep pools, or floodways with heavy stands of timber and brush	0.070	0.100	0.150	
2. **Flood Plains**				
a. Pasture no brush				
1. Short grass	0.025	0.030	0.035	outlet LOB
2. High grass	0.030	0.035	0.050	upper ROB
b. Cultivated areas				
1. No crop	0.020	0.030	0.040	
2. Mature row crops	0.025	0.035	0.045	
3. Mature field crops	0.030	0.040	0.050	
c. Brush				
1. Scattered brush, heavy weeds	0.035	0.050	0.070	
2. Light brush and trees, in winter	0.035	0.050	0.060	
3. Light brush and trees, in summer	0.040	0.060	0.080	U.S. ROB
4. Medium to dense brush, in winter	0.045	0.070	0.110	
5. Medium to dense brush, in summer	0.070	0.100	0.160	LOB
d. Trees				
1. Cleared land with tree stumps, no sprouts	0.030	0.040	0.050	
2. Same as above, but heavy sprouts	0.050	0.060	0.080	
3. Heavy stand of timber, few down trees, little undergrowth, flow below branches	0.080	0.100	0.120	D.S. LOB & ROB
4. Same as above, but with flow into branches	0.100	0.120	0.160	
5. Dense willows, summer, straight	0.110	0.150	0.200	
3. **Mountain Streams, no vegetation in channel, banks usually steep, with trees and brush on banks submerged**				
a. Bottom: gravels, cobbles, and few boulders	0.030	0.040	0.050	Channel
b. Bottom: cobbles with large boulders	0.040	0.050	0.070	Channel

Table 3-1 (Continued) Manning's 'n' Values

Type of Channel and Description	Minimum	Normal	Maximum
B. *Lined or Built-Up Channels*			
1. **Concrete**			
a. Trowel finish	0.011	0.013	0.015
b. Float Finish	0.013	0.015	0.016
c. Finished, with gravel bottom	0.015	0.017	0.020
d. Unfinished	0.014	0.017	0.020
e. Gunite, good section	0.016	0.019	0.023
f. Gunite, wavy section	0.018	0.022	0.025
g. On good excavated rock	0.017	0.020	
h. On irregular excavated rock	0.022	0.027	
2. **Concrete bottom float finished with sides of:**			
a. Dressed stone in mortar	0.015	0.017	0.020
b. Random stone in mortar	0.017	0.020	0.024
c. Cement rubble masonry, plastered	0.016	0.020	0.024
d. Cement rubble masonry	0.020	0.025	0.030
e. Dry rubble on riprap	0.020	0.030	0.035
3. **Gravel bottom with sides of:**			
a. Formed concrete	0.017	0.020	0.025
b. Random stone in mortar	0.020	0.023	0.026
c. Dry rubble or riprap	0.023	0.033	0.036
4. **Brick**			
a. Glazed	0.011	0.013	0.015
b. In cement mortar	0.012	0.015	0.018
5. **Metal**			
a. Smooth steel surfaces	0.011	0.012	0.014
b. Corrugated metal	0.021	0.025	0.030
6. **Asphalt**			
a. Smooth	0.013	0.013	
b. Rough	0.016	0.016	
7. **Vegetal lining**	0.030		0.500

Table 3-1 (Continued) Manning's 'n' Values

Type of Channel and Description	Minimum	Normal	Maximum
C. *Excavated or Dredged Channels*			
1. Earth, straight and uniform			
a. Clean, recently completed	0.016	0.018	0.020
b. Clean, after weathering	0.018	0.022	0.025
c. Gravel, uniform section, clean	0.022	0.025	0.030
d. With short grass, few weeds	0.022	0.027	0.033
2. Earth, winding and sluggish			
a. No vegetation	0.023	0.025	0.030
b. Grass, some weeds	0.025	0.030	0.033
c. Dense weeds or aquatic plants in deep channels	0.030	0.035	0.040
d. Earth bottom and rubble side	0.028	0.030	0.035
e. Stony bottom and weedy banks	0.025	0.035	0.040
f. Cobble bottom and clean sides	0.030	0.040	0.050
3. Dragline-excavated or dredged			
a. No vegetation	0.025	0.028	0.033
b. Light brush on banks	0.035	0.050	0.060
4. Rock cuts			
a. Smooth and uniform	0.025	0.035	0.040
b. Jagged and irregular	0.035	0.040	0.050
5. Channels not maintained, weeds and brush			
a. Clean bottom, brush on sides	0.040	0.050	0.080
b. Same as above, highest stage of flow	0.045	0.070	0.110
c. Dense weeds, high as flow depth	0.050	0.080	0.120
d. Dense brush, high stage	0.080	0.100	0.140

Other sources that include pictures of selected streams as a guide to n value determination are available (Fasken, 1963; Barnes, 1967; and Hicks and Mason, 1991). In general, these references provide color photos with tables of calibrated n values for a range of flows.

Although there are many factors that affect the selection of the n value for the channel, some of the most important factors are the type and size of materials that compose the bed and banks of a channel, and the shape of the channel. Cowan (1956) developed a procedure for estimating the effects of these factors to determine the value of Manning's n of a channel. In Cowan's procedure, the value of n is computed by the following equation:

Show

Manning's n Values

Reference tables for Manning's n values for Channels, Closed Conduits Flowing Partially Full, and Corrugated Metal Pipes.

Manning's n for Channels (Chow, 1959).

Type of Channel and Description	Minimum	Normal	Maximum	
Natural streams - minor streams (top width at floodstage < 100 ft)				
1. Main Channels				
a. clean, straight, full stage, no rifts or deep pools	0.025	0.030	0.033	
b. same as above, but more stones and weeds	0.030	0.035	0.040	
c. clean, winding, some pools and shoals	0.033	0.040	0.045	
d. same as above, but some weeds and stones	0.035	0.045	0.050	
e. same as above, lower stages, more ineffective slopes and sections	0.040	0.048	0.055	
f. same as "d" with more stones	0.045	0.050	0.060	
g. sluggish reaches, weedy, deep pools	0.050	0.070	0.080	
h. very weedy reaches, deep pools, or floodways with heavy stand of timber and underbrush	0.075	0.100	0.150	
2. Mountain streams, no vegetation in channel, banks usually steep, trees and brush along banks submerged at high stages				
a. bottom: gravels, cobbles, and few boulders	0.030	0.040	0.050	
b. bottom: cobbles with large boulders	0.040	0.050	0.070	
3. Floodplains				
a. Pasture, no brush				
1.short grass	0.025	0.030	0.035	U.S. LOB
2. high grass	0.030	0.035	0.050	U.S ROB
b. Cultivated areas				
1. no crop	0.020	0.030	0.040	
2. mature row crops	0.025	0.035	0.045	
3. mature field crops	0.030	0.040	0.050	
c. Brush				
1. scattered brush, heavy weeds	0.035	0.050	0.070	
2. light brush and trees, in winter	0.035	0.050	0.060	
3. light brush and trees, in summer	0.040	0.060	0.080	U.S. ROB D.S. ROB
4. medium to dense brush, in winter	0.045	0.070	0.110	
5. medium to dense brush, in summer	0.070	0.100	0.160	U.S. LOB D.S. LOB Some ROB
d. Trees				
1. dense willows, summer, straight	0.110	0.150	0.200	
2. cleared land with tree stumps, no sprouts	0.030	0.040	0.050	
3. same as above, but with heavy growth of sprouts	0.050	0.060	0.080	

4. heavy stand of timber, a few down trees, little undergrowth, flood stage below branches	0.080	0.100	0.120	
5. same as 4. with flood stage reaching branches	0.100	0.120	0.160	
4. Excavated or Dredged Channels				
a. Earth, straight, and uniform				
1. clean, recently completed	0.016	0.018	0.020	
2. clean, after weathering	0.018	0.022	0.025	
3. gravel, uniform section, clean	0.022	0.025	0.030	Immediately D.S. Channel
4. with short grass, few weeds	0.022	0.027	0.033	
b. Earth winding and sluggish				
1. no vegetation	0.023	0.025	0.030	
2. grass, some weeds	0.025	0.030	0.033	
3. dense weeds or aquatic plants in deep channels	0.030	0.035	0.040	
4. earth bottom and rubble sides	0.028	0.030	0.035	
5. stony bottom and weedy banks	0.025	0.035	0.040	DS. Channel
6. cobble bottom and clean sides	0.030	0.040	0.050	
c. Dragline-excavated or dredged				
1. no vegetation	0.025	0.028	0.033	
2. light brush on banks	0.035	0.050	0.060	
d. Rock cuts				
1. smooth and uniform	0.025	0.035	0.040	
2. jagged and irregular	0.035	0.040	0.050	
e. Channels not maintained, weeds and brush uncut				
1. dense weeds, high as flow depth	0.050	0.080	0.120	
2. clean bottom, brush on sides	0.040	0.050	0.080	
3. same as above, highest stage of flow	0.045	0.070	0.110	
4. dense brush, high stage	0.080	0.100	0.140	
5. Lined or Constructed Channels				
a. Cement				
1. neat surface	0.010	0.011	0.013	
2. mortar	0.011	0.013	0.015	
b. Wood				
1. planed, untreated	0.010	0.012	0.014	
2. planed, creosoted	0.011	0.012	0.015	
3. unplaned	0.011	0.013	0.015	
4. plank with battens	0.012	0.015	0.018	
5. lined with roofing paper	0.010	0.014	0.017	
c. Concrete				
1. trowel finish	0.011	0.013	0.015	
2. float finish	0.013	0.015	0.016	
3. finished, with gravel on bottom	0.015	0.017	0.020	
4. unfinished	0.014	0.017	0.020	
5. gunite, good section	0.016	0.019	0.023	
6. gunite, wavy section	0.018	0.022	0.025	
7. on good excavated rock	0.017	0.020		

8. on irregular excavated rock	0.022	0.027	
d. Concrete bottom float finish with sides of:			
1. dressed stone in mortar	0.015	0.017	0.020
2. random stone in mortar	0.017	0.020	0.024
3. cement rubble masonry, plastered	0.016	0.020	0.024
4. cement rubble masonry	0.020	0.025	0.030
5. dry rubble or riprap	0.020	0.030	0.035
e. Gravel bottom with sides of:			
1. formed concrete	0.017	0.020	0.025
2. random stone mortar	0.020	0.023	0.026
3. dry rubble or riprap	0.023	0.033	0.036
f. Brick			
1. glazed	0.011	0.013	0.015
2. in cement mortar	0.012	0.015	0.018
g. Masonry			
1. cemented rubble	0.017	0.025	0.030
2. dry rubble	0.023	0.032	0.035
h. Dressed ashlar/stone paving	0.013	0.015	0.017
i. Asphalt			
1. smooth	0.013	0.013	
2. rough	0.016	0.016	
j. Vegetal lining	0.030		0.500

In vacinity of Dam

Manning's n for Closed Conduits Flowing Partly Full (Chow, 1959).

Type of Conduit and Description	Minimum	Normal	Maximum
1. Brass, smooth:	0.009	0.010	0.013
2. Steel:			
Lockbar and welded	0.010	0.012	0.014
Riveted and spiral	0.013	0.016	0.017
3. Cast Iron:			
Coated	0.010	0.013	0.014
Uncoated	0.011	0.014	0.016
4. Wrought Iron:			
Black	0.012	0.014	0.015
Galvanized	0.013	0.016	0.017
5. Corrugated Metal:			
Subdrain	0.017	0.019	0.021
Stormdrain	0.021	0.024	0.030
6. Cement:			
Neat Surface	0.010	0.011	0.013
Mortar	0.011	0.013	0.015
7. Concrete:			
Culvert, straight and free of debris	0.010	0.011	0.013
Culvert with bends, connections, and some debris	0.011	0.013	0.014
Finished	0.011	0.012	0.014
Sewer with manholes, inlet, etc., straight	0.013	0.015	0.017
Unfinished, steel form	0.012	0.013	0.014

Plan: Run#2c Stream Reach RS: 176 Profile: Q1.1				
E.G. US. (ft)	156.95	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	156.57	E.G. Elev (ft)	156.97	155.36
Q Total (cfs)	532	W.S. Elev (ft)	156.32	154.14
Q Bridge (cfs)	532	Crit W.S. (ft)	155.35	154.14
Q Weir (cfs)		Max Chl Dpth (ft)	4.02	2.78
Weir Sta Lft (ft)		Vel Total (ft/s)	6.44	8.88
Weir Sta Rgt (ft)		Flow Area (sq ft)	82.64	59.91
Weir Submerg		Froude # Chl	0.57	0.94
Weir Max Depth (ft)		Specif Force (cu ft)	250.31	220.46
Min El Weir Flow (ft)	170.56	Hydr Depth (ft)	3.48	2.46
Min El Prs (ft)	169.71	W.P. Total (ft)	32.32	28.88
Delta EG (ft)	1.8	Conv. Total (cfs)	5102.4	3619.9
Delta WS (ft)	2.48	Top Width (ft)	23.73	24.37
BR Open Area (sq ft)	368.78	Frctn Loss (ft)		
BR Open Vel (ft/s)	8.88	C & E Loss (ft)		
Coef of Q		Shear Total (lb/sq ft)	1.74	2.8
Br Sel Method	Momentum	Power Total (lb/ft s)	0	0

Plan: Run#2c Stream Reach RS: 176 Profile: Q10				
E.G. US. (ft)	160.55	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	159.77	E.G. Elev (ft)	160.36	159.09
Q Total (cfs)	1506	W.S. Elev (ft)	157.82	156.58
Q Bridge (cfs)	1506	Crit W.S. (ft)	157.82	156.58
Q Weir (cfs)		Max Chl Dpth (ft)	5.52	5.22
Weir Sta Lft (ft)		Vel Total (ft/s)	12.77	12.71
Weir Sta Rgt (ft)		Flow Area (sq ft)	117.91	118.5
Weir Submerg		Froude # Chl	0.96	0.98
Weir Max Depth (ft)		Specif Force (cu ft)	891.86	886.19
Min El Weir Flow (ft)	170.56	Hydr Depth (ft)	5.06	5.01
Min El Prs (ft)	169.71	W.P. Total (ft)	35.36	33.82
Delta EG (ft)	2.03	Conv. Total (cfs)	8690	10155.4
Delta WS (ft)	2.48	Top Width (ft)	23.28	23.65
BR Open Area (sq ft)	368.78	Frctn Loss (ft)	0.72	0.03
BR Open Vel (ft/s)	12.77	C & E Loss (ft)	0.01	0.38
Coef of Q		Shear Total (lb/sq ft)	6.25	4.81
Br Sel Method	Energy only	Power Total (lb/ft s)	0	0

Plan: Run#2c Stream Reach RS: 176 Profile: Q25				
E.G. US. (ft)	161.97	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	161.08	E.G. Elev (ft)	161.74	160.46
Q Total (cfs)	1935	W.S. Elev (ft)	158.73	157.48
Q Bridge (cfs)	1935	Crit W.S. (ft)	158.73	157.48
Q Weir (cfs)		Max Chl Dpth (ft)	6.43	6.12
Weir Sta Lft (ft)		Vel Total (ft/s)	13.93	13.85
Weir Sta Rgt (ft)		Flow Area (sq ft)	138.92	139.76
Weir Submerg		Froude # Chl	0.97	0.99
Weir Max Depth (ft)		Specif Force (cu ft)	1248.09	1240.55
Min El Weir Flow (ft)	170.56	Hydr Depth (ft)	6.04	5.98
Min El Prs (ft)	169.71	W.P. Total (ft)	37.19	35.65
Delta EG (ft)	2.29	Conv. Total (cfs)	11042.9	12908.7
Delta WS (ft)	2.82	Top Width (ft)	23.02	23.38
BR Open Area (sq ft)	368.78	Frctn Loss (ft)	0.73	0.03
BR Open Vel (ft/s)	13.93	C & E Loss (ft)	0.01	0.47
Coef of Q		Shear Total (lb/sq ft)	7.16	5.5
Br Sel Method	Energy only	Power Total (lb/ft s)	0	0

Plan: Run#2c Stream Reach RS: 176 Profile: Q50				
E.G. US. (ft)	163.1	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	162.12	E.G. Elev (ft)	162.84	161.55
Q Total (cfs)	2297	W.S. Elev (ft)	159.44	158.18
Q Bridge (cfs)	2297	Crit W.S. (ft)	159.44	158.18
Q Weir (cfs)		Max Chl Dpth (ft)	7.14	6.82
Weir Sta Lft (ft)		Vel Total (ft/s)	14.8	14.72
Weir Sta Rgt (ft)		Flow Area (sq ft)	155.25	156.07
Weir Submerg		Froude # Chl	0.98	0.99
Weir Max Depth (ft)		Specif Force (cu ft)	1571.35	1562.09
Min El Weir Flow (ft)	170.56	Hydr Depth (ft)	6.81	6.73
Min El Prs (ft)	169.71	W.P. Total (ft)	38.63	37.06
Delta EG (ft)	2.53	Conv. Total (cfs)	12957.9	15119.4
Delta WS (ft)	3.16	Top Width (ft)	22.81	23.18
BR Open Area (sq ft)	368.78	Frctn Loss (ft)	0.75	0.03
BR Open Vel (ft/s)	14.8	C & E Loss (ft)	0.01	0.53
Coef of Q		Shear Total (lb/sq ft)	7.88	6.07
Br Sel Method	Energy only	Power Total (lb/ft s)	0	0

Plan: Run#2c Stream Reach RS: 176 Profile: Q100				
E.G. US. (ft)	164.3	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	163.23	E.G. Elev (ft)	164.01	162.7
Q Total (cfs)	2700	W.S. Elev (ft)	160.2	158.93
Q Bridge (cfs)	2700	Crit W.S. (ft)	160.2	158.93
Q Weir (cfs)		Max Chl Dpth (ft)	7.9	7.57
Weir Sta Lft (ft)		Vel Total (ft/s)	15.67	15.59
Weir Sta Rgt (ft)		Flow Area (sq ft)	172.32	173.2
Weir Submerg		Froude # Chl	0.98	1
Weir Max Depth (ft)		Specif Force (cu ft)	1952.93	1941.6
Min El Weir Flow (ft)	170.56	Hydr Depth (ft)	7.63	7.54
Min El Prs (ft)	169.71	W.P. Total (ft)	40.15	38.56
Delta EG (ft)	2.83	Conv. Total (cfs)	15026.3	17514
Delta WS (ft)	3.58	Top Width (ft)	22.58	22.96
BR Open Area (sq ft)	368.78	Frctn Loss (ft)	0.77	0.03
BR Open Vel (ft/s)	15.67	C & E Loss (ft)	0.01	0.58
Coef of Q		Shear Total (lb/sq ft)	8.65	6.66
Br Sel Method	Energy only	Power Total (lb/ft s)	0	0

Plan: Run#2c Stream Reach RS: 176 Profile: Q500				
E.G. US. (ft)	167.38	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	166.08	E.G. Elev (ft)	167.01	165.67
Q Total (cfs)	3820	W.S. Elev (ft)	162.13	160.83
Q Bridge (cfs)	3820	Crit W.S. (ft)	162.13	160.83
Q Weir (cfs)		Max Chl Dpth (ft)	9.83	9.47
Weir Sta Lft (ft)		Vel Total (ft/s)	17.73	17.65
Weir Sta Rgt (ft)		Flow Area (sq ft)	215.42	216.38
Weir Submerg		Froude # Chl	1	1.01
Weir Max Depth (ft)		Specif Force (cu ft)	3117.71	3099.9
Min El Weir Flow (ft)	170.56	Hydr Depth (ft)	9.79	9.66
Min El Prs (ft)	169.71	W.P. Total (ft)	44.06	42.41
Delta EG (ft)	3.66	Conv. Total (cfs)	20490.5	23821.2
Delta WS (ft)	4.8	Top Width (ft)	22.01	22.4
BR Open Area (sq ft)	368.78	Frctn Loss (ft)	0.83	0.03
BR Open Vel (ft/s)	17.73	C & E Loss (ft)	0.01	0.72
Coef of Q		Shear Total (lb/sq ft)	10.61	8.19
Br Sel Method	Energy only	Power Total (lb/ft s)	0	0

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach	771.3979	Q1.1	532	165.96	168.88	168.88	169.86	0.014507	8.24	70.89	37.68	0.91
Reach	771.3979	Q2	835	165.96	169.61	169.61	170.83	0.013505	9.4	99.57	40.99	0.92
Reach	771.3979	Q10	1506	165.96	171.03	171.03	172.4	0.010238	10.42	176.39	71.92	0.85
Reach	771.3979	Q25	1935	165.96	171.66	171.66	173.1	0.009493	10.92	225	79.26	0.83
Reach	771.3979	Q50	2297	165.96	172.06	172.06	173.62	0.009495	11.47	257.61	82.26	0.85
Reach	771.3979	Q100	2700	165.96	172.47	172.47	174.13	0.009516	12.01	291.48	85.26	0.86
Reach	771.3979	Q500	3820	165.96	174.49		175.67	0.00502	10.55	481.21	103.54	0.65
Reach	718.399	Q1.1	532	164.23	167.78	167.78	168.61	0.011417	8.04	91.31	65.63	0.82
Reach	718.399	Q2	835	164.23	168.42	168.42	169.41	0.011543	9.2	135.76	73.14	0.85
Reach	718.399	Q10	1506	164.23	171.05		171.49	0.003154	6.9	369.14	106.04	0.49
Reach	718.399	Q25	1935	164.23	171.68		172.2	0.003333	7.57	439.08	114.1	0.51
Reach	718.399	Q50	2297	164.23	172.25		172.8	0.003263	7.89	505.6	121.27	0.51
Reach	718.399	Q100	2700	164.23	172.73		173.34	0.003365	8.36	566.11	127.44	0.52
Reach	718.399	Q500	3820	164.23	174.81		175.33	0.002274	8.02	858.91	153.84	0.45
Reach	619.7879	Q1.1	532	161.94	164.26	164.26	164.91	0.021879	6.45	84.04	70.92	1.01
Reach	619.7879	Q2	835	161.94	164.73	164.73	165.56	0.018811	7.35	118.25	76.21	0.98
Reach	619.7879	Q10	1506	161.94	171.24		171.32	0.000246	2.37	838.73	138.5	0.15
Reach	619.7879	Q25	1935	161.94	171.9		172	0.000304	2.77	931.09	143.12	0.16
Reach	619.7879	Q50	2297	161.94	172.47		172.59	0.000339	3.05	1013.34	147.11	0.17
Reach	619.7879	Q100	2700	161.94	172.97		173.11	0.000385	3.37	1087.51	150.62	0.19
Reach	619.7879	Q500	3820	161.94	174.97		175.15	0.000383	3.79	1404	164.97	0.19
Reach	530.4464	Q1.1	532	159.95	163.57		163.64	0.000955	2.13	257.89	108.18	0.23
Reach	530.4464	Q2	835	159.95	164.78		164.86	0.000638	2.25	392.8	114.92	0.2
Reach	530.4464	Q10	1506	159.95	171.27		171.3	0.000067	1.42	1247.98	148.02	0.08
Reach	530.4464	Q25	1935	159.95	171.93		171.97	0.000089	1.7	1347.26	152.24	0.09
Reach	530.4464	Q50	2297	159.95	172.5		172.55	0.000105	1.91	1435.94	159.11	0.1
Reach	530.4464	Q100	2700	159.95	173		173.07	0.000124	2.14	1517.95	166.4	0.11
Reach	530.4464	Q500	3820	159.95	175.02		175.11	0.000142	2.54	1882.01	195.45	0.12
Reach	390.0037	Q1.1	532	159.91	163.5		163.53	0.0005	1.47	369.22	162.35	0.17
Reach	390.0037	Q2	835	159.91	164.75		164.78	0.000298	1.51	577.73	171.62	0.14
Reach	390.0037	Q10	1506	159.91	171.27		171.28	0.000029	0.93	1871.52	230.98	0.05
Reach	390.0037	Q25	1935	159.91	171.94		171.96	0.000038	1.12	2027.73	238.45	0.06
Reach	390.0037	Q50	2297	159.91	172.51		172.53	0.000045	1.25	2166.48	244.9	0.07
Reach	390.0037	Q100	2700	159.91	173.02		173.05	0.000053	1.4	2292.21	250.59	0.07
Reach	390.0037	Q500	3820	159.91	175.04		175.08	0.00006	1.66	2821.27	273.26	0.08
Reach	337.3069	Q1.1	532	160.5	163.28		163.46	0.00381	3.74	188.29	97.93	0.42
Reach	337.3069	Q2	835	160.5	164.59		164.74	0.001938	3.54	325.25	112.01	0.32
Reach	337.3069	Q10	1506	160.5	171.25		171.28	0.000123	1.75	1488.44	229.09	0.1
Reach	337.3069	Q25	1935	160.5	171.91		171.95	0.000157	2.06	1641.72	236.4	0.11
Reach	337.3069	Q50	2297	160.5	172.48		172.53	0.000179	2.27	1778.09	242.71	0.12
Reach	337.3069	Q100	2700	160.5	172.98		173.04	0.000207	2.52	1901.19	248.28	0.13
Reach	337.3069	Q500	3820	160.5	174.99		175.07	0.000217	2.85	2424.22	270.64	0.13
Reach	272.1776	Q1.1	532	158.82	161.53	161.53	162.86	0.023216	9.26	58.21	22.69	1
Reach	272.1776	Q2	835	158.82	163.15		164.38	0.011651	8.98	95.97	24.12	0.76
Reach	272.1776	Q10	1506	158.82	171.03		171.25	0.000658	4.28	573.41	130.06	0.22
Reach	272.1776	Q25	1935	158.82	171.62		171.9	0.000843	5	656.29	150.24	0.25
Reach	272.1776	Q50	2297	158.82	172.15		172.48	0.000947	5.44	741.7	172.04	0.26
Reach	272.1776	Q100	2700	158.82	172.61		172.98	0.001076	5.93	824.54	190.89	0.28
Reach	272.1776	Q500	3820	158.82	174.69		175.02	0.000906	5.98	1322.34	302.2	0.26
Reach	252.5655	Q1.1	532	154.29	159.8	158.01	160.64	0.002221	7.38	73.11	13.62	0.56
Reach	252.5655	Q2	835	154.29	163.44	159.31	164.19	0.001001	6.95	123.43	14.03	0.41
Reach	252.5655	Q10	1506	154.29	170.57	161.73	171.19	0.000414	6.57	390.61	106.76	0.29
Reach	252.5655	Q25	1935	154.29	170.86	163.07	171.82	0.00063	8.2	423.19	118.58	0.36
Reach	252.5655	Q50	2297	154.29	171.03	164.12	172.36	0.000856	9.63	445.37	136.82	0.41

Reach	252.5655	Q100	2700	154.29	170.95	165.39	172.81	0.001207	11.4	434.24	126.85	0.49
Reach	252.5655	Q500	3820	154.29	168.5	168.5	174.42	0.004529	19.85	254.67	35.76	0.93

Reach 251 Culvert

Reach	207.8855	Q1.1	532	151.79	156.67		157.01	0.003093	4.72	114.89	29.09	0.4
Reach	207.8855	Q2	835	151.79	157.53		158.1	0.004052	6.11	140.43	30.11	0.48
Reach	207.8855	Q10	1506	151.79	159.8		160.62	0.003668	7.43	215.62	38.98	0.48
Reach	207.8855	Q25	1935	151.79	161.14		162.02	0.003229	7.79	269.96	41.99	0.47
Reach	207.8855	Q50	2297	151.79	162.24		163.15	0.002881	7.97	318.09	45.07	0.45
Reach	207.8855	Q100	2700	151.79	163.43		164.35	0.002564	8.11	373.43	48.12	0.43
Reach	207.8855	Q500	3820	151.79	166.52		167.46	0.001962	8.37	532.59	54.85	0.39

Reach	193.28	Q1.1	532	152.27	156.57	155.16	156.95	0.004602	5.05	109.3	34.29	0.46
Reach	193.28	Q2	835	152.27	157.45	155.92	158.03	0.005303	6.26	139.61	34.4	0.52
Reach	193.28	Q10	1506	152.27	159.77	157.34	160.55	0.004131	7.27	219.9	34.69	0.49
Reach	193.28	Q25	1935	152.27	161.08	158.07	161.97	0.003765	7.8	265.48	34.86	0.48
Reach	193.28	Q50	2297	152.27	162.12	158.63	163.1	0.003542	8.19	301.8	34.99	0.48
Reach	193.28	Q100	2700	152.27	163.23	159.21	164.3	0.003347	8.59	340.48	35.13	0.47
Reach	193.28	Q500	3820	152.27	166.08	160.75	167.38	0.002966	9.51	441.12	35.5	0.46

Reach 176 Bridge

Reach	160.3296	Q1.1	532	151.36	154.09	154.09	155.16	0.017148	8.37	65.35	31.69	0.97
Reach	160.3296	Q2	835	151.36	155.37		156.35	0.008988	8.13	108.52	34.95	0.75
Reach	160.3296	Q10	1506	151.36	157.3		158.52	0.006506	9.2	177.45	36.25	0.69
Reach	160.3296	Q25	1935	151.36	158.26		159.68	0.006142	9.95	212.55	36.57	0.69
Reach	160.3296	Q50	2297	151.36	158.96		160.57	0.006068	10.59	238.29	36.8	0.7
Reach	160.3296	Q100	2700	151.36	159.65		161.47	0.006124	11.3	263.61	37.03	0.71
Reach	160.3296	Q500	3820	151.36	161.28		163.72	0.006415	13.12	324.59	37.58	0.75

Reach	141.5313	Q1.1	532	150.37	153.79	153.64	154.85	0.013971	8.3	66.14	27.96	0.89
Reach	141.5313	Q2	835	150.37	154.52	154.52	156.08	0.015096	10.12	87.49	30.72	0.97
Reach	141.5313	Q10	1506	150.37	156.08	156.08	158.25	0.013065	12.11	139.54	35.8	0.96
Reach	141.5313	Q25	1935	150.37	156.92	156.92	159.41	0.012372	13.08	170.87	38.82	0.96
Reach	141.5313	Q50	2297	150.37	157.59	157.59	160.3	0.011758	13.71	197.75	41.23	0.95
Reach	141.5313	Q100	2700	150.37	158.29	158.29	161.2	0.011196	14.33	227.43	43.7	0.94
Reach	141.5313	Q500	3820	150.37	159.8	159.8	163.44	0.011154	16.24	297	49.34	0.97

Reach	86.5459	Q1.1	532	149.6	153.61	152.86	154.19	0.006739	6.1	88.53	34.44	0.63
Reach	86.5459	Q2	835	149.6	154.26		155.14	0.007934	7.56	112.56	41.79	0.71
Reach	86.5459	Q10	1506	149.6	155.14	155.14	156.71	0.009894	9.77	155.14	56.07	0.82
Reach	86.5459	Q25	1935	149.6	156.28	156.09	157.33	0.004438	7.62	259	113.91	0.57
Reach	86.5459	Q50	2297	149.6	156.71	156.23	157.87	0.003417	7.03	308.2	114.87	0.5
Reach	86.5459	Q100	2700	149.6	156.95	156.45	158.38	0.00347	7.27	335.92	115.41	0.51
Reach	86.5459	Q500	3820	149.6	157.44	157.42	159.74	0.003933	8.14	393.13	116.51	0.55

Reach	43.8688	Q1.1	532	150.74	152.94	152.83	153.73	0.016507	7.16	74.59	40.8	0.92
Reach	43.8688	Q2	835	150.74	153.51	153.51	154.63	0.016502	8.54	101.76	53.09	0.96
Reach	43.8688	Q10	1506	150.74	154.66	154.66	156.17	0.013837	10.09	172.62	72.81	0.94
Reach	43.8688	Q25	1935	150.74	155.29	155.29	156.95	0.012614	10.73	224.5	91.42	0.92
Reach	43.8688	Q50	2297	150.74	155.72	155.72	157.54	0.012437	11.35	267.33	115.75	0.93
Reach	43.8688	Q100	2700	150.74	156.4	156.4	158.1	0.010061	11.18	353.04	128.29	0.85
Reach	43.8688	Q500	3820	150.74	157.37	157.37	159.38	0.010122	12.52	478.15	130.74	0.88

Plan: Existing Fish Stream Reach RS: 176 Profile: Aug-Sept				
E.G. US. (ft)	152.99	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	152.94	E.G. Elev (ft)	152.94	151.96
Q Total (cfs)	10	W.S. Elev (ft)	152.78	151.91
Q Bridge (cfs)	10	Crit W.S. (ft)	152.78	151.78
Q Weir (cfs)		Max Chl Dpth (ft)	0.48	0.55
Weir Sta Lft (ft)		Vel Total (ft/s)	3.17	1.71
Weir Sta Rgt (ft)		Flow Area (sq ft)	3.15	5.86
Weir Submerg		Froude # Chl	0.8	0.54
Weir Max Depth (ft)		Specif Force (cu ft)	1.55	1.7
Min El Weir Flow (ft)	170.56	Hydr Depth (ft)	0.3	0.32
Min El Prs (ft)	169.71	W.P. Total (ft)	11.32	18.85
Delta EG (ft)	1.09	Conv. Total (cfs)	44.3	99.9
Delta WS (ft)	1.16	Top Width (ft)	10.48	18.58
BR Open Area (sq ft)	368.78	Frctn Loss (ft)	0.54	0.05
BR Open Vel (ft/s)	3.17	C & E Loss (ft)	0.03	0.01
Coef of Q		Shear Total (lb/sq ft)	0.88	0.19
Br Sel Method	Energy only	Power Total (lb/ft s)	0	0

Plan: Existing Fish Stream Reach RS: 176 Profile: March				
E.G. US. (ft)	154.17	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	154	E.G. Elev (ft)	154.11	152.96
Q Total (cfs)	100	W.S. Elev (ft)	153.71	152.71
Q Bridge (cfs)	100	Crit W.S. (ft)	153.71	152.51
Q Weir (cfs)		Max Chl Dpth (ft)	1.41	1.35
Weir Sta Lft (ft)		Vel Total (ft/s)	5.1	4.05
Weir Sta Rgt (ft)		Flow Area (sq ft)	19.61	24.67
Weir Submerg		Froude # Chl	0.76	0.62
Weir Max Depth (ft)		Specif Force (cu ft)	25.68	25.64
Min El Weir Flow (ft)	170.56	Hydr Depth (ft)	0.8	1
Min El Prs (ft)	169.71	W.P. Total (ft)	27.02	25.99
Delta EG (ft)	1.27	Conv. Total (cfs)	522.7	885.5
Delta WS (ft)	1.49	Top Width (ft)	24.39	24.79
BR Open Area (sq ft)	368.78	Frctn Loss (ft)	0.56	0.05
BR Open Vel (ft/s)	5.1	C & E Loss (ft)	0.04	0.01
Coef of Q		Shear Total (lb/sq ft)	1.66	0.76
Br Sel Method	Energy only	Power Total (lb/ft s)	0	0

Plan: Existing Fish Stream Reach RS: 176 Profile: April				
E.G. US. (ft)	154.75	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	154.5	E.G. Elev (ft)	154.69	153.51
Q Total (cfs)	180	W.S. Elev (ft)	154.09	153.05
Q Bridge (cfs)	180	Crit W.S. (ft)	154.09	152.89
Q Weir (cfs)		Max Chl Dpth (ft)	1.79	1.69
Weir Sta Lft (ft)		Vel Total (ft/s)	6.21	5.41
Weir Sta Rgt (ft)		Flow Area (sq ft)	29	33.28
Weir Submerg		Froude # Chl	0.82	0.73
Weir Max Depth (ft)		Specif Force (cu ft)	53.89	53.37
Min El Weir Flow (ft)	170.56	Hydr Depth (ft)	1.19	1.35
Min El Prs (ft)	169.71	W.P. Total (ft)	27.82	26.69
Delta EG (ft)	1.31	Conv. Total (cfs)	984.8	1432
Delta WS (ft)	1.61	Top Width (ft)	24.38	24.69
BR Open Area (sq ft)	368.78	Frctn Loss (ft)	0.62	0.06
BR Open Vel (ft/s)	6.21	C & E Loss (ft)	0.04	0.01
Coef of Q		Shear Total (lb/sq ft)	2.17	1.23
Br Sel Method	Energy only	Power Total (lb/ft s)	0	0

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach	771.3979	Aug-Sept	10	165.96	166.35	166.35	166.47	0.037527	2.75	3.64	15.34	0.99
Reach	771.3979	March	100	165.96	167.17	167.16	167.6	0.024302	5.25	19.04	21.76	0.99
Reach	771.3979	April	180	165.96	167.59	167.59	168.2	0.021806	6.29	28.85	24.95	0.99
Reach	718.399	Aug-Sept	10	164.23	164.88	164.8	164.97	0.016574	2.33	4.29	12.53	0.7
Reach	718.399	March	100	164.23	165.75	165.75	166.29	0.024493	5.88	17	16.1	1.01
Reach	718.399	April	180	164.23	166.33	166.33	167	0.018678	6.61	28.54	25.38	0.94
Reach	619.7879	Aug-Sept	10	161.94	162.45	162.45	162.58	0.038206	2.9	3.45	13.56	1.01
Reach	619.7879	March	100	161.94	163.23	163.23	163.52	0.029654	4.31	23.19	41.69	1.02
Reach	619.7879	April	180	161.94	163.52	163.52	163.89	0.027285	4.93	36.5	50.4	1.02
Reach	530.4464	Aug-Sept	10	159.95	160.99		160.99	0.000675	0.63	15.97	30.44	0.15
Reach	530.4464	March	100	159.95	161.92		161.94	0.001008	1.14	88.21	95.47	0.21
Reach	530.4464	April	180	159.95	162.26		162.3	0.001178	1.49	121.89	99.4	0.23
Reach	390.0037	Aug-Sept	10	159.91	160.93		160.93	0.000308	0.46	21.67	36.28	0.11
Reach	390.0037	March	100	159.91	161.77		161.79	0.001137	1	100.64	142.95	0.21
Reach	390.0037	April	180	159.91	162.12		162.14	0.001015	1.19	151.51	150.53	0.21
Reach	337.3069	Aug-Sept	10	160.5	160.84	160.75	160.88	0.016366	1.6	6.25	26.76	0.58
Reach	337.3069	March	100	160.5	161.47		161.63	0.015435	3.17	33.62	70.95	0.68
Reach	337.3069	April	180	160.5	161.8		162	0.011945	3.64	58.32	76.92	0.64
Reach	272.1776	Aug-Sept	10	158.82	159.02	159.02	159.12	0.051627	2.5	3.99	20.46	1
Reach	272.1776	March	100	158.82	159.73	159.73	160.17	0.033183	5.35	18.69	21.09	1
Reach	272.1776	April	180	158.82	160.15	160.15	160.81	0.029867	6.49	27.76	21.47	1
Reach	252.5655	Aug-Sept	10	154.29	154.68	154.57	154.74	0.005688	2.07	4.83	13.04	0.6
Reach	252.5655	March	100	154.29	156.1	155.52	156.38	0.003294	4.26	23.51	13.2	0.56
Reach	252.5655	April	180	154.29	156.97	156.11	157.38	0.002864	5.17	34.99	13.3	0.56
Reach	251		Culvert									
Reach	207.8855	Aug-Sept	10	151.79	153		153	0.000316	0.54	18.39	20.31	0.1
Reach	207.8855	March	100	151.79	154.16		154.24	0.002168	2.19	45.64	26.06	0.29
Reach	207.8855	April	180	151.79	154.69		154.83	0.002912	3.02	59.72	26.8	0.35
Reach	193.28	Aug-Sept	10	152.27	152.94	152.73	152.99	0.008446	1.66	6.03	14.09	0.45
Reach	193.28	March	100	152.27	154	153.62	154.17	0.009606	3.29	30.36	27.43	0.55
Reach	193.28	April	180	152.27	154.5	153.99	154.75	0.009107	4.08	44.36	29.18	0.57
Reach	176		Bridge									
Reach	160.3296	Aug-Sept	10	151.36	151.78	151.78	151.9	0.038116	2.76	3.63	15.26	1
Reach	160.3296	March	100	151.36	152.51	152.51	152.9	0.02657	5.02	19.92	25.82	1.01
Reach	160.3296	April	180	151.36	152.88	152.88	153.45	0.023592	6.02	29.91	27.12	1.01
Reach	141.5313	Aug-Sept	10	150.37	151.2		151.23	0.003593	1.37	7.32	15.09	0.35
Reach	141.5313	March	100	150.37	152.19		152.41	0.008284	3.82	26.2	21.34	0.61
Reach	141.5313	April	180	150.37	152.67		153.04	0.009659	4.86	37.01	23.34	0.68
Reach	86.5459	Aug-Sept	10	149.6	151.19		151.19	0.000224	0.51	19.75	22.4	0.1
Reach	86.5459	March	100	149.6	152.05		152.14	0.002539	2.45	40.81	26.53	0.35
Reach	86.5459	April	180	149.6	152.48		152.66	0.003884	3.41	52.77	28.59	0.44
Reach	43.8688	Aug-Sept	10	150.74	151.11	151.07	151.16	0.016505	1.63	6.15	30.86	0.64
Reach	43.8688	March	100	150.74	151.68	151.57	151.91	0.01651	3.79	26.36	36.77	0.79
Reach	43.8688	April	180	150.74	151.99	151.87	152.34	0.016502	4.75	37.88	37.32	0.83

Plan: New_Run#1 Stream Reach RS: 141 Profile: Q1.1				
E.G. US. (ft)	155.48	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	154.86	E.G. Elev (ft)	155.47	155.25
Q Total (cfs)	532	W.S. Elev (ft)	154.84	154.68
Q Bridge (cfs)	532	Crit W.S. (ft)	154.04	153.64
Q Weir (cfs)		Max Chl Dpth (ft)	3.48	4.31
Weir Sta Lft (ft)		Vel Total (ft/s)	6.29	5.75
Weir Sta Rgt (ft)		Flow Area (sq ft)	84.59	92.46
Weir Submerg		Froude # Chl	0.63	0.57
Weir Max Depth (ft)		Specif Force (cu ft)	238.11	260.54
Min El Weir Flow (ft)	173.03	Hydr Depth (ft)	2.73	2.95
Min El Prs (ft)	171.88	W.P. Total (ft)	36.52	33.16
Delta EG (ft)	0.65	Conv. Total (cfs)	5915.9	7359.6
Delta WS (ft)	1.22	Top Width (ft)	30.94	31.29
BR Open Area (sq ft)	702.58	Frctn Loss (ft)	0.21	0.35
BR Open Vel (ft/s)	6.29	C & E Loss (ft)	0.02	0.06
Coef of Q		Shear Total (lb/sq ft)	1.17	0.91
Br Sel Method	Energy only	Power Total (lb/ft s)	0	0

Plan: New_Run#1 Stream Reach RS: 141 Profile: Q10				
E.G. US. (ft)	158.89	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	157.93	E.G. Elev (ft)	158.88	158.67
Q Total (cfs)	1506	W.S. Elev (ft)	157.88	157.39
Q Bridge (cfs)	1506	Crit W.S. (ft)	156.45	156.05
Q Weir (cfs)		Max Chl Dpth (ft)	6.52	7.02
Weir Sta Lft (ft)		Vel Total (ft/s)	7.84	8.14
Weir Sta Rgt (ft)		Flow Area (sq ft)	192	185.02
Weir Submerg		Froude # Chl	0.55	0.6
Weir Max Depth (ft)		Specif Force (cu ft)	921.95	952.89
Min El Weir Flow (ft)	173.03	Hydr Depth (ft)	5.19	5.11
Min El Prs (ft)	171.88	W.P. Total (ft)	46.13	41.25
Delta EG (ft)	0.64	Conv. Total (cfs)	20178.6	19867
Delta WS (ft)	1.84	Top Width (ft)	37.01	36.23
BR Open Area (sq ft)	702.58	Frctn Loss (ft)	0.18	0.33
BR Open Vel (ft/s)	8.14	C & E Loss (ft)	0.03	0.09
Coef of Q		Shear Total (lb/sq ft)	1.45	1.61
Br Sel Method	Energy only	Power Total (lb/ft s)	0	0

Plan: New_Run#1 Stream Reach RS: 141 Profile: Q25				
E.G. US. (ft)	160.09	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	159.07	E.G. Elev (ft)	160.06	159.84
Q Total (cfs)	1935	W.S. Elev (ft)	158.91	158.25
Q Bridge (cfs)	1935	Crit W.S. (ft)	157.18	156.85
Q Weir (cfs)		Max Chl Dpth (ft)	7.55	7.88
Weir Sta Lft (ft)		Vel Total (ft/s)	8.41	8.93
Weir Sta Rgt (ft)		Flow Area (sq ft)	230.09	216.69
Weir Submerg		Froude # Chl	0.55	0.63
Weir Max Depth (ft)		Specif Force (cu ft)	1280.19	1303.42
Min El Weir Flow (ft)	173.03	Hydr Depth (ft)	6.22	5.85
Min El Prs (ft)	171.88	W.P. Total (ft)	48.2	43.42
Delta EG (ft)	0.67	Conv. Total (cfs)	26621.3	24883.6
Delta WS (ft)	2.15	Top Width (ft)	37.01	37.01
BR Open Area (sq ft)	702.58	Frctn Loss (ft)	0.18	0.34
BR Open Vel (ft/s)	8.93	C & E Loss (ft)	0.04	0.09
Coef of Q		Shear Total (lb/sq ft)	1.57	1.88
Br Sel Method	Energy only	Power Total (lb/ft s)	0	0

Plan: New_Run#1 Stream Reach RS: 141 Profile: Q50				
E.G. US. (ft)	160.99	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	159.94	E.G. Elev (ft)	160.96	160.72
Q Total (cfs)	2297	W.S. Elev (ft)	159.67	158.86
Q Bridge (cfs)	2297	Crit W.S. (ft)	157.69	157.49
Q Weir (cfs)		Max Chl Dpth (ft)	8.31	8.49
Weir Sta Lft (ft)		Vel Total (ft/s)	8.9	9.61
Weir Sta Rgt (ft)		Flow Area (sq ft)	258.01	239
Weir Submerg		Froude # Chl	0.56	0.66
Weir Max Depth (ft)		Specif Force (cu ft)	1597.03	1610.62
Min El Weir Flow (ft)	173.03	Hydr Depth (ft)	6.97	6.46
Min El Prs (ft)	171.88	W.P. Total (ft)	49.72	44.61
Delta EG (ft)	0.7	Conv. Total (cfs)	31723.7	28669
Delta WS (ft)	2.35	Top Width (ft)	37.01	37.01
BR Open Area (sq ft)	702.58	Frctn Loss (ft)	0.19	0.34
BR Open Vel (ft/s)	9.61	C & E Loss (ft)	0.06	0.08
Coef of Q		Shear Total (lb/sq ft)	1.7	2.15
Br Sel Method	Energy only	Power Total (lb/ft s)	0	0

Plan: New_Run#1 Stream Reach RS: 141 Profile: Q100				
E.G. US. (ft)	161.93	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	160.85	E.G. Elev (ft)	161.89	161.62
Q Total (cfs)	2700	W.S. Elev (ft)	160.42	159.41
Q Bridge (cfs)	2700	Crit W.S. (ft)	158.3	158.18
Q Weir (cfs)		Max Chl Dpth (ft)	9.06	9.04
Weir Sta Lft (ft)		Vel Total (ft/s)	9.44	10.4
Weir Sta Rgt (ft)		Flow Area (sq ft)	286.03	259.56
Weir Submerg		Froude # Chl	0.57	0.7
Weir Max Depth (ft)		Specif Force (cu ft)	1963.6	1962.49
Min El Weir Flow (ft)	173.03	Hydr Depth (ft)	7.73	7.01
Min El Prs (ft)	171.88	W.P. Total (ft)	51.21	45.73
Delta EG (ft)	0.73	Conv. Total (cfs)	37150.8	32330.1
Delta WS (ft)	2.56	Top Width (ft)	37.01	37.01
BR Open Area (sq ft)	702.58	Frctn Loss (ft)	0.19	0.35
BR Open Vel (ft/s)	10.4	C & E Loss (ft)	0.07	0.07
Coef of Q		Shear Total (lb/sq ft)	1.84	2.47
Br Sel Method	Energy only	Power Total (lb/ft s)	0	0

Plan: New_Run#1 Stream Reach RS: 141 Profile: Q500				
E.G. US. (ft)	164.33	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	163.22	E.G. Elev (ft)	164.24	163.86
Q Total (cfs)	3820	W.S. Elev (ft)	162.33	160.36
Q Bridge (cfs)	3820	Crit W.S. (ft)	159.7	159.75
Q Weir (cfs)		Max Chl Dpth (ft)	10.97	9.99
Weir Sta Lft (ft)		Vel Total (ft/s)	10.71	12.97
Weir Sta Rgt (ft)		Flow Area (sq ft)	356.53	294.56
Weir Submerg		Froude # Chl	0.59	0.84
Weir Max Depth (ft)		Specif Force (cu ft)	3072.35	2986.21
Min El Weir Flow (ft)	173.03	Hydr Depth (ft)	9.63	7.96
Min El Prs (ft)	171.88	W.P. Total (ft)	55.02	47.61
Delta EG (ft)	0.89	Conv. Total (cfs)	52027.6	38932.8
Delta WS (ft)	3.41	Top Width (ft)	37.01	37.01
BR Open Area (sq ft)	702.58	Frctn Loss (ft)	0.23	0.42
BR Open Vel (ft/s)	12.97	C & E Loss (ft)	0.16	0.01
Coef of Q		Shear Total (lb/sq ft)	2.18	3.72
Br Sel Method	Energy only	Power Total (lb/ft s)	0	0

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach	771.3979	Q1.1	532	165.96	168.88	168.88	169.86	0.014507	8.24	70.89	37.68	0.91
Reach	771.3979	Q2	835	165.96	169.61	169.61	170.83	0.013505	9.4	99.57	40.99	0.92
Reach	771.3979	Q10	1506	165.96	171.03	171.03	172.4	0.010238	10.42	176.39	71.92	0.85
Reach	771.3979	Q25	1935	165.96	171.66	171.66	173.1	0.009493	10.92	225	79.26	0.83
Reach	771.3979	Q50	2297	165.96	172.06	172.06	173.62	0.009495	11.47	257.61	82.26	0.85
Reach	771.3979	Q100	2700	165.96	172.47	172.47	174.13	0.009516	12.01	291.48	85.26	0.86
Reach	771.3979	Q500	3820	165.96	174.49		175.67	0.00502	10.55	481.21	103.54	0.65
Reach	718.399	Q1.1	532	164.23	167.78	167.78	168.61	0.011417	8.04	91.31	65.63	0.82
Reach	718.399	Q2	835	164.23	168.42	168.42	169.41	0.011543	9.2	135.76	73.14	0.85
Reach	718.399	Q10	1506	164.23	171.07		171.51	0.003099	6.86	371.71	106.35	0.48
Reach	718.399	Q25	1935	164.23	171.82		172.3	0.003039	7.32	455.06	115.86	0.49
Reach	718.399	Q50	2297	164.23	172.01		172.63	0.003774	8.31	477.92	118.34	0.54
Reach	718.399	Q100	2700	164.23	172.55		173.21	0.003742	8.68	543.37	125.16	0.55
Reach	718.399	Q500	3820	164.23	174.81		175.33	0.002274	8.02	858.91	153.84	0.45
Reach	619.7879	Q1.1	532	161.94	164.26	164.26	164.91	0.021879	6.45	84.04	70.92	1.01
Reach	619.7879	Q2	835	161.94	164.73	164.73	165.56	0.018811	7.35	118.25	76.21	0.98
Reach	619.7879	Q10	1506	161.94	171.27		171.34	0.000243	2.36	841.62	138.64	0.14
Reach	619.7879	Q25	1935	161.94	172.02		172.12	0.000289	2.73	948.38	143.96	0.16
Reach	619.7879	Q50	2297	161.94	172.27		172.4	0.000367	3.13	984.4	145.72	0.18
Reach	619.7879	Q100	2700	161.94	172.81		172.96	0.000409	3.43	1064.35	149.53	0.19
Reach	619.7879	Q500	3820	161.94	174.97		175.15	0.000383	3.79	1404	164.97	0.19
Reach	530.4464	Q1.1	532	159.95	163.57		163.64	0.000955	2.13	257.89	108.18	0.23
Reach	530.4464	Q2	835	159.95	164.78		164.86	0.000638	2.25	392.8	114.92	0.2
Reach	530.4464	Q10	1506	159.95	171.29		171.32	0.000067	1.42	1251.05	148.12	0.08
Reach	530.4464	Q25	1935	159.95	172.05		172.09	0.000086	1.68	1365.47	153.18	0.09
Reach	530.4464	Q50	2297	159.95	172.3		172.36	0.000111	1.95	1405.13	156.28	0.1
Reach	530.4464	Q100	2700	159.95	172.85		172.92	0.00013	2.17	1492.77	164.2	0.11
Reach	530.4464	Q500	3820	159.95	175.02		175.11	0.000142	2.54	1882.01	195.45	0.12
Reach	390.0037	Q1.1	532	159.91	163.5		163.53	0.0005	1.47	369.22	162.35	0.17
Reach	390.0037	Q2	835	159.91	164.75		164.78	0.000298	1.51	577.73	171.62	0.14
Reach	390.0037	Q10	1506	159.91	171.29		171.3	0.000029	0.93	1876.3	231.22	0.05
Reach	390.0037	Q25	1935	159.91	172.06		172.07	0.000037	1.1	2056.22	239.79	0.06
Reach	390.0037	Q50	2297	159.91	172.32		172.34	0.000048	1.28	2118.91	242.71	0.07
Reach	390.0037	Q100	2700	159.91	172.87		172.9	0.000055	1.42	2254.24	248.88	0.07
Reach	390.0037	Q500	3820	159.91	175.04		175.08	0.00006	1.66	2821.27	273.26	0.08
Reach	337.3069	Q1.1	532	160.5	163.28		163.46	0.00381	3.74	188.29	97.93	0.42
Reach	337.3069	Q2	835	160.5	164.59		164.74	0.001938	3.54	325.25	112.01	0.32
Reach	337.3069	Q10	1506	160.5	171.27		171.3	0.000122	1.75	1493.23	229.32	0.1
Reach	337.3069	Q25	1935	160.5	172.03		172.07	0.00015	2.03	1670.26	237.73	0.11
Reach	337.3069	Q50	2297	160.5	172.28		172.33	0.000193	2.33	1730.38	240.52	0.12
Reach	337.3069	Q100	2700	160.5	172.82		172.89	0.000219	2.56	1863.07	246.57	0.13
Reach	337.3069	Q500	3820	160.5	174.99		175.07	0.000217	2.85	2424.22	270.64	0.13
Reach	272.1776	Q1.1	532	158.82	161.53	161.53	162.86	0.023216	9.26	58.21	22.69	1
Reach	272.1776	Q2	835	158.82	163.15		164.38	0.011651	8.98	95.97	24.12	0.76
Reach	272.1776	Q10	1506	158.82	171.05		171.27	0.000651	4.26	576.4	130.84	0.21
Reach	272.1776	Q25	1935	158.82	171.76		172.03	0.000796	4.89	677.05	155.42	0.24
Reach	272.1776	Q50	2297	158.82	171.92		172.28	0.001045	5.65	703.1	162.37	0.28
Reach	272.1776	Q100	2700	158.82	172.42		172.83	0.001165	6.12	789.82	183.37	0.29
Reach	272.1776	Q500	3820	158.82	174.69		175.02	0.000906	5.98	1322.34	302.2	0.26
Reach	252.5655	Q1.1	532	154.29	159.8	158.01	160.64	0.002221	7.38	73.11	13.62	0.56
Reach	252.5655	Q2	835	154.29	163.44	159.31	164.19	0.001001	6.95	123.43	14.03	0.41
Reach	252.5655	Q10	1506	154.29	170.59	161.73	171.21	0.000411	6.56	393.27	107.69	0.29

Reach	252.5655	Q25	1935	154.29	171	163.07	171.94	0.000613	8.13	440.51	132.56	0.35
Reach	252.5655	Q50	2297	154.29	170.77	164.12	172.15	0.000912	9.83	412.34	114.71	0.43
Reach	252.5655	Q100	2700	154.29	170.69	165.39	172.64	0.001285	11.64	404.34	111.78	0.51
Reach	252.5655	Q500	3820	154.29	168.5	168.5	174.42	0.004529	19.85	254.67	35.76	0.93

Reach 251 Culvert

Reach	207.8855	Q1.1	532	151.79	156.32		156.73	0.004132	5.16	104.86	28.69	0.46
Reach	207.8855	Q2	835	151.79	157.21		157.87	0.005041	6.53	130.98	29.73	0.53
Reach	207.8855	Q10	1506	151.79	158.52		159.79	0.007177	9.15	170.85	31.85	0.65
Reach	207.8855	Q25	1935	151.79	158.97		160.76	0.00926	10.9	185.58	33.93	0.75
Reach	207.8855	Q50	2297	151.79	159.62	158.61	161.66	0.00934	11.66	208.63	37.85	0.77
Reach	207.8855	Q100	2700	151.79	160.42	159.37	162.58	0.008705	12.08	240.35	40.38	0.75
Reach	207.8855	Q500	3820	151.79	162.65		164.9	0.006825	12.6	336.49	46.12	0.69

Reach	193.28	Q1.1	532	152.3	155.42	155.42	156.54	0.023683	8.53	63.31	29.46	0.96
Reach	193.28	Q2	835	152.3	156.25	156.25	157.66	0.020647	9.67	89.08	32.38	0.94
Reach	193.28	Q10	1506	152.3	157.69	157.69	159.57	0.017599	11.35	139.11	37.4	0.92
Reach	193.28	Q25	1935	152.3	158.72	158.46	160.59	0.013578	11.38	179.82	41.03	0.83
Reach	193.28	Q50	2297	152.3	159.67		161.42	0.010579	11.11	220.04	44.33	0.76
Reach	193.28	Q100	2700	152.3	160.61		162.3	0.008631	10.96	263.67	47.65	0.7
Reach	193.28	Q500	3820	152.3	163.05		164.59	0.005586	10.6	390.16	56.18	0.59

Reach	160.3296	Q1.1	532	151.36	154.86	154.04	155.48	0.007939	6.41	85.11	30.99	0.63
Reach	160.3296	Q2	835	151.36	155.9	154.94	156.7	0.00712	7.31	119.44	34.65	0.62
Reach	160.3296	Q10	1506	151.36	157.93	156.45	158.89	0.005375	8.22	196.79	41.74	0.58
Reach	160.3296	Q25	1935	151.36	159.07	157.22	160.09	0.004626	8.52	246.77	45.74	0.55
Reach	160.3296	Q50	2297	151.36	159.94	157.82	160.99	0.004192	8.73	288	48.8	0.53
Reach	160.3296	Q100	2700	151.36	160.85	158.43	161.93	0.003811	8.92	333.75	51.97	0.52
Reach	160.3296	Q500	3820	151.36	163.22	159.89	164.33	0.002971	9.16	466.54	60.26	0.47

Reach 141 Bridge

Reach	121.5313	Q1.1	532	150.37	153.64	153.64	154.84	0.017115	8.83	61.85	27.48	0.98
Reach	121.5313	Q2	835	150.37	154.52	154.52	156.08	0.015096	10.12	87.49	30.72	0.97
Reach	121.5313	Q10	1506	150.37	156.08	156.08	158.25	0.013065	12.11	139.54	35.8	0.96
Reach	121.5313	Q25	1935	150.37	156.92	156.92	159.41	0.012372	13.08	170.87	38.82	0.96
Reach	121.5313	Q50	2297	150.37	157.59	157.59	160.3	0.011758	13.71	197.75	41.23	0.95
Reach	121.5313	Q100	2700	150.37	158.29	158.29	161.2	0.011196	14.33	227.43	43.7	0.94
Reach	121.5313	Q500	3820	150.37	159.8	159.8	163.44	0.011154	16.24	297	49.34	0.97

Reach	86.5459	Q1.1	532	149.6	153.61	152.86	154.19	0.006739	6.1	88.53	34.44	0.63
Reach	86.5459	Q2	835	149.6	154.26		155.14	0.007934	7.56	112.56	41.79	0.71
Reach	86.5459	Q10	1506	149.6	155.14	155.14	156.71	0.009894	9.77	155.14	56.07	0.82
Reach	86.5459	Q25	1935	149.6	156.28	156.09	157.33	0.004438	7.62	259	113.91	0.57
Reach	86.5459	Q50	2297	149.6	156.71	156.23	157.87	0.003417	7.03	308.2	114.87	0.5
Reach	86.5459	Q100	2700	149.6	156.95	156.45	158.38	0.003467	7.26	336.01	115.41	0.51
Reach	86.5459	Q500	3820	149.6	157.44	157.42	159.74	0.003932	8.14	393.16	116.51	0.55

Reach	43.8688	Q1.1	532	150.74	152.94	152.83	153.73	0.016507	7.16	74.59	40.8	0.92
Reach	43.8688	Q2	835	150.74	153.51	153.51	154.63	0.016502	8.54	101.76	53.09	0.96
Reach	43.8688	Q10	1506	150.74	154.66	154.66	156.17	0.013837	10.09	172.62	72.81	0.94
Reach	43.8688	Q25	1935	150.74	155.29	155.29	156.95	0.012614	10.73	224.5	91.42	0.92
Reach	43.8688	Q50	2297	150.74	155.72	155.72	157.54	0.012437	11.35	267.33	115.75	0.93
Reach	43.8688	Q100	2700	150.74	156.4	156.4	158.1	0.010061	11.18	353.04	128.29	0.85
Reach	43.8688	Q500	3820	150.74	157.37	157.37	159.38	0.010122	12.52	478.15	130.74	0.88

Plan: Fish Passage Stream Reach RS: 141 Profile: Aug-Sept				
E.G. US. (ft)	151.84	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	151.79	E.G. Elev (ft)	151.8	151.33
Q Total (cfs)	10	W.S. Elev (ft)	151.7	151.31
Q Bridge (cfs)	10	Crit W.S. (ft)	151.7	150.89
Q Weir (cfs)		Max Chl Dpth (ft)	0.34	0.94
Weir Sta Lft (ft)		Vel Total (ft/s)	2.63	1.1
Weir Sta Rgt (ft)		Flow Area (sq ft)	3.8	9.11
Weir Submerg		Froude # Chl	0.99	0.26
Weir Max Depth (ft)		Specif Force (cu ft)	1.35	3.43
Min El Weir Flow (ft)	173.03	Hydr Depth (ft)	0.22	0.53
Min El Prs (ft)	171.88	W.P. Total (ft)	17.6	17.2
Delta EG (ft)	0.62	Conv. Total (cfs)	50.7	221.5
Delta WS (ft)	0.6	Top Width (ft)	17.1	17.07
BR Open Area (sq ft)	702.58	Frctn Loss (ft)	0.17	0.11
BR Open Vel (ft/s)	2.63	C & E Loss (ft)	0.03	0
Coef of Q		Shear Total (lb/sq ft)	0.52	0.07
Br Sel Method	Energy only	Power Total (lb/ft s)	0	0

Plan: Fish Passage Stream Reach RS: 141 Profile: March				
E.G. US. (ft)	152.88	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	152.66	E.G. Elev (ft)	152.87	152.63
Q Total (cfs)	100	W.S. Elev (ft)	152.63	152.48
Q Bridge (cfs)	100	Crit W.S. (ft)	152.39	151.81
Q Weir (cfs)		Max Chl Dpth (ft)	1.27	2.11
Weir Sta Lft (ft)		Vel Total (ft/s)	3.88	3.06
Weir Sta Rgt (ft)		Flow Area (sq ft)	25.76	32.65
Weir Submerg		Froude # Chl	0.67	0.45
Weir Max Depth (ft)		Specif Force (cu ft)	25.95	36.46
Min El Weir Flow (ft)	173.03	Hydr Depth (ft)	1.03	1.45
Min El Prs (ft)	171.88	W.P. Total (ft)	27.41	23.19
Delta EG (ft)	0.53	Conv. Total (cfs)	918.1	1523.5
Delta WS (ft)	0.57	Top Width (ft)	24.99	22.55
BR Open Area (sq ft)	702.58	Frctn Loss (ft)	0.21	0.26
BR Open Vel (ft/s)	3.88	C & E Loss (ft)	0.03	0.01
Coef of Q		Shear Total (lb/sq ft)	0.7	0.38
Br Sel Method	Energy only	Power Total (lb/ft s)	0	0

Plan: Fish Passage Stream Reach RS: 141 Profile: April				
E.G. US. (ft)	153.53	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	153.22	E.G. Elev (ft)	153.52	153.29
Q Total (cfs)	180	W.S. Elev (ft)	153.2	153.05
Q Bridge (cfs)	180	Crit W.S. (ft)	152.77	152.27
Q Weir (cfs)		Max Chl Dpth (ft)	1.84	2.68
Weir Sta Lft (ft)		Vel Total (ft/s)	4.5	3.9
Weir Sta Rgt (ft)		Flow Area (sq ft)	39.99	46.21
Weir Submerg		Froude # Chl	0.63	0.5
Weir Max Depth (ft)		Specif Force (cu ft)	57.77	71.14
Min El Weir Flow (ft)	173.03	Hydr Depth (ft)	1.6	1.79
Min El Prs (ft)	171.88	W.P. Total (ft)	28.55	26.74
Delta EG (ft)	0.56	Conv. Total (cfs)	1859.7	2599.7
Delta WS (ft)	0.7	Top Width (ft)	24.99	25.81
BR Open Area (sq ft)	702.58	Frctn Loss (ft)	0.21	0.3
BR Open Vel (ft/s)	4.5	C & E Loss (ft)	0.02	0.02
Coef of Q		Shear Total (lb/sq ft)	0.82	0.52
Br Sel Method	Energy only	Power Total (lb/ft s)	0	0

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach	771.3979	Aug-Sept	10	165.96	166.35	166.35	166.47	0.037527	2.75	3.64	15.34	0.99
Reach	771.3979	March	100	165.96	167.17	167.16	167.6	0.024302	5.25	19.04	21.76	0.99
Reach	771.3979	April	180	165.96	167.59	167.59	168.2	0.021806	6.29	28.85	24.95	0.99
Reach	718.399	Aug-Sept	10	164.23	164.88	164.8	164.97	0.016574	2.33	4.29	12.53	0.7
Reach	718.399	March	100	164.23	165.75	165.75	166.29	0.024493	5.88	17	16.1	1.01
Reach	718.399	April	180	164.23	166.33	166.33	167	0.018678	6.61	28.54	25.38	0.94
Reach	619.7879	Aug-Sept	10	161.94	162.45	162.45	162.58	0.038206	2.9	3.45	13.56	1.01
Reach	619.7879	March	100	161.94	163.23	163.23	163.52	0.029654	4.31	23.19	41.69	1.02
Reach	619.7879	April	180	161.94	163.52	163.52	163.89	0.027285	4.93	36.5	50.4	1.02
Reach	530.4464	Aug-Sept	10	159.95	160.99		160.99	0.000675	0.63	15.97	30.44	0.15
Reach	530.4464	March	100	159.95	161.92		161.94	0.001008	1.14	88.21	95.47	0.21
Reach	530.4464	April	180	159.95	162.26		162.3	0.001178	1.49	121.89	99.4	0.23
Reach	390.0037	Aug-Sept	10	159.91	160.93		160.93	0.000308	0.46	21.67	36.28	0.11
Reach	390.0037	March	100	159.91	161.77		161.79	0.001137	1	100.64	142.95	0.21
Reach	390.0037	April	180	159.91	162.12		162.14	0.001015	1.19	151.51	150.53	0.21
Reach	337.3069	Aug-Sept	10	160.5	160.84	160.75	160.88	0.016366	1.6	6.25	26.76	0.58
Reach	337.3069	March	100	160.5	161.47		161.63	0.015435	3.17	33.62	70.95	0.68
Reach	337.3069	April	180	160.5	161.8		162	0.011945	3.64	58.32	76.92	0.64
Reach	272.1776	Aug-Sept	10	158.82	159.02	159.02	159.12	0.051627	2.5	3.99	20.46	1
Reach	272.1776	March	100	158.82	159.73	159.73	160.17	0.033183	5.35	18.69	21.09	1
Reach	272.1776	April	180	158.82	160.15	160.15	160.81	0.029867	6.49	27.76	21.47	1
Reach	252.5655	Aug-Sept	10	154.29	154.68	154.57	154.74	0.005688	2.07	4.83	13.04	0.6
Reach	252.5655	March	100	154.29	156.1	155.52	156.38	0.003294	4.26	23.51	13.2	0.56
Reach	252.5655	April	180	154.29	156.97	156.11	157.38	0.002864	5.17	34.99	13.3	0.56
Reach	251		Culvert									
Reach	207.8855	Aug-Sept	10	151.79	153.02		153.03	0.000291	0.53	18.91	20.47	0.1
Reach	207.8855	March	100	151.79	154.17		154.25	0.002126	2.18	45.93	26.09	0.29
Reach	207.8855	April	180	151.79	154.71		154.85	0.002838	3	60.2	26.82	0.35
Reach	193.28	Aug-Sept	10	152.3	152.86	152.86	153	0.046989	3.04	3.29	11.35	1
Reach	193.28	March	100	152.3	153.72	153.72	154.13	0.036279	5.14	19.47	24.64	1.02
Reach	193.28	April	180	152.3	154.11	154.11	154.71	0.032279	6.2	29.04	24.95	1.01
Reach	160.3296	Aug-Sept	10	151.36	151.79	151.69	151.84	0.013315	1.82	5.49	19.1	0.6
Reach	160.3296	March	100	151.36	152.66	152.39	152.88	0.010932	3.79	26.42	24.99	0.65
Reach	160.3296	April	180	151.36	153.22	152.77	153.53	0.009039	4.45	40.44	24.99	0.62
Reach	141		Bridge									
Reach	121.5313	Aug-Sept	10	150.37	151.19		151.22	0.003845	1.4	7.14	14.93	0.36
Reach	121.5313	March	100	150.37	152.09		152.36	0.010643	4.15	24.1	20.94	0.68
Reach	121.5313	April	180	150.37	152.52		152.97	0.012818	5.36	33.61	22.73	0.78
Reach	86.5459	Aug-Sept	10	149.6	151.19		151.19	0.000224	0.51	19.75	22.4	0.1
Reach	86.5459	March	100	149.6	152.05		152.14	0.002539	2.45	40.81	26.53	0.35
Reach	86.5459	April	180	149.6	152.48		152.66	0.003884	3.41	52.77	28.59	0.44
Reach	43.8688	Aug-Sept	10	150.74	151.11	151.07	151.16	0.016505	1.63	6.15	30.86	0.64
Reach	43.8688	March	100	150.74	151.68	151.57	151.91	0.01651	3.79	26.36	36.77	0.79
Reach	43.8688	April	180	150.74	151.99	151.87	152.34	0.016502	4.75	37.88	37.32	0.83

Plan: 70 ft Bridge Stream Reach RS: 141 Profile: Q1.1				
E.G. US. (ft)	155.48	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	154.86	E.G. Elev (ft)	155.47	155.25
Q Total (cfs)	532	W.S. Elev (ft)	154.84	154.68
Q Bridge (cfs)	532	Crit W.S. (ft)	154.04	153.64
Q Weir (cfs)		Max Chl Dpth (ft)	3.48	4.31
Weir Sta Lft (ft)		Vel Total (ft/s)	6.29	5.7
Weir Sta Rgt (ft)		Flow Area (sq ft)	84.59	93.37
Weir Submerg		Froude # Chl	0.63	0.57
Weir Max Depth (ft)		Specif Force (cu ft)	238.11	260.68
Min El Weir Flow (ft)	173.03	Hydr Depth (ft)	2.73	2.75
Min El Prs (ft)	170.59	W.P. Total (ft)	36.52	35.64
Delta EG (ft)	0.65	Conv. Total (cfs)	5916.1	7361.5
Delta WS (ft)	1.22	Top Width (ft)	30.94	33.94
BR Open Area (sq ft)	931.88	Frctn Loss (ft)	0.21	0.35
BR Open Vel (ft/s)	6.29	C & E Loss (ft)	0.02	0.06
Coef of Q		Shear Total (lb/sq ft)	1.17	0.85
Br Sel Method	Energy only	Power Total (lb/ft s)	0	0

Plan: 70 ft Bridge Stream Reach RS: 141 Profile: Q10				
E.G. US. (ft)	158.73	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	157.64	E.G. Elev (ft)	158.72	158.54
Q Total (cfs)	1506	W.S. Elev (ft)	157.62	157.45
Q Bridge (cfs)	1506	Crit W.S. (ft)	156.45	156.17
Q Weir (cfs)		Max Chl Dpth (ft)	6.26	7.08
Weir Sta Lft (ft)		Vel Total (ft/s)	8.17	6.96
Weir Sta Rgt (ft)		Flow Area (sq ft)	184.37	216.37
Weir Submerg		Froude # Chl	0.63	0.62
Weir Max Depth (ft)		Specif Force (cu ft)	891.61	957.5
Min El Weir Flow (ft)	173.03	Hydr Depth (ft)	4.53	3.95
Min El Prs (ft)	170.59	W.P. Total (ft)	47.75	57.21
Delta EG (ft)	0.58	Conv. Total (cfs)	18691.2	21206.5
Delta WS (ft)	1.47	Top Width (ft)	40.69	54.76
BR Open Area (sq ft)	931.88	Frctn Loss (ft)	0.18	0.3
BR Open Vel (ft/s)	8.17	C & E Loss (ft)	0	0.09
Coef of Q		Shear Total (lb/sq ft)	1.56	1.19
Br Sel Method	Energy only	Power Total (lb/ft s)	0	0

Plan: 70 ft Bridge Stream Reach RS: 141 Profile: Q25				
E.G. US. (ft)	159.77	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	158.52	E.G. Elev (ft)	159.76	159.58
Q Total (cfs)	1935	W.S. Elev (ft)	158.5	158.35
Q Bridge (cfs)	1935	Crit W.S. (ft)	157.23	157.01
Q Weir (cfs)		Max Chl Dpth (ft)	7.14	7.98
Weir Sta Lft (ft)		Vel Total (ft/s)	8.74	7.2
Weir Sta Rgt (ft)		Flow Area (sq ft)	221.5	268.62
Weir Submerg		Froude # Chl	0.63	0.55
Weir Max Depth (ft)		Specif Force (cu ft)	1216.31	1310.59
Min El Weir Flow (ft)	173.03	Hydr Depth (ft)	5.06	4.43
Min El Prs (ft)	170.59	W.P. Total (ft)	51.3	63.53
Delta EG (ft)	0.58	Conv. Total (cfs)	24363.3	27542.2
Delta WS (ft)	1.53	Top Width (ft)	43.77	60.68
BR Open Area (sq ft)	931.88	Frctn Loss (ft)	0.18	0.29
BR Open Vel (ft/s)	8.74	C & E Loss (ft)	0.01	0.1
Coef of Q		Shear Total (lb/sq ft)	1.7	1.3
Br Sel Method	Energy only	Power Total (lb/ft s)	0	0

Plan: 70 ft Bridge Stream Reach RS: 141 Profile: Q50				
E.G. US. (ft)	160.55	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	159.17	E.G. Elev (ft)	160.54	160.35
Q Total (cfs)	2297	W.S. Elev (ft)	159.16	159.03
Q Bridge (cfs)	2297	Crit W.S. (ft)	157.82	157.64
Q Weir (cfs)		Max Chl Dpth (ft)	7.8	8.66
Weir Sta Lft (ft)		Vel Total (ft/s)	9.16	7.39
Weir Sta Rgt (ft)		Flow Area (sq ft)	250.88	310.68
Weir Submerg		Froude # Chl	0.64	0.55
Weir Max Depth (ft)		Specif Force (cu ft)	1502.04	1623.79
Min El Weir Flow (ft)	173.03	Hydr Depth (ft)	5.45	4.95
Min El Prs (ft)	170.59	W.P. Total (ft)	53.94	66.46
Delta EG (ft)	0.58	Conv. Total (cfs)	29131.3	33066.8
Delta WS (ft)	1.56	Top Width (ft)	46.06	62.82
BR Open Area (sq ft)	931.88	Frctn Loss (ft)	0.17	0.28
BR Open Vel (ft/s)	9.16	C & E Loss (ft)	0.02	0.1
Coef of Q		Shear Total (lb/sq ft)	1.81	1.41
Br Sel Method	Energy only	Power Total (lb/ft s)	0	0

Plan: 70 ft Bridge Stream Reach RS: 141 Profile: Q100				
E.G. US. (ft)	161.34	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	159.82	E.G. Elev (ft)	161.33	161.13
Q Total (cfs)	2700	W.S. Elev (ft)	159.8	159.69
Q Bridge (cfs)	2700	Crit W.S. (ft)	158.43	158.36
Q Weir (cfs)		Max Chl Dpth (ft)	8.44	9.32
Weir Sta Lft (ft)		Vel Total (ft/s)	9.6	7.65
Weir Sta Rgt (ft)		Flow Area (sq ft)	281.38	352.85
Weir Submerg		Froude # Chl	0.65	0.55
Weir Max Depth (ft)		Specif Force (cu ft)	1829.16	1982.7
Min El Weir Flow (ft)	173.03	Hydr Depth (ft)	5.82	5.44
Min El Prs (ft)	170.59	W.P. Total (ft)	56.54	69.29
Delta EG (ft)	0.59	Conv. Total (cfs)	34320	38884.7
Delta WS (ft)	1.56	Top Width (ft)	48.32	64.9
BR Open Area (sq ft)	931.88	Frctn Loss (ft)	0.17	0.27
BR Open Vel (ft/s)	9.6	C & E Loss (ft)	0.03	0.11
Coef of Q		Shear Total (lb/sq ft)	1.92	1.53
Br Sel Method	Energy only	Power Total (lb/ft s)	0	0

Plan: 70 ft Bridge Stream Reach RS: 141 Profile: Q500				
E.G. US. (ft)	163.19	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	161.3	E.G. Elev (ft)	163.19	162.97
Q Total (cfs)	3820	W.S. Elev (ft)	161.28	161.2
Q Bridge (cfs)	3820	Crit W.S. (ft)	159.89	159.66
Q Weir (cfs)		Max Chl Dpth (ft)	9.92	10.83
Weir Sta Lft (ft)		Vel Total (ft/s)	10.71	8.43
Weir Sta Rgt (ft)		Flow Area (sq ft)	356.71	453.16
Weir Submerg		Froude # Chl	0.67	0.57
Weir Max Depth (ft)		Specif Force (cu ft)	2777.27	3024.08
Min El Weir Flow (ft)	173.03	Hydr Depth (ft)	6.67	6.76
Min El Prs (ft)	170.59	W.P. Total (ft)	62.51	73.87
Delta EG (ft)	0.6	Conv. Total (cfs)	48050.3	53957.1
Delta WS (ft)	1.57	Top Width (ft)	53.5	67.01
BR Open Area (sq ft)	931.88	Frctn Loss (ft)	0.18	0.27
BR Open Vel (ft/s)	10.71	C & E Loss (ft)	0.04	0.11
Coef of Q		Shear Total (lb/sq ft)	2.25	1.92
Br Sel Method	Energy only	Power Total (lb/ft s)	0	0

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach	771.3979	Q1.1	532	165.96	168.88	168.88	169.86	0.014507	8.24	70.89	37.68	0.91
Reach	771.3979	Q2	835	165.96	169.61	169.61	170.83	0.013505	9.4	99.57	40.99	0.92
Reach	771.3979	Q10	1506	165.96	171.03	171.03	172.4	0.010238	10.42	176.39	71.92	0.85
Reach	771.3979	Q25	1935	165.96	171.66	171.66	173.1	0.009493	10.92	225	79.26	0.83
Reach	771.3979	Q50	2297	165.96	172.06	172.06	173.62	0.009495	11.47	257.61	82.26	0.85
Reach	771.3979	Q100	2700	165.96	172.47	172.47	174.13	0.009516	12.01	291.48	85.26	0.86
Reach	771.3979	Q500	3820	165.96	174.49		175.67	0.00502	10.55	481.21	103.54	0.65
Reach	718.399	Q1.1	532	164.23	167.78	167.78	168.61	0.011417	8.04	91.31	65.63	0.82
Reach	718.399	Q2	835	164.23	168.42	168.42	169.41	0.011543	9.2	135.76	73.14	0.85
Reach	718.399	Q10	1506	164.23	171.05		171.49	0.003154	6.9	369.13	106.04	0.49
Reach	718.399	Q25	1935	164.23	171.82		172.3	0.003039	7.32	455.06	115.86	0.49
Reach	718.399	Q50	2297	164.23	172.23		172.79	0.003288	7.91	504.13	121.11	0.51
Reach	718.399	Q100	2700	164.23	172.51		173.19	0.003827	8.75	538.68	124.68	0.55
Reach	718.399	Q500	3820	164.23	174.81		175.33	0.002274	8.02	858.91	153.84	0.45
Reach	619.7879	Q1.1	532	161.94	164.26	164.26	164.91	0.021879	6.45	84.04	70.92	1.01
Reach	619.7879	Q2	835	161.94	164.73	164.73	165.56	0.018811	7.35	118.25	76.21	0.98
Reach	619.7879	Q10	1506	161.94	171.24		171.32	0.000246	2.37	838.72	138.49	0.15
Reach	619.7879	Q25	1935	161.94	172.02		172.12	0.000289	2.73	948.38	143.96	0.16
Reach	619.7879	Q50	2297	161.94	172.46		172.58	0.00034	3.06	1011.79	147.03	0.18
Reach	619.7879	Q100	2700	161.94	172.78		172.93	0.000414	3.45	1059.61	149.31	0.19
Reach	619.7879	Q500	3820	161.94	174.97		175.15	0.000383	3.79	1404	164.97	0.19
Reach	530.4464	Q1.1	532	159.95	163.57		163.64	0.000955	2.13	257.89	108.18	0.23
Reach	530.4464	Q2	835	159.95	164.78		164.86	0.000638	2.25	392.8	114.92	0.2
Reach	530.4464	Q10	1506	159.95	171.27		171.3	0.000067	1.42	1247.97	148.02	0.08
Reach	530.4464	Q25	1935	159.95	172.05		172.09	0.000086	1.68	1365.47	153.18	0.09
Reach	530.4464	Q50	2297	159.95	172.49		172.54	0.000105	1.91	1434.28	158.96	0.1
Reach	530.4464	Q100	2700	159.95	172.82		172.89	0.000131	2.18	1487.63	163.75	0.11
Reach	530.4464	Q500	3820	159.95	175.02		175.11	0.000142	2.54	1882.01	195.45	0.12
Reach	390.0037	Q1.1	532	159.91	163.5		163.53	0.0005	1.47	369.22	162.35	0.17
Reach	390.0037	Q2	835	159.91	164.75		164.78	0.000298	1.51	577.73	171.62	0.14
Reach	390.0037	Q10	1506	159.91	171.27		171.28	0.000029	0.93	1871.51	230.98	0.05
Reach	390.0037	Q25	1935	159.91	172.06		172.07	0.000037	1.1	2056.22	239.79	0.06
Reach	390.0037	Q50	2297	159.91	172.5		172.52	0.000045	1.25	2163.93	244.78	0.07
Reach	390.0037	Q100	2700	159.91	172.84		172.86	0.000056	1.43	2246.46	248.53	0.07
Reach	390.0037	Q500	3820	159.91	175.04		175.08	0.00006	1.66	2821.27	273.26	0.08
Reach	337.3069	Q1.1	532	160.5	163.28		163.46	0.00381	3.74	188.29	97.93	0.42
Reach	337.3069	Q2	835	160.5	164.59		164.74	0.001938	3.54	325.25	112.01	0.32
Reach	337.3069	Q10	1506	160.5	171.25		171.28	0.000123	1.75	1488.43	229.09	0.1
Reach	337.3069	Q25	1935	160.5	172.03		172.07	0.00015	2.03	1670.26	237.73	0.11
Reach	337.3069	Q50	2297	160.5	172.47		172.52	0.00018	2.28	1775.54	242.6	0.12
Reach	337.3069	Q100	2700	160.5	172.79		172.86	0.000221	2.57	1855.25	246.22	0.13
Reach	337.3069	Q500	3820	160.5	174.99		175.07	0.000217	2.85	2424.22	270.64	0.13
Reach	272.1776	Q1.1	532	158.82	161.53	161.53	162.86	0.023216	9.26	58.21	22.69	1
Reach	272.1776	Q2	835	158.82	163.15		164.38	0.011651	8.98	95.97	24.12	0.76
Reach	272.1776	Q10	1506	158.82	171.03		171.25	0.000658	4.28	573.4	130.05	0.22
Reach	272.1776	Q25	1935	158.82	171.76		172.03	0.000796	4.89	677.05	155.42	0.24
Reach	272.1776	Q50	2297	158.82	172.14		172.47	0.000952	5.45	739.6	171.53	0.26
Reach	272.1776	Q100	2700	158.82	172.38		172.79	0.001185	6.16	782.79	181.76	0.29
Reach	272.1776	Q500	3820	158.82	174.69		175.02	0.000906	5.98	1322.34	302.2	0.26
Reach	252.5655	Q1.1	532	154.29	159.8	158.01	160.64	0.002221	7.38	73.11	13.62	0.56
Reach	252.5655	Q2	835	154.29	163.44	159.31	164.19	0.001001	6.95	123.43	14.03	0.41
Reach	252.5655	Q10	1506	154.29	170.57	161.73	171.19	0.000414	6.57	390.6	106.76	0.29

Reach	252.5655	Q25	1935	154.29	171	163.07	171.94	0.000613	8.13	440.51	132.56	0.35
Reach	252.5655	Q50	2297	154.29	171.02	164.12	172.35	0.000859	9.64	443.35	135.07	0.42
Reach	252.5655	Q100	2700	154.29	170.63	165.39	172.61	0.001308	11.71	397.26	109.11	0.51
Reach	252.5655	Q500	3820	154.29	168.5	168.5	174.42	0.004529	19.85	254.67	35.76	0.93

Reach 251 Culvert

Reach	207.8855	Q1.1	532	151.79	156.32		156.73	0.004132	5.16	104.86	28.69	0.46
Reach	207.8855	Q2	835	151.79	157.21		157.87	0.005041	6.53	130.98	29.73	0.53
Reach	207.8855	Q10	1506	151.79	158.52		159.79	0.007175	9.15	170.87	31.85	0.65
Reach	207.8855	Q25	1935	151.79	159.01		160.78	0.009055	10.83	187.01	34.13	0.74
Reach	207.8855	Q50	2297	151.79	159.19	158.61	161.54	0.011606	12.48	193.21	34.97	0.85
Reach	207.8855	Q100	2700	151.79	159.53	159.37	162.42	0.013451	13.88	205.46	36.56	0.92
Reach	207.8855	Q500	3820	151.79	161.21	161.21	164.59	0.012226	15.24	272.76	42.14	0.91

Reach	193.28	Q1.1	532	152.3	155.42	155.42	156.54	0.023683	8.53	63.31	29.46	0.96
Reach	193.28	Q2	835	152.3	156.25	156.25	157.66	0.020647	9.67	89.08	32.38	0.94
Reach	193.28	Q10	1506	152.3	157.69	157.69	159.57	0.017599	11.35	139.11	37.4	0.92
Reach	193.28	Q25	1935	152.3	158.46	158.46	160.57	0.016315	12.09	168.97	40.1	0.91
Reach	193.28	Q50	2297	152.3	159.03	159.03	161.32	0.015619	12.64	192.66	42.11	0.9
Reach	193.28	Q100	2700	152.3	159.6	159.6	162.09	0.015162	13.22	217.31	44.11	0.9
Reach	193.28	Q500	3820	152.3	161.05	161.05	163.95	0.013794	14.38	284.97	49.19	0.89

Reach	160.3296	Q1.1	532	151.36	154.86	154.04	155.48	0.007939	6.41	85.11	30.99	0.63
Reach	160.3296	Q2	835	151.36	155.9	154.94	156.69	0.007154	7.32	119.24	34.63	0.62
Reach	160.3296	Q10	1506	151.36	157.64	156.45	158.73	0.006433	8.72	184.95	40.74	0.63
Reach	160.3296	Q25	1935	151.36	158.52	157.22	159.77	0.006258	9.41	222.11	43.81	0.63
Reach	160.3296	Q50	2297	151.36	159.17	157.82	160.55	0.006172	9.93	251.51	46.1	0.64
Reach	160.3296	Q100	2700	151.36	159.82	158.43	161.34	0.006147	10.47	282.06	48.37	0.64
Reach	160.3296	Q500	3820	151.36	161.3	159.89	163.19	0.006281	11.82	357.49	53.55	0.67

Reach 141 Bridge

Reach	121.5313	Q1.1	532	150.37	153.64	153.64	154.84	0.017115	8.83	61.85	27.48	0.98
Reach	121.5313	Q2	835	150.37	154.53	154.53	156.08	0.014853	10.07	88.57	32.86	0.96
Reach	121.5313	Q10	1506	150.37	156.17	156.17	158.15	0.011898	11.69	152.2	45.12	0.92
Reach	121.5313	Q25	1935	150.37	156.98	156.98	159.2	0.011167	12.51	191.63	51.26	0.91
Reach	121.5313	Q50	2297	150.37	157.61	157.61	159.97	0.010677	13.09	225.01	55.93	0.9
Reach	121.5313	Q100	2700	150.37	158.26	158.26	160.75	0.010122	13.59	263.31	60.86	0.9
Reach	121.5313	Q500	3820	150.37	159.73	159.73	162.59	0.00959	14.97	360.56	71.86	0.9

Reach	86.5459	Q1.1	532	149.6	153.61	152.86	154.19	0.006739	6.1	88.53	34.44	0.63
Reach	86.5459	Q2	835	149.6	154.26		155.14	0.007934	7.56	112.56	41.79	0.71
Reach	86.5459	Q10	1506	149.6	155.14	155.14	156.71	0.009894	9.77	155.14	56.07	0.82
Reach	86.5459	Q25	1935	149.6	156.28	156.09	157.33	0.004438	7.62	259	113.91	0.57
Reach	86.5459	Q50	2297	149.6	156.71	156.23	157.87	0.003417	7.03	308.2	114.87	0.5
Reach	86.5459	Q100	2700	149.6	156.95	156.45	158.38	0.00347	7.27	335.93	115.41	0.51
Reach	86.5459	Q500	3820	149.6	157.44	157.42	159.74	0.003932	8.14	393.17	116.51	0.55

Reach	43.8688	Q1.1	532	150.74	152.94	152.83	153.73	0.016507	7.16	74.59	40.8	0.92
Reach	43.8688	Q2	835	150.74	153.51	153.51	154.63	0.016502	8.54	101.76	53.09	0.96
Reach	43.8688	Q10	1506	150.74	154.66	154.66	156.17	0.013837	10.09	172.62	72.81	0.94
Reach	43.8688	Q25	1935	150.74	155.29	155.29	156.95	0.012614	10.73	224.5	91.42	0.92
Reach	43.8688	Q50	2297	150.74	155.72	155.72	157.54	0.012437	11.35	267.33	115.75	0.93
Reach	43.8688	Q100	2700	150.74	156.4	156.4	158.1	0.010061	11.18	353.04	128.29	0.85
Reach	43.8688	Q500	3820	150.74	157.37	157.37	159.38	0.010122	12.52	478.15	130.74	0.88

Plan: 70 ft Fish Stream Reach RS: 141 Profile: Aug-Sept				
E.G. US. (ft)	151.84	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	151.79	E.G. Elev (ft)	151.8	151.33
Q Total (cfs)	10	W.S. Elev (ft)	151.7	151.31
Q Bridge (cfs)	10	Crit W.S. (ft)	151.7	150.89
Q Weir (cfs)		Max Chl Dpth (ft)	0.34	0.94
Weir Sta Lft (ft)		Vel Total (ft/s)	2.63	1.1
Weir Sta Rgt (ft)		Flow Area (sq ft)	3.8	9.11
Weir Submerg		Froude # Chl	0.99	0.26
Weir Max Depth (ft)		Specif Force (cu ft)	1.35	3.43
Min El Weir Flow (ft)	173.03	Hydr Depth (ft)	0.22	0.53
Min El Prs (ft)	170.59	W.P. Total (ft)	17.6	17.2
Delta EG (ft)	0.62	Conv. Total (cfs)	50.7	221.5
Delta WS (ft)	0.6	Top Width (ft)	17.1	17.07
BR Open Area (sq ft)	931.88	Frctn Loss (ft)	0.17	0.11
BR Open Vel (ft/s)	2.63	C & E Loss (ft)	0.03	0
Coef of Q		Shear Total (lb/sq ft)	0.52	0.07
Br Sel Method	Energy only	Power Total (lb/ft s)	0	0

Plan: 70 ft Fish Stream Reach RS: 141 Profile: March				
E.G. US. (ft)	152.88	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	152.66	E.G. Elev (ft)	152.87	152.63
Q Total (cfs)	100	W.S. Elev (ft)	152.63	152.48
Q Bridge (cfs)	100	Crit W.S. (ft)	152.39	151.81
Q Weir (cfs)		Max Chl Dpth (ft)	1.27	2.11
Weir Sta Lft (ft)		Vel Total (ft/s)	3.88	3.06
Weir Sta Rgt (ft)		Flow Area (sq ft)	25.76	32.65
Weir Submerg		Froude # Chl	0.67	0.45
Weir Max Depth (ft)		Specif Force (cu ft)	25.95	36.46
Min El Weir Flow (ft)	173.03	Hydr Depth (ft)	1.03	1.45
Min El Prs (ft)	170.59	W.P. Total (ft)	27.41	23.19
Delta EG (ft)	0.53	Conv. Total (cfs)	918.1	1523.5
Delta WS (ft)	0.57	Top Width (ft)	24.99	22.55
BR Open Area (sq ft)	931.88	Frctn Loss (ft)	0.21	0.26
BR Open Vel (ft/s)	3.88	C & E Loss (ft)	0.03	0.01
Coef of Q		Shear Total (lb/sq ft)	0.7	0.38
Br Sel Method	Energy only	Power Total (lb/ft s)	0	0

Plan: 70 ft Fish Stream Reach RS: 141 Profile: April				
E.G. US. (ft)	153.53	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	153.22	E.G. Elev (ft)	153.52	153.29
Q Total (cfs)	180	W.S. Elev (ft)	153.2	153.05
Q Bridge (cfs)	180	Crit W.S. (ft)	152.77	152.27
Q Weir (cfs)		Max Chl Dpth (ft)	1.84	2.68
Weir Sta Lft (ft)		Vel Total (ft/s)	4.5	3.9
Weir Sta Rgt (ft)		Flow Area (sq ft)	39.99	46.21
Weir Submerg		Froude # Chl	0.63	0.5
Weir Max Depth (ft)		Specif Force (cu ft)	57.77	71.14
Min El Weir Flow (ft)	173.03	Hydr Depth (ft)	1.6	1.79
Min El Prs (ft)	170.59	W.P. Total (ft)	28.55	26.74
Delta EG (ft)	0.56	Conv. Total (cfs)	1859.7	2599.7
Delta WS (ft)	0.7	Top Width (ft)	24.99	25.81
BR Open Area (sq ft)	931.88	Frctn Loss (ft)	0.21	0.3
BR Open Vel (ft/s)	4.5	C & E Loss (ft)	0.02	0.02
Coef of Q		Shear Total (lb/sq ft)	0.82	0.52
Br Sel Method	Energy only	Power Total (lb/ft s)	0	0

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach	771.3979	Aug-Sept	10	165.96	166.35	166.35	166.47	0.037527	2.75	3.64	15.34	0.99
Reach	771.3979	March	100	165.96	167.17	167.16	167.6	0.024302	5.25	19.04	21.76	0.99
Reach	771.3979	April	180	165.96	167.59	167.59	168.2	0.021806	6.29	28.85	24.95	0.99
Reach	718.399	Aug-Sept	10	164.23	164.88	164.8	164.97	0.016574	2.33	4.29	12.53	0.7
Reach	718.399	March	100	164.23	165.75	165.75	166.29	0.024493	5.88	17	16.1	1.01
Reach	718.399	April	180	164.23	166.33	166.33	167	0.018678	6.61	28.54	25.38	0.94
Reach	619.7879	Aug-Sept	10	161.94	162.45	162.45	162.58	0.038206	2.9	3.45	13.56	1.01
Reach	619.7879	March	100	161.94	163.23	163.23	163.52	0.029654	4.31	23.19	41.69	1.02
Reach	619.7879	April	180	161.94	163.52	163.52	163.89	0.027285	4.93	36.5	50.4	1.02
Reach	530.4464	Aug-Sept	10	159.95	160.99		160.99	0.000675	0.63	15.97	30.44	0.15
Reach	530.4464	March	100	159.95	161.92		161.94	0.001008	1.14	88.21	95.47	0.21
Reach	530.4464	April	180	159.95	162.26		162.3	0.001178	1.49	121.89	99.4	0.23
Reach	390.0037	Aug-Sept	10	159.91	160.93		160.93	0.000308	0.46	21.67	36.28	0.11
Reach	390.0037	March	100	159.91	161.77		161.79	0.001137	1	100.64	142.95	0.21
Reach	390.0037	April	180	159.91	162.12		162.14	0.001015	1.19	151.51	150.53	0.21
Reach	337.3069	Aug-Sept	10	160.5	160.84	160.75	160.88	0.016366	1.6	6.25	26.76	0.58
Reach	337.3069	March	100	160.5	161.47		161.63	0.015435	3.17	33.62	70.95	0.68
Reach	337.3069	April	180	160.5	161.8		162	0.011945	3.64	58.32	76.92	0.64
Reach	272.1776	Aug-Sept	10	158.82	159.02	159.02	159.12	0.051627	2.5	3.99	20.46	1
Reach	272.1776	March	100	158.82	159.73	159.73	160.17	0.033183	5.35	18.69	21.09	1
Reach	272.1776	April	180	158.82	160.15	160.15	160.81	0.029867	6.49	27.76	21.47	1
Reach	252.5655	Aug-Sept	10	154.29	154.68	154.57	154.74	0.005688	2.07	4.83	13.04	0.6
Reach	252.5655	March	100	154.29	156.1	155.52	156.38	0.003294	4.26	23.51	13.2	0.56
Reach	252.5655	April	180	154.29	156.97	156.11	157.38	0.002864	5.17	34.99	13.3	0.56
Reach	251		Culvert									
Reach	207.8855	Aug-Sept	10	151.79	153.02		153.03	0.000291	0.53	18.91	20.47	0.1
Reach	207.8855	March	100	151.79	154.17		154.25	0.002126	2.18	45.93	26.09	0.29
Reach	207.8855	April	180	151.79	154.71		154.85	0.002838	3	60.2	26.82	0.35
Reach	193.28	Aug-Sept	10	152.3	152.86	152.86	153	0.046989	3.04	3.29	11.35	1
Reach	193.28	March	100	152.3	153.72	153.72	154.13	0.036279	5.14	19.47	24.64	1.02
Reach	193.28	April	180	152.3	154.11	154.11	154.71	0.032279	6.2	29.04	24.95	1.01
Reach	160.3296	Aug-Sept	10	151.36	151.79	151.69	151.84	0.013315	1.82	5.49	19.1	0.6
Reach	160.3296	March	100	151.36	152.66	152.39	152.88	0.010932	3.79	26.42	24.99	0.65
Reach	160.3296	April	180	151.36	153.22	152.77	153.53	0.009039	4.45	40.44	24.99	0.62
Reach	141		Bridge									
Reach	121.5313	Aug-Sept	10	150.37	151.19		151.22	0.003845	1.4	7.14	14.93	0.36
Reach	121.5313	March	100	150.37	152.09		152.36	0.010643	4.15	24.1	20.94	0.68
Reach	121.5313	April	180	150.37	152.52		152.97	0.012818	5.36	33.61	22.73	0.78
Reach	86.5459	Aug-Sept	10	149.6	151.19		151.19	0.000224	0.51	19.75	22.4	0.1
Reach	86.5459	March	100	149.6	152.05		152.14	0.002539	2.45	40.81	26.53	0.35
Reach	86.5459	April	180	149.6	152.48		152.66	0.003884	3.41	52.77	28.59	0.44
Reach	43.8688	Aug-Sept	10	150.74	151.11	151.07	151.16	0.016505	1.63	6.15	30.86	0.64
Reach	43.8688	March	100	150.74	151.68	151.57	151.91	0.01651	3.79	26.36	36.77	0.79
Reach	43.8688	April	180	150.74	151.99	151.87	152.34	0.016502	4.75	37.88	37.32	0.83