Environmental Assessment
Bridge Street Bridge over the Bush Kill
Village of Fleischmanns, Delaware County, New York

PW-07990

4020-DR-NY

December 2015

Appendix B

Engineer's Preliminary Report/Photographs

HYDROLOGIC AND HYDRAULIC CALCULATIONS

DELAWARE COUNTY BRIDGE 80
OVER BUSHKILL CREEK
VILLAGE OF FLEISCHMANNS, NY

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NOVEMBER 2015

HYDROLOGIC AND HYDRAULIC CALCULATIONS

DELAWARE COUNTY BRIDGE 80
OVER BUSHKILL CREEK
VILLAGE OF FLEISCHMANNS, NY

SUMMARY

Purpose:

Design of a pedestrian bridge replacement for the structure that was damaged beyond repair and subsequently removed after flooding caused by Hurricane Irene in 2011. Bridge alternatives were analyzed to determine potential impacts of the proposed structure on the floodplain, and to withstand future storms of severity comparable to Irene while meeting ADA criteria.

Design Approach:

Existing and Proposed Conditions models were developed using the U.S. Army Corps of Engineers HEC-RAS River Analysis System, Version 4.1.0, January 2010. To meet recommended NYSDOT survey manual criteria, topographic and stream survey was performed to supplement a county-provided site survey performed by T.Y. Lin International in April, 2012. Nominated peak discharges calculated in the "East Branch Delaware River Hydrology Methodology Report" prepared by Gomez and Sullivan Engineers, P.C., August 2012 were verified and adopted for Bushkill Creek.

Assumptions:

The proposed bridge type alternative that has been evaluated is the preferred 84'-0" single span configuration. The longer clear span will shift the abutment locations back, and relieve the flow restriction caused by the previous structure's approach embankments. The forecasted hydraulic performance results also assume that the prescribed upstream floodplain stream bank grading is adopted and performed in conjunction with, or prior to, bridge construction. Floodplain grading as proposed will require the relocation of a sanitary sewer manhole in the southeast bridge quadrant. Scour protection is assumed to consist of rock riprap similar to the adjacent emergency stream bank restoration performed by the Delaware County Soil and Water Conservation District.

Conclusions:

The Proposed conditions model (Alternative C) provides improved hydraulic performance over the existing condition due to the associated channel modifications and large hydraulic bridge opening, and will meet the need and purpose of the project. Alternative C results in a significant reduction in both the 100-year flood elevation (-2.5 ft) at the upstream comparison section 720, and the 100-year channel velocity (-4.4 ft/s) at bridge section 617.

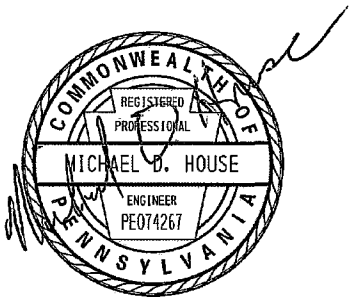
CALCULATIONS

Section 1 - Plans

Section 2 - Hydrology

Section 3 – Existing Conditions Model

Section 4 – Proposed Conditions Model



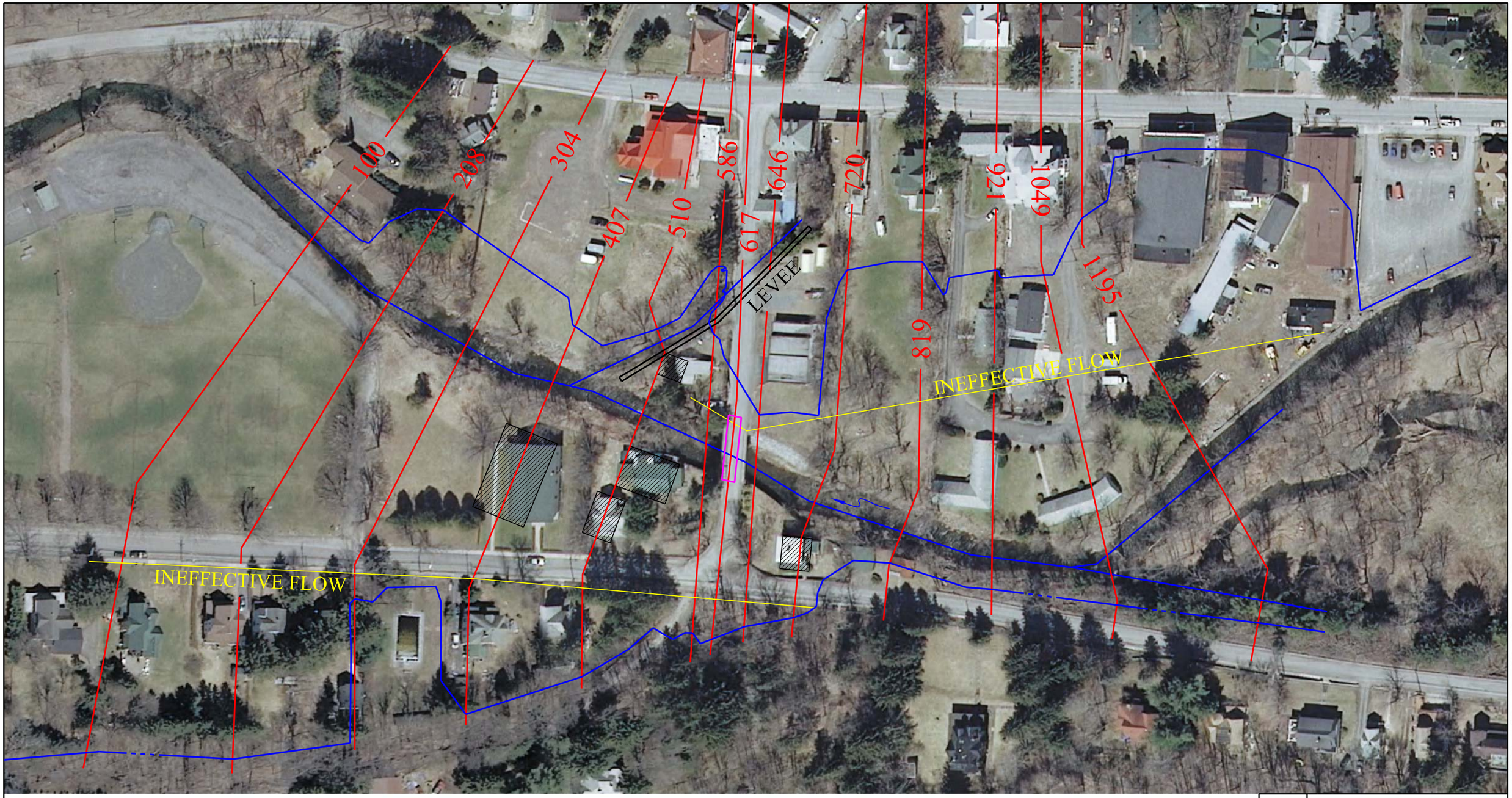
HYDROLOGIC AND HYDRAULIC ANALYSIS

DELAWARE COUNTY BRIDGE 80
OVER BUSHKILL CREEK
VILLAGE OF FLEISCHMANNS, NY

Calculations

Section 1

Plans



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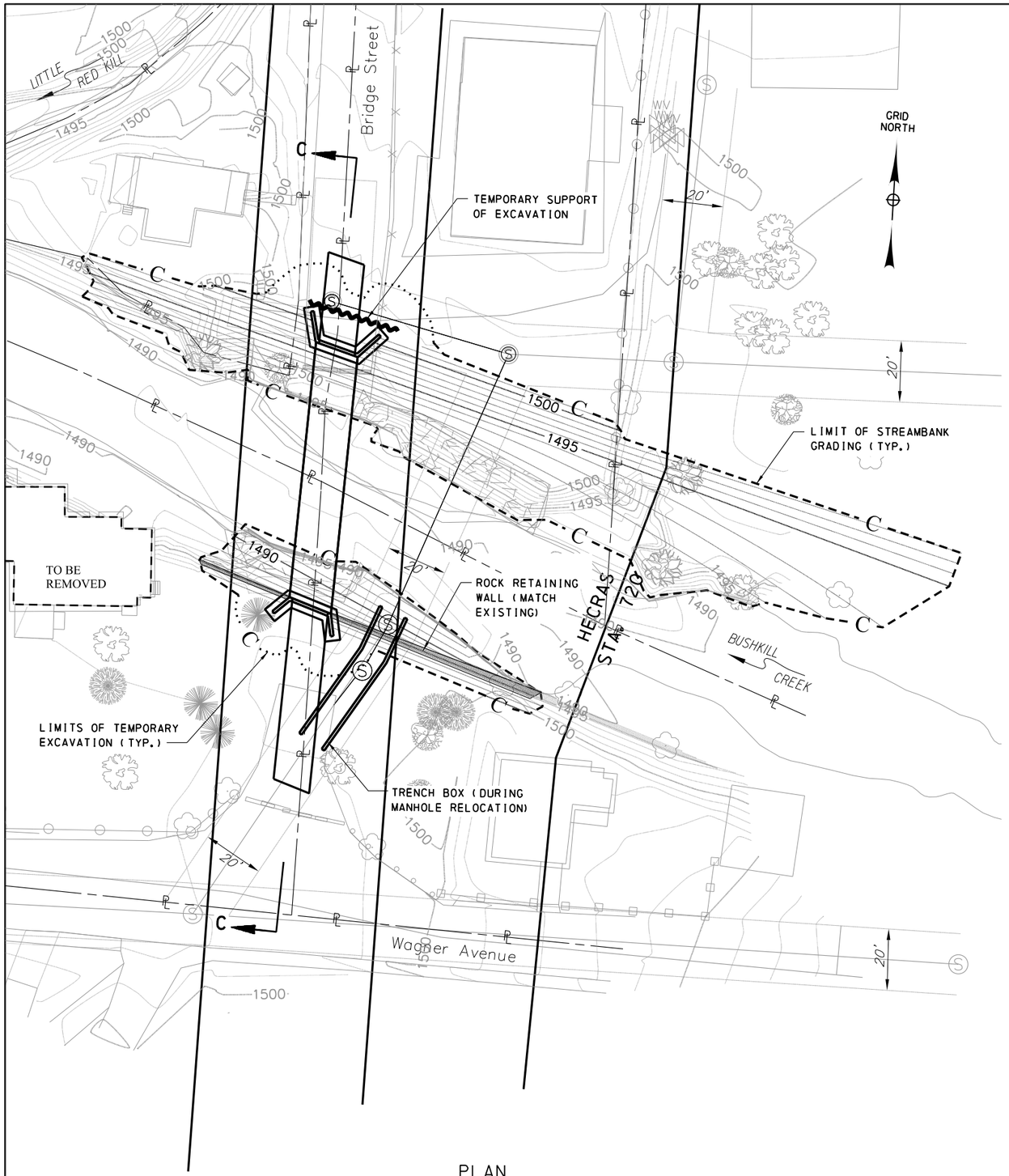
PEDESTRIAN BRIDGE BR-80 FLEISCHMANNS, NY
BRIDGE STREET BRIDGE REPLACEMENT
WORKING HECRAS SKETCH

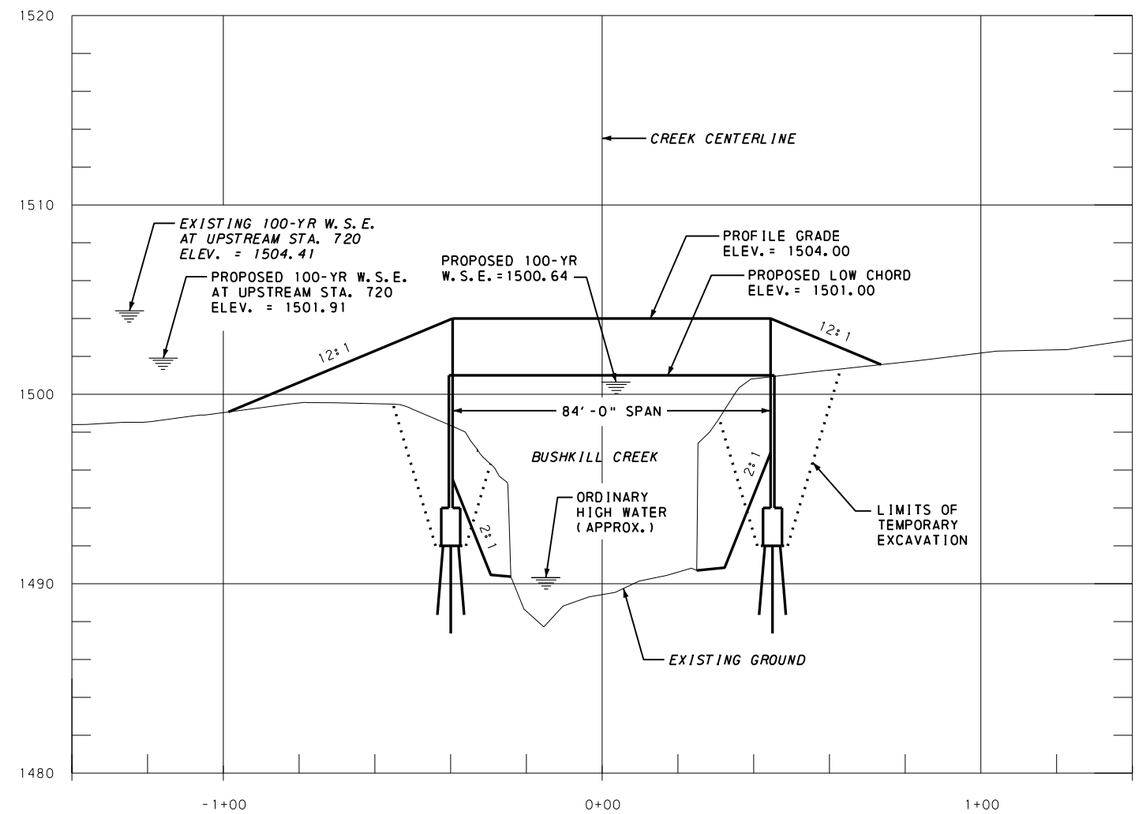
DGN	VAL SEC MAP	MILEPOST
CHK	FILE	DATE 2/4/2014
SHEET NUMBER	DRAWING NUMBER	



PLAN

20' 10' 0 20' 40'

SCALE 1" = 20'



PROFILE C-C

5V: 1H

20' 10' 0 20' 40'

HORIZONTAL SCALE 1" = 20'

4' 2' 0 4' 8'

VERTICAL SCALE 1" = 4'

HYDRAULIC DATA

DRAINAGE AREA: 29.4 SQUARE MILES
100-YEAR FLOOD:
MAGNITUDE: 9,365 C.F.S.
WATER SUR. ELEV.: 1500.10 FT. EXISTING (NO BRIDGE)
WATER SUR. ELEV.: 1500.64 FT. PROPOSED AT BRIDGE
VELOCITY : 15.96 FT./SEC. EXISTING
VELOCITY : 11.58 FT./SEC. PROPOSED

DGN	MDH
CHK	TPL
DWG	MDH
CHK	-

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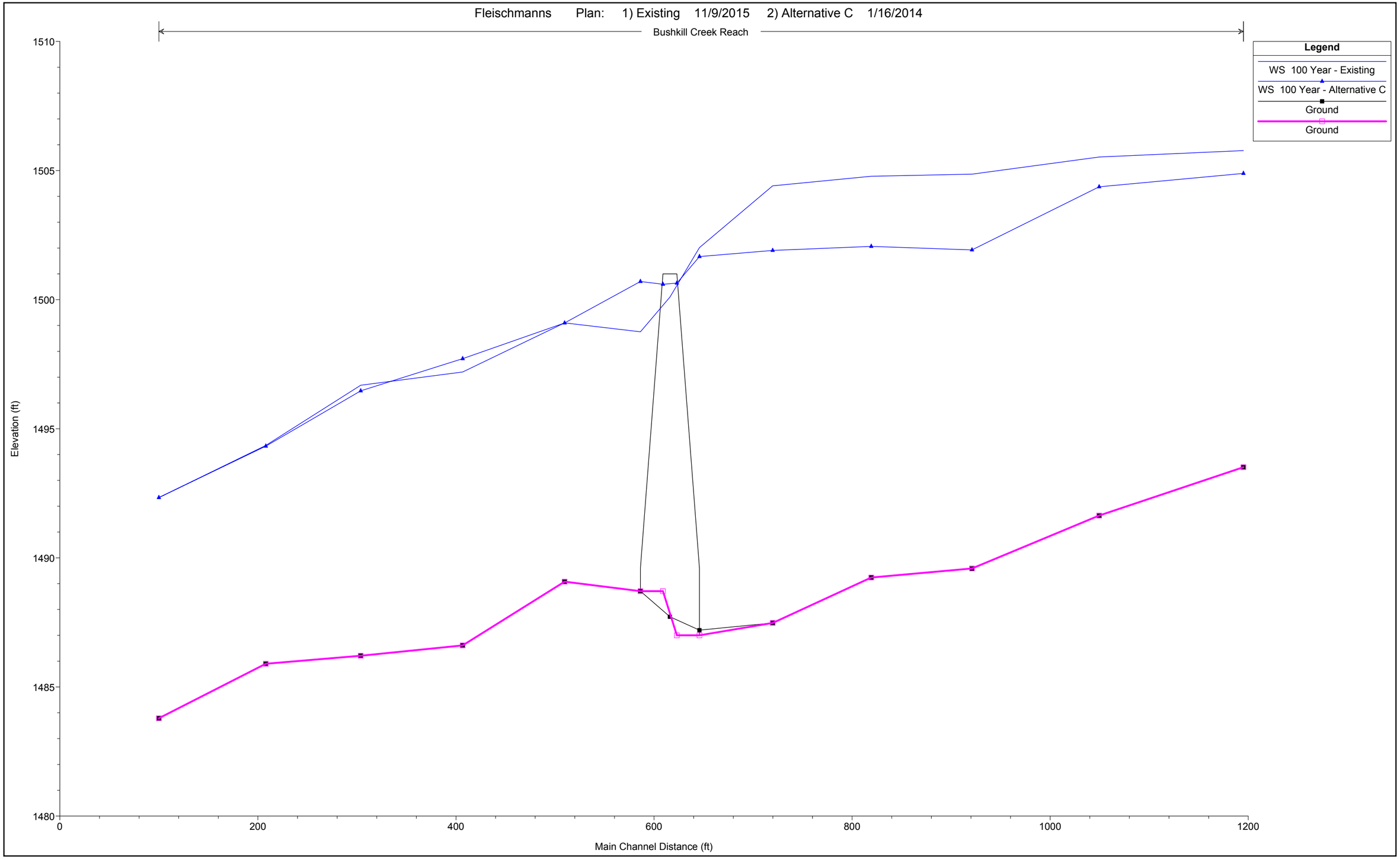
PEDESTRIAN BRIDGE BR-80 FLEISCHMANNS, NY
BRIDGE STREET BRIDGE REPLACEMENT
ALTERNATIVE C

DGN	VAL SEC	MAP	MILEPOST
CHK	FILE		DATE 2/4/2014
SHEET NUMBER 3		DRAWING NUMBER	


Fleischmanns Plan: 1) Existing 11/9/2015 2) Alternative C 1/16/2014
Bushkill Creek Reach
Legend
WS 100 Year - Existing
WS 100 Year - Alternative C
Ground
Ground
Elevation (ft)
1510
1505
1500
1495
1490
1485
1480
0
200
400
600
800
1000
1200
Main Channel Distance (ft)

HYDROLOGIC AND HYDRAULIC ANALYSIS

DELAWARE COUNTY BRIDGE 80
OVER BUSHKILL CREEK
VILLAGE OF FLEISCHMANNS, NY

Calculations

Section 2

Hydrology

House, Michael D.

From: Lavin, Thomas P.
Sent: Friday, November 22, 2013 3:28 PM
To: Blabac, Blaise A
Cc: House, Michael D.
Subject: RE: Delaware Co. Bush Kill hydrology
Attachments: East Branch Delaware River Hydrology Methodology Report Excerpt - Bush Kill Summary of Discharges .pdf

Blaise,

I have completed my review of the Bush Kill hydrology, specifically the 100-year flow in the East Branch Delaware River Hydrology Methodology Report forwarded to us by the County.

After discussions with Delaware County Soil and Water (Tom Mallory) and the report author Gomez and Sullivan (Damian Gomez), as well as email exchange with USGS regarding the Streamstats hydrology program, I believe we should use the flows listed in the attached table from the report. The table was sent to me by Damian Gomez and represents the latest flow data according to Mr. Gomez. He indicated that the report has gone through final technical review and is in administrative processing at FEMA. The flows are slightly higher than the flows in the same table of the draft report that we have been using.

Both Mr. Mallory and Mr. Gomez confirmed that the impetus for the Report was the severe flooding that has occurred in recent years, even before the 2011 flood that wiped out the bridge. The flows on Bushkill are at least 50% higher than the flows in the FEMA Flood Insurance Study. This is because the FEMA study used a regression equation based on data from a 1979 report, while the Gomez and Sullivan report use a regression equation developed in 2006.

I checked the flows using the online Streamstats program (which uses the 2006 regression equation), and the flows it calculated are slightly lower than the flows in the attached table. This makes sense since, according to the report, the flows in the table have been weighted for the recent large floods using the gage records at Arkville just downstream.

My correspondence with technical support at Streamstats helped me understand how the program uses gage data. The program does not perform the Log Pearson Type III frequency analysis of gage date, but instead accesses previously-computed LP analysis of gages in its database. If a gage did not have at least 10 years of record at the time Streamstats went online (e.g., Arkville), the LP analysis was not done. That explains why Streamstats would not do a gage-weighted frequency analysis at this location.

Tom

From: Blabac, Blaise A
Sent: Friday, November 22, 2013 1:04 PM
To: Lavin, Thomas P.
Subject: RE: Delaware Co. Bush Kill hydrology

Tom,

I wanted to see how your conversation went with Soil & Water. Were they able to shed any light on your hydrology questions?

BLAISE A. BLABAC, PE | *Sr. Project Engineer*

Modjeski and Masters, Inc.

Table 3: Summary of Discharges – Detailed Studies

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs)				
		10-PERCENT	4-PERCENT	2-PERCENT	1-PERCENT	0.2-PERCENT
Tributary 3 to Bush Kill						
At Hog Mountain Circle Road	0.07	18	22	25	29	41
Approximately 165 Feet Downstream of Hog Mountain Road	0.14	30	37	43	50	72
Approximately 1,530 Feet Downstream of Somerset Lake Road	0.42	62	88	111	135	201
Approximately 1,525 Feet Upstream of State Highway 28	0.74	107	151	190	232	344
At Confluence with Bush Kill	0.79	114	160	202	247	366
Bush Kill						
At Confluence of Vly Creek and Emory Brook	29.60	4,601	6,283	7,766	9,365	13,608
Upstream of Depot Street	31.52	4,866	6,657	8,231	9,929	14,446
Approximately 2,275 Feet Downstream of Depot Street	32.99	5,076	6,950	8,591	10,363	15,080
Upstream of Confluence of Red Kill	33.25	5,101	6,987	8,639	10,422	15,172
Downstream of Confluence of Red Kill	42.05	6,273	8,640	10,676	12,870	18,744
Upstream of Confluence of Tributary 3 to Bush Kill	43.96	6,528	9,003	11,125	13,409	19,532

Table 3: Summary of Discharges – Detailed Studies

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs)				
		10-PERCENT	4-PERCENT	2-PERCENT	1-PERCENT	0.2-PERCENT
Downstream of Confluence of Tributary 3 to Bush Kill	44.93	6,659	9,189	11,355	13,686	19,937
USGS Gage 1413398	46.77	6,906	9,541	11,789	14,206	20,694
At Confluence with Dry Brook	47.22	6,955	9,606	11,868	14,301	20,828
East Branch Delaware River						
Approximately 6,225 Feet Upstream of Schuman Road	2.07	283	387	478	573	819
Approximately 5,190 Feet Upstream of Schuman Road	3.68	487	662	816	977	1,391
Approximately 2,690 Feet Upstream of Schuman Road	4.75	623	845	1,040	1,244	1,770
At Schuman Road	5.42	705	956	1,177	1,407	2,000
Approximately 1,150 Feet Downstream of Railroad Crossing	7.38	941	1,283	1,583	1,898	2,708
Approximately 290 Feet Upstream of Teichman Road	8.26	1,011	1,390	1,723	2,073	2,968
At South Montgomery Hollow Road	9.03	1,066	1,478	1,840	2,219	3,188
At USGS Gage 1413088	13.51	1,314	1,932	2,472	3,038	4,451

HYDROLOGIC AND HYDRAULIC ANALYSIS

DELAWARE COUNTY BRIDGE 80
OVER BUSHKILL CREEK
VILLAGE OF FLEISCHMANNS, NY

Calculations

Section 3

Existing Conditions Model

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                    HEC-RAS Version 4.1.0 Jan 2010
                     U.S. Army Corps of Engineers
                    Hydrologic Engineering Center
                          609 Second Street
                          Davis, California


          X     X  XXXXXX    XXXX        XXXX       XX      XXXX
          X     X  X        X    X       X   X     X  X    X
          X     X  X        X            X   X    X    X   X
          XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
          X     X  X        X            X  X     X    X        X
          X     X  X        X    X       X   X    X    X        X
          X     X  XXXXXX    XXXX        X    X   X    X   XXXXX


PROJECT DATA
Project Title: Fleischmanns
Project File : Fleischmanns.prj
Run Date and Time: 12/17/2013 4:16:17 PM

Project in English units


PLAN DATA

Plan Title: Existing
Plan File : p:\3281\Calculations\Highway\HEC-RAS\Fleischmanns.p01

           Geometry Title: Existing
           Geometry File : p:\3281\Calculations\Highway\HEC-RAS\Fleischmanns.g01

           Flow Title    : Bushkill
           Flow File     : p:\3281\Calculations\Highway\HEC-RAS\Fleischmanns.f01

Plan Summary Information:
Number of:  Cross Sections =   13    Multiple Openings  =    0
            Culverts       =    0    Inline Structures  =    0
            Bridges        =    0    Lateral Structures =    0

Computational Information
    Water surface calculation tolerance  =  0.01
    Critical depth calculation tolerance =  0.01
    Maximum number of iterations         =  20
    Maximum difference tolerance         =  0.3
    Flow tolerance factor                =  0.001

Computation Options
    Critical depth computed only where necessary
    Conveyance Calculation Method: At breaks in n values only
    Friction Slope Method:         Average Conveyance
    Computational Flow Regime:     Mixed Flow



FLOW DATA

Flow Title: Bushkill
Flow File : p:\3281\Calculations\Highway\HEC-RAS\Fleischmanns.f01

Flow Data (cfs)


  River           Reach           RS                10 Year         25 Year         50 Year        100 Year        500 Year

  Bushkill Creek  Reach           1195                 4601            6283            7766            9365           13608

  Bushkill Creek  Reach           407                  4866            6657            8231            9929           14446
```

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Bushkill Creek	Reach	10 Year	Normal S = 0.0125	Normal S = 0.01
Bushkill Creek	Reach	25 Year	Normal S = 0.0125	Normal S = 0.01
Bushkill Creek	Reach	50 Year	Normal S = 0.0125	Normal S = 0.01
Bushkill Creek	Reach	100 Year	Normal S = 0.0125	Normal S = 0.01
Bushkill Creek	Reach	500 Year	Normal S = 0.0125	Normal S = 0.01

GEOMETRY DATA

Geometry Title: Existing
Geometry File : p:\3281\Calculations\Highway\HEC-RAS\Fleischmanns.g01

CROSS SECTION

RIVER: Bushkill Creek
REACH: Reach RS: 1195

INPUT
Description: 1095 1196.539
Station Elevation Data num= 101

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-225.65	1532.15	-224.27	1532.14	-215.12	1531.69	-205.59	1527.24	-205.11	1526.91
-195.57	1521.11	-191.42	1518.65	-188.97	1514.08	-185.18	1508.62	-181.25	1501.77
-180.17	1499.82	-173.36	1495.96	-170.85	1495.28	- 157.9	1495.59	-152.32	1496.09
-146.52	1498.78	-143.47	1499.24	-124.26	1499.61	-102.29	1500.34	-100.71	1499.31
-100.17	1499.14	- 98.44	1498.14	- 84.62	1498.17	- 82.22	1498.26	- 81.56	1498.14
- 70.75	1497	- 62.77	1496.39	- 59.63	1496.48	- 53.07	1501.27	- 41.49	1500.63
- 30.98	1500.53	- 29.4	1497.91	- 27.74	1497.68	- 27.29	1497.28	- 25.38	1496.75
- 25.22	1496.71	- 25.14	1497.23	- 22.38	1495.63	- 21.44	1495.22	- 16.54	1494.68
- 13.71	1494.45	- 7.13	1494.3	- 2.61	1493.74	7.23	1493.54	7.4	1493.51
7.82	1493.52	18.27	1494.69	23.75	1496.95	34.21	1497.7	41.74	1499.76
50.74	1500.87	51.09	1500.91	71.18	1501.41	82.66	1501.97	104.54	1502.3
128.76	1502.35	137.64	1502.02	153.21	1501.57	157.54	1501.51	192.62	1501.52
210.94	1501.8	230.4	1502.32	243.9	1502.62	253.25	1502.89	272.83	1504.26
275.8	1504.43	280.5	1504.58	284.26	1504.65	296.92	1505.2	301.62	1505.19
303.62	1505.29	308.9	1505.42	313.67	1505.61	316.84	1505.8	317.92	1505.78
320.45	1505.97	327.03	1505.94	348.39	1506.95	360.06	1507.45	383.25	1508.67
398.01	1509.67	413.79	1510.91	416.16	1511.01	422.24	1510.73	435.7	1511.43
448.63	1510.89	448.64	1511.14	452.61	1511.5	452.89	1511.75	453.69	1512.23
455.21	1512.48	470.14	1513.73	486.06	1515.35	487.65	1515.3	490.14	1515.51
503.79	1515.82	510.2	1516.05	516.59	1516.02	528.57	1516.19	550.45	1515.8
552.71	1515.83								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-225.65	.055	-181.25	.04	50.74	.055

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
-	181.25	50.74	165.15	145.72	129	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
133.09	552.71	1506	F

CROSS SECTION

RIVER: Bushkill Creek
REACH: Reach RS: 1049

INPUT
Description: 949 1050.816

```
Station Elevation Data    num=     101
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
  - 91.79    1523  - 88.99 1522.96  - 85.11 1522.74  - 80.09 1522.57  - 72.63 1520.04
  - 70.77  1519.2  - 65.49  1514.3  - 65.02 1513.91  - 58.04  1509.6  - 55.38 1506.01
   - 52.8 1502.26  - 50.92 1500.88  - 42.52 1495.24  - 42.19 1495.11   - 34.2 1494.27
   - 28.1 1493.02  - 28.07 1493.01  - 26.97 1492.79   - 19.9 1491.64  - 14.88  1492.3
  - 10.52 1493.29   -  .85 1492.82   10.35  1493.5   15.66 1493.36   20.67 1493.71
    27.75 1496.47   52.92 1496.74   56.15 1496.81   83.22 1497.39   94.58 1499.39
   106.53 1500.09  123.63 1500.42  134.49 1500.41  146.79 1500.18  160.92 1500.37
   166.67  1500.4  180.58 1500.22  189.43  1500.4   190.8 1500.39  195.29 1500.49
   203.46 1500.98  204.13 1501.06  222.57 1501.76  226.73 1501.78  228.78 1501.92
   236.46 1502.21  242.03 1502.28   251.7 1502.53  257.09 1502.59  261.52 1502.69
   270.44 1502.79  272.52 1502.85  283.25  1502.9  286.89 1503.53  300.98 1503.65
   308.38 1505.67  309.97 1505.81  313.62 1505.78  316.14 1505.62  325.64 1505.87
   328.76 1505.95  337.86 1506.01  345.39 1506.17  362.86 1506.24  375.84 1506.39
   384.26 1506.56  389.33 1507.79   402.6 1508.27  416.58 1508.85  434.88 1510.42
   446.15 1511.61  459.88 1512.68  481.65 1511.96  487.52 1511.63  487.53 1511.38
   493.16  1511.4  500.49  1511.6  509.09 1511.09  513.84 1510.89  513.85 1511.14
   515.33 1511.34  517.53 1511.93   518.8 1512.81  519.08 1512.95  521.12 1513.13
    524.2  1513.5  535.01 1514.23  545.04 1515.42  546.04 1515.51  555.15 1515.68
   559.29 1515.92   562.8 1515.91  566.46 1516.05  572.83 1516.15  575.88 1516.09
   580.32 1516.12  588.24 1516.31   598.4 1516.29  605.47 1516.55  611.61 1516.63
   617.42 1516.92

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
  - 91.79    .055  - 42.52     .04   27.75    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
     -    42.52   27.75           136.18   128.4  117.93             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  198.27  617.42  1505.5       F

CROSS SECTION


RIVER: Bushkill Creek
REACH: Reach              RS: 921

INPUT
Description: 821  922.4118
Station Elevation Data    num=     101
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
  - 62.16 1515.59  - 52.11 1515.29  - 44.26 1512.09  - 41.41 1510.31  - 39.3 1508.94
  - 37.95 1507.84  - 34.77 1504.97  - 28.93 1500.54  - 26.34  1495.9  - 25.17 1494.64
  - 24.27 1493.67  - 19.03 1493.03  - 17.91 1492.43   -  17 1491.99  - 13.1 1489.96
  - 11.12 1489.64  - 10.58 1489.59  - 2.75 1489.77    5.28 1490.96    5.34 1490.94
     7.49 1490.97   11.98  1491.1   12.05 1491.08   14.86 1491.55   18.42 1492.23
    21.67 1494.28   24.25 1494.46   27.21 1495.72   50.28 1496.25   50.35 1496.25
    72.63 1496.88   90.08 1501.35  110.28 1501.35   125.8 1501.08  131.87 1500.59
   137.78 1500.64  151.84 1499.96  161.68 1500.89  173.31 1500.97  178.36 1500.96
   179.69 1501.03  182.52  1501.1   186.3 1501.26  190.73 1501.17  192.95  1501.2
   198.91  1501.2  208.26 1501.32  214.39 1501.34  223.63 1501.59  234.88 1502.09
   251.26 1502.48  256.38 1502.73  282.34  1502.8  292.65 1503.52  293.71 1503.55
    304.1 1504.28  305.84 1504.26  313.17  1504.4  320.75 1504.69  330.44 1505.38
    340.5 1505.84  353.34 1506.18  370.22 1506.52  386.15 1506.55  387.73 1506.53
   405.72 1506.54  405.79 1506.69  406.28 1508.02  413.25 1509.14  426.41 1510.61
   432.31 1511.19  459.22 1513.07     460 1513.15  461.75 1513.09  466.75 1513.13
   477.97 1512.76  483.11 1512.35  487.31 1512.06  496.86 1511.99  509.26 1511.76
   511.42 1512.47  512.78  1512.7  514.38 1513.41  515.27 1513.72  517.31 1514.21
   518.41 1514.51  523.18 1514.99  530.51 1515.65  535.93 1516.34  539.27 1516.68
   540.33 1516.85  545.11 1517.18  551.95 1517.84  555.44 1518.12  565.94 1518.07
   571.72 1517.76  577.64 1517.76  583.87 1517.66  589.48  1517.7  607.32 1518.06
   612.79 1518.23

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
  - 62.16    .055  - 26.34     .04   27.21    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
```

```
    -    26.34   27.21           116.71  101.73   83.82             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  182.38  612.79    1505       F

CROSS SECTION


RIVER: Bushkill Creek
REACH: Reach              RS: 819

INPUT
Description: 719  820.6844
Station Elevation Data    num=     101
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
  - 98.97 1512.41  - 93.86 1510.09  -  90.8 1508.41  - 88.57 1508.27  - 87.75 1508.27
  - 77.91 1508.55  -  72.1 1508.35  - 66.84 1508.32  - 58.67 1508.08  - 46.15 1507.35
  - 38.58 1505.23  - 36.98 1504.68  - 36.45  1504.4  - 28.56 1500.68  - 26.37  1499.6
  - 25.05 1496.42  - 23.33  1492.3  - 20.22 1491.43  - 19.28  1491.3  - 16.06 1490.96
  -  7.96 1489.97  -  6.05 1490.05  -  3.75 1490.34    2.02 1489.24    6.07 1489.53
    10.7 1490.31   13.13 1490.67    16.1 1491.15   19.12 1491.32   22.76 1491.56
    22.9 1491.55   29.16 1494.05    49.3 1494.73   50.12 1494.77   51.75 1494.84
   55.03 1495.32    64.2 1497.96   86.09 1498.38   91.84 1498.62  101.91 1498.73
  105.29 1498.69  108.07 1498.79  110.38 1498.81  127.71 1499.14  130.57 1499.16
  140.83 1499.31  143.25 1499.43   157.9 1499.79  170.63 1499.92  182.91 1500.17
  195.62 1500.27  207.91 1500.34  211.22 1500.78  224.66 1501.36  234.13 1501.61
  246.72 1502.03  255.08 1502.23   273.9 1503.33  277.69 1503.58  281.54 1503.88
  283.77 1503.96  286.82 1503.99  293.77 1504.26  301.86 1504.38  307.93 1504.51
  318.08 1504.91  332.93 1505.53  340.92 1505.77  356.95  1506.6  374.06 1507.31
   378.6 1507.69   395.4 1509.02  396.52 1509.12  397.63 1509.18  399.49 1509.38
     412 1510.49  419.71  1511.8  428.82 1512.25  429.14 1512.29     431 1512.32
  455.75 1513.27  457.31 1513.27  460.82 1513.05  460.83  1512.8  469.06 1513.16
  474.44 1513.36   486.7 1512.71  489.34 1513.01  490.61 1513.08  501.09  1514.2
   502.7 1514.19   504.1  1514.2  510.26 1514.44  515.56 1514.51  529.98 1515.29
  537.03 1515.72  550.35 1516.43  556.35  1516.7  569.37 1517.66  572.25 1517.84
  590.61 1518.49

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
  - 98.97    .055  - 25.05     .04   29.16    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
    -    25.05   29.16            99.58    99.5   99.71             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
   144.4  590.61  1505.5       F

CROSS SECTION


RIVER: Bushkill Creek
REACH: Reach              RS: 720

INPUT
Description: 620  721.1794
Station Elevation Data    num=     101
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 -148.81 1514.95 -147.18  1513.9 -146.66 1513.63 -139.55 1509.29 -136.79  1507.7
 -132.05 1505.07 -122.19 1502.12 -117.54 1501.96 -114.79 1501.77  - 113.5 1501.75
 -111.19 1501.84 -100.45 1501.86  - 89.75 1502.29  - 87.68 1502.59  - 86.51  1502.7
  - 71.84 1502.58  -  67.7 1502.81  - 40.25 1501.63  - 35.34 1501.22  -  35.2 1501.08
  - 27.31  1498.1  - 27.17 1498.08   -   25 1496.67  - 24.51 1496.35  - 22.33 1490.24
  - 15.33 1490.02  - 11.26 1489.96  - 1.25 1490.24    8.39 1489.26   16.26 1487.48
    21.03 1489.44   23.62 1490.76   28.97 1495.13   30.19 1495.57   30.73 1494.82
    34.82 1492.29   35.72 1492.45   39.73 1492.84   42.65 1493.69   43.56 1494.42
    45.33 1494.42   50.01 1495.79   55.48 1497.38   60.99 1497.81   75.15  1498.5
    83.59 1498.74   104.9 1498.97  127.28 1500.42  151.41 1500.64  177.39  1500.6
   202.45 1501.42  213.28    1502  234.56 1502.82  242.27 1503.25  253.28 1503.66
    277.4 1504.66  279.01 1504.67  287.77 1505.06  290.08 1505.12  302.27 1505.85
   307.45 1505.85  320.32 1506.59  324.64 1506.71  327.77 1507.05   338.5 1507.15
   352.84 1508.28  377.83 1509.07  385.47  1509.9  388.07 1510.07  398.66 1511.11
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  404.93 1511.57  409.66 1512.29  420.97    1513  423.62 1513.06  426.32 1513.21
  428.52 1513.17  432.62 1513.29  438.09 1513.24  446.18 1513.48  458.05 1512.97
  461.55 1513.04  465.85 1513.48  476.89 1514.23  479.08 1514.28  482.73 1514.21
   489.9 1514.33  495.92 1513.73   499.2 1513.31  500.88 1512.76  507.54 1510.35
   516.4 1510.18  524.89 1510.53  531.97 1511.54  533.92 1511.74  537.93 1513.61
  538.38  1513.6  539.55 1513.88  540.88 1515.09  545.91 1515.73  552.85  1515.9
  561.53 1516.26

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 -148.81    .055  - 24.51     .04   30.19    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
    -    24.51   30.19            60.14   73.95   89.95             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 -148.81 -114.58    1505       F
    98.4  561.53    1505       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
  - 75.94  - 40.31    1510

CROSS SECTION


RIVER: Bushkill Creek
REACH: Reach              RS: 646

INPUT
Description: 546  647.2308
Station Elevation Data    num=     101
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
-174.549 1509.71-171.426 1507.36-167.442 1504.19-161.744 1502.08-159.891 1501.23
-156.333 1501.42-156.166 1501.38-151.182 1501.21-144.084 1500.56-139.637 1499.44
-138.757 1499.23-137.302 1499.25-132.966 1499.19-131.576  1499.1-129.862 1499.15
-123.979 1499.21-118.864 1499.16-109.942 1499.26-106.486 1499.24 -84.907 1499.54
 -80.228 1499.54 -59.511 1499.99 -52.099 1499.85 -48.735 1499.32 -33.188 1499.48
 -26.045 1499.38 -21.282 1499.31 -15.955  1487.2  - 4.911  1489.2  - 4.855 1489.19
   9.812 1489.98  21.709 1491.74  29.806 1498.08  30.251 1498.35  34.189 1500.25
  36.477 1501.27  41.814 1501.42  51.126 1501.64  71.741 1502.14  82.804 1502.28
  85.889  1502.4  96.748  1502.5 108.478 1502.73  127.12 1503.13 141.073 1503.36
 147.503 1503.38 152.581 1503.51 156.352 1503.28 171.093 1503.56 172.705 1503.62
 177.523 1503.68 195.683 1503.76 196.007 1503.82 198.259 1504.35 200.038 1506.02
 201.418 1507.24 202.233 1507.88 205.272 1508.19  208.45 1505.34 212.546 1504.73
  214.01 1504.67 217.095 1502.48  217.66 1501.97 218.012 1501.91 224.887 1500.38
  232.04 1501.26  233.05 1502.07 236.413 1505.34 240.638 1505.85 253.609 1506.82
  260.29 1506.84   268.1 1506.95 269.629 1506.92 289.003 1507.23 293.793 1507.37
 311.147 1507.75 318.763 1508.03 328.491 1508.27 329.372 1508.21 339.749 1509.68
 342.325 1510.09  342.76 1510.13 353.563 1511.58 359.688 1511.99 365.451 1511.98
 366.683 1511.95 378.079 1512.44 385.769 1512.05 387.836 1512.03  391.19 1512.06
 400.455 1512.76 402.966  1512.8 421.237 1512.97  426.75 1513.08 430.363 1513.04
 436.312 1513.25 451.433 1514.22  456.51 1514.07 461.652  1514.2 477.505 1514.83
 481.665 1515.09

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
-174.549    .055 -21.282     .04  36.477    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
    -    21.282  36.477            30.38   29.81   29.47             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
-174.549-134.022  1502.5       F
  39.646 481.665  1502.5       F
Right Levee     Station=  221.55      Elevation= 1508.19
Skew Angle = 22.1

CROSS SECTION


RIVER: Bushkill Creek
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REACH: Reach              RS: 617

INPUT
Description: 617 Washed Out Bridge
Station Elevation Data    num=      53
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
-219.356    1510-200.825 1509.84-195.386 1506.16 -194.08 1505.02-186.242 1501.43
-177.903 1500.58-160.271 1500.97-156.222 1500.71-148.921  1498.9-139.461 1498.43
-110.498 1498.55  - 74.66 1499.53 -49.356 1499.45 -33.522 1498.01 -29.797 1496.85
 -26.406 1496.15 -25.165 1495.68 -23.163  1495.3 -23.071 1495.24 -22.329 1490.38
 -19.105 1488.66 -14.259 1487.72  - 9.562 1488.82  - 3.169 1489.31   3.141 1489.54
   9.099 1490.14  15.807 1490.44  21.523  1490.8  21.792 1490.83  23.135  1490.7
   23.45 1497.41  26.258 1497.99  30.446 1499.35  33.513 1500.35  36.635 1500.81
   55.36 1501.27  75.475 1501.74  96.322 1502.27 115.288 1502.42 133.003 1503.01
  172.77 1504.75 217.743 1505.42 259.882 1506.23 303.457 1507.75  331.79  1509.3
 364.107 1511.54 375.976 1511.06 382.971 1512.17 395.767 1512.79 409.127 1513.04
 419.662 1513.44  451.21 1513.89 468.666 1515.11

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
-219.356    .055 -49.356     .04  36.635    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
    -   49.356  36.635            30.38   29.81   29.47             .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
-219.356-145.002    1501       F
Right Levee     Station=  186.47      Elevation= 1504.75
Skew Angle = 22.1

CROSS SECTION


RIVER: Bushkill Creek
REACH: Reach              RS: 586

INPUT
Description: 486  587.6091
Station Elevation Data    num=     101
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
-219.402 1510.69-214.612 1505.26-207.876 1502.47-188.363 1501.58-174.697 1500.67
-165.469 1500.25-159.335 1499.62-156.676 1498.35-155.666 1498.15-152.692 1497.83
-121.477 1498.07-115.742 1498.17-112.684 1498.32-108.135 1498.24 -83.693 1498.67
 -59.409 1498.26 -46.299  1498.7 -41.749 1498.26 -40.702 1496.41 -38.414 1495.76
 -31.159 1491.17 -30.816 1491.09 -30.372 1490.88 -25.535    1490 -24.775 1489.64
 -22.839 1488.71 -15.195 1488.74  - 3.456 1489.15   3.484 1489.84  15.908 1489.76
  19.133 1489.07  20.977 1489.62  21.023 1489.81  21.755 1496.86  28.074 1498.55
  32.577 1499.88  35.708 1501.07  46.048 1501.29  49.523 1500.12  49.541 1500.11
  53.766 1498.67  57.334  1498.7  74.104 1499.29  74.465 1499.45  79.005 1499.34
  94.571 1499.63 100.148 1499.97 101.353 1500.33 104.994 1500.93 110.155 1501.46
  111.48 1501.51 121.394  1502.6 125.535 1502.69 130.307  1502.3 133.837 1502.14
  136.45  1501.7 141.555 1498.72 147.327 1497.23  152.72 1496.99 156.972 1497.48
 162.189 1497.93 163.653 1498.43 172.881 1500.44  178.32 1503.69 178.894 1503.67
 181.998 1504.09 185.157 1504.19 192.477 1503.53 197.128  1503.3 209.849  1503.6
  216.52  1504.2 225.184  1504.3 241.379  1505.3 254.351 1505.93 257.779 1505.65
 263.486 1506.44 264.552 1506.51 268.721 1506.49  272.02  1506.7 279.932 1507.51
 289.355 1507.97 294.266  1508.4 306.431 1508.88 309.229 1509.09 309.729 1509.25
 319.245  1509.7 321.691 1509.73 333.365 1510.36 336.793 1510.36 338.081 1510.44
   338.1 1510.19 353.776 1511.03 364.904 1510.48 374.568 1512.02 388.966 1512.63
 403.605 1513.03 407.691 1513.01 419.569 1513.72 426.565 1513.79 448.866 1514.43
 458.029 1514.98

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
-219.402    .055 -46.299     .04  35.708    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
    -   46.299  35.708            91.48   76.57   61.66             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
-219.402-154.276    1502       F
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  35.708 458.029    1502       F
Right Levee     Station=  135.49      Elevation= 1502.69
Skew Angle = 22.1

CROSS SECTION


RIVER: Bushkill Creek
REACH: Reach              RS: 510

INPUT
Description: 410  511.0375
Station Elevation Data    num=     101
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 -308.11 1509.15 -299.74 1501.79 -291.37 1498.43 -290.28 1498.25 -284.89 1497.09
 -281.56 1496.56 -276.26 1496.74 -259.24 1496.86 -234.24 1497.47 -230.92 1497.46
 -209.24 1496.81 -204.98 1497.05 -197.66 1496.71 -194.93 1496.61 -184.55 1496.93
 -182.78 1496.99 -176.75 1496.86 -168.41 1496.79 -146.62 1497.34 -124.33 1497.54
 -104.25 1497.99  - 95.2 1497.66  - 88.45 1497.63  - 54.33 1497.04  - 40.98 1496.92
  - 35.58 1489.56  - 32.84 1489.15  - 27.34 1490.15  - 25.07 1490.08  -  23.9 1490.04
  - 20.34 1490.03  -  7.09 1489.39    8.23 1489.08    9.04 1489.11    9.45  1489.2
    15.53 1489.17   17.71 1489.28   20.77 1490.97   27.06 1494.23   32.45 1495.21
    33.06 1495.37   38.98 1497.63   41.36 1498.01   45.11 1498.36   50.15 1498.66
    50.17 1498.66   53.13 1498.75   57.69 1498.78   64.86  1498.3   67.16 1498.62
    70.81 1499.35   73.09 1499.74   74.87 1498.82   81.02 1495.26   84.44 1494.92
    85.79 1494.87   91.23 1495.09   93.82 1497.57   98.06 1499.64   99.83 1499.71
    105.4 1499.65  106.44 1499.55   113.3 1499.22  121.33 1498.01  127.33 1498.17
   136.07 1498.19  141.98 1498.51  144.49 1498.78   148.9 1499.09  154.68 1499.05
   159.06 1499.43  165.25  1499.8   174.1 1500.47  179.42 1500.74  201.29 1500.63
   233.07 1500.58  245.68 1500.48  251.33 1500.59  252.45 1500.66  254.66 1500.68
   258.99  1501.3  261.07  1501.4  262.03 1501.53  263.16 1505.67   278.9 1505.52
   287.61 1505.51  295.83 1505.77  300.12 1506.63   304.2 1507.84  311.93 1508.81
   323.72 1508.96  332.58 1509.19  339.24 1509.48  342.12  1510.2  343.14  1510.2
   348.35 1509.67  351.24 1509.46  355.51 1509.34  366.02 1509.95  377.99 1509.52
   378.21 1509.57

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 -308.11    .055  - 40.98     .04   38.98    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
     -    40.98   38.98           104.51   102.9  101.29             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 -308.11 -199.39  1500.5       F
Right Levee     Station=   73.09      Elevation= 1499.74
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 -142.47  - 94.82    1505  - 82.56  - 36.88    1505    46.2    70.8    1505

CROSS SECTION


RIVER: Bushkill Creek
REACH: Reach              RS: 407

INPUT
Description: 307  408.1406
Station Elevation Data    num=     101
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
  - 388.3  1502.2  - 386.3 1500.94 -376.56 1497.33  - 373.2 1496.23 -371.02  1495.8
 -363.58 1495.88  - 352.9 1495.67  - 348.6 1495.66 -328.16 1496.13 -324.76 1496.11
 -303.03 1496.41 -300.02 1496.49  - 296.9 1496.53 -294.74 1496.52 -274.78 1496.51
 -271.27 1496.54 -269.14 1496.54  - 262.3 1496.62 -254.74 1496.48 -240.59 1496.31
 -238.94 1496.29  - 233.6 1496.29   -  229 1496.24 -222.65 1496.14 -218.05 1496.19
  - 205.3 1495.68 -203.06 1495.97 -202.21 1495.96 -200.55 1496.03 -197.93 1496.02
 -192.87 1496.12 -187.48 1496.21  - 169.8 1496.41 -132.14 1496.63 -114.52 1496.79
 -105.86 1496.75  - 88.84 1496.58  - 74.57    1496  - 61.86 1495.12  - 54.41 1495.03
  - 40.82  1495.5  - 39.71 1494.39  - 36.52 1490.61  - 36.24  1490.6  - 31.74 1489.83
  - 29.77 1489.56  - 25.28  1489.4  - 22.77 1489.31  - 19.94 1489.23  - 13.14 1488.12
   - 5.25 1487.49    4.74 1486.82      10 1486.61   15.66 1488.09   20.12 1489.45
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   20.18 1489.47   23.01 1489.84   26.41 1490.32   27.57 1490.56    30.5 1491.61
   35.84 1494.84   38.57 1496.43   50.63 1496.93   50.65 1496.93   69.47 1497.13
   73.44 1497.11   73.72 1497.14   98.38 1497.52   101.2 1497.55  114.26 1497.79
  120.28 1497.89  122.09 1497.94  127.04 1497.95  150.11 1498.08  154.03 1498.16
  174.87 1498.46  181.01 1498.53  206.49 1498.34  214.42 1498.15  216.71 1498.12
  231.68  1499.7  238.96 1500.05   244.3 1500.23  268.12 1501.26  270.26 1501.94
  276.67 1504.01  280.98 1505.52  281.71 1505.94  283.63 1506.25  288.73 1507.64
  309.61 1507.88  312.99 1507.95  316.55 1508.14   318.4 1508.15  326.38 1508.49
  328.32  1508.4  330.62 1508.26  335.43 1508.14  344.54 1508.69  347.87 1508.63
  356.66 1508.43

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
  - 388.3    .055  - 40.82     .04   38.57    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
    -    40.82   38.57           107.14  102.92    98.7             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  - 388.3 -229.21  1498.5       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 -157.24  - 60.02    1505

CROSS SECTION


RIVER: Bushkill Creek
REACH: Reach              RS: 304

INPUT
Description: 204  305.2249
Station Elevation Data    num=     101
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 -465.94 1499.77 -465.13 1499.22 -460.31 1498.06 -458.19 1497.99 -451.66 1498.07
 -448.64 1498.03 -445.27 1497.51 -441.64  1497.6 -434.61 1497.53 -427.81 1497.65
 -425.05 1497.64 -422.61  1497.7 -413.93 1497.81 -410.95 1497.95 -400.16 1498.23
 -387.04 1498.48 -374.17 1498.47 -368.72  1498.6 -351.97 1498.58 -345.56 1498.34
 -334.09 1498.41 -331.17 1498.27 -324.25 1498.03 -316.62 1497.34 -305.78 1496.99
 -303.03 1496.78 -294.73 1496.53 -291.01 1496.04 -289.31 1495.59 -281.35    1495
  - 280.9  1494.8 -279.75  1494.8 -278.38 1494.88 -276.07 1494.74  - 274.5 1494.42
 -274.02 1494.36 -265.15 1494.64  - 262.5 1494.72  - 257.4 1494.65 -251.17 1494.67
 -246.43 1495.29 -220.41 1496.06 -218.01  1496.1 -211.65 1496.11 -192.45 1495.95
 -164.41 1495.92 -156.44 1495.88 -136.38 1495.66 -124.53 1495.45  - 64.66 1495.16
  - 52.88 1494.94  - 42.64 1494.85  - 42.33 1494.77  - 35.11 1494.42  - 27.75 1493.97
  - 25.04 1490.64  - 24.33 1489.77  - 17.12 1487.96  - 9.75 1486.21  - 6.07 1486.55
     1.33 1487.33     1.8 1487.32   19.18 1487.89    28.5 1489.12   33.74 1489.43
    40.57 1489.87    48.9 1492.82   50.09 1493.21   57.43 1495.62   80.02 1496.31
    87.93  1496.5   98.62 1496.67  115.97  1496.8  135.81 1497.09  144.01 1497.27
    154.4 1497.43  172.05 1497.41  175.53 1497.56  180.44 1496.85  186.23 1496.76
   200.08 1496.67  209.19 1497.04  209.71 1497.03  210.74 1497.14  231.12 1497.84
   248.68 1498.14  251.72 1498.31  267.39 1500.06  269.38 1500.24  279.89 1501.69
   283.61 1502.67  289.62 1504.09  296.56 1505.66  300.55 1506.38  305.65 1506.44
   306.44 1506.48  309.02 1506.46  310.43  1506.5  311.02 1506.22  323.22 1506.55
   334.97 1506.06

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 -465.94    .055  - 27.75     .04   57.43    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
    -    27.75   57.43            99.31   95.84   92.38             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 -465.94 -274.68    1498       F
     155  334.97    1498       F

CROSS SECTION


RIVER: Bushkill Creek
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REACH: Reach              RS: 208

INPUT
Description: 108  209.3810
Station Elevation Data    num=     101
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 - 553.3 1502.54 -547.68    1500 -544.73 1498.48 -540.62 1496.24 -535.44 1493.51
 -530.11 1492.75 -525.91 1492.16 -521.36 1492.06   -  517 1492.01 -512.62  1491.9
 -507.64  1491.9 - 487.6 1491.78 -465.81 1492.39 -462.58  1492.5 -459.61 1492.55
 -437.56 1493.25 -413.59 1493.64 -412.54 1493.66 -393.92 1493.88 -385.65 1493.75
 -380.04 1493.68 -379.51 1493.68 -362.49 1493.26 -341.34 1492.96 -336.36  1492.8
 -334.94 1492.72 -333.68 1492.63 -332.19 1492.52 -332.06 1492.67 -330.37 1492.56
 -319.57 1492.59 -317.47 1492.66 -314.41 1492.57 -309.62  1492.4 -301.01 1492.25
 -293.99 1493.03 -293.92 1493.06 -293.58 1493.06 -270.92 1492.85 -235.71 1492.49
 -234.01 1492.51 - 180.9 1492.76 -104.24 1493.21 - 72.42 1493.75 - 32.25 1493.19
 - 32.05 1493.18 - 28.64 1492.81 - 24.98 1490.74 - 17.85 1486.69  - 8.96  1485.9
 - 6.44 1486.07  - 2.56 1486.43    8.18 1486.94     8.4 1486.96    8.45 1486.97
   18.31 1486.79   24.12 1486.72    29.2  1487.8   36.49 1490.87   45.03 1494.41
   50.02    1494   50.05    1494   53.62  1493.7   56.11 1493.69   67.81 1493.61
   73.88  1493.7   75.09 1493.74   75.61 1493.71      79 1493.66   83.36 1493.63
   94.94 1493.71  100.04 1493.92  122.21 1494.43  124.27  1494.5   153.2 1495.05
  170.91 1495.27  185.52 1495.25  187.51 1495.27  194.47 1495.25  199.19 1495.32
  211.47 1495.48  216.15 1495.64  219.13 1495.79  229.82 1496.03  236.21 1496.32
  236.79 1496.42   240.4 1496.97  241.78 1497.18  251.44 1499.12  254.69 1499.86
  262.82 1501.37  269.07 1503.24  270.06 1503.52  274.91 1504.84  277.66 1505.16
  278.11 1505.19  282.52 1504.96  283.93 1504.73  293.71 1505.04  300.47 1505.13
  305.19 1505.05

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 - 553.3    .055 - 32.05     .04   45.03    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
    -    32.05   45.03           112.18     108  103.83             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 - 553.3 -331.31    1495       F
      45  305.19    1495       F

CROSS SECTION


RIVER: Bushkill Creek
REACH: Reach              RS: 100

INPUT
Description: 0  101.3798
Station Elevation Data    num=     101
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 -640.29 1495.74 -639.84 1495.52 -634.51  1492.8 - 632.8 1492.18 -629.65 1492.17
 -604.46 1491.93 -598.21 1491.74 -589.11 1491.75 -582.84 1491.91 -577.17 1491.98
 -554.15 1492.53 -552.32 1492.56 - 544.6 1492.55 -530.75 1492.55 -528.16 1492.52
 -524.37 1492.53 -502.73 1492.45 - 487.9 1492.29 -477.29 1492.12 - 462.1 1492.08
 - 456.7 1492.02 -454.77 1491.96 -440.04  1491.6 -429.62 1491.27 -428.03 1491.24
 -418.52 1490.96 -417.97 1490.94 -414.06 1490.93 -410.97 1490.69 -400.24 1490.86
 -389.45 1490.59 -386.88 1490.52 -385.97 1490.61 -326.67 1490.67 -306.73 1490.59
 -218.67 1491.05 - 132.5 1491.27 - 87.71 1490.89 - 86.88 1490.91 - 86.55 1490.86
 - 54.59 1491.84  - 53.7 1490.26 - 53.34 1489.72  - 50.7  1489.6 - 50.63 1489.59
 - 44.26  1489.3 - 36.42 1488.95  - 36.3 1488.94 - 25.36 1487.44  - 21.6 1486.92
 - 18.03 1485.82  - 8.65 1483.79  - 5.71 1483.98     .61 1484.43     .75 1484.43
    3.43 1484.75   10.94 1485.68   11.04 1485.73   17.25 1486.41   21.59 1486.94
   21.69 1486.97   21.87 1487.07    35.7 1495.82   36.22 1496.23   36.46 1496.24
   43.85 1496.94   50.67 1496.99   50.69 1496.99   75.89 1496.88   84.97 1496.56
   86.25  1496.4   89.52 1496.07   90.52    1496   94.67 1495.77    95.6 1495.72
  100.39 1495.52  101.68 1495.45  104.64 1495.28  104.74 1495.28  105.21  1495.3
  108.23 1495.28  118.85 1495.29  137.45 1495.19   155.2    1495  162.44 1494.74
  164.86 1494.78  170.89 1494.88  174.12 1494.98  186.41 1496.71  199.29 1497.99
  204.23 1498.52  205.37 1498.87  210.26 1500.21   217.9 1502.61  224.66  1503.5
  230.05 1504.36  230.48 1504.39  231.16  1504.4  244.57 1503.88  252.75 1504.07
   255.2 1504.09
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```
Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 - 640.29    .055  - 54.59     .04   43.85    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
    -     54.59   43.85                0       0       0              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 - 640.29 -414.33  1492.5       F
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SUMMARY OF MANNING'S N VALUES

River:Bushkill Creek

Reach	River Sta.	n1	n2	n3
Reach	1195	.055	.04	.055
Reach	1049	.055	.04	.055
Reach	921	.055	.04	.055
Reach	819	.055	.04	.055
Reach	720	.055	.04	.055
Reach	646	.055	.04	.055
Reach	617	.055	.04	.055
Reach	586	.055	.04	.055
Reach	510	.055	.04	.055
Reach	407	.055	.04	.055
Reach	304	.055	.04	.055
Reach	208	.055	.04	.055
Reach	100	.055	.04	.055

SUMMARY OF REACH LENGTHS

River: Bushkill Creek

Reach	River Sta.	Left	Channel	Right
Reach	1195	165.15	145.72	129
Reach	1049	136.18	128.4	117.93
Reach	921	116.71	101.73	83.82
Reach	819	99.58	99.5	99.71
Reach	720	60.14	73.95	89.95
Reach	646	30.38	29.81	29.47
Reach	617	30.38	29.81	29.47
Reach	586	91.48	76.57	61.66
Reach	510	104.51	102.9	101.29
Reach	407	107.14	102.92	98.7
Reach	304	99.31	95.84	92.38
Reach	208	112.18	108	103.83
Reach	100	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Bushkill Creek

Reach	River Sta.	Contr.	Expan.
Reach	1195	.1	.3
Reach	1049	.1	.3
Reach	921	.1	.3
Reach	819	.1	.3
Reach	720	.3	.5
Reach	646	.3	.5
Reach	617	.3	.5

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Reach                586             .3        .5
Reach                510             .1        .3
Reach                407             .1        .3
Reach                304             .1        .3
Reach                208             .1        .3
Reach                100             .1        .3
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HEC-RAS Plan: Existing River: Bushkill Creek Reach: Reach

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach	1195	10 Year	4601.00	1493.51	1501.997	1499.53	1502.32	0.002248	4.56	1024.91	345.68	0.39
Reach	1195	25 Year	6283.00	1493.51	1504.023	1500.34	1504.27	0.001081	4.09	1651.10	451.99	0.29
Reach	1195	50 Year	7766.00	1493.51	1504.844	1500.88	1505.13	0.001065	4.40	1910.52	471.75	0.29
Reach	1195	100 Year	9365.00	1493.51	1505.774	1501.39	1506.09	0.000998	4.62	2204.72	499.96	0.29
Reach	1195	500 Year	13608.00	1493.51	1507.409	1502.57	1507.71	0.000840	4.79	3604.70	543.60	0.27
Reach	1049	10 Year	4601.00	1491.64	1501.479	1498.63	1502.00	0.001884	6.43	1014.37	266.91	0.40
Reach	1049	25 Year	6283.00	1491.64	1503.734	1499.42	1504.11	0.001084	5.74	1580.93	355.10	0.31
Reach	1049	50 Year	7766.00	1491.64	1504.519	1500.09	1504.96	0.001181	6.30	1778.91	358.52	0.33
Reach	1049	100 Year	9365.00	1491.64	1505.524	1500.40	1505.93	0.001070	6.35	2364.14	362.89	0.32
Reach	1049	500 Year	13608.00	1491.64	1506.932	1502.86	1507.53	0.001417	7.86	2940.02	441.86	0.38
Reach	921	10 Year	4601.00	1489.59	1500.944	1498.12	1501.71	0.002324	7.63	764.55	160.04	0.44
Reach	921	25 Year	6283.00	1489.59	1503.250	1499.25	1503.91	0.001647	7.45	1243.06	321.28	0.39
Reach	921	50 Year	7766.00	1489.59	1503.951	1500.09	1504.74	0.001869	8.25	1394.16	332.85	0.42
Reach	921	100 Year	9365.00	1489.59	1504.861	1501.13	1505.71	0.001903	8.73	1591.13	357.79	0.42
Reach	921	500 Year	13608.00	1489.59	1506.367	1503.57	1507.28	0.002054	9.75	2479.16	398.96	0.45
Reach	819	10 Year	4601.00	1489.24	1500.873	1497.01	1501.47	0.001705	6.80	922.11	242.35	0.38
Reach	819	25 Year	6283.00	1489.24	1503.230	1497.96	1503.73	0.001182	6.52	1336.49	306.15	0.33
Reach	819	50 Year	7766.00	1489.24	1503.904	1500.10	1504.53	0.001417	7.40	1457.20	317.60	0.36
Reach	819	100 Year	9365.00	1489.24	1504.781	1500.81	1505.51	0.001535	8.04	1615.66	352.07	0.38
Reach	819	500 Year	13608.00	1489.24	1506.339	1502.35	1507.06	0.001569	8.73	2718.69	394.45	0.39
Reach	720	10 Year	4601.00	1487.48	1500.673	1496.20	1501.29	0.001695	6.78	849.34	213.73	0.37
Reach	720	25 Year	6283.00	1487.48	1502.997	1497.38	1503.59	0.001332	6.87	1199.14	327.22	0.34
Reach	720	50 Year	7766.00	1487.48	1503.589	1498.50	1504.37	0.001662	7.90	1304.23	342.85	0.38
Reach	720	100 Year	9365.00	1487.48	1504.408	1500.18	1505.33	0.001853	8.68	1449.34	365.52	0.41
Reach	720	500 Year	13608.00	1487.48	1506.084	1502.13	1506.88	0.001724	9.02	2644.82	409.77	0.40
Reach	646	10 Year	4601.00	1487.20	1497.090	1496.98	1500.25	0.014779	14.26	322.60	48.85	0.98
Reach	646	25 Year	6283.00	1487.20	1498.950	1498.60	1502.48	0.013280	15.08	416.64	52.62	0.94
Reach	646	50 Year	7766.00	1487.20	1501.241	1501.24	1503.65	0.007804	13.00	743.82	189.26	0.75
Reach	646	100 Year	9365.00	1487.20	1502.016	1502.02	1504.58	0.007842	13.73	878.14	232.16	0.76
Reach	646	500 Year	13608.00	1487.20	1504.047	1504.05	1506.24	0.006132	13.71	1537.50	370.69	0.69
Reach	617	10 Year	4601.00	1487.72	1496.833	1496.49	1499.65	0.014083	13.46	341.89	53.14	0.93
Reach	617	25 Year	6283.00	1487.72	1498.957	1498.96	1501.69	0.013088	13.29	489.30	126.71	0.92
Reach	617	50 Year	7766.00	1487.72	1499.322	1500.47	1502.95	0.017592	15.38	537.42	146.68	1.07
Reach	617	100 Year	9365.00	1487.72	1500.098	1501.33	1503.89	0.017107	15.96	669.18	186.49	1.08
Reach	617	500 Year	13608.00	1487.72	1501.817	1502.90	1505.52	0.014221	16.52	1056.57	265.59	1.02
Reach	586	10 Year	4601.00	1488.71	1497.031	1495.62	1498.83	0.007844	10.75	427.81	63.45	0.73
Reach	586	25 Year	6283.00	1488.71	1498.175	1497.00	1500.59	0.009407	12.47	510.91	108.51	0.81
Reach	586	50 Year	7766.00	1488.71	1497.271	1499.37	1502.04	0.020308	17.52	443.18	64.48	1.18
Reach	586	100 Year	9365.00	1488.71	1498.757	1500.20	1503.18	0.017533	16.98	596.85	191.73	1.11
Reach	586	500 Year	13608.00	1488.71	1500.657	1501.70	1504.92	0.014752	17.46	950.54	264.43	1.05
Reach	510	10 Year	4601.00	1489.08	1495.992	1495.41	1498.05	0.010966	11.50	400.13	71.57	0.86
Reach	510	25 Year	6283.00	1489.08	1497.149	1496.65	1499.74	0.011548	12.93	497.53	178.68	0.89
Reach	510	50 Year	7766.00	1489.08	1498.231	1498.23	1500.88	0.010266	13.27	648.20	240.59	0.86
Reach	510	100 Year	9365.00	1489.08	1499.099	1499.10	1501.90	0.009789	13.85	780.13	245.91	0.85
Reach	510	500 Year	13608.00	1489.08	1500.526	1500.53	1502.63	0.007510	13.33	1534.82	362.06	0.75
Reach	407	10 Year	4866.00	1486.61	1495.450	1494.08	1497.03	0.006906	10.08	487.18	95.41	0.71
Reach	407	25 Year	6657.00	1486.61	1496.783	1495.40	1498.64	0.006623	11.07	662.38	324.74	0.72
Reach	407	50 Year	8231.00	1486.61	1496.432	1497.02	1499.67	0.012168	14.53	601.35	255.04	0.96
Reach	407	100 Year	9929.00	1486.61	1497.199	1498.22	1500.73	0.011861	15.37	741.81	356.49	0.97
Reach	407	500 Year	14446.00	1486.61	1498.526	1499.47	1501.63	0.010086	15.73	1428.61	502.12	0.92
Reach	304	10 Year	4866.00	1486.21	1494.255	1493.59	1496.15	0.009771	11.05	440.99	85.68	0.84
Reach	304	25 Year	6657.00	1486.21	1495.133	1495.13	1497.70	0.011351	12.89	540.32	154.68	0.92
Reach	304	50 Year	8231.00	1486.21	1496.869	1496.87	1498.52	0.005980	10.95	1049.59	449.57	0.69
Reach	304	100 Year	9929.00	1486.21	1496.685	1497.49	1499.36	0.009846	13.82	978.26	403.06	0.89
Reach	304	500 Year	14446.00	1486.21	1498.073	1498.58	1500.36	0.007982	13.93	1725.57	624.42	0.82
Reach	208	10 Year	4866.00	1485.90	1494.077	1494.08	1495.18	0.006062	9.15	786.49	638.51	0.67
Reach	208	25 Year	6657.00	1485.90	1493.797	1494.68	1496.46	0.014677	13.87	681.56	611.84	1.03
Reach	208	50 Year	8231.00	1485.90	1493.994	1495.01	1497.40	0.018701	15.95	755.56	633.54	1.17
Reach	208	100 Year	9929.00	1485.90	1494.355	1495.11	1497.96	0.019671	16.90	890.97	655.17	1.21
Reach	208	500 Year	14446.00	1485.90	1495.815	1495.82	1497.06	0.007448	11.99	2260.71	760.04	0.77
Reach	100	10 Year	4866.00	1483.79	1491.112	1492.14	1493.91	0.020670	13.62	425.72	347.51	1.17

HEC-RAS Plan: Existing River: Bushkill Creek Reach: Reach (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach	100	25 Year	6657.00	1483.79	1491.699	1492.82	1494.57	0.020410	14.57	670.71	468.58	1.18
Reach	100	50 Year	8231.00	1483.79	1492.014	1493.13	1495.11	0.021821	15.64	810.46	523.79	1.23
Reach	100	100 Year	9929.00	1483.79	1492.334	1493.40	1495.56	0.022392	16.44	952.66	593.10	1.26
Reach	100	500 Year	14446.00	1483.79	1493.279	1494.03	1495.75	0.017187	15.87	1638.24	667.13	1.13

Plan: Existing Bushkill Creek Reach RS: 1195 Profile: 100 Year

E.G. Elev (ft)	1506.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.31	Wt. n-Val.	0.055	0.040	0.055
W.S. Elev (ft)	1505.77	Reach Len. (ft)	165.15	145.72	129.00
Crit W.S. (ft)	1501.39	Flow Area (sq ft)	4.60	1880.48	319.64
E.G. Slope (ft/ft)	0.000998	Area (sq ft)	4.60	1880.48	862.39
Q Total (cfs)	9365.00	Flow (cfs)	3.92	8687.29	673.79
Top Width (ft)	499.96	Top Width (ft)	2.30	231.99	265.67
Vel Total (ft/s)	4.25	Avg. Vel. (ft/s)	0.85	4.62	2.11
Max Chl Dpth (ft)	12.26	Hydr. Depth (ft)	2.00	8.11	3.88
Conv. Total (cfs)	296378.4	Conv. (cfs)	124.0	274930.6	21323.9
Length Wtd. (ft)	141.93	Wetted Per. (ft)	4.62	240.85	82.38
Min Ch El (ft)	1493.51	Shear (lb/sq ft)	0.06	0.49	0.24
Alpha	1.11	Stream Power (lb/ft s)	552.71	0.00	0.00
Frctn Loss (ft)	0.15	Cum Volume (acre-ft)	5.93	18.62	13.35
C & E Loss (ft)	0.01	Cum SA (acres)	4.07	2.02	3.42

Plan: Existing Bushkill Creek Reach RS: 1049 Profile: 100 Year

E.G. Elev (ft)	1505.93	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.41	Wt. n-Val.	0.055	0.040	0.055
W.S. Elev (ft)	1505.52	Reach Len. (ft)	136.18	128.40	117.93
Crit W.S. (ft)	1500.40	Flow Area (sq ft)	73.79	851.51	1438.83
E.G. Slope (ft/ft)	0.001070	Area (sq ft)	73.79	851.51	1438.83
Q Total (cfs)	9365.00	Flow (cfs)	177.66	5406.53	3780.81
Top Width (ft)	362.89	Top Width (ft)	12.53	70.27	280.09
Vel Total (ft/s)	3.96	Avg. Vel. (ft/s)	2.41	6.35	2.63
Max Chl Dpth (ft)	13.88	Hydr. Depth (ft)	5.89	12.12	5.14
Conv. Total (cfs)	286273.3	Conv. (cfs)	5430.9	165269.0	115573.4
Length Wtd. (ft)	124.63	Wetted Per. (ft)	16.41	71.30	280.66
Min Ch El (ft)	1491.64	Shear (lb/sq ft)	0.30	0.80	0.34
Alpha	1.67	Stream Power (lb/ft s)	617.42	0.00	0.00
Frctn Loss (ft)	0.17	Cum Volume (acre-ft)	5.78	14.05	9.94
C & E Loss (ft)	0.04	Cum SA (acres)	4.05	1.52	2.61

Plan: Existing Bushkill Creek Reach RS: 921 Profile: 100 Year

E.G. Elev (ft)	1505.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.85	Wt. n-Val.	0.055	0.040	0.055
W.S. Elev (ft)	1504.86	Reach Len. (ft)	116.71	101.73	83.82
Crit W.S. (ft)	1501.13	Flow Area (sq ft)	29.51	705.50	856.11
E.G. Slope (ft/ft)	0.001903	Area (sq ft)	29.51	705.50	1181.88
Q Total (cfs)	9365.00	Flow (cfs)	61.79	6161.54	3141.67
Top Width (ft)	357.79	Top Width (ft)	8.29	53.55	295.95
Vel Total (ft/s)	5.89	Avg. Vel. (ft/s)	2.09	8.73	3.67
Max Chl Dpth (ft)	15.27	Hydr. Depth (ft)	3.56	13.17	5.52
Conv. Total (cfs)	214663.2	Conv. (cfs)	1416.3	141234.0	72013.0
Length Wtd. (ft)	95.73	Wetted Per. (ft)	12.46	56.39	155.83
Min Ch El (ft)	1489.59	Shear (lb/sq ft)	0.28	1.49	0.65
Alpha	1.58	Stream Power (lb/ft s)	612.79	0.00	0.00
Frctn Loss (ft)	0.16	Cum Volume (acre-ft)	5.62	11.75	6.40
C & E Loss (ft)	0.04	Cum SA (acres)	4.01	1.34	1.83

Plan: Existing Bushkill Creek Reach RS: 819 Profile: 100 Year

E.G. Elev (ft)	1505.51	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.73	Wt. n-Val.	0.055	0.040	0.055
W.S. Elev (ft)	1504.78	Reach Len. (ft)	99.58	99.50	99.71
Crit W.S. (ft)	1500.81	Flow Area (sq ft)	36.92	752.26	826.48
E.G. Slope (ft/ft)	0.001535	Area (sq ft)	36.92	752.26	1346.73

Plan: Existing Bushkill Creek Reach RS: 819 Profile: 100 Year (Continued)

Q Total (cfs)	9365.00	Flow (cfs)	69.65	6049.95	3245.40
Top Width (ft)	352.07	Top Width (ft)	12.22	54.21	285.63
Vel Total (ft/s)	5.80	Avg. Vel. (ft/s)	1.89	8.04	3.93
Max Chl Dpth (ft)	15.54	Hydr. Depth (ft)	3.02	13.88	7.17
Conv. Total (cfs)	239012.5	Conv. (cfs)	1777.7	154406.1	82828.7
Length Wtd. (ft)	99.56	Wetted Per. (ft)	15.52	57.92	115.68
Min Ch El (ft)	1489.24	Shear (lb/sq ft)	0.23	1.24	0.68
Alpha	1.40	Stream Power (lb/ft s)	590.61	0.00	0.00
Frctn Loss (ft)	0.17	Cum Volume (acre-ft)	5.53	10.05	3.96
C & E Loss (ft)	0.02	Cum SA (acres)	3.99	1.21	1.27

Plan: Existing Bushkill Creek Reach RS: 720 Profile: 100 Year

E.G. Elev (ft)	1505.33	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.92	Wt. n-Val.	0.055	0.040	0.055
W.S. Elev (ft)	1504.41	Reach Len. (ft)	60.14	73.95	89.95
Crit W.S. (ft)	1500.18	Flow Area (sq ft)	159.26	779.08	511.00
E.G. Slope (ft/ft)	0.001853	Area (sq ft)	186.56	779.08	1028.69
Q Total (cfs)	9365.00	Flow (cfs)	369.81	6762.74	2232.45
Top Width (ft)	365.52	Top Width (ft)	69.70	54.70	241.12
Vel Total (ft/s)	6.46	Avg. Vel. (ft/s)	2.32	8.68	4.37
Max Chl Dpth (ft)	16.93	Hydr. Depth (ft)	2.93	14.24	7.49
Conv. Total (cfs)	217552.0	Conv. (cfs)	8590.7	157100.7	51860.6
Length Wtd. (ft)	74.64	Wetted Per. (ft)	60.18	61.60	70.18
Min Ch El (ft)	1487.48	Shear (lb/sq ft)	0.31	1.46	0.84
Alpha	1.42	Stream Power (lb/ft s)	561.53	0.00	0.00
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	5.28	8.30	1.24
C & E Loss (ft)	0.49	Cum SA (acres)	3.89	1.09	0.67

Plan: Existing Bushkill Creek Reach RS: 646 Profile: 100 Year

E.G. Elev (ft)	1504.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.57	Wt. n-Val.	0.055	0.040	0.055
W.S. Elev (ft)	1502.02	Reach Len. (ft)	30.38	29.81	29.47
Crit W.S. (ft)	1502.02	Flow Area (sq ft)	288.12	587.81	2.22
E.G. Slope (ft/ft)	0.007842	Area (sq ft)	327.48	587.81	12.81
Q Total (cfs)	9365.00	Flow (cfs)	1288.02	8072.78	4.19
Top Width (ft)	232.16	Top Width (ft)	140.32	57.76	34.08
Vel Total (ft/s)	10.66	Avg. Vel. (ft/s)	4.47	13.73	1.89
Max Chl Dpth (ft)	14.82	Hydr. Depth (ft)	2.56	10.18	0.70
Conv. Total (cfs)	105754.7	Conv. (cfs)	14545.1	91162.3	47.4
Length Wtd. (ft)	29.86	Wetted Per. (ft)	112.80	68.91	3.17
Min Ch El (ft)	1487.20	Shear (lb/sq ft)	1.25	4.18	0.34
Alpha	1.45	Stream Power (lb/ft s)	481.67	0.00	221.55
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	4.92	7.14	0.17
C & E Loss (ft)	0.19	Cum SA (acres)	3.75	0.99	0.39

Plan: Existing Bushkill Creek Reach RS: 617 Profile: 100 Year

E.G. Elev (ft)	1503.89	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.79	Wt. n-Val.	0.055	0.040	
W.S. Elev (ft)	1500.10	Reach Len. (ft)	30.38	29.81	29.47
Crit W.S. (ft)	1501.33	Flow Area (sq ft)	108.31	560.87	
E.G. Slope (ft/ft)	0.017107	Area (sq ft)	116.27	560.87	
Q Total (cfs)	9365.00	Flow (cfs)	415.72	8949.28	
Top Width (ft)	186.49	Top Width (ft)	104.40	82.09	
Vel Total (ft/s)	13.99	Avg. Vel. (ft/s)	3.84	15.96	
Max Chl Dpth (ft)	12.38	Hydr. Depth (ft)	1.13	6.83	
Conv. Total (cfs)	71601.2	Conv. (cfs)	3178.4	68422.8	

Plan: Existing Bushkill Creek Reach RS: 617 Profile: 100 Year (Continued)

Length Wtd. (ft)	29.83	Wetted Per. (ft)	95.67	94.24	
Min Ch El (ft)	1487.72	Shear (lb/sq ft)	1.21	6.36	
Alpha	1.25	Stream Power (lb/ft s)	468.67	0.00	186.47
Frctn Loss (ft)	0.33	Cum Volume (acre-ft)	4.77	6.75	0.17
C & E Loss (ft)	0.37	Cum SA (acres)	3.66	0.94	0.37

Plan: Existing Bushkill Creek Reach RS: 586 Profile: 100 Year

E.G. Elev (ft)	1503.18	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.42	Wt. n-Val.	0.055	0.040	
W.S. Elev (ft)	1498.76	Reach Len. (ft)	91.48	76.57	61.66
Crit W.S. (ft)	1500.20	Flow Area (sq ft)	51.97	544.88	
E.G. Slope (ft/ft)	0.017533	Area (sq ft)	53.61	544.88	0.31
Q Total (cfs)	9365.00	Flow (cfs)	114.17	9250.83	
Top Width (ft)	191.73	Top Width (ft)	111.23	75.07	5.43
Vel Total (ft/s)	15.69	Avg. Vel. (ft/s)	2.20	16.98	
Max Chl Dpth (ft)	10.05	Hydr. Depth (ft)	0.48	7.26	
Conv. Total (cfs)	70725.5	Conv. (cfs)	862.2	69863.2	
Length Wtd. (ft)	78.01	Wetted Per. (ft)	108.01	84.97	
Min Ch El (ft)	1488.71	Shear (lb/sq ft)	0.53	7.02	
Alpha	1.16	Stream Power (lb/ft s)	458.03	0.00	135.49
Frctn Loss (ft)	0.52	Cum Volume (acre-ft)	4.71	6.37	0.16
C & E Loss (ft)	0.19	Cum SA (acres)	3.59	0.89	0.37

Plan: Existing Bushkill Creek Reach RS: 510 Profile: 100 Year

E.G. Elev (ft)	1501.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.80	Wt. n-Val.	0.055	0.040	0.055
W.S. Elev (ft)	1499.10	Reach Len. (ft)	104.51	102.90	101.29
Crit W.S. (ft)	1499.10	Flow Area (sq ft)	140.55	632.34	7.24
E.G. Slope (ft/ft)	0.009789	Area (sq ft)	327.12	632.34	7.24
Q Total (cfs)	9365.00	Flow (cfs)	588.47	8758.32	18.21
Top Width (ft)	245.91	Top Width (ft)	162.83	75.86	7.22
Vel Total (ft/s)	12.00	Avg. Vel. (ft/s)	4.19	13.85	2.51
Max Chl Dpth (ft)	10.02	Hydr. Depth (ft)	2.03	8.34	1.00
Conv. Total (cfs)	94654.7	Conv. (cfs)	5947.8	88522.8	184.1
Length Wtd. (ft)	102.98	Wetted Per. (ft)	73.93	86.44	7.94
Min Ch El (ft)	1489.08	Shear (lb/sq ft)	1.16	4.47	0.56
Alpha	1.25	Stream Power (lb/ft s)	378.21	0.00	73.09
Frctn Loss (ft)	0.84	Cum Volume (acre-ft)	4.31	5.33	0.16
C & E Loss (ft)	0.14	Cum SA (acres)	3.30	0.76	0.36

Plan: Existing Bushkill Creek Reach RS: 407 Profile: 100 Year

E.G. Elev (ft)	1500.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.53	Wt. n-Val.	0.055	0.040	0.055
W.S. Elev (ft)	1497.20	Reach Len. (ft)	107.14	102.92	98.70
Crit W.S. (ft)	1498.22	Flow Area (sq ft)	111.40	620.51	9.89
E.G. Slope (ft/ft)	0.011861	Area (sq ft)	252.30	620.51	9.89
Q Total (cfs)	9929.00	Flow (cfs)	382.35	9534.98	11.67
Top Width (ft)	356.49	Top Width (ft)	238.12	79.39	38.98
Vel Total (ft/s)	13.38	Avg. Vel. (ft/s)	3.43	15.37	1.18
Max Chl Dpth (ft)	10.59	Hydr. Depth (ft)	1.22	7.82	0.25
Conv. Total (cfs)	91168.4	Conv. (cfs)	3510.8	87550.5	107.1
Length Wtd. (ft)	103.20	Wetted Per. (ft)	94.03	83.83	39.00
Min Ch El (ft)	1486.61	Shear (lb/sq ft)	0.88	5.48	0.19
Alpha	1.27	Stream Power (lb/ft s)	356.66	0.00	0.00
Frctn Loss (ft)	1.11	Cum Volume (acre-ft)	3.61	3.85	0.14
C & E Loss (ft)	0.07	Cum SA (acres)	2.82	0.57	0.31

Plan: Existing Bushkill Creek Reach RS: 304 Profile: 100 Year

E.G. Elev (ft)	1499.36	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.68	Wt. n-Val.	0.055	0.040	0.055
W.S. Elev (ft)	1496.69	Reach Len. (ft)	99.31	95.84	92.38
Crit W.S. (ft)	1497.49	Flow Area (sq ft)	314.26	644.45	19.55
E.G. Slope (ft/ft)	0.009846	Area (sq ft)	341.41	644.45	19.57
Q Total (cfs)	9929.00	Flow (cfs)	989.07	8909.02	30.91
Top Width (ft)	403.06	Top Width (ft)	272.11	85.18	45.76
Vel Total (ft/s)	10.15	Avg. Vel. (ft/s)	3.15	13.82	1.58
Max Chl Dpth (ft)	10.47	Hydr. Depth (ft)	1.27	7.57	0.45
Conv. Total (cfs)	100064.6	Conv. (cfs)	9967.9	89785.2	311.5
Length Wtd. (ft)	96.36	Wetted Per. (ft)	247.04	88.73	43.16
Min Ch El (ft)	1486.21	Shear (lb/sq ft)	0.78	4.46	0.28
Alpha	1.67	Stream Power (lb/ft s)	334.97	0.00	0.00
Frctn Loss (ft)	1.11	Cum Volume (acre-ft)	2.88	2.36	0.11
C & E Loss (ft)	0.25	Cum SA (acres)	2.19	0.38	0.21

Plan: Existing Bushkill Creek Reach RS: 208 Profile: 100 Year

E.G. Elev (ft)	1497.96	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.61	Wt. n-Val.	0.055	0.040	
W.S. Elev (ft)	1494.36	Reach Len. (ft)	112.18	108.00	103.83
Crit W.S. (ft)	1495.11	Flow Area (sq ft)	422.98	467.99	
E.G. Slope (ft/ft)	0.019671	Area (sq ft)	723.87	467.99	37.96
Q Total (cfs)	9929.00	Flow (cfs)	2018.24	7910.76	
Top Width (ft)	655.17	Top Width (ft)	504.99	76.95	73.23
Vel Total (ft/s)	11.14	Avg. Vel. (ft/s)	4.77	16.90	
Max Chl Dpth (ft)	8.45	Hydr. Depth (ft)	1.41	6.08	
Conv. Total (cfs)	70793.0	Conv. (cfs)	14389.9	56403.1	
Length Wtd. (ft)	108.96	Wetted Per. (ft)	299.33	80.08	
Min Ch El (ft)	1485.90	Shear (lb/sq ft)	1.74	7.18	
Alpha	1.87	Stream Power (lb/ft s)	305.19	0.00	0.00
Frctn Loss (ft)	1.30	Cum Volume (acre-ft)	1.67	1.14	0.05
C & E Loss (ft)	0.09	Cum SA (acres)	1.30	0.20	0.09

Plan: Existing Bushkill Creek Reach RS: 100 Profile: 100 Year

E.G. Elev (ft)	1495.56	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.22	Wt. n-Val.	0.055	0.040	
W.S. Elev (ft)	1492.33	Reach Len. (ft)			
Crit W.S. (ft)	1493.40	Flow Area (sq ft)	503.73	448.93	
E.G. Slope (ft/ft)	0.022392	Area (sq ft)	571.99	448.93	
Q Total (cfs)	9929.00	Flow (cfs)	2548.66	7380.34	
Top Width (ft)	593.10	Top Width (ft)	508.32	84.78	
Vel Total (ft/s)	10.42	Avg. Vel. (ft/s)	5.06	16.44	
Max Chl Dpth (ft)	8.54	Hydr. Depth (ft)	1.40	5.30	
Conv. Total (cfs)	66352.8	Conv. (cfs)	17032.0	49320.8	
Length Wtd. (ft)		Wetted Per. (ft)	359.78	88.27	
Min Ch El (ft)	1483.79	Shear (lb/sq ft)	1.96	7.11	
Alpha	1.91	Stream Power (lb/ft s)	255.20	0.00	0.00
Frctn Loss (ft)	2.28	Cum Volume (acre-ft)			
C & E Loss (ft)	0.12	Cum SA (acres)			

Errors Warnings and Notes for Plan : Existing

Location:	River: Bushkill Creek Reach: Reach RS: 1195 Profile: 10 Year
Warning:	Divided flow computed for this cross-section.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 1195 Profile: 25 Year
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 1195 Profile: 50 Year
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 1195 Profile: 100 Year
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 1195 Profile: 500 Year
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 1049 Profile: 10 Year
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 1049 Profile: 25 Year
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 1049 Profile: 50 Year
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 1049 Profile: 100 Year
Warning:	Multiple water surfaces were found that could balance the energy equation. The program selected the water surface whose main
	channel velocity head was the closest to the previously computed cross section.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 1049 Profile: 500 Year
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 921 Profile: 10 Year
Warning:	Divided flow computed for this cross-section.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 921 Profile: 25 Year
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 921 Profile: 50 Year
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 921 Profile: 100 Year
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 921 Profile: 500 Year
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Location:	River: Bushkill Creek Reach: Reach RS: 819 Profile: 10 Year
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 819 Profile: 25 Year
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 819 Profile: 50 Year
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 819 Profile: 100 Year
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 819 Profile: 500 Year
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 720 Profile: 10 Year
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may
	indicate the need for additional cross sections.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for
	additional cross sections.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 720 Profile: 25 Year
Warning:	Divided flow computed for this cross-section.
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may
	indicate the need for additional cross sections.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for
	additional cross sections.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

Errors Warnings and Notes for Plan : Existing (Continued)

Location:	River: Bushkill Creek Reach: Reach RS: 720 Profile: 50 Year
Warning:	Divided flow computed for this cross-section.
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may
	indicate the need for additional cross sections.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 720 Profile: 100 Year
Warning:	Divided flow computed for this cross-section.
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may
	indicate the need for additional cross sections.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 720 Profile: 500 Year
Warning:	Divided flow computed for this cross-section.
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may
	indicate the need for additional cross sections.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 646 Profile: 10 Year
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 646 Profile: 25 Year
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 646 Profile: 50 Year
Warning:	The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water
	surface and continued on with the calculations.
Warning:	Divided flow computed for this cross-section.
Warning:	During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface
	came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 646 Profile: 100 Year
Warning:	The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water
	surface and continued on with the calculations.
Warning:	Divided flow computed for this cross-section.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for
	additional cross sections.
Warning:	During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface
	came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 646 Profile: 500 Year
Warning:	The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water
	surface and continued on with the calculations.
Warning:	Divided flow computed for this cross-section.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for
	additional cross sections.
Warning:	During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface
	came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 617 Profile: 10 Year
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 617 Profile: 25 Year
Warning:	The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water
	surface and continued on with the calculations.
Warning:	Divided flow computed for this cross-section.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for
	additional cross sections.
Warning:	During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface
	came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Errors Warnings and Notes for Plan : Existing (Continued)

Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 617 Profile: 50 Year
Warning:	Divided flow computed for this cross-section.
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may
	indicate the need for additional cross sections.
Note:	Program found supercritical flow starting at this cross section.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 617 Profile: 100 Year
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may
	indicate the need for additional cross sections.
Note:	Program found supercritical flow starting at this cross section.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 617 Profile: 500 Year
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may
	indicate the need for additional cross sections.
Note:	Program found supercritical flow starting at this cross section.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 586 Profile: 10 Year
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 586 Profile: 25 Year
Warning:	Divided flow computed for this cross-section.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 586 Profile: 50 Year
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 586 Profile: 100 Year
Warning:	Divided flow computed for this cross-section.
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 586 Profile: 500 Year
Warning:	Divided flow computed for this cross-section.
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 510 Profile: 10 Year
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for
	additional cross sections.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 510 Profile: 25 Year
Warning:	Divided flow computed for this cross-section.
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for
	additional cross sections.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 510 Profile: 50 Year
Warning:	The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water
	surface and continued on with the calculations.
Warning:	Divided flow computed for this cross-section.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for
	additional cross sections.
Warning:	During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface
	came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 510 Profile: 100 Year
Warning:	The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water
	surface and continued on with the calculations.
Warning:	Divided flow computed for this cross-section.

Errors Warnings and Notes for Plan : Existing (Continued)

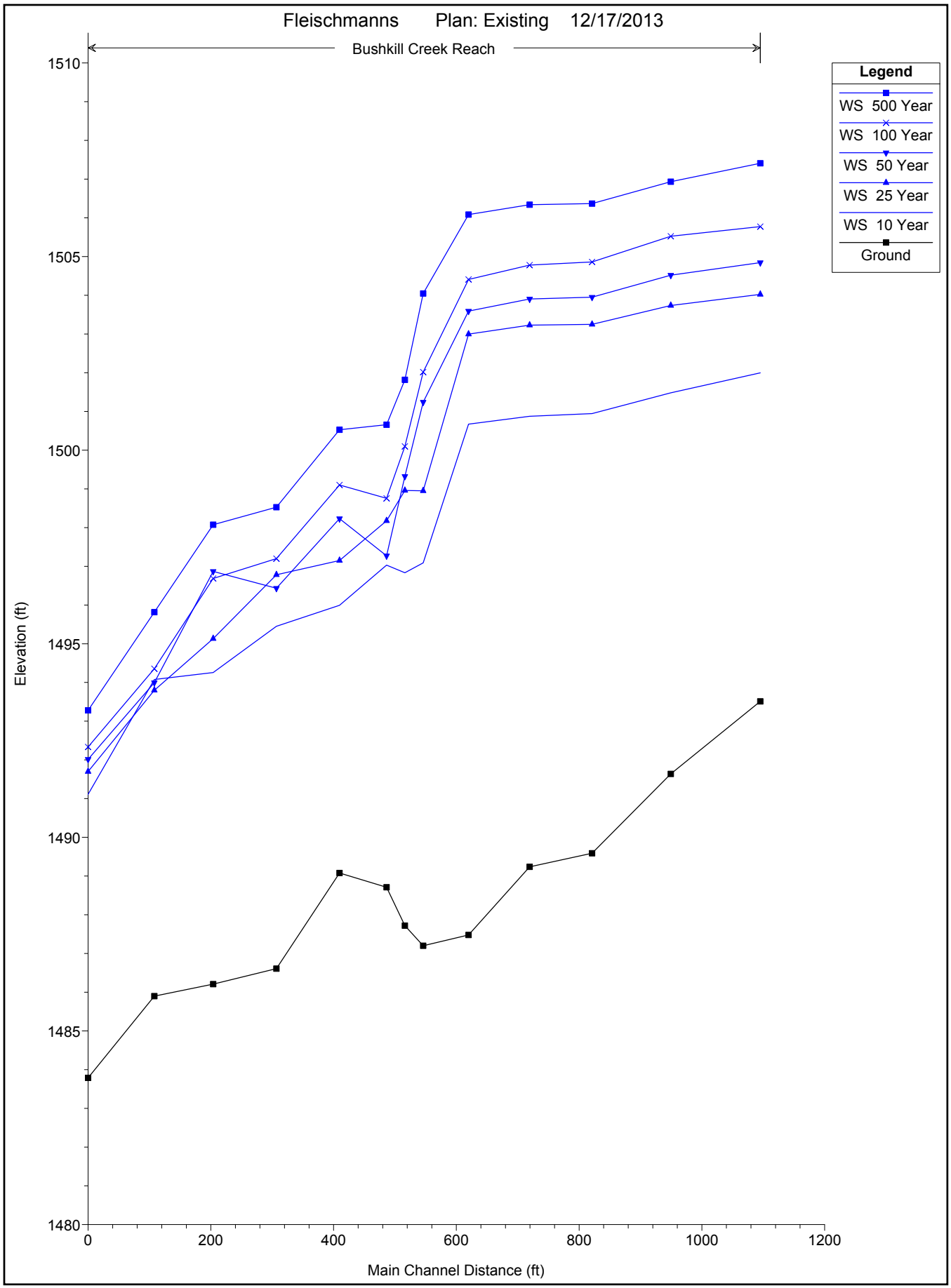
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for
	additional cross sections.
Warning:	During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface
	came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 510 Profile: 500 Year
Warning:	The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water
	surface and continued on with the calculations.
Warning:	Divided flow computed for this cross-section.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for
	additional cross sections.
Warning:	During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface
	came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Location:	River: Bushkill Creek Reach: Reach RS: 407 Profile: 10 Year
Warning:	Divided flow computed for this cross-section.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 407 Profile: 25 Year
Warning:	Divided flow computed for this cross-section.
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 407 Profile: 50 Year
Warning:	Divided flow computed for this cross-section.
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for
	additional cross sections.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 407 Profile: 100 Year
Warning:	Divided flow computed for this cross-section.
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for
	additional cross sections.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 407 Profile: 500 Year
Warning:	Divided flow computed for this cross-section.
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Location:	River: Bushkill Creek Reach: Reach RS: 304 Profile: 10 Year
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 304 Profile: 25 Year
Warning:	The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water
	surface and continued on with the calculations.
Warning:	Divided flow computed for this cross-section.
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for
	additional cross sections.
Warning:	During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface
	came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 304 Profile: 50 Year
Warning:	The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water
	surface and continued on with the calculations.
Warning:	Divided flow computed for this cross-section.
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for
	additional cross sections.
Warning:	During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface
	came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 304 Profile: 100 Year

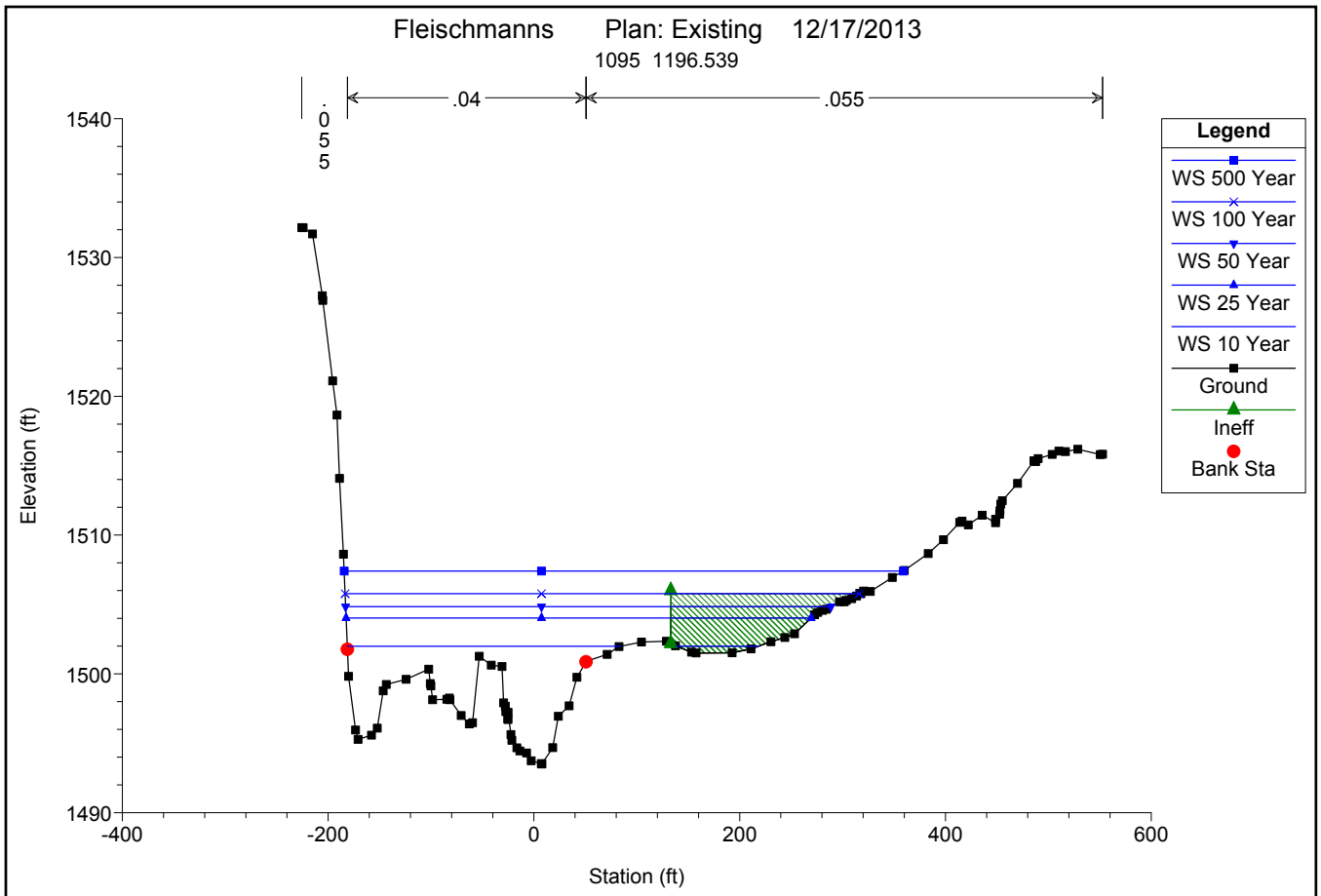
Errors Warnings and Notes for Plan : Existing (Continued)

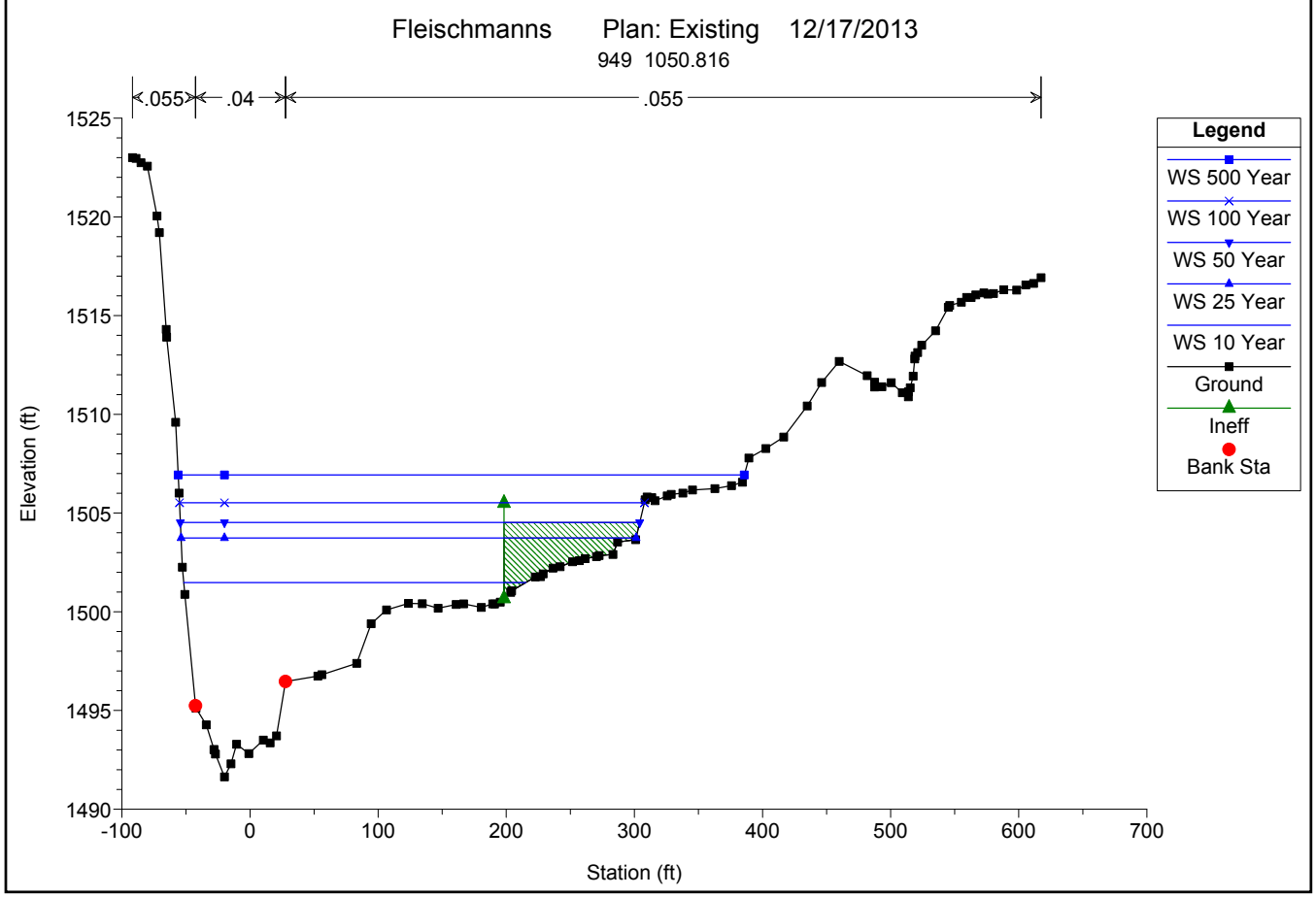
Warning:	Divided flow computed for this cross-section.
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for
	additional cross sections.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 304 Profile: 500 Year
Warning:	The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that
	had the least amount of error between computed and assumed values.
Warning:	Divided flow computed for this cross-section.
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for
	additional cross sections.
Location:	River: Bushkill Creek Reach: Reach RS: 208 Profile: 10 Year
Warning:	The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water
	surface and continued on with the calculations.
Warning:	Divided flow computed for this cross-section.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for
	additional cross sections.
Warning:	During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface
	came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 208 Profile: 25 Year
Warning:	Divided flow computed for this cross-section.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for
	additional cross sections.
Note:	Program found supercritical flow starting at this cross section.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 208 Profile: 50 Year
Warning:	Divided flow computed for this cross-section.
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may
	indicate the need for additional cross sections.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for
	additional cross sections.
Location:	River: Bushkill Creek Reach: Reach RS: 208 Profile: 100 Year
Warning:	Divided flow computed for this cross-section.
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may
	indicate the need for additional cross sections.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for
	additional cross sections.
Location:	River: Bushkill Creek Reach: Reach RS: 208 Profile: 500 Year
Warning:	The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water
	surface and continued on with the calculations.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for
	additional cross sections.
Warning:	During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface
	came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Location:	River: Bushkill Creek Reach: Reach RS: 100 Profile: 10 Year
Warning:	Divided flow computed for this cross-section.
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may
	indicate the need for additional cross sections.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for
	additional cross sections.
Note:	Program found supercritical flow starting at this cross section.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 100 Profile: 25 Year
Warning:	Divided flow computed for this cross-section.

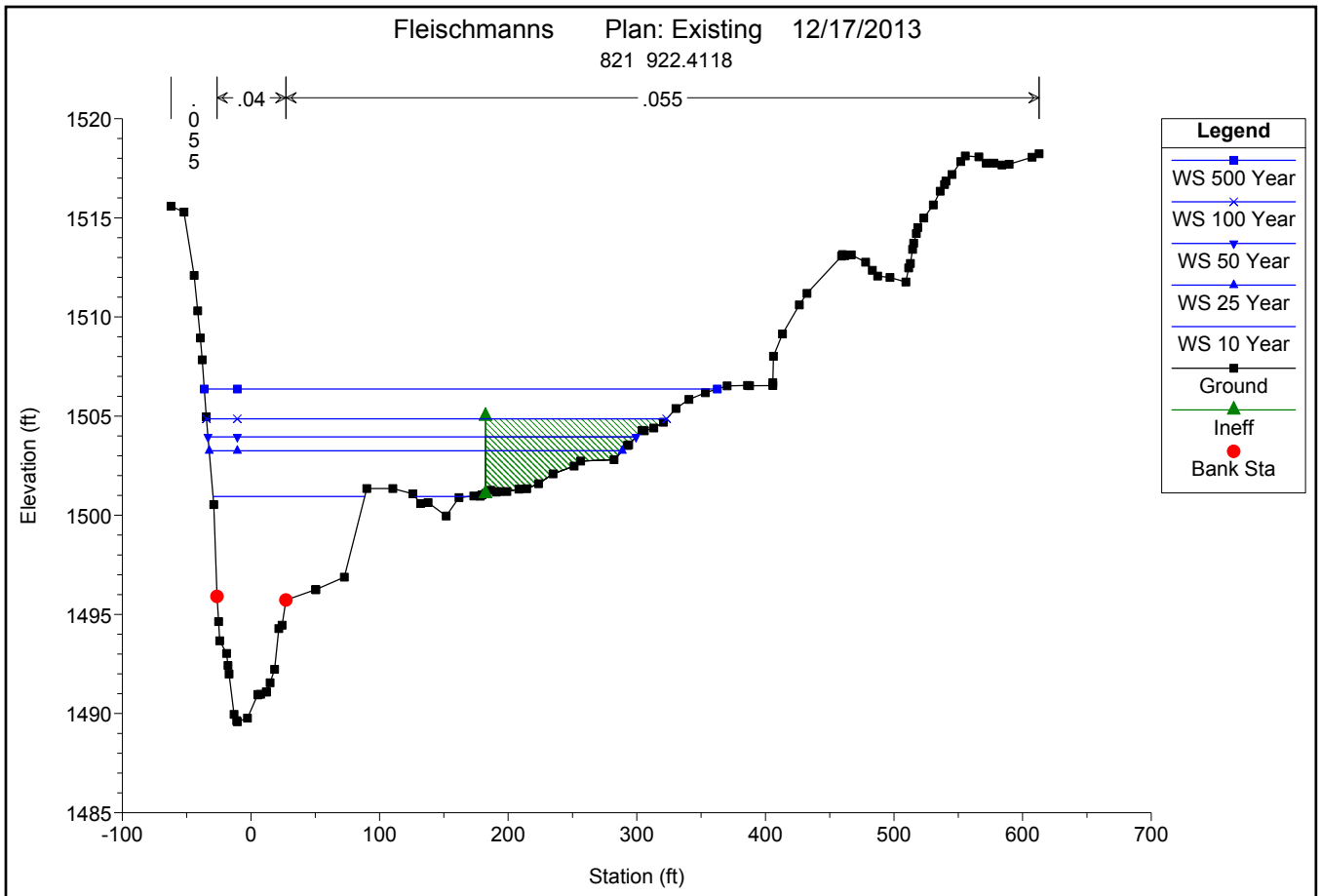
Errors Warnings and Notes for Plan : Existing (Continued)

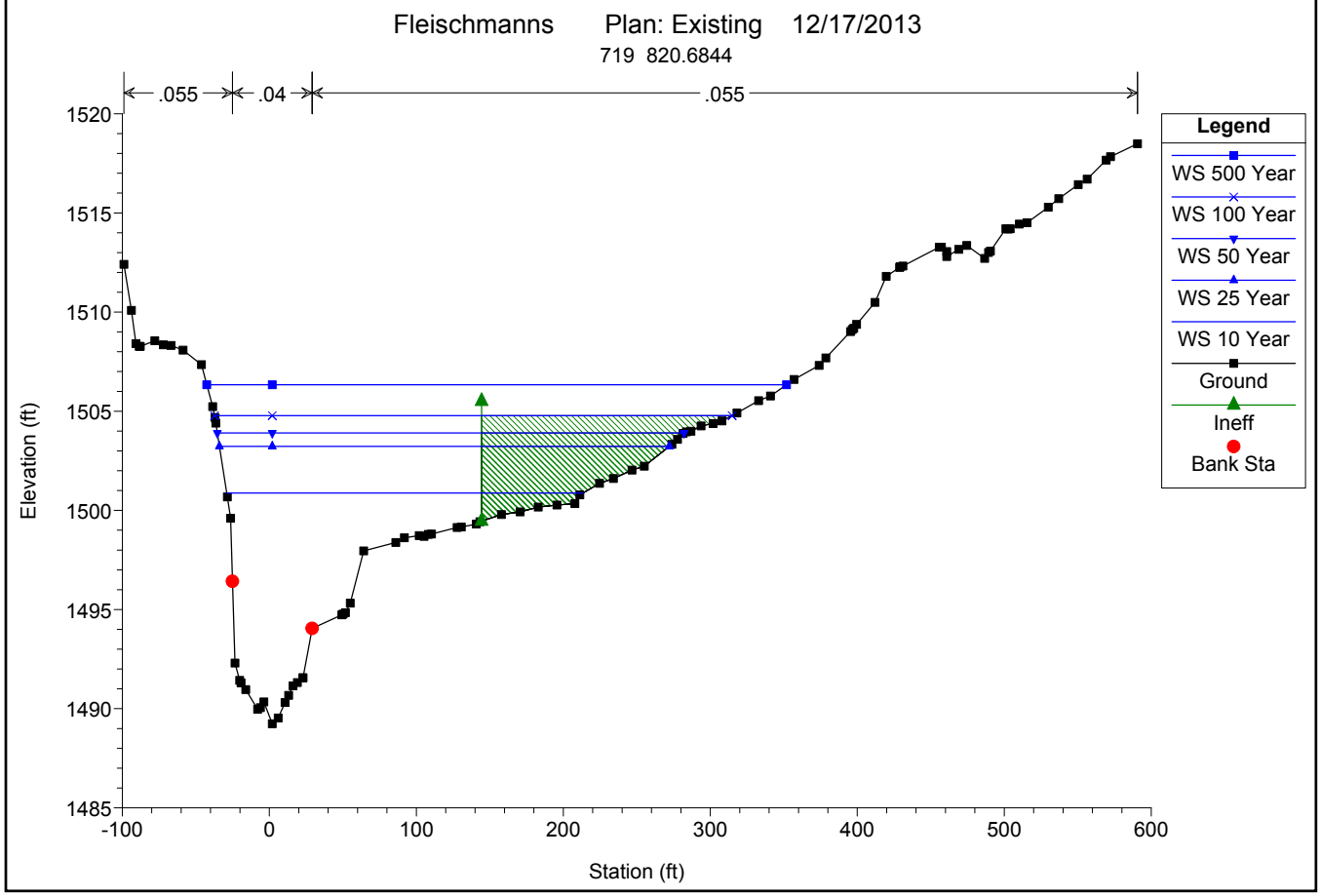
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for
	additional cross sections.
Location:	River: Bushkill Creek Reach: Reach RS: 100 Profile: 50 Year
Warning:	Divided flow computed for this cross-section.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for
	additional cross sections.
Location:	River: Bushkill Creek Reach: Reach RS: 100 Profile: 100 Year
Warning:	Divided flow computed for this cross-section.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for
	additional cross sections.
Location:	River: Bushkill Creek Reach: Reach RS: 100 Profile: 500 Year
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may
	indicate the need for additional cross sections.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for
	additional cross sections.

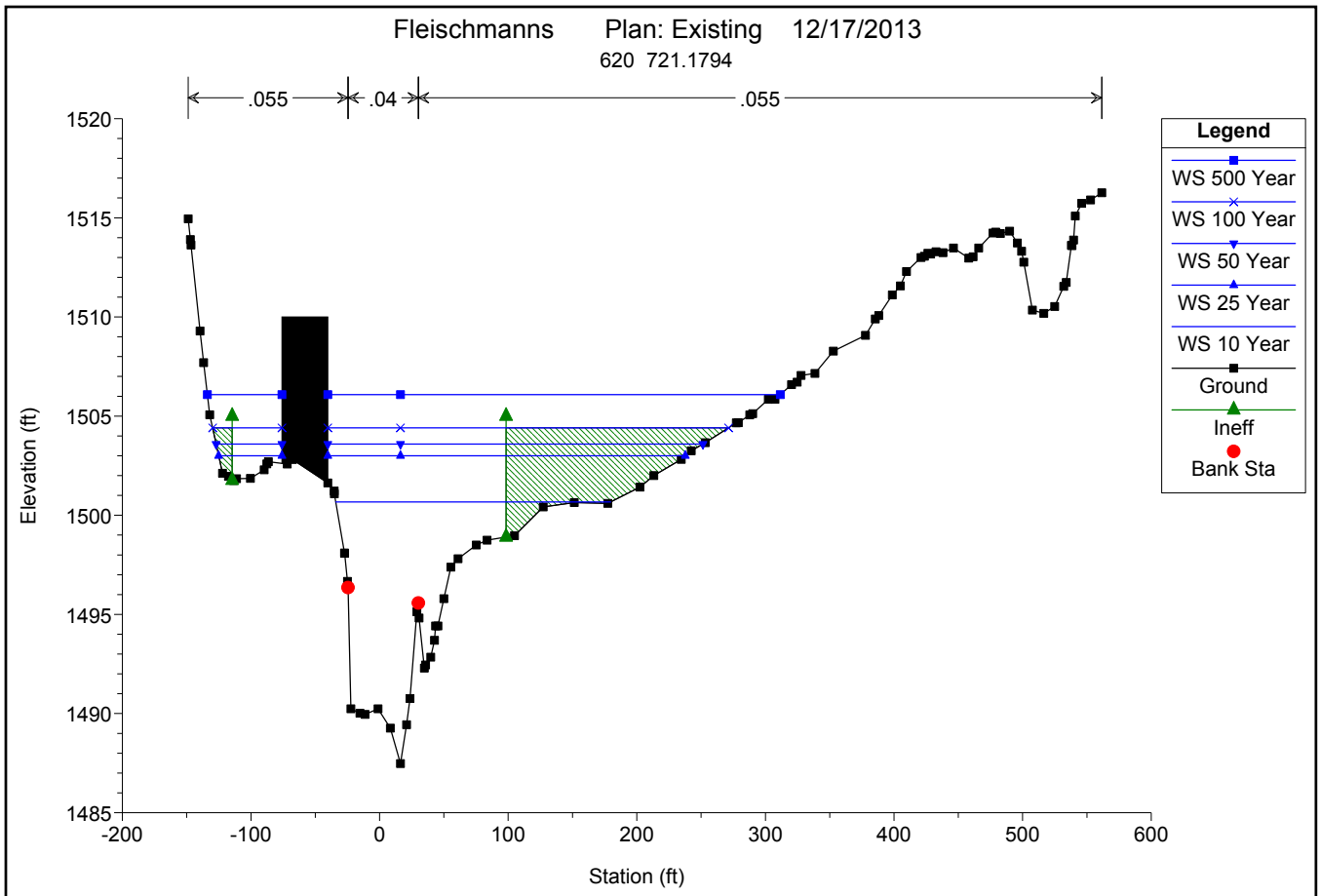

Fleischmanns Plan: Existing 12/17/2013
Bushkill Creek Reach
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 25 Year
WS 10 Year
Ground
Elevation (ft)
1510
1505
1500
1495
1490
1485
1480
0
200
400
600
800
1000
1200
Main Channel Distance (ft)

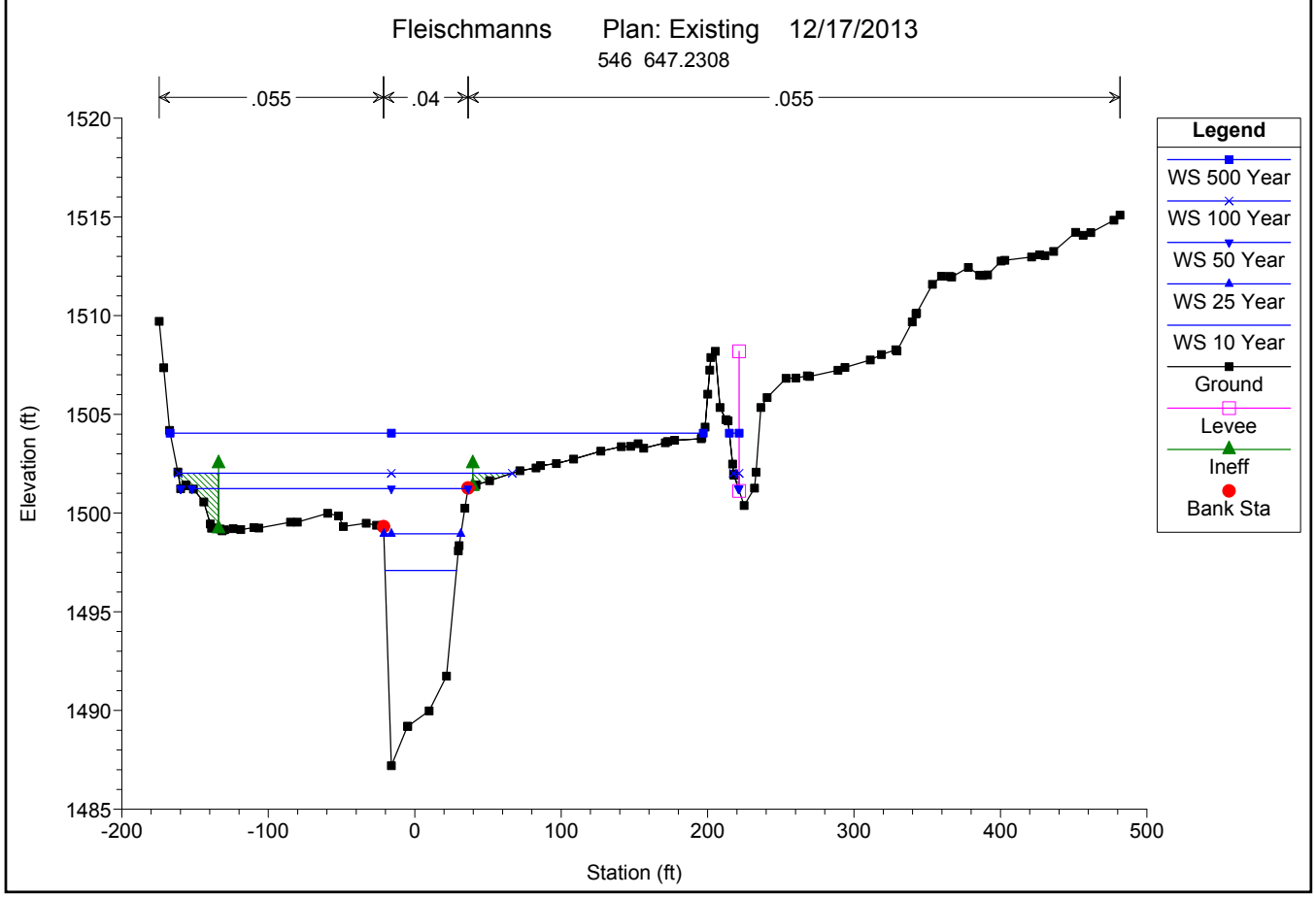

Fleischmanns Plan: Existing 12/17/2013
1095 1196.539
.055
.04
.055
Elevation (ft)
Station (ft)
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 25 Year
WS 10 Year
Ground
Ineff
Bank Sta

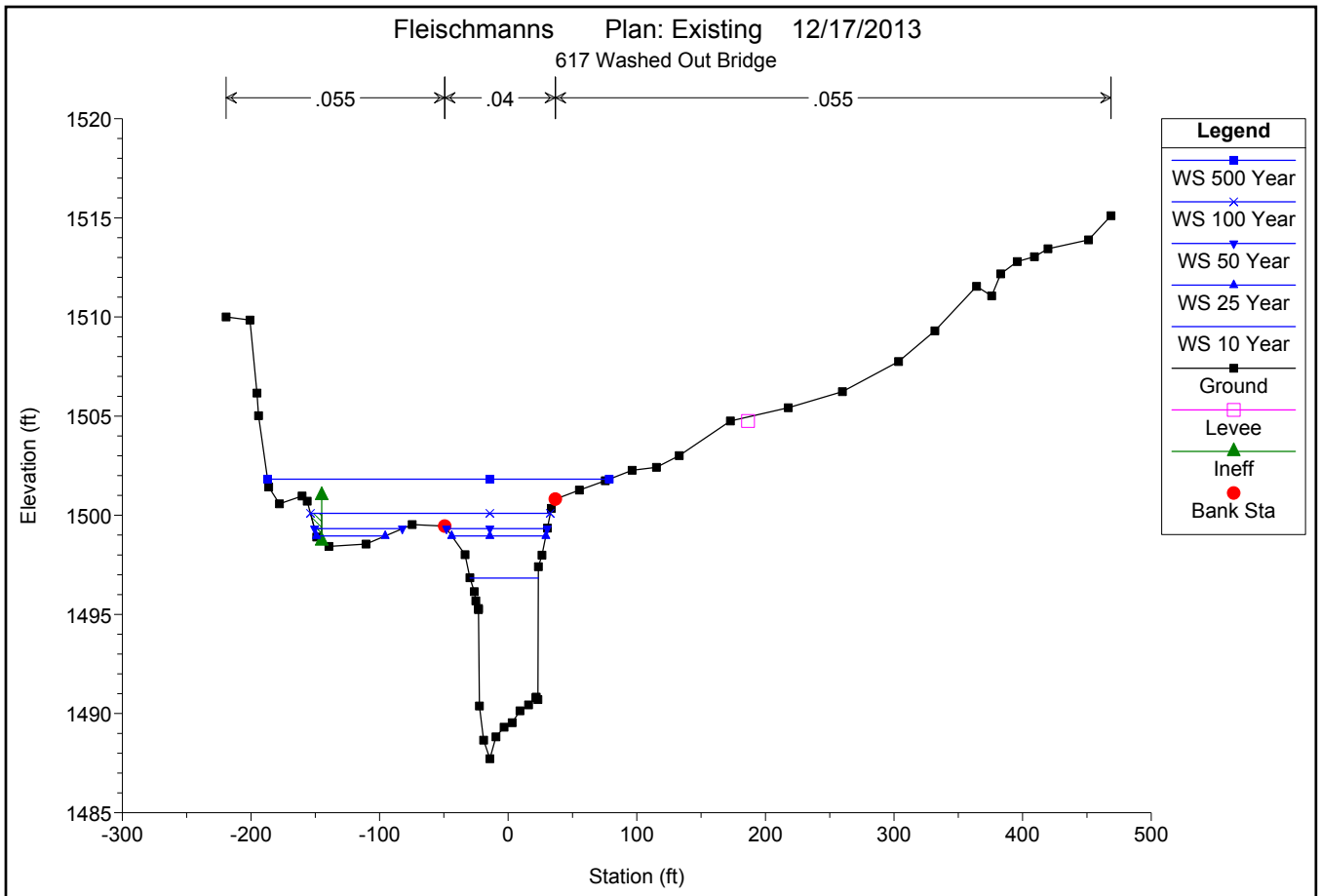

Fleischmanns Plan: Existing 12/17/2013
949 1050.816
.055
.04
.055
Elevation (ft)
Station (ft)
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 25 Year
WS 10 Year
Ground
Ineff
Bank Sta

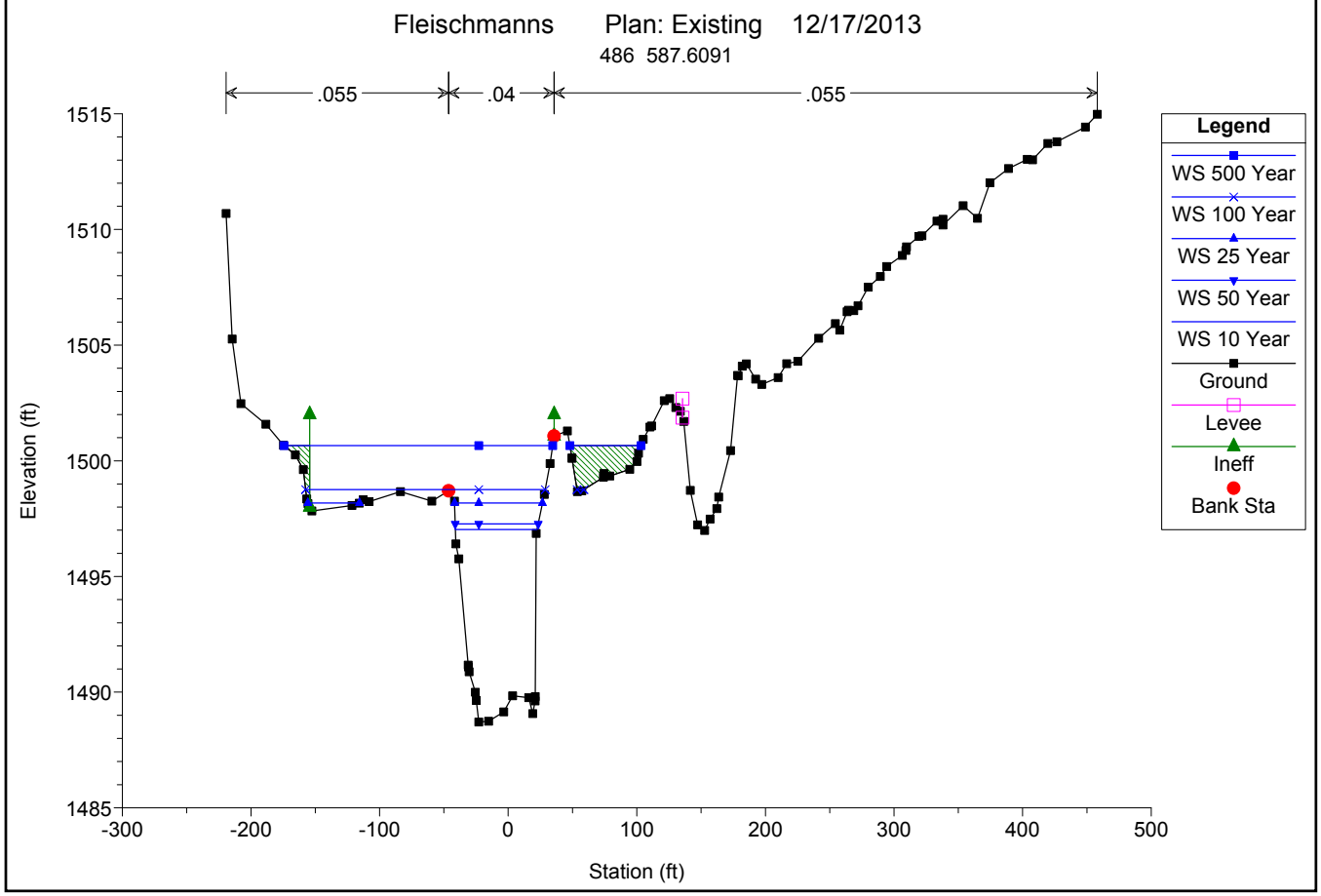

Fleischmanns Plan: Existing 12/17/2013
821 922.4118
.055
.04
.055
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 25 Year
WS 10 Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
1520
1515
1510
1505
1500
1495
1490
1485
-100
0
100
200
300
400
500
600
700

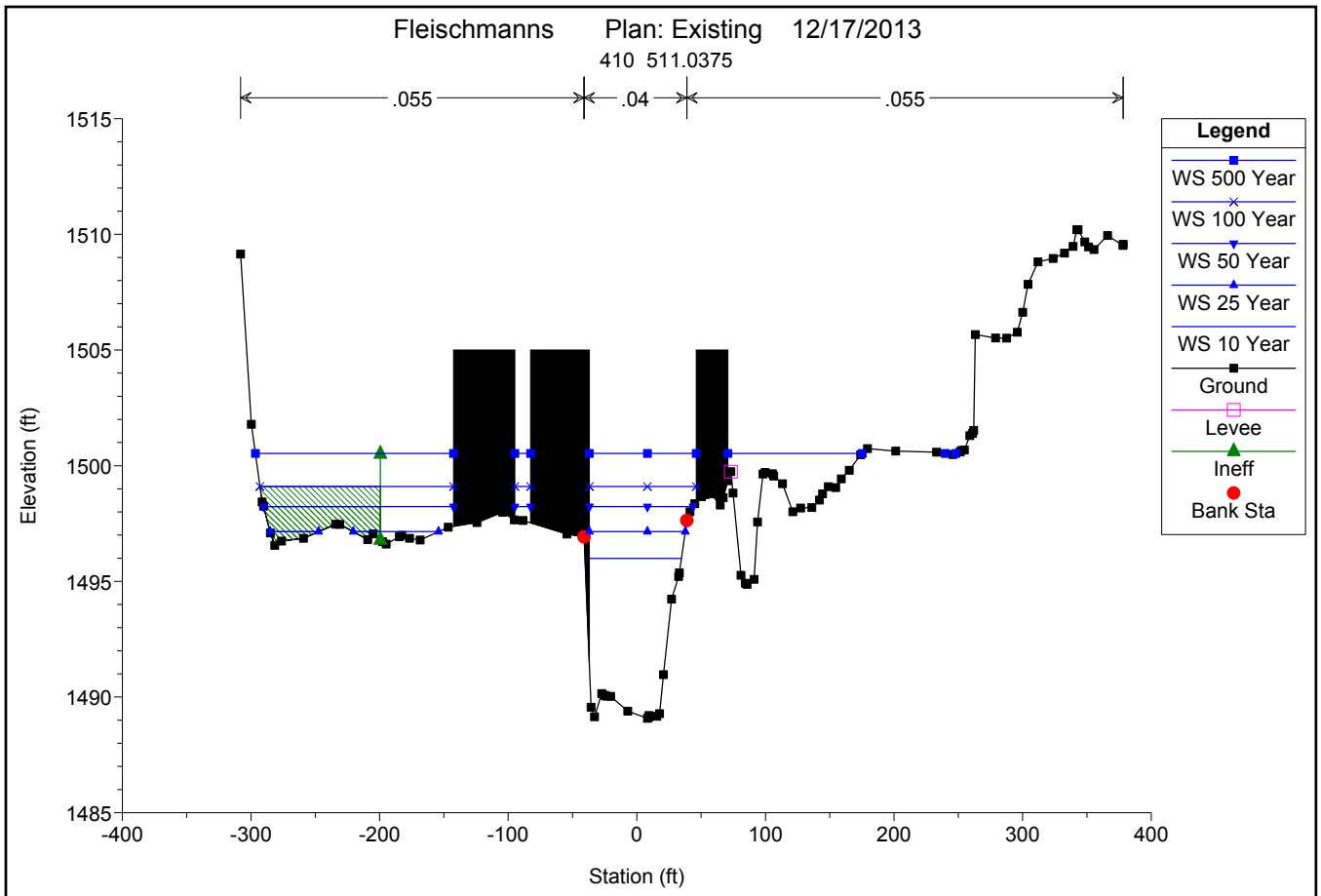

Fleischmanns Plan: Existing 12/17/2013
719 820.6844
.055
.04
.055
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 25 Year
WS 10 Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
1520
1515
1510
1505
1500
1495
1490
1485
-100
0
100
200
300
400
500
600

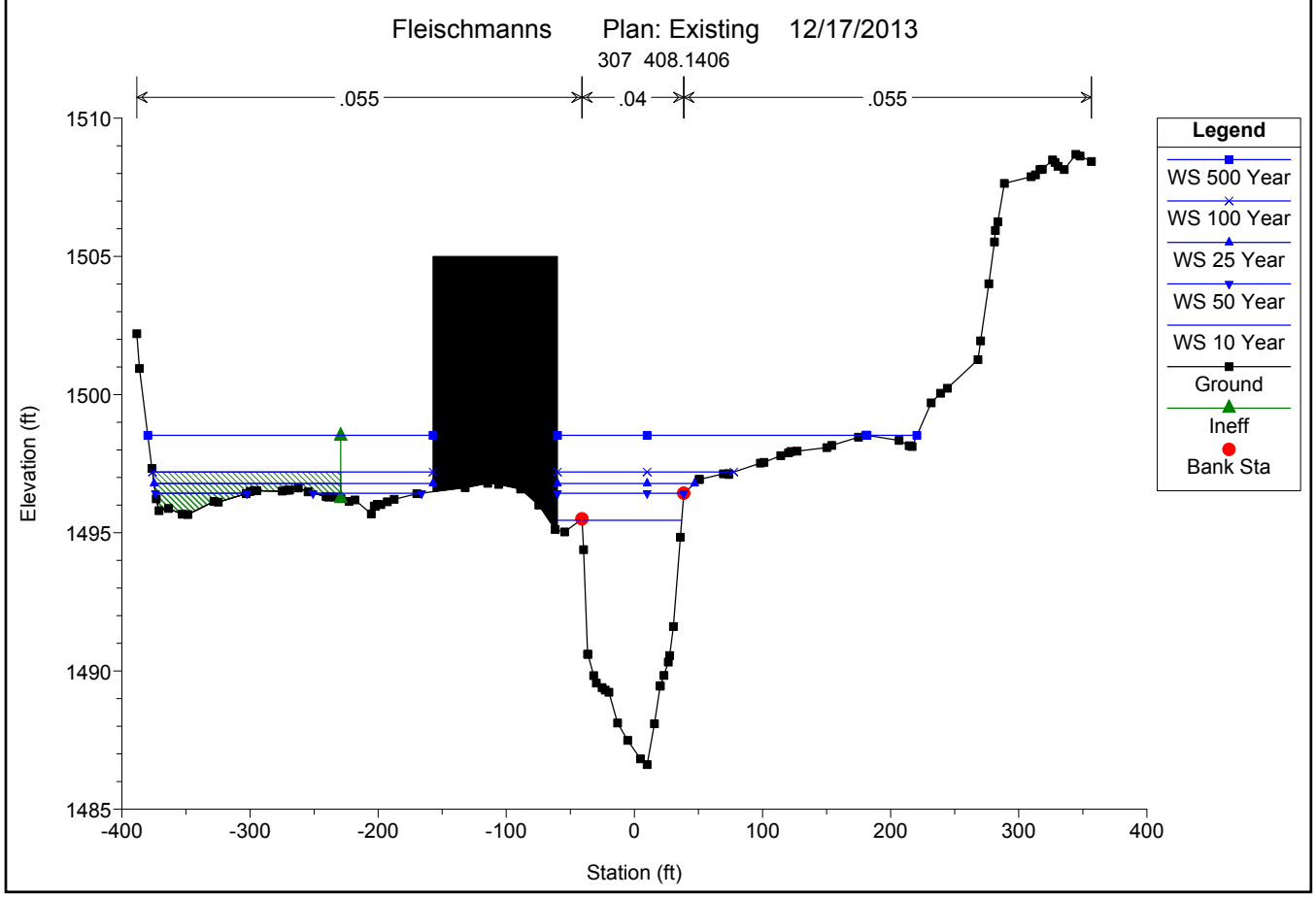

Fleischmanns Plan: Existing 12/17/2013
620 721.1794
.055
.04
.055
Elevation (ft)
Station (ft)
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 25 Year
WS 10 Year
Ground
Ineff
Bank Sta

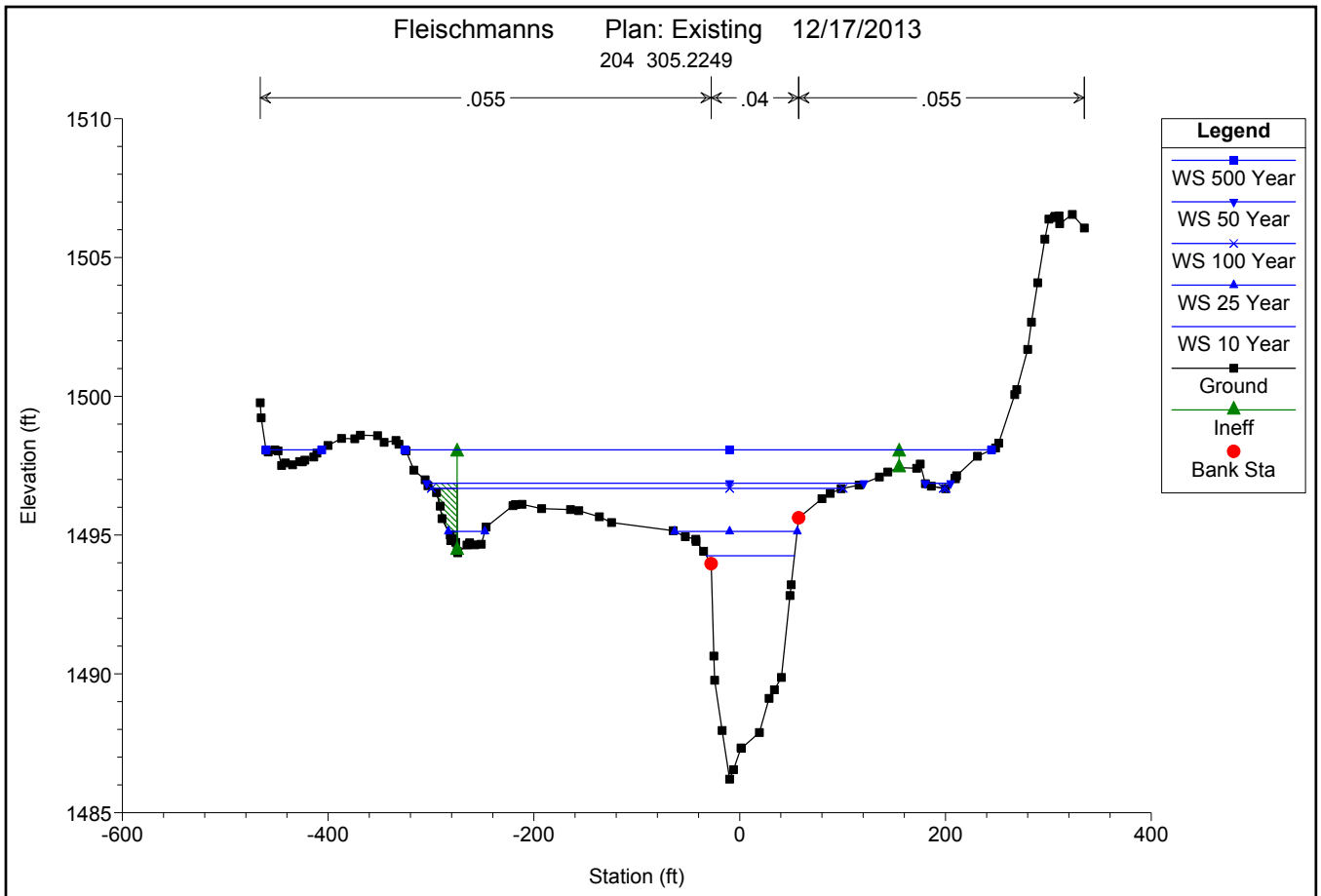

Fleischmanns Plan: Existing 12/17/2013
546 647.2308
.055
.04
.055
Elevation (ft)
Station (ft)
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 25 Year
WS 10 Year
Ground
Levee
Ineff
Bank Sta

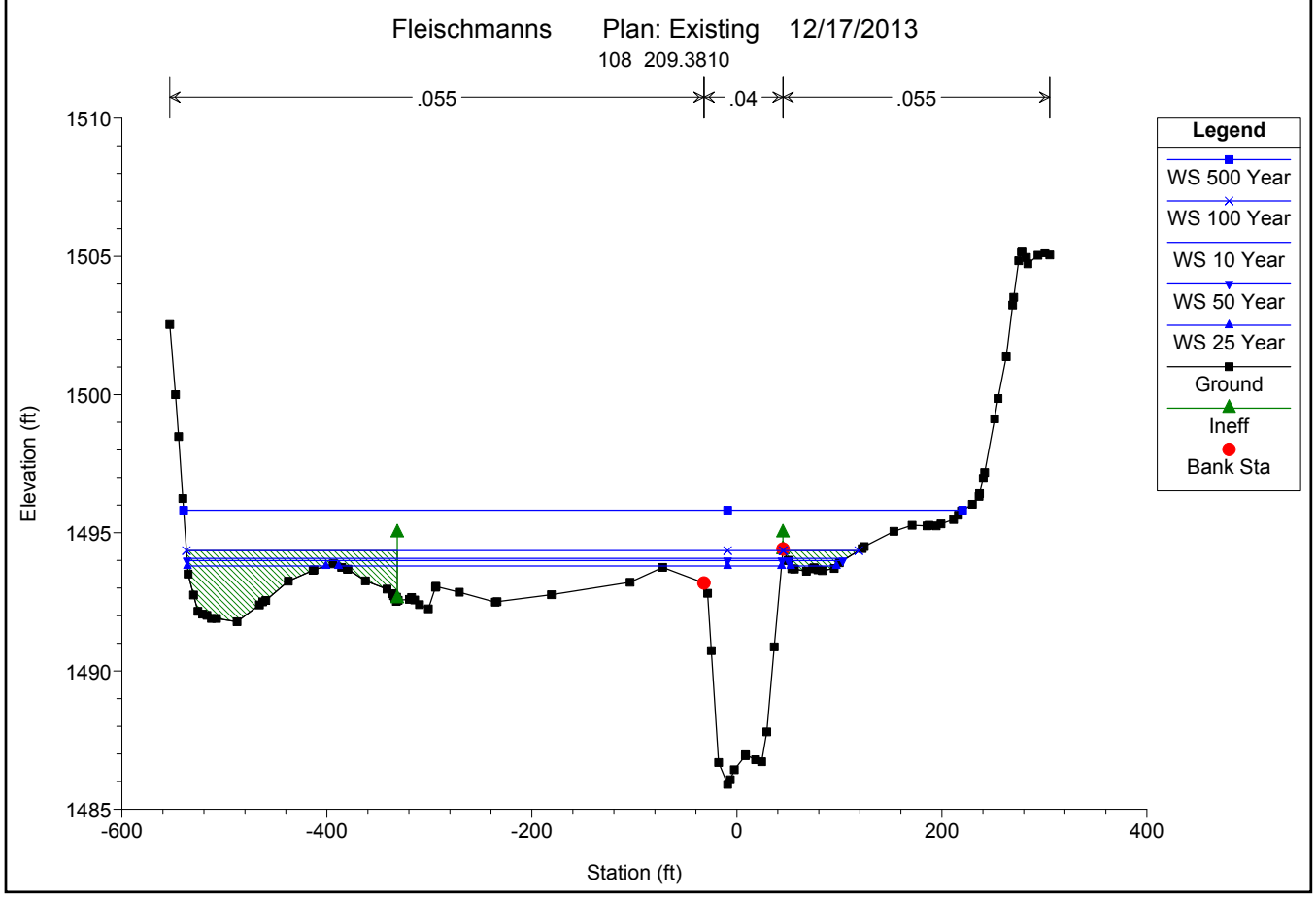

Fleischmanns Plan: Existing 12/17/2013
617 Washed Out Bridge
.055
.04
.055
Elevation (ft)
Station (ft)
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 25 Year
WS 10 Year
Ground
Levee
Ineff
Bank Sta

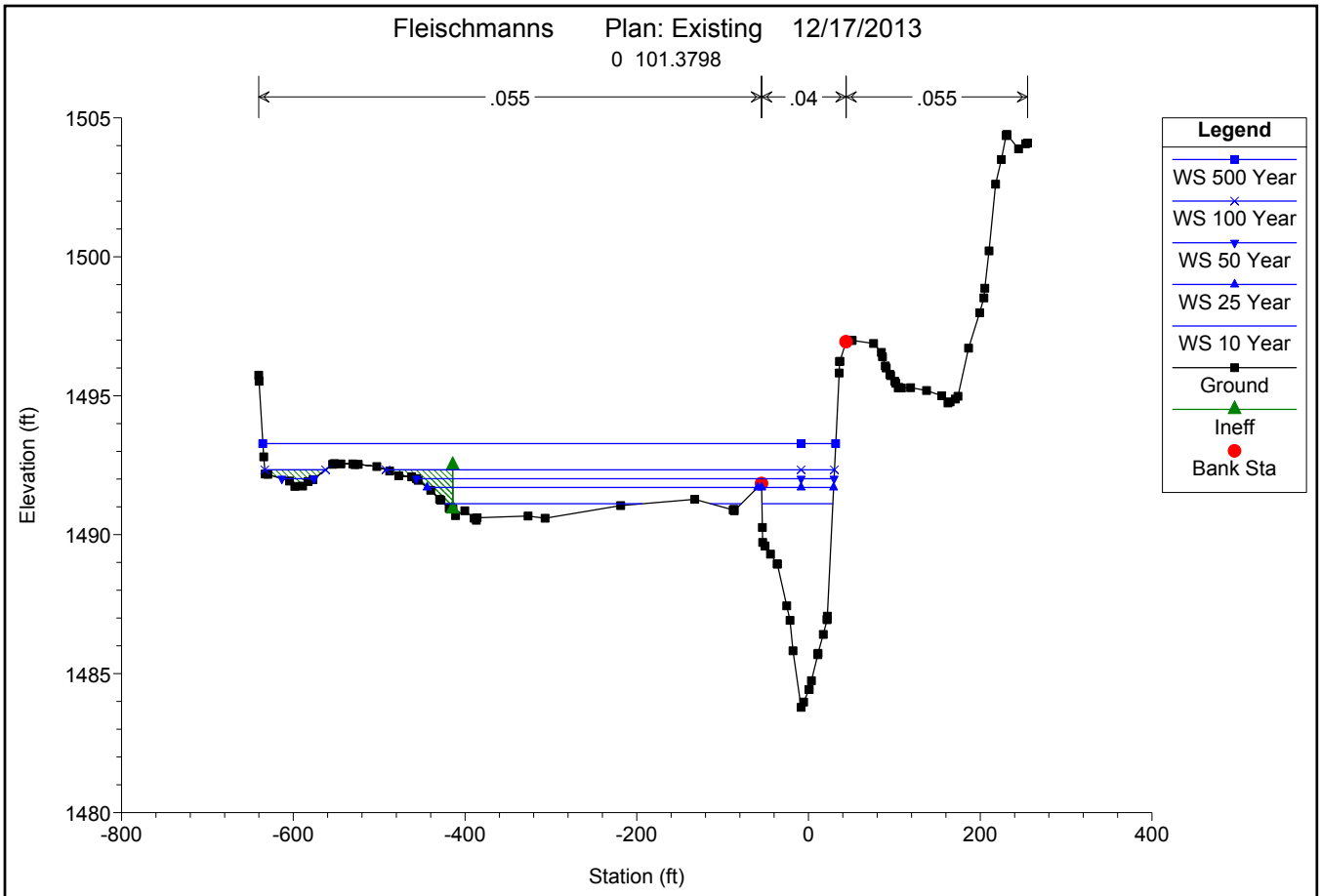

Fleischmanns Plan: Existing 12/17/2013
486 587.6091
.055
.04
.055
Elevation (ft)
Station (ft)
Legend
WS 500 Year
WS 100 Year
WS 25 Year
WS 50 Year
WS 10 Year
Ground
Levee
Ineff
Bank Sta

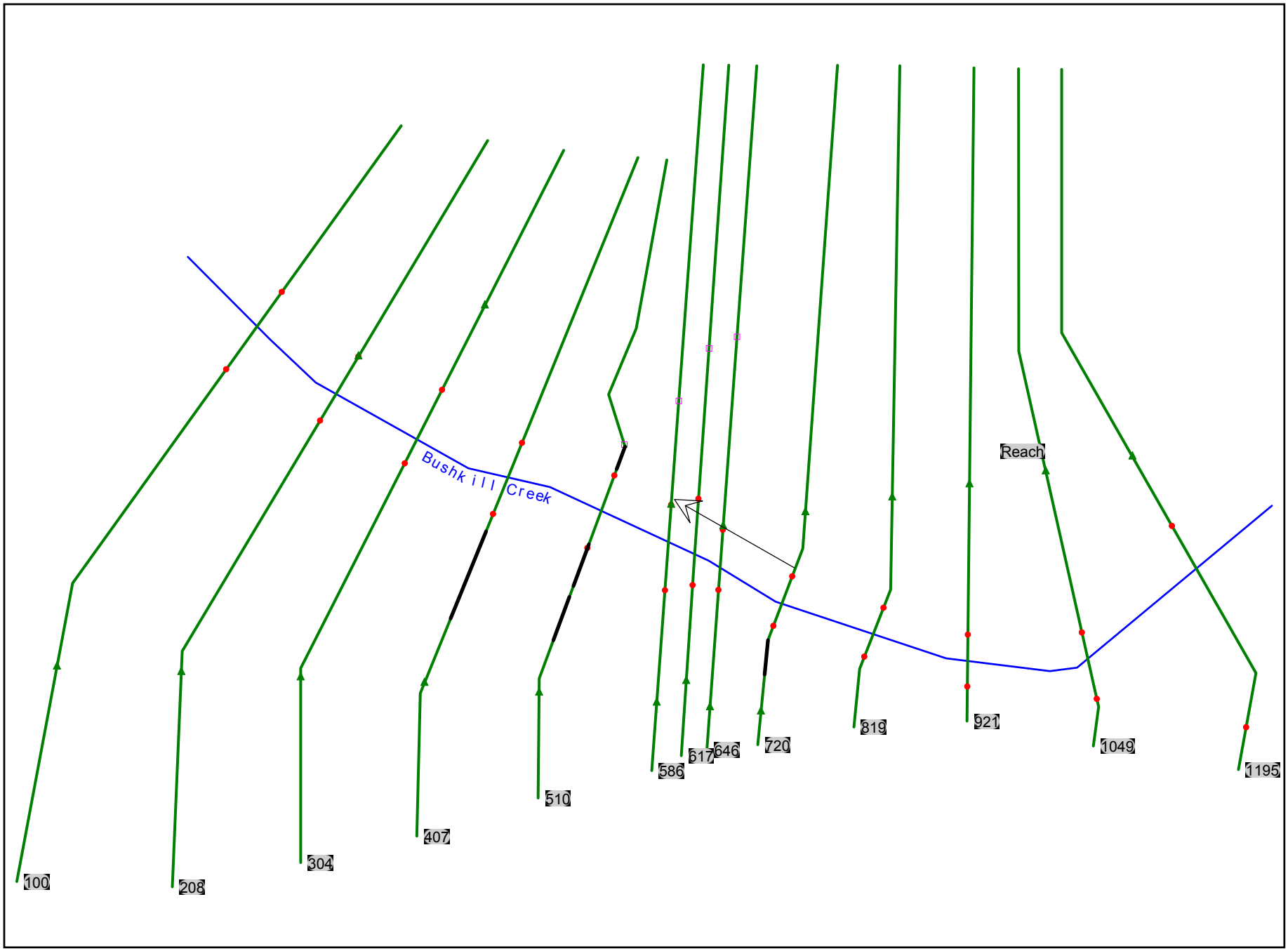

Fleischmanns Plan: Existing 12/17/2013
410 511.0375
.055
.04
.055
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 25 Year
WS 10 Year
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
1515
1510
1505
1500
1495
1490
1485
-400
-300
-200
-100
0
100
200
300
400


Fleischmanns Plan: Existing 12/17/2013
307 408.1406
.055
.04
.055
Legend
WS 500 Year
WS 100 Year
WS 25 Year
WS 50 Year
WS 10 Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
1510
1505
1500
1495
1490
1485
-400
-300
-200
-100
0
100
200
300
400


Fleischmanns Plan: Existing 12/17/2013
204 305.2249
.055
.04
.055
Legend
WS 500 Year
WS 50 Year
WS 100 Year
WS 25 Year
WS 10 Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
1510
1505
1500
1495
1490
1485
-600
-400
-200
0
200
400


Fleischmanns Plan: Existing 12/17/2013
108 209.3810
.055
.04
.055
Legend
WS 500 Year
WS 100 Year
WS 10 Year
WS 50 Year
WS 25 Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
1510
1505
1500
1495
1490
1485
-600
-400
-200
0
200
400


Fleischmanns Plan: Existing 12/17/2013
0 101.3798
.055
.04
.055
Elevation (ft)
1505
1500
1495
1490
1485
1480
-800
-600
-400
-200
0
200
400
Station (ft)
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 25 Year
WS 10 Year
Ground
Ineff
Bank Sta


Bushkill Creek
Reach
100
208
304
407
510
586
617
646
720
819
921
1049
1195

HYDROLOGIC AND HYDRAULIC ANALYSIS

DELAWARE COUNTY BRIDGE 80
OVER BUSHKILL CREEK
VILLAGE OF FLEISCHMANNS, NY

Calculations

Section 4

Proposed Conditions Model

```
                    HEC-RAS Version 4.1.0 Jan 2010
                     U.S. Army Corps of Engineers
                    Hydrologic Engineering Center
                          609 Second Street
                          Davis, California


          X     X  XXXXXX    XXXX        XXXX       XX      XXXX
          X     X  X        X    X       X   X     X  X    X
          X     X  X        X            X   X    X    X   X
          XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
          X     X  X        X            X  X     X    X        X
          X     X  X        X    X       X   X    X    X        X
          X     X  XXXXXX    XXXX        X    X   X    X   XXXXX


PROJECT DATA
Project Title: Fleischmanns
Project File : Fleischmanns.prj
Run Date and Time: 1/16/2014 6:06:37 PM

Project in English units


PLAN DATA

Plan Title: Alternative C
Plan File : p:\3281\Calculations\Highway\HEC-RAS\Fleischmanns.p03

           Geometry Title: Alternative C
           Geometry File : p:\3281\Calculations\Highway\HEC-RAS\Fleischmanns.g03

           Flow Title    : Bushkill
           Flow File     : p:\3281\Calculations\Highway\HEC-RAS\Fleischmanns.f01

Plan Summary Information:
Number of:  Cross Sections =   12    Multiple Openings  =    0
            Culverts       =    0    Inline Structures  =    0
            Bridges        =    1    Lateral Structures =    0

Computational Information
    Water surface calculation tolerance  =  0.01
    Critical depth calculation tolerance =  0.01
    Maximum number of iterations         =  20
    Maximum difference tolerance         =  0.3
    Flow tolerance factor                =  0.001

Computation Options
    Critical depth computed only where necessary
    Conveyance Calculation Method: At breaks in n values only
    Friction Slope Method:         Average Conveyance
    Computational Flow Regime:     Mixed Flow



FLOW DATA

Flow Title: Bushkill
Flow File : p:\3281\Calculations\Highway\HEC-RAS\Fleischmanns.f01

Flow Data (cfs)


  River           Reach           RS                10 Year         25 Year         50 Year        100 Year        500 Year

  Bushkill Creek  Reach           1195                 4601            6283            7766            9365           13608

  Bushkill Creek  Reach           407                  4866            6657            8231            9929           14446
```

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Bushkill Creek	Reach	10 Year	Normal S = 0.0125	Normal S = 0.01
Bushkill Creek	Reach	25 Year	Normal S = 0.0125	Normal S = 0.01
Bushkill Creek	Reach	50 Year	Normal S = 0.0125	Normal S = 0.01
Bushkill Creek	Reach	100 Year	Normal S = 0.0125	Normal S = 0.01
Bushkill Creek	Reach	500 Year	Normal S = 0.0125	Normal S = 0.01

GEOMETRY DATA

Geometry Title: Alternative C
Geometry File : p:\3281\Calculations\Highway\HEC-RAS\Fleischmanns.g03

CROSS SECTION

RIVER: Bushkill Creek
REACH: Reach RS: 1195

INPUT
Description: 1095 1196.539
Station Elevation Data num= 101

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-225.65	1532.15	-224.27	1532.14	-215.12	1531.69	-205.59	1527.24	-205.11	1526.91
-195.57	1521.11	-191.42	1518.65	-188.97	1514.08	-185.18	1508.62	-181.25	1501.77
-180.17	1499.82	-173.36	1495.96	-170.85	1495.28	- 157.9	1495.59	-152.32	1496.09
-146.52	1498.78	-143.47	1499.24	-124.26	1499.61	-102.29	1500.34	-100.71	1499.31
-100.17	1499.14	- 98.44	1498.14	- 84.62	1498.17	- 82.22	1498.26	- 81.56	1498.14
- 70.75	1497	- 62.77	1496.39	- 59.63	1496.48	- 53.07	1501.27	- 41.49	1500.63
- 30.98	1500.53	- 29.4	1497.91	- 27.74	1497.68	- 27.29	1497.28	- 25.38	1496.75
- 25.22	1496.71	- 25.14	1497.23	- 22.38	1495.63	- 21.44	1495.22	- 16.54	1494.68
- 13.71	1494.45	- 7.13	1494.3	- 2.61	1493.74	7.23	1493.54	7.4	1493.51
7.82	1493.52	18.27	1494.69	23.75	1496.95	34.21	1497.7	41.74	1499.76
50.74	1500.87	51.09	1500.91	71.18	1501.41	82.66	1501.97	104.54	1502.3
128.76	1502.35	137.64	1502.02	153.21	1501.57	157.54	1501.51	192.62	1501.52
210.94	1501.8	230.4	1502.32	243.9	1502.62	253.25	1502.89	272.83	1504.26
275.8	1504.43	280.5	1504.58	284.26	1504.65	296.92	1505.2	301.62	1505.19
303.62	1505.29	308.9	1505.42	313.67	1505.61	316.84	1505.8	317.92	1505.78
320.45	1505.97	327.03	1505.94	348.39	1506.95	360.06	1507.45	383.25	1508.67
398.01	1509.67	413.79	1510.91	416.16	1511.01	422.24	1510.73	435.7	1511.43
448.63	1510.89	448.64	1511.14	452.61	1511.5	452.89	1511.75	453.69	1512.23
455.21	1512.48	470.14	1513.73	486.06	1515.35	487.65	1515.3	490.14	1515.51
503.79	1515.82	510.2	1516.05	516.59	1516.02	528.57	1516.19	550.45	1515.8
552.71	1515.83								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-225.65	.055	-181.25	.04	50.74	.055

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
-	181.25	50.74	165.15	145.72	129	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
133.09	552.71	1506	F

CROSS SECTION

RIVER: Bushkill Creek
REACH: Reach RS: 1049

INPUT
Description: 949 1050.816
Station Elevation Data num= 101

```
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
  - 91.79    1523  - 88.99 1522.96  - 85.11 1522.74  - 80.09 1522.57  - 72.63 1520.04
  - 70.77  1519.2  - 65.49  1514.3  - 65.02 1513.91  - 58.04  1509.6  - 55.38 1506.01
  - 52.8 1502.26  - 50.92 1500.88  - 42.52 1495.24  - 42.19 1495.11  - 34.2 1494.27
  - 28.1 1493.02  - 28.07 1493.01  - 26.97 1492.79  - 19.9 1491.64  - 14.88  1492.3
  - 10.52 1493.29   -  .85 1492.82   10.35  1493.5   15.66 1493.36   20.67 1493.71
   27.75 1496.47   52.92 1496.74   56.15 1496.81   83.22 1497.39   94.58 1499.39
  106.53 1500.09  123.63 1500.42  134.49 1500.41  146.79 1500.18  160.92 1500.37
  166.67  1500.4  180.58 1500.22  189.43  1500.4   190.8 1500.39  195.29 1500.49
  203.46 1500.98  204.13 1501.06  222.57 1501.76  226.73 1501.78  228.78 1501.92
  236.46 1502.21  242.03 1502.28   251.7 1502.53  257.09 1502.59  261.52 1502.69
  270.44 1502.79  272.52 1502.85  283.25  1502.9  286.89 1503.53  300.98 1503.65
  308.38 1505.67  309.97 1505.81  313.62 1505.78  316.14 1505.62  325.64 1505.87
  328.76 1505.95  337.86 1506.01  345.39 1506.17  362.86 1506.24  375.84 1506.39
  384.26 1506.56  389.33 1507.79   402.6 1508.27  416.58 1508.85  434.88 1510.42
  446.15 1511.61  459.88 1512.68  481.65 1511.96  487.52 1511.63  487.53 1511.38
  493.16  1511.4  500.49  1511.6  509.09 1511.09  513.84 1510.89  513.85 1511.14
  515.33 1511.34  517.53 1511.93   518.8 1512.81  519.08 1512.95  521.12 1513.13
   524.2  1513.5  535.01 1514.23  545.04 1515.42  546.04 1515.51  555.15 1515.68
  559.29 1515.92   562.8 1515.91  566.46 1516.05  572.83 1516.15  575.88 1516.09
  580.32 1516.12  588.24 1516.31   598.4 1516.29  605.47 1516.55  611.61 1516.63
  617.42 1516.92

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
  - 91.79    .055  - 42.52     .04   27.75    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
     -    42.52   27.75           136.18   128.4  117.93             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  198.27  617.42  1505.5       F

CROSS SECTION


RIVER: Bushkill Creek
REACH: Reach              RS: 921

INPUT
Description: 821  922.4118
Station Elevation Data    num=     101
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
  - 62.16 1515.59  - 52.11 1515.29  - 44.26 1512.09  - 41.41 1510.31  - 39.3 1508.94
  - 37.95 1507.84  - 34.77 1504.97  - 28.93 1500.54  - 26.34  1495.9  - 25.17 1494.64
  - 24.27 1493.67  - 19.03 1493.03  - 17.91 1492.43   -  17 1491.99  - 13.1 1489.96
  - 11.12 1489.64  - 10.58 1489.59  - 2.75 1489.77    5.28 1490.96    5.34 1490.94
     7.49 1490.97   11.98  1491.1   12.05 1491.08   14.86 1491.55   18.42 1492.23
   21.67 1494.28   24.25 1494.46   27.21 1495.72   50.28 1496.25   50.35 1496.25
   72.63 1496.88   90.08 1501.35  110.28 1501.35   125.8 1501.08  131.87 1500.59
  137.78 1500.64  151.84 1499.96  161.68 1500.89  173.31 1500.97  178.36 1500.96
  179.69 1501.03  182.52  1501.1   186.3 1501.26  190.73 1501.17  192.95  1501.2
  198.91  1501.2  208.26 1501.32  214.39 1501.34  223.63 1501.59  234.88 1502.09
  251.26 1502.48  256.38 1502.73  282.34  1502.8  292.65 1503.52  293.71 1503.55
   304.1 1504.28  305.84 1504.26  313.17  1504.4  320.75 1504.69  330.44 1505.38
   340.5 1505.84  353.34 1506.18  370.22 1506.52  386.15 1506.55  387.73 1506.53
  405.72 1506.54  405.79 1506.69  406.28 1508.02  413.25 1509.14  426.41 1510.61
  432.31 1511.19  459.22 1513.07     460 1513.15  461.75 1513.09  466.75 1513.13
  477.97 1512.76  483.11 1512.35  487.31 1512.06  496.86 1511.99  509.26 1511.76
  511.42 1512.47  512.78  1512.7  514.38 1513.41  515.27 1513.72  517.31 1514.21
  518.41 1514.51  523.18 1514.99  530.51 1515.65  535.93 1516.34  539.27 1516.68
  540.33 1516.85  545.11 1517.18  551.95 1517.84  555.44 1518.12  565.94 1518.07
  571.72 1517.76  577.64 1517.76  583.87 1517.66  589.48  1517.7  607.32 1518.06
  612.79 1518.23

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
  - 62.16    .055  - 26.34     .04   27.21    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
     -    26.34   27.21           116.71  101.73   83.82             .1       .3
```

```
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  182.38  612.79    1505       F

CROSS SECTION


RIVER: Bushkill Creek
REACH: Reach              RS: 819

INPUT
Description: 719  820.6844
Station Elevation Data    num=     101
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
  - 98.97 1512.41  - 93.86 1510.09  - 90.8 1508.41  - 88.57 1508.27  - 87.75 1508.27
  - 77.91 1508.55  -  72.1 1508.35  - 66.84 1508.32  - 58.67 1508.08  - 46.15 1507.35
  - 38.58 1505.23  - 36.98 1504.68  - 36.45  1504.4  - 28.56 1500.68  - 26.37  1499.6
  - 25.05 1496.42  - 23.33  1492.3  - 20.22 1491.43  - 19.28  1491.3  - 16.06 1490.96
   - 7.96 1489.97  - 6.05 1490.05  - 3.75 1490.34    2.02 1489.24    6.07 1489.53
     10.7 1490.31   13.13 1490.67    16.1 1491.15   19.12 1491.32   22.76 1491.56
     22.9 1491.55   29.16 1494.05    49.3 1494.73   50.12 1494.77   51.75 1494.84
    55.03 1495.32    64.2 1497.96   86.09 1498.38   91.84 1498.62  101.91 1498.73
   105.29 1498.69  108.07 1498.79  110.38 1498.81  127.71 1499.14  130.57 1499.16
   140.83 1499.31  143.25 1499.43   157.9 1499.79  170.63 1499.92  182.91 1500.17
   195.62 1500.27  207.91 1500.34  211.22 1500.78  224.66 1501.36  234.13 1501.61
   246.72 1502.03  255.08 1502.23   273.9 1503.33  277.69 1503.58  281.54 1503.88
   283.77 1503.96  286.82 1503.99  293.77 1504.26  301.86 1504.38  307.93 1504.51
   318.08 1504.91  332.93 1505.53  340.92 1505.77  356.95  1506.6  374.06 1507.31
    378.6 1507.69   395.4 1509.02  396.52 1509.12  397.63 1509.18  399.49 1509.38
      412 1510.49  419.71  1511.8  428.82 1512.25  429.14 1512.29     431 1512.32
   455.75 1513.27  457.31 1513.27  460.82 1513.05  460.83  1512.8  469.06 1513.16
   474.44 1513.36   486.7 1512.71  489.34 1513.01  490.61 1513.08  501.09  1514.2
    502.7 1514.19   504.1  1514.2  510.26 1514.44  515.56 1514.51  529.98 1515.29
   537.03 1515.72  550.35 1516.43  556.35  1516.7  569.37 1517.66  572.25 1517.84
   590.61 1518.49

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
  - 98.97    .055  - 25.05     .04   29.16    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
     -    25.05   29.16            99.58    99.5   99.71             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
   144.4  590.61  1505.5       F

CROSS SECTION


RIVER: Bushkill Creek
REACH: Reach              RS: 720

INPUT
Description: 620  721.1794
Station Elevation Data    num=      97
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 -148.81 1514.95 -147.18  1513.9 -146.66 1513.63 -139.55 1509.29 -136.79  1507.7
 -132.05 1505.07 -122.19 1502.12 -117.54 1501.96 -114.79 1501.77  - 113.5 1501.75
 -111.19 1501.84 -100.45 1501.86  - 89.75 1502.29  - 87.68 1502.59  - 86.51  1502.7
  - 71.84 1502.58  - 67.7 1502.81  - 40.25 1501.63  - 35.34 1501.22  - 35.2 1501.08
  - 27.31  1498.1  - 27.17 1498.08   -  25 1496.67  - 24.51 1496.35  - 22.33 1490.24
  - 15.33 1490.02  - 11.26 1489.96  - 1.25 1490.24    8.39 1489.26   16.26 1487.48
    21.03 1489.44   23.62 1490.76   33.98    1491   39.74    1492   46.73    1493
    52.35    1494      57    1495   59.35    1496    61.6    1497   63.86    1498
    75.15  1498.5   83.59 1498.74   104.9 1498.97  127.28 1500.42  151.41 1500.64
   177.39  1500.6  202.45 1501.42  213.28    1502  234.56 1502.82  242.27 1503.25
   253.28 1503.66   277.4 1504.66  279.01 1504.67  287.77 1505.06  290.08 1505.12
   302.27 1505.85  307.45 1505.85  320.32 1506.59  324.64 1506.71  327.77 1507.05
    338.5 1507.15  352.84 1508.28  377.83 1509.07  385.47  1509.9  388.07 1510.07
   398.66 1511.11  404.93 1511.57  409.66 1512.29  420.97    1513  423.62 1513.06
   426.32 1513.21  428.52 1513.17  432.62 1513.29  438.09 1513.24  446.18 1513.48
```

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  458.05 1512.97  461.55 1513.04  465.85 1513.48  476.89 1514.23  479.08 1514.28
  482.73 1514.21   489.9 1514.33  495.92 1513.73   499.2 1513.31  500.88 1512.76
  507.54 1510.35   516.4 1510.18  524.89 1510.53  531.97 1511.54  533.92 1511.74
  537.93 1513.61  538.38  1513.6  539.55 1513.88  540.88 1515.09  545.91 1515.73
  552.85  1515.9  561.53 1516.26

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 -148.81    .055  - 24.51     .04   63.86    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
     -    24.51   63.86            60.14   73.95   89.95             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 -148.81 -114.58    1505       F
    98.4  561.53    1505       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
  - 75.94  - 40.31    1510

CROSS SECTION


RIVER: Bushkill Creek
REACH: Reach              RS: 646

INPUT
Description: 546  647.2308
Station Elevation Data    num=     100
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
-174.549 1509.71-171.426 1507.36-167.442 1504.19-161.744 1502.08-159.891 1501.23
-156.333 1501.42-156.166 1501.38-151.182 1501.21-144.084 1500.56-139.637 1499.44
-138.757 1499.23-137.302 1499.25-132.966 1499.19-131.576  1499.1-129.862 1499.15
-123.979 1499.21-118.864 1499.16-109.942 1499.26-106.486 1499.24 -84.907 1499.54
 -80.228 1499.54 -59.511 1499.99 -52.099 1499.85 -48.735 1499.32 -37.738    1499
 -35.023  1497.5  - 33.16  1492.5 -21.356    1487 -15.955  1487.2  - 4.911  1489.2
  - 4.855 1489.19   9.812 1489.98  21.709 1491.74  34.754    1492  38.127    1493
  40.276    1494  53.285    1501  71.741 1502.14  82.804 1502.28  85.889  1502.4
  96.748  1502.5 108.478 1502.73  127.12 1503.13 141.073 1503.36 147.503 1503.38
 152.581 1503.51 156.352 1503.28 171.093 1503.56 172.705 1503.62 177.523 1503.68
 195.683 1503.76 196.007 1503.82 198.259 1504.35 200.038 1506.02 201.418 1507.24
 202.233 1507.88 205.272 1508.19  208.45 1505.34 212.546 1504.73  214.01 1504.67
 217.095 1502.48  217.66 1501.97 218.012 1501.91 224.887 1500.38  232.04 1501.26
  233.05 1502.07 236.413 1505.34 240.638 1505.85 253.609 1506.82  260.29 1506.84
   268.1 1506.95 269.629 1506.92 289.003 1507.23 293.793 1507.37 311.147 1507.75
 318.763 1508.03 328.491 1508.27 329.372 1508.21 339.749 1509.68 342.325 1510.09
  342.76 1510.13 353.563 1511.58 359.688 1511.99 365.451 1511.98 366.683 1511.95
 378.079 1512.44 385.769 1512.05 387.836 1512.03  391.19 1512.06 400.455 1512.76
 402.966  1512.8 421.237 1512.97  426.75 1513.08 430.363 1513.04 436.312 1513.25
 451.433 1514.22  456.51 1514.07 461.652  1514.2 477.505 1514.83 481.665 1515.09

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
-174.549    .055 -37.738     .04  53.285    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
     -   37.738  53.285            60.76   59.62   58.94             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
-174.549-134.022  1502.5       F
  52.145 481.665  1502.5       F
Right Levee     Station=  205.27      Elevation= 1508.19
Skew Angle = 22.1

BRIDGE


RIVER: Bushkill Creek
REACH: Reach              RS: 616.5

INPUT
```

```
Description:
Distance from Upstream XS =   22.83
Deck/Roadway Width        =      14
Weir Coefficient          =     2.6
Bridge Deck/Roadway Skew  =    22.1
Upstream  Deck/Roadway Coordinates
    num=      33
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
-214.806    1510       0-196.276 1509.84       0-190.837 1506.16       0
-189.531 1505.02       0-181.693 1501.43       0-173.354 1500.58       0
-155.722 1500.97       0-151.673 1500.71       0-144.372  1498.9       0
-134.912 1498.43       0-105.949 1498.55       0  - 86.89 1499.07       0
 -32.512    1504       0 -31.993    1504    1501  45.761    1504    1501
  46.243    1504       0  81.674 1501.57       0 100.871 1502.27       0
 119.837 1502.42       0 137.552 1503.01       0 177.319 1504.75       0
 222.292 1505.42       0 264.431 1506.23       0 308.006 1507.75       0
 336.339  1509.3       0 368.656 1511.54       0 380.525 1511.06       0
 387.521 1512.17       0 400.316 1512.79       0 413.677 1513.04       0
 424.211 1513.44       0 455.759 1513.89       0 473.215 1515.11       0

Upstream Bridge Cross Section Data
Station Elevation Data    num=     100
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
-174.549 1509.71-171.426 1507.36-167.442 1504.19-161.744 1502.08-159.891 1501.23
-156.333 1501.42-156.166 1501.38-151.182 1501.21-144.084 1500.56-139.637 1499.44
-138.757 1499.23-137.302 1499.25-132.966 1499.19-131.576  1499.1-129.862 1499.15
-123.979 1499.21-118.864 1499.16-109.942 1499.26-106.486 1499.24 -84.907 1499.54
 -80.228 1499.54 -59.511 1499.99 -52.099 1499.85 -48.735 1499.32 -37.738    1499
 -35.023  1497.5  - 33.16  1492.5 -21.356    1487 -15.955  1487.2  - 4.911  1489.2
  - 4.855 1489.19   9.812 1489.98  21.709 1491.74  34.754    1492  38.127    1493
  40.276    1494  53.285    1501  71.741 1502.14  82.804 1502.28  85.889  1502.4
  96.748  1502.5 108.478 1502.73  127.12 1503.13 141.073 1503.36 147.503 1503.38
 152.581 1503.51 156.352 1503.28 171.093 1503.56 172.705 1503.62 177.523 1503.68
 195.683 1503.76 196.007 1503.82 198.259 1504.35 200.038 1506.02 201.418 1507.24
 202.233 1507.88 205.272 1508.19  208.45 1505.34 212.546 1504.73  214.01 1504.67
 217.095 1502.48  217.66 1501.97 218.012 1501.91 224.887 1500.38  232.04 1501.26
  233.05 1502.07 236.413 1505.34 240.638 1505.85 253.609 1506.82  260.29 1506.84
   268.1 1506.95 269.629 1506.92 289.003 1507.23 293.793 1507.37 311.147 1507.75
 318.763 1508.03 328.491 1508.27 329.372 1508.21 339.749 1509.68 342.325 1510.09
  342.76 1510.13 353.563 1511.58 359.688 1511.99 365.451 1511.98 366.683 1511.95
 378.079 1512.44 385.769 1512.05 387.836 1512.03  391.19 1512.06 400.455 1512.76
 402.966  1512.8 421.237 1512.97  426.75 1513.08 430.363 1513.04 436.312 1513.25
 451.433 1514.22  456.51 1514.07 461.652  1514.2 477.505 1514.83 481.665 1515.09

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
-174.549    .055 -37.738     .04  53.285    .055

Bank Sta: Left   Right    Coeff Contr.   Expan.
    -   37.738  53.285             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
-174.549-134.022  1502.5       F
  52.145 481.665  1502.5       F
Right Levee     Station=  205.27      Elevation= 1508.19
Skew Angle = 22.1

Downstream  Deck/Roadway Coordinates
    num=      33
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
-221.579    1510       0-203.049 1509.84       0 -197.61 1506.16       0
-196.304 1505.02       0-188.466 1501.43       0-180.126 1500.58       0
-162.495 1500.97       0-158.446 1500.71       0-151.145  1498.9       0
-141.685 1498.43       0-112.721 1498.55       0 -93.663 1499.07       0
 -39.285    1504       0 -38.766    1504    1501  38.988    1504    1501
   39.47    1504       0  74.901 1501.57       0  94.098 1502.27       0
 113.064 1502.42       0  130.78 1503.01       0 170.546 1504.75       0
 215.519 1505.42       0 257.658 1506.23       0 301.233 1507.75       0
 329.566  1509.3       0 361.884 1511.54       0 373.752 1511.06       0
 380.748 1512.17       0 393.543 1512.79       0 406.904 1513.04       0
 417.438 1513.44       0 448.987 1513.89       0 466.442 1515.11       0
```

```
Downstream Bridge Cross Section Data
Station Elevation Data    num=      97
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
-219.402 1510.69-214.612 1505.26-207.876 1502.47-188.363 1501.58-174.697 1500.67
-165.469 1500.25-159.335 1499.62-156.676 1498.35-155.666 1498.15-152.692 1497.83
-121.477 1498.07-115.742 1498.17-112.684 1498.32-108.135 1498.24 -83.693 1498.67
 -59.409 1498.26 -46.299  1498.7 -41.749 1498.26 -40.925    1498 -39.248 1497.81
 -37.988 1494.12 -26.897    1490 -25.535    1490 -24.775 1489.64 -22.839 1488.71
 -15.195 1488.74  - 3.456 1489.15   3.484 1489.84  15.908 1489.76  19.133 1489.07
  20.977 1489.62  21.023 1489.81  27.712    1491   45.02    1500  49.523 1500.12
  49.541 1500.11  53.766 1498.67  57.334  1498.7  74.104 1499.29  74.465 1499.45
  79.005 1499.34  94.571 1499.63 100.148 1499.97 101.353 1500.33 104.994 1500.93
 110.155 1501.46  111.48 1501.51 121.394  1502.6 125.535 1502.69 130.307  1502.3
 133.837 1502.14  136.45  1501.7 141.555 1498.72 147.327 1497.23  152.72 1496.99
 156.972 1497.48 162.189 1497.93 163.653 1498.43 172.881 1500.44  178.32 1503.69
 178.894 1503.67 181.998 1504.09 185.157 1504.19 192.477 1503.53 197.128  1503.3
 209.849  1503.6  216.52  1504.2 225.184  1504.3 241.379  1505.3 254.351 1505.93
 257.779 1505.65 263.486 1506.44 264.552 1506.51 268.721 1506.49  272.02  1506.7
 279.932 1507.51 289.355 1507.97 294.266  1508.4 306.431 1508.88 309.229 1509.09
 309.729 1509.25 319.245  1509.7 321.691 1509.73 333.365 1510.36 336.793 1510.36
 338.081 1510.44   338.1 1510.19 353.776 1511.03 364.904 1510.48 374.568 1512.02
 388.966 1512.63 403.605 1513.03 407.691 1513.01 419.569 1513.72 426.565 1513.79
 448.866 1514.43 458.029 1514.98

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
-219.402    .055 -46.299     .04   45.02    .055

Bank Sta: Left   Right    Coeff Contr.   Expan.
    -   46.299   45.02             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
-219.402-154.276    1502       F
   42.24 458.029    1502       F
Right Levee     Station=  125.54      Elevation= 1502.69
Skew Angle = 22.1

Upstream Embankment side slope              =       2 horiz. to 1.0 vertical
Downstream Embankment side slope            =       2 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Energy Only

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION


RIVER: Bushkill Creek
REACH: Reach              RS: 586

INPUT
Description: 486  587.6091
Station Elevation Data    num=      97
```

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     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
-219.402 1510.69-214.612 1505.26-207.876 1502.47-188.363 1501.58-174.697 1500.67
-165.469 1500.25-159.335 1499.62-156.676 1498.35-155.666 1498.15-152.692 1497.83
-121.477 1498.07-115.742 1498.17-112.684 1498.32-108.135 1498.24 -83.693 1498.67
 -59.409 1498.26 -46.299  1498.7 -41.749 1498.26 -40.925    1498 -39.248 1497.81
 -37.988 1494.12 -26.897    1490 -25.535    1490 -24.775 1489.64 -22.839 1488.71
 -15.195 1488.74  - 3.456 1489.15   3.484 1489.84  15.908 1489.76  19.133 1489.07
  20.977 1489.62  21.023 1489.81  27.712    1491   45.02    1500  49.523 1500.12
  49.541 1500.11  53.766 1498.67  57.334  1498.7  74.104 1499.29  74.465 1499.45
  79.005 1499.34  94.571 1499.63 100.148 1499.97 101.353 1500.33 104.994 1500.93
 110.155 1501.46  111.48 1501.51 121.394  1502.6 125.535 1502.69 130.307  1502.3
 133.837 1502.14  136.45  1501.7 141.555 1498.72 147.327 1497.23  152.72 1496.99
 156.972 1497.48 162.189 1497.93 163.653 1498.43 172.881 1500.44  178.32 1503.69
 178.894 1503.67 181.998 1504.09 185.157 1504.19 192.477 1503.53 197.128  1503.3
 209.849  1503.6  216.52  1504.2 225.184  1504.3 241.379  1505.3 254.351 1505.93
 257.779 1505.65 263.486 1506.44 264.552 1506.51 268.721 1506.49  272.02  1506.7
 279.932 1507.51 289.355 1507.97 294.266  1508.4 306.431 1508.88 309.229 1509.09
 309.729 1509.25 319.245  1509.7 321.691 1509.73 333.365 1510.36 336.793 1510.36
 338.081 1510.44   338.1 1510.19 353.776 1511.03 364.904 1510.48 374.568 1512.02
 388.966 1512.63 403.605 1513.03 407.691 1513.01 419.569 1513.72 426.565 1513.79
 448.866 1514.43 458.029 1514.98

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
-219.402    .055 -46.299     .04   45.02    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
    -   46.299   45.02            91.48   76.57   61.66              .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
-219.402-154.276    1502       F
   42.24 458.029    1502       F
Right Levee     Station=  125.54      Elevation= 1502.69
Skew Angle = 22.1

CROSS SECTION


RIVER: Bushkill Creek
REACH: Reach              RS: 510

INPUT
Description: 410  511.0375
Station Elevation Data    num=     101
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 -308.11 1509.15 -299.74 1501.79 -291.37 1498.43 -290.28 1498.25 -284.89 1497.09
 -281.56 1496.56 -276.26 1496.74 -259.24 1496.86 -234.24 1497.47 -230.92 1497.46
 -209.24 1496.81 -204.98 1497.05 -197.66 1496.71 -194.93 1496.61 -184.55 1496.93
 -182.78 1496.99 -176.75 1496.86 -168.41 1496.79 -146.62 1497.34 -124.33 1497.54
 -104.25 1497.99  - 95.2 1497.66  - 88.45 1497.63  - 54.33 1497.04  - 40.98 1496.92
  - 35.58 1489.56  - 32.84 1489.15  - 27.34 1490.15  - 25.07 1490.08  - 23.9 1490.04
  - 20.34 1490.03  - 7.09 1489.39    8.23 1489.08    9.04 1489.11    9.45  1489.2
    15.53 1489.17   17.71 1489.28   20.77 1490.97   27.06 1494.23   32.45 1495.21
    33.06 1495.37   38.98 1497.63   41.36 1498.01   45.11 1498.36   50.15 1498.66
    50.17 1498.66   53.13 1498.75   57.69 1498.78   64.86  1498.3   67.16 1498.62
    70.81 1499.35   73.09 1499.74   74.87 1498.82   81.02 1495.26   84.44 1494.92
    85.79 1494.87   91.23 1495.09   93.82 1497.57   98.06 1499.64   99.83 1499.71
    105.4 1499.65  106.44 1499.55   113.3 1499.22  121.33 1498.01  127.33 1498.17
   136.07 1498.19  141.98 1498.51  144.49 1498.78   148.9 1499.09  154.68 1499.05
   159.06 1499.43  165.25  1499.8   174.1 1500.47  179.42 1500.74  201.29 1500.63
   233.07 1500.58  245.68 1500.48  251.33 1500.59  252.45 1500.66  254.66 1500.68
   258.99  1501.3  261.07  1501.4  262.03 1501.53  263.16 1505.67   278.9 1505.52
   287.61 1505.51  295.83 1505.77  300.12 1506.63   304.2 1507.84  311.93 1508.81
   323.72 1508.96  332.58 1509.19  339.24 1509.48  342.12  1510.2  343.14  1510.2
   348.35 1509.67  351.24 1509.46  355.51 1509.34  366.02 1509.95  377.99 1509.52
   378.21 1509.57

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 -308.11    .055  - 40.98     .04   38.98    .055
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Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
    -    40.98   38.98           104.51   102.9  101.29              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 -308.11 -199.39  1500.5       F
Right Levee     Station=   73.09      Elevation= 1499.74
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 -142.47  - 94.82    1505    46.2    70.8    1505

CROSS SECTION


RIVER: Bushkill Creek
REACH: Reach              RS: 407

INPUT
Description: 307  408.1406
Station Elevation Data    num=     101
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
  - 388.3  1502.2  - 386.3 1500.94 -376.56 1497.33  - 373.2 1496.23 -371.02  1495.8
 -363.58 1495.88  - 352.9 1495.67  - 348.6 1495.66 -328.16 1496.13 -324.76 1496.11
 -303.03 1496.41 -300.02 1496.49  - 296.9 1496.53 -294.74 1496.52 -274.78 1496.51
 -271.27 1496.54 -269.14 1496.54  - 262.3 1496.62 -254.74 1496.48 -240.59 1496.31
 -238.94 1496.29  - 233.6 1496.29   -  229 1496.24 -222.65 1496.14 -218.05 1496.19
  - 205.3 1495.68 -203.06 1495.97 -202.21 1495.96 -200.55 1496.03 -197.93 1496.02
 -192.87 1496.12 -187.48 1496.21  - 169.8 1496.41 -132.14 1496.63 -114.52 1496.79
 -105.86 1496.75  - 88.84 1496.58  - 74.57    1496  - 61.86 1495.12  - 54.41 1495.03
  - 40.82  1495.5  - 39.71 1494.39  - 36.52 1490.61  - 36.24  1490.6  - 31.74 1489.83
  - 29.77 1489.56  - 25.28  1489.4  - 22.77 1489.31  - 19.94 1489.23  - 13.14 1488.12
   - 5.25 1487.49    4.74 1486.82      10 1486.61   15.66 1488.09   20.12 1489.45
    20.18 1489.47   23.01 1489.84   26.41 1490.32   27.57 1490.56    30.5 1491.61
    35.84 1494.84   38.57 1496.43   50.63 1496.93   50.65 1496.93   69.47 1497.13
    73.44 1497.11   73.72 1497.14   98.38 1497.52   101.2 1497.55  114.26 1497.79
   120.28 1497.89  122.09 1497.94  127.04 1497.95  150.11 1498.08  154.03 1498.16
   174.87 1498.46  181.01 1498.53  206.49 1498.34  214.42 1498.15  216.71 1498.12
   231.68  1499.7  238.96 1500.05   244.3 1500.23  268.12 1501.26  270.26 1501.94
   276.67 1504.01  280.98 1505.52  281.71 1505.94  283.63 1506.25  288.73 1507.64
   309.61 1507.88  312.99 1507.95  316.55 1508.14   318.4 1508.15  326.38 1508.49
   328.32  1508.4  330.62 1508.26  335.43 1508.14  344.54 1508.69  347.87 1508.63
   356.66 1508.43

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
  - 388.3    .055  - 40.82     .04   38.57    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
    -    40.82   38.57           107.14  102.92    98.7              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  - 388.3 -229.21  1498.5       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 -157.24  - 60.02    1505

CROSS SECTION


RIVER: Bushkill Creek
REACH: Reach              RS: 304

INPUT
Description: 204  305.2249
Station Elevation Data    num=     101
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 -465.94 1499.77 -465.13 1499.22 -460.31 1498.06 -458.19 1497.99 -451.66 1498.07
 -448.64 1498.03 -445.27 1497.51 -441.64  1497.6 -434.61 1497.53 -427.81 1497.65
 -425.05 1497.64 -422.61  1497.7 -413.93 1497.81 -410.95 1497.95 -400.16 1498.23
 -387.04 1498.48 -374.17 1498.47 -368.72  1498.6 -351.97 1498.58 -345.56 1498.34
 -334.09 1498.41 -331.17 1498.27 -324.25 1498.03 -316.62 1497.34 -305.78 1496.99
 -303.03 1496.78 -294.73 1496.53 -291.01 1496.04 -289.31 1495.59 -281.35    1495
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 - 280.9  1494.8 -279.75  1494.8 -278.38 1494.88 -276.07 1494.74  - 274.5 1494.42
 -274.02 1494.36 -265.15 1494.64  - 262.5 1494.72  - 257.4 1494.65 -251.17 1494.67
 -246.43 1495.29 -220.41 1496.06 -218.01  1496.1 -211.65 1496.11 -192.45 1495.95
 -164.41 1495.92 -156.44 1495.88 -136.38 1495.66 -124.53 1495.45  - 64.66 1495.16
 - 52.88 1494.94  - 42.64 1494.85  - 42.33 1494.77  - 35.11 1494.42  - 27.75 1493.97
 - 25.04 1490.64  - 24.33 1489.77  - 17.12 1487.96  - 9.75 1486.21  - 6.07 1486.55
    1.33 1487.33     1.8 1487.32   19.18 1487.89    28.5 1489.12   33.74 1489.43
   40.57 1489.87    48.9 1492.82   50.09 1493.21   57.43 1495.62   80.02 1496.31
   87.93  1496.5   98.62 1496.67  115.97  1496.8  135.81 1497.09  144.01 1497.27
   154.4 1497.43  172.05 1497.41  175.53 1497.56  180.44 1496.85  186.23 1496.76
  200.08 1496.67  209.19 1497.04  209.71 1497.03  210.74 1497.14  231.12 1497.84
  248.68 1498.14  251.72 1498.31  267.39 1500.06  269.38 1500.24  279.89 1501.69
  283.61 1502.67  289.62 1504.09  296.56 1505.66  300.55 1506.38  305.65 1506.44
  306.44 1506.48  309.02 1506.46  310.43  1506.5  311.02 1506.22  323.22 1506.55
  334.97 1506.06

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 -465.94    .055  - 27.75     .04   57.43    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
    -    27.75   57.43            99.31   95.84   92.38             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 -465.94 -274.68    1498       F
     155  334.97    1498       F

CROSS SECTION


RIVER: Bushkill Creek
REACH: Reach              RS: 208

INPUT
Description: 108  209.3810
Station Elevation Data    num=     101
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
  - 553.3 1502.54 -547.68    1500 -544.73 1498.48 -540.62 1496.24 -535.44 1493.51
 -530.11 1492.75 -525.91 1492.16 -521.36 1492.06  -  517 1492.01 -512.62  1491.9
 -507.64  1491.9  - 487.6 1491.78 -465.81 1492.39 -462.58  1492.5 -459.61 1492.55
 -437.56 1493.25 -413.59 1493.64 -412.54 1493.66 -393.92 1493.88 -385.65 1493.75
 -380.04 1493.68 -379.51 1493.68 -362.49 1493.26 -341.34 1492.96 -336.36  1492.8
 -334.94 1492.72 -333.68 1492.63 -332.19 1492.52 -332.06 1492.67 -330.37 1492.56
 -319.57 1492.59 -317.47 1492.66 -314.41 1492.57 -309.62  1492.4 -301.01 1492.25
 -293.99 1493.03 -293.92 1493.06 -293.58 1493.06 -270.92 1492.85 -235.71 1492.49
 -234.01 1492.51  - 180.9 1492.76 -104.24 1493.21  - 72.42 1493.75  - 32.25 1493.19
  - 32.05 1493.18  - 28.64 1492.81  - 24.98 1490.74  - 17.85 1486.69  - 8.96  1485.9
  - 6.44 1486.07  - 2.56 1486.43    8.18 1486.94     8.4 1486.96    8.45 1486.97
   18.31 1486.79   24.12 1486.72    29.2  1487.8   36.49 1490.87   45.03 1494.41
   50.02    1494   50.05    1494   53.62  1493.7   56.11 1493.69   67.81 1493.61
   73.88  1493.7   75.09 1493.74   75.61 1493.71      79 1493.66   83.36 1493.63
   94.94 1493.71  100.04 1493.92  122.21 1494.43  124.27  1494.5   153.2 1495.05
  170.91 1495.27  185.52 1495.25  187.51 1495.27  194.47 1495.25  199.19 1495.32
  211.47 1495.48  216.15 1495.64  219.13 1495.79  229.82 1496.03  236.21 1496.32
  236.79 1496.42   240.4 1496.97  241.78 1497.18  251.44 1499.12  254.69 1499.86
  262.82 1501.37  269.07 1503.24  270.06 1503.52  274.91 1504.84  277.66 1505.16
  278.11 1505.19  282.52 1504.96  283.93 1504.73  293.71 1505.04  300.47 1505.13
  305.19 1505.05

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
  - 553.3    .055  - 32.05     .04   45.03    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
    -    32.05   45.03           112.18     108  103.83             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  - 553.3 -331.31    1495       F
      45  305.19    1495       F

CROSS SECTION
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RIVER: Bushkill Creek
REACH: Reach              RS: 100

INPUT
Description: 0  101.3798
Station Elevation Data    num=     101
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 -640.29 1495.74 -639.84 1495.52 -634.51  1492.8  - 632.8 1492.18 -629.65 1492.17
 -604.46 1491.93 -598.21 1491.74 -589.11 1491.75 -582.84 1491.91 -577.17 1491.98
 -554.15 1492.53 -552.32 1492.56  - 544.6 1492.55 -530.75 1492.55 -528.16 1492.52
 -524.37 1492.53 -502.73 1492.45  - 487.9 1492.29 -477.29 1492.12  - 462.1 1492.08
  - 456.7 1492.02 -454.77 1491.96 -440.04  1491.6 -429.62 1491.27 -428.03 1491.24
 -418.52 1490.96 -417.97 1490.94 -414.06 1490.93 -410.97 1490.69 -400.24 1490.86
 -389.45 1490.59 -386.88 1490.52 -385.97 1490.61 -326.67 1490.67 -306.73 1490.59
 -218.67 1491.05  - 132.5 1491.27  - 87.71 1490.89  - 86.88 1490.91  - 86.55 1490.86
  - 54.59 1491.84  -  53.7 1490.26  - 53.34 1489.72  -  50.7  1489.6  - 50.63 1489.59
  - 44.26  1489.3  - 36.42 1488.95  -  36.3 1488.94  - 25.36 1487.44  -  21.6 1486.92
  - 18.03 1485.82  -  8.65 1483.79  -  5.71 1483.98     .61 1484.43     .75 1484.43
     3.43 1484.75   10.94 1485.68   11.04 1485.73   17.25 1486.41   21.59 1486.94
    21.69 1486.97   21.87 1487.07    35.7 1495.82   36.22 1496.23   36.46 1496.24
    43.85 1496.94   50.67 1496.99   50.69 1496.99   75.89 1496.88   84.97 1496.56
    86.25  1496.4   89.52 1496.07   90.52    1496   94.67 1495.77    95.6 1495.72
   100.39 1495.52  101.68 1495.45  104.64 1495.28  104.74 1495.28  105.21  1495.3
   108.23 1495.28  118.85 1495.29  137.45 1495.19   155.2    1495  162.44 1494.74
   164.86 1494.78  170.89 1494.88  174.12 1494.98  186.41 1496.71  199.29 1497.99
   204.23 1498.52  205.37 1498.87  210.26 1500.21   217.9 1502.61  224.66  1503.5
   230.05 1504.36  230.48 1504.39  231.16  1504.4  244.57 1503.88  252.75 1504.07
    255.2 1504.09

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 -640.29    .055  - 54.59     .04   43.85    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
     -    54.59   43.85                0       0       0              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 -640.29 -414.33  1492.5       F



SUMMARY OF MANNING'S N VALUES

River:Bushkill Creek

      Reach          River Sta.       n1        n2        n3

 Reach                1195              .055       .04      .055
 Reach                1049              .055       .04      .055
 Reach                921               .055       .04      .055
 Reach                819               .055       .04      .055
 Reach                720               .055       .04      .055
 Reach                646               .055       .04      .055
 Reach                616.5        Bridge
 Reach                586               .055       .04      .055
 Reach                510               .055       .04      .055
 Reach                407               .055       .04      .055
 Reach                304               .055       .04      .055
 Reach                208               .055       .04      .055
 Reach                100               .055       .04      .055



SUMMARY OF REACH LENGTHS

River: Bushkill Creek

      Reach          River Sta.      Left     Channel    Right
```

Reach	1195	165.15	145.72	129
Reach	1049	136.18	128.4	117.93
Reach	921	116.71	101.73	83.82
Reach	819	99.58	99.5	99.71
Reach	720	60.14	73.95	89.95
Reach	646	60.76	59.62	58.94
Reach	616.5	Bridge		
Reach	586	91.48	76.57	61.66
Reach	510	104.51	102.9	101.29
Reach	407	107.14	102.92	98.7
Reach	304	99.31	95.84	92.38
Reach	208	112.18	108	103.83
Reach	100	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Bushkill Creek

Reach	River Sta.	Contr.	Expan.
Reach	1195	.1	.3
Reach	1049	.1	.3
Reach	921	.1	.3
Reach	819	.1	.3
Reach	720	.3	.5
Reach	646	.3	.5
Reach	616.5	Bridge	
Reach	586	.3	.5
Reach	510	.1	.3
Reach	407	.1	.3
Reach	304	.1	.3
Reach	208	.1	.3
Reach	100	.1	.3

HEC-RAS Plan: Alternative C River: Bushkill Creek Reach: Reach

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach	1195	10 Year	4601.00	1493.51	1501.300	1499.53	1501.76	0.004052	5.46	845.85	247.77	0.50
Reach	1195	25 Year	6283.00	1493.51	1502.674	1500.34	1503.11	0.002543	5.35	1225.84	427.54	0.42
Reach	1195	50 Year	7766.00	1493.51	1503.687	1500.88	1504.12	0.002008	5.37	1545.18	447.00	0.39
Reach	1195	100 Year	9365.00	1493.51	1504.888	1501.39	1505.30	0.001515	5.27	1924.41	472.78	0.35
Reach	1195	500 Year	13608.00	1493.51	1506.994	1502.57	1507.33	0.000999	5.07	3380.88	533.66	0.29
Reach	1049	10 Year	4601.00	1491.64	1500.292	1498.63	1501.17	0.003655	8.05	723.95	190.61	0.54
Reach	1049	25 Year	6283.00	1491.64	1501.910	1499.42	1502.70	0.002730	8.01	1122.20	280.95	0.48
Reach	1049	50 Year	7766.00	1491.64	1503.052	1500.09	1503.79	0.002282	7.96	1408.95	337.47	0.45
Reach	1049	100 Year	9365.00	1491.64	1504.371	1500.40	1505.04	0.001826	7.76	1741.54	357.87	0.41
Reach	1049	500 Year	13608.00	1491.64	1506.397	1502.86	1507.11	0.001753	8.51	2704.86	431.83	0.42
Reach	921	10 Year	4601.00	1489.59	1498.900	1498.12	1500.49	0.006305	10.64	516.23	108.53	0.70
Reach	921	25 Year	6283.00	1489.59	1500.428	1499.25	1502.13	0.005469	11.26	690.66	129.98	0.67
Reach	921	50 Year	7766.00	1489.59	1501.285	1500.09	1503.23	0.005693	12.23	824.85	211.23	0.70
Reach	921	100 Year	9365.00	1489.59	1501.928	1501.13	1504.45	0.006806	13.96	960.14	261.99	0.77
Reach	921	500 Year	13608.00	1489.59	1505.639	1503.57	1506.80	0.002682	10.77	2200.10	371.63	0.51
Reach	819	10 Year	4601.00	1489.24	1498.311	1497.01	1499.87	0.005972	10.44	519.05	108.34	0.68
Reach	819	25 Year	6283.00	1489.24	1500.005	1497.96	1501.58	0.004893	10.84	772.27	201.98	0.63
Reach	819	50 Year	7766.00	1489.24	1501.055	1500.10	1502.63	0.004462	11.13	953.55	246.94	0.62
Reach	819	100 Year	9365.00	1489.24	1502.064	1500.81	1503.66	0.004159	11.45	1130.02	279.63	0.60
Reach	819	500 Year	13608.00	1489.24	1505.052	1502.35	1506.50	0.002973	11.34	1665.00	359.53	0.53
Reach	720	10 Year	4601.00	1487.48	1498.437	1495.41	1499.24	0.002944	7.20	644.08	101.92	0.47
Reach	720	25 Year	6283.00	1487.48	1500.100	1496.53	1501.04	0.002654	7.85	851.05	154.94	0.46
Reach	720	50 Year	7766.00	1487.48	1501.018	1497.42	1502.14	0.002832	8.65	972.42	225.19	0.49
Reach	720	100 Year	9365.00	1487.48	1501.907	1498.31	1503.23	0.002993	9.43	1094.78	269.35	0.51
Reach	720	500 Year	13608.00	1487.48	1505.217	1500.65	1506.11	0.001704	8.51	2377.10	388.39	0.40
Reach	646	10 Year	4601.00	1487.00	1498.111	1495.09	1498.99	0.003218	7.52	611.50	84.04	0.49
Reach	646	25 Year	6283.00	1487.00	1499.698	1496.24	1500.78	0.003261	8.36	777.32	169.73	0.51
Reach	646	50 Year	7766.00	1487.00	1500.625	1497.17	1501.88	0.003426	9.09	945.65	197.38	0.53
Reach	646	100 Year	9365.00	1487.00	1501.668	1498.10	1502.99	0.003250	9.51	1139.86	224.94	0.52
Reach	646	500 Year	13608.00	1487.00	1505.002	1501.15	1505.96	0.001895	8.70	2202.40	367.42	0.42
Reach	616.5		Bridge									
Reach	586	10 Year	4601.00	1488.71	1497.639	1495.20	1498.71	0.004129	8.31	553.81	79.67	0.56
Reach	586	25 Year	6283.00	1488.71	1499.261	1496.36	1500.44	0.003970	8.82	798.39	223.44	0.56
Reach	586	50 Year	7766.00	1488.71	1499.992	1497.34	1501.36	0.004215	9.65	942.06	258.30	0.58
Reach	586	100 Year	9365.00	1488.71	1500.703	1499.23	1502.24	0.004396	10.39	1081.79	278.82	0.60
Reach	586	500 Year	13608.00	1488.71	1499.776	1500.96	1504.32	0.014384	17.52	899.50	251.88	1.07
Reach	510	10 Year	4601.00	1489.08	1496.048	1495.38	1497.98	0.010151	11.16	412.30	75.18	0.84
Reach	510	25 Year	6283.00	1489.08	1497.265	1496.63	1499.62	0.010173	12.35	529.87	223.21	0.86
Reach	510	50 Year	7766.00	1489.08	1498.351	1498.35	1500.64	0.008484	12.43	731.89	288.25	0.80
Reach	510	100 Year	9365.00	1489.08	1499.097	1499.10	1501.52	0.008215	13.04	879.67	291.58	0.80
Reach	510	500 Year	13608.00	1489.08	1500.433	1500.51	1503.04	0.008065	14.30	1349.08	397.73	0.82
Reach	407	10 Year	4866.00	1486.61	1495.450	1494.08	1497.03	0.006906	10.08	487.18	95.41	0.71
Reach	407	25 Year	6657.00	1486.61	1496.783	1495.40	1498.64	0.006623	11.07	662.38	324.74	0.72
Reach	407	50 Year	8231.00	1486.61	1496.787	1497.02	1499.63	0.010100	13.68	663.21	324.87	0.89
Reach	407	100 Year	9929.00	1486.61	1497.714	1498.22	1500.58	0.009085	14.03	858.26	390.48	0.86
Reach	407	500 Year	14446.00	1486.61	1499.470	1499.47	1501.26	0.005657	12.58	1909.21	514.61	0.70
Reach	304	10 Year	4866.00	1486.21	1494.255	1493.59	1496.15	0.009771	11.05	440.99	85.68	0.84
Reach	304	25 Year	6657.00	1486.21	1495.133	1495.13	1497.70	0.011351	12.89	540.32	154.68	0.92
Reach	304	50 Year	8231.00	1486.21	1496.833	1496.87	1498.52	0.006127	11.05	1035.39	444.53	0.70
Reach	304	100 Year	9929.00	1486.21	1496.467	1497.49	1499.52	0.011398	14.59	898.41	380.83	0.95
Reach	304	500 Year	14446.00	1486.21	1498.579	1498.58	1500.26	0.005783	12.30	2058.69	698.97	0.70
Reach	208	10 Year	4866.00	1485.90	1494.077	1494.08	1495.18	0.006062	9.15	786.49	638.51	0.67
Reach	208	25 Year	6657.00	1485.90	1493.797	1494.68	1496.46	0.014677	13.87	681.56	611.84	1.03
Reach	208	50 Year	8231.00	1485.90	1494.002	1495.01	1497.39	0.018572	15.91	758.40	634.02	1.16
Reach	208	100 Year	9929.00	1485.90	1494.327	1495.11	1498.02	0.020156	17.07	880.59	653.52	1.22
Reach	208	500 Year	14446.00	1485.90	1495.815	1495.82	1497.06	0.007448	11.99	2260.71	760.04	0.77
Reach	100	10 Year	4866.00	1483.79	1491.112	1492.14	1493.91	0.020670	13.62	425.72	347.51	1.17
Reach	100	25 Year	6657.00	1483.79	1491.699	1492.82	1494.57	0.020410	14.57	670.71	468.58	1.18
Reach	100	50 Year	8231.00	1483.79	1492.015	1493.13	1495.11	0.021815	15.64	810.57	523.83	1.23
Reach	100	100 Year	9929.00	1483.79	1492.334	1493.40	1495.56	0.022412	16.45	952.28	592.98	1.26
Reach	100	500 Year	14446.00	1483.79	1493.279	1494.03	1495.75	0.017187	15.87	1638.24	667.13	1.13

Plan: Alternative C Bushkill Creek Reach RS: 1195 Profile: 100 Year

E.G. Elev (ft)	1505.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.41	Wt. n-Val.	0.055	0.040	0.055
W.S. Elev (ft)	1504.89	Reach Len. (ft)	165.15	145.72	129.00
Crit W.S. (ft)	1501.39	Flow Area (sq ft)	2.79	1674.94	246.68
E.G. Slope (ft/ft)	0.001515	Area (sq ft)	2.79	1674.94	637.93
Q Total (cfs)	9365.00	Flow (cfs)	2.48	8823.60	538.92
Top Width (ft)	472.78	Top Width (ft)	1.79	231.99	239.01
Vel Total (ft/s)	4.87	Avg. Vel. (ft/s)	0.89	5.27	2.18
Max Chl Dpth (ft)	11.38	Hydr. Depth (ft)	1.56	7.22	3.00
Conv. Total (cfs)	240603.8	Conv. (cfs)	63.6	226694.3	13845.9
Length Wtd. (ft)	142.55	Wetted Per. (ft)	3.60	240.85	82.38
Min Ch El (ft)	1493.51	Shear (lb/sq ft)	0.07	0.66	0.28
Alpha	1.12	Stream Power (lb/ft s)	552.71	0.00	0.00
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)	5.98	18.57	7.41
C & E Loss (ft)	0.03	Cum SA (acres)	4.04	2.15	2.87

Plan: Alternative C Bushkill Creek Reach RS: 1049 Profile: 100 Year

E.G. Elev (ft)	1505.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.67	Wt. n-Val.	0.055	0.040	0.055
W.S. Elev (ft)	1504.37	Reach Len. (ft)	136.18	128.40	117.93
Crit W.S. (ft)	1500.40	Flow Area (sq ft)	59.81	770.52	911.21
E.G. Slope (ft/ft)	0.001826	Area (sq ft)	59.81	770.52	1118.43
Q Total (cfs)	9365.00	Flow (cfs)	173.54	5978.75	3212.71
Top Width (ft)	357.87	Top Width (ft)	11.73	70.27	275.87
Vel Total (ft/s)	5.38	Avg. Vel. (ft/s)	2.90	7.76	3.53
Max Chl Dpth (ft)	12.73	Hydr. Depth (ft)	5.10	10.97	5.34
Conv. Total (cfs)	219151.1	Conv. (cfs)	4061.0	139909.3	75180.8
Length Wtd. (ft)	125.75	Wetted Per. (ft)	15.01	71.30	170.74
Min Ch El (ft)	1491.64	Shear (lb/sq ft)	0.45	1.23	0.61
Alpha	1.48	Stream Power (lb/ft s)	617.42	0.00	0.00
Frctn Loss (ft)	0.40	Cum Volume (acre-ft)	5.87	14.48	4.81
C & E Loss (ft)	0.19	Cum SA (acres)	4.01	1.65	2.10

Plan: Alternative C Bushkill Creek Reach RS: 921 Profile: 100 Year

E.G. Elev (ft)	1504.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.52	Wt. n-Val.	0.055	0.040	0.055
W.S. Elev (ft)	1501.93	Reach Len. (ft)	116.71	101.73	83.82
Crit W.S. (ft)	1501.13	Flow Area (sq ft)	10.87	548.39	400.87
E.G. Slope (ft/ft)	0.006806	Area (sq ft)	10.87	548.39	428.42
Q Total (cfs)	9365.00	Flow (cfs)	30.74	7656.82	1677.45
Top Width (ft)	261.99	Top Width (ft)	4.42	53.55	204.02
Vel Total (ft/s)	9.75	Avg. Vel. (ft/s)	2.83	13.96	4.18
Max Chl Dpth (ft)	12.34	Hydr. Depth (ft)	2.46	10.24	2.58
Conv. Total (cfs)	113516.1	Conv. (cfs)	372.6	92810.7	20332.9
Length Wtd. (ft)	97.86	Wetted Per. (ft)	7.61	56.39	155.83
Min Ch El (ft)	1489.59	Shear (lb/sq ft)	0.61	4.13	1.09
Alpha	1.71	Stream Power (lb/ft s)	612.79	0.00	0.00
Frctn Loss (ft)	0.51	Cum Volume (acre-ft)	5.76	12.54	2.71
C & E Loss (ft)	0.28	Cum SA (acres)	3.99	1.47	1.45

Plan: Alternative C Bushkill Creek Reach RS: 819 Profile: 100 Year

E.G. Elev (ft)	1503.66	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.59	Wt. n-Val.	0.055	0.040	0.055
W.S. Elev (ft)	1502.06	Reach Len. (ft)	99.58	99.50	99.71
Crit W.S. (ft)	1500.81	Flow Area (sq ft)	11.60	604.99	513.43
E.G. Slope (ft/ft)	0.004159	Area (sq ft)	11.60	604.99	671.25

Plan: Alternative C Bushkill Creek Reach RS: 819 Profile: 100 Year (Continued)

Q Total (cfs)	9365.00	Flow (cfs)	23.69	6925.47	2415.83
Top Width (ft)	279.63	Top Width (ft)	6.45	54.21	218.98
Vel Total (ft/s)	8.29	Avg. Vel. (ft/s)	2.04	11.45	4.71
Max Chl Dpth (ft)	12.82	Hydr. Depth (ft)	1.80	11.16	4.46
Conv. Total (cfs)	145221.0	Conv. (cfs)	367.4	107391.8	37461.8
Length Wtd. (ft)	99.53	Wetted Per. (ft)	9.13	57.92	115.68
Min Ch El (ft)	1489.24	Shear (lb/sq ft)	0.33	2.71	1.15
Alpha	1.49	Stream Power (lb/ft s)	590.61	0.00	0.00
Frctn Loss (ft)	0.35	Cum Volume (acre-ft)	5.73	11.19	1.65
C & E Loss (ft)	0.08	Cum SA (acres)	3.97	1.34	1.05

Plan: Alternative C Bushkill Creek Reach RS: 720 Profile: 100 Year

E.G. Elev (ft)	1503.23	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.32	Wt. n-Val.	0.055	0.040	0.055
W.S. Elev (ft)	1501.91	Reach Len. (ft)	60.14	73.95	89.95
Crit W.S. (ft)	1498.31	Flow Area (sq ft)	34.85	945.18	114.75
E.G. Slope (ft/ft)	0.002993	Area (sq ft)	35.01	945.18	274.94
Q Total (cfs)	9365.00	Flow (cfs)	78.56	8908.94	377.51
Top Width (ft)	269.35	Top Width (ft)	33.30	88.37	147.69
Vel Total (ft/s)	8.55	Avg. Vel. (ft/s)	2.25	9.43	3.29
Max Chl Dpth (ft)	14.43	Hydr. Depth (ft)	1.12	10.70	3.32
Conv. Total (cfs)	171192.1	Conv. (cfs)	1436.0	162855.3	6900.8
Length Wtd. (ft)	73.80	Wetted Per. (ft)	32.51	94.62	34.56
Min Ch El (ft)	1487.48	Shear (lb/sq ft)	0.20	1.87	0.62
Alpha	1.16	Stream Power (lb/ft s)	561.53	0.00	0.00
Frctn Loss (ft)	0.23	Cum Volume (acre-ft)	5.67	9.42	0.57
C & E Loss (ft)	0.00	Cum SA (acres)	3.93	1.18	0.63

Plan: Alternative C Bushkill Creek Reach RS: 646 Profile: 100 Year

E.G. Elev (ft)	1502.99	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.33	Wt. n-Val.	0.055	0.040	
W.S. Elev (ft)	1501.67	Reach Len. (ft)	22.83	22.83	22.83
Crit W.S. (ft)	1498.10	Flow Area (sq ft)	214.17	925.70	
E.G. Slope (ft/ft)	0.003250	Area (sq ft)	244.06	926.81	3.61
Q Total (cfs)	9365.00	Flow (cfs)	561.81	8803.19	
Top Width (ft)	224.94	Top Width (ft)	123.11	91.02	10.81
Vel Total (ft/s)	8.22	Avg. Vel. (ft/s)	2.62	9.51	
Max Chl Dpth (ft)	14.67	Hydr. Depth (ft)	2.22	10.30	
Conv. Total (cfs)	164280.4	Conv. (cfs)	9855.3	154425.1	
Length Wtd. (ft)	22.83	Wetted Per. (ft)	96.34	97.27	
Min Ch El (ft)	1487.00	Shear (lb/sq ft)	0.45	1.93	
Alpha	1.27	Stream Power (lb/ft s)	481.67	0.00	205.27
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	5.48	7.83	0.28
C & E Loss (ft)	0.22	Cum SA (acres)	3.82	1.03	0.46

Plan: Alternative C Bushkill Creek Reach RS: 616.5 BR U Profile: 100 Year

E.G. Elev (ft)	1502.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.04	Wt. n-Val.	0.055	0.040	
W.S. Elev (ft)	1500.64	Reach Len. (ft)	14.00	14.00	14.00
Crit W.S. (ft)	1498.12	Flow Area (sq ft)	77.02	794.01	
E.G. Slope (ft/ft)	0.005538	Area (sq ft)	87.74	794.01	
Q Total (cfs)	9365.00	Flow (cfs)	174.28	9190.73	
Top Width (ft)	153.16	Top Width (ft)	75.41	77.75	
Vel Total (ft/s)	10.75	Avg. Vel. (ft/s)	2.26	11.58	
Max Chl Dpth (ft)	13.64	Hydr. Depth (ft)	1.19	10.21	
Conv. Total (cfs)	125843.2	Conv. (cfs)	2341.9	123501.3	

Plan: Alternative C Bushkill Creek Reach RS: 616.5 BR U Profile: 100 Year (Continued)

Length Wtd. (ft)	14.00	Wetted Per. (ft)	64.52	92.67	
Min Ch El (ft)	1487.00	Shear (lb/sq ft)	0.41	2.96	
Alpha	1.14	Stream Power (lb/ft s)	481.67	0.00	205.27
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	5.39	7.38	0.28
C & E Loss (ft)	0.03	Cum SA (acres)	3.77	0.98	0.46

Plan: Alternative C Bushkill Creek Reach RS: 616.5 BR D Profile: 100 Year

E.G. Elev (ft)	1502.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.98	Wt. n-Val.	0.055	0.040	
W.S. Elev (ft)	1500.60	Reach Len. (ft)	22.79	22.79	22.79
Crit W.S. (ft)	1498.17	Flow Area (sq ft)	130.16	782.79	
E.G. Slope (ft/ft)	0.005375	Area (sq ft)	131.86	782.79	
Q Total (cfs)	9365.00	Flow (cfs)	363.89	9001.11	
Top Width (ft)	158.89	Top Width (ft)	81.14	77.75	
Vel Total (ft/s)	10.26	Avg. Vel. (ft/s)	2.80	11.50	
Max Chl Dpth (ft)	11.89	Hydr. Depth (ft)	1.68	10.07	
Conv. Total (cfs)	127741.9	Conv. (cfs)	4963.5	122778.4	
Length Wtd. (ft)	22.79	Wetted Per. (ft)	77.62	90.23	
Min Ch El (ft)	1488.71	Shear (lb/sq ft)	0.56	2.91	
Alpha	1.21	Stream Power (lb/ft s)	458.03	0.00	125.54
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	5.36	7.13	0.28
C & E Loss (ft)	0.22	Cum SA (acres)	3.74	0.96	0.46

Plan: Alternative C Bushkill Creek Reach RS: 586 Profile: 100 Year

E.G. Elev (ft)	1502.24	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.54	Wt. n-Val.	0.055	0.040	
W.S. Elev (ft)	1500.70	Reach Len. (ft)	91.48	76.57	61.66
Crit W.S. (ft)	1499.23	Flow Area (sq ft)	262.18	819.61	
E.G. Slope (ft/ft)	0.004396	Area (sq ft)	279.85	823.58	75.82
Q Total (cfs)	9365.00	Flow (cfs)	848.25	8516.75	
Top Width (ft)	278.82	Top Width (ft)	128.90	91.32	58.60
Vel Total (ft/s)	8.66	Avg. Vel. (ft/s)	3.24	10.39	
Max Chl Dpth (ft)	11.99	Hydr. Depth (ft)	2.43	9.26	
Conv. Total (cfs)	141248.5	Conv. (cfs)	12793.8	128454.7	
Length Wtd. (ft)	77.90	Wetted Per. (ft)	108.01	94.58	
Min Ch El (ft)	1488.71	Shear (lb/sq ft)	0.67	2.38	
Alpha	1.32	Stream Power (lb/ft s)	458.03	0.00	125.54
Frctn Loss (ft)	0.46	Cum Volume (acre-ft)	5.25	6.71	0.26
C & E Loss (ft)	0.26	Cum SA (acres)	3.69	0.91	0.44

Plan: Alternative C Bushkill Creek Reach RS: 510 Profile: 100 Year

E.G. Elev (ft)	1501.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.42	Wt. n-Val.	0.055	0.040	0.055
W.S. Elev (ft)	1499.10	Reach Len. (ft)	104.51	102.90	101.29
Crit W.S. (ft)	1499.10	Flow Area (sq ft)	219.87	652.57	7.23
E.G. Slope (ft/ft)	0.008215	Area (sq ft)	406.26	652.57	7.23
Q Total (cfs)	9365.00	Flow (cfs)	837.59	8510.78	16.63
Top Width (ft)	291.58	Top Width (ft)	204.40	79.96	7.22
Vel Total (ft/s)	10.65	Avg. Vel. (ft/s)	3.81	13.04	2.30
Max Chl Dpth (ft)	10.02	Hydr. Depth (ft)	1.99	8.16	1.00
Conv. Total (cfs)	103325.8	Conv. (cfs)	9241.3	93901.1	183.5
Length Wtd. (ft)	103.01	Wetted Per. (ft)	113.94	85.60	7.94
Min Ch El (ft)	1489.08	Shear (lb/sq ft)	0.99	3.91	0.47
Alpha	1.38	Stream Power (lb/ft s)	378.21	0.00	73.09
Frctn Loss (ft)	0.78	Cum Volume (acre-ft)	4.53	5.41	0.20
C & E Loss (ft)	0.03	Cum SA (acres)	3.34	0.76	0.40

Plan: Alternative C Bushkill Creek Reach RS: 407 Profile: 100 Year

E.G. Elev (ft)	1500.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.87	Wt. n-Val.	0.055	0.040	0.055
W.S. Elev (ft)	1497.71	Reach Len. (ft)	107.14	102.92	98.70
Crit W.S. (ft)	1498.22	Flow Area (sq ft)	158.32	661.37	38.57
E.G. Slope (ft/ft)	0.009085	Area (sq ft)	375.23	661.37	38.57
Q Total (cfs)	9929.00	Flow (cfs)	582.61	9280.61	65.78
Top Width (ft)	390.48	Top Width (ft)	239.56	79.39	71.54
Vel Total (ft/s)	11.57	Avg. Vel. (ft/s)	3.68	14.03	1.71
Max Chl Dpth (ft)	11.10	Hydr. Depth (ft)	1.74	8.33	0.54
Conv. Total (cfs)	104170.5	Conv. (cfs)	6112.5	97367.9	690.1
Length Wtd. (ft)	103.19	Wetted Per. (ft)	95.06	83.83	71.56
Min Ch El (ft)	1486.61	Shear (lb/sq ft)	0.94	4.47	0.31
Alpha	1.38	Stream Power (lb/ft s)	356.66	0.00	0.00
Frctn Loss (ft)	0.89	Cum Volume (acre-ft)	3.59	3.86	0.15
C & E Loss (ft)	0.04	Cum SA (acres)	2.81	0.57	0.31

Plan: Alternative C Bushkill Creek Reach RS: 304 Profile: 100 Year

E.G. Elev (ft)	1499.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.05	Wt. n-Val.	0.055	0.040	0.055
W.S. Elev (ft)	1496.47	Reach Len. (ft)	99.31	95.84	92.38
Crit W.S. (ft)	1497.49	Flow Area (sq ft)	260.60	625.94	11.86
E.G. Slope (ft/ft)	0.011398	Area (sq ft)	283.02	625.94	11.86
Q Total (cfs)	9929.00	Flow (cfs)	778.95	9131.25	18.79
Top Width (ft)	380.83	Top Width (ft)	266.50	85.18	29.14
Vel Total (ft/s)	11.05	Avg. Vel. (ft/s)	2.99	14.59	1.58
Max Chl Dpth (ft)	10.26	Hydr. Depth (ft)	1.06	7.35	0.41
Conv. Total (cfs)	93001.0	Conv. (cfs)	7296.2	85528.8	176.0
Length Wtd. (ft)	96.32	Wetted Per. (ft)	247.04	88.73	29.16
Min Ch El (ft)	1486.21	Shear (lb/sq ft)	0.75	5.02	0.29
Alpha	1.61	Stream Power (lb/ft s)	334.97	0.00	0.00
Frctn Loss (ft)	1.05	Cum Volume (acre-ft)	2.78	2.34	0.09
C & E Loss (ft)	0.02	Cum SA (acres)	2.18	0.38	0.19

Plan: Alternative C Bushkill Creek Reach RS: 208 Profile: 100 Year

E.G. Elev (ft)	1498.02	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.69	Wt. n-Val.	0.055	0.040	
W.S. Elev (ft)	1494.33	Reach Len. (ft)	112.18	108.00	103.83
Crit W.S. (ft)	1495.11	Flow Area (sq ft)	414.72	465.87	
E.G. Slope (ft/ft)	0.020156	Area (sq ft)	709.94	465.87	35.96
Q Total (cfs)	9929.00	Flow (cfs)	1976.95	7952.05	
Top Width (ft)	653.52	Top Width (ft)	504.94	76.88	71.70
Vel Total (ft/s)	11.28	Avg. Vel. (ft/s)	4.77	17.07	
Max Chl Dpth (ft)	8.43	Hydr. Depth (ft)	1.39	6.06	
Conv. Total (cfs)	69936.0	Conv. (cfs)	13924.9	56011.1	
Length Wtd. (ft)	108.95	Wetted Per. (ft)	299.33	80.01	
Min Ch El (ft)	1485.90	Shear (lb/sq ft)	1.74	7.33	
Alpha	1.87	Stream Power (lb/ft s)	305.19	0.00	0.00
Frctn Loss (ft)	1.43	Cum Volume (acre-ft)	1.65	1.13	0.04
C & E Loss (ft)	0.06	Cum SA (acres)	1.30	0.20	0.09

Plan: Alternative C Bushkill Creek Reach RS: 100 Profile: 100 Year

E.G. Elev (ft)	1495.56	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.22	Wt. n-Val.	0.055	0.040	
W.S. Elev (ft)	1492.33	Reach Len. (ft)			
Crit W.S. (ft)	1493.40	Flow Area (sq ft)	503.42	448.86	
E.G. Slope (ft/ft)	0.022412	Area (sq ft)	571.56	448.86	

Plan: Alternative C Bushkill Creek Reach RS: 100 Profile: 100 Year (Continued)

Q Total (cfs)	9929.00	Flow (cfs)	2547.22	7381.78	
Top Width (ft)	592.98	Top Width (ft)	508.21	84.78	
Vel Total (ft/s)	10.43	Avg. Vel. (ft/s)	5.06	16.45	
Max Chl Dpth (ft)	8.54	Hydr. Depth (ft)	1.40	5.29	
Conv. Total (cfs)	66322.8	Conv. (cfs)	17014.7	49308.1	
Length Wtd. (ft)		Wetted Per. (ft)	359.78	88.27	
Min Ch El (ft)	1483.79	Shear (lb/sq ft)	1.96	7.12	
Alpha	1.91	Stream Power (lb/ft s)	255.20	0.00	0.00
Frctn Loss (ft)	2.31	Cum Volume (acre-ft)			
C & E Loss (ft)	0.14	Cum SA (acres)			

Plan: Alternative C Bushkill Creek Reach RS: 616.5 Profile: 10 Year

E.G. US. (ft)	1498.99	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	1498.11	E.G. Elev (ft)	1498.89	1498.81
Q Total (cfs)	4601.00	W.S. Elev (ft)	1497.91	1497.78
Q Bridge (cfs)	4601.00	Crit W.S. (ft)	1495.09	1495.21
Q Weir (cfs)		Max Chl Dpth (ft)	10.91	9.07
Weir Sta Lft (ft)		Vel Total (ft/s)	7.91	8.16
Weir Sta Rgt (ft)		Flow Area (sq ft)	581.97	563.86
Weir Submerg		Froude # Chl	0.42	0.48
Weir Max Depth (ft)		Specif Force (cu ft)	3493.75	3362.08
Min El Weir Flow (ft)	1499.11	Hydr Depth (ft)	7.48	7.25
Min El Prs (ft)	1501.00	W.P. Total (ft)	87.22	84.60
Delta EG (ft)	0.28	Conv. Total (cfs)	76621.7	74187.1
Delta WS (ft)	0.47	Top Width (ft)	77.76	77.76
BR Open Area (sq ft)	814.28	Frctn Loss (ft)	0.05	0.09
BR Open Vel (ft/s)	8.16	C & E Loss (ft)	0.02	0.01
Coef of Q		Shear Total (lb/sq ft)	1.50	1.60
Br Sel Method	Energy only	Power Total (lb/ft s)	-174.55	-219.40

Plan: Alternative C Bushkill Creek Reach RS: 616.5 Profile: 25 Year

E.G. US. (ft)	1500.78	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	1499.70	E.G. Elev (ft)	1500.64	1500.58
Q Total (cfs)	6283.00	W.S. Elev (ft)	1499.38	1499.29
Q Bridge (cfs)	6280.24	Crit W.S. (ft)	1496.27	1496.38
Q Weir (cfs)		Max Chl Dpth (ft)	12.38	10.58
Weir Sta Lft (ft)		Vel Total (ft/s)	8.96	8.72
Weir Sta Rgt (ft)		Flow Area (sq ft)	701.58	720.72
Weir Submerg		Froude # Chl	0.45	0.49
Weir Max Depth (ft)		Specif Force (cu ft)	5060.60	4925.97
Min El Weir Flow (ft)	1499.11	Hydr Depth (ft)	6.09	5.17
Min El Prs (ft)	1501.00	W.P. Total (ft)	127.65	149.25
Delta EG (ft)	0.34	Conv. Total (cfs)	100998.8	100192.3
Delta WS (ft)	0.44	Top Width (ft)	120.60	139.30
BR Open Area (sq ft)	814.28	Frctn Loss (ft)	0.05	0.09
BR Open Vel (ft/s)	9.21	C & E Loss (ft)	0.01	0.06
Coef of Q		Shear Total (lb/sq ft)	1.33	1.19
Br Sel Method	Energy only	Power Total (lb/ft s)	-174.55	-219.40

Plan: Alternative C Bushkill Creek Reach RS: 616.5 Profile: 50 Year

E.G. US. (ft)	1501.88	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	1500.63	E.G. Elev (ft)	1501.67	1501.59
Q Total (cfs)	7766.00	W.S. Elev (ft)	1500.02	1499.96
Q Bridge (cfs)	7710.21	Crit W.S. (ft)	1497.20	1497.30
Q Weir (cfs)		Max Chl Dpth (ft)	13.02	11.25
Weir Sta Lft (ft)		Vel Total (ft/s)	9.90	9.51
Weir Sta Rgt (ft)		Flow Area (sq ft)	784.53	816.77
Weir Submerg		Froude # Chl	0.50	0.54
Weir Max Depth (ft)		Specif Force (cu ft)	6253.48	6118.51
Min El Weir Flow (ft)	1499.11	Hydr Depth (ft)	5.80	5.51
Min El Prs (ft)	1501.00	W.P. Total (ft)	149.04	159.55
Delta EG (ft)	0.52	Conv. Total (cfs)	113020.2	113719.9
Delta WS (ft)	0.63	Top Width (ft)	143.25	149.34
BR Open Area (sq ft)	814.28	Frctn Loss (ft)	0.07	0.10
BR Open Vel (ft/s)	10.51	C & E Loss (ft)	0.01	0.13
Coef of Q		Shear Total (lb/sq ft)	1.55	1.49
Br Sel Method	Energy only	Power Total (lb/ft s)	-174.55	-219.40

Plan: Alternative C Bushkill Creek Reach RS: 616.5 Profile: 100 Year

E.G. US. (ft)	1502.99	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	1501.67	E.G. Elev (ft)	1502.68	1502.57
Q Total (cfs)	9365.00	W.S. Elev (ft)	1500.64	1500.60
Q Bridge (cfs)	9190.73	Crit W.S. (ft)	1498.12	1498.17
Q Weir (cfs)		Max Chl Dpth (ft)	13.64	11.89
Weir Sta Lft (ft)		Vel Total (ft/s)	10.75	10.26
Weir Sta Rgt (ft)		Flow Area (sq ft)	871.03	912.95
Weir Submerg		Froude # Chl	0.55	0.58
Weir Max Depth (ft)		Specif Force (cu ft)	7606.51	7459.60
Min El Weir Flow (ft)	1499.11	Hydr Depth (ft)	6.12	5.88
Min El Prs (ft)	1501.00	W.P. Total (ft)	157.19	167.84
Delta EG (ft)	0.75	Conv. Total (cfs)	125843.2	127741.9
Delta WS (ft)	0.96	Top Width (ft)	153.16	158.89
BR Open Area (sq ft)	814.28	Frctn Loss (ft)	0.08	0.11
BR Open Vel (ft/s)	11.74	C & E Loss (ft)	0.03	0.22
Coef of Q		Shear Total (lb/sq ft)	1.92	1.83
Br Sel Method	Energy only	Power Total (lb/ft s)	-174.55	-219.40

Plan: Alternative C Bushkill Creek Reach RS: 616.5 Profile: 500 Year

E.G. US. (ft)	1505.96	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	1505.00	E.G. Elev (ft)	1505.66	1504.75
Q Total (cfs)	13608.00	W.S. Elev (ft)	1504.03	1500.72
Q Bridge (cfs)	9945.92	Crit W.S. (ft)	1504.03	1501.00
Q Weir (cfs)		Max Chl Dpth (ft)	17.02	12.01
Weir Sta Lft (ft)		Vel Total (ft/s)	9.70	14.59
Weir Sta Rgt (ft)		Flow Area (sq ft)	1403.33	932.95
Weir Submerg		Froude # Chl	0.44	0.82
Weir Max Depth (ft)		Specif Force (cu ft)	12304.79	11057.32
Min El Weir Flow (ft)	1499.11	Hydr Depth (ft)	4.28	5.96
Min El Prs (ft)	1501.00	W.P. Total (ft)	499.92	169.52
Delta EG (ft)	1.65	Conv. Total (cfs)	98056.9	130709.4
Delta WS (ft)	5.23	Top Width (ft)	327.74	162.81
BR Open Area (sq ft)	814.28	Frctn Loss (ft)		0.20
BR Open Vel (ft/s)	12.55	C & E Loss (ft)		0.72
Coef of Q		Shear Total (lb/sq ft)	3.38	3.72
Br Sel Method	Energy only	Power Total (lb/ft s)	-174.55	-219.40

Errors Warnings and Notes for Plan : Alternative C

Location:	River: Bushkill Creek Reach: Reach RS: 1195 Profile: 10 Year
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 1195 Profile: 25 Year
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 1195 Profile: 50 Year
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 1195 Profile: 100 Year
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 1195 Profile: 500 Year
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 1049 Profile: 10 Year
Warning:	Divided flow computed for this cross-section.
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 1049 Profile: 25 Year
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may
	indicate the need for additional cross sections.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 1049 Profile: 50 Year
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may
	indicate the need for additional cross sections.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 1049 Profile: 100 Year
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may
	indicate the need for additional cross sections.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 1049 Profile: 500 Year
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 921 Profile: 10 Year
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 921 Profile: 25 Year
Warning:	Divided flow computed for this cross-section.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 921 Profile: 50 Year
Warning:	Divided flow computed for this cross-section.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 921 Profile: 100 Year
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 921 Profile: 500 Year
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Location:	River: Bushkill Creek Reach: Reach RS: 819 Profile: 10 Year
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 819 Profile: 25 Year
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 819 Profile: 50 Year
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 819 Profile: 100 Year
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 819 Profile: 500 Year
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 720 Profile: 10 Year
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

Errors Warnings and Notes for Plan : Alternative C (Continued)

Location:	River: Bushkill Creek Reach: Reach RS: 720 Profile: 25 Year
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 720 Profile: 50 Year
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 720 Profile: 100 Year
Warning:	Divided flow computed for this cross-section.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 720 Profile: 500 Year
Warning:	Multiple water surfaces were found that could balance the energy equation. The program selected the water surface whose main
	channel velocity head was the closest to the previously computed cross section.
Warning:	Divided flow computed for this cross-section.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 646 Profile: 10 Year
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Location:	River: Bushkill Creek Reach: Reach RS: 646 Profile: 25 Year
Warning:	Divided flow computed for this cross-section.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Location:	River: Bushkill Creek Reach: Reach RS: 646 Profile: 50 Year
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Location:	River: Bushkill Creek Reach: Reach RS: 646 Profile: 100 Year
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Location:	River: Bushkill Creek Reach: Reach RS: 646 Profile: 500 Year
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may
	indicate the need for additional cross sections.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Location:	River: Bushkill Creek Reach: Reach RS: 616.5 Profile: 10 Year Upstream
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Location:	River: Bushkill Creek Reach: Reach RS: 616.5 Profile: 10 Year Downstream
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Location:	River: Bushkill Creek Reach: Reach RS: 616.5 Profile: 25 Year Upstream
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Location:	River: Bushkill Creek Reach: Reach RS: 616.5 Profile: 25 Year Downstream
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Location:	River: Bushkill Creek Reach: Reach RS: 616.5 Profile: 50 Year Upstream
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Location:	River: Bushkill Creek Reach: Reach RS: 616.5 Profile: 50 Year Downstream
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Location:	River: Bushkill Creek Reach: Reach RS: 616.5 Profile: 100 Year Upstream
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Location:	River: Bushkill Creek Reach: Reach RS: 616.5 Profile: 100 Year Downstream
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Location:	River: Bushkill Creek Reach: Reach RS: 616.5 Profile: 500 Year Upstream
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Location:	River: Bushkill Creek Reach: Reach RS: 616.5 Profile: 500 Year Downstream
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note:	The energy method has computed a class B profile.
Location:	River: Bushkill Creek Reach: Reach RS: 586 Profile: 10 Year
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may
	indicate the need for additional cross sections.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Location:	River: Bushkill Creek Reach: Reach RS: 586 Profile: 25 Year
Warning:	Divided flow computed for this cross-section.
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may
	indicate the need for additional cross sections.

Errors Warnings and Notes for Plan : Alternative C (Continued)

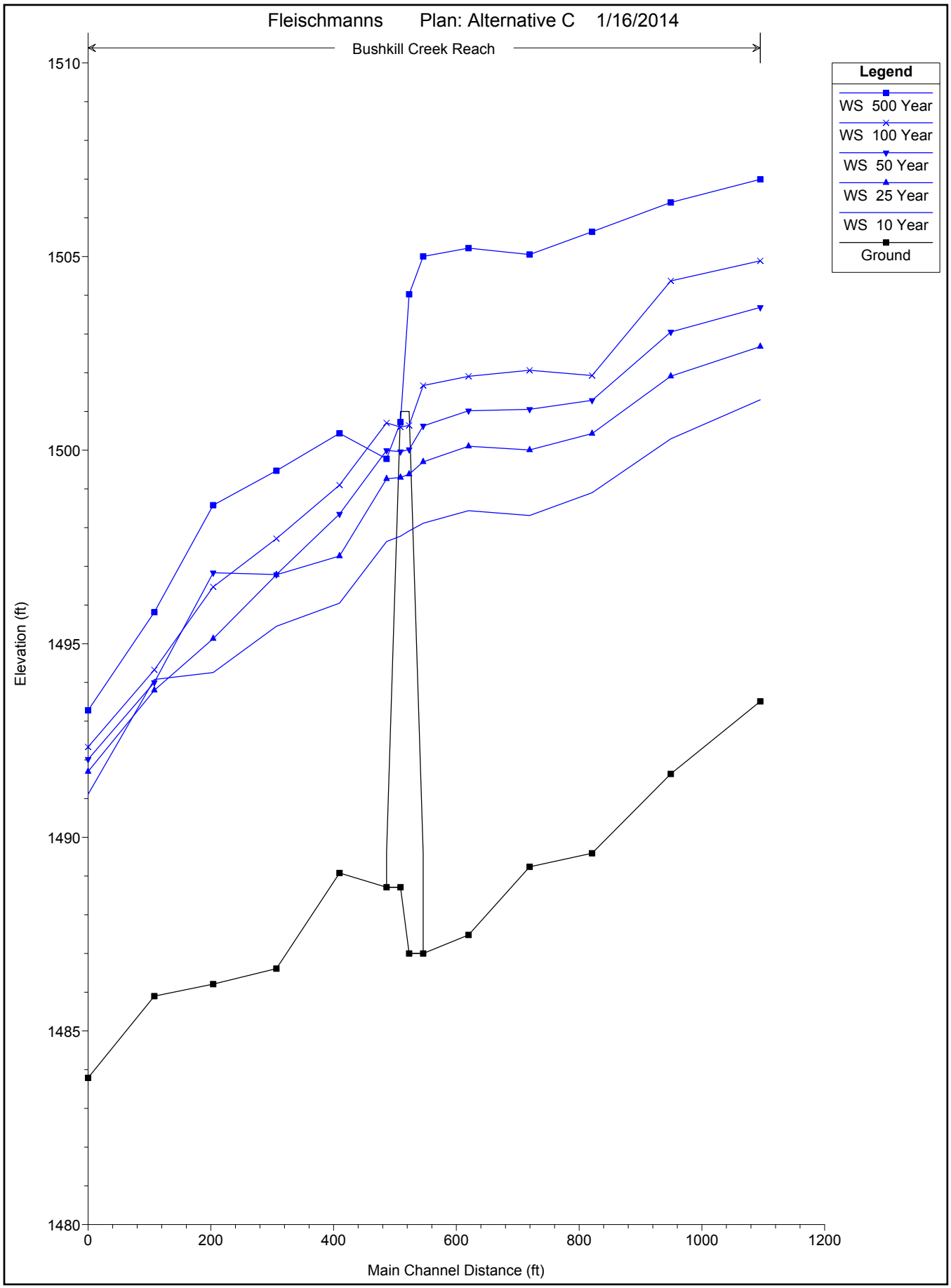
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Location:	River: Bushkill Creek Reach: Reach RS: 586 Profile: 50 Year
Warning:	Divided flow computed for this cross-section.
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may
	indicate the need for additional cross sections.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Location:	River: Bushkill Creek Reach: Reach RS: 586 Profile: 100 Year
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Location:	River: Bushkill Creek Reach: Reach RS: 586 Profile: 500 Year
Warning:	Divided flow computed for this cross-section.
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note:	The energy method has computed a class B profile.
Location:	River: Bushkill Creek Reach: Reach RS: 510 Profile: 10 Year
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 510 Profile: 25 Year
Warning:	Divided flow computed for this cross-section.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 510 Profile: 50 Year
Warning:	The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water
	surface and continued on with the calculations.
Warning:	Divided flow computed for this cross-section.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for
	additional cross sections.
Warning:	During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface
	came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 510 Profile: 100 Year
Warning:	The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water
	surface and continued on with the calculations.
Warning:	Divided flow computed for this cross-section.
Warning:	During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface
	came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 510 Profile: 500 Year
Warning:	The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that
	had the least amount of error between computed and assumed values.
Warning:	Divided flow computed for this cross-section.
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for
	additional cross sections.
Location:	River: Bushkill Creek Reach: Reach RS: 407 Profile: 10 Year
Warning:	Divided flow computed for this cross-section.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 407 Profile: 25 Year
Warning:	Divided flow computed for this cross-section.
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 407 Profile: 50 Year
Warning:	Divided flow computed for this cross-section.
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for
	additional cross sections.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 407 Profile: 100 Year
Warning:	Divided flow computed for this cross-section.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

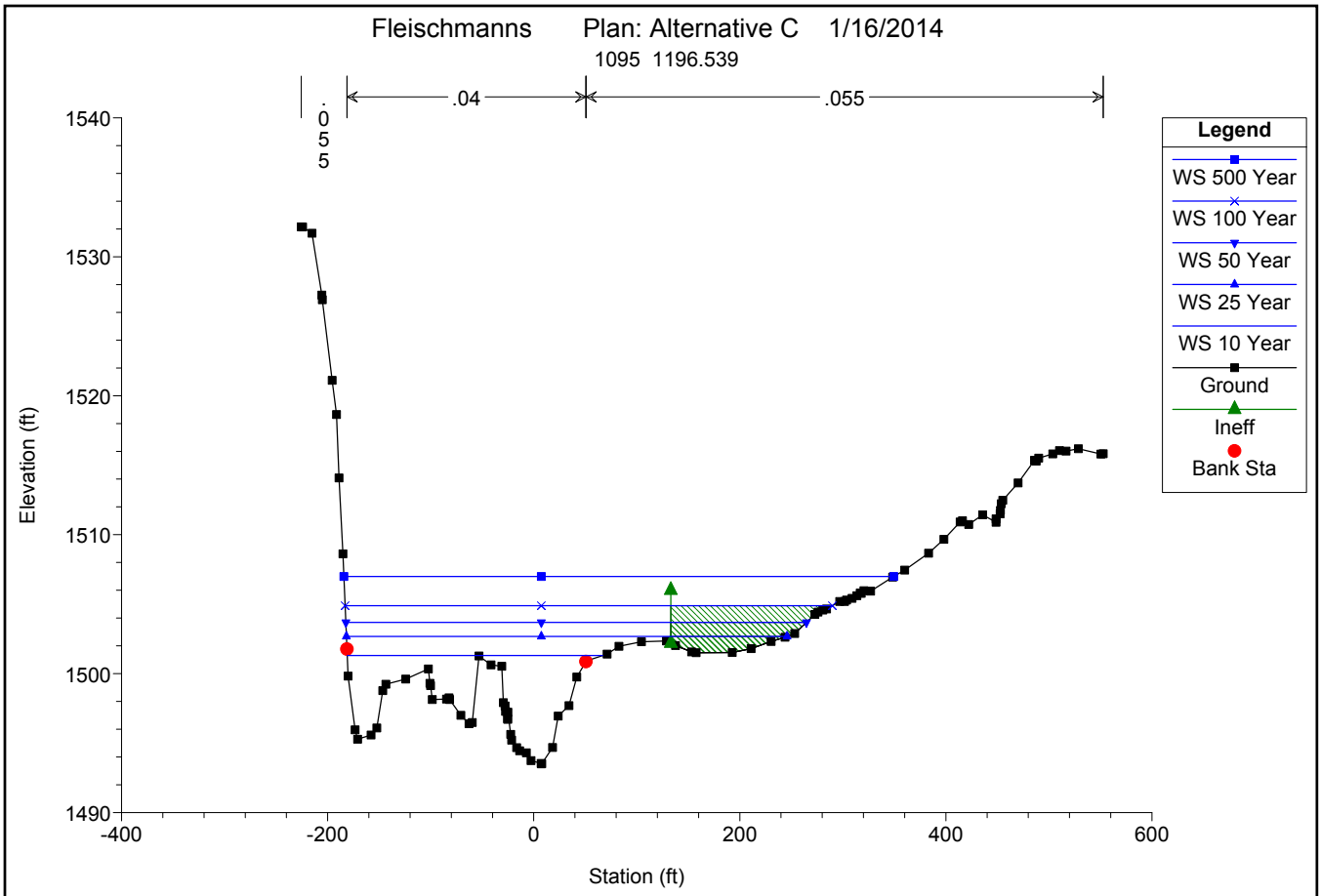
Errors Warnings and Notes for Plan : Alternative C (Continued)

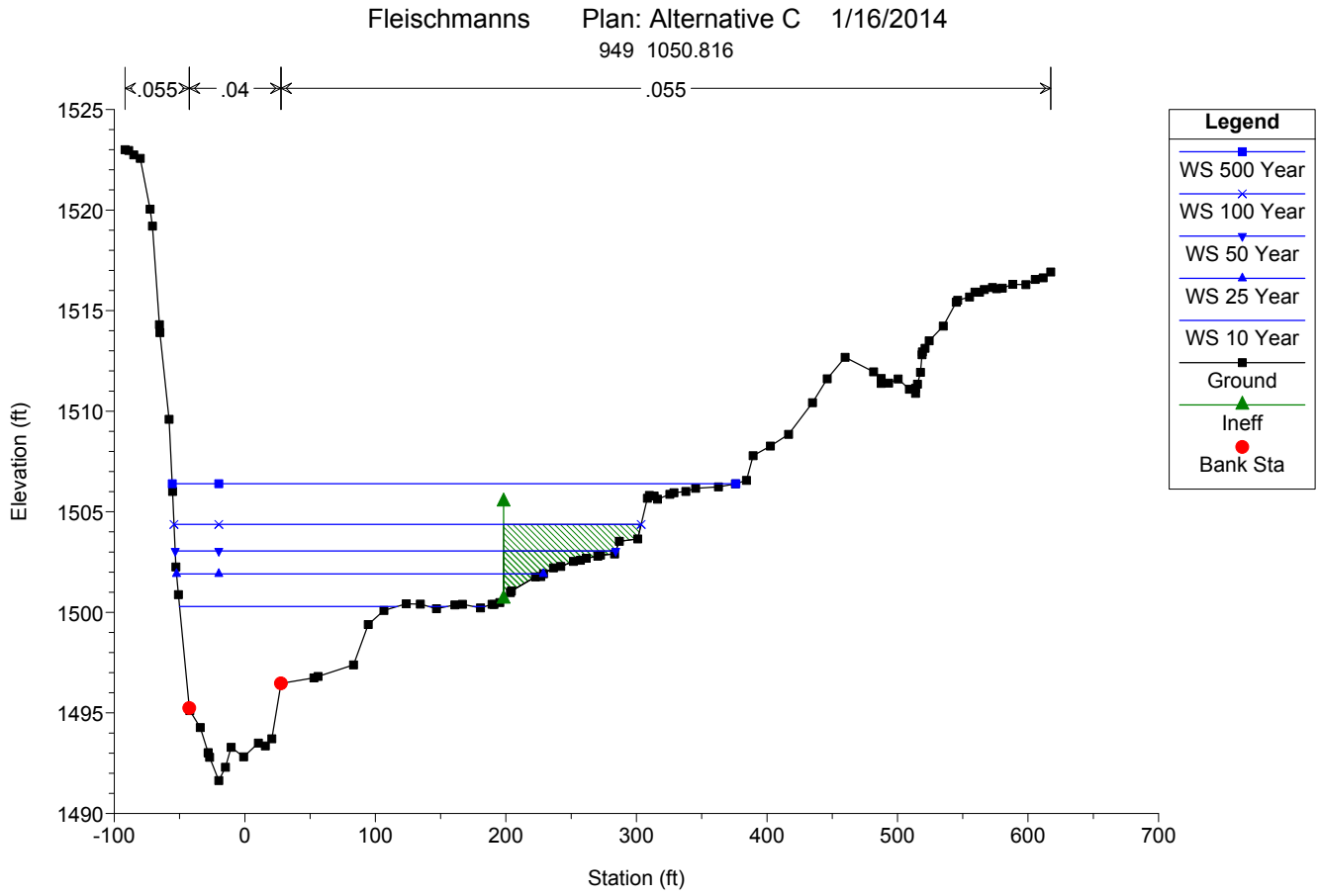
Location:	River: Bushkill Creek Reach: Reach RS: 407 Profile: 500 Year
Warning:	The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water
	surface and continued on with the calculations.
Warning:	Divided flow computed for this cross-section.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for
	additional cross sections.
Warning:	During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface
	came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Location:	River: Bushkill Creek Reach: Reach RS: 304 Profile: 10 Year
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 304 Profile: 25 Year
Warning:	The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water
	surface and continued on with the calculations.
Warning:	Divided flow computed for this cross-section.
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for
	additional cross sections.
Warning:	During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface
	came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 304 Profile: 50 Year
Warning:	The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that
	had the least amount of error between computed and assumed values.
Warning:	Divided flow computed for this cross-section.
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for
	additional cross sections.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 304 Profile: 100 Year
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for
	additional cross sections.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 304 Profile: 500 Year
Warning:	The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water
	surface and continued on with the calculations.
Warning:	Divided flow computed for this cross-section.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for
	additional cross sections.
Warning:	During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface
	came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Location:	River: Bushkill Creek Reach: Reach RS: 208 Profile: 10 Year
Warning:	The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water
	surface and continued on with the calculations.
Warning:	Divided flow computed for this cross-section.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for
	additional cross sections.
Warning:	During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface
	came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 208 Profile: 25 Year
Warning:	Divided flow computed for this cross-section.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for
	additional cross sections.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 208 Profile: 50 Year
Warning:	Divided flow computed for this cross-section.
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may

Errors Warnings and Notes for Plan : Alternative C (Continued)

	indicate the need for additional cross sections.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for
	additional cross sections.
Location:	River: Bushkill Creek Reach: Reach RS: 208 Profile: 100 Year
Warning:	Divided flow computed for this cross-section.
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for
	additional cross sections.
Location:	River: Bushkill Creek Reach: Reach RS: 208 Profile: 500 Year
Warning:	The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water
	surface and continued on with the calculations.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for
	additional cross sections.
Warning:	During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface
	came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Location:	River: Bushkill Creek Reach: Reach RS: 100 Profile: 10 Year
Warning:	Divided flow computed for this cross-section.
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may
	indicate the need for additional cross sections.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for
	additional cross sections.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Location:	River: Bushkill Creek Reach: Reach RS: 100 Profile: 25 Year
Warning:	Divided flow computed for this cross-section.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for
	additional cross sections.
Location:	River: Bushkill Creek Reach: Reach RS: 100 Profile: 50 Year
Warning:	Divided flow computed for this cross-section.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for
	additional cross sections.
Location:	River: Bushkill Creek Reach: Reach RS: 100 Profile: 100 Year
Warning:	Divided flow computed for this cross-section.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for
	additional cross sections.
Location:	River: Bushkill Creek Reach: Reach RS: 100 Profile: 500 Year
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may
	indicate the need for additional cross sections.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for
	additional cross sections.


Fleischmanns Plan: Alternative C 1/16/2014
Bushkill Creek Reach
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 25 Year
WS 10 Year
Ground
Elevation (ft)
1510
1505
1500
1495
1490
1485
1480
0
200
400
600
800
1000
1200
Main Channel Distance (ft)


Fleischmanns Plan: Alternative C 1/16/2014
1095 1196.539
.055
.04
.055
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 25 Year
WS 10 Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
1540
1530
1520
1510
1500
1490
-400
-200
0
200
400
600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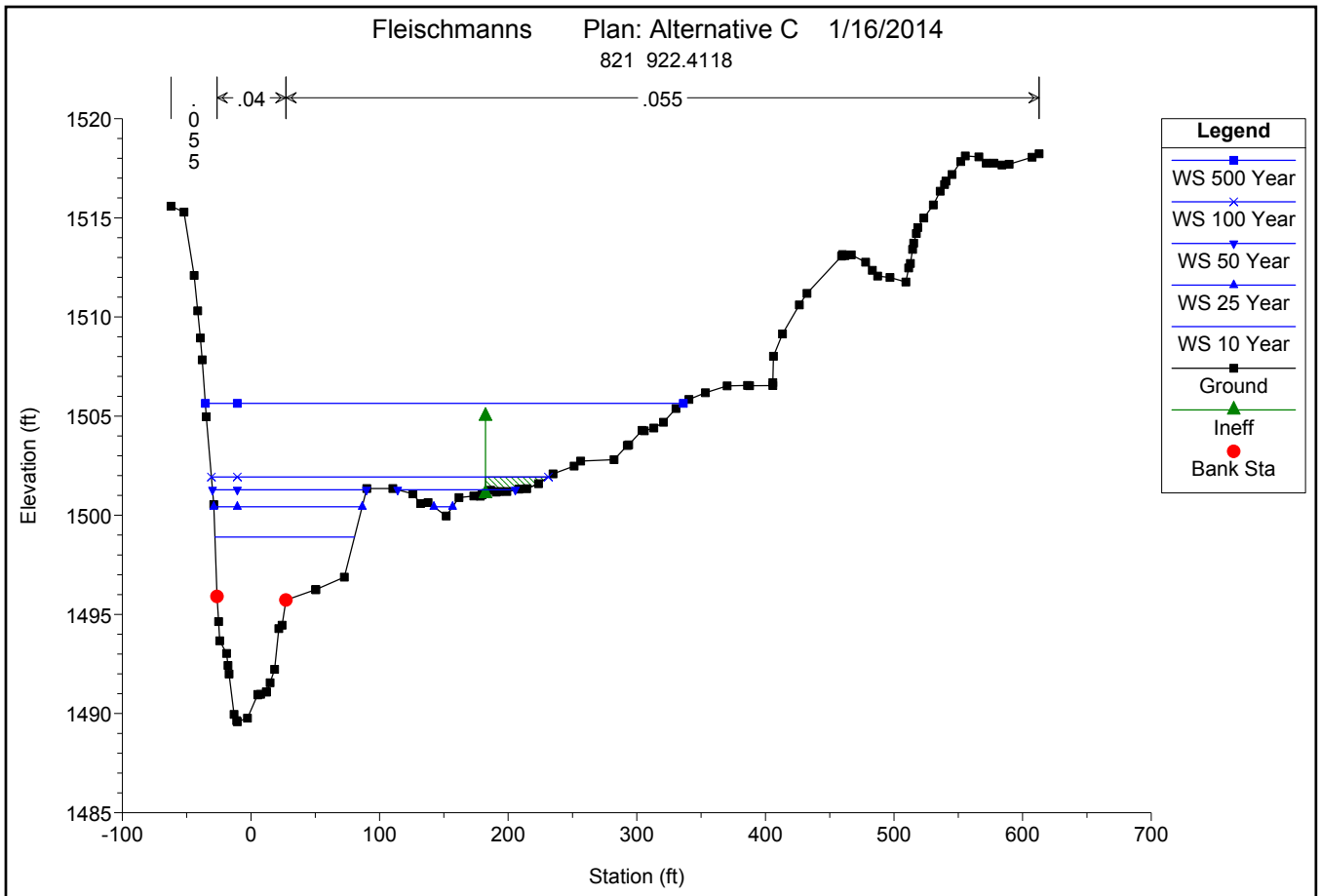
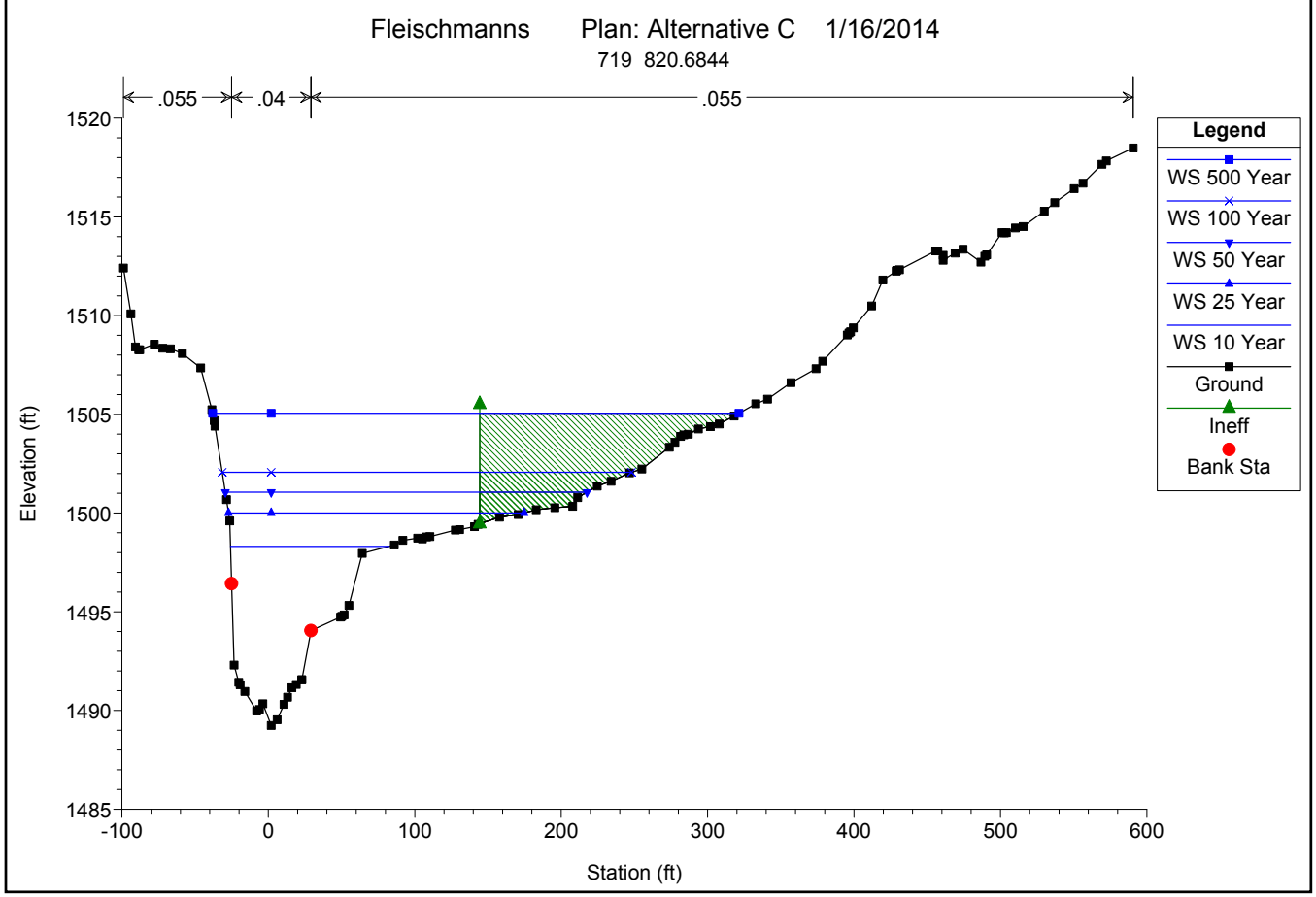
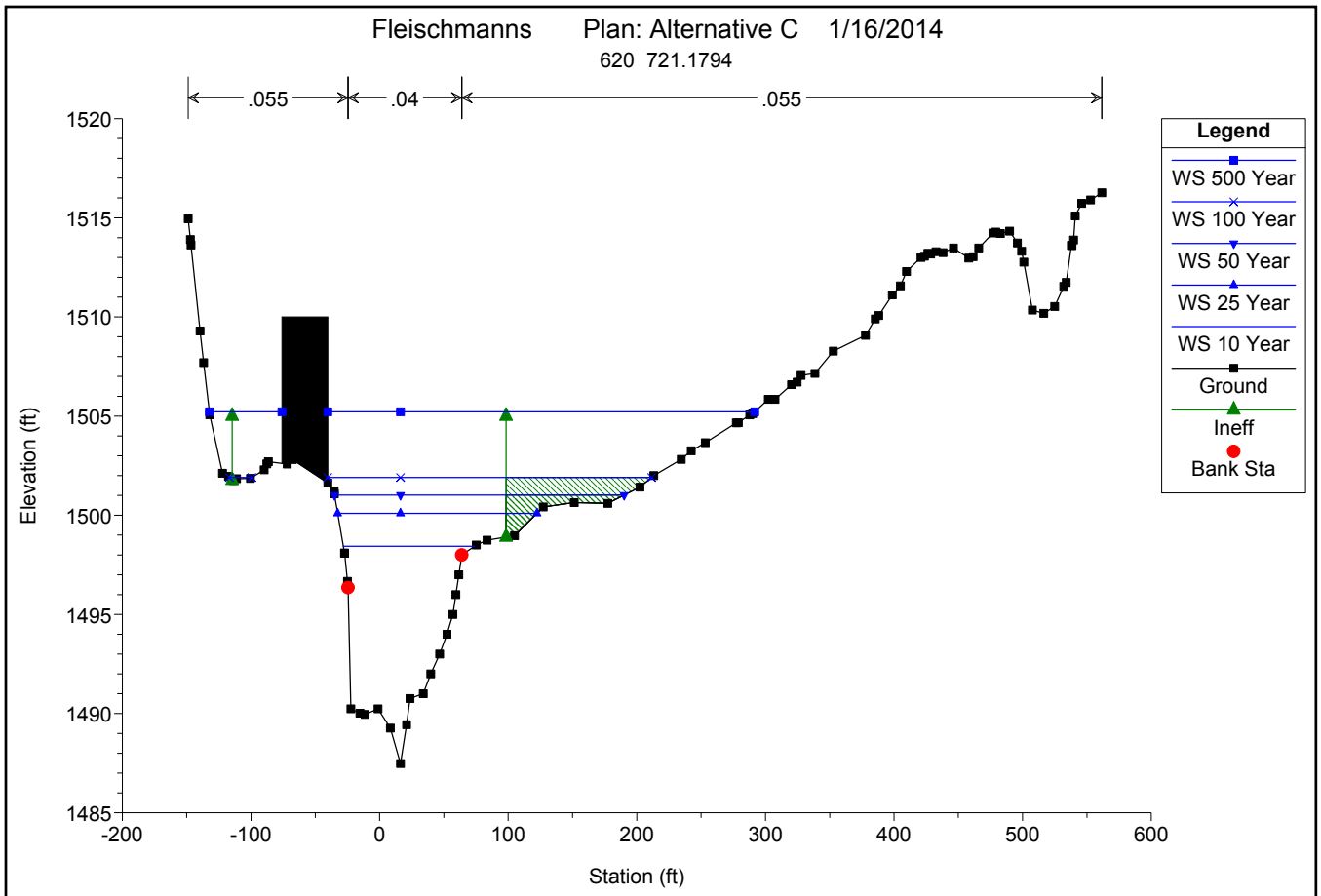
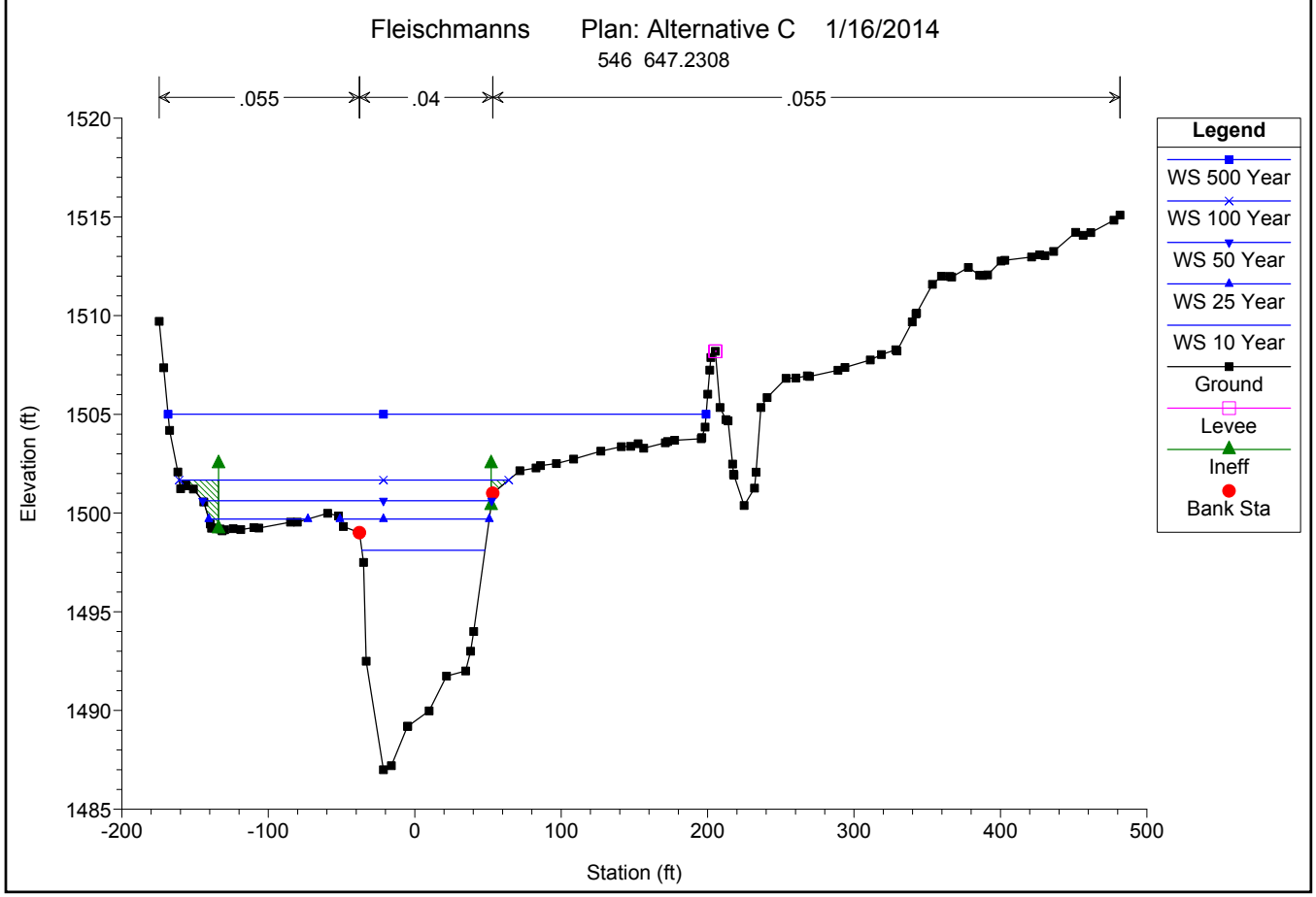
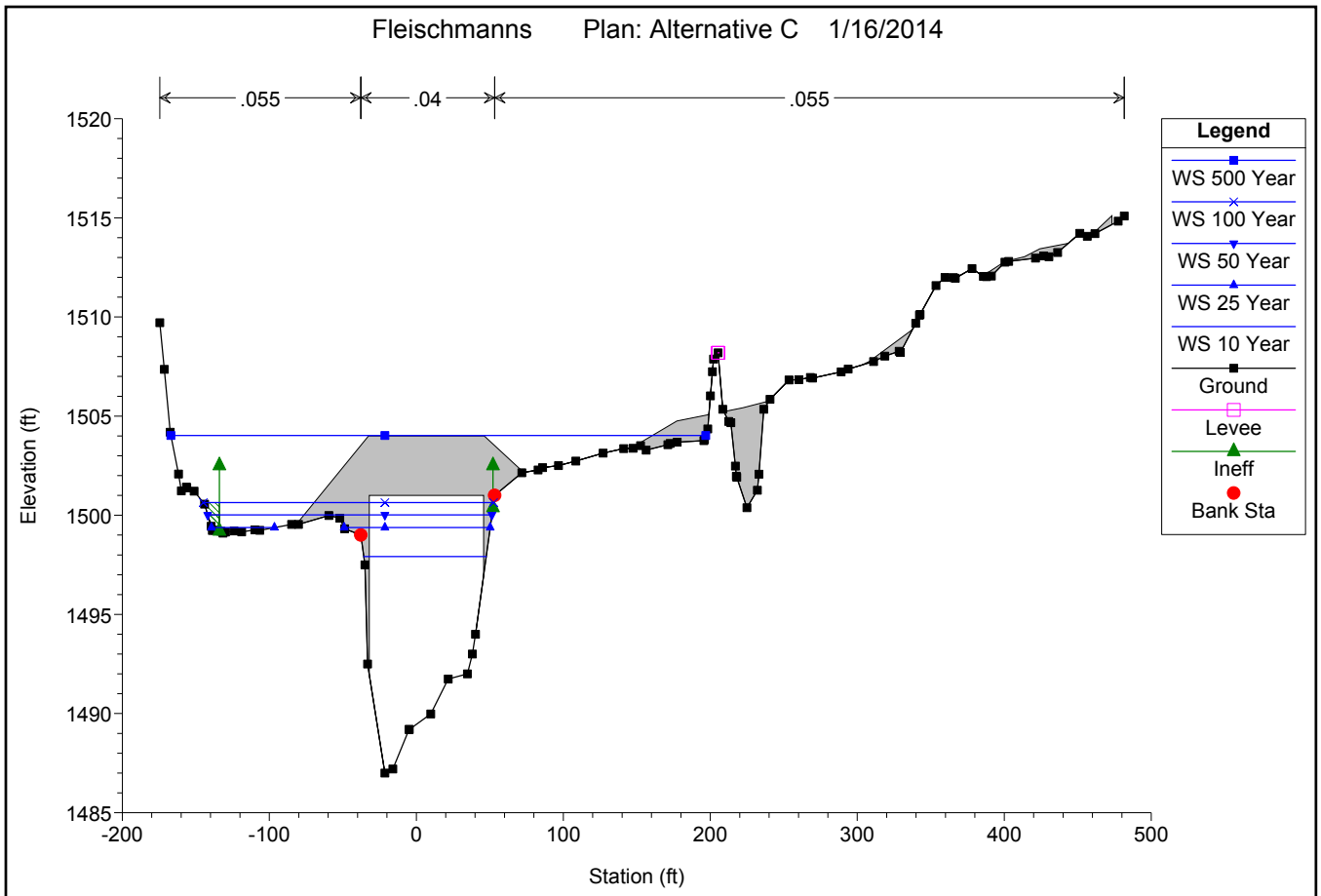
949 1050.816
.055
.04
.055
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 25 Year
WS 10 Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
1525
1520
1515
1510
1505
1500
1495
1490
-100
0
100
200
300
400
500
600
700

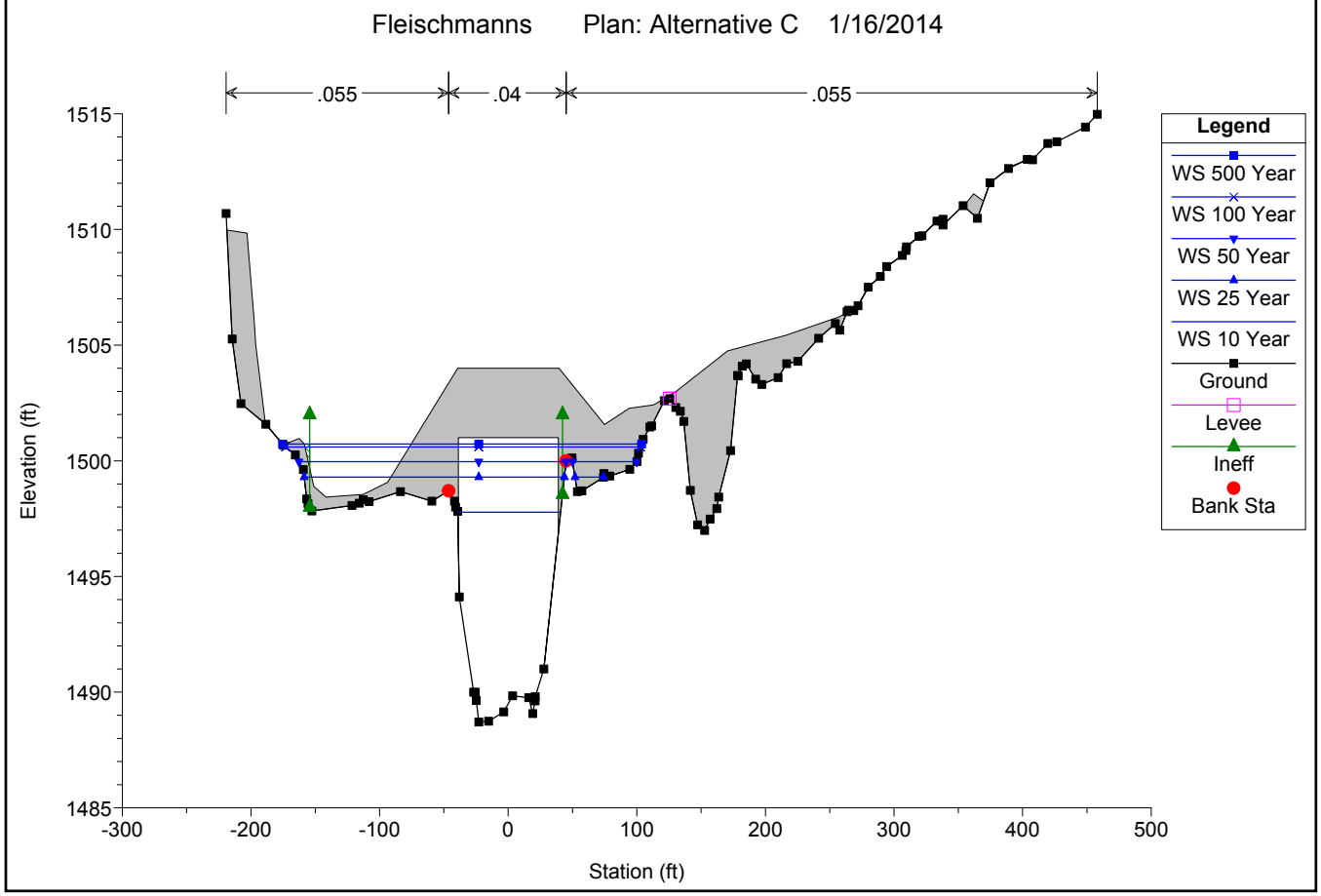

Fleischmanns Plan: Alternative C 1/16/2014
821 922.4118
.055
.04
.055
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 25 Year
WS 10 Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
1520
1515
1510
1505
1500
1495
1490
1485
-100
0
100
200
300
400
500
600
700

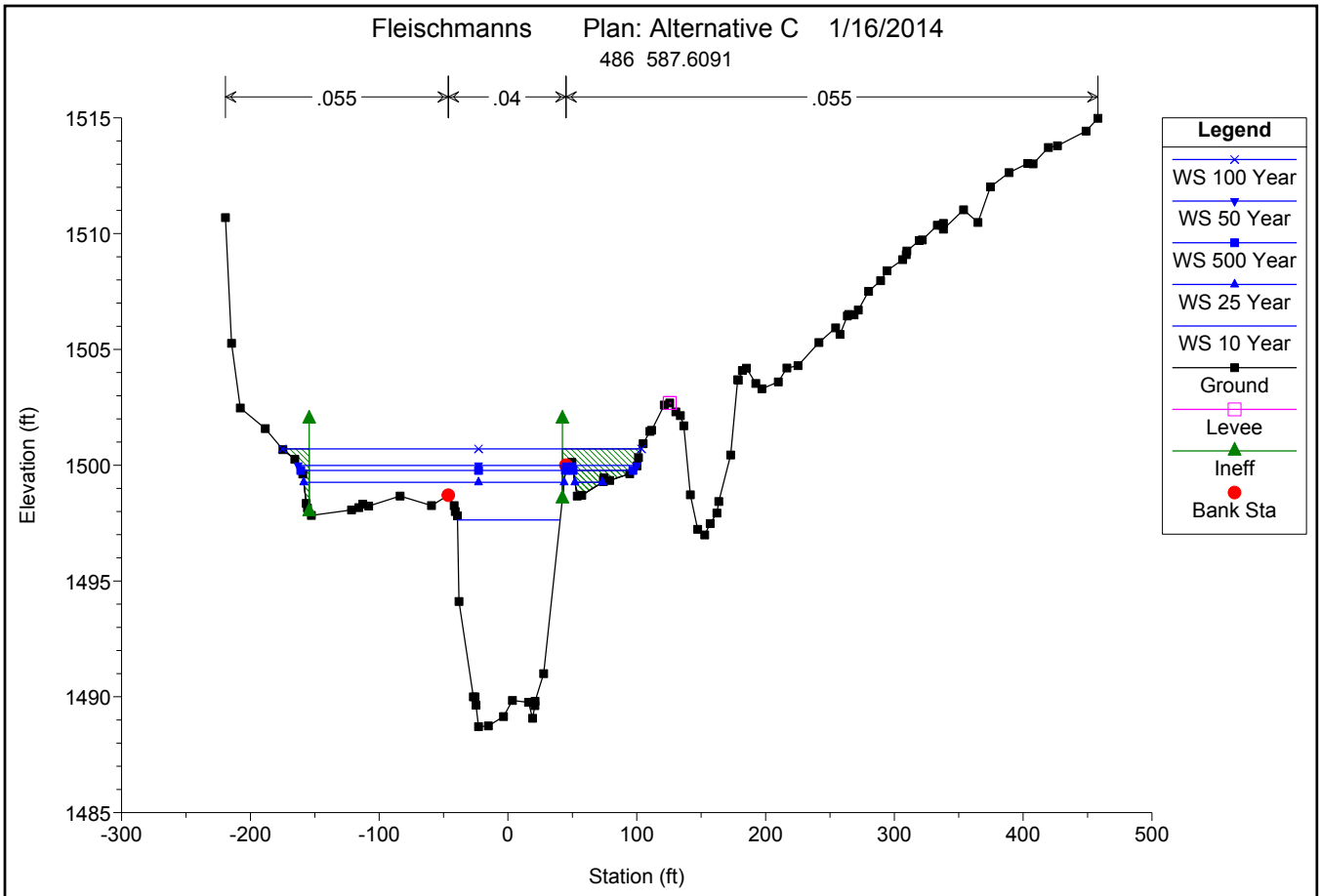

Fleischmanns Plan: Alternative C 1/16/2014
719 820.6844
.055
.04
.055
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 25 Year
WS 10 Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
1520
1515
1510
1505
1500
1495
1490
1485
-100
0
100
200
300
400
500
600

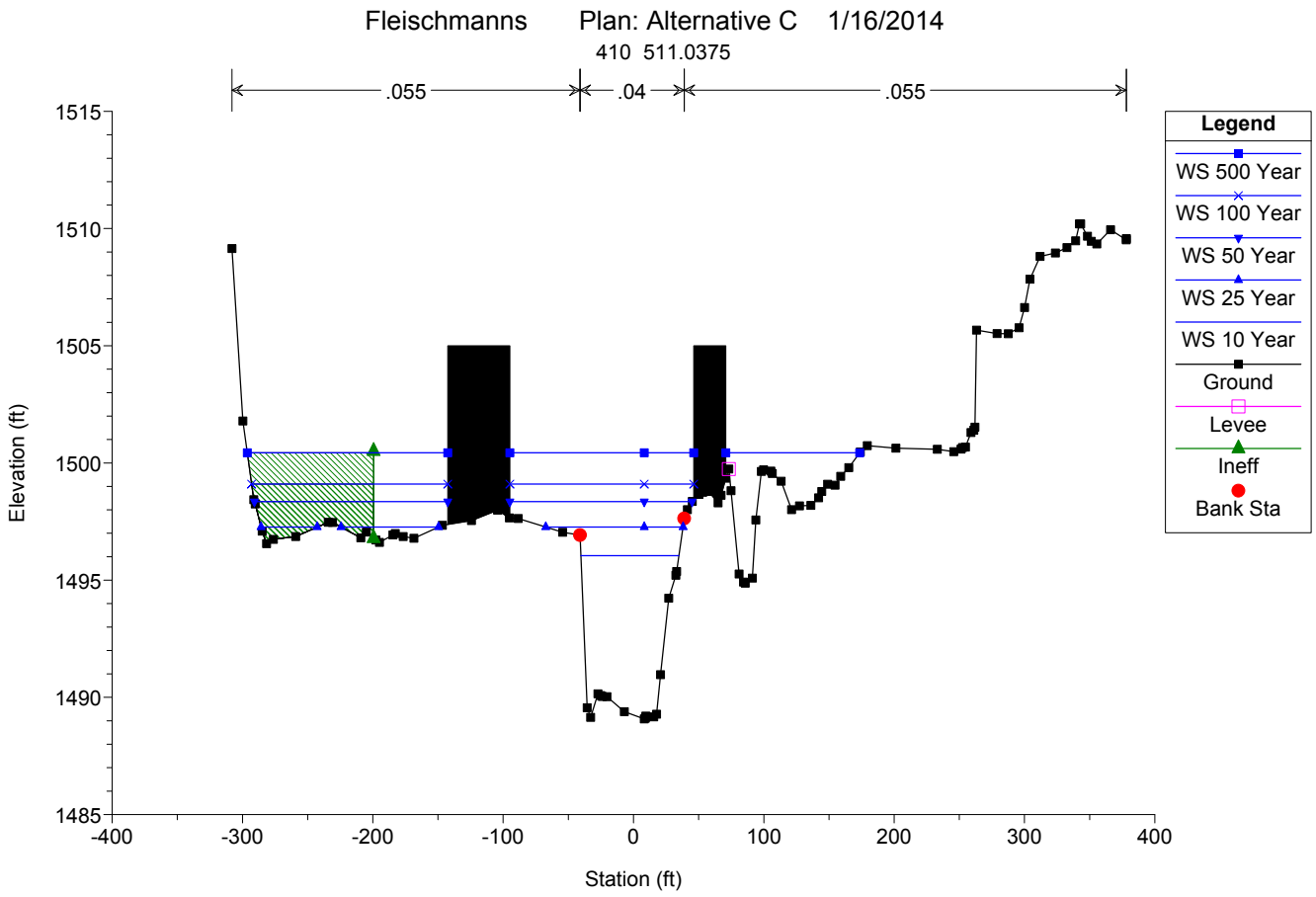

Fleischmanns Plan: Alternative C 1/16/2014
620 721.1794
.055
.04
.055
Elevation (ft)
Station (ft)
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 25 Year
WS 10 Year
Ground
Ineff
Bank Sta

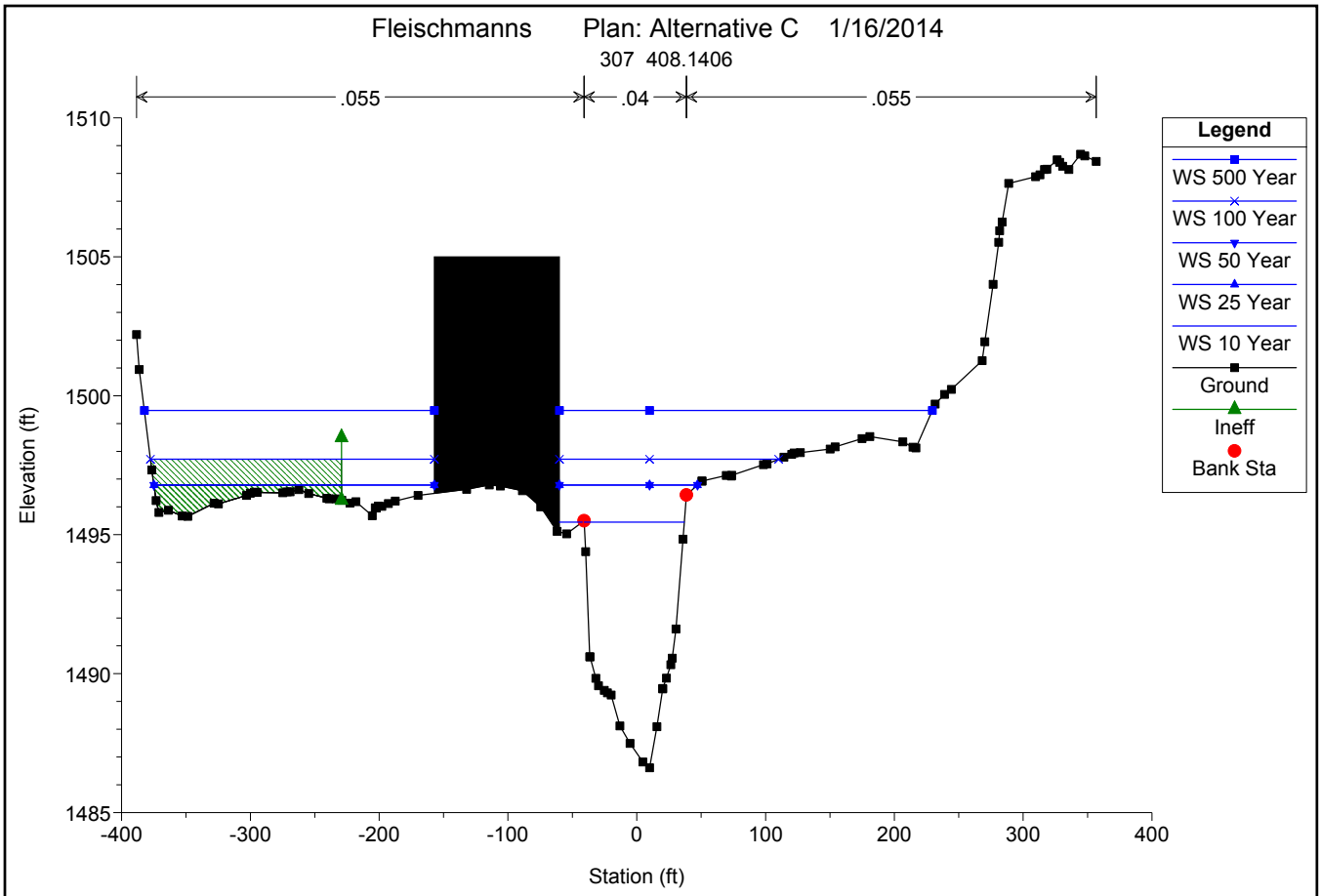

Fleischmanns Plan: Alternative C 1/16/2014
546 647.2308
.055
.04
.055
Elevation (ft)
Station (ft)
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 25 Year
WS 10 Year
Ground
Levee
Ineff
Bank Sta

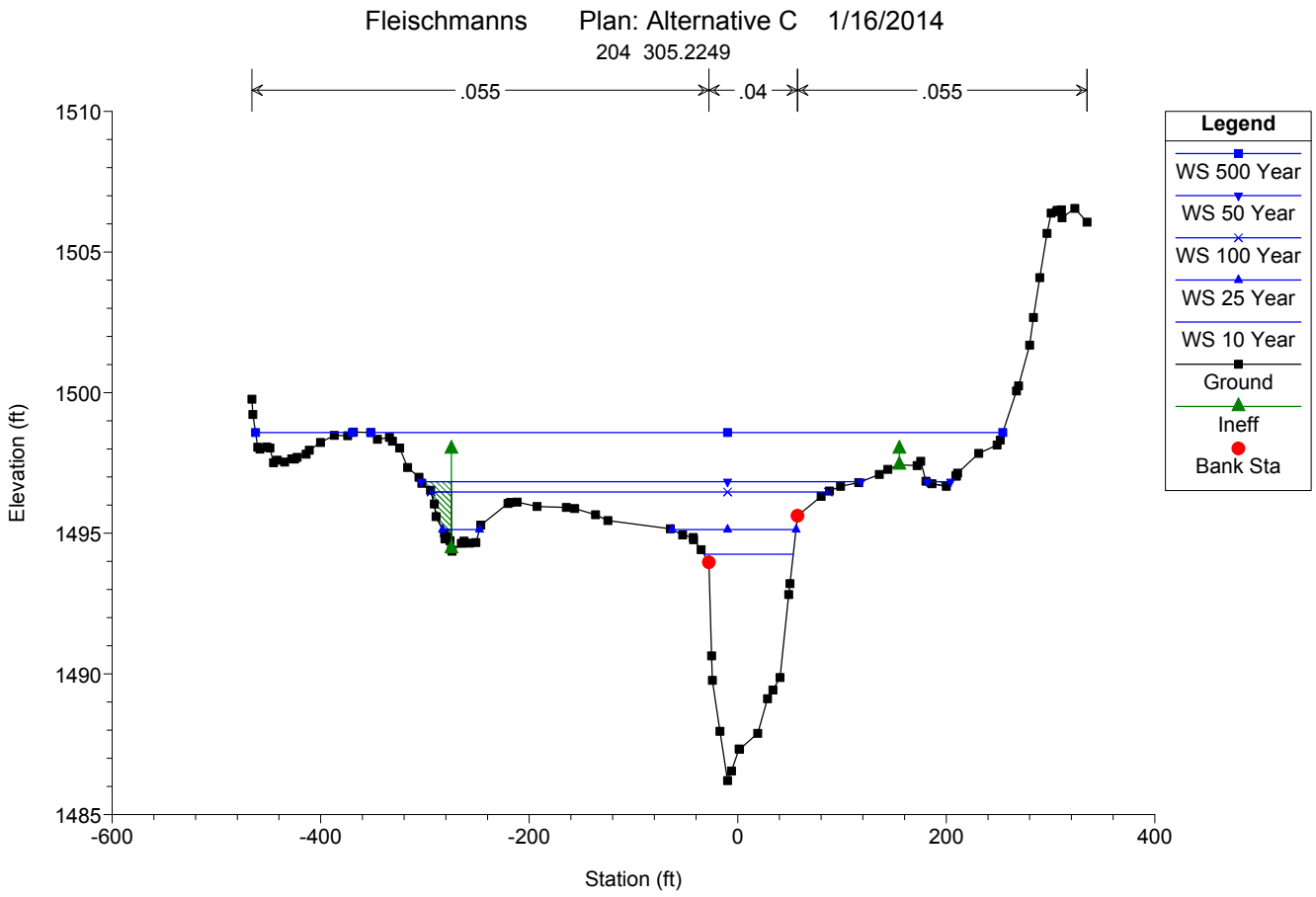

Fleischmanns Plan: Alternative C 1/16/2014
.055
.04
.055
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 25 Year
WS 10 Year
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
1520
1515
1510
1505
1500
1495
1490
1485
-200
-100
0
100
200
300
400
500

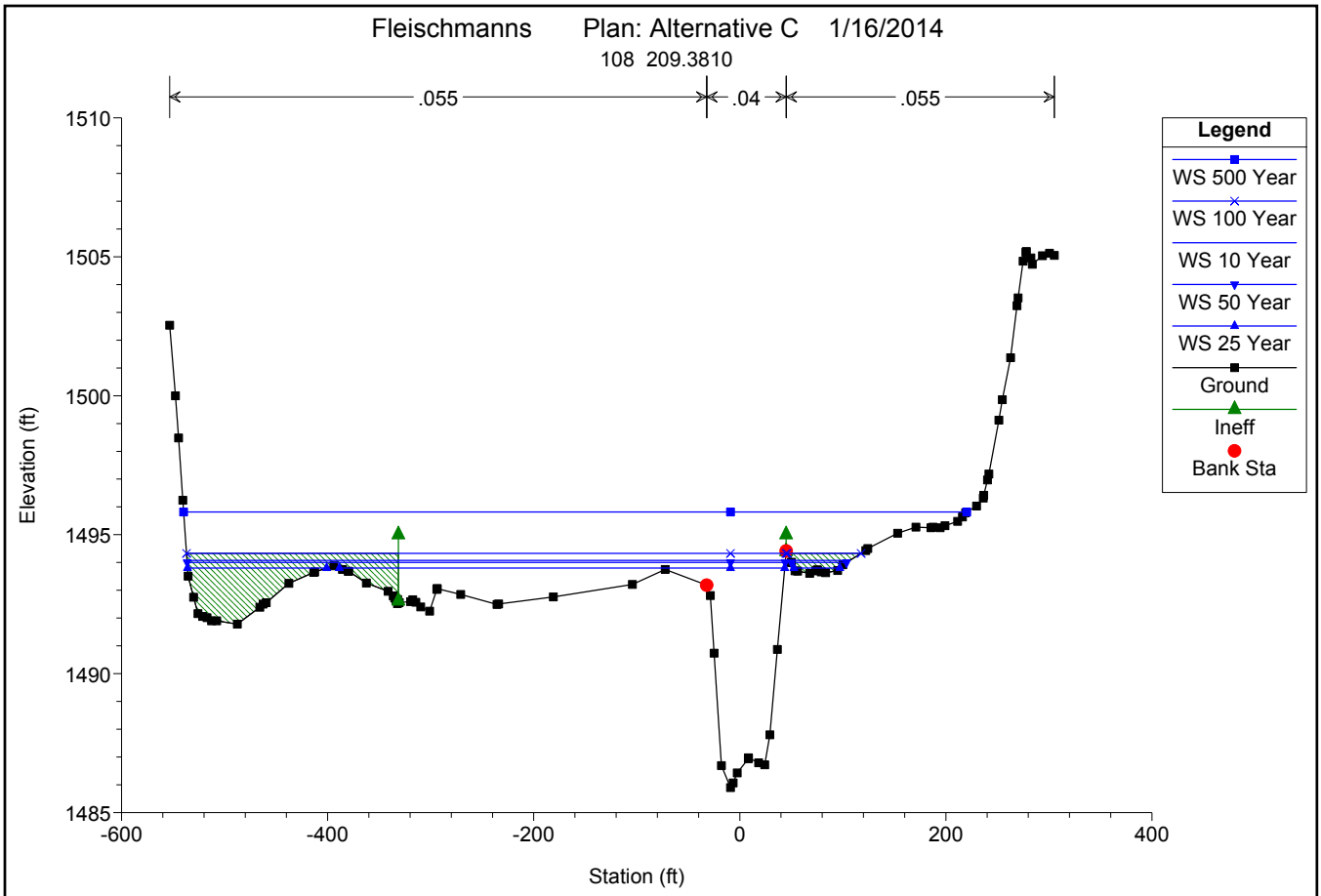

Fleischmanns Plan: Alternative C 1/16/2014
.055
.04
.055
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 25 Year
WS 10 Year
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
1515
1510
1505
1500
1495
1490
1485
-300
-200
-100
0
100
200
300
400
500

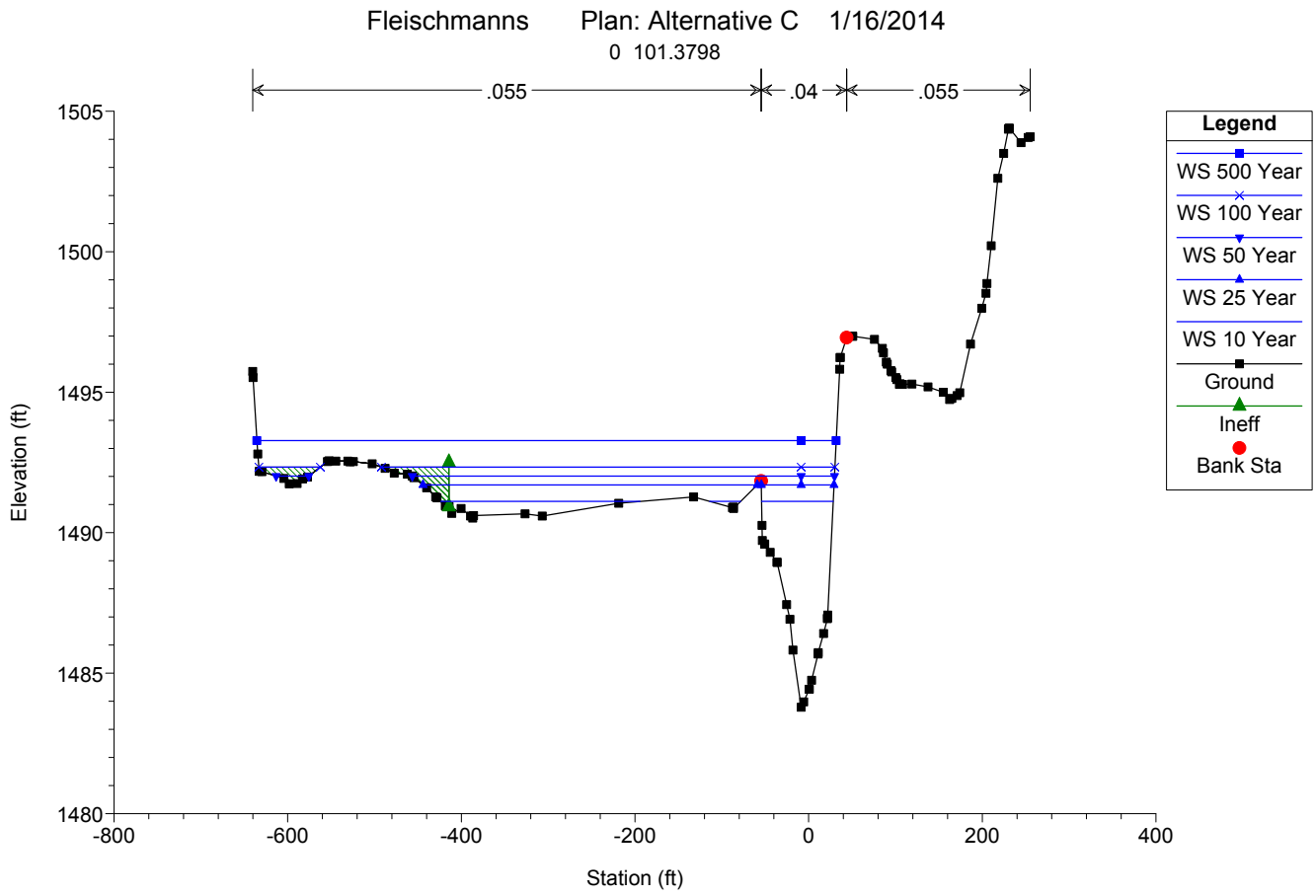

Fleischmanns Plan: Alternative C 1/16/2014
486 587.6091
.055
.04
.055
Elevation (ft)
Station (ft)
Legend
WS 100 Year
WS 50 Year
WS 500 Year
WS 25 Year
WS 10 Year
Ground
Levee
Ineff
Bank Sta


Fleischmanns Plan: Alternative C 1/16/2014
410 511.0375
.055
.04
.055
Elevation (ft)
Station (ft)
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 25 Year
WS 10 Year
Ground
Levee
Ineff
Bank Sta


Fleischmanns Plan: Alternative C 1/16/2014
307 408.1406
.055
.04
.055
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 25 Year
WS 10 Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
1510
1505
1500
1495
1490
1485
-400
-300
-200
-100
0
100
200
300
400


Fleischmanns Plan: Alternative C 1/16/2014
204 305.2249
.055
.04
.055
Legend
WS 500 Year
WS 50 Year
WS 100 Year
WS 25 Year
WS 10 Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
1510
1505
1500
1495
1490
1485
-600
-400
-200
0
200
400


Fleischmanns Plan: Alternative C 1/16/2014
108 209.3810
.055
.04
.055
Legend
WS 500 Year
WS 100 Year
WS 10 Year
WS 50 Year
WS 25 Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
1510
1505
1500
1495
1490
1485
-600
-400
-200
0
200
400


Fleischmanns Plan: Alternative C 1/16/2014
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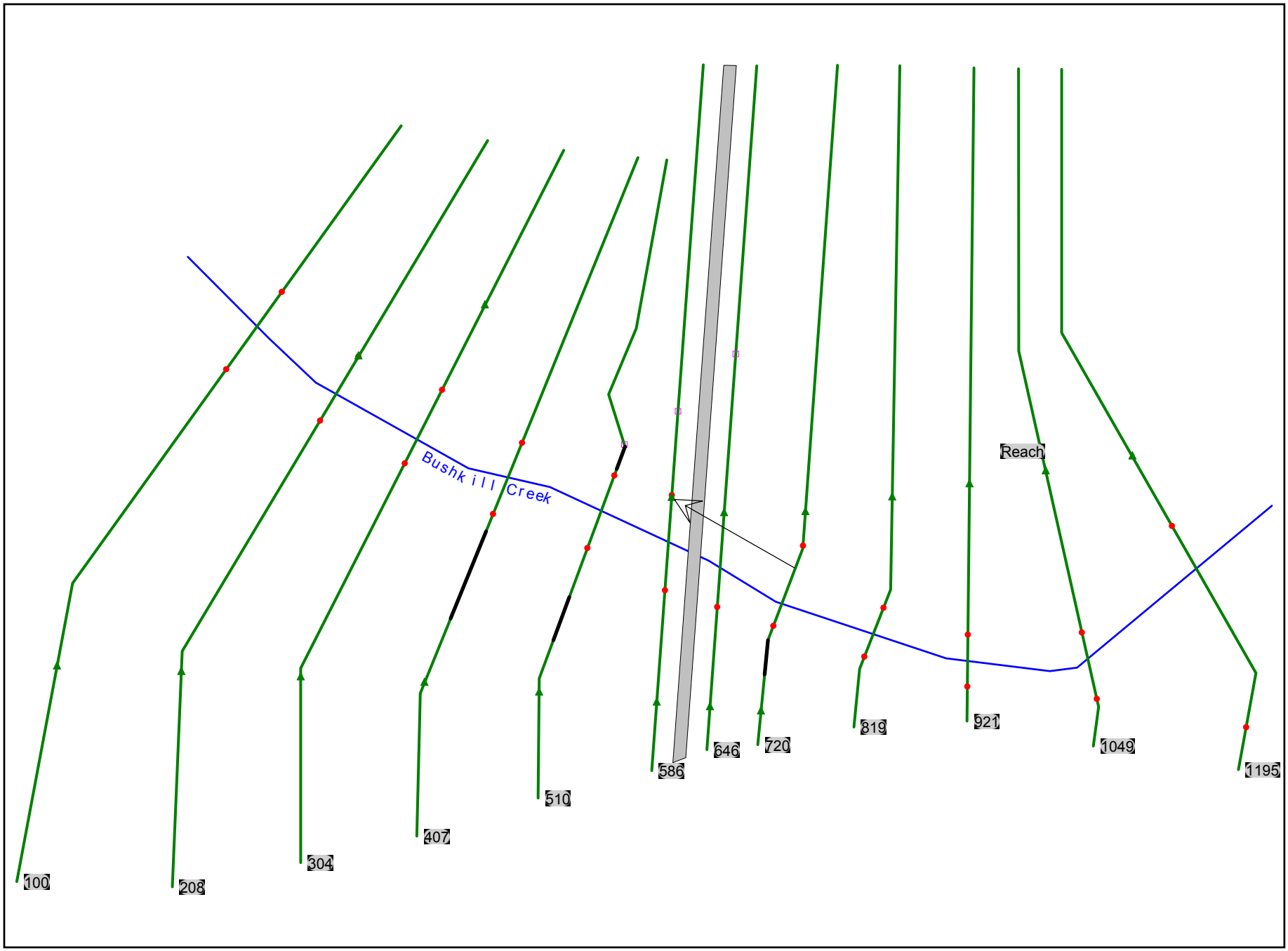
.055
.04
.055
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 25 Year
WS 10 Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
1505
1500
1495
1490
1485
1480
-800
-600
-400
-200
0
200
400


Bushkill Creek
Reach
100
208
304
407
510
586
646
720
819
921
1049
1195