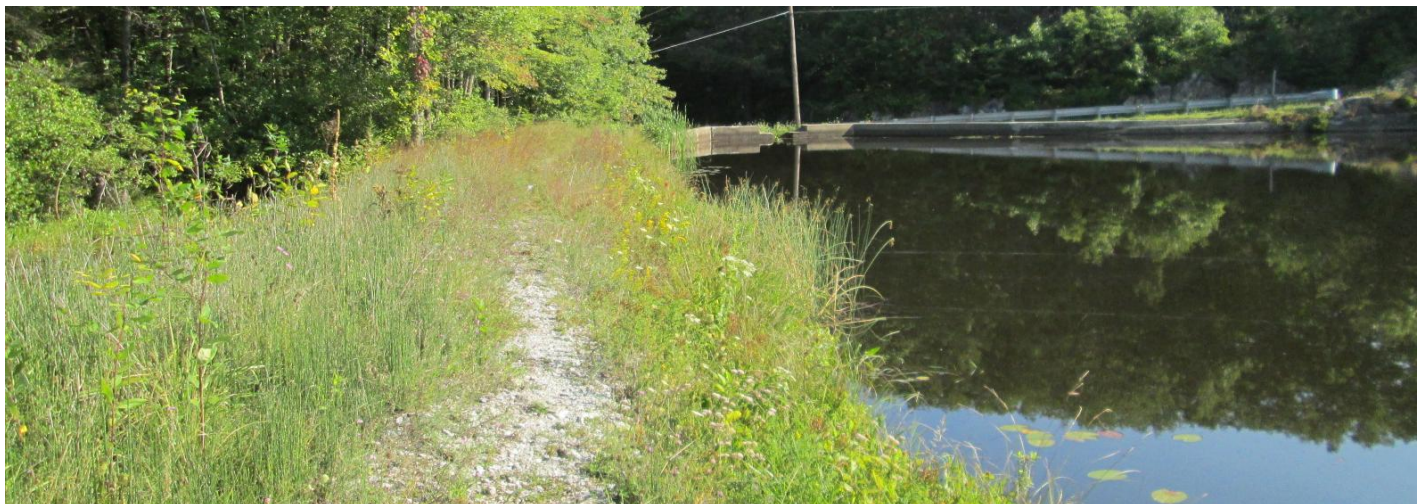


# ALTERNATIVES ANALYSIS REPORT

## HEATERS POND DAM

NJDEP FILE NO. 22-184

BOROUGH OF OGDENSBURG, SUSSEX COUNTY, NEW JERSEY



Prepared For:

Borough of Ogdensburg  
14 Highland Avenue  
Ogdensburg, NJ 07439

Prepared By:



MEMBER OF THE VAN CLEEF ENGINEERING GROUP

755 MEMORIAL PARKWAY – SUITE 110  
PHILLIPSBURG, NEW JERSEY 08865

CW Project#: NJ-SU-O-104  
Submitted: June 2, 2015











































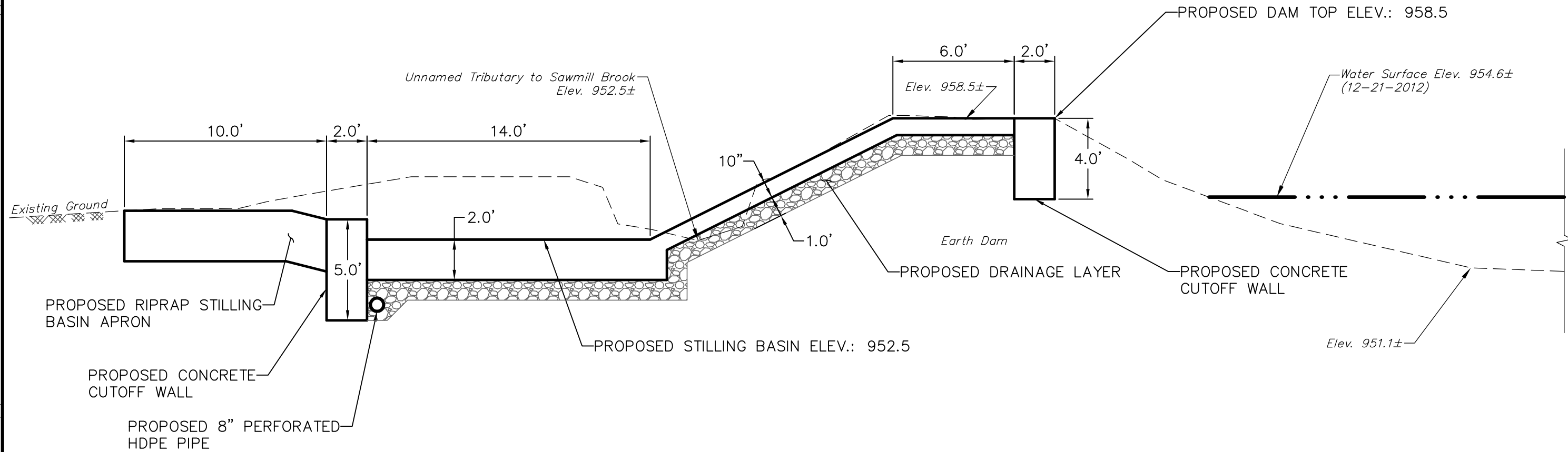


PLOT DATE: 07/29/2015 10:54:28 AM

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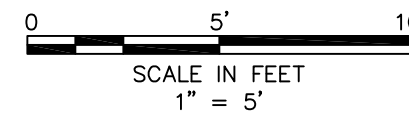
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# TYPICAL SECTION – REINFORCED CONCRETE

STA. 200+30± TO STA. 201+74±

SCALE 1" = 5'



A-6

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TYPICAL SECTION – REINFORCED CONCRETE

**HEATER'S POND DAM**  
**NJDEP FILE No.22-184**

OGDENSBURG BOROUGH, SUSSEX COUNTY, NEW JERSEY

## APPENDIX B

### Preliminary Hydraulic Calculations

Heaters Pond  
Comparison of Flows for Various Design Storms  
(from HEC-HMS model)

0.4 PMP	Existing	Alt. 2: 100' Aux. Spillway El. 957.25	Change from Existing	Alt. 3: 100' Aux. Spillway El. 954.75	Change from Existing
Subbasin-1	5,446.7	5,446.7	0.0	5,446.7	0.0
HP Dam	4,525.3	4,583.4	58.1	4,858.6	333.3
Reach-1	4,524.5	4,579.8	55.3	4,856.3	331.8
Reach-2	4,523.5	4,579.7	56.2	4,854.9	331.4
Reach-3	4,522.4	4,579.3	56.9	4,853.6	331.2
Reach-4	4,520.9	4,578.7	57.8	4,851.7	330.8
Reach-5	4,519.8	4,578.1	58.3	4,850.5	330.7
Subbasin-2	453.1	453.1	0.0	453.1	0.0
Junction-1	4,604.8	4,663.1	58.3	4,947.9	343.1
Reach-6	4,604.0	4,662.8	58.8	4,947.1	343.1
RR Emb Stor	4,601.1	4,662.4	61.3	4,944.4	343.3
Reach-7	4,599.3	4,661.4	62.1	4,944.3	345.0
Reach-8	4,598.4	4,660.4	62.0	4,944.2	345.8
Subbasin-3	518.3	518.3	0.0	518.3	0.0
Junction-2	4,697.0	4,759.5	62.5	5,054.7	357.7
Reach-9	4,695.7	4,758.8	63.1	5,053.5	357.8

0.3 PMP	Existing	Alt. 2: 100' Aux. Spillway El. 957.25	Change from Existing	Alt. 3: 100' Aux. Spillway El. 954.75	Change from Existing
Subbasin-1	3,862.4	3,862.4	0.0	3,862.4	0.0
HP Dam	3,126.8	3,234.7	107.9	3,433.8	307.0
Reach-1	3,124.6	3,234.2	109.6	3,430.6	306.0
Reach-2	3,124.4	3,233.5	109.1	3,429.3	304.9
Reach-3	3,124.1	3,232.8	108.7	3,429.2	305.1
Reach-4	3,123.5	3,231.7	108.2	3,428.9	305.4
Reach-5	3,123.1	3,230.9	107.8	3,428.6	305.5
Subbasin-2	322.0	322.0	0.0	322.0	0.0
Junction-1	3,181.4	3,292.8	111.4	3,494.5	313.1
Reach-6	3,181.1	3,292.3	111.2	3,494.5	313.4
RR Emb Stor	3,178.8	3,289.1	110.3	3,494.2	315.4
Reach-7	3,177.7	3,289.1	111.4	3,493.4	315.7
Reach-8	3,176.7	3,289.0	112.3	3,492.7	316.0
Subbasin-3	367.3	367.3	0.0	367.3	0.0
Junction-2	3,244.6	3,358.3	113.7	3,569.5	324.9
Reach-9	3,243.7	3,357.4	113.7	3,569.1	325.4



Heaters Pond  
Comparison of Flows for Various Design Storms  
(from HEC-HMS model)

100 YR	Existing	Alt. 2: 100' Aux. Spillway El. 957.25	Change from Existing	Alt. 3: 100' Aux. Spillway El. 954.75	Change from Existing	Alt. 4: Dam Removed	Change from Existing
Subbasin-1	2,857.7	2,857.7	0.0	2,857.7	0.0	2,607.1	-250.6
HP Dam	2,276.3	2,464.5	188.2	2,508.7	232.4	2,165.1	-111.2
Reach-1	2,275.2	2,462.7	187.5	2,507.2	232.0	2,163.8	-111.4
Reach-2	2,274.3	2,461.9	187.6	2,506.0	231.7	2,162.6	-111.7
Reach-3	2,273.5	2,461.7	188.2	2,504.8	231.3	2,162.0	-111.5
Reach-4	2,272.2	2,461.5	189.3	2,502.9	230.7	2,161.9	-110.3
Reach-5	2,272.2	2,461.1	188.9	2,501.5	229.3	2,161.7	-110.5
Subbasin-2	238.8	238.8	0.0	238.8	0.0	238.8	0.0
Junction-1	2,315.5	2,508.2	192.7	2,551.6	236.1	2,198.4	-117.1
Reach-6	2,314.8	2,508.1	193.3	2,550.6	235.8	2,198.3	-116.5
RR Emb Stor	2,166.0	2,435.3	269.3	2,449.9	283.9	1,863.7	-302.3
Reach-7	2,166.0	2,427.3	261.3	2,442.1	276.1	1,863.6	-302.4
Reach-8	2,165.5	2,422.4	256.9	2,434.3	268.8	1,863.5	-302.0
Subbasin-3	271.6	271.6	0.0	271.6	0.0	271.6	0.0
Junction-2	2,203.3	2,466.7	263.4	2,480.8	277.5	1,895.1	-308.2
Reach-9	2,202.4	2,466.7	264.3	2,473.5	271.1	1,895.0	-307.4

50 YR	Existing	Alt. 2: 100' Aux. Spillway El. 957.25	Change from Existing	Alt. 3: 100' Aux. Spillway El. 954.75	Change from Existing	Alt. 4: Dam Removed	Change from Existing
Subbasin-1	2,398.6	2,398.6	0.0	2,398.6	0.0	2,187.8	-210.8
HP Dam	1,902.3	2,046.4	144.1	2,045.5	143.2	1,777.6	-124.7
Reach-1	1,901.1	2,046.2	145.1	2,045.1	144.0	1,776.9	-124.2
Reach-2	1,900.1	2,045.8	145.7	2,044.6	144.5	1,776.4	-123.7
Reach-3	1,899.8	2,045.1	145.3	2,043.9	144.1	1,775.7	-124.1
Reach-4	1,899.7	2,044.2	144.5	2,042.8	143.1	1,774.7	-125.0
Reach-5	1,899.4	2,043.5	144.1	2,041.9	142.5	1,774.1	-125.3
Subbasin-2	200.5	200.5	0.0	200.5	0.0	200.5	0.0
Junction-1	1,935.5	2,083.7	148.2	2,082.1	146.6	1,805.4	-130.1
Reach-6	1,935.4	2,083.2	147.8	2,081.4	146.0	1,804.8	-130.6
RR Emb Stor	1,722.7	1,784.6	61.9	1,770.7	48.0	1,636.7	-86.0
Reach-7	1,722.5	1,784.5	62.0	1,770.7	48.2	1,636.5	-86.0
Reach-8	1,722.4	1,784.5	62.1	1,770.6	48.2	1,636.4	-86.0
Subbasin-3	227.6	227.6	0.0	227.6	0.0	227.6	0.0
Junction-2	1,752.6	1,815.7	63.1	1,802.1	49.5	1,664.5	-88.1
Reach-9	1,752.6	1,815.7	63.1	1,801.9	49.3	1,664.4	-88.2

Heaters Pond  
Comparison of Flows for Various Design Storms  
(from HEC-HMS model)

10 YR	Existing	Alt. 2: 100' Aux. Spillway El. 957.25	Change from Existing	Alt. 3: 100' Aux. Spillway El. 954.75	Change from Existing	Alt. 4: Dam Removed	Change from Existing
Subbasin-1	1,493.8	1,493.8	0.0	1,493.8	0.0	1,361.3	-132.5
HP Dam	1,178.0	1,256.2	78.2	1,207.3	29.3	1,014.3	-163.7
Reach-1	1,177.7	1,255.0	77.3	1,206.2	28.5	1,013.4	-164.3
Reach-2	1,177.3	1,254.8	77.5	1,205.4	28.1	1,013.3	-164.0
Reach-3	1,176.8	1,254.7	77.9	1,205.4	28.6	1,013.2	-163.6
Reach-4	1,176.0	1,254.4	78.4	1,205.1	29.1	1,013.0	-163.0
Reach-5	1,175.4	1,254.1	78.7	1,204.9	29.5	1,012.7	-162.7
Subbasin-2	125.0	125.0	0.0	125.0	0.0	125.0	0.0
Junction-1	1,199.2	1,279.2	80.0	1,228.7	29.5	1,031.4	-167.8
Reach-6	1,198.7	1,279.0	80.3	1,228.6	29.9	1,031.2	-167.5
RR Emb Stor	1,182.3	1,244.6	62.3	1,207.4	25.1	1,022.2	-160.1
Reach-7	1,182.1	1,244.6	62.5	1,207.4	25.3	1,021.9	-160.2
Reach-8	1,181.9	1,244.5	62.6	1,207.4	25.5	1,021.6	-160.3
Subbasin-3	140.9	140.9	0.0	140.9	0.0	140.9	0.0
Junction-2	1,205.8	1,268.9	63.1	1,231.6	25.8	1,041.7	-164.1
Reach-9	1,205.6	1,268.6	63.0	1,231.4	25.8	1,041.4	-164.2

**Existing Dam, using dimensions from HEC-HMS model**

**A. Spillway 1**

Length	W <sub>D</sub> Inv.	Depth	C	Q	elevation
3.5	957.0	10	3.33	369	967.0
3.5	957.0	9	3.33	315	966.0
3.5	957.0	8	3.33	264	965.0
3.5	957.0	7	3.33	216	964.0
3.5	957.0	6	3.33	171	963.0
3.5	957.0	5	3.33	130	962.0
3.5	957.0	4	3.33	93	961.0
3.5	957.0	3	3.33	61	960.0
3.5	957.0	2	3.33	33	959.0
3.5	957.0	1	3.33	12	958.0
3.5	957.0	0	3.33	0	957.0

**B. Spillway 2**

Length	W <sub>D</sub> Inv.	Depth	C	Q	elevation
4.8	957.5	9.5	2.68	377	967.0
4.8	957.5	8.5	2.68	319	966.0
4.8	957.5	7.5	2.68	264	965.0
4.8	957.5	6.5	2.68	213	964.0
4.8	957.5	5.5	2.68	166	963.0
4.8	957.5	4.5	2.68	123	962.0
4.8	957.5	3.5	2.68	84	961.0
4.8	957.5	2.5	2.68	51	960.0
4.8	957.5	1.5	2.68	24	959.0
4.8	957.5	0.5	2.68	5	958.0
4.8	957.5	0	2.68	0	957.5

**C. Spillway 3**

Length	W <sub>D</sub> Inv.	Depth	C	Q	elevation
60	958.6	9.4	2.68	4,634	968.0
60	958.6	8.4	2.68	3,915	967.0
60	958.6	7.4	2.68	3,237	966.0
60	958.6	6.4	2.68	2,603	965.0
60	958.6	5.4	2.68	2,018	964.0
60	958.6	4.4	2.68	1,484	963.0
60	958.6	3.4	2.68	1,008	962.0
60	958.6	2.4	2.68	598	961.0
60	958.6	1.4	2.68	266	960.0
60	958.6	0.4	2.68	41	959.0
60	958.6	0	2.68	0	958.6

**D. Spillway 4 (existing bypass)**

Length	Inv.	Depth	C	Q	elevation
40	958.0	10	2.6	3,289	968.0
40	958.0	9	2.6	2,808	967.0
40	958.0	8	2.6	2,353	966.0
40	958.0	7	2.6	1,926	965.0
40	958.0	6	2.6	1,528	964.0
40	958.0	5	2.6	1,163	963.0
40	958.0	4	2.6	832	962.0
40	958.0	3	2.6	540	961.0
40	958.0	2	2.6	294	960.0
40	958.0	1	2.6	104	959.0
40	958.0	0	2.6	0	958.0

**E. Dam Top 1**

**Part 1 - beginning slope**

Slope (ft/ft)	H Length	W <sub>D</sub> Inv.	Ave D	C	Q	elevation
0.105714	70	958.6	3.7	2.63	1,310	966.0
0.105714	60.541	958.6	3.2	2.63	911	965.0
0.105714	51.081	958.6	2.7	2.63	596	964.0
0.105714	41.622	958.6	2.2	2.63	357	963.0
0.105714	32.162	958.6	1.7	2.63	187	962.0
0.105714	22.703	958.6	1.2	2.63	78	961.0
0.105714	13.243	958.6	0.7	2.63	20	960.0
0.105714	3.7838	958.6	0.2	2.63	1	959.0
0.105714	0	958.6	0	2.63	0	958.6

0	966	
70	0.1057	1
70	958.6	
35	0.0171	2
105	958	
5	0	3
110	958	
25	0.032	4
135	958.8	
30	0.0067	5
165	959	
80	0	6
245	959	
25	0.28	7
270	966	

**Part 2 -** crest slope = 0.01714  
 El Lt. = 958.6 El Rt. = 958

Length	Ave. Inv.	Ave. D	C	Q	elevation
35	958.3	7.7	2.63	1,967	966.0
35	958.3	6.7	2.63	1,596	965.0
35	958.3	5.7	2.63	1,253	964.0
35	958.3	4.7	2.63	938	963.0
35	958.3	3.7	2.63	655	962.0
35	958.3	2.7	2.63	408	961.0
35	958.3	1.7	2.63	204	960.0
35	958.3	0.7	2.63	54	959.0
35	958.3	0	2.63	0	958.3

**Part 3 - Level**

Length	W <sub>D</sub> Inv.	Depth	C	Q	elevation
5	958.0	8	2.63	298	966.0
5	958.0	7	2.63	244	965.0
5	958.0	6	2.63	193	964.0
5	958.0	5	2.63	147	963.0
5	958.0	4	2.63	105	962.0
5	958.0	3	2.63	68	961.0
5	958.0	2	2.63	37	960.0
5	958.0	1	2.63	13	959.0
5	958.0	0	2.63	0	958.0

**Part 4 -** crest slope = 0.032  
 El Lt. = 958 El Rt. = 958.8

Length	Ave. Inv.	Ave. D	C	Q	elevation
25	958.4	7.6	2.63	1,378	966.0
25	958.4	6.6	2.63	1,115	965.0
25	958.4	5.6	2.63	871	964.0
25	958.4	4.6	2.63	649	963.0
25	958.4	3.6	2.63	449	962.0
25	958.4	2.6	2.63	276	961.0
25	958.4	1.6	2.63	133	960.0
25	958.4	0.6	2.63	31	959.0
25	958.4	0	2.63	0	958.4

Heaters Pond Dam existing

**Part 5 -** crest slope = 0.00667  
 El Lt. = 958.8 El Rt. = 959

Length	Ave. Inv.	Ave. D	C	Q	elevation
25	958.9	7.1	2.63	1,244	966.0
25	958.9	6.1	2.63	991	965.0
25	958.9	5.1	2.63	757	964.0
25	958.9	4.1	2.63	546	963.0
25	958.9	3.1	2.63	359	962.0
25	958.9	2.1	2.63	200	961.0
25	958.9	1.1	2.63	76	960.0
25	958.9	0.1	2.63	2	959.0
25	958.9	0	2.63	0	958.9

**Part 6 - Level**

Length	W <sub>D</sub> Inv.	Depth	C	Q	elevation
80	959.0	7	2.63	3,897	966.0
80	959.0	6	2.63	3,092	965.0
80	959.0	5	2.63	2,352	964.0
80	959.0	4	2.63	1,683	963.0
80	959.0	3	2.63	1,093	962.0
80	959.0	2	2.63	595	961.0
80	959.0	1	2.63	210	960.0
80	959.0	0	2.63	0	959.0

**Part 7 - end slope**

Slope (ft/ft)	H Length	W <sub>D</sub> Inv.	Ave D	C	Q	elevation
0.28	25	959.0	3.5	2.63	431	966.0
0.28	21.429	959.0	3	2.63	293	965.0
0.28	17.857	959.0	2.5	2.63	186	964.0
0.28	14.286	959.0	2	2.63	106	963.0
0.28	10.714	959.0	1.5	2.63	52	962.0
0.28	7.1429	959.0	1	2.63	19	961.0
0.28	3.5714	959.0	0.5	2.63	3	960.0
0.28	0	959.0	0	2.63	0	959.0

**Combined Flow**

elevation	Q <sub>A</sub>	Q <sub>B</sub>	Q <sub>C</sub>	Q <sub>D</sub>	Q <sub>E1</sub>	Q <sub>E2</sub>	Q <sub>E3</sub>	Q <sub>E4</sub>	Q <sub>E5</sub>	Q <sub>E6</sub>	Q <sub>E7</sub>	TOTAL
966.0	315	319	3,237	2,353	1,310	1,967	298	1,378	1,244	3,897	431	16,747
965.0	264	264	2,603	1,926	911	1,596	244	1,115	991	3,092	293	13,299
964.0	216	213	2,018	1,528	596	1,253	193	871	757	2,352	186	10,184
963.0	171	166	1,484	1,163	357	938	147	649	546	1,683	106	7,410
962.0	130	123	1,008	832	187	655	105	449	359	1,093	52	4,994
961.0	93	84	598	540	78	408	68	276	200	595	19	2,961
960.0	61	51	266	294	20	204	37	133	76	210	3	1,356
959.0	33	24	41	104	1	54	13	31	2	0	0	302
958.0	12	5		0								16
957.0	0											0
956.0												
955.0												
954.0												
953.0												
952.0												
951.5												
951.0												

**Note:** The above calculations represent the spillways and dam top as modeled in HEC-HMS for existing conditions. A comparison to HEC-HMS time-series output verifies that the above methodology gives very close correlation to the HEC-HMS model. For the dam removal option, the outflow channel will perform as a channel rather than a weir, so HEC-HMS cannot directly model the dam removal as a reservoir. Instead the above calculations were modified to use open channel flow for the outlet while the remaining portion of the dam is modeled as a wier.

**Dam Removal**

**A. trapezoidal swale (channel) (replaces existing spillway)**

bottom W <sub>C</sub>	side slope	depth (ft)	area (s.f.)	wetted perimeter	hydrauli c radius	channel slope	n	V	Q	top width	Froude Number	Elevation
6	2 :1	15.0	298.0	23.89	12.47	0.015	0.04	24.5	7,293	22	1.17	966.0
6	2 :1	14.0	276.0	23.89	11.55	0.015	0.04	23.3	6,418	22	1.16	965.0
6	2 :1	13.0	254.0	23.89	10.63	0.015	0.04	22.0	5,588	22	1.14	964.0
6	2 :1	12.0	232.0	23.89	9.71	0.015	0.04	20.7	4,805	22	1.12	963.0
6	2 :1	11.0	210.0	23.89	8.79	0.015	0.04	19.4	4,070	22	1.11	962.0
6	2 :1	10.0	188.0	23.89	7.87	0.015	0.04	18.0	3,384	22	1.09	961.0
6	2 :1	9.0	166.0	23.89	6.95	0.015	0.04	16.6	2,750	22	1.06	960.0
6	2 :1	8.0	144.0	23.89	6.03	0.015	0.04	15.1	2,170	22	1.04	959.0
6	2 :1	7.0	122.0	23.89	5.11	0.015	0.04	13.5	1,646	22	1.01	958.0
6	2 :1	6.0	100.0	23.89	4.19	0.015	0.04	11.8	1,182	22	0.98	957.0
6	2 :1	5.0	78.0	23.89	3.27	0.015	0.04	10.0	781	22	0.94	956.0
6	2 :1	4.0	56.0	23.89	2.34	0.015	0.04	8.0	450	22	0.89	955.0
6	2 :1	3.0	36.0	19.42	1.85	0.015	0.04	6.9	247	18	0.86	954.0
6	2 :1	2.0	20.0	14.94	1.34	0.015	0.04	5.5	111	14	0.81	953.0
6	2 :1	1.0	8.0	10.47	0.76	0.015	0.04	3.8	30	10	0.75	952.0
6	2 :1	0.5	3.5	8.24	0.42	0.015	0.04	2.6	9	8	0.69	951.5

full flow

W<sub>A</sub> invert 951.0  
depth (ft) = 4

**B. trapezoidal swale (overbanks) (replaces existing spillway)**

bottom W <sub>R</sub>	side slope	depth (ft)	area (s.f.)	wetted perimeter	hydrauli c radius	channel slope	n	V	Q	top width	Froude Number	elevation
25	0 :1	11.0	355.0	33.25	10.68	0.015	0.06	14.7	5,222	33	0.79	966.0
25	0 :1	10.0	322.0	33.25	9.69	0.015	0.06	13.8	4,438	33	0.78	965.0
25	0 :1	9.0	289.0	33.25	8.69	0.015	0.06	12.8	3,706	33	0.76	964.0
25	0 :1	8.0	256.0	33.25	7.70	0.015	0.06	11.8	3,028	33	0.75	963.0
25	0 :1	7.0	223.0	33.25	6.71	0.015	0.06	10.8	2,406	33	0.73	962.0
25	0 :1	6.0	190.0	33.25	5.71	0.015	0.06	9.7	1,842	33	0.71	961.0
25	0 :1	5.0	157.0	33.25	4.72	0.015	0.06	8.5	1,340	33	0.69	960.0
25	0 :1	4.0	124.0	33.25	3.73	0.015	0.06	7.3	905	33	0.66	959.0
25	0 :1	3.0	91.0	33.25	2.74	0.015	0.06	5.9	540	33	0.63	958.0
25	4 :1	2.0	58.0	33.25	1.74	0.015	0.06	4.4	255	33	0.58	957.0
25	4 :1	1.0	27.0	29.12	0.93	0.015	0.06	2.9	78	29	0.53	956.0
25	4 :1	0.5	13.0	27.06	0.48	0.015	0.06	1.9	24	27	0.47	955.5

top

W<sub>C</sub> invert 955.0

**C. Spillway 3 (modified: original length 60')**

Length	W <sub>D</sub> Inv.	Depth	C	Q	elevation
40	958.6	9.4	2.68	3,089	968.0
40	958.6	8.4	2.68	2,610	967.0
40	958.6	7.4	2.68	2,158	966.0
40	958.6	6.4	2.68	1,736	965.0
40	958.6	5.4	2.68	1,345	964.0
40	958.6	4.4	2.68	989	963.0
40	958.6	3.4	2.68	672	962.0
40	958.6	2.4	2.68	399	961.0
40	958.6	1.4	2.68	178	960.0
40	958.6	0.4	2.68	27	959.0
40	958.6	0	2.68	0	958.6

**D. Spillway 4 (existing bypass) (no change)**

Length	Inv.	Depth	C	Q	elevation
40	958.0	10	2.6	3,289	968.0
40	958.0	9	2.6	2,808	967.0
40	958.0	8	2.6	2,353	966.0
40	958.0	7	2.6	1,926	965.0
40	958.0	6	2.6	1,528	964.0
40	958.0	5	2.6	1,163	963.0
40	958.0	4	2.6	832	962.0
40	958.0	3	2.6	540	961.0
40	958.0	2	2.6	294	960.0
40	958.0	1	2.6	104	959.0
40	958.0	0	2.6	0	958.0

E. Dam Top 1

**Part 1 - beginning slope (no change)**

Slope (ft/f)	H Length	W <sub>D</sub> Inv.	Ave D	C	Q	elevation
0.1057	70	958.6	3.7	2.63	1,310	966.0
0.1057	60.541	958.6	3.2	2.63	911	965.0
0.1057	51.081	958.6	2.7	2.63	596	964.0
0.1057	41.622	958.6	2.2	2.63	357	963.0
0.1057	32.162	958.6	1.7	2.63	187	962.0
0.1057	22.703	958.6	1.2	2.63	78	961.0
0.1057	13.243	958.6	0.7	2.63	20	960.0
0.1057	3.7838	958.6	0.2	2.63	1	959.0
0.1057	0	958.6	0	2.63	0	958.6

0	966		
70	0.1057	1	
70	958.6		
35	0.0171	2	
105	958		
5	0	3	
110	958		
25	0.032	4	
135	958.8		
30	0.0067	5	
165	959		
80	0	6	
245	959		
25	0.28	7	
270	966		

**Part 2 (modified: original length 35')**

EI Lt. = 958      EI Rt. = 958

Length	Ave. Inv.	Ave. D	C	Q	elevation
10	958.3	7.7	2.63	562	966.0
10	958.3	6.7	2.63	456	965.0
10	958.3	5.7	2.63	358	964.0
10	958.3	4.7	2.63	268	963.0
10	958.3	3.7	2.63	187	962.0
10	958.3	2.7	2.63	117	961.0
10	958.3	1.7	2.63	58	960.0
10	958.3	0.7	2.63	15	959.0
10	958.3	0	2.63	0	958.3

**Part 3 - Level (no change)**

Length	W <sub>D</sub> Inv.	Depth	C	Q	elevation
5	958.0	8	2.63	298	966.0
5	958.0	7	2.63	244	965.0
5	958.0	6	2.63	193	964.0
5	958.0	5	2.63	147	963.0
5	958.0	4	2.63	105	962.0
5	958.0	3	2.63	68	961.0
5	958.0	2	2.63	37	960.0
5	958.0	1	2.63	13	959.0
5	958.0	0	2.63	0	958.0

**Part 4 (no change) crest slope = 0.032**

EI Lt. = 958      EI Rt. = 958.8

Length	Ave. Inv.	Ave. D	C	Q	elevation
25	958.4	7.6	2.63	1,378	966.0
25	958.4	6.6	2.63	1,115	965.0
25	958.4	5.6	2.63	871	964.0
25	958.4	4.6	2.63	649	963.0
25	958.4	3.6	2.63	449	962.0
25	958.4	2.6	2.63	276	961.0
25	958.4	1.6	2.63	133	960.0
25	958.4	0.6	2.63	31	959.0
25	958.4	0	2.63	0	958.4

**Part 5 (no change) crest slope = 0.00667**

EI Lt. = 958.8      EI Rt. = 959

Length	Ave. Inv.	Ave. D	C	Q	elevation
25	958.9	7.1	2.63	1,244	966.0
25	958.9	6.1	2.63	991	965.0
25	958.9	5.1	2.63	757	964.0
25	958.9	4.1	2.63	546	963.0
25	958.9	3.1	2.63	359	962.0
25	958.9	2.1	2.63	200	961.0
25	958.9	1.1	2.63	76	960.0
25	958.9	0.1	2.63	2	959.0
25	958.9	0	2.63	0	958.9

**Part 6 - Level (no change)**

Length	W <sub>D</sub> Inv.	Depth	C	Q	elevation
80	959.0	8	2.63	4,761	967.0
80	959.0	7	2.63	3,897	966.0
80	959.0	6	2.63	3,092	965.0
80	959.0	5	2.63	2,352	964.0
80	959.0	4	2.63	1,683	963.0
80	959.0	3	2.63	1,093	962.0
80	959.0	2	2.63	595	961.0
80	959.0	1	2.63	210	960.0
80	959.0	0	2.63	0	959.0

**Part 7 - end slope (no change)**

Slope (ft/fH)	Length	W <sub>D</sub> Inv.	Ave D	C	Q	elevation
0.28	28.571	959.0	4	2.63	601	967.0
0.28	25	959.0	3.5	2.63	431	966.0
0.28	21.429	959.0	3	2.63	293	965.0
0.28	17.857	959.0	2.5	2.63	186	964.0
0.28	14.286	959.0	2	2.63	106	963.0
0.28	10.714	959.0	1.5	2.63	52	962.0
0.28	7.1429	959.0	1	2.63	19	961.0
0.28	3.5714	959.0	0.5	2.63	3	960.0
0.28	0	959.0	0	2.63	0	959.0

**Combined Flow after removal of dam: Existing model modified to remove spillway and part of dam**

elevation	Q <sub>A</sub>	Q <sub>B</sub>	Q <sub>C</sub>	Q <sub>D</sub>	Q <sub>E1</sub>	Q <sub>E2</sub>	Q <sub>E3</sub>	Q <sub>E4</sub>	Q <sub>E5</sub>	Q <sub>E6</sub>	Q <sub>E7</sub>	Q <sub>TOTAL</sub>	elevation	existing Q
966.0	7,293	5,222	2,158	2,353	1,310	562	298	1,378	1,244	3,897	431	<b>26,144</b>	<b>966.0</b>	16,747
965.0	6,418	4,438	1,736	1,926	911	456	244	1,115	991	3,092	293	<b>21,619</b>	<b>965.0</b>	13,299
964.0	5,588	3,706	1,345	1,528	596	358	193	871	757	2,352	186	<b>17,482</b>	<b>964.0</b>	10,184
963.0	4,805	3,028	989	1,163	357	268	147	649	546	1,683	106	<b>13,741</b>	<b>963.0</b>	7,410
962.0	4,070	2,406	672	832	187	187	105	449	359	1,093	52	<b>10,413</b>	<b>962.0</b>	4,994
961.0	3,384	1,842	399	540	78	117	68	276	200	595	19	<b>7,519</b>	<b>961.0</b>	2,961
960.0	2,750	1,340	178	294	20	58	37	133	76	210	3	<b>5,101</b>	<b>960.0</b>	1,356
959.0	2,170	905	27	104	1	15	13	31	2	0	0	<b>3,268</b>	<b>959.0</b>	302
958.0	1,646	540		0								<b>2,186</b>	<b>958.0</b>	16
957.0	1,182	255										<b>1,437</b>	<b>957.0</b>	0
956.0	781	78										<b>859</b>	<b>956.0</b>	
955.0	450											<b>450</b>	<b>955.0</b>	
954.0	247											<b>247</b>	<b>954.0</b>	
953.0	111											<b>111</b>	<b>953.0</b>	
952.0	30											<b>30</b>	<b>952.0</b>	
951.5	9											<b>9</b>	<b>951.5</b>	
951.0	0											<b>0</b>	<b>951.0</b>	



Heaters Pond Dam - Interpolation of Downstream Water Surface Elevation, Alternatives 2 and 3

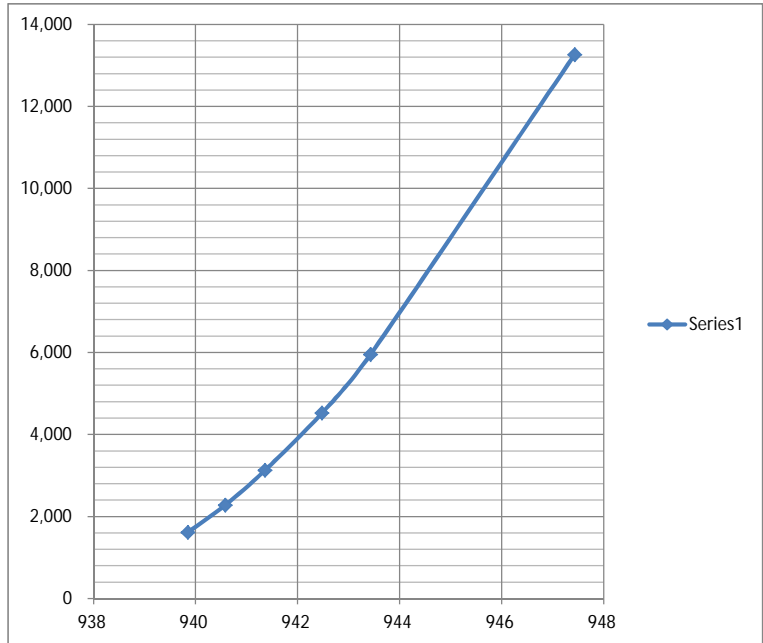
from HEC-RAS Upper, 2/2015

Hydrology & Hydraulics Report		Q Total	W.S. Elev	Incr. from
River Sta	Plan	(cfs)	(ft)	previous
39+08	Sunny Day Breach	1,615	939.85	
39+08	100y HP ot RR ot	2,275	940.58	90.41
39+08	0.3 PMP HP ot RR ot	3,125	941.36	108.97
39+08	0.4 PMP HP ot RR ot	4,525	942.48	125.00
39+08	0.5 PMP HP ot RR ot	5,953	943.43	150.32
39+08	PMP HP ot RR ot	13,261	947.43	182.70

3908 100Y HPOT_RROT			
Alt 2	flow incr at current sta	189.0	
	elev incr due to flow incr	0.17	941.53
Alt 3	flow incr at current sta	232.0	
	elev incr due to flow incr	0.21	940.79

3908 0.3PMP HPOT RROT			
Alt 2	flow incr at current sta	108.0	
	elev incr due to flow incr	0.09	947.52
Alt 3	flow incr at current sta	307.0	
	elev incr due to flow incr	0.25	941.61

3908 0.4PMP HPOT RROT			
Alt 2	flow incr at current sta	58.0	
	elev incr due to flow incr	0.04	942.52
Alt 3	flow incr at current sta	333.0	
	elev incr due to flow incr	0.22	942.70



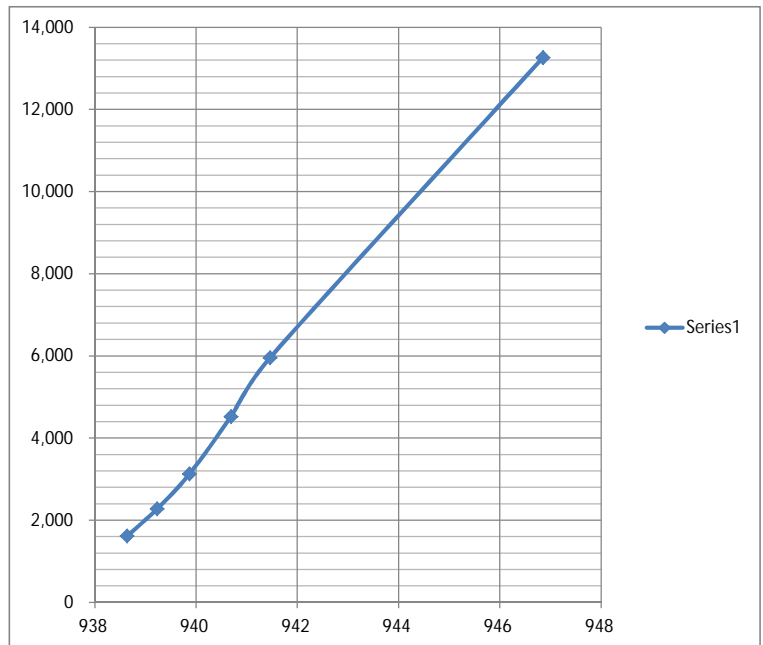
from HEC-RAS Upper, 2/2015

Hydrology & Hydraulics Report		Q Total	W.S. Elev	Incr. from
River Sta	Plan	(cfs)	(ft)	previous
38+88	Sunny Day Breach	1,615	938.64	
38+88	100y HP ot RR ot	2,275	939.23	111.86
38+88	0.3 PMP HP ot RR ot	3,125	939.87	132.81
38+88	0.4 PMP HP ot RR ot	4,525	940.69	170.73
38+88	0.5 PMP HP ot RR ot	5,953	941.46	185.45
38+88	PMP HP ot RR ot	13,261	946.85	135.58

3888 100Y HPOT_RROT			
Alt 2	flow incr at current sta	189.0	
	elev incr due to flow incr	0.14	940.01
Alt 3	flow incr at current sta	231.0	
	elev incr due to flow incr	0.17	939.40

3888 0.3PMP HPOT RROT			
Alt 2	flow incr at current sta	108.0	
	elev incr due to flow incr	0.06	946.91
Alt 3	flow incr at current sta	305.0	
	elev incr due to flow incr	0.18	940.05

3888 0.4PMP HPOT RROT			
Alt 2	flow incr at current sta	58.0	
	elev incr due to flow incr	0.03	940.72
Alt 3	flow incr at current sta	331.0	
	elev incr due to flow incr	0.18	940.87



from HEC-RAS Final Lower, 2/2015

Hydrology & Hydraulics Report		Q Total	W.S. Elev
River Sta	Plan	(cfs)	(ft)
1910	PMP HPOT RROT	13798.5	651.87
1910	PMP HPBR_RRBR	19473.64	653.9
1910	PMP HPBR RROT	17090.09	653.09
1910	PMP HPOT RRBR	16021.41	652.7
1910	0.5PMP HPOT RROT	6181.4	648.36
1910	0.5PMP HPBR RRBR	11124.37	650.8
1910	0.5PMP HPBR RROT	8942.68	649.84
1910	0.5PMP HPOT RRBR	8359.26	649.55
1910	0.4PMP HPOT RROT	4695.7	647.42
1910	0.4PMP HPBR RRBR	9564.16	650.13
1910	0.4PMP HPBR RROT	7340.08	649.03

Heaters Pond Dam - Interpolation of Downstream Water Surface Elevation, Alternatives 2 and 3

1910 0.4PMP HPOT RRBR	6689.94	648.66
1910 0.3PMP HPOT RROT	3243.7	646.32
1910 0.3PMP HPBR RRBR	7937.2	649.33
1910 0.3PMP HPBR RROT	5775.58	648.13
1910 0.3PMP HPOT RRBR	5180.9	647.75
1910 100Y HPOT_RROT	2204.6	645.35
1910 100Y HPBR_RRBR	6294.56	648.43
1910 100Y HPBR RROT	4756.97	647.46
1910 100Y HPOT RRBR	3999.47	646.93
1910 Sunny Day Breach	1303.7	644.27
1725 PMP HPOT RROT	13796.35	638.58
1725 PMP HPBR_RRBR	19434.8	640.76
1725 PMP HPBR RROT	17057.52	639.87
1725 PMP HPOT RRBR	15966.97	639.44
1725 0.5PMP HPOT RROT	6180.68	634.49
1725 0.5PMP HPBR RRBR	11059.73	637.17
1725 0.5PMP HPBR RROT	8935.48	636.07
1725 0.5PMP HPOT RRBR	8336.02	635.76
1725 0.4PMP HPOT RROT	4693.54	633.49
1725 0.4PMP HPBR RRBR	9509.4	636.38
1725 0.4PMP HPBR RROT	7329.72	635.16
1725 0.4PMP HPOT RRBR	6638.13	634.77
1725 0.3PMP HPOT RROT	3242.21	632.37
1725 0.3PMP HPBR RRBR	7901.74	635.51
1725 0.3PMP HPBR RROT	5749.43	634.19
1725 0.3PMP HPOT RRBR	5165.69	633.82
1725 100Y HPOT_RROT	2202.13	631.41
1725 100Y HPBR_RRBR	6264.29	634.54
1725 100Y HPBR RROT	4716.31	633.5
1725 100Y HPOT RRBR	3958.57	632.95
1725 Sunny Day Breach	1302.69	630.29

from HEC-RAS Final Lower\_2/2015

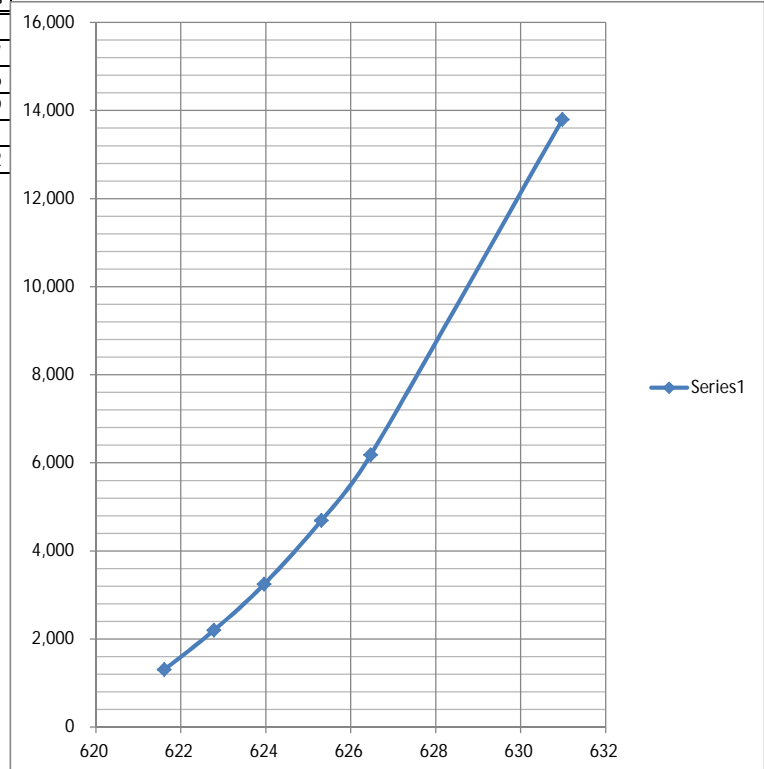
Hydrology & Hydraulics Report

River Sta	Plan	Q Total (cfs)	W.S. Elev (ft)	Incr. from previous
15+50	Sunny Day Breach	1,302	621.61	
15+50	100y HP ot RR ot	2,199	622.78	76.67
15+50	0.3 PMP HP ot RR ot	3,241	623.96	88.36
15+50	0.4 PMP HP ot RR ot	4,692	625.31	107.49
15+50	0.5 PMP HP ot RR ot	6,180	626.47	128.21
15+50	PMP HP ot RR ot	13,794	630.98	168.82

1910 100Y HPOT_RROT	2204.6	
	% of flow vs sta 1910	99.73%
	Alt 2	Alt 3
	flow incr. at sta 1910	264 271
	flow incr at current sta	263.3 270.3
	elev incr due to flow incr	0.30 0.31
	elev due to flow incr.	623.08 623.09

1910 0.3PMP HPOT RROT	3243.7	
	% of flow vs sta 1910	99.92%
	Alt 2	Alt 3
	flow incr. at sta 1910	114 325
	flow incr at current sta	113.9 324.7
	elev incr due to flow incr	0.11 0.30
	elev due to flow incr.	624.07 624.26

1910 0.4PMP HPOT RROT	4695.7	
	% of flow vs sta 1910	99.93%
	Alt 2	Alt 3
	flow incr. at sta 1910	63 358
	flow incr at current sta	63.0 357.7
	elev incr due to flow incr	0.05 0.28
	elev due to flow incr.	625.36 625.59



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from HEC-RAS Final Lower, 2/2015

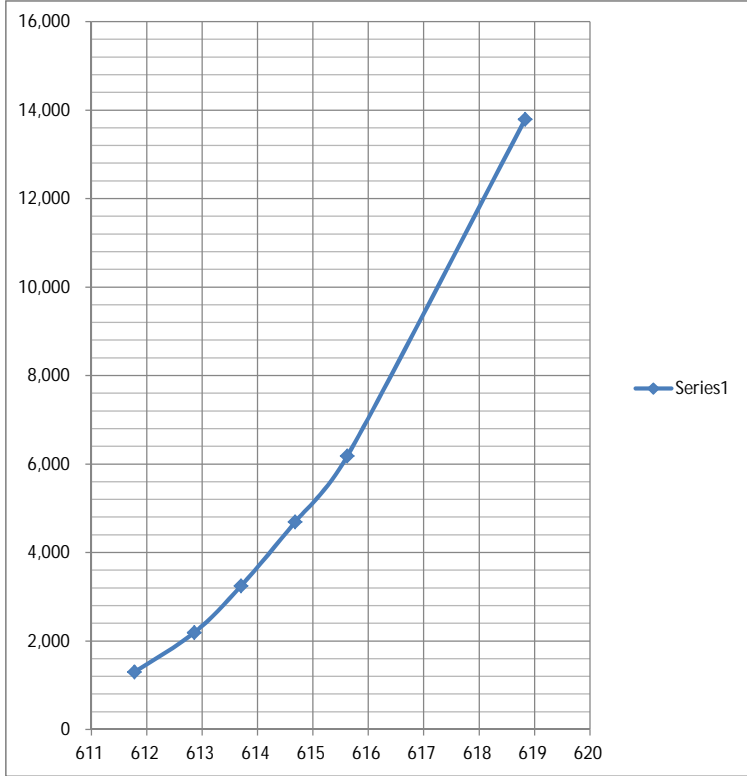
Hydrology & Hydraulics Report

River Sta	Plan	Q Total (cfs)	W.S. Elev (ft)	Incr. from previous
13+00	Sunny Day Breach	1,296	611.78	
13+00	100y HP ot RR ot	2,192	612.86	82.92
13+00	0.3 PMP HP ot RR ot	3,241	613.70	124.91
13+00	0.4 PMP HP ot RR ot	4,692	614.68	148.06
13+00	0.5 PMP HP ot RR ot	6,177	615.62	158.03
13+00	PMP HP ot RR ot	13,788	618.83	237.10

1910	100Y HPOT_RROT	2204.6	
	% of flow vs sta 1910	99.41%	
		Alt 2	Alt 3
	flow incr. at sta 1910	264	271
	flow incr at current sta	262.4	269.4
	elev incr due to flow incr	0.21	0.22
	elev due to flow incr.	613.07	613.08

1910	0.3PMP HPOT RROT	3243.7	
	% of flow vs sta 1910	99.91%	
		Alt 2	Alt 3
	flow incr. at sta 1910	114	325
	flow incr at current sta	113.9	324.7
	elev incr due to flow incr	0.08	0.22
	elev due to flow incr.	613.78	613.92

1910	0.4PMP HPOT RROT	4695.7	
	% of flow vs sta 1910	99.92%	
		Alt 2	Alt 3
	flow incr. at sta 1910	63	358
	flow incr at current sta	62.9	357.7
	elev incr due to flow incr	0.04	0.23
	elev due to flow incr.	614.72	614.91



1230 PMP HPOT RROT	13786	614.53
1230 PMP HPBR_RRBR	19290.28	615.27
1230 PMP HPBR RROT	17007.8	614.98
1230 PMP HPOT RRBR	15913.54	614.82
1230 0.5PMP HPOT RROT	6175.89	613.11
1230 0.5PMP HPBR RRBR	10835.92	614.12
1230 0.5PMP HPBR RROT	8894.65	613.71
1230 0.5PMP HPOT RRBR	8238.62	613.57
1230 0.4PMP HPOT RROT	4691.33	612.64
1230 0.4PMP HPBR RRBR	9303.65	613.8
1230 0.4PMP HPBR RROT	7271.25	613.36
1230 0.4PMP HPOT RRBR	6509.03	613.2
1230 0.3PMP HPOT RROT	3240.34	612.1
1230 0.3PMP HPBR RRBR	7759.35	613.47
1230 0.3PMP HPBR RROT	5650.21	612.94
1230 0.3PMP HPOT RRBR	5089.39	612.77
1230 100Y HPOT_RROT	2186.15	611.57
1230 100Y HPBR_RRBR	6149.05	613.1
1230 100Y HPBR RROT	4622.49	612.62
1230 100Y HPOT RRBR	3822.41	612.37
1230 Sunny Day Breach	1294.48	610.61

1210 Culvert

Heaters Pond Dam - Interpolation of Downstream Water Surface Elevation, Alternatives 2 and 3

from HEC-RAS Final Lower, 2/2015

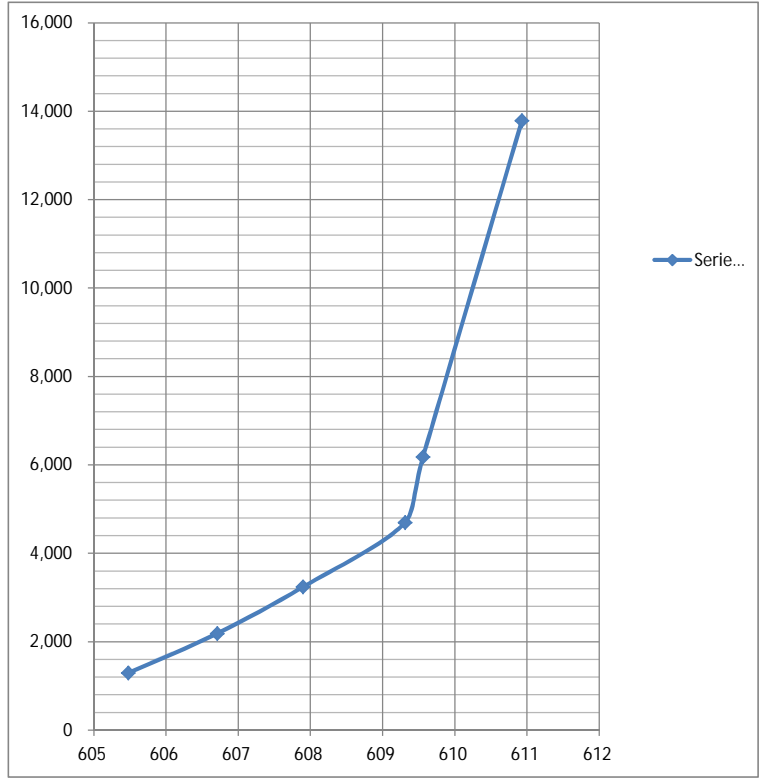
Hydrology & Hydraulics Report

River Sta	Plan	Q Total (cfs)	W.S. Elev (ft)	Incr. from previous
11+90	Sunny Day Breach	1,294	605.48	
11+90	100Y HPOT_RROT	2,186	606.71	72.49
11+90	0.3PMP HPOT RROT	3,240	607.90	88.59
11+90	0.4PMP HPOT RROT	4,691	609.31	102.91
11+90	0.5PMP HPOT RROT	6,176	609.56	593.82
11+90	PMP HPOT RROT	13,786	610.93	555.48

1910	100Y HPOT_RROT	2204.6	
	% of flow vs sta 1910	99.16%	
		Alt 2	Alt 3
	flow incr. at sta 1910	264	271
	flow incr at current sta	261.8	268.7
	elev incr due to flow incr	0.30	0.30
	elev due to flow incr.	607.01	607.01

1910	0.3PMP HPOT RROT	3243.7	
	% of flow vs sta 1910	99.90%	
		Alt 2	Alt 3
	flow incr. at sta 1910	114	325
	flow incr at current sta	113.9	324.7
	elev incr due to flow incr	0.11	0.32
	elev due to flow incr.	608.01	608.22

1910	0.4PMP HPOT RROT	4695.7	
	% of flow vs sta 1910	99.91%	
		Alt 2	Alt 3
	flow incr. at sta 1910	63	358
	flow incr at current sta	62.9	357.7
	elev incr due to flow incr	0.01	0.06
	elev due to flow incr.	609.32	609.37



from HEC-RAS Final Lower, 2/2015

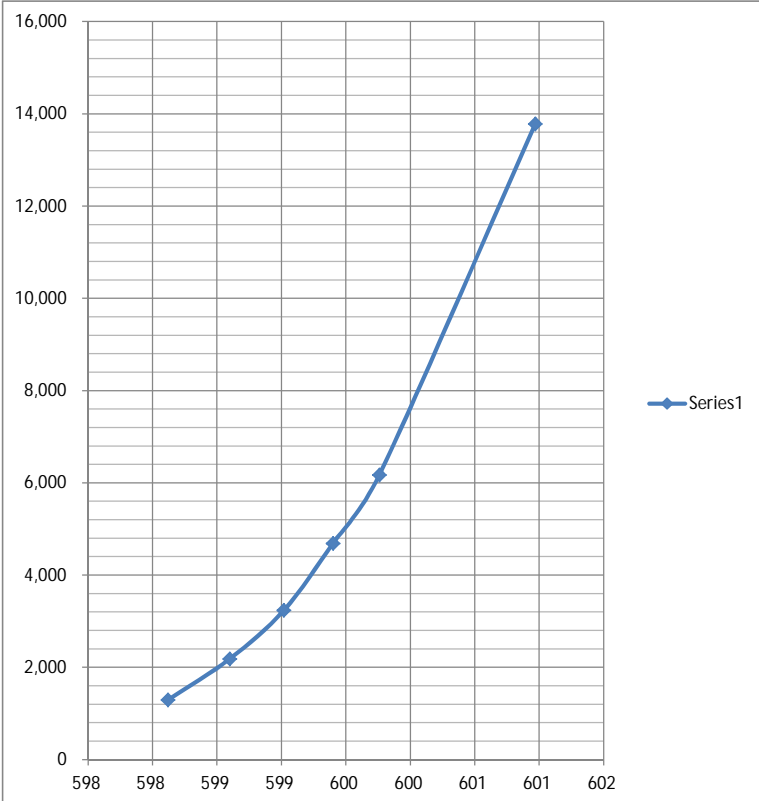
Hydrology & Hydraulics Report

River Sta	Plan	Q Total (cfs)	W.S. Elev (ft)	Incr. from previous
09+35	Sunny Day Breach	1,294	598.12	
09+35	100Y HPOT_RROT	2,185	598.60	185.72
09+35	0.3PMP HPOT RROT	3,239	599.02	250.84
09+35	0.4PMP HPOT RROT	4,690	599.40	381.77
09+35	0.5PMP HPOT RROT	6,173	599.76	412.16
09+35	PMP HPOT RROT	13,779	600.97	628.55

1910	100Y HPOT_RROT	2204.6	
	% of flow vs sta 1910	99.12%	
		Alt 2	Alt 3
	flow incr. at sta 1910	264	271
	flow incr at current sta	261.7	268.6
	elev incr due to flow incr	0.10	0.11
	elev due to flow incr.	598.70	598.71

1910	0.3PMP HPOT RROT	3243.7	
	% of flow vs sta 1910	99.85%	
		Alt 2	Alt 3
	flow incr. at sta 1910	114	325
	flow incr at current sta	113.8	324.5
	elev incr due to flow incr	0.03	0.09
	elev due to flow incr.	599.05	599.11

1910	0.4PMP HPOT RROT	4695.7	
	% of flow vs sta 1910	99.87%	
		Alt 2	Alt 3
	flow incr. at sta 1910	63	358
	flow incr at current sta	62.9	357.5
	elev incr due to flow incr	0.02	0.09
	elev due to flow incr.	599.42	599.49



Heaters Pond Dam - Interpolation of Downstream Water Surface Elevation, Alternatives 2 and 3

from HEC-RAS Final Lower, 2/2015

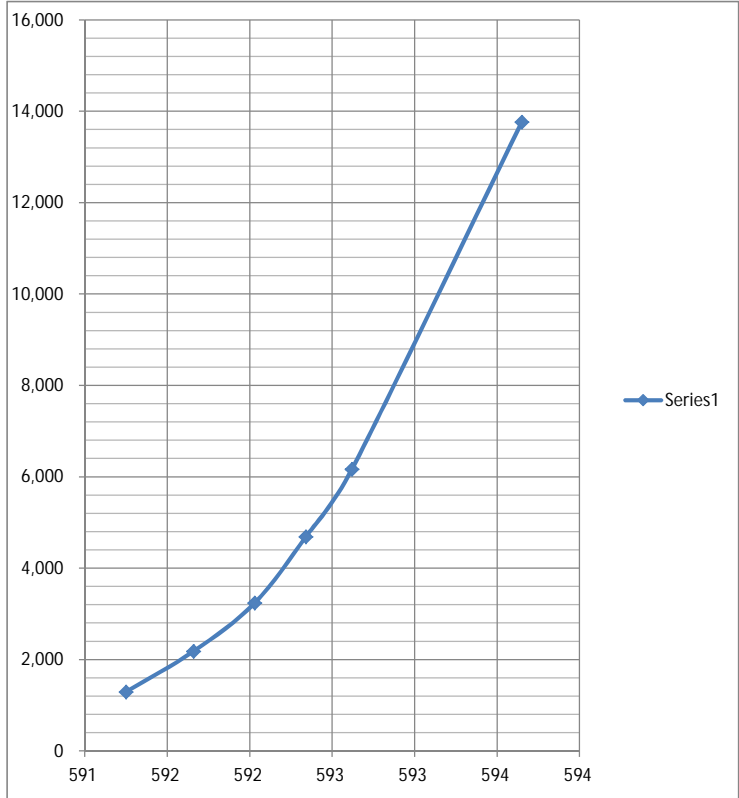
Hydrology & Hydraulics Report

River Sta	Plan	Q Total (cfs)	W.S. Elev (ft)	Incr. from previous
07+15	Sunny Day Breach	1,292	591.25	
07+15	100Y HPOT_RROT	2,181	591.66	216.99
07+15	0.3PMP HPOT RROT	3,235	592.03	284.87
07+15	0.4PMP HPOT RROT	4,687	592.34	468.19
07+15	0.5PMP HPOT RROT	6,168	592.62	529.00
07+15	PMP HPOT RROT	13,766	593.65	737.64

1910	100Y HPOT_RROT	2204.6	
	% of flow vs sta 1910	98.94%	
		Alt 2	Alt 3
	flow incr. at sta 1910	264	271
	flow incr at current sta	261.2	268.1
	elev incr due to flow incr	0.09	0.09
	elev due to flow incr.	591.75	591.75

1910	0.3PMP HPOT RROT	3243.7	
	% of flow vs sta 1910	99.74%	
		Alt 2	Alt 3
	flow incr. at sta 1910	114	325
	flow incr at current sta	113.7	324.2
	elev incr due to flow incr	0.02	0.07
	elev due to flow incr.	592.05	592.10

1910	0.4PMP HPOT RROT	4695.7	
	% of flow vs sta 1910	99.81%	
		Alt 2	Alt 3
	flow incr. at sta 1910	63	358
	flow incr at current sta	62.9	357.3
	elev incr due to flow incr	0.01	0.07
	elev due to flow incr.	592.35	592.41



from HEC-RAS Final Lower, 2/2015

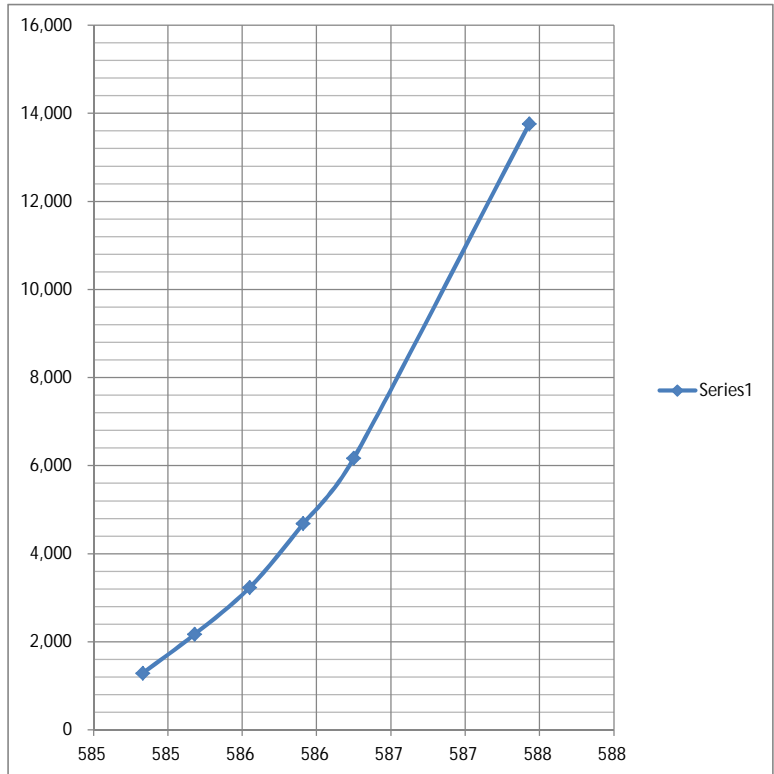
Hydrology & Hydraulics Report

River Sta	Plan	Q Total (cfs)	W.S. Elev (ft)	Incr. from previous
04+90	Sunny Day Breach	1,286	584.83	
04+90	100Y HPOT_RROT	2,172	585.18	253.13
04+90	0.3PMP HPOT RROT	3,232	585.55	286.42
04+90	0.4PMP HPOT RROT	4,680	585.91	402.27
04+90	0.5PMP HPOT RROT	6,165	586.25	436.67
04+90	PMP HPOT RROT	13,757	587.43	643.46

1910	100Y HPOT_RROT	2204.6	
	% of flow vs sta 1910	98.52%	
		Alt 2	Alt 3
	flow incr. at sta 1910	264	271
	flow incr at current sta	260.1	267.0
	elev incr due to flow incr	0.09	0.09
	elev due to flow incr.	585.27	585.27

1910	0.3PMP HPOT RROT	3243.7	
	% of flow vs sta 1910	99.63%	
		Alt 2	Alt 3
	flow incr. at sta 1910	114	325
	flow incr at current sta	113.6	323.8
	elev incr due to flow incr	0.03	0.08
	elev due to flow incr.	585.58	585.63

1910	0.4PMP HPOT RROT	4695.7	
	% of flow vs sta 1910	99.66%	
		Alt 2	Alt 3
	flow incr. at sta 1910	63	358
	flow incr at current sta	62.8	356.8
	elev incr due to flow incr	0.01	0.08
	elev due to flow incr.	585.92	585.99



Heaters Pond Dam - Interpolation of Downstream Water Surface Elevation, Alternatives 2 and 3

from HEC-RAS Final Lower, 2/2015

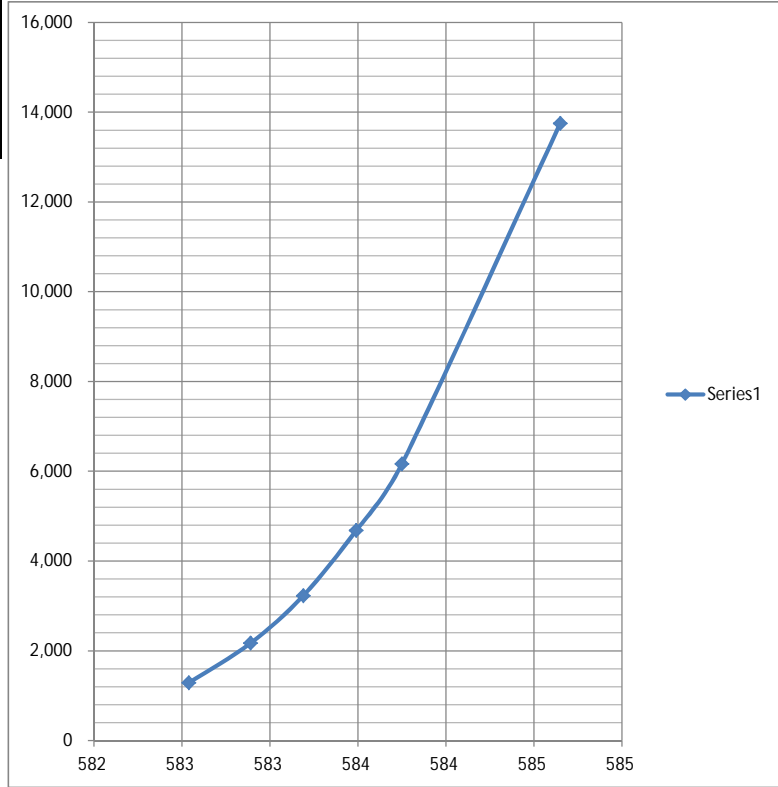
Hydrology & Hydraulics Report

River Sta	Plan	Q Total (cfs)	W.S. Elev (ft)	Incr. from previous
03+40	Sunny Day Breach	1,286	582.54	
03+40	100Y HPOT_RROT	2,168	582.89	252.17
03+40	0.3PMP HPOT RROT	3,229	583.19	353.36
03+40	0.4PMP HPOT RROT	4,679	583.49	483.47
03+40	0.5PMP HPOT RROT	6,162	583.75	570.48
03+40	PMP HPOT RROT	13,752	584.65	843.35

1910	100Y HPOT_RROT	2204.6	
	% of flow vs sta 1910	98.36%	
		Alt 2	Alt 3
	flow incr. at sta 1910	264	271
	flow incr at current sta	259.7	266.6
	elev incr due to flow incr	0.07	0.08
	elev due to flow incr.	582.96	582.97

1910	0.3PMP HPOT RROT	3243.7	
	% of flow vs sta 1910	99.53%	
		Alt 2	Alt 3
	flow incr. at sta 1910	114	325
	flow incr at current sta	113.5	323.5
	elev incr due to flow incr	0.02	0.07
	elev due to flow incr.	583.21	583.26

1910	0.4PMP HPOT RROT	4695.7	
	% of flow vs sta 1910	99.64%	
		Alt 2	Alt 3
	flow incr. at sta 1910	63	358
	flow incr at current sta	62.8	356.7
	elev incr due to flow incr	0.01	0.06
	elev due to flow incr.	583.50	583.55



from HEC-RAS Final Lower, 2/2015

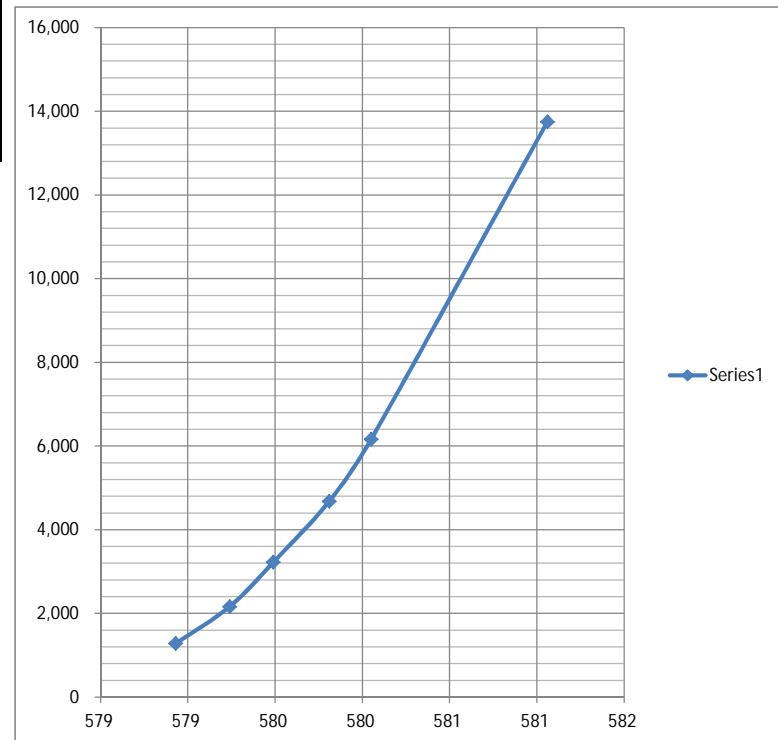
Hydrology & Hydraulics Report

River Sta	Plan	Q Total (cfs)	W.S. Elev (ft)	Incr. from previous
01+20	Sunny Day Breach	1,279	578.93	
01+20	100Y HPOT_RROT	2,162	579.24	284.74
01+20	0.3PMP HPOT RROT	3,223	579.49	424.27
01+20	0.4PMP HPOT RROT	4,676	579.81	454.18
01+20	0.5PMP HPOT RROT	6,157	580.05	617.01
01+20	PMP HPOT RROT	13,743	581.06	751.13

1910	100Y HPOT_RROT	2204.6	
	% of flow vs sta 1910	98.07%	
		Alt 2	Alt 3
	flow incr. at sta 1910	264	271
	flow incr at current sta	258.9	265.8
	elev incr due to flow incr	0.06	0.06
	elev due to flow incr.	579.30	579.30

1910	0.3PMP HPOT RROT	3243.7	
	% of flow vs sta 1910	99.35%	
		Alt 2	Alt 3
	flow incr. at sta 1910	114	325
	flow incr at current sta	113.3	322.9
	elev incr due to flow incr	0.02	0.07
	elev due to flow incr.	579.51	579.56

1910	0.4PMP HPOT RROT	4695.7	
	% of flow vs sta 1910	99.58%	
		Alt 2	Alt 3
	flow incr. at sta 1910	63	358
	flow incr at current sta	62.7	356.5
	elev incr due to flow incr	0.01	0.06
	elev due to flow incr.	579.82	579.87



Heaters Pond Dam - Interpolation of Downstream Water Surface Elevation, Alternatives 2 and 3

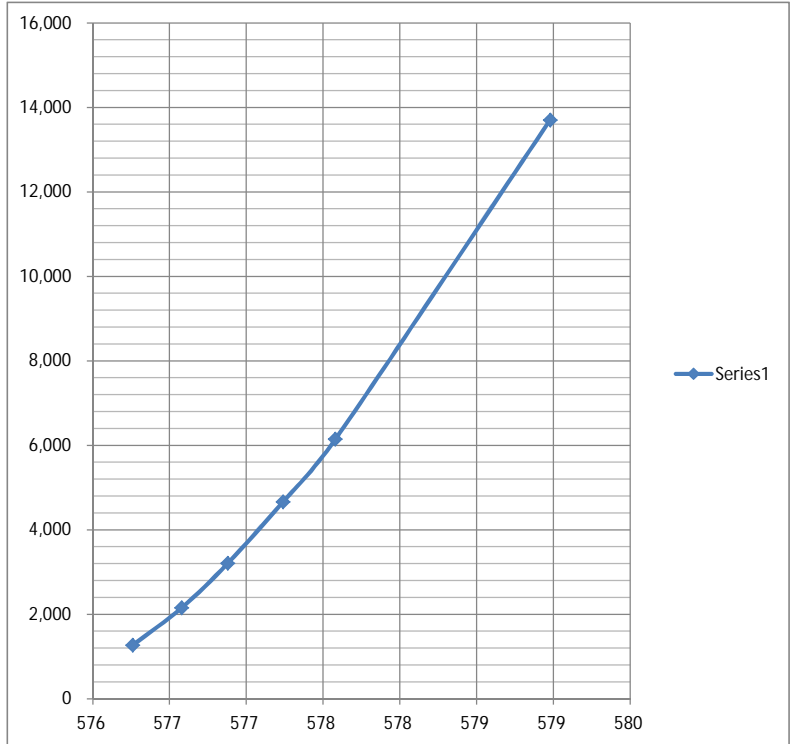
from HEC-RAS Final Lower, 2/2015

Hydrology & Hydraulics Report		Q Total	W.S. Elev	Incr. from
River Sta	Plan	(cfs)	(ft)	previous
-00+60	Sunny Day Breach	1,267	576.26	
-00+60	100Y HPOT_RROT	2,154	576.58	277.04
-00+60	0.3PMP HPOT RROT	3,209	576.88	351.85
-00+60	0.4PMP HPOT RROT	4,665	577.24	404.33
-00+60	0.5PMP HPOT RROT	6,144	577.58	434.90
-00+60	PMP HPOT RROT	13,701	578.98	539.83

1910	100Y HPOT_RROT	2204.6	
	% of flow vs sta 1910	97.70%	
		Alt 2	Alt 3
	flow incr. at sta 1910	264	271
	flow incr at current sta	257.9	264.8
	elev incr due to flow incr	0.07	0.08
	elev due to flow incr.	576.65	576.66

1910	0.3PMP HPOT RROT	3243.7	
	% of flow vs sta 1910	98.94%	
		Alt 2	Alt 3
	flow incr. at sta 1910	114	325
	flow incr at current sta	112.8	321.6
	elev incr due to flow incr	0.03	0.08
	elev due to flow incr.	576.91	576.96

1910	0.4PMP HPOT RROT	4695.7	
	% of flow vs sta 1910	99.35%	
		Alt 2	Alt 3
	flow incr. at sta 1910	63	358
	flow incr at current sta	62.6	355.7
	elev incr due to flow incr	0.01	0.08
	elev due to flow incr.	577.25	577.32



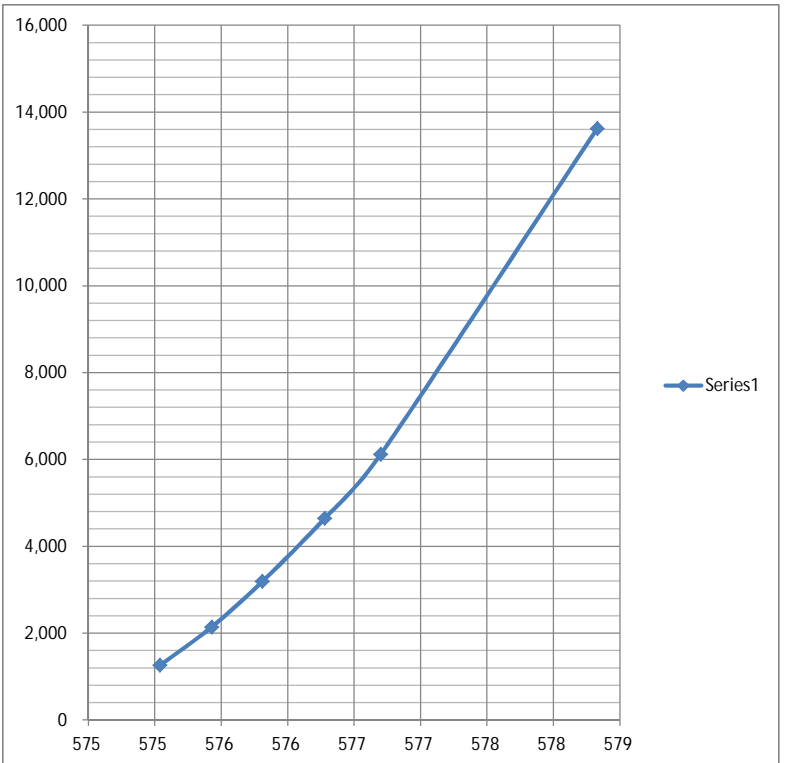
from HEC-RAS Final Lower, 2/2015

Hydrology & Hydraulics Report		Q Total	W.S. Elev	Incr. from
River Sta	Plan	(cfs)	(ft)	previous
-02+20	Sunny Day Breach	1,261	575.04	
-02+20	100Y HPOT_RROT	2,144	575.43	226.61
-02+20	0.3PMP HPOT RROT	3,191	575.81	275.50
-02+20	0.4PMP HPOT RROT	4,644	576.28	309.19
-02+20	0.5PMP HPOT RROT	6,117	576.70	350.51
-02+20	PMP HPOT RROT	13,621	578.33	460.38

1910	100Y HPOT_RROT	2204.6	
	% of flow vs sta 1910	97.27%	
		Alt 2	Alt 3
	flow incr. at sta 1910	264	271
	flow incr at current sta	256.8	263.6
	elev incr due to flow incr	0.09	0.10
	elev due to flow incr.	575.52	575.53

1910	0.3PMP HPOT RROT	3243.7	
	% of flow vs sta 1910	98.38%	
		Alt 2	Alt 3
	flow incr. at sta 1910	114	325
	flow incr at current sta	112.2	319.8
	elev incr due to flow incr	0.04	0.10
	elev due to flow incr.	575.85	575.91

1910	0.4PMP HPOT RROT	4695.7	
	% of flow vs sta 1910	98.91%	
		Alt 2	Alt 3
	flow incr. at sta 1910	63	358
	flow incr at current sta	62.3	354.1
	elev incr due to flow incr	0.02	0.10
	elev due to flow incr.	576.30	576.38



Heaters Pond Dam - Interpolation of Downstream Water Surface Elevation, Alternatives 2 and 3

from HEC-RAS Final Lower, 2/2015

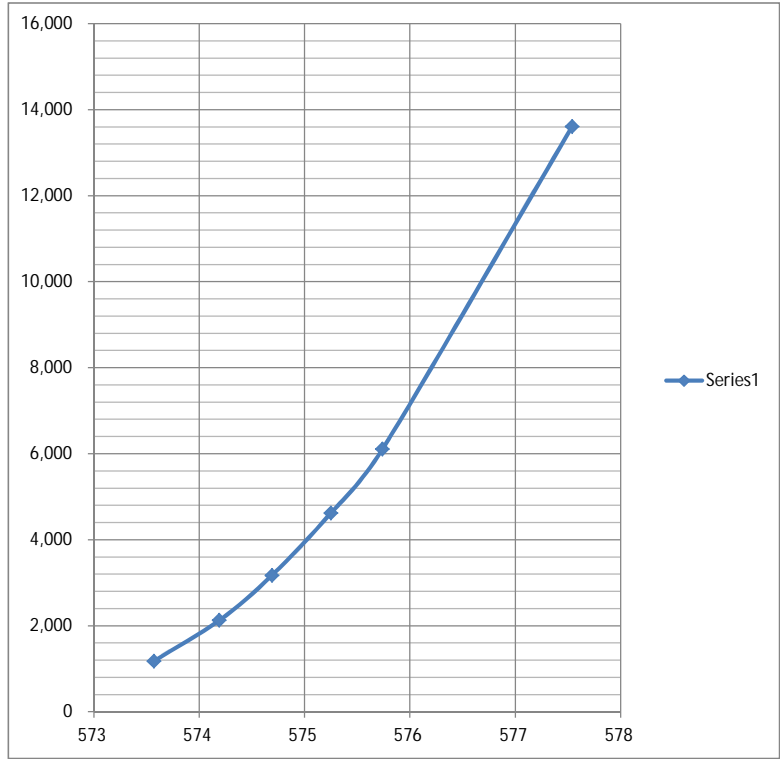
Hydrology & Hydraulics Report

River Sta	Plan	Q Total (cfs)	W.S. Elev (ft)	Incr. from previous
-04+20	Sunny Day Breach	1,175	573.57	
-04+20	100Y HPOT_RROT	2,122	574.19	152.72
-04+20	0.3PMP HPOT RROT	3,169	574.69	209.36
-04+20	0.4PMP HPOT RROT	4,618	575.25	258.85
-04+20	0.5PMP HPOT RROT	6,105	575.74	303.47
-04+20	PMP HPOT RROT	13,606	577.54	416.71

1910	100Y HPOT_RROT	2204.6	
	% of flow vs sta 1910	96.25%	
		Alt 2	Alt 3
	flow incr. at sta 1910	264	271
	flow incr at current sta	254.1	260.8
	elev incr due to flow incr	0.12	0.12
	elev due to flow incr.	574.31	574.31

1910	0.3PMP HPOT RROT	3243.7	
	% of flow vs sta 1910	97.69%	
		Alt 2	Alt 3
	flow incr. at sta 1910	114	325
	flow incr at current sta	111.4	317.5
	elev incr due to flow incr	0.04	0.12
	elev due to flow incr.	574.73	574.81

1910	0.4PMP HPOT RROT	4695.7	
	% of flow vs sta 1910	98.35%	
		Alt 2	Alt 3
	flow incr. at sta 1910	63	358
	flow incr at current sta	62.0	352.1
	elev incr due to flow incr	0.02	0.12
	elev due to flow incr.	575.27	575.37



from HEC-RAS Final Lower, 2/2015

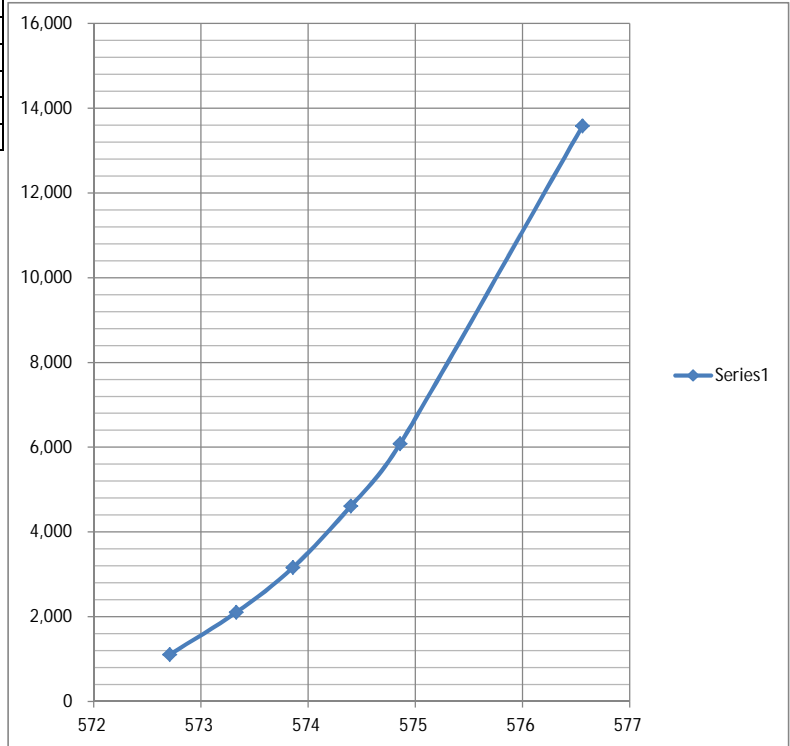
Hydrology & Hydraulics Report

River Sta	Plan	Q Total (cfs)	W.S. Elev (ft)	Incr. from previous
-07+50	Sunny Day Breach	1,106	572.71	
-07+50	100Y HPOT_RROT	2,102	573.33	160.63
-07+50	0.3PMP HPOT RROT	3,161	573.86	199.87
-07+50	0.4PMP HPOT RROT	4,612	574.40	268.75
-07+50	0.5PMP HPOT RROT	6,082	574.86	319.47
-07+50	PMP HPOT RROT	13,575	576.56	440.79

1910	100Y HPOT_RROT	2204.6	
	% of flow vs sta 1910	95.32%	
		Alt 2	Alt 3
	flow incr. at sta 1910	264	271
	flow incr at current sta	251.7	258.3
	elev incr due to flow incr	0.13	0.13
	elev due to flow incr.	573.46	573.46

1910	0.3PMP HPOT RROT	3243.7	
	% of flow vs sta 1910	97.45%	
		Alt 2	Alt 3
	flow incr. at sta 1910	114	325
	flow incr at current sta	111.1	316.7
	elev incr due to flow incr	0.04	0.12
	elev due to flow incr.	573.90	573.98

1910	0.4PMP HPOT RROT	4695.7	
	% of flow vs sta 1910	98.22%	
		Alt 2	Alt 3
	flow incr. at sta 1910	63	358
	flow incr at current sta	61.9	351.6
	elev incr due to flow incr	0.02	0.11
	elev due to flow incr.	574.42	574.51





Heaters Pond Dam - Interpolation of Downstream Water Surface Elevation, Alternatives 2 and 3

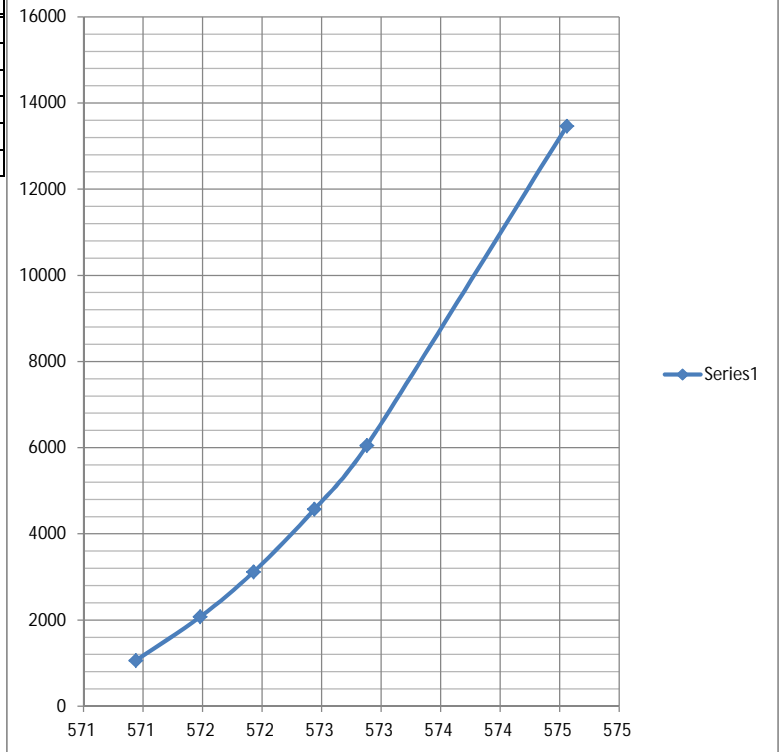
from HEC-RAS Final Lower, 2/2015

Hydrology & Hydraulics Report  
River Sta Plan

	Q Total (cfs)	W.S. Elev (ft)	Incr. from previous
-1250 Sunny Day Breach	1057.95	570.94	
-12+50 100Y HPOT_RROT	2,072	571.48	187.8722
-12+50 0.3PMP HPOT RROT	3,118	571.93	232.37
-12+50 0.4PMP HPOT RROT	4,568	572.44	284.30
-12+50 0.5PMP HPOT RROT	6,046	572.88	335.91
-12+50 PMP HPOT RROT	13,460	574.56	441.30
1910 100Y HPOT_RROT	2204.6		
% of flow vs sta 1910	94.01%		
	Alt 2	Alt 3	
flow incr. at sta 1910	264	271	
flow incr at current sta	248.2	254.8	
elev incr due to flow incr	0.11	0.11	
elev due to flow incr.	571.59	571.59	

1910 0.3PMP HPOT RROT	3243.7		
% of flow vs sta 1910	96.13%		
	Alt 2	Alt 3	
flow incr. at sta 1910	114	325	
flow incr at current sta	109.6	312.4	
elev incr due to flow incr	0.04	0.11	
elev due to flow incr.	571.97	572.04	

1910 0.4PMP HPOT RROT	4695.7		
% of flow vs sta 1910	97.28%		
	Alt 2	Alt 3	
flow incr. at sta 1910	63	358	
flow incr at current sta	61.3	348.3	
elev incr due to flow incr	0.02	0.10	
elev due to flow incr.	572.46	572.54	



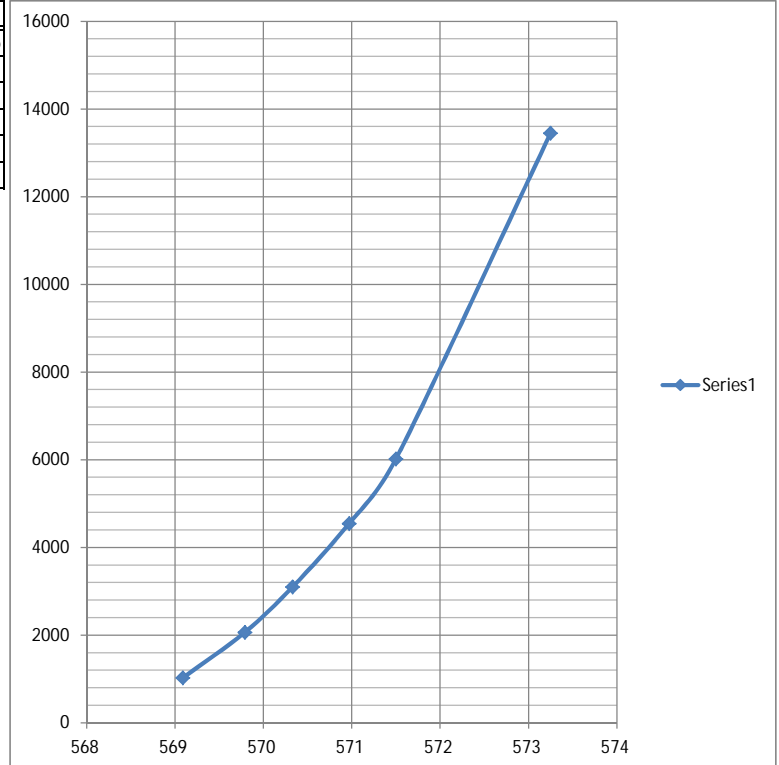
from HEC-RAS Final Lower, 2/2015

Hydrology & Hydraulics Report  
River Sta Plan

	Q Total (cfs)	W.S. Elev (ft)	Incr. from previous
-1500 Sunny Day Breach	1026.19	569.09	
-15+00 100Y HPOT_RROT	2,063	569.79	148.1586
-15+00 0.3PMP HPOT RROT	3,099	570.33	191.73
-15+00 0.4PMP HPOT RROT	4,545	570.97	226.06
-15+00 0.5PMP HPOT RROT	6,019	571.50	277.95
-15+00 PMP HPOT RROT	13,448	573.25	424.54
1910 100Y HPOT_RROT	2204.6		
% of flow vs sta 1910	93.59%		
	Alt 2	Alt 3	
flow incr. at sta 1910	264	271	
flow incr at current sta	247.1	253.6	
elev incr due to flow incr	0.13	0.13	
elev due to flow incr.	569.92	569.92	

1910 0.3PMP HPOT RROT	3243.7		
% of flow vs sta 1910	95.53%		
	Alt 2	Alt 3	
flow incr. at sta 1910	114	325	
flow incr at current sta	108.9	310.5	
elev incr due to flow incr	0.05	0.14	
elev due to flow incr.	570.38	570.47	

1910 0.4PMP HPOT RROT	4695.7		
% of flow vs sta 1910	96.80%		
	Alt 2	Alt 3	
flow incr. at sta 1910	63	358	
flow incr at current sta	61.0	346.5	
elev incr due to flow incr	0.02	0.12	
elev due to flow incr.	570.99	571.09	



Heaters Pond Dam - Interpolation of Downstream Water Surface Elevation, Alternatives 2 and 3

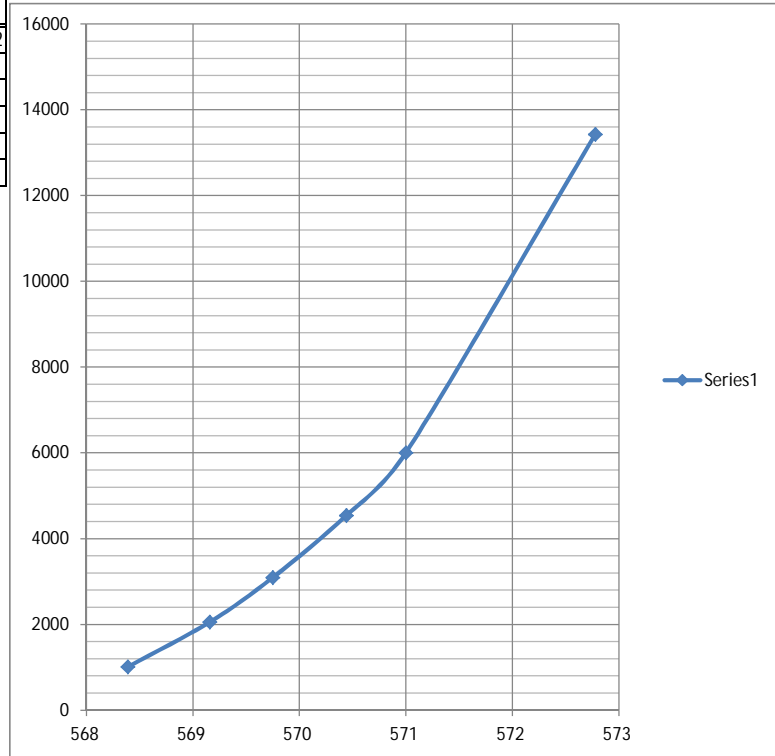
from HEC-RAS Final Lower, 2/2015

Hydrology & Hydraulics Report  
River Sta Plan

Q Total (cfs)	W.S. Elev (ft)	Incr. from previous	
-1685 Sunny Day Breach	1009.25	568.39	
-16+85 100Y HPOT_RROT	2,058	569.16	136.2312
-16+85 0.3PMP HPOT RROT	3,093	569.75	175.43
-16+85 0.4PMP HPOT RROT	4,539	570.44	209.56
-16+85 0.5PMP HPOT RROT	6,005	571.00	261.82
-16+85 PMP HPOT RROT	13,431	572.78	417.15
1910 100Y HPOT_RROT	2204.6		
% of flow vs sta 1910	93.36%		
	Alt 2	Alt 3	
flow incr. at sta 1910	264	271	
flow incr at current sta	246.5	253.0	
elev incr due to flow incr	0.14	0.14	
elev due to flow incr.	569.30	569.30	

1910 0.3PMP HPOT RROT	3243.7	
% of flow vs sta 1910	95.36%	
	Alt 2	Alt 3
flow incr. at sta 1910	114	325
flow incr at current sta	108.7	309.9
elev incr due to flow incr	0.05	0.15
elev due to flow incr.	569.80	569.90

1910 0.4PMP HPOT RROT	4695.7	
% of flow vs sta 1910	96.67%	
	Alt 2	Alt 3
flow incr. at sta 1910	63	358
flow incr at current sta	60.9	346.1
elev incr due to flow incr	0.02	0.13
elev due to flow incr.	570.46	570.57



Heaters Pond Breach Trials, Alternates 2 & 3

0.4 PMP Existing Embankment

Breach Heaters Pond embankment only

Breach El.	Q HP	Q rr	Q R9
961.0	7,365.2	7,317.9	7,367.2
960.9	7,330.0	7,289.4	7,336.6
960.8	7,242.4	7,218.9	7,268.9
961.1	7,392.2	7,269.3	7,350.1
961.2	7,390.3	7,268.4	7,349.8
961.3	7,362.7	7,233.0	7,314.4

0.4 PMP Lower Embankment to 957.25 (Alt. 2)

Breach Heaters Pond embankment only

Breach El.	Q HP	Q rr	Q R9	
961.0	6,957.1	6,863.3	6,904.4	
960.9	7,049.9	6,945.0	7,001.0	
960.8	7,126.2	7,008.0	7,083.4	
960.7	7,217.5	7,103.1	7,184.5	
960.6	7,225.9	7,123.7	7,206.2	
960.5	7,225.9	7,123.7	7,206.2	7365.2 -139.3 (decrease)
960.4	7,207.4	7,118.1	7,201.6	
960.3	7,160.2	7,130.1	7,182.7	

0.4 PMP Lower Embankment to 954.25 (Alt. 3)

Breach Heaters Pond embankment only

Breach El.	Q HP	Q rr	Q R9	
960.0	6,304.6	6,319.6	6,371.0	
959.9	6,444.1	6,447.3	6,498.8	
959.8	6,664.1	6,639.8	6,691.5	
959.7	6,664.1	6,639.8	6,691.5	
959.6	6,746.1	6,704.4	6,758.6	
959.5	6,802.1	6,743.1	6,812.3	
959.4	6,828.3	6,746.4	6,848.6	
959.3	6,822.3	6,752.4	6,856.9	
959.2	6,822.3	6,752.4	6,856.9	7365.2 -542.9 (decrease)
959.1	6,782.7	6,710.2	6,827.0	
959.0	6,732.6	6,672.8	6,793.6	

Heaters Pond Breach Trials, Alternates 2 & 3

0.3 PMP Existing Embankment

Breach Heaters Pond embankment only

Breach El.	Q HP	Q rr	Q R9
960.6	5,856.5	5,768.8	5,785.7
960.5	5,844.1	5,760.9	5,776.2
960.7	5,850.8	5,754.6	5,772.0

0.3 PMP Lower Embankment to 957.25 (Alt. 2)

Breach Heaters Pond embankment only

Breach El.	Q HP	Q rr	Q R9		
960.3	5,530.4	5,418.9	5,442.0		
960.2	5,641.1	5,518.2	5,553.1		
960.1	5,667.3	5,551.1	5,587.3	5856.5	-189.2 (decrease)
960.0	5,643.1	5,545.5	5,581.5		
959.9	5,643.1	5,545.5	5,581.5		
958.8	5,593.1	5,516.4	5,553.8		

0.3 PMP Lower Embankment to 954.75 (Alt. 3)

Breach Heaters Pond embankment only

Breach El.	Q HP	Q rr	Q R9		
959.0	4,928.4	4,924.7	4,960.8		
958.9	4,969.9	4,969.5	5,004.0		
958.8	5,001.7	4,985.2	5,021.9		
958.7	5,001.7	4,985.2	5,021.9		
958.6	5,017.6	5,000.8	5,022.9	5856.5	-838.9 (decrease)
958.5	5,011.7	4,966.1	5,020.1		
958.4	5,011.7	4,966.1	5,020.1		
958.3	4,989.6	4,925.7	5,009.1		

Heaters Pond Breach Trials, Alternates 2 & 3

100 Year Existing Embankment

Breach Heaters Pond embankment only

Breach El.	Q HP	Q rr	Q R9
960.2	4,909.3	4,777.6	4,764.8
960.1	4,865.8	4,769.8	4,719.6
960.3	4,912.1	4,773.2	4,767.2
960.4	4,884.2	4,729.5	4,730.3

100Y Lower Embankment to 957.25 (Alt. 2)

Breach Heaters Pond embankment only

Breach El.	Q HP	Q rr	Q R9	
959.9	4,381.5	4,261.6	4,295.2	
959.8	4,482.0	4,358.9	4,394.2	
959.7	4,541.8	4,437.1	4,453.4	
959.6	4,550.7	4,454.3	4,462.2	4912.1 -361.4 (decrease)
959.5	4,543.8	4,459.8	4,456.3	
959.4	4,520.3	4,452.8	4,421.9	

100Y Lower Embankment to 954.75 (Alt. 3)

Breach Heaters Pond embankment only

Breach El.	Q HP	Q rr	Q R9	
958.5	3,823.2	3,731.2	3,771.7	
958.4	3,881.5	3,789.2	3,830.3	
958.3	3,928.8	3,845.6	3,872.9	
958.2	3,928.8	3,845.6	3,872.9	
958.1	3,963.3	3,885.7	3,900.7	
958.0	3,983.0	3,924.1	3,909.1	
957.9	3,983.0	3,924.1	3,909.1	4912.1 -929.1 (decrease)
957.8	3,984.6	3,859.6	3,832.2	
957.7	3,966.7	3,781.8	3,821.7	

Heaters Pond Dam Breach Flow Comparisons for Various Design Storms  
(from HEC-HMS model)

0.4 PMP	existing	Alt. 2	Change from Existing	Alt. 3	Change from Existing
Subbasin-1	5,446.7	5,446.7	0.0	5,446.7	0.0
HP Dam	7,365.2	7,225.9	-139.3	6,822.3	-542.9
Reach-1	7,289.4	7,158.1	-131.3	6,769.8	-519.6
Reach-2	7,252.5	7,126.4	-126.1	6,744.5	-508.0
Reach-3	7,223.5	7,102.8	-120.7	6,722.7	-500.8
Reach-4	7,186.0	7,070.3	-115.7	6,696.4	-489.6
Reach-5	7,163.1	7,050.4	-112.7	6,680.3	-482.8
Subbasin-2	453.1	453.1	0.0	453.1	0.0
Junction-1	7,260.7	7,141.0	-119.7	6,786.5	-474.2
Reach-6	7,241.8	7,124.4	-117.4	6,773.1	-468.7
RR Emb Stor	7,317.9	7,123.7	-194.2	6,752.4	-565.5
Reach-7	7,297.4	7,118.9	-178.5	6,750.0	-547.4
Reach-8	7,279.8	7,113.5	-166.3	6,746.7	-533.1
Subbasin-3	518.3	518.3	0.0	518.3	0.0
Junction-2	7,385.7	7,212.7	-173.0	6,860.8	-524.9
Reach-9	7,367.2	7,206.2	-161.0	6,856.9	-510.3

0.3 PMP	existing	Alt. 2	Change from Existing	Alt. 3	Change from Existing
Subbasin-1	3,862.4	3,862.4	0.0	3,862.4	0.0
HP Dam	5,856.5	5,667.3	-189.2	5,017.6	-838.9
Reach-1	5,792.3	5,615.8	-176.5	5,001.3	-791.0
Reach-2	5,757.2	5,589.4	-167.8	4,990.1	-767.1
Reach-3	5,731.3	5,568.5	-162.8	4,979.5	-751.8
Reach-4	5,695.1	5,539.7	-155.4	4,965.4	-729.7
Reach-5	5,672.0	5,521.1	-150.9	4,955.6	-716.4
Subbasin-2	322.0	322.0	0.0	322.0	0.0
Junction-1	5,733.9	5,582.9	-151.0	5,026.5	-707.4
Reach-6	5,715.3	5,567.7	-147.6	5,018.5	-696.8
RR Emb Stor	5,769.8	5,551.1	-218.7	5,000.8	-769.0
Reach-7	5,751.2	5,540.3	-210.9	4,976.5	-774.7
Reach-8	5,735.2	5,530.4	-204.8	4,956.6	-778.6
Subbasin-3	367.3	367.3	0.0	367.3	0.0
Junction-2	5,803.1	5,598.3	-204.8	5,039.3	-763.8
Reach-9	5,785.7	5,587.3	-198.4	5,022.9	-762.8

100-year	existing	Alt. 2	Change from Existing	Alt. 3	Change from Existing
Subbasin-1	2,857.7	2,857.7	0.0	2,857.7	0.0
HP Dam	4,912.1	4,550.7	-361.4	3,983.0	-929.1
Reach-1	4,843.1	4,510.2	-332.9	3,953.5	-889.6
Reach-2	4,808.5	4,482.9	-325.6	3,934.5	-874.0
Reach-3	4,779.1	4,457.6	-321.5	3,916.9	-862.2
Reach-4	4,742.4	4,428.3	-314.1	3,894.9	-847.5
Reach-5	4,719.3	4,409.6	-309.7	3,881.0	-838.3
Subbasin-2	238.8	238.8	0.0	238.8	0.0
Junction-1	4,763.8	4,459.8	-304.0	3,931.1	-832.7
Reach-6	4,740.3	4,440.8	-299.5	3,916.8	-823.5
RR Emb Stor	4,773.2	4,454.3	-318.9	3,924.1	-849.1
Reach-7	4,754.5	4,439.6	-314.9	3,903.1	-851.4
Reach-8	4,737.7	4,425.7	-312.0	3,881.0	-856.7
Subbasin-3	271.6	271.6	0.0	271.6	0.0
Junction-2	4,786.5	4,480.4	-306.1	3,935.6	-850.9
Reach-9	4,767.2	4,464.2	-303.0	3,909.1	-858.1

## APPENDIX C

### Preliminary Cost Estimates

BY: JJM DATE:  
 CHKD. BY: PWO DATE:  
 SUBJECT: CONCEPT COST ESTIMATE

CHERRY, WEBER & ASSOCIATES, P.C.  
 CONSULTING ENGINEERS - PLANNERS

SHEET NO. C-1 OF C-10  
 JOB NO. NJ-SU-O-104

Project: Heater's Pond Dam Alternatives Analysis  
 Borough of Ogdensburg, Sussex County, New Jersey

Date Printed: 6/1/2015

**Alternative No.: 1 - Armor Existing Dam with Grouted Riprap and Repair Spillway**

PAY ITEM NUMBER	DESCRIPTION	UNIT	Plan Quantity	Total Quantity	Unit Cost	Total Cost
<b>ITEMS</b>						
1	PERFORMANCE BOND AND PAYMENT BOND	L.S.	1	1	\$6,700.00	\$ 6,700.00
2	MOBILIZATION / DEMOBILIZATION	L.S.	1	1	\$33,200.00	\$ 33,200.00
3	SILT FENCE	L.F.	500	500	\$8.00	\$ 4,000.00
4	HAYBALE	UNIT	25	25	\$30.00	\$ 750.00
5	CONSTRUCTION DRIVEWAY	TON	54	54	\$75.00	\$ 4,050.00
6	BREAKAWAY BARRICADE	UNIT	10	10	\$125.00	\$ 1,250.00
7	DRUM	UNIT	25	25	\$50.00	\$ 1,250.00
8	CONSTRUCTION SIGNS	S.F.	135	135	\$18.00	\$ 2,430.00
9	CONSTRUCTION BARRIER CURB	L.F.	120	120	\$75.00	\$ 9,000.00
10	TRAFFIC DIRECTOR, FLAGGER	HOURL	80	80	\$85.00	\$ 6,800.00
11	FINAL CLEANUP	L.S.	1	1	\$5,000.00	\$ 5,000.00
12	CLEARING SITE	L.S.	1	1	\$15,000.00	\$ 15,000.00
13	FISH SALVAGE OPERATIONS	L.S.	1	1	\$5,000.00	\$ 5,000.00
14	EXCAVATION, UNCLASSIFIED	C.Y.	1204	1204	\$35.00	\$ 42,140.00
15	DRAINAGE LAYER	C.Y.	200	200	\$40.00	\$ 8,000.00
16	8" PVC UNDERDRAIN	L.F.	200	200	\$35.00	\$ 7,000.00
17	DENSE-GRADED AGGREGATE BASE COURSE, 6" THICK	S.Y.	55	55	\$15.00	\$ 825.00
18	HOT MIX ASPHALT 19M64 BASE COURSE	TON	20	20	\$120.00	\$ 2,400.00
19	HOT MIX ASPHALT 9.5M64 SURFACE COURSE	TON	10	10	\$125.00	\$ 1,250.00
20	GROUTED RIPRAP SLOPE PROTECTION, 30" THICK, D50 = 15"	S.Y.	600	600	\$175.00	\$ 105,000.00
21	RIPRAP SLOPE PROTECTION, 30" THICK, D50 = 15"	S.Y.	245	245	\$125.00	\$ 30,625.00
22	CONCRETE CUTOFF WALLS	C.Y.	70	70	\$400.00	\$ 28,000.00
23	BEAM GUIDE RAIL	L.F.	50	50	\$30.00	\$ 1,500.00
24	FLARED GUIDE RAIL TERMINAL	UNIT	2	2	\$2,500.00	\$ 5,000.00
25	COFFERDAM / DEWATERING	L.S.	1	1	\$25,000.00	\$ 25,000.00
26	CONCRETE REPAIR, TYPE A	S.F.	200	200	\$80.00	\$ 16,000.00
27	CONCRETE REPAIR, TYPE B	S.F.	150	150	\$110.00	\$ 16,500.00
28	ALUMINUM STOP LOG ASSEMBLY	L.S.	1	1	\$10,000.00	\$ 10,000.00
29	TOPSOILING, 4" THICK	S.Y.	200	200	\$5.50	\$ 1,100.00
30	FERTILIZING AND SEEDING	S.Y.	200	200	\$2.50	\$ 500.00
31	TOPSOIL STABILIZATION, TYPE 2 MAT	S.Y.	200	200	\$7.50	\$ 1,500.00
						\$ -
<b>SUBTOTAL ITEMS</b>						<b>\$ 396,770.00</b>
Contingency & Escalation: 10%						\$ 39,677.00
<b>TOTAL</b>						<b>\$ 436,447.00</b>
<b>CALL</b>						<b>\$ 436,000.00</b>



BY: JJM DATE:  
 CHKD. BY: PWO DATE:  
 SUBJECT: CONCEPT COST ESTIMATE

CHERRY, WEBER & ASSOCIATES, P.C.  
 CONSULTING ENGINEERS - PLANNERS

SHEET NO. C-2 OF C-10  
 JOB NO. NJ-SU-O-104

Project: Heater's Pond Dam Alternatives Analysis  
 Borough of Ogdensburg, Sussex County, New Jersey

Date Printed: 6/1/2015

**Alternative No.: 1 - Armor Existing Dam with Roller Compacted Concrete and Repair Spillway**

PAY ITEM NUMBER	DESCRIPTION	UNIT	Plan Quantity	Total Quantity	Unit Cost	Total Cost
<b>ITEMS</b>						
1	PERFORMANCE BOND AND PAYMENT BOND	L.S.	1	1	\$7,500.00	\$ 7,500.00
2	MOBILIZATION / DEMOBILIZATION	L.S.	1	1	\$37,300.00	\$ 37,300.00
3	SILT FENCE	L.F.	500	500	\$8.00	\$ 4,000.00
4	HAYBALE	UNIT	25	25	\$30.00	\$ 750.00
5	CONSTRUCTION DRIVEWAY	TON	54	54	\$75.00	\$ 4,050.00
6	BREAKAWAY BARRICADE	UNIT	10	10	\$125.00	\$ 1,250.00
7	DRUM	UNIT	25	25	\$50.00	\$ 1,250.00
8	CONSTRUCTION SIGNS	S.F.	135	135	\$18.00	\$ 2,430.00
9	CONSTRUCTION BARRIER CURB	L.F.	120	120	\$75.00	\$ 9,000.00
10	TRAFFIC DIRECTOR, FLAGGER	HOUR	80	80	\$85.00	\$ 6,800.00
11	FINAL CLEANUP	L.S.	1	1	\$5,000.00	\$ 5,000.00
12	CLEARING SITE	L.S.	1	1	\$15,000.00	\$ 15,000.00
13	FISH SALVAGE OPERATIONS	L.S.	1	1	\$5,000.00	\$ 5,000.00
14	EXCAVATION, UNCLASSIFIED	C.Y.	1260	1260	\$35.00	\$ 44,100.00
15	DRAINAGE LAYER	C.Y.	230	230	\$40.00	\$ 9,200.00
16	8" PVC UNDERDRAIN	L.F.	200	200	\$40.00	\$ 8,000.00
17	DENSE-GRADED AGGREGATE BASE COURSE, 6" THICK	S.Y.	55	55	\$15.00	\$ 825.00
18	HOT MIX ASPHALT 19M64 BASE COURSE	TON	20	20	\$120.00	\$ 2,400.00
19	HOT MIX ASPHALT 9.5M64 SURFACE COURSE	TON	10	10	\$125.00	\$ 1,250.00
20	ROLLER-COMPACTED CONCRETE (RCC)	C.Y.	710	710	\$200.00	\$ 142,000.00
21	RIPRAP SLOPE PROTECTION, 30" THICK, D50 = 15"	S.Y.	250	250	\$125.00	\$ 31,250.00
22	CONCRETE CUTOFF WALLS	C.Y.	60	60	\$400.00	\$ 24,000.00
23	BEAM GUIDE RAIL	L.F.	50	50	\$85.00	\$ 4,250.00
24	FLARED GUIDE RAIL TERMINAL	UNIT	2	2	\$2,500.00	\$ 5,000.00
25	COFFERDAM / DEWATERING	L.S.	1	1	\$25,000.00	\$ 25,000.00
26	CONCRETE REPAIR, TYPE A	S.F.	200	200	\$80.00	\$ 16,000.00
27	CONCRETE REPAIR, TYPE B	S.F.	150	150	\$110.00	\$ 16,500.00
28	ALUMINUM STOP LOG ASSEMBLY	L.S.	1	1	\$10,000.00	\$ 10,000.00
29	TOPSOILING, 4" THICK	S.Y.	200	200	\$5.50	\$ 1,100.00
30	FERTILIZING AND SEEDING	S.Y.	200	200	\$2.50	\$ 500.00
31	TOPSOIL STABILIZATION, TYPE 2 MAT	S.Y.	200	200	\$7.50	\$ 1,500.00
						\$ -
						<b>SUBTOTAL ITEMS \$ 442,205.00</b>
					Contingency & Escalation: 10%	\$ 44,220.50
					<b>TOTAL</b>	<b>\$ 486,425.50</b>
					<b>CALL</b>	<b>\$ 486,000.00</b>

BY: JJM DATE:  
 CHKD. BY: PWO DATE:  
 SUBJECT: CONCEPT COST ESTIMATE

CHERRY, WEBER & ASSOCIATES, P.C.  
 CONSULTING ENGINEERS - PLANNERS

SHEET NO. C-3 OF C-10  
 JOB NO. NJ-SU-O-104

Project: Heater's Pond Dam Alternatives Analysis  
 Borough of Ogdensburg, Sussex County, New Jersey

Date Printed: 6/1/2015

**Alternative No.: 1 - Armor Existing Dam and Repair Spillway with Reinforced Concrete**

PAY ITEM NUMBER	DESCRIPTION	UNIT	Plan Quantity	Total Quantity	Unit Cost	Total Cost
<b>ITEMS</b>						
1	PERFORMANCE BOND AND PAYMENT BOND	L.S.	1	1	\$7,300.00	\$ 7,300.00
2	MOBILIZATION / DEMOBILIZATION	L.S.	1	1	\$36,400.00	\$ 36,400.00
3	SILT FENCE	L.F.	500	500	\$8.00	\$ 4,000.00
4	HAYBALE	UNIT	25	25	\$30.00	\$ 750.00
5	CONSTRUCTION DRIVEWAY	TON	54	54	\$75.00	\$ 4,050.00
6	BREAKAWAY BARRICADE	UNIT	10	10	\$125.00	\$ 1,250.00
7	DRUM	UNIT	25	25	\$50.00	\$ 1,250.00
8	CONSTRUCTION SIGNS	S.F.	135	135	\$18.00	\$ 2,430.00
9	CONSTRUCTION BARRIER CURB	L.F.	120	120	\$75.00	\$ 9,000.00
10	TRAFFIC DIRECTOR, FLAGGER	HOUR	80	80	\$85.00	\$ 6,800.00
11	FINAL CLEANUP	L.S.	1	1	\$5,000.00	\$ 5,000.00
12	CLEARING SITE	L.S.	1	1	\$15,000.00	\$ 15,000.00
13	EXCAVATION, UNCLASSIFIED	C.Y.	923	923	\$35.00	\$ 32,305.00
14	FISH SALVAGE OPERATIONS	L.S.	1	1	\$5,000.00	\$ 5,000.00
15	DRAINAGE LAYER	C.Y.	240	240	\$40.00	\$ 9,600.00
16	8" PVC UNDERDRAIN	L.F.	200	200	\$40.00	\$ 8,000.00
17	DENSE-GRADED AGGREGATE BASE COURSE, 6" THICK	S.Y.	55	55	\$15.00	\$ 825.00
18	HOT MIX ASPHALT 19M64 BASE COURSE	TON	20	20	\$120.00	\$ 2,400.00
19	HOT MIX ASPHALT 9.5M64 SURFACE COURSE	TON	10	10	\$125.00	\$ 1,250.00
20	REINFORCED CONCRETE	C.Y.	360	360	\$475.00	\$ 171,000.00
21	RIPRAP SLOPE PROTECTION, 30" THICK, D50 = 15"	S.Y.	250	250	\$125.00	\$ 31,250.00
22	BEAM GUIDE RAIL	L.F.	50	50	\$30.00	\$ 1,500.00
23	FLARED GUIDE RAIL TERMINAL	UNIT	2	2	\$2,500.00	\$ 5,000.00
24	COFFERDAM / DEWATERING	L.S.	1	1	\$25,000.00	\$ 25,000.00
25	CONCRETE REPAIR, TYPE A	S.F.	200	200	\$80.00	\$ 16,000.00
26	CONCRETE REPAIR, TYPE B	S.F.	150	150	\$110.00	\$ 16,500.00
27	ALUMINUM STOP LOG ASSEMBLY	L.S.	1	1	\$10,000.00	\$ 10,000.00
28	TOPSOILING, 4" THICK	S.Y.	200	200	\$5.50	\$ 1,100.00
29	FERTILIZING AND SEEDING	S.Y.	200	200	\$2.50	\$ 500.00
30	TOPSOIL STABILIZATION, TYPE 2 MAT	S.Y.	200	200	\$7.50	\$ 1,500.00
						\$ -
						\$ -
<b>SUBTOTAL ITEMS</b>						<b>\$ 431,960.00</b>
					Contingency & Escalation: 10%	\$ 43,196.00
<b>TOTAL</b>						<b>\$ 475,156.00</b>
<b>CALL</b>						<b>\$ 475,000.00</b>

BY: JJM DATE:  
 CHKD. BY: PWO DATE:  
 SUBJECT: CONCEPT COST ESTIMATE

CHERRY, WEBER & ASSOCIATES, P.C.  
 CONSULTING ENGINEERS - PLANNERS

SHEET NO. C-4 OF C-10  
 JOB NO. NJ-SU-O-104

Project: Heater's Pond Dam Alternatives Analysis  
 Borough of Ogdensburg, Sussex County, New Jersey

Date Printed: 6/1/2015

**Alternative No.: 2 - Lower and Armor Portion of the Existing Dam with Grouted Riprap, Repair Spillway**

PAY ITEM NUMBER	DESCRIPTION	UNIT	Plan Quantity	Total Quantity	Unit Cost	Total Cost
<b>ITEMS</b>						
1	PERFORMANCE BOND AND PAYMENT BOND	L.S.	1	1	\$6,700.00	\$ 6,700.00
2	MOBILIZATION / DEMOBILIZATION	L.S.	1	1	\$33,400.00	\$ 33,400.00
3	SILT FENCE	L.F.	500	500	\$8.00	\$ 4,000.00
4	HAYBALE	UNIT	25	25	\$30.00	\$ 750.00
5	CONSTRUCTION DRIVEWAY	TON	54	54	\$75.00	\$ 4,050.00
6	BREAKAWAY BARRICADE	UNIT	10	10	\$125.00	\$ 1,250.00
7	DRUM	UNIT	25	25	\$50.00	\$ 1,250.00
8	CONSTRUCTION SIGNS	S.F.	135	135	\$18.00	\$ 2,430.00
9	CONSTRUCTION BARRIER CURB	L.F.	120	120	\$75.00	\$ 9,000.00
10	TRAFFIC DIRECTOR, FLAGGER	HOURL	80	80	\$85.00	\$ 6,800.00
11	FINAL CLEANUP	L.S.	1	1	\$5,000.00	\$ 5,000.00
12	CLEARING SITE	L.S.	1	1	\$15,000.00	\$ 15,000.00
13	FISH SALVAGE OPERATIONS	L.S.	1	1	\$5,000.00	\$ 5,000.00
14	EXCAVATION, UNCLASSIFIED	C.Y.	1263	1263	\$35.00	\$ 44,205.00
15	DRAINAGE LAYER	C.Y.	200	200	\$40.00	\$ 8,000.00
16	8" PVC UNDERDRAIN	L.F.	200	200	\$35.00	\$ 7,000.00
17	DENSE-GRADED AGGREGATE BASE COURSE, 6" THICK	S.Y.	55	55	\$15.00	\$ 825.00
18	HOT MIX ASPHALT 19M64 BASE COURSE	TON	20	20	\$120.00	\$ 2,400.00
19	HOT MIX ASPHALT 9.5M64 SURFACE COURSE	TON	10	10	\$125.00	\$ 1,250.00
20	GROUTED RIPRAP SLOPE PROTECTION, 30" THICK, D50 = 15"	S.Y.	600	600	\$175.00	\$ 105,000.00
21	RIPRAP SLOPE PROTECTION, 30" THICK, D50 = 15"	S.Y.	245	245	\$125.00	\$ 30,625.00
22	CONCRETE CUTOFF WALLS	C.Y.	70	70	\$400.00	\$ 28,000.00
23	BEAM GUIDE RAIL	L.F.	50	50	\$30.00	\$ 1,500.00
24	FLARED GUIDE RAIL TERMINAL	UNIT	2	2	\$2,500.00	\$ 5,000.00
25	COFFERDAM / DEWATERING	L.S.	1	1	\$25,000.00	\$ 25,000.00
26	CONCRETE REPAIR, TYPE A	S.F.	200	200	\$80.00	\$ 16,000.00
27	CONCRETE REPAIR, TYPE B	S.F.	150	150	\$110.00	\$ 16,500.00
28	ALUMINUM STOP LOG ASSEMBLY	L.S.	1	1	\$10,000.00	\$ 10,000.00
29	TOPSOILING, 4" THICK	S.Y.	200	200	\$5.50	\$ 1,100.00
30	FERTILIZING AND SEEDING	S.Y.	200	200	\$2.50	\$ 500.00
31	TOPSOIL STABILIZATION, TYPE 2 MAT	S.Y.	200	200	\$7.50	\$ 1,500.00
						\$ -
<b>RIPRAP SPILLWAY ELEVATION 957.25 SUBTOTAL ITEMS</b>						<b>\$ 399,035.00</b>
					Contingency & Escalation: 10%	\$ 39,903.50
<b>TOTAL</b>						<b>\$ 438,938.50</b>
<b>CALL</b>						<b>\$ 439,000.00</b>

BY: JJM DATE:  
 CHKD. BY: PWO DATE:  
 SUBJECT: CONCEPT COST ESTIMATE

CHERRY, WEBER & ASSOCIATES, P.C.  
 CONSULTING ENGINEERS - PLANNERS

SHEET NO. C-5 OF C-10  
 JOB NO. NJ-SU-O-104

Project: Heater's Pond Dam Alternatives Analysis  
 Borough of Ogdensburg, Sussex County, New Jersey

Date Printed: 6/1/2015

**Alternative No.: 2 - Lower and Armor Portion of the Existing Dam with Roller Compacted Concrete, Repair Spillway**

PAY ITEM	DESCRIPTION	UNIT	Plan	Total	Unit Cost	Total Cost
<b>ITEMS</b>						
1	PERFORMANCE BOND AND PAYMENT BOND	L.S.	1	1	\$7,300.00	\$ 7,300.00
2	MOBILIZATION / DEMOBILIZATION	L.S.	1	1	\$36,300.00	\$ 36,300.00
3	SILT FENCE	L.F.	500	500	\$8.00	\$ 4,000.00
4	HAYBALE	UNIT	25	25	\$30.00	\$ 750.00
5	CONSTRUCTION DRIVEWAY	TON	54	54	\$75.00	\$ 4,050.00
6	BREAKAWAY BARRICADE	UNIT	10	10	\$125.00	\$ 1,250.00
7	DRUM	UNIT	25	25	\$50.00	\$ 1,250.00
8	CONSTRUCTION SIGNS	S.F.	135	135	\$18.00	\$ 2,430.00
9	CONSTRUCTION BARRIER CURB	L.F.	120	120	\$75.00	\$ 9,000.00
10	TRAFFIC DIRECTOR, FLAGGER	HOUR	80	80	\$85.00	\$ 6,800.00
11	FINAL CLEANUP	L.S.	1	1	\$5,000.00	\$ 5,000.00
12	CLEARING SITE	L.S.	1	1	\$15,000.00	\$ 15,000.00
13	FISH SALVAGE OPERATIONS	L.S.	1	1	\$5,000.00	\$ 5,000.00
14	EXCAVATION, UNCLASSIFIED	C.Y.	1292	1292	\$35.00	\$ 45,220.00
15	DRAINAGE LAYER	C.Y.	220	220	\$40.00	\$ 8,800.00
16	8" PVC UNDERDRAIN	L.F.	200	200	\$40.00	\$ 8,000.00
17	DENSE-GRADED AGGREGATE BASE COURSE, 6" THICK	S.Y.	55	55	\$15.00	\$ 825.00
18	HOT MIX ASPHALT 19M64 BASE COURSE	TON	20	20	\$120.00	\$ 2,400.00
19	HOT MIX ASPHALT 9.5M64 SURFACE COURSE	TON	10	10	\$125.00	\$ 1,250.00
20	ROLLER-COMPACTED CONCRETE (RCC)	C.Y.	670	670	\$200.00	\$ 134,000.00
21	RIPRAP SLOPE PROTECTION, 30" THICK, D50 = 15"	S.Y.	250	250	\$125.00	\$ 31,250.00
22	CONCRETE CUTOFF WALLS	C.Y.	60	60	\$400.00	\$ 24,000.00
23	BEAM GUIDE RAIL	L.F.	50	50	\$30.00	\$ 1,500.00
24	FLARED GUIDE RAIL TERMINAL	UNIT	2	2	\$2,500.00	\$ 5,000.00
25	COFFERDAM / DEWATERING	L.S.	1	1	\$25,000.00	\$ 25,000.00
26	CONCRETE REPAIR, TYPE A	S.F.	200	200	\$80.00	\$ 16,000.00
27	CONCRETE REPAIR, TYPE B	S.F.	150	150	\$110.00	\$ 16,500.00
28	ALUMINUM STOP LOG ASSEMBLY	L.S.	1	1	\$10,000.00	\$ 10,000.00
29	TOPSOILING, 4" THICK	S.Y.	200	200	\$5.50	\$ 1,100.00
30	FERTILIZING AND SEEDING	S.Y.	200	200	\$2.50	\$ 500.00
31	TOPSOIL STABILIZATION, TYPE 2 MAT	S.Y.	200	200	\$7.50	\$ 1,500.00
						\$ -
						\$ -
<b>SPILLWAY ELEVATION 957.25 SUBTOTAL ITEMS</b>						<b>\$ 430,975.00</b>
Contingency & Escalation: 10%						\$ 43,097.50
<b>TOTAL</b>						<b>\$ 474,072.50</b>
<b>CALL</b>						<b>\$ 474,000.00</b>

BY: JJM DATE:  
 CHKD. BY: PWO DATE:  
 SUBJECT: CONCEPT COST ESTIMATE

CHERRY, WEBER & ASSOCIATES, P.C.  
 CONSULTING ENGINEERS - PLANNERS

SHEET NO. C-6 OF C-10  
 JOB NO. NJ-SU-O-104

Project: Heater's Pond Dam Alternatives Analysis  
 Borough of Ogdensburg, Sussex County, New Jersey

Date Printed: 6/1/2015

**Alternative No.: 2 - Lower and Armor Portion of the Existing Dam with Reinforced Concrete, Repair Spillway**

PAY ITEM NUMBER	DESCRIPTION	UNIT	Plan Quantity	Total Quantity	Unit Cost	Total Cost
<b>ITEMS</b>						
1	PERFORMANCE BOND AND PAYMENT BOND	L.S.	1	1	\$7,300.00	\$ 7,300.00
2	MOBILIZATION / DEMOBILIZATION	L.S.	1	1	\$36,500.00	\$ 36,500.00
3	SILT FENCE	L.F.	500	500	\$8.00	\$ 4,000.00
4	HAYBALE	UNIT	25	25	\$30.00	\$ 750.00
5	CONSTRUCTION DRIVEWAY	TON	54	54	\$75.00	\$ 4,050.00
6	BREAKAWAY BARRICADE	UNIT	10	10	\$125.00	\$ 1,250.00
7	DRUM	UNIT	25	25	\$50.00	\$ 1,250.00
8	CONSTRUCTION SIGNS	S.F.	135	135	\$18.00	\$ 2,430.00
9	CONSTRUCTION BARRIER CURB	L.F.	120	120	\$75.00	\$ 9,000.00
10	TRAFFIC DIRECTOR, FLAGGER	HOURL	80	80	\$85.00	\$ 6,800.00
11	FINAL CLEANUP	L.S.	1	1	\$5,000.00	\$ 5,000.00
12	CLEARING SITE	L.S.	1	1	\$15,000.00	\$ 15,000.00
13	FISH SALVAGE OPERATIONS	L.S.	1	1	\$5,000.00	\$ 5,000.00
14	EXCAVATION, UNCLASSIFIED	C.Y.	984	984	\$35.00	\$ 34,440.00
15	DRAINAGE LAYER	C.Y.	240	240	\$40.00	\$ 9,600.00
16	8" PVC UNDERDRAIN	L.F.	200	200	\$40.00	\$ 8,000.00
17	DENSE-GRADED AGGREGATE BASE COURSE, 6" THICK	S.Y.	55	55	\$15.00	\$ 825.00
18	HOT MIX ASPHALT 19M64 BASE COURSE	TON	20	20	\$120.00	\$ 2,400.00
19	HOT MIX ASPHALT 9.5M64 SURFACE COURSE	TON	10	10	\$125.00	\$ 1,250.00
20	REINFORCED CONCRETE	C.Y.	358	358	\$475.00	\$ 170,050.00
21	RIPRAP SLOPE PROTECTION, 30" THICK, D50 = 15"	S.Y.	250	250	\$125.00	\$ 31,250.00
22	BEAM GUIDE RAIL	L.F.	50	50	\$30.00	\$ 1,500.00
23	FLARED GUIDE RAIL TERMINAL	UNIT	2	2	\$2,500.00	\$ 5,000.00
24	COFFERDAM / DEWATERING	L.S.	1	1	\$25,000.00	\$ 25,000.00
25	CONCRETE REPAIR, TYPE A	S.F.	200	200	\$80.00	\$ 16,000.00
26	CONCRETE REPAIR, TYPE B	S.F.	150	150	\$110.00	\$ 16,500.00
27	ALUMINUM STOP LOG ASSEMBLY	L.S.	1	1	\$10,000.00	\$ 10,000.00
28	TOPSOILING, 4" THICK	S.Y.	200	200	\$5.50	\$ 1,100.00
29	FERTILIZING AND SEEDING	S.Y.	200	200	\$2.50	\$ 500.00
30	TOPSOIL STABILIZATION, TYPE 2 MAT	S.Y.	200	200	\$7.50	\$ 1,500.00
						\$ -
<b>SPILLWAY ELEVATION 957.25 SUBTOTAL ITEMS</b>						<b>\$ 433,245.00</b>
					Contingency & Escalation: 10%	\$ 43,324.50
<b>TOTAL</b>						<b>\$ 476,569.50</b>
<b>CALL</b>						<b>\$ 477,000.00</b>

BY: JJM DATE:  
 CHKD. BY: PWO DATE:  
 SUBJECT: CONCEPT COST ESTIMATE

CHERRY, WEBER & ASSOCIATES, P.C.  
 CONSULTING ENGINEERS - PLANNERS

SHEET NO. C-7 OF C-10  
 JOB NO. NJ-SU-O-104

Project: Heater's Pond Dam Alternatives Analysis  
 Borough of Ogdensburg, Sussex County, New Jersey

Date Printed: 6/1/2015

**Alternative No.: 3 - Lower and Armor Portion of the Existing Dam with Grouted Riprap, Repair Spillway, Permanently Lower Pond Elevation**

PAY ITEM NUMBER	DESCRIPTION	UNIT	Plan Quantity	Total Quantity	Unit Cost	Total Cost
<b>ITEMS</b>						
1	PERFORMANCE BOND AND PAYMENT BOND	L.S.	1	1	\$6,800.00	\$ 6,800.00
2	MOBILIZATION / DEMOBILIZATION	L.S.	1	1	\$33,600.00	\$ 33,600.00
3	SILT FENCE	L.F.	500	500	\$8.00	\$ 4,000.00
4	HAYBALE	UNIT	25	25	\$30.00	\$ 750.00
5	CONSTRUCTION DRIVEWAY	TON	54	54	\$75.00	\$ 4,050.00
6	BREAKAWAY BARRICADE	UNIT	10	10	\$125.00	\$ 1,250.00
7	DRUM	UNIT	25	25	\$50.00	\$ 1,250.00
8	CONSTRUCTION SIGNS	S.F.	135	135	\$18.00	\$ 2,430.00
9	CONSTRUCTION BARRIER CURB	L.F.	120	120	\$75.00	\$ 9,000.00
10	TRAFFIC DIRECTOR, FLAGGER	HOURL	80	80	\$85.00	\$ 6,800.00
11	FINAL CLEANUP	L.S.	1	1	\$5,000.00	\$ 5,000.00
12	CLEARING SITE	L.S.	1	1	\$15,000.00	\$ 15,000.00
13	FISH SALVAGE OPERATIONS	L.S.	1	1	\$5,000.00	\$ 5,000.00
14	EXCAVATION, UNCLASSIFIED	C.Y.	1353	1353	\$35.00	\$ 47,355.00
15	DRAINAGE LAYER	C.Y.	150	150	\$40.00	\$ 6,000.00
16	8" PVC UNDERDRAIN	L.F.	200	200	\$35.00	\$ 7,000.00
17	DENSE-GRADED AGGREGATE BASE COURSE, 6" THICK	S.Y.	55	55	\$15.00	\$ 825.00
18	HOT MIX ASPHALT 19M64 BASE COURSE	TON	20	20	\$120.00	\$ 2,400.00
19	HOT MIX ASPHALT 9.5M64 SURFACE COURSE	TON	10	10	\$125.00	\$ 1,250.00
20	GROUTED RIPRAP SLOPE PROTECTION, 30" THICK, D50 = 15"	S.Y.	600	600	\$175.00	\$ 105,000.00
21	RIPRAP SLOPE PROTECTION, 30" THICK, D50 = 15"	S.Y.	245	245	\$125.00	\$ 30,625.00
22	CONCRETE CUTOFF WALLS	C.Y.	70	70	\$400.00	\$ 28,000.00
23	BEAM GUIDE RAIL	L.F.	50	50	\$30.00	\$ 1,500.00
24	FLARED GUIDE RAIL TERMINAL	UNIT	2	2	\$2,500.00	\$ 5,000.00
25	COFFERDAM / DEWATERING	L.S.	1	1	\$25,000.00	\$ 25,000.00
26	CONCRETE REPAIR, TYPE A	S.F.	200	200	\$80.00	\$ 16,000.00
27	CONCRETE REPAIR, TYPE B	S.F.	150	150	\$110.00	\$ 16,500.00
28	ALUMINUM STOP LOG ASSEMBLY	L.S.	1	1	\$10,000.00	\$ 10,000.00
29	TOPSOILING, 4" THICK	S.Y.	200	200	\$5.50	\$ 1,100.00
30	FERTILIZING AND SEEDING	S.Y.	200	200	\$2.50	\$ 500.00
31	TOPSOIL STABILIZATION, TYPE 2 MAT	S.Y.	200	200	\$7.50	\$ 1,500.00
						\$ -
<b>RIPRAP SPILLWAY ELEVATION 955.75 SUBTOTAL ITEMS</b>						<b>\$ 400,485.00</b>
Contingency & Escalation: 10%						\$ 40,048.50
<b>TOTAL</b>						<b>\$ 440,533.50</b>
<b>CALL</b>						<b>\$ 441,000.00</b>

BY: JJM DATE:  
 CHKD. BY: PWO DATE:  
 SUBJECT: CONCEPT COST ESTIMATE

CHERRY, WEBER & ASSOCIATES, P.C.  
 CONSULTING ENGINEERS - PLANNERS

SHEET NO. C-8 OF C-10  
 JOB NO. NJ-SU-O-104

Project: Heater's Pond Dam Alternatives Analysis  
 Borough of Ogdensburg, Sussex County, New Jersey

Date Printed: 6/1/2015

**Alternative No.: 3 - Lower and Armor Portion of the Existing Dam with Roller Compacted Concrete, Repair Spillway, Permanently Lower Pond Elevation**

PAY ITEM NUMBER	DESCRIPTION	UNIT	Plan Quantity	Total Quantity	Unit Cost	Total Cost
<b>ITEMS</b>						
1	PERFORMANCE BOND AND PAYMENT BOND	L.S.	1	1	\$7,100.00	\$ 7,100.00
2	MOBILIZATION / DEMOBILIZATION	L.S.	1	1	\$35,500.00	\$ 35,500.00
3	SILT FENCE	L.F.	500	500	\$8.00	\$ 4,000.00
4	HAYBALE	UNIT	25	25	\$30.00	\$ 750.00
5	CONSTRUCTION DRIVEWAY	TON	54	54	\$75.00	\$ 4,050.00
6	BREAKAWAY BARRICADE	UNIT	10	10	\$125.00	\$ 1,250.00
7	DRUM	UNIT	25	25	\$50.00	\$ 1,250.00
8	CONSTRUCTION SIGNS	S.F.	135	135	\$18.00	\$ 2,430.00
9	CONSTRUCTION BARRIER CURB	L.F.	120	120	\$75.00	\$ 9,000.00
10	TRAFFIC DIRECTOR, FLAGGER	HOUR	80	80	\$85.00	\$ 6,800.00
11	FINAL CLEANUP	L.S.	1	1	\$5,000.00	\$ 5,000.00
12	CLEARING SITE	L.S.	1	1	\$15,000.00	\$ 15,000.00
13	FISH SALVAGE OPERATIONS	L.S.	1	1	\$5,000.00	\$ 5,000.00
14	EXCAVATION, UNCLASSIFIED	C.Y.	1218	1218	\$35.00	\$ 42,630.00
15	DRAINAGE LAYER	C.Y.	210	210	\$40.00	\$ 8,400.00
16	8" PVC UNDERDRAIN	L.F.	200	200	\$40.00	\$ 8,000.00
17	DENSE-GRADED AGGREGATE BASE COURSE, 6" THICK	S.Y.	55	55	\$15.00	\$ 825.00
18	HOT MIX ASPHALT 19M64 BASE COURSE	TON	20	20	\$120.00	\$ 2,400.00
19	HOT MIX ASPHALT 9.5M64 SURFACE COURSE	TON	10	10	\$125.00	\$ 1,250.00
20	ROLLER-COMPACTED CONCRETE (RCC)	C.Y.	630	630	\$200.00	\$ 126,000.00
21	RIPRAP SLOPE PROTECTION, 30" THICK, D50 = 15"	S.Y.	250	250	\$125.00	\$ 31,250.00
22	CONCRETE CUTOFF WALLS	C.Y.	60	60	\$400.00	\$ 24,000.00
23	BEAM GUIDE RAIL	L.F.	50	50	\$85.00	\$ 4,250.00
24	FLARED GUIDE RAIL TERMINAL	UNIT	2	2	\$2,500.00	\$ 5,000.00
25	COFFERDAM / DEWATERING	L.S.	1	1	\$25,000.00	\$ 25,000.00
26	CONCRETE REPAIR, TYPE A	S.F.	200	200	\$80.00	\$ 16,000.00
27	CONCRETE REPAIR, TYPE B	S.F.	150	150	\$110.00	\$ 16,500.00
28	ALUMINUM STOP LOG ASSEMBLY	L.S.	1	1	\$10,000.00	\$ 10,000.00
29	TOPSOILING, 4" THICK	S.Y.	200	200	\$5.50	\$ 1,100.00
30	FERTILIZING AND SEEDING	S.Y.	200	200	\$2.50	\$ 500.00
31	TOPSOIL STABILIZATION, TYPE 2 MAT	S.Y.	200	200	\$7.50	\$ 1,500.00
						\$ -
<b>SPILLWAY ELEVATION 955.75 SUBTOTAL ITEMS</b>						<b>\$ 421,735.00</b>
					Contingency & Escalation: 10%	\$ 42,173.50
<b>TOTAL</b>						<b>\$ 463,908.50</b>
<b>CALL</b>						<b>\$ 464,000.00</b>

BY: JJM DATE:  
 CHKD. BY: PWO DATE:  
 SUBJECT: CONCEPT COST ESTIMATE

CHERRY, WEBER & ASSOCIATES, P.C.  
 CONSULTING ENGINEERS - PLANNERS

SHEET NO. C-9 OF C-10  
 JOB NO. NJ-SU-O-104

Project: Heater's Pond Dam Alternatives Analysis  
 Borough of Ogdensburg, Sussex County, New Jersey

Date Printed: 6/1/2015

**Alternative No.: 3 - Lower and Armor Portion of the Existing Dam with Reinforced Concrete, Repair Spillway, Permanently Lower Pond Elevation**

PAY ITEM NUMBER	DESCRIPTION	UNIT	Plan Quantity	Total Quantity	Unit Cost	Total Cost
<b>ITEMS</b>						
1	PERFORMANCE BOND AND PAYMENT BOND	L.S.	1	1	\$7,400.00	\$ 7,400.00
2	MOBILIZATION / DEMOBILIZATION	L.S.	1	1	\$36,700.00	\$ 36,700.00
3	SILT FENCE	L.F.	500	500	\$8.00	\$ 4,000.00
4	HAYBALE	UNIT	25	25	\$30.00	\$ 750.00
5	CONSTRUCTION DRIVEWAY	TON	54	54	\$75.00	\$ 4,050.00
6	BREAKAWAY BARRICADE	UNIT	10	10	\$125.00	\$ 1,250.00
7	DRUM	UNIT	25	25	\$50.00	\$ 1,250.00
8	CONSTRUCTION SIGNS	S.F.	135	135	\$18.00	\$ 2,430.00
9	CONSTRUCTION BARRIER CURB	L.F.	120	120	\$75.00	\$ 9,000.00
10	TRAFFIC DIRECTOR, FLAGGER	HOUR	80	80	\$85.00	\$ 6,800.00
11	FINAL CLEANUP	L.S.	1	1	\$5,000.00	\$ 5,000.00
12	CLEARING SITE	L.S.	1	1	\$15,000.00	\$ 15,000.00
13	FISH SALVAGE OPERATIONS	L.S.	1	1	\$5,000.00	\$ 5,000.00
14	EXCAVATION, UNCLASSIFIED	C.Y.	1077	1077	\$35.00	\$ 37,695.00
15	DRAINAGE LAYER	C.Y.	230	230	\$40.00	\$ 9,200.00
16	8" PVC UNDERDRAIN	L.F.	200	200	\$40.00	\$ 8,000.00
17	DENSE-GRADED AGGREGATE BASE COURSE, 6" THICK	S.Y.	55	55	\$15.00	\$ 825.00
18	HOT MIX ASPHALT 19M64 BASE COURSE	TON	20	20	\$120.00	\$ 2,400.00
19	HOT MIX ASPHALT 9.5M64 SURFACE COURSE	TON	10	10	\$125.00	\$ 1,250.00
20	REINFORCED CONCRETE	C.Y.	356	356	\$475.00	\$ 169,100.00
21	RIPRAP SLOPE PROTECTION, 30" THICK, D50 = 15"	S.Y.	250	250	\$125.00	\$ 31,250.00
22	BEAM GUIDE RAIL	L.F.	50	50	\$30.00	\$ 1,500.00
23	FLARED GUIDE RAIL TERMINAL	UNIT	2	2	\$2,500.00	\$ 5,000.00
24	COFFERDAM / DEWATERING	L.S.	1	1	\$25,000.00	\$ 25,000.00
25	CONCRETE REPAIR, TYPE A	S.F.	200	200	\$80.00	\$ 16,000.00
26	CONCRETE REPAIR, TYPE B	S.F.	150	150	\$110.00	\$ 16,500.00
27	ALUMINUM STOP LOG ASSEMBLY	L.S.	1	1	\$10,000.00	\$ 10,000.00
28	TOPSOILING, 4" THICK	S.Y.	200	200	\$5.50	\$ 1,100.00
29	FERTILIZING AND SEEDING	S.Y.	200	200	\$2.50	\$ 500.00
30	TOPSOIL STABILIZATION, TYPE 2 MAT	S.Y.	200	200	\$7.50	\$ 1,500.00
						\$ -
<b>SPILLWAY ELEVATION 955.75 SUBTOTAL ITEMS</b>						<b>\$ 435,450.00</b>
					Contingency & Escalation: 10%	\$ 43,545.00
<b>TOTAL</b>						<b>\$ 478,995.00</b>
<b>CALL</b>						<b>\$ 479,000.00</b>



BY: JJM DATE:  
 CHKD. BY: PWO DATE:  
 SUBJECT: CONCEPT COST ESTIMATE

CHERRY, WEBER & ASSOCIATES, P.C.  
 CONSULTING ENGINEERS - PLANNERS

Project: Heater's Pond Dam Alternatives Analysis  
 Borough of Ogdensburg, Sussex County, New Jersey

Date Printed: 6/1/2015

Alternative No.: 4 - Removal of Dam

PAY ITEM NUMBER	DESCRIPTION	UNIT	Plan Quantity	Total Quantity	Unit Cost	Total Cost
<b>ITEMS</b>						
1	PERFORMANCE BOND AND PAYMENT BOND	L.S.	1	1	\$2,100.00	\$ 2,100.00
2	MOBILIZATION / DEMOBILIZATION	L.S.	1	1	\$8,300.00	\$ 8,300.00
3	SILT FENCE	L.F.	500	500	\$8.00	\$ 4,000.00
4	HAYBALE	UNIT	25	25	\$30.00	\$ 750.00
5	CONSTRUCTION DRIVEWAY	TON	54	54	\$75.00	\$ 4,050.00
6	BREAKAWAY BARRICADE	UNIT	10	10	\$125.00	\$ 1,250.00
7	DRUM	UNIT	25	25	\$50.00	\$ 1,250.00
8	CONSTRUCTION SIGNS	S.F.	135	135	\$18.00	\$ 2,430.00
9	CONSTRUCTION BARRIER CURB	L.F.	120	120	\$75.00	\$ 9,000.00
10	TRAFFIC DIRECTOR, FLAGGER	HOUR	80	80	\$85.00	\$ 6,800.00
11	FINAL CLEANUP	L.S.	1	1	\$5,000.00	\$ 5,000.00
12	CLEARING SITE (INCLUDES CONCRETE REMOVAL)	L.S.	1	1	\$65,000.00	\$ 65,000.00
13	FISH SALVAGE OPERATIONS	L.S.	1	1	\$5,000.00	\$ 5,000.00
14	EXCAVATION, UNCLASSIFIED	C.Y.	192	192	\$35.00	\$ 6,720.00
15	DENSE-GRADED AGGREGATE BASE COURSE, 6" THICK	S.Y.	55	55	\$15.00	\$ 825.00
16	HOT MIX ASPHALT 19M64 BASE COURSE	TON	20	20	\$120.00	\$ 2,400.00
17	HOT MIX ASPHALT 9.5M64 SURFACE COURSE	TON	10	10	\$125.00	\$ 1,250.00
18	BEAM GUIDE RAIL	L.F.	50	50	\$85.00	\$ 4,250.00
19	FLARED GUIDE RAIL TERMINAL	UNIT	2	2	\$2,500.00	\$ 5,000.00
20	STREAM STABILIZATION (PARTIALLY GROUTED RIPRAP 2' BELOW STREAMBED)	S.Y.	195	195	\$150.00	\$ 29,250.00
21	TOPSOILING, 6" THICK	S.Y.	179	179	\$8.00	\$ 1,432.00
22	FERTILIZING AND SEEDING	S.Y.	179	179	\$2.50	\$ 448.00
23	TOPSOIL STABILIZATION, TYPE 2 MAT	S.Y.	179	179	\$10.00	\$ 1,790.00
						\$ -
<b>SUBTOTAL ITEMS</b>						<b>\$ 168,295.00</b>
					Contingency & Escalation: 10%	\$ 16,829.50
<b>TOTAL</b>						<b>\$ 185,124.50</b>
<b>CALL</b>						<b>\$ 185,000.00</b>