

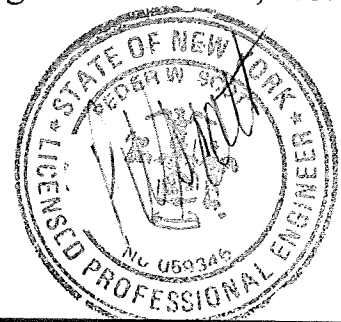
Diverging Channel Drainage Analysis

Brennan Dam
2200 Saw Mill River Rd
Yorktown, NY

Prepared By:

Peder W. Scott, P.E., R.A.
P. W. Scott Engineering & Architecture, P.C.
3871 Danbury Rd.
Brewster, NY 10509

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Diverging Channel - Cofferdam Drainage Analysis

I. Refer to attached HEC2 Model of the site; flow into Brennan Dam is:

$$Q_{25} = 1,653 \text{ cfs}$$

$$Q_{100} = 2,571.5 \text{ cfs}$$

Class A Dams designed using above storm events.

II. Cofferdam capacity based upon discharge through the channel proposed.

The pond is routed for the Q_{25} flow limiting the impoundment from 404 elevation to max. permitted of 412 (8' of depth).

Channel is designed as 15' wide by 5.0' deep at a slope of 1.8%.

The walls are lined with a liner with $N = .015$

The pond operates as a variable geometry weir during routing with C value of 2.80.

Routing is through Pond Pack computer program for the above ponds using NRC extreme precipitation storm events with modified B storm intensity curves.

Outlet Structure

Weir 1: Channel X-Y geometry at 404 – 15' wide

Extend to 411.5 @ 2/1 slope

Weir 2: Cofferdam @ 411.5

Width = 100.00 feet

Routing

25-Year Storm Event: Max. WSEL: 411.42 below cofferdam

100-Year Storm Event: Max. WSEL: 412.78 cofferdam over tops.

Channel Capacity @ 1,653 cfs (25-year storm)

Refer to Flow Master output

$n = .012$ (lined with rubber)

Slope = 1.8% - See section

Width is 15.0 @ base with 2/1 side slopes (below top of liner)

Channel Depth = 3.25

$$V = 23 \text{ fps}$$

At 100-Year Storm Event while Portadam overtops; flow through channel is: 2,353 cfs

Channel Depth = 3.93 (also below liner top)

MASTER DESIGN STORM SUMMARY

Default Network Design Storm File, ID STORMS.RNQ WESTCHESTER-BREN

Return Event	Total Depth in	Rainfall Type	RNF File	RNF ID
25NR	6.8000	Synthetic Curve	GAUGED	Synth.Tbl 25
100NR	8.7100	Synthetic Curve	GAUGED	Synth.Tbl 100

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Storage Node ID	Return Type	Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond ac-ft
BRENNON POND IN	POND	25NR	3279.878		13.5000	1653.70		
BRENNON POND IN	POND	100 NR	4007.019		13.5000	2571.54		
BRENNON POND OUT	POND	25NR	3279.513		13.5000	1653.66	411.42	3.371
BRENNON POND OUT	POND	100 NR	4006.649		13.5000	2571.10	412.78	4.794
*OVER THE DAM	JCT	25NR	3279.513		13.5000	1653.66		
*OVER THE DAM	JCT	100 NR	4006.649		13.5000	2571.10		
P123 OUT	JCT	25NR	983.577		13.0000	587.02		
P123 OUT	JCT	100 NR	1380.526		13.0000	967.11		
P120UT	JCT	25NR	836.973		18.3000	352.93		
P120UT	JCT	100 NR	1175.751		17.3500	544.01		
P40UT	JCT	25NR	138.837		14.7500	158.03		
P40UT	JCT	100 NR	192.964		14.2000	371.75		
P50UT	JCT	25NR	33.933		18.9000	11.10		
P50UT	JCT	100 NR	48.528		18.1500	16.32		
P60UT	JCT	25NR	446.977		25.0000	104.30		
P60UT	JCT	100 NR	626.001		22.5000	173.44		

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

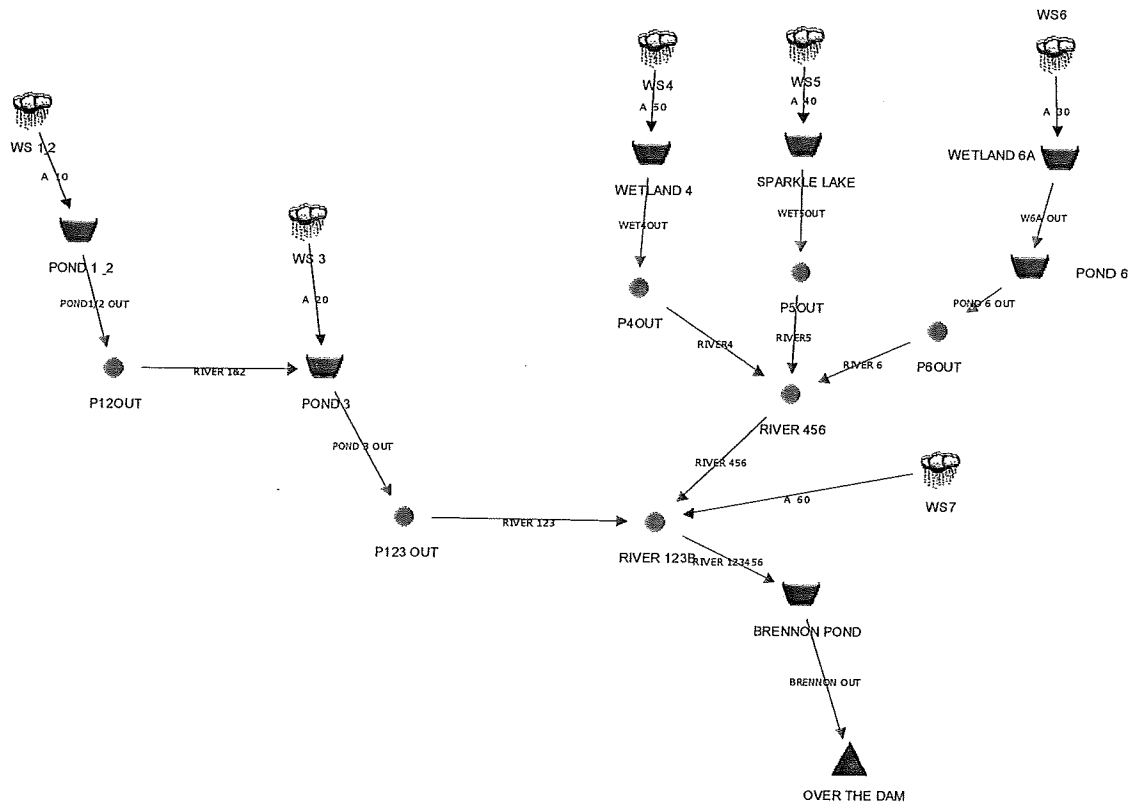
(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Storage Node ID	Return		HYG Vol		Qpeak	Qpeak	Max WSEL	Max Pond
	Type	Event	ac-ft	Trun	hrs	cfs	ft	ac-ft
POND 1 & 2	IN	POND 25NR	891.151		13.4500	2730.39		
POND 1 & 2	IN	POND 100 NR	1237.552		13.5000	4087.34		
POND 1 & 2	OUT	POND 25NR	836.973		18.3000	352.93	450.83	616.272
POND 1 & 2	OUT	POND 100 NR	1175.751		17.3500	544.01	451.67	845.434
POND 3	IN	POND 25NR	984.361		13.0000	588.37		
POND 3	IN	POND 100 NR	1381.483		13.0000	968.78		
POND 3	OUT	POND 25NR	983.577		13.0000	587.02	432.80	7.001
POND 3	OUT	POND 100 NR	1380.526		13.0000	967.11	433.21	7.980
POND 6	IN	POND 25NR	447.133		24.4500	104.32		
POND 6	IN	POND 100 NR	626.903		22.0000	173.86		
POND 6	OUT	POND 25NR	446.977		25.0000	104.30	469.27	12.155
POND 6	OUT	POND 100 NR	626.001		22.5000	173.44	469.77	14.946
RIVER 123B		JCT 25NR	3287.367		13.0000	1669.56		
RIVER 123B		JCT 100 NR	4014.624		13.0000	2599.87		
RIVER 456		JCT 25NR	619.714		15.1000	227.07		
RIVER 456		JCT 100 NR	867.381		14.3000	443.81		
SPARKLE LAKE	IN	POND 25NR	40.590		13.0000	155.26		
SPARKLE LAKE	IN	POND 100 NR	56.101		13.0000	254.60		
SPARKLE LAKE	OUT	POND 25NR	33.933		18.9000	11.10	482.78	30.763
SPARKLE LAKE	OUT	POND 100 NR	48.528		18.1500	16.32	483.39	42.225
WETLAND 4	IN	POND 25NR	139.350		13.2500	458.69		
WETLAND 4	IN	POND 100 NR	193.517		13.3000	695.15		
WETLAND 4	OUT	POND 25NR	138.837		14.7500	158.03	524.17	73.878
WETLAND 4	OUT	POND 100 NR	192.964		14.2000	371.75	524.54	90.067

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversioin;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Storage Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond ac-ft
WETLAND 6A	IN	POND 25NR	447.144		14.1500	1008.01		
WETLAND 6A	IN	POND 100 NR	626.996		14.1500	1427.95		
WETLAND 6A	OUT	POND 25NR	447.133		24.4500	104.32	473.15	328.058
WETLAND 6A	OUT	POND 100 NR	626.903		22.0000	173.86	474.45	464.302
WS 1& 2		AREA 25NR	891.151		13.4500	2730.39		
WS 1& 2		AREA 100 NR	1237.552		13.5000	4087.34		
WS 3		AREA 25NR	153.213		13.0000	587.53		
WS 3		AREA 100 NR	212.764		13.0000	966.34		
WS4		AREA 25NR	139.350		13.2500	458.69		
WS4		AREA 100 NR	193.517		13.3000	695.15		
WS5		AREA 25NR	40.590		13.0000	155.26		
WS5		AREA 100 NR	56.101		13.0000	254.60		
WS6		AREA 25NR	447.144		14.1500	1008.01		
WS6		AREA 100 NR	626.996		14.1500	1427.95		
WS7		AREA 25NR	231.815		13.0000	856.10		
WS7		AREA 100 NR	316.013		13.0000	1388.82		



Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Smoothing	Yes
State	New York
Location	
Longitude	73.620 degrees West
Latitude	41.407 degrees North
Elevation	0 feet
Date/Time	Wed, 02 May 2018 15:20:47 -0400

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.33	0.50	0.62	0.81	1.02	1.27	1yr	0.88	1.21	1.46	1.81	2.24	2.78	3.12	1yr	2.46	3.00	3.47	4.15	4.79	1yr
2yr	0.39	0.59	0.74	0.97	1.22	1.53	2yr	1.06	1.43	1.76	2.19	2.71	3.34	3.74	2yr	2.96	3.59	4.13	4.88	5.53	2yr
5yr	0.46	0.71	0.89	1.19	1.52	1.93	5yr	1.31	1.77	2.22	2.76	3.41	4.19	4.73	5yr	3.71	4.55	5.26	6.11	6.87	5yr
10yr	0.51	0.81	1.02	1.38	1.80	2.29	10yr	1.55	2.07	2.65	3.30	4.06	4.98	5.66	10yr	4.41	5.44	6.31	7.24	8.10	10yr
25yr	0.60	0.95	1.22	1.68	2.24	2.88	25yr	1.93	2.55	3.35	4.18	5.14	6.25	7.18	25yr	5.54	6.90	8.05	9.07	10.06	25yr
50yr	0.68	1.10	1.41	1.97	2.65	3.44	50yr	2.29	2.99	4.00	4.99	6.12	7.44	8.60	50yr	6.58	8.27	9.68	10.76	11.87	50yr
100yr	0.78	1.26	1.62	2.30	3.14	4.10	100yr	2.71	3.51	4.79	5.96	7.31	8.85	10.30	100yr	7.83	9.90	11.65	12.77	14.01	100yr
200yr	0.89	1.45	1.88	2.69	3.72	4.89	200yr	3.21	4.12	5.72	7.13	8.72	10.53	12.35	200yr	9.32	11.87	14.02	15.15	16.53	200yr
500yr	1.07	1.76	2.30	3.34	4.67	6.17	500yr	4.03	5.10	7.23	9.02	11.02	13.26	15.70	500yr	11.73	15.10	17.93	19.01	20.59	500yr

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.22	0.34	0.42	0.56	0.69	1.01	1yr	0.60	0.98	1.17	1.53	2.00	2.52	2.85	1yr	2.23	2.74	3.24	3.82	4.43	1yr
2yr	0.38	0.58	0.71	0.97	1.19	1.43	2yr	1.03	1.39	1.63	2.07	2.63	3.28	3.66	2yr	2.90	3.52	4.04	4.77	5.43	2yr
5yr	0.42	0.64	0.79	1.09	1.39	1.67	5yr	1.20	1.63	1.90	2.44	3.07	3.94	4.48	5yr	3.49	4.31	4.93	5.72	6.47	5yr
10yr	0.45	0.70	0.86	1.21	1.56	1.87	10yr	1.34	1.83	2.13	2.75	3.44	4.52	5.20	10yr	4.00	5.00	5.72	6.56	7.34	10yr
25yr	0.50	0.76	0.95	1.35	1.78	2.15	25yr	1.53	2.11	2.44	3.24	3.99	5.41	6.34	25yr	4.79	6.10	6.96	7.86	8.69	25yr
50yr	0.54	0.82	1.02	1.46	1.97	2.38	50yr	1.70	2.33	2.72	3.66	4.47	6.19	7.37	50yr	5.48	7.09	8.06	9.02	9.86	50yr
100yr	0.58	0.87	1.09	1.58	2.16	2.64	100yr	1.86	2.58	3.04	4.15	4.93	7.10	8.59	100yr	6.28	8.26	9.38	10.36	11.16	100yr
200yr	0.62	0.93	1.18	1.71	2.38	2.92	200yr	2.05	2.85	3.39	4.70	5.50	8.15	10.06	200yr	7.21	9.67	10.91	11.90	12.69	200yr
500yr	0.68	1.01	1.30	1.89	2.69	3.35	500yr	2.32	3.28	3.95	5.58	6.34	9.79	12.40	500yr	8.67	11.93	13.35	14.31	15.00	500yr

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.37	0.56	0.69	0.93	1.14	1.38	1yr	0.98	1.35	1.56	1.98	2.46	2.98	3.35	1yr	2.64	3.22	3.72	4.40	5.07	1yr
2yr	0.41	0.63	0.78	1.06	1.30	1.53	2yr	1.12	1.49	1.77	2.21	2.80	3.44	3.85	2yr	3.04	3.70	4.25	5.00	5.74	2yr
5yr	0.49	0.76	0.94	1.29	1.64	1.94	5yr	1.42	1.90	2.21	2.88	3.64	4.43	5.03	5yr	3.92	4.84	5.57	6.48	7.30	5yr
10yr	0.58	0.89	1.11	1.55	2.00	2.34	10yr	1.73	2.29	2.66	3.52	4.48	5.40	6.19	10yr	4.78	5.96	6.86	7.89	8.83	10yr
25yr	0.73	1.12	1.39	1.99	2.61	3.03	25yr	2.25	2.96	3.41	4.60	5.89	7.02	8.15	25yr	6.22	7.84	9.05	10.25	11.40	25yr
50yr	0.87	1.33	1.65	2.38	3.20	3.68	50yr	2.76	3.60	4.13	5.64	7.26	8.58	10.02	50yr	7.59	9.64	11.14	12.49	13.84	50yr
100yr	1.05	1.59	1.99	2.87	3.93	4.48	100yr	3.40	4.38	5.00	6.91	9.30	10.47	12.32	100yr	9.26	11.85	13.73	15.22	16.78	100yr
200yr	1.26	1.89	2.40	3.47	4.85	5.44	200yr	4.18	5.31	6.04	8.46	11.51	12.77	15.14	200yr	11.30	14.56	16.93	18.56	20.38	200yr
500yr	1.62	2.41	3.10	4.50	6.41	7.03	500yr	5.53	6.87	7.77	11.08	15.36	16.61	19.87	500yr	14.70	19.11	22.31	24.11	26.35	500yr