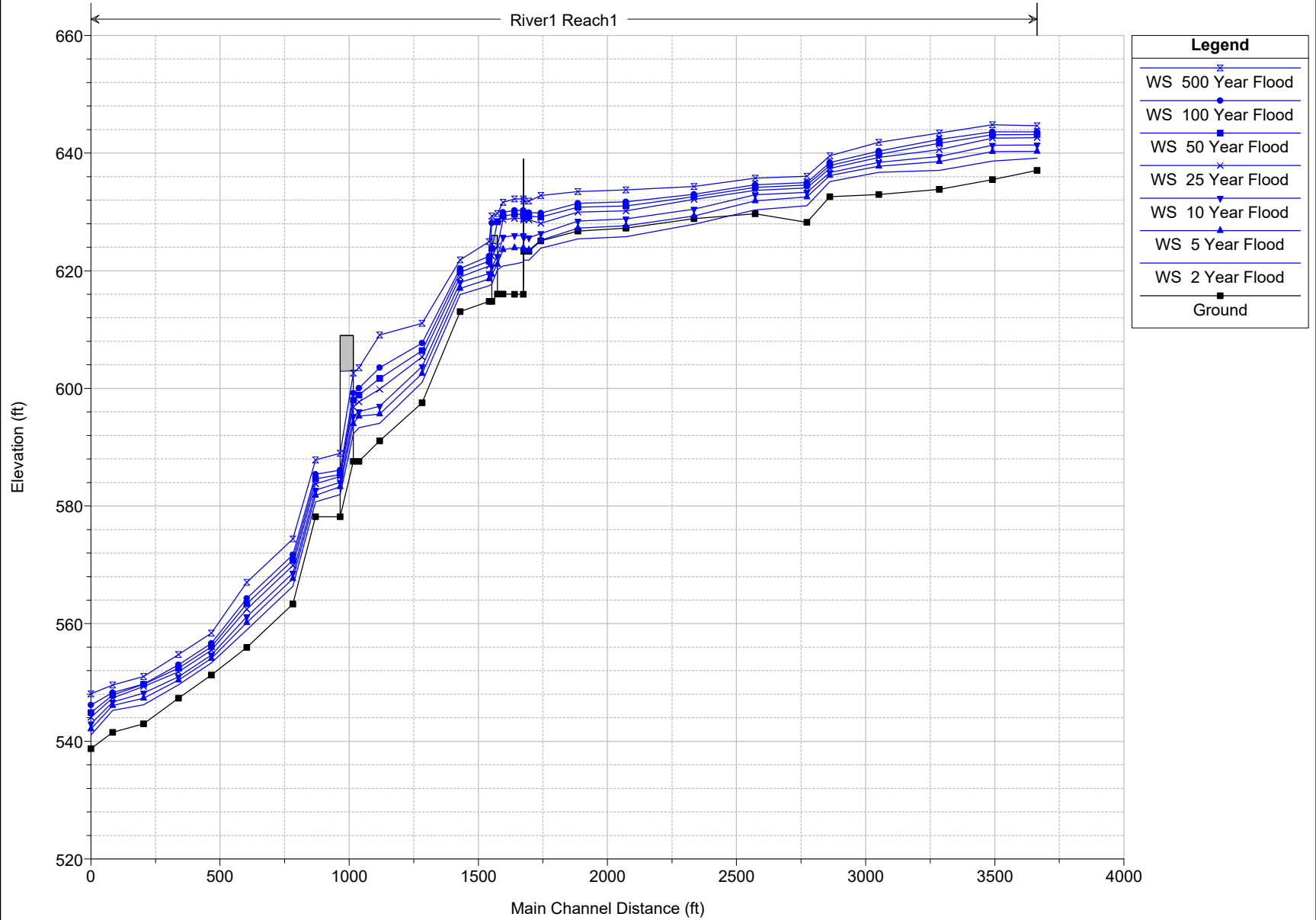
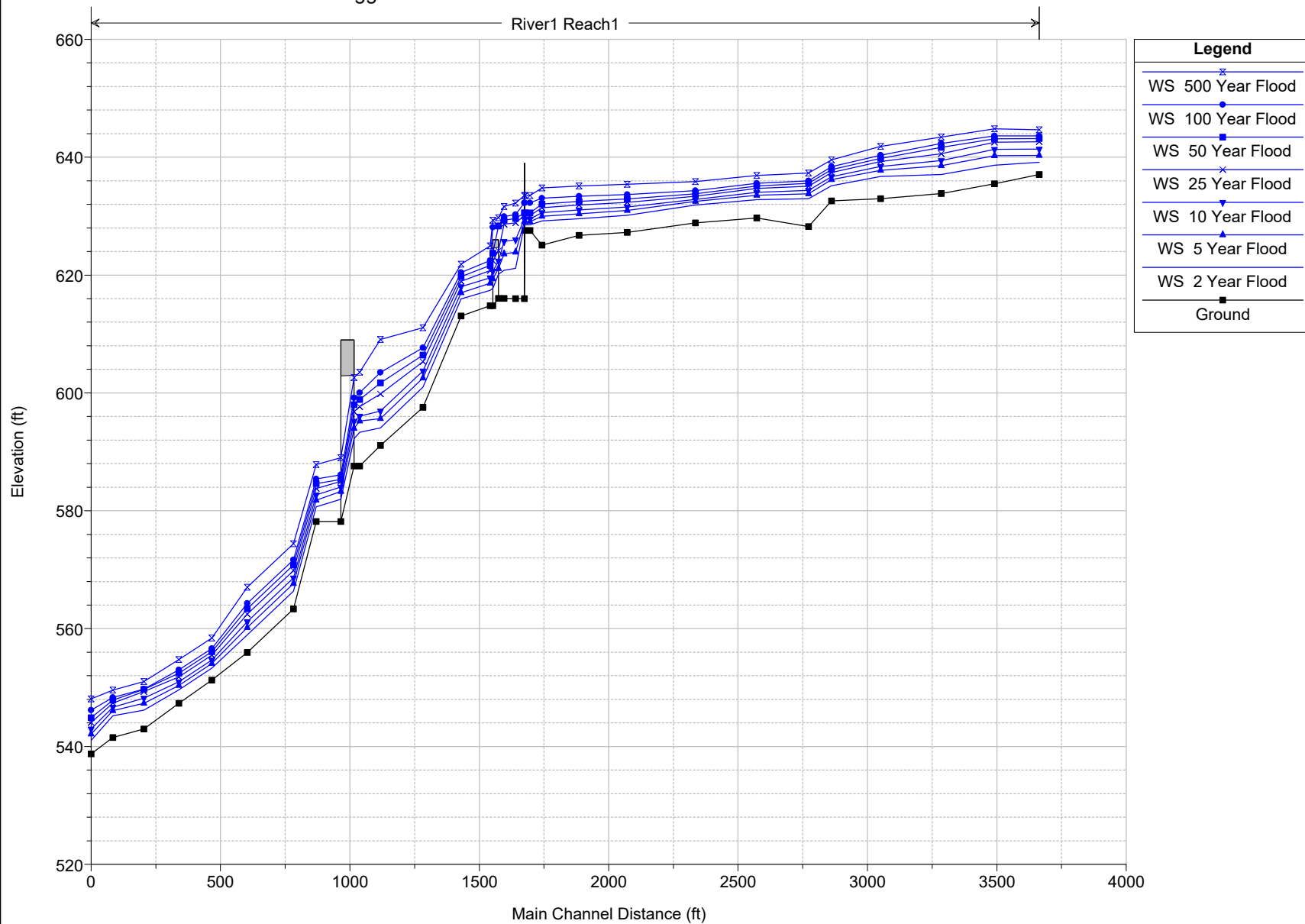


ATTACHMENT C
HEC-RAS Results

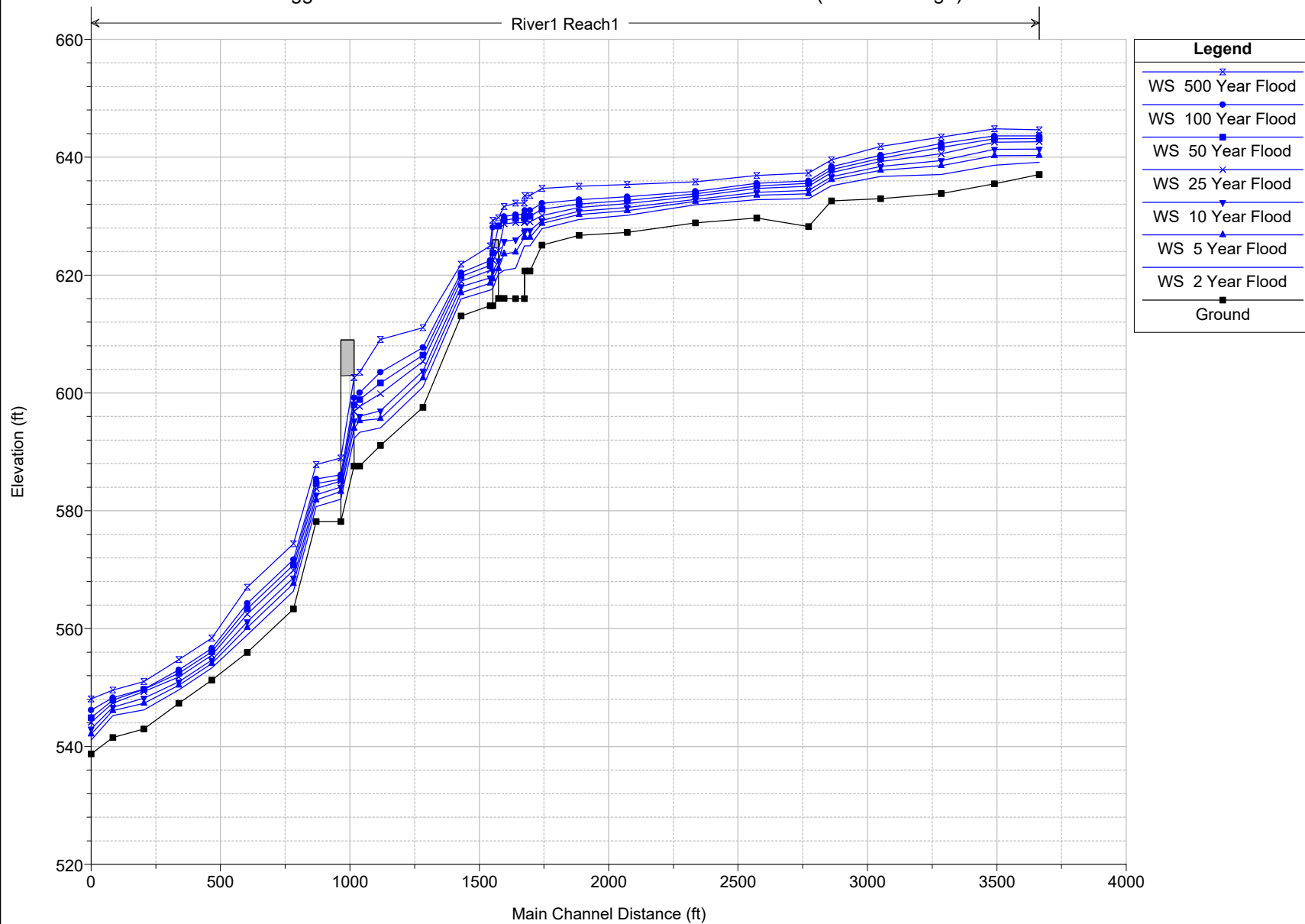
McTaggart Hec-Ras Model 1 Plan: 1) 04 Full Removal w. ACT to Refusal 8/15/2019



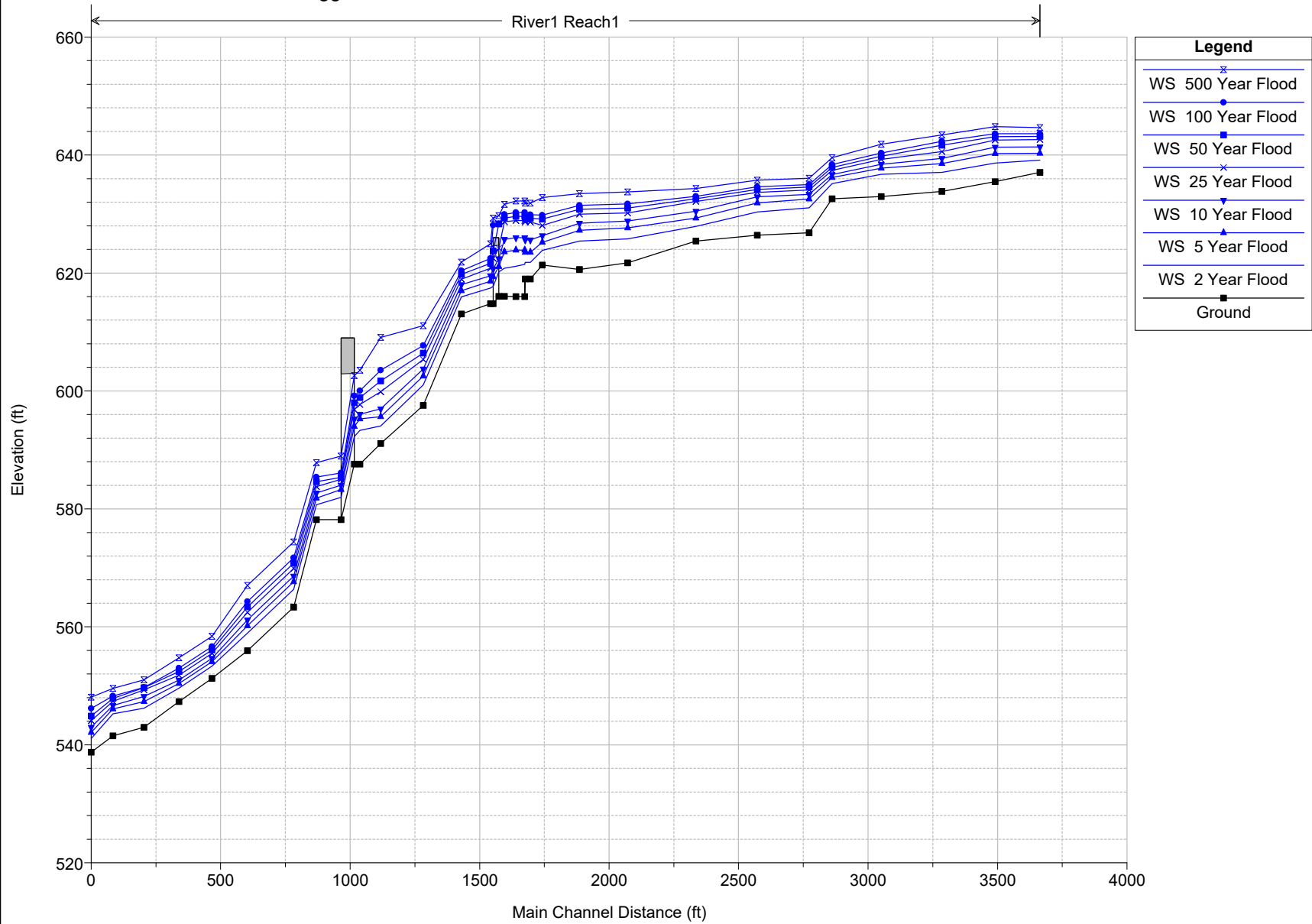
McTaggart Hec-Ras Model 1 Plan: 02 Partial Removal w. ACT 8/14/2019



McTaggart Hec-Ras Model 1 Plan: 03 Full Removal w. ACT (no sed change) 8/15/2019

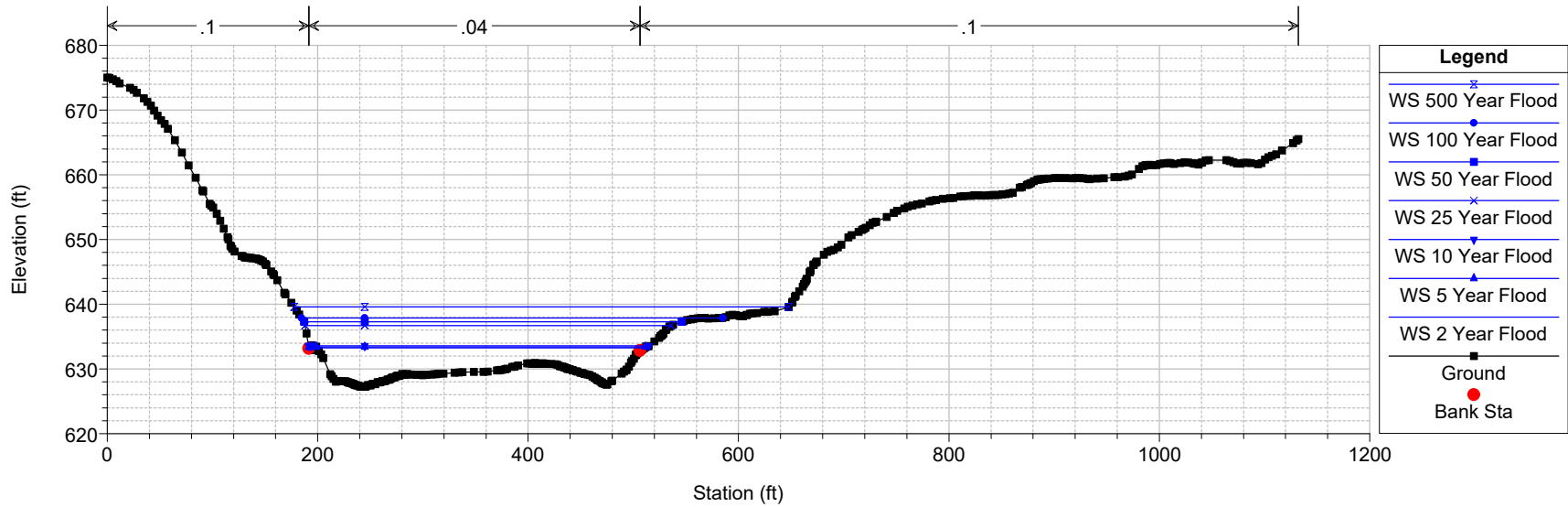


McTaggart Hec-Ras Model 1 Plan: 04 Full Removal w. ACT to Refusal 8/15/2019



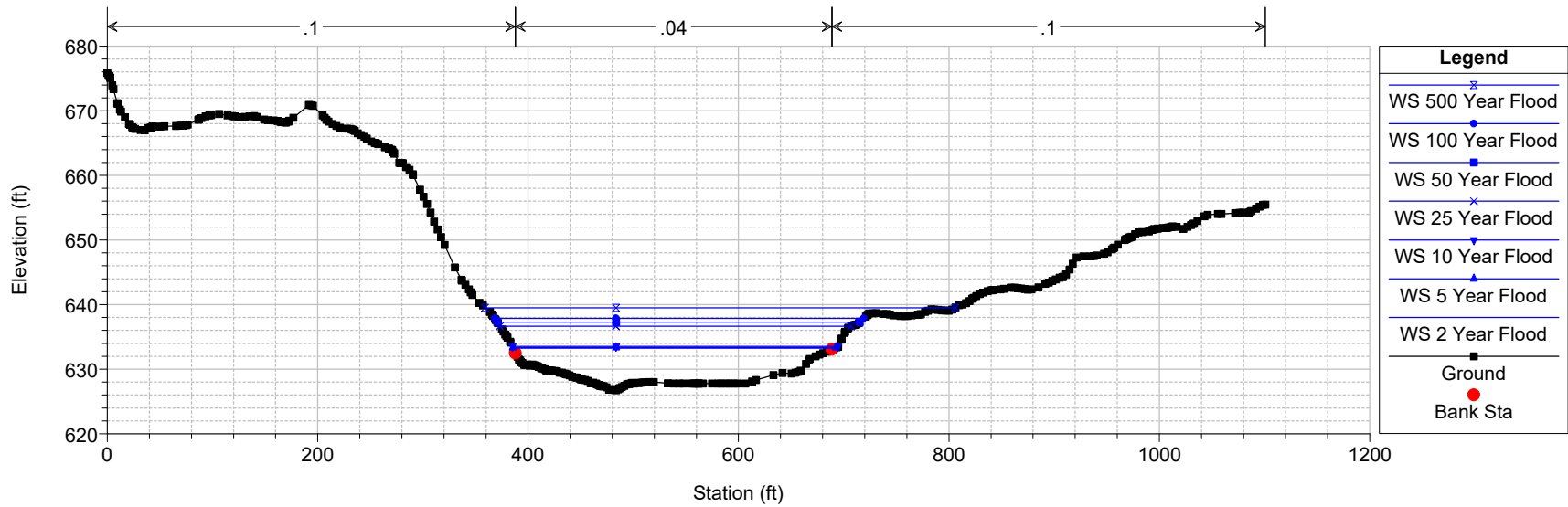
McTaggart Hec-Ras Model 1 Plan: 01 Existing w. ACT 8/14/2019

River = River1 Reach = Reach1 RS = 2113.273



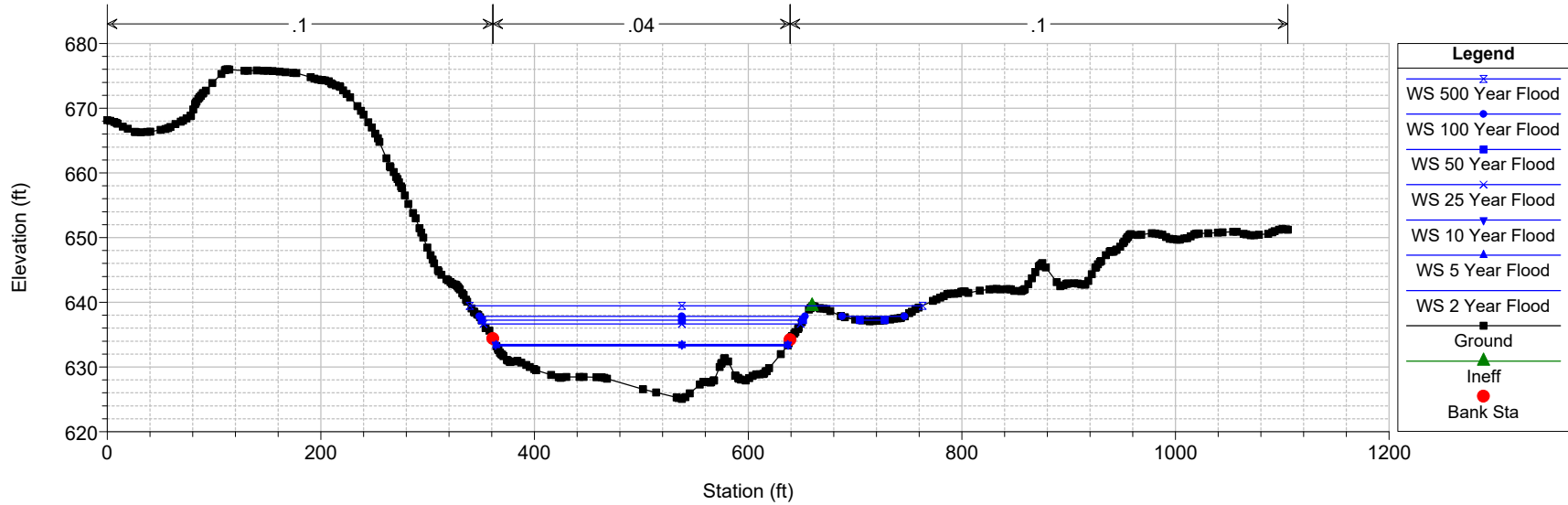
McTaggart Hec-Ras Model 1 Plan: 01 Existing w. ACT 8/14/2019

River = River1 Reach = Reach1 RS = 1927.178



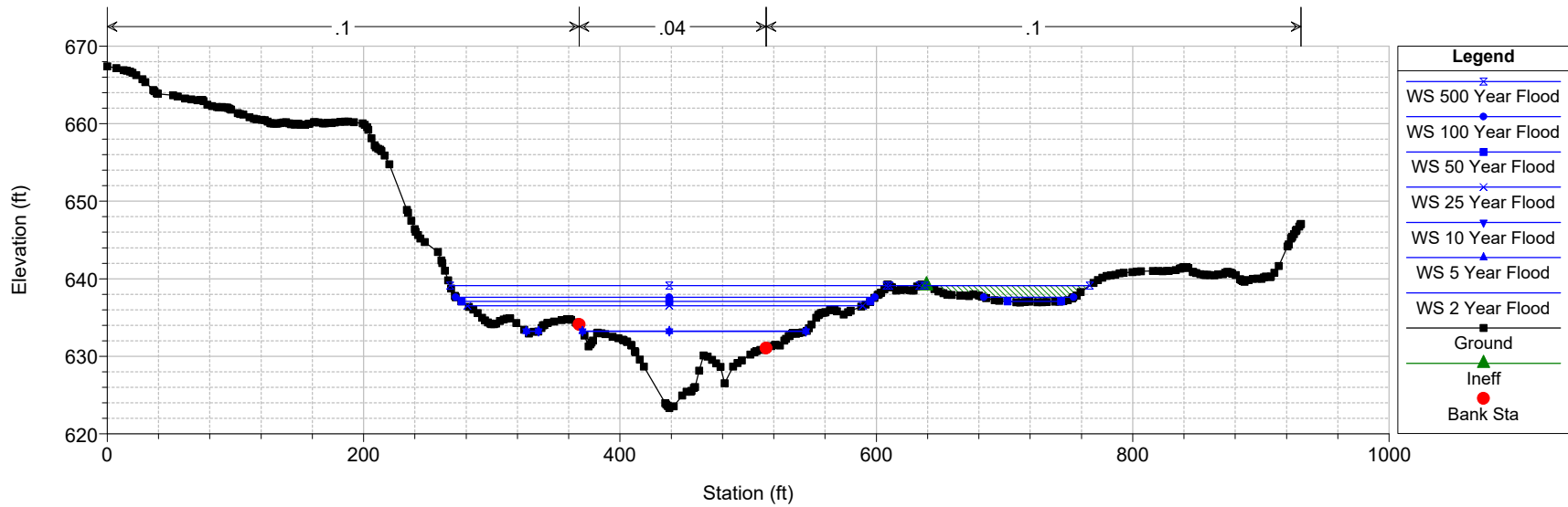
McTaggart Hec-Ras Model 1 Plan: 01 Existing w. ACT 8/14/2019

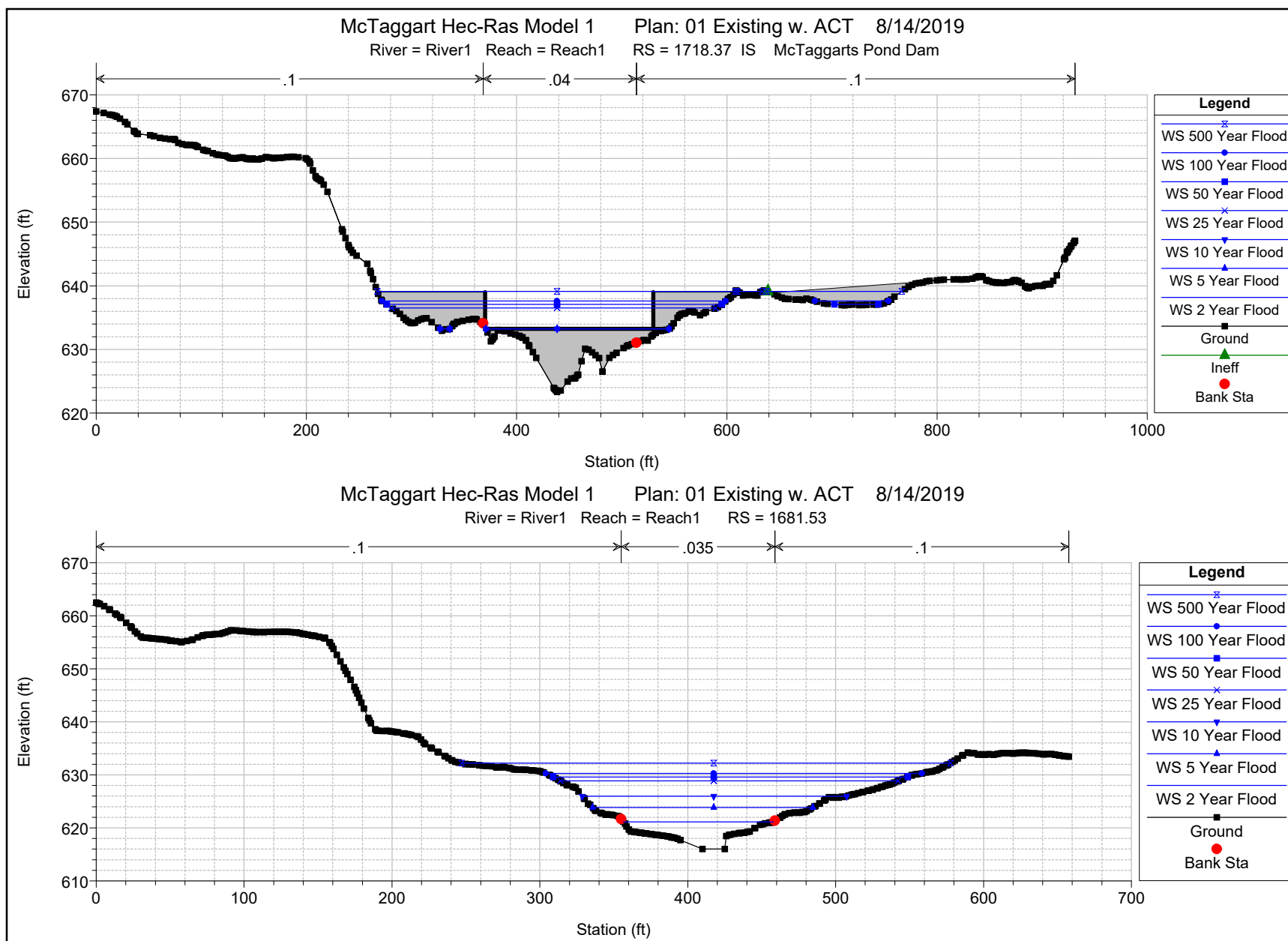
River = River1 Reach = Reach1 RS = 1783.649



McTaggart Hec-Ras Model 1 Plan: 01 Existing w. ACT 8/14/2019

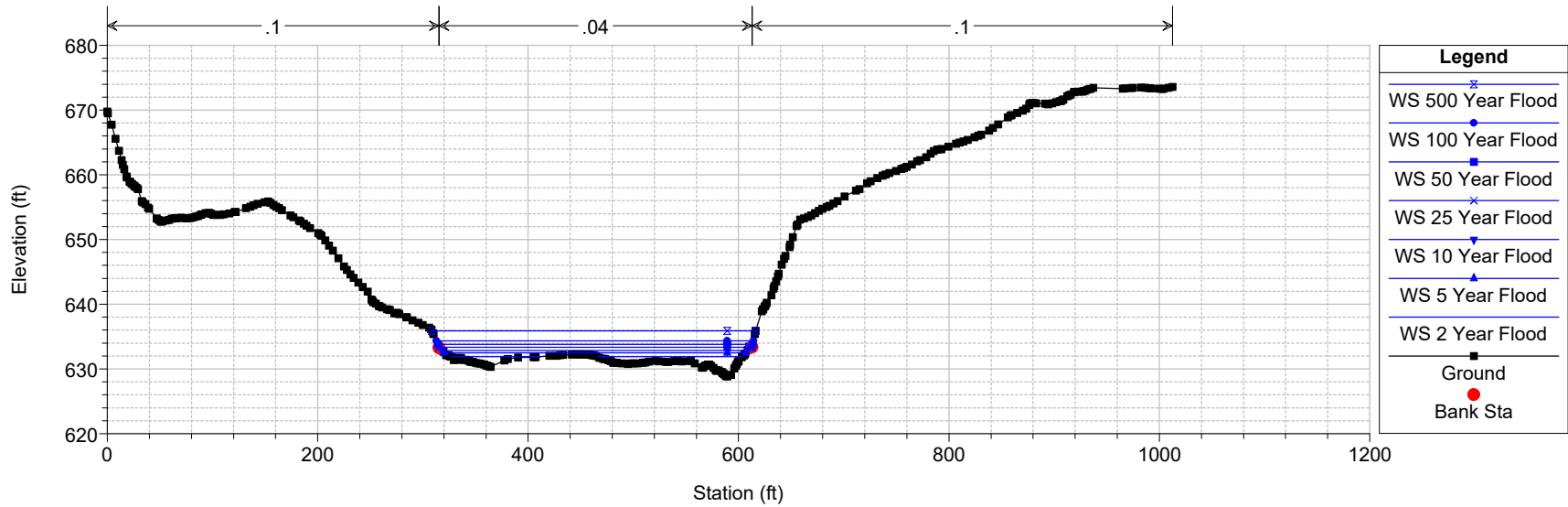
River = River1 Reach = Reach1 RS = 1737.38





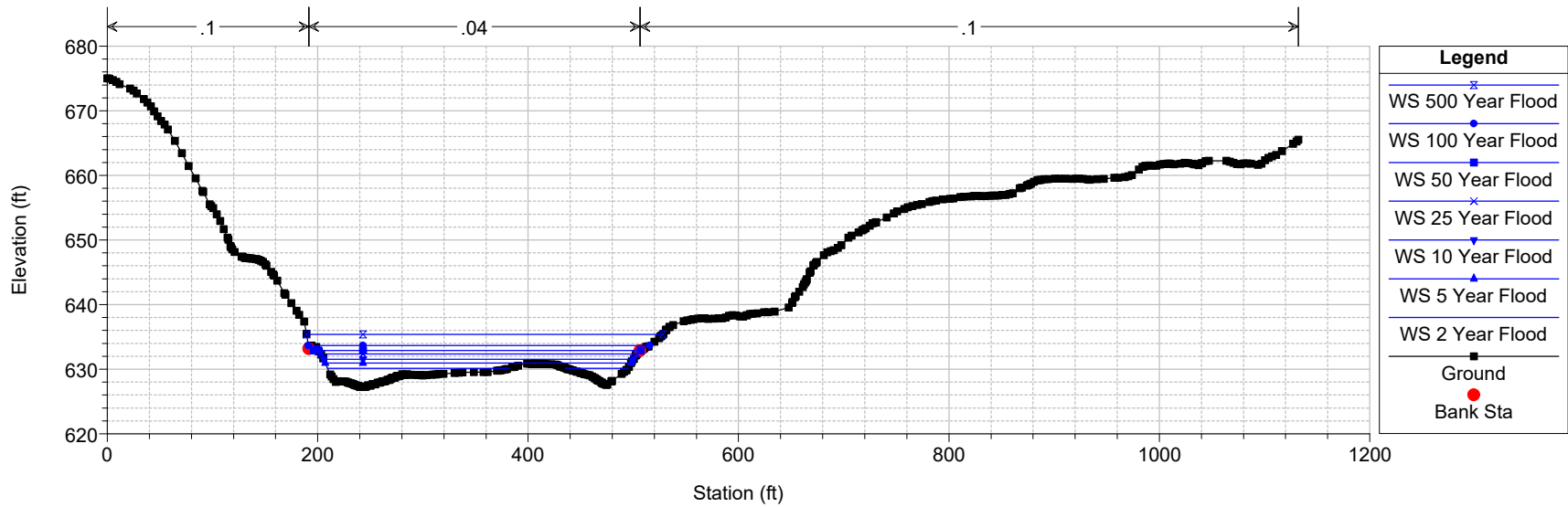
McTaggart Hec-Ras Model 1 Plan: 02 Partial Removal w. ACT 8/14/2019

River = River1 Reach = Reach1 RS = 2376.771



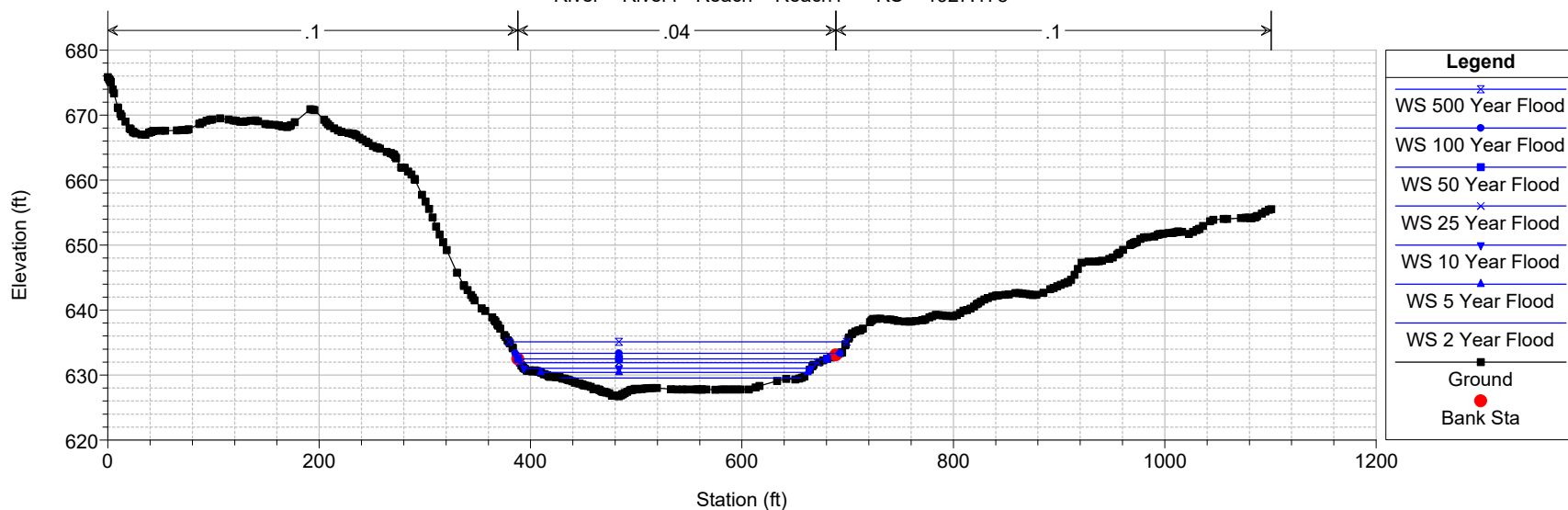
McTaggart Hec-Ras Model 1 Plan: 02 Partial Removal w. ACT 8/14/2019

River = River1 Reach = Reach1 RS = 2113.273



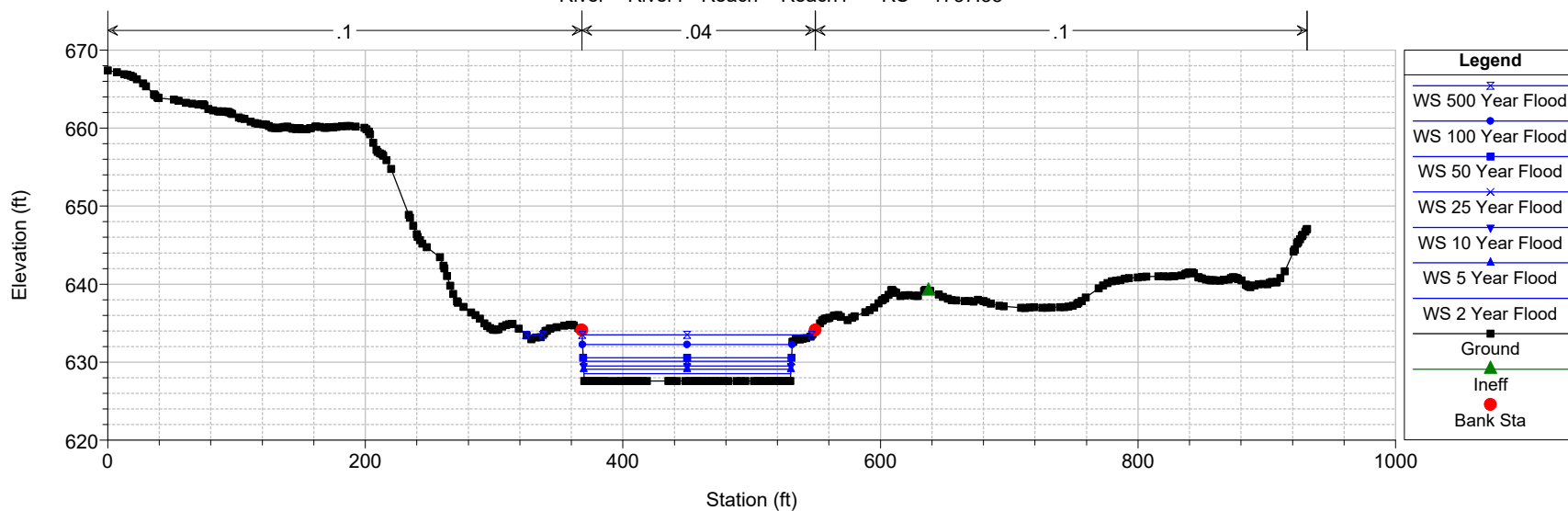
McTaggart Hec-Ras Model 1 Plan: 02 Partial Removal w. ACT 8/14/2019

River = River1 Reach = Reach1 RS = 1927.178



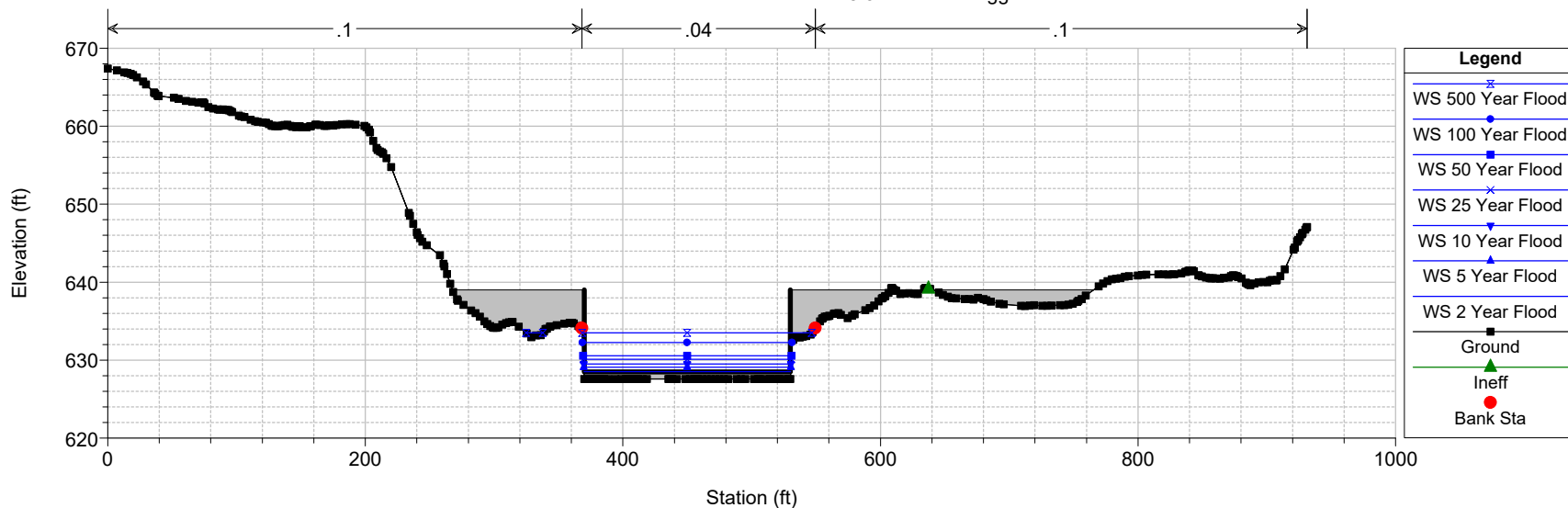
McTaggart Hec-Ras Model 1 Plan: 02 Partial Removal w. ACT 8/14/2019

River = River1 Reach = Reach1 RS = 1737.38



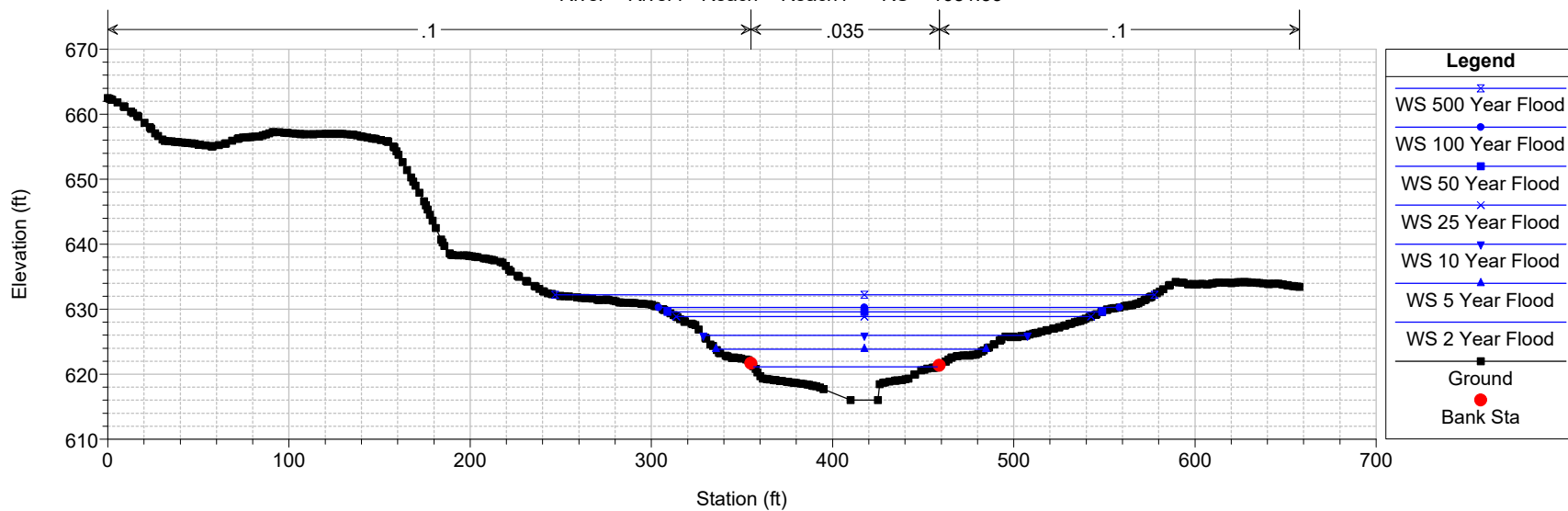
McTaggart Hec-Ras Model 1 Plan: 02 Partial Removal w. ACT 8/14/2019

River = River1 Reach = Reach1 RS = 1718.37 IS McTaggarts Pond Dam



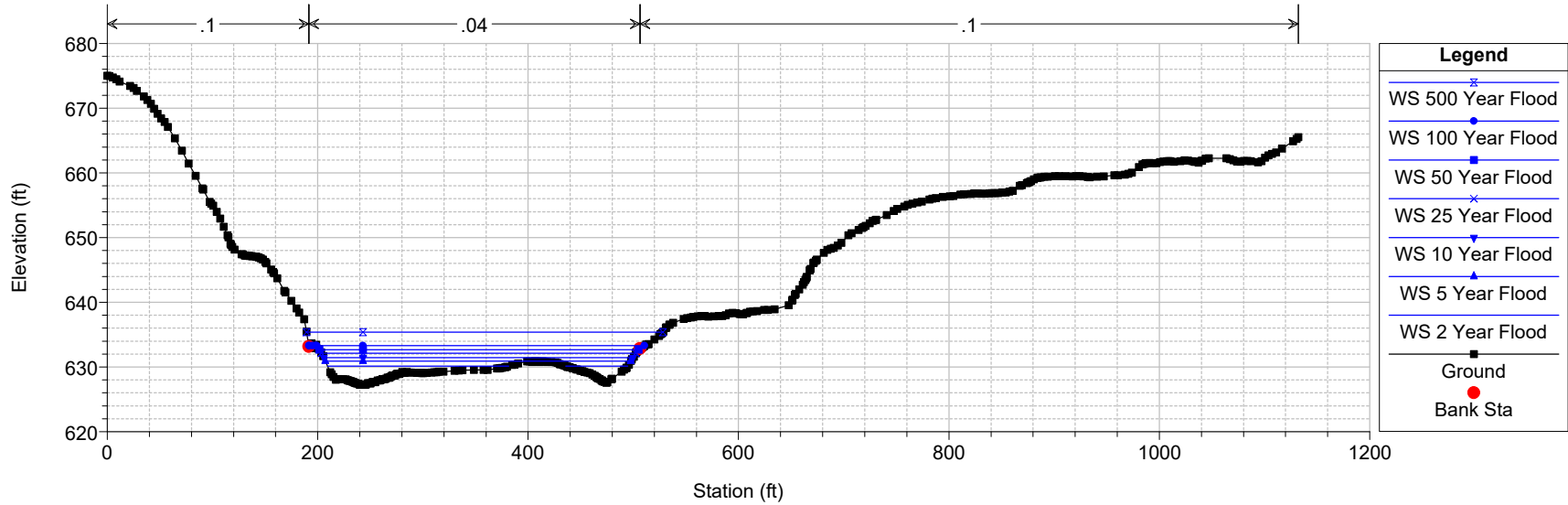
McTaggart Hec-Ras Model 1 Plan: 02 Partial Removal w. ACT 8/14/2019

River = River1 Reach = Reach1 RS = 1681.53



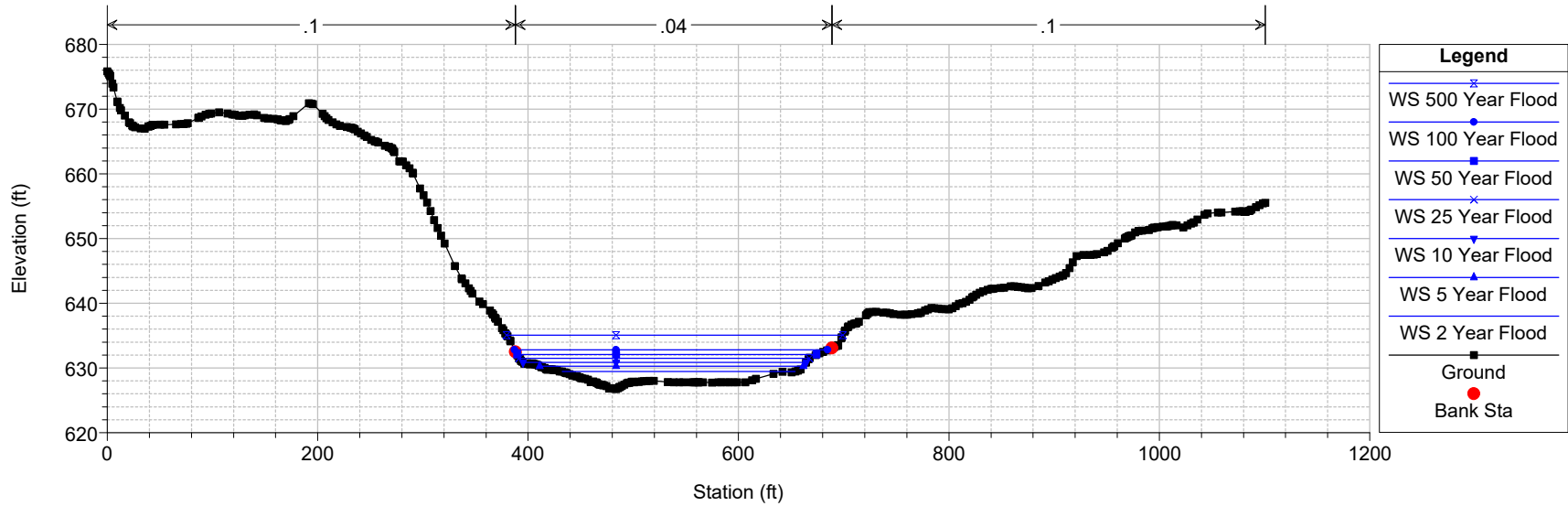
McTaggart Hec-Ras Model 1 Plan: 03 Full Removal w. ACT (no sed change) 8/15/2019

River = River1 Reach = Reach1 RS = 2113.273



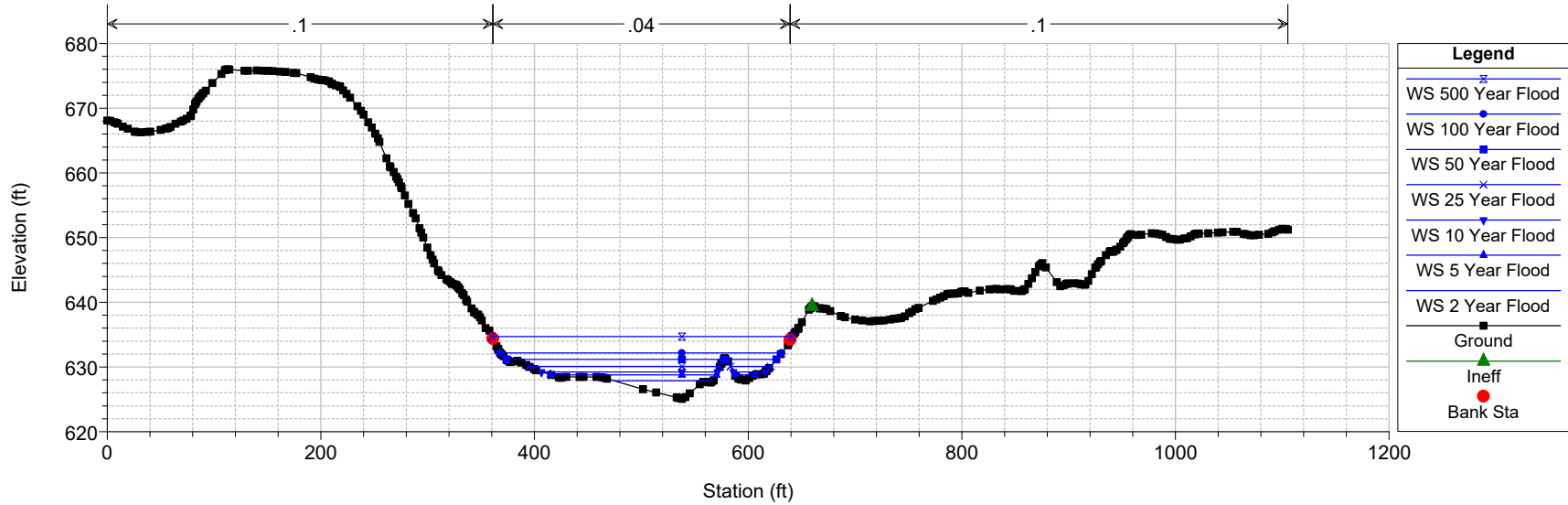
McTaggart Hec-Ras Model 1 Plan: 03 Full Removal w. ACT (no sed change) 8/15/2019

River = River1 Reach = Reach1 RS = 1927.178



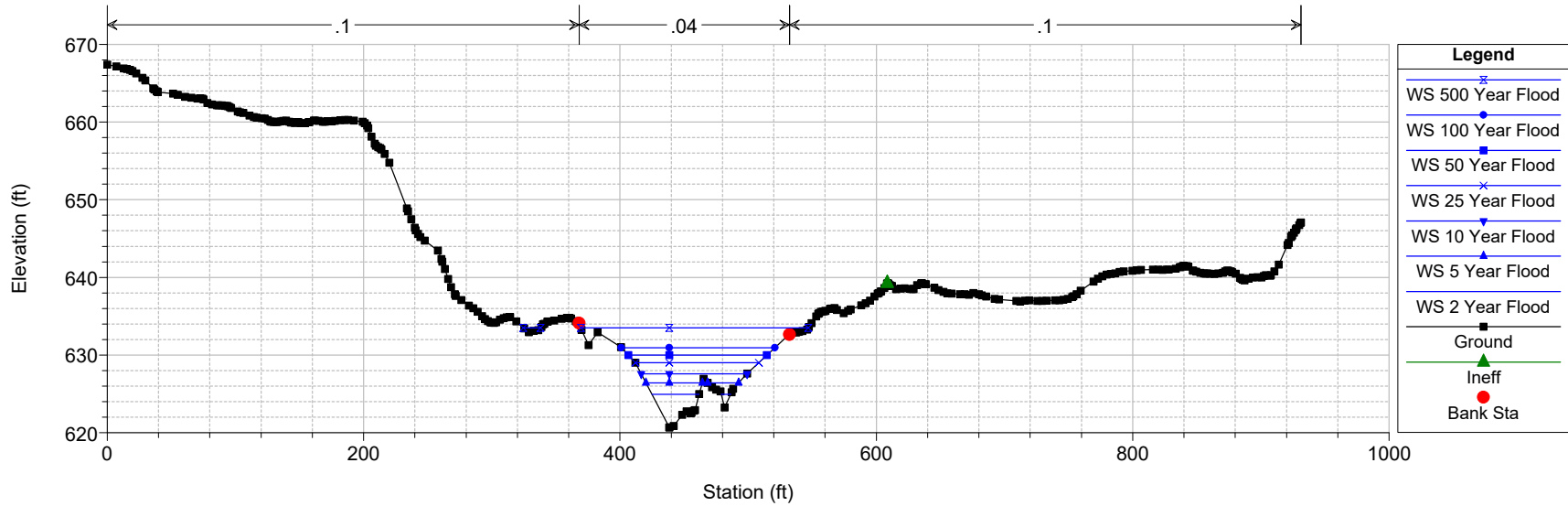
McTaggart Hec-Ras Model 1 Plan: 03 Full Removal w. ACT (no sed change) 8/15/2019

River = River1 Reach = Reach1 RS = 1783.649



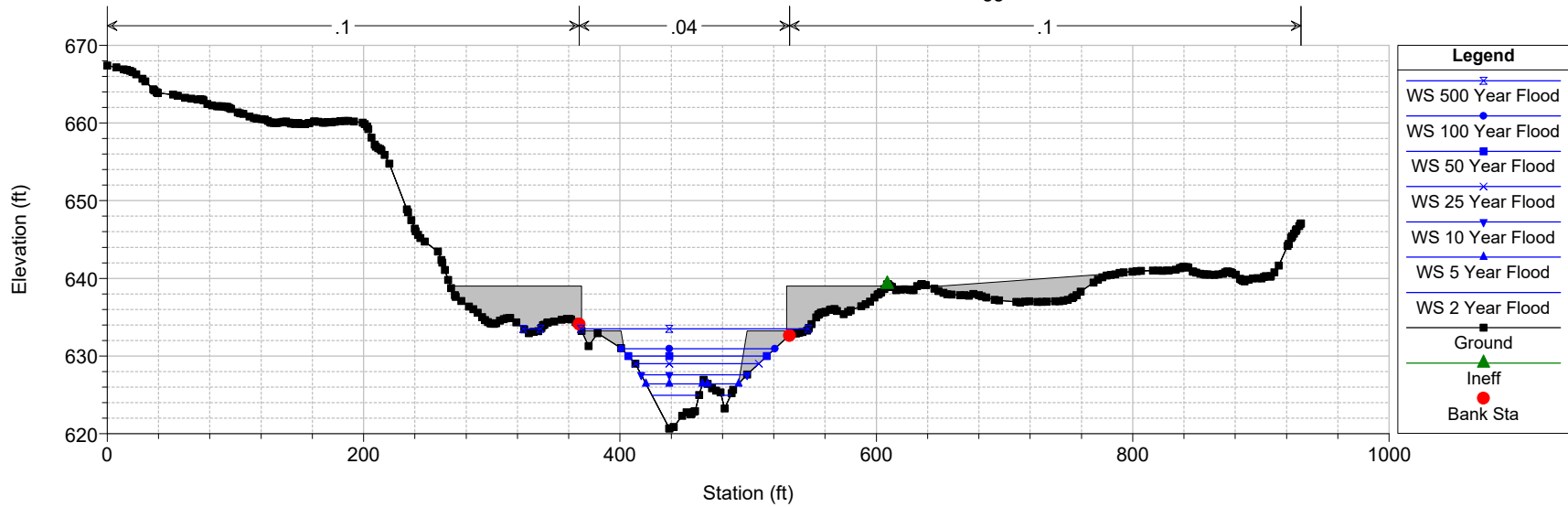
McTaggart Hec-Ras Model 1 Plan: 03 Full Removal w. ACT (no sed change) 8/15/2019

River = River1 Reach = Reach1 RS = 1737.38



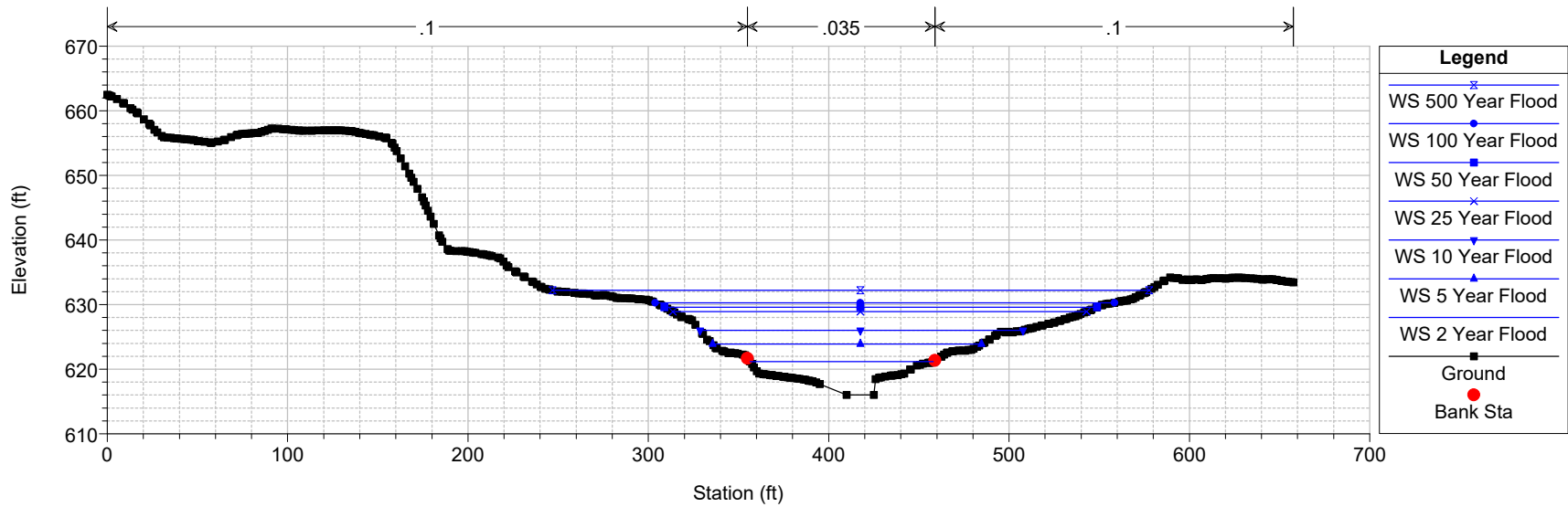
McTaggart Hec-Ras Model 1 Plan: 03 Full Removal w. ACT (no sed change) 8/15/2019

River = River1 Reach = Reach1 RS = 1718.37 IS McTaggarts Pond Dam



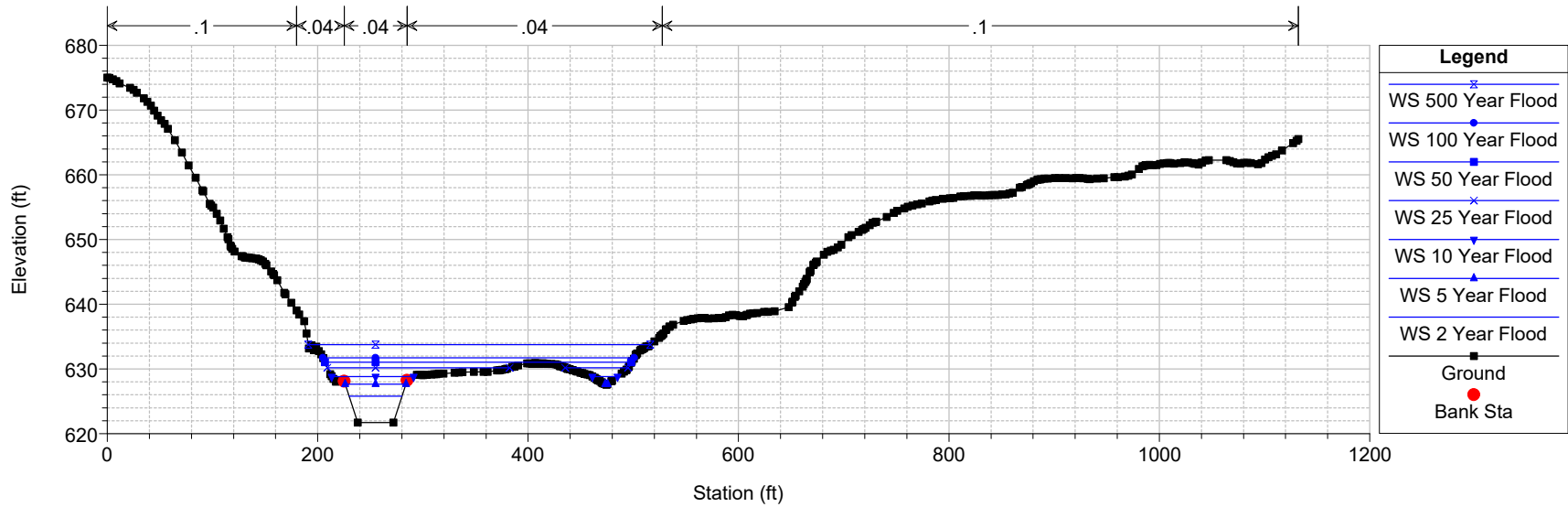
McTaggart Hec-Ras Model 1 Plan: 03 Full Removal w. ACT (no sed change) 8/15/2019

River = River1 Reach = Reach1 RS = 1681.53



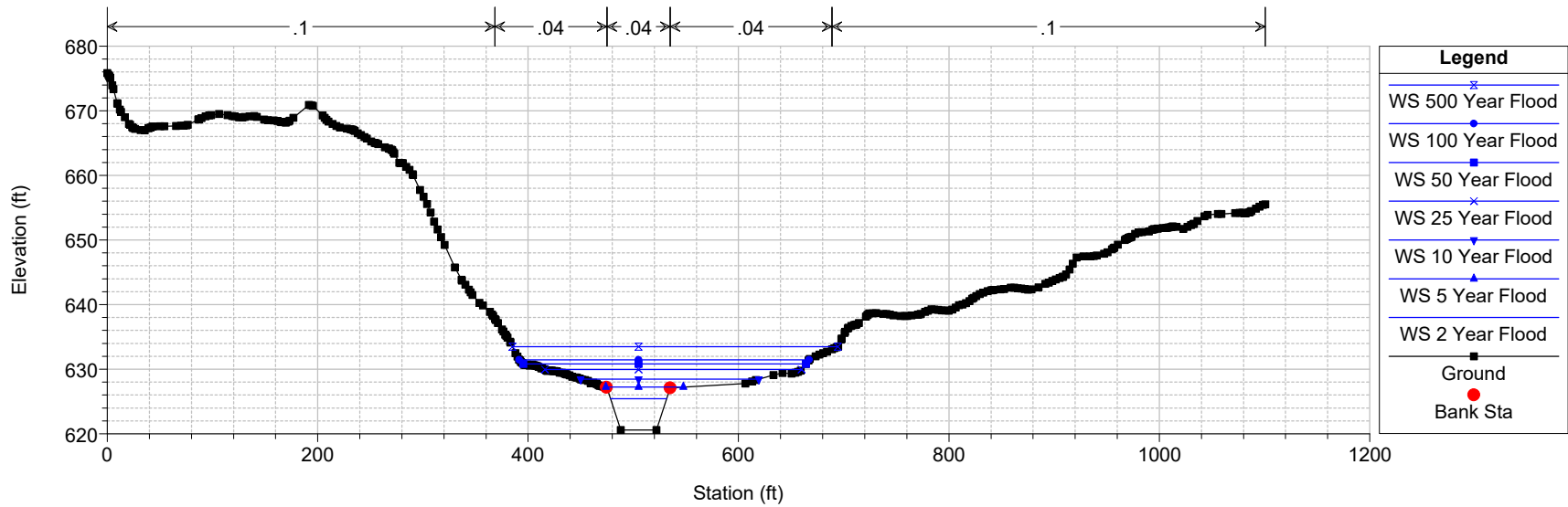
McTaggart Hec-Ras Model 1 Plan: 04 Full Removal w. ACT to Refusal 8/15/2019

River = River1 Reach = Reach1 RS = 2113.273



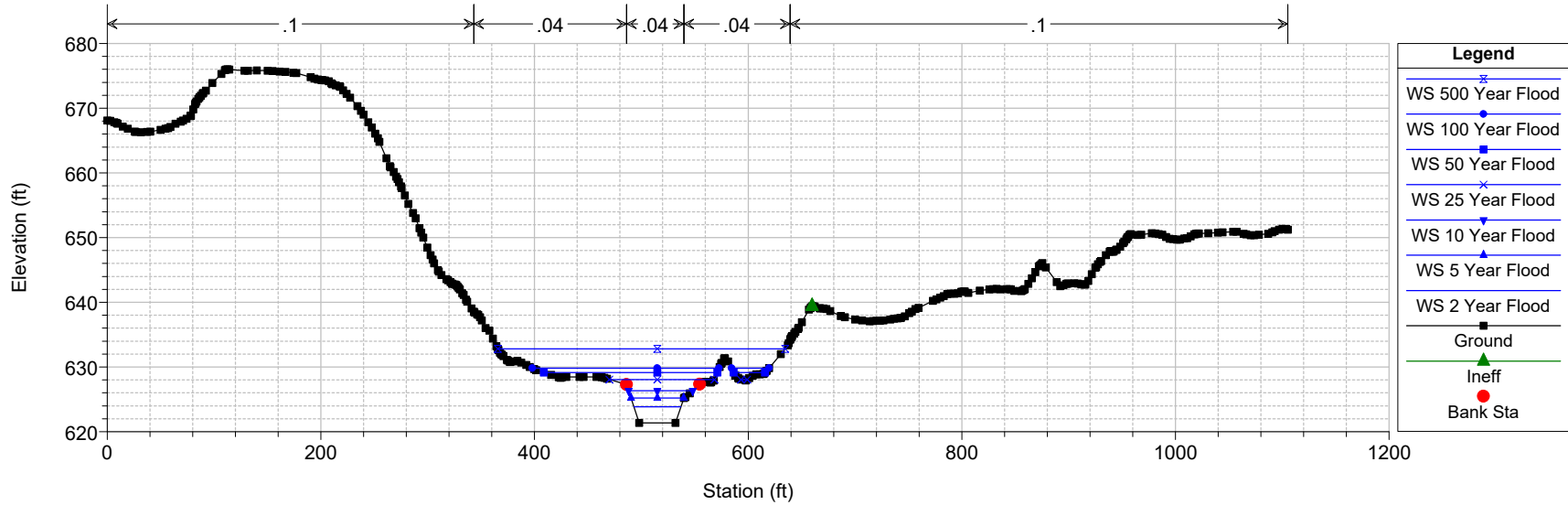
McTaggart Hec-Ras Model 1 Plan: 04 Full Removal w. ACT to Refusal 8/15/2019

River = River1 Reach = Reach1 RS = 1927.178



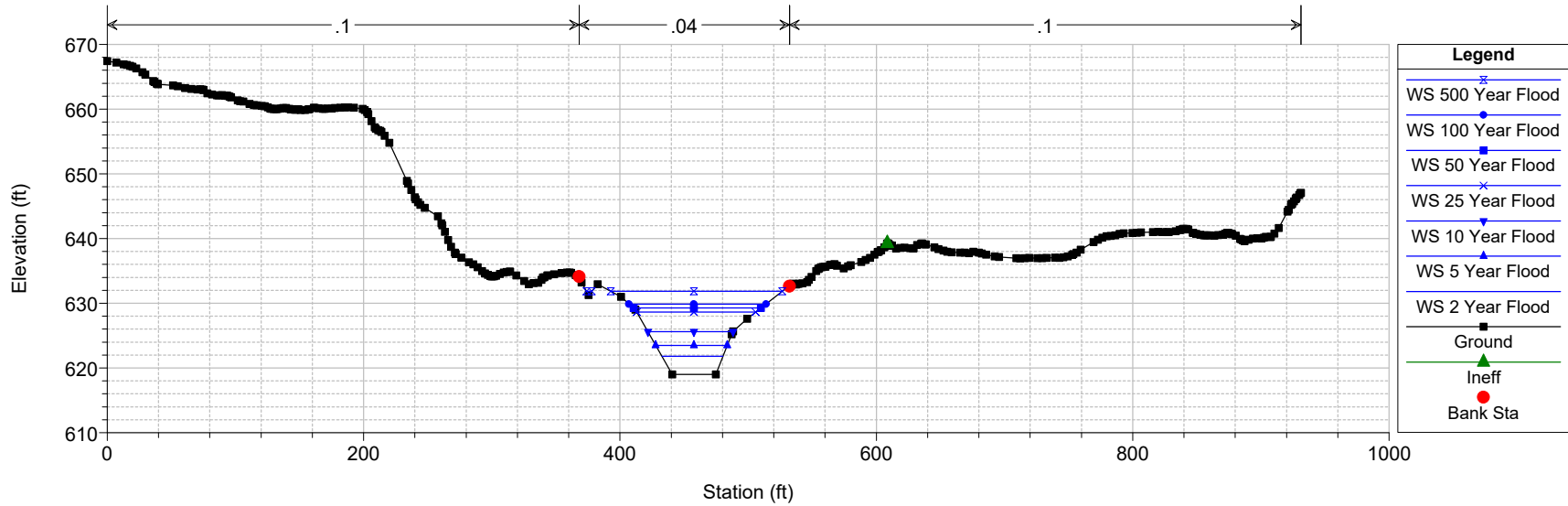
McTaggart Hec-Ras Model 1 Plan: 04 Full Removal w. ACT to Refusal 8/15/2019

River = River1 Reach = Reach1 RS = 1783.649



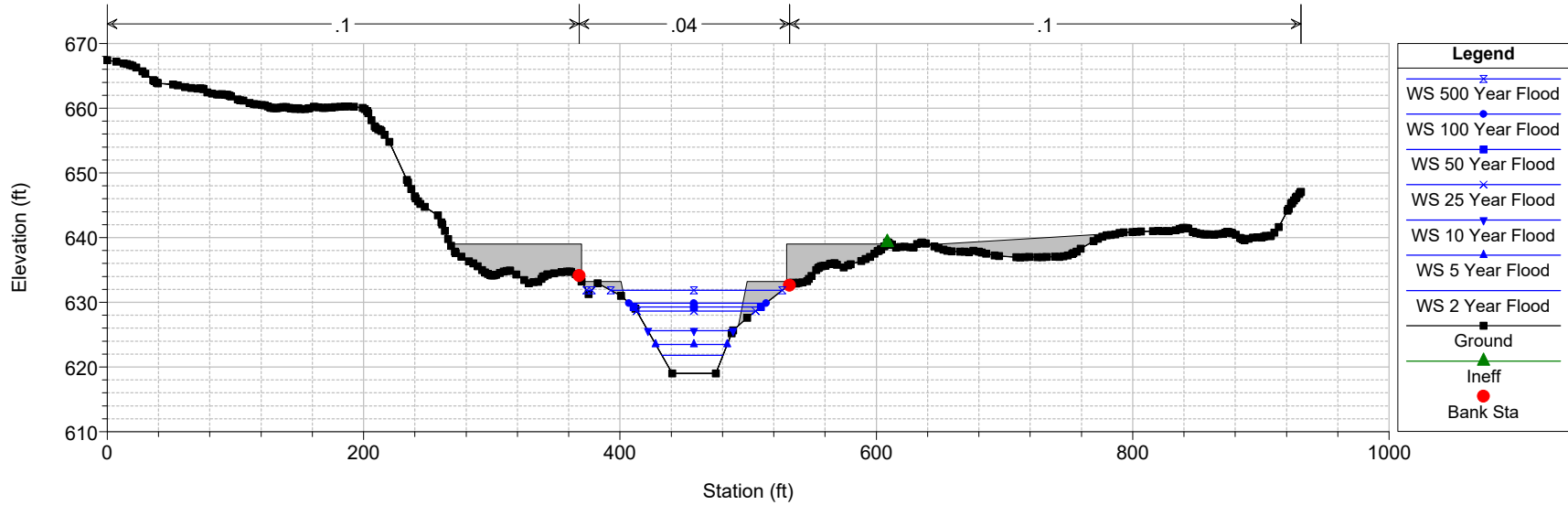
McTaggart Hec-Ras Model 1 Plan: 04 Full Removal w. ACT to Refusal 8/15/2019

River = River1 Reach = Reach1 RS = 1737.38



McTaggart Hec-Ras Model 1 Plan: 04 Full Removal w. ACT to Refusal 8/15/2019

River = River1 Reach = Reach1 RS = 1718.37 IS McTaggarts Pond Dam



McTaggart Hec-Ras Model 1 Plan: 04 Full Removal w. ACT to Refusal 8/15/2019

River = River1 Reach = Reach1 RS = 1681.53

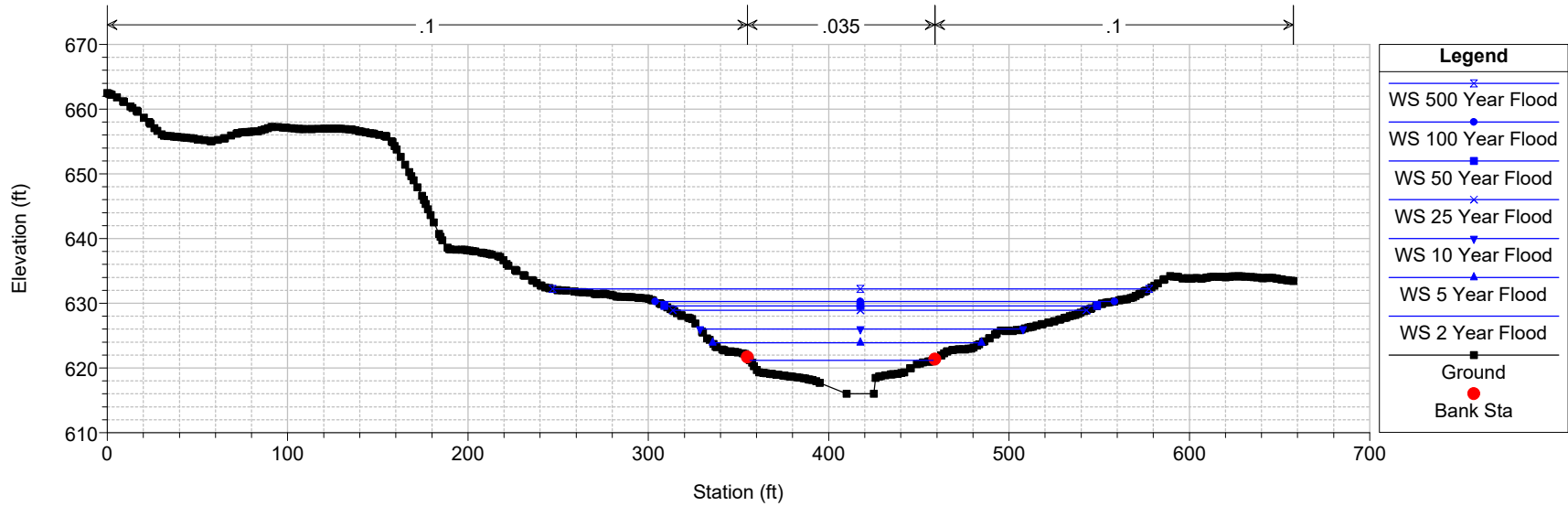


Table C-1

Existing Conditions HEC-RAS Results

Distance US of Dam (ft)	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
-1987	3705.37	2 Year Flood	818.8	637.08	639.16	639.16	639.82	0.016004	6.55	128.82	110.27	0.99
-1987	3705.37	5 Year Flood	1643.8	637.08	640.32	639.98	641.04	0.007798	6.91	274.87	154.05	0.77
-1987	3705.37	10 Year Flood	2435.6	637.08	641.39		642.08	0.004791	6.87	448.47	166.4	0.64
-1987	3705.37	25 Year Flood	3650.1	637.08	642.61		643.4	0.003813	7.45	678.91	206.13	0.6
-1987	3705.37	50 Year Flood	4657.2	637.08	643.15		644.14	0.004254	8.45	795.56	228.52	0.64
-1987	3705.37	100 Year Flood	5726.7	637.08	643.63		644.83	0.004656	9.36	907.12	234.82	0.68
-1987	3705.37	500 Year Flood	9399.6	637.08	644.67	644.26	646.77	0.006774	12.59	1154.35	243.7	0.85
-1814	3532.84	2 Year Flood	818.8	635.48	638.66		638.81	0.001646	3.18	299.19	152.32	0.35
-1814	3532.84	5 Year Flood	1643.8	635.48	640.25		640.46	0.001186	3.75	551.72	164.13	0.33
-1814	3532.84	10 Year Flood	2435.6	635.48	641.33		641.59	0.001163	4.33	739.77	220.65	0.34
-1814	3532.84	25 Year Flood	3650.1	635.48	642.55		642.92	0.001238	5.15	1116.97	350.54	0.36
-1814	3532.84	50 Year Flood	4657.2	635.48	643.13		643.58	0.001416	5.83	1319.8	354.79	0.39
-1814	3532.84	100 Year Flood	5726.7	635.48	643.64		644.19	0.001606	6.5	1501.16	359.07	0.42
-1814	3532.84	500 Year Flood	9399.6	635.48	644.8		645.76	0.002405	8.77	1926.03	371.96	0.52
-1608	3326.795	2 Year Flood	818.8	633.84	637.06	636.89	638.06	0.008883	8.3	134.64	78.86	0.84
-1608	3326.795	5 Year Flood	1643.8	633.84	638.56	638.56	639.85	0.007418	9.94	301.68	141.48	0.83
-1608	3326.795	10 Year Flood	2435.6	633.84	639.42	639.42	640.96	0.007666	11.34	429.03	164.73	0.86
-1608	3326.795	25 Year Flood	3650.1	633.84	640.58	640.58	642.28	0.007178	12.51	719.39	342.96	0.86
-1608	3326.795	50 Year Flood	4657.2	633.84	641.68	641.68	642.99	0.005188	11.81	1231.69	527.62	0.75
-1608	3326.795	100 Year Flood	5726.7	633.84	642.33	642.33	643.58	0.004907	12.12	1591.9	578.76	0.74
-1608	3326.795	500 Year Flood	9399.6	633.84	643.4	643.4	644.95	0.006069	14.63	2227.07	599.52	0.84
-1374	3092.841	2 Year Flood	818.8	632.98	636.75	635.19	636.89	0.002161	3.02	271.33	124.71	0.35
-1374	3092.841	5 Year Flood	1643.8	632.98	637.77	636.15	638.03	0.002613	4.13	420.71	182.09	0.41
-1374	3092.841	10 Year Flood	2435.6	632.98	638.44	636.83	638.82	0.002987	5.01	537.61	278.91	0.45
-1374	3092.841	25 Year Flood	3650.1	632.98	639.26	637.6	639.75	0.003137	5.83	913.7	453.34	0.47
-1374	3092.841	50 Year Flood	4657.2	632.98	639.82	638.13	640.37	0.003163	6.31	1177.14	489.01	0.48
-1374	3092.841	100 Year Flood	5726.7	632.98	640.33	638.63	640.94	0.003245	6.8	1435.84	525.23	0.5
-1374	3092.841	500 Year Flood	9399.6	632.98	641.83	640.28	642.56	0.003216	7.89	2280.04	603.87	0.52
-1185	2902.916	2 Year Flood	818.8	632.59	635.15	635.15	635.91	0.019047	7.05	122.13	92.84	0.98
-1185	2902.916	5 Year Flood	1643.8	632.59	636.18	636.18	637.02	0.013306	7.66	299.47	241.09	0.87
-1185	2902.916	10 Year Flood	2435.6	632.59	636.71	636.71	637.72	0.01311	8.68	433.52	263.46	0.9
-1185	2902.916	25 Year Flood	3650.1	632.59	637.39	637.39	638.61	0.012745	9.85	627.11	305.34	0.91
-1185	2902.916	50 Year Flood	4657.2	632.59	637.9	637.9	639.24	0.012206	10.52	793.68	341.7	0.91
-1185	2902.916	100 Year Flood	5726.7	632.59	638.38	638.38	639.81	0.011711	11.09	962.8	364.02	0.91
-1185	2902.916	500 Year Flood	9399.6	632.59	639.56	639.56	641.39	0.012072	13.12	1421.08	405.72	0.96
-1095	2813.468	2 Year Flood	818.8	628.22	633.48		633.52	0.000359	1.66	494.43	135.97	0.15
-1095	2813.468	5 Year Flood	1643.8	628.22	633.99		634.12	0.000998	2.9	566.08	144.46	0.26
-1095	2813.468	10 Year Flood	2435.6	628.22	634.49		634.71	0.0016	3.8	640.59	155.46	0.33
-1095	2813.468	25 Year Flood	3650.1	628.22	636.87		637.04	0.000797	3.4	1208.33	331.63	0.25
-1095	2813.468	50 Year Flood	4657.2	628.22	637.49		637.72	0.000899	3.87	1420.6	346.49	0.27
-1095	2813.468	100 Year Flood	5726.7	628.22	638.1		638.37	0.000982	4.29	1637.94	367.54	0.28
-1095	2813.468	500 Year Flood	9399.6	628.22	639.8		640.23	0.001195	5.46	2306.51	420.25	0.32
-895	2613.664	2 Year Flood	818.8	629.7	633.4		633.44	0.000489	1.43	574.07	250.44	0.17
-895	2613.664	5 Year Flood	1643.8	629.7	633.8		633.89	0.001181	2.44	674.95	255.47	0.26
-895	2613.664	10 Year Flood	2435.6	629.7	634.22		634.37	0.001615	3.11	782.03	258.66	0.32
-895	2613.664	25 Year Flood	3650.1	629.7	636.8		636.9	0.000485	2.44	1522.73	317.73	0.19
-895	2613.664	50 Year Flood	4657.2	629.7	637.43		637.55	0.000536	2.77	1725.15	327.22	0.2
-895	2613.664	100 Year Flood	5726.7	629.7	638.04		638.19	0.000578	3.07	1929.42	340.7	0.21
-895	2613.664	500 Year Flood	9399.6	629.7	639.76		640	0.000695	3.94	2537.89	368.45	0.24
-658	2376.771	2 Year Flood	818.8	628.85	633.28		633.31	0.000569	1.4	585.63	294.46	0.17
-658	2376.771	5 Year Flood	1643.8	628.85	633.45		633.55	0.001758	2.58	636.27	297.24	0.31
-658	2376.771	10 Year Flood	2435.6	628.85	633.7		633.88	0.002698	3.43	709.36	298.94	0.39
-658	2376.771	25 Year Flood	3650.1	628.85	636.71		636.79	0.000396	2.27	1629.25	316.78	0.17
-658	2376.771	50 Year Flood	4657.2	628.85	637.32		637.43	0.000449	2.6	1827.38	326.42	0.19
-658	2376.771	100 Year Flood	5726.7	628.85	637.93		638.06	0.000492	2.9	2026.75	335.01	0.2
-658	2376.771	500 Year Flood	9399.6	628.85	639.62		639.83	0.000616	3.77	2617.17	365.17	0.23
-395	2113.273	2 Year Flood	818.8	627.25	633.26		633.27	0.000058	0.69	1186.56	314.37	0.06

Table C-1

Existing Conditions HEC-RAS Results

Distance US of Dam (ft)	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
-395	2113.273	5 Year Flood	1643.8	627.25	633.38		633.41	0.000214	1.34	1224.31	317.38	0.12
-395	2113.273	10 Year Flood	2435.6	627.25	633.56		633.62	0.000406	1.9	1282.8	322.8	0.17
-395	2113.273	25 Year Flood	3650.1	627.25	636.68		636.72	0.000136	1.61	2329.97	347.99	0.11
-395	2113.273	50 Year Flood	4657.2	627.25	637.29		637.35	0.000168	1.89	2545.8	358.76	0.12
-395	2113.273	100 Year Flood	5726.7	627.25	637.89		637.96	0.000199	2.16	2766.77	400.32	0.13
-395	2113.273	500 Year Flood	9399.6	627.25	639.57		639.7	0.000286	2.92	3503.98	469.94	0.16
-209	1927.178	2 Year Flood	818.8	626.74	633.25		633.26	0.000037	0.61	1340.02	305.36	0.05
-209	1927.178	5 Year Flood	1643.8	626.74	633.35		633.37	0.000139	1.2	1370.41	307.17	0.1
-209	1927.178	10 Year Flood	2435.6	626.74	633.51		633.55	0.000273	1.72	1418.68	309.54	0.14
-209	1927.178	25 Year Flood	3650.1	626.74	636.66		636.7	0.00011	1.54	2426.82	333.73	0.1
-209	1927.178	50 Year Flood	4657.2	626.74	637.26		637.32	0.00014	1.82	2632.77	344.47	0.11
-209	1927.178	100 Year Flood	5726.7	626.74	637.86		637.93	0.000168	2.09	2839.09	350.79	0.12
-209	1927.178	500 Year Flood	9399.6	626.74	639.52		639.65	0.000255	2.88	3503.64	446.98	0.16
-65	1783.649	2 Year Flood	818.8	625.09	633.25	627.87	633.25	0.000036	0.63	1300.34	272.48	0.05
-65	1783.649	5 Year Flood	1643.8	625.09	633.33	628.79	633.35	0.000138	1.24	1323.07	273.12	0.1
-65	1783.649	10 Year Flood	2435.6	625.09	633.47	629.24	633.51	0.000277	1.79	1359.82	273.94	0.14
-65	1783.649	25 Year Flood	3650.1	625.09	636.64	629.8	636.68	0.00012	1.63	2261.94	296.9	0.1
-65	1783.649	50 Year Flood	4657.2	625.09	637.24	630.2	637.29	0.000154	1.93	2440.95	324.07	0.12
-65	1783.649	100 Year Flood	5726.7	625.09	637.82	630.59	637.9	0.000187	2.22	2618.44	363.37	0.13
-65	1783.649	500 Year Flood	9399.6	625.09	639.46	631.72	639.61	0.000287	3.07	3289.41	423.95	0.16
-19	1737.38	2 Year Flood	816.8	623.3	633.22	627.56	633.25	0.000203	1.35	633.73	183.86	0.12
-19	1737.38	5 Year Flood	1639.5	623.3	633.22	629.06	633.33	0.000817	2.71	633.73	183.86	0.23
-19	1737.38	10 Year Flood	2431.9	623.3	633.22	630.14	633.47	0.001797	4.01	633.73	183.86	0.35
-19	1737.38	25 Year Flood	3644.2	623.3	636.51	631.15	636.66	0.00053	3.18	1440.41	308.55	0.21
-19	1737.38	50 Year Flood	4650.3	623.3	637.07	631.85	637.27	0.000659	3.72	1615.33	360.84	0.23
-19	1737.38	100 Year Flood	5718.3	623.3	637.61	632.57	637.86	0.000778	4.23	1790.94	397.31	0.26
-19	1737.38	500 Year Flood	9395.4	623.3	639.11	634.22	639.55	0.001135	5.69	2302.49	492.83	0.32
0	1718.37		Inl Struct									
37	1681.53	2 Year Flood	816.8	616	621.13		621.26	0.001301	2.95	276.98	101.28	0.31
37	1681.53	5 Year Flood	1639.5	616	623.85		623.98	0.000507	2.89	612.31	148.96	0.22
37	1681.53	10 Year Flood	2431.9	616	625.98		626.12	0.000351	3.01	952.57	178.79	0.19
37	1681.53	25 Year Flood	3644.2	616	628.85		628.99	0.00025	3.14	1535.88	228.52	0.17
37	1681.53	50 Year Flood	4650.3	616	629.6		629.79	0.000315	3.7	1711.68	239.91	0.2
37	1681.53	100 Year Flood	5718.3	616	630.28		630.53	0.000384	4.25	1879.09	254.4	0.22
37	1681.53	500 Year Flood	9395.4	616	632.22		632.69	0.000597	5.86	2444.08	330.67	0.28
81	1636.923	2 Year Flood	816.8	616.05	620.79	619.22	621.12	0.003067	4.6	177.46	63.26	0.48
81	1636.923	5 Year Flood	1639.5	616.05	623.58	620.72	623.89	0.001293	4.48	366.58	91.01	0.35
81	1636.923	10 Year Flood	2431.9	616.05	625.69	621.59	626.03	0.000903	4.7	528.64	162.05	0.31
81	1636.923	25 Year Flood	3644.2	616.05	628.65	622.72	628.93	0.000526	4.51	1230.11	229.44	0.25
81	1636.923	50 Year Flood	4650.3	616.05	629.32	623.54	629.72	0.000675	5.33	1391.31	254.47	0.28
81	1636.923	100 Year Flood	5718.3	616.05	629.93	624.31	630.43	0.000829	6.12	1550.78	277.92	0.32
81	1636.923	500 Year Flood	9395.4	616.05	631.64	626.84	632.53	0.001268	8.3	2071.81	326.18	0.4
103	1615.645		Bridge									
135	1583.47	2 Year Flood	816.8	614.81	617.43	617.4	618.41	0.013847	7.93	102.99	50.89	0.98
135	1583.47	5 Year Flood	1639.5	614.81	618.63	618.63	620.09	0.012486	9.69	169.49	59.21	0.99
135	1583.47	10 Year Flood	2431.9	614.81	619.54	619.54	621.41	0.011262	10.99	225.55	64.82	0.99
135	1583.47	25 Year Flood	3644.2	614.81	620.78	620.78	623.14	0.009835	12.38	312.94	91.74	0.96
135	1583.47	50 Year Flood	4650.3	614.81	621.61	621.61	624.38	0.00956	13.48	375.67	111.76	0.98
135	1583.47	100 Year Flood	5718.3	614.81	622.47	622.47	625.59	0.009033	14.35	441.48	146.23	0.97
135	1583.47	500 Year Flood	9395.4	614.81	624.96	624.96	629.25	0.008319	16.95	630.68	188.45	0.98
248	1470.783	2 Year Flood	816.8	613.04	615.94	615.94	616.81	0.013752	8.05	145.71	91.19	0.99
248	1470.783	5 Year Flood	1639.5	613.04	616.98	616.98	618.32	0.012813	10.2	247.13	103.76	1.02
248	1470.783	10 Year Flood	2431.9	613.04	618.04	618.04	619.53	0.010007	10.95	381.84	137.92	0.95
248	1470.783	25 Year Flood	3644.2	613.04	618.96	618.96	620.89	0.01042	12.77	513.41	173.72	1
248	1470.783	50 Year Flood	4650.3	613.04	619.75	619.75	621.88	0.009775	13.62	639.39	212.87	0.99
248	1470.783	100 Year Flood	5718.3	613.04	620.42	620.42	622.82	0.009783	14.63	752.68	244.66	1.01

Table C-1

Existing Conditions HEC-RAS Results

Distance US of Dam (ft)	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
248	1470.783	500 Year Flood	9395.4	613.04	621.85	621.85	625.6	0.012304	18.73	1025.29	292.12	1.17
394	1324.077	2 Year Flood	816.8	597.53	601	601	602.26	0.013633	8.99	91.09	37.45	1
394	1324.077	5 Year Flood	1639.5	597.53	602.51	602.51	604.45	0.011254	11.19	152.17	43.28	0.98
394	1324.077	10 Year Flood	2431.9	597.53	603.72	603.72	606.18	0.010188	12.68	206.75	47.54	0.98
394	1324.077	25 Year Flood	3644.2	597.53	605.3	605.3	608.44	0.009245	14.4	286.31	53.24	0.97
394	1324.077	50 Year Flood	4650.3	597.53	606.44	606.44	610.1	0.008801	15.59	350.34	59.12	0.98
394	1324.077	100 Year Flood	5718.3	597.53	607.69	607.69	611.69	0.008024	16.4	429.39	67.86	0.95
394	1324.077	500 Year Flood	9395.4	597.53	611.05	611.05	616.2	0.007071	18.96	690.32	88.04	0.94
558	1159.907	2 Year Flood	816.8	591.07	594.06	594.06	595.23	0.014205	8.66	94.27	41	1.01
558	1159.907	5 Year Flood	1639.5	591.07	595.62	595.48	597.17	0.011348	9.99	164.12	48.2	0.95
558	1159.907	10 Year Flood	2431.9	591.07	596.92	596.69	598.63	0.009618	10.49	236.05	68.3	0.91
558	1159.907	25 Year Flood	3644.2	591.07	599.81		601.03	0.003505	9.01	461.65	85.37	0.6
558	1159.907	50 Year Flood	4650.3	591.07	601.68		602.86	0.002497	8.9	632.2	95.74	0.53
558	1159.907	100 Year Flood	5718.3	591.07	603.48		604.65	0.001979	8.96	831.96	137.09	0.48
558	1159.907	500 Year Flood	9395.4	591.07	609.07		610.11	0.001095	8.82	1669.24	160.22	0.39
640	1078.855	2 Year Flood	816.8	587.58	593.31	592.25	594.01	0.005322	6.72	121.49	34.62	0.63
640	1078.855	5 Year Flood	1639.5	587.58	595.23	593.95	596.38	0.00508	8.58	193.92	40.97	0.66
640	1078.855	10 Year Flood	2431.9	587.58	596.04	595.19	597.92	0.006909	11	227.93	42.7	0.79
640	1078.855	25 Year Flood	3644.2	587.58	597.67	596.81	600.24	0.006933	12.92	299.39	44.87	0.82
640	1078.855	50 Year Flood	4650.3	587.58	598.86	598	601.96	0.006955	14.23	353.48	46.79	0.84
640	1078.855	100 Year Flood	5718.3	587.58	600.03	599.15	603.65	0.006911	15.4	409.75	49.46	0.86
640	1078.855	500 Year Flood	9395.4	587.58	603.51	602.99	608.69	0.006734	18.54	609.71	69.22	0.89
729	988.8714	Bridge										
808	910.7321	2 Year Flood	816.8	578.19	580.69	580.69	581.61	0.014698	7.68	106.31	57.76	1
808	910.7321	5 Year Flood	1639.5	578.19	581.8	581.8	583.2	0.012992	9.48	172.93	61.93	1
808	910.7321	10 Year Flood	2431.9	578.19	582.69	582.69	584.44	0.012025	10.61	229.26	65.23	1
808	910.7321	25 Year Flood	3644.2	578.19	583.78	583.78	586.06	0.010981	12.13	302.61	69.36	1
808	910.7321	50 Year Flood	4650.3	578.19	584.62	584.62	587.27	0.01023	13.08	361.97	72.4	0.99
808	910.7321	100 Year Flood	5718.3	578.19	585.41	585.41	588.45	0.009764	14	420.73	74.65	0.99
808	910.7321	500 Year Flood	9395.4	578.19	587.84	587.84	591.99	0.008686	16.44	609.69	80.91	0.98
895	823.656	2 Year Flood	816.8	563.33	566.36	566.36	567.43	0.014581	8.3	98.44	46.76	1.01
895	823.656	5 Year Flood	1639.5	563.33	567.66	567.66	569.22	0.013009	10.02	163.75	54.19	1.01
895	823.656	10 Year Flood	2431.9	563.33	568.59	568.59	570.6	0.011736	11.36	216.9	58.41	1
895	823.656	25 Year Flood	3644.2	563.33	569.85	569.85	572.42	0.010537	12.9	293.07	63.39	0.99
895	823.656	50 Year Flood	4650.3	563.33	570.81	570.81	573.77	0.009724	13.86	355.89	67.48	0.98
895	823.656	100 Year Flood	5718.3	563.33	571.68	571.68	575.07	0.009378	14.86	416.13	70.05	0.98
895	823.656	500 Year Flood	9395.4	563.33	574.4	574.4	578.96	0.008342	17.4	616.45	77.48	0.98
1073	645.2139	2 Year Flood	816.8	555.97	558.93	558.93	559.97	0.01445	8.17	100.05	49.08	1.01
1073	645.2139	5 Year Flood	1639.5	555.97	560.17	560.17	561.76	0.011947	10.13	167.35	58.66	0.99
1073	645.2139	10 Year Flood	2431.9	555.97	561.16	561.16	563.17	0.010713	11.44	228.38	64.52	0.98
1073	645.2139	25 Year Flood	3644.2	555.97	562.44	562.44	565	0.009747	13	315.07	70.68	0.97
1073	645.2139	50 Year Flood	4650.3	555.97	563.38	563.38	566.34	0.009238	14.05	383.27	74.62	0.97
1073	645.2139	100 Year Flood	5718.3	555.97	564.28	564.28	567.64	0.008879	15.03	452.31	78.26	0.98
1073	645.2139	500 Year Flood	9395.4	555.97	567.04	567.04	571.5	0.007909	17.53	687.28	92.18	0.97
1210	507.9141	2 Year Flood	816.8	551.25	553.32	553.32	553.95	0.015764	6.41	132.95	113.29	0.98
1210	507.9141	5 Year Flood	1639.5	551.25	554.08	554.08	555.06	0.013642	8.06	220.59	118.13	0.99
1210	507.9141	10 Year Flood	2431.9	551.25	554.69	554.69	555.95	0.012515	9.16	293.58	121.29	0.98
1210	507.9141	25 Year Flood	3644.2	551.25	555.46	555.46	557.13	0.011835	10.55	389.15	138.75	1
1210	507.9141	50 Year Flood	4650.3	551.25	556.06	556.06	558	0.01117	11.4	464.9	166	1
1210	507.9141	100 Year Flood	5718.3	551.25	556.65	556.65	558.85	0.0107	12.2	539.46	177.69	1
1210	507.9141	500 Year Flood	9395.4	551.25	558.4	558.4	561.44	0.009738	14.41	770.21	214.43	1
1338	380.8181	2 Year Flood	816.8	547.32	549.58	549.58	550.24	0.016615	6.52	125.3	95.86	1.01
1338	380.8181	5 Year Flood	1639.5	547.32	550.37	550.37	551.37	0.014461	8.03	204.23	103.23	1
1338	380.8181	10 Year Flood	2431.9	547.32	550.99	550.99	552.27	0.012871	9.07	270.12	110.87	0.99
1338	380.8181	25 Year Flood	3644.2	547.32	551.81	551.81	553.45	0.011537	10.3	368.26	126.18	0.98
1338	380.8181	50 Year Flood	4650.3	547.32	552.42	552.42	554.31	0.010707	11.08	448.06	177.72	0.97

Table C-1

Existing Conditions HEC-RAS Results

Distance US of Dam (ft)	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1338	380.8181	100 Year Flood	5718.3	547.32	553	553	555.14	0.010254	11.85	526.29	270.74	0.97
1338	380.8181	500 Year Flood	9395.4	547.32	554.74	554.74	557.62	0.009136	13.85	780.7	355.24	0.97
1473	245.2894	2 Year Flood	816.8	542.97	546.18	546.02	547.07	0.011598	7.54	108.37	129.34	0.91
1473	245.2894	5 Year Flood	1639.5	542.97	547.33	547.33	548.71	0.012842	9.43	174.08	191.33	1
1473	245.2894	10 Year Flood	2431.9	542.97	548.18	548.18	549.95	0.011615	10.7	231.33	238.49	0.99
1473	245.2894	25 Year Flood	3644.2	542.97	549.28	549.28	551.58	0.010605	12.21	313.92	306.2	0.99
1473	245.2894	50 Year Flood	4650.3	542.97	549.7	549.7	550.75	0.006164	9.84	987.3	316.94	0.76
1473	245.2894	100 Year Flood	5718.3	542.97	549.75	549.75	551.29	0.008959	11.94	1002.44	317.38	0.92
1473	245.2894	500 Year Flood	9395.4	542.97	551	551	553.06	0.00973	14.38	1408.91	328.44	1
Reach1	125.912	2 Year Flood	816.8	541.54	545.21	545.21	545.89	0.007778	7.69	254.91	218.99	0.79
Reach1	125.912	5 Year Flood	1639.5	541.54	546.08	546.08	546.95	0.00872	9.65	465.9	266.1	0.87
Reach1	125.912	10 Year Flood	2431.9	541.54	546.68	546.68	547.67	0.009183	10.91	630.09	281.23	0.91
Reach1	125.912	25 Year Flood	3644.2	541.54	547.36	547.36	548.59	0.01024	12.68	829.92	301.57	0.99
Reach1	125.912	50 Year Flood	4650.3	541.54	547.87	547.87	549.23	0.01059	13.73	984.62	308.79	1.02
Reach1	125.912	100 Year Flood	5718.3	541.54	548.3	548.3	549.82	0.011254	14.87	1118.59	313.97	1.06
Reach1	125.912	500 Year Flood	9395.4	541.54	549.56	549.56	551.57	0.012724	17.93	1522.57	328.27	1.17
Reach1	41.42999	2 Year Flood	816.8	538.74	541.04	541.04	541.92	0.014643	7.55	109.64	64.84	1
Reach1	41.42999	5 Year Flood	1639.5	538.74	542.1	542.1	543.47	0.012249	9.43	182.52	71.48	0.98
Reach1	41.42999	10 Year Flood	2431.9	538.74	542.95	542.95	544.71	0.011225	10.73	244.44	75.59	0.98
Reach1	41.42999	25 Year Flood	3644.2	538.74	544.07	544.07	546.33	0.010219	12.21	332.46	123.88	0.98
Reach1	41.42999	50 Year Flood	4650.3	538.74	544.87	544.87	547.52	0.009839	13.28	399.39	152.43	0.99
Reach1	41.42999	100 Year Flood	5718.3	538.74	546.15	546.15	548.33	0.006568	12.44	713.61	219.98	0.83
Reach1	41.42999	500 Year Flood	9395.4	538.74	548.08	548.08	550.78	0.006427	14.5	1164.69	254.94	0.86

Table C-2

Alternative 1: Partial Dam Removal

Distance US of Dam (ft)	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
-1987	3705.37	2 Year Flood	818.8	637.08	639.16	639.16	639.82	0.016004	6.55	128.82	110.27	0.99
-1987	3705.37	5 Year Flood	1643.8	637.08	640.32	639.98	641.04	0.007792	6.91	274.96	154.06	0.77
-1987	3705.37	10 Year Flood	2435.6	637.08	641.4		642.08	0.004785	6.87	448.65	166.41	0.64
-1987	3705.37	25 Year Flood	3650.1	637.08	642.61		643.39	0.003817	7.45	678.61	206.11	0.6
-1987	3705.37	50 Year Flood	4657.2	637.08	643.16		644.15	0.004237	8.44	796.92	228.61	0.64
-1987	3705.37	100 Year Flood	5726.7	637.08	643.63		644.83	0.004653	9.36	907.36	234.82	0.68
-1987	3705.37	500 Year Flood	9399.6	637.08	644.67	644.26	646.77	0.006764	12.58	1155.03	243.72	0.85
-1814	3532.84	2 Year Flood	818.8	635.48	638.66		638.81	0.001646	3.18	299.2	152.31	0.35
-1814	3532.84	5 Year Flood	1643.8	635.48	640.25		640.46	0.001186	3.75	551.82	164.15	0.33
-1814	3532.84	10 Year Flood	2435.6	635.48	641.33		641.59	0.001162	4.33	740.06	220.56	0.34
-1814	3532.84	25 Year Flood	3650.1	635.48	642.55		642.92	0.001239	5.15	1116.39	350.53	0.36
-1814	3532.84	50 Year Flood	4657.2	635.48	643.13		643.59	0.001411	5.82	1322.07	354.84	0.39
-1814	3532.84	100 Year Flood	5726.7	635.48	643.64		644.19	0.001605	6.5	1501.54	359.1	0.42
-1814	3532.84	500 Year Flood	9399.6	635.48	644.8		645.76	0.002402	8.76	1927.08	372.01	0.52
-1608	3326.795	2 Year Flood	818.8	633.84	637.06	636.89	638.06	0.008881	8.3	134.57	78.89	0.84
-1608	3326.795	5 Year Flood	1643.8	633.84	638.56	638.56	639.85	0.007417	9.94	301.56	141.51	0.83
-1608	3326.795	10 Year Flood	2435.6	633.84	639.41	639.41	640.97	0.007682	11.35	428.44	164.44	0.87
-1608	3326.795	25 Year Flood	3650.1	633.84	640.59	640.59	642.28	0.00714	12.49	721.25	343.49	0.86
-1608	3326.795	50 Year Flood	4657.2	633.84	641.66	641.66	643	0.005276	11.89	1220.19	524.63	0.76
-1608	3326.795	100 Year Flood	5726.7	633.84	642.32	642.32	643.58	0.004912	12.13	1591.05	578.73	0.74
-1608	3326.795	500 Year Flood	9399.6	633.84	643.4	643.4	644.95	0.006088	14.65	2224.03	599.47	0.85
-1374	3092.841	2 Year Flood	818.8	632.98	636.75	635.19	636.89	0.002161	3.02	271.33	124.71	0.35
-1374	3092.841	5 Year Flood	1643.8	632.98	637.77	636.15	638.03	0.002613	4.13	420.71	182.09	0.41
-1374	3092.841	10 Year Flood	2435.6	632.98	638.44	636.83	638.82	0.002987	5.01	537.58	278.87	0.45
-1374	3092.841	25 Year Flood	3650.1	632.98	639.26	637.6	639.75	0.003138	5.83	913.53	453.33	0.47
-1374	3092.841	50 Year Flood	4657.2	632.98	639.82	638.13	640.37	0.003164	6.31	1176.96	488.98	0.48
-1374	3092.841	100 Year Flood	5726.7	632.98	640.33	638.63	640.94	0.003247	6.8	1435.39	525.19	0.5
-1374	3092.841	500 Year Flood	9399.6	632.98	641.83	640.28	642.56	0.003217	7.89	2279.9	603.86	0.52
-1185	2902.916	2 Year Flood	818.8	632.59	635.15	635.15	635.91	0.019047	7.05	122.13	92.84	0.98
-1185	2902.916	5 Year Flood	1643.8	632.59	636.18	636.18	637.02	0.013306	7.66	299.47	241.09	0.87
-1185	2902.916	10 Year Flood	2435.6	632.59	636.71	636.71	637.72	0.01311	8.68	433.52	263.46	0.9
-1185	2902.916	25 Year Flood	3650.1	632.59	637.39	637.39	638.61	0.012745	9.85	627.11	305.34	0.91
-1185	2902.916	50 Year Flood	4657.2	632.59	637.9	637.9	639.24	0.012206	10.52	793.68	341.7	0.91
-1185	2902.916	100 Year Flood	5726.7	632.59	638.38	638.38	639.81	0.011711	11.09	962.8	364.02	0.91
-1185	2902.916	500 Year Flood	9399.6	632.59	639.56	639.56	641.39	0.012072	13.12	1421.08	405.72	0.96
-1095	2813.468	2 Year Flood	818.8	628.22	632.97		633.03	0.00055	1.92	426.62	129.62	0.19
-1095	2813.468	5 Year Flood	1643.8	628.22	633.79		633.94	0.001144	3.06	537.87	140.81	0.28
-1095	2813.468	10 Year Flood	2435.6	628.22	634.37		634.61	0.001719	3.91	622.51	152.75	0.34
-1095	2813.468	25 Year Flood	3650.1	628.22	635.09		635.47	0.002497	4.94	739.49	179.95	0.42
-1095	2813.468	50 Year Flood	4657.2	628.22	635.56		636.06	0.003026	5.67	829.35	210.33	0.46
-1095	2813.468	100 Year Flood	5726.7	628.22	636.01		636.63	0.003417	6.35	940.24	286.44	0.5
-1095	2813.468	500 Year Flood	9399.6	628.22	637.33		638.31	0.00402	8.04	1363.8	342.47	0.56
-895	2613.664	2 Year Flood	818.8	629.7	632.81		632.87	0.001237	1.91	428.17	241.24	0.25
-895	2613.664	5 Year Flood	1643.8	629.7	633.54		633.66	0.001636	2.7	609.38	252.7	0.31
-895	2613.664	10 Year Flood	2435.6	629.7	634.06		634.22	0.00193	3.29	739.87	257.43	0.34
-895	2613.664	25 Year Flood	3650.1	629.7	634.7		634.95	0.002327	4.02	908.55	269.73	0.39
-895	2613.664	50 Year Flood	4657.2	629.7	635.14		635.46	0.002549	4.53	1028.39	278.51	0.41
-895	2613.664	100 Year Flood	5726.7	629.7	635.57		635.95	0.002719	5	1149.46	285.86	0.43
-895	2613.664	500 Year Flood	9399.6	629.7	636.91		637.5	0.002996	6.14	1557.47	319.7	0.47
-658	2376.771	2 Year Flood	818.8	628.85	631.9		632.16	0.01369	4.06	201.91	223.22	0.75
-658	2376.771	5 Year Flood	1643.8	628.85	632.49		632.82	0.011573	4.61	356.35	286.42	0.73
-658	2376.771	10 Year Flood	2435.6	628.85	632.83		633.28	0.011447	5.35	454.99	290.08	0.75
-658	2376.771	25 Year Flood	3650.1	628.85	633.36		633.92	0.009893	5.98	610.09	295.18	0.73
-658	2376.771	50 Year Flood	4657.2	628.85	633.8		634.42	0.008499	6.28	741.95	299.36	0.7
-658	2376.771	100 Year Flood	5726.7	628.85	634.34		634.97	0.006689	6.35	903.89	301.39	0.64
-658	2376.771	500 Year Flood	9399.6	628.85	635.86		636.61	0.004653	6.94	1365.34	307.73	0.57
-395	2113.273	2 Year Flood	818.8	627.25	630.15		630.27	0.00424	2.81	291.17	231.51	0.44

Table C-2

Alternative 1: Partial Dam Removal

Distance US of Dam (ft)	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
-395	2113.273	5 Year Flood	1643.8	627.25	630.96		631.13	0.003898	3.31	496.87	290.62	0.45
-395	2113.273	10 Year Flood	2435.6	627.25	631.55		631.75	0.00323	3.64	669.49	294.77	0.43
-395	2113.273	25 Year Flood	3650.1	627.25	632.33		632.59	0.002751	4.04	902.46	300.29	0.41
-395	2113.273	50 Year Flood	4657.2	627.25	632.92		633.21	0.002529	4.31	1079.71	306.66	0.4
-395	2113.273	100 Year Flood	5726.7	627.25	633.69		633.98	0.002035	4.34	1322.98	324.55	0.37
-395	2113.273	500 Year Flood	9399.6	627.25	635.4		635.79	0.001741	5.04	1891.78	338.75	0.37
-209	1927.178	2 Year Flood	818.8	626.74	629.56		629.66	0.002628	2.46	333.07	226.83	0.36
-209	1927.178	5 Year Flood	1643.8	626.74	630.4		630.55	0.002487	3.06	536.95	252.43	0.37
-209	1927.178	10 Year Flood	2435.6	626.74	631.05		631.23	0.002405	3.44	707.1	271.55	0.38
-209	1927.178	25 Year Flood	3650.1	626.74	631.89		632.12	0.002204	3.89	939.1	281.59	0.38
-209	1927.178	50 Year Flood	4657.2	626.74	632.5		632.77	0.00214	4.18	1113.54	292.52	0.38
-209	1927.178	100 Year Flood	5726.7	626.74	633.36		633.63	0.001681	4.18	1372.23	307.25	0.35
-209	1927.178	500 Year Flood	9399.6	626.74	635.11		635.49	0.001528	4.95	1921.17	319.75	0.35
-65	1783.649	2 Year Flood	818.8	625.09	629.19	627.87	629.29	0.002483	2.58	317.87	192.93	0.35
-65	1783.649	5 Year Flood	1643.8	625.09	629.97	628.79	630.16	0.002939	3.44	478.48	213.68	0.4
-65	1783.649	10 Year Flood	2435.6	625.09	630.6	629.25	630.84	0.003028	3.95	616.11	227.71	0.42
-65	1783.649	25 Year Flood	3650.1	625.09	631.44	629.81	631.75	0.003034	4.44	822.25	255.6	0.44
-65	1783.649	50 Year Flood	4657.2	625.09	632.06	630.21	632.41	0.002829	4.74	982.36	262.45	0.43
-65	1783.649	100 Year Flood	5726.7	625.09	633.03	630.59	633.36	0.002051	4.62	1240.28	270.68	0.38
-65	1783.649	500 Year Flood	9399.6	625.09	634.77	631.71	635.23	0.001927	5.46	1721.68	281.15	0.39
-19	1737.38	2 Year Flood	818.2	627.59	628.52	628.52	628.99	0.024338	5.49	149.14	160.53	1
-19	1737.38	5 Year Flood	1642.9	627.59	629.08	629.08	629.81	0.020628	6.88	238.81	160.85	1
-19	1737.38	10 Year Flood	2436.2	627.59	629.52	629.52	630.48	0.019232	7.87	309.6	161.1	1
-19	1737.38	25 Year Flood	3650.1	627.59	630.12	630.12	631.37	0.017588	8.98	406.56	161.44	1
-19	1737.38	50 Year Flood	4652.6	627.59	630.57	630.57	632.03	0.016679	9.72	478.9	161.7	1
-19	1737.38	100 Year Flood	5724.7	627.59	632.25	631	633.15	0.005772	7.61	751.88	162.66	0.62
-19	1737.38	500 Year Flood	9398	627.59	633.48	632.31	634.97	0.00783	9.79	963.78	191.36	0.74
0	1718.37	Inl Struct										
37	1681.53	2 Year Flood	818.2	616	621.13		621.27	0.001299	2.95	277.43	101.32	0.31
37	1681.53	5 Year Flood	1642.9	616	623.86		623.99	0.000507	2.89	613.52	149.04	0.22
37	1681.53	10 Year Flood	2436.2	616	625.99		626.13	0.000351	3.01	954.59	178.93	0.19
37	1681.53	25 Year Flood	3650.1	616	628.87		629.01	0.000249	3.14	1540.41	228.81	0.17
37	1681.53	50 Year Flood	4652.6	616	629.6		629.8	0.000315	3.7	1712.32	239.95	0.2
37	1681.53	100 Year Flood	5724.7	616	630.28		630.54	0.000385	4.25	1879.96	254.49	0.22
37	1681.53	500 Year Flood	9398	616	632.22		632.7	0.000597	5.86	2444.75	330.71	0.28
81	1636.923	2 Year Flood	818.2	616.05	620.79	619.22	621.12	0.003063	4.6	177.75	63.3	0.48
81	1636.923	5 Year Flood	1642.9	616.05	623.59	620.74	623.9	0.001292	4.48	367.15	91.09	0.35
81	1636.923	10 Year Flood	2436.2	616.05	625.7	621.58	626.04	0.000901	4.7	529.51	162.26	0.31
81	1636.923	25 Year Flood	3650.1	616.05	628.67	622.73	628.95	0.000524	4.5	1234.81	229.82	0.25
81	1636.923	50 Year Flood	4652.6	616.05	629.33	623.53	629.72	0.000675	5.33	1391.98	254.6	0.28
81	1636.923	100 Year Flood	5724.7	616.05	629.93	624.31	630.44	0.00083	6.12	1551.57	278.04	0.32
81	1636.923	500 Year Flood	9398	616.05	631.64	626.77	632.53	0.001268	8.3	2072.51	326.22	0.4
103	1615.645	Bridge										
135	1583.47	2 Year Flood	818.2	614.81	617.43	617.4	618.41	0.013922	7.95	102.92	50.88	0.99
135	1583.47	5 Year Flood	1642.9	614.81	618.62	618.62	620.1	0.012676	9.75	168.91	59.15	1
135	1583.47	10 Year Flood	2436.2	614.81	619.53	619.53	621.42	0.011333	11.02	225.35	64.81	0.99
135	1583.47	25 Year Flood	3650.1	614.81	620.78	620.78	623.15	0.009864	12.39	312.97	91.76	0.97
135	1583.47	50 Year Flood	4652.6	614.81	621.64	621.64	624.39	0.009384	13.41	378.22	113.68	0.97
135	1583.47	100 Year Flood	5724.7	614.81	622.48	622.48	625.6	0.009015	14.35	442.12	146.4	0.97
135	1583.47	500 Year Flood	9398	614.81	624.96	624.96	629.25	0.008324	16.96	630.68	188.45	0.98
248	1470.783	2 Year Flood	818.2	613.04	615.95	615.95	616.82	0.013589	8.02	146.52	91.3	0.98
248	1470.783	5 Year Flood	1642.9	613.04	616.99	616.99	618.32	0.01283	10.21	247.39	103.8	1.02
248	1470.783	10 Year Flood	2436.2	613.04	618.03	618.03	619.53	0.010159	11.01	380.14	137.79	0.95
248	1470.783	25 Year Flood	3650.1	613.04	618.96	618.96	620.9	0.010454	12.79	513.41	173.72	1
248	1470.783	50 Year Flood	4652.6	613.04	619.75	619.75	621.89	0.009823	13.64	638.41	212.43	0.99
248	1470.783	100 Year Flood	5724.7	613.04	620.43	620.43	622.82	0.009752	14.62	754.3	245.25	1.01

Table C-2

Alternative 1: Partial Dam Removal

Distance US of Dam (ft)	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
248	1470.783	500 Year Flood	9398	613.04	621.85	621.85	625.61	0.012311	18.74	1025.29	292.12	1.17
394	1324.077	2 Year Flood	818.2	597.53	601.01	601.01	602.26	0.013528	8.97	91.4	37.49	1
394	1324.077	5 Year Flood	1642.9	597.53	602.52	602.52	604.46	0.011274	11.2	152.28	43.29	0.99
394	1324.077	10 Year Flood	2436.2	597.53	603.72	603.72	606.19	0.010188	12.68	207.01	47.56	0.98
394	1324.077	25 Year Flood	3650.1	597.53	605.3	605.3	608.45	0.009283	14.43	286.23	53.23	0.98
394	1324.077	50 Year Flood	4652.6	597.53	606.44	606.44	610.1	0.008832	15.61	350	59.08	0.98
394	1324.077	100 Year Flood	5724.7	597.53	607.68	607.68	611.7	0.008077	16.44	428.63	67.79	0.96
394	1324.077	500 Year Flood	9398	597.53	611.06	611.06	616.2	0.007069	18.96	690.59	88.06	0.94
558	1159.907	2 Year Flood	818.2	591.07	594.06	594.06	595.23	0.014194	8.67	94.41	41.02	1.01
558	1159.907	5 Year Flood	1642.9	591.07	595.62	595.49	597.18	0.011362	10	164.28	48.21	0.96
558	1159.907	10 Year Flood	2436.2	591.07	596.94	596.7	598.64	0.009518	10.46	237.23	68.53	0.9
558	1159.907	25 Year Flood	3650.1	591.07	599.82		601.04	0.003497	9.01	462.63	85.45	0.6
558	1159.907	50 Year Flood	4652.6	591.07	601.69		602.86	0.002496	8.9	632.6	95.76	0.53
558	1159.907	100 Year Flood	5724.7	591.07	603.49		604.66	0.001976	8.96	833.44	137.14	0.48
558	1159.907	500 Year Flood	9398	591.07	609.07		610.11	0.001095	8.82	1669.63	160.23	0.39
640	1078.855	2 Year Flood	818.2	587.58	593.31	592.26	594.01	0.005337	6.73	121.52	34.62	0.63
640	1078.855	5 Year Flood	1642.9	587.58	595.24	593.96	596.38	0.005096	8.59	193.99	40.98	0.66
640	1078.855	10 Year Flood	2436.2	587.58	596.05	595.2	597.92	0.006909	11.01	228.19	42.71	0.79
640	1078.855	25 Year Flood	3650.1	587.58	597.68	596.81	600.25	0.006934	12.93	299.7	44.88	0.82
640	1078.855	50 Year Flood	4652.6	587.58	598.86	598	601.97	0.006956	14.23	353.59	46.79	0.84
640	1078.855	100 Year Flood	5724.7	587.58	600.03	599.16	603.66	0.006909	15.41	410.13	49.47	0.86
640	1078.855	500 Year Flood	9398	587.58	603.52	602.58	608.69	0.006725	18.53	610.19	69.25	0.89
729	988.8714	Bridge										
808	910.7321	2 Year Flood	818.2	578.19	580.69	580.69	581.61	0.014748	7.7	106.31	57.76	1
808	910.7321	5 Year Flood	1642.9	578.19	581.81	581.81	583.21	0.013005	9.49	173.1	61.94	1
808	910.7321	10 Year Flood	2436.2	578.19	582.69	582.69	584.44	0.01205	10.62	229.37	65.23	1
808	910.7321	25 Year Flood	3650.1	578.19	583.79	583.79	586.07	0.010959	12.13	303.12	69.39	0.99
808	910.7321	50 Year Flood	4652.6	578.19	584.62	584.62	587.27	0.010242	13.09	361.95	72.4	0.99
808	910.7321	100 Year Flood	5724.7	578.19	585.41	585.41	588.45	0.009793	14.02	420.62	74.64	0.99
808	910.7321	500 Year Flood	9398	578.19	587.84	587.84	592	0.008718	16.46	609.03	80.89	0.99
895	823.656	2 Year Flood	818.2	563.33	566.37	566.37	567.44	0.014589	8.3	98.53	46.77	1.01
895	823.656	5 Year Flood	1642.9	563.33	567.66	567.66	569.22	0.013017	10.03	163.93	54.21	1.01
895	823.656	10 Year Flood	2436.2	563.33	568.6	568.6	570.6	0.011735	11.36	217.15	58.43	1
895	823.656	25 Year Flood	3650.1	563.33	569.85	569.85	572.43	0.010534	12.91	293.42	63.41	0.99
895	823.656	50 Year Flood	4652.6	563.33	570.81	570.81	573.77	0.009723	13.86	356.02	67.48	0.98
895	823.656	100 Year Flood	5724.7	563.33	571.69	571.69	575.08	0.009373	14.87	416.54	70.07	0.98
895	823.656	500 Year Flood	9398	563.33	574.4	574.4	578.96	0.008341	17.4	616.59	77.49	0.98
1073	645.2139	2 Year Flood	818.2	555.97	558.94	558.94	559.97	0.014445	8.17	100.18	49.12	1.01
1073	645.2139	5 Year Flood	1642.9	555.97	560.18	560.18	561.77	0.011942	10.13	167.61	58.69	0.99
1073	645.2139	10 Year Flood	2436.2	555.97	561.17	561.17	563.17	0.010708	11.44	228.7	64.54	0.98
1073	645.2139	25 Year Flood	3650.1	555.97	562.45	562.45	565.01	0.009742	13.01	315.5	70.71	0.97
1073	645.2139	50 Year Flood	4652.6	555.97	563.38	563.38	566.35	0.009239	14.05	383.4	74.63	0.97
1073	645.2139	100 Year Flood	5724.7	555.97	564.29	564.29	567.65	0.008877	15.03	452.7	78.28	0.98
1073	645.2139	500 Year Flood	9398	555.97	567.04	567.04	571.51	0.007909	17.53	687.44	92.18	0.97
1210	507.9141	2 Year Flood	818.2	551.25	553.32	553.32	553.95	0.01593	6.43	132.64	113.27	0.99
1210	507.9141	5 Year Flood	1642.9	551.25	554.07	554.07	555.07	0.013744	8.08	220.35	118.12	0.99
1210	507.9141	10 Year Flood	2436.2	551.25	554.69	554.69	555.95	0.01256	9.18	293.57	121.29	0.99
1210	507.9141	25 Year Flood	3650.1	551.25	555.48	555.48	557.13	0.011649	10.51	391.58	139.65	0.99
1210	507.9141	50 Year Flood	4652.6	551.25	556.07	556.07	558	0.011136	11.4	465.52	166.09	1
1210	507.9141	100 Year Flood	5724.7	551.25	556.63	556.63	558.86	0.010859	12.26	537.28	177.33	1
1210	507.9141	500 Year Flood	9398	551.25	558.4	558.4	561.44	0.009717	14.4	770.89	214.48	1
1338	380.8181	2 Year Flood	818.2	547.32	549.59	549.59	550.24	0.016284	6.48	126.24	95.96	1
1338	380.8181	5 Year Flood	1642.9	547.32	550.37	550.37	551.38	0.014456	8.03	204.52	103.26	1
1338	380.8181	10 Year Flood	2436.2	547.32	550.99	550.99	552.27	0.012988	9.1	269.65	110.71	1
1338	380.8181	25 Year Flood	3650.1	547.32	551.81	551.81	553.45	0.011483	10.29	369.27	126.28	0.98
1338	380.8181	50 Year Flood	4652.6	547.32	552.42	552.42	554.31	0.010696	11.08	448.38	177.97	0.97

Table C-2

Alternative 1: Partial Dam Removal

Distance US of Dam (ft)	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1338	380.8181	100 Year Flood	5724.7	547.32	552.99	552.99	555.15	0.010286	11.87	526.11	270.59	0.97
1338	380.8181	500 Year Flood	9398	547.32	554.73	554.73	557.62	0.009188	13.88	779.27	355.08	0.97
1473	245.2894	2 Year Flood	818.2	542.97	546.18	546.03	547.07	0.011689	7.56	108.21	129.28	0.91
1473	245.2894	5 Year Flood	1642.9	542.97	547.33	547.33	548.72	0.012968	9.46	173.77	191.02	1
1473	245.2894	10 Year Flood	2436.2	542.97	548.19	548.19	549.96	0.011499	10.68	232.37	239.15	0.99
1473	245.2894	25 Year Flood	3650.1	542.97	549.3	549.3	551.59	0.01052	12.19	315.18	306.57	0.99
1473	245.2894	50 Year Flood	4652.6	542.97	549.7	549.7	550.75	0.006171	9.85	987.26	316.95	0.77
1473	245.2894	100 Year Flood	5724.7	542.97	549.75	549.75	551.29	0.00896	11.95	1003.29	317.41	0.92
1473	245.2894	500 Year Flood	9398	542.97	551.01	551.01	553.07	0.009704	14.37	1410.64	328.5	1
Reach1	125.912	2 Year Flood	818.2	541.54	545.22	545.22	545.9	0.00769	7.66	256.86	219.55	0.78
Reach1	125.912	5 Year Flood	1642.9	541.54	546.08	546.08	546.96	0.008725	9.66	466.69	266.37	0.87
Reach1	125.912	10 Year Flood	2436.2	541.54	546.68	546.68	547.68	0.00918	10.91	631.06	281.32	0.91
Reach1	125.912	25 Year Flood	3650.1	541.54	547.36	547.36	548.59	0.010322	12.72	828.36	301.41	0.99
Reach1	125.912	50 Year Flood	4652.6	541.54	547.86	547.86	549.23	0.010707	13.79	981.03	308.63	1.03
Reach1	125.912	100 Year Flood	5724.7	541.54	548.3	548.3	549.83	0.011235	14.86	1120.13	314.01	1.06
Reach1	125.912	500 Year Flood	9398	541.54	549.56	549.56	551.58	0.01272	17.93	1523.07	328.31	1.17
Reach1	41.42999	2 Year Flood	818.2	538.74	541.04	541.04	541.93	0.014623	7.56	109.8	64.85	1
Reach1	41.42999	5 Year Flood	1642.9	538.74	542.1	542.1	543.48	0.01237	9.47	182.16	71.46	0.99
Reach1	41.42999	10 Year Flood	2436.2	538.74	542.96	542.96	544.71	0.01115	10.71	245.28	75.64	0.98
Reach1	41.42999	25 Year Flood	3650.1	538.74	544.07	544.07	546.34	0.01027	12.24	332.24	123.69	0.98
Reach1	41.42999	50 Year Flood	4652.6	538.74	544.87	544.87	547.53	0.009848	13.28	399.38	152.43	0.99
Reach1	41.42999	100 Year Flood	5724.7	538.74	546.15	546.15	548.33	0.006579	12.45	713.79	220.01	0.84
Reach1	41.42999	500 Year Flood	9398	538.74	548.09	548.09	550.78	0.006392	14.47	1167.91	255.14	0.86

Table C-3

Alternative 2: Dam Removal with Existing Sediment Conditions within McTaggart's Pond

Distance US of Dam (ft)	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
-1987	3705.37	2 Year Flood	818.8	637.08	639.16	639.16	639.82	0.016004	6.55	128.82	110.27	0.99
-1987	3705.37	5 Year Flood	1643.8	637.08	640.32	639.98	641.04	0.007792	6.91	274.96	154.06	0.77
-1987	3705.37	10 Year Flood	2435.6	637.08	641.4		642.08	0.004785	6.87	448.65	166.41	0.64
-1987	3705.37	25 Year Flood	3650.1	637.08	642.61		643.39	0.003817	7.45	678.61	206.11	0.6
-1987	3705.37	50 Year Flood	4657.2	637.08	643.16		644.15	0.004237	8.44	796.92	228.61	0.64
-1987	3705.37	100 Year Flood	5726.7	637.08	643.63		644.83	0.004653	9.36	907.36	234.82	0.68
-1987	3705.37	500 Year Flood	9399.6	637.08	644.67	644.26	646.77	0.006764	12.58	1155.03	243.72	0.85
-1814	3532.84	2 Year Flood	818.8	635.48	638.66		638.81	0.001646	3.18	299.2	152.31	0.35
-1814	3532.84	5 Year Flood	1643.8	635.48	640.25		640.46	0.001186	3.75	551.82	164.15	0.33
-1814	3532.84	10 Year Flood	2435.6	635.48	641.33		641.59	0.001162	4.33	740.06	220.56	0.34
-1814	3532.84	25 Year Flood	3650.1	635.48	642.55		642.92	0.001239	5.15	1116.39	350.53	0.36
-1814	3532.84	50 Year Flood	4657.2	635.48	643.13		643.59	0.001411	5.82	1322.07	354.84	0.39
-1814	3532.84	100 Year Flood	5726.7	635.48	643.64		644.19	0.001605	6.5	1501.54	359.1	0.42
-1814	3532.84	500 Year Flood	9399.6	635.48	644.8		645.76	0.002402	8.76	1927.08	372.01	0.52
-1608	3326.795	2 Year Flood	818.8	633.84	637.06	636.89	638.06	0.008881	8.3	134.57	78.89	0.84
-1608	3326.795	5 Year Flood	1643.8	633.84	638.56	638.56	639.85	0.007417	9.94	301.56	141.51	0.83
-1608	3326.795	10 Year Flood	2435.6	633.84	639.41	639.41	640.97	0.007682	11.35	428.44	164.44	0.87
-1608	3326.795	25 Year Flood	3650.1	633.84	640.59	640.59	642.28	0.00714	12.49	721.25	343.49	0.86
-1608	3326.795	50 Year Flood	4657.2	633.84	641.66	641.66	643	0.005276	11.89	1220.19	524.63	0.76
-1608	3326.795	100 Year Flood	5726.7	633.84	642.32	642.32	643.58	0.004912	12.13	1591.05	578.73	0.74
-1608	3326.795	500 Year Flood	9399.6	633.84	643.4	643.4	644.95	0.006088	14.65	2224.03	599.47	0.85
-1374	3092.841	2 Year Flood	818.8	632.98	636.75	635.19	636.89	0.002161	3.02	271.33	124.71	0.35
-1374	3092.841	5 Year Flood	1643.8	632.98	637.77	636.15	638.03	0.002614	4.13	420.7	182.09	0.41
-1374	3092.841	10 Year Flood	2435.6	632.98	638.44	636.83	638.82	0.002987	5.01	537.58	278.87	0.45
-1374	3092.841	25 Year Flood	3650.1	632.98	639.26	637.6	639.75	0.003138	5.83	913.53	453.33	0.47
-1374	3092.841	50 Year Flood	4657.2	632.98	639.82	638.13	640.37	0.003164	6.31	1176.96	488.98	0.48
-1374	3092.841	100 Year Flood	5726.7	632.98	640.33	638.63	640.94	0.003247	6.8	1435.39	525.19	0.5
-1374	3092.841	500 Year Flood	9399.6	632.98	641.83	640.28	642.56	0.003217	7.89	2279.9	603.86	0.52
-1185	2902.916	2 Year Flood	818.8	632.59	635.15	635.15	635.91	0.019047	7.05	122.13	92.84	0.98
-1185	2902.916	5 Year Flood	1643.8	632.59	636.18	636.18	637.02	0.013306	7.66	299.47	241.09	0.87
-1185	2902.916	10 Year Flood	2435.6	632.59	636.71	636.71	637.72	0.01311	8.68	433.52	263.46	0.9
-1185	2902.916	25 Year Flood	3650.1	632.59	637.39	637.39	638.61	0.012745	9.85	627.11	305.34	0.91
-1185	2902.916	50 Year Flood	4657.2	632.59	637.9	637.9	639.24	0.012206	10.52	793.68	341.7	0.91
-1185	2902.916	100 Year Flood	5726.7	632.59	638.38	638.38	639.81	0.011711	11.09	962.8	364.02	0.91
-1185	2902.916	500 Year Flood	9399.6	632.59	639.56	639.56	641.39	0.012072	13.12	1421.08	405.72	0.96
-1095	2813.468	2 Year Flood	818.8	628.22	632.97		633.03	0.00055	1.92	426.59	129.62	0.19
-1095	2813.468	5 Year Flood	1643.8	628.22	633.79		633.94	0.001145	3.06	537.71	140.79	0.28
-1095	2813.468	10 Year Flood	2435.6	628.22	634.37		634.61	0.001721	3.91	622.22	152.71	0.34
-1095	2813.468	25 Year Flood	3650.1	628.22	635.09		635.47	0.002499	4.94	739.21	179.9	0.42
-1095	2813.468	50 Year Flood	4657.2	628.22	635.56		636.06	0.003026	5.67	829.45	210.39	0.46
-1095	2813.468	100 Year Flood	5726.7	628.22	636		636.63	0.00343	6.35	938.58	286.15	0.5
-1095	2813.468	500 Year Flood	9399.6	628.22	637.32		638.3	0.004031	8.05	1362.19	342.36	0.56
-895	2613.664	2 Year Flood	818.8	629.7	632.81		632.87	0.001237	1.91	428.08	241.24	0.25
-895	2613.664	5 Year Flood	1643.8	629.7	633.54		633.66	0.00164	2.7	608.98	252.68	0.31
-895	2613.664	10 Year Flood	2435.6	629.7	634.05		634.22	0.001936	3.3	739.16	257.41	0.34
-895	2613.664	25 Year Flood	3650.1	629.7	634.7		634.95	0.002332	4.02	907.94	269.67	0.39
-895	2613.664	50 Year Flood	4657.2	629.7	635.14		635.46	0.002547	4.53	1028.57	278.52	0.41
-895	2613.664	100 Year Flood	5726.7	629.7	635.56		635.95	0.002739	5.01	1146.77	285.7	0.43
-895	2613.664	500 Year Flood	9399.6	629.7	636.91		637.49	0.003009	6.15	1555.23	319.58	0.47
-658	2376.771	2 Year Flood	818.8	628.85	631.91	631.69	632.16	0.013382	4.02	203.53	223.88	0.74
-658	2376.771	5 Year Flood	1643.8	628.85	632.51		632.83	0.011075	4.55	361.16	286.57	0.71
-658	2376.771	10 Year Flood	2435.6	628.85	632.86		633.29	0.010882	5.27	462.11	290.33	0.74
-658	2376.771	25 Year Flood	3650.1	628.85	633.38		633.92	0.009699	5.95	613.93	295.48	0.73
-658	2376.771	50 Year Flood	4657.2	628.85	633.77		634.4	0.008859	6.36	732.73	299.24	0.71
-658	2376.771	100 Year Flood	5726.7	628.85	634.21		634.89	0.007811	6.65	862.41	300.87	0.69
-658	2376.771	500 Year Flood	9399.6	628.85	635.84		636.59	0.004727	6.97	1358.73	307.62	0.58
-395	2113.273	2 Year Flood	818.8	627.25	630.14		630.26	0.004341	2.83	288.93	231.15	0.45

Table C-3

Alternative 2: Dam Removal with Existing Sediment Conditions within McTaggart's Pond

Distance US of Dam (ft)	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
-395	2113.273	5 Year Flood	1643.8	627.25	630.93		631.1	0.004147	3.37	487.6	290.43	0.46
-395	2113.273	10 Year Flood	2435.6	627.25	631.47		631.69	0.003626	3.77	646.13	294.18	0.45
-395	2113.273	25 Year Flood	3650.1	627.25	632.12		632.41	0.00348	4.35	838.98	298.52	0.46
-395	2113.273	50 Year Flood	4657.2	627.25	632.66		632.99	0.003219	4.65	1000.94	303.65	0.45
-395	2113.273	100 Year Flood	5726.7	627.25	633.28		633.64	0.0028	4.8	1193.51	314.95	0.43
-395	2113.273	500 Year Flood	9399.6	627.25	635.37		635.77	0.001773	5.07	1880.97	338.54	0.37
-209	1927.178	2 Year Flood	818.8	626.74	629.45		629.56	0.003285	2.65	308.49	221.39	0.4
-209	1927.178	5 Year Flood	1643.8	626.74	630.28		630.45	0.002984	3.24	506.93	250.61	0.4
-209	1927.178	10 Year Flood	2435.6	626.74	630.85		631.06	0.003089	3.73	653.5	269.01	0.42
-209	1927.178	25 Year Flood	3650.1	626.74	631.48		631.78	0.0033	4.43	824.86	275.7	0.45
-209	1927.178	50 Year Flood	4657.2	626.74	632.06		632.41	0.003065	4.71	988.9	284.7	0.45
-209	1927.178	100 Year Flood	5726.7	626.74	632.78		633.14	0.002581	4.78	1198.74	297.68	0.42
-209	1927.178	500 Year Flood	9399.6	626.74	635.07		635.45	0.001559	4.98	1909.04	319.46	0.35
-65	1783.649	2 Year Flood	818.8	625.09	627.87	627.87	628.54	0.021397	6.58	124.44	93.13	1
-65	1783.649	5 Year Flood	1643.8	625.09	628.79	628.79	629.49	0.02082	6.71	244.9	174.21	1
-65	1783.649	10 Year Flood	2435.6	625.09	629.25	629.25	630.1	0.019497	7.36	330.81	194.86	1
-65	1783.649	25 Year Flood	3650.1	625.09	630.1	629.81	630.91	0.012307	7.23	505.15	216.42	0.83
-65	1783.649	50 Year Flood	4657.2	625.09	631.18	630.21	631.77	0.006349	6.15	757.03	251.01	0.62
-65	1783.649	100 Year Flood	5726.7	625.09	632.18	630.59	632.68	0.003869	5.65	1014.38	263.75	0.51
-65	1783.649	500 Year Flood	9399.6	625.09	634.72	631.71	635.19	0.001976	5.5	1708.74	280.82	0.39
-19	1737.38	2 Year Flood	826.9	620.67	624.94	624.94	626.05	0.019053	8.44	98	44.19	1
-19	1737.38	5 Year Flood	1646.5	620.67	626.41	626.41	627.72	0.01794	9.19	179.14	68.12	1
-19	1737.38	10 Year Flood	2445.6	620.67	627.58	627.3	628.87	0.013142	9.09	269.01	82.55	0.89
-19	1737.38	25 Year Flood	3672.7	620.67	629.03	628.36	630.35	0.009827	9.22	398.33	96.51	0.8
-19	1737.38	50 Year Flood	4656.3	620.67	629.98	629.07	631.35	0.008833	9.4	495.46	107.99	0.77
-19	1737.38	100 Year Flood	5730.6	620.67	630.95	629.8	632.34	0.007801	9.45	606.56	119.79	0.74
-19	1737.38	500 Year Flood	9400.4	620.67	633.52	631.88	634.95	0.00636	9.59	990.7	190.85	0.69
0	1718.37	Inl Struct										
37	1681.53	2 Year Flood	826.9	616	621.16		621.29	0.001288	2.95	280.2	101.56	0.31
37	1681.53	5 Year Flood	1646.5	616	623.87		624	0.000506	2.9	614.75	149.12	0.22
37	1681.53	10 Year Flood	2445.6	616	626.01		626.15	0.00035	3.01	958.37	179.18	0.19
37	1681.53	25 Year Flood	3672.7	616	628.91		629.05	0.000248	3.14	1550.03	229.41	0.17
37	1681.53	50 Year Flood	4656.3	616	629.6		629.8	0.000315	3.7	1712.86	239.98	0.2
37	1681.53	100 Year Flood	5730.6	616	630.29		630.54	0.000385	4.25	1881.02	254.59	0.22
37	1681.53	500 Year Flood	9400.4	616	632.22		632.7	0.000596	5.86	2446.22	330.81	0.28
81	1636.923	2 Year Flood	826.9	616.05	620.82	619.24	621.15	0.003044	4.61	179.49	63.55	0.48
81	1636.923	5 Year Flood	1646.5	616.05	623.6	620.75	623.91	0.001291	4.48	367.72	91.17	0.35
81	1636.923	10 Year Flood	2445.6	616.05	625.72	621.61	626.06	0.0009	4.71	531.12	162.63	0.31
81	1636.923	25 Year Flood	3672.7	616.05	628.71	622.74	628.99	0.000522	4.51	1244.54	230.49	0.25
81	1636.923	50 Year Flood	4656.3	616.05	629.33	623.55	629.72	0.000675	5.33	1392.46	254.69	0.28
81	1636.923	100 Year Flood	5730.6	616.05	629.93	624.33	630.44	0.00083	6.13	1552.63	278.2	0.32
81	1636.923	500 Year Flood	9400.4	616.05	631.65	626.78	632.54	0.001266	8.3	2074.2	326.31	0.4
103	1615.645	Bridge										
135	1583.47	2 Year Flood	826.9	614.81	617.44	617.43	618.43	0.013948	7.98	103.6	50.98	0.99
135	1583.47	5 Year Flood	1646.5	614.81	618.63	618.63	620.11	0.012693	9.76	169.07	59.16	1
135	1583.47	10 Year Flood	2445.6	614.81	619.54	619.54	621.43	0.011376	11.05	225.64	64.83	0.99
135	1583.47	25 Year Flood	3672.7	614.81	620.79	620.79	623.18	0.009923	12.45	313.69	92.19	0.97
135	1583.47	50 Year Flood	4656.3	614.81	621.64	621.64	624.39	0.009404	13.42	378.16	113.63	0.97
135	1583.47	100 Year Flood	5730.6	614.81	622.48	622.48	625.61	0.00902	14.36	442.34	146.46	0.97
135	1583.47	500 Year Flood	9400.4	614.81	624.96	624.96	629.25	0.008334	16.97	630.54	188.43	0.98
248	1470.783	2 Year Flood	826.9	613.04	615.96	615.96	616.83	0.013609	8.06	147.55	91.46	0.98
248	1470.783	5 Year Flood	1646.5	613.04	616.99	616.99	618.33	0.012773	10.2	248.2	103.91	1.02
248	1470.783	10 Year Flood	2445.6	613.04	618.04	618.04	619.54	0.010097	11	382.17	137.94	0.95
248	1470.783	25 Year Flood	3672.7	613.04	618.96	618.96	620.92	0.010583	12.87	513.41	173.72	1.01
248	1470.783	50 Year Flood	4656.3	613.04	619.76	619.76	621.89	0.009722	13.6	641.42	214.47	0.99
248	1470.783	100 Year Flood	5730.6	613.04	620.41	620.41	622.83	0.009861	14.68	751.6	244.25	1.01

Table C-3

Alternative 2: Dam Removal with Existing Sediment Conditions within McTaggart's Pond

Distance US of Dam (ft)	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
248	1470.783	500 Year Flood	9400.4	613.04	621.85	621.85	625.61	0.012317	18.74	1025.29	292.12	1.17
394	1324.077	2 Year Flood	826.9	597.53	601.03	601.03	602.29	0.013438	8.99	92.19	37.57	1
394	1324.077	5 Year Flood	1646.5	597.53	602.52	602.52	604.47	0.011271	11.21	152.52	43.31	0.99
394	1324.077	10 Year Flood	2445.6	597.53	603.74	603.74	606.21	0.010125	12.68	208.03	47.63	0.98
394	1324.077	25 Year Flood	3672.7	597.53	605.34	605.34	608.49	0.009207	14.43	288.39	53.4	0.97
394	1324.077	50 Year Flood	4656.3	597.53	606.43	606.43	610.11	0.008864	15.63	349.72	59.05	0.98
394	1324.077	100 Year Flood	5730.6	597.53	607.7	607.7	611.71	0.008025	16.42	430.15	67.93	0.95
394	1324.077	500 Year Flood	9400.4	597.53	611.05	611.05	616.21	0.00708	18.97	690.26	88.03	0.94
558	1159.907	2 Year Flood	826.9	591.07	594.08	594.08	595.25	0.014189	8.69	95.12	41.11	1.01
558	1159.907	5 Year Flood	1646.5	591.07	595.63	595.5	597.18	0.011293	9.99	164.87	48.27	0.95
558	1159.907	10 Year Flood	2445.6	591.07	596.97	596.71	598.65	0.009316	10.41	239.71	69	0.9
558	1159.907	25 Year Flood	3672.7	591.07	599.86		601.09	0.003465	9	466.4	85.75	0.6
558	1159.907	50 Year Flood	4656.3	591.07	601.69		602.87	0.002493	8.9	633.23	95.79	0.53
558	1159.907	100 Year Flood	5730.6	591.07	603.51		604.68	0.001971	8.96	835.35	137.2	0.48
558	1159.907	500 Year Flood	9400.4	591.07	609.07		610.12	0.001095	8.82	1670.34	160.24	0.39
640	1078.855	2 Year Flood	826.9	587.58	593.33	592.29	594.04	0.005353	6.76	122.3	34.69	0.63
640	1078.855	5 Year Flood	1646.5	587.58	595.25	593.96	596.39	0.005075	8.59	194.54	41.04	0.66
640	1078.855	10 Year Flood	2445.6	587.58	596.06	595.21	597.94	0.006908	11.03	228.8	42.73	0.79
640	1078.855	25 Year Flood	3672.7	587.58	597.71	596.85	600.29	0.006933	12.96	300.98	44.91	0.82
640	1078.855	50 Year Flood	4656.3	587.58	598.86	598	601.97	0.006956	14.24	353.79	46.8	0.84
640	1078.855	100 Year Flood	5730.6	587.58	600.04	599.16	603.67	0.00691	15.41	410.41	49.48	0.86
640	1078.855	500 Year Flood	9400.4	587.58	603.51	603	608.69	0.006737	18.54	609.87	69.23	0.89
729	988.8714	Bridge										
808	910.7321	2 Year Flood	826.9	578.19	580.69	580.69	581.63	0.014966	7.76	106.53	57.78	1.01
808	910.7321	5 Year Flood	1646.5	578.19	581.82	581.82	583.21	0.012897	9.47	173.82	61.98	1
808	910.7321	10 Year Flood	2445.6	578.19	582.7	582.7	584.46	0.012027	10.63	230.06	65.27	1
808	910.7321	25 Year Flood	3672.7	578.19	583.78	583.78	586.1	0.011119	12.21	302.91	69.38	1
808	910.7321	50 Year Flood	4656.3	578.19	584.61	584.61	587.28	0.010318	13.12	361.27	72.37	0.99
808	910.7321	100 Year Flood	5730.6	578.19	585.4	585.4	588.46	0.009863	14.06	419.92	74.62	0.99
808	910.7321	500 Year Flood	9400.4	578.19	587.84	587.84	592	0.008722	16.46	609.05	80.9	0.99
895	823.656	2 Year Flood	826.9	563.33	566.38	566.38	567.46	0.014557	8.33	99.32	46.88	1.01
895	823.656	5 Year Flood	1646.5	563.33	567.66	567.66	569.23	0.013005	10.03	164.21	54.25	1.01
895	823.656	10 Year Flood	2445.6	563.33	568.61	568.61	570.62	0.011729	11.38	217.73	58.46	1
895	823.656	25 Year Flood	3672.7	563.33	569.87	569.87	572.46	0.010527	12.94	294.7	63.48	0.99
895	823.656	50 Year Flood	4656.3	563.33	570.81	570.81	573.77	0.009719	13.87	356.26	67.49	0.98
895	823.656	100 Year Flood	5730.6	563.33	571.69	571.69	575.08	0.009372	14.87	416.86	70.08	0.98
895	823.656	500 Year Flood	9400.4	563.33	574.4	574.4	578.97	0.008342	17.4	616.67	77.49	0.98
1073	645.2139	2 Year Flood	826.9	555.97	558.95	558.95	559.99	0.014449	8.2	100.92	49.28	1.01
1073	645.2139	5 Year Flood	1646.5	555.97	560.18	560.18	561.77	0.011937	10.14	167.88	58.72	0.99
1073	645.2139	10 Year Flood	2445.6	555.97	561.18	561.18	563.19	0.010698	11.46	229.4	64.6	0.98
1073	645.2139	25 Year Flood	3672.7	555.97	562.47	562.47	565.04	0.009725	13.03	317.11	70.82	0.97
1073	645.2139	50 Year Flood	4656.3	555.97	563.38	563.38	566.35	0.009238	14.06	383.65	74.64	0.97
1073	645.2139	100 Year Flood	5730.6	555.97	564.29	564.29	567.66	0.008874	15.04	453.1	78.3	0.98
1073	645.2139	500 Year Flood	9400.4	555.97	567.04	567.04	571.51	0.007909	17.53	687.56	92.19	0.97
1210	507.9141	2 Year Flood	826.9	551.25	553.33	553.33	553.97	0.015899	6.45	133.66	113.34	0.99
1210	507.9141	5 Year Flood	1646.5	551.25	554.08	554.08	555.07	0.013716	8.08	220.81	118.14	0.99
1210	507.9141	10 Year Flood	2445.6	551.25	554.68	554.68	555.96	0.012811	9.24	292.42	121.25	1
1210	507.9141	25 Year Flood	3672.7	551.25	555.48	555.48	557.15	0.011842	10.58	391.06	139.46	1
1210	507.9141	50 Year Flood	4656.3	551.25	556.08	556.08	558	0.011065	11.38	466.72	166.27	0.99
1210	507.9141	100 Year Flood	5730.6	551.25	556.66	556.66	558.86	0.010685	12.21	540.47	177.86	1
1210	507.9141	500 Year Flood	9400.4	551.25	558.41	558.41	561.44	0.009672	14.38	772.2	214.57	1
1338	380.8181	2 Year Flood	826.9	547.32	549.59	549.59	550.26	0.016456	6.53	126.67	96.01	1
1338	380.8181	5 Year Flood	1646.5	547.32	550.38	550.38	551.38	0.014359	8.02	205.22	103.34	1
1338	380.8181	10 Year Flood	2445.6	547.32	550.99	550.99	552.28	0.013039	9.13	269.97	110.82	1
1338	380.8181	25 Year Flood	3672.7	547.32	551.82	551.82	553.47	0.011515	10.33	370.49	126.41	0.98
1338	380.8181	50 Year Flood	4656.3	547.32	552.42	552.42	554.31	0.010775	11.11	447.46	176.7	0.98

Table C-3

Alternative 2: Dam Removal with Existing Sediment Conditions within McTaggart's Pond

Distance US of Dam (ft)	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1338	380.8181	100 Year Flood	5730.6	547.32	553.01	553.01	555.15	0.010212	11.84	527.85	272.14	0.97
1338	380.8181	500 Year Flood	9400.4	547.32	554.74	554.74	557.62	0.009152	13.87	780.51	355.22	0.97
1473	245.2894	2 Year Flood	826.9	542.97	546.19	546.04	547.09	0.0118	7.61	108.69	129.66	0.92
1473	245.2894	5 Year Flood	1646.5	542.97	547.34	547.34	548.72	0.012867	9.45	174.42	191.62	1
1473	245.2894	10 Year Flood	2445.6	542.97	548.2	548.2	549.97	0.011508	10.69	232.91	239.55	0.99
1473	245.2894	25 Year Flood	3672.7	542.97	549.34	549.34	551.62	0.010378	12.17	318.09	307.48	0.98
1473	245.2894	50 Year Flood	4656.3	542.97	549.7	549.7	550.75	0.006181	9.86	987.26	316.95	0.77
1473	245.2894	100 Year Flood	5730.6	542.97	549.74	549.74	551.29	0.009004	11.97	1002.2	317.38	0.93
1473	245.2894	500 Year Flood	9400.4	542.97	551	551	553.07	0.009764	14.4	1407.7	328.43	1
Reach1	125.912	2 Year Flood	826.9	541.54	545.24	545.24	545.91	0.007668	7.68	260.03	220.48	0.78
Reach1	125.912	5 Year Flood	1646.5	541.54	546.07	546.07	546.96	0.008845	9.72	464.77	265.98	0.87
Reach1	125.912	10 Year Flood	2445.6	541.54	546.68	546.68	547.69	0.009214	10.94	632.07	281.39	0.92
Reach1	125.912	25 Year Flood	3672.7	541.54	547.37	547.37	548.61	0.010301	12.73	832.98	301.82	0.99
Reach1	125.912	50 Year Flood	4656.3	541.54	547.87	547.87	549.23	0.010605	13.74	985.03	308.79	1.02
Reach1	125.912	100 Year Flood	5730.6	541.54	548.3	548.3	549.83	0.011319	14.91	1117.99	313.93	1.07
Reach1	125.912	500 Year Flood	9400.4	541.54	549.55	549.55	551.58	0.012769	17.95	1521.31	328.25	1.17
Reach1	41.42999	2 Year Flood	826.9	538.74	541.06	541.06	541.95	0.014523	7.57	110.78	64.95	0.99
Reach1	41.42999	5 Year Flood	1646.5	538.74	542.11	542.11	543.49	0.012236	9.45	183.09	71.53	0.98
Reach1	41.42999	10 Year Flood	2445.6	538.74	542.97	542.97	544.73	0.011154	10.73	245.89	75.68	0.98
Reach1	41.42999	25 Year Flood	3672.7	538.74	544.09	544.09	546.36	0.010251	12.26	333.87	126.46	0.98
Reach1	41.42999	50 Year Flood	4656.3	538.74	544.9	544.9	547.53	0.009712	13.23	401.58	153.05	0.98
Reach1	41.42999	100 Year Flood	5730.6	538.74	546.15	546.15	548.34	0.00659	12.46	713.91	220.02	0.84
Reach1	41.42999	500 Year Flood	9400.4	538.74	548.09	548.09	550.78	0.00638	14.47	1169.23	255.22	0.86

Table C-3

Alternative 3: Dam Removal Assuming the Channel Sediment in McTaggart's Pond Extends to Refusal

Distance US of Dam (ft)	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
-1987	3705.37	2 Year Flood	818.8	637.08	639.16	639.16	639.82	0.016004	6.55	128.82	110.27	0.99
-1987	3705.37	5 Year Flood	1643.8	637.08	640.32	639.98	641.04	0.007792	6.91	274.96	154.06	0.77
-1987	3705.37	10 Year Flood	2435.6	637.08	641.4		642.08	0.004785	6.87	448.65	166.41	0.64
-1987	3705.37	25 Year Flood	3650.1	637.08	642.61		643.39	0.003817	7.45	678.61	206.11	0.6
-1987	3705.37	50 Year Flood	4657.2	637.08	643.16		644.15	0.004237	8.44	796.92	228.61	0.64
-1987	3705.37	100 Year Flood	5726.7	637.08	643.63		644.83	0.004653	9.36	907.36	234.82	0.68
-1987	3705.37	500 Year Flood	9399.6	637.08	644.67	644.26	646.77	0.006764	12.58	1155.03	243.72	0.85
-1814	3532.84	2 Year Flood	818.8	635.48	638.66		638.81	0.001646	3.18	299.2	152.31	0.35
-1814	3532.84	5 Year Flood	1643.8	635.48	640.25		640.46	0.001186	3.75	551.82	164.15	0.33
-1814	3532.84	10 Year Flood	2435.6	635.48	641.33		641.59	0.001162	4.33	740.06	220.56	0.34
-1814	3532.84	25 Year Flood	3650.1	635.48	642.55		642.92	0.001239	5.15	1116.39	350.53	0.36
-1814	3532.84	50 Year Flood	4657.2	635.48	643.13		643.59	0.001411	5.82	1322.07	354.84	0.39
-1814	3532.84	100 Year Flood	5726.7	635.48	643.64		644.19	0.001605	6.5	1501.54	359.1	0.42
-1814	3532.84	500 Year Flood	9399.6	635.48	644.8		645.76	0.002402	8.76	1927.08	372.01	0.52
-1608	3326.795	2 Year Flood	818.8	633.84	637.06	636.89	638.06	0.008884	8.3	134.55	78.88	0.84
-1608	3326.795	5 Year Flood	1643.8	633.84	638.56	638.56	639.85	0.007417	9.94	301.56	141.51	0.83
-1608	3326.795	10 Year Flood	2435.6	633.84	639.41	639.41	640.97	0.007682	11.35	428.44	164.44	0.87
-1608	3326.795	25 Year Flood	3650.1	633.84	640.59	640.59	642.28	0.00714	12.49	721.25	343.49	0.86
-1608	3326.795	50 Year Flood	4657.2	633.84	641.66	641.66	643	0.005276	11.89	1220.19	524.63	0.76
-1608	3326.795	100 Year Flood	5726.7	633.84	642.32	642.32	643.58	0.004912	12.13	1591.05	578.73	0.74
-1608	3326.795	500 Year Flood	9399.6	633.84	643.4	643.4	644.95	0.006088	14.65	2224.03	599.47	0.85
-1374	3092.841	2 Year Flood	818.8	632.98	636.75	635.19	636.89	0.002163	3.02	271.23	124.64	0.35
-1374	3092.841	5 Year Flood	1643.8	632.98	637.77	636.15	638.03	0.002615	4.13	420.63	182.07	0.41
-1374	3092.841	10 Year Flood	2435.6	632.98	638.44	636.83	638.82	0.002988	5.01	537.56	278.84	0.45
-1374	3092.841	25 Year Flood	3650.1	632.98	639.26	637.6	639.75	0.003138	5.83	913.53	453.33	0.47
-1374	3092.841	50 Year Flood	4657.2	632.98	639.82	638.13	640.37	0.003164	6.31	1176.99	488.99	0.48
-1374	3092.841	100 Year Flood	5726.7	632.98	640.33	638.63	640.94	0.003246	6.8	1435.42	525.19	0.5
-1374	3092.841	500 Year Flood	9399.6	632.98	641.83	640.28	642.56	0.003217	7.89	2279.78	603.85	0.52
-1185	2902.916	2 Year Flood	818.8	632.59	635.15	635.15	635.91	0.019047	7.05	122.13	92.84	0.98
-1185	2902.916	5 Year Flood	1643.8	632.59	636.18	636.18	637.02	0.013306	7.66	299.47	241.09	0.87
-1185	2902.916	10 Year Flood	2435.6	632.59	636.71	636.71	637.72	0.01311	8.68	433.52	263.46	0.9
-1185	2902.916	25 Year Flood	3650.1	632.59	637.39	637.39	638.61	0.012745	9.85	627.11	305.34	0.91
-1185	2902.916	50 Year Flood	4657.2	632.59	637.9	637.9	639.24	0.012206	10.52	793.68	341.7	0.91
-1185	2902.916	100 Year Flood	5726.7	632.59	638.38	638.38	639.81	0.011711	11.09	962.8	364.02	0.91
-1185	2902.916	500 Year Flood	9399.6	632.59	639.56	639.56	641.39	0.012072	13.12	1421.08	405.72	0.96
-1095	2813.468	2 Year Flood	818.8	626.81	631.04		631.18	0.001493	2.98	274.47	105.42	0.33
-1095	2813.468	5 Year Flood	1643.8	626.81	632.53		632.75	0.001486	3.72	446.16	124.5	0.33
-1095	2813.468	10 Year Flood	2435.6	626.81	633.34		633.65	0.001792	4.55	549.71	134.39	0.37
-1095	2813.468	25 Year Flood	3650.1	626.81	634.1		634.62	0.002453	5.83	656.01	146.96	0.44
-1095	2813.468	50 Year Flood	4657.2	626.81	634.58		635.28	0.002996	6.78	729.76	157.36	0.49
-1095	2813.468	100 Year Flood	5726.7	626.81	635.01		635.91	0.003571	7.73	798.83	173.31	0.54
-1095	2813.468	500 Year Flood	9399.6	626.81	636.07	634.74	637.73	0.005537	10.61	1031.56	291.5	0.68
-895	2613.664	2 Year Flood	818.8	626.39	630.35		630.72	0.003572	4.87	170.77	69.05	0.48
-895	2613.664	5 Year Flood	1643.8	626.39	631.89	630.36	632.32	0.003	5.66	378.71	211.34	0.46
-895	2613.664	10 Year Flood	2435.6	626.39	632.91	631.8	633.26	0.002223	5.53	614.83	242.77	0.41
-895	2613.664	25 Year Flood	3650.1	626.39	633.69		634.11	0.002424	6.27	808.97	254.49	0.43
-895	2613.664	50 Year Flood	4657.2	626.39	634.18		634.68	0.002626	6.84	935.37	258.36	0.46
-895	2613.664	100 Year Flood	5726.7	626.39	634.61		635.19	0.002902	7.48	1047.14	266.78	0.48
-895	2613.664	500 Year Flood	9399.6	626.39	635.76		636.64	0.003644	9.22	1369.13	289.16	0.56
-658	2376.771	2 Year Flood	818.8	625.4	627.88	627.88	629	0.018766	8.46	96.74	43.93	1.01
-658	2376.771	5 Year Flood	1643.8	625.4	629.31	629.31	630.87	0.015596	10.02	165.85	57.9	0.97
-658	2376.771	10 Year Flood	2435.6	625.4	630.49	630.49	632.13	0.012643	10.46	247.85	89.62	0.91
-658	2376.771	25 Year Flood	3650.1	625.4	632.15	632.15	633.2	0.006563	9.07	546.33	274.32	0.68
-658	2376.771	50 Year Flood	4657.2	625.4	632.58	632.58	633.71	0.006829	9.72	669.31	287.25	0.7
-658	2376.771	100 Year Flood	5726.7	625.4	633	633	634.18	0.006879	10.21	789.58	291.67	0.71
-658	2376.771	500 Year Flood	9399.6	625.4	634.33		635.58	0.006089	10.91	1187.82	301.36	0.69
-395	2113.273	2 Year Flood	818.8	621.74	625.79		626.14	0.003455	4.81	170.28	50.19	0.46

Table C-3

Alternative 3: Dam Removal Assuming the Channel Sediment in McTaggart's Pond Extends to Refusal

Distance US of Dam (ft)	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
-395	2113.273	5 Year Flood	1643.8	621.74	627.66		628.23	0.00359	6.06	271.55	60.1	0.49
-395	2113.273	10 Year Flood	2435.6	621.74	628.82		629.58	0.003784	7.05	364.56	101.87	0.52
-395	2113.273	25 Year Flood	3650.1	621.74	630.19		631.02	0.003376	7.69	600.04	233.02	0.51
-395	2113.273	50 Year Flood	4657.2	621.74	631.03		631.83	0.003061	7.89	817.04	291.08	0.49
-395	2113.273	100 Year Flood	5726.7	621.74	631.71		632.46	0.0028	7.97	1016.31	295.83	0.48
-395	2113.273	500 Year Flood	9399.6	621.74	633.76		634.44	0.002167	8.09	1646.61	325.18	0.44
-209	1927.178	2 Year Flood	818.8	620.6	625.41		625.64	0.001877	3.9	209.7	53.23	0.35
-209	1927.178	5 Year Flood	1643.8	620.6	627.22		627.65	0.002363	5.25	313.75	73.69	0.41
-209	1927.178	10 Year Flood	2435.6	620.6	628.45		628.96	0.002273	5.92	477.76	169.29	0.41
-209	1927.178	25 Year Flood	3650.1	620.6	629.97		630.45	0.001841	6.14	788.92	243.9	0.38
-209	1927.178	50 Year Flood	4657.2	620.6	630.82		631.3	0.00171	6.33	1006.44	268.68	0.38
-209	1927.178	100 Year Flood	5726.7	620.6	631.45		631.97	0.001739	6.68	1178.82	275.46	0.38
-209	1927.178	500 Year Flood	9399.6	620.6	633.48		634.04	0.00161	7.32	1770.07	309.17	0.38
-65	1783.649	2 Year Flood	818.8	621.34	623.83	623.83	624.94	0.018534	8.43	97.14	43.96	1
-65	1783.649	5 Year Flood	1643.8	621.34	625.2	625.2	626.82	0.01647	10.22	160.84	49.42	1
-65	1783.649	10 Year Flood	2435.6	621.34	626.33	626.33	628.18	0.013796	10.91	223.19	60.02	1
-65	1783.649	25 Year Flood	3650.1	621.34	628.06	627.62	629.84	0.009313	10.75	349.58	103.84	0.85
-65	1783.649	50 Year Flood	4657.2	621.34	629.14	629.14	630.78	0.007249	10.6	514.29	191.45	0.76
-65	1783.649	100 Year Flood	5726.7	621.34	629.8	629.8	631.46	0.006806	10.94	649.1	209.9	0.75
-65	1783.649	500 Year Flood	9399.6	621.34	632.81	631.37	633.74	0.002915	9.02	1389.34	268.92	0.51
-19	1737.38	2 Year Flood	826.9	619	621.79	621.47	622.61	0.012339	7.27	113.81	47.58	0.83
-19	1737.38	5 Year Flood	1646.5	619	623.5	622.79	624.53	0.008998	8.13	202.47	55.92	0.75
-19	1737.38	10 Year Flood	2445.6	619	625.61	623.82	626.46	0.004883	7.38	331.5	66.53	0.58
-19	1737.38	25 Year Flood	3672.7	619	628.64	625.11	629.28	0.002781	6.42	571.76	92.88	0.46
-19	1737.38	50 Year Flood	4656.3	619	629.26	626.05	630.11	0.003511	7.38	631.3	99.36	0.52
-19	1737.38	100 Year Flood	5730.6	619	629.88	626.99	630.94	0.004242	8.24	695.1	106.84	0.57
-19	1737.38	500 Year Flood	9400.4	619	631.85	629.51	633.43	0.006014	10.09	931.29	137.87	0.68
0	1718.37		Inl Struct									
37	1681.53	2 Year Flood	826.9	616	621.16		621.29	0.001288	2.95	280.2	101.56	0.31
37	1681.53	5 Year Flood	1646.5	616	623.87		624	0.000506	2.9	614.75	149.12	0.22
37	1681.53	10 Year Flood	2445.6	616	626.01		626.15	0.00035	3.01	958.37	179.18	0.19
37	1681.53	25 Year Flood	3672.7	616	628.91		629.05	0.000248	3.14	1550.03	229.41	0.17
37	1681.53	50 Year Flood	4656.3	616	629.6		629.8	0.000315	3.7	1712.86	239.98	0.2
37	1681.53	100 Year Flood	5730.6	616	630.29		630.54	0.000385	4.25	1881.02	254.59	0.22
37	1681.53	500 Year Flood	9400.4	616	632.22		632.7	0.000596	5.86	2446.22	330.81	0.28
81	1636.923	2 Year Flood	826.9	616.05	620.82	619.24	621.15	0.003044	4.61	179.49	63.55	0.48
81	1636.923	5 Year Flood	1646.5	616.05	623.6	620.75	623.91	0.001291	4.48	367.72	91.17	0.35
81	1636.923	10 Year Flood	2445.6	616.05	625.72	621.61	626.06	0.0009	4.71	531.12	162.63	0.31
81	1636.923	25 Year Flood	3672.7	616.05	628.71	622.74	628.99	0.000522	4.51	1244.54	230.49	0.25
81	1636.923	50 Year Flood	4656.3	616.05	629.33	623.55	629.72	0.000675	5.33	1392.46	254.69	0.28
81	1636.923	100 Year Flood	5730.6	616.05	629.93	624.33	630.44	0.00083	6.13	1552.63	278.2	0.32
81	1636.923	500 Year Flood	9400.4	616.05	631.65	626.78	632.54	0.001266	8.3	2074.2	326.31	0.4
103	1615.645		Bridge									
135	1583.47	2 Year Flood	826.9	614.81	617.44	617.43	618.43	0.013948	7.98	103.6	50.98	0.99
135	1583.47	5 Year Flood	1646.5	614.81	618.63	618.63	620.11	0.012693	9.76	169.07	59.16	1
135	1583.47	10 Year Flood	2445.6	614.81	619.54	619.54	621.43	0.011376	11.05	225.64	64.83	0.99
135	1583.47	25 Year Flood	3672.7	614.81	620.79	620.79	623.18	0.009923	12.45	313.69	92.19	0.97
135	1583.47	50 Year Flood	4656.3	614.81	621.64	621.64	624.39	0.009404	13.42	378.16	113.63	0.97
135	1583.47	100 Year Flood	5730.6	614.81	622.48	622.48	625.61	0.00902	14.36	442.34	146.46	0.97
135	1583.47	500 Year Flood	9400.4	614.81	624.96	624.96	629.25	0.008334	16.97	630.54	188.43	0.98
248	1470.783	2 Year Flood	826.9	613.04	615.96	615.96	616.83	0.013609	8.06	147.55	91.46	0.98
248	1470.783	5 Year Flood	1646.5	613.04	616.99	616.99	618.33	0.012773	10.2	248.2	103.91	1.02
248	1470.783	10 Year Flood	2445.6	613.04	618.04	618.04	619.54	0.010097	11	382.17	137.94	0.95
248	1470.783	25 Year Flood	3672.7	613.04	618.96	618.96	620.92	0.010583	12.87	513.41	173.72	1.01
248	1470.783	50 Year Flood	4656.3	613.04	619.76	619.76	621.89	0.009722	13.6	641.42	214.47	0.99
248	1470.783	100 Year Flood	5730.6	613.04	620.41	620.41	622.83	0.009861	14.68	751.6	244.25	1.01

Table C-3

Alternative 3: Dam Removal Assuming the Channel Sediment in McTaggart's Pond Extends to Refusal

Distance US of Dam (ft)	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
248	1470.783	500 Year Flood	9400.4	613.04	621.85	621.85	625.61	0.012317	18.74	1025.29	292.12	1.17
394	1324.077	2 Year Flood	826.9	597.53	601.03	601.03	602.29	0.013438	8.99	92.19	37.57	1
394	1324.077	5 Year Flood	1646.5	597.53	602.52	602.52	604.47	0.011271	11.21	152.52	43.31	0.99
394	1324.077	10 Year Flood	2445.6	597.53	603.74	603.74	606.21	0.010125	12.68	208.03	47.63	0.98
394	1324.077	25 Year Flood	3672.7	597.53	605.34	605.34	608.49	0.009207	14.43	288.39	53.4	0.97
394	1324.077	50 Year Flood	4656.3	597.53	606.43	606.43	610.11	0.008864	15.63	349.72	59.05	0.98
394	1324.077	100 Year Flood	5730.6	597.53	607.7	607.7	611.71	0.008025	16.42	430.15	67.93	0.95
394	1324.077	500 Year Flood	9400.4	597.53	611.05	611.05	616.21	0.00708	18.97	690.26	88.03	0.94
558	1159.907	2 Year Flood	826.9	591.07	594.08	594.08	595.25	0.014189	8.69	95.12	41.11	1.01
558	1159.907	5 Year Flood	1646.5	591.07	595.63	595.5	597.18	0.011293	9.99	164.87	48.27	0.95
558	1159.907	10 Year Flood	2445.6	591.07	596.97	596.71	598.65	0.009316	10.41	239.71	69	0.9
558	1159.907	25 Year Flood	3672.7	591.07	599.86		601.09	0.003465	9	466.4	85.75	0.6
558	1159.907	50 Year Flood	4656.3	591.07	601.69		602.87	0.002493	8.9	633.23	95.79	0.53
558	1159.907	100 Year Flood	5730.6	591.07	603.51		604.68	0.001971	8.96	835.35	137.2	0.48
558	1159.907	500 Year Flood	9400.4	591.07	609.07		610.12	0.001095	8.82	1670.34	160.24	0.39
640	1078.855	2 Year Flood	826.9	587.58	593.33	592.29	594.04	0.005353	6.76	122.3	34.69	0.63
640	1078.855	5 Year Flood	1646.5	587.58	595.25	593.96	596.39	0.005075	8.59	194.54	41.04	0.66
640	1078.855	10 Year Flood	2445.6	587.58	596.06	595.21	597.94	0.006908	11.03	228.8	42.73	0.79
640	1078.855	25 Year Flood	3672.7	587.58	597.71	596.85	600.29	0.006933	12.96	300.98	44.91	0.82
640	1078.855	50 Year Flood	4656.3	587.58	598.86	598	601.97	0.006956	14.24	353.79	46.8	0.84
640	1078.855	100 Year Flood	5730.6	587.58	600.04	599.16	603.67	0.00691	15.41	410.41	49.48	0.86
640	1078.855	500 Year Flood	9400.4	587.58	603.51	603	608.69	0.006737	18.54	609.87	69.23	0.89
729	988.8714	Bridge										
808	910.7321	2 Year Flood	826.9	578.19	580.69	580.69	581.63	0.014966	7.76	106.53	57.78	1.01
808	910.7321	5 Year Flood	1646.5	578.19	581.82	581.82	583.21	0.012897	9.47	173.82	61.98	1
808	910.7321	10 Year Flood	2445.6	578.19	582.7	582.7	584.46	0.012027	10.63	230.06	65.27	1
808	910.7321	25 Year Flood	3672.7	578.19	583.78	583.78	586.1	0.011119	12.21	302.91	69.38	1
808	910.7321	50 Year Flood	4656.3	578.19	584.61	584.61	587.28	0.010318	13.12	361.27	72.37	0.99
808	910.7321	100 Year Flood	5730.6	578.19	585.4	585.4	588.46	0.009863	14.06	419.92	74.62	0.99
808	910.7321	500 Year Flood	9400.4	578.19	587.84	587.84	592	0.008722	16.46	609.05	80.9	0.99
895	823.656	2 Year Flood	826.9	563.33	566.38	566.38	567.46	0.014557	8.33	99.32	46.88	1.01
895	823.656	5 Year Flood	1646.5	563.33	567.66	567.66	569.23	0.013005	10.03	164.21	54.25	1.01
895	823.656	10 Year Flood	2445.6	563.33	568.61	568.61	570.62	0.011729	11.38	217.73	58.46	1
895	823.656	25 Year Flood	3672.7	563.33	569.87	569.87	572.46	0.010527	12.94	294.7	63.48	0.99
895	823.656	50 Year Flood	4656.3	563.33	570.81	570.81	573.77	0.009719	13.87	356.26	67.49	0.98
895	823.656	100 Year Flood	5730.6	563.33	571.69	571.69	575.08	0.009372	14.87	416.86	70.08	0.98
895	823.656	500 Year Flood	9400.4	563.33	574.4	574.4	578.97	0.008342	17.4	616.67	77.49	0.98
1073	645.2139	2 Year Flood	826.9	555.97	558.95	558.95	559.99	0.014449	8.2	100.92	49.28	1.01
1073	645.2139	5 Year Flood	1646.5	555.97	560.18	560.18	561.77	0.011937	10.14	167.88	58.72	0.99
1073	645.2139	10 Year Flood	2445.6	555.97	561.18	561.18	563.19	0.010698	11.46	229.4	64.6	0.98
1073	645.2139	25 Year Flood	3672.7	555.97	562.47	562.47	565.04	0.009725	13.03	317.11	70.82	0.97
1073	645.2139	50 Year Flood	4656.3	555.97	563.38	563.38	566.35	0.009238	14.06	383.65	74.64	0.97
1073	645.2139	100 Year Flood	5730.6	555.97	564.29	564.29	567.66	0.008874	15.04	453.1	78.3	0.98
1073	645.2139	500 Year Flood	9400.4	555.97	567.04	567.04	571.51	0.007909	17.53	687.56	92.19	0.97
1210	507.9141	2 Year Flood	826.9	551.25	553.33	553.33	553.97	0.015899	6.45	133.66	113.34	0.99
1210	507.9141	5 Year Flood	1646.5	551.25	554.08	554.08	555.07	0.013716	8.08	220.81	118.14	0.99
1210	507.9141	10 Year Flood	2445.6	551.25	554.68	554.68	555.96	0.012811	9.24	292.42	121.25	1
1210	507.9141	25 Year Flood	3672.7	551.25	555.48	555.48	557.15	0.011842	10.58	391.06	139.46	1
1210	507.9141	50 Year Flood	4656.3	551.25	556.08	556.08	558	0.011065	11.38	466.72	166.27	0.99
1210	507.9141	100 Year Flood	5730.6	551.25	556.66	556.66	558.86	0.010685	12.21	540.47	177.86	1
1210	507.9141	500 Year Flood	9400.4	551.25	558.41	558.41	561.44	0.009672	14.38	772.2	214.57	1
1338	380.8181	2 Year Flood	826.9	547.32	549.59	549.59	550.26	0.016456	6.53	126.67	96.01	1
1338	380.8181	5 Year Flood	1646.5	547.32	550.38	550.38	551.38	0.014359	8.02	205.22	103.34	1
1338	380.8181	10 Year Flood	2445.6	547.32	550.99	550.99	552.28	0.013039	9.13	269.97	110.82	1
1338	380.8181	25 Year Flood	3672.7	547.32	551.82	551.82	553.47	0.011515	10.33	370.49	126.41	0.98
1338	380.8181	50 Year Flood	4656.3	547.32	552.42	552.42	554.31	0.010775	11.11	447.46	176.7	0.98

Table C-3

Alternative 3: Dam Removal Assuming the Channel Sediment in McTaggart's Pond Extends to Refusal

Distance US of Dam (ft)	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1338	380.8181	100 Year Flood	5730.6	547.32	553.01	553.01	555.15	0.010212	11.84	527.85	272.14	0.97
1338	380.8181	500 Year Flood	9400.4	547.32	554.74	554.74	557.62	0.009152	13.87	780.51	355.22	0.97
1473	245.2894	2 Year Flood	826.9	542.97	546.19	546.04	547.09	0.0118	7.61	108.69	129.66	0.92
1473	245.2894	5 Year Flood	1646.5	542.97	547.34	547.34	548.72	0.012867	9.45	174.42	191.62	1
1473	245.2894	10 Year Flood	2445.6	542.97	548.2	548.2	549.97	0.011508	10.69	232.91	239.55	0.99
1473	245.2894	25 Year Flood	3672.7	542.97	549.34	549.34	551.62	0.010378	12.17	318.09	307.48	0.98
1473	245.2894	50 Year Flood	4656.3	542.97	549.7	549.7	550.75	0.006181	9.86	987.26	316.95	0.77
1473	245.2894	100 Year Flood	5730.6	542.97	549.74	549.74	551.29	0.009004	11.97	1002.2	317.38	0.93
1473	245.2894	500 Year Flood	9400.4	542.97	551	551	553.07	0.009764	14.4	1407.7	328.43	1
Reach1	125.912	2 Year Flood	826.9	541.54	545.24	545.24	545.91	0.007668	7.68	260.03	220.48	0.78
Reach1	125.912	5 Year Flood	1646.5	541.54	546.07	546.07	546.96	0.008845	9.72	464.77	265.98	0.87
Reach1	125.912	10 Year Flood	2445.6	541.54	546.68	546.68	547.69	0.009214	10.94	632.07	281.39	0.92
Reach1	125.912	25 Year Flood	3672.7	541.54	547.37	547.37	548.61	0.010301	12.73	832.98	301.82	0.99
Reach1	125.912	50 Year Flood	4656.3	541.54	547.87	547.87	549.23	0.010605	13.74	985.03	308.79	1.02
Reach1	125.912	100 Year Flood	5730.6	541.54	548.3	548.3	549.83	0.011319	14.91	1117.99	313.93	1.07
Reach1	125.912	500 Year Flood	9400.4	541.54	549.55	549.55	551.58	0.012769	17.95	1521.31	328.25	1.17
Reach1	41.42999	2 Year Flood	826.9	538.74	541.06	541.06	541.95	0.014523	7.57	110.78	64.95	0.99
Reach1	41.42999	5 Year Flood	1646.5	538.74	542.11	542.11	543.49	0.012236	9.45	183.09	71.53	0.98
Reach1	41.42999	10 Year Flood	2445.6	538.74	542.97	542.97	544.73	0.011154	10.73	245.89	75.68	0.98
Reach1	41.42999	25 Year Flood	3672.7	538.74	544.09	544.09	546.36	0.010251	12.26	333.87	126.46	0.98
Reach1	41.42999	50 Year Flood	4656.3	538.74	544.9	544.9	547.53	0.009712	13.23	401.58	153.05	0.98
Reach1	41.42999	100 Year Flood	5730.6	538.74	546.15	546.15	548.34	0.00659	12.46	713.91	220.02	0.84
Reach1	41.42999	500 Year Flood	9400.4	538.74	548.09	548.09	550.78	0.00638	14.47	1169.23	255.22	0.86

APPENDIX F
Geotechnical Memorandum

McTaggart's Pond Dam Seepage and Stability Evaluation

TO: Dan Buttrick
FROM: Dan Gnatek
COPY: File
DATE: November 4, 2019

This technical memorandum presents the results of the subsurface exploration program and seepage and stability analyses performed on a section of McTaggart's Pond Dam in Fitchburg, Massachusetts. A Site Locus is presented as Figure 1 of Appendix A. Elevations presented in this memorandum reference the North American Vertical Datum of 1988 (NAVD88). The existing conditions described in this memorandum are based on an Existing Conditions Plan prepared by Sherman & Frydryk, LLC, dated August 7, 2019. No bathymetric survey was performed as part of this scope.

Common terms used in this memorandum when discussing the orientation of the dam are defined as follows:

- Upstream – the side of the dam that borders the impoundment
- Downstream – the high side of the dam (i.e. the side opposite the upstream side)
- Right – the area to the right when facing the downstream direction
- Left – the area to the left when facing the downstream direction

Site Conditions

Existing – McTaggart's Pond Dam is an Intermediate-size, Significant-hazard dam rated in Poor condition based on the Office of Dam Safety's rating guidelines. The dam is an approximately 430-foot-long earth and concrete/stone-masonry embankment dam with a primary spillway and a low-level outlet structure. The embankment crest is approximately 20 feet wide with an approximately 150-foot-long concrete retaining wall at the downstream edge of the crest to the right of the gatehouse structure. The wall has a maximum height of approximately 16 feet. Previous inspections have identified areas of active seepage downstream of this wall. Historical drawings of the dam are included in Appendix B.

Subsurface Conditions

The generalized subsurface conditions described in the text below summarize trends observed in the explorations. The boundaries between soil strata are approximate and are based on interpretations of widely spaced explorations and samples. Actual conditions could be more variable.

Test Borings – Three geotechnical test borings (B-1 through B-3) were drilled by Seaboard Drilling, Inc. of Chicopee, Massachusetts on November 7 and 8, 2018. An additional boring (B-3A) was drilled by Seaboard Drilling, Inc. on March 18, 2019. The borings were drilled along a cross-section through the dam embankment near the maximum section, just right

of the spillway. Boring B-1 was drilled on the upstream side of the dam crest, boring B-2 was drilled on the downstream side of the dam crest, and borings B-3 and B-3A were drilled at the downstream toe of the dam. Test borings were advanced with 4-inch-inner-diameter flush-joint casing, using drive-and-wash methods to depths of between 7.5 and 17.5 feet below the existing ground surface. Split-spoon sampling and Standard Penetration Tests (SPTs) were conducted continuously through the dam embankment and existing fill soils at the toe of the dam. Test borings were terminated upon casing refusal, except for boring B-1, which was terminated within the embankment fill at a depth of 15 feet. A 5-foot rock core was obtained in test boring B-3A in accordance with ASTM D2113 using an NX-sized double-wall core barrel. Rock core recovery and rock quality designation (RQD) were logged for the core run, and recovered soil and rock samples were visually classified in the field.

Groundwater monitoring wells were installed in test borings B-1 and B-2 upon completion of drilling. The monitoring wells were constructed using a 10-foot-long section of 2-inch-diameter Schedule 40 PVC slotted screen below sections of PVC riser pipe of varying lengths. The annulus between the borehole and the PVC pipe was backfilled with filter sand to a height of approximately 2 feet above the top of the screened section, and an approximately 2-foot-thick bentonite seal was installed above the filter sand. The remaining annulus was grouted via tremie methods to grade to limit surface water from infiltrating the well. Protective steel flush-mounted well caps were installed at each well location. Groundwater elevation readings were taken periodically during the explorations and additional readings were taken following the completion of drilling activities. A borehole permeability test was attempted in boring B-2, but the embankment fill was deemed too permeable to provide reliable results. Test borings B-3 and B-3A were grouted via tremie methods upon completion of drilling.

Boring locations are shown on Figure 2, of Appendix A. Test boring logs are included in Appendix C.

Laboratory Testing – Laboratory tests were performed to aid in soil classifications and estimation of strength and permeability properties. Three mechanical Particle Size Analysis tests (ASTM D6913) were performed on samples taken during the explorations. Laboratory test results are included in Appendix D.

Summary of Subsurface Conditions – In general, subsurface conditions observed in the explorations performed within the dam embankment consisted of approximately 6 inches of topsoil, overlying approximately 18 feet of existing embankment fill, overlying bedrock. Subsurface conditions observed in the explorations performed at the downstream toe of the dam generally consisted of approximately 6 inches of topsoil, overlying approximately 5 to 7 feet of existing fill, overlying gneissic bedrock. Organic material (fibrous peat) was observed to be intermixed near the bottom of the existing fill stratum. Table 1 below presents the general stratigraphy encountered during the subsurface exploration program in descending depth from the ground surface.

Groundwater was encountered approximately 4.5 to 6.5 feet below the existing ground surface within the dam embankment, corresponding to elevations 631.5 to 633.5 feet. Groundwater was encountered approximately 2.5 feet below the existing ground surface at the downstream toe of the dam, corresponding to elevation 622.5 feet. Water levels can fluctuate with season, precipitation, and nearby construction or other below grade activities, such as excavation, dewatering, wells, infiltration basins, etc.

Table 1
Description of Subsurface Conditions Encountered

Strata (In Descending Depth)	General Description ¹
TOPSOIL	Loose, brown, fine to medium SAND and SILT, trace Gravel, trace Organic Matter
EMBANKMENT FILL	Loose to medium dense, brown, little to some Silt, trace to some Gravel, trace Brick, trace Cinders; varying to loose, brown, fine to coarse SAND and SILT, trace Gravel; varying to medium dense, brown, GRAVEL and fine to coarse SAND, some Silt; varying to very loose to very dense, GRAVEL, little to some fine to coarse Sand, trace to some Silt, trace Brick
FILL (at downstream toe)	Loose to medium dense, dark brown, fine to coarse SAND, little to some Silt, little to some Gravel; varying to medium, dark brown, SILT and GRAVEL, little fine to coarse Sand, little Fibrous Peat, trace Glass, trace Brick, trace Cinders; varying to very dense, dark brown, fine to coarse SAND, some Silt, little to some Gravel, little Fibrous Peat, trace Brick
BEDROCK	Hard to very hard, slight to very slightly weathered, moderately fractured to sound, grey/black, fine- to coarse-grained GNEISS, close to moderately close, shallow fractures
	REC ² = 56"/60" = 93.3%; RQD ³ = 46"/60" = 76.7%

¹ Definition of Soil Description Terms: "trace" = 0-10%, "little" = 10-20%, "some" = 20-35%, "and" = 35-50%, by weight

² Rock core recovery (REC) is defined as the length of all core pieces recovered divided by the total core run length.

³ Rock Quality Designation (RQD) is defined as the sum of all recovered sound rock pieces measuring 4 inches or more in length (for type NX, NQ, or PQ cores) divided by the total core run length. RQD is a relative indicator of rock quality

Seepage and Stability Analyses

The analyses and recommendations presented in this evaluation are based upon the data obtained from a limited number of subsurface explorations. Therefore, the nature and extent of variations of subsurface conditions may not become evident until commencement of corrective action (if recommended). If significant variations from these descriptions appear during construction, it will be necessary to re-evaluate these recommendations.

Development of Cross-Section for Seepage and Slope Stability – A cross-section was taken through the dam embankment at approximately the maximum section, just right of the spillway and near the recent subsurface explorations as shown on Figure 2 of Appendix A. The section geometry was developed based on the Existing Conditions Plan, historical record drawings for the dam, and information collected during the subsurface exploration program. Historical drawings, prepared by Howard Turner, dated Jan 31, 1956, which indicate that upstream and downstream walls bear on bedrock. The subsurface conditions observed in borings B-1 and B-2 (embankment fill over bedrock) support the bearing condition indicated on the historical drawings. The soil parameters used for the seepage and stability analyses are presented in Table 2 below.

Table 2
Soil Parameters for Seepage and Stability Analyses

Item	Total Unit Weight (PCF)	Cohesion (PSF)	Internal Friction Angle (Degrees)	Permeability (cm/s)
Vegetated Topsoil	105	100	28	3e-6
Fill	105	0	30	1e-5
Embankment Fill	120	0	32	1e-3
Stone Masonry	150	-	-	1e-7
Concrete	150	-	-	1e-10
Bedrock	165	-	-	1e-8
Sediment	110	0	30	3e-5

PCF = Pounds per Cubic Foot; PSF = Pounds per Square Foot

The material properties for soils were based on correlations with $(N_1)_{60}$ corrected blow counts presented in the California Department of Transportation (Caltrans) Geotechnical Manual, after Bowles (1977), typical properties of compacted fill presented in the Naval Facilities Engineering Command (NAVFAC) Design Manual 7.02 (1986), and engineering judgement. Bedrock, concrete, and stone masonry strength parameters were estimated using the Generalized Hoek-Brown method, which approximates the relationship between rock mass quality and material constants based on empirical data.

Seepage Analysis – A seepage analysis was performed near the maximum embankment section using the finite element groundwater capabilities of Slide 8.018 by Rocscience, Inc. The analysis was performed under two impoundment water surface conditions: normal storage pool elevation (635.3 feet) and maximum pool at the top dam elevation (638.9 feet). Soil permeability values were adjusted to generate a phreatic surface through the embankment that was in general agreement with the water surface observed in the groundwater monitoring wells.

Under the normal pool condition, the predicted phreatic surface (i.e. water table) generally flows horizontally through the dam embankment and drops steeply through the downstream retaining wall. This generally agrees with the groundwater measurements taken during the subsurface explorations and consistent with the relatively high permeability of the embankment soils. A more significant drop in the phreatic surface across the embankment would be observed if the embankment soils were less permeable and provided better seepage cutoff. Under the maximum pool condition, the predicted phreatic surface is similar to the normal pool condition, although higher in the embankment due to the increased impoundment level.

Exit gradients for the seepage model were predicted to be 0.2 and 0.3 for the normal pool and maximum pool conditions, respectively. Therefore, the potential for piping to occur is low, with factors of safety against piping of 3 and 2 for the normal pool and maximum pool conditions, respectively. Calculated discharge rates at Section A-A are generally small (approximately 1×10^{-6} gpm and 2×10^{-6} gpm per linear foot for the normal pool and maximum pool conditions, respectively) with the majority of the flow predicted through the bedrock layer.

Seepage cutoff appears to be adequate based on the results of the seepage analysis. However, areas of active seepage have been identified in past dam inspections, which may indicate specific defects that allow more seepage than is predicted. The above-referenced historical drawings indicate below-grade drain pipes penetrating through the downstream

retaining wall, which may be a contributing factor. Additionally, bedrock fractures may provide preferential seepage paths. If the downstream retaining wall is to remain and be buttressed, it is recommended that a chimney drain and blanket drain be installed to safely filter, collect, and discharge seepage flows.

Stability Analysis – A stability analysis was performed according to the requirements presented in Commonwealth of Massachusetts 302 CMR 10.00 Dam Safety, revised February 10, 2017. The guidelines provide minimum factors of safety for stability under specific loading conditions. The stability analyses were performed for the following conditions:

- **Steady State** – Assumes that the impoundment elevation (normal pool and maximum pool) remains constant for a sufficient period of time for seepage to reach equilibrium.
- **Rapid Drawdown** – Evaluates the stability of the dam if there is a rapid loss of water in the impoundment (normal pool and maximum pool) while leaving the upstream slope saturated. The rapid drawdown condition is a relative term that assumes that the impoundment will recede much quicker than the embankment soils can drain.
- **Earthquake** – Examines the stability of the dam during a seismic event. Maximum pool is not considered during this analysis as it is recognized that the probability of a flood and seismic event occurring at the same time is extremely low.

Slope stability software, Slide version 8.018, using the Spencer method, was used to analyze the conditions and determine the factor of safety against a global slope failure. The Spencer method is used to analyze slopes of varying geometries and is considered a rigorous method, as it satisfies both force and moment equilibrium.

Table 3 presents the results of our stability analysis and compares them to the minimum factors of safety (FOS) recommended by the DCR guidelines. Graphical output, illustrating the predicted failure planes, is included in Appendix E.

Table 3
Soil Parameters for Seepage and Stability Analyses

Condition	<u>Steady State Seepage</u>		<u>Rapid Drawdown</u>		<u>Earthquake</u>	
	Required FOS	Calculated FOS	Required FOS	Calculated FOS	Required FOS	Calculated FOS
Downstream Normal Pool	1.5	2.9	N/A	-	1.0	2.2
Downstream Max Pool	1.5	2.9	N/A	-	N/A	-
Upstream Normal Pool	1.5	3.2	1.2	2.3	1.0	2.8
Upstream Max Pool	1.5	4.5	1.1	2.1	N/A	-

Values in bold indicate the minimum FOS is not achieved. N/A = Not Applicable

The upstream and downstream slopes of the dam embankment are generally stable and meet the required factors of safety for the loading conditions required by 302 CMR 10.00 Dam Safety. The global minimum factors of safety for the downstream slope are along

shallow failure planes, and failure along these planes would likely result in minor sloughing. The deeper-seated failure circles have factors of safety of greater than 5.

It should be noted that the Slide software does not evaluate the structural stability of the retaining walls. If the upstream and/or downstream retaining walls are to be re-used or re-purposed as part of the dam rehabilitation, it is recommended that they be evaluated by a Structural Engineer for stability with respect to sliding and overturning.

J:\F\F0079 Fitchburg\047 McTaggart's Pond Dam\Geotechnical\Report\Text\F-0079-047_Seepage and Stability.doc

Appendix A

Figures

Latitude: 42.579532
Longitude: -71.841711

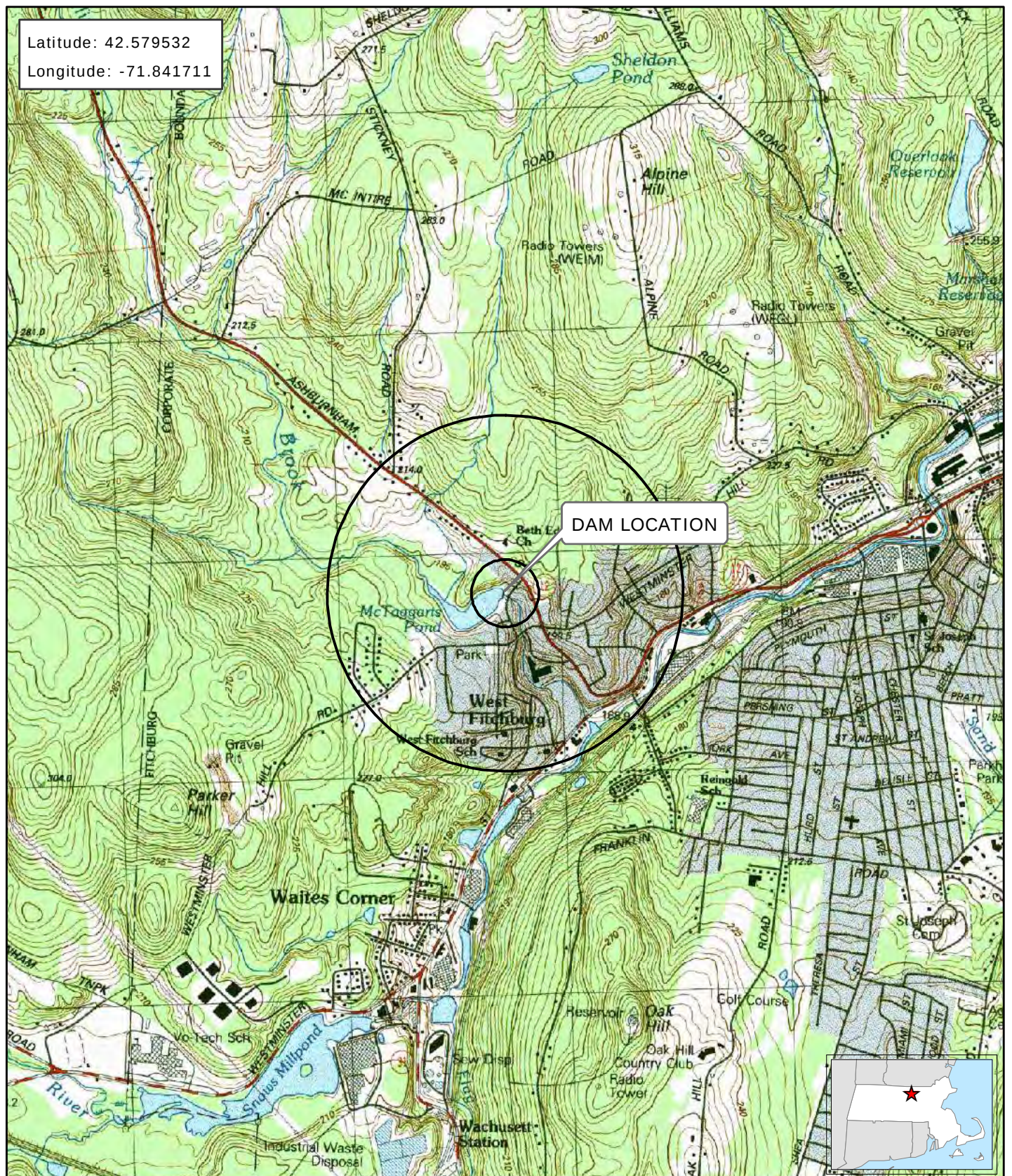


FIGURE 1
SITE LOCUS &
DOWNSTREAM AREA MAP

McTaggart's Pond Dam
MA00879
Fitchburg, Massachusetts

March 2019

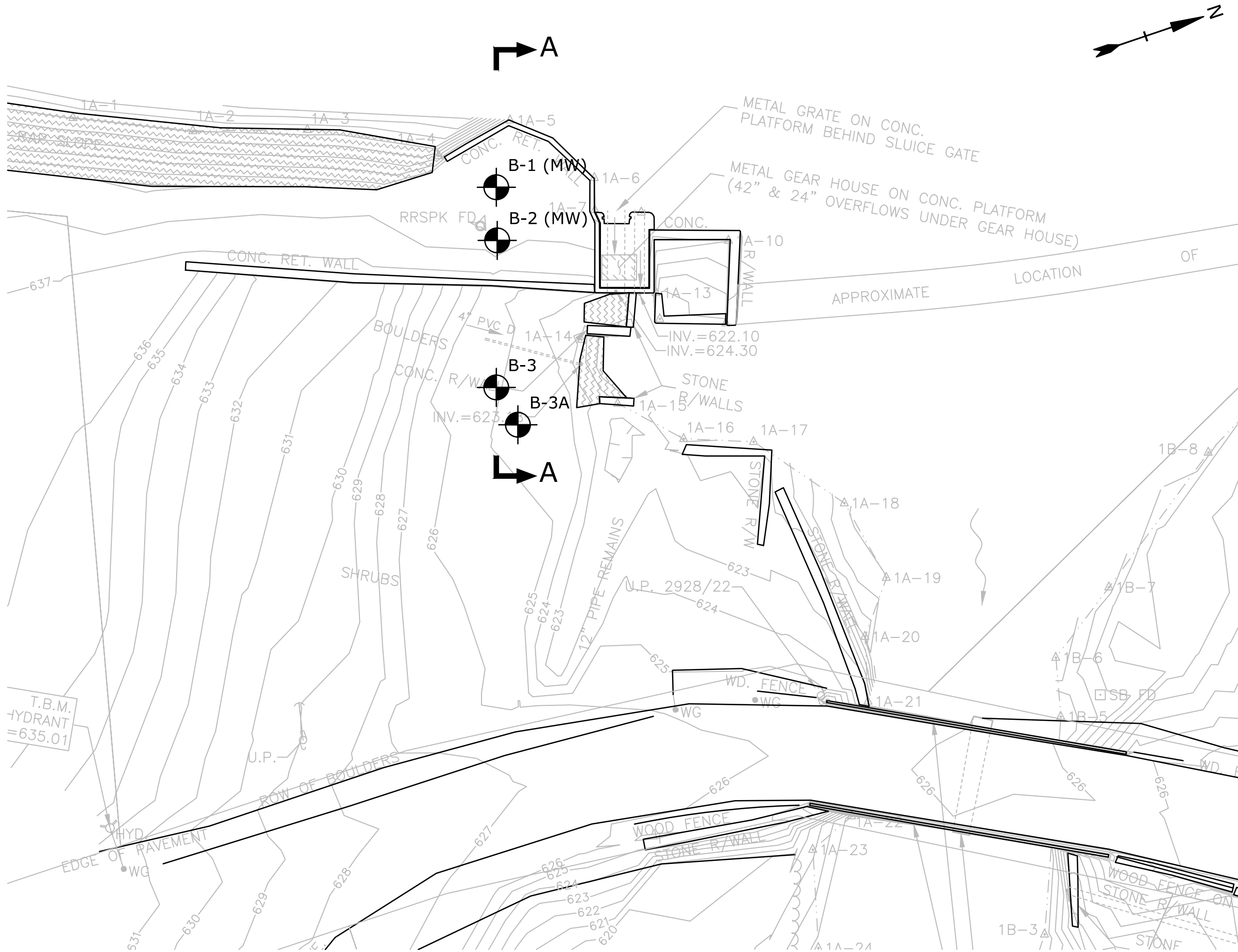
Tighe & Bond
Engineers | Environmental Specialists

Image provided by MassGIS based
on USGS Topographic Map for
Fitchburg, MA, Revised 1988.
Circles indicate 500-foot & half-mile radii
Contour Interval: 3 Meters

1:24,000
0 1,000 2,000
Feet



Mar 21, 2019 4:18pm Plotted By: dgnatek
Tighe & Bond, Inc. F:\Projects\F0079 Fitchburg\047 McTaggart's Pond Dam\Drawings_Figures\AutoCAD\Geotechnical\F-0079-047-B-BLP.dwg

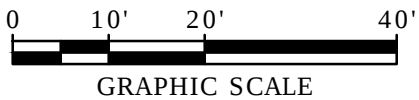


GENERAL NOTES:

1. ELEVATIONS SHOWN HEREIN REFERENCE THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
2. BORING LOCATIONS LAID OUT BY TIGHE & BOND REPRESENTATIVES BY MEASURING OFF EXISTING FEATURES. LOCATIONS SHOULD BE CONSIDERED APPROXIMATE.
3. BORINGS DRILLED BY SEABOARD DRILLING, INC. OF CHICOPEE, MA ON NOVEMBER 7 AND 8, 2018. BORINGS WERE ADVANCED USING FLUSH-JOINT CASING USING DRIVE-AND-WASH METHODS.
4. DISTURBED SOIL SAMPLES WERE OBTAINED USING A STANDARD SPLIT-SPOON SAMPLER ADVANCED BY A 140-POUND HAMMER FREE FALLING FROM A HEIGHT OF 30 INCHES.
5. REFER TO BORING LOGS FOR DETAILED INFORMATION.

LEGEND:

- B-#
- APPROXIMATE BORING LOCATION
- (MW) DENOTES MONITORING WELL



**MCTAGGART'S POND DAM
FITCHBURG, MA**

SUBSURFACE EXPLORATION PLAN

DATE: 02/07/2019

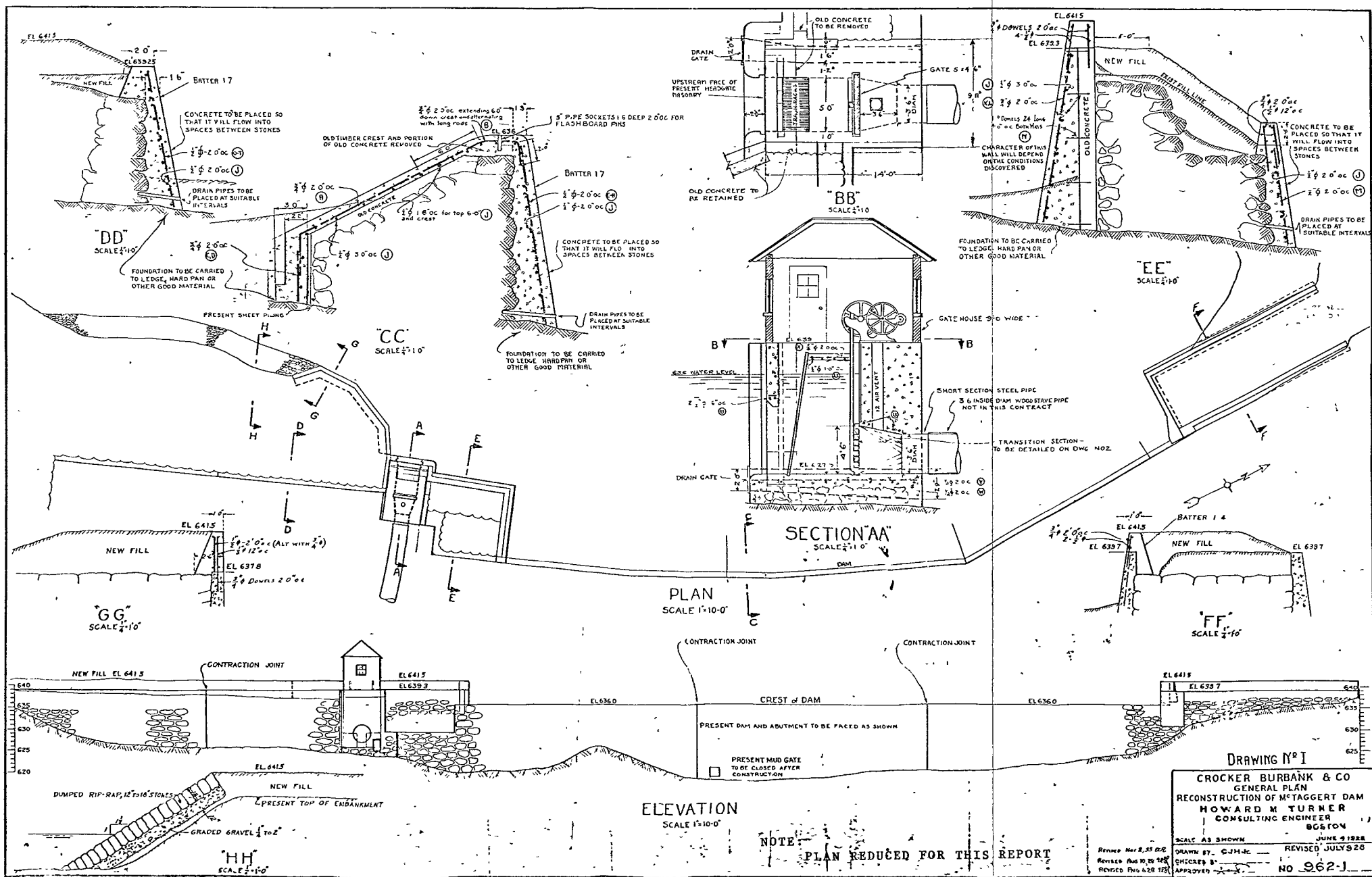
SCALE: 1" = 20'

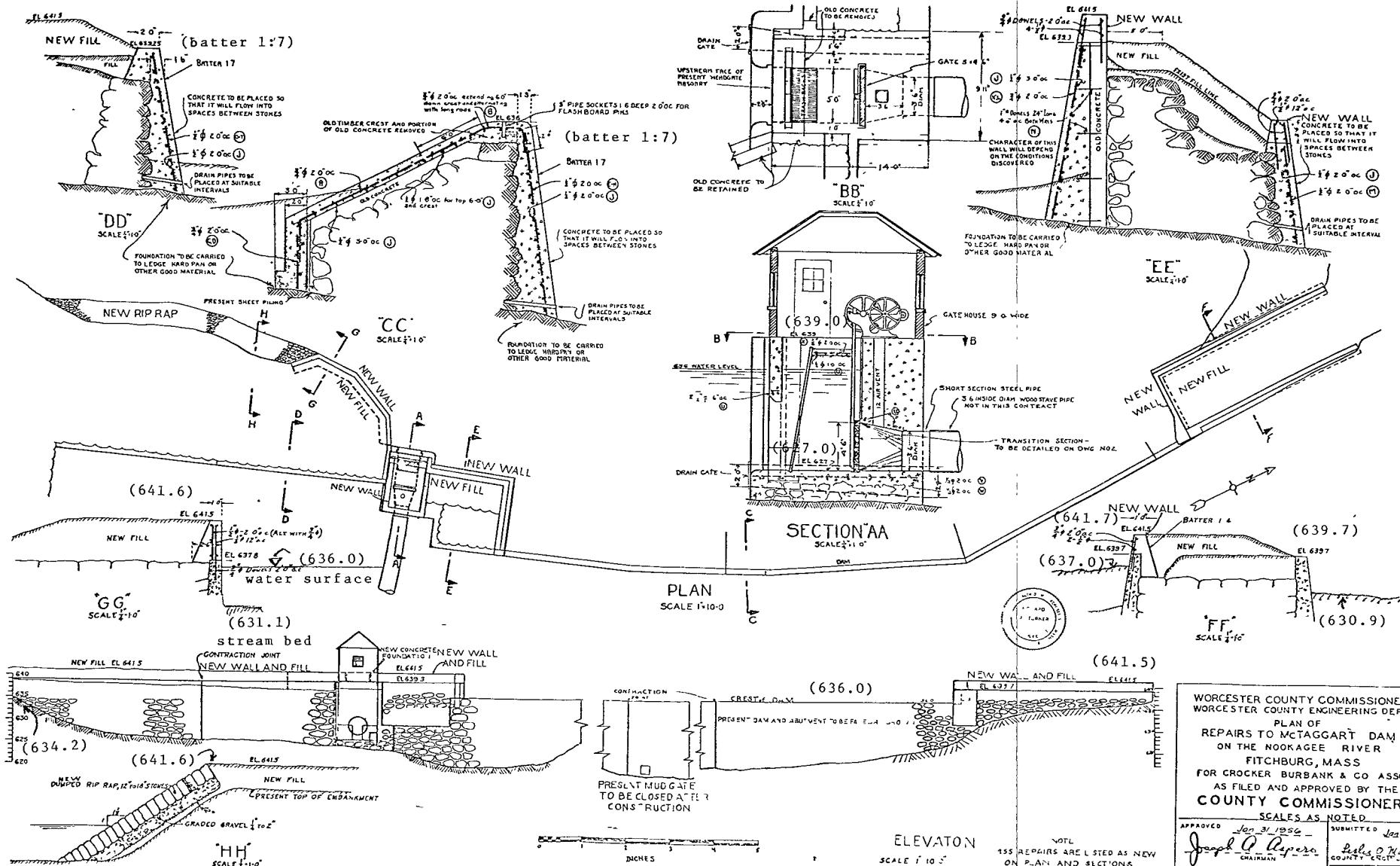
FIGURE 2

Tighe&Bond
Engineers | Environmental Specialists

Appendix B

Historical Drawings





WORCESTER COUNTY COMMISSIONERS
 WORCESTER COUNTY ENGINEERING DEPT
 PLAN OF
 REPAIRS TO MCTAGGART DAM
 ON THE NOOKAGEE RIVER
 FITCHBURG, MASS
 FOR CROCKER BURBANK & CO ASSN
 AS FILED AND APPROVED BY THE
 COUNTY COMMISSIONERS
 SCALES AS NOTED

APPROVED	SUBMITTED
Jan. 31, 1936	Jan. 31, 1936
Joseph P. Rapera CHAIRMAN	Robert O. Waterhouse COUNTY ENGINEER
Howard P. Turner ENGINEER	HOWARD TURNER
	DAM NO - 16-22

MCTAGGARTS POND DAM

FIGURE B-3

Appendix C

Exploration Logs

Project: McTaggart's Pond Dam
Location: Fitchburg, MA
Client: City of Fitchburg

Boring No. B-1 (OW)
Page 1 of 1
File No. F-0079-047
Checked by: D. Gnatek

Drilling Co. Seaboard Drilling, Inc.
Foreman: D. Feeley
T&B Rep.: M. Trovato
Date Start: 11/08/18 End: 11/08/18
Location See Exploration Location Plan
GS. Elev. 638± Datum: NAVD88

Casing Sampler
Type Flush Joint Split Spoon
I.D./O.D. 4"/4-1/2" 1-3/8"/2"
Hammer Wt. - 140#
Hammer Fall - 30"
Rig Make/Model Diedrich D50 w/ auto hmr

Table with 5 columns: Date, Time, Depth, Casing, Sta. Time. Data rows for 8-Nov and 23-Nov.

Main data table with 10 columns: Depth (ft.), Casing Blows Per Ft., Sample No. Rec.(in), Sample Depth (ft.), Blows Per 6", PID Reading (ppm), Sample Description, General Stratigraphy, Notes, Well Construction. Includes data for 0-15 feet depth and a note 'no refusal to 623''.

Notes: 1. Groundwater monitoring well installed at the completion of drilling.
Proportions Used: TRACE (TR.) 0 - <10%, LITTLE (LI.) 10 - <20%, SOME (SO.) 20 - <35%, AND 35 - <50%
Density/Consistency: VERY LOOSE 0-4, LOOSE 4-10, MEDIUM DENSE 10-30, DENSE 30-50, VERY DENSE >50, VERY SOFT <2, SOFT 2-4, MEDIUM 4-8, STIFF 8-15, VERY STIFF 15-30, HARD >30

Project: McTaggart's Pond Dam
Location: Fitchburg, MA
Client: City of Fitchburg

Boring No. B-2 (OW)
Page 1 of 1
File No. F-0079-047
Checked by: D. Gnatek

Drilling Co. Seaboard Drilling, Inc.

Foreman: D. Feeley

T&B Rep.: M. Trovato

Date Start: 11/08/18 End: 11/08/18

Location See Exploration Location Plan

GS. Elev. 638± Datum: NAVD88

	Casing	Sampler
Type	Flush Joint	Split Spoon
I.D./O.D.	4"/4-1/2"	1-3/8"/2"
Hammer Wt.	-	140#
Hammer Fall	-	30"
Rig Make/Model	Diedrich D50 w/ auto hmr	

Groundwater Readings

Date	Time	Depth	Casing	Sta. Time
8-Nov	14:10	6.5'		0 hrs
23-Nov	8:10	12.74'		2 wks

Depth (ft.)	Casing Blows Per Ft.	Sample No. Rec.(in)	Sample Depth (ft.)	Blows Per 6"	PID Reading (ppm)	Sample Description	General Stratigraphy	Notes	Well Construction		
5		S-1 / 20	0-2	2-3		Loose, light brown, fine to coarse SAND, little Silt, trace Gravel	0.5' TOPSOIL		Road		Box
				5-7							
		S-2 / 14	2-4	6-5		Medium dense, brown, fine to coarse SAND, little Silt, little Gravel, trace Cinders, trace Brick			Grout		
				6-4							
		S-3 / 10	4-6	4-4		Loose, brown, fine to coarse SAND, some Gravel, little Silt			Bentonite	2" PVC Riser	4.5'
10		S-4 / 3	6-8	4-5		Medium dense, brown, fine to coarse SAND and GRAVEL, some Silt	EMBANKMENT FILL				6.5'
				7-5							7.5'
		S-5 / 3	8-10	4-2		Loose, brown, GRAVEL, little fine to coarse Sand, trace Silt					
				3-3							
		S-6 / 9	10-10.8	23-50/4		Very dense, brown, GRAVEL, some fine to coarse Sand, little Silt, trace Brick					
15											
		S-7 / 0	13-13.1	50/1		No Recovery		1			
								2			
20											
25											
30											
						End of boring at 17.5' due to casing refusal		3			17.5'

Notes:
1. Boulder encountered from approximately 13-13.5'.
2. Boulder encountered from approximately 15-17.5'.
3. Groundwater monitoring well installed at the completion of drilling.

Proportions Used

TRACE (TR.)	0 - <10%
LITTLE (LI.)	10 - <20%
SOME (SO.)	20 - <35%
AND	35 - <50%

Density/Consistency

VERY LOOSE	0-4	VERY SOFT	<2
LOOSE	4-10	SOFT	2-4
MEDIUM DENSE	10-30	MEDIUM	4-8
DENSE	30-50	STIFF	8-15
VERY DENSE	>50	VERY STIFF	15-30
		HARD	>30

Project: McTaggart's Pond Dam
Location: Fitchburg, MA
Client: City of Fitchburg

Boring No. B-3
Page 1 of 1
File No. F-0079-047
Checked by: D. Gnatek

Drilling Co. Seaboard Drilling, Inc.
Foreman: D. Feeley
T&B Rep.: M. Trovato
Date Start: 11/07/18 End: 11/08/18
Location See Exploration Location Plan
GS. Elev. 625± Datum: NAVD88

Casing Sampler
Type Flush Joint Split Spoon
I.D./O.D. 4"/4-1/2" 1-3/8"/2"
Hammer Wt. - 140#
Hammer Fall - 30"
Rig Make/Model Diedrich D50 w/ auto hmr

Groundwater Readings table with columns: Date, Time, Depth, Casing, Sta. Time. Row 1: 7-Nov, 14:00, 2.6', End of Boring.

Main data table with columns: Depth (ft.), Casing Blows Per Ft., Sample No./Rec.(in), Sample Depth (ft.), Blows Per 6", PID Reading (ppm), Sample Description, General Stratigraphy, Notes, Well Construction. Includes sample data for S-1, S-2, S-3, S-4 and notes on casing refusal and potential rock.

Summary and Notes section. Includes 'Notes' (Borehole grouted at completion), 'Proportions Used' table, and 'Density/Consistency' table.

Project: McTaggart's Pond Dam
Location: Fitchburg, MA
Client: City of Fitchburg

Boring No. B-3A
Page 1 of 1
File No. F-0079-047
Checked by: D. Gnatek

Drilling Co. Seaboard Drilling, Inc.
Foreman: D. Feeley
T&B Rep.: M. Trovato
Date Start: 03/18/19 End: 03/18/19
Location See Exploration Location Plan
GS. Elev. 625± Datum: NAVD88

Casing Sampler
Type Flush Joint Split Spoon
I.D./O.D. 4"/4-1/2" 1-3/8"/2"
Hammer Wt. - 140#
Hammer Fall - 30"
Rig Make/Model Diedrich D50 w/ auto hmr

Table with 5 columns: Date, Time, Depth, Casing, Sta. Time. Row 1: 3-Mar, 9:45, 2.4', End of Boring.

Main data table with 10 columns: Depth (ft.), Casing Blows Per Ft., Sample No./Rec.(in), Sample Depth (ft.), Blows Per 6", PID Reading (ppm), Sample Description, General Stratigraphy, Notes, Well Construction. Includes data for TOPSOIL, FILL, and GNEISS layers.

Notes: 1. Petroleum-like odor observed from 2-4'. 2. Fracture observed from approximaely 6-6.4'. 3. Borehole grouted at the completion of drilling.

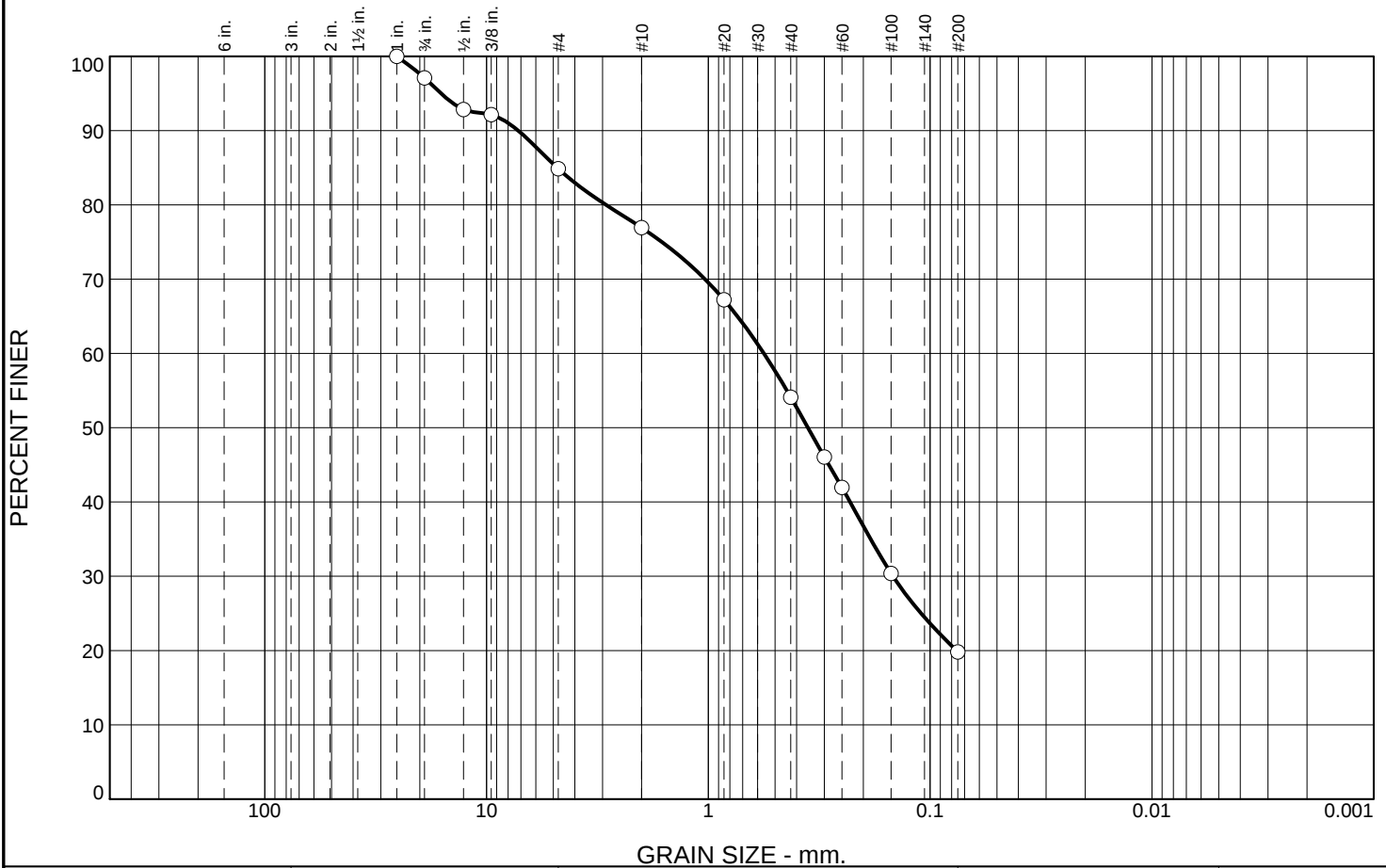
Proportions Used: TRACE (TR.) 0 - <10%, LITTLE (LI.) 10 - <20%, SOME (SO.) 20 - <35%, AND 35 - <50%

Density/Consistency: VERY LOOSE 0-4, LOOSE 4-10, MEDIUM DENSE 10-30, DENSE 30-50, VERY DENSE >50, VERY SOFT <2, SOFT 2-4, MEDIUM 4-8, STIFF 8-15, VERY STIFF 15-30, HARD >30

Appendix D

Laboratory Test Results

Particle Size Distribution Report



% +3"	% Gravel	% Sand	% Silt	% Clay
0.0	15.1	65.1	19.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100.0		
3/4"	97.1		
1/2"	92.8		
3/8"	92.1		
#4	84.9		
#10	76.9		
#20	67.2		
#40	54.1		
#50	46.1		
#60	42.0		
#100	30.4		
#200	19.8		

* (no specification provided)

Material Description

Dark brown silty sand little gravel

Atterberg Limits

PL= NP

LL= NV

PI= NP

Coefficients

D₈₅= 4.8020

D₆₀= 0.5618

D₅₀= 0.3557

D₃₀= 0.1471

D₁₅=

D₁₀=

C_u=

C_c=

Classification

USCS= SM

AASHTO= A-2-4(0)

Remarks

Boring jar sample submitted by client on 02/25/19

Sample No.: L-26858

Source of Sample: McTaggarts Pond Dam - Fitchburg MA

Date: 02/26/19

Location: B-1 S-2

Elev./Depth: 2'- 4'

**YANKEE ENGINEERING
& TESTING, INC.**

Client: Tighe & Bond Consulting Engineers

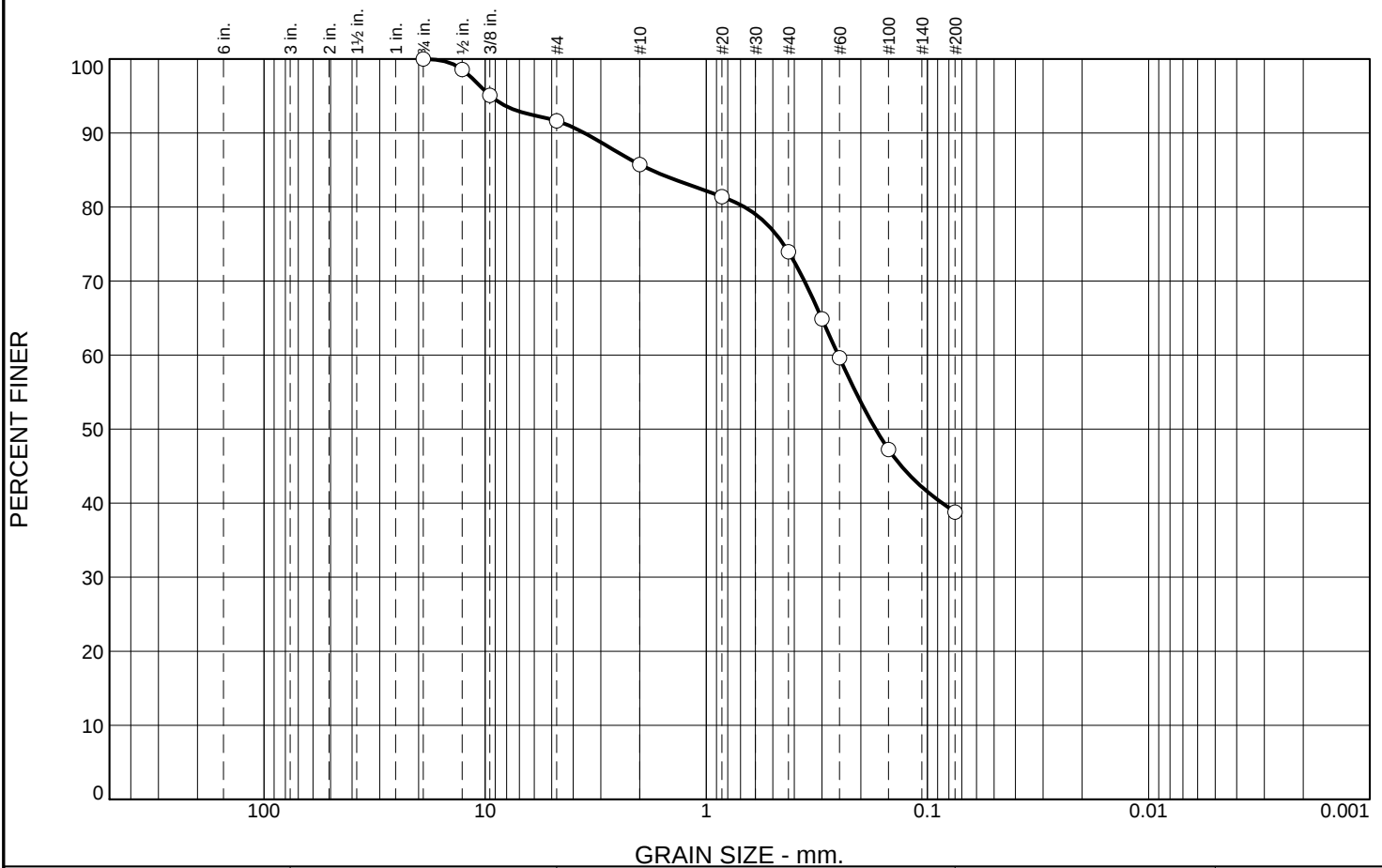
Project: Tighe & Bond - Various Sites
Worcester MA Office

Project No: 92047A

Tested By: AK/AH

Checked By: WJP

Particle Size Distribution Report



% +3"	% Gravel	% Sand	% Silt	% Clay
0.0	8.4	52.8	38.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4"	100.0		
1/2"	98.6		
3/8"	95.1		
#4	91.6		
#10	85.7		
#20	81.4		
#40	74.0		
#50	64.9		
#60	59.6		
#100	47.3		
#200	38.8		

* (no specification provided)

Material Description

Brown silty sand trace gravel
fines appeared to be non-plastic

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D₈₅= 1.7729 D₆₀= 0.2532 D₅₀= 0.1716
D₃₀= D₁₅= D₁₀=
C_u= C_c=

Classification

USCS= SM AASHTO= A-4(0)

Remarks

Boring jar sample submitted by client on 02/25/19

Sample No.: L-26859

Location: B-1 S-5

Source of Sample: McTaggart Pond Dam - Fitchburg MA

Date: 02/26/19

Elev./Depth: 8'- 10'

**YANKEE ENGINEERING
& TESTING, INC.**

Client: Tighe & Bond Consulting Engineers

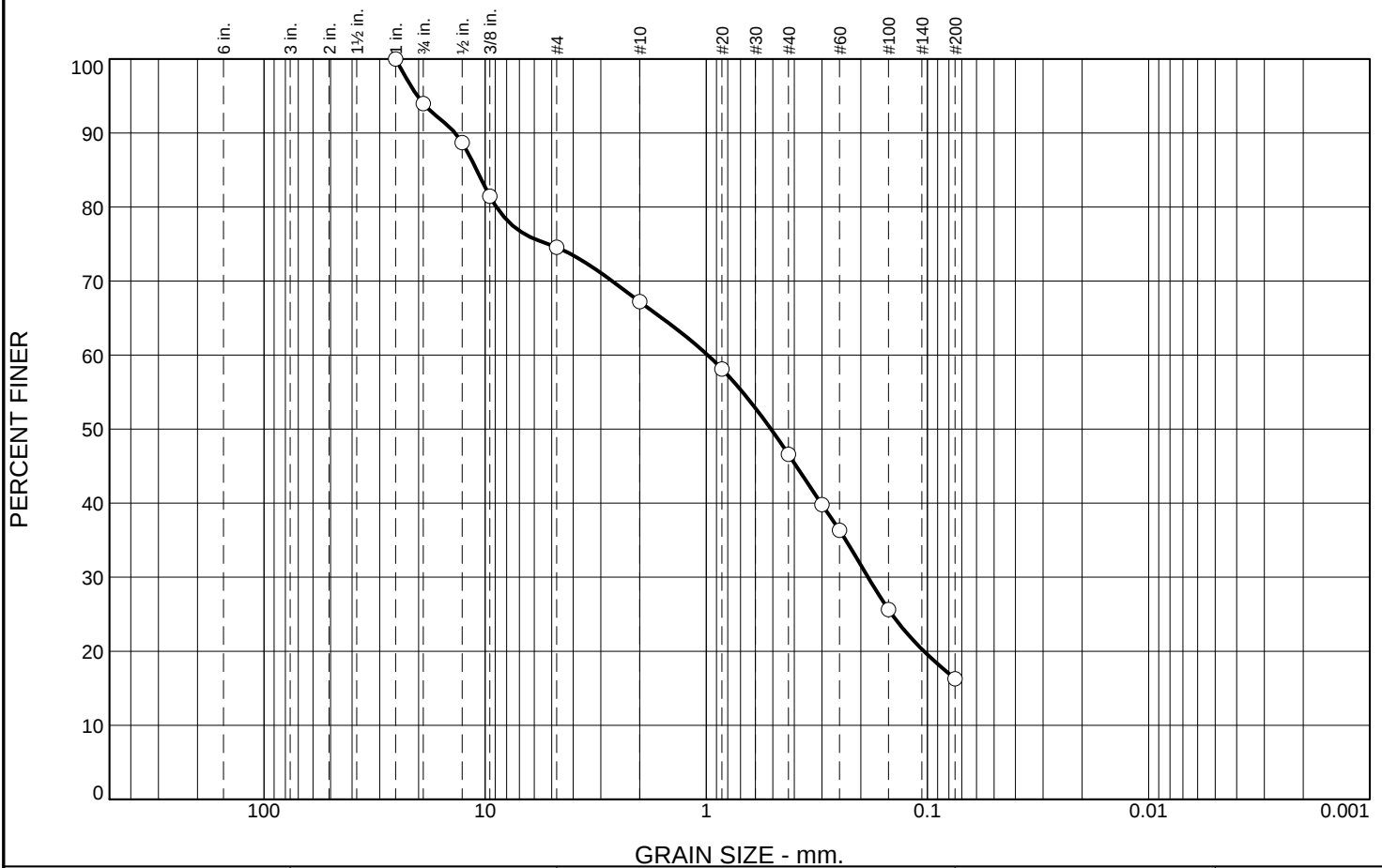
Project: Tighe & Bond - Various Sites
Worcester MA Office

Project No: 92047A

Tested By: AK/AH

Checked By: WJP

Particle Size Distribution Report



% +3"	% Gravel	% Sand	% Silt	% Clay
0.0	25.4	58.3	16.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100.0		
3/4"	94.0		
1/2"	88.7		
3/8"	81.5		
#4	74.6		
#10	67.2		
#20	58.1		
#40	46.6		
#50	39.8		
#60	36.3		
#100	25.6		
#200	16.3		

* (no specification provided)

Material Description

Brown silty sand some gravel

Atterberg Limits

PL= NP

LL= NV

PI= NP

Coefficients

D₈₅= 10.9237

D₆₀= 0.9856

D₅₀= 0.5098

D₃₀= 0.1857

D₁₅=

D₁₀=

C_u=

C_c=

Classification

USCS= SM

AASHTO= A-1-b

Remarks

Boring jar sample submitted by client on 02/25/19

Sample No.: L-26860

Location: B-2 S-3

Source of Sample: McTaggarts Pond Dam - Fitchburg MA

Date: 02/26/19

Elev./Depth: 4'- 6'

**YANKEE ENGINEERING
& TESTING, INC.**

Client: Tighe & Bond Consulting Engineers

Project: Tighe & Bond - Various Sites
Worcester MA Office

Project No: 92047A

Tested By: AK/AH

Checked By: WJP