

SKYLINE LANDFILL
ATTACHMENT C2
APPENDIX C2-C
POSTDEVELOPMENT HEC-RAS EVALUATION



Includes pages C2-C-1 through C2-C-61

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4/12/2012

TEN MILE CREEK 25-YEAR FLOOD STAGE ANALYSIS SUMMARY

HEC-RAS Cross Section	25-YEAR FLOW RATE (cfs)	25-YEAR WATER SURFACE (ft)	25-YEAR VELOCITY (fps)
2.269	25,033.43	417.00	7.67
2.183	25,025.74	416.68	3.47
2.104	25,097.97	416.32	4.79
2.050	25,096.91	416.00	5.50
2.006	25,095.24	415.75	5.58
1.966	25,092.90	415.37	6.25
1.919	25,093.38	414.85	6.05
1.873	25,071.87	414.30	6.80
1.768	25,070.42	413.65	5.54
1.725	25,140.83	413.22	6.01
1.609	25,170.25	411.57	6.90
1.522	25,165.50	410.92	4.24
1.441	25,134.41	410.00	7.98
1.389	25,130.21	409.31	7.68
1.350	25,122.76	409.15	4.68
1.267	25,118.50	408.67	6.08
1.222	25,113.05	408.37	5.74
1.180	25,064.35	408.19	4.40
1.114	25,063.40	407.97	4.30
0.990	25,062.64	407.45	4.70
0.947	25,068.31	407.15	5.43
0.927	25,066.37	406.58	8.79
0.883	25,062.21	406.30	5.33
0.772	25,140.13	405.23	5.40
0.734	25,139.22	404.77	6.26
0.462	25,111.08	403.10	3.28
0.381	25,184.35	402.80	4.27

TEN MILE CREEK 100-YEAR FLOOD STAGE ANALYSIS SUMMARY

HEC-RAS Cross Section	100-YEAR FLOW RATE (cfs)	100-YEAR WATER SURFACE (ft)	100-YEAR VELOCITY (fps)
2.269	33,597.52	418.09	8.11
2.183	33,595.84	417.71	4.12
2.104	33,692.13	417.29	5.46
2.050	33,689.23	416.94	6.15
2.006	33,685.72	416.67	6.15
1.966	33,681.47	416.26	6.75
1.919	33,660.75	415.77	6.20
1.873	33,659.70	415.25	7.12
1.768	33,656.27	414.62	5.84
1.725	33,750.88	414.20	6.27
1.609	33,788.27	412.63	7.17
1.522	33,782.18	411.98	4.65
1.441	33,743.45	411.10	8.23
1.389	33,740.04	410.40	8.15
1.350	33,790.07	410.21	5.19
1.267	33,735.55	409.76	6.22
1.222	33,733.22	409.47	5.91
1.180	33,729.80	409.29	4.74
1.114	33,722.92	409.05	4.75
0.990	33,713.00	408.52	5.01
0.947	33,718.09	408.24	5.58
0.927	33,697.21	407.61	9.91
0.883	33,695.19	407.28	5.86
0.772	33,822.39	406.14	5.98
0.734	33,819.63	405.70	6.62
0.462	33,787.94	404.07	3.90
0.381	33,882.88	403.77	4.56

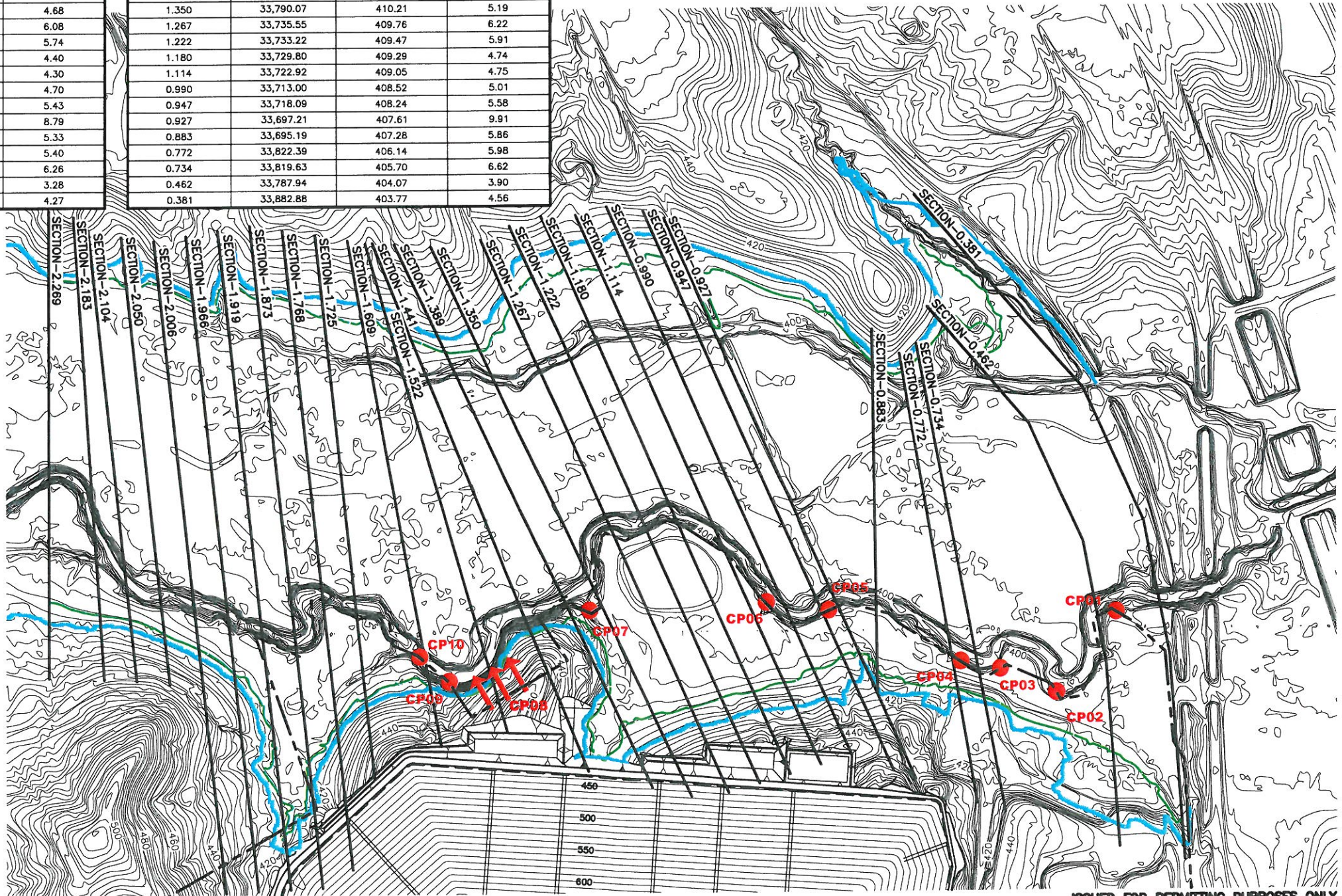


LEGEND

- PERMIT BOUNDARY
- LANDFILL FOOTPRINT
- EXISTING CONTOUR
- HEC-RAS CROSS SECTIONS
- STREAM
- FIRM 100-YEAR FLOODPLAIN
- BME 100-YEAR WATERSURFACE

NOTES:

1. EXISTING CONTOURS PROVIDED BY THE NORTH CENTRAL TEXAS COUNCIL OF GOVERNMENTS FROM AERIAL PHOTOGRAPHY CAPTURED BETWEEN JANUARY AND MARCH 2007. COORDINATE SYSTEM IS BASED ON TEXAS STATE PLANE, NORTH CENTRAL ZONE, NAD 83.
2. CONTOURS WITHIN THE WASTE DISPOSAL FOOTPRINT DEPICT POSTDEVELOPMENT FINAL CONTOURS.
3. SEE DRAWING C2-A-1 FOR PERMIT BOUNDARY LOCATION.



POSTDEVELOPED
FLOOD STAGE ANALYSIS SUMMARY
WASTE MANAGEMENT OF TEXAS, INC.
SKYLINE LANDFILL
MAJOR PERMIT AMENDMENT



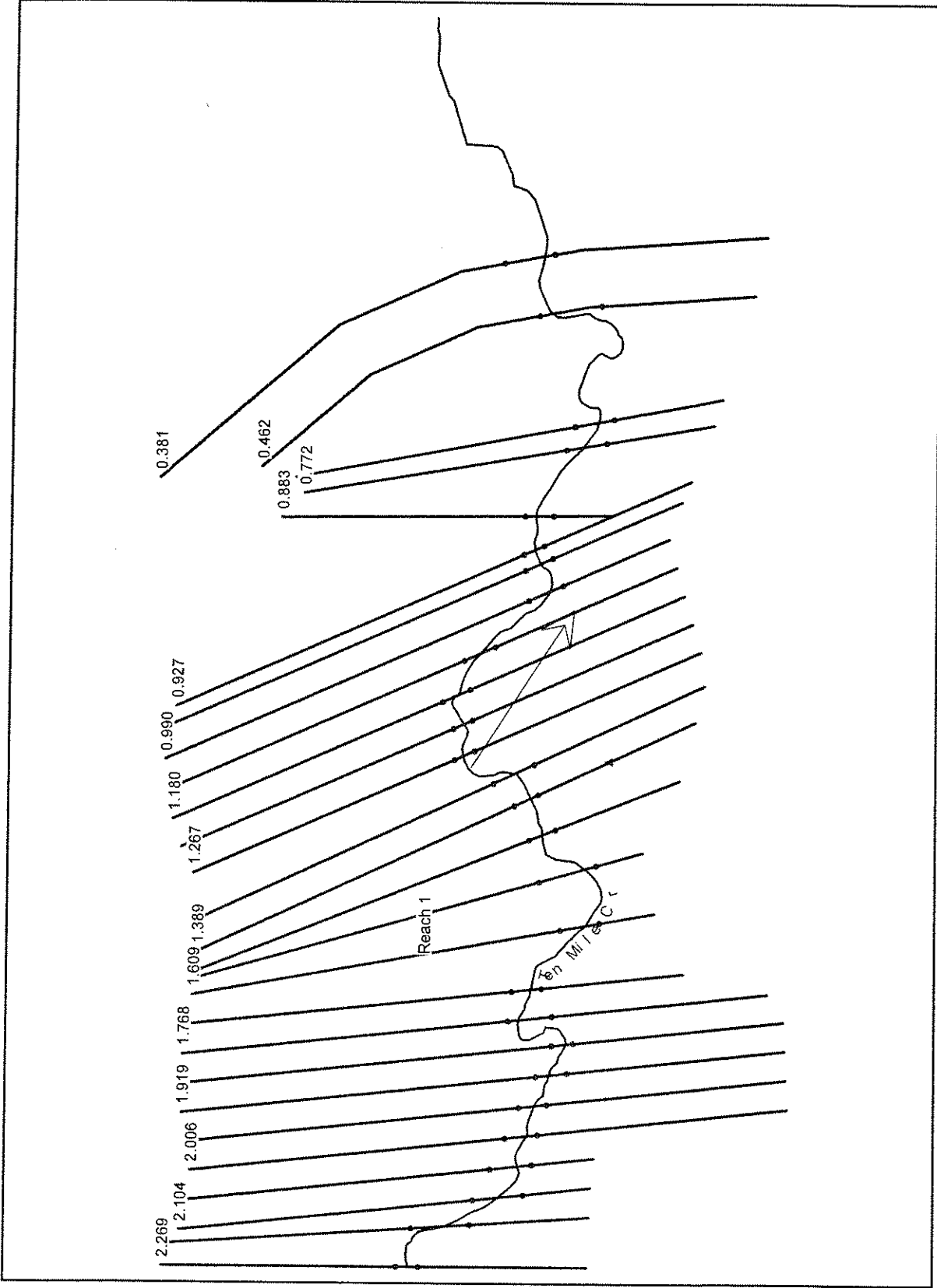
BIGGS & MATHEWS
ENVIRONMENTAL
CONSULTING ENGINEERS
MANSFIELD
DALLAS • WICHITA FALLS
817-563-1144

ISSUED FOR PERMITTING PURPOSES ONLY

REVISIONS						TBPE FIRM NO. F-256	TBPG FIRM NO. 50222
DSN.	FAW	DATE :	04/12			DRAWING	C2-C-1
DWN.	BBB	SCALE :	GRAPHIC				
CHK.	KJW	DWG :	C2_C_1.dwg				

J:\101\01\120\ATT\C2_C_1.dwg Layout: Layout1 User: bboles

POSTDEVELOPED HEC-RAS SCHEMATIC



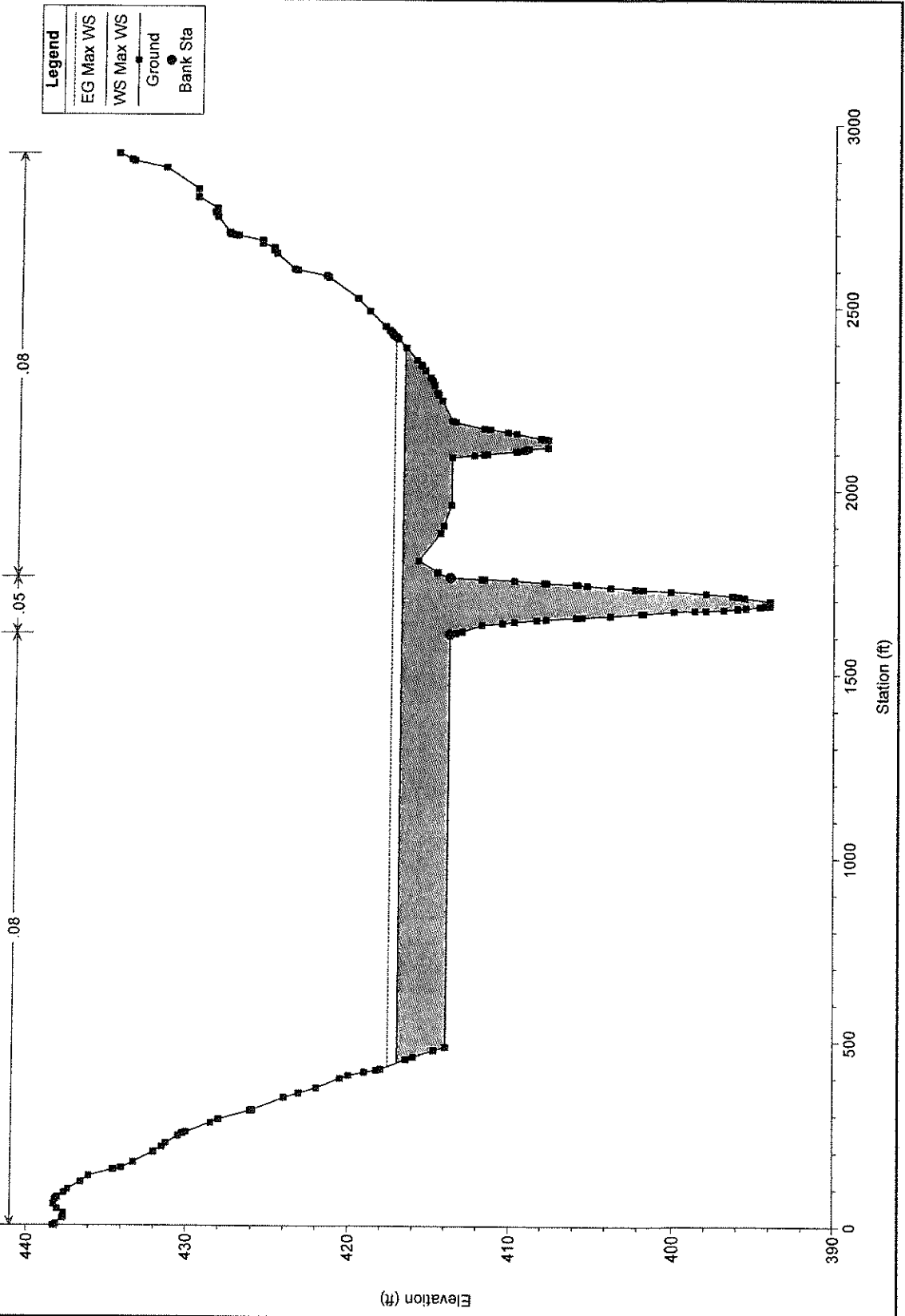
POSTDEVELOPED 25-YEAR HEC-RAS ANALYSIS

HEC-RAS Plan: 25 Year Post River: Ten Mile Cr Reach: Reach 1 Profile: Max WS

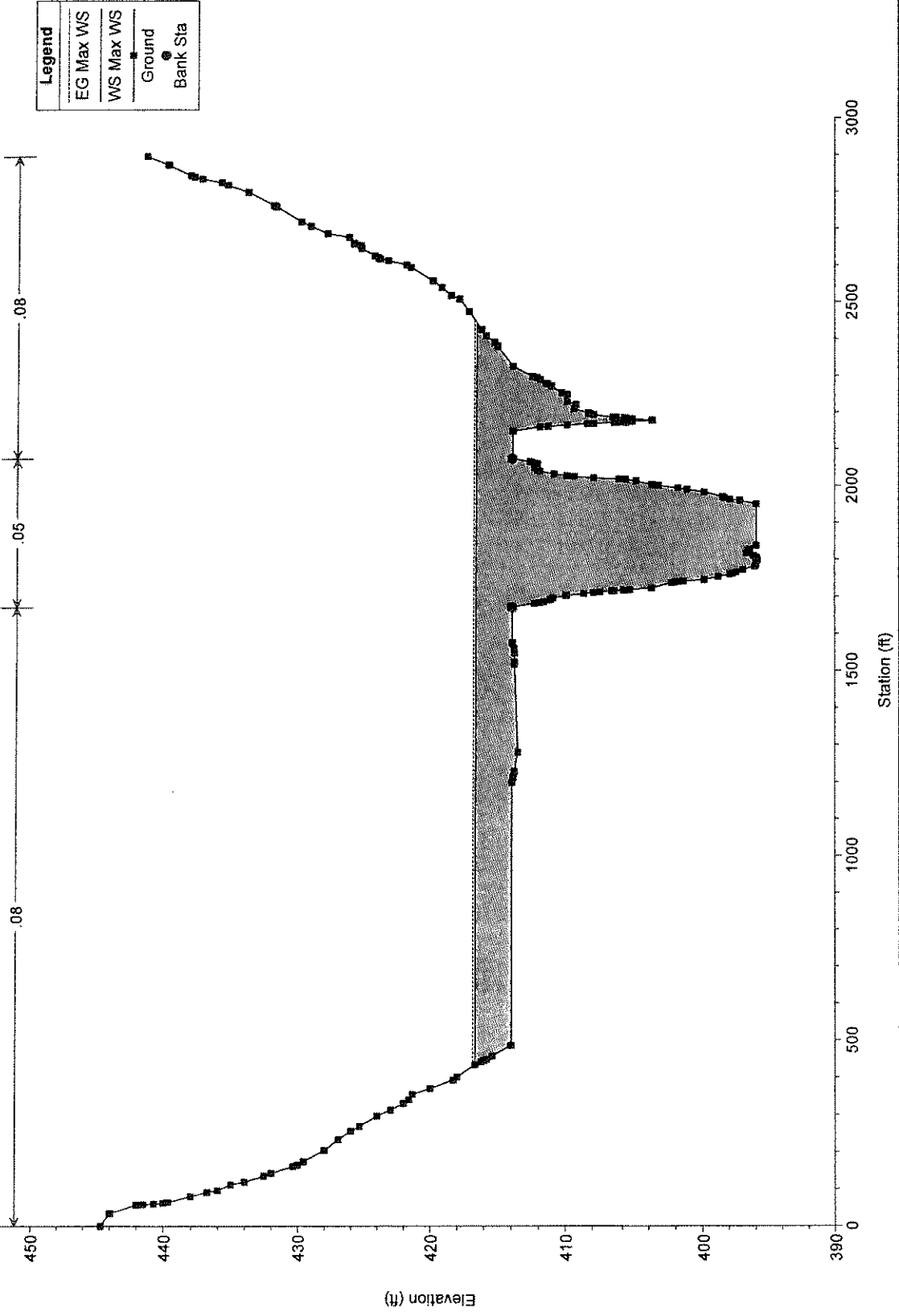
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach 1	2.259	Max WS	25033.43	394.00	417.00		417.59	0.002265	7.67	7271.27	1948.96	0.37
Reach 1	2.183	Max WS	25025.74	395.88	416.68		416.84	0.000362	3.47	10988.88	2009.45	0.16
Reach 1	2.104	Max WS	25097.97	396.00	416.32		416.61	0.000931	4.79	8622.93	2061.66	0.24
Reach 1	2.050	Max WS	25096.91	394.00	415.00		416.37	0.001301	5.50	8243.36	2142.32	0.28
Reach 1	2.005	Max WS	25096.24	394.00	415.75		416.05	0.001398	5.58	9310.96	2253.71	0.29
Reach 1	1.966	Max WS	25092.90	394.00	415.37		415.70	0.001983	6.25	8739.02	2293.98	0.34
Reach 1	1.919	Max WS	25093.38	394.00	414.85		415.13	0.002525	6.05	9014.53	2900.08	0.37
Reach 1	1.873	Max WS	25071.87	394.00	414.30		414.69	0.001892	6.80	8946.38	2755.59	0.34
Reach 1	1.768	Max WS	25070.42	392.00	413.65		413.94	0.002000	5.54	8811.77	2553.30	0.33
Reach 1	1.725	Max WS	25140.83	394.00	413.22		413.50	0.002245	6.01	8940.07	2385.73	0.35
Reach 1	1.609	Max WS	25170.25	394.00	411.57		412.06	0.003017	6.90	6997.06	2042.89	0.41
Reach 1	1.522	Max WS	25165.50	393.95	410.92		411.12	0.000977	4.24	10260.54	2262.12	0.24
Reach 1	1.441	Max WS	25134.41	392.00	410.00		410.67	0.002788	7.98	6670.39	1987.27	0.41
Reach 1	1.389	Max WS	25130.21	389.35	409.31		409.95	0.002523	7.68	6695.84	1898.22	0.39
Reach 1	1.350	Max WS	25122.76	388.00	409.15		409.41	0.000874	4.68	9818.65	2433.69	0.23
Reach 1	1.267	Max WS	25118.50	388.00	408.67		408.94	0.001889	6.08	10157.90	2646.20	0.31
Reach 1	1.222	Max WS	25113.05	388.00	408.37		408.61	0.001295	5.74	11185.20	2797.85	0.28
Reach 1	1.180	Max WS	25064.35	388.00	408.19		408.35	0.000700	4.40	13143.12	2831.86	0.21
Reach 1	1.114	Max WS	25063.40	388.00	407.97		408.15	0.000569	4.30	12858.68	2774.35	0.19
Reach 1	0.990	Max WS	25062.64	388.00	407.45		407.64	0.001072	4.70	11250.72	2690.86	0.25
Reach 1	0.947	Max WS	25068.31	388.00	407.15		407.37	0.001896	5.43	10245.20	2656.62	0.31
Reach 1	0.827	Max WS	25065.37	388.00	406.58		407.38	0.003254	8.79	5611.94	1976.79	0.44
Reach 1	0.883	Max WS	25062.21	388.00	406.30		406.51	0.001875	5.33	8924.66	1891.10	0.32
Reach 1	0.772	Max WS	25140.13	388.77	405.23		405.51	0.001670	5.40	8748.98	1987.37	0.31
Reach 1	0.734	Max WS	25139.22	388.00	404.77		405.12	0.003024	6.26	7719.69	2123.07	0.40
Reach 1	0.462	Max WS	25111.08	380.00	403.10		403.24	0.000331	3.26	12113.21	2888.91	0.15
Reach 1	0.381	Max WS	25184.35	360.00	402.80	396.85	402.97	0.001009	4.27	12018.90	3486.73	0.24

Ten Mile Creek Post Plan: 25-Year Post 10/25/2011

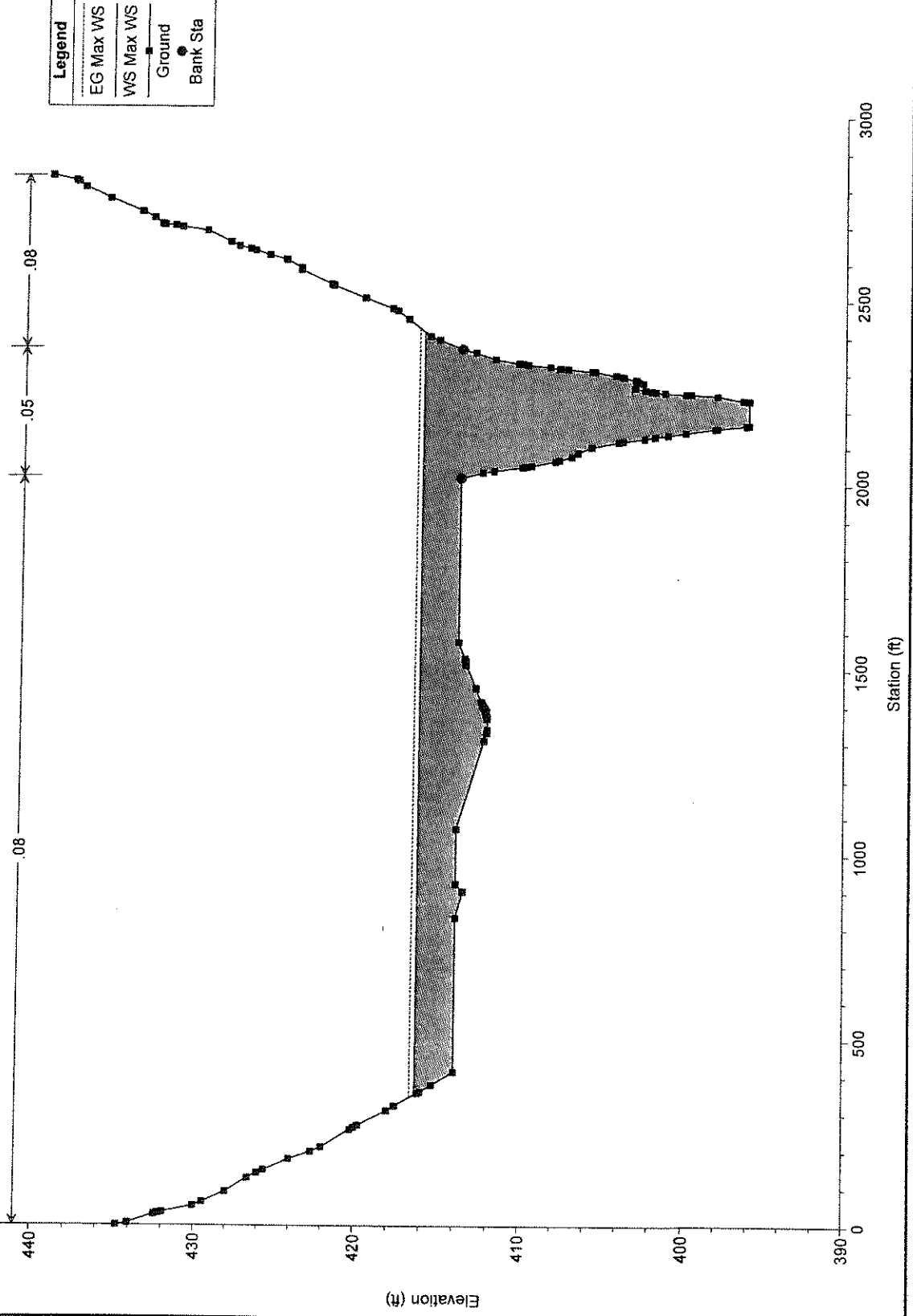
RS = 2.269 25-Year



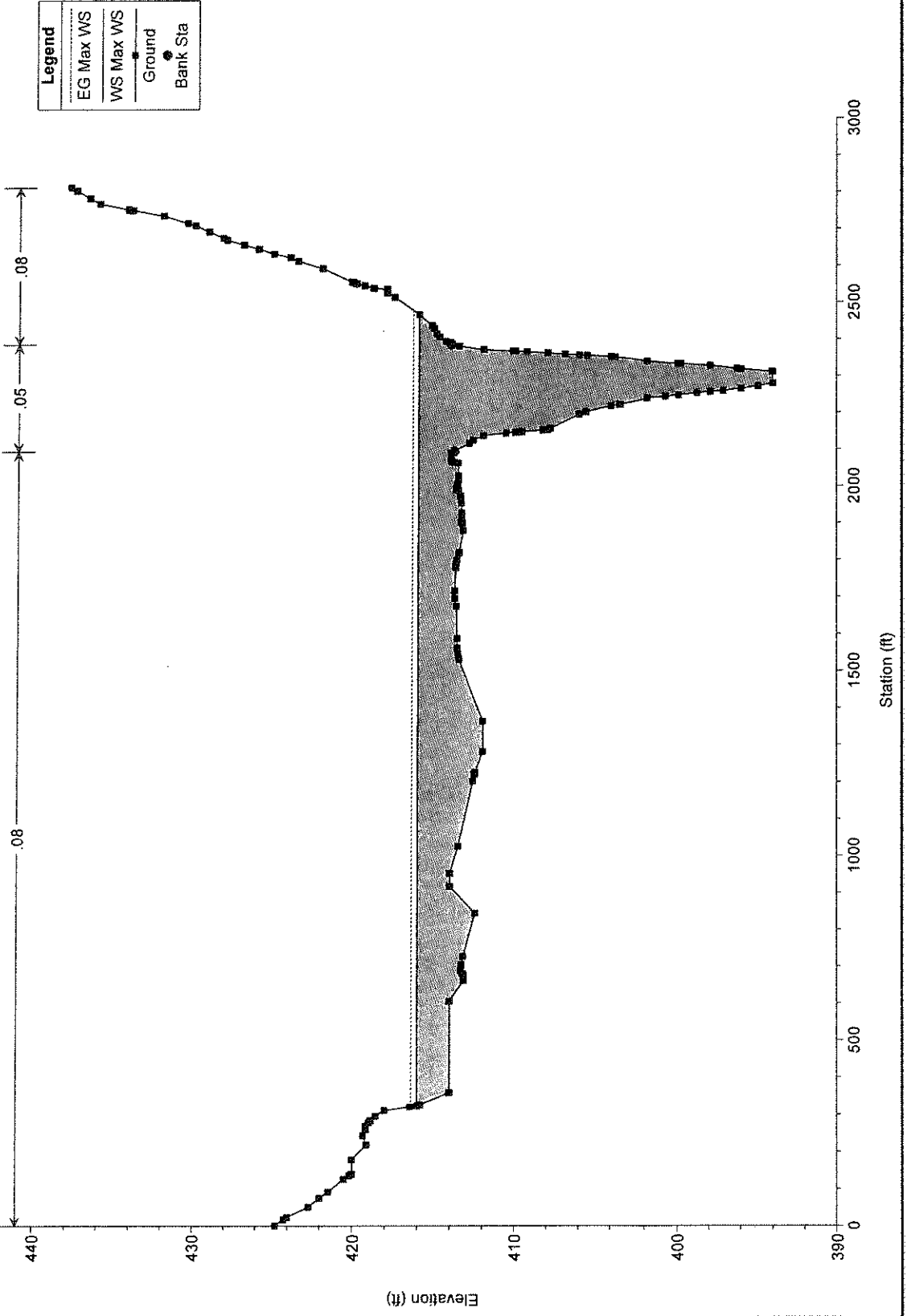
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RS = 2.183 25-Year



Ten Mile Creek Post Plan: 25-Year Post 10/25/2011
RS = 2.104 25-Year

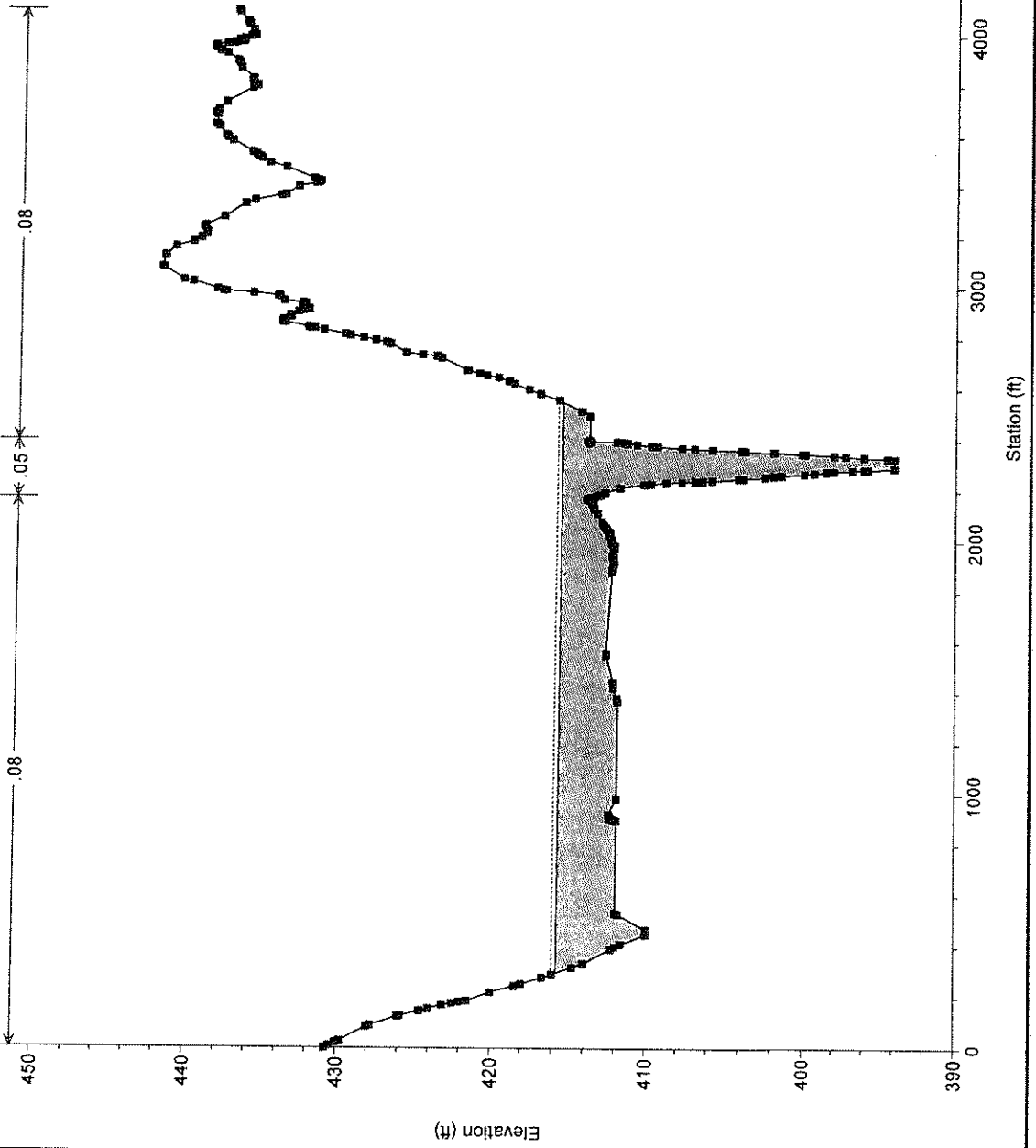


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RS = 2.050 25-Year



Ten Mile Creek Post Plan: 25-Year Post 10/25/2011

RS = 2.006 25-Year

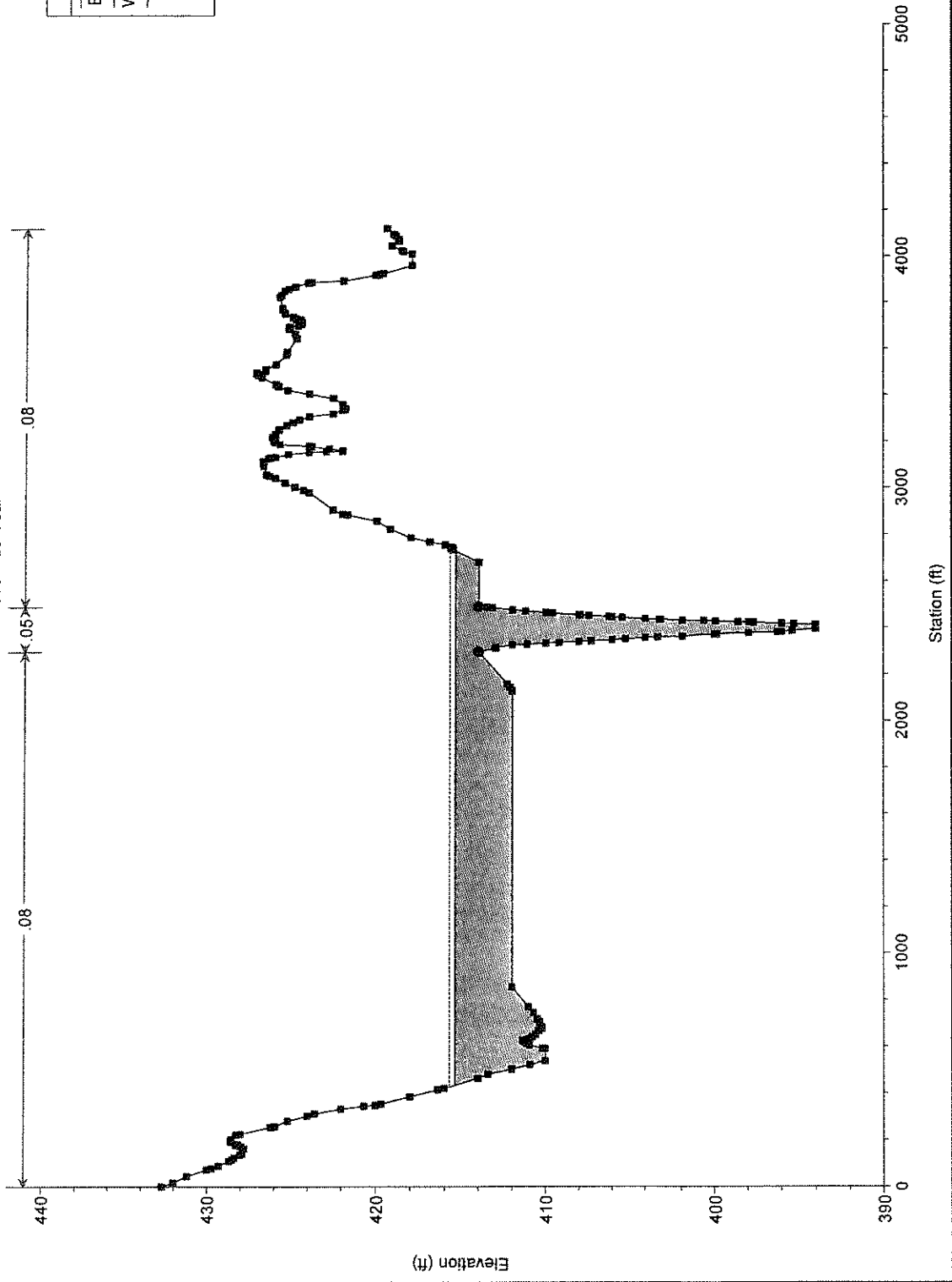


Ten Mile Creek Post Plan: 25-Year Post 10/25/2011

RS = 1.966 25-Year

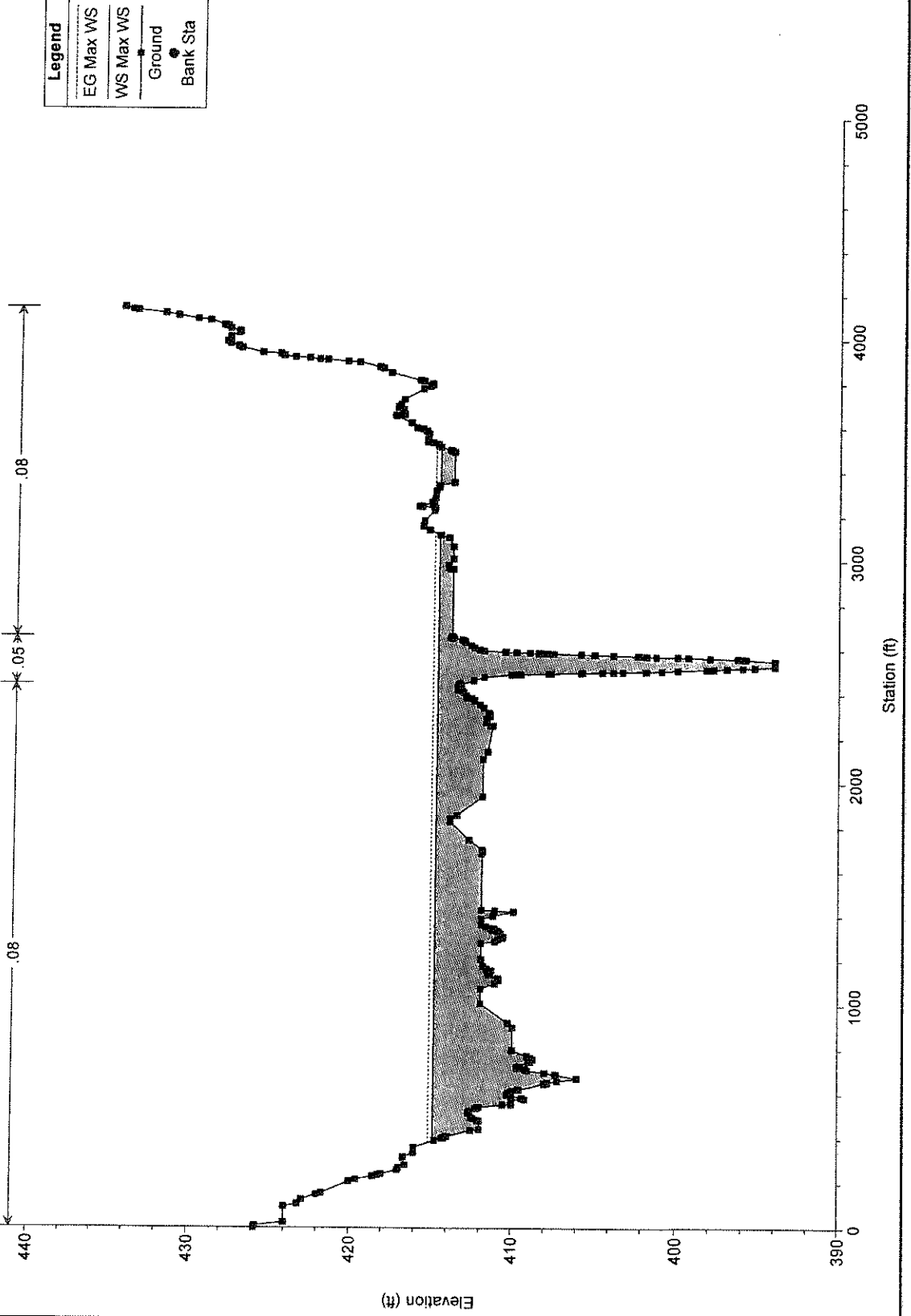


Legend	
EG Max WS	—
WS Max WS	—
Ground	●
Bank Sta	●



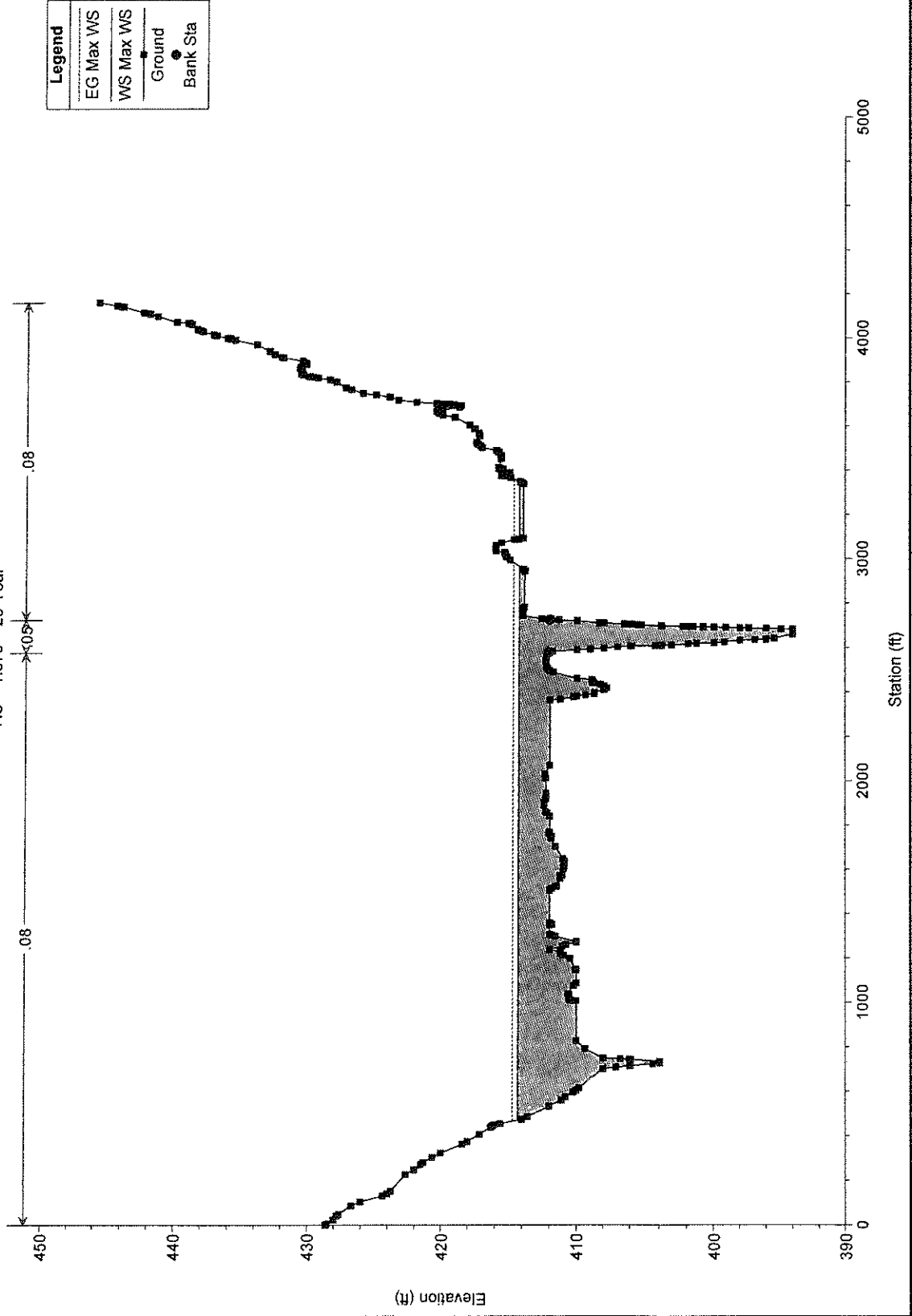
Ten Mile Creek Post Plan: 25-Year Post 10/25/2011

RS = 1.919 25-Year



Ten Mile Creek Post Plan: 25-Year Post 10/25/2011

RS = 1.873 25-Year



Ten Mile Creek Post Plan: 25-Year Post 10/25/2011

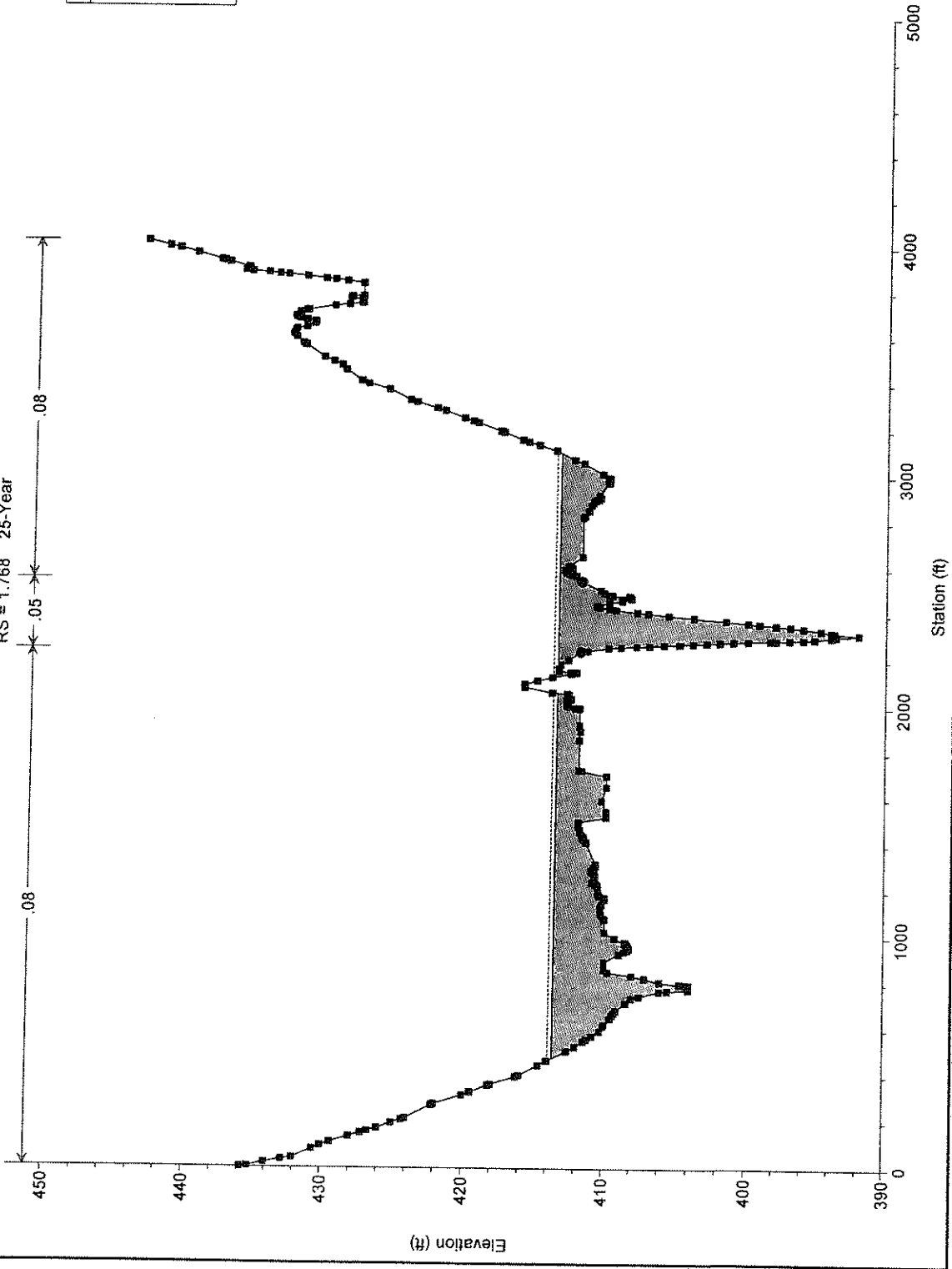
RS = 1.768 25-Year

0.08

0.05

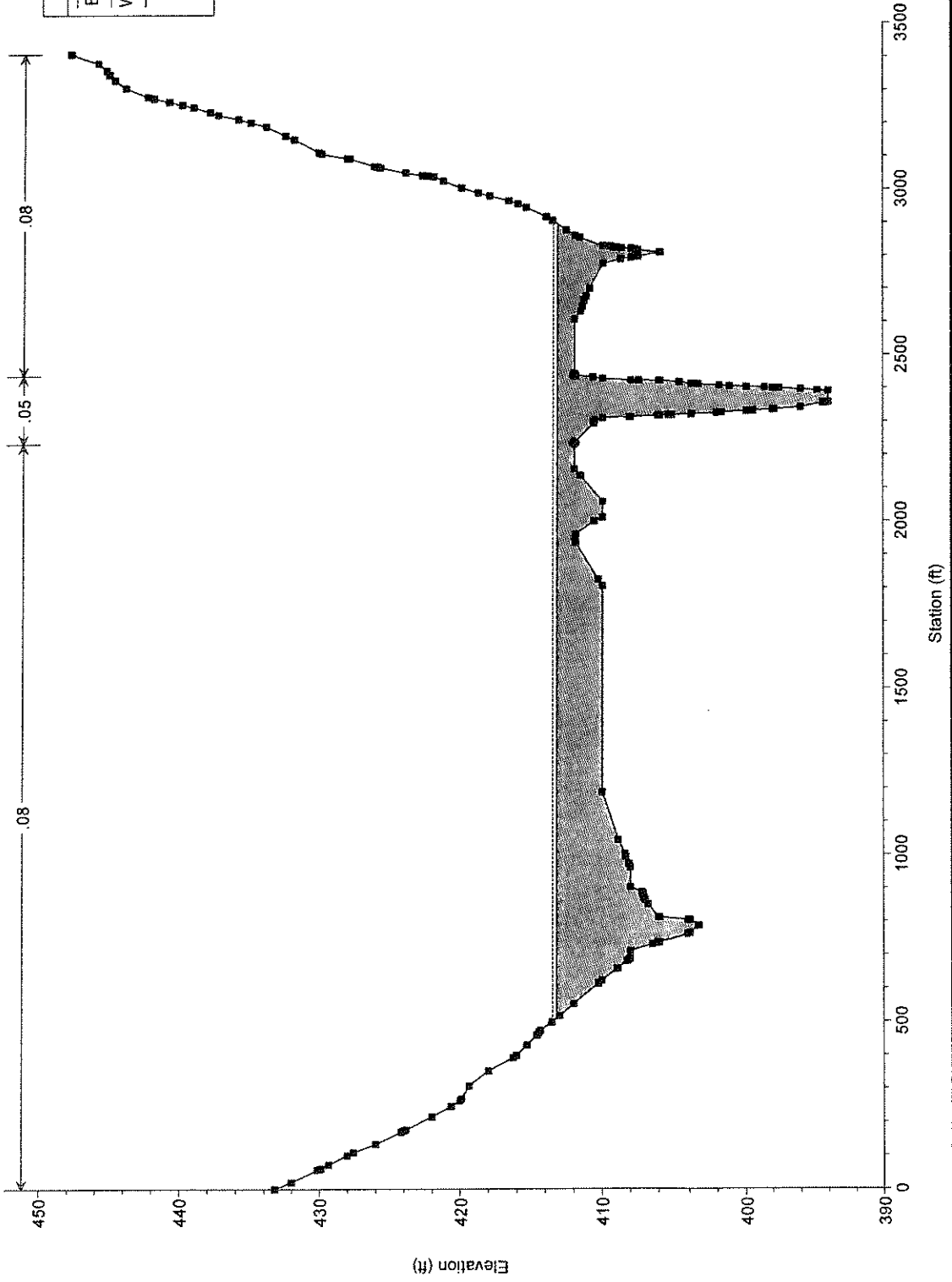
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Legend	
EG Max WS	—
WS Max WS	—
Ground	—
Bank Sta	●

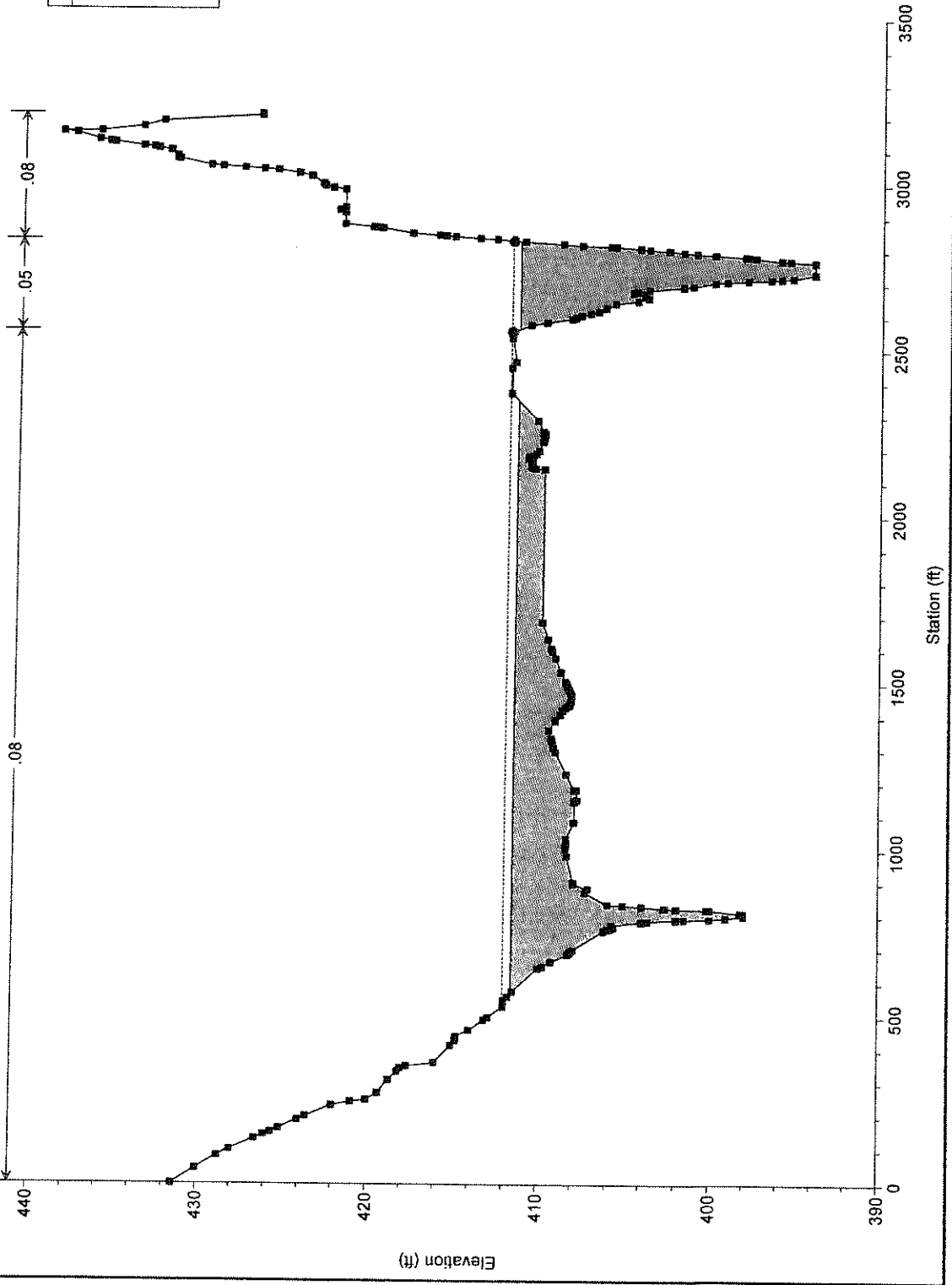


Ten Mile Creek Post Plan: 25-Year Post 10/25/2011

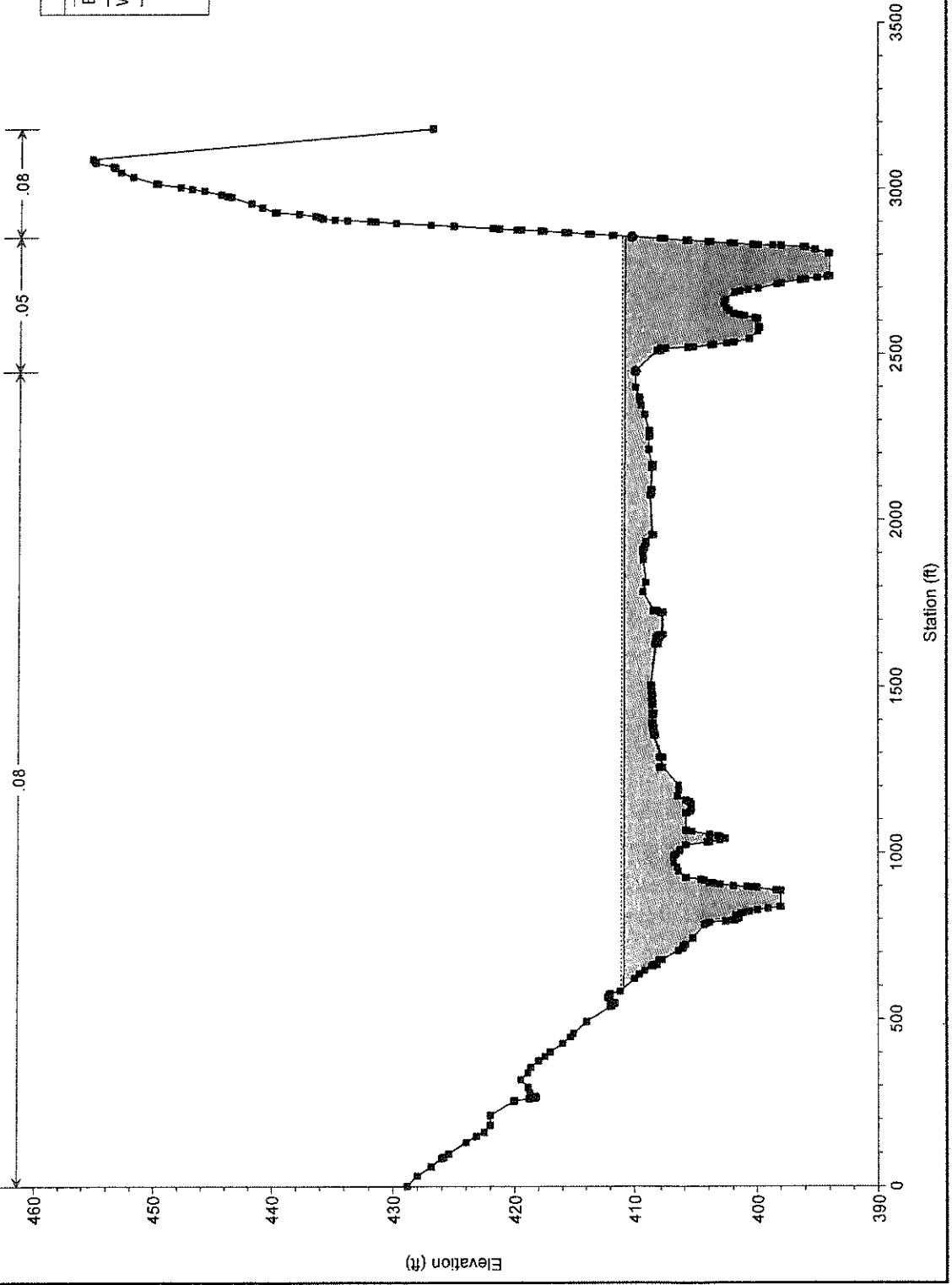
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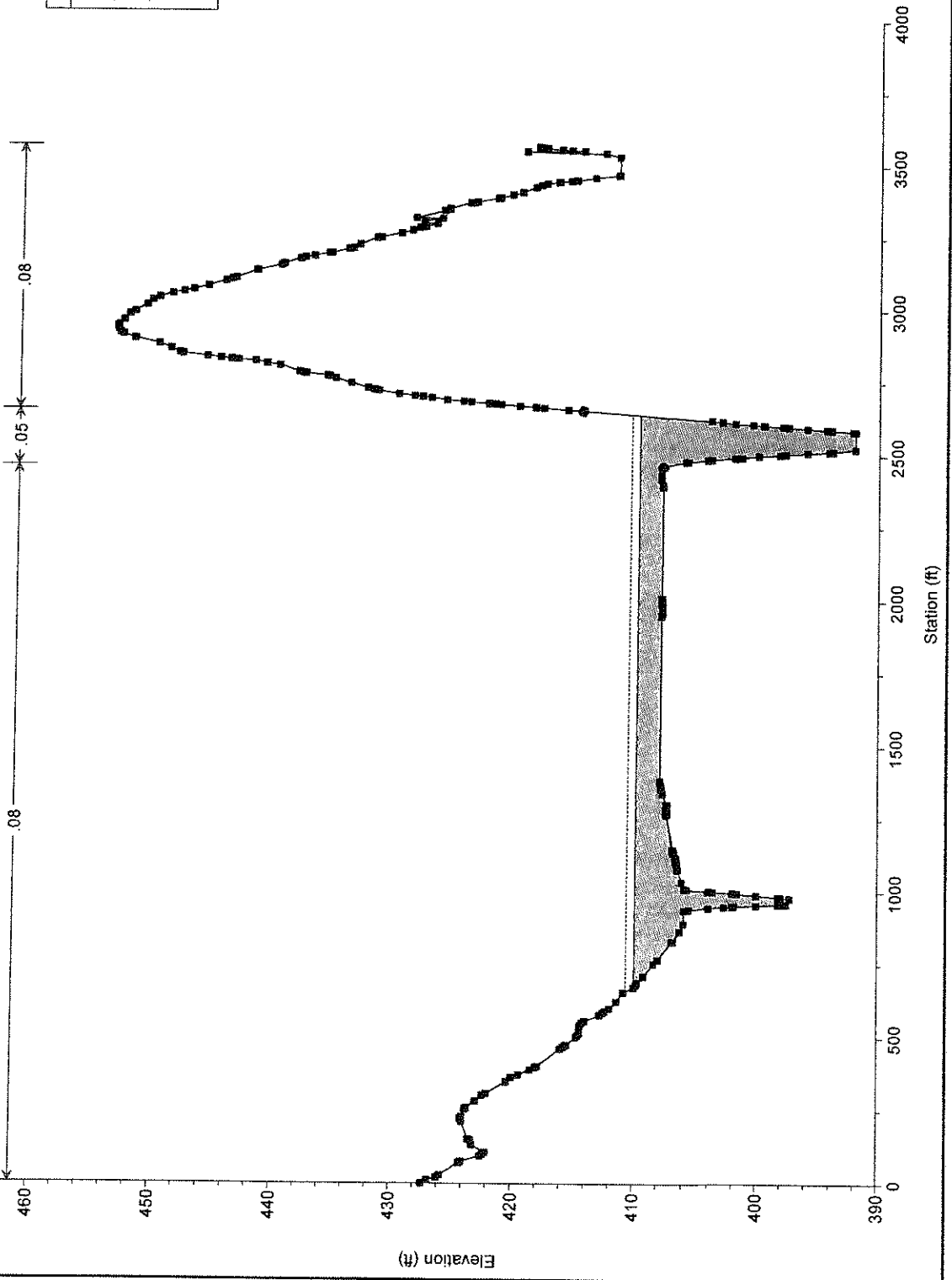
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RS = 1.609 25-Year



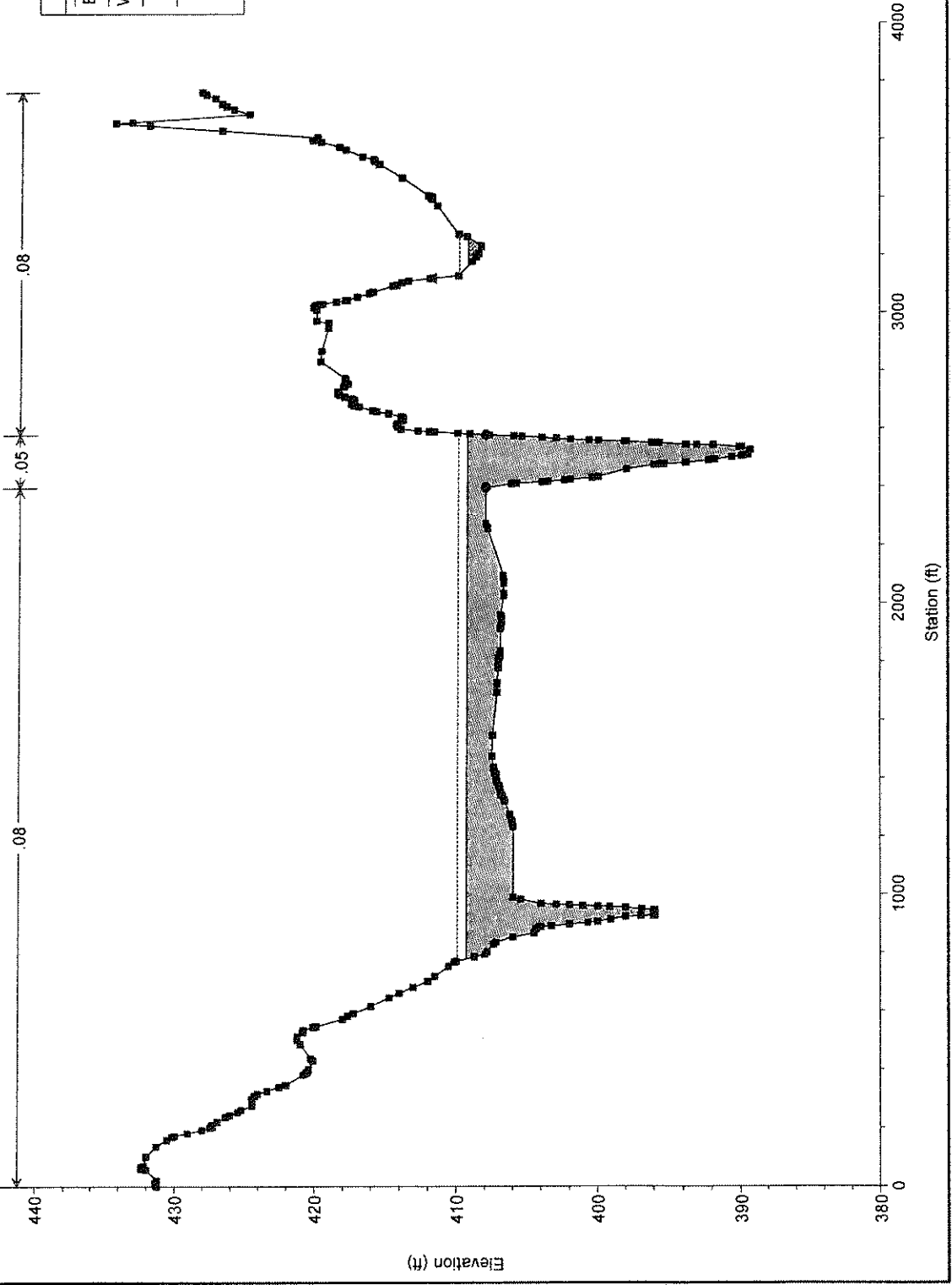
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RS = 1.522 25-Year



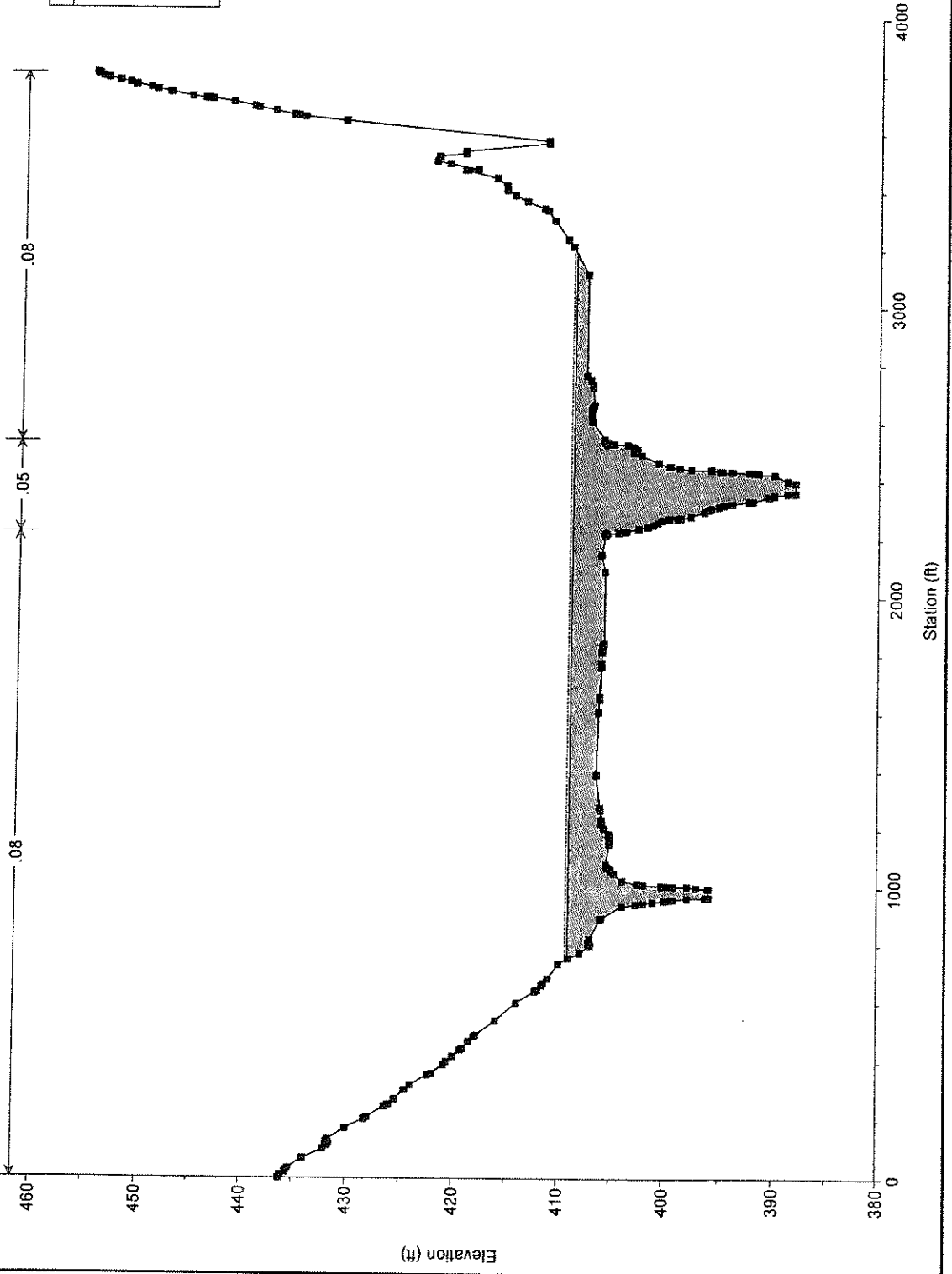
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RS = 1.441 25-Year



Ten Mile Creek Post Plan: 25-Year Post 10/25/2011
RS = 1.389 25-Year



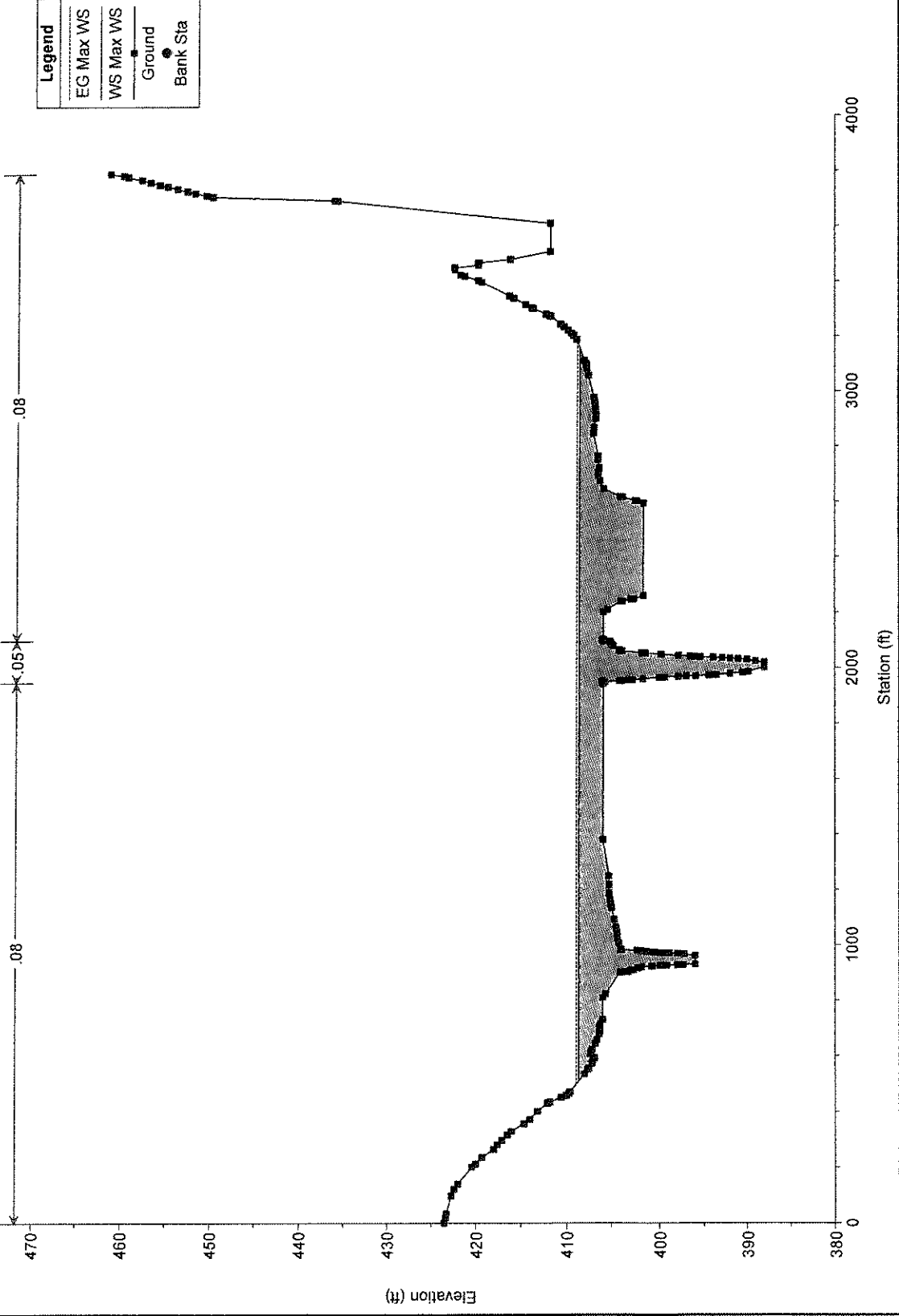
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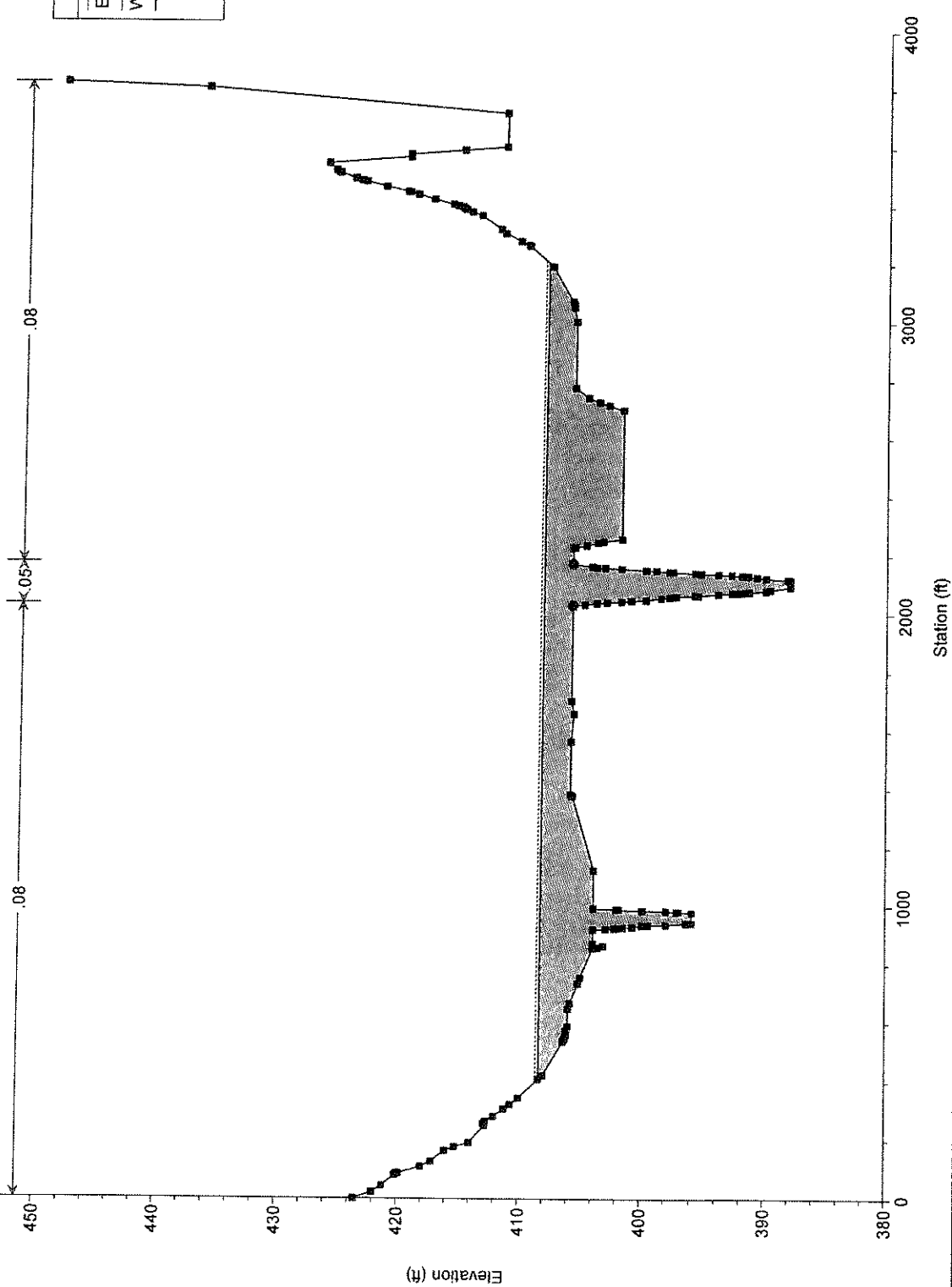
C2-C-20

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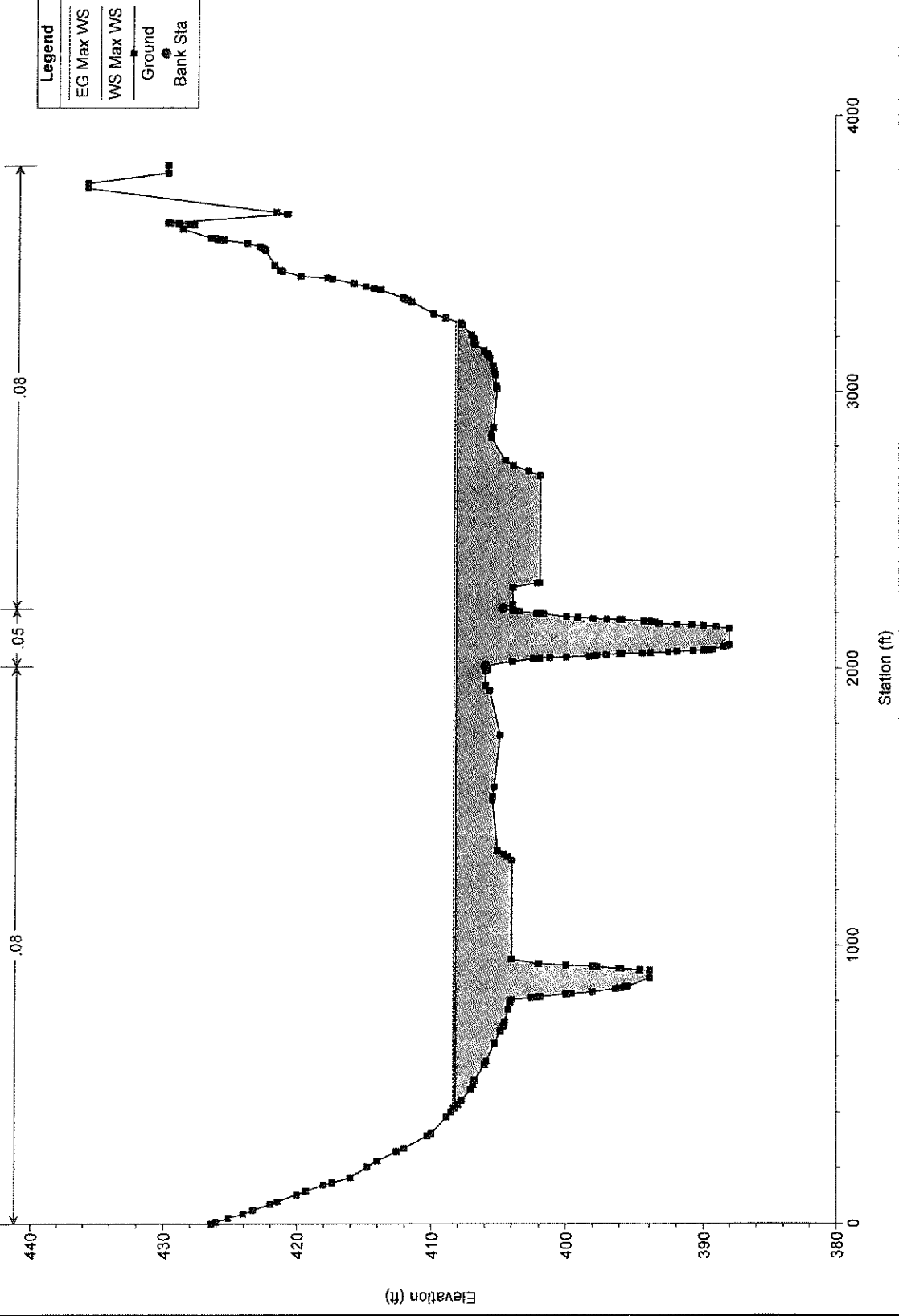


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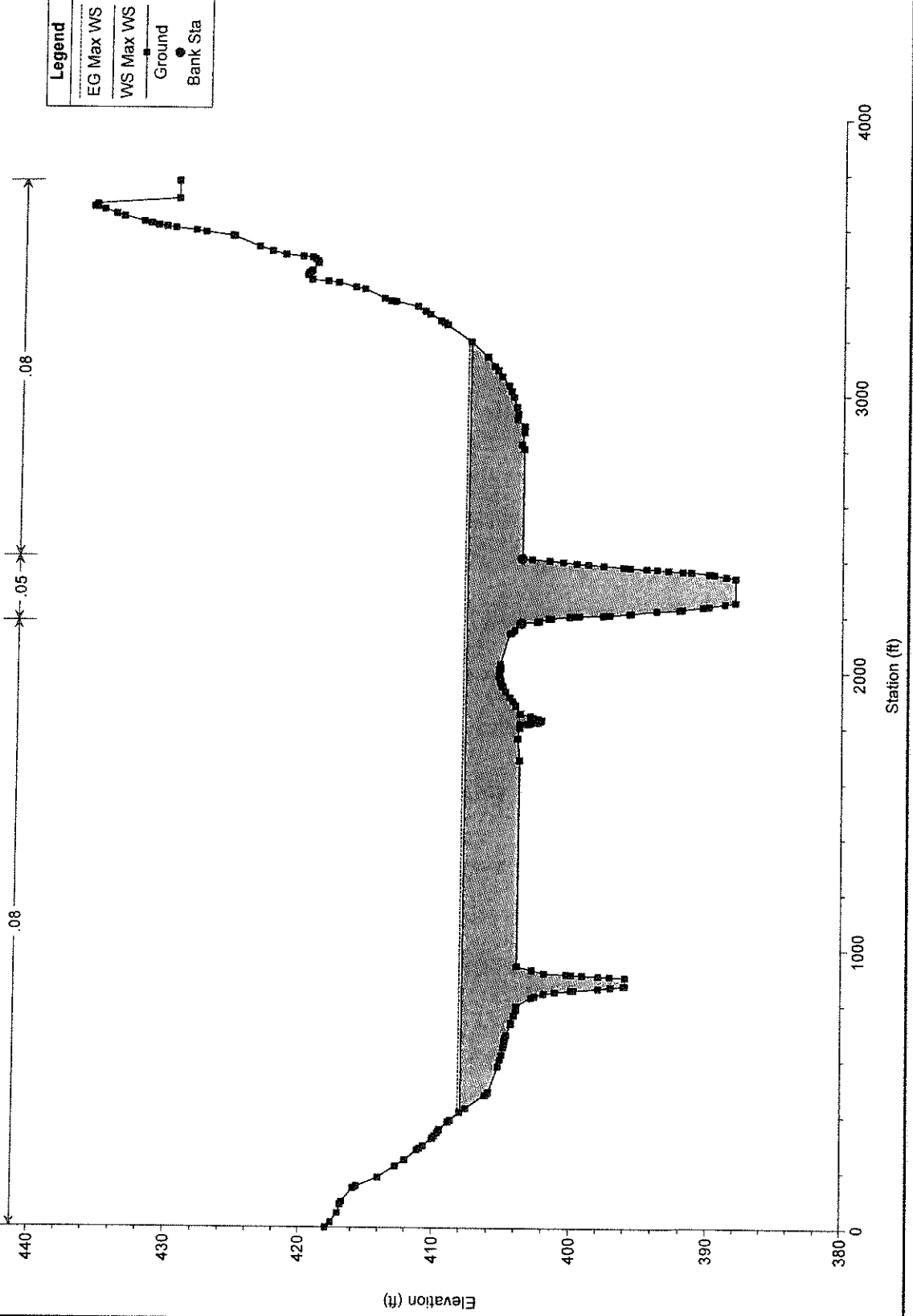
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RS = 1.180 25-Year



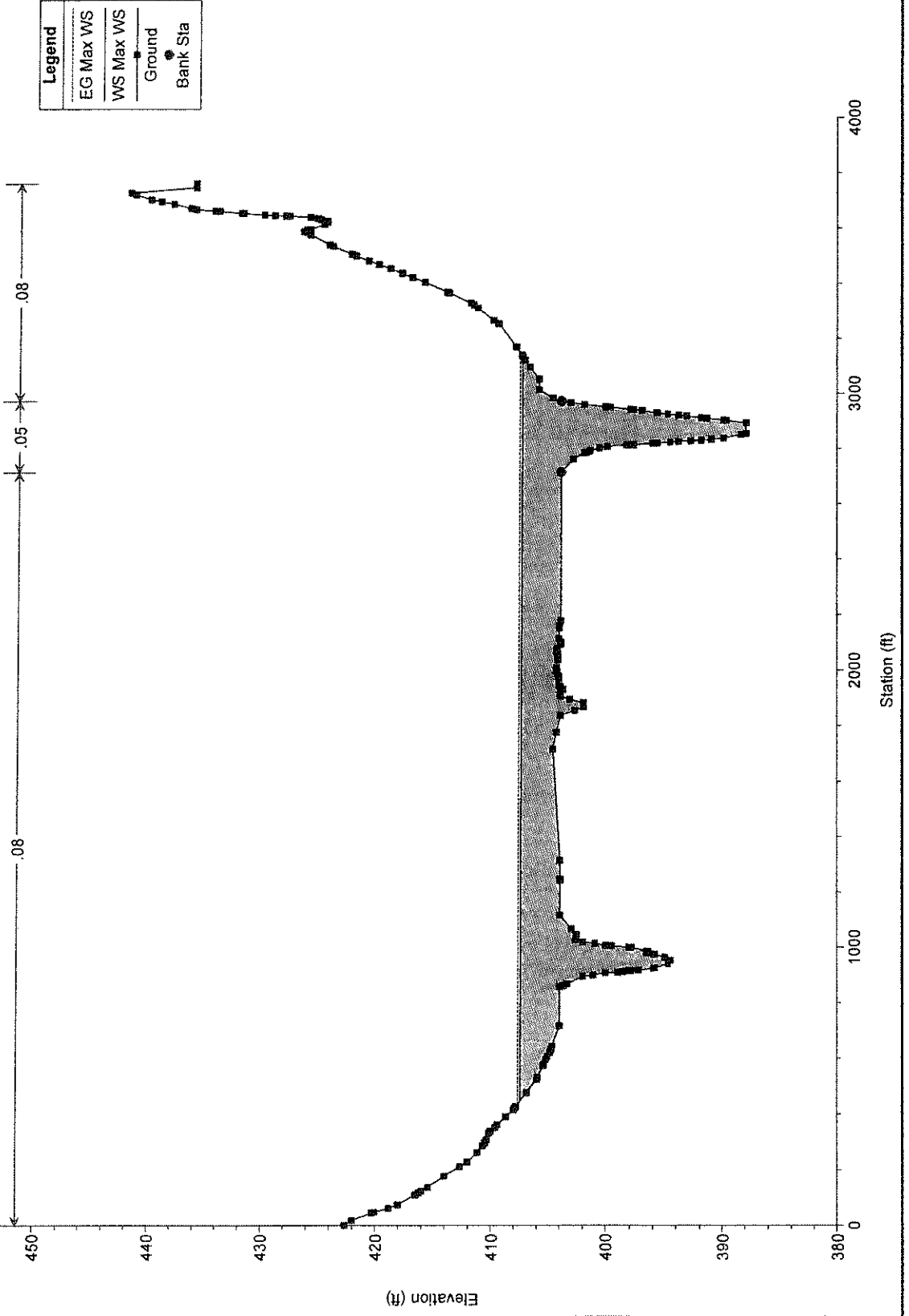
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RS = 1.114 25-Year

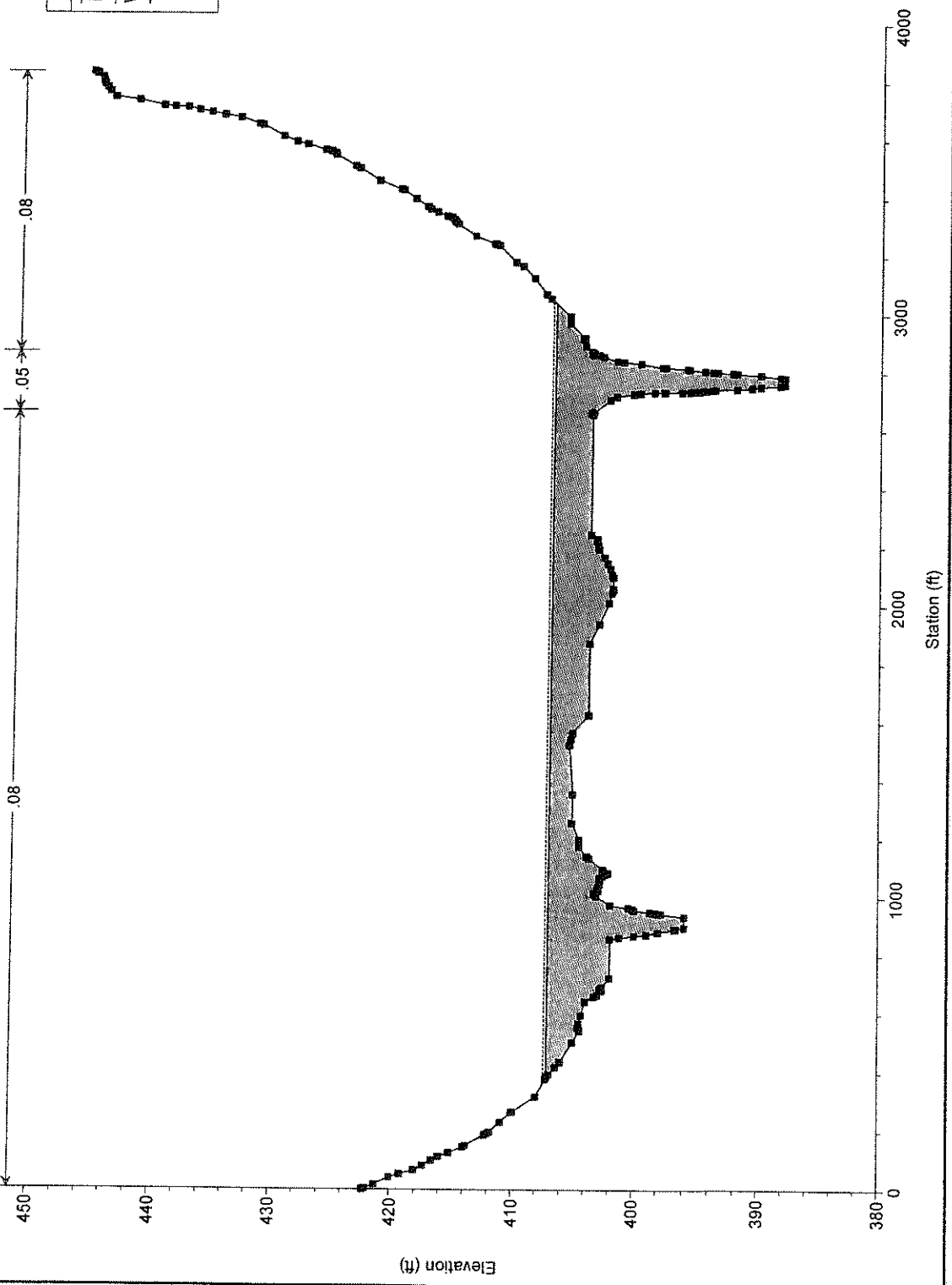


Ten Mile Creek Post Plan: 25-Year Post 10/25/2011

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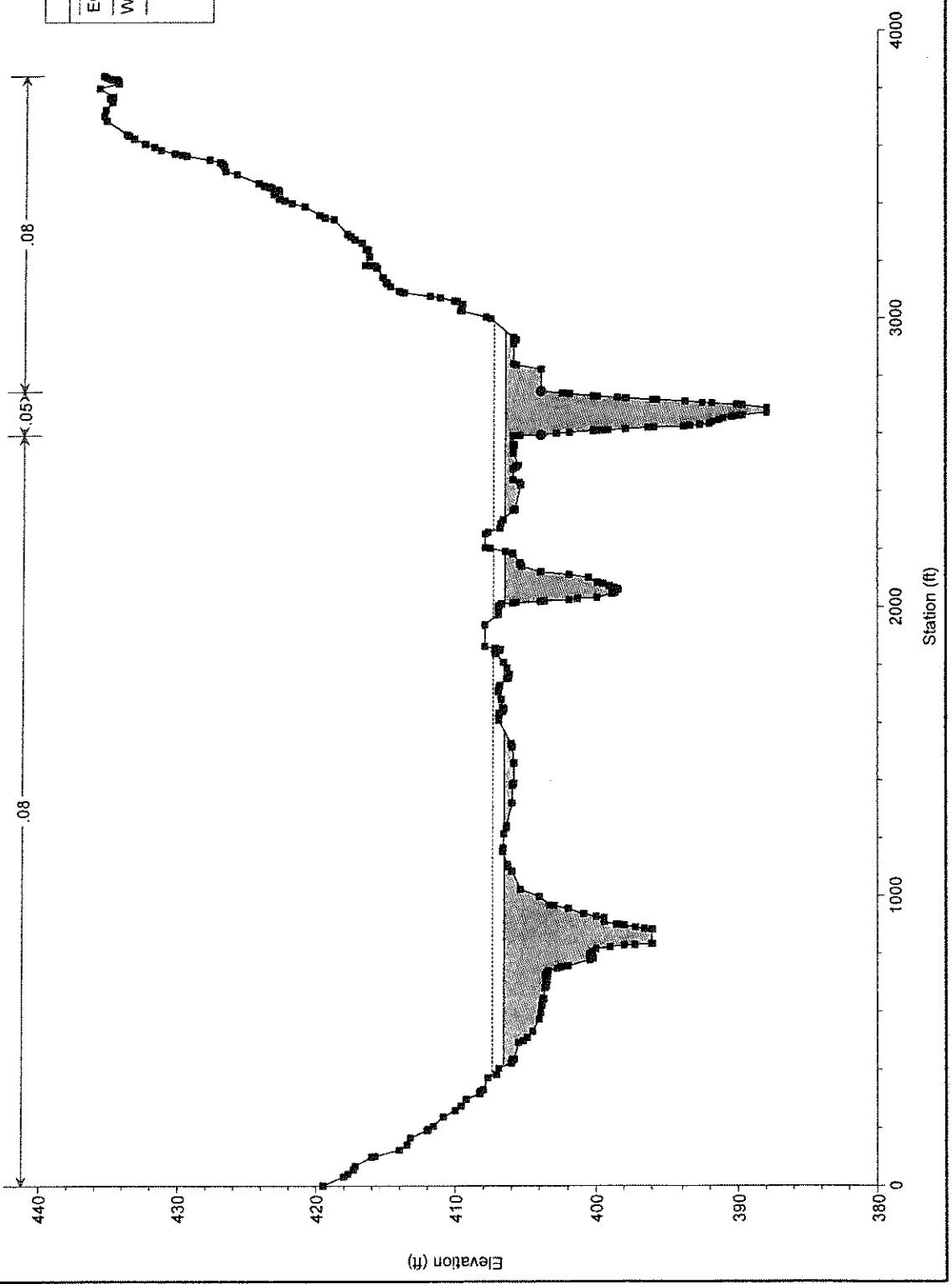


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RS = 0.947 25-Year

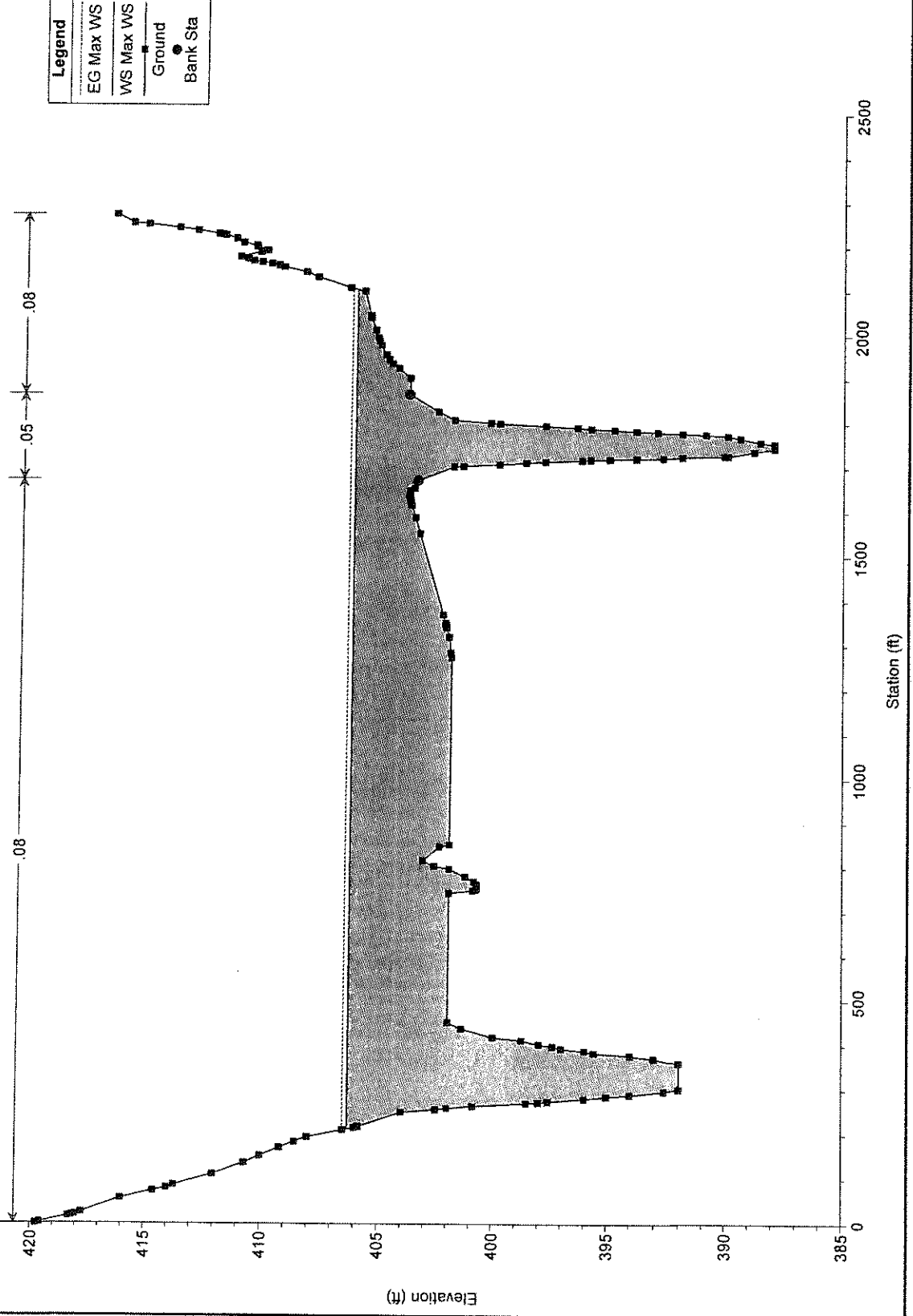


Ten Mile Creek Post Plan: 25-Year Post 10/25/2011

RS = 0.927 25-Year

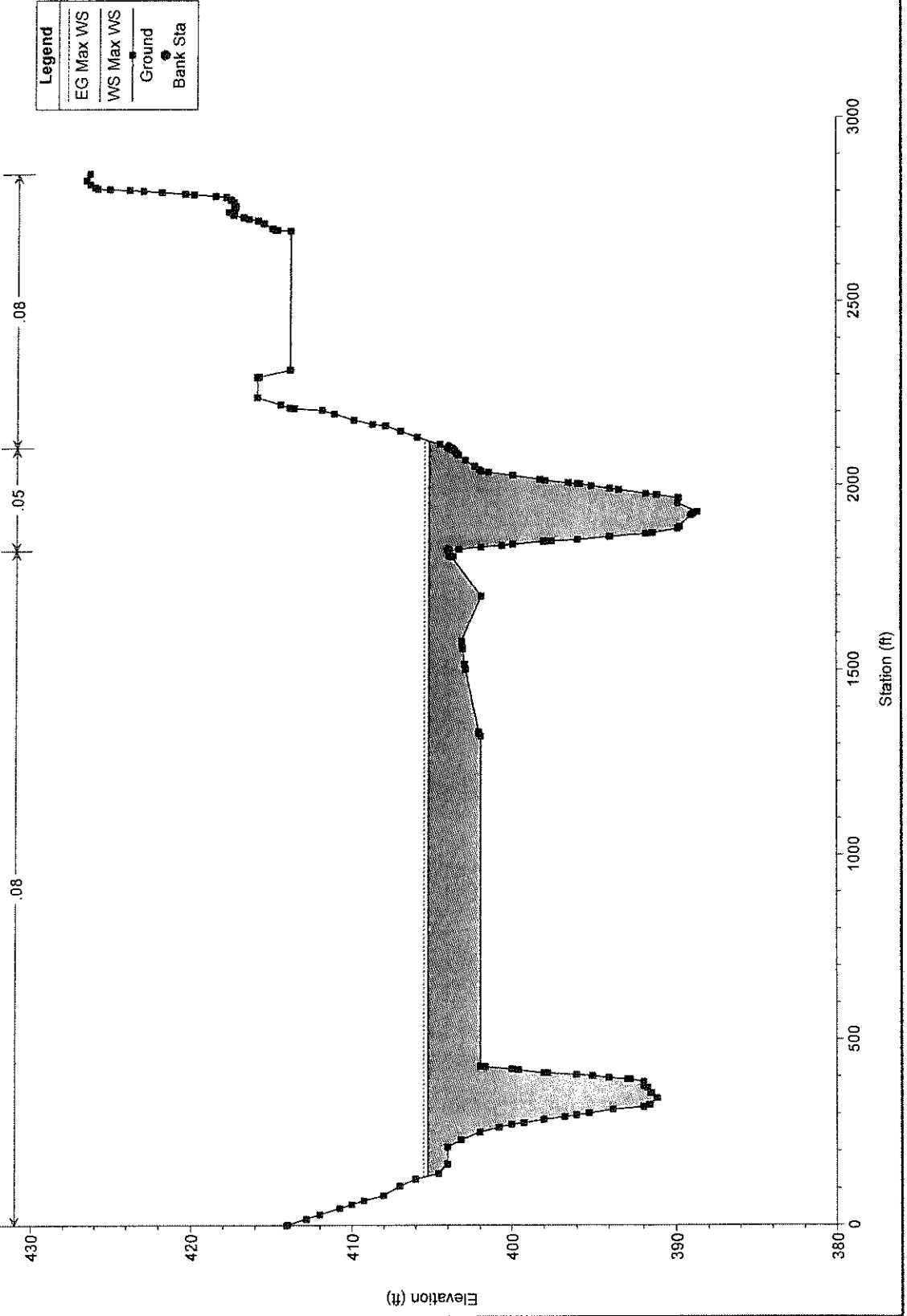


Ten Mile Creek Post Plan: 25-Year Post 10/25/2011
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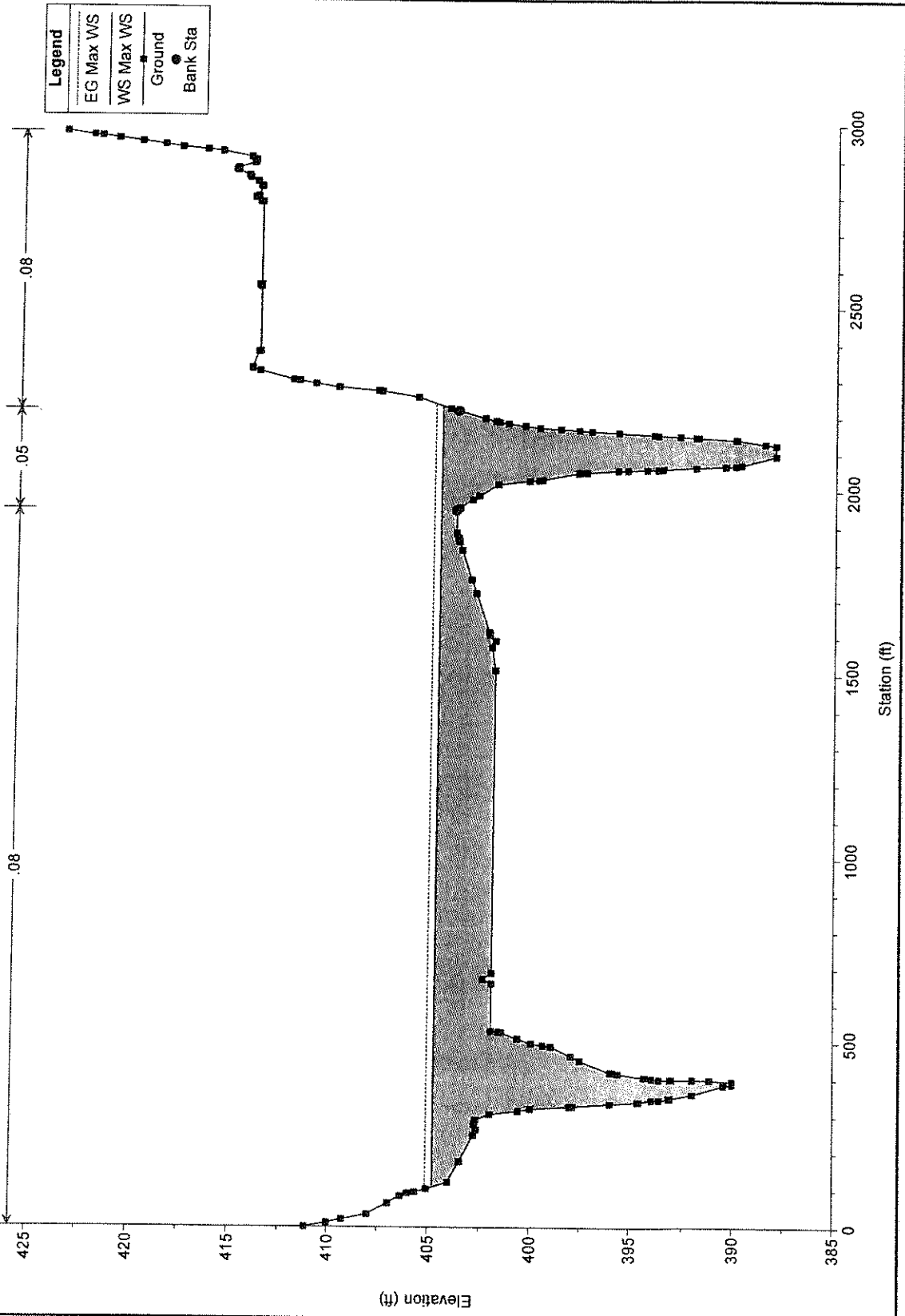


Ten Mile Creek Post Plan: 25-Year Post 10/25/2011

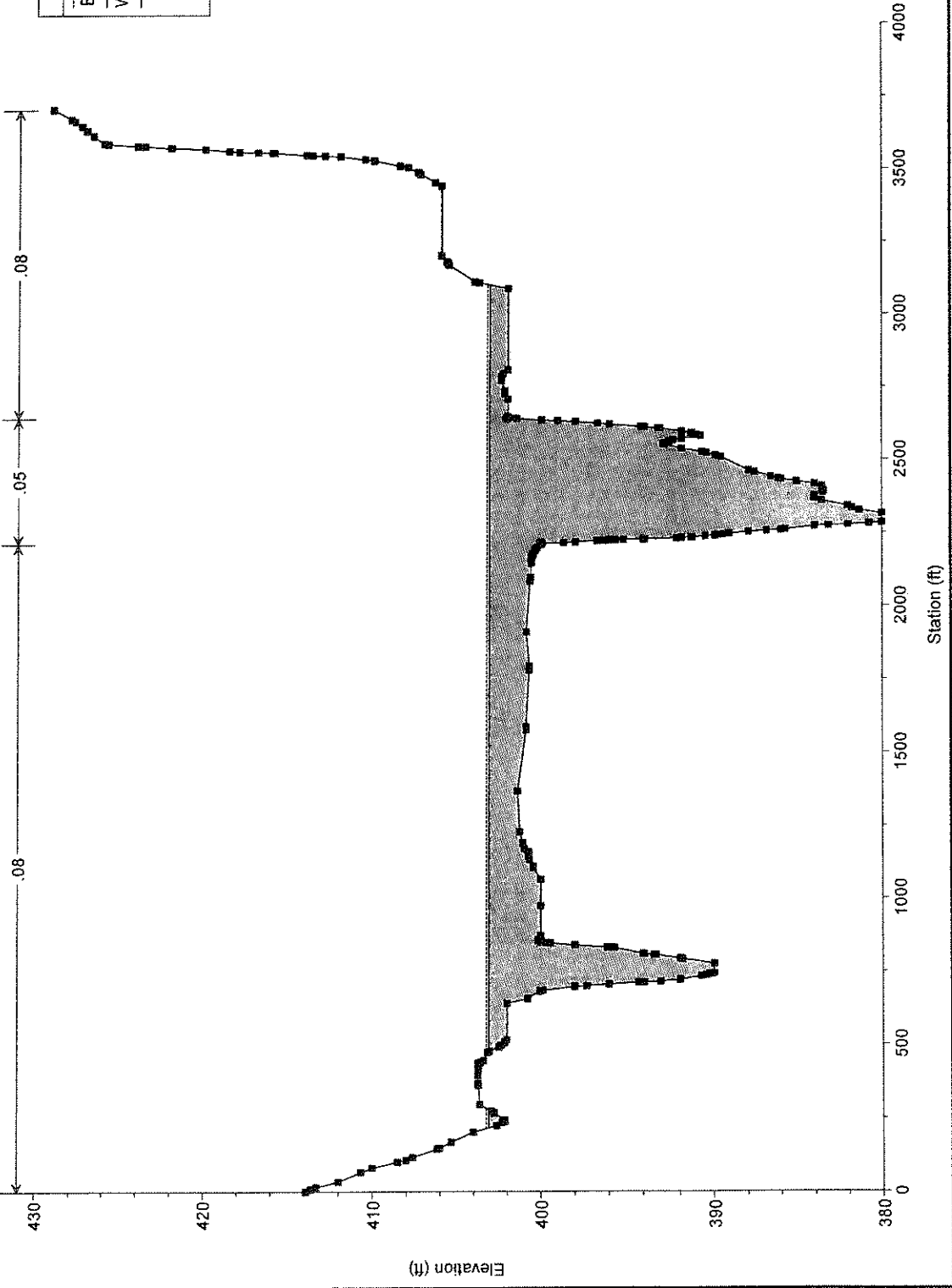
RS = 0.772 25-Year



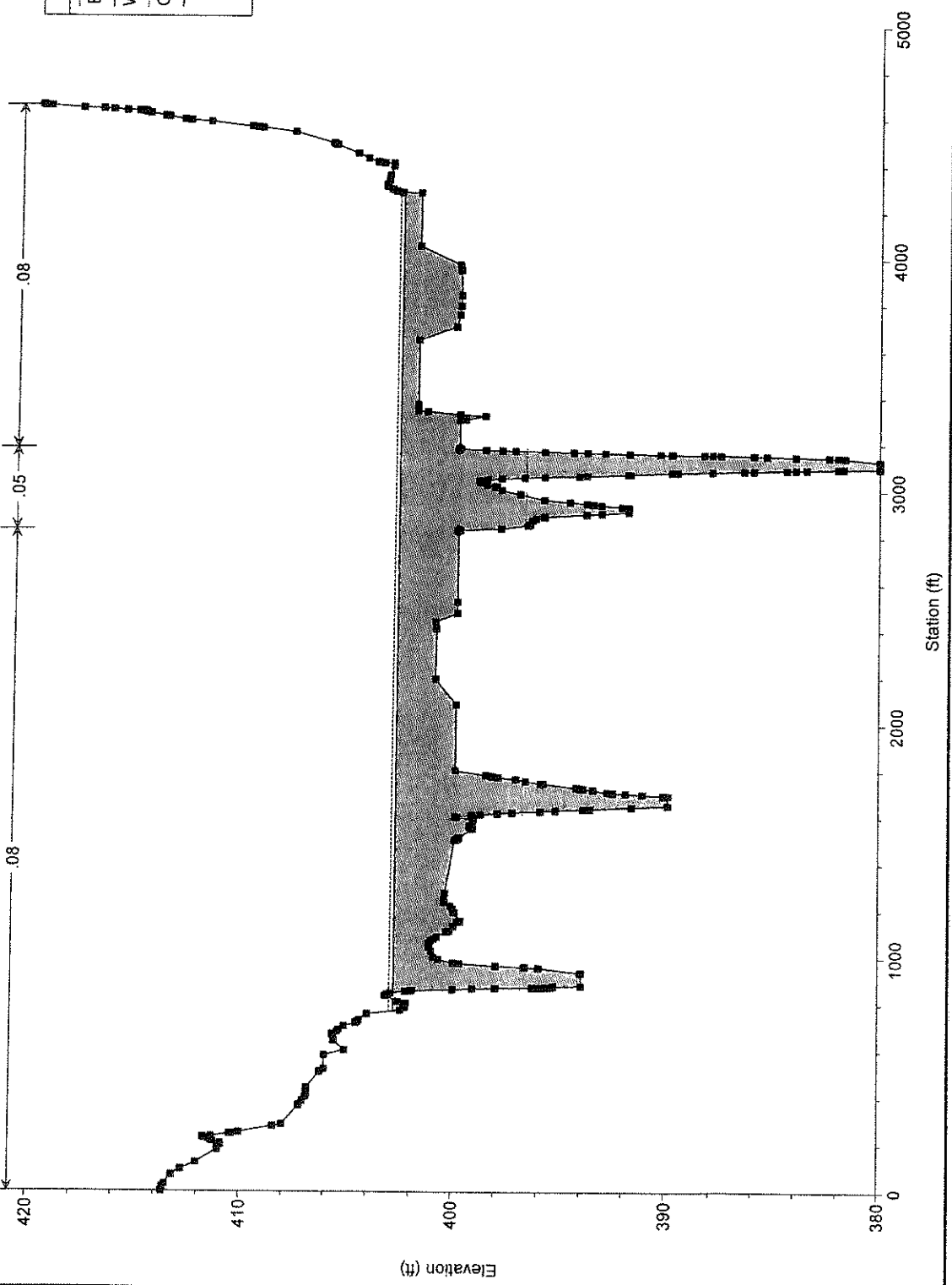
Ten Mile Creek Post Plan: 25-Year Post 10/25/2011
RS = 0.734 25-Year



Ten Mile Creek Post Plan: 25-Year Post 10/25/2011
RS = 0.462 25-Year



Ten Mile Creek Post Plan: 25-Year Post 10/25/2011
RS = 0.381 25-Year



POSTDEVELOPED 100-YEAR HEC-RAS ANALYSIS

HEC-RAS Plan: 100-Year Post River: Ten Mile Cr Reach: Reach 1 Profile: Max WS

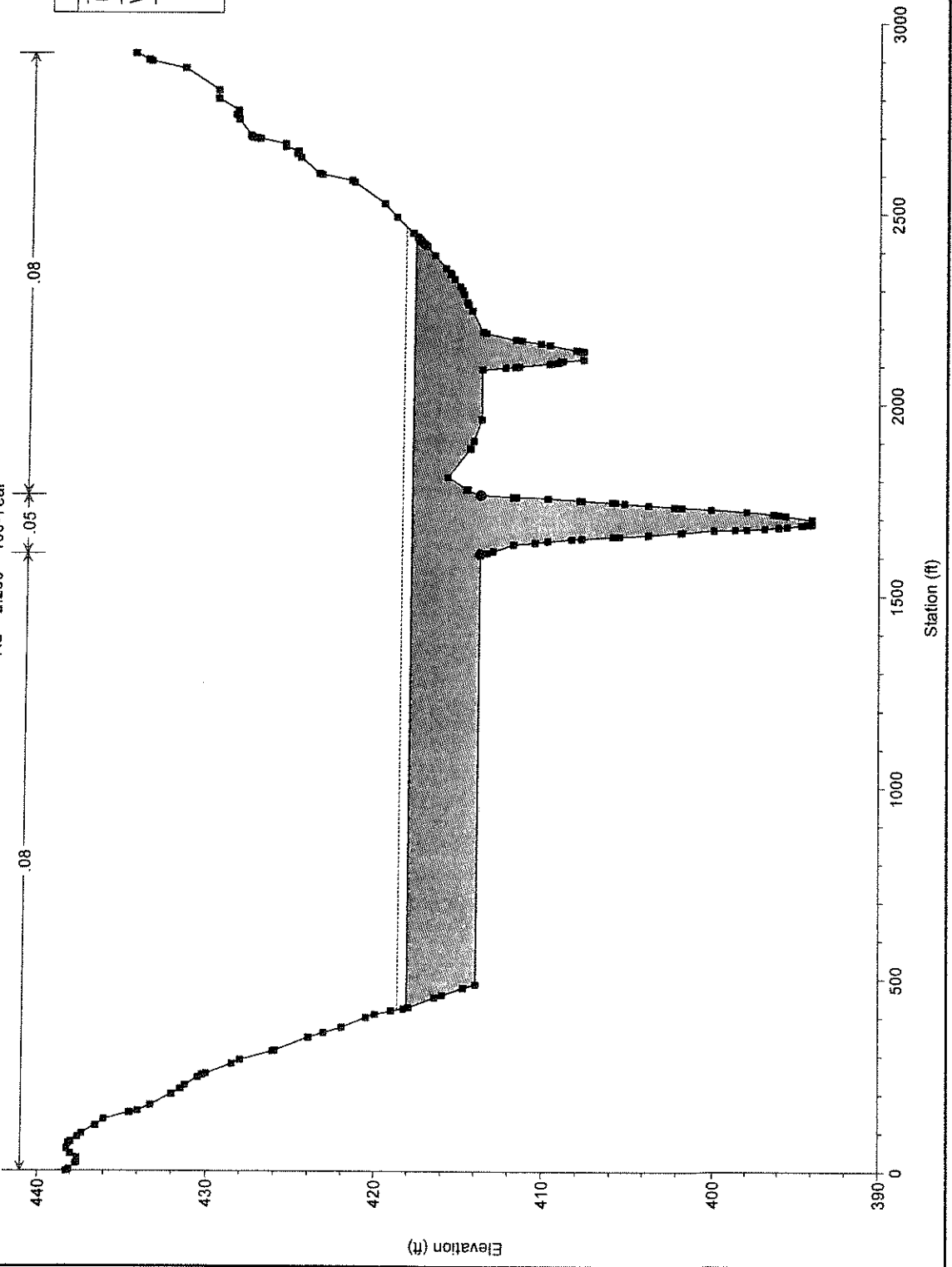
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	WS Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach 1	2.269	Max WS	33597.52	394.00	418.09		418.66	0.002277	8.11	9416.37	2016.25	0.38
Reach 1	2.183	Max WS	33595.84	395.88	417.71		417.92	0.000487	4.12	13098.38	2086.13	0.18
Reach 1	2.104	Max WS	33692.13	396.00	417.29		417.64	0.001092	5.46	10654.15	2120.49	0.26
Reach 1	2.050	Max WS	33689.23	394.00	416.94		417.36	0.001465	6.15	10273.92	2176.79	0.30
Reach 1	2.005	Max WS	33685.72	394.00	416.67		417.00	0.001534	6.15	11390.88	2282.57	0.31
Reach 1	1.966	Max WS	33681.47	394.00	416.26		416.62	0.002075	6.75	10815.21	2342.80	0.35
Reach 1	1.919	Max WS	33660.75	394.00	415.77		416.04	0.002311	6.20	11829.68	3204.23	0.36
Reach 1	1.873	Max WS	33659.70	394.00	415.25		415.63	0.001866	7.12	11611.49	2860.43	0.34
Reach 1	1.768	Max WS	33656.27	392.00	414.62		414.92	0.001931	5.84	11327.40	2627.96	0.33
Reach 1	1.725	Max WS	33750.88	394.00	414.20		414.49	0.002136	6.27	11327.38	2444.13	0.35
Reach 1	1.609	Max WS	33788.27	394.00	412.63		413.11	0.002918	7.17	9365.79	2325.00	0.41
Reach 1	1.522	Max WS	33782.18	393.95	411.58		412.20	0.001026	4.65	12668.72	2295.44	0.25
Reach 1	1.441	Max WS	33743.45	392.00	411.10		411.72	0.002597	8.23	8650.46	2001.09	0.41
Reach 1	1.369	Max WS	33740.04	389.35	410.40		411.03	0.002530	8.15	8658.13	1998.60	0.40
Reach 1	1.350	Max WS	33790.07	388.00	410.21		410.49	0.000966	5.19	12434.38	2519.91	0.25
Reach 1	1.287	Max WS	33735.55	388.00	409.76		410.01	0.001570	6.22	13098.51	2747.37	0.31
Reach 1	1.222	Max WS	33733.22	388.00	409.47		409.70	0.001228	5.81	14326.57	2881.25	0.28
Reach 1	1.180	Max WS	33729.80	388.00	409.29		409.46	0.000733	4.74	16303.96	2908.94	0.22
Reach 1	1.114	Max WS	33722.92	388.00	409.05		409.25	0.000633	4.75	15899.60	2856.28	0.21
Reach 1	0.990	Max WS	33713.00	388.00	408.52		408.71	0.001075	5.01	14173.33	2800.93	0.26
Reach 1	0.947	Max WS	33718.09	388.00	408.24		408.45	0.001556	5.58	13190.05	2771.52	0.30
Reach 1	0.927	Max WS	33697.21	388.00	407.61		408.54	0.003705	9.91	8211.26	2474.98	0.48
Reach 1	0.863	Max WS	33695.19	388.00	407.28		407.53	0.001958	5.86	10794.69	1916.78	0.33
Reach 1	0.772	Max WS	33822.39	388.77	408.14		406.47	0.001817	5.98	10571.55	2011.11	0.33
Reach 1	0.734	Max WS	33819.63	388.00	405.70		406.06	0.002905	6.62	9884.78	2154.52	0.40
Reach 1	0.462	Max WS	33787.94	380.00	404.07		404.26	0.000430	3.90	14834.87	2914.04	0.17
Reach 1	0.381	Max WS	33882.86	380.00	403.77	398.31	403.85	0.001013	4.56	15486.50	3650.31	0.24

Ten Mile Creek Post Plan: 100-Year Post 10/25/2011

RS = 2.269 100-Year

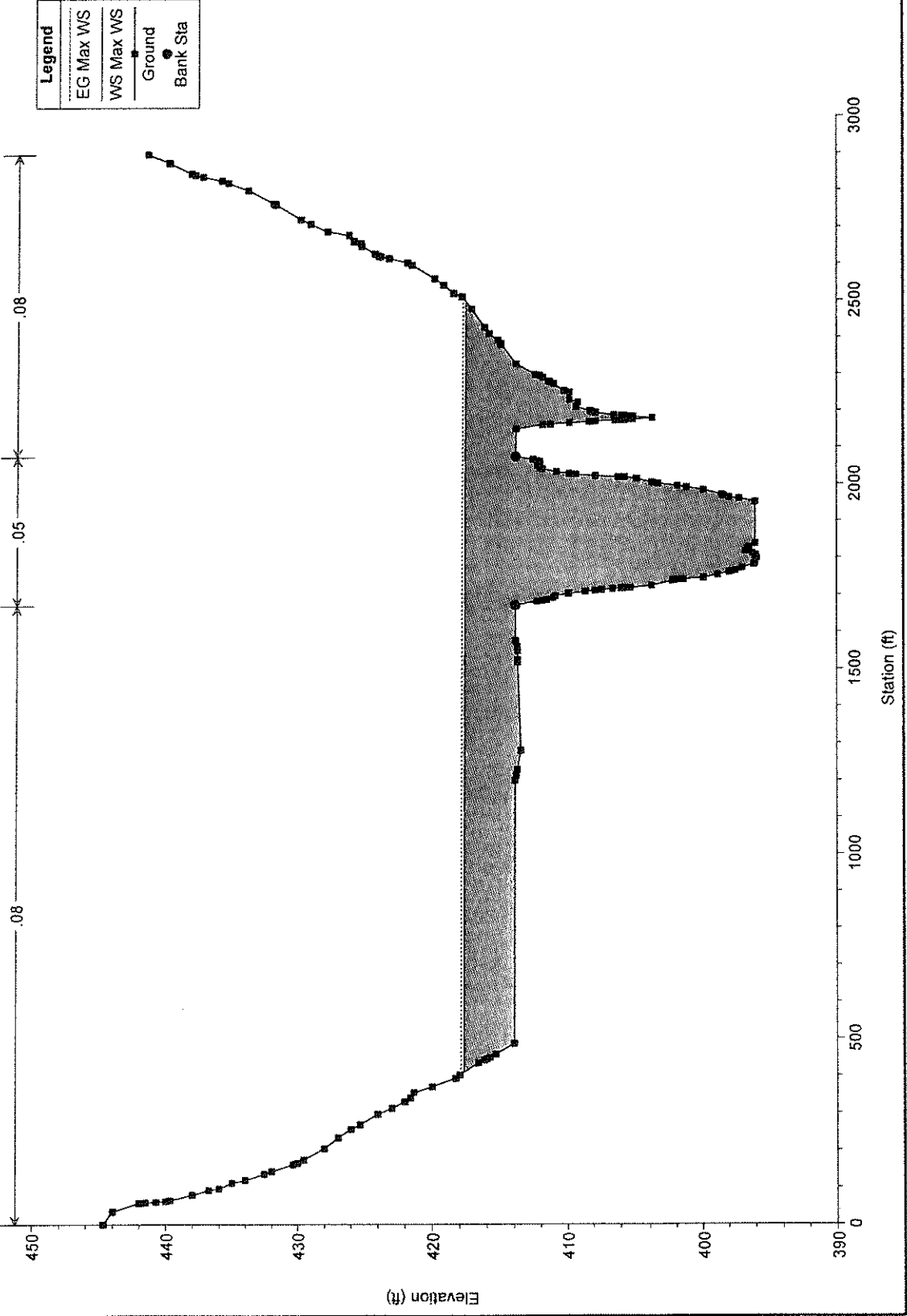
.08 .05 .08

Legend	
EG Max WS	—
WS Max WS	—
Ground	—
Bank Sta	●

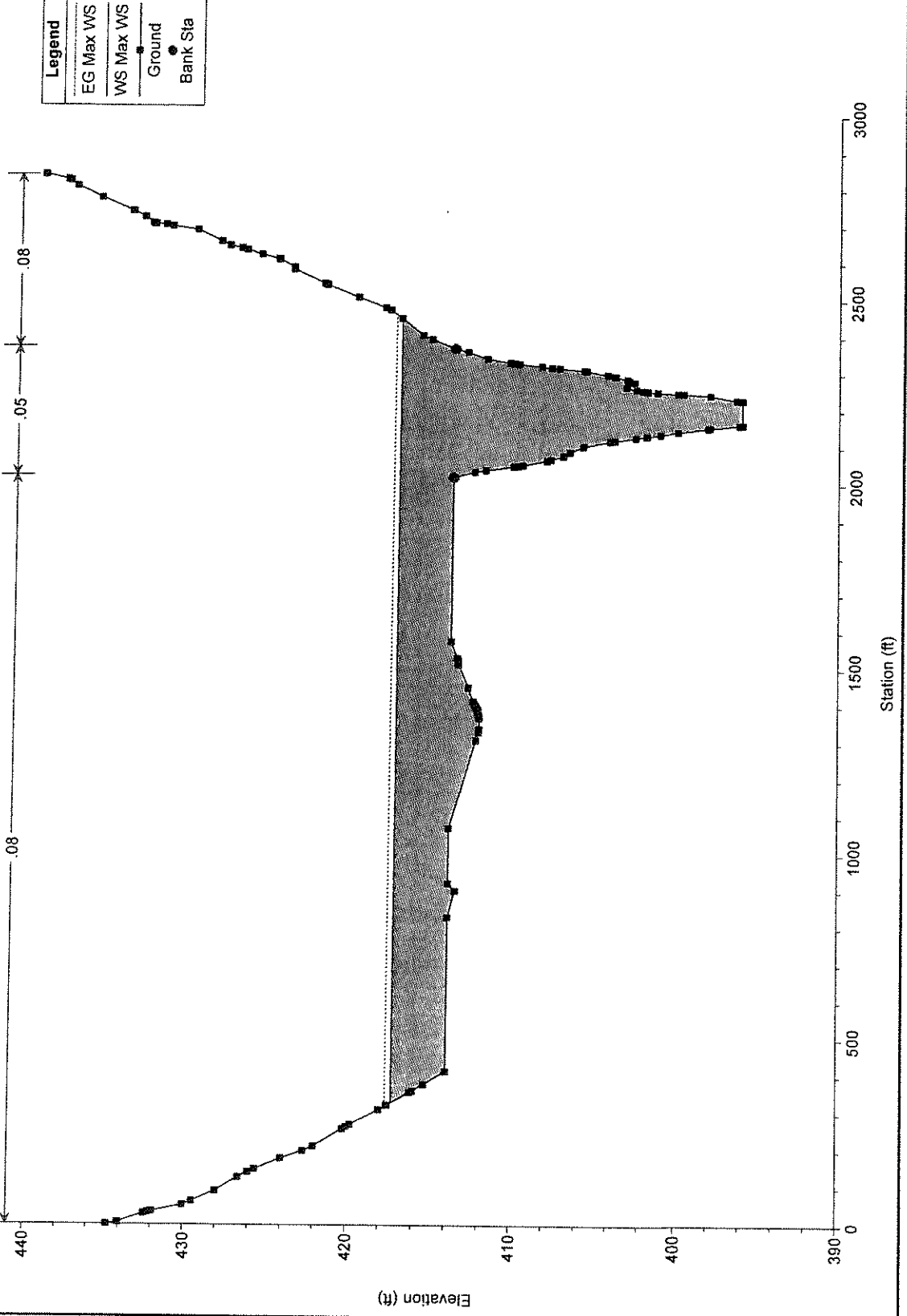


Ten Mile Creek Post Plan: 100-Year Post 10/25/2011

RS = 2.183 100-Year

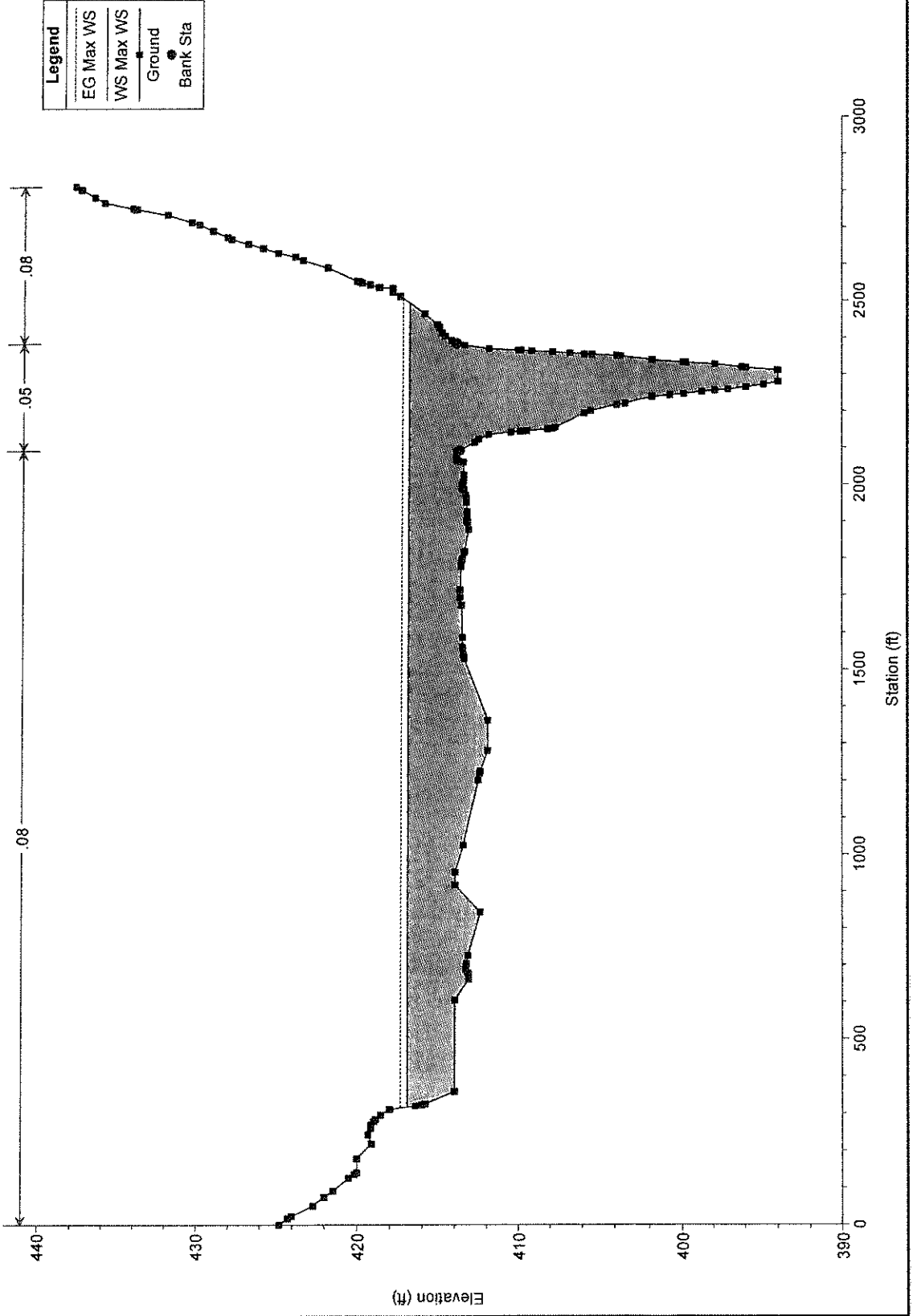


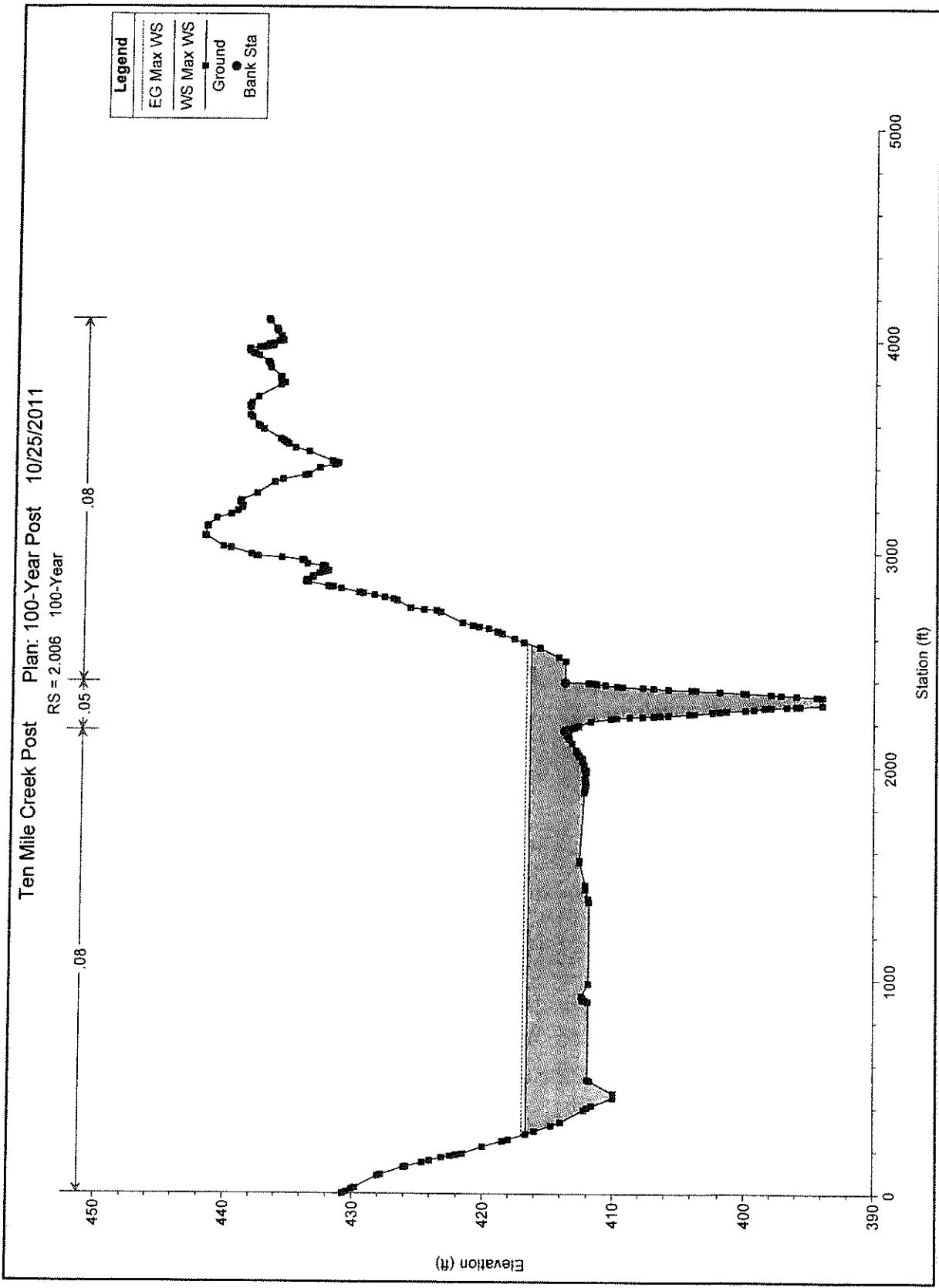
Ten Mile Creek Post Plan: 100-Year Post 10/25/2011
RS = 2.104 100-Year



Ten Mile Creek Post Plan: 100-Year Post 10/25/2011

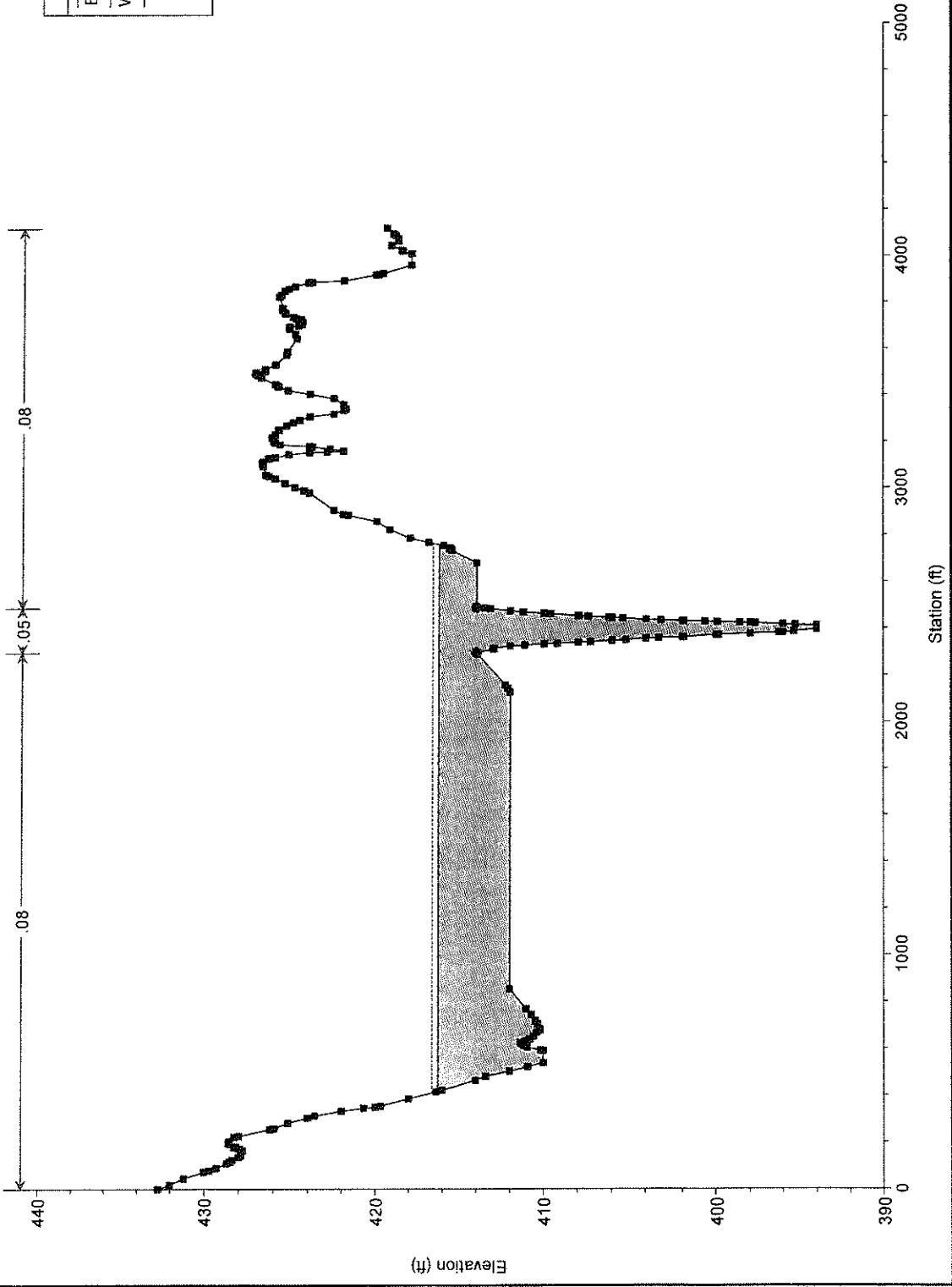
RS = 2.050 100-Year



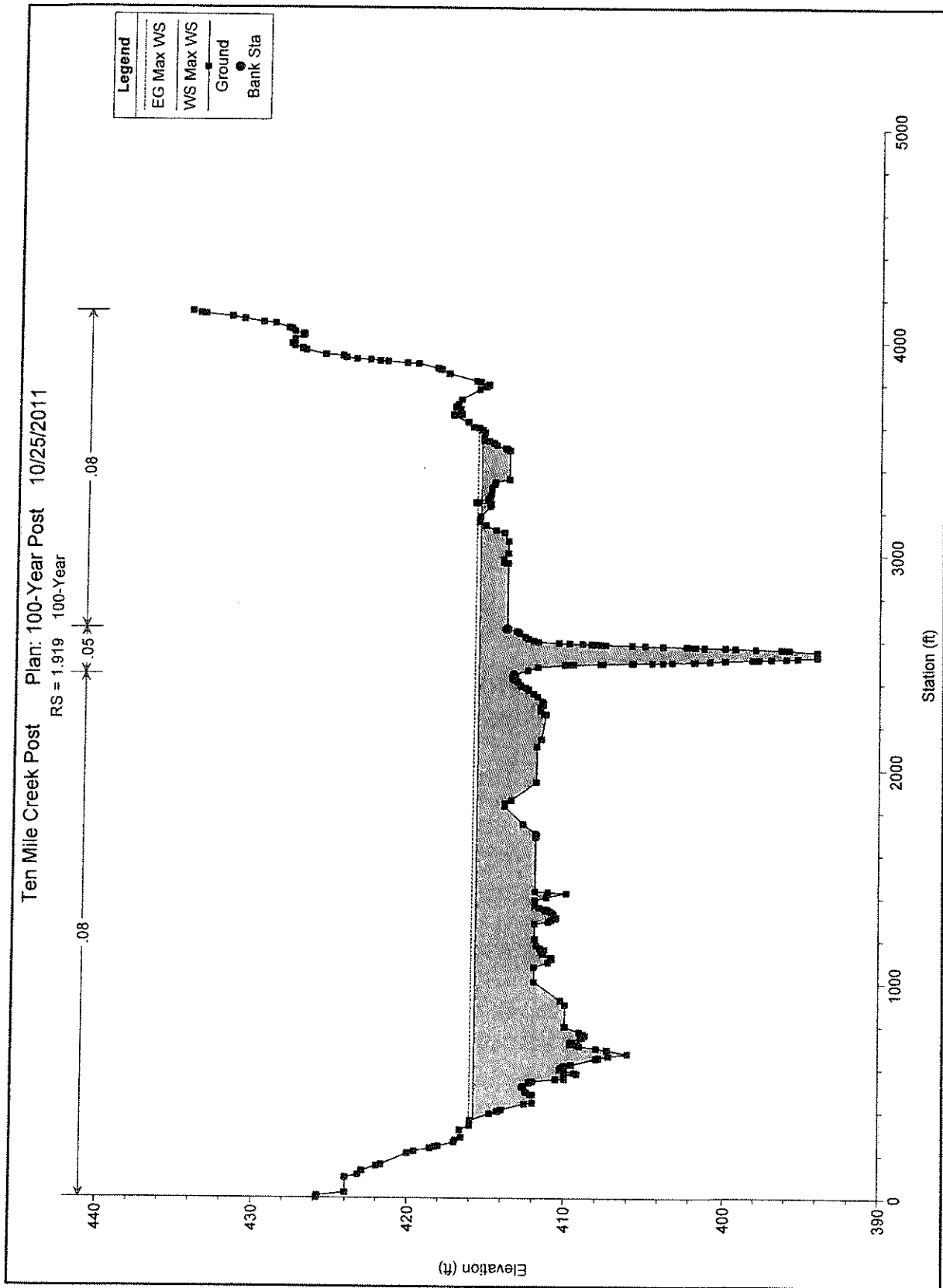


Ten Mile Creek Post Plan: 100-Year Post 10/25/2011

RS = 1.966 100-Year



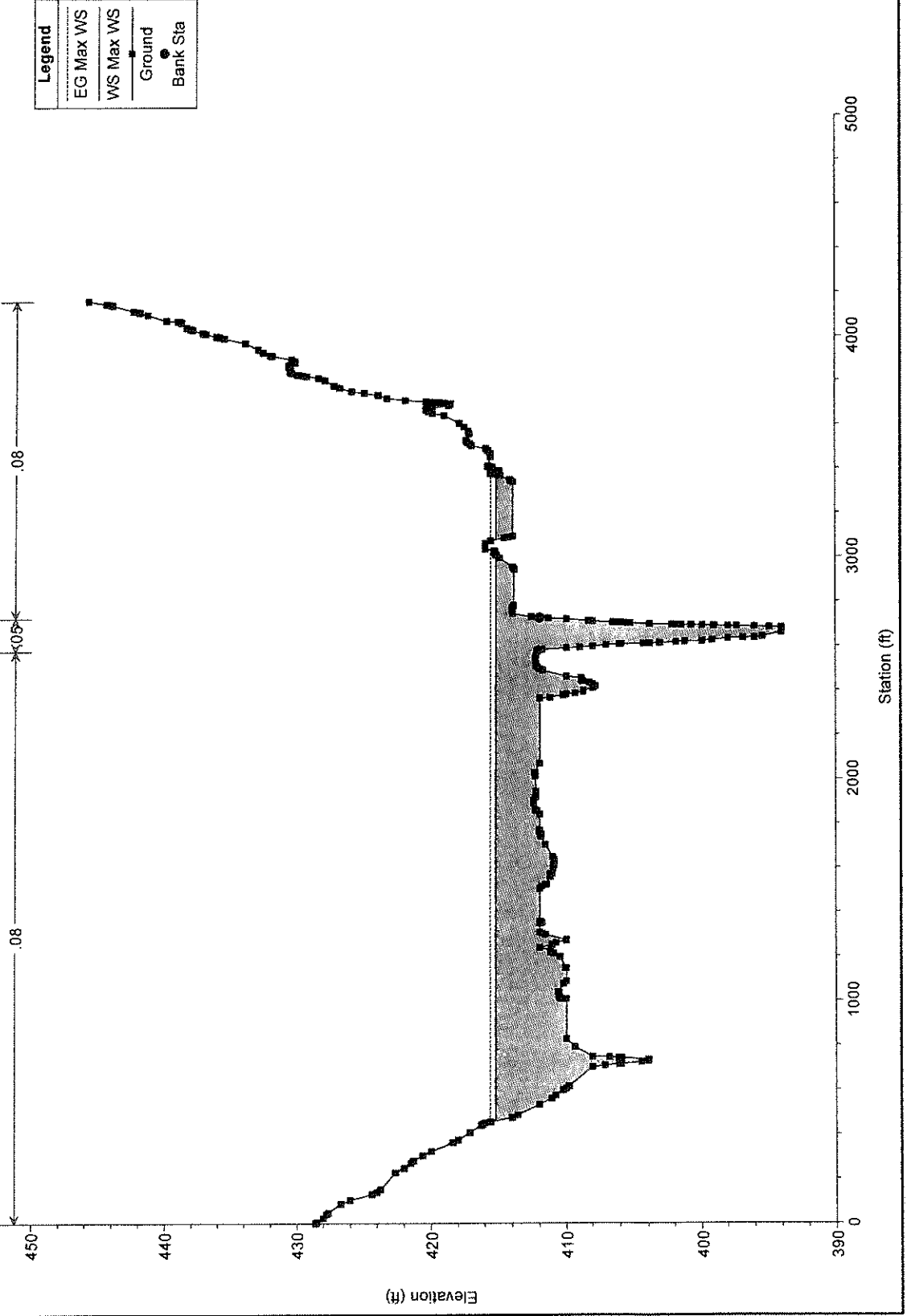
Legend	
—	EG Max WS
- - -	WS Max WS
•	Ground
•	Bank Sta



C2-C-41

Ten Mile Creek Post Plan: 100-Year Post 10/25/2011

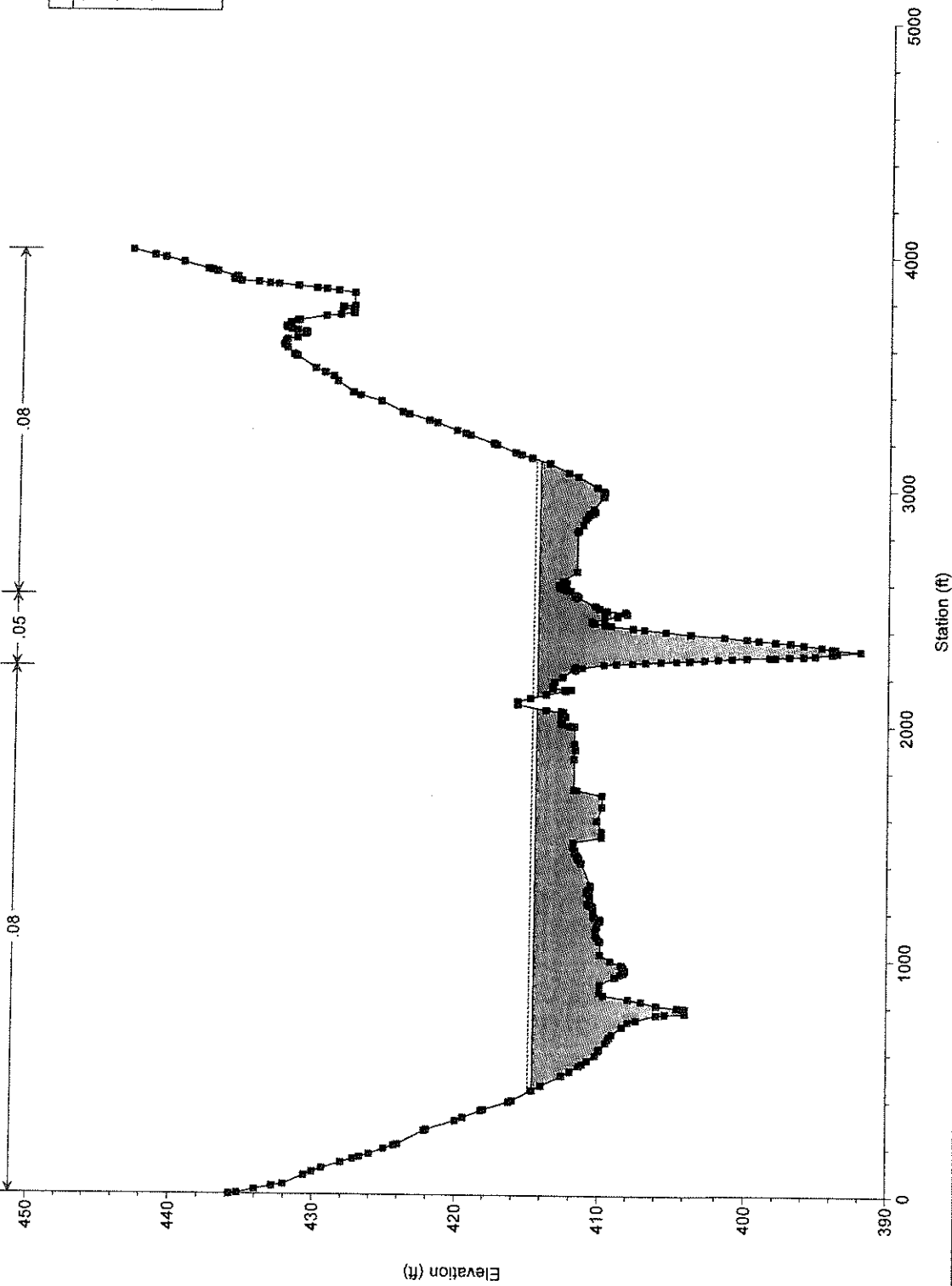
RS = 1.873 100-Year



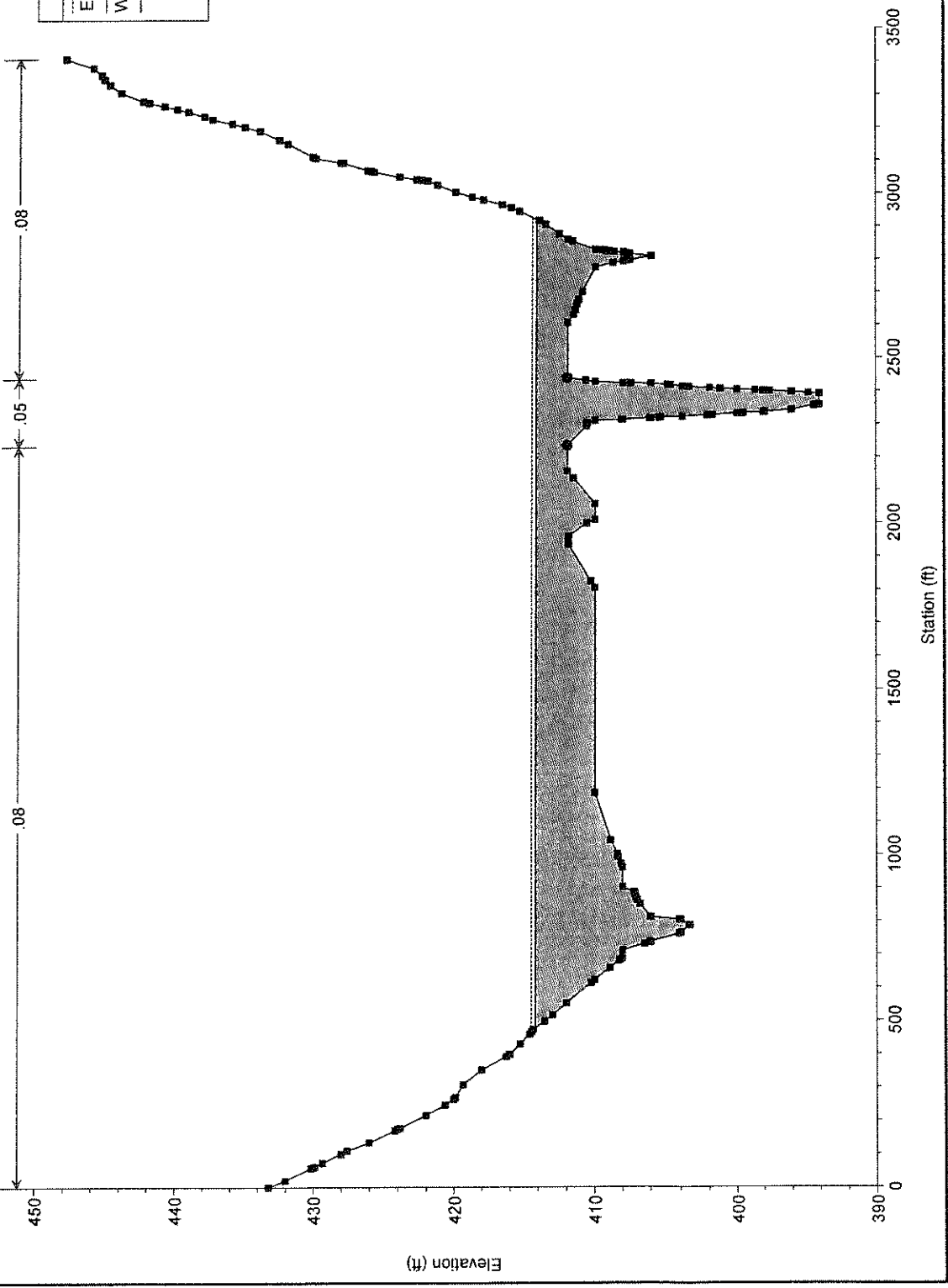
Legend	
EG Max WS	(Symbol)
WS Max WS	(Symbol)
Ground	(Symbol)
Bank Sta	(Symbol)

Ten Mile Creek Post Plan: 100-Year Post 10/25/2011

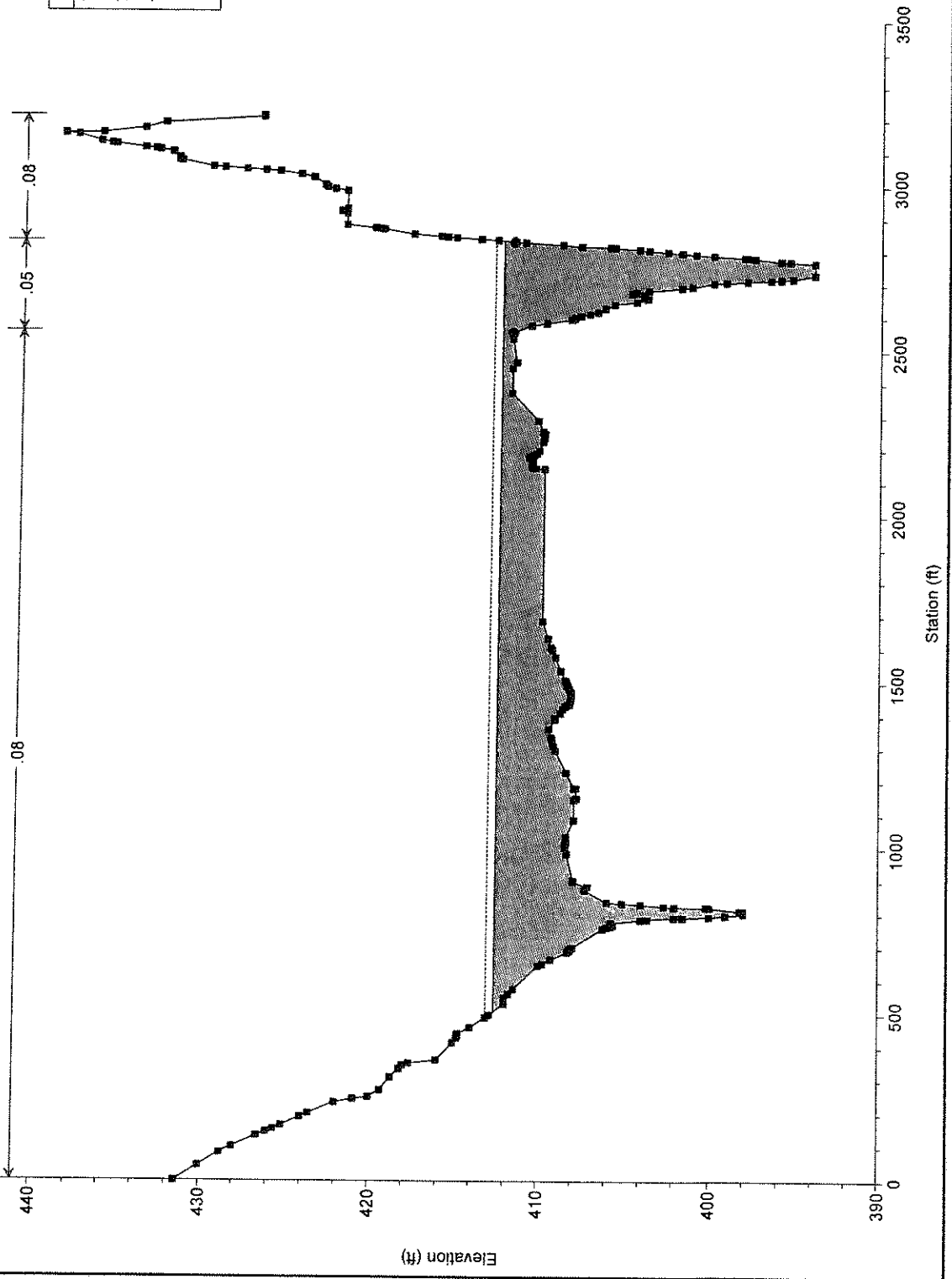
RS = 1.768 100-Year



Ten Mile Creek Post Plan: 100-Year Post 10/25/2011
RS = 1.725 100-Year



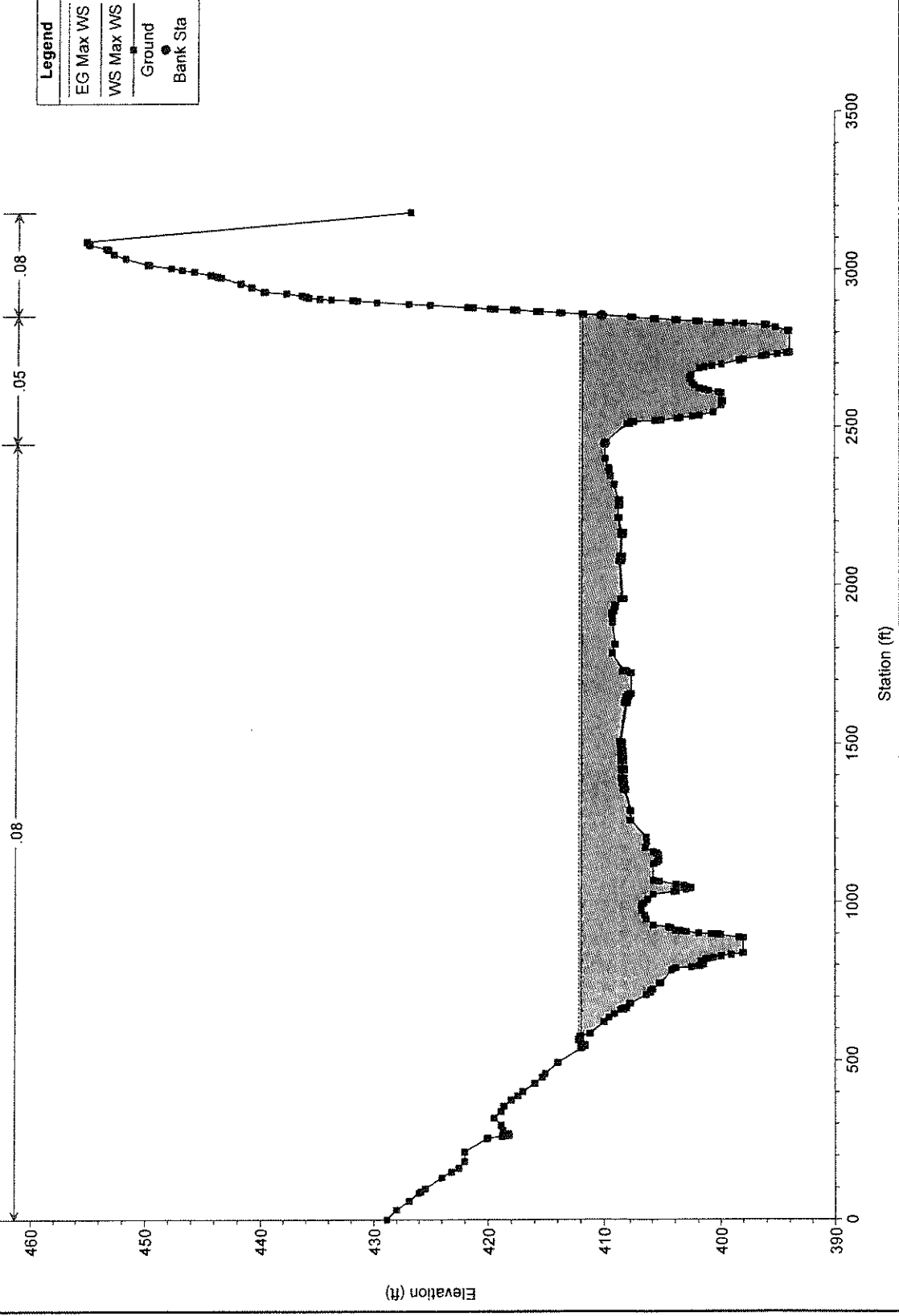
Ten Mile Creek Post Plan: 100-Year Post 10/25/2011
RS = 1.609 100-Year

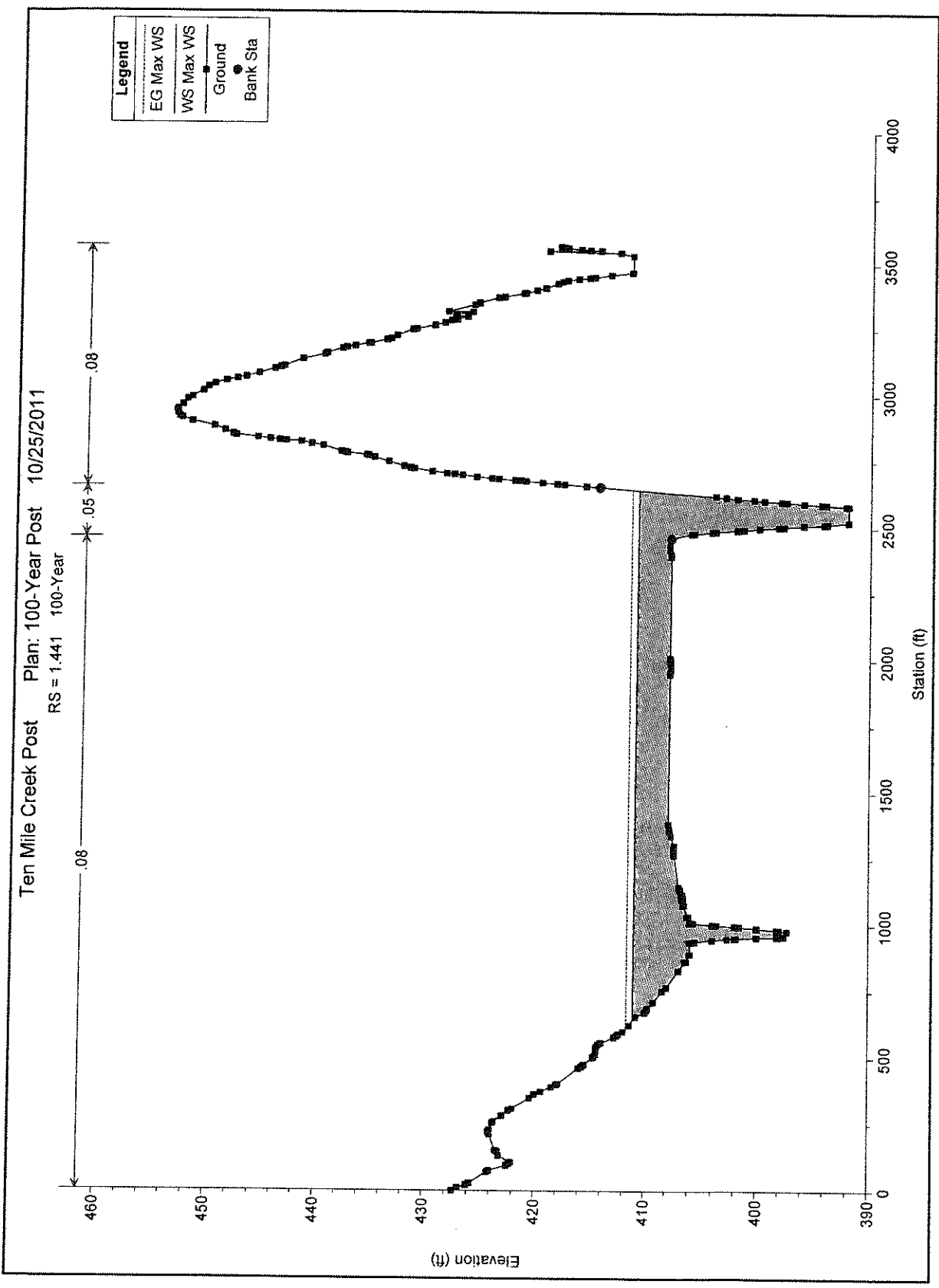


Legend	
EG Max WS	(Symbol)
WS Max WS	(Symbol)
Ground	(Symbol)
Bank Sta	(Symbol)

Ten Mile Creek Post Plan: 100-Year Post 10/25/2011

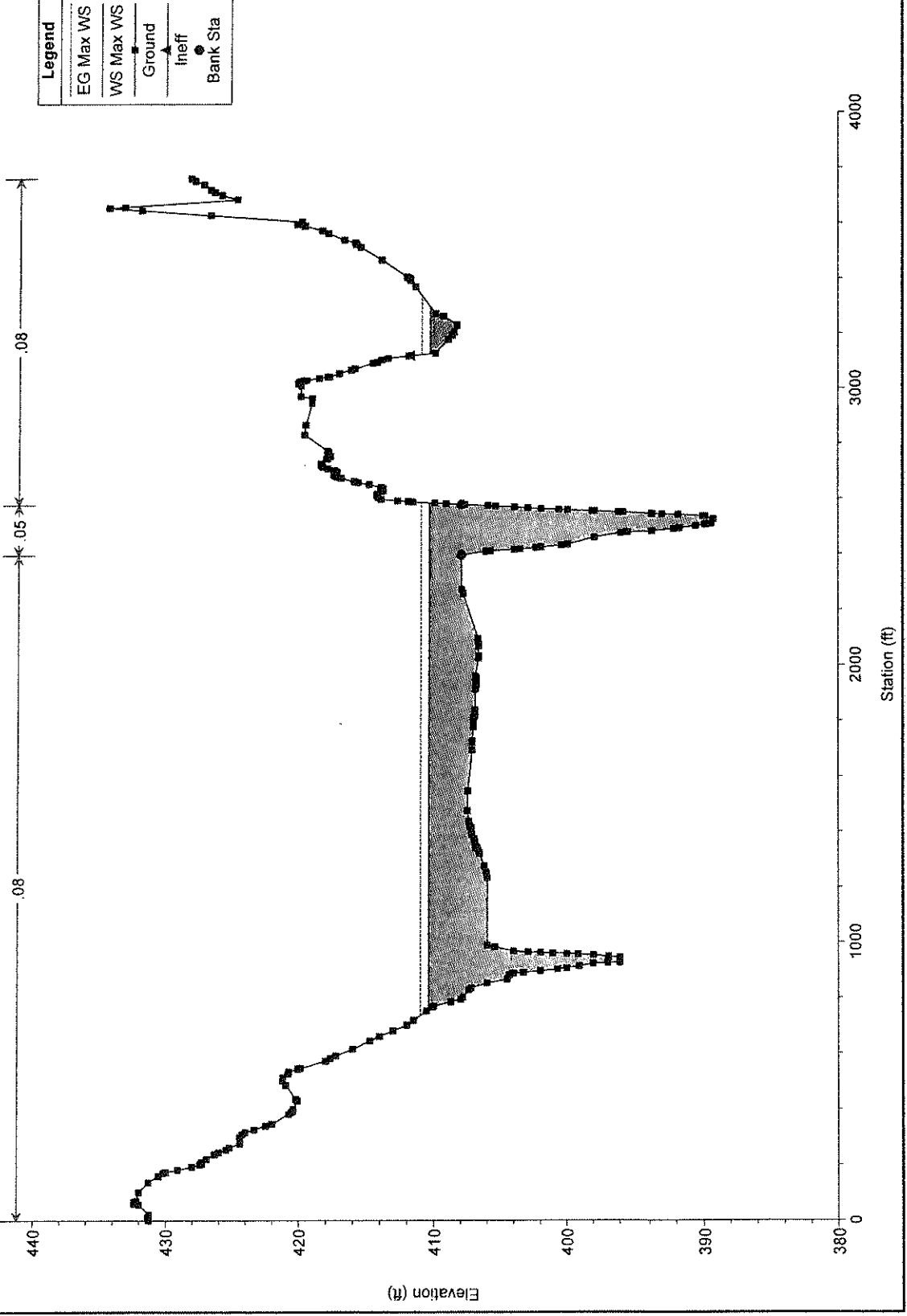
RS = 1.522 100-Year





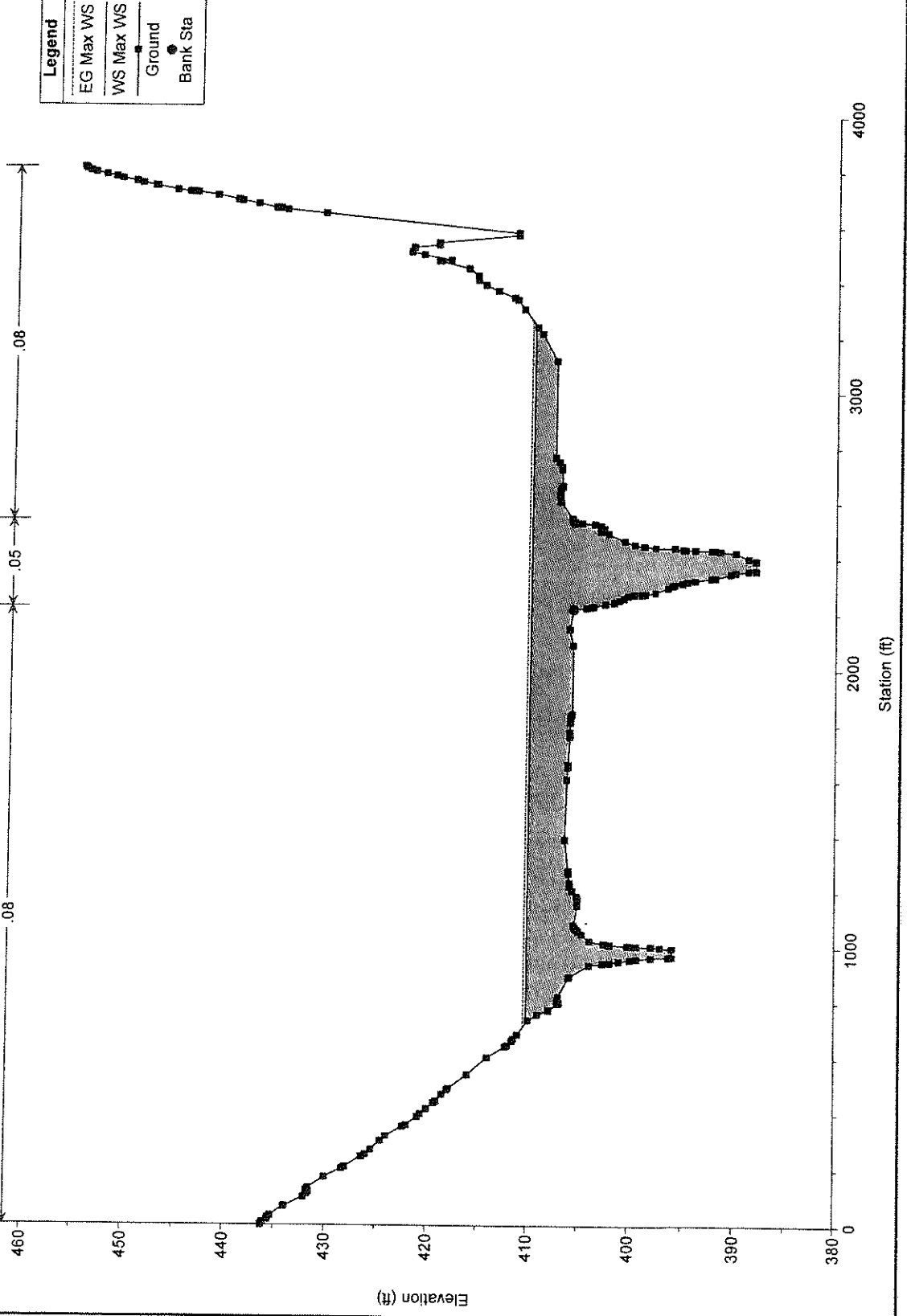
Ten Mile Creek Post Plan: 100-Year Post 10/25/2011

RS = 1.389 100-Year



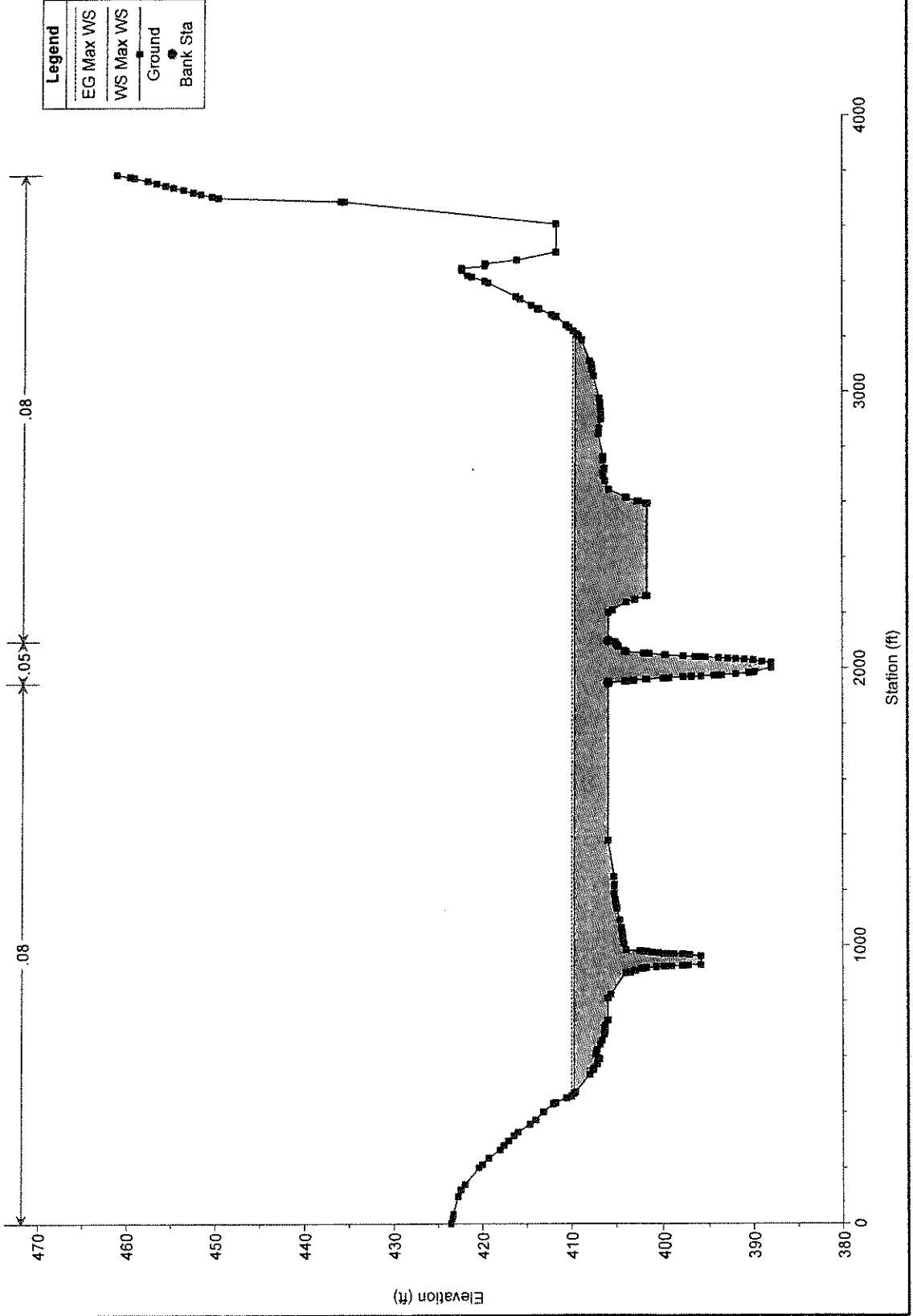
Ten Mile Creek Post Plan: 100-Year Post 10/25/2011

RS = 1.350 100-Year



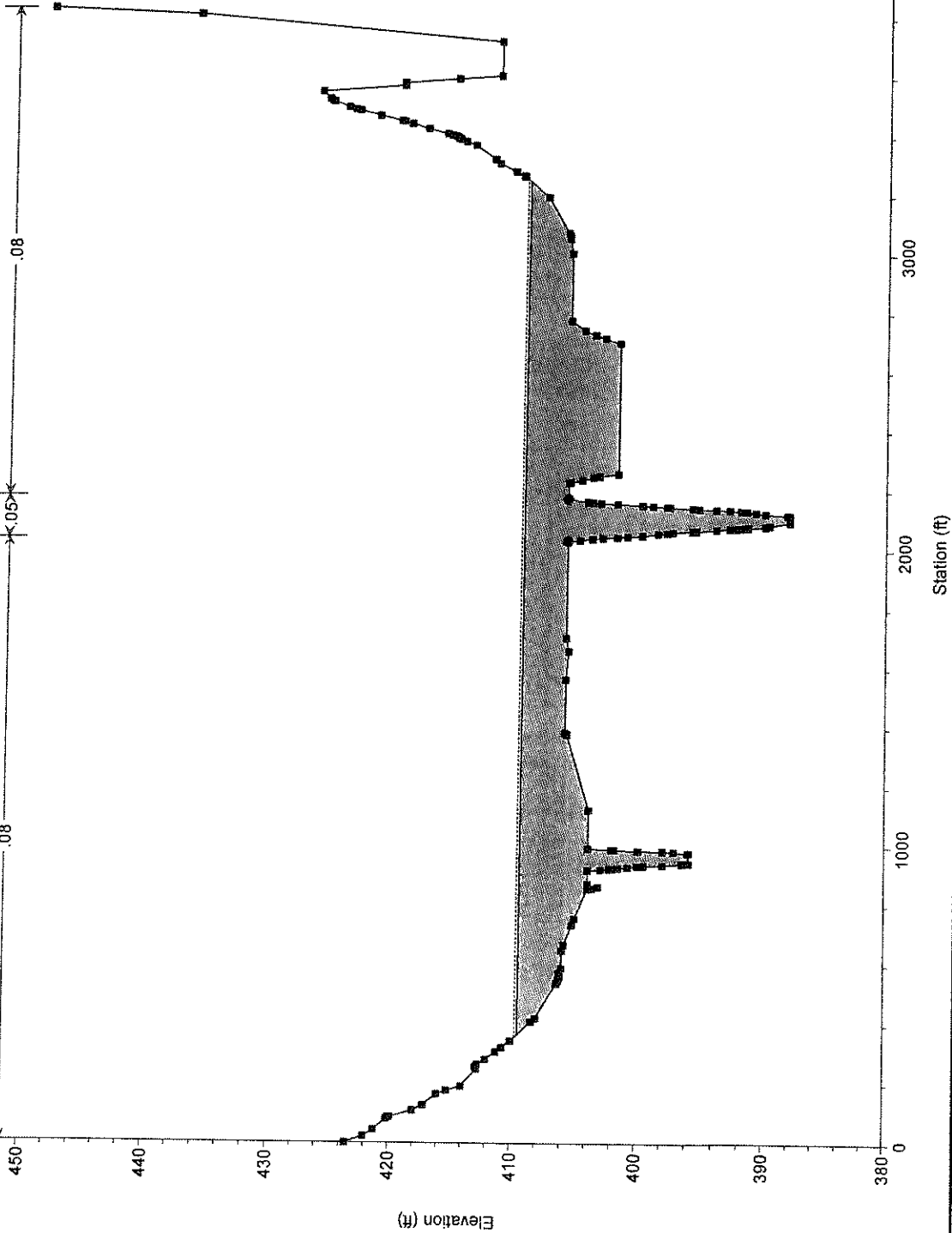
Ten Mile Creek Post Plan: 100-Year Post 10/25/2011

RS = 1.267 100-Year



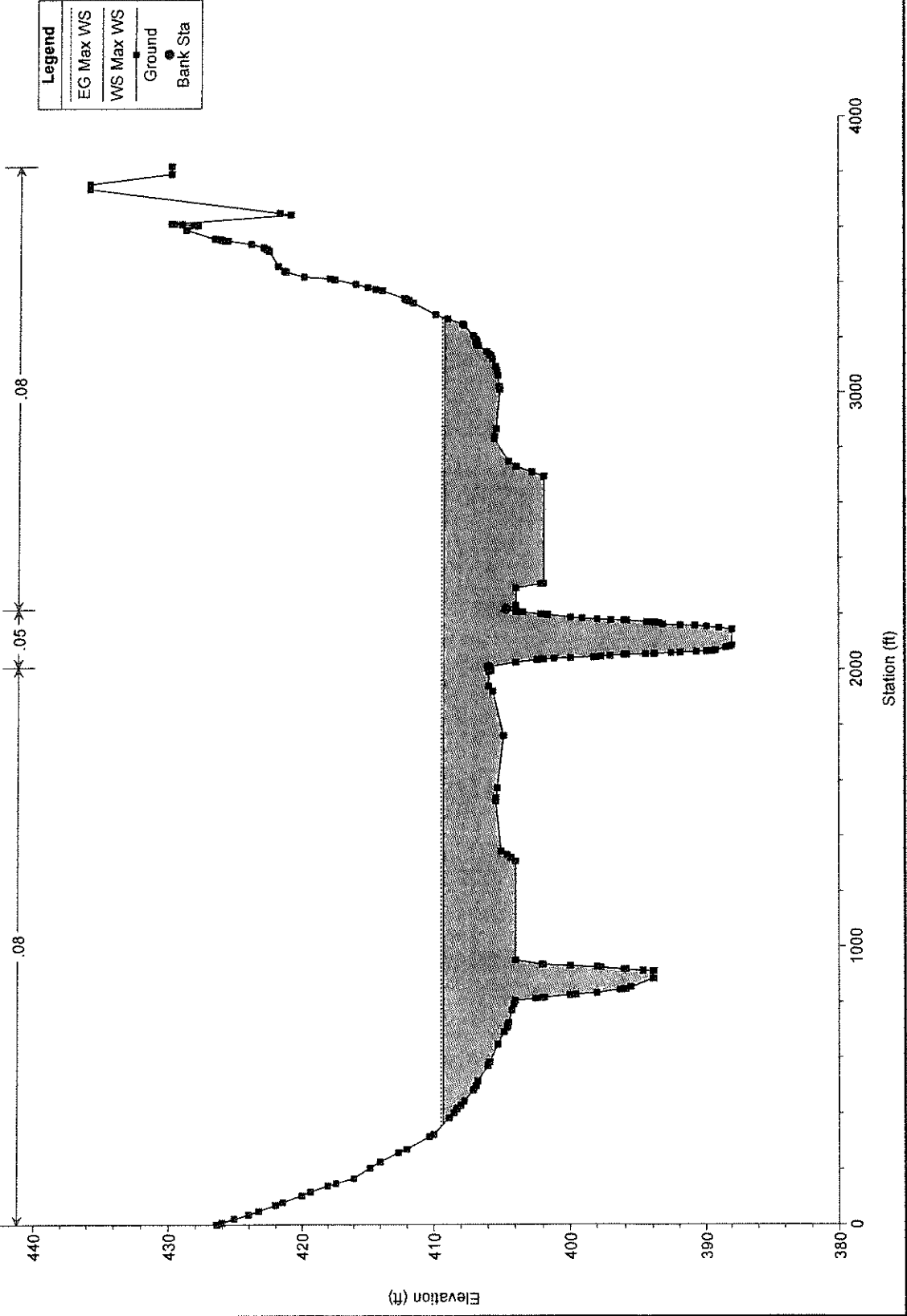
Ten Mile Creek Post Plan: 100-Year Post 10/25/2011

RS = 1.222 100-Year



Ten Mile Creek Post Plan: 100-Year Post 10/25/2011

RS = 1.180 100-Year

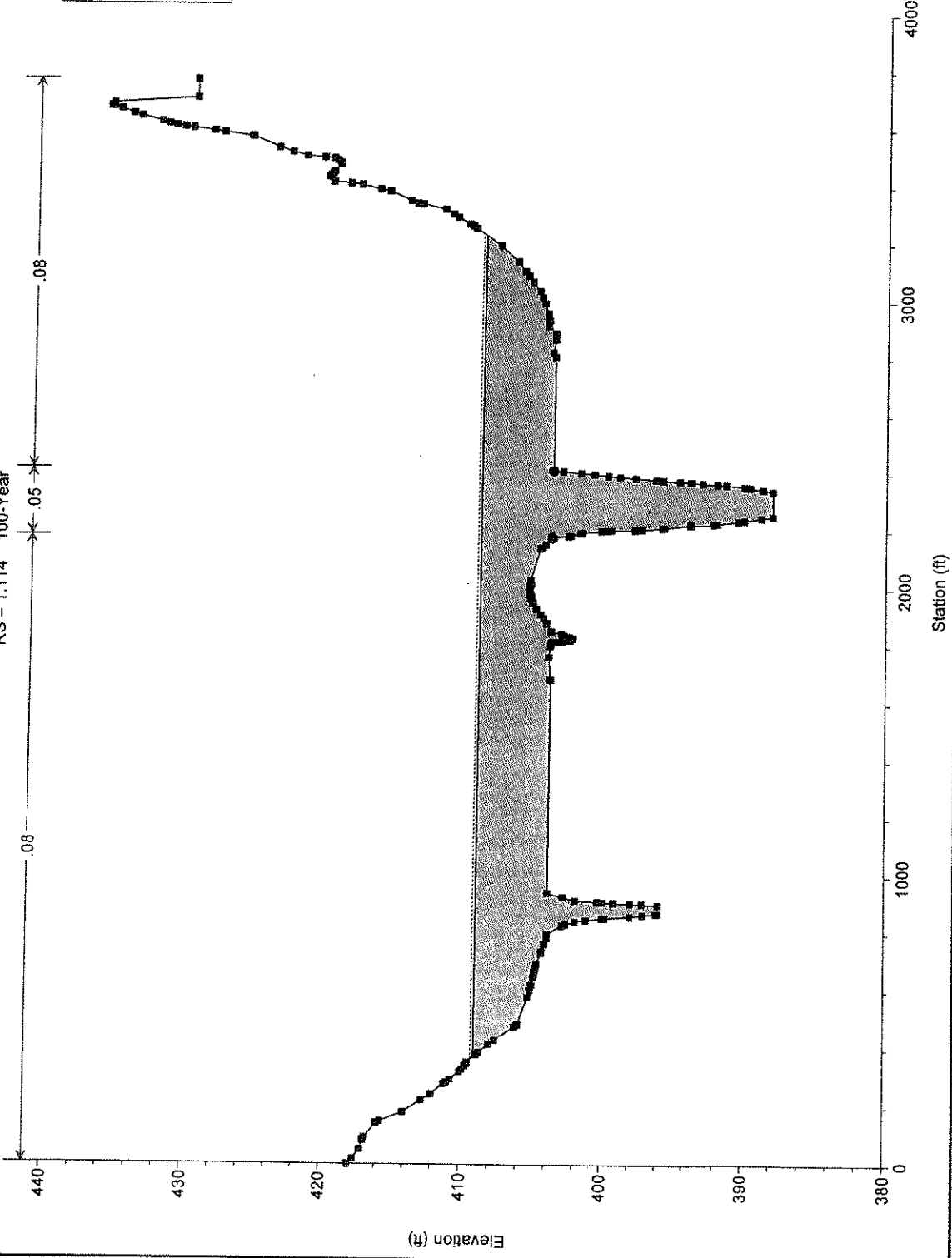


Ten Mile Creek Post Plan: 100-Year Post 10/25/2011

RS = 1.114 100-Year

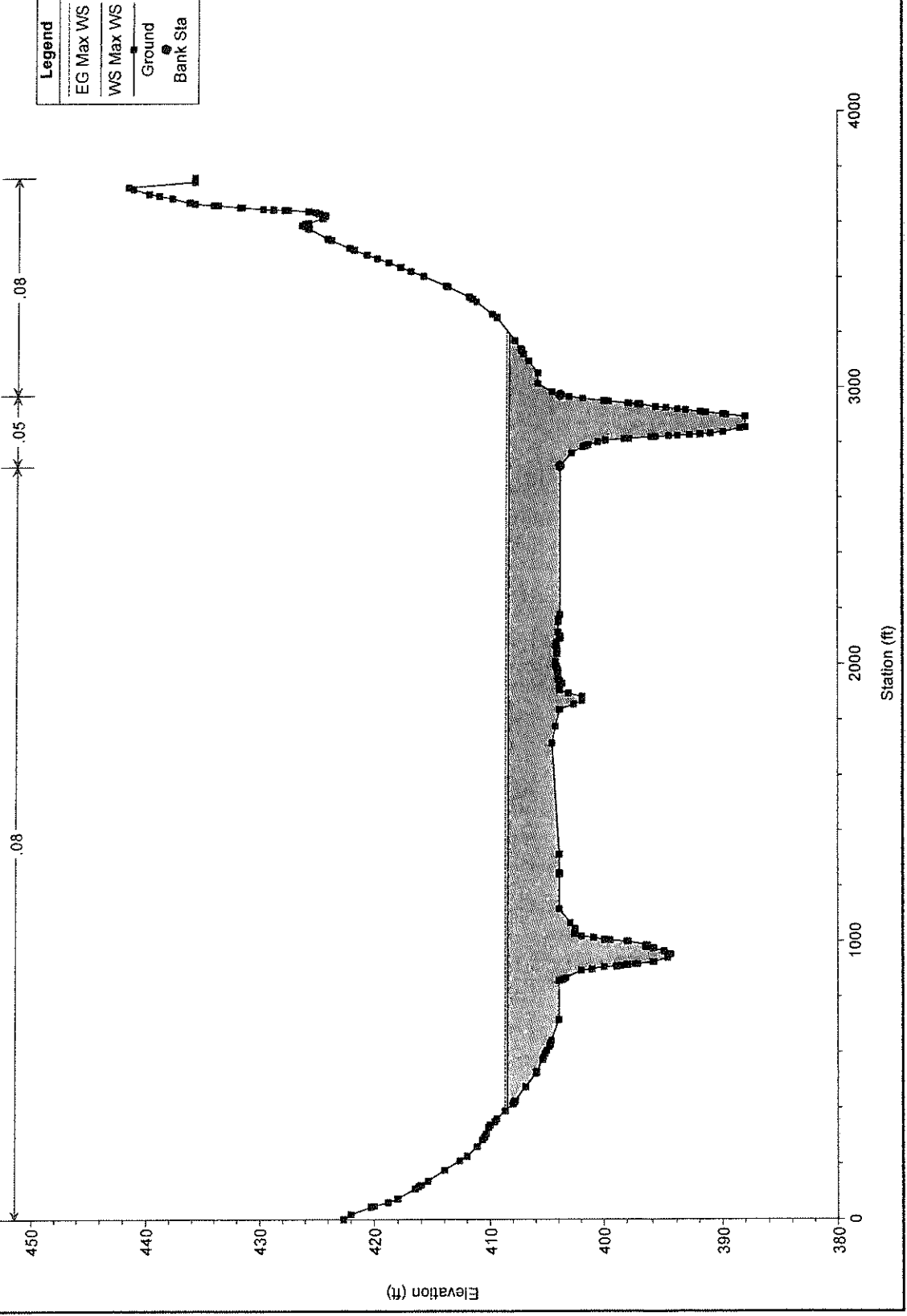
0.08 0.05 0.08

Legend	
EG Max WS	—
WS Max WS	—
Ground	—
Bank Sta	●

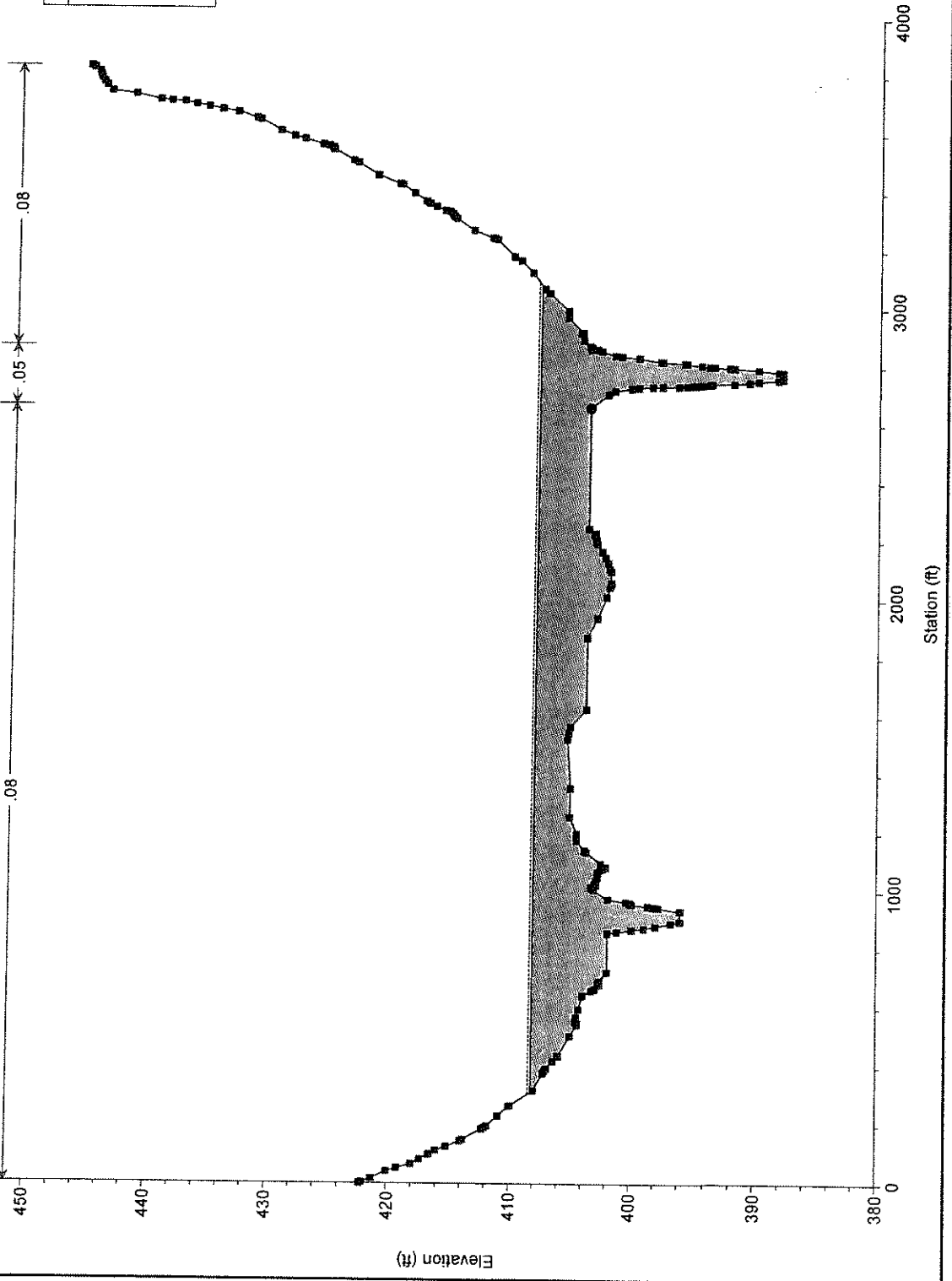


Ten Mile Creek Post Plan: 100-Year Post 10/25/2011

RS = 0.990 100-Year

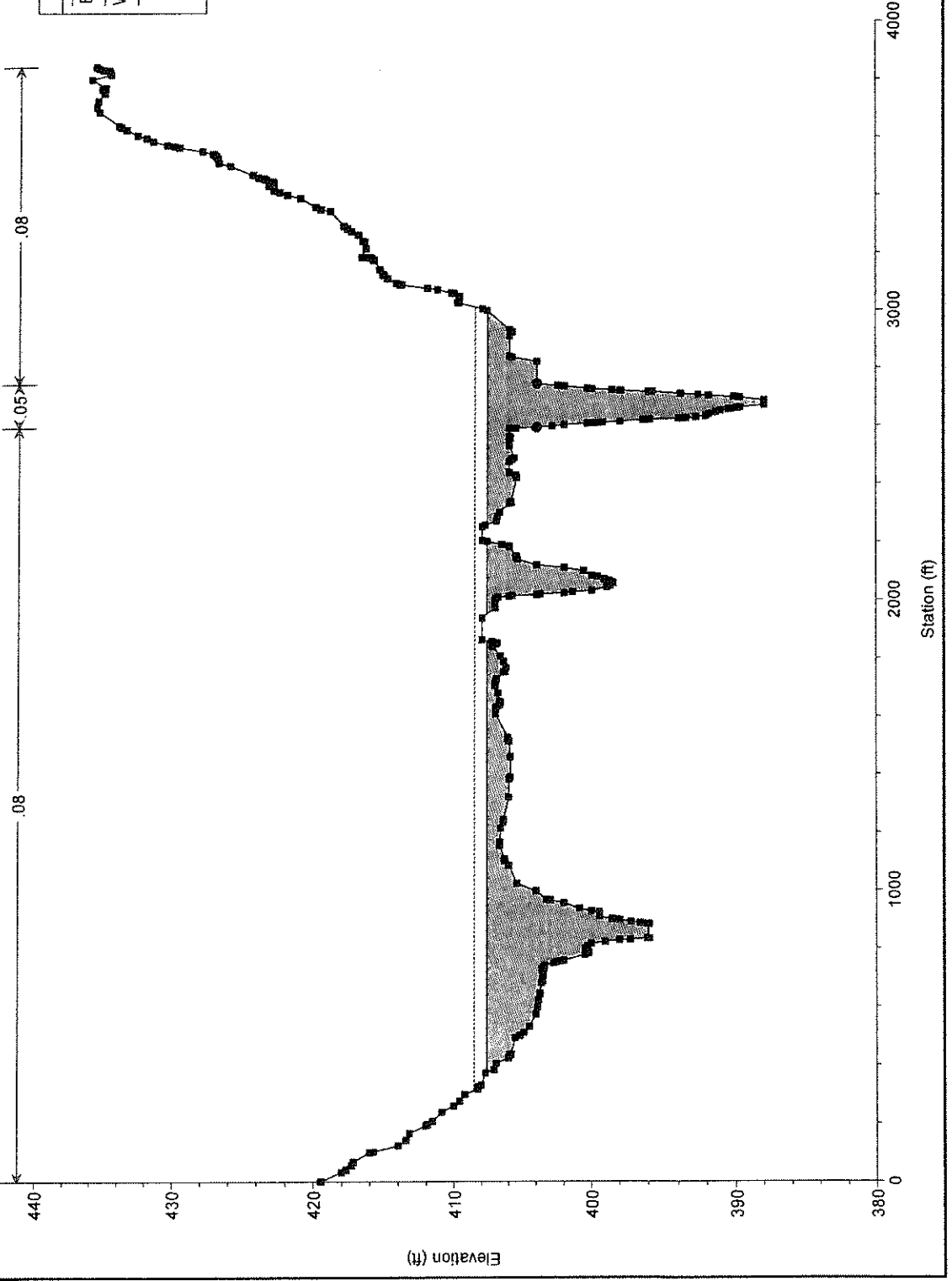


Ten Mile Creek Post Plan: 100-Year Post 10/25/2011
RS = 0.947 100-Year



Ten Mile Creek Post Plan: 100-Year Post 10/25/2011

RS = 0.927 100-Year



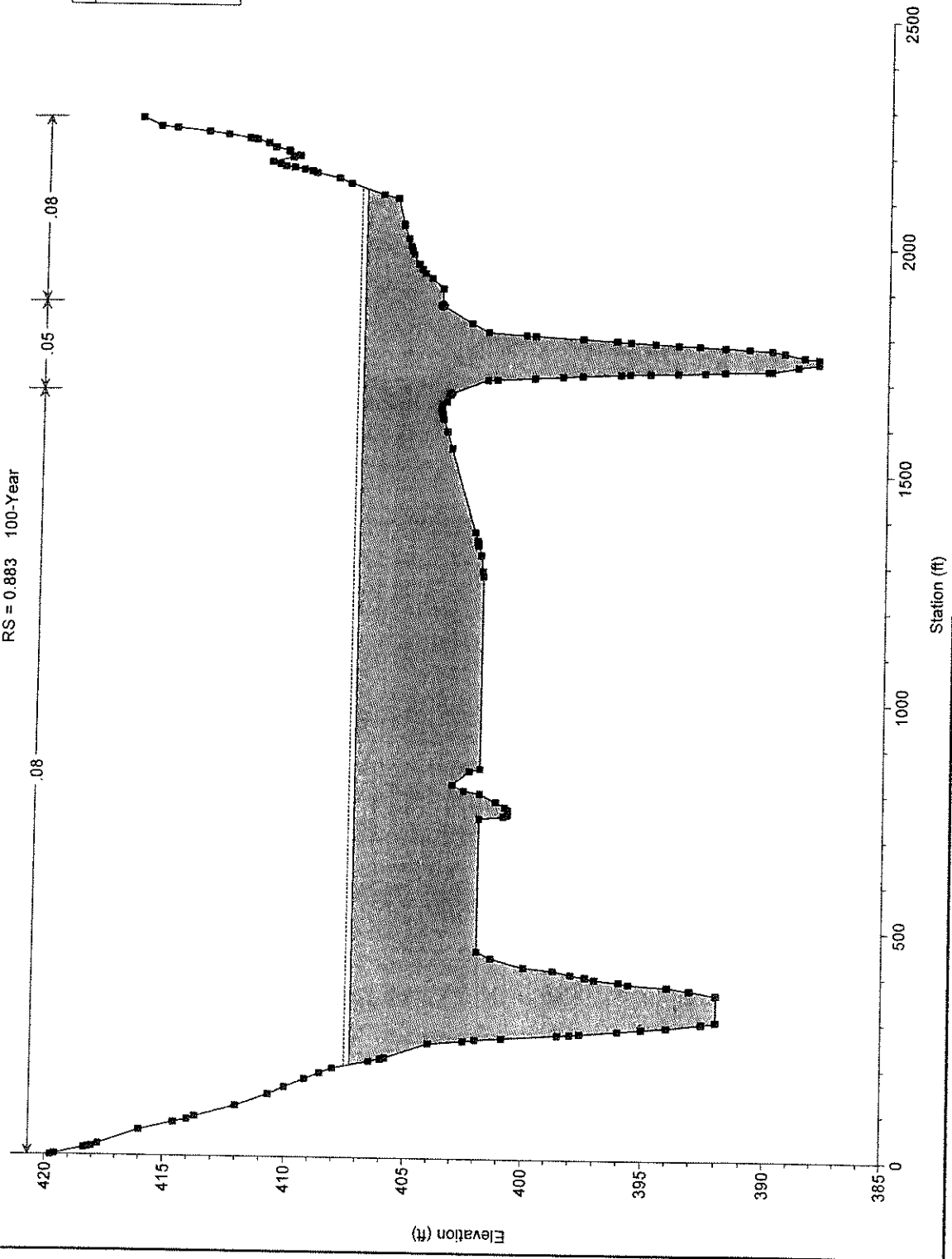
Ten Mile Creek Post Plan: 100-Year Post 10/25/2011

RS = 0.883 100-Year

.08 .05 .08

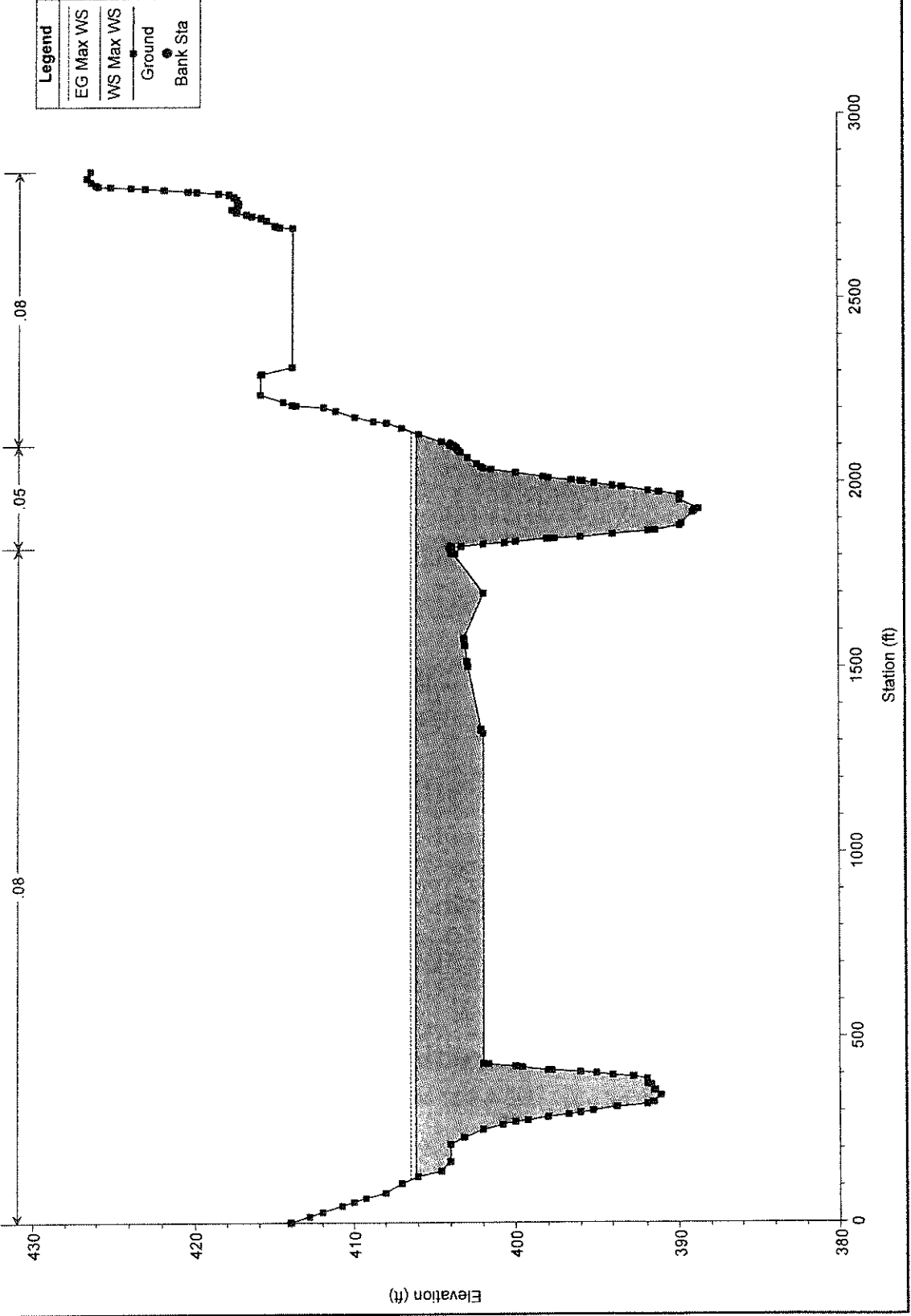
Legend

- EG Max WS
- WS Max WS
- Ground
- Bank Sta

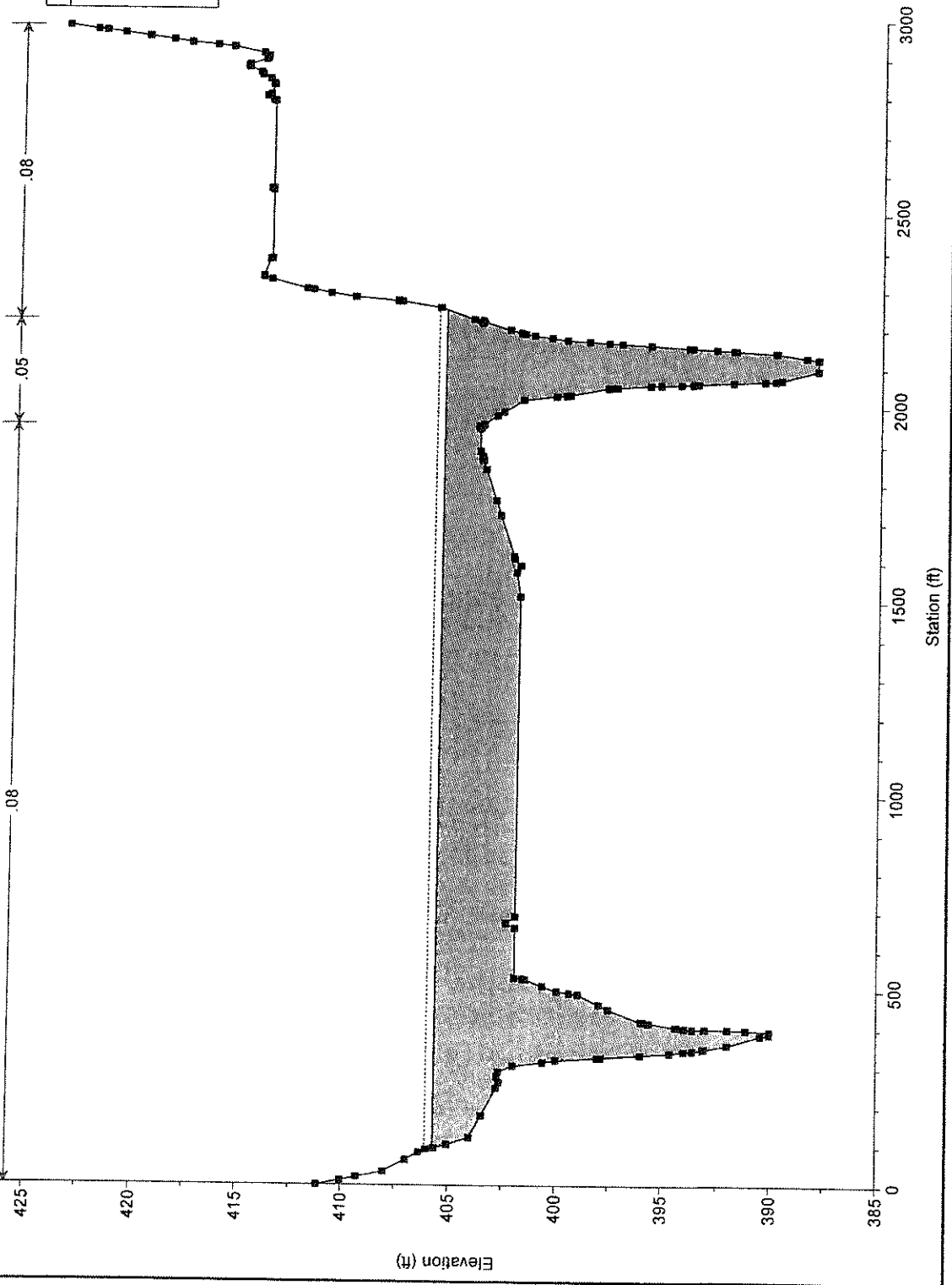


Ten Mile Creek Post Plan: 100-Year Post 10/25/2011

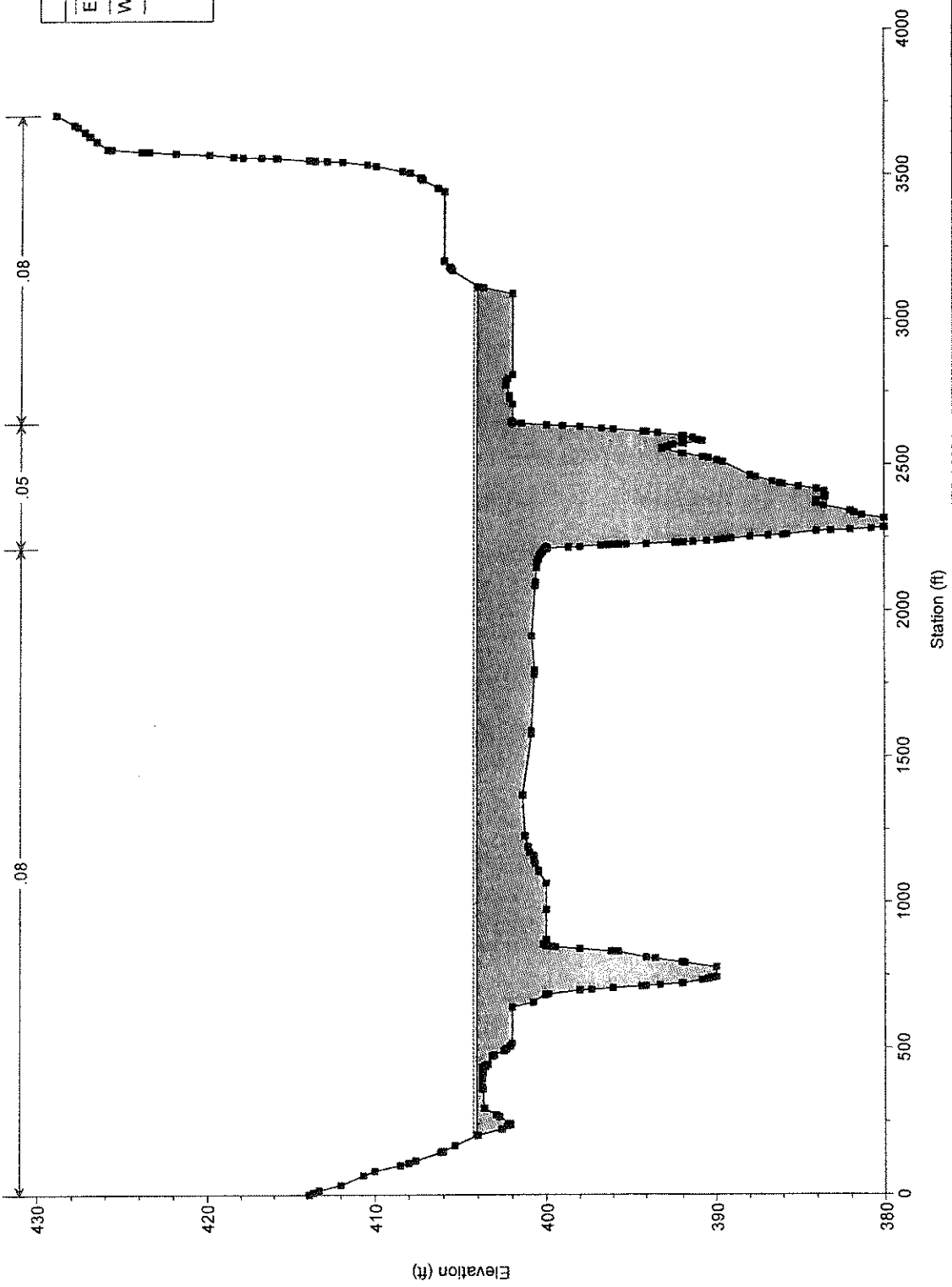
RS = 0.772 100-Year



Ten Mile Creek Post Plan: 100-Year Post 10/25/2011
RS = 0.734 100-Year



Ten Mile Creek Post Plan: 100-Year Post 10/25/2011
RS = 0.462 100-Year



Legend	
EG Max WS	—
WS Max WS	—
Ground	—
Bank Sta	—

Ten Mile Creek Post Plan: 100-Year Post 10/25/2011

RS = 0.381 100-Year

