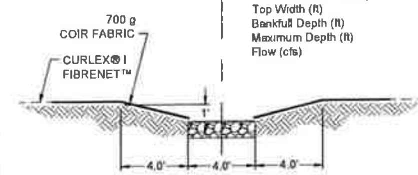
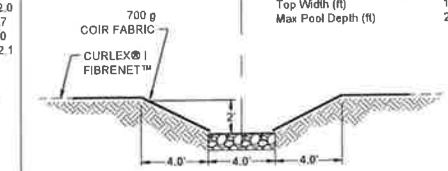
MAIN UPPER (STA. 0+40 TO 2+80)

Riffle Dimensions	
Cross Sectional Area (ft^2)	8.0
Top Width (ft)	12.0
Bankfull Depth (ft)	0.7
Maximum Depth (ft)	1.0
Flow (cfs)	22.1



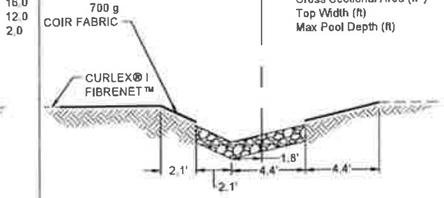
TYPICAL
RIFFLE SECTION

Pool Dimensions	
Cross Sectional Area (ft^2)	16.0
Top Width (ft)	12.0
Max Pool Depth (ft)	2.0



TYPICAL
STRAIGHT POOL SECTION

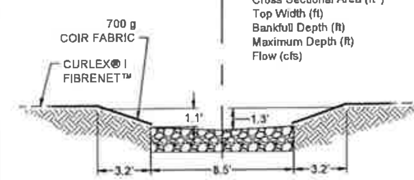
Pool Dimensions	
Cross Sectional Area (ft^2)	13.0
Top Width (ft)	13.0
Max Pool Depth (ft)	2.0



TYPICAL
MEANDER POOL SECTION

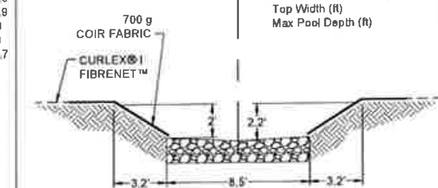
MAIN LOWER (STA. 2+80 TO 17+20)

Riffle Dimensions	
Cross Sectional Area (ft^2)	12.8
Top Width (ft)	14.9
Bankfull Depth (ft)	0.9
Maximum Depth (ft)	1.3
Flow (cfs)	37.7



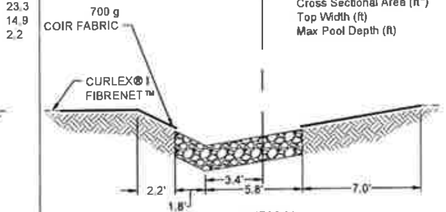
TYPICAL
RIFFLE SECTION

Pool Dimensions	
Cross Sectional Area (ft^2)	23.3
Top Width (ft)	14.9
Max Pool Depth (ft)	2.2



TYPICAL
STRAIGHT POOL SECTION

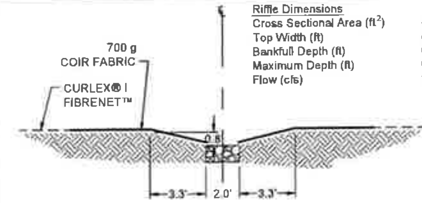
Pool Dimensions	
Cross Sectional Area (ft^2)	16.8
Top Width (ft)	16.8
Max Pool Depth (ft)	2.0



TYPICAL
MEANDER POOL SECTION

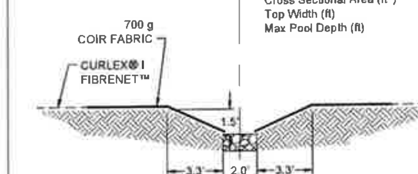
TRIBUTARY (STA. 20+00 TO 29+64)

Riffle Dimensions	
Cross Sectional Area (ft^2)	4.4
Top Width (ft)	8.6
Bankfull Depth (ft)	0.5
Maximum Depth (ft)	0.8
Flow (cfs)	13.4



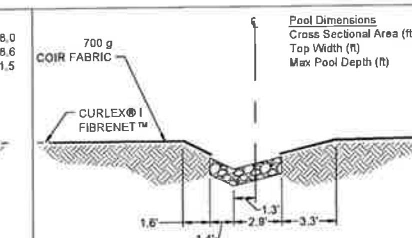
TYPICAL
RIFFLE SECTION

Pool Dimensions	
Cross Sectional Area (ft^2)	8.0
Top Width (ft)	8.6
Max Pool Depth (ft)	1.5



TYPICAL
STRAIGHT POOL SECTION

Pool Dimensions	
Cross Sectional Area (ft^2)	6.8
Top Width (ft)	9.1
Max Pool Depth (ft)	1.5



TYPICAL
MEANDER POOL SECTION

SCALE 1"=5'

0 5' 10'

TIMMONS GROUP

NORTH BRANCH PIGEON CREEK RESTORATION SITE

SOMERSET TOWNSHIP - WASHINGTON COUNTY - PENNSYLVANIA

HYDROLOGY AND CHANNEL DESIGN PARAMETERS

DATE	JUNE 2013
DRAWN BY	M. HUGHES
DESIGNED BY	M. HUGHES
CHECKED BY	R. NAPIER
SCALE	1" = 5'
JOB NO.	33548
SHEET NO.	2.01

REFERENCE REACH

Design Parameters	Field Collected Reference Min	Field Collected Reference Max	Reference Reach Min	Reference Reach Max
Stream Name	On site longpro		Skymeadows	
Stream Type	B4c		C4	
Drainage Area, DA (sq mi)	0.83		1.23	
Riffle Mean Depth, d_{bkf} (ft)	0.80		0.80	
Riffle Width, W_{bkf} (ft)	13.70		25.10	
Riffle Width-to-Depth Ratio, $[W_{bkf}/d_{bkf}]$	17.13		31.38	
Riffle XSEC Area, A_{bkf} (sq ft)	11.46		20.87	
Riffle Max Depth, d_{mbkf} (ft)	1.57	1.85	1.45	1.45
Riffle Max Depth Ratio, $[d_{mbkf}/d_{bkf}]$	1.96	2.31	1.81	1.81
Pool Width, W_{pool} (ft)	10.70	10.70	14.90	14.90
Pool Width Ratio, $[W_{pool}/W_{bkf}]$	0.78	0.78	0.59	0.59
Pool XSEC Area, A_{pool} (sq ft)	14.00	14.00	30.90	30.90
Pool Area Ratio, $[A_{pool}/A_{bkf}]$	1.22	1.22	1.48	1.48
Pool Max Depth, d_{mpool} (ft)	2.51	2.51	4.03	4.03
Pool Max Depth Ratio, $[d_{mpool}/d_{pool}]$	3.14	3.14	5.04	5.04
Low Bank Height, LBH (ft)	1.60	1.90	N/A	0.00
Low Bank Height Ratio, $[LBH/d_{mbkf}]$	1.02	1.03	N/A	N/A
Width Flood Prone Area, W_{fpa} (ft)	24.00	29.50	59.00	59.00
Entrenchment Ratio, $[W_{fpa}/W_{bkf}]$	1.75	2.15	2.35	2.35
Point Bar Slope, H/V (ft/ft)	0.44	0.64	0.63	0.63
Meander Length, L_m (ft)	100.16	100.16	N/A	N/A
Meander Length Ratio, $[L_m/W_{bkf}]$	7.31	7.31	N/A	N/A
Radius of Curvature, R_c (ft)	11.52	86.23	85.00	85.00
Rc Ratio, $[R_c/W_{bkf}]$	0.84	6.29	3.39	3.39
Meander Belt Width, W_{blt} (ft)	28.46	28.46	84.00	84.00
MW Ratio, $[W_{blt}/W_{bkf}]$	2.08	2.08	3.35	3.35
Riffle Length, L_{rf} (ft)	21.59	30.16	33.60	34.80
Riffle Length Ratio, $[L_{rf}/W_{bkf}]$	1.58	2.20	1.34	1.39
Riffle Slope, S_{rf} (ft/ft)	0.003	0.018	0.013	0.036
Riffle Slope Ratio, $[S_{rf}/S_{ave}]$	0.46	3.18	0.85	2.36
Pool Length, L_{pool} (ft)	15.32	15.32	18.90	31.50
Pool Length Ratio, $[L_{pool}/W_{bkf}]$	1.12	1.12	0.75	1.25
Pool Slope, S_{pool} (ft/ft)	0.00	0.00	0.00	0.01
Pool Slope Ratio, $[S_{pool}/S_{ave}]$	0.00	0.27	0.13	0.33
Pool to Pool Spacing, p-p (ft)	12.00	73.00	60.00	70.50
Pool Spacing Ratio, $[p\text{-}p/W_{bkf}]$	0.88	5.33	2.39	2.81
Valley Length, VL (ft)	137.94		260.70	
Valley Elevation Change, VΔ (ft)	0.84		4.43	
Valley Slope, VS (ft/ft)	0.006		0.017	
Stream Length, SL (ft)	150.00		300.00	
Stream Elevation Change, SΔ (ft)	0.84		4.57	
Average Water Surface Slope, S (ft/ft)	0.01		0.02	
Sinuosity, K (ft/ft)	1.09		1.15	
Bankfull Wetted Perimeter, P (ft)	15.30		26.70	
Bankfull Hydraulic Radius, R (ft)	0.70		0.80	
Bankfull Mannings n (esitmate)	0.045		0.040	
Manning Bkf Discharge, Q_{bkf} (cfs)	22.40		82.70	
Manning Bkf Velocity, u_{bkf} (ft/s^2)	1.95		3.96	
Bankfull Stream Power, ω (lb/ft/s)	0.47		3.01	
Bankfull Shear Stress, τ (lb/ft^2)	0.24		0.76	
Shields - Diameter Mobilized (mm)	94		93	

TRIBUTARY (STA. 20+00 TO 29+64)

Design Parameters	Design Ratios Min	Design Ratios Max	Target Ratios Min	Target Ratios Max	Existing Condition Min	Existing Condition Max
Stream Name	Trib		Trib		Trib	
Stream Type	C4b		C4b		C4	
Drainage Area, DA (sq mi)	0.28		0.28		0.28	
Riffle Mean Depth, d_{bkf} (ft)	0.50		0.50		0.50	
Riffle Width, W_{bkf} (ft)	8.60		7.70		7.24	
Riffle Width-to-Depth Ratio, $[W_{bkf}/d_{bkf}]$	17.20		15.00		14.48	
Riffle XSEC Area, A_{bkf} (sq ft)	4.40		4.00		3.89	
Riffle Max Depth, d_{mbkf} (ft)	0.80	0.80	0.60	0.90	1.22	1.22
Riffle Max Depth Ratio, $[d_{mbkf}/d_{bkf}]$	1.60	1.60	1.20	1.70	2.44	2.44
Pool Width, W_{pool} (ft)	8.60	9.10	6.16	9.24	13.29	13.29
Pool Width Ratio, $[W_{pool}/W_{bkf}]$	1.00	1.06	0.80	1.20	1.84	1.84
Pool XSEC Area, A_{pool} (sq ft)	6.80	8.00	4.80	8.00	6.35	6.35
Pool Area Ratio, $[A_{pool}/A_{bkf}]$	1.55	1.82	1.20	2.00	1.63	1.63
Pool Max Depth, d_{mpool} (ft)	1.50	1.50	1.30	1.80	1.29	1.29
Pool Max Depth Ratio, $[d_{mpool}/d_{pool}]$	3.00	3.00	2.50	3.50	2.58	2.58
Low Bank Height, LBH (ft)	0.80	0.80	0.60	0.90	2.00	3.00
Low Bank Height Ratio, $[LBH/d_{mbkf}]$	1.00	1.00	1.00	1.00	1.64	2.46
Width Flood Prone Area, W_{fpa} (ft)	60.00	100.00	18.50	46.20	0.00	0.00
Entrenchment Ratio, $[W_{fpa}/W_{bkf}]$	6.98	11.63	2.40	6.00	0.00	0.00
Point Bar Slope, H/V (ft/ft)	0.25	0.25	0.20	0.50	0.36	0.36
Meander Length, L_m (ft)	77.42	106.40	53.90	92.40	58.00	58.00
Meander Length Ratio, $[L_m/W_{bkf}]$	9.00	12.37	7.00	12.00	8.01	8.01
Radius of Curvature, R_c (ft)	21.00	31.00	15.40	30.80	8.00	30.00
Rc Ratio, $[R_c/W_{bkf}]$	2.44	3.60	2.00	4.00	1.10	4.14
Meander Belt Width, W_{blt} (ft)	16.67	32.94	15.40	38.50	18.74	37.63
MW Ratio, $[W_{blt}/W_{bkf}]$	1.94	3.83	2.00	5.00	2.59	5.20
Riffle Length, L_{rf} (ft)	12.99	30.62	11.55	30.80	36.20	90.50
Riffle Length Ratio, $[L_{rf}/W_{bkf}]$	1.51	3.56	1.50	4.00	5.00	12.50
Riffle Slope, S_{rf} (ft/ft)	0.023	0.031	0.029	0.038	0.017	0.020
Riffle Slope Ratio, $[S_{rf}/S_{ave}]$	1.17	1.61	1.50	2.00	0.90	1.06
Pool Length, L_{pool} (ft)	4.27	17.06	3.85	12.32	16.10	25.40
Pool Length Ratio, $[L_{pool}/W_{bkf}]$	0.50	1.98	0.50	1.60	2.22	3.51
Pool Slope, S_{pool} (ft/ft)	0.00	0.00	0.00	0.00	0.00	0.00
Pool Slope Ratio, $[S_{pool}/S_{ave}]$	0.00	0.00	0.00	0.10	0.00	0.08
Pool to Pool Spacing, p-p (ft)	9.73	43.96	23.10	53.90	44.20	201.00
Pool Spacing Ratio, $[p\text{-}p/W_{bkf}]$	1.13	5.11	3.00	7.00	6.10	27.76
Valley Length, VL (ft)	800.82		800.82		801.48	
Valley Elevation Change, VΔ (ft)	17.28		17.28		17.28	
Valley Slope, VS (ft/ft)	0.022		0.022		0.022	
Stream Length, SL (ft)	899.39		899.39		913.71	
Stream Elevation Change, SΔ (ft)	17.28		17.28		17.28	
Average Water Surface Slope, S (ft/ft)	0.02		0.02		0.02	
Sinuosity, K (ft/ft)	1.12		1.12		1.14	
Bankfull Wetted Perimeter, P (ft)	9.60		8.70		8.20	
Bankfull Hydraulic Radius, R (ft)	0.50		0.50		0.50	
Bankfull Mannings n (esitmate)	0.040		0.040		0.035	
Manning Bkf Discharge, Q_{bkf} (cfs)	14.30		13.00		14.30	
Manning Bkf Velocity, u_{bkf} (ft/s^2)	3.25		3.25		3.68	
Bankfull Stream Power, ω (lb/ft/s)	1.95		1.95		2.17	
Bankfull Shear Stress, τ (lb/ft^2)	0.60		0.60		0.59	
Shields - Diameter Mobilized (mm)	119		119		87	

MAIN UPPER (STA. 0+40 TO 2+80)

Design Parameters	Design Ratios Min	Design Ratios Max	Target Ratios Min	Target Ratios Max	Existing Condition Min	Existing Condition Max
Stream Name	Main Upper		Main Upper		Main Upper	
Stream Type	C4b		C4b		E4b	
Drainage Area, DA (sq mi)	0.62		0.62		0.62	
Riffle Mean Depth, d_{bkf} (ft)	0.70		0.70		1.30	
Riffle Width, W_{bkf} (ft)	12.00		11.00		6.10	
Riffle Width-to-Depth Ratio, $[W_{bkf}/d_{bkf}]$	17.14		15.00		4.69	
Riffle XSEC Area, A_{bkf} (sq ft)	8.00		8.00		7.98	
Riffle Max Depth, d_{mbkf} (ft)	1.00	1.00	0.80	1.20	1.95	1.95
Riffle Max Depth Ratio, $[d_{mbkf}/d_{bkf}]$	1.43	1.43	1.20	1.70	1.50	1.50
Pool Width, W_{pool} (ft)	12.00	13.00	8.80	13.20	9.64	9.64
Pool Width Ratio, $[W_{pool}/W_{bkf}]$	1.00	1.08	0.80	1.20	1.58	1.58
Pool XSEC Area, A_{pool} (sq ft)	13.00	16.00	9.60	16.00	13.41	13.41
Pool Area Ratio, $[A_{pool}/A_{bkf}]$	1.63	2.00	1.20	2.00	1.68	1.68
Pool Max Depth, d_{mpool} (ft)	2.00	2.00	1.80	2.50	2.84	2.84
Pool Max Depth Ratio, $[d_{mpool}/d_{pool}]$	2.86	2.86	2.50	3.50	2.18	2.18
Low Bank Height, LBH (ft)	1.00	1.00	0.80	1.20	2.60	2.60
Low Bank Height Ratio, $[LBH/d_{mbkf}]$	1.00	1.00	1.00	1.00	1.33	1.33
Width Flood Prone Area, W_{fpa} (ft)	42.00	116.00	26.40	66.00	0.00	0.00
Entrenchment Ratio, $[W_{fpa}/W_{bkf}]$	3.50	9.67	2.40	6.00	0.00	0.00
Point Bar Slope, H/V (ft/ft)	0.22	0.22	0.20	0.50	0.24	0.24
Meander Length, L_m (ft)	52.00	60.00	77.00	132.00	29.00	68.00
Meander Length Ratio, $[L_m/W_{bkf}]$	4.33	5.00	7.00	12.00	4.75	11.15
Radius of Curvature, R_c (ft)	22.00	22.00	22.00	44.00	5.00	14.00
Rc Ratio, $[R_c/W_{bkf}]$	1.83	1.83	2.00	4.00	0.82	2.30
Meander Belt Width, W_{blt} (ft)	36.00	44.00	22.00	55.00	26.00	31.00
MW Ratio, $[W_{blt}/W_{bkf}]$	3.00	3.67	2.00	5.00	4.26	5.08
Riffle Length, L_{rf} (ft)	18.81	41.78	16.50	44.00	26.43	82.55
Riffle Length Ratio, $[L_{rf}/W_{bkf}]$	1.57	3.48	1.50	4.00	4.33	13.53
Riffle Slope, S_{rf} (ft/ft)	0.016	0.016	0.041	0.055	0.011	0.021
Riffle Slope Ratio, $[S_{rf}/S_{ave}]$	0.60	0.60	1.50	2.00	0.47	0.86
Pool Length, L_{pool} (ft)	7.36	12.28	5.50	17.60	6.68	13.00
Pool Length Ratio, $[L_{pool}/W_{bkf}]$	0.61	1.02	0.50	1.60	1.10	2.13
Pool Slope, S_{pool} (ft/ft)	0.00	0.00	0.00	0.00	0.00	0.00
Pool Slope Ratio, $[S_{pool}/S_{ave}]$	0.00	0.00	0.00	0.10	0.00	0.06
Pool to Pool Spacing, p-p (ft)	39.66	60.00	33.00	77.00	50.33	50.33
Pool Spacing Ratio, $[p\text{-}p/W_{bkf}]$	3.31	5.00	3.00	7.00	8.25	8.25
Valley Length, VL (ft)	199.94		199.94		237.80	
Valley Elevation Change, VΔ (ft)	6.12		6.12		6.12	
Valley Slope, VS (ft/ft)	0.031		0.031		0.026	
Stream Length, SL (ft)	223.83		223.83		253.90	
Stream Elevation Change, SΔ (ft)	6.12		6.12		6.12	
Average Water Surface Slope, S (ft/ft)	0.03		0.03		0.02	
Sinuosity, K (ft/ft)	1.12		1.12		1.07	
Bankfull Wetted Perimeter, P (ft)	13.40		12.40		8.70	
Bankfull Hydraulic Radius, R (ft)	0.60		0.60		0.90	
Bankfull Mannings n (esitmate)	0.040		0.040		0.035	
Manning Bkf Discharge, Q_{bkf} (cfs)	35.00		35.00		49.20	
Manning Bkf Velocity, u_{bkf} (ft/s^2)	4.38		4.38		6.17	
Bankfull Stream Power, ω (lb/ft/s)	4.46		4.46		8.32	
Bankfull Shear Stress, τ (lb/ft^2)	1.02		1.02		1.35	
Shields - Diameter Mobilized (mm)	111		111		146	

MAIN LOWER (STA. 2+80 TO 17+20)

Design Parameters	Design Ratios Min	Design Ratios Max	Target Ratios Min	Target Ratios Max	Existing Condition Min	Existing Condition Max
Stream Name	Main Lower		Main Lower		Main Lower	
Stream Type	C4		C4		E4	
Drainage Area, DA (sq mi)	0.99		0.99		0.99	
Riffle Mean Depth, d_{bkf} (ft)	0.90		0.80		1.40	
Riffle Width, W_{bkf} (ft)	14.80		14.20		8.95	
Riffle Width-to-Depth Ratio, $[W_{bkf}/d_{bkf}]$	16.44		16.78		6.39	
Riffle XSEC Area, A_{bkf} (sq ft)	12.80		12.00		12.70	
Riffle Max Depth, d_{mbkf} (ft)	1.10	1.10	1.00	1.90	2.25	2.44
Riffle Max Depth Ratio, $[d_{mbkf}/d_{bkf}]$	1.22	1.22	1.20	2.40	1.61	1.74
Pool Width, W_{pool} (ft)	14.80	16.80	11.36	17.04	9.39	9.50
Pool Width Ratio, $[W_{pool}/W_{bkf}]$	1.00	1.14	0.80	1.20	1.05	1.06
Pool XSEC Area, A_{pool} (sq ft)	16.80	23.30	14.40	24.00	14.06	17.41
Pool Area Ratio, $[A_{pool}/A_{bkf}]$	1.31	1.82	1.20	2.00	1.11	1.37
Pool Max Depth, d_{mpool} (ft)	2.00	2.00	2.00	2.80	2.64	3.14
Pool Max Depth Ratio, $[d_{mpool}/d_{pool}]$	2.22	2.22	2.50	3.50	1.89	2.24
Low Bank Height, LBH (ft)	1.10	1.10	1.00	1.90	2.40	2.50
Low Bank Height Ratio, $[LBH/d_{mbkf}]$	1.00	1.00	1.00	1.00	1.07	1.02
Width Flood Prone Area, W_{fpa} (ft)	46.83	105.60	34.10	85.20	33.00	33.00
Entrenchment Ratio, $[W_{fpa}/W_{bkf}]$	3.16	7.14	2.40	6.00	3.69	3.69
Point Bar Slope, H/V (ft/ft)	0.16	0.16	0.14	0.25	0.50	0.70
Meander Length, L_m (ft)	129.73	198.54	99.40	170.40	10.00	200.00
Meander Length Ratio, $[L_m/W_{bkf}]$	8.77	13.41	7.00	12.00	1.12	22.35
Radius of Curvature, R_c (ft)	28.00	57.00	28.40	56.80	3.80	18.00
Rc Ratio, $[R_c/W_{bkf}]$	1.89	3.85	2.00	4.00	0.42	2.01
Meander Belt Width, W_{blt} (ft)	38.48	55.77	28.40	71.00	21.36	64.32
MW Ratio, $[W_{blt}/W_{bkf}]$	2.60	3.77	2.00	5.00	2.39	7.19
Riffle Length, L_{rf} (ft)	7.86	55.68	21.30	56.80	75.58	160.36
Riffle Length Ratio, $[L_{rf}/W_{bkf}]$	0.53	3.76	1.50	4.00	8.44	17.92
Riffle Slope, S_{rf} (ft/ft)	0.013	0.017	0.010	0.014	0.006	0.013
Riffle Slope Ratio, $[S_{rf}/S_{ave}]$	1.91	2.54	1.50	2.00	1.07	2.35
Pool Length, L_{pool} (ft)	6.37	23.81	11.36	21.30	11.04	28.14
Pool Length Ratio, $[L_{pool}/W_{bkf}]$	0.43	1.61	0.80	1.50	1.23	3.14
Pool Slope, S_{pool} (ft/ft)	0.00	0.00	0.00	0.00	0.00	0.00
Pool Slope Ratio, $[S_{pool}/S_{ave}]$	0.00	0.00	0.00	0.10	0.00	0.53
Pool to Pool Spacing, p-p (ft)	14.94	102.22	35.50	99.40	96.86	191.85
Pool Spacing Ratio, $[p\text{-}p/W_{bkf}]$	1.01	6.91	2.50	7.00	10.82	21.44
Valley Length, VL (ft)	1225.66		1225.66		1221.00	
Valley Elevation Change, VΔ (ft)	9.52		9.52		9.52	
Valley Slope, VS (ft/ft)	0.008		0.008		0.008	
Stream Length, SL (ft)	1398.26		1398.26		1752.16	
Stream Elevation Change, SΔ (ft)	9.52		9.52		9.52	
Average Water Surface Slope, S (ft/ft)	0.01		0.01		0.01	
Sinuosity, K (ft/ft)	1.14		1.14		1.44	
Bankfull Wetted Perimeter, P (ft)	16.60		15.80		11.80	
Bankfull Hydraulic Radius, R (ft)	0.80		0.80		1.10	
Bankfull Mannings n (esitmate)	0.040		0.040		0.035	
Manning Bkf Discharge, Q_{bkf} (cfs)	33.90		31.80		42.50	
Manning Bkf Velocity, u_{bkf} (ft/s^2)	2.65		2.65		3.35	
Bankfull Stream Power, ω (lb/ft/s)	0.90		0.90		1.24	
Bankfull Shear Stress, τ (lb/ft^2)	0.34		0.34		0.37	
Shields - Diameter Mobilized (mm)	115		115		125	

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
REBECCA E. NAPIER
ENGINEER

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TEL 804.200.6500 FAX 804.560.1016 www.timmons.com

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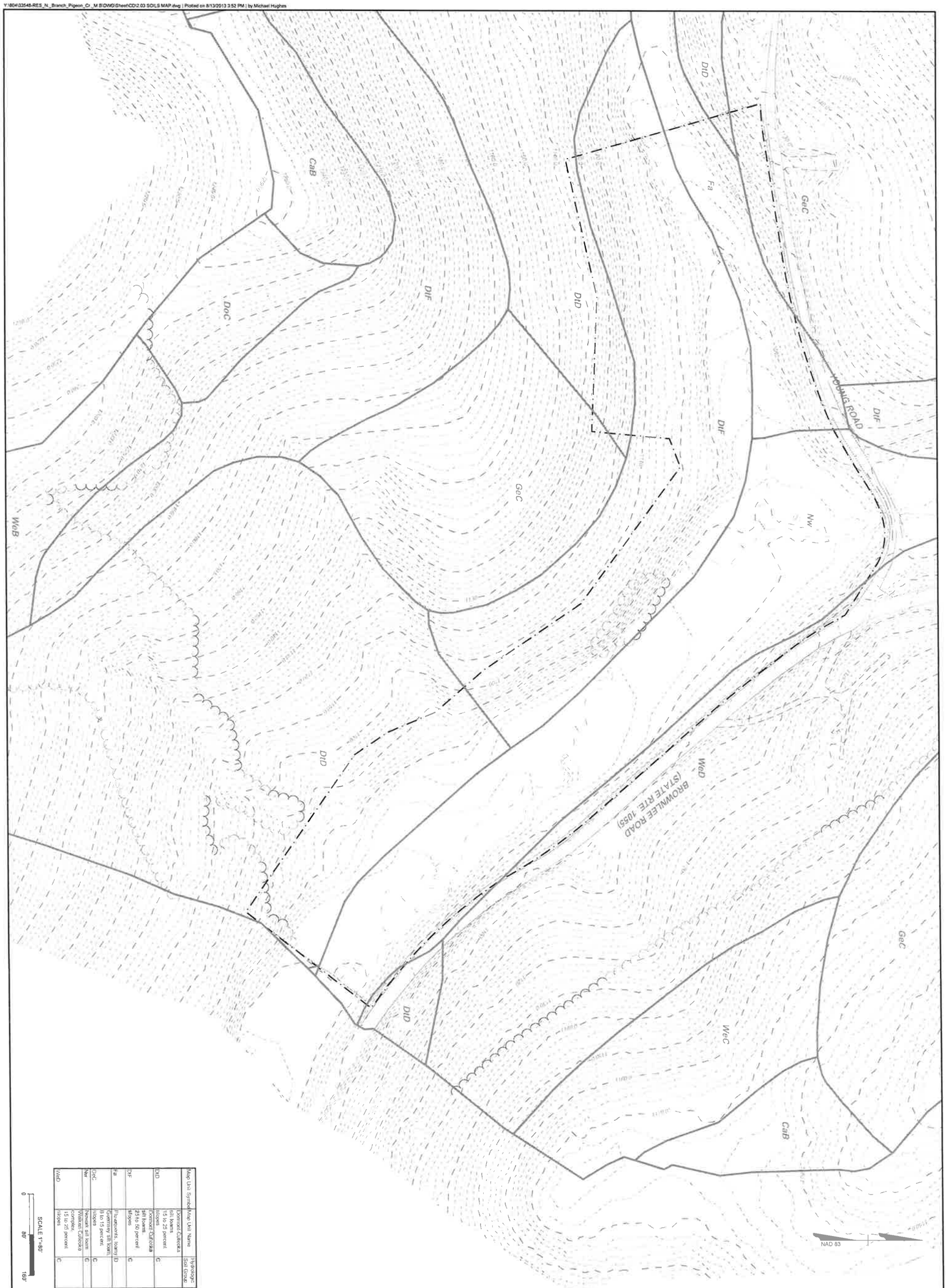
REVISION DESCRIPTION

DATE

TIMMONS GROUP

NORTH BRANCH PIGEON CREEK RESTORATION SITE
SOMERSET TOWNSHIP - WASHINGTON COUNTY - PENNSYLVANIA
GEOMORPHOLOGIC CALCULATIONS

DATE	JUNE 2013
DRAWN BY	M. HUGHES
DESIGNED BY	M. HUGHES
CHECKED BY	R. NAPIER
SCALE	N/A
JOB NO.	33548
SHEET NO.	2.02



Map Unit Symbol	Map Unit Name	Hydrologic Soil Group
DID	Dormont-Culleoka silt loams, 15 to 25 percent slopes	C
DIF	Dormont-Culleoka silt loams, 25 to 50 percent slopes	C
Fa	Fluvaquents, loamy	D
GeC	Gertrude silt loam, 8 to 15 percent slopes	C
Nw	Newark silt loam	C
WeB	Weikert-Culleoka channery silt loams, 3 to 15 percent slopes	C
WeC	Weikert-Culleoka channery silt loams, 15 to 25 percent slopes	C

SCALE 1"=80'
0
80'
160'

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REBECCA E. NAPIER — REGISTERED PROFESSIONAL ENGINEER — COMMONWEALTH OF PENNSYLVANIA

NORTH BRANCH PIGEON CREEK RESTORATION SITE

SOMERSET TOWNSHIP - WASHINGTON COUNTY - PENNSYLVANIA

SOILS MAP

SHEET NO.	2.03
JOB NO.	33548
SCALE	1"=300'
CHECKED BY	R. NAPIER
DESIGNED BY	M. HUGHES
DRAWN BY	M. HUGHES
DATE	JUNE 2013

DATE	REVISION DESCRIPTION

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REBECCA E. NAPIER — REGISTERED PROFESSIONAL ENGINEER — COMMONWEALTH OF PENNSYLVANIA

SHEET NO.	JOB NO.	NORTH BRANCH PIGEON CREEK RESTORATION SITE	SCALE	CHECKED BY	DESIGNED BY	DRAWN BY	DATE
3.00	33548	SOMERSET TOWNSHIP - WASHINGTON COUNTY - PENNSYLVANIA	1" = 80'	R. NAPIER	M. HUGHES	M. HUGHES	JUNE 2013
		DEMOLITION PLAN					

DATE	REVISION DESCRIPTION

EROSION AND SEDIMENT CONTROL NARRATIVE

A. Soils:
The predominant soils on the project are

Map Unit: BoB—Brooke silty clay loam, 3 to 8 percent slopes

Component: Brooke (100%)

The Brooke component makes up 100 percent of the map unit. Slopes are 3 to 8 percent. This component is on hills. The parent material consists of clayey residuum weathered from limestone and shale. Depth to a root restrictive layer, bedrock, lithic, is 20 to 40 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is low. Shrink-swell potential is high. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 4 percent.

Map Unit: BoC—Brooke silty clay loam, 8 to 15 percent slopes

Component: Brooke (100%)

The Brooke component makes up 100 percent of the map unit. Slopes are 8 to 15 percent. This component is on hills. The parent material consists of clayey residuum weathered from limestone and shale. Depth to a root restrictive layer, bedrock, lithic, is 20 to 40 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is low. Shrink-swell potential is high. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 4 percent.

Map Unit: CaB—Culleoka silt loam, 3 to 8 percent slopes

Component: Culleoka (85%)

The Culleoka component makes up 85 percent of the map unit. Slopes are 3 to 8 percent. This component is on hills. The parent material consists of residuum weathered from nonacid siltstone, fine-grained sandstone, and shale. Depth to a root restrictive layer, bedrock, lithic, is 20 to 40 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent.

Map Unit: CaC—Culleoka silt loam, 8 to 15 percent slopes

Component: Culleoka (80%)

The Culleoka component makes up 80 percent of the map unit. Slopes are 8 to 15 percent. This component is on hillslopes. The parent material consists of residuum weathered from nonacid siltstone, fine-grained sandstone, and shale. Depth to a root restrictive layer, bedrock, lithic, is 20 to 40 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent.

Map Unit: DoB—Dormont silt loam, 3 to 8 percent slopes

Component: Dormont (75%)

The Dormont component makes up 75 percent of the map unit. Slopes are 3 to 8 percent. This component is on hills. The parent material consists of residuum weathered from interbedded limestone, sandstone, and shale. Depth to a root restrictive layer, bedrock, lithic, is 40 to 150 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is high. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 32 inches during February, March. Organic matter content in the surface horizon is about 3 percent.

Map Unit: DoC—Dormont silt loam, 8 to 15 percent slopes

Component: Dormont (70%)

The Dormont component makes up 70 percent of the map unit. Slopes are 8 to 15 percent. This component is on hillslopes. The parent material consists of residuum weathered from interbedded limestone, sandstone, and shale. Depth to a root restrictive layer, bedrock, lithic, is 40 to 150 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is high. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 32 inches during February, March. Organic matter content in the surface horizon is about 3 percent.

Map Unit: DtD—Dormont-Culleoka silt loams, 15 to 25 percent slopes

Component: Dormont (45%)

The Dormont component makes up 45 percent of the map unit. Slopes are 15 to 25 percent. This component is on hillslopes. The parent material consists of residuum weathered from interbedded limestone, sandstone, and shale. Depth to a root restrictive layer, bedrock, lithic, is 40 to 150 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is high. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 32 inches during February, March. Organic matter content in the surface horizon is about 3 percent.

Component: Culleoka (40%)

The Culleoka component makes up 40 percent of the map unit. Slopes are 15 to 25 percent. This component is on hillslopes. The parent material consists of residuum weathered from nonacid siltstone, fine-grained sandstone, and shale. Depth to a root restrictive layer, bedrock, lithic, is 20 to 40 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent.

Map Unit: DtF—Dormont-Culleoka silt loams, 25 to 50 percent slopes

Component: Dormont (55%)

The Dormont component makes up 55 percent of the map unit. Slopes are 25 to 50 percent. This component is on hillslopes. The parent material consists of residuum weathered from interbedded limestone, sandstone, and shale. Depth to a root restrictive layer, bedrock, lithic, is 40 to 150 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is high. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 32 inches during February, March. Organic matter content in the surface horizon is about 3 percent.

Component: Culleoka (40%)

The Culleoka component makes up 40 percent of the map unit. Slopes are 25 to 50 percent. This component is on hillslopes. The parent material consists of residuum weathered from nonacid siltstone, fine-grained sandstone, and shale. Depth to a root restrictive layer, bedrock, lithic, is 20 to 40 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent.

Map Unit: Fa—Fluvaquents, loamy

Component: Fluvaquents (80%)

The Fluvaquents component makes up 80 percent of the map unit. Slopes are 0 to 3 percent. This component is on flood plains. The parent material consists of alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is frequently flooded. It is not ponded. A seasonal zone of water saturation is at 6 inches during January, February, March, April, May, October, November, December. Organic matter content in the surface horizon is about 2 percent.

Component: Melvin (10%)

Generated brief soil descriptions are created for major components. The Melvin soil is a minor component.

Map Unit: GeB—Guernsey silt loam, 3 to 8 percent slopes

Component: Guernsey (85%)

The Guernsey component makes up 85 percent of the map unit. Slopes are 3 to 8 percent. This component is on hills. The parent material consists of residuum weathered from limestone and calcareous shale. Depth to a root restrictive layer, bedrock, lithic, is 50 to 75 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is moderate. Shrink-swell potential is high. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 21 inches during January, February, March, April, May, November, December. Organic matter content in the surface horizon is about 2 percent.

Map Unit: GeC—Guernsey silt loam, 8 to 15 percent slopes

Component: Guernsey (80%)

The Guernsey component makes up 80 percent of the map unit. Slopes are 8 to 15 percent. This component is on hillslopes. The parent material consists of residuum weathered from limestone and calcareous shale. Depth to a root restrictive layer, bedrock, lithic, is 50 to 75 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is moderate. Shrink-swell potential is high. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 21 inches during January, February, March, April, May, November, December. Organic matter content in the surface horizon is about 2 percent.

Map Unit: LbB—Library silty clay loam, 3 to 8 percent slopes

Component: Library (70%)

The Library component makes up 70 percent of the map unit. Slopes are 0 to 8 percent. This component is on terraces. The parent material consists of residuum weathered from limestone and calcareous shale. Depth to a root restrictive layer, bedrock, lithic, is 40 to 150 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is moderate. Shrink-swell potential is high. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 12 inches during January, February, March, April, May, October, November, December. Organic matter content in the surface horizon is about 3 percent.

Map Unit: Nw—Newark silt loam

Component: Newark (85%)

The Newark component makes up 85 percent of the map unit. Slopes are 0 to 2 percent. This component is on flood plains. The parent material consists of fine-silty alluvium derived from limestone, sandstone, and shale. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is very high. Shrink-swell potential is low. This soil is frequently flooded. It is not ponded. A seasonal zone of water saturation is at 12 inches during January, February, March, April, May, December. Organic matter content in the surface horizon is about 2 percent.

Component: Atkins (5%)

Generated brief soil descriptions are created for major components. The Atkins soil is a minor component.

Component: Brinkerton (5%)

Generated brief soil descriptions are created for major components. The Brinkerton soil is a minor component.

Map Unit: WeB—Weikert-Culleoka complex, 3 to 8 percent slopes

Component: Weikert (65%)

The Weikert component makes up 65 percent of the map unit. Slopes are 3 to 8 percent. This component is on hillslopes. The parent material consists of residuum weathered from siltstone. Depth to a root restrictive layer, bedrock, lithic, is 10 to 20 inches. The natural drainage class is somewhat excessively drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent.

Component: Culleoka (30%)

The Culleoka component makes up 30 percent of the map unit. Slopes are 3 to 8 percent. This component is on hills. The parent material consists of residuum weathered from nonacid siltstone, fine-grained sandstone, and shale. Depth to a root restrictive layer, bedrock, lithic, is 20 to 40 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent.

Map Unit: WeC—Weikert-Culleoka complex, 8 to 15 percent slopes

Component: Weikert (50%)

The Weikert component makes up 50 percent of the map unit. Slopes are 8 to 15 percent. This component is on hillslopes. The parent material consists of residuum weathered from siltstone. Depth to a root restrictive layer, bedrock, lithic, is 10 to 20 inches. The natural drainage class is somewhat excessively drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent.

Component: Culleoka (40%)

The Culleoka component makes up 40 percent of the map unit. Slopes are 8 to 15 percent. This component is on hillslopes. The parent material consists of residuum weathered from nonacid siltstone, fine-grained sandstone, and shale. Depth to a root restrictive layer, bedrock, lithic, is 20 to 40 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent.

Map Unit: WeD—Weikert-Culleoka complex, 15 to 25 percent slopes

Component: Weikert (50%)

The Weikert component makes up 50 percent of the map unit. Slopes are 15 to 25 percent. This component is on hillslopes. The parent material consists of residuum weathered from siltstone. Depth to a root restrictive layer, bedrock, lithic, is 10 to 20 inches. The natural drainage class is somewhat excessively drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent.

Component: Culleoka (40%)

The Culleoka component makes up 40 percent of the map unit. Slopes are 15 to 25 percent. This component is on hillslopes. The parent material consists of residuum weathered from nonacid siltstone, fine-grained sandstone, and shale. Depth to a root restrictive layer, bedrock, lithic, is 20 to 40 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent.

B. Critical Areas:
Earth moving shall be conducted in accordance with the Construction Sequence in this plan and the Contractor's workflow plan. Work will begin in the higher elevations of the project and progress downstream to completion, unless agreed to otherwise by Project Engineer. Work shall be completed in specified segments in accordance with the Project Engineer approved Contractor's workflow plan.

If necessary base stream shall be pumped from upstream of the active work area to downstream of the active work area. Each segment of the stream channel shall be brought to final grade and stabilized before continuing to the next segment taking special care to have the site stabilized at the end of each day so that stream flow can be redirected back into the existing channel. As final grade and stabilization of the banks progress downstream, the banks shall be seeded and the erosion control matting shall be installed to protect the newly seeded bank in accordance with the typical cross-section details.

C. Erosion and Sediment Control Measures:
The following measures shall be installed and used by the Contractor, however, additional measures may be necessary depending on the conditions at the time of construction. Prior to commencing land disturbing activities in areas not indicated on these plans, the Contractor shall submit a supplementary erosion control plan to the Owner for review and approval by the Plan Approving Authority. Unless otherwise indicated, all vegetative and structural erosion and sediment control practices shall be constructed and maintained according to the minimum standards and specifications of the Pennsylvania Department of Environmental Protection Erosion and Sediment Pollution Control Program Manual, March 2012, as well as any additional measures required by applicable local, state and federal regulations.

C.1. Structural Practices

C.1.1. Rock Construction Entrance Detail # 3-1. A rock construction entrance should be installed wherever it is anticipated that construction traffic will exit the project site onto any roadway, public or private. Access to the site should be limited to the stabilized construction entrance(s).

C.1.2. Temporary Stream Crossing Detail # 3-13. Temporary stream crossings must be provided wherever construction equipment (including clearing and grubbing equipment) must cross an existing stream channel (water course with a defined bed and bank). Maintenance: Temporary stream crossings shall be inspected on a daily basis. Damaged crossings shall be repaired within 24 hours of the inspection and before any subsequent use. Sediment deposits on the crossing or its approaches shall be removed within 24 hours of the inspection.

C.1.3. Temporary Cofferdam and Pump Bypass Around In-channel Work Areas Figure 3.11. Pump-around systems should not be used for bypasses anticipated to last more than 2 weeks. Maintenance: Temporary Cofferdams and Pump Bypass shall be inspected on a daily basis. Damaged Cofferdam and Pumps Bypass shall be repaired within 24 hours of the inspection and before any subsequent use. Sediment deposits shall be removed within 24 hours of the inspection.

C.1.3.1. A cofferdam should be constructed to impound water for the pump intake. Do not excavate a sump area within the stream channel for the pump intake.

C.1.4. Pumped Water Filter Bag Detail # 3-16. Filter bags may be used to filter water pumped from disturbed areas prior to discharging to surface waters. They may also be used to filter water pumped from the sediment storage areas of sediment basins and sediment traps. Maintenance: Pumped Water Filter Bags shall be inspected on a daily basis. Damaged bags shall be repaired within 24 hours of the inspection and before any subsequent use. Filter bags shall be replaced when they become ½ full of sediment. Spare bags shall be kept available for replacement of those that have failed or are filled. Bags shall be placed on straps to facilitate the removal unless bags come with lifting straps already attached.

C.1.5. Standard Silt Fence (18" High) Detail # 4-7. Silt Fence may be used to control runoff from small disturbed areas when it is in the form of sheet flow, and the discharge is to a stable area. Maintenance: Sediment must be removed when deposits reach approximately one-half the height of the barrier. Any sediment deposits remaining in place after the silt fence or filter barrier is no longer required shall be dressed to conform to the existing grade, prepared and seeded. Silt fence shall be maintained until stabilization is achieved in accordance with the erosion control notes.

D. Permanent Stabilization:
Site work activities shall be completed, if possible, at least eight weeks earlier than the recommended planting window. During this time, the erosion control cover crop shall be permitted to mature. Permanent seeding shall be in accordance with the Planting Specifications in this plan set.

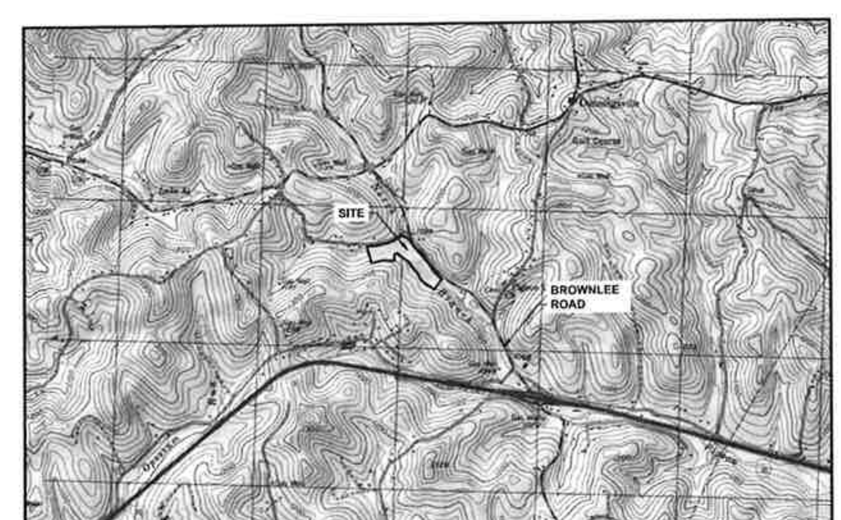
It should be expected that the specified stream and buffer vegetation will be planted in the "wet". Planting of all specified containerized, bare root, and live stake vegetation shall be in accordance with the Planting Specifications on the attached Planting Notes and Details sheet.

E. General Erosion and Sediment Control Notes:

1. All earth disturbances, including clearing and grubbing as well as cuts and fills shall be done in accordance with the approved E&S plan. A copy of the approved drawings (stamped, signed and dated by the reviewing agency) must be available at the project site at all times. The reviewing agency shall be notified of any changes to the approved plan prior to implementation of those changes. The reviewing agency may require a written submittal of those changes for review and approval at its discretion.
2. At least 7 days prior to starting any earth disturbance activities, including clearing and grubbing, the owner and/or operator shall invite all contractors, the landowner, appropriate municipal officials, the E&S plan preparer, the PCSM plan preparer, the licensed professional responsible for oversight of critical stages of implementation of the PCSM plan and a representative from the local conservation district to an on-site preconstruction meeting.
3. At least 3 days prior to starting any earth disturbance activities, or expanding into an area previously unmarked, the Pennsylvania One Call System Inc. shall be notified at 1-800-242-1776 for the location of existing underground utilities.
4. All earth disturbance activities shall proceed in accordance with the sequence provided on the plan drawings. Deviation from that sequence must be approved in writing from the local conservation district or by the Department prior to implementation.
5. Areas to be filled are to be cleared, grubbed, and stripped of topsoil to remove trees, vegetation, roots and other objectionable material.
6. Clearing, grubbing and topsoil stripping shall be limited to those areas described in each stage of the construction sequence. General site clearing, grubbing and topsoil stripping may not commence in any stage or phase of the project until the E&S BMPs specified by the BMP sequence for that stage or phase have been installed and are functioning as described in this E&S plan.
7. At no time shall construction vehicles be allowed to enter areas outside the limit of disturbance boundaries shown on the plan maps. These areas must be clearly marked and fenced off before clearing and grubbing operations begin.
8. Topsoil required for the establishment of vegetation shall be stockpiled at the location(s) shown on the plan maps(s) in the amount necessary to complete the finish grading of all exposed areas that are to be stabilized by vegetation. Each stockpile shall be protected in the manner shown on the plan drawings. Stockpile heights shall not exceed 35 feet. Stockpile slopes shall be 2H:1V or flatter.
9. Immediately upon discovering unforeseen circumstances posing the potential for accelerated erosion and/or sediment pollution, the operator shall implement appropriate best management practices to minimize the potential for erosion and sediment pollution and notify the local conservation district and/or the regional office of the Department.
10. All building materials and wastes shall be removed from the site and recycled or disposed of in accordance with the Department's Solid Waste Management Regulations at 25 Pa. Code 260.1 et seq., 271.1, and 287.1 et. seq. No building materials or wastes or unused building materials shall be burned, buried, dumped or discharged at the site.
11. All off-site waste and borrow areas must have an E&S plan approved by the local conservation district or the Department fully implemented prior to being activated.
12. The contractor is responsible for ensuring that any material brought on site is clean fill. Form FP-001 must be retained by the property owner for any fill material affected by a spill or release of a regulated substance but qualifying as clean fill due to analytical testing.
13. All pumping of water from any work area shall be done according to the procedure described in this plan, over undisturbed vegetated areas.
14. Vehicles and equipment may neither enter directly nor exit directly from lots (specify lot numbers) onto (specify road names) .
15. Until the site is stabilized, all erosion and sediment BMPs shall be maintained properly. Maintenance shall include inspections of all erosion and sediment BMPs after each runoff event and on a weekly basis. All preventative and remedial maintenance work, including clean out, repair, replacement, regrading, reseeding, remulching and renetting must be performed immediately. If the E&S BMPs fail to perform as expected, replacement BMPs, or modifications of those installed will be required.
16. A log showing dates that E&S BMPs were inspected as well as any deficiencies found and the date they were corrected shall be maintained on the site and be made available to regulatory agency officials at the time of inspection.
17. Sediment tracked onto any public roadway or sidewalk shall be returned to the construction site by the end of each work day and disposed in the manner described in this plan. In no case shall the sediment be washed, shoveled or swept into any roadside ditch, storm sewer or surface water.
18. All sediment removed from BMPs shall be disposed of in the manner described on the plan drawings.
19. Areas which are to be topsoiled shall be scarified to a minimum depth of 3 to 5 inches (6 to 12 inches on compacted soils) prior to placement of topsoil. Areas to be vegetated shall have a minimum 4 inches of topsoil in place prior to seeding and mulching. Fill outslopes shall have a minimum of 2 inches of topsoil.
20. All fills shall be compacted as required to reduce erosion, slippage, settlement, subsidence or other related problems. Fill intended to support buildings, structures and conduits, etc. shall be compacted in accordance with local requirements or codes.
21. All earthen fills shall be placed in compacted layers not to exceed 9 inches in thickness.
22. Fill materials shall be free of frozen particles, brush, roots, sod, or other foreign or objectionable materials that would interfere with or prevent construction of satisfactory fills.
23. Frozen materials or soft, mucky, or highly compressible materials shall not be incorporated into fills.
24. Fill shall not be placed on saturated or frozen surfaces.
25. Seeps or springs encountered during construction shall be handled in accordance with the standard and specification for subsurface drain or other approved method.
26. All graded areas shall be permanently stabilized immediately upon reaching finished grade. Cut slopes in competent bedrock and rock fills need not be vegetated. Seeded areas within 50 feet of a surface water, or as otherwise shown on the plan drawings, shall be blanketed according to the standards of this plan.
27. Immediately after earth disturbance activities cease in any area or subarea of the project, the operator shall stabilize all disturbed areas. During non-germinating months, mulch or protective blanketing shall be applied as described in the plan. Areas not at finished grade, which will be reactivated within 1 year, may be stabilized in accordance with the temporary stabilization specifications. Those areas which will not be reactivated within 1 year shall be stabilized in accordance with the permanent stabilization specifications.
28. Permanent stabilization is defined as a minimum uniform, perennial 70% vegetative cover or other permanent non-vegetative cover with a density sufficient to resist accelerated erosion. Cut and fill slopes shall be capable of resisting failure due to slumping, sliding, or other movements.
29. E&S BMPs shall remain functional as such until all contributing areas are permanently stabilized or until they are replaced by another BMP approved by the local conservation district or the Department.
30. Upon completion of all earth disturbance activities and permanent stabilization of all disturbed areas, the owner and/or operator shall contact the local conservation district for an inspection prior to removal/conversion of the E&S BMPs.
31. After final site stabilization has been achieved, temporary erosion and sediment BMPs must be removed or converted to permanent post construction stormwater management BMPs. Areas disturbed during removal or conversion of the BMPs shall be stabilized immediately. In order to ensure rapid revegetation of disturbed areas, such removal/conversions are to be done only during the germinating season.
32. Upon completion of all earth disturbance activities and permanent stabilization of all disturbed areas, the owner and/or operator shall contact the local conservation district to schedule a final inspection.
33. Failure to correctly install E&S BMPs, failure to prevent sediment-laden runoff from leaving the construction site or failure to take immediate corrective action to resolve failure of E&S BMPs may result in administrative civil, and/or criminal penalties being instituted by the Department as defined in Section 602 of the Pennsylvania Clean Streams Law. The Clean Streams Law provides for up to $10,000 per day in civil penalties, up to $10,000 in summary criminal penalties and up to $25,000 in misdemeanor criminal penalties for each violation.

F. Erosion Control Sequence:

1. Before any work commences, an onsite preconstruction conference shall be held to ensure that all affected parties (Project Engineer, Contractor, Surveyor, Project Manager, and a representative from the County Conservation District) fully understand the construction sequencing.
2. Prior to any construction activities, the temporary construction entrance, construction roads, stockpile, composting, staging areas and silt fence shall be installed.
3. After erosion control measures are approved by the inspector, areas proposed for grading may be cleared and grubbed.
4. Each stream segment shall be brought to final grade and stabilized daily before continuing to the next segment, allowing diverted (pump around) stream flow to be redirected back into the existing channel.
5. On a daily basis, as final grade and stabilization of the banks progresses downstream, the banks and other graded surfaces shall be seeded and lined with matting as shown on the Erosion and Sediment Control Plan.
6. BMPs shall be inspected on a weekly basis or 24 hours after a rain event. Any failure shall be repaired within 24 hours of the inspection.
7. Erosion Control BMPs may only be removed once 70 percent vegetative cover has been achieved and the County Conservation District has approved their removal.



SCALE 1"=2,000'

0 2,000' 4,000'

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DESIGNED BY	M. HUGHES
CHECKED BY	R. NAPIER
SCALE	1"=2000'

TIMMONS GROUP

NORTH BRANCH PIGEON CREEK RESTORATION SITE

SOMERSET TOWNSHIP - WASHINGTON COUNTY - PENNSYLVANIA

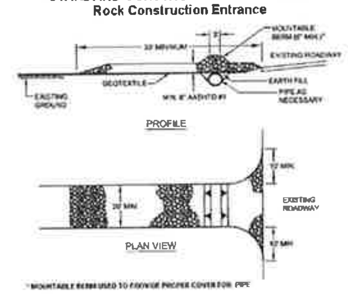
EROSION AND SEDIMENT CONTROL NARRATIVE

JOB NO. 33548

SHEET NO. 3.01

CE

STANDARD CONSTRUCTION DETAIL # 3-1
Rock Construction Entrance



Modified from Maryland DOE

Remove topsoil prior to installation of rock construction entrance. Extend rock over full width of entrance.

Runoff shall be diverted from roadway to a suitable sediment removal BMP prior to entering rock construction entrance.

Mountable berm shall be installed wherever optional culvert pipe is used and proper pipe cover as specified by manufacturer is not otherwise provided. Pipe shall be sized appropriately for size of ditch being crossed.

MAINTENANCE: Rock construction entrance thickness shall be constantly maintained to the specified dimensions by adding rock. A stockpile shall be maintained on site for this purpose. All sediment deposited on paved roadways shall be removed and returned to the construction site immediately. If excessive amounts of sediment are being deposited on roadway, extend length of rock construction entrance by 50 foot increments until condition is alleviated or install wash rack. Washing the roadway or sweeping the deposits into roadway ditches, sewers, culverts, or other drainage courses is not acceptable.

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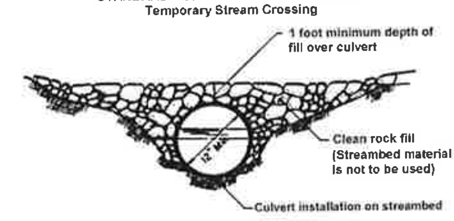
SC

STANDARD CONSTRUCTION DETAIL # 3-13
Temporary Stream Crossing



PA DEP

Provide 50' stabilized access to crossing on both sides of stream channel (see Standard Construction Detail #3-12).

Pipes shall extend beyond the toe of the roadway.

Runoff from the roadway shall be diverted off the roadway and into a sediment removal BMP before it reaches the rock approach to the crossing.

MAINTENANCE

1. Temporary stream crossings shall be inspected on a daily basis.
2. Damaged crossings shall be repaired within 24 hours of the inspection and before any subsequent use.
3. Sediment deposits on the crossing or its approaches shall be removed within 24 hours of the inspection

As soon as the temporary crossing is no longer needed, it shall be removed. All materials shall be disposed of properly and disturbed areas stabilized.

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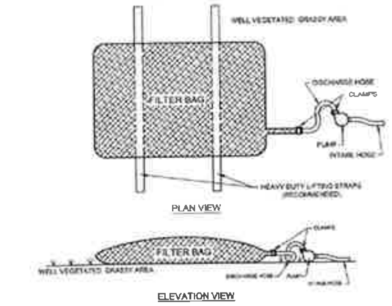
WFB

STANDARD CONSTRUCTION DETAIL # 3-16
Pumped Water Filter Bag



PA DEP

Low volume filter bags shall be made from non-woven geotextile material sewn with high strength, double stitched "J" type seams. They shall be capable of trapping particles larger than 150 microns. High volume filter bags shall be made from woven geotextiles that meet the following standards:

Property	Test Method	Minimum Standard
Avg. Wide Width Strength	ASTM D-4884	60 lb/in
Grab Tensile	ASTM D-4632	205 lb
Puncture	ASTM D-4833	110 lb
Mullen Burst	ASTM D-3786	350 psi
UV Resistance	ASTM D-4355	70%
AOS % Retained	ASTM D-4751	80 Sieve

A suitable means of accessing the bag with machinery required for disposal purposes shall be provided. Filter bags shall be replaced when they become ½ full of sediment. Spare bags shall be kept available for replacement of those that have failed or are filled. Bags shall be placed on straps to facilitate removal unless bags come with lifting straps already attached.

Bags shall be located in well-vegetated (grassy) area, and discharge onto stable, erosion resistant areas. Where this is not possible, a geotextile underlayment and flow path shall be provided. Bags may be placed on filter stone to increase discharge capacity. Bags shall not be placed on slopes greater than 5%. For slopes exceeding 5%, clean rock or other non-erodible and non-polluting material may be placed under the bag to reduce slope steepness.

No downslope sediment barrier is required for most installations. Compost berm or compost filter sock shall be installed below bags located in HQ or EV watersheds, within 50 feet of any receiving surface water or where grassy area is not available.

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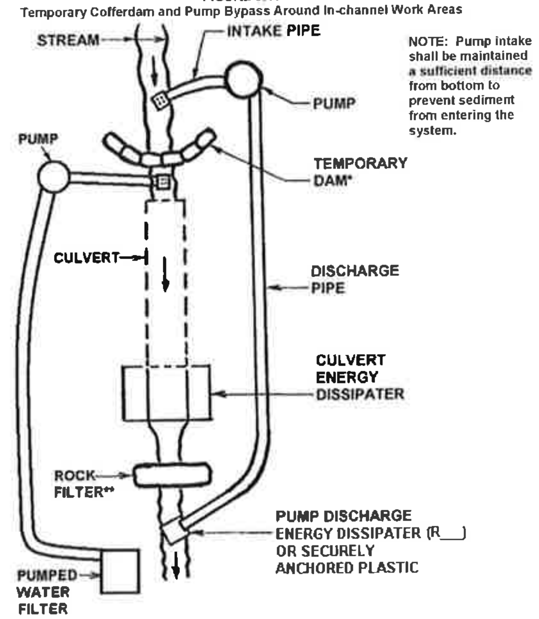
CPB

FIGURE 3.11
Temporary Cofferdam and Pump Bypass Around In-channel Work Areas



PA DEP

* Sandbags (Standard Construction Detail #3-15), Jersey barriers (Figure 3.13) or other non-erosive material, no earth fill. Do not excavate a sump for the pump intake.

** See Standard Construction Detail # 4-14. For low gradient channels, the rock filter may be replaced by an impervious cofferdam to prevent backflow into the work area.

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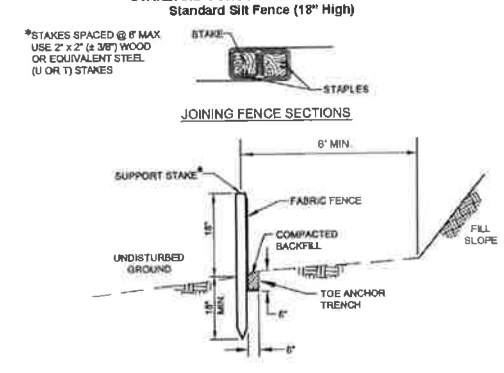
SF

STANDARD CONSTRUCTION DETAIL # 4-7
Standard Silt Fence (18" High)



PA DEP

Fabric shall have the minimum properties as shown in Table 4.3.

Fabric width shall be 30" minimum. Stakes shall be hardwood or equivalent steel (U or T) stakes.

Silt fence shall be placed at level existing grade. Both ends of the fence shall be extended at least 8 feet up slope at 45 degrees to the main fence alignment (see Figure 4.1).

Sediment shall be removed when accumulations reach half the aboveground height of the fence.

Any section of silt fence which has been undermined or topped shall be immediately replaced with a rock filter outlet (Standard Construction Detail # 4-5).

Fence shall be removed and properly disposed of when tributary area is permanently stabilized.

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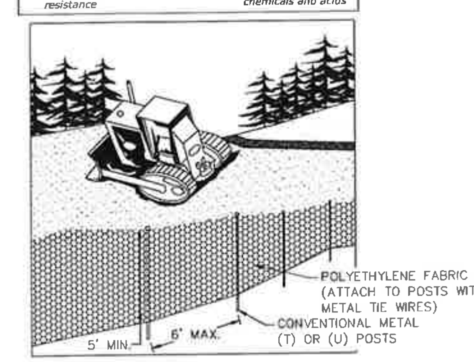
SAF

PHYSICAL PROPERTIES OF PLASTIC SAFETY FENCE

Physical Property	*Test*	*Requirements*
Recommended color	*N/A*	*"International" orange*
Tensile yield	*ASTM D638*	*Average 2000 lbs. per 4ft. width*
Ultimate tensile strength	*ASTM D638*	*Average 2000 lbs. per 4ft. width*
Elongation at break (%)	*ASTM D638*	*Greater than 1000%*
Chemical resistance	*N/A*	*Inert to most chemicals and acids*



SOURCE: ADAPTED FROM CONWED PLASTICS AND VIRGINIA EROSION AND SEDIMENT CONTROL MANUAL

REBECCA E. NAPIER — REGISTERED PROFESSIONAL ENGINEER — COMMONWEALTH OF PENNSYLVANIA

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NORTH BRANCH PIGEON CREEK RESTORATION SITE
SOMERSET TOWNSHIP - WASHINGTON COUNTY - PENNSYLVANIA
EROSION AND SEDIMENT CONTROL DETAILS

DATE	REVISION DESCRIPTION

DATE	JUNE 2013
DRAWN BY	M. HUGHES
DESIGNED BY	M. HUGHES
CHECKED BY	R. NAPIER
SCALE	AS SHOWN
JOB NO.	33548
SHEET NO.	3.02

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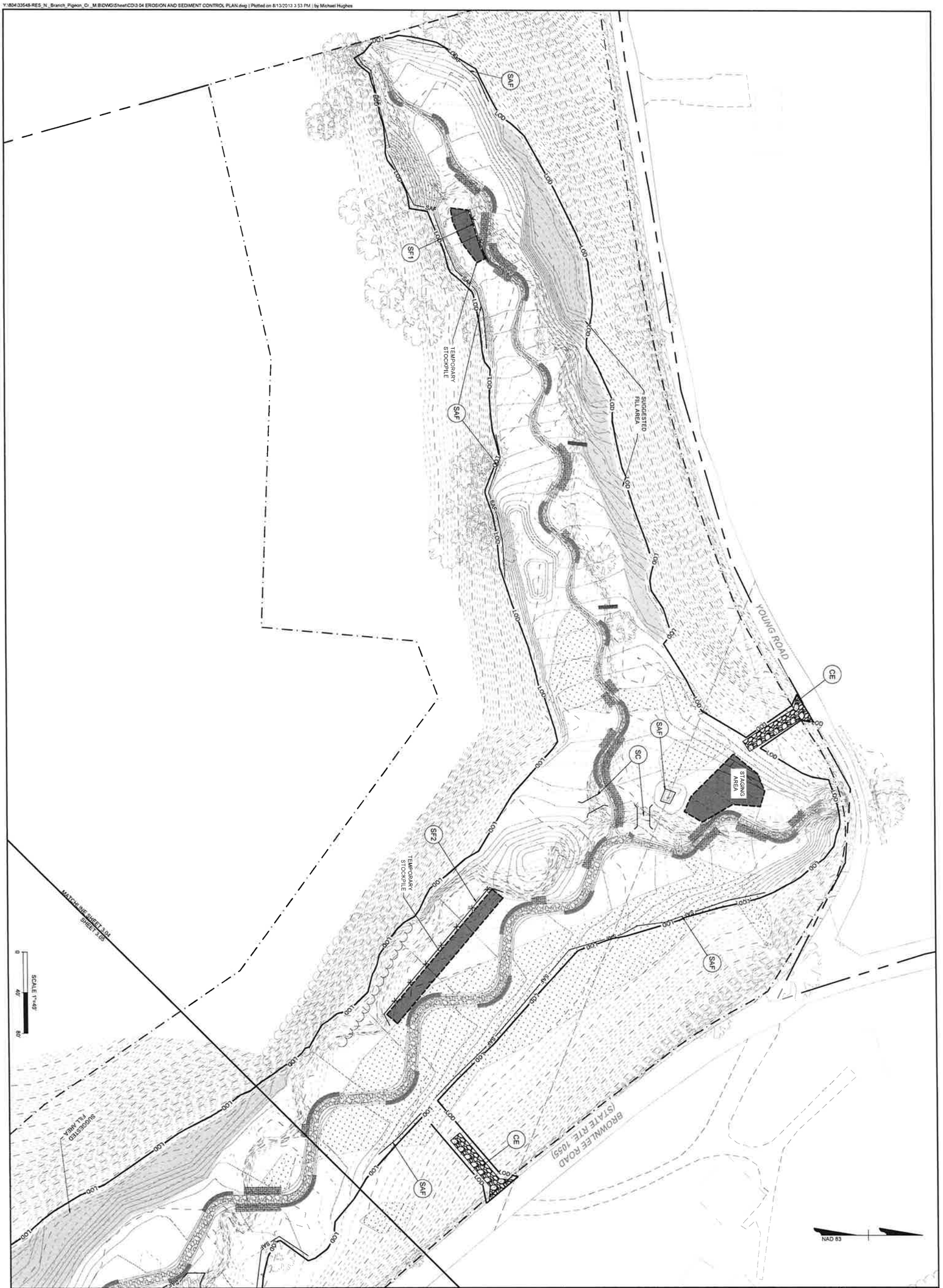
NORTH BRANCH PIGEON CREEK RESTORATION SITE

SOMERSET TOWNSHIP - WASHINGTON COUNTY - PENNSYLVANIA

EROSION AND SEDIMENT CONTROL SHEET INDEX

SHEET NO.	3.03
TDM NO.	33548
SCALE	1" = 80'
CHECKED BY	R. NAPIER
DESIGNED BY	M. HUGHES
DRAWN BY	M. HUGHES
DATE	JUNE 2013

DATE	REVISION DESCRIPTION



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REGISTERED PROFESSIONAL

JOB NO.	33548
SHEET NO.	3.04

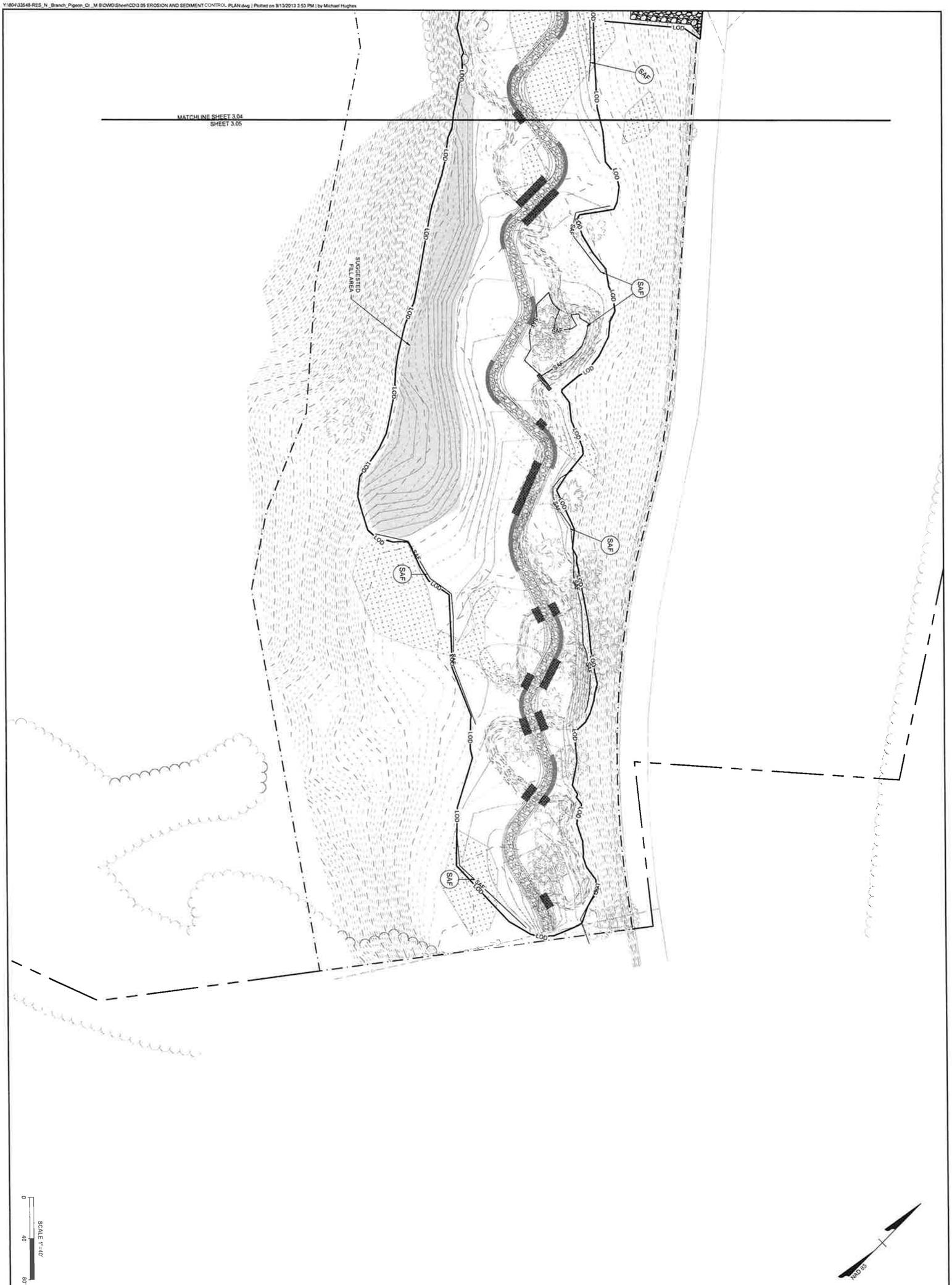
NORTH BRANCH PIGEON CREEK RESTORATION SITE

SOMERSET TOWNSHIP - WASHINGTON COUNTY - PENNSYLVANIA

EROSION AND SEDIMENT CONTROL PLAN

SCALE	1" = 40'
CHECKED BY	R. NAPIER
DESIGNED BY	M. HUGHES
DRAWN BY	M. HUGHES
DATE	JUNE 2013

DATE	REVISION DESCRIPTION



SCALE 1"=40'
0
40'
80'

NAD 83

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REBECCA E. NAPIER
ENGINEER

SHEET NO.	JOB NO.	NORTH BRANCH PIGEON CREEK RESTORATION SITE	SCALE	CHECKED BY	DESIGNED BY	DRAWN BY	DATE
3.05	33548	SOMERSET TOWNSHIP - WASHINGTON COUNTY - PENNSYLVANIA	1" = 40'	R. NAPIER	M. HUGHES	M. HUGHES	JUNE 2013
		EROSION AND SEDIMENT CONTROL PLAN					

DATE	REVISION DESCRIPTION

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PROJECT NO.	33548
SHEET NO.	3.06

NORTH BRANCH PIGEON CREEK RESTORATION SITE

SOMERSET TOWNSHIP - WASHINGTON COUNTY - PENNSYLVANIA

EROSION AND SEDIMENT CONTROL MATTING PLAN

SCALE	1" = 40'
CHECKED BY	R. NAPIER
DESIGNED BY	M. HUGHES
DRAWN BY	M. HUGHES
DATE	JUNE 2013

DATE	REVISION DESCRIPTION

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REBECCA E. HAPER
ENGINEER

SHEET NO. 3.07

JOB NO. 33548

NORTH BRANCH PIGEON CREEK RESTORATION SITE

SOMERSET TOWNSHIP - WASHINGTON COUNTY - PENNSYLVANIA

EROSION AND SEDIMENT CONTROL MATTING PLAN

SCALE	CHECKED BY	DESIGNED BY	DRAWN BY	DATE
1" = 40'	R. NAPIER	M. HUGHES	M. HUGHES	JUNE 2013

DATE	REVISION DESCRIPTION

AREA AND DESCRIPTION	AREA (SF)	AREA (AC)	RESTORATION BMPs
AREA 1:			BMP 6.7.1, BMP 6.7.3
FILL AREA	9,218 SF	0.212 AC	
AREA 2:			BMP 6.7.1, BMP 6.7.3
ACCESS ROUTE	1,402 SF	0.032 AC	
AREA3:			BMP 6.7.1, BMP 6.7.3
FILL AREA	11,689 SF	0.268 AC	
AREA 4:			BMP 6.7.1, BMP 6.7.3
ACCESS ROUTE	1,815 SF	0.042 AC	

NOTES

1. THE PROPOSED DESIGN UTILIZES NATURAL STREAM CHANNEL DESIGN TECHNIQUES PROVIDING FLOODPLAIN CONNECTIVITY AND IMPROVED IN-STREAM HABITAT ALONG WITH A VEGETATIVE BUFFER. THE VEGETATIVE BUFFER WILL BE ESTABLISHED AS DESCRIBED ON SHEETS 6.00 TO 6.03. TO ENSURE LONG-TERM MONITORING AND MAINTENANCE OF THE PROJECT, LONG-TERM MONITORING SHALL BE PERFORMED AS PRESCRIBED IN APPENDIX B. MONITORING PLAN OF THE APPROVED UMBI.

2. CONTRACTOR SHALL REFER TO THE PENNSYLVANIA STORMWATER MANAGEMENT PRACTICES MANUAL CHAPTER 6 FOR DETAILS OF RESTORATION BMP'S. FOR SEEDING SPECIFICATIONS, THE CONTRACTOR MAY REFER TO SHEET 6.02 AND FOLLOW THE PLANTING PLAN ON 6.03 AND 6.04.

3. PRIOR TO SOIL AMENDMENTS AND SEEDING AS DESCRIBED IN ABOVE NOTE #2, ALL CONSTRUCTION MATERIALS INCLUDING BUT NOT LIMITED TO GRAVEL AND MATTING SHALL BE REMOVED. THESE AREAS SHALL BE SCARIFIED A MINIMUM OF 6" TO ELIMINATE ANY COMPACTION THAT OCCURRED.

SCALE 1"=80'
0 80' 160'

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DATE	JUNE 2013
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DESIGNED BY	M. HUGHES
CHECKED BY	R. NAPIER
SCALE	1" = 80'

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NORTH BRANCH PIGEON CREEK RESTORATION SITE

SOMERSET TOWNSHIP - WASHINGTON COUNTY - PENNSYLVANIA

POST - CONSTRUCTION STORMWATER MANAGEMENT PLAN

JOB NO. 33548

SHEET NO. 3.08

CONSTRUCTION NOTES

A. Pre-Construction Preparation & Notification:

1. The Contractor shall notify the Project Engineer a minimum of one (1) week prior to commencing any land disturbing activities for verification they are in accordance with the approved permits.

2. The Contractor shall be responsible for determining the locations of all existing utilities and services within the project limits prior to commencing construction operations, and must contact "Pennsylvania One Call System" a minimum of 48 hours prior to any construction work. All utilities shall be clearly identified prior to construction. The location of existing utilities within the project area is not necessarily shown on the construction drawings and where shown is only approximately correct. The Contractor shall be responsible for any damage to existing utilities whether above grade or underground facilities.

3. The Contractor shall schedule a pre-construction meeting accommodating project stakeholders (Project Engineer, subcontractors, certified responsible land disturber, Owner's representative and the local Plan Approving Authority) a minimum of one (1) week prior to commencing any land disturbing activities. At this time, the Contractor shall be prepared to review their Workflow Plan and proposed Construction Schedule (reference following Submittals section).

4. The Contractor shall install the initial erosion and sediment control measures and then notify the Project Engineer of the completed installation. The Project Engineer shall then provide the local inspector 48-hour notification to schedule an onsite pre-construction meeting to inspect the install of these erosion and sediment control measures, prior to issuance of the land disturbance permit.

5. Limited construction access easements are specified on the construction drawings. Alternatives or deviations shall be approved by the Project Engineer and Owner prior to commencement of construction. Contractor proposed alternatives with delineation of entrance locations and access paths shall be included in the proposed Workflow Plan.

6. Prior to the commencement of construction, non-impact wetlands shall be flagged and no disturbance shall occur within these areas.

7. Existing plant materials suitable for relocation, such as willows and other shrubs, shall be flagged or otherwise marked prior to any grading activities within the respective stream segments.

B. Submittals

1. Contractor shall develop a Workflow Plan and Construction Schedule for submittal to the Project Engineer for review and approval a minimum of one (1) week prior to the pre-construction meeting. The proposed Workflow Plan shall describe/delineate the Contractor's proposed construction access paths, alternate temporary stockpile locations, estimated daily channel segments, and alternative means & methods. The proposed Construction Schedule shall include submittal review time, key construction and critical path tasks, phasing of work flow, weather contingency, as-built survey coordination, planting period and substantial and/or final completion goals.

2. Contractor shall provide experience qualifications to the Project Engineer identifying the key personnel to be working on the project, including their project manager and superintendent. Contractor shall also specify the minimum number of daily crew/staff and equipment to be expected onsite during construction.

3. Contractor shall be responsible to submit a copy of the material certifications to the Project Engineer for review on any construction materials used on the project site. The certification shall state that the product is manufactured in accordance with the project specifications and the approved shop drawing or detail, as applicable. Any materials ordered or work performed with said materials by the Contractor before the Project Engineer has reviewed the respective material certifications shall be at the risk of the Contractor.

4. Review time for the specified submittals shall be clearly noted in the Construction Schedule. Allow a minimum of one (1) week review time for submittal package.

C. Surveying:

1. The Owner's Surveyor will stake out the following:

   1.1. Stream Alignment. The PC and PT points along the new stream alignment shall be staked along the centerline and at 50-foot offsets, identified by corresponding centerline station. The center of each curve shall be staked and marked with the corresponding radius of curvature. The 50-foot offset stakes shall also include the distance to the "daylight" limits for both the left and right banks. Vertical control benchmarks shall be clearly marked at a minimum of 1,000-foot intervals along the proposed stream channel.

2. If during construction, the existing elevations (especially stream inverts) shown on these construction drawings are found to differ significantly from the elevations in the field, the Contractor must notify the Project Engineer immediately for an adjustment in elevations.

3. The Owner's Surveyor will schedule and perform the as-built survey following written notification, from the Contractor to the Project Engineer, stating that design grade has been achieved. This coordination shall be performed prior to disking, final seeding and planting.

4. The Contractor is expected to perform survey verification prior to providing written notification for as-built survey coordination. The Contractor shall be responsible for any costs associated with additional as-built survey resulting from project areas discovered to not be in substantial accordance with the specified design.

D. Minimizing Impacts:

1. All necessary erosion and sediment control measures shall be installed in accordance with the attached Erosion and Sediment Control Notes prior to the commencement of land disturbing activities. Alternative and/or additional measures shall be approved by the Project Engineer prior to installation.

2. Disturbance of existing mature trees shall be minimized to the greatest extent possible. Shrubs and small trees suitable for relocation shall be clearly marked prior to the pre-construction meeting and incorporated into the planning for each section of proposed stream activity. Tree protection measures shall be installed in accordance with the construction drawings to preserve trees not utilized for structures or disturbed by grading. Contractor shall only remove vegetation necessary to perform grading operations depicted on the construction drawings. Tree and root damage shall be avoided to the maximum extent practicable within the project boundary and temporary construction access areas.

3. Materials, supplies or equipment shall be stockpiled and/or stored outside of non-impact wetland limits. Contractor shall not travel across, store spoils on or otherwise impact the non-impact wetlands and flagged buffer areas. All temporary impacts to wetlands shall be re-vegetated.

4. Material storage and staging areas shall be located and protected as shown on the attached Erosion and Sediment Control Plan sheets. Any deviation from the Erosion and Sediment Control Plan shall be approved by the Project Engineer and Owner prior to implementation. All equipment and supplies shall be stored within the construction staging area while construction activities have ceased for the day.

5. Excess excavation material shall be disposed of in a suitable location approved by the Project Engineer and Owner. Suitable locations for spreading and/or stockpiling excess material will be discussed at the pre-construction meeting. Contractor shall obtain approval from the Project Engineer and Owner prior to permanently placing excess material. The Contractor shall be responsible for cost associated with removing and relocating any excess material placed without prior approvals. Contractor shall endeavor to separate suitable and unsuitable materials during excavation operations to allow for separate means of disposal for excess materials.

6. The Contractor shall remove all trash and debris from the site on a daily basis and dispose of offsite in accordance with all local, state and federal regulations. Any necessary permits required for such disposal shall be obtained by the Contractor at their expense.

7. The Contractor shall provide all measures and devices necessary to protect the project limits, adjacent property, employees, and the general public for the duration of the project construction.

8. Existing plant materials selected for relocation shall be excavated during grading activities in the respective wetland area or stream segment. Plant excavation shall be performed with great care in order to retain the root structure within the drip-line of the plant, and roots shall not be allowed to dry out during temporary storage and relocation.

9. Strip and stockpile topsoil in designated material storage areas.

10. The contractor shall remove all trees, stumps, shrubs, brush, and other organic material within the grading limits necessary to facilitate earthwork activities. Other debris shall also be removed.

11. All additional material will be chipped and stockpiled on-site for subsequent use by the contractor for organic matter (or mulch) within the project limits.

12. All vegetation removed within the project limits that cannot be chipped or used for structures shall be hauled off-site and disposed of by the Contractor.

E. Construction Guidelines

1. All references to "left" and "right" in the construction drawings are in reference to looking downstream.

2. Construction shall proceed from the upstream to downstream, working and completing and stabilizing one segment of the proposed channel and planting area daily. If needed, pump any base stream flow from upstream of the active work area to downstream of the active work area.

3. As stated in Section "B.1." above, the Contractor is responsible for describing their proposed construction means and methods in their Workflow Plan; however, to accommodate a balance of earth work on this site the following Construction Sequence is suggested by the Project Engineer:

   - All areas to be planted shall be sprayed with herbicide application as noted in Planting Specification "B.11." on sheet 6.00.
   - Install erosion and sediment control measures per the Erosion and Sediment Control Plan.
   - Construct and stabilize the tributary channel from proposed station 20+38.89 to 28+31.55 starting from upstream and moving downstream. Tie to existing channel at station 28+31.55. Remove existing two 30" CMP and existing stream crossing structure, fill and stabilize existing stream channel.
   - Place excess cut material within suggested fill area.
   - Construct and stabilize the upper main channel from proposed station 0+70.58 to 2+26.00 starting from upstream and moving downstream. Excess soil shall be used to fill existing stream channel.
   - Working offline, construct and stabilize the lower main channel from proposed station 2+99.94 to 9+13.89 starting from upstream and moving downstream. Excess soil shall be moved to an appropriate stockpile area to be utilized in filling the existing channel.
   - Construct and stabilize the remaining sections of the proposed tributary and upper main stream sections.
   - Fill and stabilize the existing channel with stockpiled material.
   - Construct and stabilize the main channel from proposed station 9+13.89 to 16+98.19 starting from upstream and moving downstream. Fill existing channel as construction progresses.

4. Contractor is responsible to monitor weather forecasts and prepare site conditions, including erosion control measures, for pending storms capable of producing significant rainfall.

5. The Contractor shall perform all rough and fine grading earthwork operations in accordance with proposed grades and technical specifications, as shown herein.

6. On benches and slopes above bankfull elevation, the Contractor shall strip, stockpile, and replace 6 inches of topsoil prior to achieving final design elevation. Each section shall be rough graded first along the specified segment, then install structures and bring proposed stream bed and banks to final grade as work proceeds downstream. Existing plant materials that have been temporarily stored for relocation shall then be brought back to these areas and replanted at the final grade.

7. Final grade of the proposed channel shall utilize the specified bed substrate material as the final layer in the proposed channel. Stones shall be placed to create a dense stable mass with a minimum of voids.

8. Coir fabric along the banks shall be installed along with installation of rock and wood structures so that fabric can be placed first with sills on top to pin fabric in place. Sills shall be embedded so that tops are at final proposed grade.

9. Each stream segment shall be brought to final grade and stabilized daily before continuing to the next segment, allowing diverted (pump around) stream flow to be redirected back into the existing channel.

10. On a daily basis, as final grade and stabilization of the banks progresses downstream, the banks and other graded surfaces shall be seeded and lined with matting as shown on the Erosion and Sediment Control Plan. The Contractor shall be responsible to maintain all denuded and disturbed areas until which time they have been stabilized with the specified vegetative cover. The County Inspector and Project Engineer shall determine when the site has been completely stabilized.

11. Specified plantings shall be installed in accordance with the attached construction drawings following final grading, matting, seeding and as-built survey coordination. Contractor shall only use ATV scale vehicles and small equipment to complete planting work to avoid track rutting and disruption of final grade.

12. Upon completion of construction and vegetative stabilization, the Contractor shall remove temporary erosion and sediment control measures in accordance with the attached Erosion and Sediment Control Notes. This work includes permanent seeding of any remaining access roads and disturbance to temporary material storage areas and access easements.

F. Geotechnical Notes:

1. Excavation
   - 1.1. Excavation consists of soil material removal from any location within the project limits. All excavation shall be in accordance with the construction drawings.
   - 1.2. Unauthorized excavation consists of removal of soil materials beyond specified subgrade elevations, dimensions or locations without specific direction from the Project Engineer and Owner approval.
   - 1.3. Unsuitable material shall be identified and removed, if necessary, to the limits determined by the Project Engineer and suitable replacement material shall be backfilled in accordance with the geotechnical specifications contained herein.
   - 1.4. All work shall be performed in a safe manner in accordance with 29CFR1926 OSHA standards, latest edition.
   - 1.5. Dewatering, if necessary, shall be performed in accordance with the Erosion and Sediment Control Notes and the latest edition of the Pennsylvania Erosion and Sediment Control Handbook.

2. Backfilling & Fill Placement
   - 2.1. Vegetative debris and deleterious organic matter shall be removed from the channel (fill area) prior to the placement of fill.
   - 2.2. Material used for fill shall be suitable material as previously defined, free from rocks larger than 4 inches in any dimension, debris, root mass, clods or deleterious matter. Fill shall be placed in lifts not to exceed 8 inches and each lift shall be compacted to a minimum 95% of standard proctor.
   - 2.3. The use of a bridge lift is permitted as the initial fill lift only, where the existing channel bottom consists of soil materials that are either unsuitable or exceed optimum moisture conditions. Bridge lifts shall be placed in lifts not to exceed 8 inches with a maximum depth of 2 feet and be constructed with suitable fill within 3 percentage points of optimum moisture content. Fill lifts installed above the bridge lift shall be compacted to a minimum 95% of standard proctor.
   - 2.4. Streambed Substrate Mix shall be placed in lifts as specified on sheet 4.02.
   - 2.5. Reference the attached Erosion and Sediment Control Notes and Planting Specifications for direction on topsoil stripping, stockpiling, testing, amendment and reapplication.

COMMONWEALTH OF PENNSYLVANIA
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DATE	REVISION DESCRIPTION

TIMMONS GROUP

DATE	JUNE 2013
DRAWN BY	M. HUGHES
DESIGNED BY	M. HUGHES
CHECKED BY	R. NAPIER
SCALE	N/A

NORTH BRANCH PIGEON CREEK RESTORATION SITE
SOMERSET TOWNSHIP - WASHINGTON COUNTY - PENNSYLVANIA
CONSTRUCTION NOTES

JOB NO. 33548
SHEET NO. 4.00

MAIN UPPER SILL/HEADER TABLE

Structure Name	Station	Elevation
ROCK SILL	1+02.13	1080.10
TRIPLE LOG SILL	1+20.89	1079.79
TRIPLE LOG SILL	1+80.78	1079.24
ROCK CROSS VANE HEADER	2+99.89	1077.99

MAIN LOWER SILL/HEADER TABLE

Structure Name	Station	Elevation
ROCK SILL	3+73.20	1077.60
TRIPLE LOG SILL	4+35.00	1077.20
TRIPLE LOG SILL	5+12.01	1076.69
TRIPLE LOG SILL	5+87.63	1076.23
TRIPLE LOG SILL	6+70.92	1075.67
TRIPLE LOG SILL	7+55.36	1075.08
TRIPLE LOG SILL	8+42.75	1074.44
TRIPLE LOG SILL	9+29.71	1073.83
TRIPLE LOG SILL	10+11.62	1073.15
TRIPLE LOG SILL	10+82.44	1072.52
TRIPLE LOG SILL	11+67.96	1071.90
ROCK SILL	12+57.86	1071.17
ROCK SILL	13+63.35	1070.46
ROCK SILL	14+40.98	1069.93
TRIPLE LOG SILL	15+07.53	1069.24
TRIPLE LOG SILL	15+82.98	1068.57
TRIPLE LOG SILL	16+03.96	1068.17
ROCK SILL	16+53.27	1067.28
ROCK SILL	16+68.21	1066.88
ROCK SILL	16+83.15	1066.48

TRIBUTARY SILL/HEADER TABLE

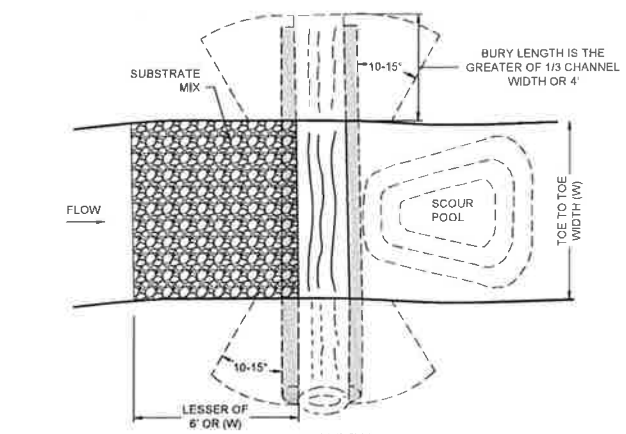
Structure Name	Station	Elevation
ROCK SILL	20+36.89	1093.25
ROCK SILL	20+68.62	1092.58
TRIPLE LOG SILL	21+15.96	1091.89
TRIPLE LOG SILL	21+59.91	1091.40
TRIPLE LOG SILL	22+04.45	1090.71
ROCK SILL	22+59.44	1089.96
ROCK SILL	23+02.89	1089.47
TRIPLE LOG SILL	23+59.35	1088.74
TRIPLE LOG SILL	23+71.66	1088.49
TRIPLE LOG SILL	24+04.80	1087.60
TRIPLE LOG SILL	24+53.99	1086.96
TRIPLE LOG SILL	24+68.49	1086.66
TRIPLE LOG SILL	25+00.46	1085.84
TRIPLE LOG SILL	25+15.66	1085.54
TRIPLE LOG SILL	25+59.49	1084.38
TRIPLE LOG SILL	26+06.17	1083.89
TRIPLE LOG SILL	26+52.03	1083.26
TRIPLE LOG SILL	26+63.10	1083.01
TRIPLE LOG SILL	27+01.11	1082.03
ROCK SILL	27+44.66	1081.49

TRIBUTARY SILL/HEADER TABLE

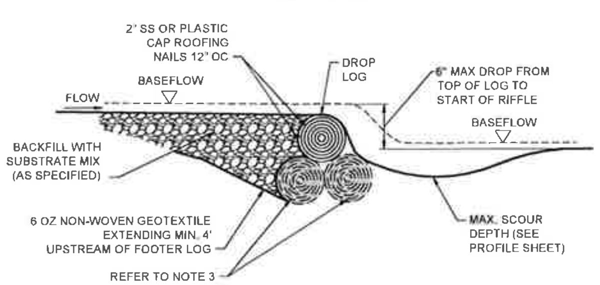
Structure Name	Station	Elevation
TRIPLE LOG SILL	27+54.99	1080.54
ROCK SILL	27+87.86	1080.37
TRIPLE LOG SILL	28+43.02	1079.80
TRIPLE LOG SILL	28+91.58	1079.49
TRIPLE LOG SILL	29+04.25	1079.09
TRIPLE LOG SILL	29+16.92	1078.69
ROCK SILL	29+24.55	1078.77
ROCK SILL	29+29.64	1078.29

MAIN LOWER ARM/VANE TABLE

Structure Name	Start Station	Start Crown Elevation (FT)	End Station	End Crown Elevation (FT)
ROCK VANE	3+21.53	1078.70	3+00.23	1077.99
ROCK VANE	3+00.87	1077.99	3+12.92	1078.28



PLAN VIEW



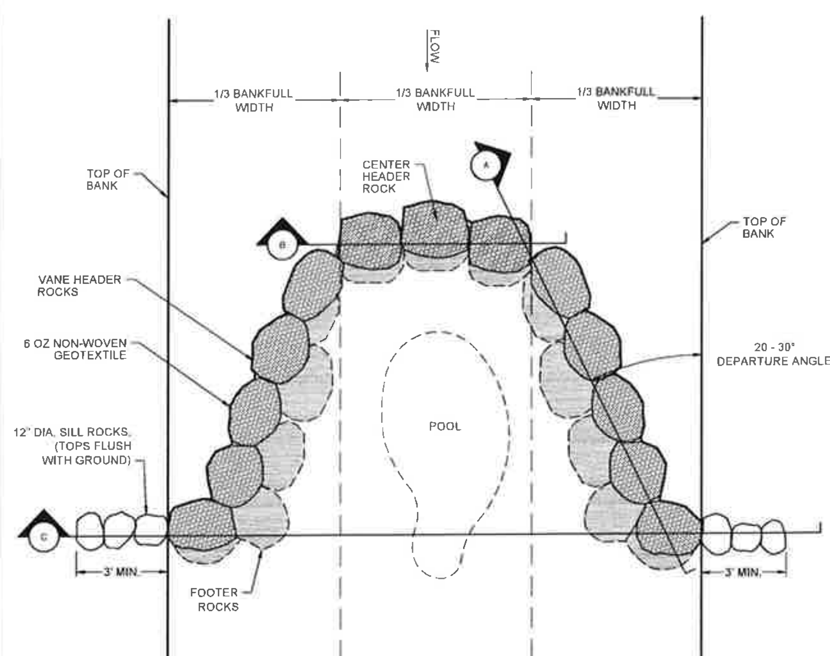
SECTION VIEW

NOTES

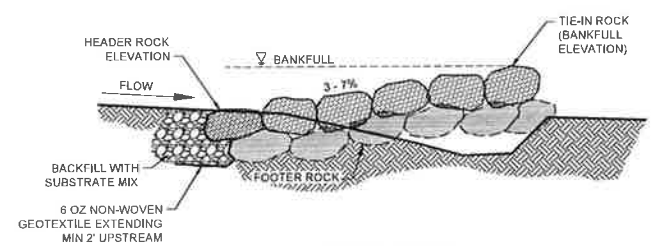
1. REFER TO STRUCTURE TABLE ON SHEET 4.01.
2. LOG SILLS MAY BE ANGLED WITHIN A RANGE FROM 10-15° AS SHOWN IN PLAN VIEW.
3. REACH 3 AND REACH 1 SHALL USE 12" LOGS, REACH 2 SHALL USE 18" LOGS.

REV. 9/26/11

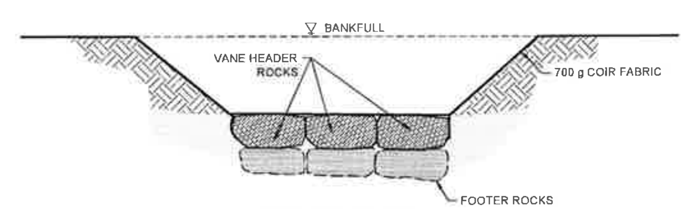
LOG SILL (TRIPLE)
NO SCALE



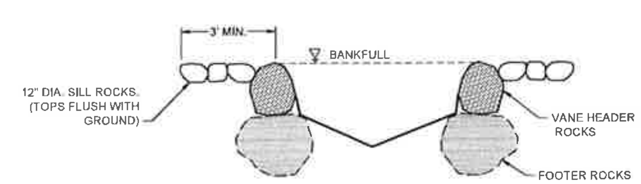
PLAN VIEW



SECTION A VIEW



SECTION B VIEW



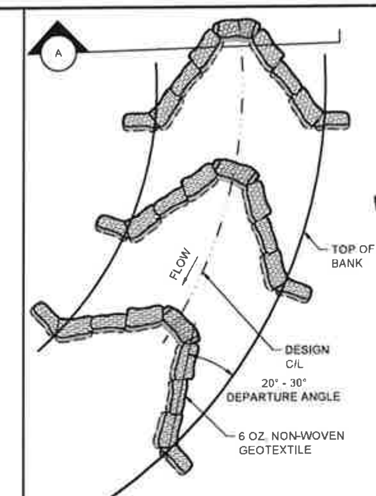
SECTION C VIEW

NOTES

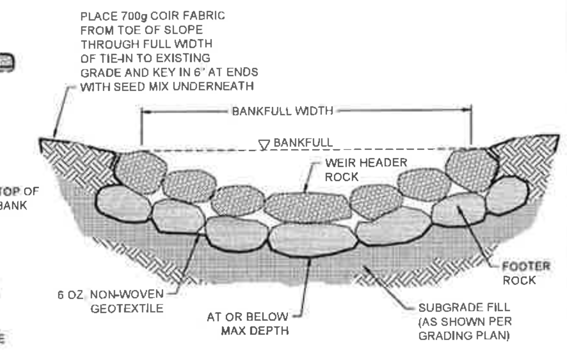
1. REFER TO SUITABLE ROCK SIZE DIAGRAM ON SHEET 4.02 FOR HEADER AND FOOTER ROCK DIMENSIONS.
2. REFER TO STRUCTURE TABLE ON SHEET 4.01.

REV. 9/26/11

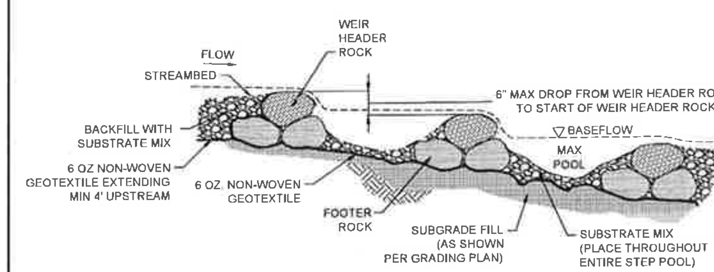
ROCK CROSS VANE
NO SCALE



PLAN VIEW



SECTION A VIEW



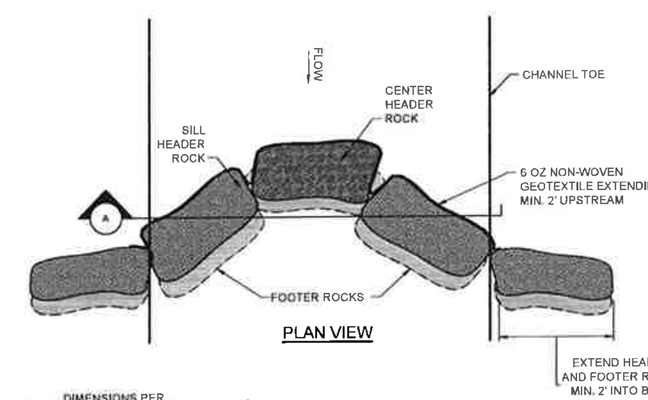
PROFILE VIEW

NOTES

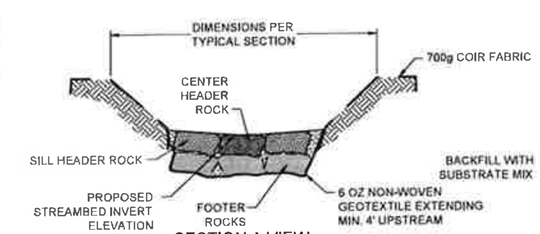
1. REFER TO SUITABLE ROCK SIZE DIAGRAM ON SHEET 4.02 FOR WEIR AND FOOTER ROCK DIMENSIONS.
2. REFER TO GRADING PLAN FOR STATION AND ELEVATION OF POOL AND ROCK STRUCTURES.

REV. 6/11/12

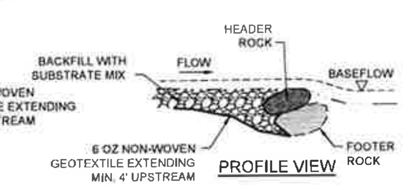
ROCK STEP POOL
NO SCALE



PLAN VIEW



SECTION A VIEW



PROFILE VIEW

NOTES

1. REFER TO SUITABLE ROCK SIZE DIAGRAM ON SHEET 4.02 FOR HEADER AND FOOTER ROCK DIMENSIONS.
2. THE ROCK SILL IS TO BE CENTERED IN THE CHANNEL WITH ALL HEADER ROCKS FLUSH WITH THE PROPOSED GRADE. ALL ROCKS PLACED TIGHTLY TO EACH OTHER WITH SUBSTRATE MIX COMPACTED AROUND EACH.
3. REFER TO STRUCTURE TABLE ON SHEET 4.01.

REV. 9/26/11

ROCK SILL
NO SCALE

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DATE

DATE	JUNE 2013
DRAWN BY	M. HUGHES
DESIGNED BY	M. HUGHES
CHECKED BY	R. NAPIER
SCALE	N/A

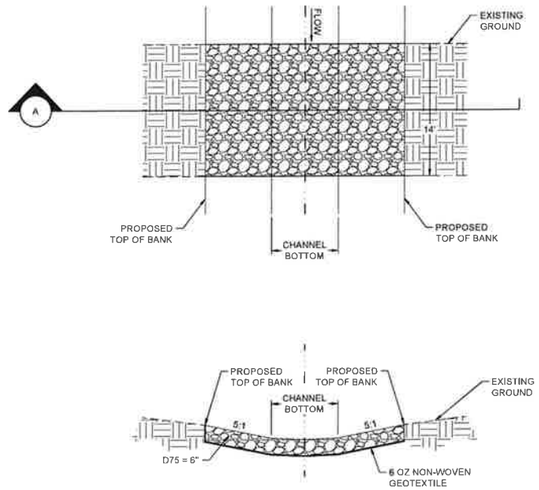
TIMMONS GROUP

NORTH BRANCH PIGEON CREEK RESTORATION SITE

SOMERSET TOWNSHIP - WASHINGTON COUNTY - PENNSYLVANIA

STRUCTURE TABLE AND CONSTRUCTION DETAILS

JOB NO.	33548
SHEET NO.	4.01

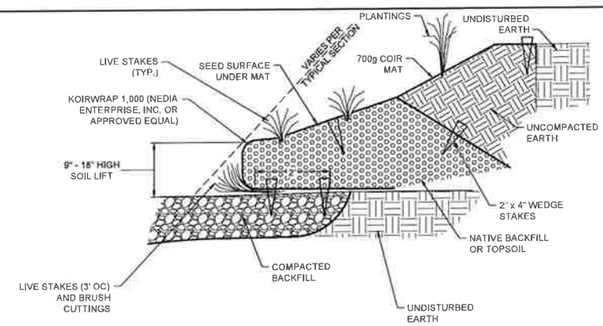


SECTION A VIEW

NOTES:

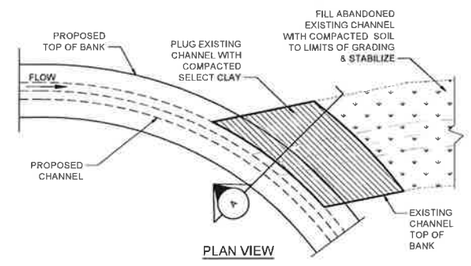
1. FORD CROSSING ADAPTED FROM NRCS FIELD OFFICE TECHNICAL GUIDE, SECTION IV, CONSERVATION PRACTICE STANDARD - STREAM CROSSING 578.
2. ROCK SIZE CALCULATED USING FWS-LANE METHOD IN THE NATIONAL ENGINEERING HANDBOOK, PART 650 - ENGINEERING FIELD HANDBOOK CHAPTER 16 - STREAMBANK AND SHORELINE PROTECTION.

FORD CROSSING
NO SCALE

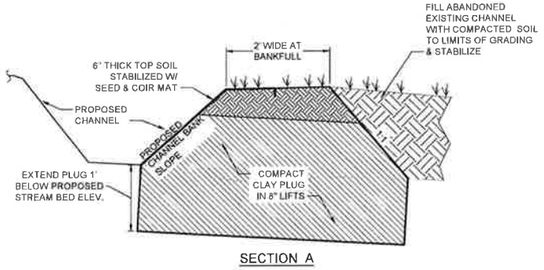


REV. 10/08/12

REINFORCED SOIL LIFTS
NO SCALE

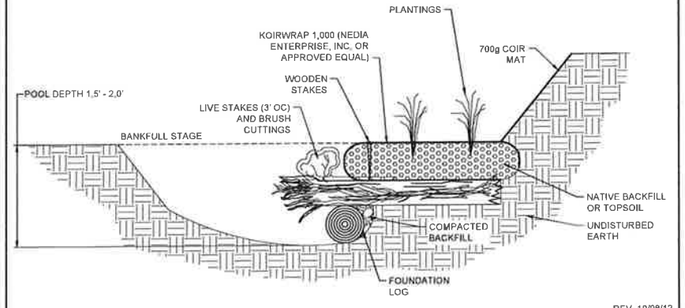


PLAN VIEW



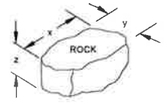
SECTION A

CLAY PLUG
NO SCALE



REV. 10/08/12

TOE WOOD
NO SCALE



SUITABLE ROCKS WILL HAVE THE FOLLOWING THREE PRIMARY DIMENSIONS (±2").

x = LONGEST DIMENSION
y = INTERMEDIATE DIMENSION (30")
z = SHORTEST DIMENSION

REV. 9/26/11

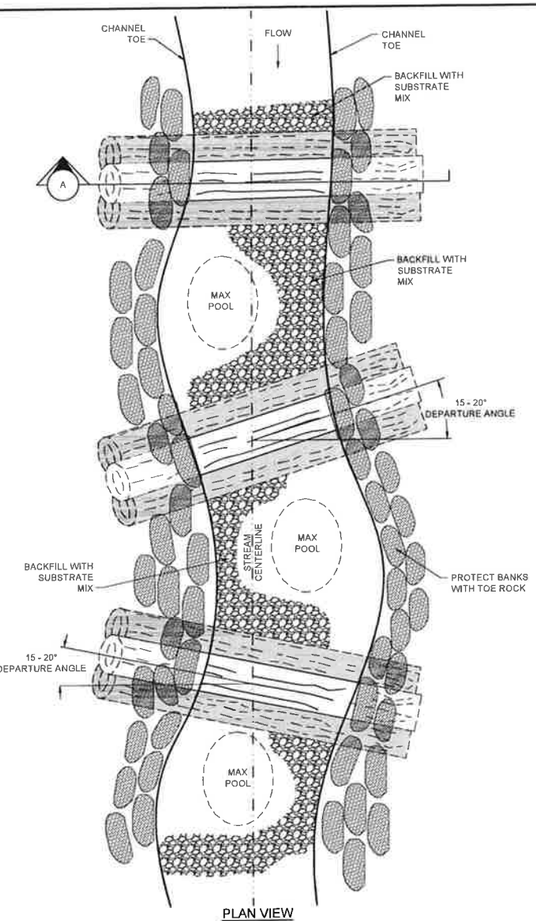
SUITABLE ROCK SIZE DIAGRAM
NO SCALE

PARTICLE DIAMETER	SIZE
D50	4"

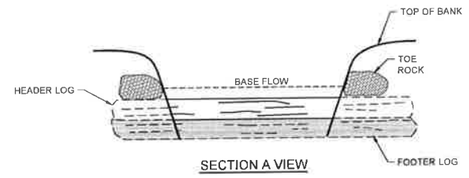
1. SUBSTRATE DEPTH SHALL BE 12".
2. THE INTERMEDIATE DIMENSION OF FLAT OR "PLATY" ROCK SHALL BE THE AVERAGE OF THE LENGTH, WIDTH AND THICKNESS.
2. ALL MATERIAL USED FOR SECTIONS OF THE STREAM CHANNEL THAT ARE RAISED ABOVE EXISTING GRADE SHALL BE REVIEWED AND APPROVED BY THE PROJECT ENGINEER PRIOR TO PLACEMENT IN THE STREAM CHANNEL.
3. COBBLE AND GRAVEL MATERIALS SHALL BE SIMILAR IN NATURE TO COMMON STREAM AND RIVERBED FORMATIONS IN THIS VICINITY.
4. FILL CONSISTS OF MATERIAL EXCAVATED AND RELOCATED FROM THE PROJECT SITE OR ASSOCIATED AREAS ON THE PROPERTY. PROPOSED FILL SOURCES SHALL BE APPROVED BY THE PROJECT ENGINEER PRIOR TO USE.
5. MATERIALS IMPORTED TO THE SITE SHALL BE MIXED TO THE SPECIFIED PERCENTAGES WITHIN THE LIMITS OF THE STOCKPILE AND STAGING AREAS PRIOR TO FINAL PLACEMENT.

REV. 9/26/11

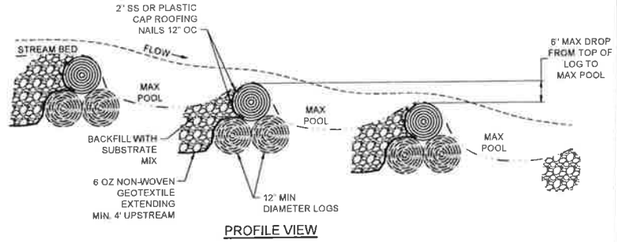
SUBSTRATE MIX SPECS
NO SCALE



PLAN VIEW



SECTION A VIEW



PROFILE VIEW

REV. 4/18/12

LOG STEP-POOL
NO SCALE

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No. PE058126

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REVISION DESCRIPTION	DATE

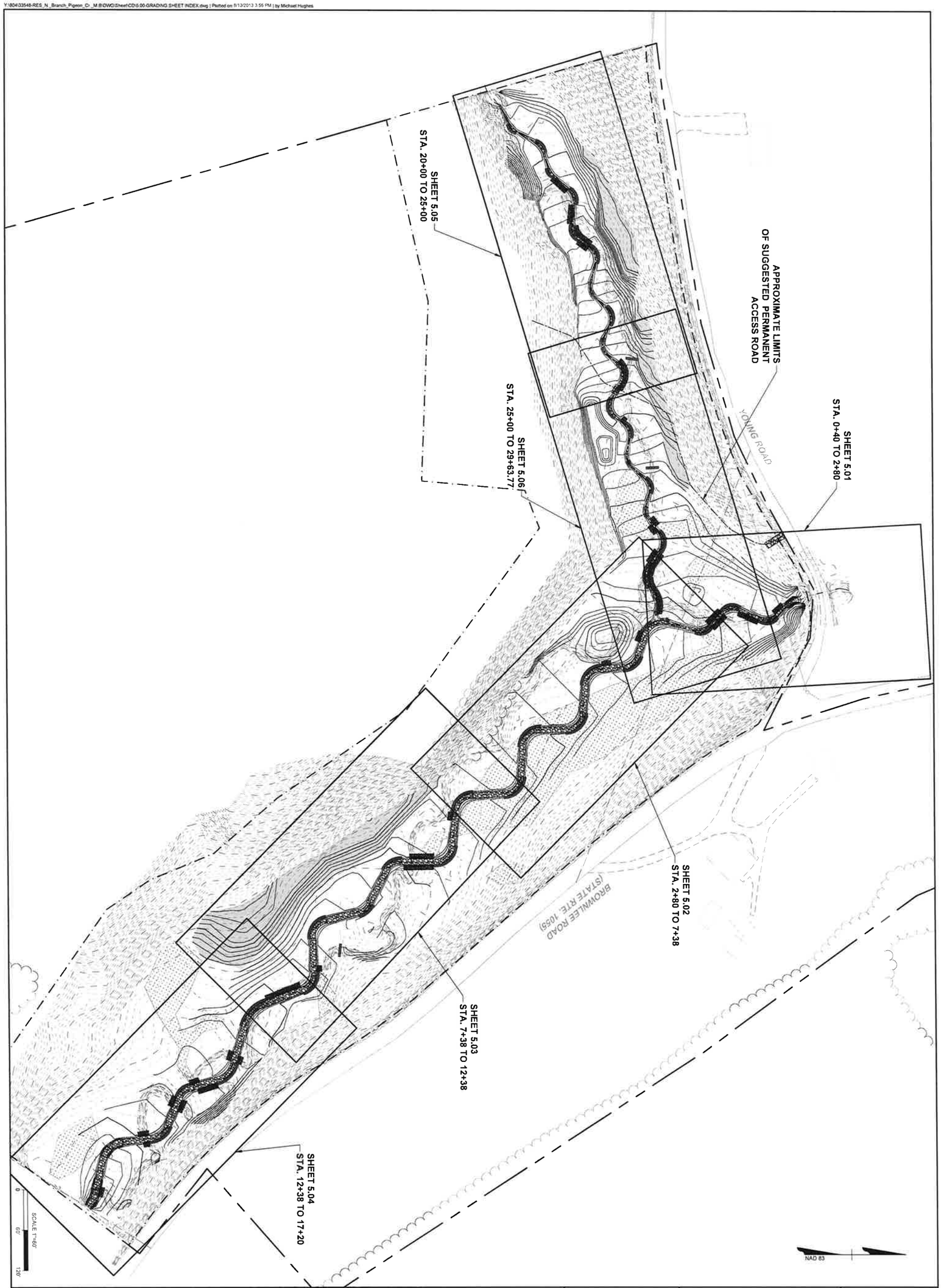
DATE: JUNE 2013
DRAWN BY: M. HUGHES
DESIGNED BY: M. HUGHES
CHECKED BY: R. NAPIER
SCALE: ----

TIMMONS GROUP

NORTH BRANCH PIGEON CREEK RESTORATION SITE
SOMERSET TOWNSHIP - WASHINGTON COUNTY - PENNSYLVANIA
CONSTRUCTION DETAILS

JOB NO. 33548
SHEET NO. 4.02

Y:\85433548\REE_N_Branch_Pigeon_Cr_-_M BOWG\Sheet\CD\4.02 CONSTRUCTION DETAILS.dwg | Plotted on 8/13/2013 2:55 PM | by Michael Hughes



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REBECCA E. NAPIER
ENGINEER

SHEET NO.	5.00
JOB NO.	33548

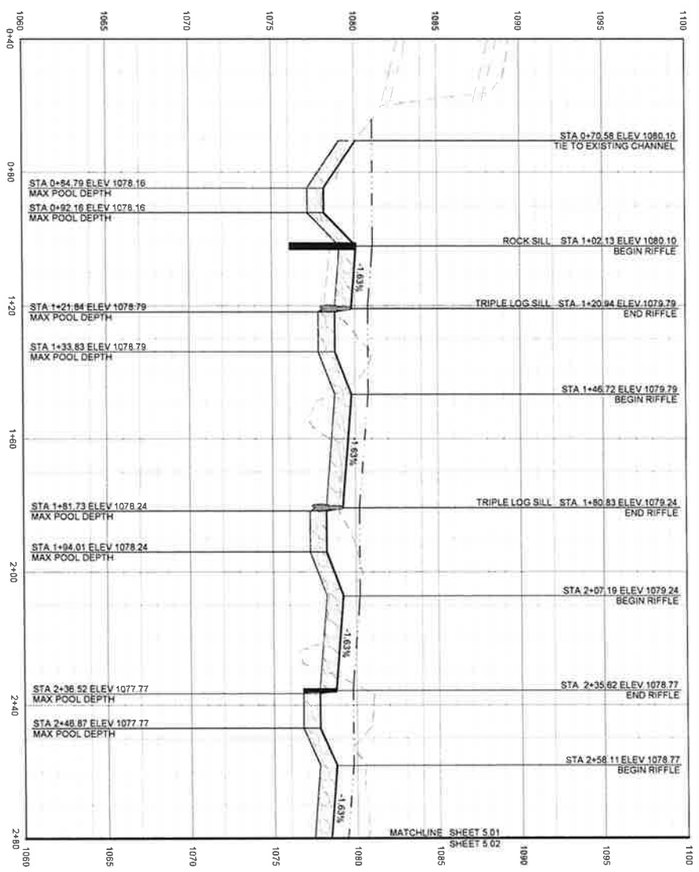
NORTH BRANCH PIGEON CREEK RESTORATION SITE

SOMERSET TOWNSHIP - WASHINGTON COUNTY - PENNSYLVANIA

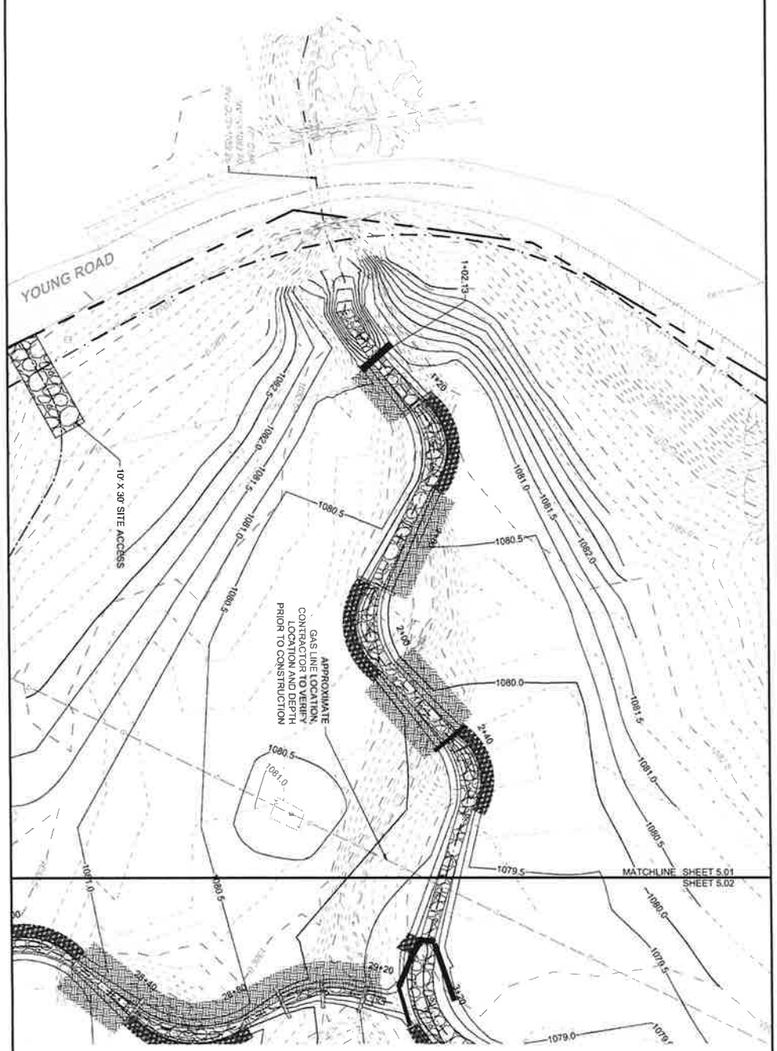
GRADING SHEET INDEX

SCALE	1" = 60'
CHECKED BY	R. NAPIER
DESIGNED BY	M. HUGHES
DRAWN BY	M. HUGHES
DATE	JUNE 2013

DATE	REVISION DESCRIPTION



PROFILE SCALE
0
4
0
20



SCALE 1"=20'
0
20'
40'

NOTE
1. ALL GAS LINES SHOWN ON THIS PLAN ARE APPROXIMATE LOCATIONS. CONTRACTOR TO VERIFY LOCATION AND DEPTH PRIOR TO CONSTRUCTION.

NORTH

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REGISTERED PROFESSIONAL
REBECCA E. NAPIER
ENGINEER

DATE	REVISION DESCRIPTION

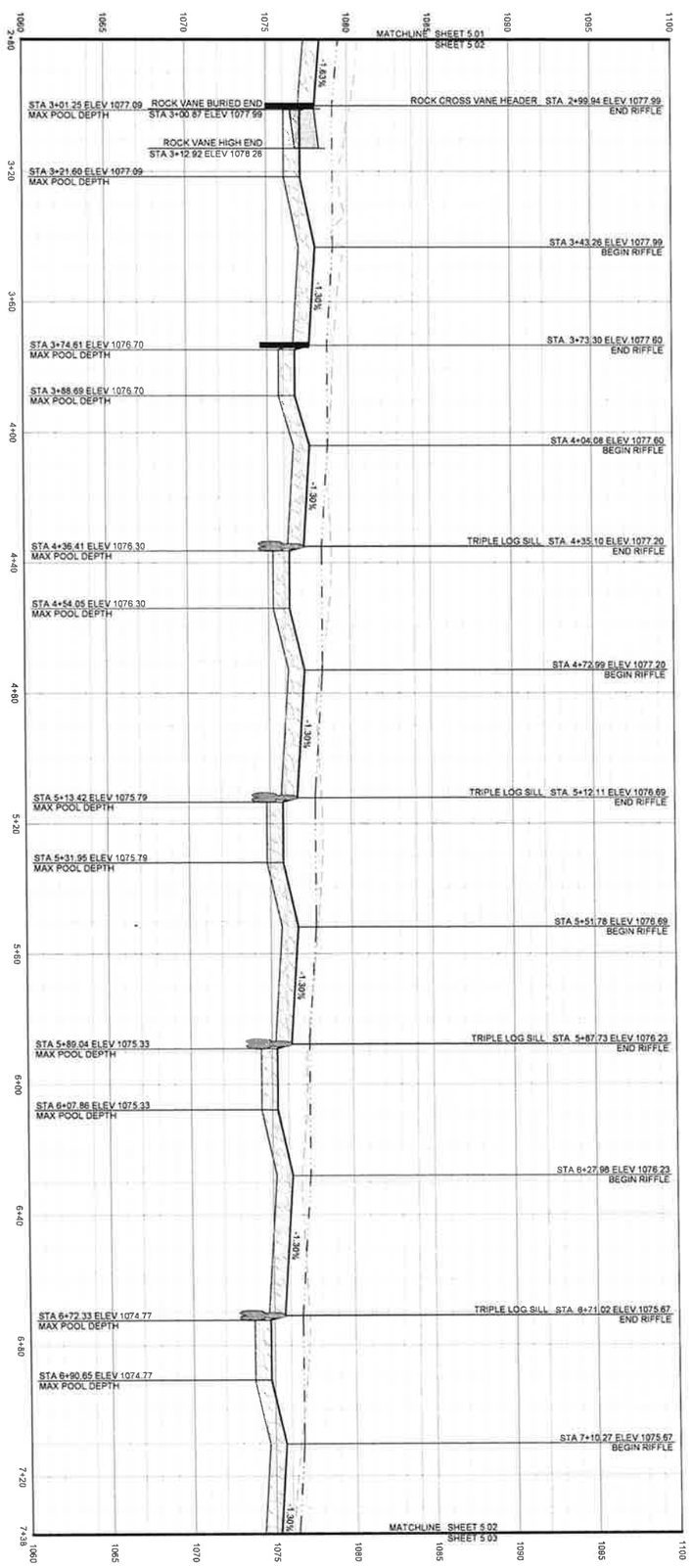
SHEET NO. 5.01
TGG NO. 33548

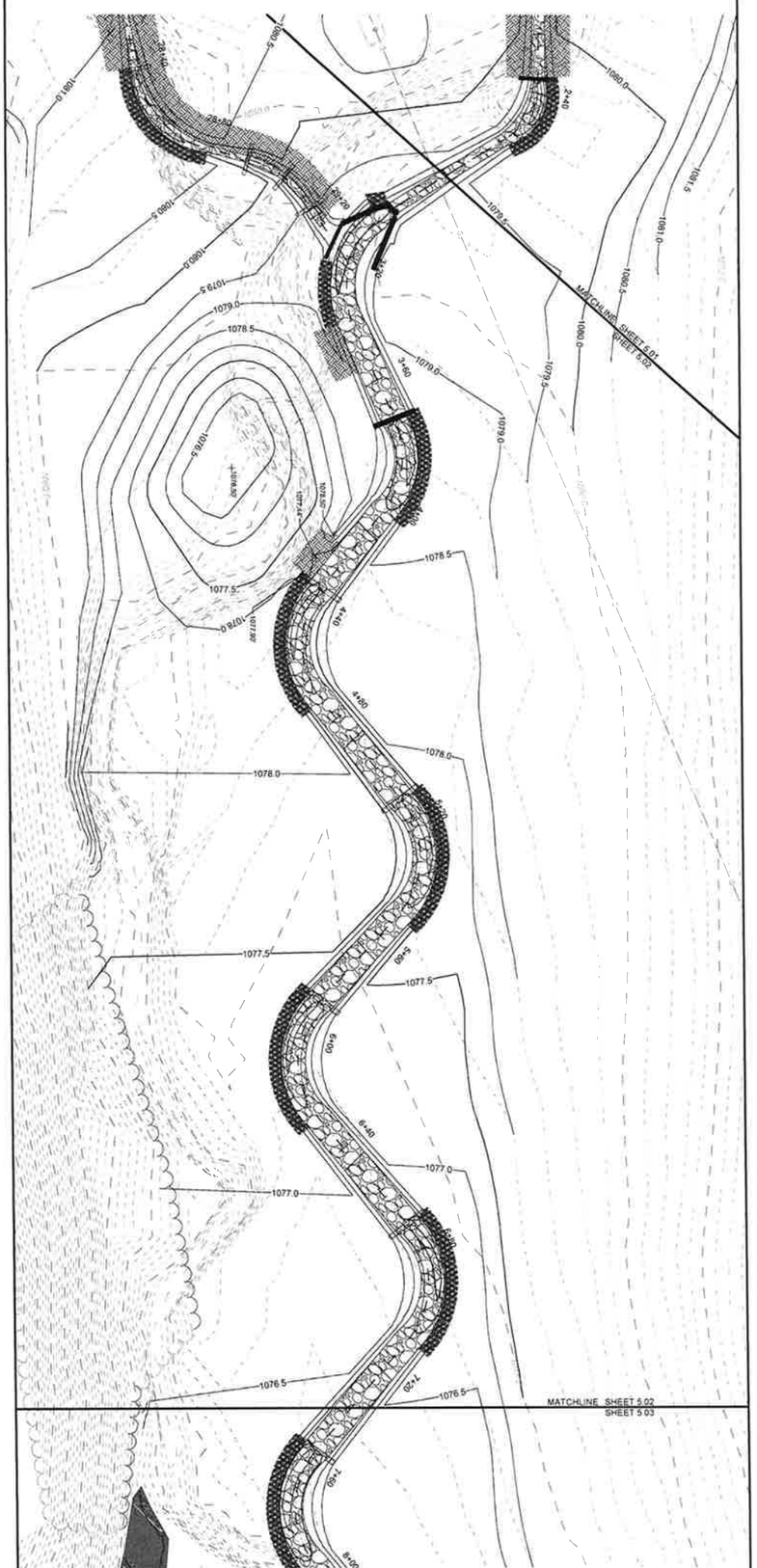
NORTH BRANCH PIGEON CREEK RESTORATION SITE

SOMERSET TOWNSHIP - WASHINGTON COUNTY - PENNSYLVANIA

GRADING PLAN AND PROFILE REACH 1 STA. 0+40.00 TO 2+80.00

SCALE H: 1" = 20' V: 1" = 4'
R. NAPIER CHECKED BY
M. HUGHES DESIGNED BY
M. HUGHES DRAWN BY
JUNE 2013 DATE





PROFILE SCALE
0 4
0 20 40

SCALE 1"=20'
0 20' 40'

NOTE
1. ALL GAS LINES SHOWN ON THIS PLAN ARE APPROXIMATE LOCATIONS. CONTRACTOR TO VERIFY LOCATION AND DEPTH PRIOR TO CONSTRUCTION.

MAG N

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REBECCA E. NAPIER — REGISTERED PROFESSIONAL ENGINEER — COMMONWEALTH OF VIRGINIA

JOB NO. 33548
SHEET NO. 5.02

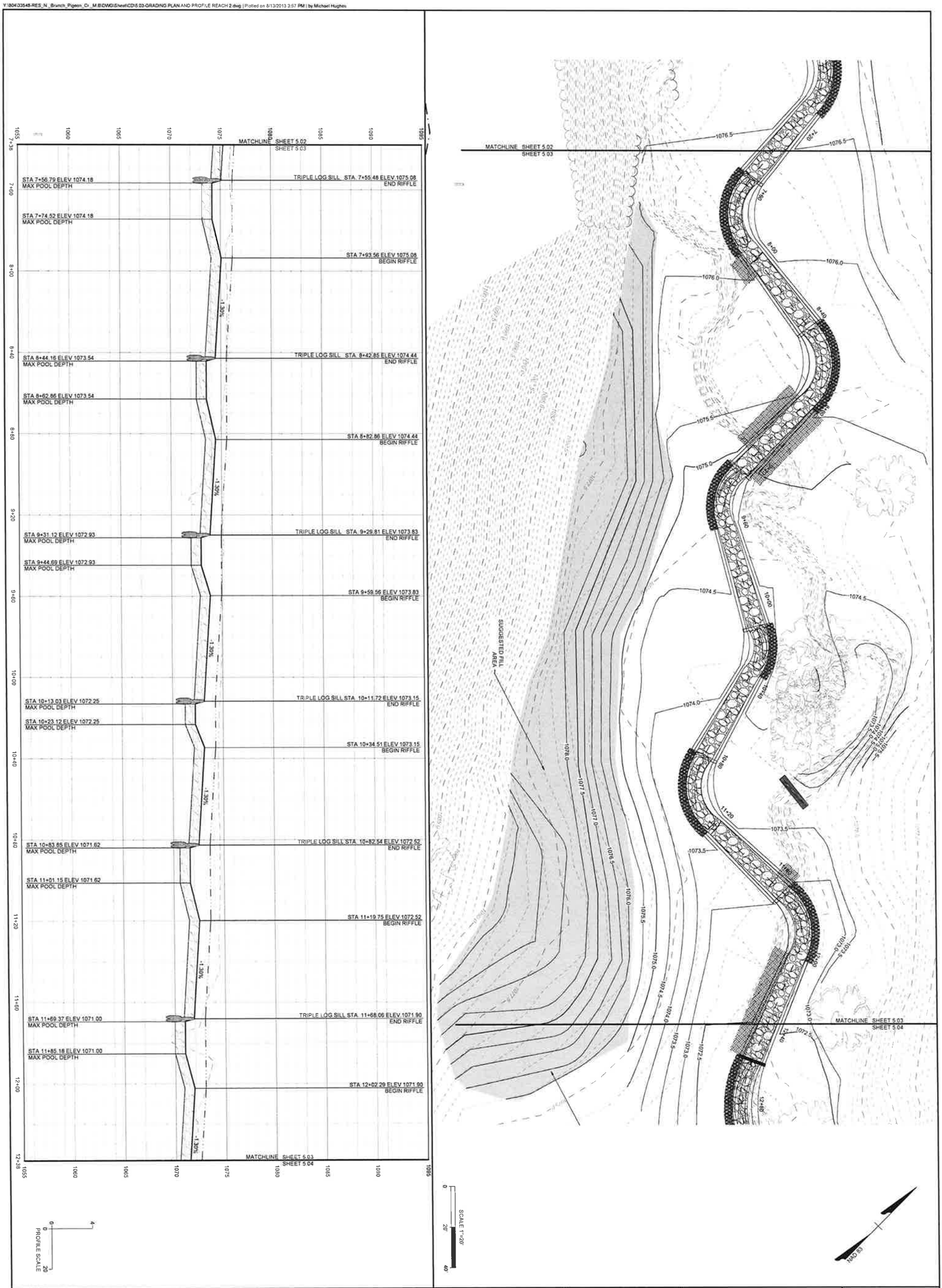
NORTH BRANCH PIGEON CREEK RESTORATION SITE

SOMERSET TOWNSHIP - WASHINGTON COUNTY - PENNSYLVANIA

GRADING PLAN AND PROFILE REACH 2 STA. 2+80 -7+38

SCALE	H: 1" = 20' V: 1" = 4'
CHECKED BY	R. NAPIER
DESIGNED BY	M. HUGHES
DRAWN BY	M. HUGHES
DATE	JUNE 2013

DATE	REVISION DESCRIPTION



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LICENSED PROFESSIONAL ENGINEER
COMMONWEALTH OF VIRGINIA

SHEET NO.	5.03
JOB NO.	33548

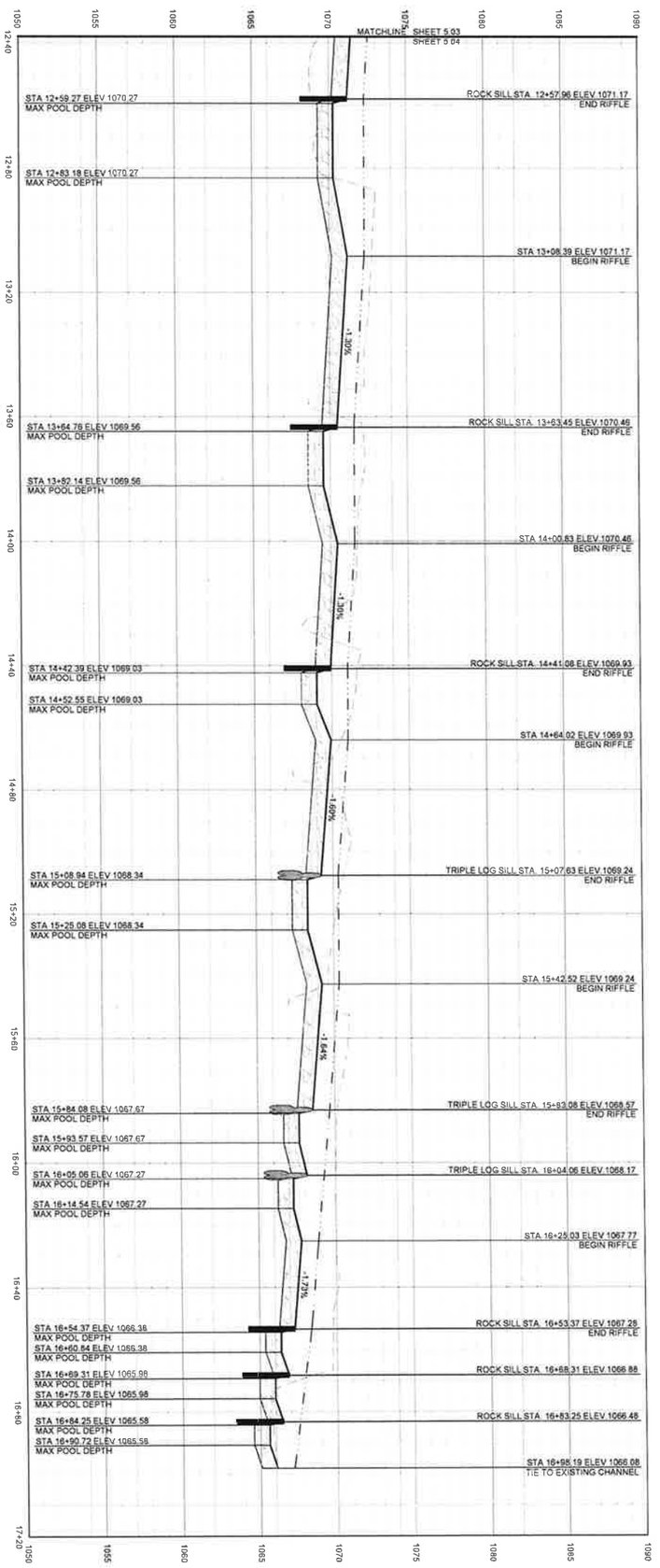
NORTH BRANCH PIGEON CREEK RESTORATION SITE

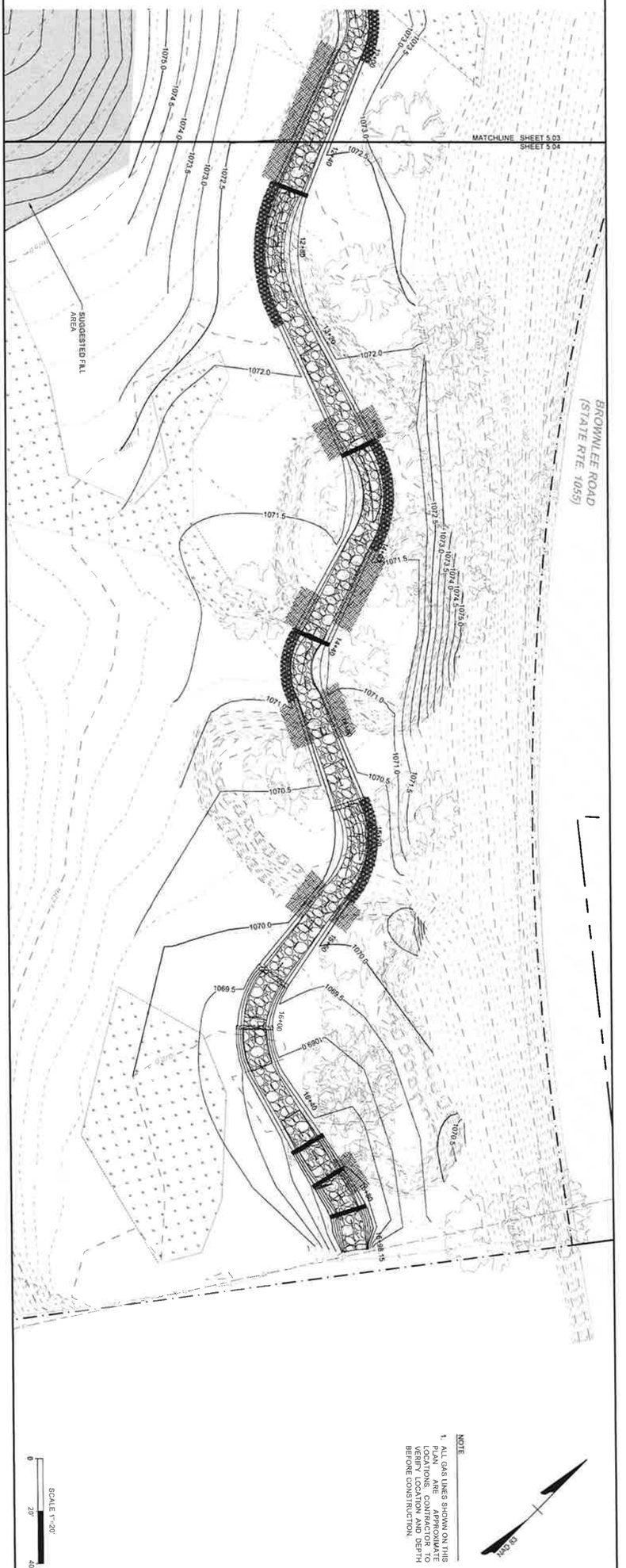
SOMERSET TOWNSHIP - WASHINGTON COUNTY - PENNSYLVANIA

GRADING PLAN AND PROFILE REACH 2 STA. 7+38 - 12+38

SCALE	H: 1" = 20' V: 1" = 4'
CHECKED BY	R. NAPIER
DESIGNED BY	M. HUGHES
DRAWN BY	M. HUGHES
DATE	JUNE 2013

DATE	REVISION DESCRIPTION





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COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL REBECCA E. HARPER ENGINEER

NORTH BRANCH PIGEON CREEK RESTORATION SITE

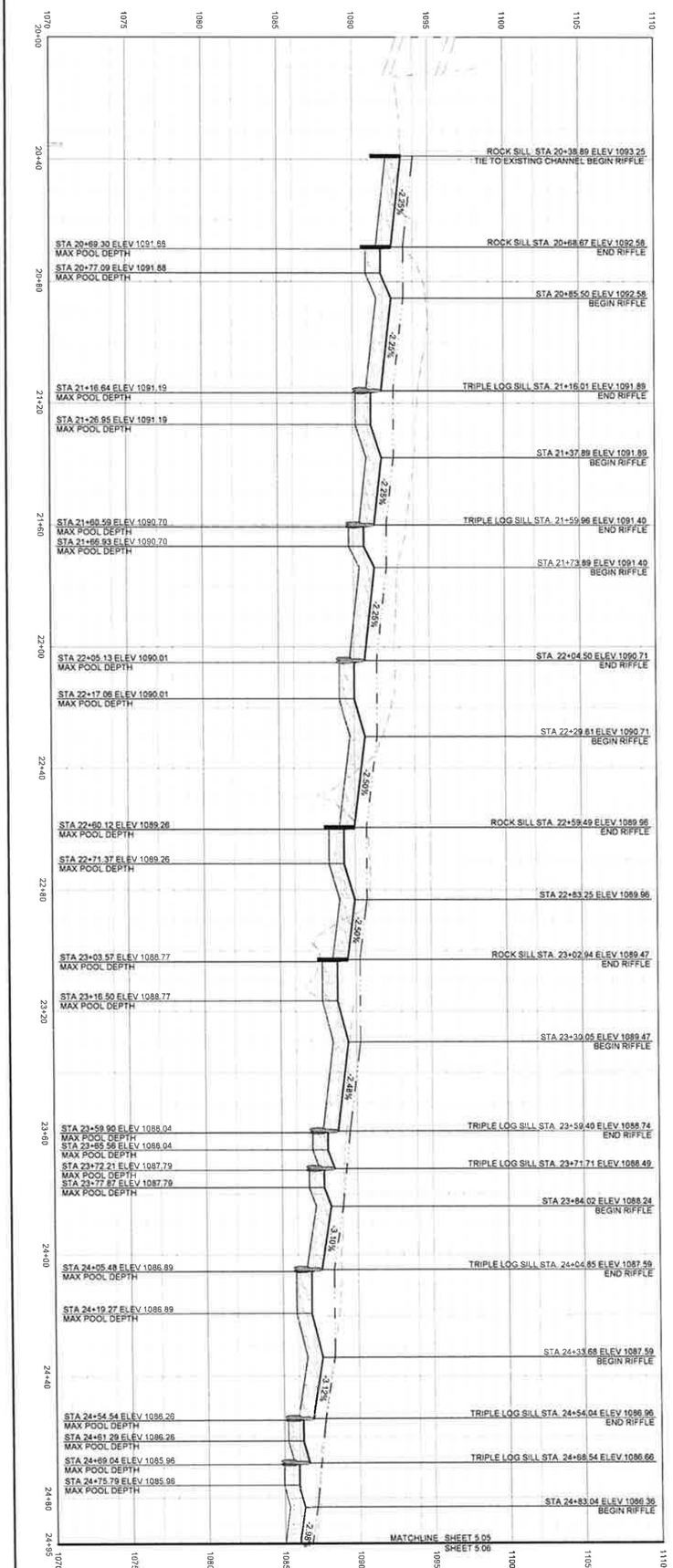
SOMERSET TOWNSHIP - WASHINGTON COUNTY - PENNSYLVANIA

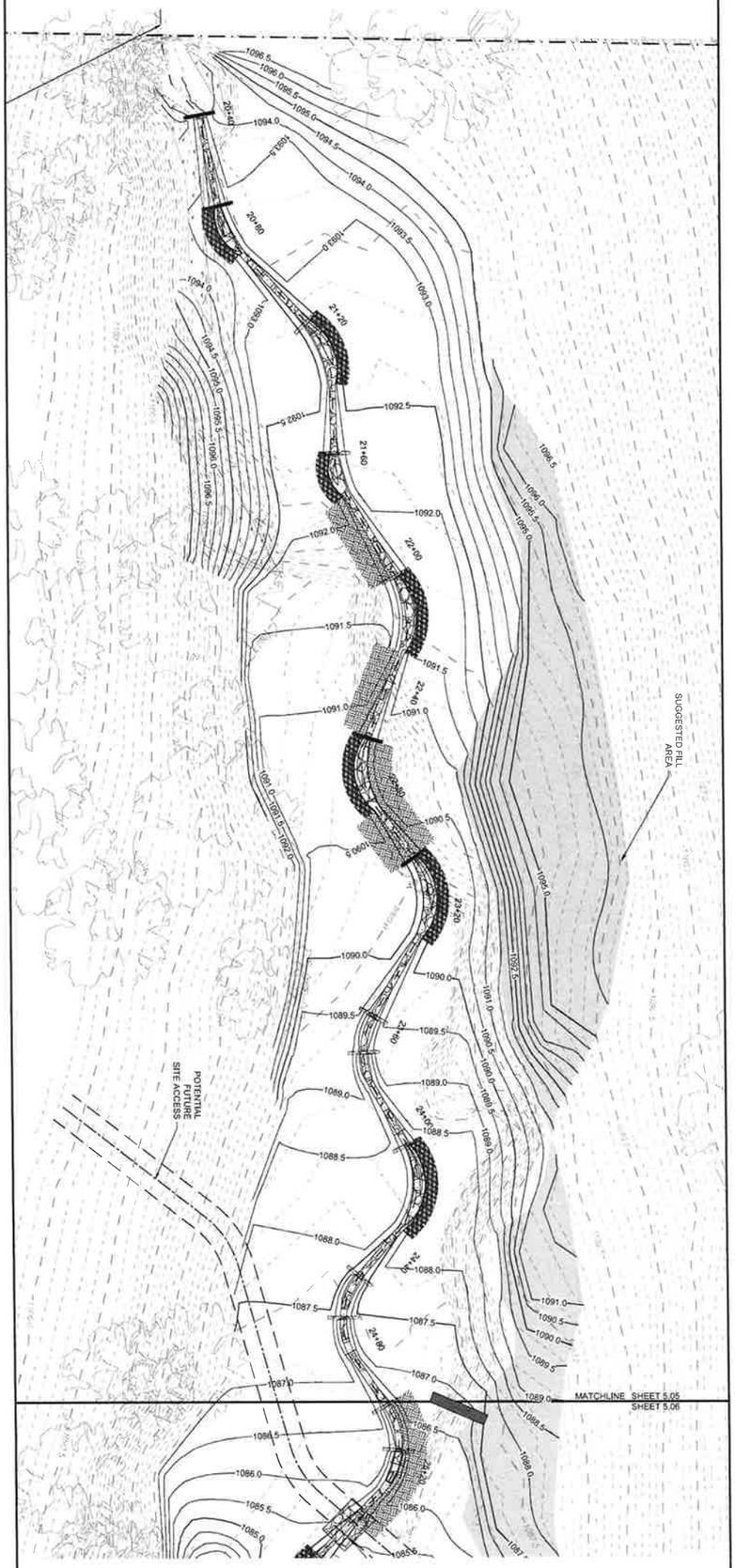
GRADING PLAN AND PROFILE REACH 2 STA. 12+38 - 17+20

SHEET NO.	JOB NO.	SCALE	DESIGNED BY	DRAWN BY	DATE
5.04	33548	H: 1" = 20' V: 1" = 4'	R. HARPER	M. HUGHES	JUNE 2013

CHECKED BY: M. HUGHES

DATE	REVISION DESCRIPTION





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REBECCA E. NAPIER — COMMONWEALTH OF PENNSYLVANIA — REGISTERED PROFESSIONAL — ENGINEER

JOB NO.	33548
SHEET NO.	5.05

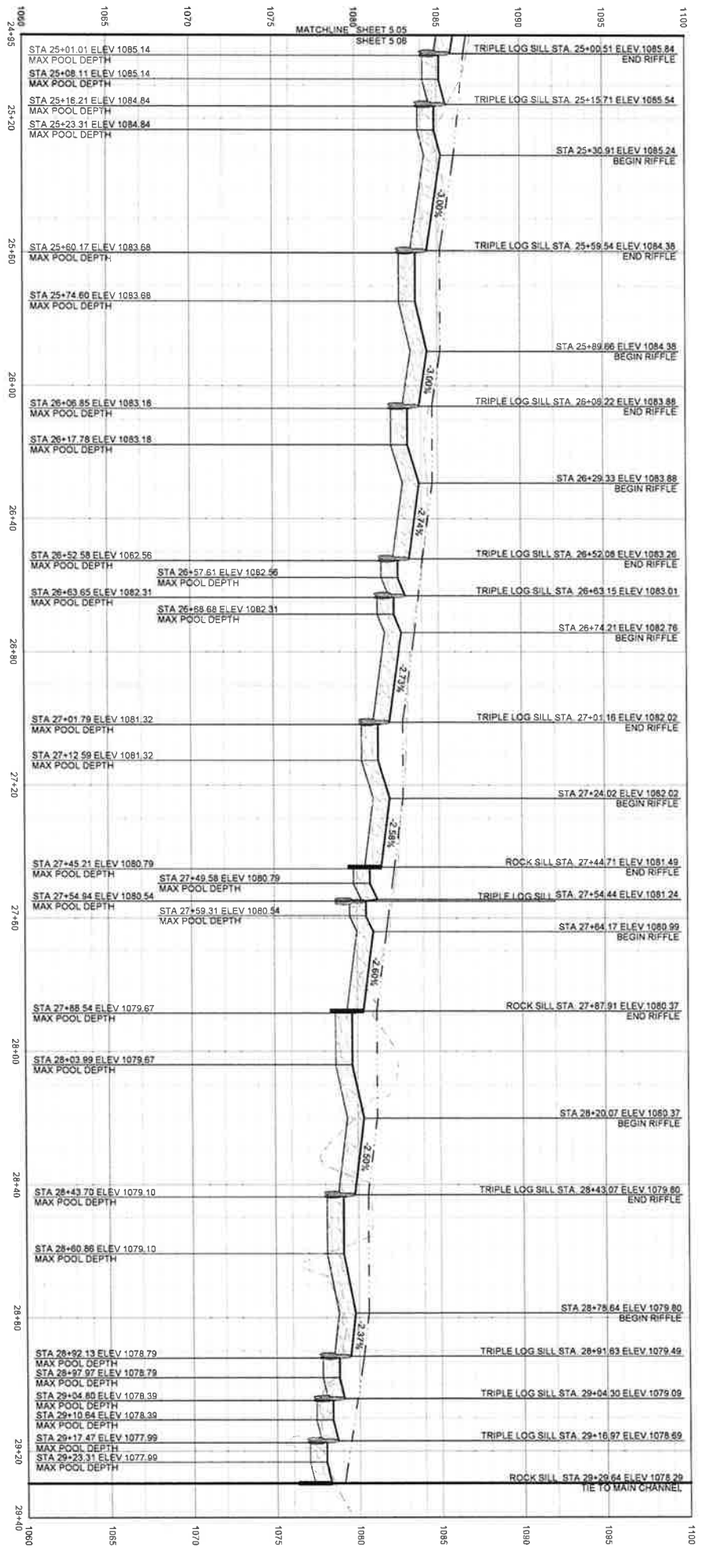
NORTH BRANCH PIGEON CREEK RESTORATION SITE

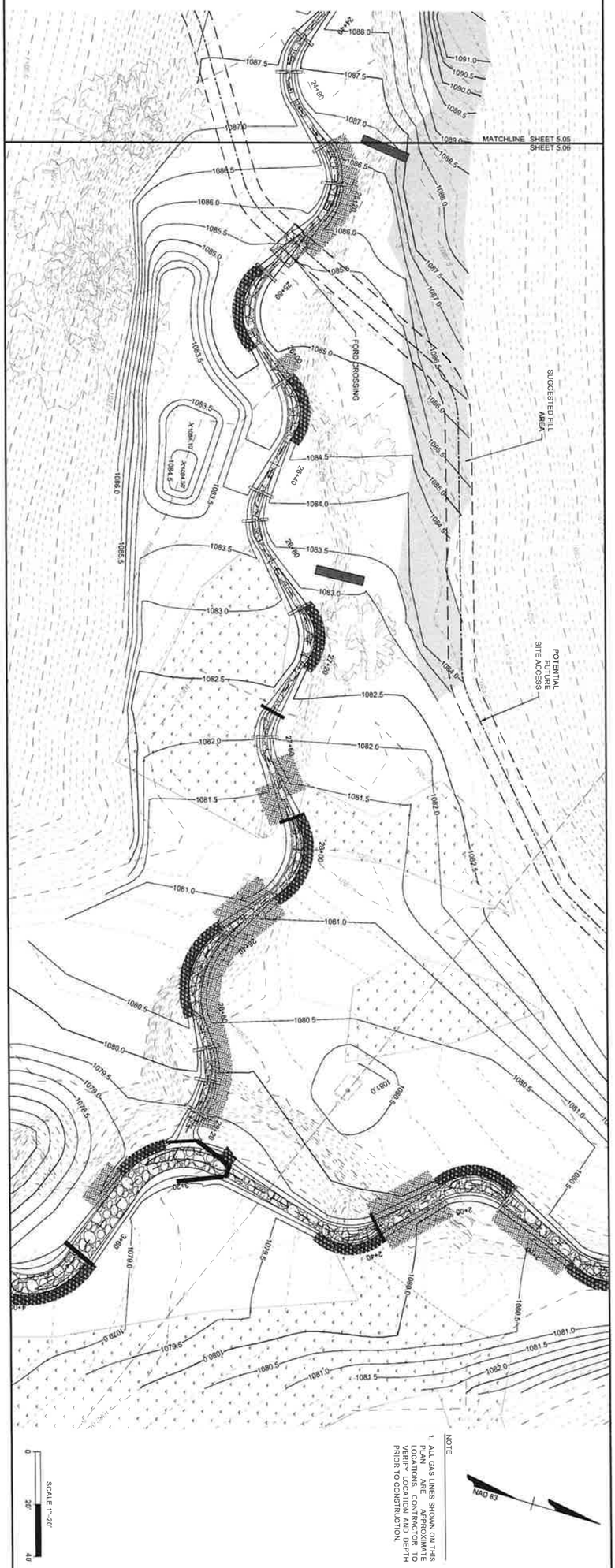
SOMERSET TOWNSHIP - WASHINGTON COUNTY - PENNSYLVANIA

GRADING PLAN AND PROFILE REACH 3 STA. 20+00 - 25+00

SCALE	H: 1" = 20' V: 1" = 4'
CHECKED BY	R. NAPIER
DESIGNED BY	M. HUGHES
DRAWN BY	M. HUGHES
DATE	JUNE 2013

DATE	REVISION DESCRIPTION





NOTE
1. ALL GAS LINES SHOWN ON THIS PLAN ARE APPROXIMATE LOCATIONS. CONTRACTOR TO VERIFY LOCATION AND DEPTH PRIOR TO CONSTRUCTION.

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REBECCA E. NAPIER — LICENSED PROFESSIONAL ENGINEER

DATE	REVISION DESCRIPTION

JOB NO. 33548
SHEET NO. 5.06

NORTH BRANCH PIGEON CREEK RESTORATION SITE

SOMERSET TOWNSHIP - WASHINGTON COUNTY - PENNSYLVANIA

GRADING PLAN AND PROFILE REACH 3 STA. 25+00 - 29+63.77

H: 1" = 20'
V: 1" = 4'
SCALE

R. MAPIER — CHECKED BY
M. HUGHES — DESIGNED BY
M. HUGHES — DRAWN BY
JUNE 2013 — DATE

PLANTING SPECIFICATIONS

A. General:

1. Plant details are incorporated into this specification by reference.

2. Submittals
   - 2.1. Installers Qualifications provide a list, with references, of the past three projects of similar scope.
   - 2.2. Product Data for each type of product indicated.
   - 2.3. Plant Material Certifications: Contractor shall be required to submit the material certifications to the Project Engineer for review and approval prior to material purchase.
   - 2.4. **Topsoil Analysis and Soil Amendments: Contractor shall be responsible to submit certified soil test results and soil amendment recommendations prior to commencement of construction.**
   - 2.5. Contractor should schedule a minimum of one week for Project Engineer review time of the specified submittal.

3. Quality Assurance
   - 3.1. Supplier Certification: the supplier of all seeds and/or vegetation shall certify that origin of the seeds from which the plants or seeds were produced is from hardiness zone 5, from the eastern or central portions of the U.S., prior to planting.
   - 3.2. Installer Qualifications engage an experienced installer, who has successfully completed planting projects similar in size and complexity to this project.
   - 3.3. Installer's Field Supervision: Installer to maintain an experienced full-time supervisor on the project site when planting is in progress.

4. Plant Materials
   - 4.1. Provide plant materials of quantity, size, genus, species and variety indicated on the construction drawings.

5. All plant materials and work shall comply with recommendations and requirements of ANSI z60.1 2004 American Standard for Nursery Stock. All seed must meet applicable state and federal regulations and must include labeling indicating supplier, formulation, germination rates and seed date.

6. Do not make substitutions unless approved by the Project Engineer. If specified landscape material is not obtainable, submit proof of non-availability to Project Engineer together with proposal for use of equivalent material.

7. Project Engineer may inspect plant materials either at place of growth or on site during planting activities, for compliance with requirements for genus, species, variety, size and quality. Additionally, Project Engineer retains the right to further inspect plant material. Material found to be unacceptable will be rejected and the contractor will be required to supply replacement material within a reasonable time frame (i.e., 1 week). Rejected material shall be immediately removed from project site. Unacceptable material is defined as the following
   - 7.1. Plants with bent trunks or multiple leaders, unless characteristic for the species.
   - 7.2. Plants with diseased trunks, stems or leaves;
   - 7.3. Plants with pest-infested trunks, stems or leaves;
   - 7.4. Plants of insufficient size;
   - 7.5. Plants of wrong species/sub-species; and
   - 7.6. Plants having root girdling in the container.

8. Delivery, Storage and Handling
   - 8.1. Protect bark, branches and root systems from sun scald, drying, sweating, whipping and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of plants during delivery. Do not drop plants during delivery.
   - 8.2. Deliver plant materials after preparations for planting have been completed and plant immediately. If planting is delayed more than 6 hours after delivery, set plant materials in shade, protect from weather and mechanical damage, and keep roots moist and free from frost. Prevent plug, tubelings and bareroot material from drying.
   - 8.3. Do not remove container-grown stock from containers until planting time.
   - 8.4. Balled and burlapped material shall be dug so as to retain as many fibrous roots as practicable and shall come from soil which will form a firm ball. The soil in the ball shall be the original and undisturbed soil in which the plant has been grown. The plant shall be dug, wrapped, transported and handled in such a manner that the soil ball will not be loosened to cause stripping of the small and fine feeding roots or cause the soil to drop away from such roots.
   - 8.5. Balled and burlapped material shall be freshly dug. If trees are stored, untie and set vertically.
   - 8.6. Handle planting stock by root ball.
   - 8.7. Prevent live staking material from drying out and store according to supplier's recommendations.

9. Project Conditions
   - 9.1. Examine the sub-grade and topsoil, verify the elevations and observe the conditions under which work is to be performed. All soil amendments and conditioning shall be completed prior to seeding and plant material installation. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the installer.
   - 9.2. Call Pennsylvania One Call System at 1-800-242-1776, 48 hours prior to any excavation. Determine location of underground utilities and perform work in a manner which will avoid possible damage. Hand excavate as required.

10. Planting and Seeding Restrictions
   - 10.1. Plants shall be planted during unfrozen soil conditions October 15th - April 30th. Plant installation outside of this time period shall not occur unless approved by the Project Engineer and may require additions to the scope of work, such as watering regimes and additional plant quantities.
   - 10.2. Seeding shall be completed during March - May or September - November. Grading operations needing stabilization outside of this time period shall be seeded with an alternative warm season or cool season grass mix that is approved by the Project Engineer until such time as the specified seeding can occur.
   - 10.3. These limits may not be modified unless approved by the Project Engineer, in advance, with the risk of survival borne solely by the Contractor.

11. Warranty
   - 11.1. Warranty period is for one (1) year after date of Final Acceptance and covers defects including death and unsatisfactory growth, except for defects resulting from neglect by Owner, abuse or damage by others, or unusual phenomena or incidents which are beyond Contractor's control.
   - 11.2. Contractor shall guarantee a minimum survival rate for the warranty period of 85% for balled and burlapped, container grown, and tubelings, and 75% for bare root and live stakes.
   - 11.3. If survival rates are less than the above warranty rates, then Contractor shall replace the quantity of defective or dead plants up to the original construction drawing specified plant quality. Warranty plantings shall occur within the next planting window (October 15th - April 30th, excluding frozen soil conditions) following the end of the applicable warranty period.
   - 11.4. It shall be the Contractor's responsibility during the warranty period to provide written notice of any maintenance practice to the Owner, which in their opinion will affect the guarantee if not remedied promptly. The Project Engineer will render an opinion of any conflict if necessary.

12. Maintenance
   - 12.1. The Contractor is responsible for maintaining all plant material until Final Acceptance. The Owner is responsible for maintaining all plant material throughout the warranty period according to the Project Engineer approved Maintenance Schedule.

B. Products/Materials:

1. Plant Materials
   - 1.1. General. The contractor is to provide nursery-grown plant materials complying with ANSI z60.1, with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock free of disease, insects, eggs, larvae and defects such as knots, sun scald, injuries, abrasions and disfigurement.
   - 1.2. Transplants. Transplants may include live stakes, shrubs, small trees, grass plugs and live mats. When available, the source and location of suitable materials for transplanting will be identified by the Project Engineer. The plant materials to be transplanted will be marked and identified for the Contractor prior to construction.

2. Live Stakes
   - 2.1. Commercially supplied or field harvested live stakes shall be at least one year old and shall be harvested and transported when plants are dormant.
   - 2.2. The size of stakes shall range from ½ inch to 1 inch in caliper and average 24 inches in length with a minimum planted length of 18 inches. Side branches shall be removed with the remaining bark intact. The bottom (basal) end shall be cleanly cut at a 45 degree or sharper angle and the top end should be cut square (flat), protruding no more than 4 inches.

3. Branch Cutting
   - 3.1. Commercially supplied or field harvested branch cuttings shall be approximately ½ inch in diameter and shall not exceed 2 inches in diameter. Cuttings shall be 3 to 6 feet in length.
   - 3.2. Live branch cuttings shall consist of a mix of at least two of the approved plants species as specified on the Planting Schedule.

4. Seed. Seed should be clean and dry. Do not use seed that has become moist during delivery or storage.

5. Water. Free of substances harmful to plant growth.

6. Tree Mats. Ecodepot Treemat™ or Project Engineer approved equal. Tree mat must be composed of 100% biodegradable, machine-compressed coir fiber with 100% biodegradable rubber coating on one side. Tree mat must have a center opening, a radial slit, and must be a minimum of ½ inch thick. Manufacturer's recommended sizing:

   12" Treemat - tubelings and bareroot trees/shrubs
   16" Treemat - 1 gallon containerized trees/shrubs
   24" Treemat - 3 gallon containerized trees/shrubs
   30" Treemat - 5 gallon containerized trees/shrubs and 1 inch caliper trees
   36" Treemat - 2 inch caliper trees

7. Tree Shelters. Ecodepot Biobark™ tree shelter or Project Engineer approved equal. Tree shelter must be composed of 100% biodegradable materials and should be made of hardwood slats woven together with natural roping. The tree shelter must be at least 36 inches tall with at least 3 longer, hardy stakes for insertion into the ground to provide support.

8. Topsoil
   - 8.1. Reuse of surface soil stockpiled on-site. Contractor is responsible to submit soil test results, certifying suitability of stockpiled surface soil for topsoil use, to the Project Engineer for approval.
   - 8.2. If stockpiled surface soil is determined to be suitable for reuse as topsoil, then contractor shall clean soil to remove roots, plants, sod, stones, clay lumps and other extraneous materials harmful to plant growth prior to use as topsoil. Contractor may use sifted stone material as substrate material for the proposed stream as long as it meets the requirements and specifications of substrate material listed on sheet 4.03.
   - 8.3. Imported Topsoil: If on-site soil is determined to be unsuitable then contractor shall supplement with imported or manufactured topsoil from off-site sources with certified topsoil. Obtain topsoil displaced from naturally well-drained sites where topsoil occurs at least 4 inches (100 mm) deep, do not obtain from bogs or marshes. If agricultural land is the source of topsoil the material cannot include manure.

   OR
   - 8.4. Amended Surface Soil. If on-site soil is determined to be unsuitable then contractor shall amend existing in-place surface soil to produce topsoil. Contractor is responsible to submit certified surface soil test results and recommended amendments to the Project Engineer for approval prior to purchasing amendments. Contractor shall clean surface soil to remove roots, plants, sod, stones, clay lumps, and other extraneous materials harmful to plant growth prior to mixing in approved amendments.

9. Organic Soil Amendments
   - 9.1. Organic backfill shall be added as a soil amendment and shall consist of composted yard waste or other approved recycled organic materials. Prior to delivery, the Contractor shall submit to the Project Engineer for approval a sample of the organic backfill that will be used by the Contractor.
   - 9.2. Organic backfill shall be aged not less than one year and must be free of viable weed seed. The Project Engineer reserves the right at any time to test and reject compost material that fails to meet these specifications. Composted waste products shall exclude sewer sludge or bio-solids, plastics or metals.

10. Straw Mulch. Cereal grain straw shall be harvested from dry stalks, properly stored and clean of weed seeds. Straw shall come in baled form to be spread by hand or machine-blown.

11. Herbicide Spray Application: Existing areas with substantial coverage of undesirable grass species shall be sprayed with an aquatic safe glyphosate (AquaPro®) or approved equal). Apply at a rate of 8 ounces of AquaPro and 4 ounces of non-ionic surfactant (Cide-Kick® or equivalent) with 2 gallons of water per 50' x 50' area, spraying directly onto target plants. Cool season grass eradication requires one application in the fall and one in the spring. Grass should be allowed to grow 6 inches, either after mowing or from spring growth, to weaken the plant and provide maximum surface area for application. See product label for complete use directions. Glyphosate is a non-selective chemical which will control any vegetation on which it is sprayed, care should be taken to avoid contact with non-target species. Preferably, application should be applied by a certified pesticide applicator.

12. Tree Tags. Tree Tags shall be 5 inch x ½ inch wrap-around tags constructed of fade resistant plastic. Tag color shall be proposed with product submittal to Project Engineer. Recommend Enviroflex® Wrap-Around Tag distributed by Western Tag & Label or equivalent.

C. Execution:

Install plant materials in accordance with the specifications and details of the construction drawings following the addition of soil amendments, seeding, and installation of applicable erosion control fabric.

1. Container Grown Material
   - 1.1. Planting of container grown material shall occur in accordance with locations and/or patterns specific to the construction drawings.
   - 1.2. Planting holes shall be twice the diameter and 1 foot deeper than the container in which they are grown. Scarify planting hole bottom a minimum of 6 inches and mix ½ cubic foot of organic blend with hole backfill prior to setting plant. Do not remove plant material from container until immediately before installation. Examine the roots to see if they are pot bound. Carefully separate any pot bound or cramped roots and spread them out when placing the plant within the hole so that the roots can grow without further constriction of the root ball.
   - 1.3. Set plant materials plumb and centered within hole, ensuring that the top of the root ball is elevated 2 to 3 inches above the surrounding soil elevations. Backfill around root ball with suitable native soil, maintaining plumb and gently tamping backfill layers to eliminate voids. Water in backfill layers to the point of soil saturation.
   - 1.4. Following the backfilling, add existing soil to bring the final grade in the planting hole to the surrounding soil surface. Rake the unused existing soil outside the planting house, taking care not to mound the soil or to significantly alter the existing grades.
   - 1.5. Install tree mat around plant and secure with 8 inch sod staples in accordance with manufacturer's recommendations. If approved by the Project Engineer as an alternate, the Contractor may apply 2 to 3 inch average thickness of approved organic mulch layer in lieu of installing Treemats across the entire planting hole extending a minimum of 9 inches radially. Do not place mulch within 3 inches of plant trunk or stem.
   - 1.6. Install approved tree tag in accordance with manufacturer's recommendations.

2. Bareroot and Tubeling Material
   - 2.1. Planting of tubeling and bare root material shall occur in a random pattern across the site and in accordance with the schedule and details provided.
   - 2.2. It should be anticipated that the soil may be compacted more than optimal for planting and it shall be the contractor's responsibility to disk and rake soil to assure optimal planting condition.
   - 2.3. Bareroot material shall be treated with root dip according to the manufacturers recommendation prior to planting. Materials shall be planted immediately or otherwise stored per the manufacturer's recommendations.
   - 2.4. Install 12" tree mat around plant and secure with 8 inch sod staples in accordance with manufacturer's recommendations. If approved by the Project Engineer as an alternate, the Contractor may apply 2 to 3 inch average thickness of approved organic mulch layer, in lieu of installing Treemats across the entire planting hole extending a minimum of 9 inches radially. Do not place mulch within 3 inches of plant trunk or stem.
   - 2.5. Install approved tree tag in accordance with manufacturer's recommendations.

3. Live Stake Material
   - 3.1. Live stake material shall be soaked with growth hormone 48 hours prior to installation and shall be kept moist according to manufacturer's recommendations. Do not allow the live stakes to dry out prior to installation.
   - 3.2. Material shall be planted according to the detail provided on sheet 6.01. The use of a punch/planting bar, auger, rebar or water-jet may be used to predrill hole if necessary. Tamp soil around stake following install.
   - 3.3. Install approved tree tag in accordance with manufacturer's recommendations.

4. Seeding
   - 4.1. Seeding in areas graded or otherwise denuded shall occur in accordance with the current version of the Pennsylvania Department of Environmental Protection Erosion and Sediment Pollution Control Program Manual. Seed shall be applied prior to installation of any erosion control fabric. Areas applied with herbicide in the spring may be seeded 7 days after application.
   - 4.2. Sow seed with a spreader or a hydroseed machine with manufacturer recommended binding agent. Do not broadcast or drop seed when wind velocity exceeds 5 mph. Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.
   - 4.3. Do not use wet seed or seed that is moldy or otherwise damaged in transit or storage.
   - 4.4. Sow seed prior to installation of erosion control fabric where applicable.
   - 4.5. Rake seed lightly into the top ¼ to ½ inch of topsoil, roll lightly, and water with a fine spray.
   - 4.6. Protect seeded areas against erosion by spreading straw mulch immediately following completion of seeding operations if other erosion control measures are not otherwise specified. Spread uniformly at a rate of 2 tons per acre (90 lb. per 1,000 S.F.) to form a continuous blanket over seeded areas. Spread by hand, blower or other suitable equipment. Anchor straw mulch by crimping into topsoil by suitable mechanical equipment.

5. Transplants
   - 5.1 Live Mat Transplanting
     - 5.1.1 Unless otherwise directed by the Project Engineer, the Contractor shall stage transplanting of live mats such that they can be immediately re-planted on the prepared surface. Double handling of the mats shall be avoided when possible.
     - 5.1.2 The surface that will receive the mats shall be graded and loose. Mats will not be placed over compacted or currently vegetated soils without cultivating the surface.
     - 5.1.3 The Contractor shall use suitable equipment so as to obtain a thick mat of vegetation with the root mass intact. Mats shall be a minimum of one foot (1') thick, and three foot (3') by four foot (4') size.
     - 5.1.4 After placement on the prepared slope, the Contractor shall tamp the mat to ensure it is in full and stable contact with the underlying soil surface. Handwork with sharp shovels may be needed to trim mats such that the joints between mats are tight, with minimal exposed soil.
   - 5.2 Grass, Shrub, and Tree Transplanting
     - 5.2.1 Unless otherwise directed by the Project Engineer, the Contractor shall stage transplanting of grass/shrubs/trees such that materials can be immediately re-planted. Double handling of the shrubs/trees shall be avoided when possible.
     - 5.2.2 The Contractor shall use suitable equipment to harvest the grass/shrubs/trees with an adequate root-mass for the plants survival. Grasses shall be harvested using a hand trowel and transported in vessels capable of maintaining moisture and adequate soil around the roots.
     - 5.2.3 The Contractor shall avoid excessive damage to the materials during the harvesting and planting process. Large shrubs shall be bundled and tied prior to digging to reduce damage to the bark. Tree limbs may be trimmed as is reasonable to avoid damage from the equipment.
     - 5.2.4 Transplanted shrubs/trees shall be replanted such that the plants are set into the ground at the same depth they were growing at the harvest location. The shrubs/trees shall be placed in a hole of an adequate size and shall be backfilled and tamped to remove voids in the soil. Water may be used to wash fill material around the root mass.
   - 5.1. Larger trees may require staking. When specified by the Project Engineer, trees shall be staked on two sides with wooden stakes, heavy wire and protective collars shall be used where the wire makes contact with the tree bark.

6. Ball and Burlap Material
   - 6.1. Planting of ball and burlap material shall occur in accordance with locations and/or patterns specific to the construction drawings.
   - 6.2. Planting holes shall be triple the diameter. Do not remove plant material from container until immediately before installation.
   - 6.3. If field grown, cut away all balling ropes. Remove burlap or wire basket from top ⅓ of ball. Prune suckers.
   - 6.4. Set plant materials on unexcavated or tampered soil, plumb and centered within hole, ensuring that the top of the root ball is elevated 2 to 3 inches above the surrounding soil elevations. Remove burlap around root ball and allow roots to extend into pit. Backfill around root ball with suitable native soil, maintaining plumb and gently tamping backfill layers to eliminate voids. Water in backfill layers to the point of soil saturation.
   - 6.5. Following the backfilling, add existing soil to bring the final grade in the planting hole to the surrounding soil surface. Rake the unused existing soil outside the planting house, taking care not to mound the soil or to significantly alter the existing grades.
   - 6.6. Install tree mat around plant and secure with 8 inch sod staples in accordance with manufacturer's recommendations. If approved by the Project Engineer as an alternate, the Contractor may apply 2 to 3 inch average thickness of organic mulch layer in lieu of installing tree mats across the entire planting hole. Do not place mulch within 3 inches of plant trunk or stem.
   - 6.7. Install Tree Shelter around plant in accordance with manufacturer's recommendations.

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL ENGINEER
REBECCA E. NAPIER

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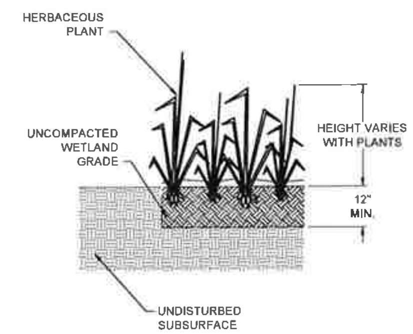
DESIGNED BY	M. HUGHES
CHECKED BY	R. NAPIER
SCALE	N/A

TIMMONS GROUP

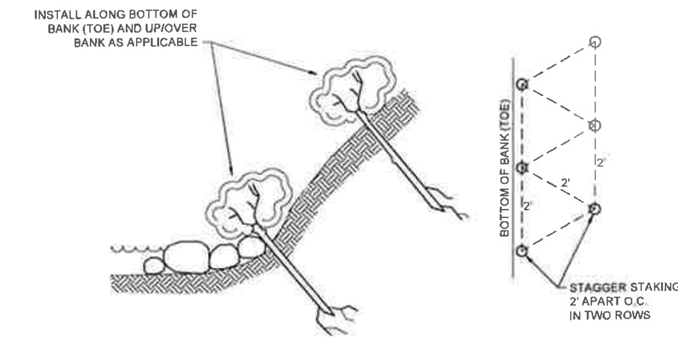
NORTH BRANCH PIGEON CREEK RESTORATION SITE
SOMERSET TOWNSHIP - WASHINGTON COUNTY - PENNSYLVANIA
PLANTING SPECIFICATIONS AND DETAILS

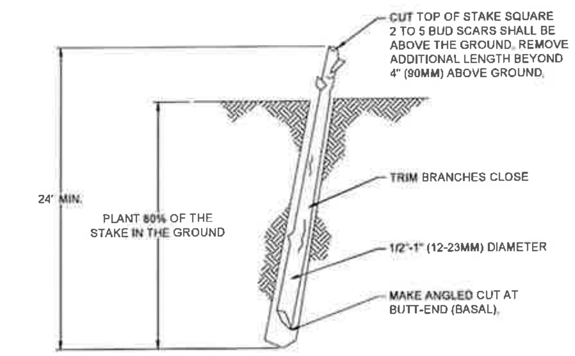
JOB NO.	33548
SHEET NO.	6.00



REV. 7/22/13

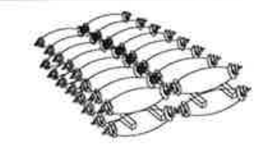
HERBACEOUS PLANTING DETAIL
NO SCALE





REV. 9/26/11

LIVE STAKING (DOUBLE ROW)
NO SCALE



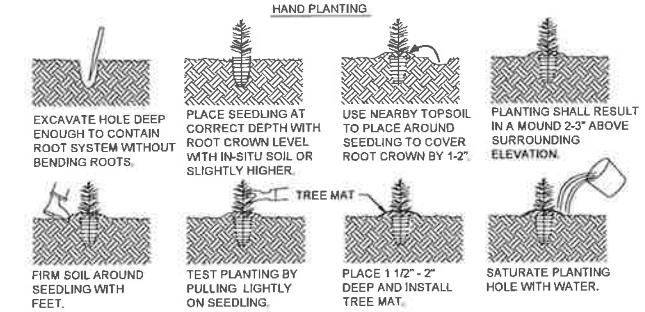
CARE OF SEEDLINGS UNTIL PLANTED

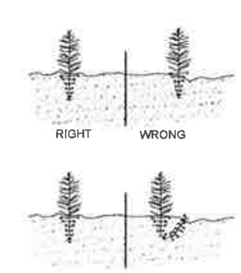
SEEDLINGS SHOULD BE PLANTED IMMEDIATELY. IF IT IS NECESSARY TO STORE MOSS-PACKED SEEDLINGS FOR MORE THAN 2 WEEKS, ONE PINT OF WATER PER PKG. SHOULD BE ADDED. IF CLAY-TREATED, DO NOT ADD WATER TO PKG. PACKAGES MUST BE SEPARATED TO PROVIDE VENTILATION TO PREVENT "HEATING". SEPARATE PACKAGES WITH WOOD STRIPS AND STORE OUT OF THE WIND IN A SHADED, COOL (NOT FREEZING) LOCATION.

CARE OF SEEDLINGS DURING PLANTING

WHEN PLANTING, ROOTS MUST BE KEPT MOIST UNTIL TREES ARE IN THE GROUND. DO NOT CARRY SEEDLINGS IN YOUR HAND EXPOSED TO THE AIR AND SUN. KEEP MOSS-PACKED SEEDLINGS IN A CONTAINER PACKED WITH WET MOSS OR FILLED WITH THICK MUDDY WATER. COVER CLAY-TREATED SEEDLINGS WITH WET BURLAP ONLY.

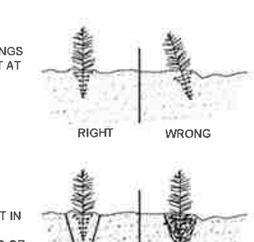
HAND PLANTING





DON'T EXPOSE ROOTS TO AIR DURING FREEZE OR PLANT IN FROZEN GROUND. ROOT COLLAR SHALL BE 1"-2" BELOW SOIL.

PLANT SEEDLINGS UPRIGHT - NOT AT AN ANGLE.



DO NOT BEND ROOTS SO THAT THEY GROW UPWARDS OUT OF THE GROUND.

ALWAYS PLANT IN SOIL - NEVER LOOSE LEAVES OR DEBRIS. PACK SOIL TIGHTLY.

REV. 9/26/11

TUBELING AND BARE-ROOT SEEDLING INSTALLATION W/ TREE MAT
NO SCALE

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
REBECCA E. NAPIER
ENGINEER

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YOUR VISION ACHIEVED THROUGH OURS.

DATE	REVISION DESCRIPTION

DATE: JUNE 2013
DRAWN BY: M. HUGHES
DESIGNED BY: M. HUGHES
CHECKED BY: R. NAPIER
SCALE: AS SHOWN

TIMMONS GROUP

NORTH BRANCH PIGEON CREEK RESTORATION SITE
SOMERSET TOWNSHIP - WASHINGTON COUNTY - PENNSYLVANIA

PLANTING DETAILS

JOB NO. 33548
SHEET NO. 6.01

SEEDING SCHEDULE

MIX	BOTANICAL NAME	COMMON NAME	INDICATOR STATUS	MIX DENSITY	SEEDING RATE (lbs/acre)	TOTAL QUANTITY (lbs)	AREA (acres)	QUANTITY PER ZONE A 0.86	B 2.28	C 1.75
RIPARIAN BUFFER MIX (ERNMX-178)	*Panicum clandestinum*	Deer Tongue, 'Tioga'	FAC	20%						
	Elymus riparius	Riverbank Wild Rye	FACW	18%						
	Andropogon gerardii	Big Bluestem, 'Niagara'	FAC	15%						
	Carex vulpinoidea	Fox Sedge	OBL	10%						
	Chamaecrista fasciculata	Partridge Pea	FACU	6%						
	Panicum virgatum	Switchgrass, 'Carthage'	FAC	5%						
	Verbena hastata	Blue Vervain	FACW	4%						
	Agrostis perennans	Autumn Bentgrass	FACU	4%						
	Heliopsis helianthoides	Oxeye Sunflower	NI	3%						
	Eupatorium perfoliatum	Boneset	FACW	2%						
	Baptisia australis	Blue False Indigo	NI	2%						
	Juncus effusus	Soft Rush	FACW	2%						
	Vernonia gigantea	Giant Ironweed	FAC	2%						
	Elymus virginicus	Virginia Wild Rye	FACW	2%						
	Rudbeckia hirta	Black Eyed Susan	FACU	2%						
	Eupatorium fistulosum	Joe Pye Weed	FACW	1%						
	Lobelia siphilitica	Great Blue Lobelia	FACW	1%						
	Monarda fistulosa	Wild Bergamot	UPL	1%						
	TOTAL QUANTITY			100%	20	97.8	4.9	17.3	45.6	34.9

MIX	BOTANICAL NAME	COMMON NAME	INDICATOR STATUS	MIX DENSITY	SEEDING RATE (lbs/acre)	TOTAL QUANTITY (lbs)	AREA (acres)	QUANTITY PER ZONE A 2.17	B 7.13	C 2.11
NATIVE STEEP SLOPE MIX WITH ANNUAL RYEGRASS (ERNMX-181)	*Lolium multiflorum*	Annual Ryegrass	NI	20%						
	Tridens flavus	Purpletop	FACU	15%						
	Elymus riparius	Riverbank Wildrye	FACW	14%						
	Festuca rubra	Creeping Red Fescue	FACU	12%						
	Sorghastrum nutans	Indiangrass	UPL	12%						
	Andropogon geradii	Big Bluestem	FAC	5%						
	Elymus virginicus	Virginia Wildrye	FACW	4%						
	Agrostis scabra	Ticklegrass	FAC	4%						
	Agrostis perennans	Autumn Bentgrass	FACU	4%						
	Echinacea purpurea	Purple Coneflower	NI	2%						
	Chamaecrista fasciculata	Partridge Pea	FACU	2%						
	Monarda fistulosa	Wild Bergamot	UPL	1%						
	Coreopsis lanceolata	Lanceleaf Coreopsis	FACU	1%						
	Penstemon digitalis	Tall White Beardtongue	FAC	1%						
	Liatris spicata	Marsh (Dense) Blazing S	FAC	1%						
	Heliopsis helianthoides	Oxeye Sunflower	NI	1%						
	Rudbeckia hirta	Black Eyed Susan	FACU	1%						
	TOTAL QUANTITY			100%	60	684.5	11.4	130.0	428.0	126.6

MIX	BOTANICAL NAME	COMMON NAME	INDICATOR STATUS	MIX DENSITY	SEEDING RATE (lbs/acre)	TOTAL QUANTITY (lbs)	AREA (acres)	QUANTITY PER ZONE A 0.86	B 2.28	C 1.75
STARTUP MIX	*Lolium multiflorum*	Annual Ryegrass	NI	100%	30	146.6	4.9	25.9	68.4	52.4

SEEDING SCHEDULE NOTES:

1. Annual Ryegrass shall be substituted with German Foxtail Millet (*Setaria italica*) if grading activities are scheduled to conclude between May 1 and August 31
2. The above referenced seed mixes are available from Ernst Conservation Seeds, Meadville PA (800) 873-3321
3. Quantities are based on estimated areas of grading activity Additional seeding shall conform to the materials and rate of this schedule
4. Seeding quantities are for convenience only and shall be verified by the Planting Contractor based on the specified density (pounds/acre) prior to bidding
5. Substitutions shall only be made with the approval of the Project Engineer

PLANTING SCHEDULE

ZONE	BOTANICAL NAME	COMMON NAME	INDICATOR STATUS	MATURE HEIGHT (FT)	SHADE TOLERANCE	WILDLIFE VALUE	PLANT SPACING (FEET O.C.)	PLANTS PER ACRE	# OF PLANTS	TYPE	A (0.82 acres) TUBELING	B (2.14 acres) TUBELING	C (1.66 acres) TUBELING
RIPARIAN WETLAND FOREST	*Acer rubrum*	Red Maple	FAC	75-100	tolerant	food source-fruits and young shoots	6-10'	35	163		29	75	59
	Acer negundo	Box Elder	FAC	40-60	tolerant	Seeds ar fair for songbirds and small mammals	6-10'	35	163		29	75	59
	Betula nigra	River Birch	FACW	40-70	intolerant	food source-seeds, buds, young twigs and foliage	6-10'	35	163		29	75	59
	Carpinus caroliniana	American Hornbeam	FAC	35-50	very tolerant	food source-catkins, buds, seeds, leaves and twigs	6-10'	35	163		29	75	59
	Quercus palustris	Pin Oak	FACW	50-75	intolerant	food source-acorns and twigs	6-10'	35	163		29	75	59
	Quercus bicolor	Swamp White Oak	FACW	25-35	intermediate	food source and cover	6-10'	30	137		25	63	49
	Cephalanthus occidentalis	Common Buttonbush	OBL	8-10	intolerant	food source and cover	6-10'	5	26		5	12	9
	Platanus occidentalis	Sycamore	FACW	100-170	intermediate	food-seeds eaten by songbirds, Good dening tree	6-10'	35	163		29	75	59
	Cornus amomum	Silky Dogwood	FACW	6-12	intolerant	food source-fruits	6-10'	55	256		46	118	92
	Cornus sericea	Redosier Dogwood	FACW	6-12	intermediate	food source-fruits, buds, and twigs	6-10'	55	256		46	118	92
	Lindera benzion	Spicebush	FACW	6-12	tolerant	food-seeds	6-10'	55	256		46	118	92
	Sambucus canadensis	Common Elderberry	FACW	6-12	intolerant	food-seeds	6-10'	55	256		46	118	92
	Spiraea latifolia	Meadowsweet	FACW	3-6	intermediate	food source-fruit and twigs	6-10'	55	256		46	118	92
	Vaccinium corymbosum	Highbush Blueberry	FACW	6-12	tolerant	food source-fruit	6-10'	55	256		46	118	92
	Alnus serrulata	Hazel Alder	OBL	6-15	intermediate	food-seeds	6-10'	55	256		46	118	92
								TOTAL	2,933				

ZONE	BOTANICAL NAME	COMMON NAME	INDICATOR STATUS	MATURE HEIGHT (FT)	SHADE TOLERANCE	WILDLIFE VALUE	PLANT SPACING (FEET O.C.)	PLANTS PER ACRE	# OF PLANTS	TYPE	A (acres)	B (0.14 acres) HERBACIOUS PLUG	C (0.04 acres) HERBACIOUS PLUG
VERNAL POOL	*Iris versicolor*	Harlequin Blue Flag	OBL	4	tolerant	food source and cover	1'	11,263	1,905			1,489	416
	Lobelia cardinalis	Cardinal Flower	OBL	6	tolerant	food source and cover	1'	11,263	1,905			1,489	416
	Schoenoplectus tabernaemontani	Softstem Bulrush	OBL	9	intolerant	food source and cover	1'	11,263	1,905			1,489	416
	Carex gynandra	Nodding Sedge	OBL	4	intolerant	food source and cover	1'	11,263	1,905			1,489	416
								TOTAL	7,620				

ZONE	BOTANICAL NAME	COMMON NAME	INDICATOR STATUS	MATURE HEIGHT (FT)	SHADE TOLERANCE	WILDLIFE VALUE	PLANT SPACING (FEET O.C.)	PLANTS PER ACRE	# OF PLANTS	TYPE	A (1.93 acres) TUBELING	B (7.13 acres) TUBELING	C (2.03 acres) TUBELING
UPLAND FOREST	*Acer rubrum*	Red Maple	FAC	75-100	tolerant	food source-fruits and young shoots	6-10'	35	390		68	250	72
	Acer saccharum	Sugar Maple	FACU	75-100	very tolerant	food source-seeds and twigs	6-10'	35	390		68	250	72
	Betula alleghaniensis	Yellow Birch	FAC	60-100	intermediate	food source-seeds young twigs and shoots and catkins	6-10'	35	390		68	250	72
	Fagus grandifolia	American Beech	FACU	75-100	very tolerant	food source-nuts	6-10'	35	390		68	250	72
	Prunus serotina	Wild black Cherry	FACU	50-75	intolerant	high value food source-fruits, twigs and nectar	6-10'	35	390		68	250	72
	Quercus prinus	Chestnut Oak	UPL	50-70	intermediate	food-acorn, browse	6-10'	35	390		68	250	72
	Quercus alba	White Oak	FACU	50-80	tolerant	food-acorn, browse	6-10'	35	390		68	250	72
	Carpinus caroliniana	American Hornbeam	FAC	35-50	very tolerant	food source-catkins, buds, seeds leaves and twigs	6-10'	80	889		155	571	163
	Hammamelis virginiana	Witch-Hazel	FAC	20-30	tolerant	food-browse	6-10'	80	889		155	571	163
	Rhus typhina	Staghorn Sumac	UPL	10-15	intermediate	food-seeds	6-10'	80	889		155	571	163
	Sassafras albidum	Sassafras	FACU	30-60	intolerant	food-seeds/berries	6-10'	80	889		155	571	163
	Viburnum prunifolium	Blackhaw Viburnum	FACU	12-26	intermediate	food-seeds/berries	6-10'	80	889		155	571	163
								TOTAL	7,175				

ZONE	BOTANICAL NAME	COMMON NAME	INDICATOR STATUS	MATURE HEIGHT (FT)	SHADE TOLERANCE	WILDLIFE VALUE	PLANT SPACING (FEET O.C.)	PER STREAM LENGTH	# OF PLANTS	TYPE	MAIN CHANNEL (LENGTH 1,628) LIVESTAKE	TRIBUTARY (LENGTH 891) LIVESTAKE
STREAM BANK	*Cornus amomum*	Silky Dogwood	FACW	6-12	intolerant	food source-fruits	2	2,518	1,684		1,088	596
	Cornus sericea	Redosier Dogwood	FACW	5-13	intolerant	food source-seeds and fruits	2	2,518	1,684		1,088	596
	Salix nigra	Black Willow	FACW	20-40	intolerant	food source-seeds and leaves	2	2,518	1,684		1,088	596
								TOTAL	5,052			

PLANTING SCHEDULE NOTES:

1. Quantities are based on estimated areas of planting, including areas of disturbance Additional plantings shall conform to the materials and rate of this schedule
2. Planting quantities are for convenience only and shall be verified by the Planting Contractor based on the specified density (plants/acre) prior to bidding.
3. Substitutions shall only be made with the approval of the Project Engineer
4. Seeding shall occur prior to planting.
5. Tubelings shall be planted at a density of at least 630 stems/acre Refer to warranty requirements on Sheet 6.01
6. Live stakes quantities are cumulative for entire length of stream (both sides of banks)
7. Planting location shall be specified by the Project Engineer at the time of planting

COMMONWEALTH OF PENNSYLVANIA — REGISTERED PROFESSIONAL — REBECCA E. NAPIER — ENGINEER

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TIMMONS GROUP

REVISION DESCRIPTION | DATE

NORTH BRANCH PIGEON CREEK RESTORATION SITE

SOMERSET TOWNSHIP - WASHINGTON COUNTY - PENNSYLVANIA

PLANTING AND SEEDING SCHEDULE

DATE: JUNE 2013
DRAWN BY: M. HUGHES
DESIGNED BY: M. HUGHES
CHECKED BY: R. NAPIER
SCALE: NA
JOB NO.: 33548
SHEET NO.: 6.02