AGENDA

BRIDGEWATER TOWN COUNCIL

December 13, 2022

7:00 p.m. **Public Hearing:** Possible Sale of Real Estate at 429 North Main Street

7:05 p.m. **Call to Order: Mayor Ted W. Flory**

7:06 p.m. **Invocation: Vice Mayor A. Fontaine Canada**

7:08 p.m. **Visitors**

1. Babak Hafezi of Hafezi Capital: Grocery Feasibility Study Results

All persons may speak at this time, and all persons are asked to refrain from interjecting at other times.

7:23 p.m. **Minutes of previous meeting: Ms. Morgan Shirkey**

7:24 p.m. **Finance and Ordinance Committees:**

1. Finance: Dr. Bill Miracle
   a. Treasurer's Report for the month of November
   b. Bills for the month of November
2. Ordinance Committee: Mr. Steven Schofield

7:28 p.m. **Administrative Report: Mr. J. Jay Litten**

1. Oakdale Pond (R2022-16)
2. Buzz Branding
3. Police Career Progression

7:38 p.m. **Public Works and Recreation Commission:**

1. Public Works: Mr. Fontaine Canada & Ms. Megan Byler
   a. Recycling

7:41 p.m. **Community Relations and Economic Development:**

1. Community Relations: Mr. Travis Bowman
2. Economic Development: Mr. Jim Tongue

7:43 p.m. **Mayor's Report**

1. Special Presentation

7:48 p.m. **Adjournment**

It is the policy of the Town of Bridgewater, Virginia, that persons in attendance may elect to sit or stand during invocations, as they see fit, and that they may take part in the invocation or refrain from doing so, as they choose. Prayers offered by council members reflect their personal beliefs. All persons are counseled that disruptive behavior is not allowed during the invocation or any other time.

MINUTES
BRIDGEWATER TOWN COUNCIL

November 9, 2022

Present: Mayor Ted W. Flory Council: Steven A. Schofield, William D. Miracle, Dillina W. Stickley, A. Fontaine Canada, James M. Tongue.

Absent: Travis L. Bowman.

The Bridgewater Town Council met in regular session on Wednesday, November 9, 2022, at Sipe Center, 100 North Main Street, Bridgewater, Virginia, having moved from Tuesday due to Election Day.

Call to Order and Invocation: Mayor Flory called the Council to order at 7:00 p.m.

Invocation: Ms. Stickley gave the invocation.

Visitors: Mr. Larry French (4035 Cannery Woods Drive) thanked Council and staff for both the DORM stoplight and the SUP for Randy's Hardware, a property he owns.

Minutes: Ms. Morgan Shirkey

October minutes were approved as presented.

Finance: Dr. William D. Miracle

1. October Treasurer's Report (Attached).

Dr. Miracle moved that the October 2022 Treasurer's Report be accepted for submission to audit. Seconded by Mr. Schofield. The motion carried unanimously as follows: Those voting aye: Schofield, Miracle, Stickley, Flory, Canada, Tongue. Those voting nay: None. Absent: Bowman.

2. October Bills (Attached).

Dr. Miracle moved to appropriate and authorize the payment of October bills in the amount of $287,830.00 and to ratify the earlier payment of bills totaling $309,124.34, all as reviewed and approved by Town staff and the Finance Committee Chairman. Seconded by Mr. Tongue. The motion carried unanimously as follows: Those voting aye: Schofield, Miracle, Stickley, Flory, Canada, Tongue. Those voting nay: None. Absent: Bowman.

3. Presentation of Audit. Ms. Betsy Hedrick of PBMares presented the Town's audit, with Tyler Farnsworth in attendance. The Town received an "Unmodified Opinion," or "clean opinion" on both its financial statements for the fiscal year ending June 30, 2022, and a federal single audit, mandatory when spending over $750,000 of federal funds. The Town's net position was approximately $8.6 million at the end of the fiscal year, with a majority of that being net investment and capital assets. She called attention to individual statements and noted the Town is continuing toward the recommended reserve in funds and commended the Town on this, as well as the Treasurer directly for implementation and documentation for new requirements in this year's report.

Ordinance: Mr. Steven A. Schofield

No report submitted.

Administrative Report: Mr. J. Jay Litten

1. Pedestrian Crosswalk. Mr. Litten said the pedestrian crosswalk at Turner Ashby is moving to bid and unveiled the intended new Welcome to Bridgewater sign. The one near the schools will be about 15 feet long and 5 feet high and a model for other, smaller, signs at Town entrances. The black border on the sign will feature the names of every Mayor of Bridgewater from 1835 to the present.

Public Works: Mr. A. Fontaine Canada and Ms. Megan S. Byler

1. Lead Pipes. Ms. Byler noted that she, Betsy Putney, and our Water Treatment Supervisor, Anna King, have undergone training regarding new EPA regulations, and we are required to inventory all water service lines in town, identifying if there are any lead pipes still in existence and whether they are on the public side or the private side from the meter to the house. This is the first step before looking at replacement, and the inventory is due October 16, 2024.

2. Paving. Fall paving, which was all full mill except for one alley, was completed on Monday, November 7, except for Whitelow Park's path, which was completed on November 9. Paved areas include Second Street from Dinkel to Virginia Avenue; Third Street; North Pope Street; Old River Road; Dinkel in a single lane near Bridgewater Fields to improve some lane line confusion, and the alley along Wynant Park.

Recreation Commission: Ms. Dillina W. Stickley and Ms. Megan S. Byler

1. Ice Rink Opening. The ice rink at Generations Park will reopen on Thanksgiving Day. There are a few minor adjustments to the hours and rates, but everything else will run the same. The fees will be $6 for a session and $4 for a skate rental and remain free for B-Rec members. We are continuing the hour and a half session times to keep the half hour for resurfacing the ice. The rink will close daily at 9:30 p.m.

Community Relations: Mr. Travis Bowman

1. Christmas Tree Lighting. In Mr. Bowman's absence, Megan Byler noted that the annual Christmas tree lighting will happen at Generations Park on Sunday, November 27 at 6:30 PM. Ginger snaps, hot cider, and holiday music will be available for all in attendance.

Economic Development Committee: Mr. Jim Tongue

1. Business Christmas Decoration Contest. Gwen Gottfried said the inaugural business decorating contest is taking entries until November 18, and voting will begin on the Buzz after the tree lighting. The theme for the contest is "Favorite Holiday Movie."

Mayor's Report: Mayor Flory

1. Monthly Police Report. There were no questions concerning this report.

Adjournment – 7:25 p.m.

Ted W. Flory, Mayor

Morgan Shirkey, Clerk

TOWN OF BRIDGEWATER- CUMULATIVE MONTHLY FINANCE SUMMARY

($OOO)

2022-2023	ESTIMATED			ACTUAL			CASH IN BANK	NOTES
	REVENUE	EXPENSES	DIFFERENCES	REVENUE	EXPENSES	DIFFERENCES		
1 Month (Jul 31)	3769	1484	2285	3921	1303	2618	4827	
2 Months (Aug 31)	4397	2389	2008	4631	2132	2499	4728	
3 Months (Sep 30)	5256	3351	1905	5644	3146	2498	4731	
4 Months (Oct 31)	5933	4608	1325	6516	3862	2654	4913	
5 Months (Nov 30)	6717	5380	1337	7475	4644	2831	5106	
6 Months (Dec 31)	7776	6502	1274			0		
7 Months (Jan 31)	8555	7373	1182			0		
8 Months (Feb 28)	9251	8139	1112			0		
9 Months (Mar 31)	10171	9143	1028			0		
10 Months (Apr 30)	10808	10007	801			0		
11 Months (May 31)	11560	10906	654			0		
12 Months (Jun 30)	12370	12370	0			0		

TOWN OF BRIDGEWATER

Revenues and Expenditures
For the Month Ended November 30, 2022

	Budget For Year	Estimated for 5 Months	Actual for 5 Months
Revenues and Other Sources			
General Property Taxes	401,300.00	302,000.00	330,089.58
Other Local Taxes	2,508,750.00	886,990.00	1,073,219.76
Local Fees	112,091.00	11,475.00	8,577.47
Permits	8,600.00	3,600.00	4,871.38
Fines & Forfeitures	19,400.00	8,075.00	6,412.62
Revenue from Services	157,400.00	29,950.00	35,351.75
Revenue from the Use of Money & Property	144,854.00	79,265.00	116,036.97
Sipe Center	165,134.00	50,275.00	107,784.80
Miscellaneous	87,500.00	22,325.00	27,969.52
Categorical Aid	1,481,315.00	458,525.00	4,025,471.51
Proceeds from Financing	0.00	0.00	0.00
Funds Carried Forward(General Fund)	3,137,000.00	3,137,000.00	-50,770.00
Stormwater Management	171,538.00	71,500.00	71,633.46
Sanitation	600,095.00	250,025.00	256,958.83
Water	1,241,102.00	517,100.00	573,886.14
Sewer	2,133,941.00	889,037.00	887,714.08
Totals:	12,370,020.00	6,717,142.00	7,475,207.87
Expenditures			
Town Council	41,926.00	20,863.00	21,036.90
Manager's Office	535,337.00	226,600.00	240,146.32
Legal Services	33,000.00	13,750.00	19,903.86
Independent Auditor	55,650.00	54,000.00	47,750.00
Treasurer's Office	262,258.00	104,185.00	107,472.30
Police Department	1,003,601.00	465,875.00	462,997.35
Volunteer Fire & Rescue Squad	30,000.00	0.00	0.00
Public Works Department	267,120.00	106,925.00	99,985.05
Highways, Streets, Sidewalks	1,638,626.00	491,992.00	941,646.40
Street Lights	91,359.00	38,050.00	39,313.94
General Properties	693,459.00	327,292.00	214,817.46
Parks	865,188.00	593,039.00	231,698.72
Recreation	250,015.00	105,175.00	120,032.41
Community Development	429,011.00	132,110.00	143,884.49
Sipe Center	277,759.00	132,100.00	148,595.61
Economic Development	86,370.00	15,367.00	45,713.94
Insurance	135,000.00	33,750.00	36,660.00
Fund Balance	734,640.00	597,750.00	105,437.45
Bad Debts	0.00	0.00	0.00
Debt Service	346,078.00	60,748.00	60,746.93
Storm Water Management	718,766.00	266,375.00	62,233.12
Sanitation & Waste Removal	719,060.00	385,484.00	228,358.90
Water Treatment	838,665.00	326,125.00	342,516.42
Water Distribution	848,504.00	208,758.00	234,455.15
Sewer Department	1,468,628.00	673,653.00	688,583.12
Totals:	12,370,020.00	5,379,966.00	4,643,985.84
Excesses (Deficiency of Revenue Over Expenditures)	0.00	1,337,176.00	2,831,222.03

STATEMENT OF REVENUES

For the Month Ended November 30, 2022

	For the Month Ended 11/30/22		For the 5 Months Ended 11/30/22	
	Estimated	Actual	Estimated	Actual
General Property Taxes				
Personal Property Taxes	200,000.00	228,097.48	200,000.00	227,984.66
Personal Property Taxes(State Portion)	0.00	0.00	102,000.00	102,034.14
Penalties and Interest on Taxes	0.00	26.96	0.00	70.78
Total:	200,000.00	228,124.44	302,000.00	330,089.58
Other Local Taxes				
Local Sales & Use Taxes	24,450.00	25,930.24	122,225.00	131,809.63
Communications Tax	5,450.00	5,365.42	27,250.00	26,497.12
Consumption Tax	1,835.00	3,348.51	9,165.00	10,799.34
Consumer's Utility Taxes	62,625.00	115,660.49	313,150.00	371,060.39
Cigarette Tax	0.00	0.00	7,200.00	20,073.62
Business License Taxes	0.00	297.50	0.00	2,103.58
Transient Occupancy Tax	0.00	272.74	1,100.00	2,178.90
Vehicle Rental Tax	0.00	877.87	0.00	4,308.34
Bank Stock Taxes	0.00	0.00	0.00	0.00
Meals Tax	52,300.00	91,956.76	406,900.00	504,388.84
Total:	146,660.00	243,709.53	886,990.00	1,073,219.76
Local Fees				
Motor Vehicle License Fee	0.00	10.00	0.00	(267.94)
Right-of Way Fees	3,100.00	1,872.06	11,100.00	8,845.41
Passport Application Fees	0.00	0.00	375.00	0.00
Total:	3,100.00	1,882.06	11,475.00	8,577.47
Permits				
Zoning, Erosion Permits **Total:**	725.00	204.00	3,600.00	4,871.38
Fines & Forfeitures				
Fines & Forfeitures **Total:**	1,625.00	951.14	8,075.00	6,412.62
Revenue from Services				
Rental Fees - Generation Park	8,000.00	12,163.26	8,000.00	12,163.26
Rental Fees - Mini Golf & Par 3	0.00	175.00	21,950.00	23,188.49
Total:	8,000.00	12,338.26	29,950.00	35,351.75
Sipe Center				
Concessions	1,225.00	3,734.09	6,175.00	25,334.68
Live Performances	5,150.00	27,254.00	25,750.00	40,902.00
Sponsorships	0.00	6,000.00	3,000.00	22,000.00
Movies	1,150.00	3,493.15	5,850.00	17,143.12
Space Rental	1,900.00	460.00	9,500.00	2,405.00
Total:	9,425.00	40,941.24	50,275.00	107,784.80
Revenue from use of Money & Property				
Interest on Bank Deposits	455.00	9,529.30	2,290.00	22,328.05
Rental of General Property/Shelters	500.00	1,135.00	2,500.00	6,450.00
Rental of Tennis Facilities	500.00	1,562.00	2,500.00	10,147.00
Sale of Vehicles	0.00	0.00	0.00	1,561.00
Sale of Material & Supplies	3,100.00	50.00	15,575.00	3,190.00
Sale of Real Estate	0.00	0.00	0.00	0.00
Public Communication Service Rent	0.00	0.00	56,400.00	72,360.92
Total:	4,555.00	12,276.30	79,265.00	116,036.97
Miscellaneous/Donations				
Miscellaneous	725.00	678.43	3,650.00	5,047.52
Gifts & Donations from Private Sources	0.00	0.00	625.00	0.00
Cemetery Lots	0.00	0.00	0.00	0.00
Classes, Camps, Festivals	0.00	335.00	1,000.00	5,957.00
Brick Donations	0.00	0.00	0.00	0.00
Town of Mt. Crawford	0.00	0.00	17,050.00	16,965.00
Town of Dayton	0.00	0.00	0.00	0.00
Total:	725.00	1,013.43	22,325.00	27,969.52

STATEMENT OF REVENUES

For the Month Ended November 30, 2022

	For the Month Ended 11/30/22		For the 5 Months Ended 11/30/22	
	Estimated	Actual	Estimated	Actual
Categorical Aid				
VDOT Secondary Maintenance	0.00	0.00	148,575.00	159,315.82
VDOT Primary Maintenance	0.00	0.00	50,675.00	53,105.26
Overweight Permit Fee Revenue	0.00	0.00	175.00	112.38
VDOT Urban Construction (DORM)	0.00	0.00	30,000.00	481,447.14
VDOT Revenue Sharing (Dry River Rd)	0.00	0.00	0.00	0.00
Riverwalk Grant	35,000.00	0.00	109,000.00	2,474.41
Crosswalk Improvement Grant	25,000.00	2,326.50	79,000.00	2,326.50
Gen-Oak Connector Grant	0.00	0.00	2,000.00	0.00
Law Enforcement Assistance Funds	0.00	38,585.00	35,100.00	77,170.00
Misc. Grants	0.00	0.00	0.00	15,000.00
Police Grants	0.00	0.00	0.00	46,750.00
Litter Control Grant	4,000.00	0.00	4,000.00	0.00
ARPA Funds	0.00	0.00	0.00	3,187,770.00
Total:	64,000.00	40,911.50	458,525.00	4,025,471.51
Proceeds from Financing				
Short Term Financing	0.00	0.00	0.00	0.00
Capital Financing	0.00	0.00	0.00	0.00
Total:	0.00	0.00	0.00	0.00
Funds Carried Forward				
Funds Carried Forward	0.00	0.00	3,137,000.00	(50,770.00)
Total:	0.00	0.00	3,137,000.00	(50,770.00)
Total Revenue General Fund:	438,815.00	582,351.90	4,989,480.00	5,685,015.36

STATEMENT OF REVENUES

For the Month Ended November 30, 2022

	For the Month Ended 11/30/22		For the 5 Months Ended 11/30/22	
	Estimated	Actual	Estimated	Actual
Stormwater Management				
Monthly Utility Fee	14,300.00	14,423.32	71,500.00	71,633.46
Stormwater Admin Fees	0.00	0.00	0.00	0.00
Total:	14,300.00	14,423.32	71,500.00	71,633.46
Sanitation Revenue				
Refuse Collection Charges	46,900.00	47,644.22	234,500.00	237,282.17
Recycling/Vegetation Recycling Fees	2,850.00	2,916.69	14,275.00	14,532.91
Recycle Reimbursement	250.00	154.90	1,250.00	5,143.75
Total:	50,000.00	50,715.81	250,025.00	256,958.83
Water Revenue				
Charges of Services	92,650.00	95,195.82	463,300.00	487,206.52
Connection Fees	8,875.00	34,670.00	44,400.00	75,734.12
Penalties	1,900.00	2,293.59	9,400.00	10,829.61
Bad Debt	0.00	0.00	0.00	115.89
Total:	103,425.00	132,159.41	517,100.00	573,886.14
Sewer Revenue				
Charges for Services	156,100.00	160,458.53	780,437.00	768,609.12
Connection Fees	19,800.00	16,632.00	99,000.00	109,162.11
Penalties	1,900.00	2,017.05	9,400.00	9,512.85
Proceeds from Capital Financing	0.00	0.00	0.00	0.00
Sewer Surcharge	0.00	0.00	0.00	0.00
HRRSA Board Contribution	0.00	130.00	200.00	430.00
Total:	177,800.00	179,237.58	889,037.00	887,714.08
Total Revenue Enterprise Funds:	345,525.00	376,536.12	1,727,662.00	1,790,192.51
TOTAL REVENUE:	784,340.00	958,888.02	6,717,142.00	7,475,207.87

Cash in the Bank	**Oct 31, 2022**		**Nov 30, 2022**
	425,934.86	LGIP -(Fund Balance)	447,743.41
	3,132,336.07	LGIP(ARPA)	3,136,169.61
	142,049.53	LGIP(SAFETEA-LU)	142,429.33
	1,212,818.26	F & M Bank- Checking(Sweep Acct)	1,379,245.46
	100.00	Farmers & Merchants Payroll Acct.	100.00
Total:	4,913,238.72		5,105,687.81

Comparative Statement of Appropriations with Expenses

For the Month Ended November 30, 2022

		For the Month Ended 11/30/22		For the 5 Months Ended 11/30/22	
		Estimated	Actual	Estimated	Actual
Town Council					
Personal Services		19,008.00	18,665.95	19,008.00	18,744.39
Fringe Benefits		1,455.00	1,427.95	1,455.00	1,434.37
Other Charges		75.00	31.48	400.00	858.14
	Total:	20,538.00	20,125.38	20,863.00	21,036.90
Manager's Office					
Personal Services		29,750.00	32,151.57	163,550.00	180,572.53
Fringe Benefits		9,100.00	8,776.82	50,175.00	48,080.39
Contractual Services		900.00	1,366.32	4,575.00	8,518.52
Other Charges		1,075.00	684.88	8,300.00	2,974.88
Capital Outlay		0.00	0.00	0.00	0.00
	Total:	40,825.00	42,979.59	226,600.00	240,146.32
Legal Services	**Total:**	2,750.00	3,361.83	13,750.00	19,903.86
Independent Auditor	**Total:**	17,000.00	5,000.00	54,000.00	47,750.00
Treasurer's Office					
Personal Services		13,150.00	13,140.77	72,275.00	73,717.49
Fringe Benefits		4,650.00	5,040.26	25,575.00	25,814.33
Contractual Services		1,100.00	2,279.25	5,500.00	4,940.40
Other Charges		167.00	278.77	835.00	3,000.08
Capital Outlay		0.00	0.00	0.00	0.00
	Total:	19,067.00	20,739.05	104,185.00	107,472.30
Volunteer Fire & Rescue					
Fire & Rescue/Donations		0.00	0.00	0.00	0.00
Fire Program Funds		0.00	0.00	0.00	0.00
	Total:	0.00	0.00	0.00	0.00
Police Department					
Personal Services		45,700.00	52,202.97	251,225.00	248,600.34
Personal Services (overtime)		2,500.00	2,168.46	12,500.00	14,183.82
Fringe Benefits		15,625.00	17,736.68	86,000.00	83,575.94
Auto Repair		750.00	1,238.62	3,750.00	5,475.72
Gas, Oil, Tires, etc.		1,650.00	1,455.35	8,325.00	10,246.09
Contractual Services		2,350.00	1,347.02	23,500.00	21,207.47
Other		2,925.00	6,380.67	14,575.00	57,912.70
Capital Outlay		0.00	0.00	66,000.00	21,795.27
	Total:	71,500.00	82,529.77	465,875.00	462,997.35
Public Works Department					
Personal Service		14,150.00	12,015.62	77,800.00	66,269.04
Fringe Benefits		4,400.00	5,068.39	24,300.00	25,815.56
Contractual Services		800.00	1,529.22	4,000.00	3,686.27
Other		150.00	3,409.31	825.00	4,214.18
Capital Outlay		0.00	0.00	0.00	0.00
	Total:	19,500.00	22,022.54	106,925.00	99,985.05

Comparative Statement of Appropriations with Expenses

For the Month Ended November 30, 2022

	For the Month Ended 11/30/22		For the 5 Months Ended 11/30/22	
	Estimated	Actual	Estimated	Actual
Highways, Streets, Bridges & Sidewalks				
Personal Services	10,000.00	3,403.65	55,050.00	43,631.90
Fringe Benefits	4,050.00	3,677.30	22,375.00	20,785.75
Contractual Services	4,175.00	(5,251.30)	20,825.00	30,854.04
Street Paving	0.00	0.00	0.00	0.00
Revenue Sharing/Dry River Rd	0.00	0.00	0.00	0.00
Capital Outlay(Equipment)	0.00	0.00	0.00	0.00
Other Charges	6,900.00	2,913.23	34,575.00	20,354.53
VDOT/Urban Construction (DORM)	0.00	103,779.15	100,000.00	814,761.16
Main St Undergrounding	0.00	0.00	0.00	0.00
Light Bridge	0.00	0.00	0.00	0.00
Gen-Oak Connector	0.00	0.00	0.00	8,162.49
Main St Crosswalk Improvements	22,500.00	0.00	112,500.00	3,096.53
Capital Outlay	0.00	0.00	146,667.00	0.00
Total:	47,625.00	108,522.03	491,992.00	941,646.40
Street Lights **Total:**	7,600.00	8,043.63	38,050.00	39,313.94
General Properties				
Personal Services	18,250.00	14,711.42	100,425.00	72,632.30
Fringe Benefits	6,800.00	6,885.26	37,300.00	34,939.16
Contractual Services	6,000.00	5,845.73	30,000.00	43,210.35
Other Charges	2,575.00	3,056.13	12,900.00	12,722.94
Capital Outlay	0.00	0.00	146,667.00	51,312.71
Total:	33,625.00	30,498.54	327,292.00	214,817.46
Parks				
Personal Services	14,175.00	9,514.15	78,000.00	78,283.58
Fringe Benefits	5,750.00	5,647.25	31,700.00	31,137.06
Contractual Services	5,750.00	10,546.16	28,750.00	69,339.05
Other Charges	4,250.00	4,843.82	21,250.00	23,196.72
Capital Outlay - Riverwalk	78,339.00	0.00	418,339.00	11,053.81
Capital Outlay (or Contingency)	5,000.00	0.00	10,000.00	18,688.50
Capital Outlay/Equipment	0.00	0.00	5,000.00	0.00
Total:	113,264.00	30,551.38	593,039.00	231,698.72
Recreation				
Personal Services	9,675.00	9,989.71	53,675.00	66,993.95
Fringe Benefits	2,925.00	2,017.88	16,100.00	11,434.78
Contractual Services	5,000.00	6,999.50	25,000.00	29,872.08
Other Charges	2,075.00	(2,225.75)	10,400.00	5,598.11
Classes & Camps	0.00	0.00	0.00	6,133.49
Capital Outlay	0.00	0.00	0.00	0.00
Total:	19,675.00	16,781.34	105,175.00	120,032.41

Comparative Statement of Appropriations with Expenses

For the Month Ended November 30, 2022

		For the Month Ended 11/30/22		For the 5 Months Ended 11/30/22	
		Estimated	Actual	Estimated	Actual
Community Development					
Personal Services		3,075.00	10,985.29	16,950.00	24,981.63
Fringe Benefits		1,000.00	930.16	5,600.00	2,151.46
Contractual Services		3,150.00	2,101.99	15,075.00	16,290.03
Other Charges		2,575.00	4,137.06	12,900.00	17,321.88
Festivals		0.00	5,379.91	33,550.00	38,200.82
Entertainment		0.00	0.00	8,700.00	7,818.98
Passport Processing Expense		67.00	0.00	335.00	0.00
Capital		0.00	0.00	39,000.00	37,119.69
	Total:	9,867.00	23,534.41	132,110.00	143,884.49
Sipe Center					
Personal Services		4,125.00	5,944.21	22,675.00	29,643.02
Fringe Benefits		1,475.00	2,399.27	8,175.00	8,891.42
Other Charges		1,250.00	1,007.63	6,250.00	7,749.88
Contractual Services		3,525.00	3,455.92	19,075.00	11,428.74
Concessions		0.00	771.47	0.00	8,070.86
Movies		825.00	2,345.00	4,125.00	14,278.09
Live Performances		20,600.00	25,774.60	71,800.00	62,634.60
Capital		0.00	0.00	0.00	5,899.00
	Total:	31,800.00	41,698.10	132,100.00	148,595.61
Economic Development					
Personal Services		1,775.00	1,743.00	9,850.00	8,865.44
Fringe Benefits		700.00	475.11	3,850.00	2,356.35
Contractual Services		250.00	12,876.00	1,250.00	34,402.00
Other Charges		83.00	6.54	417.00	90.15
Capital Improvement(Main St Parking)		0.00	0.00	0.00	0.00
	Total:	2,808.00	15,100.65	15,367.00	45,713.94
Insurance	**Total:**	0.00	0.00	33,750.00	36,660.00
Fund Balance	**Total:**	19,550.00	20,743.02	597,750.00	105,437.45
Debt Service					
Debt Retirement		0.00	0.00	37,373.00	40,342.52
Interest Expense		0.00	0.00	23,375.00	20,404.41
	Total:	0.00	0.00	60,748.00	60,746.93
Bad Debt-General Fund	**Total:**	0.00	0.00	0.00	0.00
Total Expenditures General Fund:		476,994.00	492,231.26	3,519,571.00	2,982,401.68

Comparative Statement of Appropriations with Expenses

For the Month Ended November 30, 2022

		For the Month Ended 11/30/22		For the 5 Months Ended 11/30/22	
		Estimated	Actual	Estimated	Actual
Storm Water Management					
Personal Services		6,325.00	5,599.25	34,725.00	30,380.22
Fringe Benefits		2,100.00	1,886.79	11,575.00	9,542.36
Contractual Services		4,575.00	9,856.83	22,900.00	22,225.16
Other Charges		850.00	53.80	4,175.00	85.38
Capital Outlay		63,000.00	0.00	193,000.00	0.00
	Total:	76,850.00	17,396.67	266,375.00	62,233.12
Water Treatment					
Personal Services		24,800.00	17,206.04	138,025.00	96,532.85
Fringe Benefits		8,500.00	6,202.39	46,850.00	31,741.43
Contractual Services		16,250.00	27,970.87	81,250.00	105,523.45
Other Charges		2,000.00	2,428.76	10,000.00	11,568.69
Capital Outlay		0.00	42,500.00	50,000.00	97,150.00
	Total:	51,550.00	96,308.06	326,125.00	342,516.42
Water Distribution					
Personal Services		12,000.00	9,547.18	66,000.00	65,286.09
Fringe Benefits		4,500.00	4,550.29	24,725.00	24,572.06
Contractual Services		6,725.00	2,692.30	89,925.00	100,403.60
Other Charges		5,300.00	18,342.63	26,475.00	43,206.26
Debt Service/Int Expense		0.00	0.00	1,633.00	1,086.66
Capital Outlay		0.00	0.00	0.00	0.00
Bad Debt-Water		0.00	0.00	0.00	(99.52)
	Total:	28,525.00	35,132.40	208,758.00	234,455.15
Sanitation & Waste Removal					
Personal Services		7,275.00	6,412.15	40,100.00	35,778.00
Fringe Benefits		2,950.00	2,988.80	16,275.00	15,527.11
Contractual Services		2,275.00	1,794.32	11,350.00	10,589.62
Contractual/Waste Management		21,750.00	22,727.00	108,732.00	110,664.10
Other Services		1,150.00	728.55	5,825.00	3,125.55
Landfill Fees		11,335.00	8,979.66	56,535.00	52,674.52
Capital Outlay		0.00	0.00	146,667.00	0.00
	Total:	46,735.00	43,630.48	385,484.00	228,358.90
Sewer Department					
Personal Services		7,650.00	12,577.22	42,200.00	40,013.24
Fringe Benefits		2,650.00	3,281.80	14,650.00	14,614.29
Contractual Services		2,500.00	1,989.26	12,500.00	10,682.65
Sewer Authority		75,150.00	75,037.85	375,750.00	371,192.83
Other Charges		1,750.00	2,083.15	8,750.00	7,541.21
Debt Service/Int Expense		2,070.00	2,070.31	114,803.00	113,803.94
Capital Outlay		0.00	0.00	105,000.00	130,734.96
	Total:	91,770.00	97,039.59	673,653.00	688,583.12
Total Expenditures Enterprise Funds		295,430.00	289,507.20	1,860,395.00	1,556,146.71
TOTAL EXPENDITURES:	**Total:**	772,424.00	781,738.46	5,379,966.00	4,643,985.84
Excess Revenue Over Expenses:		11,916.00	177,149.56	1,337,176.00	2,831,222.03

BRIDGEWATER INDUSTRIAL DEVELOPMENT AUTHORITY

STATEMENT OF REVENUES

For the Month ended November 30, 2022

	Budget FY'23	Current Month 11/30/2022	Year to Date 7/1/2022 -6/30/2023
IDA Fees	6,000.00	0.00	0.00
Interest on Bank Deposits	0.00	0.00	0.00
Lease Proceeds/IDA Property	36,000.00	3,000.00	15,150.00
Bond /Principle & Interest	16,500.00	0.00	0.00
Miscellaneous Revenue	0.00	0.00	0.00
Transfer from Reserves	0.00	0.00	0.00
Total:	58,500.00	3,000.00	15,150.00

STATEMENT OF EXPENSES

For the Month ended November 30, 2022

	Budget FY'23	Current Month 11/30/2022	Year to Date 7/1/2022 -6/30/2023
Personal Service	1,000.00	0.00	350.00
Fringe Benefits	0.00	0.00	26.78
Other	0.00	0.00	166,233.83
Contractual Services	2,000.00	0.00	686.00
Capital	10,000.00	0.00	0.00
Legal Service	1,000.00	0.00	0.00
Insurance & Bonding	0.00	0.00	0.00
Debt Retirement	18,500.00	0.00	5,377.09
Interest Expense	15,700.00	0.00	4,905.35
Add to IDA Reserve	10,300.00	0.00	0.00
Total:	58,500.00	0.00	177,579.05
Excess Revenue over Expense		3,000.00	-162,429.05

Cash in the Bank- IDA	**Oct 31, 2022**	**Nov 30, 2022**
United Bank - IDA Checking	117,924.61	120,924.61
Total:	117,924.61	120,924.61

TO: Town Council

FROM: J. Jay Litten, Town Manager

DATE: December 9, 2022

RE: December Staff Report

Treasurer's Report
[Council Action? Yes.]

The November Treasurer's Report is unremarkable, except an unidentified utility accidentally paid us double again on the Consumer Utility Tax, leaving our key metrics as follows:

	Month	Year
CUT	184.7%	118.5%
MEALS	175.9%	124.0%
CUT+M	**180.7%**	**121.6%**
WATER	102.8%	98.5%
SEWER	101.4%	97.4%
W+S	**102.1%**	**98.0%**

If we normalize the CUT by dividing this month's payment in half, the metrics looks like this:

	Month	Year
CUT	92.3%	100.0%
MEALS	175.9%	124.0%
CUT+M	**130.4%**	**113.6%**
WATER	102.8%	98.5%
SEWER	101.4%	97.4%
W+S	**102.1%**	**98.0%**

The bottom line on the metrics is that water, sewer, and CUT are very near projections, while the Meals Tax is going like gangbusters.

Expenses are normal, except for contractual services in Economic Development. The expenditure there is a software/data package which helps us count the number of people who visit a location, determine where they came from, and track where they go next.[1] We plan to use the data mainly for Sipe Center, but we can see great potential for Town businesses to learn more about their customers. We will explore such opportunities with our business community.

Expect us to present a budget amendment in February, to deal with the Oakdale Pond, SLAF funding (we hope), and a host of similar issues.

Oakdale Park Pond
[Council Action? Yes.]

We advertised the Oakdale Park Pond project for bids last month. We received six bids last Friday, with Commonwealth Excavating submitting the low bid of $699,064 (and other bids reaching above $1.7 million.)

As we've reported previously, the Town is subject to mandatory DEQ MS4 nutrient-reduction goals. We've spent considerable time formulating a plan that would earn us the number of credits necessary to meet these goals. This plan initially consisted of purchasing about $1.5 million in credits and constructing a wet pond at Oakdale Park for just under $500,000. Fortunately, we were able to redesign the pond to maximize the amount of nutrient credits earned through its construction. This means we no longer need to purchase $1.5 million in credits.

Staff recommends approval of the $699,064 bid submitted by Commonwealth Excavating, and the attached resolution requests appropriation of said funds for the Oakdale Park Pond project.

Grocery Store Study
[Council Action? No.]

Hafezi Capital, an international consulting and investing company out of McLean, Virginia, has been diligently working on a Bridgewater grocery store feasibility study over the last several months. Hopefully, all of you were able to participate in the survey that was a part of that study. Mr. Hafezi has completed his research and has put together a report for the Town. We're looking forward to him presenting his findings with us at the Council meeting on Tuesday.

Again, this study is just about learning more about the strengths in our market. We are not looking to dislodge any particular businesses.

[1] The data is all anonymous, of course.

Bridgewater Police Department Career Progression Program
[Council Action? No.]

Chief Read has instituted a Career Progression Program intended to strengthen the police department and better serve the community. Four key goals underlie the program:

(1) To enhance the level of law enforcement service to the public;

(2) To increase the technical expertise and overall effectiveness of our personnel;

(3) To provide for continued professional development of department personnel, and

(4) To promote a philosophy of community policing.

The program allows officers to work toward the titles of "Senior Police Officer" and then "Master Police Officer." Similarly, sergeants can work toward the designations of "Senior Sergeant" and "Master Sergeant." As each of these designations is earned, a five percent pay increase will be awarded, but the designations aren't earned easily. Each requires a combination of physical fitness, experience with the Town, undertaking additional departmental duties, and training in community policing and other subjects.

We believe the program will prepare our officers to effectively tackle any incident or problem they will face. At the same time, it will help them advance in their careers and prepare them to lead.

RESOLUTION AUTHORIZING APPROVAL OF BID TO CONSTRUCT OAKDALE PARK POND

(R2022-16)

WHEREAS, the Town of Bridgewater (the "Town") posted an Invitation for Bid for the construction of a wet pond at Oakdale Park to achieve MS4 nutrient-reduction credits; and

WHEREAS, the Town is mandated by the Virginia Department of Environmental Quality, in accord with our MS4 Program Plan, to meet our MS4 nutrient-reduction goals; and

WHEREAS, bids were due on December 2, 2022, with the Town receiving six bids, the lowest of which was submitted by Commonwealth Excavating, Inc. ("Commonwealth") in the lump sum amount of $699,064; and

WHEREAS, the Town has reviewed Commonwealth's bid and it satisfies the requirements of our Invitation for Bid; and

WHEREAS, Town staff believes that Commonwealth is qualified to construct the Oakdale Park Pond in accord with the terms, guidelines, and specifications of the Invitation for Bid and recommends approval of Commonwealth's bid. The Invitation for Bid and all attachments and exhibits are attached to this resolution, and all of those documents constitute the contract between the Town and Commonwealth;

NOW, THEREFORE, BE IT RESOLVED THAT the Town Council authorizes the Town Manager or his designee to award the bid of $699,064 for the construction of the Oakdale Park Pond and to issue a Notice to Proceed to begin construction within a reasonable time thereafter. Further, the Town appropriates $699,064 for costs associated with the construction of the Oakdale Park Pond.

ADOPTED this 13th day of December, 2022.

_____

Ted W. Flory, Mayor

I certify that I am the Clerk of the Town of Bridgewater, Virginia, and that the foregoing is a true copy of a resolution adopted by the Council of the Town of Bridgewater, Virginia on December 13, 2022, upon the following vote:

AYE	NAY	ABSTAIN	NOT PRESENT	MEMBER
____	____	____	____	Mr. Bowman
____	____	____	____	Mr. Canada
____	____	____	____	Mr. Flory
____	____	____	____	Dr. Miracle
____	____	____	____	Mr. Schofield
____	____	____	____	Ms. Stickley
____	____	____	____	Mr. Tongue

_____ Date

_____ Clerk

Bid Received from
Commonwealth Excavating, Inc.

TOWN OF BRIDGEWATER, VIRGINIA

Bid Form: Oakdale Park Pond

IFB Number: 8675309

Due Date: December 2, 2022, at 2:00 PM

BID

In compliance with the Invitation for Bid referenced above, the provisions thereof, and all the conditions imposed therein, the undersigned offers and agrees to furnish the goods and services in accordance with the signed bid or as mutually agreed upon by subsequent negotiations.

LUMP SUM BID FOR COMPLETION OF CONTRACT: $ 699,064.00/xx
Six Hundred Ninety Nine Thousand Sixty Four Dollars and 00/xx cents.

Has the contractor constructed five or more projects regulated by the Virginia Department of Environmental Quality and described in the Virginia Stormwater Best Management Practice Clearinghouse. ☑ Yes ☐ No *(Such experience is not required but is relevant in some situations.)*

☐ Please check here if contractor wishes to redirect retainage to an escrow account as allowed by Va. Code § 2.2-4334. An escrow agreement substantially similar to that used by VDOT will be sent upon award.

NAME OF CONTRACTOR *(print)*	Commonwealth Excavating Inc
POSTAL ADDRESS *(print)*	PO Box 897 Verona Va 24482
TELEPHONE	540 248-2000
EMAIL	Pat@commonwealthexcavating.com crs.cei@hotmail.com
FAX *(if no email)*	540 248-2001
CLASS A CONTRACTOR NO.	2705035555
SSN *(for individual contractors)* FEIN *(for artificial entities)*	N/A
NAME OF UNDERSIGNED *(print)*	Ira J. Biggs
TITLE OF UNDERSIGNED *(print)*	Sec/Trea - G.M

The undersigned certifies that the above information is true, that he or she is authorized to sign this bid, that the bidder is authorized to do business in Virginia, that the bidder Class A contract license is valid and in good standing, and that the bidder is not currently debarred from bidding by the Commonwealth of Virginia (or any jurisdiction therein) and has not been so debarred in the previous five years.

12-2-22
DATE

SIGNATURE

- 7 addendums acknowledged + received

EMC | Employers Mutual Casualty Company

717 Mulberry St., Des Moines, IA 50309-3872

BID BOND

KNOW ALL MEN BY THESE PRESENTS: That we, Commonwealth Excavating, Inc.

40 Sutton Road Verona, VA 24882

as Principal, and the EMPLOYERS MUTUAL CASUALTY COMPANY, a corporation organized and existing under the laws of the State of Iowa and authorized to do business in the State of Virginia , as Surety, are held and firmly bound unto the Town of Bridgewater 201 Green Street Bridgewater, VA 22812

as obligee, in the sum of Five Percent of Amount Bid (5%) DOLLARS, lawful money of the United States of America, to the payment of which sum of money well and truly to be made, the said Principal and Surety bind themselves, their and each of their heirs, executors, administrators, successors and assigns, jointly and severally, by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that, if the Obligee shall make any award to the Principal for:

Oakdale Park Pond

according to the terms of the proposal or bid made by the Principal therefor, and the Principal shall duly make and enter into a contract with the Obligee in accordance with the terms of such proposal or bid and award and shall give bond for the faithful performance thereof, with the EMPLOYERS MUTUAL CASUALTY COMPANY as Surety or with other Surety or Sureties approved by the Obligee; or if the Principal shall, in case of failure so to do, pay to the Obligee the damages which the Obligee may suffer by reason of such failure not exceeding the penalty of this bond, then this obligation shall be null and void; otherwise it shall be and remain in full force and effect.

Signed, Sealed and Dated this 1st day of December , 20 22 .

Witness

Witness

Commonwealth Excavating, Inc.
Principal

By:

Employers Mutual Casualty Company
Surety

By:
Amanda Gilbert
Attorney-in-Fact

Questions regarding this bond should be directed to the EMC H.O. Bond Department at 515-345-2689.

7007.4 (11-13)

P.O. Box 712 • Des Moines, Iowa 50306-0712

EMC INSURANCE

POWER OF ATTORNEY APPOINTING INDIVIDUAL ATTORNEY-IN-FACT

KNOW ALL MEN BY THESE PRESENTS, that:

1. Employers Mutual Casualty Company, an Iowa Corporation
2. EMCASCO Insurance Company, an Iowa Corporation
3. Union Insurance Company of Providence, an Iowa Corporation
4. Illinois EMCASCO Insurance Company, an Iowa Corporation
5. Dakota Fire Insurance Company, a North Dakota Corporation
6. EMC Property & Casualty Company, an Iowa Corporation

hereinafter referred to severally as "Company" and collectively as "Companies", each does, by these presents, make, constitute and appoint:

Amanda Gilbert

its true and lawful attorney-in-fact, with full power and authority conferred to sign, seal, and execute the Bid Bond

In an amount not exceeding Ten Million Dollars $10,000,000.00

and to bind each Company thereby as fully and to the same extent as if such instruments were signed by the duly authorized officers of each such Company, and all of the acts of said attorney pursuant to the authority hereby given are hereby ratified and confirmed.

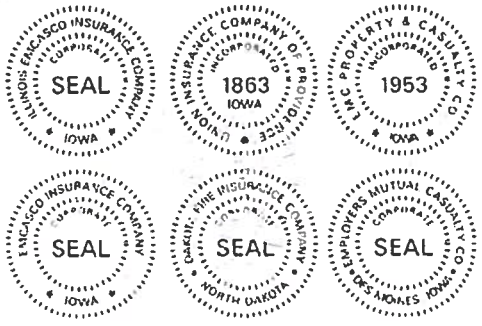
AUTHORITY FOR POWER OF ATTORNEY

This Power-of-Attorney is made and executed pursuant to and by the authority of the following resolution of the Boards of Directors of each of the Companies at the first regularly scheduled meeting of each company duly called and held in 1999:

RESOLVED: The President and Chief Executive Officer, any Vice President, the Treasurer and the Secretary of Employers Mutual Casualty Company shall have power and authority to (1) appoint attorneys-in-fact and authorize them to execute on behalf of each Company and attach the seal of the Company thereto, bonds and undertakings, recognizances, contracts of indemnity and other writings obligatory in the nature thereof; and (2) to remove any such attorney-in-fact at any time and revoke the power and authority given to him or her. Attorneys-in-fact shall have power and authority, subject to the terms and limitations of the power-of-attorney issued to them, to execute and deliver on behalf of the Company, and to attach the seal of the Company thereto, bonds and undertakings, recognizances, contracts of indemnity and other writings obligatory in the nature thereof, and any such instrument executed by any such attorney-in-fact shall be fully and in all respects binding upon the Company. Certification as to the validity of any power-of-attorney authorized herein made by an officer of Employers Mutual Casualty Company shall be fully and in all respects binding upon this Company. The facsimile or mechanically reproduced signature of such officer, whether made heretofore or hereafter, wherever appearing upon a certified copy of any power-of-attorney of the Company, shall be valid and binding upon the Company with the same force and effect as though manually affixed.

IN WITNESS THEREOF, the Companies have caused these presents to be signed for each by their officers as shown, and the Corporate seals to be hereto affixed this 22nd day of September , 2022 .

Seals



Scott R. Jean, President & CEO of Company 1; Chairman, President & CEO of Companies 2, 3, 4, 5 & 6

Todd Strother, Executive Vice President Chief Legal Officer & Secretary of Companies 1, 2, 3, 4, 5 & 6

On this 22nd day of September , 2022 before me a Notary Public in and for the State of Iowa, personally appeared Scott R. Jean and Todd Strother, who, being by me duly sworn, did say that they are, and are known to me to be the CEO, Chairman, President, Executive Vice President, Chief Legal Officer and/or Secretary, respectively, of each of the Companies above; that the seals affixed to this instrument are the seals of said corporations; that said instrument was signed and sealed on behalf of each of the Companies by authority of their respective Boards of Directors; and that the said Scott R. Jean and Todd Strother, as such officers, acknowledged the execution of said instrument to be their voluntary act and deed, and the voluntary act and deed of each of the Companies.

KATHY LOVERIDGE
Commission Number 780769
My Commission Expires
October 10, 2025

My Commission Expires October 10, 2025.

Kathy Loveridge

Notary Public in and for the State of Iowa

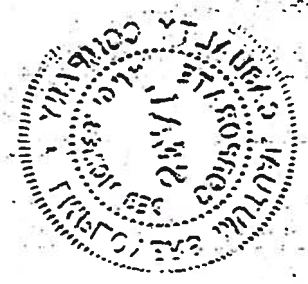
CERTIFICATE

I, Ryan J. Springer, Vice President of the Companies, do hereby certify that the foregoing resolution of the Boards of Directors by each of the Companies, and this Power of Attorney issued pursuant thereto on 22nd day of September , 2022 , are true and correct and are still in full force and effect.

In Testimony Whereof I have subscribed my name and affixed the facsimile seal of each Company this 1st day of December , 2022 .

Ryan J. Springer Vice President

"For verification of the authenticity of the Power of Attorney you may call (515) 345-7548."



COMMONWEALTH of VIRGINIA

Department of Professional and Occupational Regulation
9960 Mayland Drive, Suite 400, Richmond, VA 23233
Telephone: (804) 367-8500

EXPIRES ON
09-30-2024

NUMBER
2705035555

BOARD FOR CONTRACTORS
CLASS A CONTRACTOR
"CLASSIFICATIONS" H/H

COMMONWEALTH EXCAVATING INC
PO BOX 897
VERONA, VA 24482

DPOR

Dorrie J. Hollis, Director

Status can be verified at http://www.dpor.virginia.gov

(SEE REVERSE SIDE FOR PRIVILEGES AND INSTRUCTIONS)

DPOR-LIC (02/2017)

(DETACH HERE)

DPOR COMMONWEALTH of VIRGINIA
Department of Professional and Occupational Regulation

CLASS A BOARD FOR CONTRACTORS
CONTRACTOR

"CLASSIFICATIONS" H/H
NUMBER: 2705035555 EXPIRES: 09-30

COMMONWEALTH EXCAVATING INC
PO BOX 897
VERONA, VA 24482

(FOLD)

Status can be verified at http://www.dpor.virginia.gov

DPOR-PC (02/2017)



Commonwealth of Virginia

State Corporation Commission

CERTIFICATE OF GOOD STANDING

I Certify the Following from the Records of the Commission:

That COMMONWEALTH EXCAVATING, INC. is duly incorporated under the law of the Commonwealth of Virginia;

That the corporation was incorporated on August 22, 1996;

That the corporation's period of duration is perpetual; and

That the corporation is in existence and in good standing in the Commonwealth of Virginia as of the date set forth below.

Nothing more is hereby certified.

Signed and Sealed at Richmond on this Date:

January 31, 2022

Bernard J. Logan, Clerk of the Commission

CERTIFICATE NUMBER : 2022013116859558

Invitation for Bid

TOWN OF BRIDGEWATER, VIRGINIA

IFB Cover: Oakdale Park Pond

IFB Number: 8675309

Due Date: December 2, 2022, at 2:00 PM

ALL BIDS MUST BE RECEIVED BY THE DUE DATE (AND TIME) TO BE CONSIDERED

One original and two copies of the bid, including any attachments, may be mailed or delivered to

By Mail:	Town of Bridgewater Town Engineer P.O. Box 72 Bridgewater, Virginia 22812	By Hand:	Town of Bridgewater Town Engineer 201 Green Street Bridgewater, Virginia 22812

or

One .pdf file of the bid, including any attachments, may be emailed to

procurement@bridgewater.town.

All inquiries for information regarding procurement procedures or technical information shall be emailed to

procurement@bridgewater.town.

TOWN OF BRIDGEWATER, VIRGINIA

Invitation for Bid: Oakdale Park Pond

IFB Number: 8675309

Due Date: December 2, 2022, at 2:00 PM

ALL BIDS MUST BE RECEIVED BY THE DUE DATE (AND TIME) TO BE CONSIDERED

The Town of Bridgewater is accepting bids from qualified, class A contractors to provide construction services to build a 277,300 cubic-foot wet pond below the storage of an existing flood pond on Rockingham County Parcel 122a2-(a)-L129, also known as "Oakdale Park." The wet pond will be built to meet Specification No. 14 of the Virginia Stormwater Best Management Practice Clearinghouse (Appendixes D and E) to achieve MS4 nutrient-reduction credit.

General work elements are as follows:

- Erosion and sediment controls,
- Site grading, laying the clay liner, and incidentals such as bypass pumping,
- Landscaping, planting, seeding, and mulching,
- As-built plans of finished surfaces and features, and
- Incidentals such site clean-up

More specifically, the "Work" is the furnishing of all labor, materials, equipment, tools, and services, and the installation and construction of all items, to construct the pond and other items depicted in Exhibit 1, which is incorporated herein, abiding by the drawings, notes, and directions in the exhibit. (Note that the Town can provide a 3-D grading plan.) The "Work" also includes providing two as-built plans, prepared by a licensed surveyor: one prepared at the time the bottom of the core is reached and one prepared when the project is finished.

1. **Be Safe.** The contractor shall be responsible for the safety of all persons working at the site and any unsafe acts or conditions which may hurt persons or property in or around the work site. The contractor shall, at all times, enforce strict discipline and good order among the workers on the project, and shall not employ on the site any unfit person or anyone not skilled in the work assigned to him or her. If the project involves blasting, the contractor will take appropriate care to avoid personal injuries or property damage, and it will provide ample notice to persons who might be affected thereby.

2. There will be a non-mandatory pre-bid meeting on Tuesday, November 15, 2022, at 2:00 PM at the Bridgewater Community Center, 201 Green Street, Bridgewater, Virginia to discuss the project and answer questions regarding it. (Contractors can attend the pre-bid meeting by Zoom if they choose: *https://us02web.zoom.us/j/2281222812.*) A site tour will be conducted with any interested parties.

Link for pre-bid meeting.

3. Questions concerning this procurement should be submitted as provided on the IFB Cover. The deadline for submitting questions is Monday, November 14, 2022, at 4:30 PM.

Any questions submitted before the deadline will be answered and uploaded to the Town's website. It is the responsibility of the bidder to check for such answers and any addenda which may be issued by the Town at *www.bridgewater.town/procurement*.

Town procurement site.

4. Notice of Award will be posted at *www.bridgewater.town/procurement*.

5. **Bids & Award.** Bids shall be opened and read aloud on the Due Date, in the presence of such of the bidders or members of the public as choose to attend.

   a. All bids must be placed on the enclosed Bid Form.

   b. All bidders are to submit as part of their bid satisfactory proof that such bidder is duly licensed under the terms of Va. Code, § 54.1-1103, including the furnishing of the bidder's contractor's number.

   c. All bids shall be for a single lump sum, without contingency for rock.

   d. The Town reserves the right to reject any and all bids.

   e. The Town may, but need not, waive "informalities," meaning those parts of the bidding process which do not affect the value proposition offered the Town.

   f. Unless there are negotiations under paragraph (h) below, the Town will award the contract, if at all, at least three business days (but no more than 30 calendar days) after the Due Date.

   g. The Town will award the contract, if at all, to the lowest responsible and responsive bidder, provided that if (i) such bidder has ***not*** constructed five projects regulated by the Virginia Department of Environmental Quality and described in the Virginia Stormwater Best Management Practice Clearinghouse, and (ii) one or more other responsible and responsive bidders ***have*** constructed five or more such projects and submitted bids within 5% of the lowest responsible and responsive bidder, then the contract will be awarded, if at all, to the lowest responsible and responsive bidder which has constructed five or more such projects. The bidder selected under this paragraph (g) is the Apparent Winning Bidder ("AWB").

   h. Negotiation with AWB. Negotiations with the AWB are allowed when the bid exceeds the Town's cost estimate for the procurement. The negotiations should be conducted in accordance with the following procedures:

      1. The Town Manager shall advise the AWB, in writing, that the low bid exceeds the Town's cost estimate for the procurement. He may suggest a reduction in scope for the proposed purchase and invite the AWB to amend its bid proposal.

      2. Repetitive informal discussions may be conducted with the AWB for purposes of obtaining a Contract within the Town's cost estimate.

      3. The AWB may submit an addendum to its bid that includes the change in scope for the proposed purchase, the reduction in price, and the new Contract value.

4. If the proposed addendum is acceptable to the Town, the Town will award a Contract within the Town's cost estimate to the AWB based upon the amended bid.

i. Bids may be withdrawn only to the extent allowed by Va. Code, § 2.2-4330(B)(1). Such withdrawal, along with all working papers, must be submitted within two business days of the Due Date.

j. The Town may make such reasonable investigations as it deems necessary to determine whether the bidder can adequately perform the Work. The bidder shall furnish to the Town all such information and data for this purpose as may be requested. The Town shall have the right to inspect the bidder's physical plant prior to award to verify the bidder's capabilities. The Town may reject any bid if the evidence submitted by (or investigations of) such bidder fails to satisfy the Town that the bidder is properly qualified to carry out the Work.

k. All bids are good for 60 days from the date submitted.

6. **Contract Time.** The contract time period is for 130 calendar days from the notice to proceed, with the contractor subject to $500 per day liquidated damages for any delays in completion beyond that period (because actual damages would be difficult to compute, but $500 per day is a reasonable estimate). If the contractor encounters unforeseeable obstacles which prolong the construction, and it provides contemporaneous written notice to the Town Engineer of such obstacles, the Town will extend the contract time period accordingly. Weather, of any variation or intensity, is not unforeseeable.

a. As an incentive for prompt completion, if final completion is achieved within 100 days of the notice to proceed, the project price will be increased $500 for each day from completion until the end of the 100-day period. The 100-day period will not be extended for any reason.

b. Time is of the essence in this contract.

7. **Execution of Work.** The Work is to be performed in a workmanlike manner by properly trained and qualified personnel under supervision of the contractor.

a. The contractor may begin executing the Work upon issuance of a notice to proceed by the Town Engineer. Such notice will be issued within a reasonable time (but not more than 30 days) after the contract is awarded.

b. The contractor warrants that, unless otherwise specified, (*i*) all materials and equipment incorporated in the Work shall be new, first class, and in accordance with the contract and (*ii*) all work shall be performed by persons qualified in their respective trades. Work not conforming to these warranties shall be considered defective. This warranty of materials and workmanship is separate and independent from and in addition to any other guarantees in this contract.

c. The contractor is required to become familiar with the detailed needs and requirements of any and all regulatory agencies having jurisdiction over this work. These detailed needs

and requirements are to be accommodated, as part of the Work, in every manner just as if they were prescribed in herein.[1]

d. Underground utility locations are not all shown and if so, are approximate. The contractor is required and responsible to coordinate with Miss Utility prior to any excavation work. The contractor shall field verify the vertical and horizontal locations of all existing utilities at least 48 hours prior to any excavation. Problematic utilities shall be reported to the Town immediately.

e. The contractor shall be responsible for all means, methods, techniques, sequences, and procedures and for coordinating all portions of the Work under the Contract.

8. Change Orders.

a. The Town Engineer may initiate changes by submitting a Proposal Request to contractor. Such Request will include (*i*) a detailed description of the change in the Project; (*ii*) supplementary or revised drawings and specifications; (*iii*) the projected time span for making the change and any proposed change in the contract time period, and (*iv*) a proposed price and specific period of time during which the proposed price will be considered valid. Such request is a proposal only, and is not an instruction to execute the changes, nor to stop work in progress. The proposal will take effect when and if signed by the Contractor.

b. In lieu of a Proposal Request, the Town Engineer may issue a Construction Change Directive for contractor to proceed with a change for subsequent inclusion in a change order. The Directive will describe changes in the Work, both additions and deletions, with attachments of revised contract documents to define details of the change, and will designate the method of determining any change in the project price and any change in the contract time period. The contractor will comply with the Directive upon issuance. If the contractor also signs the Directive, its terms will be settled. If the contractor declines to sign, the changes in project price and contract time period will be resolved later (under paragraph 14, if necessary) but the stated change in the Work will be implemented immediately.

c. Contractor may initiate changes by submitting a written notice to the Town Engineer, containing (*i*) a description of the proposed changes; (*ii*) a statement of the reason for making the changes and (*iii*) a statement of the effect on the project price and the contract time period, with documentation therefor. The change will become effective when and if signed by the Town Engineer.

d. In an emergency affecting the safety or life of individuals, or of the work, or of adjoining property, the contractor, without special instruction or authorization from the Town, may act at its discretion, to prevent such threatened loss or injury. Also, should the Town

[1] Such regulatory requirements include, without limitation, the Virginia Erosion and Sediment Control Handbook, the regulations of the Virginia Occupational Safety and Health Program, and Specification No. 14 of the Virginia Stormwater Best Management Practice Clearinghouse.

instruct the contractor to act to prevent such loss injury, contractor will do so, without appeal.

Any additional compensation or extension of time claimed will be later resolved by the parties or determined as provided in paragraph 14 below.

9. Bonds.

a. Bid Bond. All bids shall be accompanied by a five percent bid bond for the total amount of the base bid.

b. Performance Bond. The contractor shall provide a performance bond in the sum of the contract amount conditioned upon the faithful performance of the contract in strict conformity with the plans, specifications, and conditions of the contract.

c. Payment Bond. The contractor shall provide a payment bond in the sum of the contract amount. The bond shall be for the protection of claimants who have and fulfill contracts to supply labor or materials to the prime contractor, or to any subcontractors, in furtherance of the Work provided for in the contract, and shall be conditioned upon the prompt payment for all materials furnished or labor supplied or performed in the furtherance of the Work.

10. Payment. Contractor shall submit applications for payment to the Town Engineer by the first day of each month. All applications must show the percentage of work completed to date, with supporting documentation.

a. The Town Engineer will approve the application if he finds it to be in proper form and fairly representative of the work performed. The contractor will provide such further data as may be necessary to allow the Town Engineer to make his finding. Subject to the remainder of this paragraph 10, the Town will pay each approved application within 35 days of acceptance.

b. Subject to the remainder of this paragraph 10 and except for the final payment, the contractor shall be paid 95% of the approved application, with five percent being retained to ensure faithful performance of the contract.

c. The contractor may require the use an escrow account to hold the five percent retainage by so indicating in the space provided on the bid form. In the event the contractor elects to use the escrow account procedure, the escrow agreement form provided with the award shall be executed and submitted to the Town Engineer within fifteen calendar days after award. If the escrow agreement form is not submitted within the fifteen-day period, the contractor shall forfeit its rights to the use of the escrow account procedure.

In order to have retained funds paid to an escrow agent, the contractor, the escrow agent, and the surety shall execute an escrow agreement form. The contractor's escrow agent shall be a trust company, bank or savings institution with its principal office located in the Commonwealth.

The contractor will be entitled to any interest on escrowed funds ultimately paid to it.

d. No payments will be made while (i) the project is not yet complete and the contract time period has expired, (ii) the contractor is materially non-compliant with any applicable law or regulation applying to the project or this contract, or (iii) the contractor is in material default of the contract. If it invokes this paragraph 10(d), the Town shall identify its reasoning and state what steps contractor should take to allow payment.

11. Completion. The Work shall be complete when (i) the Town Engineer inspects the project and certifies that it has been constructed according to this contract and (ii) the contractor has satisfied all of its other obligations (such as the provision of "as built" plans). For purposes of paragraph six, the Work shall be deemed complete as of the last date on which work was done prior to the Town Engineer's certification described above.

12. Inspection and Testing.

a. All materials, workmanship, and work-product shall be subject to inspection, examination and test by the Town Engineer at any and all times during construction. The Town Engineer shall have authority to reject defective material, workmanship, or work-product, and require its correction. Rejected workmanship shall be satisfactorily corrected and rejected material shall be satisfactorily replaced with proper material without charge therefor, and the contractor shall promptly segregate and remove the rejected material from the premises. If the contractor fails to proceed at once with replacement of rejected material or the correction of defective workmanship, the Town may replace such material or correct such workmanship charging the cost to the contractor. The Town may terminate the right of the contractor to proceed, declaring the contract to be in default.

b. The Town Engineer may order that the Work be suspended when, in his judgment, the intent of the contract and the plans is not being followed. Any such suspension shall be continued only until the matter in question is settled to the satisfaction of the Town. The cost of any such work stoppage shall be borne by the contractor unless it is later determined that no fault existed in the contractor's work

13. Insurance. Contractor must provide the Town with proof of insurance naming the Town of Bridgewater as additional insured before work may begin. Insurance requirements are as follows:

a. The contractor shall procure and maintain, for the duration of the contract, insurance against claims for injuries to persons or damages to property which may arise from or in connection with the Work by the contactor, its agents, representatives, employees or subcontractors.

b. The contractor shall provide proof of insurance naming the Town as additional insured and, if requested, a certified copy of said policy or endorsement(s) before commencement of the construction. All insurance shall be placed with an insurer licensed to do business in the Commonwealth of Virginia. The underwriter shall be subject to the approval of the Town. The contractor shall maintain limits no less than

1. *Commercial General Liability:* $1,000,000 combined single limit per occurrence for bodily injury, personal injury and property damage. The general aggregate limit shall apply separately to this project and the general aggregate shall be twice the required occurrence limit.
2. *Automobile Liability:* $1,000,000 combined single limit per accident for bodily injury and property damage.
3. *Workers' Compensation and Employers Liability:* Workers' Compensation as required by the Code of Virginia and Employers Liability with limits of $1,000,000 per accident.

14. Disputes. All disputes concerning this procurement, the contract arising from it, the performance of the Work, or payment for the same shall be resolved through the Claims and Appeals processes found in §§ 6.2 and 6.3 of the Town's Procurement Policy, which can be found at *www.bridgewater.town/procurement*.

18. Subcontractors.

a. The contractor shall, as soon as practicable after the signing of the contract, identify in writing the subcontractors proposed for the Work. The contractor shall not employ any subcontractor that is irresponsible or unsuitable. The Town shall not direct the contractor engage any particular subcontractor, but it may disapprove of any subcontractor it considers unsuitable.

b. The contractor is fully responsible to the Town for the acts and omissions of subcontractors and of persons either directly or indirectly employed by them.

c. Within seven days payment from the Town for work performed by the subcontractor, the contractor shall either:

- Pay the subcontractor for the proportionate share of the total payment received from the Town attributable to the work performed by the subcontractor; or
- Notify the Town and subcontractor, in writing, of its intention to withhold all or a part of the subcontractor's payment with the reason for nonpayment.

Individual contractors must provide the Town with their social security numbers, and proprietorships, partnerships, and corporations to provide their federal employer identification numbers.

The contractor shall pay interest to any subcontractor on all amounts owed by the contractor that remain unpaid after seven days following receipt by the contractor of payment from Town for work performed by the subcontractor, except for amounts withheld as allowed above. Unless otherwise provided under the terms of this contract, interest to subcontractors shall accrue at the rate of one percent per month. A contract modification shall not be made for the purpose of providing reimbursement for the interest charge. A cost reimbursement claim shall not include any amount for reimbursement for the interest charge.

Further, the contractor shall include in each of its subcontracts a provision requiring each subcontractor to include or otherwise be subject to the same payment and interest requirements with respect to each lower-tier subcontractor.

A contractor's obligation to pay an interest charge to a subcontractor shall not be an obligation of the Town.

19. Termination.

a. By the Contractor. If the Work should be stopped under any order of any court or other public authority for a period of three months through no fault of the contractor or of anyone employed it, or if the Town should arbitrarily fail to pay an invoice a reasonable time after it becomes due under paragraph 10 above, then the contractor may, upon fourteen calendar days' written notice to the Town, stop work or terminate the contract. The contractor may then recover the Town payment for the cost of the Work actually performed, together with the overhead and profit thereon, but profit shall be recovered only to the extent that the contractor can demonstrate that there would have been a profit on the entire contract if the work had been completed. The contractor may not receive profit or any other type of compensation for parts of the work that were not performed. The contractor may recover the cost of physically closing down the job site, but no other costs of termination. The Town may offset any claims it may have against the contractor against the amounts due to the contractor.

b. By the Town.

1. *For Convenience.* This contract may be terminated for the convenience of the Town upon 30 days' written notice to the contractor. If the contract is terminated for convenience without the required advance notice, then the Town shall be responsible for payment of work completed up to the termination date.

2. *For Cause.* If the contractor should be adjudged bankrupt, or if it should make a general assignment for the benefit of its creditors, or if a receiver should be appointed on account of its insolvency, the Town may terminate the contract. If the contractor should persistently or repeatedly refuse or should fail, except in cases for which extension of time is provided, to supply enough properly skilled workers or proper materials, or if it should fail to make prompt payment to subcontractors or for material or labor, or persistently disregard laws, ordinances or the instructions of the Town, or otherwise be in substantial violation of any provision of the contract, then the Town may terminate the contract.

   Prior to such termination of the contract, the Town shall provide the contractor 10 days' written notice. Upon termination, the Town shall take possession of the premises and of all materials, tools, and appliances thereon and finish the work by whatever method deemed expedient. In such case, the contractor shall not be entitled to receive any further payment. If the expense of finishing the Work, including compensation for additional managerial and administrative services, should exceed the unpaid balance of the contract price, the contractor shall pay the difference to the

Town. The expense incurred by the Town as herein provided, and the damage incurred through the contractor's default, shall be certified by the Town.

Termination of the contract under this section is without prejudice to any other right or remedy of the Town.

20. Anti-Discrimination. During the performance of this contract, the contractor agrees as follows:

a. The contractor will not discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin, age, disability, or other basis prohibited by state law relating to discrimination in employment, except where there is a bona fide occupational qualification reasonably necessary to the normal operation of the contractor. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.

b. The contractor, in all solicitations or advertisements for employees placed by or on behalf of the contractor, will state that such contractor is an equal opportunity employer.

c. Notices, advertisements, and solicitations placed in accordance with federal law, rule or regulation shall be deemed sufficient for the purpose of meeting the requirements of this section.

The contractor will include the provisions of the foregoing paragraphs 20(a), (b), and (c) in every subcontract or purchase order of over $10,000, so that the provisions will be binding upon each subcontractor or vendor.

21. Drug Free Workplace. During the performance of this contract, the contractor agrees to (i) provide a drug-free workplace for the contractor's employees; (ii) post in conspicuous places, available to employees and applicants for employment, a statement notifying employees that the unlawful manufacture, sale, distribution, dispensation, possession, or use of a controlled substance or marijuana is prohibited in the contractor's workplace and specifying the actions that will be taken against employees for violations of such prohibition; (iii) state in all solicitations or advertisements for employees placed by or on behalf of the contractor that the contractor maintains a drug-free workplace; and (iv) include the provisions of the foregoing clauses in every subcontract or purchase order of over $10,000, so that the provisions will be binding upon each subcontractor or vendor.

For the purposes of this paragraph 21, "drug-free workplace" means a site for the performance of this contract, in which all employees are prohibited from engaging in the unlawful manufacture, sale, distribution, dispensation, possession or use of any controlled substance or marijuana during the performance of the contract.

22. General Provisions:

a. Unless otherwise specified in the contract, the contractor shall furnish all the necessary personnel, materials, equipment, services and facilities necessary to complete the Work specified herein. All materials to be new and unused.

b. The Town has obtained permits for Erosion & Sediment Control, and Stormwater Management. It has applied for a permit for the relocation of wetlands. It will obtain any other required permits. The contractor will be responsible for the scheduling of inspections.

c. The Work and all components thereof shall carry at least a one-year warranty; individual products with longer warranties shall provide full warranty length as stated in specifications. The contractor shall repair any deficiency within two weeks' written notice by the Town at no cost to the Town. A one-year performance bond shall be required to ensure adequate warranty is maintained.

d. The contract for this project shall consist of this Invitation to Bid (including Exhibit 1), the addenda and answers which may later be posted to *www.bridgewater.town/procurement*, the Bid submitted by the selected bidder, the notice of award, and the notice to proceed, together with such amendments as the parties may agree to in the future.

e. The selected contractor agrees to indemnify, defend, and hold harmless the Town, its officers, agents, and employees from any claims, damages and actions of any kind or nature, whether at law or in equity, arising from or caused by the use of any materials, goods, services or equipment of any kind or nature furnished by the contractor, provided that such liability is not attributable to the sole negligence of the Town The contractor agrees that this clause shall include claims involving infringement of patent or copyright.

f. This invitation does not—and cannot—show all surface and subsurface conditions with precision. Bidders are cautioned to make a site examination before bidding, because notwithstanding any other provision hereof, they will be held accountable to perform the Work, in the proposed location, for the agreed price, in the contract time period, under such conditions as actually exist. Subject to the foregoing, please take note of a preliminary geotechnical report attached as Exhibit 2. (We hope to provide the final report by addendum.)

g. The contractor shall perform the Work in such a manner as not to interrupt or interfere with the ongoing activities at the location of the Work.

h. This contract shall not be assignable by the contractor in whole or in part without the written consent of the Town.

i. Some text in this invitation is highlighted. Highlighting is solely for the convenience of the reader, and highlighted text shall be given no special weight or emphasis.

November 1, 2022

TOWN OF BRIDGEWATER, VIRGINIA

By: _____
Town Engineer

TOWN OF BRIDGEWATER, VIRGINIA

Bid Form: Oakdale Park Pond

IFB Number: 8675309

Due Date: December 2, 2022, at 2:00 PM

BID

In compliance with the Invitation for Bid referenced above, the provisions thereof, and all the conditions imposed therein, the undersigned offers and agrees to furnish the goods and services in accordance with the signed bid or as mutually agreed upon by subsequent negotiations.

LUMP SUM BID FOR COMPLETION OF CONTRACT: $_____.

Has the contractor constructed five or more projects regulated by the Virginia Department of Environmental Quality and described in the Virginia Stormwater Best Management Practice Clearinghouse. ☐ Yes ☐ No *(Such experience is not required but is relevant in some situations.)*

☐ Please check here if contractor wishes to redirect retainage to an escrow account as allowed by Va. Code § 2.2-4334. An escrow agreement substantially similar to that used by VDOT will be sent upon award.

NAME OF CONTRACTOR *(print)* _____

POSTAL ADDRESS *(print)* _____

TELEPHONE _____

EMAIL _____

FAX *(if no email)* _____

CLASS A CONTRACTOR NO. _____

SSN *(for individual contractors)*
FEIN *(for artificial entities)* _____

NAME OF UNDERSIGNED *(print)* _____

TITLE OF UNDERSIGNED *(print)* _____

The undersigned certifies that the above information is true, that he or she is authorized to sign this bid, that the bidder is authorized to do business in Virginia, that the bidder Class A contract license is valid and in good standing, and that the bidder is not currently debarred from bidding by the Commonwealth of Virginia (or any jurisdiction therein) and has not been so debarred in the previous five years.

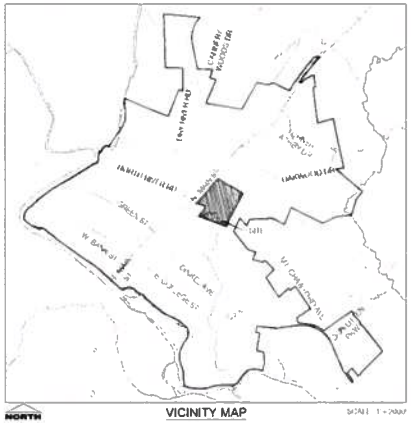
_____ DATE

_____ SIGNATURE

OAKDALE PARK WET POND

134 MT. CRAWFORD AVENUE

TOWN OF BRIDGEWATER, VIRGINIA



VICINITY MAP

SCALE: 1" = 2000'

SHEET INDEX

SHEET NUMBER	SHEET TITLE
C1.0	COVER SHEET
C2.0	OVERALL EXISTING CONDITIONS PLAN
C3.0	LAYOUT & MATERIALS PLAN
C4.0	GRADING PLAN
C4.1	SECTIONS PLAN
C4.2	SECTION PROFILES
C5.0	EROSION & SEDIMENT CONTROL PLANS
C5.1	EROSION & SEDIMENT CONTROL NOTES
C5.2	EROSION & SEDIMENT CONTROL DETAILS I
C5.3	EROSION & SEDIMENT CONTROL DETAILS II
C6.0	STORMWATER MANAGEMENT NOTES & DETAILS
C7.0	LANDSCAPE PLAN
C7.1	LANDSCAPE NOTES & DETAILS

DESCRIPTION

THE TOWN OF BRIDGEWATER IS PROPOSING A 777,900 CU. FT. (4.0 FOOT) BELOW THE STORAGE OF AN EXISTING FLOOD PORTION OF PARCEL 124A-A-124 ALSO KNOWN AS OAKDALE PARK. THE WET POND WILL BE BUILT TO MEET SPECIFICATION NO. 14 OF THE VIRGINIA STORMWATER BEST MANAGEMENT PRACTICES CLEARINGHOUSE TO ACHIEVE WATER QUALITY REDUCTION CREDITS.

RESPONSIBLE LAND DISTURBER

A RESPONSIBLE LAND DISTURBER (RLD) IS AN INDIVIDUAL HOLDING A CERTIFICATE ISSUED BY DEQ WHO IS RESPONSIBLE FOR CARRYING OUT A LAND-DISTURBING ACTIVITY IN ACCORDANCE WITH AN APPROVED EROSION AND SEDIMENT CONTROL (ESC) PLAN. THE RLD SHALL BE THE AGENT OF RECORD FOR PURPOSES OF PLAN APPROVAL ONLY. THE CONTRACTOR SHALL BE AN RLD, A QUALIFIED EMPLOYEE AND/OR CONTRACTOR.

GENERAL INFORMATION

SITE ADDRESS	134 MT. CRAWFORD AVENUE
OWNER	TOWN OF BRIDGEWATER 201 GREEN STREET P.O. BOX 72 BRIDGEWATER, VA 22812 (540) 828-5100
AGENT	CARR ASSOCIATES POC: KENT C. CARR, P.E.
TAX MAP NUMBER(S)	124A-A-124
RECORDATION NUMBER(S)	DB 824 PG 317
ZONING	R-1
EXISTING USE	PUBLIC PARK
PROPOSED USE	PUBLIC PARK
PARCEL AREA(S)	35.43 AC.
LIMITS OF CONSTR. (NTE)	87,764 SQ. FT. OR 2.01 AC.
REQUIRED PARKING	N/A
PROVIDED PARKING	N/A
CONSTR. TYPE	N/A
USE GROUP	N/A
BUILDING AREA	N/A
NO. OF STORIES	N/A
BUILDING HEIGHT	N/A
IS BLDG. SPRINKLED	N/A
EX. FIRE FLOW	N/A
NEEDED FIRE FLOW	N/A
WATER SERVICE	PUBLIC
SEWER SERVICE	PUBLIC
GRAVE SITES ON-SITE	NONE
FEMA	ZONE X (SHADED) PER FIRM PANEL 51165C0041E EFFECTIVE DATE: AUGUST 19, 2014

GENERAL NOTES

EXISTING UTILITIES	1. CONTRACTOR SHALL STAKE LOCATION AND ELEVATION OF ALL UNDERGROUND UTILITIES. THE LOCATION OF EXISTING UTILITIES ARE NOT NECESSARILY SHOWN ON THE PLANS AND WHERE SHOWN, ARE ONLY APPROXIMATE. THE CONTRACTOR SHALL DETERMINE AND AT NO EXTRA COST HAVE LOCATE ALL UNDERGROUND UTILITIES AND STRUCTURES AS NECESSARY. NO CLAIMS FOR EXTRA COMPENSATION SHALL ACCRUE TO THE CONTRACTOR FROM THE PRESENCE OF SUCH UTILITIES OR OTHER OBSTRUCTIONS AND HE MAY BE LIABLE TO THE REMOVAL OF THE ABRIDGEMENT OF THE SAME. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO UNDERGROUND STRUCTURES. CONTACT MISS UTILITY OF CENTRAL VA 811 BEFORE

ABBREVIATIONS LIST

AASHTO	AMERICAN ASSOCIATION OF STATE HIGHWAY TRANSPORTATION	EVCS	END VERTICAL CURVE STATION	P.S.I.	POUNDS PER SQUARE INCH
ADA	AMERICANS WITH DISABILITY ACT	F.W.	FACEWAY	PVC	POLYVINYL CHLORIDE
A.F.E.	ANNUAL EXCEEDANCE PROBABILITY	EW	EXCAVATE	PVMT	PAVEMENT
A.F.G.	ABOVE FINISHED GRADE	EXC	EXCAVATION	QTY	QUANTITY
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE	EXIST	EXISTING	R	RADIUS
APPROX	APPROXIMATELY	EXT	EXTERIOR	RCP	REINFORCED CONCRETE PIPE
ASPH	ASPHALT	FDN	FOUNDATION	REINF.	REINFORCEMENT
ASTM	AMERICAN SOCIETY FOR TESTING MATERIALS	FF	FINISH FLOOR	REQD	REQUIRED
BC	BACK OF CURB	FG	FINISH GRADE	REQD	REQUIRED
BIT	BITUMINOUS	GBI	GRADE BREAK ELEVATION	RLD	RESPONSIBLE LAND DISTURBER
BLDG	BUILDING	GBS	GRADE BREAK STATION	ROW	RIGHT-OF-WAY
BM	BENCHMARK	G.C.	GENERAL CONTRACTOR	RR	RAILROAD
BVCE	BEGIN VERTICAL CURVE ELEVATION	GPM	GALLONS PER MINUTE	RT	RIGHT
BVCS	BEGIN VERTICAL CURVE STATION	HDPE	HIGH DENSITY POLYETHYLENE	SAN	SANITARY
BW	BOTTOM OF WALL	HPT	HIGH POINT	SBL	SUBDIVISION LINE
BW	BOTH WAYS	HSD	HEADER SOFT DRAINAGE	SD	STORM DRAIN
C.F.S	CUBIC FEET PER SECOND	HVAC	HEATING, VENTILATION, AND AIR CONDITIONING	SHT	SHEET
CI	CAST IRON	INV	INVERT ELEVATION	SPECS	SPECIFICATIONS
CMP	CORRUGATED METAL PIPE	ID	INSIDE DIAMETER	SQ. FT.	SQUARE FEET
CMU	CONCRETE MASONRY UNIT	IE	INVERT ELEVATION	SQ. IN.	SQUARE INCHES
C.O.	CLEANOUT	IN	INCH	SS	SANITARY SEWER
CONC	CONCRETE	INTX	INTERSECTION	SSD	SUPERELEVATION DISTANCE
CONSTR	CONSTRUCTION	ISD	INTERNATIONAL ORGANIZATION OF STANDARDS	STA	STATION
CONT	CONTINUOUS	INT	INTERIOR	STD	STANDARD
COR	CORNER	INV	INVERT	S.Y.	SQUARE YARD
CU. FT.	CUBIC FEET	#	NUMBER	TBA	TO BE ABANDONED
CU. YD.	CUBIC YARD	LFT	LINEAR FEET	TBR	TO BE REMOVED
DEFL	DEFLECTION	LT	LEFT	TEL	TELEPHONE
DEQ	DEPARTMENT OF ENVIRONMENTAL QUALITY	LVC	LENGTH OF VERTICAL CURVE	TRANS	TRANSFORMER
DI	DROP INLET	MH	MANHOLE	TW	TOP OF WALL
DIA	DIAMETER	MAX	MAXIMUM	TYP	TYPICAL
DIM	DIMENSION	MIN	MINIMUM	UON	UNLESS OTHERWISE NOTED
DWG	DRAWING	MON	MONUMENT	VDOT	VIRGINIA DEPARTMENT OF TRANSPORTATION
EA	EACH	NBL	NORTHBOUND LANE	VERT	VERTICAL
EBL	EASTBOUND LANE	N.T.S.	NOT TO SCALE	VESCH	VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK
ELEC	ELECTRIC	O.C.	ON CENTER	VIF	VERIFY IN FIELD
ELEV	ELEVATION	O.D.	OUTSIDE DIAMETER	WBL	WESTBOUND LANE
ENTR	ENTRANCE	PL	PROPERTY LINE	WL	WATER LINE
EP	EDGE OF PAVEMENT	PROP	PROPOSED	W/O	WITHOUT
EQ.	EQUAL	P.S.I.	POUNDS PER SQUARE FOOT	WT	WEIGHT
EVCE	END VERTICAL CURVE ELEVATION			YD	YARD

EXHIBIT 1

labbies

TOWN OF BRIDGEWATER
201 GREEN STREET
POST OFFICE BOX 72
VIRGINIA 22812
WWW.BRIDGEWATER.TOWN

LANDSCAPE ARCHITECT
LICENSE NO. 1460
09/26/2022

OAKDALE PARK WET POND

COVER SHEET

134 MT. CRAWFORD AVENUE
TOWN OF BRIDGEWATER ASHBY DISTRICT ROCKINGHAM COUNTY VIRGINIA

BRIDGEWATER ENGINEERING

DATE	REVISIONS	SCALE
09/09/2022		
09/26/2022		N/A

C1.0



OAKDALE PARK BOUNDARY
35.43 ACRES

L1	N 47°59'06" E	132.85'
L2	N 38°51'51" E	137.38'
L3	N 32°16'02" E	135.49'
L4	N 60° 17'41" W	191.72'
L5	N 60° 57'52" W	72.44'
L6	N 80°57'58" W	91.60'
L7	N 32° 36'40" E	113.10'
L8	S 74° 18'52" E	19.66'
L9	N 32°41'08" E	95.81'
L10	N 32° 15'12" E	102.97'
L11	S 50°57'58" E	15.99'
L12	N 39°00'00" E	85.69'
L13	N 80°00'00" E	107.27'
L14	N 08°48'34" E	142.23'
L15	N 30°57'58" E	124.04'
L16	N 40°00'00" E	75.39'
L17	N 88°51'51" E	113.59'
L18	N 62°32'51" E	85.43'
L19	N 43°41'51" E	90.84'
L20	N 43°41'58" E	90.84'
L21	N 32°27'27" E	46.98'
L22	N 32°57'08" E	49.91'
L23	N 33°17'11" E	50.09'
L24	N 60°57'58" W	115.00'
L25	N 61° 15'07" W	108.09'

SOILS LEGEND

7A BOLTHAUSER SILT LOAM
PARENT MATERIAL: COLLUVIUM
DRAINAGE: MODERATELY WELL DRAINED
AND 1 TO 4 PERCENT SLOPES
Road Class: NOT RATED
HYDROLOGIC GROUP: C
FLOODING FREQUENCY: NONE
DEPTH TO BEDROCK: >80"

47B MONTEVALLO-PANDA SILT LOAM
PARENT MATERIAL: RESIDUUM
DRAINAGE: MODERATELY WELL DRAINED
AND 2 TO 6 PERCENT SLOPES
Road Class: NOT RATED
HYDROLOGIC GROUP: C
FLOODING FREQUENCY: NONE
DEPTH TO BEDROCK: >80"

TOWN OF BRIDGEWATER
201 GREEN STREET
POST OFFICE BOX 72
VIRGINIA 22812
WWW.BRIDGEWATER.TOWN

09/28/2022

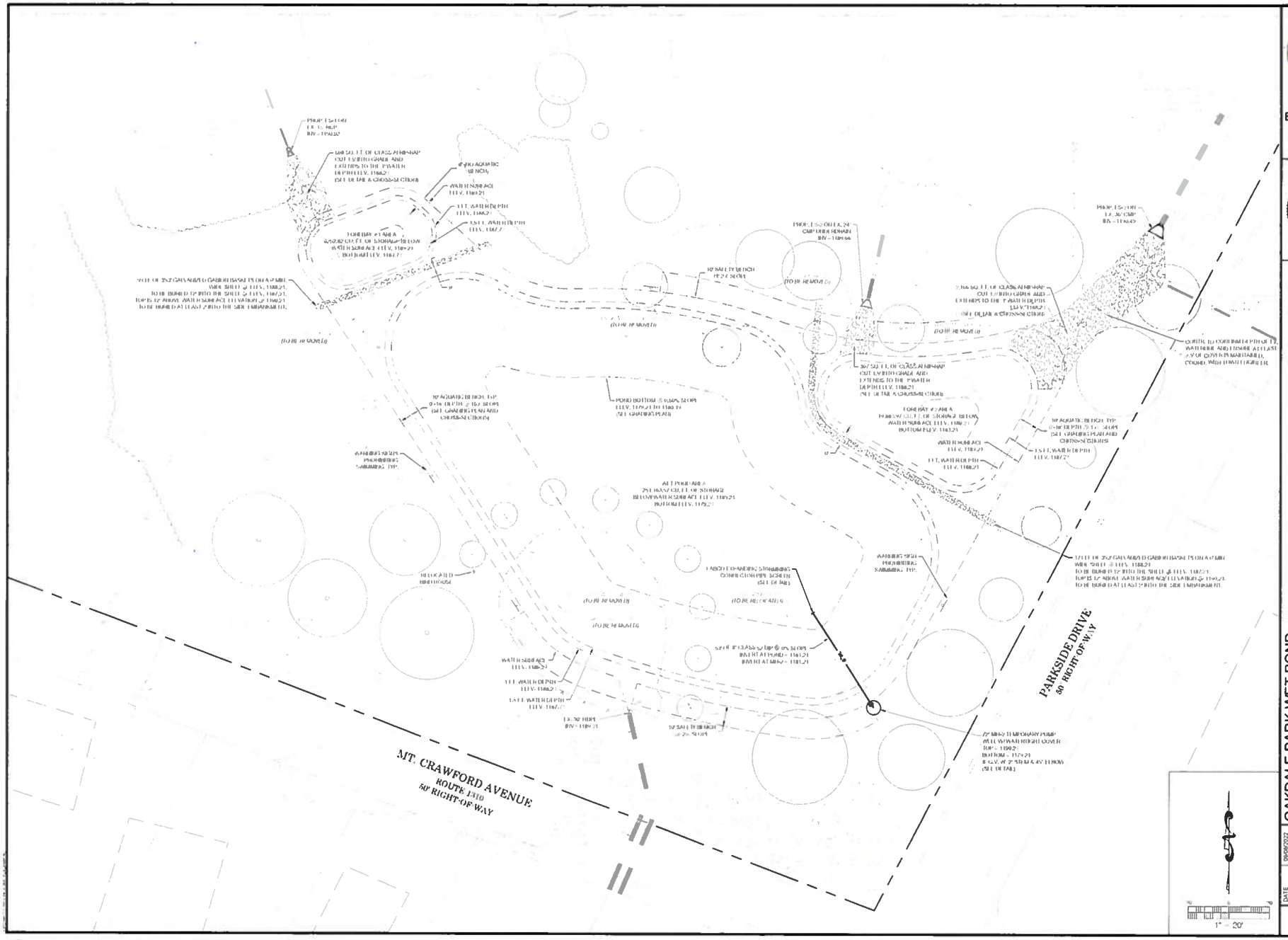
OAKDALE PARK WET POND
OVERALL EXISTING CONDITIONS PLAN

134 MT. CRAWFORD AVENUE
TOWN OF BRIDGEWATER ASHBY DISTRICT ROCKINGHAM COUNTY, VIRGINIA

BRIDGEWATER ENGINEERING

DATE	SCALE
09/09/2022	1" = 100'
REVISIONS: 09/28/2022	

C2.0



TOWN OF BRIDGEWATER
201 GREEN STREET
POST OFFICE BOX 72
VIRGINIA 22812
WWW.BRIDGEWATER.TOWN

09/26/2022

OAKDALE PARK WET POND

LAYOUT & DEMOLITION PLAN

134 MT. CRAWFORD AVENUE
TOWN OF BRIDGEWATER ASHBY DISTRICT ROCKINGHAM COUNTY VIRGINIA

BRIDGEWATER ENGINEERING

DATE	SCALE
REVISIONS	1" = 20'
09/09/2022	
09/26/2022	

C3.0

DATE	09/08/2022
REVISIONS	09/26/2022
SCALE	1" = 20'

C4.0

OAKDALE PARK WET POND

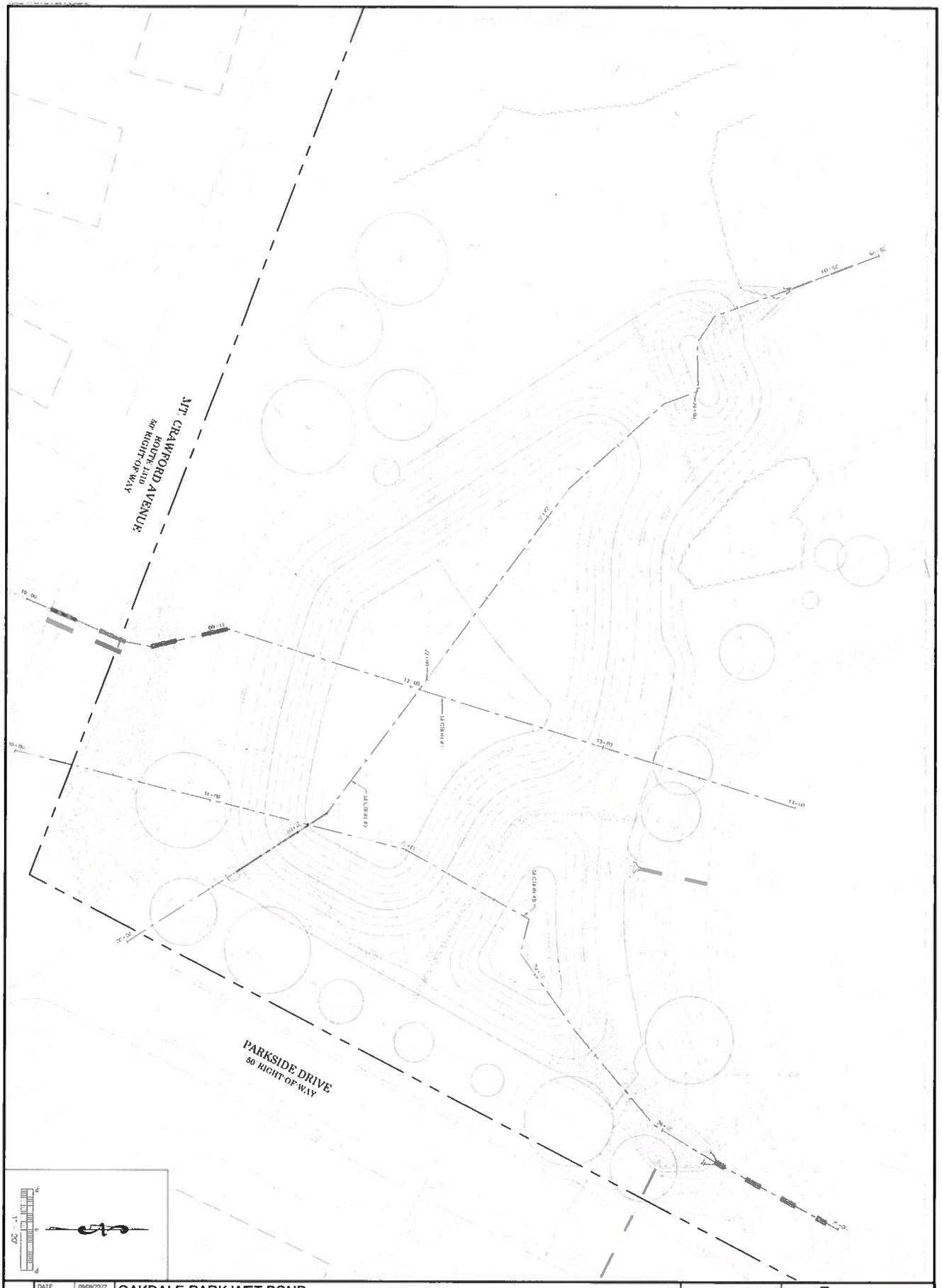
GRADING PLAN

134 LOT, CRAWFORD AVENUE
TOWN OF BRIDGEWATER, ASHBY DISTRICT, ROCKINGHAM COUNTY, VIRGINIA

BRIDGEWATER ENGINEERING

09/26/2022

TOWN OF BRIDGEWATER
201 GREEN STREET
POST OFFICE BOX 72
VIRGINIA 22812
WWW.BRIDGEWATER.TOWN



C4.1

DATE	09/09/2022
REVISIONS	09/28/2022
SCALE	1" = 20'

OAKDALE PARK WET POND

SECTIONS PLAN

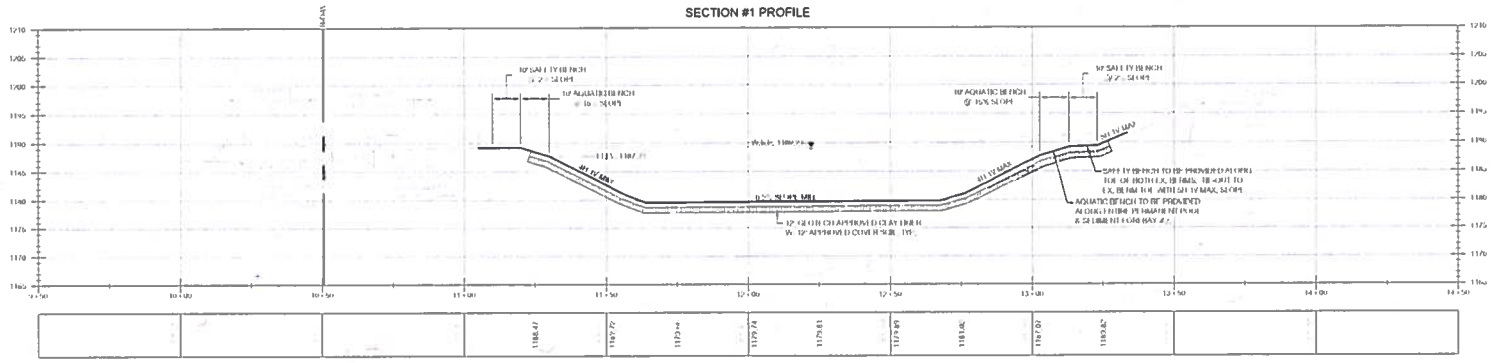
134 MT. CRAWFORD AVENUE
TOWN OF BRIDGEWATER ASHBY DISTRICT, ROCKINGHAM COUNTY, VIRGINIA

BRIDGEWATER ENGINEERING

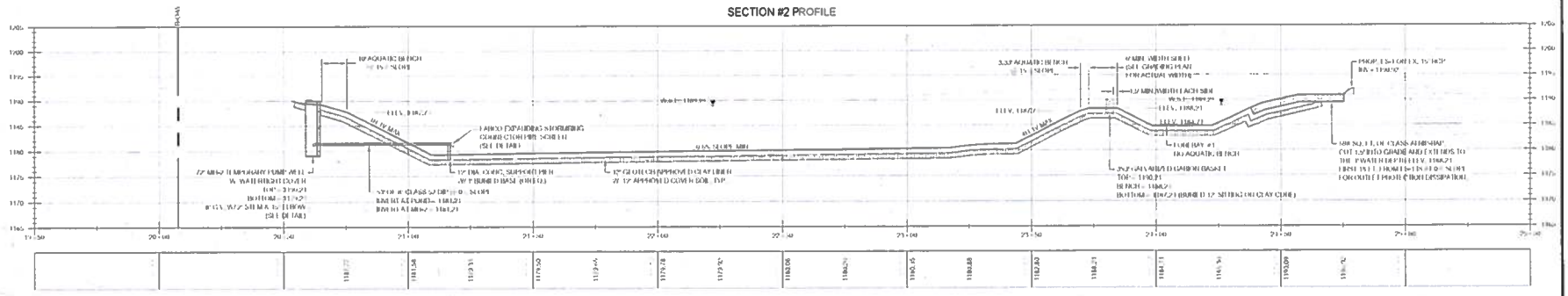
09/28/2022

TOWN OF BRIDGEWATER
201 GREEN STREET
POST OFFICE BOX 237
VIRGINIA 22812
WWW.BRIDGEWATER.TOWN

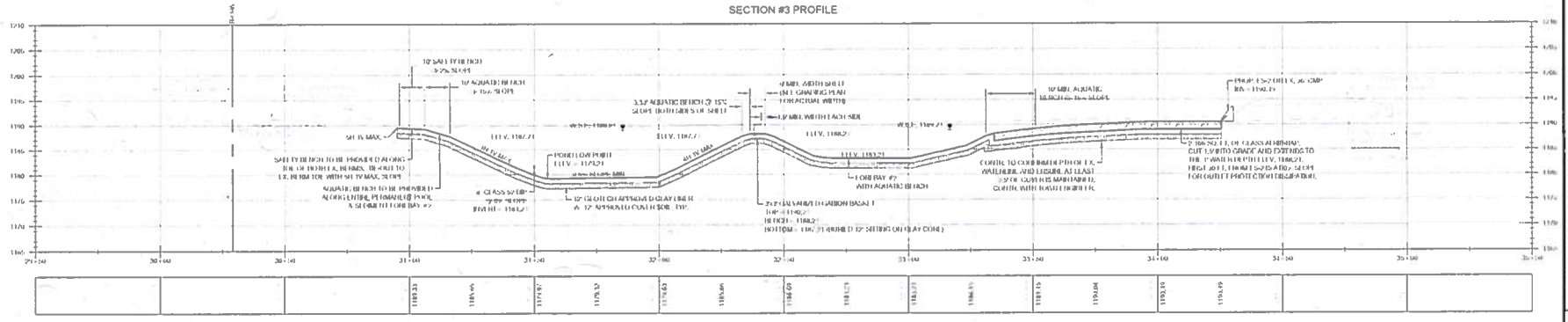
SECTION #1 PROFILE



SECTION #2 PROFILE



SECTION #3 PROFILE



VERTICAL SCALE
1" 10'

HORIZONTAL SCALE
1" 20'

TOWN OF BRIDGEWATER
201 GREEN STREET
POST OFFICE BOX 72
VIRGINIA 22812
WWW.BRIDGEWATER.TOWN

CLAUDE BARTON HUFFMAN
LICENSED PROFESSIONAL ENGINEER
No. 19621
09/28/2022
COMMONWEALTH OF VIRGINIA

OAKDALE PARK WET POND

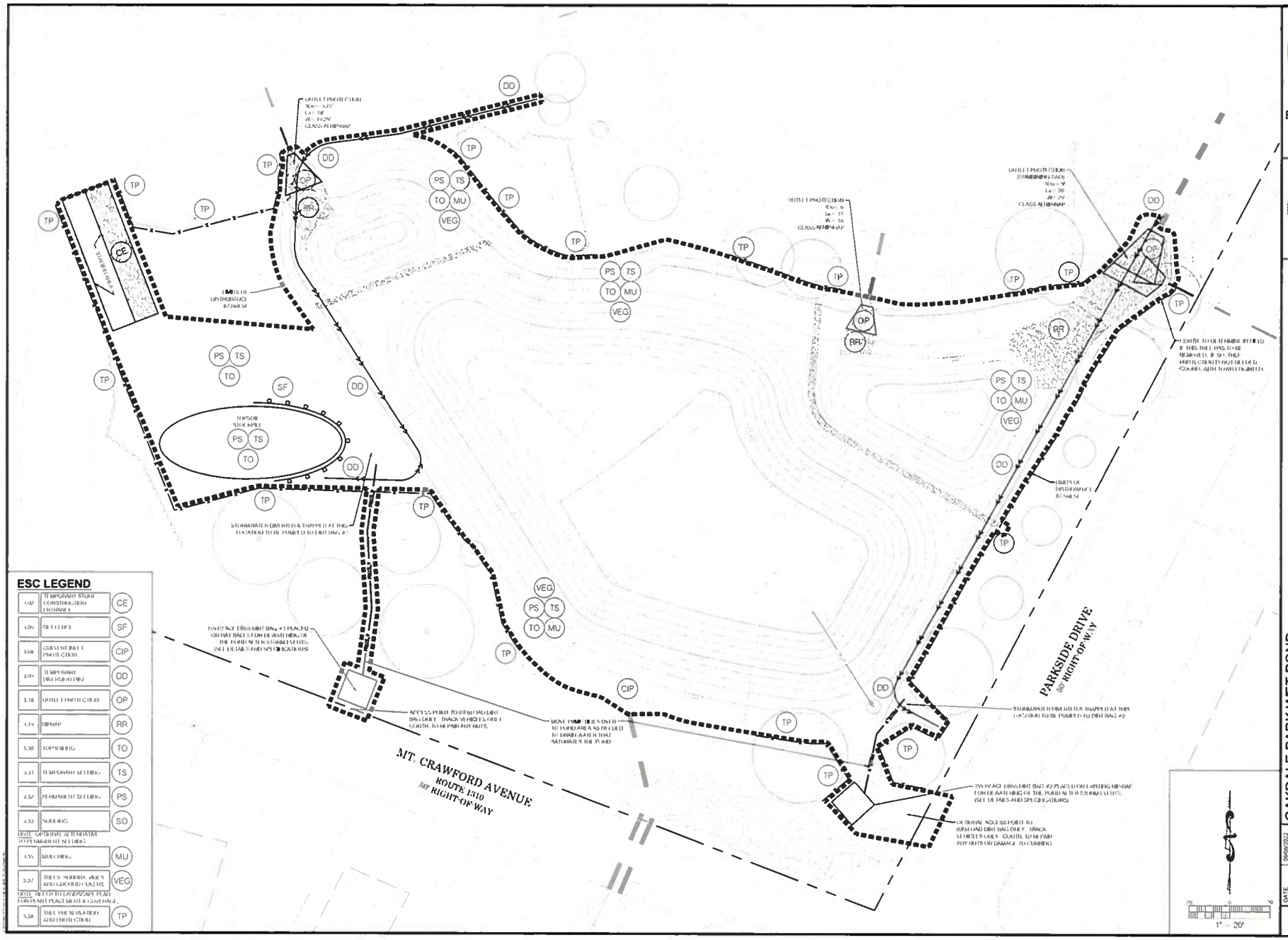
SECTION PROFILES

134 MT. CRAWFORD AVENUE
TOWN OF BRIDGEWATER, ASHBY DISTRICT, ROCKINGHAM COUNTY, VIRGINIA

DATE	REVISIONS	SCALE
09/06/2022		AS SHOWN
09/29/2022		

ENGINEERING

C4.2



TOWN OF BRIDGEWATER
201 GREEN STREET
POST OFFICE BOX 72
VIRGINIA 22812
WWW.BRIDGEWATER.TOWN

09/28/2022

OAKDALE PARK WET POND

EROSION & SEDIMENT CONTROL PLAN

130 MT. CRAWFORD AVENUE
TOWN OF BRIDGEWATER (USER) DISTRICT, ROCKINGHAM COUNTY, VIRGINIA

BRIDGEWATER ENGINEERING

DATE	REVISIONS	SCALE
09/06/2022		1" = 20'
09/28/2022		

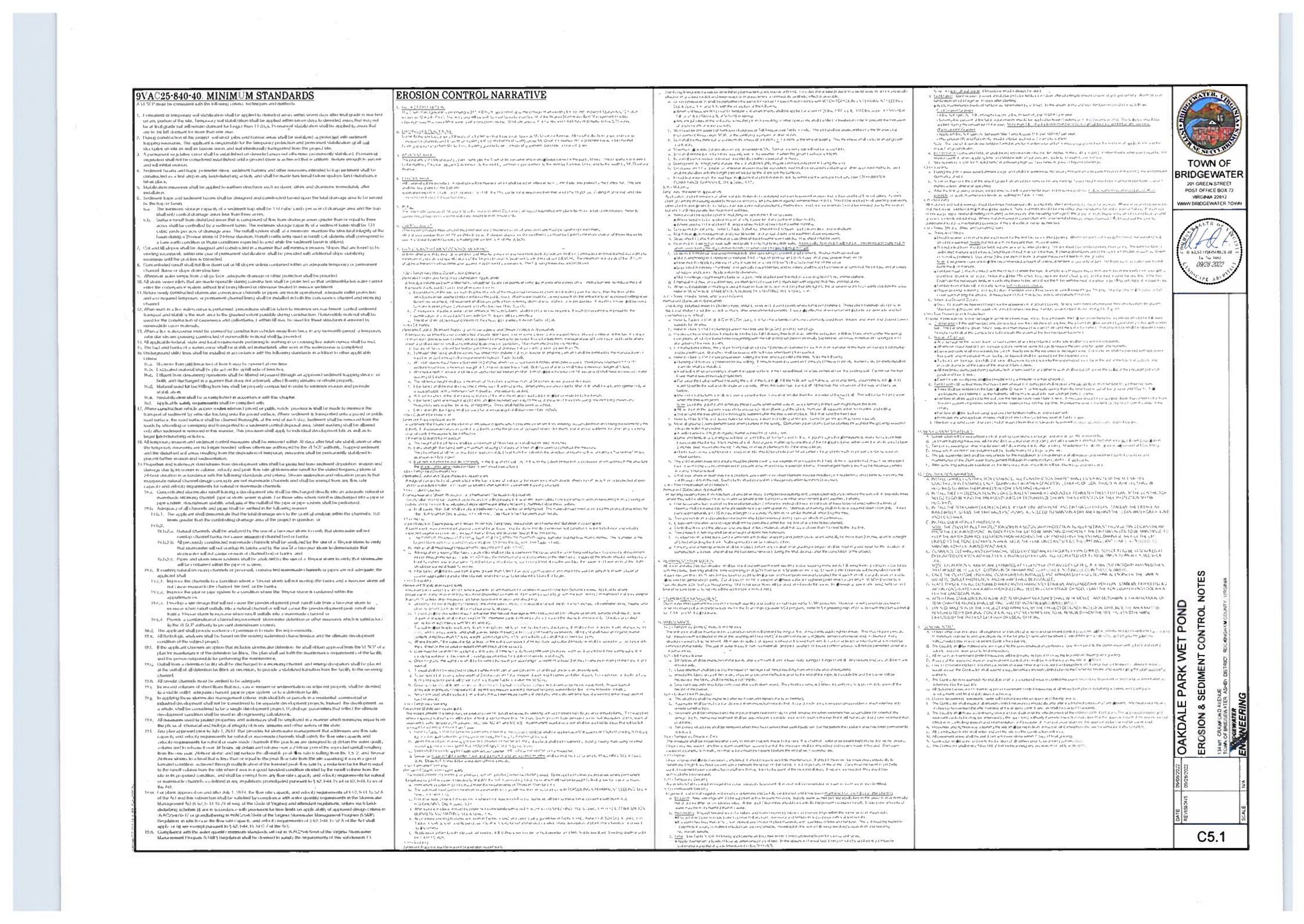
C5.0

9VAC25-840-40. MINIMUM STANDARDS

A VESCP shall be consistent with the following criteria, techniques and methods:

1. Unvegetated or temporary soil stabilization shall be applied to denuded areas within seven days after final grade or final contours are reached on any portion of the site. Temporary soil stabilization shall be applied within seven days to denuded areas that may not be at final grade but will remain dormant for longer than 14 days. Permanent stabilization shall be applied to areas that are to be left dormant for more than one year.
2. During construction of the project, soil and water shall be managed effectively to prevent off-site sediment trapping measures. The applicant is responsible for the temporary protection and permanent stabilization of all soil disturbing activities on site as well as borrow areas and soil stockpiles designated from the project site.
3. A permanent vegetative cover shall be established on denuded areas not otherwise permanently stabilized. Permanent vegetation shall not be considered established until a ground cover is achieved that is uniform, mature enough to survive and will inhibit erosion.
4. Sediment basins and sediment traps, perimeter dikes, sediment barriers and other measures intended to trap sediment shall be constructed as a first step in any land-disturbing activity, and shall be made functional before upslope land disturbance takes place.
5. Stabilization measures shall be applied to earthen structures such as dams, dikes and diversions immediately after installation.
6. Sediment traps and sediment basins shall be designed and constructed based upon the total drainage area to be served by the trap or basin.
   a. The minimum storage capacity of a sediment trap shall be 134 cubic yards per acre of drainage area until the trap has been fully stabilized. The maximum drainage area of a sediment basin shall be 130 cubic yards per acre of drainage area. The outfall system shall, at a minimum, maintain the structural integrity of the basin during a 25-year storm of 24-hour duration. Runoff coefficients used in runoff calculations shall correspond to a fully developed urban area at the end of the development (land disturbance) unless otherwise approved by the VESCP.
7. Cut and fill slopes shall be designed and constructed in a manner that will minimize erosion. Slopes that are found to be eroding excessively within one year of permanent stabilization shall be provided with additional slope stabilizing measures until the problem is corrected.
8. Concentrated runoff shall not flow down cut or fill slopes unless contained within an adequate temporary or permanent channel, flume or slope drain structure.
9. Whenever water seeps from a slope face, adequate drainage or other protection shall be provided.
10. All storm sewer inlets that are made operable during construction shall be protected so that sediment-laden water cannot enter the inlet system without first being filtered or otherwise treated to remove sediment.
11. Before newly constructed storm sewer inlets receive any drainage, they shall be protected to prevent sediment from entering the storm sewer system until all sources of potential sediment-producing areas that drain into the inlets have been permanently stabilized.
12. After work in a dam, crossing, or near a stream, creek, or wetland area is completed, the project engineer shall certify to the VESCP that the work was done in accordance with the approved plan and any modifications. Such certification shall be submitted to the VESCP before the project will be released. The certification shall include, but not be limited to, the following:
   a. Dimensions and elevations of the completed structure;
   b. Volume of material excavated and placed;
   c. Description of the construction sequence;
   d. Any significant changes made during construction; and
   e. Drawings showing any significant changes made during construction.
13. Where construction vehicle access routes intersect paved or public roads, provisions shall be made to minimize the transport of sediment by vehicles tracking onto the paved surface. Where sediment is transported onto a paved or public road surface, the road surface shall be cleaned thoroughly at the end of each day. Sediment shall be removed from the road by shoveling or sweeping and transported to a sediment control disposal area. Street washing shall be allowed only after sediment is removed in this manner. This provision shall apply to individual development lots as well as to larger land-disturbing activities.
14. All temporary erosion and sediment control measures shall be removed within 30 days after final site stabilization or after the temporary measures are no longer needed, unless otherwise authorized by the VESCP authority. Trapped sediment and the disturbed soil areas resulting from the disposition of temporary measures shall be permanently stabilized to prevent further erosion and sedimentation.
15. Properties and waterways downstream from development sites shall be protected from sediment deposition, erosion and damage due to increases in volume, velocity and peak flow rate of stormwater runoff for the stated frequency storms of 24-hour duration in accordance with the following standards and criteria. Unless manifestation and relocation projects that incorporate natural channel design concepts are not manmade channels and shall be exempt from any flow rate capacity and velocity requirements for natural or manmade channels.
   15.a. Concentrated storm water runoff leaving a development site shall be discharged directly into an adequate natural or manmade receiving channel (pipe or storm sewer system). For those sites where runoff is discharged into a pipe or pipe system, adequacy shall be defined as that runoff which can be conveyed within the pipe system shall be contained.
   15.b. Adequacy of all channels and pipe shall be verified in the following manner:
      15.b.1. The applicant shall demonstrate that the total drainage area to the point of analysis within the channels is 100 times greater than the contributing drainage area of the project in question; or
      15.b.2.
         15.b.2.a. Natural Channels. Shall be analyzed by the use of a two-year storm to verify that storm water will not overtop channel banks for the cause assumption of channel bank full flow.
         15.b.2.b. All pipes and/or constructed stormwater channels shall be analyzed by the use of a 10-year storm to verify that stormwater will not overtop the banks and by the use of a two-year storm to demonstrate that stormwater will not cause erosion of channel bed or banks; and
         15.b.2.c. Pipes and storm sewer systems shall be analyzed by the use of a 10-year storm to verify that stormwater will be contained within the pipe or system.
   15.c. If existing natural receiving channels or perennial, intermittent stormwater channels or pipes are not adequate, the applicant shall:
      15.c.1. Improve the channels to a condition where a 10-year storm will not overtop the banks and a two-year storm will not cause erosion to the banks of the channel; or
      15.c.2. Improve the pipe or pipe system to a condition where the 10-year storm is contained within the appurtenances; or
      15.c.3. Develop a site design that will not cause the peak velocity during the two-year storm to increase the velocity of the two-year storm event runoff. Where a natural channel is not adequate to handle the peak velocity of the two-year storm, the developer shall provide for channel improvements to prevent downstream erosion. Such improvements shall be approved by the VESCP authority before construction begins. Improvements may include, but are not limited to, the following:
         15.c.3.a. Considering the use of multiple use detention facilities to reduce the two-year storm peak velocity to the maximum extent practicable;
         15.c.3.b. Changing the vegetation along the channel to increase its capacity to withstand erosive forces;
         15.c.3.c. Lining the channel with erosion resistant materials such as concrete, asphalt, gabions or other such measures; or
         15.c.3.d. Providing energy dissipators at the outfall of the development to reduce flow velocities to the maximum extent practicable.
   15.d. Any plan approved prior to July 1, 2014, that provides for stormwater management that addresses any flow rate capacity and velocity requirements for natural or manmade channels shall satisfy the flow rate capacity and velocity requirements for natural or manmade channels if the practices are constructed to discharge the entire water quality volume and to address the two-year 24-hour storm event using the two-year, 24-hour storm rainfall amount from the new point of discharge and not exceeding the pre-development runoff rate for the two-year storm as stated in 9VAC25-870-66 of the Virginia Stormwater Management Program (VSMP) Regulations, as amended. Any plan approved prior to July 1, 2014, that provides for the water quality volume and to address the two-year 24-hour storm event using the two-year, 24-hour storm rainfall amount from the new point of discharge and not exceeding the pre-development runoff rate for the two-year storm as stated in 9VAC25-870-66 of the Virginia Stormwater Management Program (VSMP) Regulations, as amended, shall be considered to meet the requirements of this subdivision 15 b and c until the year 2019.
   15.e. For plans approved on and after July 1, 2014, the flow rate capacity and velocity requirements of § 62.1-44.15:52 A of the Act and this subsection shall be satisfied by compliance with water quantity requirements in the Stormwater Management Act (§ 62.1-44.15:24 et seq. of the Code of Virginia) and attendant regulations, unless such land-disturbing activities (i) are in accordance with paragraph four of § 62.1-44.15:34 A of the Act or (ii) are not otherwise exempted under subdivision 19 of § 62.1-44.15:34 A of the Act. However, such land-disturbing activities shall be considered to meet the requirements of this subdivision 15 until the year 2019 if they are designed to prevent increases over the two-year pre-development peak flow rate to safe, adequate channels, as defined by the Virginia Stormwater Management Program (VSMP) Regulations, or to the point of analysis when the land-disturbing activity is in accordance with paragraph four of § 62.1-44.15:34 A of the Act. Such channels shall be designed to handle the two-year post-development peak flow rate resulting from the ultimate development of the entire watershed as if all currently undeveloped lands were developed in accordance with current zoning or comprehensive plan, whichever is more stringent, and shall be stabilized for the two-year storm. Plans approved pursuant to this subdivision 15 e shall apply stormwater runoff control measures that will satisfy the applicable water quantity criteria set forth in regulations adopted pursuant to § 62.1-44.15:34 A of the Act.
   15.f. Compliance with the water quantity minimum standards set out in 9VAC25-870-66 of the Virginia Stormwater Management Program (VSMP) Regulations shall be deemed to satisfy the requirements of this subdivision 15.
   15.g. Any land-disturbing activity that provides for stormwater management that addresses any flow rate capacity and velocity requirements for natural or manmade channels shall satisfy the flow rate capacity and velocity requirements for natural or manmade channels if the practices are constructed to discharge the entire water quality volume and to address the two-year 24-hour storm event using the two-year, 24-hour storm rainfall amount from the new point of discharge and not exceeding the pre-development runoff rate for the two-year storm as stated in 9VAC25-870-66 of the Virginia Stormwater Management Program (VSMP) Regulations, as amended. Any land-disturbing activity that provides for stormwater management that addresses any flow rate capacity and velocity requirements for natural or manmade channels shall satisfy the flow rate capacity and velocity requirements for natural or manmade channels if the practices are constructed to discharge the entire water quality volume and to address the two-year 24-hour storm event using the two-year, 24-hour storm rainfall amount from the new point of discharge and not exceeding the pre-development runoff rate for the two-year storm as stated in 9VAC25-870-66 of the Virginia Stormwater Management Program (VSMP) Regulations, as amended, shall be considered to meet the requirements of this subdivision 15 b and c until the year 2019.
   15.h. For plans approved on and after July 1, 2014, the flow rate capacity and velocity requirements of § 62.1-44.15:52 A of the Act and this subsection shall be satisfied by compliance with water quantity requirements in the Stormwater Management Act (§ 62.1-44.15:24 et seq. of the Code of Virginia) and attendant regulations, unless such land-disturbing activities (i) are in accordance with paragraph four of § 62.1-44.15:34 A of the Act or (ii) are not otherwise exempted under subdivision 19 of § 62.1-44.15:34 A of the Act. However, such land-disturbing activities shall be considered to meet the requirements of this subdivision 15 until the year 2019 if they are designed to prevent increases over the two-year pre-development peak flow rate to safe, adequate channels, as defined by the Virginia Stormwater Management Program (VSMP) Regulations, or to the point of analysis when the land-disturbing activity is in accordance with paragraph four of § 62.1-44.15:34 A of the Act. Such channels shall be designed to handle the two-year post-development peak flow rate resulting from the ultimate development of the entire watershed as if all currently undeveloped lands were developed in accordance with current zoning or comprehensive plan, whichever is more stringent, and shall be stabilized for the two-year storm. Plans approved pursuant to this subdivision 15 e shall apply stormwater runoff control measures that will satisfy the applicable water quantity criteria set forth in regulations adopted pursuant to § 62.1-44.15:34 A of the Act.
   15.i. Compliance with the water quantity minimum standards set out in 9VAC25-870-66 of the Virginia Stormwater Management Program (VSMP) Regulations shall be deemed to satisfy the requirements of this subdivision 15.

EROSION CONTROL NARRATIVE



TOWN OF BRIDGEWATER
201 GREEN STREET
POST OFFICE BOX 72
VIRGINIA 22812
WWW.BRIDGEWATER.TOWN

09/28/2022

OAKDALE PARK WET POND

EROSION & SEDIMENT CONTROL NOTES

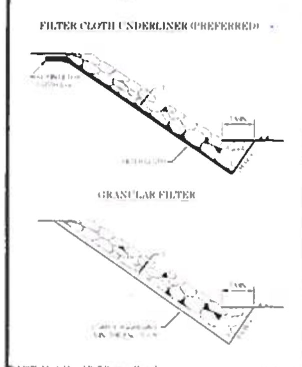
1 MAP: CRAIGHEAD AVENUE
TOWN OF BRIDGEWATER, AUGUSTA DISTRICT, ROCKINGHAM COUNTY, VIRGINIA

BRIDGEWATER ENGINEERING

DATE	09/06/2022
REVISIONS	09/28/2022
SCALE	N/A

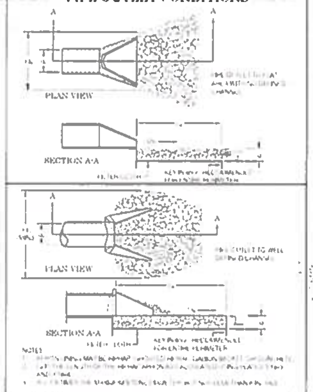
C5.1

TOE REQUIREMENTS FOR BANK STABILIZATION



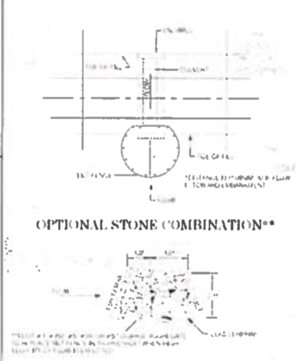
SOURCE: Adapted from VDOT Drainage Manual — PLATE 3.19-1

PIPE OUTLET CONDITIONS



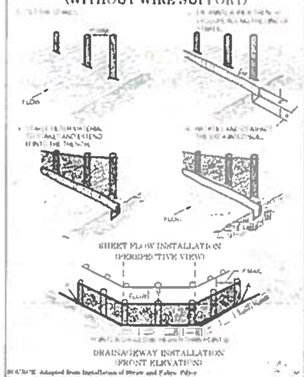
Source: Va. DSWC

SILT FENCE CULVERT INLET PROTECTION



SOURCE: ADAPTED from VDOT Standard Sheets and Va. DSWC

CONSTRUCTION OF A SILT FENCE (WITHOUT WIRE SUPPORT)



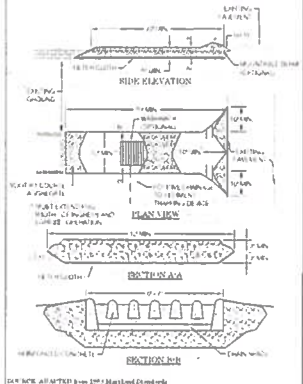
SOURCE: Adapted from Installation of Straw and Fabric Filter Barriers for Sediment Control, Va. DSWC

TABLE 3.02-A CONSTRUCTION SPECIFICATIONS FOR FILTER CLOTH UNDERLINER

Fabric Properties	Light-Duty Entrance (Graded Subgrade)	Heavy-Duty Entrance (Rough Graded)	Test Method
[illegible]	[illegible]	[illegible]	[illegible]

Source: Virginia Highway and Transportation Research Council (VHTRC)

STONE CONSTRUCTION ENTRANCE



SOURCE: ADAPTED from 1983 Maryland Standards for Soil Erosion and Sediment Control and Va. DSWC

TABLE 3.19-C GRADED RIPRAP - WEIGHT ANALYSIS

Riprap Class Type	Weight Range (lbs.)	Requirements for Stone Mixture
[illegible]	[illegible]	[illegible]

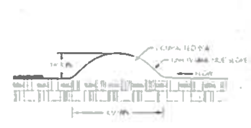
Source: Adapted from VDOT Road and Bridge Specifications

TABLE 3.19-B GRADED RIPRAP - DESIGN VALUES

Riprap Class	D_{50} Weight (lbs.)	Mean D_{50} Spherical Diameter (ft.)	Mean D_{max} Spherical Diameter (ft.)
[illegible]	[illegible]	[illegible]	[illegible]

Source: VDOT Drainage Manual

TEMPORARY DIVERSION DIKE



SOURCE: VA. DSWC

TABLE 3.05-B PHYSICAL PROPERTIES OF FILTER FABRIC IN SILT FENCE

Physical Property	Test	Requirements
[illegible]	[illegible]	[illegible]

TABLE 3.31-A LIMING REQUIREMENTS FOR TEMPORARY SITES

pH TEST	RECOMMENDED APPLICATION OF AGRICULTURAL LIMESTONE
[illegible]	[illegible]

TABLE 3.19-D REQUIREMENTS FOR FILTER FABRIC USED WITH RIPRAP

Physical Property	Test Method	Requirements
[illegible]	[illegible]	[illegible]

Source: VDOT Road and Bridge Specifications

TABLE 3.33-B MAINTENANCE FERTILIZATION OF ESTABLISHED SOD

[illegible]

Source: Va. DSWC

TABLE 3.32-F LBS. OF GROUND AGRICULTURAL LIMESTONE* PER THOUSAND SQUARE FEET NEEDED TO CORRECT pH LEVEL OF ACID SOILS TO 6.5

EXISTING pH	SOIL TEXTURE: Sandy Loam	Loam	Clay Loam
[illegible]	[illegible]	[illegible]	[illegible]

TABLE 3.31-B ACCEPTABLE TEMPORARY SEEDING PLANT MATERIALS "QUICK REFERENCE FOR ALL REGIONS"

[illegible]

TABLE 3.35-A ORGANIC MULCH MATERIALS AND APPLICATION RATES

MULCHES	RATES: Per Acre	RATES: Per 1000 sq. ft.	NOTES
[illegible]	[illegible]	[illegible]	[illegible]

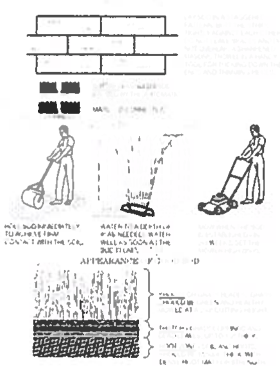
Source: Va. DSWC

TABLE 3.33-A TYPE OF SOD AVAILABLE IN VIRGINIA AND RECOMMENDED USES

[illegible]

Source: 1993 Virginia Turfgrass Variety Recommendations, Virginia Crop Improvement Association

SODDING



SOURCE: VA. DSWC — PLATE 3.33-1

TABLE 3.32-E QUALITY OF SEED*

	Minimum Seed Purity (%)	Minimum Germination (%)
[illegible]	[illegible]	[illegible]

TABLE 3.32-C SITE SPECIFIC SEEDING MIXTURES FOR APPALACHIAN/MOUNTAIN AREA

[illegible]

TOWN OF BRIDGEWATER
201 GREEN STREET
POST OFFICE BOX 72
VIRGINIA 22812
WWW.BRIDGEWATER.TOWN

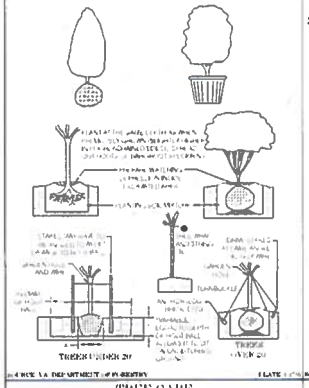
COMMONWEALTH OF VIRGINIA
LANDSCAPE ARCHITECT
09/28/2022

OAKDALE PARK WET POND
EROSION & SEDIMENT CONTROL DETAILS I
134 MT. CRAWFORD AVENUE
TOWN OF BRIDGEWATER, ASHBY DISTRICT, ROCKINGHAM COUNTY
BRIDGEWATER ENGINEERING

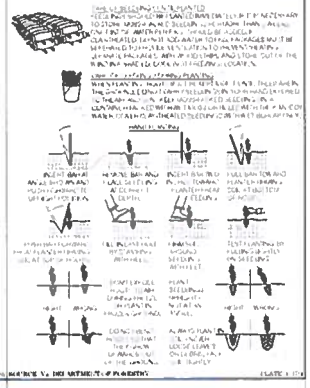
DATE	09/06/2022
REVISIONS	09/28/2022
SCALE	N/A

C5.2

PLANTING BALLED-&-BURLAPPED & CONTAINER-GROWN TREES



PLANTING BARE-ROOTED SEEDLINGS



TREE CARE

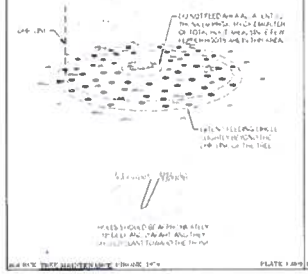


TABLE VIII-A

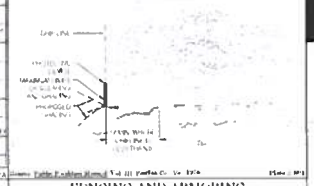
TREE FERTILIZATION FOR PROTECTION DURING CONSTRUCTION ACTIVITY

TREE TYPE	SPECIAL CONDITIONS	APPLICATION RATE & METHOD	FORMULATION

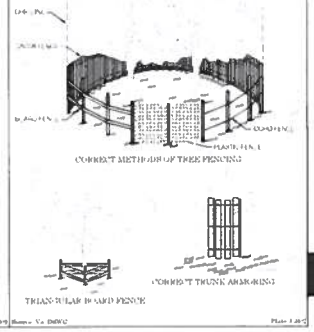
TREE FERTILIZATION

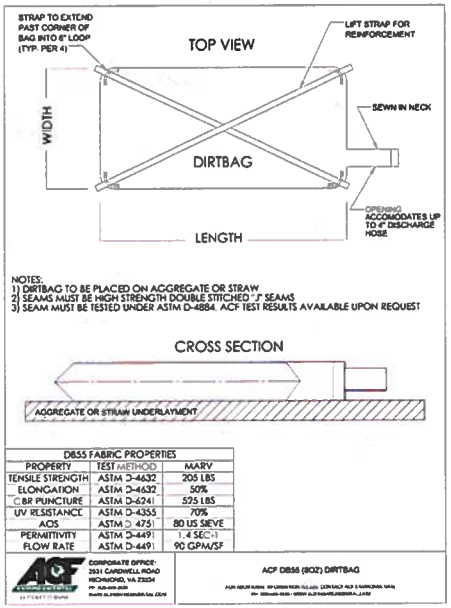


CONSTRUCTION OPERATIONS RELATIVE TO THE LOCATION OF PROTECTED TREES



FENCING AND ARMORING

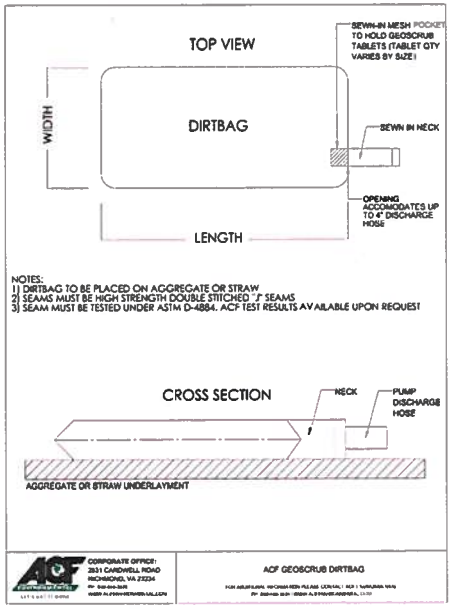




D855 FABRIC PROPERTIES		
PROPERTY	TEST METHOD	MARV
TENSILE STRENGTH	ASTM D-4632	205 LBS
ELONGATION	ASTM D-4632	50%
CBR PUNCTURE	ASTM D-6241	525 LBS
UV RESISTANCE	ASTM D-4355	70%
AOS	ASTM D 4751	80 US SIEVE
PERMITTIVITY	ASTM D-4491	1.4 SEC-1
FLOW RATE	ASTM D-4491	90 GPM/SF

CORPORATE OFFICE:
2831 CAROWELL ROAD
RICHMOND, VA 23224

ACF D855 (BOZ) DIRTBAG



CORPORATE OFFICE:
2831 CAROWELL ROAD
RICHMOND, VA 23224

ACF GEOSCRUB DIRTBAG

LET'S GET IT DONE

DIRTBAG®

SEDIMENT AND PERIMETER CONTROL

DEWATERING BAG

FILTERS SILT, SAND, AND FINES OUT OF PUMPED WATER

Dirtbag dewatering bags remove silt, sand, and other debris from pumped water on construcuon sites, ponds, dredging locations and more.

The bag easily connects to a pump discharge hose using the 4" neck and sewn in attachment straps. To increase the effectiveness of Dirtbag's filtration system, ACF Environmental recommends placing the product on a bed of hay bales or aggregate to maximize water flow through the surface area of the bag. Doing so also helps protect the surrounding area from erosion, sediment displacement and the pollution of receiving waters. Under most circumstances, a 15x15 Dirtbag can pass up to 500 gallons of water per minute.

DIRTBAG





USE GUIDELINES:

- **Dirtbag must be monitored at all times during use (over-filling may cause rupture)**
- Flow and removal rates vary based on particle size/ sediment composition
- To increase flow rate place Dirtbag on aggregate, straw bales, or other porous surfaces
- Dirtbag is full when it can no longer efficiently pass water at a reasonable rate

ADVANTAGES:

- High flow rate
- 15' x 15' Dirtbag is rated up to 500 GPM pump
- Built-in neck receives up to 4" discharge hose
- Removes sediment, trash, and debris
- Economical alternative to other methods
- Custom sizes available upon request

Full product specifications are available on the Dirtbag product page at www.acfenvironmental.com

SPECIFICATIONS

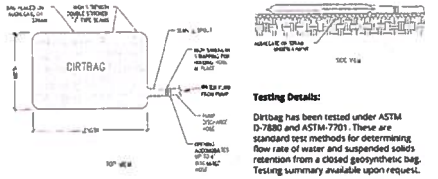
Dirtbag sizes include: 4' x 6' | 5' x 5' | 8' x 10' | 10' x 10' | 15' x 15' | and custom sizes on request

PROPERTY	TEST METHOD	MARV
Weight	ASTM D3776	8 oz/yd
Grab Strength (Tensile)	ASTM D4632	205 lbs
CBR Puncture	ASTM D6241	525 lbs
UV Resistance	ASTM D4355	70%
Apparent Opening Size (AOS)	ASTM D4751	#0 US std. sieve
Flow Rate	ASTM D4491	90 gal/min/ft²
Permeability	ASTM D4491	.4 sec⁻¹

Dirtbag® seam test results (ASTM D4884)

NONWOVEN DIRTBAG	WOVEN DIRTBAG
Maximum load 786 lbs	Maximum load 934 lbs
Maximum strength 1178 lb/ft	Maximum strength 1402 lb/ft

NOTE: Each test result was derived from a material failure rather than a stitch failure.



Testing Details:

Dirtbag has been tested under ASTM D-7880 and ASTM-7701. These are standard test methods for determining flow rate of water and suspended solids retension from a closed geosynthetic bag. Testing summary available upon request.

800.448.3636
acfenvironmental.com

DISCLAIMER: Use of dewatering bags is a standard construction method throughout the U.S. ACF Environmental in not liable for any damage caused by rupture or over-filling of Dirtbag. If Dirtbag fails to fully pass pumped water, turn off pump and contact ACF Environmental at 800-448-3636.

TOWN OF BRIDGEWATER
201 GREEN STREET
POST OFFICE BOX 72
VIRGINIA 22812
WWW.BRIDGEWATER.TOWN

09/28/2022

OAKDALE PARK WET POND

EROSION & SEDIMENT CONTROL DETAILS II

134 MT. CRAWFORD AVENUE
TOWN OF BRIDGEWATER AS-BY DISTRICT ROCKINGHAM COUNTY VIRGINIA

DATE	REVISIONS	BY
09/09/2022		
09/29/2022		

SCALE: N/A

BRIDGEWATER ENGINEERING

C5.3

FOREBAY #1 STAGE STORAGE TABLE

ELEV	AREA (SQ. FT.)	DEPTH (ft)	AVG END INC. VOL. (cu. ft.)	AVG END TOTAL VOL. (cu. ft.)	CONIC INC. VOL. (cu. ft.)	CONIC TOTAL VOL. (cu. ft.)
1,184.21	796.37	0.0	N A	0.00	0.0	0.00
1,185.00	1,196.91	0.79	89.80	89.80	99.44	99.44
1,186.21	1,811.76	1.21	1,824.06	1,729.86	1,743.63	1,743.63
1,186.00	1,726.21	0.79	1,417.06	1,419.87	1,410.13	1,643.51
1,186.21	1,810.76	0.21	1,743.91	1,743.87	1,743.82	1,743.82
1,187.00	2,299.32	0.79	1,611.90	1,584.47	1,621.79	1,621.72
1,187.21	2,412.27	0.21	2,355.91	2,479.40	2,399.81	2,365.35
1,188.00	3,012.84	0.79	1,317.76	1,593.17	1,313.01	2,213.36
1,188.21	3,095.32	0.21	4,106.87	1,710.64	1,106.78	2,319.14
1,189.21	3,879.38	1.00	3,547.76	5,654.62	3,547.79	5,866.93

FOREBAY #2 STAGE STORAGE TABLE

ELEV	AREA (SQ. FT.)	DEPTH (ft)	AVG END INC. VOL. (cu. ft.)	AVG END TOTAL VOL. (cu. ft.)	CONIC INC. VOL. (cu. ft.)	CONIC TOTAL VOL. (cu. ft.)
1,184.21	1,196.37	0.0	N A	0.00	0.0	0.00
1,185.21	2,132.64	1.00	1,653.50	1,653.50	1,582.63	1,582.63
1,186.00	2,773.82	0.79	2,420.31	3,913.84	2,410.69	3,993.33
1,186.21	2,905.68	0.21	2,817.66	5,731.34	2,908.31	5,901.64
1,187.00	3,833.96	0.79	4,788.78	10,520.12	4,768.42	10,670.06
1,187.21	3,929.65	0.21	3,861.86	14,381.97	3,873.13	14,543.18
1,188.00	4,931.56	0.79	4,609.67	18,991.64	4,610.13	19,153.32
1,188.21	5,155.96	0.21	1,108.03	20,099.67	1,115.79	20,269.11
1,189.21	7,196.32	1.00	6,611.14	26,663.81	6,599.66	26,868.77

POND AREA STAGE STORAGE TABLE

ELEV	AREA (SQ. FT.)	DEPTH (ft)	AVG END INC. VOL. (cu. ft.)	AVG END TOTAL VOL. (cu. ft.)	CONIC INC. VOL. (cu. ft.)	CONIC TOTAL VOL. (cu. ft.)
1,174.21	10.11	0.0	N A	0.00	0.0	0.00
1,180.00	10,779.50	5.79	30,251.12	30,251.12	29,777.88	29,777.88
1,181.00	11,604.75	1.00	11,192.13	41,443.25	11,066.50	40,843.38
1,181.21	11,814.02	0.21	2,365.67	43,808.92	2,376.41	43,219.81
1,182.00	12,867.86	0.79	9,961.34	53,770.26	10,047.37	53,267.18
1,182.21	13,109.96	0.21	2,597.81	56,368.07	2,608.16	55,875.33
1,183.00	13,864.12	0.79	10,668.41	67,036.48	10,686.14	66,561.47
1,183.21	14,114.02	0.21	2,745.24	69,781.72	2,745.18	69,306.65
1,184.00	14,967.98	0.79	11,552.76	81,334.48	11,564.74	80,871.39
1,185.00	15,935.44	1.00	15,379.58	96,714.06	15,368.14	96,239.53
1,186.00	16,941.66	1.00	16,410.76	113,124.82	16,399.24	112,638.77
1,187.00	17,939.70	1.00	17,408.29	130,533.11	17,371.33	130,010.10
1,187.21	18,147.76	0.21	3,727.76	134,260.87	3,720.53	133,730.63
1,188.00	19,097.10	0.79	14,611.78	148,872.65	14,611.40	148,342.03
1,188.21	19,153.83	0.21	3,811.66	152,684.31	3,811.40	152,153.43
1,189.21	20,097.83	1.00	19,622.34	172,306.65	19,606.17	171,759.61

VA DCR STORMWATER DESIGN SPECIFICATION NO. 14 — WET POND

Sample Construction Inspection Checklist for Wet Ponds. The following checklist provides a basic outline of the anticipated items for the construction inspection of a wet pond. Inspectors should review the plans carefully, and adjust these items and the timing of inspection verification as needed to ensure the intent of the design and the inspection is met. Finally, users of this information may wish to incorporate these items into a VSMP Authority Construction Checklist format consistent with the format used for erosion and sediment control and BMP construction inspections.

Pre-Construction Meeting

- ☐ Pre-construction meeting with the contractor designated to install the wet pond has been conducted.
- ☐ Identify the tentative schedule for construction and verify the requirements and schedule for interim inspections and sign-off.

Excavation of Wet Pond

- ☐ Excavation of the wet pond geometry (including bottom width, side slopes, check dams, weir or orifice and outlet protection, etc.) achieves the elevations in accordance with approved plans.
- ☐ Excavation of internal micro-topographic features: deep pool, forebays, etc., is in accordance with approved plans.
- ☐ Impermeable liner, when required, meets project specifications and is placed in accordance with manufacturers specifications.
- ☐ **Certification of Excavation Inspection:** Inspector certifies that the excavation has achieved all the appropriate grades, grade transitions, and wet pond geometry as shown on the approved plans.

Landscaping Plan and Stabilization

- ☐ Exposed soils on pond side slopes above permanent pool elevation are stabilized with specified seed mixtures, stabilization matting, mulch, etc., in accordance with approved plans.
- ☐ Appropriate number and spacing of plants are installed and protected on the aquatic bench and pond buffer in accordance with the approved plans
- ☐ All erosion and sediment control practices have been removed.
- ☐ Follow-up inspection and as-built survey certification has been scheduled
- ☐ GPS coordinates have been documented for the wet pond installation.

CONSTRUCTION INSPECTIONS

MULTIPLE INSPECTIONS ARE CRITICAL TO ENSURE THAT STORMWATER PONDS ARE PROPERLY CONSTRUCTED. THE CONSTRUCTION SHALL COORDINATE WITH THE BOARD AND COUNTY FOR INSPECTIONS DURING THE FOLLOWING STAGES OF CONSTRUCTION:

- PRE-CONSTRUCTION MEETING
- BEFORE SETTING ANY RISERS, INSTALLATION OF ANTI-SEEP COLLARS
- EXCAVATION TO SUBGRADE, BOTTOM AND SIDE SLOPES
- AFTER INSTALLATION OF THE OUTLET, ALL PLANTING AND FINAL STABILIZATION
- FINAL INSPECTION TO INCLUDE AS-BUILT AND APPROVAL THAT ALL REQUIREMENTS ARE MET.

VA STORMWATER BMP CLEARINGHOUSE DESIGN SPEC NO. 14
TABLE 14.4 CLAY LINER SPECIFICATIONS

PROPERTY	TEST METHOD	UNIT	SPECIFICATION
PERMEABILITY	ASTM D5084	CM/SEC	1 x 10⁻⁶
PLASTICITY INDEX OF CLAY	ASTM D4318	%	NOT LESS THAN 15
LIQUID LIMIT OF CLAY	ASTM D4318	%	NOT LESS THAN 30
CLAY PARTICLES PASSING	ASTM D422	%	NOT LESS THAN 30
CLAY COMPACTION	ASTM D698	%	95% OF STANDARD PROCTOR DENSITY
SOURCE DOCUMENT			

CLAY LINER NOTES

1. ALTERNATIVE TO BE REQUIRED AND IT SHALL BE A NATURAL CLAY LINER AND MEET THE FOLLOWING SPECIFICATIONS:
   - MEET THE SPECIFICATIONS OUTLINED BY VIRGINIA STORMWATER MANAGEMENT HANDBOOK
   - LINER SHALL BE A MINIMUM OF TWO FEET IN THICKNESS AND BE PLACED IN SIX INCH LIFTS AND COMPACTED TO 95% PROCTOR DENSITY.
   - IMPORTED MATERIAL FROM AN APPROVED CLAY PIT MAY BE REQUIRED.
   - GEOTECHNICAL ENGINEER MUST BE REQUIRED AT TIME OF CONSTRUCTION.
2. IF A GEOTECHNICAL ENGINEER IS NOT REQUIRED AT THE PRE-CONSTRUCTION STAGE, THE CONTRACTOR SHALL BE RESPONSIBLE FOR HAVING A GEOTECHNICAL ENGINEER CERTIFY IN WRITING THAT THE CLAY LINER WAS CONSTRUCTED IN ACCORDANCE WITH THE APPROVED PLANS AND SPECIFICATIONS. THIS CERTIFICATION MUST BE SUBMITTED TO THE TOWN AND COUNTY (VSMP AUTHORITY) PRIOR TO THE FINAL INSPECTION AND APPROVAL OF THE POND.

FIRST YEAR MAINTENANCE OPERATIONS

SINCE ESTABLISHMENT OF AN EFFECTIVE GROUND COVER IS CRITICAL TO THE LONG-TERM PERFORMANCE OF THE POND, THE FOLLOWING MAINTENANCE OPERATIONS SHALL BE PERFORMED DURING THE FIRST YEAR OF OPERATION:

- REGULAR INSPECTIONS SHALL BE MADE DURING AND AFTER CONSTRUCTION OF THE SITE SHOULD BE PERFORMED AT LEAST TWICE AFTER STORM EVENTS THAT EXCEED 1.5 INCHES OF RAINFALL.
- PLANTING OF AQUATIC BENCH – THE AQUATIC BENCH SHOULD BE PLANTED AND ESTABLISHED AS REQUIRED ON THE PLANTING SCHEDULE AND SHALL COMPRISE 50% COVERAGE BY THE END OF THE FIRST GROWING SEASON AND 80% COVERAGE BY THE END OF THE SECOND GROWING SEASON. IF COVERAGE IS NOT ESTABLISHED AS DESCRIBED IN PLANTING PLANS.
- SPOT RESEEDING – RESEEDING SHOULD OCCUR ONCE OR TWICE AS REQUIRED DURING THE FIRST GROWING SEASON.
- WATERING – THE ESTABLISHED POND BUFFER SHALL BE WATERED DURING THE FIRST GROWING SEASON, IF NECESSARY, TO ENSURE HEALTHY GROWTH. WATERING SHALL OCCUR TWICE WEEKLY DURING THE FIRST MONTH AND BIWEEKLY DURING THE REMAINDER OF THE FIRST GROWING SEASON (APPROXIMATELY 10 TREATMENTS PER YEAR).

VA STORMWATER BMP CLEARINGHOUSE DESIGN SPEC NO. 14
TABLE 14.6 TYPICAL WET POND MAINTENANCE TASKS AND FREQUENCY

MAINTENANCE ITEMS[1]	FREQUENCY[1]
REMOVE DEBRIS AND BLOCKAGES	QUARTERLY OR AS IT BECOMES A NUISANCE (+1 PRIOR TO HARVEST)
REPAIR/REPLACE FENCING AS NEEDED	
MOWING MANAGEMENT	TWICE A YEAR
SHORELINE CLEANUP TO REMOVE TRASH, DEBRIS AND FLOATABLES	ANNUALLY
ADJUST WATER LEVEL CONTROL DEVICES AS NEEDED	
OPEN UP THE PUMP-OUT TO ACCESS AND RESET THE VALVES	
REPAIR/REPLACE MECHANICAL COMPONENTS AS NEEDED	
POND BENCH AND AQUATIC BENCH REMEDIATION PLANTINGS	ONE TIME DURING THE SECOND YEAR FOLLOWING CONSTRUCTION
FOREBAY SEDIMENT REMOVAL	EVERY 10 TO 20 YEARS
REPAIR/RESET THE PUMP-OUT AND SPILLWAY AS NEEDED	EVERY 5 TO 25 YEARS

[1] MAINTENANCE ITEMS AND REQUIRED FREQUENCY SHOULD BE VERIFIED WITH LOCAL REQUIREMENTS

fabco — Engineered Stormwater Solutions

EXPANDING STORMRING CONNECTOR PIPE SCREEN

PIPE MOUNTED FULL CAPTURE DEVICE FOR TRASH AND DEBRIS

A Connector Pipe Screen (CPS) is a catch basin insert trash capture filter device. Unlike other catch basin inserts that are typically installed closer to the inlet (under the drain grate or below the curb opening), CPS inserts are installed in front of the catch basin's outlet pipe – trapping trash and debris inside the catch basin while allowing filtered stormwater to exit into the storm drain infrastructure.





The expanding ring goes into the outlet pipe opening, and allows you to torque a bolt until the ring is tightly secured onto the pipe. Then the back plate can be installed onto the expanding ring and the front cover be placed on and secured with two thumb screws. The expanding ring requires no power tools or drilling of existing structures, making maintenance easy.

SPECIFICATIONS:

- Available in 6", 8", 12", 15" and 18" configurations
- Materia
  a) Body: 5052 Aluminum or 304 Stainless Steel
  b) Hardware: 18-8 Stainless Steel
  c) Typical Filter Screen: 5mm holes, 51% Open Area
- Performance Characteristics:
  a) Filtered Flow Rate: Filtered flow rate varies based on size and screen opening size.
  b) Built in overflow with larger screen openings

INSTALLATION:

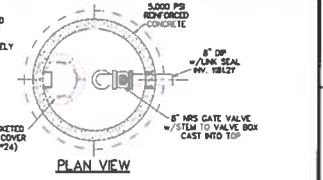
1) Carefully place expanding ring into the pipe opening and align standoffs level to the ground. Torque the bolt at the top onto the ring is secured to the inner walls of the pipe opening.

2) Align the back plate with the standoffs, and secure the plate onto the ring using the provided hex bolts and washers.

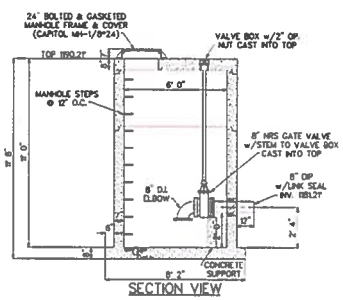
3) The front cover can then be placed by aiming the tabs at the bottom of the cover into slots on the back plate. The provided thumb screws can then be used to secure the front cover of the back plate.

www.fabco-industries.com
(631) 231-1474

NOTES:
1. CLEAR FLOW VAULT SHIPPED IN SECTIONS TO BE ASSEMBLED BY THE SITE CONTRACTOR.
2. HEAVIEST LIFT APPROXIMATELY 20,000 LBS.
3. MANHOLE FRAME & COVER SHIPPED LOOSE FOR ON-SITE INSTALLATION BY THE SITE CONTRACTOR



PLAN VIEW



SECTION VIEW

CLEAR FLOW by CP&P — CONCRETE PIPE & PRECAST, LLC — 210 STONE SPRING ROAD, HARRISONBURG, VA 22801 (540) 434 - 6879

BRIDGEWATER, VIRGINIA

OAKDALE PARK WET POND TEMPORARY PUMP WELL

REF. NO. OAKDALE PARK WET POND

TERRA AQUA GALVANIZED GABION

Scope:

This specification data sheet covers the use of galvanized steel double twisted woven wire mesh gabion baskets filled with stone and used for various applications including but not limited to retaining walls, mechanically stabilized soil retaining structures, stream bank protection, slope paving, outfall structures, weirs, drop structures, etc..

Definition:

a) Gabions are defined as double twisted woven wire mesh box shaped baskets, of various sizes and dimensions.
b) The selvedges of the gabion baskets are the thicker perimeter and edge wires to which the wire mesh is secured as to withstand sudden or gradual stress from any direction.
c) Reinforcing wires are the thicker wires incorporated into the netting during fabrication.
d) The internal diaphragms are the internal wire mesh partitions which divide the gabions into cells.
e) Lacing or tie wire is used to assemble and join the gabion units.
f) Connecting wires are the internal wire used to prevent the gabions from bulging.
g) Alternative wire fasteners are ASTM approved wire fasteners used in lieu of lacing wire.

Fabrication:

Double Twisted Hexagonal steel wire mesh Galvanized Gabions. Gabions shall be fabricated in such a manner that the sides, ends, lid and diaphragms can be assembled at the construction site into rectangular baskets of the sizes specified and shown in the drawings. Gabions shall be of single unit construction: the base, lid, ends, and sides shall be either woven into a single unit or edge of these members connected to the base section of the gabion in such a manner that strength an flexibility at the connecting point does not compromise the engineered structural design of the gabion. Where the length of the gabion exceeds on an one half its horizontal width, the gabion shall be divided by diaphragms of the same mesh and gauge as the body of the gabion, into cells whose length does not exceed the horizontal width. The gabion shall be furnished with the necessary diaphragms secured in proper position or the base in such a manner that no additional tying is required at this juncture.

Mesh Formation:

The double twisted hexagonal wire mesh shall have deformability sufficient to permit minimum of mesh elongation equivalent to 10% of the unstretched length of the mesh test section without reducing the gauge or the tensile strength of the individual wire strands to values less than those for similar wire, one gauge smaller in diameter.

Non-Raveling:

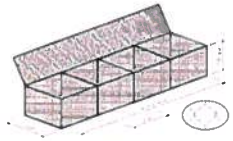
The double twisted hexagonal wire mesh is to be fabricated in such a manner as to be non raveling. This is defined as the ability to resist pulling apart at any of the nodes or connections forming the mesh when a single wire strand in a section of mesh is cut or broken.

Gabion fill:

The stone fill material used for filling the gabion units shall be clean, hard stone with pieces ranging from 4 – 8 inches on the greatest dimensions. Stone filling shall not exceed 24 inch vertical drop above the gabion basket. All effort shall be made to ensure that the stone fill material utilized in the design of the structure match the stone fill used in constructing the gabion structure.

Assembling and placing:

a) Each gabion unit shall be assembled by tying or fastening all connecting seams. The binding wire shall be tightly looped around every other mesh opening along the seams in such a manner that single and double loops are alternated. An alternative wire fasteners may be used in lieu of lacing wire. The alternative wire fasteners shall be applied at approximately 6" – 8" intervals on all vertical and horizontal seams. No less than 3 fasteners per one foot on any given seam.
b) A line of empty gabions, shall be placed into position according to the contract drawings. Binding wire or alternative wire fasteners shall be used to secure each unit to the adjoining one along the vertical reinforced edges and the top selvedges. An approved corner closure tool shall be used to adjoin adjacent gabions to ensure a tight, neat seam and minimize gabion wired or fastened to the latter at front and back. The lid shall be secured with an approved closure tool to insure proper closure without excessive mesh deformation.
c) To achieve optimum alignment and finish for retaining walls, a maximum amount of stretching may be required.
d) Connecting wire shall be inserted during the filling operation as follows: The connecting wires shall be installed according to manufacturers instructions every 1' vertical lift of the gabion unit.



Terra Aqua Gabion Unit Standard Sizes: Custom Jumbo Sizes Available

Gabion unit sz	Capacity Cubic Yards	No. of Internal Cells
6x3x3	2	2
9x3x3	3	3
12x3x3	4	4
6x3x1.5	1	2
9x3x1.5	1.5	3
12x3x1.5	2	4
6x3x1	.666	2
9x3x1	1	3
12x3x1	1.33	4

TOLERANCES: All gabion dimensions shall be within a tolerance limit of plus or minus 5% of the manufacturers stated dimensions.

Minimum Strength requirements of Terra Aqua Double Twisted Mesh Gabions

Test Description	Galvanized*Gallon Gabion	PVC Coated Gabion
Tensile strength of wire mesh parallel to twist	3500 lbs/ft	2900 lbs/ft
Tensile strength of wire mesh perpendicular to twist	1800 lbs/ft	1400 lbs/ft
Connection to selvedges	1400 lbs/ft	1200 lbs/ft
Panel to Panel	1400 lbs/ft	1200 lbs/ft
Punch strength of mesh	6000 lbs/ft	5300 lbs/ft

Material data:

- diameter of mesh wire: 0.120 inches
- diameter of selvedge wire: 0.153 inches
- diameter of lacing wire: 0.091 inches
- coating of wire: finish 5 class 3 .anc coating- ASTM A-641 tested in accordance with ASTM A370-92
- tensile of wire: soft temper in accordance with ASTM A641-92
- weight of zinc coating of wire: shall be determined by ASTM A-90
- wire diameter of 0.120 inches shall have a weight of zinc coating of: 0.85 oz/sf
- wire diameter of 0.153 inches shall have a weight of zinc coating of: 0.90 oz/sf
- wire diameter of 0.091 inches shall have a weight of zinc coating of: 0.60 oz/sf
- grade of zinc coating of wire: high grade or special high grade in accordance with ASTM B-6, Table I
- uniformity of coating: shall be determined by ASTM A-239
- Elongation: not less than 12% in accordance with ASTM A370-92

All of the above wire diameters are subject to a tolerance limit of 0.004 in accordance with ASTM A-641.

All Terra Aqua Gabion material is manufactured according to ASTM A975-97 guidelines for Double Twisted Hexagonal Mesh Gabions.

ASTM A975-97

TERRA AQUA GABIONS, INC.
1415 N. 32ND STREET
PORT SMITH AR 72904
479-785-5344

TOWN OF BRIDGEWATER
201 GREEN STREET
POST OFFICE BOX 72
VIRGINIA 22812
WWW.BRIDGEWATER.TOWN

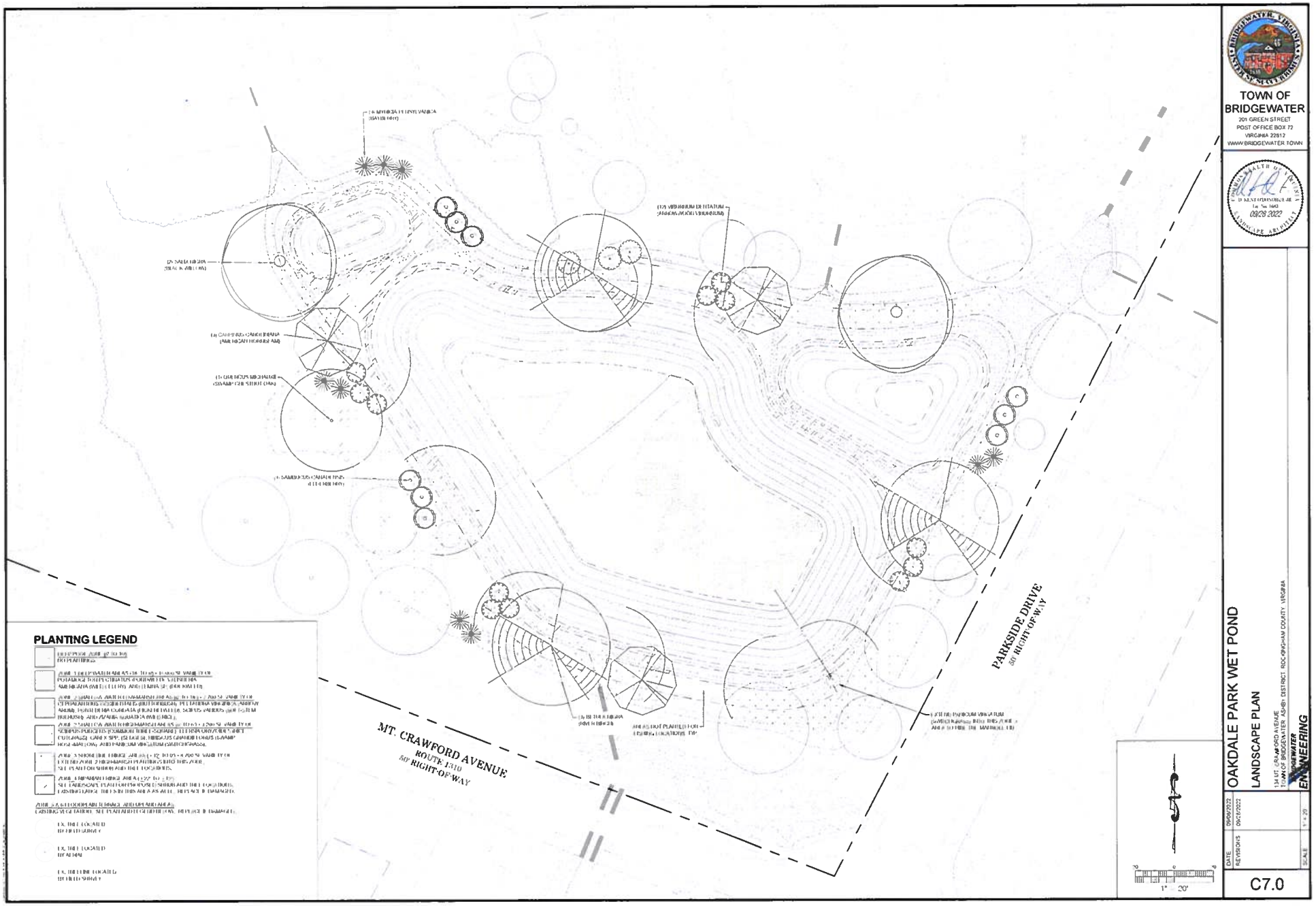
I HAVE MET THE REQUIREMENTS SET FORTH BY THE COMMONWEALTH FOR THE PRACTICE OF LANDSCAPE ARCHITECTURE
Lic No. 1660
09/28/2022

OAKDALE PARK WET POND
STORMWATER MANAGEMENT NOTES & DETAILS
134 MT. CRAWFORD AVENUE
TOWN OF BRIDGEWATER, A DRY DISTRICT ROCKINGHAM COUNTY, VIRGINIA

DATE	REVISIONS	BY
09/06/2022		
09/29/2022		

SCALE: N.T.S.

C6.0



TOWN OF BRIDGEWATER
201 GREEN STREET
POST OFFICE BOX 72
VIRGINIA 22812
WWW.BRIDGEWATER.TOWN

09/28/2022

OAKDALE PARK WET POND

LANDSCAPE PLAN

134 MT. CRAWFORD AVENUE
TOWN OF BRIDGEWATER ASHBY DISTRICT ROCKINGHAM COUNTY VIRGINIA

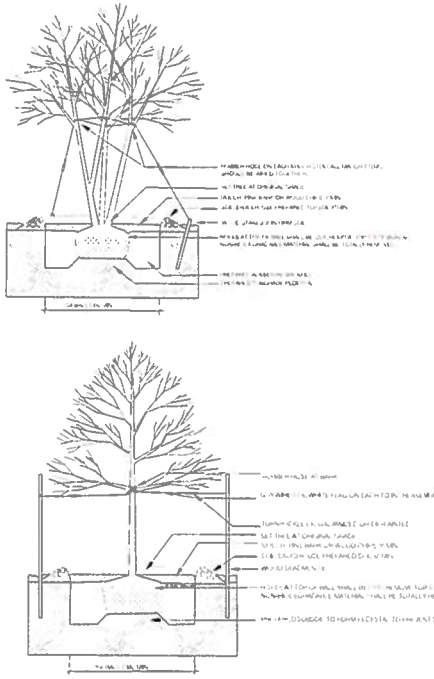
DATE: 09/09/2022
REVISIONS: 09/23/2022
SCALE: 1" = 20'

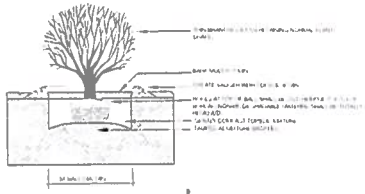
C7.0

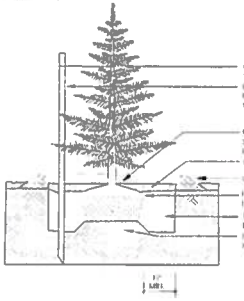
LANDSCAPE SPECIFICATIONS

LANDSCAPING, DETAILS, MATERIALS AND PLANTING SPECIFICATIONS ARE TO BE IN ACCORDANCE WITH THE VIRGINIA STORMWATER MANAGEMENT HANDBOOK, LATEST EDITION, AND THE FOLLOWING SPECIFICATIONS. WHERE THERE ARE CONFLICTS BETWEEN THE VARIOUS SPECIFICATIONS, THE MORE STRINGENT SHALL APPLY. THE SPECIFICATIONS LISTED HEREIN ARE TO BE SUPPLEMENTAL TO THE SPECIFICATIONS REFERENCED ABOVE AND NOT IN LIEU. IF ORDINANCE DOES NOT EXIST TO THE SPECIFICATIONS LISTED ABOVE, THEN COMPLY WITH THE FOLLOWING:

1. THE PLANT MATERIAL SHOULD CONFORM TO THE AMERICAN STANDARDS OF NURSERY STOCK (ANSI Z60.1) AS PUBLISHED BY THE AMERICAN ASSOCIATION OF NURSERYMEN, THE BOTANICAL (SCIENTIFIC) NAME OF THE PLANT SPECIES SHOULD BE IN ACCORDANCE WITH THE LANDSCAPE PLANTS STANDARDIZED LIST.
2. ALL PLANT MATERIAL SPECIFIED TO BE SOLD IN CONTAINERS OR PLANT BANDS SHALL BE GROWN IN SUCH CONTAINERS OR BANDS FOR A SUFFICIENT LENGTH OF TIME TO ESTABLISH A FIRM ROOT SYSTEM AND HABIT TO THE AREA.
3. ALL WORK SHALL BE COORDINATED WITH OTHER TRADES AS NECESSARY.
4. USE EXISTING TOPSOIL AND/OR IMPORT NEW TOPSOIL AS NEEDED TO FREE, FRIABLE, FERTILE, NATURAL LOAM SOIL FREE OF SUBSOIL, STONES OVER 2 INCHES IN DIAMETER, ROOTS, BRANCHES, AND OTHER FOREIGN OBJECTS. TOPSOIL SHALL BE FREE OF PLANTS, PLANT PARTS, OR WEED SEEDS HARMFUL TO PLANT GROWTH.
5. CONTRACTOR SHALL ASCERTAIN LOCATION OF ALL UTILITIES PRIOR TO EXCAVATING.
6. CONTRACTOR SHALL MAINTAIN PLANT MATERIAL DURING INSTALLATION. MAINTENANCE SHALL BECOME RESPONSIBILITY OF TOWN UPON ACCEPTANCE OF WORK.
7. WHERE THE LANDSCAPE WORK IS COMPLETED BY THE TOWN OR IS NOT NATIVE, ALL OTHER AREAS TO BE SEEDED, MAINTAINED TO ENSURE ACCEPTABILITY IN ACCORDANCE WITH THE PLANT MATERIAL SPECIFICATIONS. WORK AND CONTINUE MAINTENANCE UNTIL INSPECTION AND APPROVAL.
8. GUARANTEE ALL MATERIALS AND LABOR FOR TWO (2) CALENDAR MONTHS AFTER ACCEPTANCE.
   8.1. MAY REPLACE UNITS OF ALL DEAD PLANTS IN SPRING OF FOLLOWING YEAR, OR AT TIME OF FINAL PLANTING.
   8.2. ADD ANY ITEMS LISTED ON THE LANDSCAPING FOR THE SAME SIZE AND KIND AS THOSE ORIGINALLY PLANTED, UNLESS DIRECTED OTHERWISE.
9. WITHIN 10 DAYS AFTER ACCEPTANCE, THE CONTRACTOR SHALL DELIVER NOTICE IN WRITING TO THE PROPER OWNER(S) OF THE PLANTING FOR THE TOWN.
10. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY DURING THE GUARANTEE PERIOD TO PROVIDE WRITTEN NOTICE TO THE TOWN OF ANY MAINTENANCE PRACTICE AND/OR OPERATION ABLE AFFECT THE GUARANTEE NOT BEING MET PROPERLY.
11. DO NOT MAKE SUBSTITUTIONS. IF MATERIALS SHOWN OR PLANTS, CONTRACTOR IS REQUIRED TO PROVIDE WRITTEN REQUEST LIST OF MATERIALS, SIZES AND NUMBERS TO BE SUBSTITUTED OR DELETED FROM MARKET AND OBTAIN APPROVAL.
12. THE LANDSCAPE ARCHITECT RESERVES THE RIGHT TO ACCEPT OR REJECT ANY MATERIAL THAT, IN THE LANDSCAPE ARCHITECT'S OPINION, IS UNSUITABLE SHALL BE REMOVED PROMPTLY FROM THE SITE.
13. BALLED AND BURLAPPED PLANTS SHALL BE DUG WITH FIRM NATURAL BALLS OF EARTH THAT SHALL BE RETAINED WITH ALL SPECIMENS. ALL CONTAINER GROWN STOCK SHALL BE WELL ROOTED SUFFICIENTLY TO HOLD ITS SHAPE AND REMOVED FROM CONTAINER WITHOUT DISTURBING ROOT BALL. ALL STOCK PLANTED IN CONTAINERS SHALL HAVE A ROOT SYSTEM DEVELOPED SUFFICIENTLY TO THE POINTS SHALL WHERE THE MASS WILL HOLD THE CONTAINER.
14. ALL PLANT MATERIAL SHALL BE TRUE TO GROWN LINE AS TO THE BASE OF STEM. DAMAGED BARK SHALL BE REMOVED BEFORE PLANTING OR DURING THE PLANTING OPERATION.
15. ALL PLANT MATERIAL SHALL BE COVERED AND PROTECTED FROM EXCESSIVE DRYING DURING TRANSIT.
16. ANTI-DESICCANTS SHALL BE APPLIED ON ALL MATERIAL DAMAGED DURING DELIVERY.
17. MULCH MATERIAL SHALL BE EITHER SHREDDED HARDWOOD BARK OR OTHER APPROVED EQUAL MATERIAL SHALL BE MULCHING CHIPS, UNLESS OTHERWISE SPECIFIED OR APPROVED.
18. TOPSOIL MIXTURE SHALL BE 3 PARTS SOIL, 1 PART PEAT MOSS AND 1 PART SPAGNUM PEAT MOSS OR PEATHUMUS, EXCEPT SOIL SHALL BE FREE OF STONES, CLUMPS, ROOTS AND OTHER DEBRIS OVER 1" DIAMETER. SOIL SHALL NOT CONTAIN TOXIC SUBSTANCES HARMFUL TO PLANT GROWTH. TOPSOIL SHALL HAVE A PH RANGE OF 6.0 TO 7.0.
19. PLANTING HOLE SIZE FOR TREES AND SHRUBS:
   19.1. PLANTING SHALL occur IN ACCORDANCE WITH AHT DETAILS.
   19.2. THE TREE AND SHRUBS SHALL BE PLACED IN THE PLANTING PIT SO THAT FROM THE BALL OR WIRE BASKET THE BASE OF THE TRUNK FLARE IS FROM 1" TO 2" ABOVE THE FINISHED GRADE. ALL PLANT MATERIAL SHALL BE PLACED IN A STRAIGHT POSITION WITH THE PLANTING PIT. WITH THE MOST FAVORABLE SIDE PLACED TOWARDS THE PRIMARY VIEW (SIDEWALK, STREET, ETC.).
   19.3. THE PIT SHALL BE BACKFILLED WITH A SOIL MIXTURE AS SPECIFIED ABOVE. THE PIT SHALL BE FILLED HALF WAY WITH WATER AND TAMPED FIRMLY. ALL BOLTS, WIRES, ETC. ON THE ROOTBALL SHALL BE CUT AND THE BURLAP OR BALL WRAP PULLED BACK TO THE TOP OF THE ROOTBALL. CAREFULLY BACKFILLING PLANT PIT AND TAMP FIRMLY. BACKFILL SOIL SHALL BE COMPOSED OF ROOTBALL MULCH MIXTURE AND SHOULD BE MIXED IN THE PROPORTION OF 3 PARTS SOIL TO 1 PART MULCH. WATER THOROUGHLY TO FILL THE PLANTING PIT.
20. THE ROOTBALL AND SAFETY BRACES SHOULD BE PLACED DURING THE SAME OPERATION. VEGETATION TO BE PLANTED AS SOON AS POSSIBLE AFTER PLANTING IS COMPLETED.
21. WOODY VEGETATION MAY NOT BE PLANTED OR ALLOWED TO GROW WITHIN 15 FEET OF THE TOP OF THE EMBANKMENT MEASURED HORIZONTALLY FROM THE CENTERLINE OF THE PRINCIPAL SPILLWAY STRUCTURE.
22. ALL DEAD TREES OR TREE LIMBS THAT DO NOT CONSTITUTE A HAZARD OR NUISANCE SHALL BE REMOVED, BUT LIMBS AT LEAST 2½ FEET (30 INCHES) FROM THE MAXIMUM WATER SURFACE ELEVATION SHALL BE LEFT ON THE TREE.
23. THE SOIL IN THE FOUNDATION TRENCH AREA OF THE RESERVOIR SHALL BE PROPERLY COMPACTED UNDER THE SUPERVISION OF A QUALIFIED SOILS ENGINEER. AS A PART OF THESE PLANTING DETAILS, SHOULD THE TRENCH BE DEEPER AND WIDER THAN THE DIMENSIONS OF THE HOLE(S) FOR BALL AND BURLAP STOCK, AND/OR THE DEPTH AND WIDTH NOT OF SUFFICIENT DIAMETER FOR CONTAINER STOCK.
24. EXTRA MULCHING AROUND THE BASE OF TREES AND SHRUBS IS SUGGESTED TO CONSERVE MOISTURE AS A MEANS OF CONSERVING MOISTURE AND SUPPLY SOME NUTRIENTS.
25. HYDROSEED SLOPES AND SEED DISTURBED AREAS THAT ARE NOT OTHERWISE LANDSCAPED.







TOWN OF BRIDGEWATER
201 GREEN STREET
POST OFFICE BOX 72
VIRGINIA 22812
WWW.BRIDGEWATER.TOWN

COMMONWEALTH OF VIRGINIA
CLEMENT DOMINGUEZ JR
No. 1661
09/29/2022
LANDSCAPE ARCHITECT

OAKDALE PARK WET POND

LANDSCAPE NOTES & DETAILS

134 MT. CRAMFORD AVENUE
TOWN OF BRIDGEWATER ASHBY DISTRICT ROCKINGHAM COUNTY VIRGINIA

BRIDGEWATER ENGINEERING

DATE	09/29/2022
REVISIONS	09/29/2022
SCALE	N.T.S.

C7.1

Harrisonburg Office
1356 N. Main Street
Harrisonburg, VA 22802
Phone: 540-434-0400
Fax: 540-434-0447

Viola Engineering, PC

Winchester Office
202 Imboden Drive, Suite A
Winchester, VA 22603
Phone: 540-313-4270
Fax: 540-434-0447

November 1, 2022

Mr. Kent O'Donohue, PLA
Town of Bridgewater
P.O. Box 72
Bridgewater, VA 22812

RE: Report of Geotechnical Investigation
Oakdale Park - Wet Pond
134 Mount Crawford Avenue, Bridgewater, VA 22812
VEPC Project No.: PTL-223005

Mr. O'Donohue:

We have completed the report containing the results of our geotechnical investigation performed for the proposed wet pond located at Oakdale Park on Mount Crawford Avenue in Bridgewater, Virginia (Rockingham County). The scope of services listed herein were developed according to information provided by your office and standard geotechnical engineering practices as they relate to the proposed construction in this geological setting.

PROJECT INFORMATION AND SITE EXPLORATION

We understand construction of a wet pond with a clay liner encompassing an area of 54,940 square feet is planned. The pond will have a nominal maximum pool depth of 10 feet and will be located at the corner of Mt. Crawford Avenue and Parkside Drive. The majority of the pond will be situated in cut requiring little fill to develop plan grades.

The soil borings were performed in accordance with generally accepted geotechnical engineering practice using an ATV-mounted CME 55 rotary drill rig equipped with an automatic hammer. A total of nine (9) auger probes were conducted to refusal depth. Standard penetration testing was not conducted due to auger grinding and shallow refusal across the work area. Planned borings were terminated upon encountering auger refusal, and auger cuttings were retrieved for laboratory testing to determine soil engineering properties. A summary table of drilling depths are included on the Test Boring Location Plan. Additional test pit excavation is planned to be conducted by personnel from the Town of Bridgewater utilizing a rubber-track backhoe. A report revision will be issued upon observation of subsurface conditions.

LOCAL GEOLOGY AND PUBLISHED SOIL DATA

The site is located in the Valley and Ridge Provence of the Appalachian Highlands physiographic region. According to the **USGS State Geologic Map Compilation (SGMC, 2017)**, the site is underlain by the Martinsburg and Oranda Formations (Om) geologic unit. This formation dates from the Ordovician period and is primarily comprised of sedimentary shale with minor inclusion of sandstone. According to the **USDA Soil Survey of Rockingham County**, the overburden consists of Buchanan silt loam and Monongahela fine sandy loam, 0 to 7 percent slopes (Units: 7A & 47B). The major constituent of these units is sandy clay (CL) with varying percentages of gravel and cobbles. The liquid limit and plasticity index of this unit rarely surpass 45 and 20, respectively. Site soils are identified as Hydrologic Soil Group C according to published data.

EXHIBIT 2

Soil cuttings observed indicate the presence of residual soils consisting of sandy lean clay with varying percentages of sand and gravel. Sand and gravel content was observed to generally increase with depth correlating to slower drill advancement. Auger grinding was generally observed throughout. Further, Atterberg limit testing conducted on auger cuttings indicate low plasticity (CL) fines with a liquid limit and plasticity index of 34 and 17 percent, respectively. See the attached documents in the appendix for further information. Groundwater was not encountered at the time of our field exploration.

STORMWATER MANAGEMENT FACILITIES

We recommend that new stormwater management facilities and pond liners be constructed according to the latest revisions of the Virginia Stormwater Management Practices (VA DEQ). Further, wet pond liners shall be constructed with soils exhibiting the qualities shown in Table 2.0 below. Auger refusal was encountered in every test hole at depths ranging from 0.5 to 6.0 feet below existing grade. We understand that maximum cuts of approximately 12 feet will be required to develop the planned SWM pond. It is our opinion that blasting or extensive hoe-ramming will be required to effectively achieve site grading. Test pit excavations are planned to be conducted to confirmed site soils transition to clastic shale and/or sandstone bedrock. Further, clastic formations are largely not solution prone and is generally not susceptible to karst feature formation. ***If blasting is conducted, all loose heaved rock shall be removed prior to placement of structural fill. We recommend that the prepared rock surface be inspected by a representative from our office, prior to liner construction, to ensure significant subsurface anomalies do not exist.***

Published soil survey data indicates site soils classify as USDA Hydrologic Soil Group C. Insufficient soil sampling was conducted due to auger griding and shallow refusal. As such, permeability testing of onsite soils was not conducted. It is believed that residual site soils marginally meet required pond liner specifications. Further, blasting will require sufficient soil cover to effective rock removal. Site soils will likely become contamination with sand and gravel during excavation. As such, it is recommended that an approved offsite borrow, consisting of fat clay, be sourced for liner construction. We do not believe fortification with bentonite will be an economical alternative. It is recommended soil used for liner construction be tested for hydraulic conductivity (permeability) as stipulated below prior to placement.

Table 1.0 Virginia DEQ Required Wet Pond Clay Liner Specifications

Property	Test Method	Unit	Specification
Permeability	ASTM D-2434	Cm/sec	1×10^{-6}
Plasticity Index of Clay	ASTM D-423/424	%	Not less than 15
Liquid Limit of Clay	ASTM D-2216	%	Not less than 30
Clay Particles Passing	ASTM D-422	%	Not less than 30
Clay Compaction	ASTM D-2216	%	95% of standard proctor density

Source: DCR (1999)

SUBGRADE PREPARATION AND EARTHWORK OPERATIONS

We provide the following guidelines for soil placement as it relates to the planned construction. ***Loose or heaved rock shall be removed from the pond area prior to placement of liner materials.*** Subgrade preparation should consist of stripping all soft, loose, or unsuitable material from the pond area. Topsoil shall be stripped and stockpiled at a designated location either onsite or offsite during construction. A nominal topsoil depth of six (6) inches was encountered. Proof-rolling using a loaded dump truck with an axle weight of at least 10 tons may be used to identify localized soft or unsuitable material. Any soft or

unsuitable materials encountered during proof-rolling should be removed and replaced with an approved backfill compacted to the criteria provided below.

Any soil placed as engineered fill should be an approved material, free of organic matter or construction debris. Unacceptable fill materials include large rock, topsoil, organic materials (OH, OL), construction debris, and frozen soil. All such materials removed during grading operations should either be stockpiled for later use in landscaped areas or placed in approved disposal areas. ***Pond liner soils shall be meet the requirements of VA DCR Stormwater Design Specification No. 14. Heaved rock may be replaced with compacted soil with a maximum nominal particle size of three (3) inches and sufficient fines to prevent rinsing of liner materials. All fill materials shall be approved by the Geotechnical Engineer of Record prior to placement.*** All frozen soil should be removed prior to continuation of fill operations. Borrow fill shall not contain frozen materials at the time of placement. All frost-heaved soil should be removed prior to placement of fill, stone, concrete, or asphalt. All excavations shall be benched according to OSHA regulations to permit safe entry. Trench shoring for utility installation shall be designed by the Site Contractor's engineer utilizing OSHA Type C soil requirements for short term durations.

Soil fill should be placed in lifts not exceeding eight (8) inches in loose thickness and moisture conditioned to within ±2 percent of the optimum moisture content. We recommend that each lift be compacted to a minimum of 95% of the maximum dry density obtained in accordance with ASTM D-698 (or VTM-1), Standard Proctor Method. All areas receiving fill should be graded to facilitate positive drainage and prevent ponding of water where necessary. We do not anticipate groundwater will be an issue during construction; however, some dewatering will be required to prevent softening of liner soils. We are not aware of any naturally occurring springs which exist within the limits of the planed wet pond.

LIMITATIONS

This report has been prepared to aid in the evaluation of this site suitability for the planned construction. Our scope is limited to the specific project and location described, and the project description represents our understanding of the significant aspects relevant to soil characteristics. Subsurface conditions may vary from those encountered at the test boring locations. The borings and/or excavations are intended to only represent the conditions at the test locations where the observations occurred. Classifications of the recovered soil samples are based on recognized standards.

The interpretations and recommendations in this report are based solely on the information available at the time this report was prepared. If the location or design of the wet pond is altered, the conclusions and recommendations presented herein should not be considered valid unless we have been given the opportunity to review the changes. If you have any questions with regard to the information and recommendations presented herein, or if we can be of further assistance, please do not hesitate to contact us.

Respectfully,

Timothy P. Viola, P.E.
Project Engineer

COMMONWEALTH OF VIRGINIA
11/01/2022
TIMOTHY P. VIOLA
Lic. No. 0402056657
PROFESSIONAL ENGINEER

APPENDIX

Site Maps

Laboratory Test Results

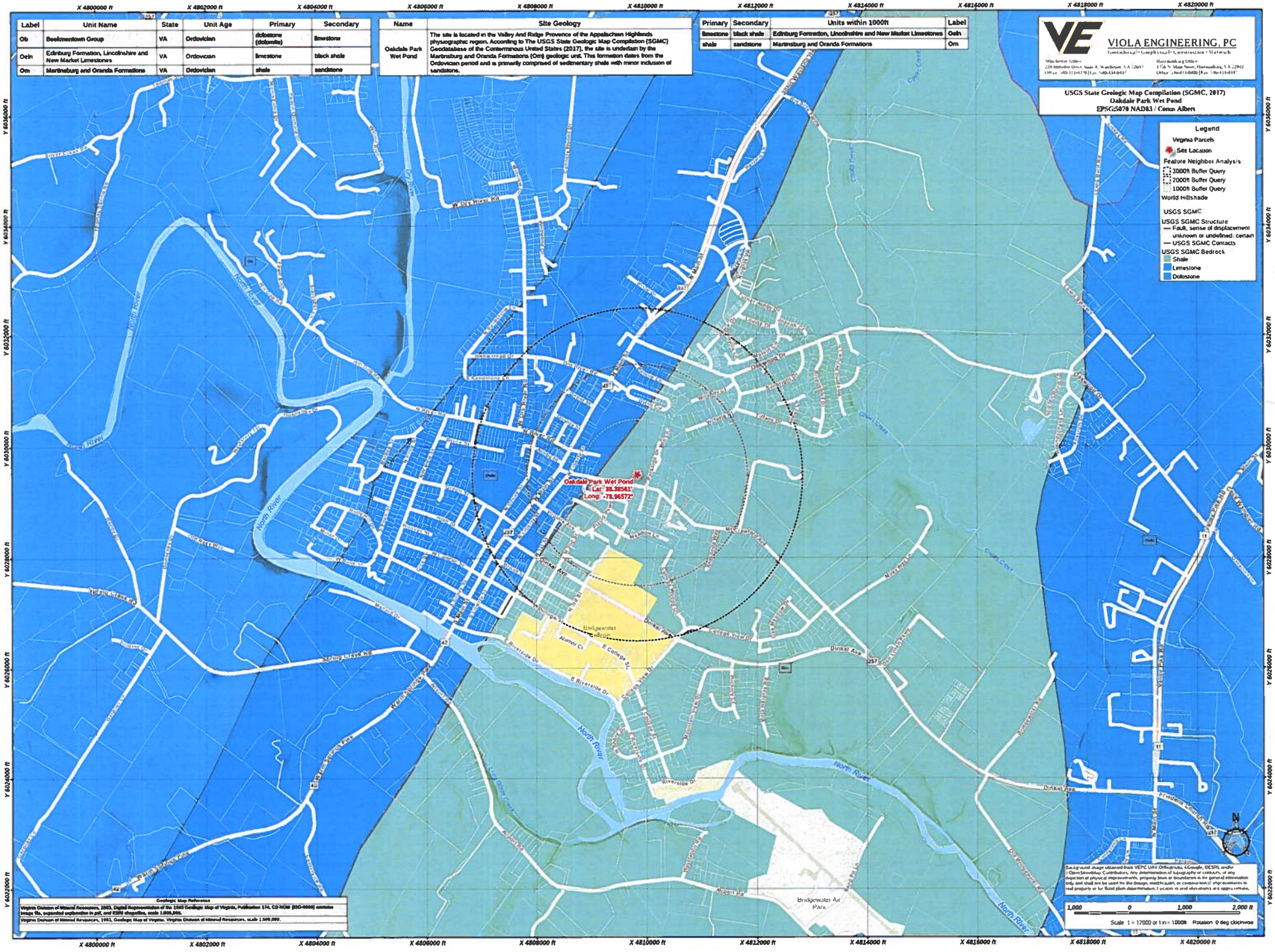
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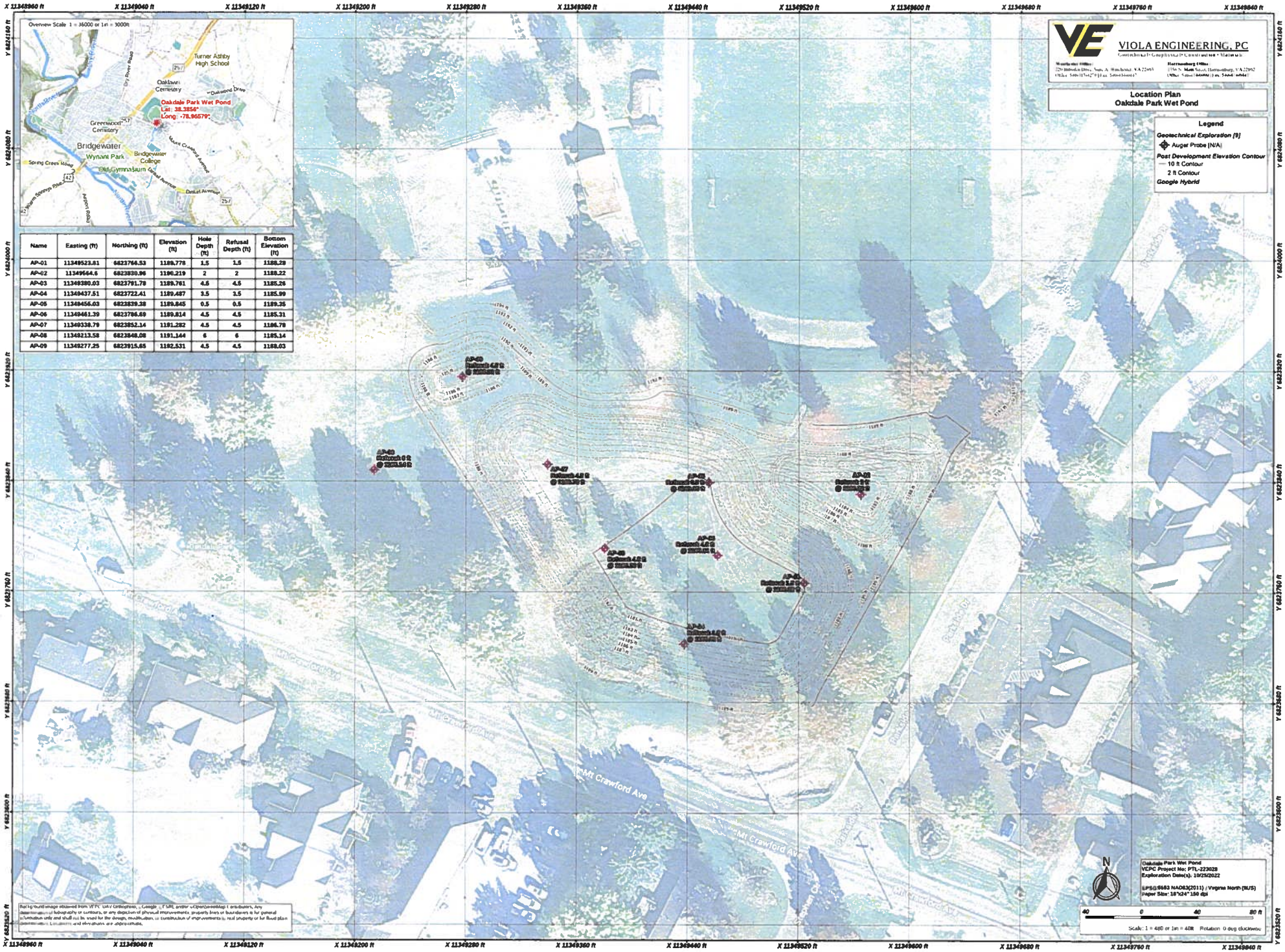
09-28-2022 Site Plans C4.0 to C4.2

VIOLA ENGINEERING, PC

Site Maps

VIOLA ENGINEERING, PC

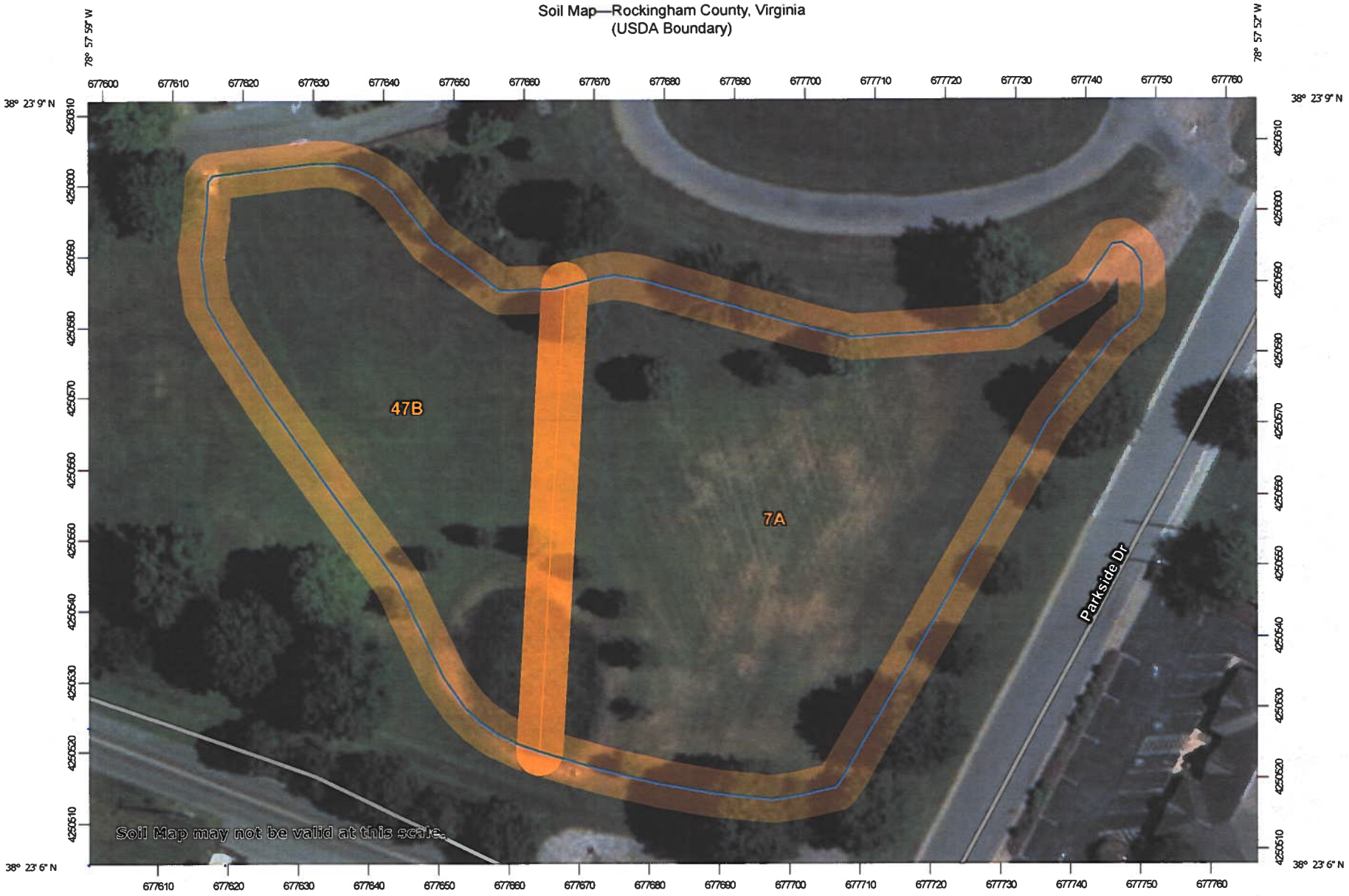

X 4800000 ft
X 4802000 ft
X 4804000 ft
X 4806000 ft
X 4808000 ft
X 4810000 ft
X 4812000 ft
X 4814000 ft
X 4816000 ft
X 4818000 ft
X 4820000 ft
Y 6026000 ft
Y 6028000 ft
Y 6030000 ft
Y 6032000 ft
Y 6034000 ft
Y 6036000 ft
Y 6038000 ft
Y 6040000 ft
Y 6042000 ft
Label | Unit Name | State | Unit Age | Primary | Secondary
Ob | Beekmantown Group | VA | Ordovician | dolostone (dolomite) | limestone
Oeln | Edinburg Formation, Lincolnshire and New Market Limestones | VA | Ordovician | limestone | black shale
Om | Martinsburg and Oranda Formations | VA | Ordovician | shale | sandstone
Name | Site Geology
Oakdale Park Wet Pond | The site is located in the Valley And Ridge Provence of the Appalachian Highlands physographic region. According to The USGS State Geologic Map Compilation (SGMC) Geodatabase of the Conterminous United States (2017), the site is underlain by the Martinsburg and Oranda Formations (Om) geologic unit. This formation dates from the Ordovician period and is primarily comprised of sedimentary shale with minor inclusion of sandstone.
Primary | Secondary | Units within 1000ft | Label
limestone | black shale | Edinburg Formation, Lincolnshire and New Market Limestones | Oeln
shale | sandstone | Martinsburg and Oranda Formations | Om
VIOLA ENGINEERING, PC
Geotechnical • Geophysical • Construction • Materials
USGS State Geologic Map Compilation (SGMC, 2017)
Oakdale Park Wet Pond
EPSG:5070 NAD83 / Conus Albers
Legend
Virginia Parcels
Site Location
Feature Neighbor Analysis
3000ft Buffer Query
2000ft Buffer Query
1000ft Buffer Query
World Hillshade
USGS SGMC
USGS SGMC Structure
Fault, sense of displacement unknown or undefined, certain
USGS SGMC Contacts
USGS SGMC Bedrock
Shale
Limestone
Dolostone
Oakdale Park Wet Pond
Lat: 38.38581°
Long: -78.96572°
North River
Dinkel Ave
E Riverside Dr
Bridgewater College
Alumni Ct
E College St
Bridgewater Air Park
Geologic Map Reference
Virginia Division of Mineral Resources. 2003. Digital Representation of the 1993 Geologic Map of Virginia, Publication 174, CD ROM [EC-0008] contains image file, expanded explanation in pdf, and ESRI shapefiles, scale 1:500,000.
Virginia Division of Mineral Resources, 1993, Geologic Map of Virginia. Virginia Division of Mineral Resources, scale 1:500,000.
1,000 0 1,000 2,000 ft
Scale 1 = 17000 or 1in = 1000ft Rotation 0 deg clockwise



Name	Easting (ft)	Northing (ft)	Elevation (ft)	Hole Depth (ft)	Refusal Depth (ft)	Bottom Elevation (ft)
AP-01	11349523.81	6823764.53	1189.778	1.5	1.5	1188.28
AP-02	11349664.6	6823830.96	1190.219	2	2	1188.22
AP-03	11349380.03	6823791.78	1189.761	4.6	4.5	1185.26
AP-04	11349437.51	6823722.41	1189.487	3.5	3.5	1185.99
AP-05	11349456.03	6823839.28	1189.845	0.5	0.5	1189.35
AP-06	11349461.39	6823786.69	1189.814	4.5	4.5	1185.31
AP-07	11349338.79	6823852.14	1191.282	4.5	4.5	1186.78
AP-08	11349213.58	6823848.08	1191.144	6	6	1185.14
AP-09	11349277.25	6823915.65	1192.531	4.5	4.5	1188.03

Background image obtained from VEPC UAV Orthophoto, © Google, © GIS, and/or ©OpenStreetMap contributors. Any depiction of topography or contours, or any depiction of physical improvements, property lines or boundaries is for general information only and shall not be used for the design, modification, or construction of improvements to real property or for flood plain determination. Locations and elevations are approximate.

Soil Map—Rockingham County, Virginia
(USDA Boundary)



Map Scale: 1:761 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 10 20 40 60

Feet
0 35 70 140 210

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Rockingham County, Virginia
Survey Area Data: Version 16, Sep 6, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 8, 2020—Sep 23, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
7A	Buchanan silt loam, 0 to 5 percent slopes	1.0	63.0%
47B	Monongahela fine sandy loam, 0 to 7 percent slopes	0.6	37.0%
Totals for Area of Interest		**1.6**	**100.0%**

Engineering Properties

This table gives the engineering classifications and the range of engineering properties for the layers of each soil in the survey area.

Hydrologic soil group is a group of soils having similar runoff potential under similar storm and cover conditions. The criteria for determining Hydrologic soil group is found in the National Engineering Handbook, Chapter 7 issued May 2007(http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba). Listing HSGs by soil map unit component and not by soil series is a new concept for the engineers. Past engineering references contained lists of HSGs by soil series. Soil series are continually being defined and redefined, and the list of soil series names changes so frequently as to make the task of maintaining a single national list virtually impossible. Therefore, the criteria is now used to calculate the HSG using the component soil properties and no such national series lists will be maintained. All such references are obsolete and their use should be discontinued. Soil properties that influence runoff potential are those that influence the minimum rate of infiltration for a bare soil after prolonged wetting and when not frozen. These properties are depth to a seasonal high water table, saturated hydraulic conductivity after prolonged wetting, and depth to a layer with a very slow water transmission rate. Changes in soil properties caused by land management or climate changes also cause the hydrologic soil group to change. The influence of ground cover is treated independently. There are four hydrologic soil groups, A, B, C, and D, and three dual groups, A/D, B/D, and C/D. In the dual groups, the first letter is for drained areas and the second letter is for undrained areas.

The four hydrologic soil groups are described in the following paragraphs:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Depth to the upper and lower boundaries of each layer is indicated.

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, "gravelly."

Classification of the soils is determined according to the Unified soil classification system (ASTM, 2005) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 2004).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Percentage of rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

References:

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Report—Engineering Properties

Absence of an entry indicates that the data were not estimated. The asterisk '*' denotes the representative texture; other possible textures follow the dash. The criteria for determining the hydrologic soil group for individual soil components is found in the National Engineering Handbook, Chapter 7 issued May 2007(http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba). Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Engineering Properties–Rockingham County, Virginia

Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			In				*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*
7A—Buchanan silt loam, 0 to 5 percent slopes														
Buchanan	75	C	0-7	Silt loam	SC, CL-ML, CL	A-4, A-6	0- 0- 0	0- 3- 5	80-95-100	75-90-100	60-85-100	40-75-90	22-33-43	6-12-18
			7-21	Cobbly loam, clay loam, cobbly sandy clay loam	SC, CL	A-2, A-6	0- 0- 0	0-10- 20	55-80-100	50-75-100	40-65-90	20-40-55	29-37-44	13-19-25
			21-60	Cobbly sandy clay loam, very cobbly fine sandy loam, cobbly loam	GC, GM, SM	A-2, A-6	0- 1- 1	0-10- 20	30-45-95	25-40-90	18-34-70	10-22-40	18-28-38	3-11-19

Engineering Properties–Rockingham County, Virginia														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			In				*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*
47B—Monongahela fine sandy loam, 0 to 7 percent slopes														
Monongahela	75	C	0-10	Fine sandy loam	SC, CL-ML, ML, SC-SM, SM	A-6, A-4	0- 0- 0	0- 3- 5	80-95-100	75-95-100	60-80-85	40-50-55	25-35-45	6-12-18
			10-24	Loam, clay loam, gravelly loam	SC, CL, CL-ML, ML	A-6, A-4	0- 0- 0	0- 3- 5	80-95-100	75-95-100	60-80-85	40-50-55	18-28-38	3-11-19
			24-33	Gravelly loam, sandy clay loam, loam	SM, SC, ML, CL	A-4, A-6	0- 0- 0	0- 5- 10	80-95-100	75-95-100	60-80-85	40-50-55	18-28-38	3-11-19
			33-60	Silt loam, clay loam	CL	A-7, A-6	0- 0- 0	0- 3- 5	75-95-100	75-90-100	70-85-90	50-70-80	35-42-49	18-23-28

Data Source Information

Soil Survey Area: Rockingham County, Virginia
Survey Area Data: Version 16, Sep 6, 2022

Laboratory Test Results

VIOLA ENGINEERING, PC

Soil Classification

VIOLA ENGINEERING, PC
Geotechnical • Geophysical • Construction • Materials
P.O. Box 575 Broadway, Virginia 22815
(540) 434-0400 fax: (540) 434-0447

Project: Oakdale Park Wet Pond
Project Number: PTL-223028
Date Performed: 10/27/2022

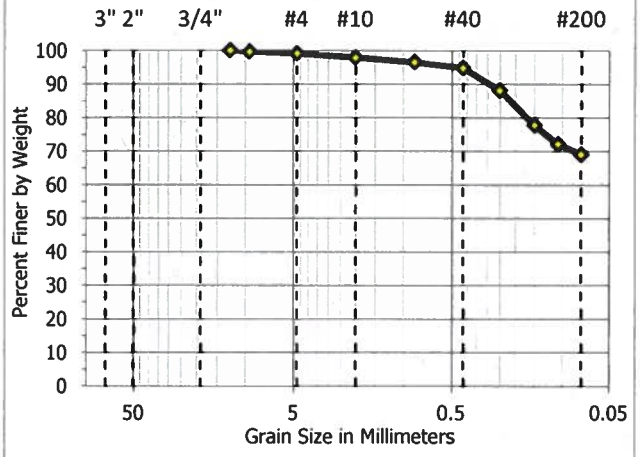
Sample Description: **S-01** : Brown Sandy Lean Clay
Sample Location: Onsite Auger Cuttings - Composite Sample
Date Received: 10/25/2022 As Received Moisture Content (%): 16.3%

USCS Classification: **CL** AASHTO Classification: **A-6** Group Index: **9.57**

Gradation Info

% passing			
#4	99.1	%Gravel	0.9
#10	97.9	% Sand	30.0
#40	94.7	% Silt/Clay	69.0
#200	69.0		
		C_c	
		C_u	

Grain Size Distribution Curve

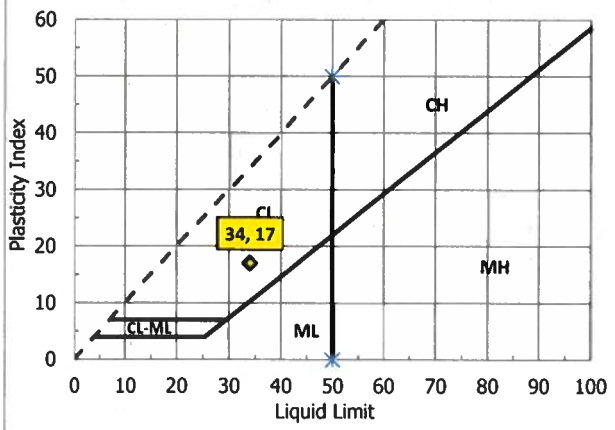


performance of wash dependent on apparent plasticity and gradation of material; sieve selection based on specification or engineer judgement; for well graded samples, -#4 material is often split for use on smaller sieves

Plasticity of -#40 Material

Liquid Limit	34
Plastic Limit	17
Plasticity Index	17

Plasticity Chart



performed using manual LL device, PL plastic roller device, straight metal grooving tool, one-point LL method; sample air dried, pulverized, processed through #40 sieve, and hydrated with distilled water overnight

Test Methods Performed:

Moisture Content	*Atterberg Limits*	*Sieve Analysis*	*Proctor*
☑ ASTM D2216	☑ ASTM D4318	☑ ASTM D1140	☐ ASTM D698
☐ AASHTO T265	☐ AASHTO T89, T90	☑ ASTM D6913	☐ AASHTO T99
	☐ VTM 7	☐ ASTM C136	☐ VTM 1
		☐ ASTM C117	☐ ASTM D1557
			☐ AASHTO T180

Tested by: BRR

Remarks:

COMMONWEALTH OF VIRGINIA
MARK A. VIOLA
Lic. No. 22705
PROFESSIONAL ENGINEER

1356 North Main Street
Harrisonburg, Virginia 22802

Phone: (540) 434 0400
Fax: (540) 434 0447

AASHTO ACCREDITED

VIOLA ENGINEERING, PC
Geotechnical • Geophysical • Construction • Materials
P.O. Box 575 Broadway, Virginia 22815
(540) 434-0400 fax: (540) 434-0447

Sieve Analysis Results

Project: Oakdale Park Wet Pond
Project Number: PTL-223028
Date Performed: 10/27/2022

Sample Description: **S-01** : Brown Sandy Lean Clay
Sample Location: Onsite Auger Cuttings - Composite Sample
Sample Retrieval Date: 10/25/2022 Total Dry Sample Weight: 514.7 g

Wash Information: ☑ wash performed ☐ no wash performed
☑ deflocculant/wetting agent used soak time (hrs): 2

Material Specification: ☐ % passing ☐ % retained ☐ not applicable

Designation	Size	mm	Weight Retained[1] (g)	Percent Retained	Percent Passing	Material Specification Minimum	Material Specification Maximum
3-inch	16x24	75					
2.5-inch	16x24	63					
2-inch	16x24	50					
1.5-inch	16x24	37.5					
1-inch	16x24	25					
3/4-inch	☑ 16x24 ☑ 8-in	19					
1/2-inch	☑ 16x24 ☑ 8-in	12.5	0.0	0%	100%		
3/8-inch	☑ 16x24 ☑ 8-in	10	1.8	0%	100%		
#4	☑ 16x24 ☑ 8-in	4.75	4.8	1%	99%		
#8	8-in	2.36					
#10	8-in	2.00	11.0	2%	98%		
#16	8-in	1.18					
#20	8-in	0.850	18.1	4%	96%		
#30	8-in	0.600					
#40	8-in	0.425	27.2	5%	95%		
#50	8-in	0.300					
#60	8-in	0.250	61.8	12%	88%		
#100	8-in	0.150	114.5	22%	78%		
#120	8-in	0.125					
#140	8-in	0.106	143.4	28%	72%		
#200	8-in	0.075	159.3	31%	69%		

Sieve analysis performed in accordance with ASTM D1140 and ASTM D6913 unless noted otherwise.

☐ entire sample sieved ☑ portions split and sieved to obtain full gradation ☐ meets specification

Method used: Method A
Procedure to obtain specimen: Air-Dried Procedure
Sample was composite sieved with 3/4-in separating sieve
Percent retained on coarsest sieve in fine sieve less than 2%
Ultrasonic bath and shaking apparatus not used in dispersion process

Remarks:

weight retained for portions where sample was split represents the full predicted weight retained; actual weight retained is lower

COMMONWEALTH OF VIRGINIA
MARK A. VIOLA
Lic. No. 22105
PROFESSIONAL ENGINEER

1356 North Main Street
Harrisonburg, Virginia 22802

AASHTO ACCREDITED

Phone: (540) 434 0400
Fax: (540) 434 0447

Sample Photos

VIOLA ENGINEERING, PC
Geotechnical • Geophysical • Construction • Materials
P.O. Box 575 Broadway, Virginia 22815
(540) 434-0400 fax: (540) 434-0447

Project: Oakdale Park Wet Pond
Project Number: PTL-223028
Date Performed: 10/27/2022

Sample Description: S-01 : Brown Sandy Lean Clay
Sample Location: Onsite Auger Cuttings - Composite Sample
Date Received: 10/25/2022 As Received Moisture Content (%): 16.3%





1356 North Main Street
Harrisonburg, Virginia 22802

AASHTO ACCREDITED

Phone: (540) 434 0400
Fax: (540) 434 0447

Photo Log

VIOLA ENGINEERING, PC

VIOLA ENGINEERING, PC
Harrisonburg 540-434-0400 | Winchester 540-313-4270

PHOTO LOG

Oakdale Park – Wet Pond
VEPC Project No: PTL-223028
Photo Dates: 10/25/22 and 11/01/22



10/25/2022
Site Drilling



10/25/2022
Site Drilling

09-28-2022 Site Plans C4.0 to C4.2

VIOLA ENGINEERING, PC

TOWN OF BRIDGEWATER
201 GREEN STREET
POST OFFICE BOX 77
VIRGINIA 22812
WWW.BRIDGEWATER.TOWN

OAKDALE PARK WET POND

GRADING PLAN

134 MT. CRAWFORD AVENUE
TOWN OF BRIDGEWATER, ASHBY DISTRICT, ROCKINGHAM COUNTY, VIRGINIA

ENGINEERING

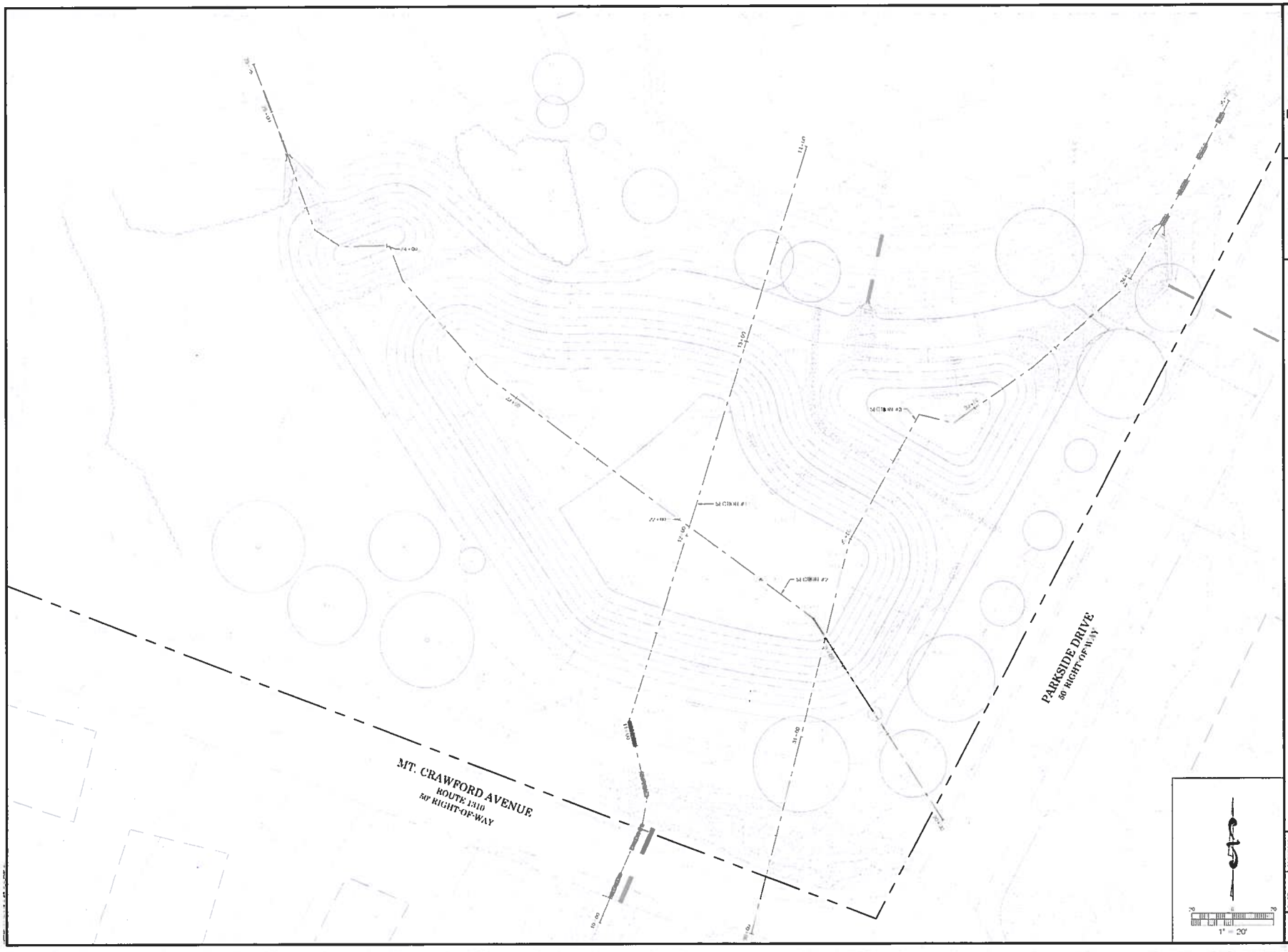
SCALE	DATE
1" = 20'	09/09/2022
	REVISIONS
	09/29/2022

C4.0

1" = 20'

PARKSIDE DRIVE
50' RIGHT-OF-WAY

MT. CRAWFORD AVENUE
ROUTE 1210
50' RIGHT-OF-WAY



TOWN OF BRIDGEWATER
201 GREEN STREET
POST OFFICE BOX 72
VIRGINIA 22812
WWW.BRIDGEWATER.TOWN

D. KENT DIMMICK JR
Lic. No. 1663
09/28/2022
LANDSCAPE ARCHITECT

OAKDALE PARK WET POND

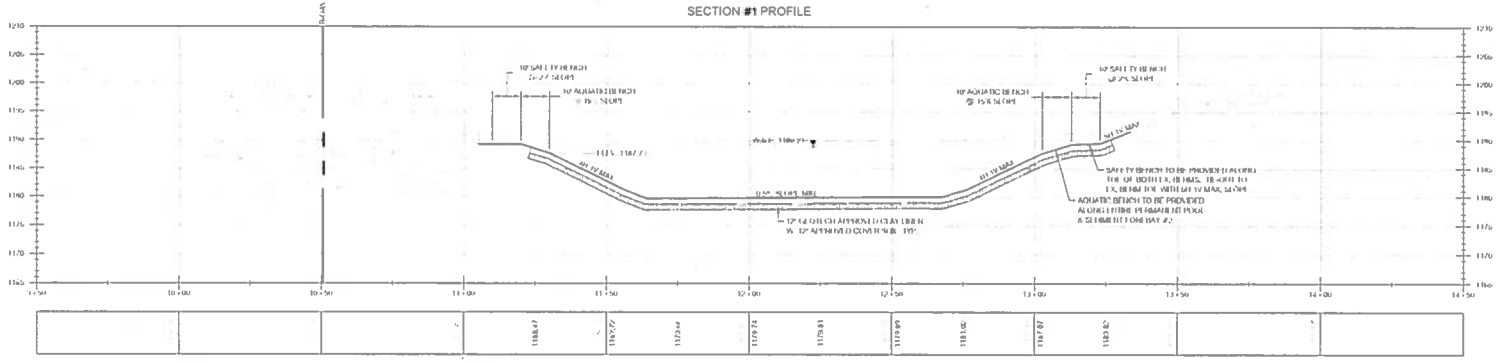
SECTIONS PLAN

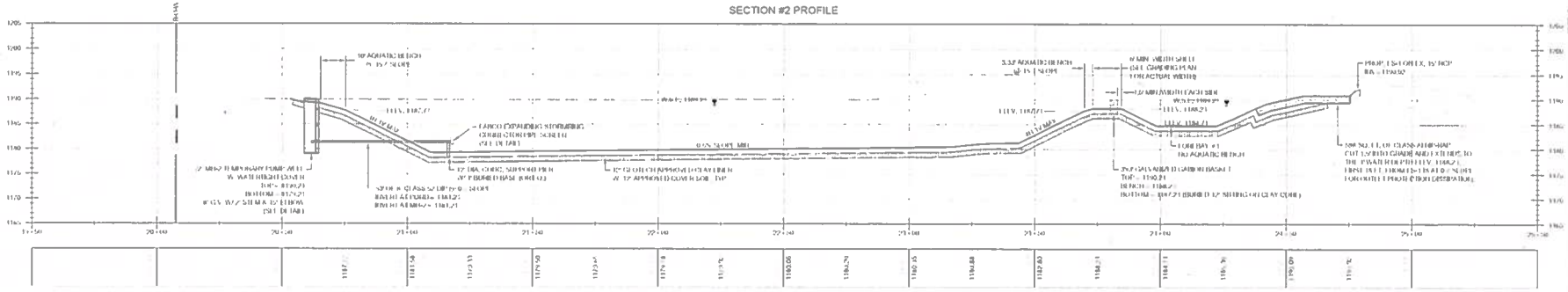
130 MT. CRAWFORD AVENUE
TOWN OF BRIDGEWATER ASHBY DISTRICT ROCKINGHAM COUNTY, VIRGINIA

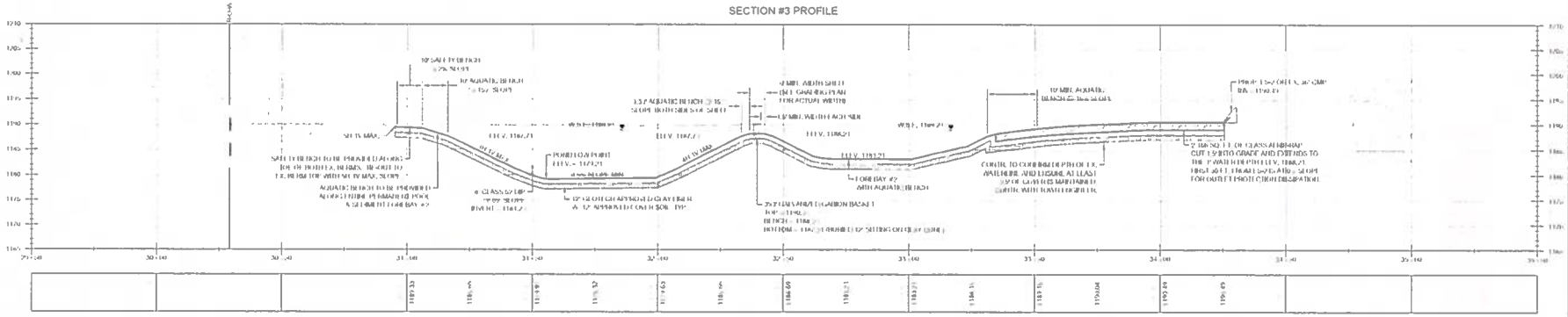
BRIDGEWATER ENGINEERING

DATE	SCALE
09/28/2022	
09/15/2022	1" = 20'
REVISIONS	

C4.1







VERTICAL SCALE
1" = 10'

HORIZONTAL SCALE
1" = 20'

TOWN OF BRIDGEWATER
201 GREEN STREET
POST OFFICE BOX 72
VIRGINIA 22812
WWW.BRIDGEWATER.TOWN

D. KENT QUARMBY JR.
Lic. No. 1940
09/26/2022
LANDSCAPE ARCHITECT

OAKDALE PARK WET POND

SECTION PROFILES

1.5 MI. CRAIGFORD AVENUE
TOWN OF BRIDGEWATER, ASHBY DISTRICT, ROCKINGHAM COUNTY, VIRGINIA

BRIDGEWATER ENGINEERING

DATE	REVISIONS	SCALE
09/09/2022		
09/26/2022		AS SHOWN

C4.2

sidual soils consisting of sandy lean clay with varying content was observed to generally increase with depth grinding was generally observed throughout. Further, indicate low plasticity (CL) fines with a liquid limit and See the attached documents in the appendix for further the time of our field exploration.

acilities and pond liners be constructed according to the gement Practices (VA DEQ). Further, wet pond liners alities shown in Table 2.0 below. Auger refusal was om 0.5 to 6.0 feet below existing grade. We understand e required to develop the planned SWM pond. It is our ill be required to effectively achieve site grading. Test cations AP-02, AP-04, and AP-09 confirming site soils t auger refusal depths. Further, clastic formations are feature (sinkhole) formation. ***If blasting is conducted, placement of structural fill. We recommend that the ntative from our office, prior to liner construction, to xist.***

fy as USDA Hydrologic Soil Group C. Insufficient soil shallow refusal. As such, permeability testing of onsite sidual site soils marginally meet required pond liner ient soil cover to effective rock removal. Site soils will during excavation. As such, it is recommended that an oe sourced for liner construction. We do not believe al alternative. It is recommended soil used for liner permeability) as stipulated below prior to placement.

d Wet Pond Clay Liner Specifications

	Unit	Specification
	Cm/sec	1×10^{-6}
	%	Not less than 15
	%	Not less than 30
	%	Not less than 30
	%	95% of standard proctor density

OPERATIONS

ment as it relates to the planned construction. ***Loose or rea prior to placement of liner materials.*** Subgrade ose, or unsuitable material from the pond area. Topsoil ocation either onsite or offsite during construction. A ntered. Proof-rolling using a loaded dump truck with an ntify localized soft or unsuitable material. Any soft or

unsuitable materials encountered during proof-rolling should be removed and replaced with an approved backfill compacted to the criteria provided below.

Any soil placed as engineered fill should be an approved material, free of organic matter or construction debris. Unacceptable fill materials include large rock, topsoil, organic materials (OH, OL), construction debris, and frozen soil. All such materials removed during grading operations should either be stockpiled for later use in landscaped areas or placed in approved disposal areas. ***Pond liner soils shall be meet the requirements of VA DCR Stormwater Design Specification No. 14. Heaved rock may be replaced with compacted soil with a maximum nominal particle size of three (3) inches and sufficient fines to prevent rinsing of liner materials. All fill materials shall be approved by the Geotechnical Engineer of Record prior to placement.*** All frozen soil should be removed prior to continuation of fill operations. Borrow fill shall not contain frozen materials at the time of placement. All frost-heaved soil should be removed prior to placement of fill, stone, concrete, or asphalt. All excavations shall be benched according to OSHA regulations to permit safe entry. Trench shoring for utility installation shall be designed by the Site Contractor's engineer utilizing OSHA Type C soil requirements for short term durations.

Soil fill should be placed in lifts not exceeding eight (8) inches in loose thickness and moisture conditioned to within ±2 percent of the optimum moisture content. We recommend that each lift be compacted to a minimum of 95% of the maximum dry density obtained in accordance with ASTM D-698 (or VTM-1), Standard Proctor Method. All areas receiving fill should be graded to facilitate positive drainage and prevent ponding of water where necessary. We do not anticipate groundwater will be an issue during construction; however, some dewatering will be required to prevent softening of liner soils. We are not aware of any naturally occurring springs which exist within the limits of the planed wet pond.

LIMITATIONS

This report has been prepared to aid in the evaluation of this site suitability for the planned construction. Our scope is limited to the specific project and location described, and the project description represents our understanding of the significant aspects relevant to soil characteristics. Subsurface conditions may vary from those encountered at the test boring locations. The borings and/or excavations are intended to only represent the conditions at the test locations where the observations occurred. Classifications of the recovered soil samples are based on recognized standards.

The interpretations and recommendations in this report are based solely on the information available at the time this report was prepared. If the location or design of the wet pond is altered, the conclusions and recommendations presented herein should not be considered valid unless we have been given the opportunity to review the changes. If you have any questions with regard to the information and recommendations presented herein, or if we can be of further assistance, please do not hesitate to contact us.

Respectfully,

Timothy P. Viola, P.E.
Project Engineer

COMMONWEALTH OF VIRGINIA
11/03/2022
TIMOTHY P. VIOLA
Lic. No. 0402056657
PROFESSIONAL ENGINEER

APPENDIX

Site Maps

Laboratory Test Results

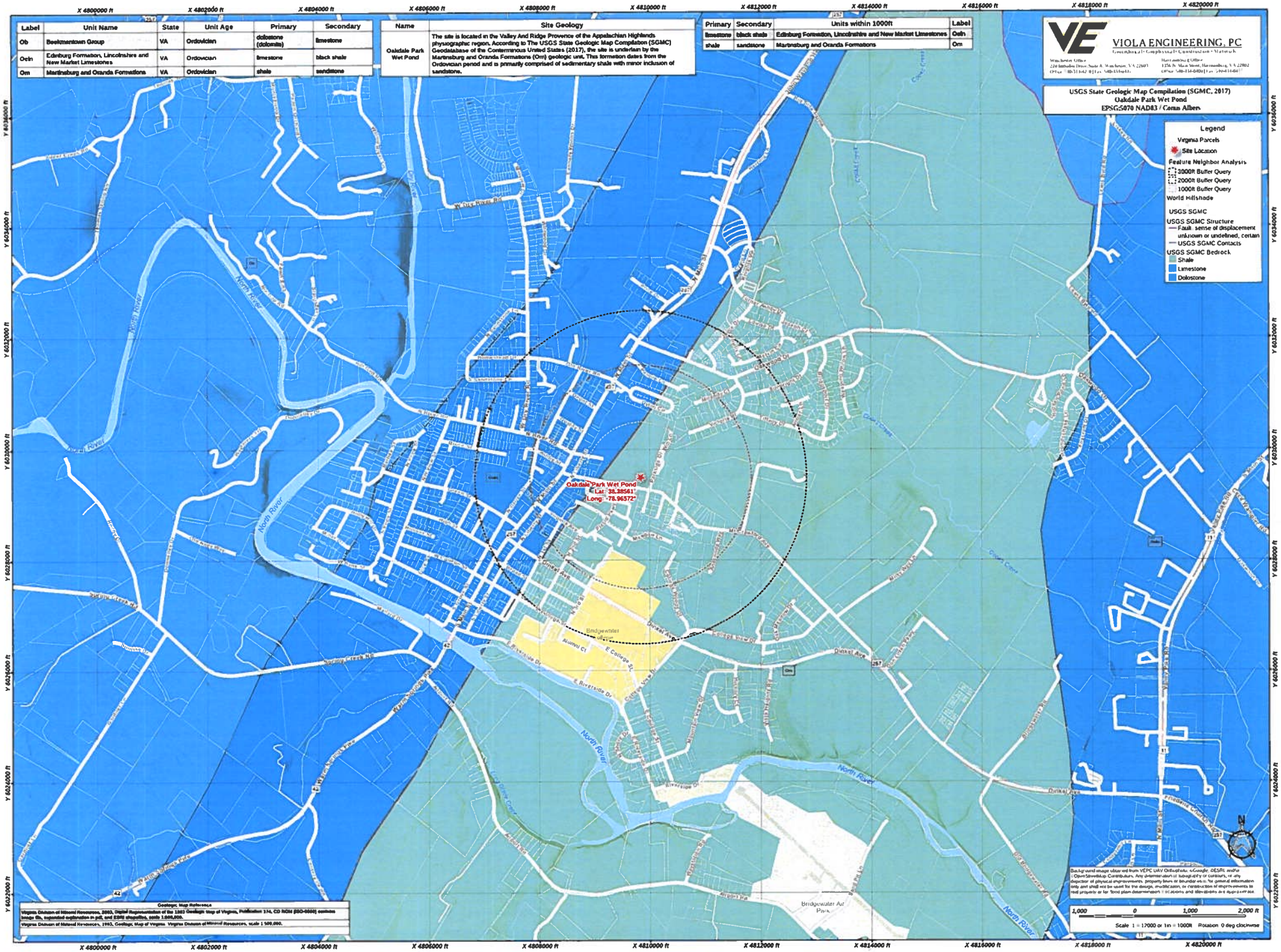
Photo Log

09-28-2022 Site Plans C4.0 to C4.2

VIOLA ENGINEERING, PC

Site Maps

VIOLA ENGINEERING, PC



Label	Unit Name	State	Unit Age	Primary	Secondary
Ob	Beekmantown Group	VA	Ordovician	dolostone (dolomite)	limestone
Oeln	Edinburg Formation, Lincolnshire and New Market Limestones	VA	Ordovician	limestone	black shale
Om	Martinsburg and Oranda Formations	VA	Ordovician	shale	sandstone

Name	Site Geology
Oakdale Park Wet Pond	The site is located in the Valley And Ridge Provence of the Appalachian Highlands physiographic region. According to The USGS State Geologic Map Compilation (SGMC) Geodatabase of the Conterminous United States (2017), the site is underlain by the Martinsburg and Oranda Formations (Om) geologic unit. This formation dates from the Ordovician period and is primarily comprised of sedimentary shale with minor inclusion of sandstone.

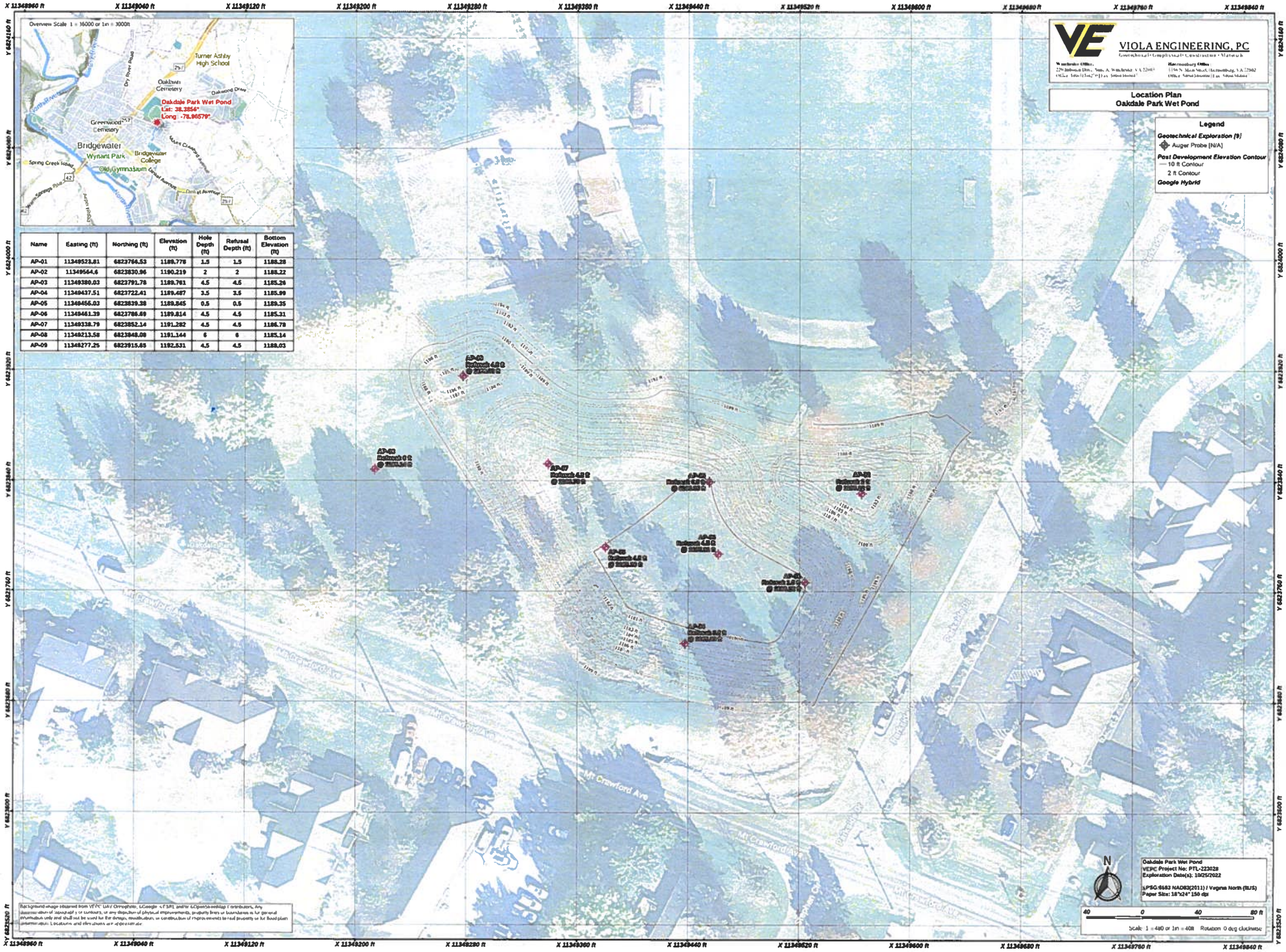
Primary	Secondary	Units within 1000ft	Label
limestone	black shale	Edinburg Formation, Lincolnshire and New Market Limestones	Oeln
shale	sandstone	Martinsburg and Oranda Formations	Om

Geologic Map Reference

Virginia Division of Mineral Resources, 2020, Digital Representation of the 1993 Geologic Map of Virginia, Publication 174, CD ROM [SID-0002] contains image file, expanded explanation in pdf, and ESRI shapefile, scale 1:500,000.

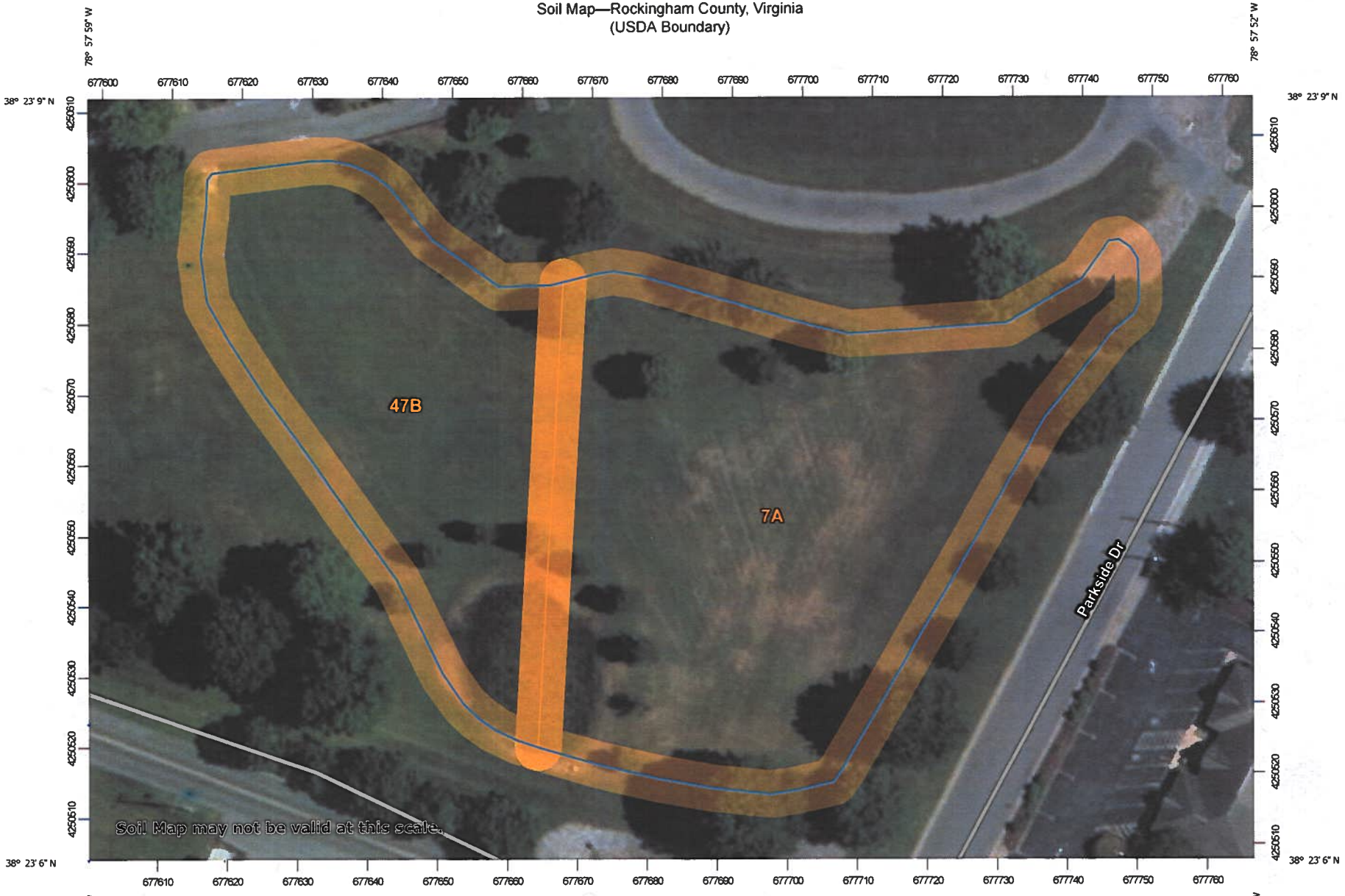
Virginia Division of Mineral Resources, 1993, Geologic Map of Virginia. Virginia Division of Mineral Resources, scale 1:500,000.

Background image obtained from VEPC UAV Orthophoto, ©Google, DESRI, and/or © OpenStreetMap Contributors. Any determination of boundary or contours, or any depiction of physical improvements, property lines or boundaries, for general information only and shall not be used for the design, modification, or construction of improvements to real property or for flood plain determinations or elevations and elevations are approximate.



Name	Easting (ft)	Northing (ft)	Elevation (ft)	Hole Depth (ft)	Refusal Depth (ft)	Bottom Elevation (ft)
AP-01	11349523.81	6823764.53	1189.778	1.5	1.5	1188.28
AP-02	11349564.6	6823830.96	1190.219	2	2	1188.22
AP-03	11349380.03	6823791.78	1189.761	4.5	4.5	1185.26
AP-04	11349437.51	6823722.41	1189.487	3.5	3.5	1185.99
AP-05	11349456.03	6823839.38	1189.845	0.5	0.5	1189.35
AP-06	11349461.39	6823786.69	1189.814	4.5	4.5	1185.31
AP-07	11349338.79	6823852.14	1191.282	4.5	4.5	1186.78
AP-08	11349213.58	6823848.08	1191.144	6	6	1185.14
AP-09	11349277.25	6823915.85	1192.531	4.5	4.5	1188.03

Soil Map—Rockingham County, Virginia
(USDA Boundary)



Map Scale: 1:761 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 10 20 40 60

Feet
0 35 70 140 210

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Rockingham County, Virginia
Survey Area Data: Version 16, Sep 6, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 8, 2020—Sep 23, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
7A	Buchanan silt loam, 0 to 5 percent slopes	1.0	63.0%
47B	Monongahela fine sandy loam, 0 to 7 percent slopes	0.6	37.0%
Totals for Area of Interest		**1.6**	**100.0%**

Engineering Properties

This table gives the engineering classifications and the range of engineering properties for the layers of each soil in the survey area.

Hydrologic soil group is a group of soils having similar runoff potential under similar storm and cover conditions. The criteria for determining Hydrologic soil group is found in the National Engineering Handbook, Chapter 7 issued May 2007(http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba). Listing HSGs by soil map unit component and not by soil series is a new concept for the engineers. Past engineering references contained lists of HSGs by soil series. Soil series are continually being defined and redefined, and the list of soil series names changes so frequently as to make the task of maintaining a single national list virtually impossible. Therefore, the criteria is now used to calculate the HSG using the component soil properties and no such national series lists will be maintained. All such references are obsolete and their use should be discontinued. Soil properties that influence runoff potential are those that influence the minimum rate of infiltration for a bare soil after prolonged wetting and when not frozen. These properties are depth to a seasonal high water table, saturated hydraulic conductivity after prolonged wetting, and depth to a layer with a very slow water transmission rate. Changes in soil properties caused by land management or climate changes also cause the hydrologic soil group to change. The influence of ground cover is treated independently. There are four hydrologic soil groups, A, B, C, and D, and three dual groups, A/D, B/D, and C/D. In the dual groups, the first letter is for drained areas and the second letter is for undrained areas.

The four hydrologic soil groups are described in the following paragraphs:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Depth to the upper and lower boundaries of each layer is indicated.

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, "gravelly."

Classification of the soils is determined according to the Unified soil classification system (ASTM, 2005) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 2004).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Percentage of rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

References:

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Report—Engineering Properties

Absence of an entry indicates that the data were not estimated. The asterisk '*' denotes the representative texture; other possible textures follow the dash. The criteria for determining the hydrologic soil group for individual soil components is found in the National Engineering Handbook, Chapter 7 issued May 2007(http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba). Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Engineering Properties–Rockingham County, Virginia

Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			In				*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*
7A—Buchanan silt loam, 0 to 5 percent slopes														
Buchanan	75	C	0-7	Silt loam	SC, CL-ML, CL	A-4, A-6	0- 0- 0	0- 3- 5	80-95-100	75-90-100	60-85-100	40-75-90	22-33-43	6-12-18
			7-21	Cobbly loam, clay loam, cobbly sandy clay loam	SC, CL	A-2, A-6	0- 0- 0	0-10- 20	55-80-100	50-75-100	40-65-90	20-40-55	29-37-44	13-19-25
			21-60	Cobbly sandy clay loam, very cobbly fine sandy loam, cobbly loam	GC, GM, SM	A-2, A-6	0- 1- 1	0-10- 20	30-45-95	25-40-90	18-34-70	10-22-40	18-28-38	3-11-19

Engineering Properties–Rockingham County, Virginia														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			In				*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*
47B—Monongahela fine sandy loam, 0 to 7 percent slopes														
Monongahela	75	C	0-10	Fine sandy loam	SC, CL-ML, ML, SC-SM, SM	A-6, A-4	0- 0- 0	0- 3- 5	80-95-100	75-95-100	60-80-85	40-50-55	25-35-45	6-12-18
			10-24	Loam, clay loam, gravelly loam	SC, CL, CL-ML, ML	A-6, A-4	0- 0- 0	0- 3- 5	80-95-100	75-95-100	60-80-85	40-50-55	18-28-38	3-11-19
			24-33	Gravelly loam, sandy clay loam, loam	SM, SC, ML, CL	A-4, A-6	0- 0- 0	0- 5- 10	80-95-100	75-95-100	60-80-85	40-50-55	18-28-38	3-11-19
			33-60	Silt loam, clay loam	CL	A-7, A-6	0- 0- 0	0- 3- 5	75-95-100	75-90-100	70-85-90	50-70-80	35-42-49	18-23-28

Data Source Information

Soil Survey Area: Rockingham County, Virginia
Survey Area Data: Version 16, Sep 6, 2022

Laboratory Test Results

VIOLA ENGINEERING, PC

Soil Classification

VIOLA ENGINEERING, PC
Geotechnical • Geophysical • Construction • Materials
P.O. Box 575 Broadway, Virginia 22815
(540) 434-0400 fax: (540) 434-0447

Project:	Oakdale Park Wet Pond
Project Number:	PTL-223028
Date Performed:	10/27/2022

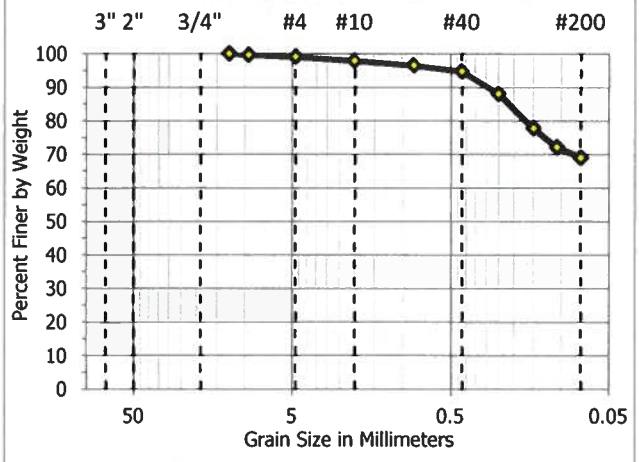
Sample Description:	**S-01** :	Brown Sandy Lean Clay	
Sample Location:		Onsite Auger Cuttings - Composite Sample	
Date Received:	10/25/2022	As Received Moisture Content (%):	16.3%

USCS Classification: **CL** AASHTO Classification: **A-6** Group Index: **9.57**

Gradation Info

% passing			
#4	99.1	%Gravel	0.9
#10	97.9	% Sand	30.0
#40	94.7	% Silt/Clay	69.0
#200	69.0		
		C_c	
		C_u	

Grain Size Distribution Curve

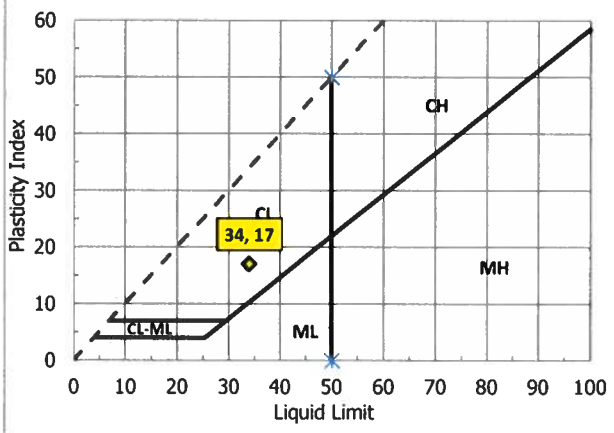


performance of wash dependent on apparent plasticity and gradation of material; sieve selection based on specification or engineer judgement; for well graded samples, -#4 material is often split for use on smaller sieves

Plasticity of -#40 Material

Liquid Limit	34
Plastic Limit	17
Plasticity Index	17

Plasticity Chart



performed using manual LL device, PL plastic roller device, straight metal grooving tool, one-point LL method; sample air dried, pulverized, processed through #40 sieve, and hydrated with distilled water overnight

Test Methods Performed:

Moisture Content	*Atterberg Limits*	*Sieve Analysis*	*Proctor*
☑ ASTM D2216	☑ ASTM D4318	☑ ASTM D1140	☐ ASTM D698
☐ AASHTO T265	☐ AASHTO T89, T90	☑ ASTM D6913	☐ AASHTO T99
	☐ VTM 7	☐ ASTM C136	☐ VTM 1
		☐ ASTM C117	☐ ASTM D1557
			☐ AASHTO T180

Tested by: BRR

Remarks:

COMMONWEALTH OF VIRGINIA
MARK A. VIOLA
Lic. No. 22705
PROFESSIONAL ENGINEER

1356 North Main Street
Harrisonburg, Virginia 22802

AASHTO ACCREDITED

Phone: (540) 434 0400
Fax: (540) 434 0447

Sieve Analysis Results

VIOLA ENGINEERING, PC
Geotechnical • Geophysical • Construction • Materials
P.O. Box 575 Broadway, Virginia 22815
(540) 434-0400 fax: (540) 434-0447

Project: Oakdale Park Wet Pond
Project Number: PTL-223028
Date Performed: 10/27/2022

Sample Description: **S-01** : Brown Sandy Lean Clay
Sample Location: Onsite Auger Cuttings - Composite Sample
Sample Retrieval Date: 10/25/2022 Total Dry Sample Weight: 514.7 g

Wash Information: ☑ wash performed ☐ no wash performed
☑ deflocculant/wetting agent used soak time (hrs): 2

Material Specification
☐ % passing
☐ % retained
☐ not applicable

Designation	Size				mm	Weight Retained[1] (g)	Percent Retained	Percent Passing	Minimum	Maximum
3-inch	16x24				75					
2.5-inch	16x24				63					
2-inch	16x24				50					
1.5-inch	16x24				37.5					
1-inch	16x24				25					
3/4-inch	☑	16x24	☑	8-in	19					
1/2-inch	☑	16x24	☑	8-in	12.5	0.0	0%	100%		
3/8-inch	☑	16x24	☑	8-in	10	1.8	0%	100%		
#4	☑	16x24	☑	8-in	4.75	4.8	1%	99%		
#8	8-in				2.36					
#10	8-in				2.00	11.0	2%	98%		
#16	8-in				1.18					
#20	8-in				0.850	18.1	4%	96%		
#30	8-in				0.600					
#40	8-in				0.425	27.2	5%	95%		
#50	8-in				0.300					
#60	8-in				0.250	61.8	12%	88%		
#100	8-in				0.150	114.5	22%	78%		
#120	8-in				0.125					
#140	8-in				0.106	143.4	28%	72%		
#200	8-in				0.075	159.3	31%	69%		

Sieve analysis performed in accordance with ASTM D1140 and ASTM D6913 unless noted otherwise.

☐ entire sample sieved ☑ portions split and sieved to obtain full gradation ☐ meets specification

Method used: Method A
Procedure to obtain specimen: Air-Dried Procedure
Sample was composite sieved with 3/4-in separating sieve
Percent retained on coarsest sieve in fine sieve less than 2%
Ultrasonic bath and shaking apparatus not used in dispersion process

Remarks:

weight retained for portions where sample was split represents the full predicted weight retained; actual weight retained is lower

COMMONWEALTH OF VIRGINIA
MARK A. VIOLA
Lic. No. 22705
PROFESSIONAL ENGINEER

1356 North Main Street
Harrisonburg, Virginia 22802

AASHTO ACCREDITED

Phone: (540) 434 0400
Fax: (540) 434 0447

VIOLA ENGINEERING, PC
Geotechnical • Geophysical • Construction • Materials
P.O. Box 575 Broadway, Virginia 22815
(540) 434-0400 fax: (540) 434-0447

Sample Photos

Project: Oakdale Park Wet Pond
Project Number: PTL-223028
Date Performed: 10/27/2022

Sample Description: S-01 : Brown Sandy Lean Clay
Sample Location: Onsite Auger Cuttings - Composite Sample
Date Received: 10/25/2022 As Received Moisture Content (%): 16.3%





1356 North Main Street
Harrisonburg, Virginia 22802

AASHTO ACCREDITED

Phone: (540) 434 0400
Fax: (540) 434 0447

Photo Log

VIOLA ENGINEERING, PC

VIOLA ENGINEERING, PC
Harrisonburg 540-434-0400
Winchester 540-313-4270

PHOTO LOG

Oakdale Park – Wet Pond
VEPC Project No: PTL-223028
Photo Dates: 10/25/22 and 11/01/22



10/25/2022
Site Drilling



10/25/2022
Site Drilling

VIOLA ENGINEERING, PC
Harrisonburg 540-434-0400 | Winchester 540-313-4270

PHOTO LOG

Oakdale Park – Wet Pond
VEPC Project No: PTL-223028
Photo Dates: 10/25/22 and 11/01/22



11/03/22
Test Pit Excavation @ AP-09
Bucket Refusal @ 4.5 feet
On Hard Tan-Brown Sandstone Bedrock



11/03/22
Test Pit Excavation @ AP-02
Bucket Refusal @ 2.0 feet
On Hard Tan-Brown Sandstone Bedrock

VIOLA ENGINEERING, PC
Harrisonburg 540-434-0400 | Winchester 540-313-4270

PHOTO LOG

Oakdale Park – Wet Pond
VEPC Project No: PTL-223028
Photo Dates: 10/25/22 and 11/01/22



11/03/22
Test Pit Excavation @ AP-04
Bucket Refusal @ 3.5 feet
On Hard Tan-Brown Sandstone Bedrock

VIOLA ENGINEERING, PC

09-28-2022 Site Plans C4.0 to C4.2

VIOLA ENGINEERING, PC

TOWN OF BRIDGEWATER
201 GREEN STREET
POST OFFICE BOX 72
VIRGINIA 22812
WWW.BRIDGEWATER.TOWN

OAKDALE PARK WET POND

GRADING PLAN

134 MT CRAWFORD AVENUE
TOWN OF BRIDGEWATER ASHBY DISTRICT ROCKINGHAM COUNTY VIRGINIA

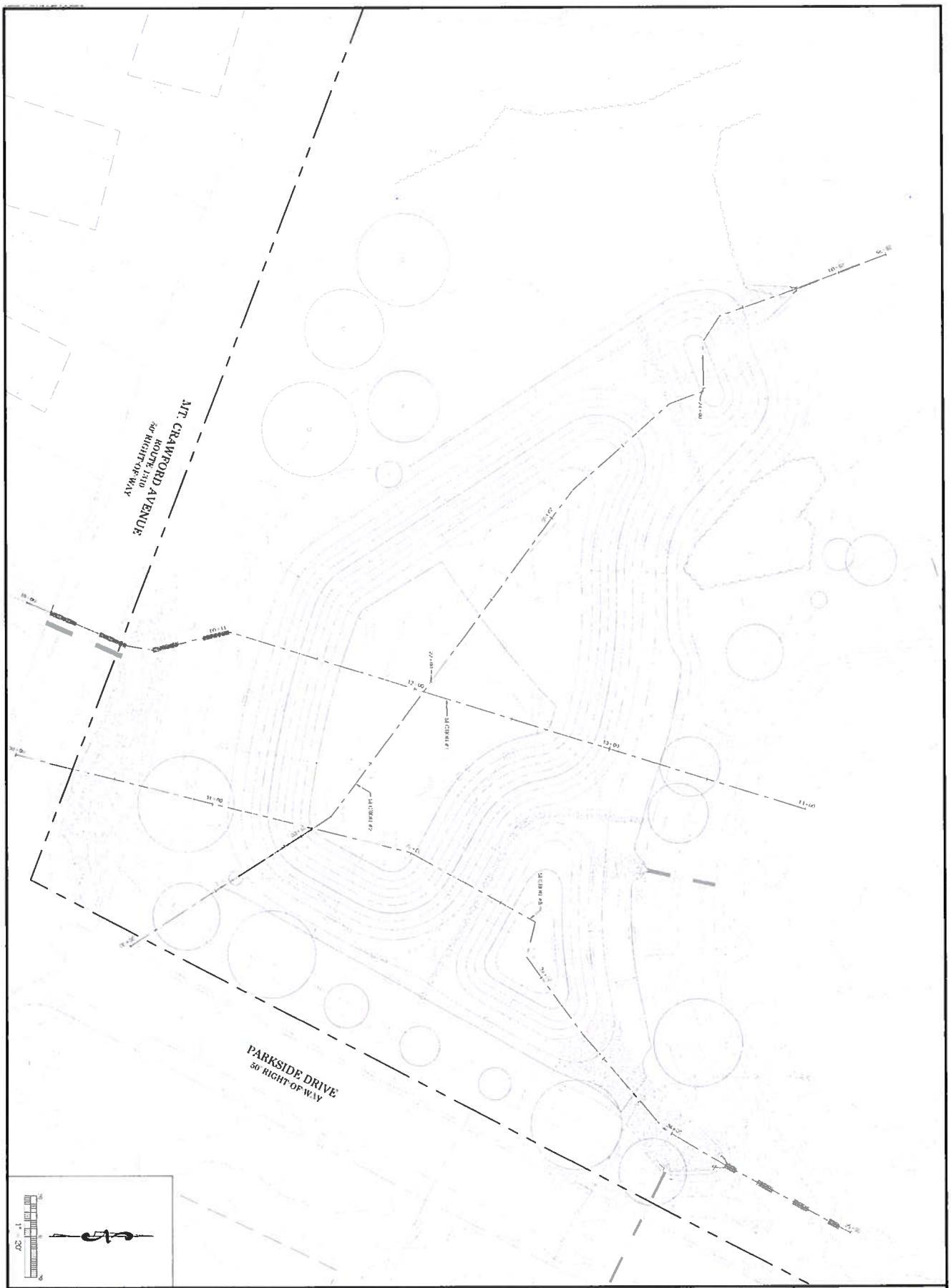
BRIDGEWATER ENGINEERING

SCALE	1" = 20'
DATE	08/04/2022
REVISIONS	08/29/2022

C4.0

PARKSIDE DRIVE
50' RIGHT-OF-WAY

MT. CRAWFORD AVENUE
ROUTE 1310
50' RIGHT-OF-WAY



C4.1	DATE	09/09/2022
	REVISIONS	09/28/2022
	SCALE	1" = 20'

OAKDALE PARK WET POND

SECTIONS PLAN

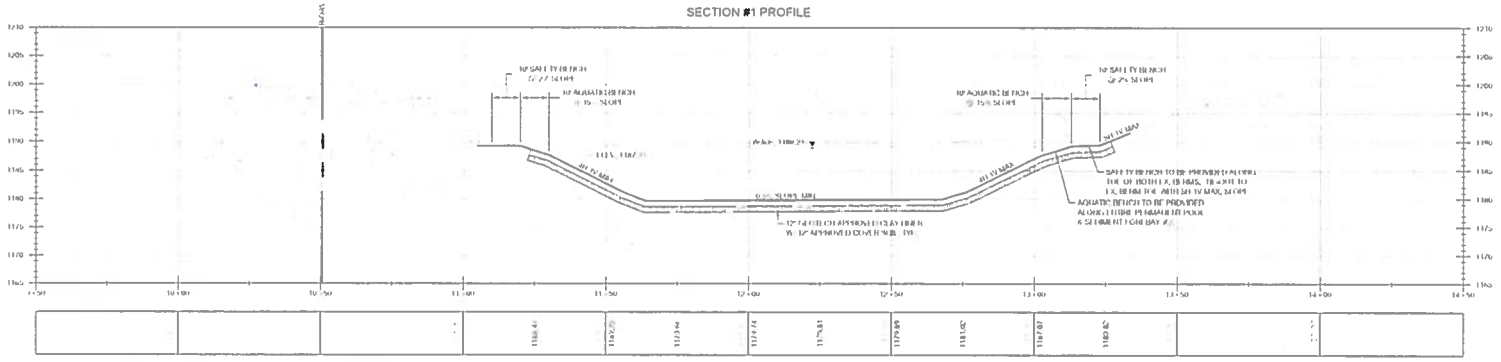
134 MT. CRAWFORD AVENUE
TOWN OF BRIDGEWATER, ASHBY DISTRICT, ROCKINGHAM COUNTY, VIRGINIA

BRIDGEWATER ENGINEERING

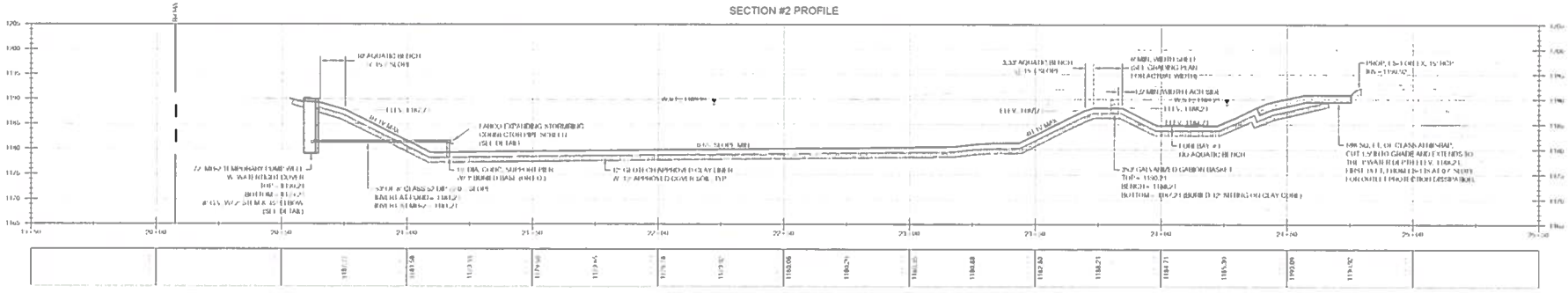
09/28/2022

TOWN OF BRIDGEWATER
201 GREEN STREET
POST OFFICE BOX 72
VIRGINIA 22812
WWW.BRIDGEWATER.TOWN

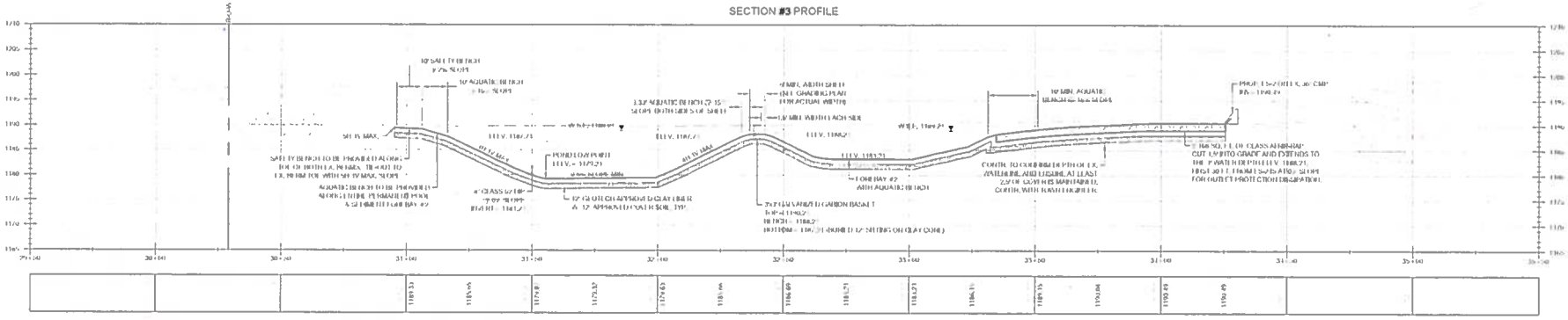
SECTION #1 PROFILE



SECTION #2 PROFILE



SECTION #3 PROFILE



VERTICAL SCALE
1" = 10'

HORIZONTAL SCALE
1" = 20'

TOWN OF BRIDGEWATER
201 GREEN STREET
POST OFFICE BOX 72
VIRGINIA 22812
WWW.BRIDGEWATER.TOWN

09/26/2022

OAKDALE PARK WET POND

SECTION PROFILES

134 LOT CRAWFORD AVENUE
TOWN OF BRIDGEWATER, ASHBY DISTRICT, ROCKINGHAM COUNTY, VIRGINIA

ENGINEERING

DATE	REVISIONS	SCALE
09/09/2022		AS SHOWN
09/26/2022		

C4.2

Addendum 2

Addendum No. 2

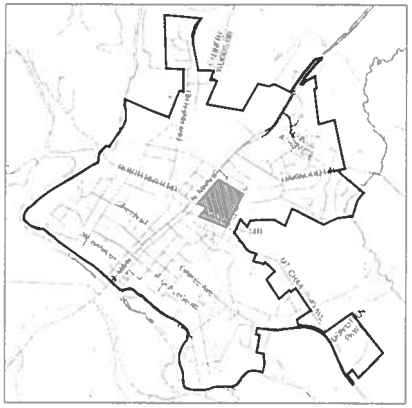
1. A 3D Model of the pond is available for construction, if desired, to aid in excavation with GPS guided equipment. It is the contractor's responsibility to bid, and construct, based on the approved site plan. The site plan is the legal document of record. It will be the contractor's responsibility to get the model loaded into their equipment correctly with a benchmark and base station determined by a licensed surveyor.
    a. The 3D model produces a cut of 13,240 cy and a fill of 0 cy. This number is from proposed finished grade and surveyed existing grade with a 1:1 ratio. This number is provided to help aid in bidding, but it is not binding to the lump sum price given by the contractor. It is the contractor's responsibility to confirm their own numbers and impacts of rock, topsoil, availability of clay core cover soil, and other factors that may affect stockpiling, export, and import.
2. Planting Notes have been added to C7.0 to cover minimum planting sizes and spacing. The notes also clarify mulching areas.
    a. Additionally, the planting square footages of Zones 1-3 have been significantly reduced. We initially proposed wetland plants around the forebays, however this has been removed since the forebays will be dredged on a more regular basis for maintenance. These areas are now to be seeded or sodded.
3. Three shrubs were not labeled on the plan. They are now labeled Common Spicebush.
4. Sheet C1.0 "Description" has been updated to include appropriate appendices from the BMP Clearinghouse. These specifications along with the "Erosion and Sediment Control Handbook" and "American Standards of Nursery Stock" are the applicable specifications and standards to be followed and are referenced throughout the site plan.
5. The stainless steel expanding StormRing shall be used and C6.0 has been updated so Aluminum is crossed out as an option.
6. Sheet C6.0 has been updated to include significantly more specific clay core notes based on geotechnical report as well as better clarification of as-built and inspection requirements.
7. The Town will provide municipal water from a nearby hydrant to fill the pond. The Town will need to provide this water in intervals due to capacity limitations. Therefore, it would be advisable, once the contract is awarded, to have the landscaper coordinate with the Town on water level intervals ideal for the needs at time of planting.

Addendum 3
Updated Plans

OAKDALE PARK WET POND

134 MT. CRAWFORD AVENUE

TOWN OF BRIDGEWATER, VIRGINIA



NORTH

VICINITY MAP

SCALE: 1" = 2000'

SHEET INDEX

SHEET NUMBER	SHEET TITLE
C1.0	COVER SHEET
C2.0	OVERALL EXISTING CONDITIONS PLAN
C3.0	LAYOUT & DEMOLITION PLAN
C4.0	GRADING PLAN
C4.1	SECTIONS PLAN
C4.2	SECTION PROFILES
C5.0	EROSION & SEDIMENT CONTROL PLANS
C5.1	EROSION & SEDIMENT CONTROL NOTES
C5.2	EROSION & SEDIMENT CONTROL DETAILS
C5.3	EROSION & SEDIMENT CONTROL DETAILS
C6.0	STORMWATER MANAGEMENT NOTES & DETAILS
C7.0	LANDSCAPE PLAN
C7.1	LANDSCAPE NOTES & DETAILS

DESCRIPTION

THE TOWN OF BRIDGEWATER PROPOSES A 277,300 CU. FT. WET POND BELOW THE STORAGE OF A FLASH FLOOD POND ON PARCEL 125A(A)4 LOT A1 ALSO KNOWN AS OAKDALE PARK. THE WET POND WILL BE BUILT TO MEET SPECIFICATIONS OF MS4 PERMIT AND APPLICABLE TO THE VIRGINIA STORMWATER BEST MANAGEMENT PRACTICE CHALLENGE TO ACHIEVE MS4 WATER QUALITY REDUCTION TARGETS.

RESPONSIBLE LAND DISTURBER

A RESPONSIBLE LAND DISTURBER (RLD) AS DEFINED IN 9VAC25-870-10 SHALL BE DESIGNATED BY OWNER IN ACCORDANCE WITH APPLICABLE LAWS. ESTABLISHED FACILITY IN ACCORDANCE WITH ARTICLE 2 OF CHAPTER 4 AND SUBMIT CONTROL (ESC) PLAN. THE RLD SHALL BE THE AGENT OF RECORD FOR PURPOSES OF PLAN APPROVAL ONLY. THE CONTRACTOR SHALL DESIGNATE A QUALIFIED DAY-TO-DAY RLD AS PART OF CONTRACT.

GENERAL INFORMATION

SITE ADDRESS:	134 MT. CRAWFORD AVENUE
OWNER:	TOWN OF BRIDGEWATER 201 GREEN STREET P.O. BOX 72 BRIDGEWATER, VA 22812 ATTN: JAY FITTON
AGENT:	SAAB ASSOCIATES 1502 RUNNYMEDE, PLACE
TAX MAP NUMBER(S):	125A(A)4 LOT A1
RECORDATION NUMBER(S):	DB 824 PG 242
ZONING:	P-1
EXISTING USE:	PUBLIC PARK
PROPOSED USE:	PUBLIC PARK
PARCEL AREA(S):	35.13 AC.
LIMITS OF CONSTR. (SITE):	87,555 SQ. FT. OR 2.01 AC.
REQUIRED PARKING:	N/A
PROVIDED PARKING:	N/A
CONSTR. TYPE:	N/A
USE GROUP:	N/A
BUILDING AREA:	N/A
NO. OF STORIES:	N/A
BUILDING HEIGHT:	N/A
IS BLDG. SPRINKLED:	N/A
EX. FIRE FLOW:	N/A
NEEDED FIRE FLOW:	N/A
WATER SERVICE:	PUBLIC
SEWER SERVICE:	PUBLIC
GRAVE SITES ON-SITE:	NONE
FEMA:	ZONE "X" (SHADED) PER FIRM NO. 51165C0136E DATED AUGUST 19, 2014

GENERAL NOTES

EXISTING UTILITIES

1. CONTRACTOR SHALL VERIFY LOCATION AND ELEVATION OF ALL OTHER REQUIRED UTILITIES. THE LOCATION OF EXISTING UTILITIES ARE NOT NECESSARILY SHOWN ON THE PLANS AND WHERE SHOWN ARE ONLY APPROXIMATE. THE CONTRACTOR SHALL OBTAIN LOCATIONS AND ALSO EXPOSE, HAND LOCATE ALL UNDERGROUND LINES AND STRUCTURES AS NECESSARY. NO CLAIMS FOR DAMAGES OR EXTRA COMPENSATION SHALL ACCRUE TO THE CONTRACTOR FROM THE PRESENCE OF SEWERS OR OTHER OBSTRUCTIONS OR FROM ANY DELAY DUE TO THE REMOVAL OR REARRANGEMENT OF THE SAME. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO UNDERGROUND STRUCTURES. CONTACT MISS UTILITY OF VIRGINIA (811 OR 1-800-552-7001).

ABBREVIATIONS LIST

AASHTO	AMERICAN ASSOCIATION OF STATE HIGHWAY TRANSPORT	EVCS	END VERTICAL CURVE STATION	P.S.I.	POUNDS PER SQUARE INCH
ADA	AMERICANS WITH DISABILITY ACT	E.W.	EACH WAY	PVC	POLYVINYL CHLORIDE
A.F.J.	ABOVE FINISH FLOOR	EW	ENDWALL	PVMT	PAVEMENT
A.F.G.	ABOVE FINISH GRADE	EXC	EXCAVATION	QTY	QUANTITY
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE	EXIST	EXISTING	R	RADIUS
APPROX	APPROXIMATE (LY)	EXT	EXTERIOR	RCP	REINFORCED CONCRETE PIPE
ASPH	ASPHALT	FDN	FOUNDATION	R.D.L.	ROOF DRAIN LEADER
ASTM	AMERICAN SOCIETY FOR TESTING MATERIALS	FF	FINISH FLOOR	REINF	REINFORCED
BC	BACK OF CURB	FG	FINISH GRADE	REQD	REQUIRED
BIT	BITUMINOUS	GFE	GRADE FINISH ELEVATION	RLD	RESPONSIBLE LAND DISTURBER
BLDG	BUILDING	GES	GRADE END AT STATION	ROW	RIGHT-OF-WAY
BM	BENCHMARK	G.C.	GENERAL CONTRACTOR	RR	RAILROAD
BVCS	BEGIN VERTICAL CURVE ELEVATION	GPM	GALLONS PER MINUTE	RT	RIGHT
BVCS	BEGIN VERTICAL CURVE STATION	HDPE	HIGH DENSITY POLYETHYLENE	SAN	SANITARY
BW	BOTTOM OF WALL	HPT	HIGH POINT	SE	SOUTHEAST / EAST
BWW	BOTH WAYS	HSD	HEADLIGHT SIGHT DISTANCE	SD	STORM DRAIN
C/S	CRUSHED STONE/CORD	HVAC	HEATING, VENTILATION, AND AIR CONDITIONING	SHT	SHEET
CL	CENTERLINE	INV	INVERT ELEVATION	SPECS	SPECIFICATIONS
CMP	CORRUGATED METAL PIPE	ID	INSIDE DIAMETER	SQ. FT.	SQUARE FEET
CMU	CONCRETE MASONRY UNIT	IE	INVERT ELEVATION	SQ. IN.	SQUARE INCHES
C.O.	CLEANOUT	IN	INCH	SS	SANITARY SEWER
CONC	CONCRETE	INTX	INTERSECTION	SSD	STOPPING SIGHT DISTANCE
CONSTR	CONSTRUCTION	ISO	INTERNATIONAL ORGANIZATION OF STANDARDS	STA	STATION
CONT	CONTINUOUS	INT	INTERIOR	STD	STANDARD
COR	CORNER	INV	INVERT	S.Y.	SQUARE YARD
CU. FT.	CUBIC FEET	IP	IRON PIN	TBA	TO BE ABANDONED
CU. YD.	CUBIC YARD	LF	LINEAR FEET	TBR	TO BE REMOVED
DEFL	DEFLECTION	LT	LEFT	TEL	TELEPHONE
DEQ	DEPARTMENT OF ENVIRONMENTAL QUALITY	LVC	LENGTH OF VERTICAL CURVE	TRANS	TRANSFORMER
DI	DROP INLET	MH	MANHOLE	TW	TOP OF WALL
DIA	DIAMETER	MAX	MAXIMUM	TYP	TYPICAL
DIM	DIMENSION	MIN	MINIMUM	UON	UNLESS OTHERWISE NOTED
DWG	DRAWING	MON	MONUMENT	VDOT	VIRGINIA DEPARTMENT OF TRANSPORTATION
EA	EACH	NBL	NORTHBOUND LANE	VERT	VERTICAL
EBL	EASTBOUND LANE	N.T.S.	NOT TO SCALE	VESCH	VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK
ELEC	ELECTRIC	O.C.	ON CENTER	V.I.F.	VERIFY IN FIELD
ELEV	ELEVATION	O.D.	OUTSIDE DIAMETER	WBL	WESTBOUND LANE
ENTR	ENTRANCE	PL	PROPERTY LINE	W	WATER LEVEL
EP	EDGE OF PAVEMENT	PROP	PROPOSED	W/O	WITHOUT
EQ.	EQUAL	P.S.I.	POUNDS PER SQUARE FOOT	WT	WEIGHT
EVCS	END VERTICAL CURVE ELEVATION			YD	YARD

TOWN OF BRIDGEWATER
201 GREEN STREET
POST OFFICE BOX 72
VIRGINIA 22812
WWW.BRIDGEWATER.TOWN

D. KENT OPPENHEIMER, LA
Lic. No. 1803
11/14/2022
LANDSCAPE ARCHITECT

OAKDALE PARK WET POND

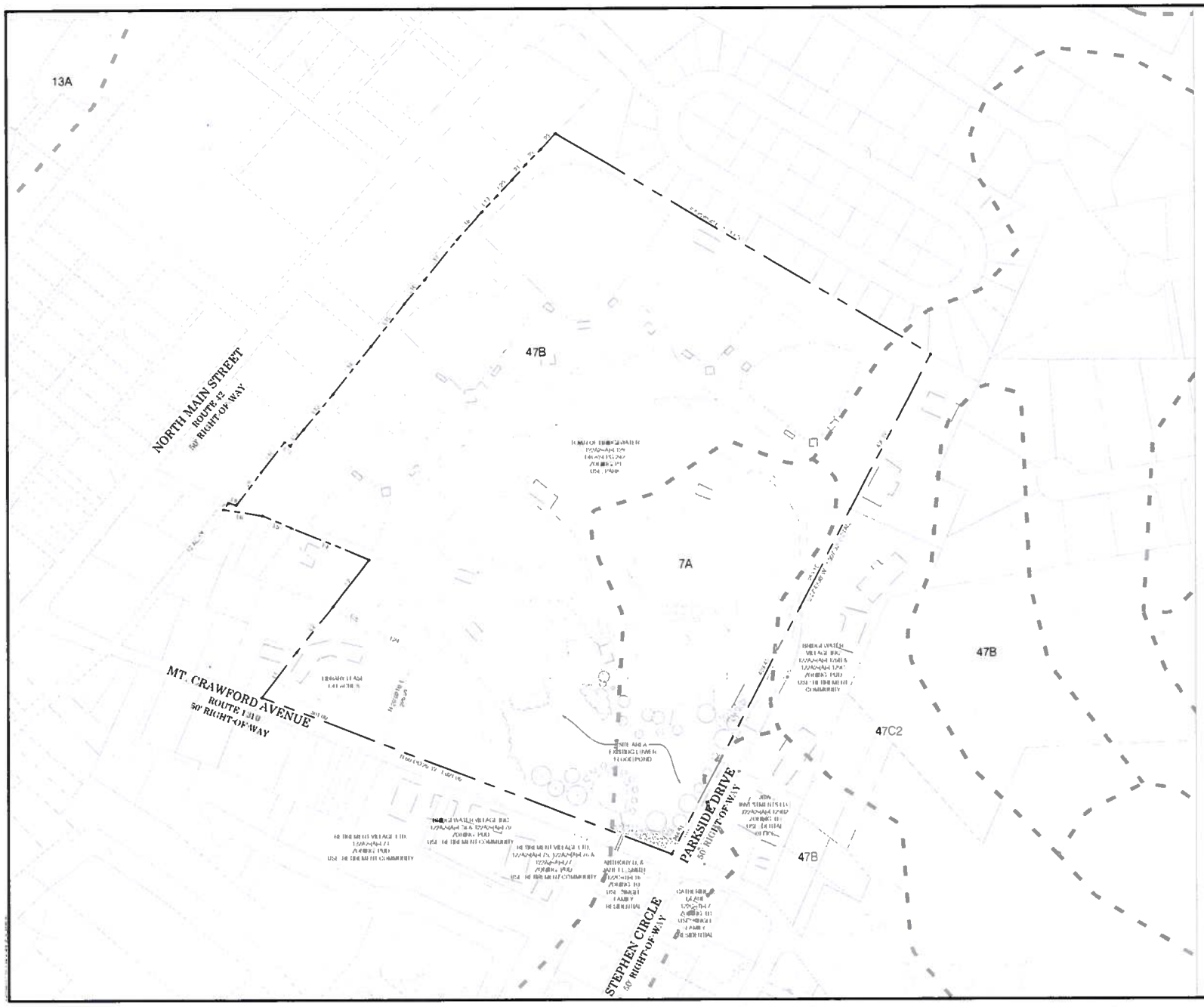
COVER SHEET

134 MT. CRAWFORD AVENUE
TOWN OF BRIDGEWATER, ASHBY DISTRICT, ROCKINGHAM COUNTY, VIRGINIA

SAAB ENGINEERING

DATE	SCALE
09/09/2022	
REVISIONS: 09/26/2022	
11/14/2022	N/A

C1.0



TOWN OF BRIDGEWATER
201 GREEN STREET
POST OFFICE BOX 72
VIRGINIA 22812
WWW.BRIDGEWATER.TOWN

09/28/2022

OAKDALE PARK WET POND

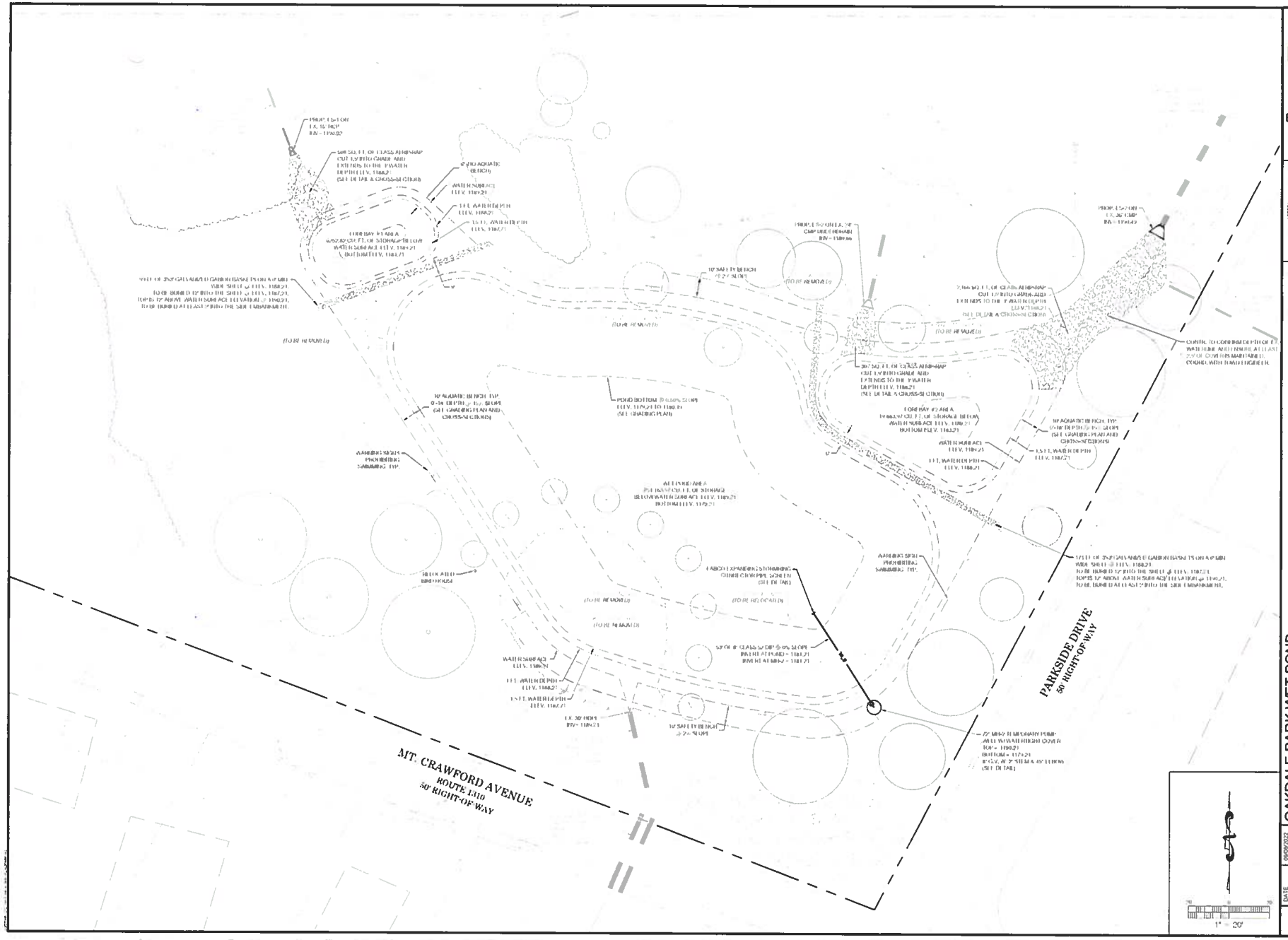
OVERALL EXISTING CONDITIONS PLAN

13A MT. CRAWFORD AVENUE
TOWN OF BRIDGEWATER ASHBY DISTRICT, ROCKINGHAM COUNTY, VIRGINIA

BRIDGEWATER ENGINEERING

DATE	REVISIONS	SCALE
09/06/2022		1" = 100'
09/28/2022		

C2.0



TOWN OF BRIDGEWATER
201 GREEN STREET
POST OFFICE BOX 72
VIRGINIA 22812
WWW.BRIDGEWATER.TOWN

DEPARTMENT OF PUBLIC WORKS
Lic. No. 1663
09/26/2022
LANDSCAPE ARCHITECT

OAKDALE PARK WET POND

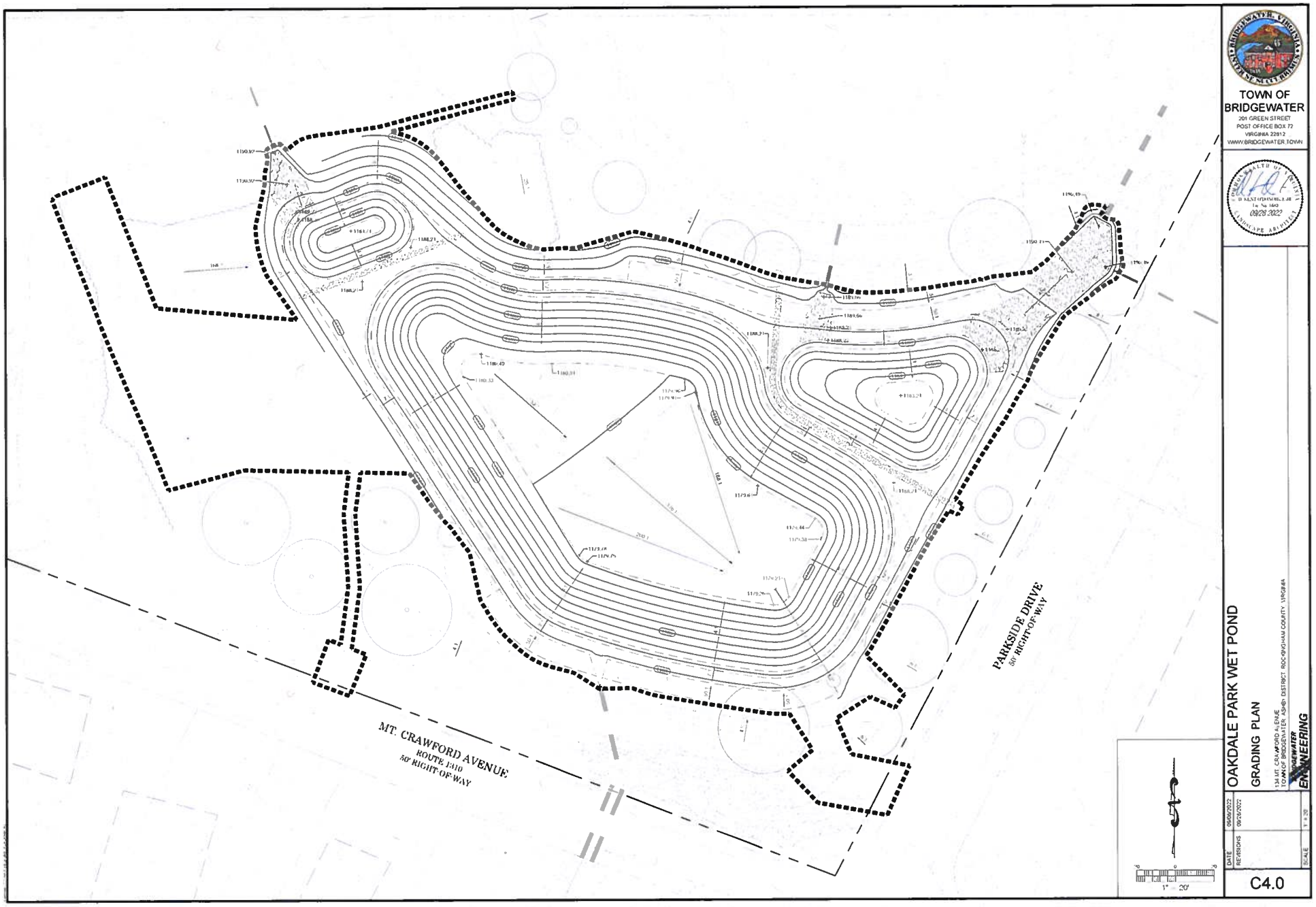
LAYOUT & DEMOLITION PLAN

134 MT. CRAWFORD AVENUE
TOWN OF BRIDGEWATER ASHBY DISTRICT ROCKINGHAM COUNTY, VIRGINIA

BRIDGEWATER ENGINEERING

DATE	09/09/2022
REVISIONS	09/26/2022
SCALE	1" = 20'

C3.0



TOWN OF BRIDGEWATER
201 GREEN STREET
POST OFFICE BOX 72
VIRGINIA 22812
WWW.BRIDGEWATER.TOWN

09/28/2022

OAKDALE PARK WET POND

GRADING PLAN

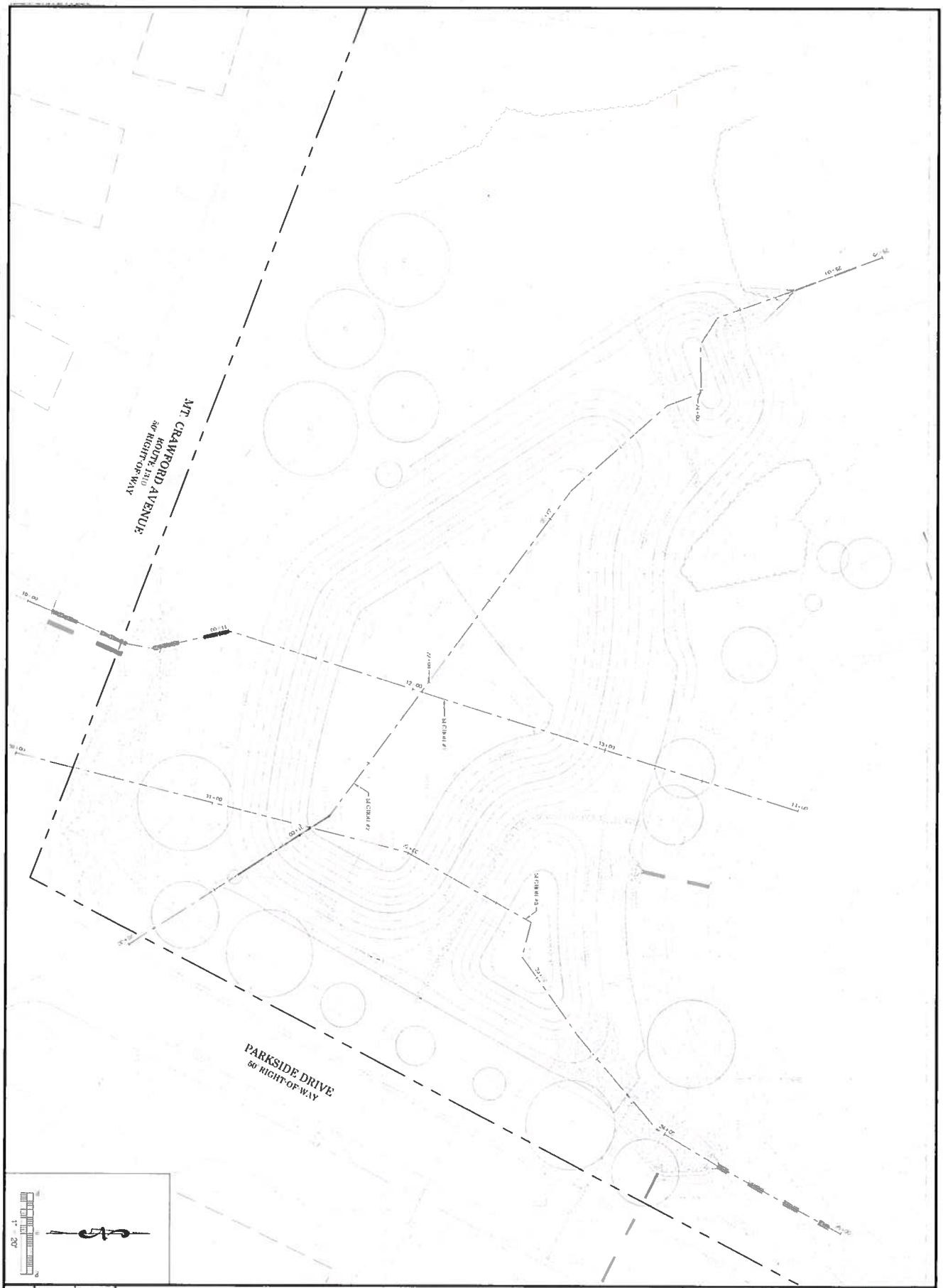
134 MT. CRAWFORD AVENUE
TOWN OF BRIDGEWATER, ASHBY DISTRICT, ROCKINGHAM COUNTY, VIRGINIA

BRIDGEWATER ENGINEERING

DATE	REVISIONS
09/09/2022	
09/28/2022	

SCALE: 1" = 20'

C4.0



C4.1

DATE	09/08/2022
REVISIONS	09/29/2022
SCALE	1" = 20'

OAKDALE PARK WET POND

SECTIONS PLAN

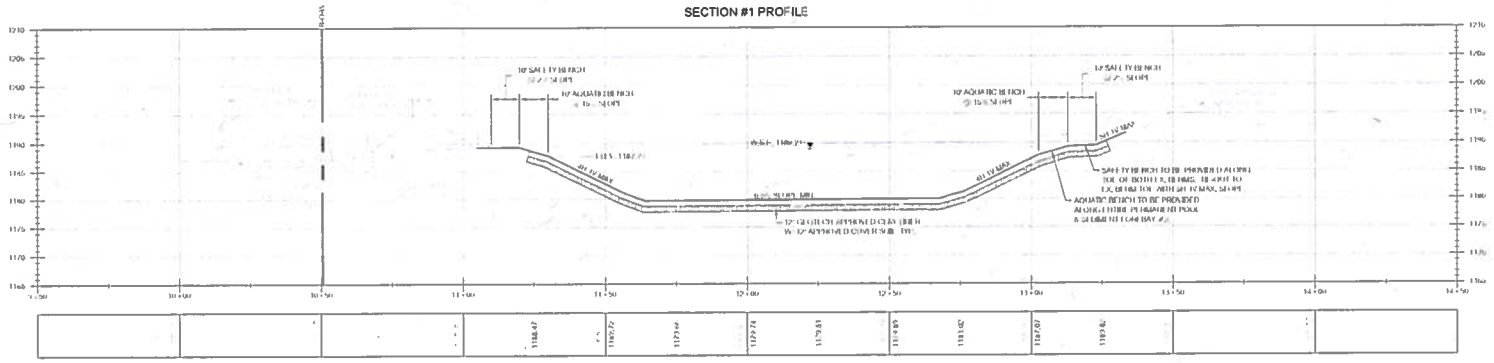
134 MT. CRAWFORD AVENUE
TOWN OF BRIDGEWATER, ASHBY DISTRICT, ROCKINGHAM COUNTY, VIRGINIA

BRIDGEWATER ENGINEERING

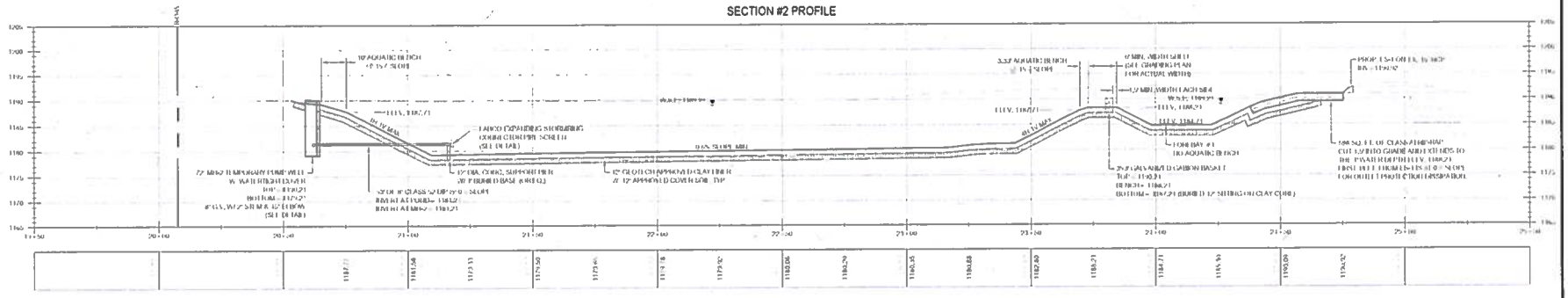
PROFESSIONAL ENGINEER
D. ALLEN FOUNTAIN, JR.
No. 19001
09/29/2022

TOWN OF BRIDGEWATER
201 GREEN STREET
POST OFFICE BOX 73
BRIDGEWATER, VIRGINIA 22812
WWW.BRIDGEWATER.TOWN

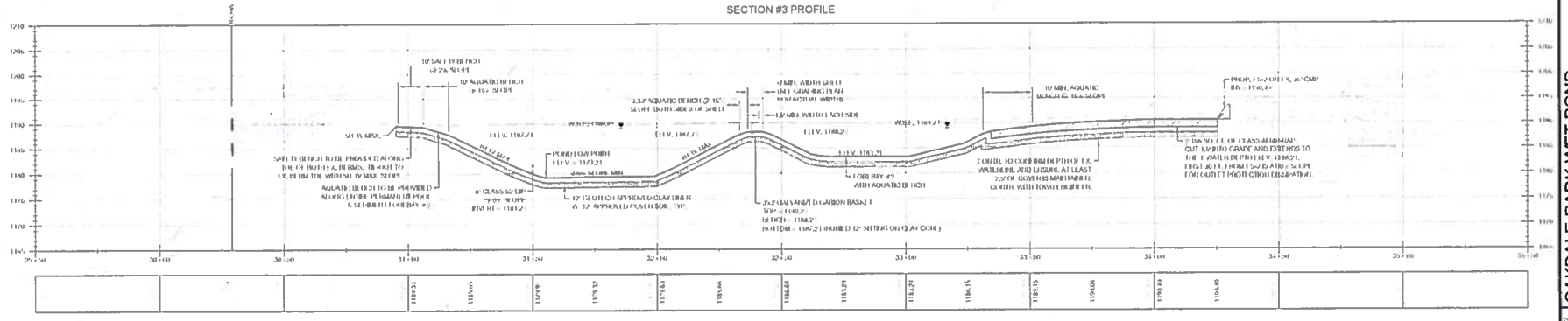
SECTION #1 PROFILE



SECTION #2 PROFILE



SECTION #3 PROFILE



VERTICAL SCALE
1" = 10'

HORIZONTAL SCALE
1" = 20'

TOWN OF BRIDGEWATER
201 GREEN STREET
POST OFFICE BOX 72
VIRGINIA 22812
WWW.BRIDGEWATER.TOWN

D. KENT CRAMFORD III
Lic. No. 1003
09/28/2022
LANDSCAPE ARCHITECT

OAKDALE PARK WET POND

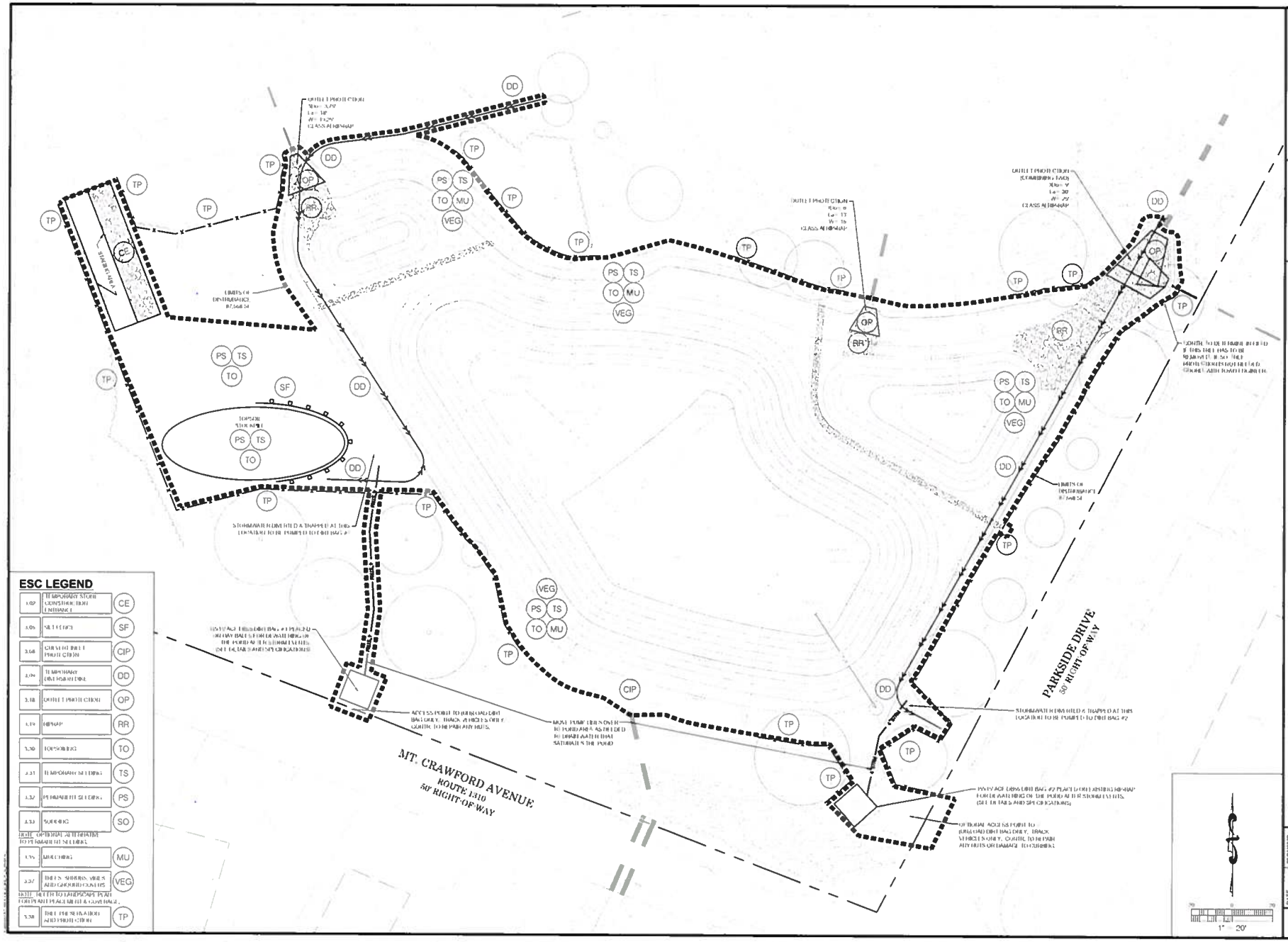
SECTION PROFILES

13 MT. CRAMFORD AVENUE
TOWN OF BRIDGEWATER ASHBY DISTRICT ROCKINGHAM COUNTY, VIRGINIA

BRIDGEWATER ENGINEERING

DATE	REVISIONS	SCALE
09/06/2022		AS SHOWN
09/28/2022		

C4.2



TOWN OF BRIDGEWATER
201 GREEN STREET
POST OFFICE BOX 72
VIRGINIA 22812
WWW.BRIDGEWATER.TOWN

09/28/2022

OAKDALE PARK WET POND

EROSION & SEDIMENT CONTROL PLAN

134 MT. CRAWFORD AVENUE
TOWN OF BRIDGEWATER ASHBY DISTRICT ROCKINGHAM COUNTY, VIRGINIA

ENGINEERING

DATE	REVISIONS
09/09/2022	
09/28/2022	

SCALE: 1" = 20'

C5.0

9VAC25-840-40. MINIMUM STANDARDS

A VESCP must be consistent with the following criteria, techniques and methods:

1. Permanent or temporary soil stabilization shall be applied to denuded areas within seven days after final grade is reached on any portion of the site. Temporary soil stabilization shall be applied within seven days to denuded areas that may not be at final grade but will remain dormant for longer than 14 days. Permanent stabilization shall be applied to areas that are to be left dormant for more than one year.
2. During construction of the project, soil stock piles and borrow areas shall be stabilized or protected with sediment trapping measures. The applicant is responsible for the temporary protection and permanent stabilization of all soil stockpiles on site as well as borrow areas and soil intentionally transported from the project site.
3. A permanent vegetative cover shall be established on denuded areas not otherwise permanently stabilized. Permanent vegetation shall not be considered established until a ground cover is achieved that is uniform, mature enough to survive and will inhibit erosion.
4. Sediment basins and traps, perimeter dikes, sediment barriers and other measures intended to trap sediment shall be constructed as a first step in any land-disturbing activity and shall be made functional before upslope land disturbance takes place.
5. Stabilization measures shall be applied to earthen structures such as dams, dikes and diversions immediately after installation.
6. Sediment traps and sediment basins shall be designed and constructed based upon the total drainage area to be served by the trap or basin.
   - 6.a. The minimum storage capacity of a sediment trap shall be 134 cubic yards per acre of drainage area and the trap shall only control drainage areas less than three acres.
   - 6.b. Surface runoff from disturbed areas that is comprised of flow from drainage areas greater than or equal to three acres shall be controlled by a sediment basin. The minimum storage capacity of a sediment basin shall be 134 cubic yards per acre of drainage area. The outfall system shall, at a minimum, maintain the structural integrity of the basin during a 25-year storm of 24-hour duration. Runoff coefficients used in runoff calculations shall correspond to a bare earth condition or those conditions expected to exist while the sediment basin is utilized.
7. Cut and fill slopes shall be designed and constructed in a manner that will minimize erosion. Slopes that are found to be eroding excessively within one year of permanent stabilization shall be provided with additional slope stabilizing measures until the problem is corrected.
8. Concentrated runoff shall not flow down cut or fill slopes unless contained within an adequate temporary or permanent channel, flume or slope drain structure.
9. Whenever water seeps from a slope face, adequate drainage or other protection shall be provided.
10. All storm sewer inlets that are made operable during construction shall be protected so that sediment-laden water cannot enter the conveyance system without first being filtered or otherwise treated to remove sediment.
11. Before newly constructed stormwater conveyance channels or pipes are made operational, adequate outlet protection and any required temporary or permanent channel lining shall be installed in both the conveyance channel and receiving channel.
12. When work in a live watercourse is performed, precautions shall be taken to minimize encroachment, control sediment transport and stabilize the work area to the greatest extent possible during construction. Nonerodible material shall be used for the construction of causeways and cofferdams. Earthen fill may be used for these structures if armored by nonerodible cover materials.
13. When a live watercourse must be crossed by construction vehicles more than twice in any six-month period, a temporary vehicular stream crossing constructed of nonerodible material shall be provided.
14. All applicable federal, state and local requirements pertaining to working in or crossing live watercourses shall be met.
15. The bed and banks of a watercourse shall be stabilized immediately after work in the watercourse is completed.
16. Underground utility lines shall be installed in accordance with the following standards in addition to other applicable criteria:
   - 16.a. No more than 500 linear feet of trench may be opened at one time.
   - 16.b. Excavated material shall be placed on the uphill side of trenches.
   - 16.c. Effluent from dewatering operations shall be filtered or passed through an approved sediment trapping device, or both, and discharged in a manner that does not adversely affect flowing streams or off-site property.
   - 16.d. Material used for backfilling trenches shall be properly compacted in order to minimize erosion and promote stabilization.
   - 16.e. Restabilization shall be accomplished in accordance with this chapter.
   - 16.f. Applicable safety requirements shall be complied with.
17. Where construction vehicle access routes intersect paved or public roads, provisions shall be made to minimize the transport of sediment by vehicular tracking onto the paved surface. Where sediment is transported onto a paved or public road surface, the road surface shall be cleaned thoroughly at the end of each day. Sediment shall be removed from the roads by shoveling or sweeping and transported to a sediment control disposal area. Street washing shall be allowed only after sediment is removed in this manner. This provision shall apply to individual development lots as well as to larger land-disturbing activities.
18. All temporary erosion and sediment control measures shall be removed within 30 days after final site stabilization or after the temporary measures are no longer needed, unless otherwise authorized by the VESCP authority. Trapped sediment and the disturbed soil areas resulting from the disposition of temporary measures shall be permanently stabilized to prevent further erosion and sedimentation.
19. Properties and waterways downstream from development sites shall be protected from sediment deposition, erosion and damage due to increases in volume, velocity and peak flow rate of stormwater runoff for the stated frequency storm of 24-hour duration in accordance with the following standards and criteria. Stream restoration and relocation projects that incorporate natural channel design concepts are not man-made channels and shall be exempt from any flow rate capacity and velocity requirements for natural or man-made channels:
   - 19.a. Concentrated stormwater runoff leaving a development site shall be discharged directly into an adequate natural or man-made receiving channel, pipe or storm sewer system. For those sites where runoff is discharged into a pipe or pipe system, downstream stability analyses at the outfall of the pipe or pipe system shall be performed.
   - 19.b. Adequacy of all channels and pipes shall be verified in the following manner:
     - 19.b.1. The applicant shall demonstrate that the total drainage area to the point of analysis within the channel is 100 times greater than the contributing drainage area of the project in question; or
     - 19.b.2.
       - 19.b.2.a. Natural channels shall be analyzed by the use of a two-year storm to verify that stormwater will not overtop channel banks nor cause erosion of channel bed or banks.
       - 19.b.2.b. All previously constructed man-made channels shall be analyzed by the use of a 10-year storm to verify that stormwater will not overtop its banks and by the use of a two-year storm to demonstrate that stormwater will not cause erosion of channel bed or banks; and
       - 19.b.2.c. Pipes and storm sewer systems shall be analyzed by the use of a 10-year storm to verify that stormwater will be contained within the pipe or system.
   - 19.c. If existing natural receiving channels or previously constructed man-made channels or pipes are not adequate, the applicant shall:
     - 19.c.1. Improve the channels to a condition where a 10-year storm will not overtop the banks and a two-year storm will not cause erosion to the channel, the bed, or the banks;
     - 19.c.2. Improve the pipe or pipe system to a condition where the 10-year storm is contained within the appurtenances;
     - 19.c.3. Develop a site design that will not cause the pre-development peak runoff rate from a two-year storm to increase when runoff outfalls into a natural channel or will not cause the pre-development peak runoff rate from a 10-year storm to increase when runoff outfalls into a man-made channel; or
     - 19.c.4. Provide a combination of channel improvement, stormwater detention or other measures which is satisfactory to the VESCP authority to prevent downstream erosion.
   - 19.d. The applicant shall provide evidence of permission to make the improvements.
   - 19.e. All hydrologic analyses shall be based on the existing watershed characteristics and the ultimate development condition of the subject project.
   - 19.f. If the applicant chooses an option that includes stormwater detention, he shall obtain approval from the VESCP of a plan for maintenance of the detention facilities. The plan shall set forth the maintenance requirements of the facility and the person responsible for performing the maintenance.
   - 19.g. Outfall from a detention facility shall be discharged to a receiving channel, and energy dissipators shall be placed at the outfall of all detention facilities as necessary to provide a stabilized transition from the facility to the receiving channel.
   - 19.h. All on-site channels must be verified to be adequate.
   - 19.i. Increased volumes of sheet flows that may cause erosion or sedimentation on adjacent property shall be diverted to a stable outlet, adequate channel, pipe or pipe system, or to a detention facility.
   - 19.j. In applying these stormwater management criteria, individual lots or parcels in a residential, commercial or industrial development shall not be considered to be separate development projects. Instead, the development, as a whole, shall be considered to be a single development project. Hydrologic parameters that reflect the ultimate development condition shall be used in all engineering calculations.
   - 19.k. All measures used to protect properties and waterways shall be employed in a manner which minimizes impacts on the physical, chemical and biological integrity of rivers, streams and other waters of the state.
   - 19.l. Any plan approved prior to July 1, 2014, that provides for stormwater management that addresses any flow rate capacity and velocity requirements for natural or man-made channels shall satisfy the flow rate capacity and velocity requirements for natural or man-made channels if the practices are designed to (i) detain the water quality volume and to release it over 48 hours; (ii) detain and release over a 24-hour period the expected rainfall resulting from the one year, 24-hour storm; and (iii) reduce the allowable peak flow rate resulting from the 1.5, 2, and 10-year, 24-hour storms to a level that is less than or equal to the peak flow rate from the site assuming it was in a good forested condition, achieved through multiplication of the forested peak flow rate by a reduction factor that is equal to the runoff volume from the site when it was in a good forested condition divided by the runoff volume from the site in its proposed condition, and shall be exempt from any flow rate capacity and velocity requirements for natural or man-made channels as defined in any regulations promulgated pursuant to § 62.1-44.15:54 or 62.1-44.15:65 of the Act.
   - 19.m. For plans approved on and after July 1, 2014, the flow rate capacity and velocity requirements of § 62.1-44.15:52 A of the Act and this subsection shall be satisfied by compliance with water quantity requirements in the Stormwater Management Act (§ 62.1-44.15:24 et seq. of the Code of Virginia) and attendant regulations, unless such land-disturbing activities (i) are in accordance with provisions for time limits on applicability of approved design criteria in 9VAC25-870-47 or grandfathering in 9VAC25-870-48 of the Virginia Stormwater Management Program (VSMP) Regulation, in which case the flow rate capacity and velocity requirements of § 62.1-44.15:52 A of the Act shall apply, or (ii) are exempt pursuant to § 62.1-44.15:34 C 7 of the Act.
   - 19.n. Compliance with the water quantity minimum standards set out in 9VAC25-870-66 of the Virginia Stormwater Management Program (VSMP) Regulation shall be deemed to satisfy the requirements of this subdivision 19.

EROSION CONTROL NARRATIVE

1. [illegible]
2. [illegible]
3. [illegible]
4. [illegible]
5. [illegible]
6. [illegible]
7. [illegible]

[illegible]

11. MANAGEMENT STRATEGIES

[illegible]

12. CONSTRUCTION SEQUENCE

A. INSTALL GRAVEL CONSTRUCTION ENTRANCE. ALL CONSTRUCTION TRAFFIC SHALL ENTER AND EXIT THE SITE VIA THE CONSTRUCTION ENTRANCE ONLY. [illegible]

[illegible]

13. GENERAL NOTES

[illegible]

DATE	09/08/2022
REVISIONS	09/28/2022
SCALE	N/A

OAKDALE PARK WET POND

EROSION & SEDIMENT CONTROL NOTES

134 MT. CRAWFORD AVENUE
TOWN OF BRIDGEWATER, ASHBY DISTRICT, ROCKINGHAM COUNTY, VIRGINIA

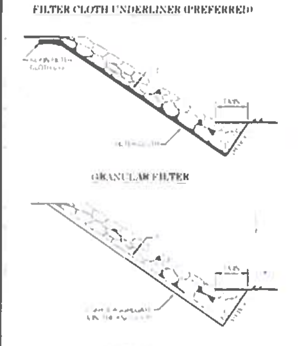
BRIDGEWATER ENGINEERING

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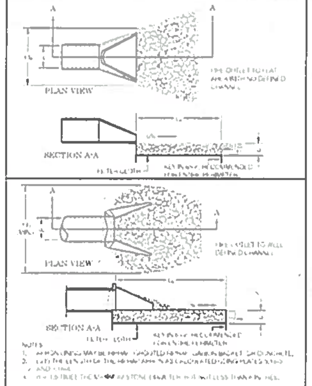
COMMONWEALTH OF VIRGINIA
LANDSCAPE ARCHITECT
09/28/2022

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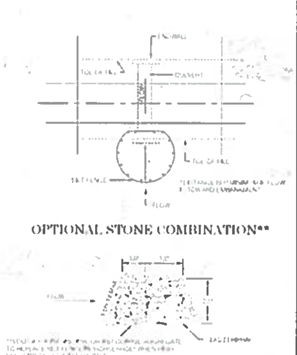
TOE REQUIREMENTS FOR BANK STABILIZATION



PIPE OUTLET CONDITIONS



SILT FENCE CULVERT INLET PROTECTION



CONSTRUCTION OF A SILT FENCE (WITHOUT WIRE SUPPORT)

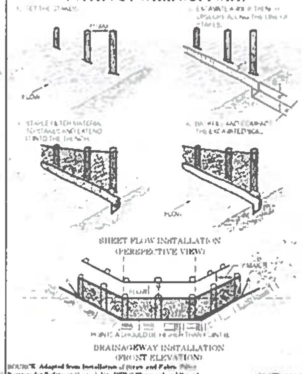


TABLE 3.02-A CONSTRUCTION SPECIFICATIONS FOR FILTER CLOTH UNDERLINER

Fabric Properties	Light-Duty Entrance (Graded Subgrade)	Heavy-Duty Entrance (Rough Graded)	Test Method
[illegible]	[illegible]	[illegible]	[illegible]

Source: Virginia Highway and Transportation Research Council (VHTRC)

STONE CONSTRUCTION ENTRANCE

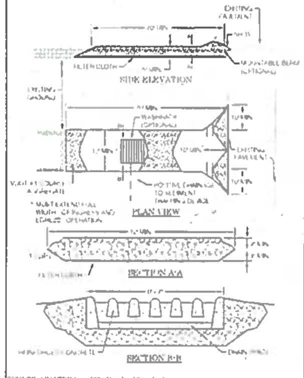


TABLE 3.19-C GRADED RIPRAP - WEIGHT ANALYSIS

Riprap Class Type	Weight Range (lbs.)	Requirements for Stone Mixture
[illegible]	[illegible]	[illegible]

Source: Adapted from VDOT Road and Bridge Specifications

TABLE 3.19-B GRADED RIPRAP - DESIGN VALUES

Riprap Class	D_{15} Weight (lbs.)	Mean D_{15} Spherical Diameter (ft.)	Mean D_{50} Spherical Diameter (ft.)
[illegible]	[illegible]	[illegible]	[illegible]

Source: VDOT Drainage Manual

TEMPORARY DIVERSION DIKE



TABLE 3.05-B PHYSICAL PROPERTIES OF FILTER FABRIC IN SILT FENCE

Physical Property	Test	Requirements
[illegible]	[illegible]	[illegible]

Source: VHTRC

TABLE 3.31-A LIMING REQUIREMENTS FOR TEMPORARY SITES

pH TEST	RECOMMENDED APPLICATION OF AGRICULTURAL LIMESTONE
[illegible]	[illegible]

Source: Va. DSWC

TABLE 3.19-D REQUIREMENTS FOR FILTER FABRIC USED WITH RIPRAP

Physical Property	Test Method	Requirements
[illegible]	[illegible]	[illegible]

Source: VDOT Road and Bridge Specifications

TABLE 3.33-B MAINTENANCE FERTILIZATION OF ESTABLISHED SOD

[illegible]

Source: Va. DSWC

TABLE 3.32-F LBS. OF GROUND AGRICULTURAL LIMESTONE* PER THOUSAND SQUARE FEET NEEDED TO CORRECT pH LEVEL OF ACID SOILS TO 6.5

EXISTING pH	SOIL TEXTURE: Sandy Loam	Loam	Clay Loam
[illegible]	[illegible]	[illegible]	[illegible]

TABLE 3.31-B ACCEPTABLE TEMPORARY SEEDING PLANT MATERIALS "QUICK REFERENCE FOR ALL REGIONS"

Planting Dates	Species	Rate (lbs./acre)
[illegible]	[illegible]	[illegible]

Source: Va. DSWC

TABLE 3.35-A ORGANIC MULCH MATERIALS AND APPLICATION RATES

MULCHES	RATES: Per Acre	RATES: Per 1000 sq. ft.	NOTES
[illegible]	[illegible]	[illegible]	[illegible]

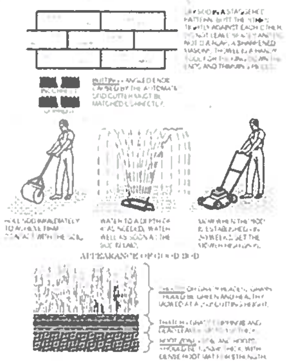
Source: Va. DSWC

TABLE 3.33-A TYPE OF SOD AVAILABLE IN VIRGINIA AND RECOMMENDED USES

[illegible]

Source: 1993 Virginia Turfgrass Variety Recommendations, Virginia Crop Improvement Association

SODDING



SOURCE: Va. DSWC

TABLE 3.32-E QUALITY OF SEED*

	Minimum Seed Purity (%)	Minimum Germination (%)
[illegible]	[illegible]	[illegible]

TABLE 3.32-C SITE SPECIFIC SEEDING MIXTURES FOR APPALACHIAN/MOUNTAIN AREA

[illegible]

DATE	09/06/2022
REVISIONS	09/26/2022
SCALE	N/A

OAKDALE PARK WET POND

EROSION & SEDIMENT CONTROL DETAILS I

134 MT. CRAWFORD AVENUE
TOWN OF BRIDGEWATER, ASHBY DISTRICT, ROCKINGHAM COUNTY, VIRGINIA

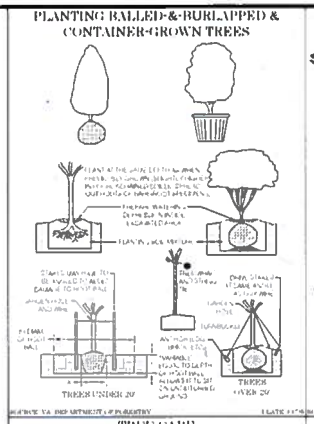
BRIDGEWATER ENGINEERING

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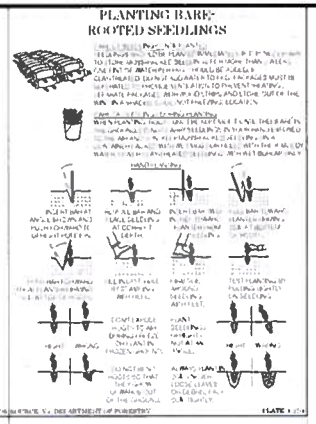
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PLANTING BALLED-&-BURLAPPED & CONTAINER-GROWN TREES



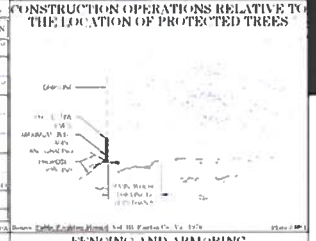
PLANTING BARE-ROOTED SEEDLINGS



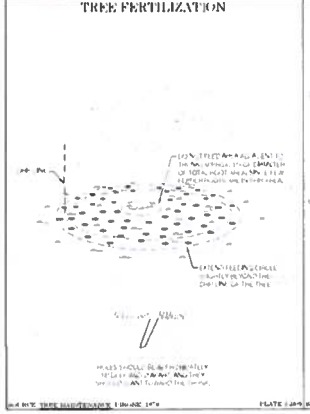
TREE CARE



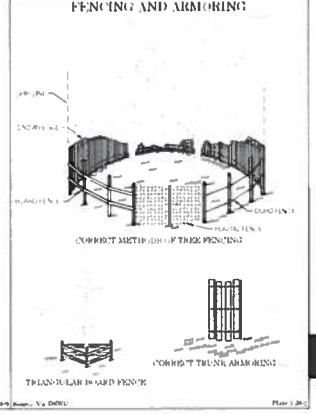
CONSTRUCTION OPERATIONS RELATIVE TO THE LOCATION OF PROTECTED TREES

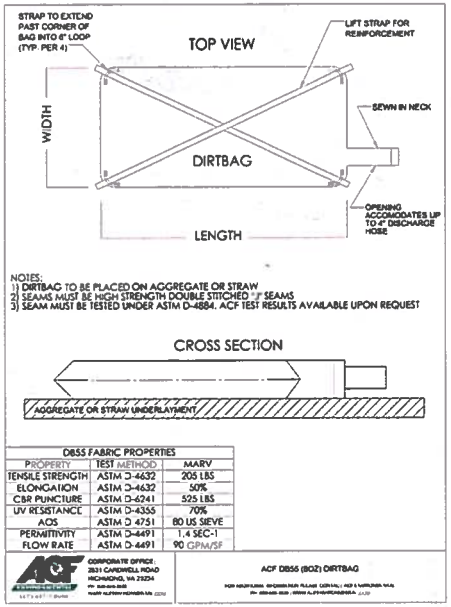


TREE FERTILIZATION



FENCING AND ARMORING

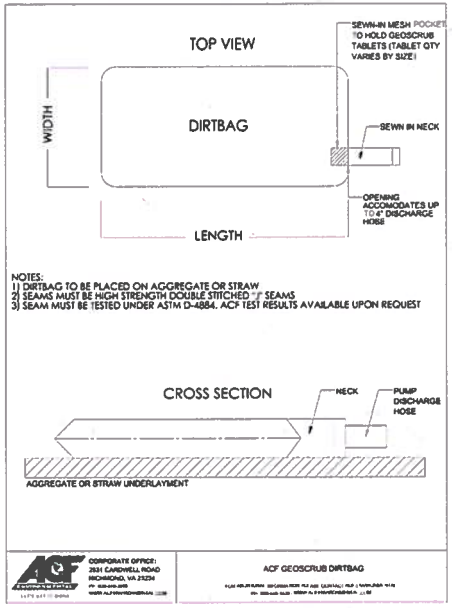




DBSS FABRIC PROPERTIES		
PROPERTY	TEST METHOD	MARV
TENSILE STRENGTH	ASTM D-4632	205 LBS
ELONGATION	ASTM D-4632	50%
CBR PUNCTURE	ASTM D-6241	525 LBS
UV RESISTANCE	ASTM D-4355	70%
AOS	ASTM D 4751	80 US SIEVE
PERMITIVITY	ASTM D-4491	1.4 SEC-1
FLOW RATE	ASTM D-4491	90 GPM/SF

CORPORATE OFFICE: 2831 CAROWELL ROAD RICHMOND, VA 23234

ACF DBSS (BOZ) DIRTBAG



CORPORATE OFFICE: 2831 CAROWELL ROAD RICHMOND, VA 23234

ACF GEOSCRUB DIRTBAG

LET'S GET IT DONE

DIRTBAG®

SEDIMENT AND PERIMETER CONTROL

DEWATERING BAG

FILTERS SILT, SAND, AND FINES OUT OF PUMPED WATER

Dirtbag dewatering bags remove silt, sand, and other debris from pumped water on construction sites, ponds, dredging locations and more.

The bag easily connects to a pump discharge hose using the 4" neck and sewn in attachment straps. To increase the effectiveness of Dirtbag's filtration system, ACF Environmental recommends placing the product on a bed of hay bales or aggregate to maximize water flow through the surface area of the bag. Doing so also helps protect the surrounding area from erosion, sediment displacement and the pollution of receiving waters. Under most circumstances, a 15x15 Dirtbag can pass up to 500 gallons of water per minute.

DIRTBAG





USE GUIDELINES:

- **Dirtbag must be maintained at all times during use (over-filling may cause rupture)**
- Flow and removal rates vary based on particle size/ sediment composition
- To increase flow rate place Dirtbag on aggregate, straw bales, or other porous surfaces
- Dirtbag is full when it can no longer efficiently pass water at a reasonable rate

ADVANTAGES:

- High flow rate
- 15' x 15' Dirtbag is rated up to 500 GPM pump
- Built-in neck receives up to 4" discharge hose
- Removes sediment, trash, and debris
- Economical alternative to other methods
- Custom sizes available upon request

Full product specifications are available on the Dirtbag product page at www.acfenvironmental.com

For more information about Sediment and Perimeter Control, contact us at 800.448.3636 or email@acfenvironmental.com

ACF ENVIRONMENTAL

SPECIFICATIONS

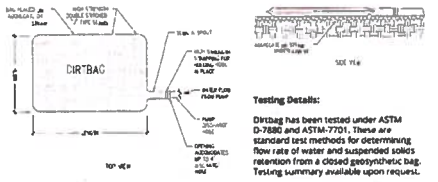
Dirtbag sizes include: 4' x 6' | 5' x 5' | 8' x 10' | 10' x 10' | 15' x 15' | and custom sizes on request

PROPERTY	TEST METHOD	MARV
Weight	ASTM D3776	8 oz/yd²
Grab Strength (Tensile)	ASTM D4632	205 lbs
CBR Puncture	ASTM D6241	525 lbs
UV Resistance	ASTM D4355	70%
Apparent Opening Size (AOS)	ASTM D4751	80 US std. sieve
Flow Rate	ASTM D4491	90 gal/min/ft²
Permittivity	ASTM D4491	1.4 sec⁻¹

Dirtbag® seam test results (ASTM D4884)

NONWOVEN DIRTBAG	WOVEN DIRTBAG
Maximum load 786 lbs	Maximum load 934 lbs
Maximum strength 1178 lb/ft	Maximum strength 1402 lb/ft

NOTE: Each test result was derived from a material failure rather than a stitch failure.



Testing Details:

Dirtbag has been tested under ASTM D-7880 and ASTM-7701. These are standard test methods for determining flow rate of water and suspended solids retention from a closed geosynthetic bag. Testing summary available upon request.

ACF ENVIRONMENTAL
800.448.3636
acfenvironmental.com

DISCLAIMER: Use of dewatering bags is a standard construction method throughout the U.S. ACF Environmental in not liable for any damage caused by rupture or over-filling of Dirtbag. If Dirtbag fails to fully pass pumped water, turn off pump and contact ACF Environmental at 800-448-3636.

TOWN OF BRIDGEWATER
201 GREEN STREET
POST OFFICE BOX 72
VIRGINIA 22812
WWW.BRIDGEWATER.TOWN

I HEREBY CERTIFY THAT I HAVE PERFORMED OR SUPERVISED THE LANDSCAPE ARCHITECTURAL WORK SHOWN ON THIS PLAN
09/28/2022

OAKDALE PARK WET POND

EROSION & SEDIMENT CONTROL DETAILS II

134 MT. CRAWFORD AVENUE
TOWN OF BRIDGEWATER, ASHBY DISTRICT, ROCKINGHAM COUNTY, VIRGINIA

DEWBERRY ENGINEERING

DATE	REVISIONS	SCALE
09/09/2022		
09/29/2022		N.A.

C5.3

FOREBAY #1 STAGE STORAGE TABLE

ELEV	AREA (SQ. FT.)	DEPTH (ft)	AVG END INC. VOL. (cu. ft.)	AVG END TOTAL VOL. (cu. ft.)	CONIC INC. VOL. (cu. ft.)	CONIC TOTAL VOL. (cu. ft.)
1 184.71	2623.37	n/a	n/a	0.00	n/a	0.00
1 185.00	3569.91	0.29	891.90	891.90	894.44	894.44
1 185.21	4317.75	0.21	827.06	1717.66	827.62	1722.08
1 186.00	7766.61	0.79	4772.06	6489.62	4782.83	6504.91
1 186.21	8829.70	0.21	1743.95	8234.57	1748.87	8253.78
1 187.00	12933.92	0.79	8613.90	16848.47	8634.79	16887.57
1 187.21	14233.67	0.21	2808.84	19657.40	2816.84	19704.40
1 188.00	19197.84	0.79	13317.76	32975.17	13353.01	33057.41
1 188.21	20613.37	0.21	4106.87	37082.04	4116.78	37174.19
1 189.21	30799.14	1.00	25642.78	62724.82	25677.39	62851.58

FOREBAY #2 STAGE STORAGE TABLE

ELEV	AREA (SQ. FT.)	DEPTH (ft)	AVG END INC. VOL. (cu. ft.)	AVG END TOTAL VOL. (cu. ft.)	CONIC INC. VOL. (cu. ft.)	CONIC TOTAL VOL. (cu. ft.)
1 181.21	646.37	n/a	n/a	0.00	n/a	0.00
1 183.21	817.84	0.50	1155.60	1155.60	1160.63	1160.63
1 184.00	977.82	0.29	568.34	1723.94	568.66	1729.29
1 184.21	1 028.68	0.21	417.50	2141.44	418.31	2147.61
1 185.00	1 833.16	0.79	1098.78	3240.22	1101.12	3248.73
1 185.21	2 021.83	0.21	1561.45	4801.67	1563.18	4811.91
1 186.00	2 878.39	0.79	1747.90	6549.58	1751.21	6563.12
1 186.21	3 041.35	0.21	2286.56	6836.13	2291.38	6854.50
1 187.00	3 836.19	0.79	1071.39	7907.52	1073.83	7928.33
1 187.21	4 581.59	0.21	948.81	8856.33	948.40	8876.73
1 188.00	5 112.75	0.79	1486.68	10343.02	1484.98	10361.72
1 188.21	5 315.96	0.21	1116.01	11459.03	1115.78	11477.50
1 189.21	7 178.32	1.00	6061.14	17520.17	6059.66	17537.17

POND AREA STAGE STORAGE TABLE

ELEV	AREA (SQ. FT.)	DEPTH (ft)	AVG END INC. VOL. (cu. ft.)	AVG END TOTAL VOL. (cu. ft.)	CONIC INC. VOL. (cu. ft.)	CONIC TOTAL VOL. (cu. ft.)
1 179.21	10.11	n/a	n/a	0.00	n/a	0.00
1 180.00	10 215.50	0.79	8039.17	8039.17	7977.38	7977.38
1 181.00	17 604.05	1.00	13909.88	21949.05	13844.52	21821.90
1 181.21	18 014.02	0.21	3676.92	25625.97	3676.43	25498.33
1 182.00	19 867.86	0.79	14945.34	40571.31	14940.37	40438.68
1 183.00	22 396.96	1.00	21048.11	61619.42	21086.44	61525.12
1 183.21	22 861.37	0.21	4745.24	66364.66	4745.18	66270.30
1 184.00	24 862.91	0.79	18856.26	85220.92	18846.74	85117.04
1 185.00	27 496.44	1.00	26179.18	111400.10	26168.14	111285.18
1 186.00	30 241.88	1.00	28869.16	140269.26	28859.24	140144.43
1 187.00	33 119.70	1.00	31680.79	171950.05	31671.11	171815.53
1 187.21	33 737.76	0.21	7457.05	179407.10	7457.03	179272.57
1 188.00	36 697.10	0.79	23431.98	202839.08	23430.58	202703.15
1 188.21	37 461.80	0.21	7817.66	210656.74	7817.40	210520.55
1 189.21	41 095.65	1.00	39077.31	249734.05	39076.77	249596.81

FIRST YEAR MAINTENANCE OPERATIONS

ONCE SITE IS ESTABLISHED IT IS POSSIBLE TO DEFINE THE MAINTENANCE REQUIREMENTS. IT IS IMPORTANT DURING THE FIRST YEAR THAT THE FOLLOWING CONDITIONS BE MET:

- INITIAL INSPECTIONS FOR THE FIRST SIX MONTHS FOLLOWING CONSTRUCTION THE SITE SHOULD BE INSPECTED AT LEAST TWICE A YEAR (SPRING AND FALL) OR AFTER A PERIOD OF HEAVY RAINFALL.
- PLANTED OR AQUATIC BENCHES - THE AQUATIC BENCH SHOULD BE PLANTED WITH EMERGENT OR FLOATING PLANTS FOLLOWING THE PLANTING RECOMMENDATIONS CONTAINED IN STANDARD AND SPECIFICATION NO. 13 (EMERGENT SHORELINE PLANTING).
- SPOT RESEEDING - INSPECTIONS SHOULD LOOK FOR BARE OR ERODING AREAS IN THE CONTRIBUTING DRAINAGE AREA OR ADJACENT TO THE POND BUFFER AND MAKE SURE THEY ARE IMMEDIATELY SEEDED AND MULCHED.
- WATERING - THIS PLANTING IN POND BUFFER NEED TO BE WATERED DURING THE ESTABLISHMENT PERIOD IN ACCORDANCE WITH STANDARD AND SPECIFICATION NO. 13 FOR THE FIRST MONTH AND THE PLANTINGS MUST BE MAINTAINED DURING THE FIRST GROWING SEASON AFTER ESTABLISHMENT.

VA STORMWATER BMP CLEARINGHOUSE DESIGN SPEC. NO. 14
TABLE 14.6 TYPICAL WET POND MAINTENANCE TASKS AND FREQUENCY

MAINTENANCE ITEMS[1]	FREQUENCY[1]
REMOVE DEBRIS AND TRASH	QUARTERLY OR AS REQUIRED DURING STORMS (>1 INCH OF RAINFALL)
REPAIR ERODED AREAS AND REVEGETATE	TAKE AS NEED
MOWING MAINTENANCE	
SPECIFIED CLEANOUT OF SEDIMENT FOREBAY DIKES AND CHANNELS	ANNUALLY
ANNUAL MAINTENANCE INSPECTION	
OPERATE THE POND'S OUTLET TO ASSESS AND EXERCISE THE VALVES	
REPAIR SHORELINE EROSION, GULLIES, ETC. AS NEEDED	
POND DEBRIS AND AQUATIC BENCH MAINTENANCE PLANTINGS	ONE TIME DURING THE SECOND YEAR FOLLOWING CONSTRUCTION
FOREBAY SEDIMENT REMOVAL	EVERY 5-7 YEARS
REPAIRING THE POND'S OUTLET AND RISER AS NEEDED	EVERY 10-25 YEARS

[1]MAINTENANCE ITEMS AND REQUIRED FREQUENCY SHOULD BE VERIFIED WITH LOCAL REQUIREMENTS

VA DCR STORMWATER DESIGN SPECIFICATION NO. 14 — WET POND

Sample Construction Inspection Checklist for Wet Ponds: The following checklist provides a basic outline of the anticipated items for the construction inspection of a wet pond. Inspectors should review the plans carefully, and adjust these items and the timing of inspection verification as needed to ensure the intent of the design and the inspection is met. Finally, users of this information may wish to incorporate these items into a VSMP Authority Construction Checklist format consistent with the format used for erosion and sediment control and BMP construction inspections.

Pre-Construction Meeting

- ☐ Pre-construction meeting with the contractor designated to install the wet pond has been conducted.
- ☐ Identify the tentative schedule for construction and verify the requirements and schedule for interim inspections and sign-off.

Excavation of Wet Pond

- ☐ Excavation of the wet pond geometry (including bottom width, side slopes, check dams, weir overflow and outlet protection, etc.) achieves the elevations in accordance with approved plans.
- ☐ Excavation of internal micro-topographic features: deep pool, forebays, etc., is in accordance with approved plans.
- ☐ Impermeable liner, when required, meets project specifications and is placed in accordance with manufacturers specifications.
- ☐ **Certification of Excavation Inspection:** Inspector certifies that the excavation has achieved all the appropriate grades, grade transitions, and wet pond geometry as shown on the approved plans.

Landscaping Plan and Stabilization

- ☐ Exposed soils on pond side slopes above permanent pool elevation are stabilized with specified seed mixtures, stabilization matting, mulch, etc., in accordance with approved plans.
- ☐ Appropriate number and spacing of plants are installed and protected on the aquatic bench and pond buffer in accordance with the approved plans.
- ☐ All erosion and sediment control practices have been removed.
- ☐ Follow-up inspection and as-built survey certification has been scheduled.
- ☐ GPS coordinates have been documented for the wet pond installation.

CONSTRUCTION INSPECTIONS

MULTIPLE INSPECTIONS ARE CRITICAL TO ENSURE THAT STORMWATER PONDS ARE PROPERLY CONSTRUCTED. THE CONTRACTOR SHALL COORDINATE WITH THE STORMWATER CONSULTANT TO ENSURE THAT THE FOLLOWING STAGES ARE CONSTRUCTED:

- PRE-CONSTRUCTION MEETING
- BEFORE SITE PREPARATION (BEFORE BEGINNING INSTALLATION OF E&S CONTROLS)
- EXCAVATED BOTTOM ELEVATION AND DEPTH (BEFORE ANY FILL IS PLACED)
- EXCAVATED SIDE SLOPES AND TOP OF BERM ELEVATION (BEFORE CLAY LINER IS PLACED)
- CLAY LINER, IF USED, IS PLACED AND TESTED (BEFORE ANY FILL IS PLACED)
- OUTLET STRUCTURE AND PIPE (BEFORE BACKFILLING OF THE EMBANKMENT)
- FINAL INSPECTION

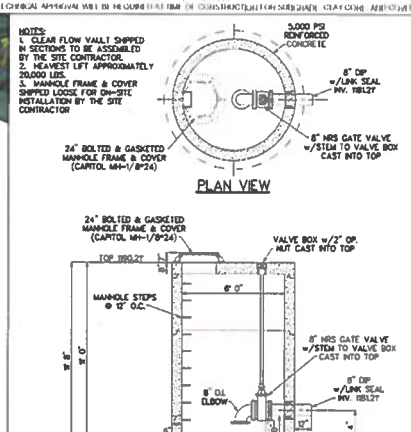
VA STORMWATER BMP CLEARINGHOUSE DESIGN SPEC. NO. 14
TABLE 14.4 CLAY LINER SPECIFICATIONS

PROPERTY	TEST METHOD	UNIT	SPECIFICATION
PLASTICITY	ASTM D4318		
PLASTICITY INDEX OF CLAY	ASTM D4318	%	
LIQUID LIMIT OF CLAY	ASTM D4318	%	
CLAY PARTICLES PASSING	ASTM D422	%	
CLAY COMPACTION	ASTM D698	%	
BOUNCE DCR (1mm)			

CLAY LINER NOTES

1. CLAY LINER TO BE REQUIRED AND SHALL BE A NATURAL CLAY LINER MEETING THE FOLLOWING SPECIFICATIONS:
   - MEETS THE SPECIFICATIONS OUTLINED IN VIRGINIA STORMWATER BMP CLEARINGHOUSE DESIGN SPECIFICATION NO. 14 AND THE PROPERTIES IN TABLE 14.4
   - SOILS FROM ACCEPTABLE BORROW SOURCE AREAS SHOWN AS ACCEPTABLE TO BE COMPACTED IN LAYERS TO FORM THE CLAY LINER SHALL BE IDENTIFIED BY A GEOTECHNICAL ENGINEER AND SHALL BE APPROVED BY THE GEOTECHNICAL ENGINEER AND ENGINEER.
   - SOILS CONSIDERED SUITABLE FROM THE GEOTECHNICAL REPORT MAY BE USED FOR THE 12 INCH COMPACTED CLAY LINER AS LONG AS THE REQUIREMENTS ARE MET.
   - THE CLAY LINER SHALL BE SEPARATED FROM ANY PERVIOUS LAYER BY A GEOTEXTILE.
   - ANY VOIDS OR CRACKS IN THE EXCAVATED SURFACE OF THE EXCAVATED SHALL BE BACKFILLED AND COMPACTED TO FORM A SMOOTH AND UNIFORM SURFACE PRIOR TO PLACEMENT OF THE CLAY LINER.
   - A GEOTECHNICAL ENGINEER SHALL BE REQUIRED AT THE TIME OF CONSTRUCTION TO OBSERVE AND APPROVE THE CLAY LINER AND ITS PLACEMENT.





TERRA AQUA GALVANIZED GABION

Scope:

This specification data sheet covers the use of galvanized steel double twisted woven wire mesh gabion baskets filled with stone and used for various applications including but not limited to retaining walls, mechanically stabilized soil retaining structures, stream bank protection, slope paving, outlet structures, weirs, drop structures, etc...

Definition:

a) Gabions are defined as double twisted woven wire mesh box shaped baskets, of various sizes and dimensions.
b) The selvedges of the gabion baskets are the thicker perimeter and edge wires to which the wire mesh is secured as to withstand suction or gradual stress from any direction.
c) Reinforcing wires are the thicker wires incorporated into the netting during fabrication.
d) The internal diaphragms are the internal wire mesh partitions which divide the gabions into cells.
e) Lacing or tie wire is used to assemble and join the gabion units.
f) Connecting wires are the internal wire used to prevent the gabions from bulging.
g) Alternative wire fasteners are ASTM approved wire fasteners used in lieu of lacing wire.

Fabrication:

Double Twisted Hexagonal steel wire mesh Galvanized Gabions. Gabions shall be fabricated in such a manner that the sides, ends, lid and diaphragms can be assembled at the construction site into rectangular baskets of the sizes specified and shown in the drawings. Gabions shall be of single unit construction: the base, lid, ends, and sides shall be either woven into a single unit or edge of these members connected to the base section of the gabion in such a manner that strength an flexibility at the connecting point does not compromise the engineered structural design of the gabion. Where the length of the gabion exceeds on an one half its horizontal width, the gabion shall be divided by diaphragms of the same mesh and gauge as the body of the gabion, into cells whose length does not exceed the horizontal width. The gabion shall be furnished with the necessary diaphragms secured in proper position or the base in such a manner that no additional tying is required at the juncture.

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Mesh Formation.

The double twisted hexagonal wire mesh shall have deformability sufficient to permit a minimum of mesh elongation equivalent to 10% of the unstretched length of the mesh test section without reducing the gauge or the tensile strength of the individual wire strands to values less than those for similar wire, one gauge smaller in diameter.

Non-Raveling:

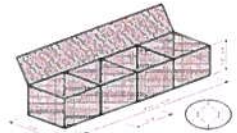
The double twisted hexagonal wire mesh is to be fabricated in such a manner as to be non raveling. This is defined as the ability to resist pulling apart at any of the twists or connections forming the mesh when a single wire strand in a section of mesh is cut or broken.

Gabion Fill

The stone fill material used for filling the gabion units shall be clean, hard stone with pieces ranging from 4 – 8 inches on the greatest dimensions. Stone filling shall not exceed 24 inch vertical drop above the gabion basket. All effort shall be made to ensure that the stone fill material utilized in the design of the structure match the stone fill used in constructing the gabion structure.

Assembling and placing:

a) Each gabion unit shall be assembled by tying or fastening all connecting seams. The binding wire shall be tightly looped around every other mesh opening along the seams in such a manner that single and double loops are alternated. An alternative wire fasteners may be used in lieu of lacing wire. The alternative wire fasteners shall be applied at approximately 4" – 6" intervals on all vertical and horizontal seams. No less than 3 fasteners per one foot on any given seam.
b) A line of empty gabions, shall be placed into position according to the contract drawings. Binding wire or alternative wire fasteners shall be used to secure each unit to the adjoining one along the vertical reinforced edges and the top selvedges. An approved corner closure tool shall be used to adjoin adjacent gabions to ensure a tight, neat seam and maximize gabion wires or fastened to the latter at front and back. The lid shall be secured with an approved closure tool to insure proper closure without excessive mesh deformation.
c) To achieve optimum alignment and finish for retaining walls, a minimum amount of stretching may be required.
d) Connecting wire shall be inserted during the filling operation as follows: The connecting wires shall be installed according to manufacturers instructions every 1' vertical lift of the gabion unit.



Terra Aqua Gabion Unit Standard Sizes: Custom Jumbo Sizes Available

Gabion unit size	Capacity Cubic Yards	No. of Internal Cells
6x3x1	2	2
9x3x1	3	3
12x3x1	4	4
6x3x1.5	1	2
9x3x1.5	1.5	3
12x3x1.5	2	4
6x3x1	.666	2
9x3x1	1	3
12x3x1	1.33	4

TOLERANCES: All gabion dimensions shall be within a tolerance limit of plus or minus 5% of the manufacturers stated dimensions.

Minimum Strength requirements of Terra Aqua Double Twisted Mesh Gabions

Test Description	Galvanized Gabion	Pvc Coated Gabion
Tensile strength of wire mesh parallel to twist	3500 lbs/ft	2900 lbs/ft
Tensile strength of wire mesh perpendicular to twist	1800 lbs/ft	1400 lbs/ft
Connection to selvedges	1400 lbs/ft	1200 lbs/ft
Panel to Panel	1400 lbs/ft	1200 lbs/ft
Punch strength of mesh	6000 lbs/ft	5300 lbs/ft

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Material data:

-diameter of mesh wire: 0.120 inches
-diameter of selvedge wire: 0.153 inches
-diameter of lacing wire: 0.091 inches
-coating of wire: Finish 5 class 3 zinc coating- ASTM A-641 tested in accordance with ASTM A370-92
-tensile of wire: soft temper in accordance with ASTM A641-92
-weight of zinc coating of wire: shall be determined by ASTM A-90
-wire diameter of 0.120 inches shall have a weight of zinc coating of: 0.85 oz/sf
-wire diameter of 0.153 inches shall have a weight of zinc coating of: 0.90 oz/sf
-wire diameter of 0.091 inches shall have a weight of zinc coating of: 0.80 oz/sf
-grade of zinc coating of wire: high grade or special high grade in accordance with ASTM B-6, Table I
-uniformity of coating: shall be determined by ASTM A-239
-Elongation: not less than 12% in accordance with ASTM A370-92.

All of the above wire diameters are subject to a tolerance limit of 0.004 in accordance with ASTM A-641.

All Terra Aqua Gabion material is manufactured according to ASTM A975-97 guidelines for Double Twisted Hexagonal Mesh Gabions.

ASTM A975-97

TERRA AQUA GABIONS, INC.
1415 N. 32ND STREET
FORT SMITH AR 72904
479-785-5344

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TOWN OF BRIDGEWATER
201 GREEN STREET
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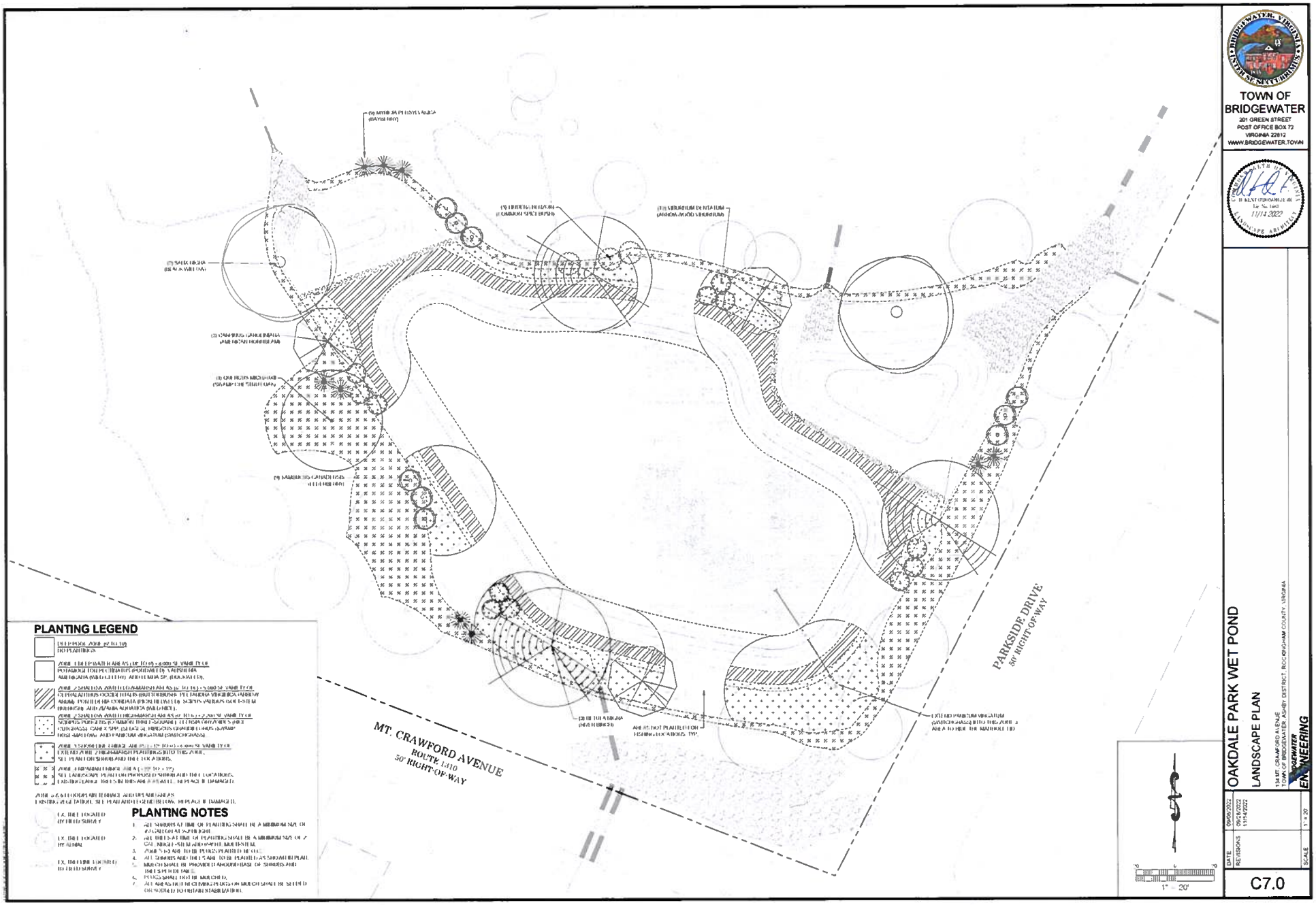
OAKDALE PARK WET POND
STORMWATER MANAGEMENT NOTES & DETAILS

1 MILE CRAWFORD AVENUE
TOWN OF BRIDGEWATER • 45th DISTRICT ROCKINGHAM COUNTY, VIRGINIA

BRIDGEWATER ENGINEERING

DATE	REVISIONS	SCALE
09/06/2022	
09/26/2022	
11/14/2022	

C6.0



TOWN OF BRIDGEWATER
201 GREEN STREET
POST OFFICE BOX 72
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11/14/2022

OAKDALE PARK WET POND

LANDSCAPE PLAN

134 MT. CRAWFORD AVENUE
TOWN OF BRIDGEWATER, ASHBY DISTRICT, ROCKINGHAM COUNTY, VIRGINIA

BRIDGEWATER ENGINEERING

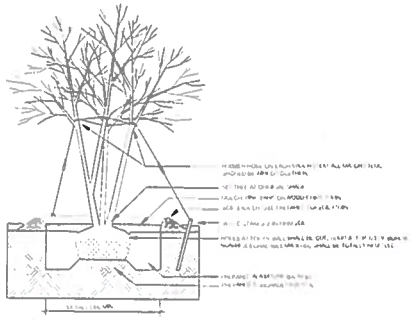
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09/06/2022	1" = 20'
REVISIONS 09/26/2022	
11/14/2022	

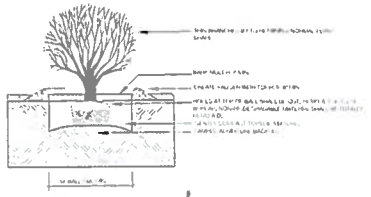
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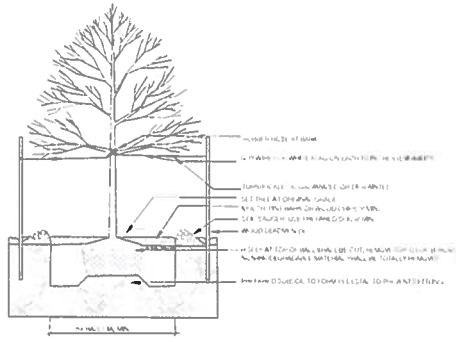
LANDSCAPE SPECIFICATIONS

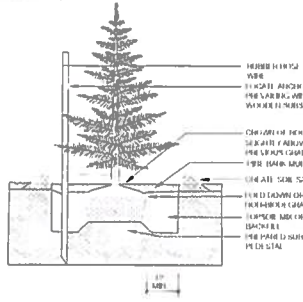
LANDSCAPING, GENERALLY SPECIFIED AND PLANTED AS LANDSCAPING, SHALL CONSIST OF LANDSCAPING AS IS THE VARIETY STANDARD FOR THE LANDSCAPING AREA, AND AS APPROPRIATE FOR THE PLANTING AREA AND ITS RELATIONSHIP TO THE SURROUNDING AREA AND LANDSCAPING. THE SPECIFICATIONS AND DETAILS CONTAINED HEREIN SHALL BE THE MINIMUM TO THE SPECIFICATIONS REQUIRED ABOVE AND NOT EXCLUDE. IF CONFLICTS EXIST DUE TO THE SPECIFICATIONS CONTAINED HEREIN AND THE ORDINANCE, THE ORDINANCE SHALL GOVERN.

1. THE PLANT MATERIAL SHOULD CONFORM TO THE MINIMUM STANDARDS OF NURSERY STOCK OF THE LATEST EDITION AS PUBLISHED BY THE AMERICAN ASSOCIATION OF NURSERYMEN, INC. BOTANICAL NOMENCLATURE USED IN THE PLANTING SCHEDULE SHOULD BE ACCORDANCE WITH THE LANDSCAPE TREATMENTS STANDARDS AND REGULATIONS.
2. ALL PLANT MATERIAL SPECIFIED SHOULD BE NURSERY GROWN UNLESS OTHERWISE NOTED. SUBSTITUTIONS MUST BE APPROVED PRIOR TO INSTALLATION.
3. ALL WORK SHALL BE COMPLETED IN A WORKMANLIKE MANNER ACCORDING TO ACCEPTED PLANTING PROCEDURES.
4. USE EXISTING TOPSOIL WHERE POSSIBLE, BUT IF NOT SUFFICIENT, IMPORT ADDITIONAL TOPSOIL FROM OFF-SITE SOURCES AS NECESSARY TO COMPLETE THE LANDSCAPING. TOPSOIL SHALL BE A FRIABLE, FERTILE, LOAM OBTAINED FROM A WELL-DRAINED SITE HAVING A PH OF 6.0 TO 7.5, BUT NOT CONTAINING MORE THAN 5% BY VOLUME OF CINDERS, STONES, SLAG, CONCRETE, OR OTHER EXTRANEOUS MATERIAL LARGER THAN 1" IN DIAMETER.
5. CONTRACTOR SHALL ASCERTAIN LOCATION OF ALL UTILITIES PRIOR TO EXCAVATION.
6. CONTRACTOR SHALL MAINTAIN PLANT MATERIAL DURING INSTALLATION. MAINTENANCE SHALL BE DONE IN ACCORDANCE WITH ACCEPTABLE HORTICULTURAL PRACTICE UNTIL THE TIME OF FINAL ACCEPTANCE BY THE OWNER OR THE OWNER'S AUTHORIZED REPRESENTATIVE.
7. WHERE THE LANDSCAPE WORK IS COMPLETED BY THE OWNER OR RESIDENT, ALL WORK SHALL BE CARRIED OUT IN ACCORDANCE WITH ACCEPTABLE HORTICULTURAL PRACTICE AND SHALL BE COMPLETED WITHIN ONE GROWING SEASON AFTER THE OCCUPANCY PERMIT HAS BEEN ISSUED.
8. GUARANTEE ALL MATERIALS AND LABOR FOR A PERIOD OF ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE.
   8.1. MAKE REPLACEMENTS OF ALL DEAD PLANTS BEFORE THE END OF THE GUARANTEE PERIOD AT THE CONTRACTOR'S EXPENSE, EXCEPT AS NOTED IN PARAGRAPH 8.2 BELOW.
   8.2. ADJUSTMENTS FOR THE EXPENSE OF THE SAME SHALL BE MADE WHEN DEAD OR DAMAGED PLANTS RESULT FROM CAUSES BEYOND THE CONTRACTOR'S CONTROL.
9. WITHIN 10 DAYS AFTER ACCEPTANCE, THE CONTRACTOR SHALL REMOVE ALL EQUIPMENT, DEBRIS, AND EXCESS MATERIAL FROM THE SITE.
10. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE ADEQUATE PROTECTION FOR ALL PLANTING AREAS, EXISTING VEGETATION, AND STRUCTURES DURING CONSTRUCTION. ANY DAMAGE TO THESE AREAS SHALL BE REPAIRED OR REPLACED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.
11. DO NOT MAKE SUBSTITUTIONS. IF MATERIALS SHOWN ON PLANS CONTRACTOR IS ENCOURAGED TO PROVIDE WRITTEN NOTIFICATION OF THE NEED FOR SUBSTITUTION AND SUBMIT A LIST OF ALTERNATE MATERIALS, SIZES AND PRICING FOR CONSIDERATION BY THE OWNER'S REPRESENTATIVE.
12. THE LANDSCAPE ARCHITECT RESERVES THE RIGHT TO ACCEPT OR REJECT ANY PLANT MATERIAL THAT DOES NOT MEET THE SPECIFICATIONS. REJECTED MATERIAL SHALL BE REMOVED PROMPTLY FROM THE SITE.
13. BALLED AND BURLAPPED PLANTS SHALL BE DUG WITH ADEQUATE BALLS OF EARTH THAT ARE FIRMLY WRAPPED IN BURLAP. BALLS SHALL BE OF SUFFICIENT SIZE TO ENSURE THE SURVIVAL OF THE PLANT IN ACCORDANCE WITH ACCEPTED HORTICULTURAL PRACTICES.
14. ALL CONTAINER-GROWN PLANTS SHALL BE HEALTHY, VIGOROUS STOCK GROWN IN CONTAINERS LONG ENOUGH FOR THE ROOT SYSTEM TO HAVE DEVELOPED SUFFICIENTLY TO HOLD ITS SHAPE AND SUSTAIN GROWTH AFTER PLANTING, BUT NOT SO LONG AS TO BECOME ROOT BOUND. CONTAINER-GROWN PLANTS SHALL HAVE BEEN GROWN IN THEIR CONTAINERS FOR AT LEAST ONE GROWING SEASON BUT NOT MORE THAN TWO YEARS. THE ROOT SYSTEM SHALL BE SUFFICIENTLY ESTABLISHED TO HOLD THE SOIL MASS TOGETHER WHEN REMOVED FROM THE CONTAINER.
15. ALL PLANT MATERIAL SHALL BE TRUE TO GENUS, SPECIES, VARIETY, AND CULTIVAR AS SPECIFIED IN THE PLANT SCHEDULE. SUBSTITUTIONS MUST BE APPROVED BY THE LANDSCAPE ARCHITECT OR OWNER'S REPRESENTATIVE IN WRITING PRIOR TO INSTALLATION.
16. ALL PLANT MATERIAL SHALL BE FREE FROM DISEASE, INSECTS, EGGS, AND LARVAE. PLANTS SHOWING SIGNS OF INSECT INFESTATION, FUNGAL INFECTION, OR OTHER PATHOLOGICAL CONDITIONS SHALL BE REJECTED.
17. ALL PLANT MATERIAL SHALL BE PROTECTED FROM DESICCATION DURING DELIVERY, STORAGE, AND PLANTING. ROOTS SHALL BE KEPT MOIST AT ALL TIMES BY MEANS OF WATER, WET BURLAP, OR OTHER APPROVED METHODS.
18. ALL PLANTS SHALL BE PLANTED IN ACCORDANCE WITH THE PLANTING DETAILS PROVIDED ON THE PLANS. PLANTING PITS SHALL BE EXCAVATED TO A DEPTH AND WIDTH AT LEAST 1.5 TIMES THE DIAMETER OF THE ROOT BALL OR CONTAINER. THE BOTTOM OF THE PLANTING PIT SHALL BE LOOSENED TO A DEPTH OF 6 INCHES TO PREVENT COMPACTION AND ENSURE GOOD ROOT PENETRATION.
19. PLANTING PROCEDURES FOR BALLED AND BURLAPPED PLANTS:
   19.1. LOWER THE PLANT INTO THE PLANTING PIT SO THAT THE ROOT FLARE IS SLIGHTLY ABOVE THE FINISHED GRADE OF THE SURROUNDING SOIL. THE ROOT FLARE SHALL BE VISIBLE AT THE SOIL SURFACE AFTER PLANTING.
   19.2. REMOVE ALL BURLAP, TWINE, WIRE BASKETS, AND OTHER WRAPPING MATERIALS FROM THE TOP TWO-THIRDS OF THE ROOT BALL. DO NOT PULL THESE MATERIALS FROM UNDER THE ROOT BALL IF DOING SO WILL DISTURB THE ROOTS.
   19.3. BACKFILL THE PLANTING PIT WITH THE EXCAVATED SOIL, MIXED WITH ORGANIC AMENDMENTS AS SPECIFIED. TAMP THE SOIL LIGHTLY TO REMOVE AIR POCKETS AND ENSURE GOOD CONTACT WITH THE ROOT BALL. DO NOT OVER-COMPACT THE SOIL.
   19.4. CREATE A SAUCER OF SOIL AROUND THE EDGE OF THE PLANTING PIT TO HOLD WATER DURING IRRIGATION AND RAINFALL.
   19.5. WATER THOROUGHLY AFTER PLANTING TO SETTLE THE SOIL AROUND THE ROOTS AND REMOVE AIR POCKETS. ADDITIONAL WATERING MAY BE REQUIRED DURING THE FIRST GROWING SEASON.
20. THE AQUATIC AND SAFETY BENCHES SHALL BE PLANTED WITH THE SPECIES AND AT THE DENSITY SHOWN ON THE PLANTING PLAN. PLANTING SHALL BE COMPLETED WITHIN THE FIRST GROWING SEASON AFTER THE POND IS CONSTRUCTED.
21. WOODY VEGETATION SHALL NOT BE PLANTED ON EARTHEN DAMS, EMBANKMENTS, OR LEVEES. ROOTS CAN CAUSE SEEPAGE AND WEAKEN THE STRUCTURE. GRASSES AND LOW-GROWING GROUNDCOVERS ARE ACCEPTABLE.
22. A MINIMUM BUFFER OF 15 FEET SHALL BE MAINTAINED BETWEEN THE EDGE OF THE WATER SURFACE AT THE PRINCIPAL SPILLWAY CREST AND THE NEAREST TREE OR SHRUB PLANTING. THIS BUFFER ALLOWS FOR ACCESS FOR MAINTENANCE EQUIPMENT AND PREVENTS ROOT DAMAGE TO THE EMBANKMENT.
23. ALL DISTURBED AREAS NOT OTHERWISE PLANTED SHALL BE SEEDED AND MULCHED IMMEDIATELY AFTER GRADING TO PREVENT EROSION AND SEDIMENTATION. SEED MIXTURES SHALL BE APPROPRIATE FOR THE SITE CONDITIONS AND SEASON OF PLANTING.
24. A MAINTENANCE PLAN FOR THE PLANTINGS, INCLUDING WATERING, MULCHING, PRUNING, AND REPLACEMENT OF DEAD PLANTS, SHALL BE PROVIDED TO THE OWNER AT THE TIME OF FINAL ACCEPTANCE.









TOWN OF BRIDGEWATER
201 GREEN STREET
POST OFFICE BOX 72
VIRGINIA 22812
WWW.BRIDGEWATER.TOWN

09/28/2022

OAKDALE PARK WET POND

LANDSCAPE NOTES & DETAILS

134 MT. CRAWFORD AVENUE
TOWN OF BRIDGEWATER, ASHBY DISTRICT, ROCKINGHAM COUNTY, VIRGINIA

BRIDGEWATER ENGINEERING

DATE	SCALE
REVISIONS 09/30/2022	NTS
09/28/2022	

C7.1

Addendum 4
Pre-Bid Meeting

Addendum based on Q&A from Pre-Bid Meeting

11/18/2022

1. Water to fill the pond will be provided by the Town from the on-site hydrant. Because we may have to pause filling repeatedly to allow our systems to recharge, it may take up to two weeks to fill the pond. These pauses might be opportune times for planting, so the contractor is encouraged to coordinate its schedule with the Town. Any day on which the Town supplies water from the hydrant toward the filling of the pond is a "Fill Day," for purposes of paragraph two below. Contractor must provide at least five days' notice to the Town before requesting filling of the pond.
2. Paragraph Six of the Invitation for Bids, "Contract Time," is superseded by the following:
    a. The Work shall be complete (as provided in paragraph 11) by June 1, 2023 (the "Deadline"), except
        i. Each "Fill Day," as described above, shall extend the Deadline by one day;
        ii. If the contractor encounters unforeseeable obstacles which prolong the construction, and it provides contemporaneous written notice to the Town Engineer of such obstacles, the Town will extend the Deadline accordingly. Weather, of any variation or intensity, is not unforeseeable.
    b. The contractor will be paid $500 for each day before the extended Deadline that the Work is complete, up to a maximum of $30,000.
    c. If the Work is not complete by the extended Deadline, the contractor will be charged $500 per day after the extended Deadline until the Work is complete.
3. Geotechnical services/inspections are the contractor's responsibility per plan. In response to some questions raised at the pre-bid meeting, we have sought information from our geotechnical engineer. We will post whatever we receive.
4. Blasting is the contractor's responsibility. See attached map for known surrounding utilities.
5. Contractor will not be responsible for irrigating and maintaining the plants for the first year. This will be provided by the Town. The standard one-year warranty on the plants themselves will be all that is required.
6. Ex. Waterline going through Forebay #2 is not active and will be abandoned by the Town. The contractor will not need to coordinate anything on this or avoid it.
7. Safety Fence will be provided by the contractor per specification, table, and plate 3.01 of the Virginia Erosion and Sediment Control Handbook. Exact location of the safety fence will be at the discretion of the contractor. The safety fence can be used as a tree protection alternative. A 5' tall plastic (polyethylene) fence with "Hazard Area-Keep Out" signs may be used as an option per the specifications.
8. Tree protection can be 40-inch high orange plastic fence, earth berms, snow fence, or any other method allowed by Specification 3.38 in the Virginia Erosion and Sediment Control Handbook. The details provided in the plans show methods of armoring and protection of trees and are not necessarily examples of materials required to be used.
9. The 9th small caliber tree around the existing wetlands that is not labeled to be removed may be removed if needed.
10. Town will provide and install the "No Swimming" signs labeled in the plans.

11. A 3D Model of the pond is available for construction, if desired, to aid in excavation with GPS guided equipment. A digital file of plan linework can also be provided if desired. It is the contractor's responsibility to bid, and construct, based on the approved site plan. The site plan is the legal document of record. It will be the contractor's responsibility to get their base station setup and model loaded into their equipment correctly. The Town will provide four benchmarks with the digital file to aid in loading the files in their equipment. These benchmarks will be set based on coordination with the contractor.
    a. The 3D model produces a cut of 13,240 cy and a fill of 0 cy. This number is from proposed finished grade and surveyed existing grade with a 1:1 ratio. This number is provided to help aid in bidding, but it is not binding to the lump sum price given by the contractor. It is the contractor's responsibility to confirm their own numbers and impacts of rock, topsoil, availability of clay core cover soil, and other factors that may affect stockpiling, export, and import.

    This paragraph contains the sum total of information available concerning the 3D model, and it supersedes any previous statements or addenda.
12. The two required as-builts must be performed by a licensed surveyor and coordinated to the Town Engineer for approval.
13. The Town will coordinate the SWPPP Registration statement and Land Disturbance Permit to the County for the contractor. There will be a $756.00 State fee that the Town will pay. No ESC Bond will be required. If the contractor prefers, the Town can also provide required inspections and weekly logging of the site in the SWPPP. If there are any deficiencies noted based on these inspections, then it will be coordinated to the contractor for repair. The contractor will still be the Responsible Land Disturber and SWPPP Coordinator.



Addendum 5
Potential Fill Sign

Addendum 5

Patrick Eye
2429 Western View
Mt. Crawford, Virginia 224814

November 8, 2022

To whom this may concern,

Our family owns real estate located on Route 846 (2429 Western View) in Rockingham County, Virginia, identified as Tax Map No. 138-(A)-L8 and located approximately 6 miles from the Town of Bridgewater. We think our property could be a potential fill site for dirt and stone for Bridgewater's Oakdale Park Pond project.

Contractors who are bidding the Oakdale Park Pond project and interested in using this property as a fill site should contact Patrick Eye at (540) 820-6014 for more information. Further terms and conditions for using the property will need to be determined between the contractor and property owner. Any usage of this property will be contingent upon an agreement between the contractor and property owner.

Patrick Eye

Patrick Eye

Harrisonburg Office
1356 N. Main Street
Harrisonburg, VA 22802
Phone: 540-434-0400
Fax: 540-434-0447

Viola Engineering, PC

Winchester Office
202 Imboden Drive, Suite A
Winchester, VA 22603
Phone: 540-313-4270
Fax: 540-434-0447

November 18, 2022

Mr. Kent O'Donohue, PLA
Town of Bridgewater
P.O. Box 72
Bridgewater, VA 22812

RE: Report of Geotechnical Investigation – Addendum 1
Oakdale Park - Wet Pond
134 Mount Crawford Avenue, Bridgewater, VA 22812
VEPC Project No.: PTL-223005

Mr. O'Donohue:

We provide the following responses to questions posed for the referenced project.

1. Will the export of onsite material be adequate for structural fill? Some of the contractors had closer sites but they will need it to be compactable to structural fill standards. If not, what could this material be used for or amended for?
    a. Site soils, excluding topsoil, are generally acceptable for structural fill. Further, blasted sandstone bedrock, is also generally acceptable for structural fill if maximum nominal particle sizes to not significantly exceed three (3) inches.

2. Is material onsite adequate to compact back into any over blasting voids before the clay liner is laid. Is that material you reference the soil between the topsoil layer and the bedrock, or do you believe the blasted sandstone bedrock itself will be able to be crushed and compacted into the voids?
    a. Site soils and blasted rock, containing sufficient fines and processed to a maximum nominal particle size of three (3) inches, may be utilized as compacted backfill in overshot areas.

3. Provide clarification on approved site for clay borrow?
    a. It is recommended that offsite borrow be subjected to conformance testing and be approved prior to stockpiling onsite. Specific approved borrow sites are not available at this time; however, clay borrow sites which host high plasticity clays (CH) are generally acceptable. Soils which do not meet project requirements may be utilized if amended with bentonite if shown to meet required soil parameters after mixing.

4. Typically, clay liners can provide sufficient water holding characteristics if the subgrade and liner materials are prepared according to geotechnical requirements and good construction practices. It is our opinion that liner failure would be low given our knowledge of the site and recommendations given. Synthetic liners can exhibit greater maintenance costs if ripped but can be patched with various methods which are not overly cumbersome.

5. It may be prudent to have bidders provide a synthetic liner alternative if unforeseen subsurface conditions arise. It is recommended that a 60 mil synthetic liner be provided, meeting DEQ requirements for karst topography, be provided as a clay liner alterative. We recommend that a controlled subgrade be established directly beneath synthetic liners to provide support and to

reduced puncture risk. Controlled subgrade material should consist of 12 inches of compactable soil consisting of inorganic soil free of roots, limbs, stone, rock or gravel larger than three (3) inches in any dimension. The soil shall have a classification of SM, SC, ML, CL, MH, or CH as defined in the Unified Soil Classification System (ASTM D 2487), or otherwise approved by the GER. Not more than 1 percent by weight of particles larger than 3/8-inch in diameter shall be allowed within the top 6 inches of the Subbase (directly below the synthetic liner) or contain sharp or angular stone that may puncture the liner. Mechanical screening, raking or other methods to remove oversize particles shall be provided by contractor as necessary. Residual site soils generally meet these requirements; however, blasted materials typically will not.

If you have any questions with regard to the information and recommendations presented herein, or if we can be of further assistance, please do not hesitate to contact us.

Respectfully,

Timothy P. Viola, P.E.
Project Engineer

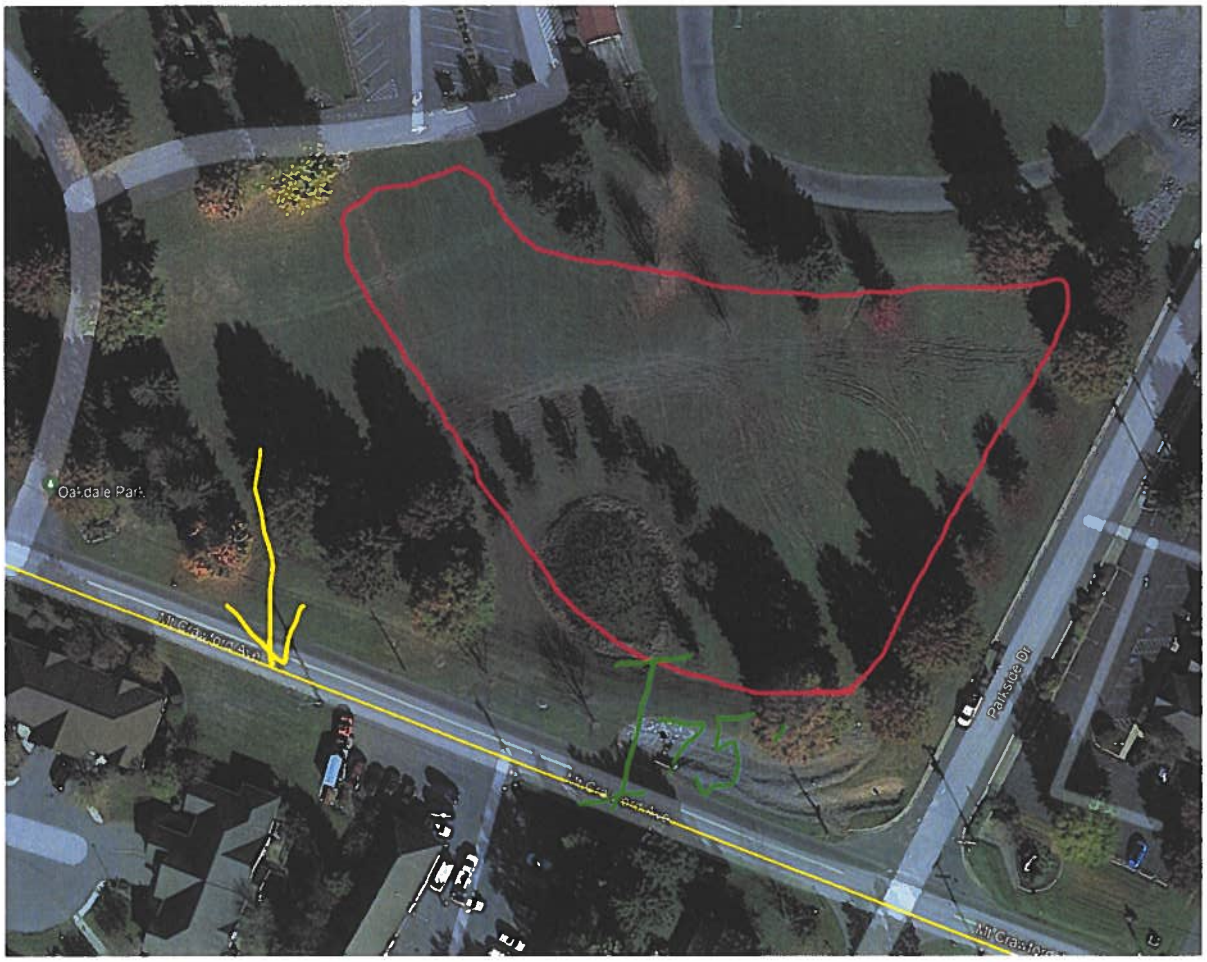
COMMONWEALTH OF VIRGINIA
11/18/2022
TIMOTHY P. VIOLA
Lic. No. 0402056657
PROFESSIONAL ENGINEER

Addendum 7
Gas Line Clarification

Addendum 7

Columbia Gas Line in relation to Blasting

1. To clarify from the previous Addendum #4 utility map. There is a Columbia Gas line running along Mt. Crawford Avenue. It is about 75' from the edge of the proposed pond, so well within the 300' requirement for a Blasting Plan with Columbia Gas. It is the contractor's responsibility to make sure the blasting bid price accounts for this.



November 2022 Police Report- Bridgewater

Police Calls for service: 999
(597 calls were proactive police calls such as extra patrols, business checks, park checks, etc.)
(402 calls are reactive police calls, anything from traffic issues to criminal issues that we received calls on)

IBR Group A offenses: 10

Incident Reports: 53

Total Traffic Crashes: 10 (including 2 Hit & Run)

DMV Crash Reports: 2

Arrests: 1

Summons: 16

Notable BPD activity:

The Officers did a great job solving several burglary and larceny cases, including solving several outside jurisdictions cases with the recovery of stolen items. Warrants were obtained and the suspects were apprehended in another jurisdiction.

Preparing for:
Dec. 10th Christmas Parade
Jan. 16th MLK march through Main St with Bridgewater College

Thank you, Chief Phillip Read

Town of Bridgewater
POLICE DEPARTMENT
201 Green Street, Bridgewater, Virginia 22812
Phone: (540) 828-2611
Fax: (540) 828-0136
police@bridgewater.town

CRIME TRENDS

Town of Bridgewater, Virginia

Group A Offense	Jan-22	Feb.- 22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Total
Crimes Against Persons													
Homicide	0	2	0	0	0	0	0	0	0	0	0	0	2
Kidnapping/Abduction	0	0	0	0	0	0	0	0	0	0	0	0	0
Forcible Sex Offenses	0	0	0	1	1	0	0	0	0	0	0	0	2
Robbery	0	0	0	0	0	0	0	0	0	0	0	0	0
Aggravated Assault	0	0	1	0	1	0	0	0	0	0	0	0	2
Simple Assault/Intimidation	2	0	0	2	0	0	1	0	0	3	2	0	10
Non-forcible Sex Offenses	0	0	0	0	0	0	0	0	0	0	0	0	0
Crimes Against Property													
Arson	0	0	0	0	0	0	0	0	0	0	0	0	0
Extortion/Blackmail	0	0	0	0	0	0	0	0	0	0	0	0	0
Burglary	1	0	0	0	0	0	0	2	1	2	1	0	7
Larceny	1	0	2	6	1	2	2	3	6	6	1	0	30
Motor Vehicle Theft	0	0	0	0	0	0	0	0	1	0	0	0	1
Counterfeiting/Forgery	0	0	1	0	0	1	2	0	0	1	0	0	5
Fraud	1	1	0	2	1	0	3	3	1	0	3	0	15
Embezzlement	0	0	0	0	0	0	0	1	0	0	0	0	1
Stolen Property	0	0	0	0	0	0	0	0	0	2	0	0	2
Property Damage/Vandalism	2	1	2	1	1	1	0	2	4	2	2	0	18
Bribery	0	0	0	0	0	0	0	0	0	0	0	0	0
Crimes Against Society													
Drug Offenses	2	2	1	2	1	0	1	0	2	1	0	0	12
Pornography/Obscene Material	0	0	0	0	0	0	0	0	0	0	0	0	0
Gambling	0	0	0	0	0	0	0	0	0	0	0	0	0
Prostitution	0	0	0	0	0	0	0	0	0	0	0	0	0
Weapon Law Violations	0	0	0	0	1	0	0	0	0	0	0	0	1