WATER & WETLAND
LAKE, POND & WETLAND MANAGEMENT

November 30, 2021

Lynnfield Conservation Commission
Lynnfield Town Hall – 55 Summer Street
Lynnfield, MA 01940
Sent via email: ecademartori@town.lynnfield.ma.us

Re: Pillings Pond, Lynnfield, MA – 2021 Year End Report (DEP# 209-0641)

Dear Commission Members:

It is our pleasure to present a year end summary report regarding the 2021 aquatic management program at Pillings Pond.

Historically, Pillings Pond has battled potentially harmful algae and other water quality issues, as well as invasive species such as spiny naiad and curly leaf pondweed. The Lynnfield Conservation Commission issued a new Order of Conditions (DEP #209-0641) on August 7, 2020 allowing for management to improve the health of the Pond. Water & Wetland, LLC took over management of Pillings Pond, under the direction of the Conservation Commission, late in the 2020 season. 2021 marked the first full season Water & Wetland managed the Pond. The goal of the approved 2021 program was to manage invasive vegetation, specifically spiny naiad, through targeted applications of diquat herbicide. Additionally, a focus was put on algae management through incorporating various proactive management strategies paired with water quality analysis.

All permitting, treatment and survey tasks were completed in accordance with the Order of Conditions and all Special Conditions (DEP# 209-0641). The table below provides the specific dates of each task. Below the table, each visit/task performed is described in additional detail.

Summary Of 2021 Management Activities

Date	Task/Description
April 1, 2021	BioChar sock installation in Bates Brook
May 6, 2021	MA-DEP Permit issued – WM04-0000483
May 19, 2021	EarthTec algaecide treatment; water quality/algae sampling; upstream/downstream of BioChar sampling
June 15, 2021	EarthTec algaecide treatment; diquat treatment of spiny naiad; algae sampling
July 14, 2021	EarthTec algaecide treatment; water quality/algae sampling; upstream/downstream of BioChar sampling
August 12, 2021	EarthTec algaecide treatment; algae sampling
September 10, 2021	Follow-up spot treatment of spiny naiad

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BioChar Sock Installation in Bates Brook – April 1, 2021

Figure 1 BioChar sock installation

Water & Wetland visited Pillings Pond to deploy biochar socks in a designated section of Bates Brook. Biochar is a product similar to activated charcoal and is a natural solution to water filtration. The specially produced, highly absorbent product is placed in porous socks and has the ability to filter nutrients (such as phosphorus) as water passes through. 50 linear feet of biochar socks were deployed. The socks were stacked and placed within the designated section of Bates Brook at Bourque Road. Water flow was monitored following the deployment to ensure that water was passing through the socks and not significantly impeding flow.

In an effort to document the success of the biochar, Water & Wetland collected four (4) samples specific to phosphorus. In May, one sample was collected upstream of the biochar and a second sample was collected on the opposite side of Bourque Road, just downstream of the biochar. The samples were analyzed for total phosphorus and dissolved phosphorus. The same process was repeated in July, for a total of four (4) samples between the two sampling events. More details in regard to this biochar specific sampling is provided below.

EarthTec Treatment / Sampling – May 19, 2021

Figure 2 Sample bottles / cooler

On May 19th, Co-Owner and Aquatic Biologist, Colin Gosselin, and Environmental Scientist James Lacasse visited Pillings Pond to perform several pond management tasks. An initial algaecide treatment was performed using EarthTec algaecide (1/2 Pond as required by product label), we switched to EarthTec for 2021 because it stays suspended in the water column for a much longer duration than traditional copper sulfate. The treatment targeted the middle of the Pond as this is the deepest section. Following shoreline posting, the EarthTec was applied using a calibrated sub-surface injection system. Water samples were collected from one mid-Pond location. The samples were preserved and transported to a local lab to be analyzed for: Algae ID, pH, total alkalinity, turbidity, dissolved phosphorus, total phosphorus, nitrate nitrogen, ammonia nitrogen, total kjeldahl nitrogen, Chlorophyll-a.

The biochar socks were inspected to insure proper flow through and to confirm they were still anchored appropriately. Water was observed flowing through the socks, predominantly one

culvert. Additional samples were collected up-stream and down-stream of the biochar socks, these samples were analyzed for total phosphorus and soluble phosphorus.

We surveyed for spiny naiad, which was observed very minimally in similar areas to those in 2020. It was slightly early in the season to document the full extent of spiny naiad, but the 2021 plan called for June treatment of all 2020 documented spiny naiad areas, following a same-day pre-treatment survey. The secchi disk clarity reading was fairly low at just 2'11", but we expected this to improve fairly quickly after the recent EarthTec treatment. Conditions were warm and sunny.

EarthTec Treatment / Diquat Treatment / Algae Sampling – June 15, 2021

Figure 3 Treatment equipment

On June 15th, Co-Owner/Aquatic Biologist, Colin Gosselin, and Environmental Scientist, James Lacasse completed a treatment at Pillings Pond targeting invasive spiny naiad and algae. Prior to treatment, the Pond was inspected. A small, microscopic algae bloom was observed. A planned algae sample was collected, preserved using an iodine preservative and shipped to the lab for analysis of algae ID and count. Spiny naiad and sparse curly leaf pondweed were found during the pre-treatment survey and the survey immediately prior to application. These were predominantly located in the mid-section of Pillings Pond towards the western/northwestern shorelines.

Diquat herbicide was applied to all areas (23+ acres) containing invasive spiny naiad and/or curly-leaf pondweed. The herbicide was injected into the water column using a calibrated sub-surface injection system. EarthTec copper based algaecide was applied to 1/2 of the Pond, focused on the southeastern section of the Pond working towards the middle. The EarthTec treatment area was determined based on visual observation prior to the treatment.

While on-site surface temperature and dissolved oxygen readings were collected using a calibrated YSI meter. The surface temperature was consistent with what we've been seeing at other nearby ponds and the dissolved oxygen was sufficient to support fish and wildlife.

EarthTec Treatment / Sampling – July 14, 2021

On July 14th, Co-Owner/Aquatic Biologist, Colin Gosselin, and Environmental Scientist, James Lacasse completed a treatment at Pillings Pond targeting algae. Prior to treatment, the Pond was inspected. A small, microscopic algae bloom was windblown to a localized area, but generally the Pond looked great. We noted a small, microscopic bloom during our June visit as well, this was much less so than that, of course a treatment was also initiated during the June visit. Patches of native waterlilies were observed scattered in healthy densities, as lilies provide beneficial fish cover and habitat. The spiny naiad was certainly controlled through the previous treatment as

none was observed. The curly-leaf pondweed was also controlled through the treatment but would typically be dying off naturally during this time of year.

EarthTec copper based algaecide was applied to 1/2 of the Pond, focused on the middle of the Pond. As planned, we used a higher dose EarthTec application rate during this treatment to target one of the most troublesome months. The EarthTec treatment area was determined based on visual observation prior to the treatment. The liquid EarthTec copper based algaecide was injected into the water column using a treatment boat equipped with a calibrated sub-surface injection system.

Figure 4 Water sampling

In addition to the treatment, significant water quality was collected during this visit. Surface grab samples were collected from mid-Pond and were analyzed for: total alkalinity, turbidity, dissolved phosphorus, total phosphorus, nitrate nitrogen, ammonia nitrogen, total kjeldahl nitrogen, Chlorophyll-a. In addition, pH was measured on-site using a meter. A sample was also collected from mid-Pond, preserved using an iodine preservative and transported to Northeast Aquatic Research where it was analyzed for algae ID and enumeration. One composite sediment sample was collected and was sent to SePro Lab in North Carolina where it was analyzed for total and available phosphorus. Lastly, samples were collected just upstream and just downstream of the BioChar. These samples were analyzed for total phosphorus and soluble phosphorus, in an effort to document the efficacy of the BioChar filtration.

While on-site surface temperature and dissolved oxygen readings were collected using a calibrated YSI meter. The surface temperature was consistent with what we've been seeing at other nearby ponds and the dissolved oxygen was sufficient to support fish and wildlife. The temperature was consistent with the June temperature, as rain and cooler temperatures had kept water temperatures down. The dissolved oxygen was increased from the previous visit.

EarthTec Treatment / Algae Sampling – August 12, 2021

On August 12th, Co-Owner/Aquatic Biologist, Colin Gosselin, and Senior Environmental Scientist, James Lacasse, performed various services at Pillings Pond. Upon arrival at Pillings Pond, a brief survey was conducted using visual observation and a standard throw-rake, as necessary. Sparse-moderate patches of waterlilies were observed scattered throughout the Pond. Invasive phragmites were observed sparsely along the shoreline of the Pond, extending onto abutter's shorelines. Pillings Pond has battled microscopic algae historically. The water clarity during this visit was average and no significant dense algae blooms were observed.


Figure 5 EarthTec treatment

The purpose of the visit was to conduct an algaecide treatment using EarthTec copper-based algaecide. EarthTec allows for proactive algae management as it stays suspended in the water column for extended periods of time vs. traditional granular copper sulfate. The EarthTec was applied using a treatment boat equipped with a calibrated sub-surface injection system. The deeper areas of the Pond were targeted as well as shoreline areas in the shallower portion of the Pond. Conditions during the treatment were hot and sunny. A surface algae sample was grabbed from mid-Pond to continue to monitor conditions and to document the efficacy of the EarthTec treatment program. The sample was preserved using an iodine preservative and shipped to Northeast Aquatic Research (NEAR) where it was analyzed for algae ID and counts.

While posting, the BioChar at Bourque Road was inspected and was still secure. The water level in Bates Brook where the BioChar is secured was extremely high and therefore the water was extending well above the BioChar.

While on-site, surface water temperature and dissolved oxygen readings were collected using a calibrated YSI meter. The temperature was consistent with what we've been seeing at other similar ponds we manage in the area. The dissolved oxygen was sufficient to support fish and wildlife.

Follow-Up Spiny Naiad Treatment – September 10, 2021


Figure 6 Spiny naiad in cove near public dock

On September 10th, Senior Environmental Scientist, James Lacasse, completed a visit to Pillings Pond to investigate an area with excessive weed growth. Following Emilie Cademartorie reaching out, we planned the visit specifically to document the weed growth and to provide a complimentary follow-up treatment if warranted. We assumed from the photos provided to us that the area with nuisance weed growth was approximately 1-2 surface acres at most.

Upon arrival, the Pond was surveyed using visual observation paired with a standard throw-rake as needed. Waterlilies were documented scattered throughout the Pond in sparse to moderate densities. Phragmites stands were noted scattered around the shoreline in trace to moderate densities. These stands were primarily located around the properties of shoreline property owners. No spiny naiad was documented within the areas previously treated with diquat. Following a search of the Pond, spiny naiad was

found in the cove near the public dock. This is the only area where spiny naiad was documented in the Pond, and it was not found in this area in the Spring when the initial pre-treatment survey was conducted. The spiny naiad density varied within the treatment area from scattered/sparse to dense. Conditions during the visit were calm and sunny.

All observed spiny naiad was treated with EPA/MA approved herbicide, diquat. This is the same herbicide that was used to control the spiny naiad during the June 15th treatment. The diquat herbicide was applied from a jon boat equipped with a calibrated sub-surface injection system. We anticipate control to be achieved within about one week. Prior to treatment, the shoreline adjacent to the treatment area was posted with neon green posters noting the treatment, affiliated water use restrictions and Water & Wetland contact information.

While on-site, surface dissolved oxygen and temperature readings were collected from a mid-Pond location. The water temperature had dropped quite a bit in the previous weeks, which was consistent with the other ponds we manage in the area. This is due to the cooler air temperatures and recent rain events. The dissolved oxygen was sufficient to support fish and wildlife.

Water Quality Analysis

Mid-Pond Water Quality Results			
Parameter	**Units**	**5/19/2021 Result**	**7/14/2021 Result**
pH	SU	7.1	7.3
Total Alkalinity	mg CaCO3/L	102	78.6
Turbidity	NTU	5.2	6.5
Soluble Phosphorus	mg/l	.013	.017
Total Phosphorus	mg/l	.039	.051
Nitrate Nitrogen	mg/l	.463	.192
Ammonia Nitrogen	mg/l	ND	.157
TKN	mg/l	.739	1.03
Chlorophyll-a	mg/m3	26.2	27.6

May 19, 2021 – BioChar Specific Sampling Results				
Parameter	**Units**	**Upstream**	**Downstream**	**Difference**
Total Phosphorus	mg/l	.054	.037	-.017
Soluble Phosphorus	mg/l	.077	.033	-.044

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July 14, 2021 – BioChar Specific Sampling Results				
Parameter	**Units**	**Upstream**	**Downstream**	**Difference**
Total Phosphorus	mg/l	.084	.093	+.009
Soluble Phosphorus	mg/l	.044	.046	+.002

pH: the measure of how acidic or basic the water is. *<6 notably acidic; 6-9 standard for freshwaters (7 is neutral); >9 notably basic*
Total Alkalinity: Measure of the buffering capacity of water, primarily consisting of carbonate, bicarbonate, and hydroxide in typical freshwater. Waters with lower levels are more susceptible to pH shifts. >20 mg/l is considered healthy; ~50 mg/l illustrates the water is resistant to change
Turbidity: Turbidity is either planktonic organisms or suspended solid particulates (algae, clay, silt, dead organic matter) in the water column that interfere with the penetration of light. The more suspended material throughout the water column, the higher the turbidity. <10 NTU drinking water standards; 10-50 NTU is considered moderate; >50 NTU potentially impactful to aquatic life
Soluble Phosphorus: Soluble phosphorous is the measure of filterable soluble and inorganic phosphorus. This form of phosphorus is directly taken up by plant cells.
Total Phosphorus: Total phosphorous is a nutrient that is essential for plants and algae to grow. Typically, a value of .03 mg/l, or 30 parts per billion, is sufficient enough to stimulate excessive plant and algae growth. This sample measures all forms of phosphorus in the water column. <12 ppb are considered nutrient deficient or oligotrophic; 12-24 ppb is considered a moderate amount of nutrients, or mesotrophic; 25-96 ppb is nutrient rich, or eutrophic; <96 ppb is considered excessive nutrients, or hypereutrophic
Nitrogen, Nitrate: Nitrate nitrogen is important to the growth of algae. Nitrate is the oxidized nitrogen and is often readily free for algae uptake. <1 mg/l typical for freshwater; 1-10 mg/l is potentially harmful; >10 mg/l possibly toxic
Nitrogen, Ammonia: Ammonia and organic nitrogen can enter water through sewage effluent and runoff from land where manure has been applied or stored. Ammonia in water is non-toxic to humans, but it is toxic to aquatic life. Unlike other forms of nitrogen, which can indirectly harm aquatic ecosystems by increasing nutrient levels and promoting algae growth in the process known as eutrophication, ammonia has direct toxic effects on aquatic ecosystems. High levels of ammonia in lakes and streams can promote the growth of algae, which in turn can choke out the growth of other aquatic plants. Bacteria can also convert ammonia in water to nitrate in a process known as nitrification. Nitrification is a beneficial process if it takes place in the soil — plants can use the produced nitrates as food. However, nitrification tends to lower the dissolved oxygen levels in water, making it harder for fish and other aquatic life to breathe.
Total Kjeldahl Nitrogen (TKN): Total Kjeldahl Nitrogen (TKN) is the organic and ammonia forms of nitrogen. Nitrogen is essential for living organisms to live in a pond or lake
Chlorophyll-a: Primary light-harvesting pigment found in algae and a measure of the algal productivity and water quality in a system. 0-2.6 ug/L oligotrophic; 2.7-20 ug/L mesotrophic; 21-56 ug/L eutrophic; >56 ug/L hypereutrophic

Pillings Pond Surface Temperature / Dissolved Oxygen		
Date	**Surface Temperature (℃)**	**Surface D.O. (mg/l)**
5/19/2021	21.9	9.68
6/15/2021	21.8	8.40
7/14/2021	21.9	10.13
8/12/2021	23.1	8.55
9/10/2021	21.2	8.27

The 2021 program was designed to include basic water quality parameters during various times throughout the season. The purpose of this was to establish a baseline, which will help document effectiveness of the management program, and will guide management over time.

The results from each sampling event as well as a basic outline of each parameter meaning is included in the tables above. Nothing was alarming about any of the values specific to pH, total alkalinity, or turbidity. While there was slight shifts in each of these parameters during the two sampling events, all values fell within a typical range.

Temperature and dissolved oxygen measurements were taken during each visit to Pillings Pond, as this is simply best practice prior to treatment. Dissolved oxygen can be affected by many outside factors, such as: temperature, time of day, and pollution. Fish and other aquatic organisms typically require a minimum of four to five milligrams per liter (mg/l) of oxygen. Dissolved oxygen readings at Pillings Pond were taken using a calibrated YSI meter. Healthy water should generally have concentrations about 6.5-8 mg/L. Readings at Pillings Pond showed sufficient dissolved oxygen at the surface, throughout the monitoring season.

The amount of dissolved oxygen a pond can hold is largely determined by water temperature. When the water temperature is cooler, it can hold more oxygen. Temperatures in Pillings Pond were also measured using a calibrated YSI meter. Generally, water cannot hold oxygen at levels that will support fish when above 85 degrees Fahrenheit. The surface water temperature at Pillings Pond peaked at roughly 73.5 degrees Fahrenheit.

As anticipated, phosphorus levels were elevated during both Pillings Pond sampling events. 2021 was of course somewhat of an anomaly, with record rainfalls throughout the Summer. May was fairly normal, however July showed excessive rainfall throughout the month. This likely skewed the July sampling results, as we would expect to see an influx of nutrients being washed in from the heavy rains.

Total phosphorus levels in Pillings Pond during both sampling events would classify the Pond as eutrophic, with mid-Pond readings at .039 mg/l and .051 mg/l. Nitrogen levels were generally within a normal range, short of the July TKN reading, which jumped slightly above 1.0 mg/l, with

< 1.0 mg/l generally considered a desirable level. This can likely be attributed to additional fertilizers, etc. washing in from the excessive rainfall during the month.

During the 2021 season an experiment using BioChar filtration socks was conducted in Bates Brook. As detailed above, the socks were staked at the culvert at Bourque Road. To gauge the effectiveness of the BioChar, samples were collected immediately upstream of the BioChar and immediately downstream of the BioChar (opposite side of Bourque Road). The samples were analyzed for both total phosphorus and soluble phosphorus. Two sampling events were conducted, one in May, and one in July. The May results were extremely encouraging, showing an approximately 37% reduction in total phosphorus and about an 80% reduction in soluble phosphorus, after the water passed through the BioChar socks.

The July sampling was much less encouraging as the downstream samples actually showed a small increase in both parameters after passing through the socks. Student intern for Lynnfield, Owen Blacker, also conducted additional stormwater sampling during the 2021 season. The results for this sampling were collected during storm events verses our collections which were collected during normal conditions. These samplings were collected later in the season, on August 19th, August 22nd, and September 1st. The August 22nd sampling showed nutrients in Bates Brook which were exorbitantly higher than anything found in our samplings. The August 19th and September 1st sampling was much more in line with what we'd expect to see. The flow rates during the September sampling were also much higher than the August sampling, which indicates a more significant storm event. Despite this variability, no real connection to the efficacy of the BioChar could be made, as small reductions and increases were seen on the various parameters upstream and downstream, but nothing substantial.

All the samplings showed increased nutrients at the inlets (Bates Brook, Crestwood Road, Lakewood Road) verses the mid-Pond results. In an ideal world, we'd have years of water quality data to analyze as water quality is ever changing and trends could be established. Based on 2021 alone, we can infer that nutrient input to Pillings Pond from the various tributaries and stormwater outfalls is elevated and should be addressed in some way. Keep in mind that 2021 was not a normal year and additional sampling is recommended in future years to further this study.

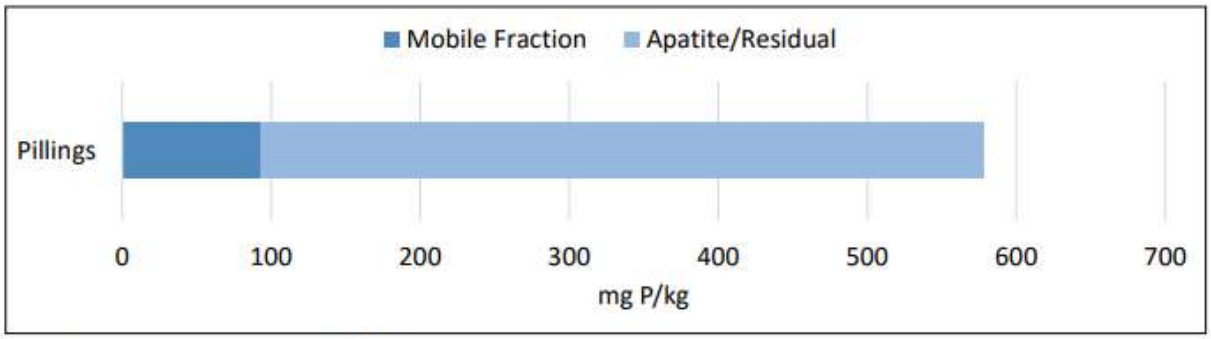
Some of the variability specific to BioChar socks could be attributed to the heavy rains during the Summer sampling events, forcing water levels above and over the BioChar. It is still unclear how long BioChar socks are effective for. The manufacturer notes that it may take several years to fully saturate the socks, but the promising results in May might suggest that the socks should be replaced more than once per season, perhaps every few months. This of course is just an assumption based on a limited sample size in a less than typical year. Given the BioChar specific sampling, we are less than convinced that BioChar is the answer to nutrient reduction at the various input points of Pillings Pond. It is definitely worth exploring further in 2022 and beyond,

especially given the early promising results. We do not recommend going "all-in" until we can determine further efficacy based on sampling.

Sediment Sampling

One sediment sample was collected from Pillings Pond and analyzed by SePro Lab for basic phosphorus fractioning. The direct lab results are illustrated in the table below.

Sample ID	Sample Name	Apatite and Residual (mg P/kg)	Mobile Phosphorus† Fraction (mg P/kg)	Sum of Phosphorus Fractions (mg P/kg)	% Solids (% Dry Wt.)
CTM29100-1	Pillings	485	93	578	43



†Mobile phosphorus represents fractions of sediment phosphorus that are potentially bio-available in typical aquatic environments. All concentrations are reported based on dry weight

These results summarize phosphorus content in the top 4 cm of sediment, which is where most nutrient exchange between sediment and the water column occurs. Total phosphorus content of 578 mg P/kg is relatively high; however, 485 mg P/kg is Appetite/Residual, which is highly unlikely to be released and therefore unavailable to algae in the water. The mobile fraction of phosphorus in the sediment was 93 mg P/kg, which is about 16% of the total. This fraction is releasable and potentially available for consumption by algae and floating plants in the water. Additional sediment sampling could be useful to determine the total releasable phosphorus more accurately in the top 4 cm of sediment throughout Pillings Pond; however, collection will be difficult in the previously dredged areas, due to depth limitations. If we were to make huge assumptions in modeling and assume this single sample is representative of the entire 90-acre waterbody, then we could assume the total releasable phosphorus in the top 4 cm of sediment to be approximately 600 lbs., which would mean the internal load of releasable phosphorus is enough to fuel hyper-eutrophic conditions in the Pond. This of course is an enormous assumption and even if a large scale, high-dose alum application were applied, there's still the underlying problem of nutrient input within Bates Brook and the other input locations.

Algae Sampling

Monthly, May through August, samples were collected to determine the concentration of algae cells and the algal species present in Pillings Pond. The samples were preserved using an iodine

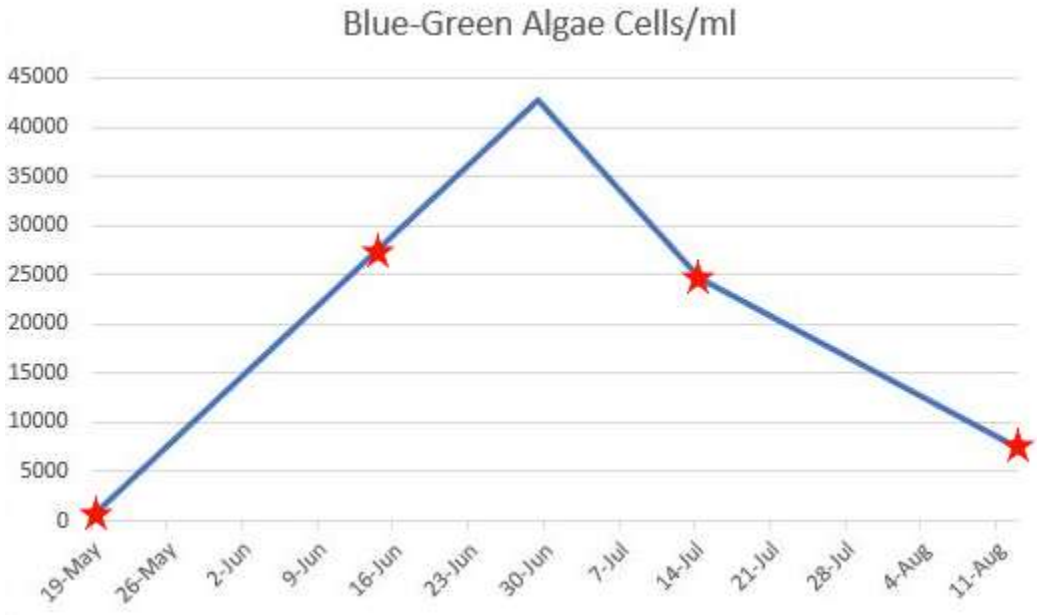
preservation, and immediately shipped to Northeast Aquatic Research, to be analyzed. Samples were generally collected from mid-Pond, unless visual signs of a bloom were observed, in which case the sample was collected in the location where the bloom was observed. This practice was designed to get a "worst case scenario," as cyanobacteria can pose potential health risks.

Massachusetts Department of Public Health recommends an advisory when cell counts exceed 70,000 per mL of water. Dense blooms and scums can contain millions of cells/mL and toxin levels in the parts per million. They can form near embankments and in areas suitable for swimming and other forms of recreation. They can also move around in the water body and grow quickly, making management of them difficult. Blue-green algae cells greater than 20,000 cells per mL are generally considered concerning from a contact recreation perspective, as designated by the World Health Organization (WHO). The blue-green algae counts are detailed in the table below, and the full algae count results are attached to the year-end report.

Blue-Green Algae Cell Counts (per ml)				
Blue Greens	**May 19**	**June 29**	**July 14**	**August 23**
Dolichospermum	0	23,810	11,079	3,003
Anacystis	0	0	0	0
Chrysosporum	0	2,041	12,974	4,402
Woronichinia	0	0	0	0
Aphanocapsa	0	0	0	0
Aphanothece	0	0	0	0
Coelospharium	0	0	0	0
Gleocapsa	0	0	0	0
Gloeothece	0	0	0	0
Merismopedia	0	0	0	0
Microcystis	0	16,871	525	0
Planktothrix	0	0	0	0
Limnothrix	0	0	0	0
Lyngbya	0	0	0	0
Planktolyngbya	0	0	0	0
Cylindrosherium	0	0	0	0
Raphidiopsis	0	0	0	0
Spirulina	0	0	0	0
Chroococcus	875	0	0	350
Total Blue-Greens	**875**	**42,722**	**24,578**	**7,755**

As seen in the table above, the blue-green cell counts were at their height during the June 29th sampling. They steadily dropped following that date. At no point did any of the results reach near the 70,000 cells/ml threshold set by Massachusetts Department of Public Health. The 42,722 cells/ml count was brought to the attention of Conservation upon receipt of the results. Luckily, there is little to no swimming in Pillings Pond and there are no public beaches. As detailed above, EarthTec algaecide was utilized in 2021 to manage the algae in Pillings Pond. Monthly treatments were applied to the Pond, starting in May.

The graph below represents the blue-green algae counts throughout the season, based on our sampling results. The red star denotes an EarthTec algaecide treatment.



As you'll see in the graph above, the counts were extremely low when the first EarthTec treatment was applied. While EarthTec does stay suspended much longer than traditional copper sulfate, the increased precipitation likely led to additional flushing of product, thus shortening the time in suspension. A second EarthTec treatment was applied in mid-June and counts started dropping roughly two weeks following that treatment and continued to drop for the rest of the season. Based on this graph, we've concluded that the first EarthTec application was slightly early, and it may make more sense in 2022 to conduct the first application later in May. Aside from the May treatment, the EarthTec was effective at knocking back the blue-green algae counts and keeping counts below the 70,000 cell threshold.

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Summary / 2022 Recommendations

2021 marked the first full year in which Water & Wetland managed Pillings Pond; it was also one of the wettest summers on record. The increased precipitation leads to increased nutrient loading, and increased flushing of product applied. Several new strategies were adopted in 2021 including the use of EarthTec algaecide, and the experiment with BioChar in Bates Brook. The new strategies were paired with sampling to assist with quantifying results and guiding future management. Despite the additional rainfall, we feel that the 2021 program was successful as the invasive spiny naiad was controlled, short of a small area that surfaced later in the season (this was later treated and controlled through a complimentary diquat application in this area). Algae was controlled through the proactive EarthTec treatments and blue-green counts did not come close to the 70,000 cells/ml threshold set by MA DPH. For 2022, it may make sense to collect an algae sample in early-May and base the initial EarthTec treatment on the received results, as the first treatment in 2021 was slightly early.

Perhaps most important to the 2021 program was the addition of water quality sampling, which gives us snapshots of water quality throughout the year. Regular annual water quality is recommended to establish baselines and to recognize trends. The excessive rainfall observed in 2021 definitely played a role in skewing results from that of a typical year. Based on the limited water quality data obtained in 2021, we can infer that phosphorus is elevated in Pillings Pond. Additionally, phosphorus levels coming into the Pond at the various input locations is further elevated. While the EarthTec is effective at managing the algae, some measures should be taken to address phosphorus. Further exploration of alum use can be explored, but we'd recommend bringing in a consultant such as ESS Group, who specializes in dosing aluminum treatments. While copper (such as EarthTec) is an algaecide, alum targets source phosphorus, as phosphorus is considered the limiting nutrient driving nuisance plant and algae growth. Alum is commonly used in ponds, lakes and drinking water reservoirs to remove phosphorus through precipitation, forming a heavier than water particulate known as floc. This floc settles to the bottom of the waterbody to create a barrier that slows sediment phosphorus release. Alum dosing can vary greatly. A low dose treatment can be used to strip phosphorus from the water column but may need to be repeated annually or more. This approach has been attempted in Pillings Pond historically, but no data was collected to support the efficacy of the treatments. Higher doses may be needed to inactivate sediment phosphorus reserves. Higher doses also typically require buffering with sodium aluminate. In either case, dosing is the key to success, and a specialist such as ESS Group can assist with intense sediment sampling and dosing. Given the need for this extensive testing, we recommend keeping alum in mind for the long-term future but are not recommending its' use for 2022.

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BioChar had mixed results in 2021, but we do not feel it should be abandoned. We recommend installing 50 linear feet at the Bourque Road location in April and replacing the BioChar in early-July. To analyze the success, we recommend keeping the sampling program identical, with samples in May and July. SePRO (manufacturer of many aquatic management technologies) has new phosphorus mitigation technologies being released in 2022 that may be applicable to Pillings Pond, these three technologies can be deployed alone or integrated to inactivate phosphorus from inflows/outflows, water column and sediment. One in particular is called EutroSORB and may be an alternative to the biochar in Bates Brook. This proprietary product is similar to BioChar in that it provides filtration, however SePRO has designed the product specifically to target phosphorus. They tout as much as 15x-20x more phosphorus removal than BioChar. We will provide more information on these technologies and pricing as it becomes available. We have an early January meeting with SePRO staff and anticipate having much more information on these technologies at that time.

As is always the case, we recommend using best management practices. These practices include not using fertilizers on lawns/turf or using non-phosphorous fertilizers when not fertilizing is not an option. Encouraging beneficial buffers will also help limit nutrient input into the Pond. This can be as simple as not mowing directly up to the shoreline. We've followed some of the work that the Conservation Commission and the Pillings Pond Sub-Committee have implemented pertaining to buffers, and fully support this work!

Spiny naiad has been successfully managed through diquat applications. Diquat is also a fairly affordable solution when compared to other aquatic herbicide options. We recommend continuing with this management based on the annual pre-treatment survey.

2022 Recommended Budgets

Task	**Timing**	**Budget**
DEP Permitting	March	$250
Provide and Install BioChar Socks	April & July	$4,000
EarthTec Treatment Program	May, June, July, Aug	$11,300
Spiny Naiad Treatment	June	$5,000
Sampling Program (includes algae sampling)	May-August	$3,200
Total		**$23,750**

You'll notice various price increases on some of the various tasks, due to supply issues leading to increased product and freight costs. The drastic increase in the BioChar cost is due to the second BioChar event (replacing the BioChar in July). The total cost of the sampling program has dropped, as we have not included the single sediment sample. As noted above, additional technologies which may be beneficial to Pillings Pond are becoming available in 2022 and we will be sure to pass along information and pricing as soon as it becomes available.

WATER & WETLAND

LAKE, POND & WETLAND MANAGEMENT

We've greatly enjoyed working with the Lynnfield Conservation Commission and the Pillings Pond Sub-Committee to improve the health of Pillings Pond. We look forward to working with you in 2022 and beyond. Should you have any questions, please do not hesitate to reach out to us.

Sincerely,

Colin Gosselin
Director of Operations
Senior Aquatic Biologist
c: 508-259-3153
o: 888-4WETLAN(D)
colin@waterandwetland.com
www.waterandwetland.com

Joe Onorato
Director of Business Development
Aquatic Specialist
c: 508-250-6238
o: 888-4WETLAN(D)
joe@waterandwetland.com
www.waterandwetland.com

Attachments Include

- **2021 WM04 Approval**
- **Spiny Naiad Treatment Map – 6/15/2021**
- **Spiny Naiad Treatment Map – 9/10/2021**
- **Direct Lab Water Quality Results**
- **Direct Lab Algae Sampling Results**
- **Direct Lab Sediment Sampling Results**

Commonwealth of Massachusetts
Executive Office of Energy and Environmental Affairs
Department of Environmental Protection
One Winter Street Boston, MA 02108 • 617-292-5500

Charles D. Baker
Governor

Karyn E. Polito
Lieutenant Governor

Kathleen A. Theoharides
Secretary

Martin Suuberg
Commissioner

License No.: **WM04-0000483**

LICENSE TO APPLY CHEMICALS FOR CONTROL OF NUISANCE AQUATIC VEGETATION

Applicant: COLIN J GOSSELIN
Name of Waterbody: PILLINGS POND
Location of Waterbody: LYNNFIELD
Project Proponent: TOWN OF LYNNFIELD

AUTHORITY FOR ISSUANCE

Pursuant to the authority granted to the Department of Environmental Protection, by Massachusetts G.L.c. 111, s5E, the following license is hereby issued to **colin Gosselin, Water and Wetland** (hereinafter called the "licensee"), authorizing the application of chemicals for the control of nutrients, algae or aquatic plants to **PILLINGS POND, LYNNFIELD**; such authorization being expressly conditional on compliance by the licensee with all terms and conditions of the license hereinafter set forth. This license shall become effective on the date of the Director's signature and shall expire on the **12/31/2021**.

Sincerely,

License Effective Date: **05/06/2021**

Stephanie Moura
Director, Division of Wetlands and Waterways
Department of Environmental Protection

License No.: WM04-0000483

A. Application Condition(s)

Chemical Information

Product Brand Name/Trade Name	Chemical Form (dry/liquid)	Total Weight/Volume Applied	Units of Measurement (lbs/gallons)	Acres Treated	Application Rate	Planned Maximum Concentration (ppm)
Alligare Diquat	liquid	51.75	gal	34.5	1.5 gal/acre	
Earthtec	liquid	360	gal	90	4 gal/acre	
Copper Sulfate	dry	225	pounds	45	1 lb/acrefoot	
AquaPro	Liquid	.75	gal	1	.75 gal/acre	

Treatment Method: Treatment will be conducted using a submersed injection system. Treatments will be split into 3-5 treatments conducted throughout the summer as necessary.

B. Application Report

By December 31st of the year of this treatment, the licensee shall submit a written report to the Department certifying the treatment date, application rate and the total weight/volume for each chemical used in the treatment, in accordance with requirements of Section I.A. of this license.
Please send the report to the Massachusetts Department of Environmental Protection (David.W.Wong@mass.gov).

C. Modification of Application Conditions

The licensee shall not apply chemicals in a manner contrary to, or inconsistent with, the application conditions set forth in Section I.A. of this license without the prior written approval of the Department.

General Conditions

A. The licensee is hereby notified that chemical treatments to control aquatic nuisances in public or private lakes and ponds of the Commonwealth involve the alteration of wetland resource areas protected under both Massachusetts G.L.c. 131, s40, the Wetlands Protection Act and 310 CMR 10.00, Massachusetts Wetlands Protection Regulations.

B. The licensee is hereby notified that issuance of this license does not in any way constitute the Department's approval of the chemical treatment as it related to the provisions of the Wetlands Protection Act.

License No.: **WM04-0000483**

C. The licensee shall obtain either a final Order of Conditions or a negative Determination of Applicability from the **LYNNFIELD** Conservation Commission(s) prior to application of chemicals authorized under this license.

D. Shoreline areas of the lake or pond must be posted with signs warning the general public of any water use restrictions stated on the chemical label minimum for one week. This is especially important at bathing beaches and other areas of common access. These signs shall clearly state that the chemical treatment is being conducted pursuant to a license issued by the Department of Environmental Protection, "DEP". A new sign shall be posted for each treatment event.

E. The Department may require the licensee to cease application of chemicals to a body of water at any time following the issuance of a license if the Department determines that the chemical treatment will be ineffective, or will result in unreasonable restrictions on current water uses, or will produce unnecessary adverse side effects on nontarget flora or fauna.

F. Chemical applications shall be performed in accordance with the manufacturer's label directions, existing pesticide use laws, and any conditions imposed by other local or state agencies.

G. Chemical treatments to water using general use pesticides shall only be performed by an applicator currently licensed by the Massachusetts Department of Agricultural Resources Pesticide Program in the aquatics category. Chemical treatments to Bordering Vegetated Wetlands (310 CMR 10.55(2)(a)) and Salt Marsh (310 CMR 10.32(2)) using general use pesticides and techniques that insure chemicals are not applied to water shall only be performed by an applicator currently licensed in Massachusetts Department of Agricultural Resources Pesticide Program. Chemical treatments using restricted use pesticides shall only be performed by an applicator currently certified by the Massachusetts Department of Agricultural Resources Pesticide Program.

H. Issuance of this license does not release the licensee from liability resulting from the use of chemicals or from negligent or reckless application of chemicals specified in Section I.A of this license.

I. Electronic notification of treatment must be made to the Massachusetts Division of Fisheries and Wildlife (jason.stolarski@mass.gov, jason.carmignani@mass.gov). Notification that the treatment was performed shall be made within 24 hours of treatment. The notification message should include waterbody, town, license number and chemicals used.

J. No chemical treatment shall be conducted while a Massachusetts Department of Public Health advisory is in effect.

K. In general, less than 1/3 of the lake area and less than ½ of the littoral zone should be targeted for herbicide treatment when native plants (particularly low growth forms) are dominant.

WATER & WETLAND
LAKE, POND & WETLAND MANAGEMENT

Pillings Pond

Spiny Naiad Treatment Map

Lynnfield, MA

Treatment Date
6/15/21
Map Date
6/21/21

WATER & WETLAND
LAKE, POND & WETLAND MANAGEMENT

Pillings Pond

Treatment Map

Lynnfield, MA

Treatment Date
9/10/2021

Map Date
9/10/2021

N

ANALYTICAL REPORT

Lab Number:	L2126472
Client:	Water & Wetland, LLC 115 South Street Upton, MA 01568
ATTN:	Joseph Onorato
Phone:	(888) 493-8526
Project Name:	PILLINGS POND
Project Number:	Not Specified
Report Date:	06/07/21

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com

Project Name: PILLINGS POND
Project Number: Not Specified

Lab Number: L2126472
Report Date: 06/07/21

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2126472-01	MID POND	WATER	LYNNFIELD, MA	05/19/21 10:00	05/19/21
L2126472-02	UPSTREAM	WATER	LYNNFIELD, MA	05/19/21 10:00	05/19/21
L2126472-03	DOWNSTREAM	WATER	LYNNFIELD, MA	05/19/21 10:30	05/19/21

Project Name:	PILLINGS POND	**Lab Number:**	L2126472
Project Number:	Not Specified	**Report Date:**	06/07/21

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name: PILLINGS POND
Project Number: Not Specified
Lab Number: L2126472
Report Date: 06/07/21

Case Narrative (continued)

Sample Receipt

The analyses performed were specified by the client.

The samples were received at the laboratory above the required temperature range. The samples were transported to the laboratory in a cooler with ice and delivered directly from the sampling site. This is considered acceptable since the samples were in the process of cooling.

Phosphorus, Orthophosphate

L2126472-01 was analyzed with the method required holding time exceeded.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Cristin Walker

Title: Technical Director/Representative Date: 06/07/21

INORGANICS
&
MISCELLANEOUS

Project Name: PILLINGS POND
Project Number: Not Specified

Lab Number: L2126472
Report Date: 06/07/21

SAMPLE RESULTS

Lab ID: L2126472-01
Client ID: MID POND
Sample Location: LYNNFIELD, MA

Date Collected: 05/19/21 10:00
Date Received: 05/19/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	5.2		NTU	0.20	--	1	-	05/20/21 02:51	121,2130B	KA
Alkalinity, Total	102.		mg CaCO3/L	2.00	NA	1	-	05/27/21 10:00	121,2320B	JB
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	06/04/21 04:40	06/04/21 19:36	121,4500NH3-BH	AT
Nitrogen, Nitrate	0.463		mg/l	0.100	--	1	-	05/21/21 03:51	121,4500NO3-F	MR
Nitrogen, Total Kjeldahl	0.739		mg/l	0.300	--	1	06/04/21 05:07	06/06/21 07:03	121,4500NH3-H	AT
Phosphorus, Total	0.039		mg/l	0.010	--	1	06/01/21 09:00	06/02/21 10:30	121,4500P-E	SD
Phosphorus, Orthophosphate	0.006		mg/l	0.005	--	1	-	05/21/21 18:04	121,4500P-E	AS
Phosphorus, Soluble	0.013		mg/l	0.010	--	1	06/02/21 10:15	06/03/21 14:26	121,4500P-E	SD
Chlorophyll A	26.2		mg/m3	2.00	NA	1	05/20/21 09:35	05/24/21 06:50	121,10200H	MT

Project Name: PILLINGS POND
Project Number: Not Specified

Lab Number: L2126472
Report Date: 06/07/21

SAMPLE RESULTS

Lab ID: L2126472-02
Client ID: UPSTREAM
Sample Location: LYNNFIELD, MA

Sample Depth:
Matrix: Water

Date Collected: 05/19/21 10:00
Date Received: 05/19/21
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Phosphorus, Total	0.054		mg/l	0.010	--	1	06/01/21 09:00	06/02/21 10:31	121,4500P-E	SD

Project Name: PILLINGS POND
Project Number: Not Specified

Lab Number: L2126472
Report Date: 06/07/21

SAMPLE RESULTS

Lab ID: L2126472-03
Client ID: DOWNSTREAM
Sample Location: LYNNFIELD, MA

Date Collected: 05/19/21 10:30
Date Received: 05/19/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Phosphorus, Total	0.037		mg/l	0.010	--	1	06/01/21 09:00	06/02/21 10:34	121,4500P-E	SD

Project Name: PILLINGS POND
Project Number: Not Specified
Lab Number: L2126472
Report Date: 06/07/21

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1501282-2										
Turbidity	ND		NTU	0.20	--	1	-	05/20/21 02:51	121,2130B	KA
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1501880-1										
Nitrogen, Nitrate	ND		mg/l	0.100	--	1	-	05/21/21 09:40	121,4500NO3-F	MR
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1501915-1										
Chlorophyll A	ND		mg/m3	2.00	NA	1	05/20/21 09:35	05/24/21 06:50	121,10200H	MT
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1502218-1										
Phosphorus, Orthophosphate	ND		mg/l	0.005	--	1	-	05/21/21 17:58	121,4500P-E	AS
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1503968-1										
Alkalinity, Total	ND		mg CaCO3/L	2.00	NA	1	-	05/27/21 10:00	121,2320B	JB
General Chemistry - Westborough Lab for sample(s): 01-03 Batch: WG1505915-1										
Phosphorus, Total	ND		mg/l	0.010	--	1	06/01/21 09:00	06/02/21 10:11	121,4500P-E	SD
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1506506-1										
Phosphorus, Soluble	ND		mg/l	0.010	--	1	06/02/21 10:15	06/03/21 15:08	121,4500P-E	SD
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1507403-1										
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	06/04/21 04:40	06/04/21 19:34	121,4500NH3-BH	AT
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1507404-1										
Nitrogen, Total Kjeldahl	ND		mg/l	0.300	--	1	06/04/21 05:07	06/06/21 06:49	121,4500NH3-H	AT

Lab Control Sample Analysis

Batch Quality Control

Project Name: PILLINGS POND
Project Number: Not Specified

Lab Number: L2126472
Report Date: 06/07/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1501282-1								
Turbidity	109		-		90-110	-		
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1501880-2								
Nitrogen, Nitrate	95		-		90-110	-		
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1502218-2								
Phosphorus, Orthophosphate	104		-		90-110	-		
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1503968-2								
Alkalinity, Total	108		-		90-110	-		10
General Chemistry - Westborough Lab Associated sample(s): 01-03 Batch: WG1505915-2								
Phosphorus, Total	100		-		80-120	-		
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1506506-2								
Phosphorus, Soluble	108		-		80-120	-		
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1507403-2								
Nitrogen, Ammonia	90		-		80-120	-		20

Lab Control Sample Analysis

Batch Quality Control

Project Name: PILLINGS POND

Project Number: Not Specified

Lab Number: L2126472

Report Date: 06/07/21

Parameter	LCS %Recovery	LCSD %Recovery	%Recovery Limits	RPD	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1507404-2					
Nitrogen, Total Kjeldahl	96	-	78-122	-	

Matrix Spike Analysis
Batch Quality Control

Project Name: PILLINGS POND
Project Number: Not Specified

Lab Number: L2126472
Report Date: 06/07/21

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1501880-4 QC Sample: L2126472-01 Client ID: MID POND												
Nitrogen, Nitrate	0.463	4	4.56	102		-	-		83-113	-		17
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1502218-4 QC Sample: L2126472-01 Client ID: MID POND												
Phosphorus, Orthophosphate	0.006	0.5	0.494	98		-	-		80-120	-		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1503968-4 QC Sample: L2126208-06 Client ID: MS Sample												
Alkalinity, Total	211	100	303	92		-	-		86-116	-		10
General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1505915-4 QC Sample: L2126272-01 Client ID: MS Sample												
Phosphorus, Total	0.022	0.5	0.499	95		-	-		75-125	-		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1506506-4 QC Sample: L2126474-01 Client ID: MS Sample												
Phosphorus, Soluble	0.014	0.5	0.488	95		-	-		75-125	-		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1507403-4 QC Sample: L2126492-03 Client ID: MS Sample												
Nitrogen, Ammonia	0.143	4	3.56	85		-	-		80-120	-		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1507404-4 QC Sample: L2126254-01 Client ID: MS Sample												
Nitrogen, Total Kjeldahl	1.81	8	9.65	98		-	-		77-111	-		24

Lab Duplicate Analysis
Batch Quality Control

Project Name: PILLINGS POND
Project Number: Not Specified

Lab Number: L2126472
Report Date: 06/07/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1501282-3 QC Sample: L2125924-01 Client ID: DUP Sample						
Turbidity	1.0	0.92	NTU	8		13
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1501880-3 QC Sample: L2126472-01 Client ID: MID POND						
Nitrogen, Nitrate	0.463	0.447	mg/l	4		17
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1501915-2 QC Sample: L2126472-01 Client ID: MID POND						
Chlorophyll A	26.2	25.0	mg/m3	5		35
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1502218-3 QC Sample: L2126472-01 Client ID: MID POND						
Phosphorus, Orthophosphate	0.006	ND	mg/l	NC		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1503968-3 QC Sample: L2126208-06 Client ID: DUP Sample						
Alkalinity, Total	211	207	mg CaCO3/L	2		10
General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1505915-3 QC Sample: L2126272-01 Client ID: DUP Sample						
Phosphorus, Total	0.022	0.022	mg/l	0		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1506506-3 QC Sample: L2126472-01 Client ID: MID POND						
Phosphorus, Soluble	0.013	0.013	mg/l	0		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1507403-3 QC Sample: L2126492-03 Client ID: DUP Sample						
Nitrogen, Ammonia	0.143	ND	mg/l	NC		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1507404-3 QC Sample: L2126254-01 Client ID: DUP Sample						
Nitrogen, Total Kjeldahl	1.81	2.23	mg/l	21		24

Project Name: PILLINGS POND
Project Number: Not Specified

Lab Number: L2126472
Report Date: 06/07/21

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2126472-01A	Plastic 250ml unpreserved/No Headspace	A	N/A	N/A	12.6	Y	Absent		ALK-T-2320(14)
L2126472-01B	Plastic 250ml unpreserved	A	7	7	12.6	Y	Absent		OPHOS-4500(2),TURB-2130(2),NO3-4500(2)
L2126472-01C	Plastic 250ml H2SO4 preserved	A	<2	<2	12.6	Y	Absent		-
L2126472-01D	Plastic 250ml H2SO4 preserved	A	<2	<2	12.6	Y	Absent		TKN-4500(28),TPHOS-4500(28),NH3-4500(28)
L2126472-01E	Plastic 500ml H2SO4 preserved	A	<2	<2	12.6	Y	Absent		TKN-4500(28),TPHOS-4500(28),NH3-4500(28)
L2126472-01F	Brown Plastic 1000ml unpreserved	A	NA		12.6	Y	Absent		CHLORO-A(1)
L2126472-01G	Brown Plastic 1000ml unpreserved	A	NA		12.6	Y	Absent		CHLORO-A(1)
L2126472-01X	Plastic 250ml H2SO4 preserved Filtrates	NA	NA			Y	Absent		SPHOS-4500(28)
L2126472-02A	Plastic 250ml H2SO4 preserved	A	<2	<2	12.6	Y	Absent		HOLD-WETCHEM()
L2126472-02B	Plastic 250ml H2SO4 preserved	A	<2	<2	12.6	Y	Absent		TPHOS-4500(28)
L2126472-03A	Plastic 250ml H2SO4 preserved	A	<2	<2	12.6	Y	Absent		HOLD-WETCHEM()
L2126472-03B	Plastic 250ml H2SO4 preserved	A	<2	<2	12.6	Y	Absent		TPHOS-4500(28)

*Values in parentheses indicate holding time in days

Project Name:	PILLINGS POND	**Lab Number:**	L2126472
Project Number:	Not Specified	**Report Date:**	06/07/21

GLOSSARY

Acronyms

DL - Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

EDL - Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).

EMPC - Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.

EPA - Environmental Protection Agency.

LCS - Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LCSD - Laboratory Control Sample Duplicate: Refer to LCS.

LFB - Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LOD - Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

LOQ - Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

MDL - Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

MS - Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.

MSD - Matrix Spike Sample Duplicate: Refer to MS.

NA - Not Applicable.

NC - Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.

NDPA/DPA - N-Nitrosodiphenylamine/Diphenylamine.

NI - Not Ignitable.

NP - Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.

NR - No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.

RL - Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

RPD - Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.

SRM - Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.

STLP - Semi-dynamic Tank Leaching Procedure per EPA Method 1315.

TEF - Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.

TEQ - Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.

TIC - Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: Data Usability Report

Project Name:	PILLINGS POND	**Lab Number:**	L2126472
Project Number:	Not Specified	**Report Date:**	06/07/21

Footnotes

1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. (Note: 'PFAS, Total (6)' is applicable to MassDEP DW compliance analysis only.). If a 'Total' result is requested, the results of its individual components will also be reported.

The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA,this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

F - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

J - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

ND - Not detected at the reporting limit (RL) for the sample.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where

Report Format: Data Usability Report

Project Name:	PILLINGS POND	**Lab Number:**	L2126472
Project Number:	Not Specified	**Report Date:**	06/07/21

Data Qualifiers

the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

Report Format: Data Usability Report

Project Name:	PILLINGS POND	**Lab Number:**	L2126472
Project Number:	Not Specified	**Report Date:**	06/07/21

REFERENCES

121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624/624.1: m/p-xylene, o-xylene, Naphthalene
EPA 625/625.1: alpha-Terpineol
EPA 8260C/8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D/8270E: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine, alpha-Terpineol; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility
SM 2540D: TSS
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.**
EPA 624.1: Volatile Halocarbons & Aromatics,
EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

Mansfield Facility:

Drinking Water
EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.
EPA 522, EPA 537.1.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

CHAIN OF CUSTODY

PAGE _____ OF _____

Date Rec'd in Lab: 5/19/21

ALPHA Job #: L2126472

8 Walkup Drive
Westboro, MA 01581
Tel: 508-898-9220

320 Forbes Blvd
Mansfield, MA 02048
Tel: 508-822-9300

Client Information

Client: Water and Wetland
Address: 115 South Street
Upton, MA 01568
Phone:
Email: colin@waterandwetland.com

Project Information

Project Name: Pillings Pond
Project Location: Lynnfield, MA
Project #:
Project Manager: Colin Gosselin
ALPHA Quote #:

Turn-Around Time

☒ Standard ☐ RUSH (only confirmed if pre-approved!)
Date Due:

Report Information - Data Deliverables

☐ ADEx ☒ EMAIL

Billing Information

☒ Same as Client info PO #:

Regulatory Requirements & Project Information Requirements

☐ Yes ☒ No MA MCP Analytical Methods ☐ Yes ☐ No CT RCP Analytical Methods
☐ Yes ☒ No Matrix Spike Required on this SDG? (Required for MCP Inorganics)
☐ Yes ☒ No GW1 Standards (Info Required for Metals & EPH with Targets)
☐ Yes ☒ No NPDES RGP
☐ Other State /Fed Program _____ Criteria _____

Additional Project Information:

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler Initials	ANALYSIS: TPhos, SPhos	Turb, NO3	Chloro-A	NH3, TKN	SAMPLE INFO / Sample Comments	TOTAL # BOTTLES
26472-01	Mid Pond	5/19/21	10:00 AM	WS	GG	X	X	X	X		7
02	Upstream	5/19/21	10:00 AM	WS	JL	X					2
03	Downstream	5/19/21	10:30 AM	WS	JL	X					2

ANALYSIS: ☐ VOC: ☐ 8260 ☐ 624 ☐ 524.2 ☐ SVOC: ☐ ABN ☐ PAH ☐ METALS: ☐ MCP 13 ☐ MCP 14 ☐ RCP 15 ☐ METALS: ☐ RCRA5 ☐ RCRA8 ☐ PP13 ☐ EPH: ☐ Ranges & Targets ☐ Ranges Only ☐ VPH: ☐ Ranges & Targets ☐ Ranges Only ☐ PCB ☐ PEST ☐ TPH: ☐ Quant Only ☐ Fingerprint

SAMPLE INFO
Filtration
☐ Field
☐ Lab to do
Preservation
☐ Lab to do

Container Type																			
Preservative																			

Container Type
P= Plastic
A= Amber glass
V= Vial
G= Glass
B= Bacteria cup
C= Cube
O= Other
E= Encore
D= BOD Bottle

Preservative
A= None
B= HCl
C= HNO_3
D= H_2SO_4
E= NaOH
F= MeOH
G= $NaHSO_4$
H = $Na_2S_2O_3$
I= Ascorbic Acid
J = NH_4Cl
K= Zn Acetate
O= Other

Relinquished By:	Date/Time	Received By:	Date/Time
	5/19/21 4:52 pm		5/19/21 1652

All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

FORM NO: 01-01 (rev. 12-Mar-2012)

ANALYTICAL REPORT

Lab Number:	L2130069
Client:	Water & Wetland, LLC 115 South Street Upton, MA 01568
ATTN:	Colin Gosselin
Phone:	(888) 493-8526
Project Name:	PILLINGS POND
Project Number:	Not Specified
Report Date:	06/22/21

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com

Project Name: PILLINGS POND
Project Number: Not Specified

Lab Number: L2130069
Report Date: 06/22/21

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2130069-01	UP STREAM	WATER	LYNNFIELD, MA	06/04/21 09:00	06/04/21
L2130069-02	DOWN STREAM	WATER	LYNNFIELD, MA	06/04/21 09:00	06/04/21

Project Name:	PILLINGS POND	**Lab Number:**	L2130069
Project Number:	Not Specified	**Report Date:**	06/22/21

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name: PILLINGS POND
Project Number: Not Specified
Lab Number: L2130069
Report Date: 06/22/21

Case Narrative (continued)

Sample Receipt

The samples were received at the laboratory above the required temperature range. The samples were delivered directly from the sampling site but were not on ice.

L2130069-01: The collection date and time on the chain of custody was 04-JUN-21 09:00; however, the collection date/time on the container label was 04-JUN-21 09:30. At the client's request, the collection date/time is reported as 04-JUN-21 09:00.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Michelle M. Morris

Title: Technical Director/Representative Date: 06/22/21

INORGANICS
&
MISCELLANEOUS

Project Name: PILLINGS POND
Project Number: Not Specified

Lab Number: L2130069
Report Date: 06/22/21

SAMPLE RESULTS

Lab ID: L2130069-01
Client ID: UP STREAM
Sample Location: LYNNFIELD, MA

Sample Depth:
Matrix: Water

Date Collected: 06/04/21 09:00
Date Received: 06/04/21
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Phosphorus, Soluble	0.077		mg/l	0.010	--	1	06/11/21 11:45	06/14/21 13:30	121,4500P-E	SD

Project Name: PILLINGS POND
Project Number: Not Specified

Lab Number: L2130069
Report Date: 06/22/21

SAMPLE RESULTS

Lab ID: L2130069-02
Client ID: DOWN STREAM
Sample Location: LYNNFIELD, MA

Date Collected: 06/04/21 09:00
Date Received: 06/04/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Phosphorus, Soluble	0.033		mg/l	0.010	--	1	06/11/21 11:45	06/14/21 13:31	121,4500P-E	SD

Project Name: PILLINGS POND
Project Number: Not Specified
Lab Number: L2130069
Report Date: 06/22/21

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab for sample(s): 01-02 Batch: WG1511003-1										
Phosphorus, Soluble	ND		mg/l	0.010	--	1	06/11/21 11:45	06/14/21 13:17	121,4500P-E	SD

Lab Control Sample Analysis

Batch Quality Control

Project Name: PILLINGS POND
Project Number: Not Specified

Lab Number: L2130069
Report Date: 06/22/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-02 Batch: WG1511003-2								
Phosphorus, Soluble	94		-		80-120	-		

Matrix Spike Analysis
Batch Quality Control

Project Name: PILLINGS POND
Project Number: Not Specified

Lab Number: L2130069
Report Date: 06/22/21

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-02 QC Batch ID: WG1511003-4 QC Sample: L2129190-18 Client ID: MS Sample												
Phosphorus, Soluble	0.032	0.5	0.460	86		-	-		75-125	-		20

Lab Duplicate Analysis

Batch Quality Control

Project Name: PILLINGS POND
Project Number: Not Specified

Lab Number: L2130069
Report Date: 06/22/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-02 QC Batch ID: WG1511003-3 QC Sample: L2129190-18 Client ID: DUP Sample						
Phosphorus, Soluble	0.032	0.029	mg/l	10		20

Project Name: PILLINGS POND
Project Number: Not Specified

Lab Number: L2130069
Report Date: 06/22/21

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2130069-01A	Plastic 250ml unpreserved	A	7	7	22.9	Y	Absent		FILTER(1)
L2130069-01X	Plastic 250ml H2SO4 preserved Filtrates	A	NA		22.9	Y	Absent		SPHOS-4500(28)
L2130069-02A	Plastic 250ml unpreserved	A	7	7	22.9	Y	Absent		FILTER(1)
L2130069-02X	Plastic 250ml H2SO4 preserved Filtrates	A	NA		22.9	Y	Absent		SPHOS-4500(28)

*Values in parentheses indicate holding time in days

Project Name:	PILLINGS POND	**Lab Number:**	L2130069
Project Number:	Not Specified	**Report Date:**	06/22/21

GLOSSARY

Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
NR	- No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: Data Usability Report

Project Name:	PILLINGS POND	**Lab Number:**	L2130069
Project Number:	Not Specified	**Report Date:**	06/22/21

Footnotes

1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA,this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

F - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

J - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

ND - Not detected at the reporting limit (RL) for the sample.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where

Report Format: Data Usability Report

Project Name:	PILLINGS POND	**Lab Number:**	L2130069
Project Number:	Not Specified	**Report Date:**	06/22/21

Data Qualifiers

the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

Report Format: Data Usability Report

Project Name:	PILLINGS POND	**Lab Number:**	L2130069
Project Number:	Not Specified	**Report Date:**	06/22/21

REFERENCES

121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624/624.1: m/p-xylene, o-xylene, Naphthalene
EPA 625/625.1: alpha-Terpineol
EPA 8260C/8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D/8270E: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine, alpha-Terpineol; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility
SM 2540D: TSS
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.**
EPA 624.1: Volatile Halocarbons & Aromatics,
EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

Mansfield Facility:

Drinking Water
EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.
EPA 522, EPA 537.1.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

CHAIN OF CUSTODY

PAGE _____ OF _____

Date Rec'd in Lab: 6/4/21

ALPHA Job #: MW L2130069 L212

8 Walkup Drive
Westboro, MA 01581
Tel: 508-898-9220

320 Forbes Blvd
Mansfield, MA 02048
Tel: 508-822-9300

Client Information

Client: Water and Wetland
Address: 115 South St
Upton MA 01568
Phone: 508 259 3153
Email: info@waterandwetland.com

Project Information

Project Name: Pillings Pond
Project Location: Lynnfield MA
Project #:
Project Manager: Colin Gosselin
ALPHA Quote #:

Turn-Around Time

☒ Standard ☐ RUSH (only confirmed if pre-approved)
Date Due:

Report Information - Data Deliverables

☐ ADEx ☒ EMAIL

Billing Information

☐ Same as Client info PO #:

Regulatory Requirements & Project Information Requirements

☐ Yes ☒ No MA MCP Analytical Methods ☐ Yes ☐ No CT RCP Analytical Methods
☐ Yes ☒ No Matrix Spike Required on this SDG? (Required for MCP Inorganics)
☐ Yes ☒ No GW1 Standards (Info Required for Metals & EPH with Targets)
☐ Yes ☒ No NPDES RGP
☐ Other State /Fed Program _____ Criteria _____

Additional Project Information:

ANALYSIS

VOC: ☐ 8260 ☐ 624 ☐ 524.2
SVOC: ☐ ABN ☐ PAH
METALS: ☐ MCP 13 ☐ MCP 14 ☐ RCP 15
METALS: ☐ RCRA5 ☐ RCRA8 ☐ PP13
EPH: ☐ Ranges & Targets ☐ Ranges Only
VPH: ☐ Ranges & Targets ☐ Ranges Only
☐ PCB ☐ PEST
TPH: ☐ Quant Only ☐ Fingerprint
Soluble Phosphorus

SAMPLE INFO
Filtration
☐ Field
☐ Lab to do
Preservation
☐ Lab to do

Sample Comments

TOTAL # BOTTLES

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler Initials	Soluble Phosphorus	TOTAL # BOTTLES
30069-01	Up Stream	6/4/21	9:00 AM	WS	CG	X	1
02	Down Stream	6/4/21	9:00 AM	WS	CG	X	1

Container Type	
Preservative	

Container Type
P= Plastic
A= Amber glass
V= Vial
G= Glass
B= Bacteria cup
C= Cube
O= Other
E= Encore
D= BOD Bottle

Preservative
A= None
B= HCl
C= HNO_3
D= H_2SO_4
E= NaOH
F= MeOH
G= $NaHSO_4$
H = $Na_2S_2O_3$
I= Ascorbic Acid
J = NH_4Cl
K= Zn Acetate
O= Other

Relinquished By:	Date/Time	Received By:	Date/Time
MK MK	6/4 3:05	[signature] AM	6/4/21 1505

All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

FORM NO: 01-01 (rev. 12-Mar-2012)

ANALYTICAL REPORT

Lab Number:	L2137772
Client:	Water & Wetland, LLC 115 South Street Upton, MA 01568
ATTN:	Colin Gosselin
Phone:	(888) 493-8526
Project Name:	PILLINGS POND
Project Number:	Not Specified
Report Date:	07/21/21

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com

Project Name: PILLINGS POND
Project Number: Not Specified

Lab Number: L2137772
Report Date: 07/21/21

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2137772-01	1. UPSTREAM	WATER	LYNFIELD, MA	07/14/21 10:15	07/14/21
L2137772-02	2. DOWNSTREAM	WATER	LYNFIELD, MA	07/14/21 10:15	07/14/21
L2137772-03	3. MID POND	WATER	LYNFIELD, MA	07/14/21 10:45	07/14/21

Project Name:	PILLINGS POND	**Lab Number:**	L2137772
Project Number:	Not Specified	**Report Date:**	07/21/21

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name: PILLINGS POND
Project Number: Not Specified
Lab Number: L2137772
Report Date: 07/21/21

Case Narrative (continued)

Sample Receipt

The samples were received at the laboratory above the required temperature range. The samples were transported to the laboratory in a cooler with ice packs and delivered directly from the sampling site. This is considered acceptable since the samples were in the process of cooling.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Sebastian Corbin

Title: Technical Director/Representative Date: 07/21/21

INORGANICS
&
MISCELLANEOUS

Project Name: PILLINGS POND
Project Number: Not Specified

Lab Number: L2137772
Report Date: 07/21/21

SAMPLE RESULTS

Lab ID: L2137772-01
Client ID: 1. UPSTREAM
Sample Location: LYNFIELD, MA

Sample Depth:
Matrix: Water

Date Collected: 07/14/21 10:15
Date Received: 07/14/21
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Phosphorus, Total	0.084		mg/l	0.010	--	1	07/15/21 09:20	07/15/21 14:44	121,4500P-E	SD
Phosphorus, Soluble	0.044		mg/l	0.010	--	1	07/15/21 14:00	07/16/21 08:29	121,4500P-E	SD

Project Name: PILLINGS POND
Project Number: Not Specified

Lab Number: L2137772
Report Date: 07/21/21

SAMPLE RESULTS

Lab ID: L2137772-02
Client ID: 2. DOWNSTREAM
Sample Location: LYNFIELD, MA

Date Collected: 07/14/21 10:15
Date Received: 07/14/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Phosphorus, Total	0.093		mg/l	0.010	--	1	07/15/21 09:20	07/15/21 14:44	121,4500P-E	SD
Phosphorus, Soluble	0.046		mg/l	0.010	--	1	07/15/21 14:00	07/16/21 08:30	121,4500P-E	SD

Project Name: PILLINGS POND
Project Number: Not Specified

Lab Number: L2137772
Report Date: 07/21/21

SAMPLE RESULTS

Lab ID: L2137772-03
Client ID: 3. MID POND
Sample Location: LYNFIELD, MA

Date Collected: 07/14/21 10:45
Date Received: 07/14/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Phosphorus, Total	0.051		mg/l	0.010	--	1	07/15/21 09:20	07/15/21 14:45	121,4500P-E	SD
Phosphorus, Soluble	0.017		mg/l	0.010	--	1	07/15/21 14:00	07/16/21 08:31	121,4500P-E	SD

Project Name: PILLINGS POND
Project Number: Not Specified
Lab Number: L2137772
Report Date: 07/21/21

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab for sample(s): 01-03 Batch: WG1524168-1										
Phosphorus, Total	ND		mg/l	0.010	--	1	07/15/21 09:20	07/15/21 14:17	121,4500P-E	SD
General Chemistry - Westborough Lab for sample(s): 01-03 Batch: WG1524309-1										
Phosphorus, Soluble	ND		mg/l	0.010	--	1	07/15/21 14:00	07/16/21 08:19	121,4500P-E	SD

Lab Control Sample Analysis

Batch Quality Control

Project Name: PILLINGS POND

Project Number: Not Specified

Lab Number: L2137772

Report Date: 07/21/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-03 Batch: WG1524168-2								
Phosphorus, Total	109		-		80-120	-		
General Chemistry - Westborough Lab Associated sample(s): 01-03 Batch: WG1524309-2								
Phosphorus, Soluble	102		-		80-120	-		

Matrix Spike Analysis
Batch Quality Control

Project Name: PILLINGS POND
Project Number: Not Specified

Lab Number: L2137772
Report Date: 07/21/21

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1524168-4 QC Sample: L2137467-01 Client ID: MS Sample												
Phosphorus, Total	0.599	0.5	1.12	103		-	-		75-125	-		20
General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1524309-4 QC Sample: L2137706-04 Client ID: MS Sample												
Phosphorus, Soluble	ND	0.5	0.509	102		-	-		75-125	-		20

Lab Duplicate Analysis
Batch Quality Control

Project Name: PILLINGS POND
Project Number: Not Specified

Lab Number: L2137772
Report Date: 07/21/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1524168-3 QC Sample: L2137467-01 Client ID: DUP Sample						
Phosphorus, Total	0.599	0.618	mg/l	3		20
General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1524309-3 QC Sample: L2137706-02 Client ID: DUP Sample						
Phosphorus, Soluble	ND	ND	mg/l	NC		20

Project Name: PILLINGS POND
Project Number: Not Specified

Lab Number: L2137772
Report Date: 07/21/21

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2137772-01A	Plastic 250ml unpreserved	A	7	7	21.6	Y	Absent		FILTER(1)
L2137772-01B	Plastic 250ml H2SO4 preserved	A	<2	<2	21.6	Y	Absent		TPHOS-4500(28)
L2137772-01X	Plastic 250ml H2SO4 preserved Filtrates	A	NA		21.6	Y	Absent		SPHOS-4500(28)
L2137772-02A	Plastic 250ml unpreserved	A	7	7	21.6	Y	Absent		FILTER(1)
L2137772-02B	Plastic 250ml H2SO4 preserved	A	<2	<2	21.6	Y	Absent		TPHOS-4500(28)
L2137772-02X	Plastic 250ml H2SO4 preserved Filtrates	A	NA		21.6	Y	Absent		SPHOS-4500(28)
L2137772-03A	Plastic 250ml unpreserved	A	7	7	21.6	Y	Absent		FILTER(1)
L2137772-03B	Plastic 250ml H2SO4 preserved	A	<2	<2	21.6	Y	Absent		TPHOS-4500(28)
L2137772-03X	Plastic 250ml H2SO4 preserved Filtrates	A	NA		21.6	Y	Absent		SPHOS-4500(28)

*Values in parentheses indicate holding time in days

Project Name:	PILLINGS POND	**Lab Number:**	L2137772
Project Number:	Not Specified	**Report Date:**	07/21/21

GLOSSARY

Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
NR	- No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: Data Usability Report

Project Name:	PILLINGS POND	**Lab Number:**	L2137772
Project Number:	Not Specified	**Report Date:**	07/21/21

Footnotes

1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA,this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

F - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

J - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

ND - Not detected at the reporting limit (RL) for the sample.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where

Report Format: Data Usability Report

Project Name:	PILLINGS POND	**Lab Number:**	L2137772
Project Number:	Not Specified	**Report Date:**	07/21/21

Data Qualifiers

the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

Report Format: Data Usability Report

Project Name:	PILLINGS POND	**Lab Number:**	L2137772
Project Number:	Not Specified	**Report Date:**	07/21/21

REFERENCES

121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624/624.1: m/p-xylene, o-xylene, Naphthalene
EPA 625/625.1: alpha-Terpineol
EPA 8260C/8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D/8270E: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine, alpha-Terpineol; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility
SM 2540D: TSS
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.**
EPA 624.1: Volatile Halocarbons & Aromatics,
EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

Mansfield Facility:

Drinking Water
EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.
EPA 522, EPA 537.1.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

Serial_No:07212115:01

CHAIN OF CUSTODY

PAGE _____ OF _____

ALPHA ANALYTICAL
8 Walkup Drive, Westboro, MA 01581, Tel: 508-898-9220
320 Forbes Blvd, Mansfield, MA 02048, Tel: 508-822-9300

Date Rec'd in Lab: 7/14/21

ALPHA Job #: L2137772 ~~L2137771~~ mm

Project Information

Project Name: Pillings Pond
Project Location: Lynnfield MA
Project #:
Project Manager: Colin
ALPHA Quote #:

Report Information - Data Deliverables

☐ ADEx ☑ EMAIL

Billing Information

☑ Same as Client info PO #:

Client Information

Client: Water and Wetland
Address: 115 South St
Phone: 508-259-3153
Email: info@waterandwetland

Regulatory Requirements & Project Information Requirements

☐ Yes ☐ No MA MCP Analytical Methods ☐ Yes ☐ No CT RCP Analytical Methods
☐ Yes ☐ No Matrix Spike Required on this SDG? (Required for MCP Inorganics)
☐ Yes ☐ No GW1 Standards (Info Required for Metals & EPH with Targets)
☐ Yes ☐ No NPDES RGP
☐ Other State /Fed Program _____ Criteria _____

Turn-Around Time

☑ Standard ☐ RUSH (only confirmed if pre-approved)
Date Due:

Additional Project Information:

ANALYSIS

VOC: ☐ 8260 ☐ 624 ☐ 524.2
SVOC: ☐ ABN ☐ PAH
METALS: ☐ MCP 13 ☐ MCP 14 ☐ RCP 15
METALS: ☐ RCRA5 ☐ RCRA8 ☐ PP13
EPH: ☐ Ranges & Targets ☐ Ranges Only
VPH: ☐ Ranges & Targets ☐ Ranges Only
☐ PCB ☐ PEST
TPH: ☐ Quant Only ☐ Fingerprint
SPhos
TPhos

SAMPLE INFO
Filtration
☐ Field
☐ Lab to do
Preservation
☐ Lab to do

Sample Comments

TOTAL # BOTTLES

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler Initials	SPhos	TPhos	TOTAL # BOTTLES
37772-01	1. Upstream	7/14	10:15		DL	1	1	
02	2. Downstream		10:15		DL			
03	3. Mid Pond		10:45		CG			

Container Type			
Preservative			

Container Type
P= Plastic
A= Amber glass
V= Vial
G= Glass
B= Bacteria cup
C= Cube
O= Other
E= Encore
D= BOD Bottle

Preservative
A= None
B= HCl
C= HNO_3
D= H_2SO_4
E= NaOH
F= MeOH
G= $NaHSO_4$
H = $Na_2S_2O_3$
I= Ascorbic Acid
J = NH_4Cl
K= Zn Acetate
O= Other

Relinquished By:	Date/Time	Received By:	Date/Time
	7/14	AR	7/14/21 1505

All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

FORM NO: 01-01 (rev. 12-Mar-2012)

ANALYTICAL REPORT

Lab Number:	L2137771
Client:	Water & Wetland, LLC 115 South Street Upton, MA 01568
ATTN:	Colin Gosselin
Phone:	(888) 493-8526
Project Name:	PILLINGS POND
Project Number:	Not Specified
Report Date:	07/26/21

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com

Project Name: PILLINGS POND
Project Number: Not Specified

Lab Number: L2137771
Report Date: 07/26/21

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2137771-01	MID POND	WATER	LYNFIELD, MA	07/14/21 10:50	07/14/21

Project Name:	PILLINGS POND	**Lab Number:**	L2137771
Project Number:	Not Specified	**Report Date:**	07/26/21

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name: PILLINGS POND
Project Number: Not Specified
Lab Number: L2137771
Report Date: 07/26/21

Case Narrative (continued)

Sample Receipt

The samples were received at the laboratory above the required temperature range. The samples were transported to the laboratory in a cooler with ice packs and delivered directly from the sampling site. This is considered acceptable since the samples were in the process of cooling.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Caitlin Walukevich

Title: Technical Director/Representative Date: 07/26/21

INORGANICS
&
MISCELLANEOUS

Project Name: PILLINGS POND
Project Number: Not Specified

Lab Number: L2137771
Report Date: 07/26/21

SAMPLE RESULTS

Lab ID: L2137771-01
Client ID: MID POND
Sample Location: LYNFIELD, MA

Date Collected: 07/14/21 10:50
Date Received: 07/14/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	6.5		NTU	0.20	--	1	-	07/14/21 16:58	121,2130B	AS
Alkalinity, Total	78.6		mg CaCO3/L	2.00	NA	1	-	07/15/21 05:52	121,2320B	JB
Nitrogen, Ammonia	0.157		mg/l	0.075	--	1	07/22/21 19:48	07/22/21 22:50	121,4500NH3-BH	AT
Nitrogen, Nitrate	0.192		mg/l	0.100	--	1	-	07/15/21 07:04	121,4500NO3-F	EL
Nitrogen, Total Kjeldahl	1.03		mg/l	0.300	--	1	07/23/21 09:50	07/23/21 21:53	121,4500NH3-H	AT
Chlorophyll A	27.6		mg/m3	2.00	NA	1	07/15/21 07:35	07/15/21 07:55	121,10200H	MT

Project Name: PILLINGS POND
Project Number: Not Specified
Lab Number: L2137771
Report Date: 07/26/21

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1523928-1										
Turbidity	ND		NTU	0.20	--	1	-	07/14/21 16:58	121,2130B	AS
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1524013-1										
Nitrogen, Nitrate	ND		mg/l	0.100	--	1	-	07/15/21 05:39	121,4500NO3-F	EL
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1524096-1										
Chlorophyll A	ND		mg/m3	2.00	NA	1	07/15/21 07:35	07/15/21 07:55	121,10200H	MT
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1524240-1										
Alkalinity, Total	ND		mg CaCO3/L	2.00	NA	1	-	07/15/21 05:52	121,2320B	JB
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1526896-1										
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	07/22/21 19:48	07/22/21 22:36	121,4500NH3-BH	AT
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1527084-1										
Nitrogen, Total Kjeldahl	ND		mg/l	0.300	--	1	07/23/21 09:50	07/23/21 21:34	121,4500NH3-H	AT

Lab Control Sample Analysis

Batch Quality Control

Project Name: PILLINGS POND
Project Number: Not Specified

Lab Number: L2137771
Report Date: 07/26/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1523928-2								
Turbidity	109		-		90-110	-		
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1524013-2								
Nitrogen, Nitrate	102		-		90-110	-		
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1524240-2								
Alkalinity, Total	104		-		90-110	-		10
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1526896-2								
Nitrogen, Ammonia	97		-		80-120	-		20
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1527084-2								
Nitrogen, Total Kjeldahl	98		-		78-122	-		

Matrix Spike Analysis
Batch Quality Control

Project Name: PILLINGS POND
Project Number: Not Specified

Lab Number: L2137771
Report Date: 07/26/21

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1524013-4 QC Sample: L2137771-01 Client ID: MID POND												
Nitrogen, Nitrate	0.192	4	4.02	96		-	-		83-113	-		17
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1524240-4 QC Sample: L2137771-01 Client ID: MID POND												
Alkalinity, Total	78.6	100	177	98		-	-		86-116	-		10
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1526896-4 QC Sample: L2135204-02 Client ID: MS Sample												
Nitrogen, Ammonia	0.158	4	4.45	107		-	-		80-120	-		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1527084-4 QC Sample: L2137988-02 Client ID: MS Sample												
Nitrogen, Total Kjeldahl	0.858	8	7.90	88		-	-		77-111	-		24

Lab Duplicate Analysis

Batch Quality Control

Project Name: PILLINGS POND
Project Number: Not Specified

Lab Number: L2137771
Report Date: 07/26/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1523928-3 QC Sample: L2137771-01 Client ID: MID POND						
Turbidity	6.5	6.5	NTU	0		13
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1524013-3 QC Sample: L2137771-01 Client ID: MID POND						
Nitrogen, Nitrate	0.192	0.175	mg/l	9		17
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1524096-2 QC Sample: L2137771-01 Client ID: MID POND						
Chlorophyll A	27.6	26.6	mg/m3	4		35
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1524240-3 QC Sample: L2137771-01 Client ID: MID POND						
Alkalinity, Total	78.6	79.0	mg CaCO3/L	1		10
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1526896-3 QC Sample: L2135204-01 Client ID: DUP Sample						
Nitrogen, Ammonia	0.594	0.685	mg/l	14		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1527084-3 QC Sample: L2137988-02 Client ID: DUP Sample						
Nitrogen, Total Kjeldahl	0.858	0.359	mg/l	**82**	Q	24

Project Name: PILLINGS POND
Project Number: Not Specified

Lab Number: L2137771
Report Date: 07/26/21

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2137771-01A	Plastic 250ml unpreserved/No Headspace	A	NA		21.6	Y	Absent		ALK-T-2320(14)
L2137771-01B	Plastic 250ml unpreserved	A	7	7	21.6	Y	Absent		TURB-2130(2),NO3-4500(2)
L2137771-01C	Plastic 500ml H2SO4 preserved	A	<2	<2	21.6	Y	Absent		TKN-4500(28),NH3-4500(28)
L2137771-01D	Brown Plastic 1000ml unpreserved	A	NA		21.6	Y	Absent		CHLORO-A(1)
L2137771-01E	Brown Plastic 1000ml unpreserved	A	NA		21.6	Y	Absent		CHLORO-A(1)

*Values in parentheses indicate holding time in days

Project Name:	PILLINGS POND	**Lab Number:**	L2137771
Project Number:	Not Specified	**Report Date:**	07/26/21

GLOSSARY

Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
NR	- No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: Data Usability Report

Project Name:	PILLINGS POND	**Lab Number:**	L2137771
Project Number:	Not Specified	**Report Date:**	07/26/21

Footnotes

1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA,this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

F - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

J - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

ND - Not detected at the reporting limit (RL) for the sample.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where

Report Format: Data Usability Report

Project Name:	PILLINGS POND	**Lab Number:**	L2137771
Project Number:	Not Specified	**Report Date:**	07/26/21

Data Qualifiers

the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

Report Format: Data Usability Report

Project Name:	PILLINGS POND	**Lab Number:**	L2137771
Project Number:	Not Specified	**Report Date:**	07/26/21

REFERENCES

121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624/624.1: m/p-xylene, o-xylene, Naphthalene
EPA 625/625.1: alpha-Terpineol
EPA 8260C/8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D/8270E: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine, alpha-Terpineol; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility
SM 2540D: TSS
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.**
EPA 624.1: Volatile Halocarbons & Aromatics,
EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

Mansfield Facility:

Drinking Water
EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.
EPA 522, EPA 537.1.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

CHAIN OF CUSTODY

PAGE _____ OF _____

ALPHA ANALYTICAL
8 Walkup Drive
Westboro, MA 01581
Tel: 508-898-9220

320 Forbes Blvd
Mansfield, MA 02048
Tel: 508-822-9300

Date Rec'd in Lab: 7/14/21

ALPHA Job #: L2137771

Client Information

Client: Water and Wetland
Address: 115 Stanley St
Phone: 508-259-3153
Email: info@waterandwetland

Project Information

Project Name: Pilling S Pond
Project Location: Lynfield MA
Project #:
Project Manager:
ALPHA Quote #:

Report Information - Data Deliverables

☐ ADEx ☑ EMAIL

Billing Information

☑ Same as Client info PO #:

Regulatory Requirements & Project Information Requirements

☐ Yes ☐ No MA MCP Analytical Methods ☐ Yes ☐ No CT RCP Analytical Methods
☐ Yes ☐ No Matrix Spike Required on this SDG? (Required for MCP Inorganics)
☐ Yes ☐ No GW1 Standards (Info Required for Metals & EPH with Targets)
☐ Yes ☐ No NPDES RGP
☐ Other State /Fed Program _____ Criteria _____

Turn-Around Time

☑ Standard ☐ RUSH (only confirmed if pre-approved)
Date Due:

Additional Project Information:

ANALYSIS

VOC: ☐ 8260 ☐ 624 ☐ 524.2
SVOC: ☐ ABN ☐ PAH
METALS: ☐ MCP 13 ☐ MCP 14 ☐ RCP 15
METALS: ☐ RCRA5 ☐ RCRA8 ☐ PP13
EPH: ☐ Ranges & Targets ☐ Ranges Only
VPH: ☐ Ranges & Targets ☐ Ranges Only
☐ PCB ☐ PEST
TPH: ☐ Quant Only ☐ Fingerprint
TALK
Tarb
Nitrate NO3
Ammonia NH3
TKN
Color A

SAMPLE INFO
Filtration
☐ Field
☐ Lab to do
Preservation
☐ Lab to do

TOTAL # BOTTLES

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler Initials	Sample Comments
37771-01	Mid Pond	7/14	10:30		CG	

Container Type
Preservative

Container Type
P= Plastic
A= Amber glass
V= Vial
G= Glass
B= Bacteria cup
C= Cube
O= Other
E= Encore
D= BOD Bottle

Preservative
A= None
B= HCl
C= HNO_3
D= H_2SO_4
E= NaOH
F= MeOH
G= $NaHSO_4$
H = $Na_2S_2O_3$
I= Ascorbic Acid
J = NH_4Cl
K= Zn Acetate
O= Other

Relinquished By:	Date/Time	Received By:	Date/Time
	7/19	AM	7/14/21 15:09

All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

FORM NO: 01-01 (rev. 12-Mar-2012)

	19-May	29-Jun	14-Jul	12-Aug
BLUE GREENS				
Dolichospermum	0	23,810	11,079	3,003
Anacystis	0	0	0	0
Chrysosporum	0	2,041	12,974	4,402
Woronichinia	0	0	0	0
Aphanocapsa	0	0	0	0
Aphanothece	0	0	0	0
Coelospharium	0	0	0	0
Gleocapsa	0	0	0	0
Gloeothece	0	0	0	0
Merismopedia	0	0	0	0
Microcystis	0	16,871	525	0
Planktothrix	0	0	0	0
Limnothrix	0	0	0	0
Lyngbya	0	0	0	0
Planktolyngbya	0	0	0	0
Cylindrosherium	0	0	0	0
Raphidiopsis	0	0	0	0
Spirulina	0	0	0	0
Chroococcus	875	0	0	350
GREENS				
Actinastrum	0	0	0	0
Ankistrodesmus	146	136	0	29
Arthodesmus	0	0	0	0
Binucleria	0	0	0	0
Botrycoccus	0	0	0	0
Chlamydomonas	175	4,082	0	0
Chlorella	0	0	262	0
Cladophera	0	0	0	0
Coelastrium	0	0	0	0
Closterium	4,927	0	29	0
Chodatella	0	0	0	0
Chromulina	0	0	0	0
Cosmarium	0	0	0	0
Crucigenia	0	0	0	0
Desmidium	0	0	0	0
Dictyosphaerium	0	0	0	0
Dimorphococcus	0	0	0	0

Elaktothrix	0	0	0	0
Eudorina	0	0	0	0
Gloeocystis	0	0	0	0
Golenkinia	0	0	0	0
Gomphosphaerium	0	0	0	0
Kirchinella	0	0	0	0
Mougeotia	0	0	0	0
Oocystis	0	0	0	0
Pediastrum	0	1,905	0	583
Penium	0	0	0	0
Protococcus	0	0	0	0
Micraterias	0	0	0	0
Quadrigula	0	0	0	0
Scenedesmus	0	0	0	1,166
Schizochlamys	0	0	0	0
Selenastrum	0	0	0	0
Sphaerocystis	0	0	0	0
Sphaerozosma	0	0	0	0
Staurastrum	0	272	87	0
Tetraedron	0	0	0	0
Tetrastrum	0	0	0	0
Tribonema	0	0	0	0
Zygnema	0	0	0	0
Ulothrix	0	0	0	0

DIATOMS

Achnanthes	0	0	0	0
Acanthoceas	0	0	0	0
Actinella	0	0	0	0
Amphora	0	0	0	0
Ampiphora	0	0	0	0
Asterionella	6,064	2,177	29	0
Cocconeis	0	0	0	0
Cyclotella	0	0	0	0
Cymbella	0	136	0	0
Diatoma	0	0	0	0
Diploneis	0	0	0	0
Epithemia	0	0	0	0
Eunotia	0	0	0	0
Fragilaria	1,808	5,442	233	0
Frustulia	0	0	0	0

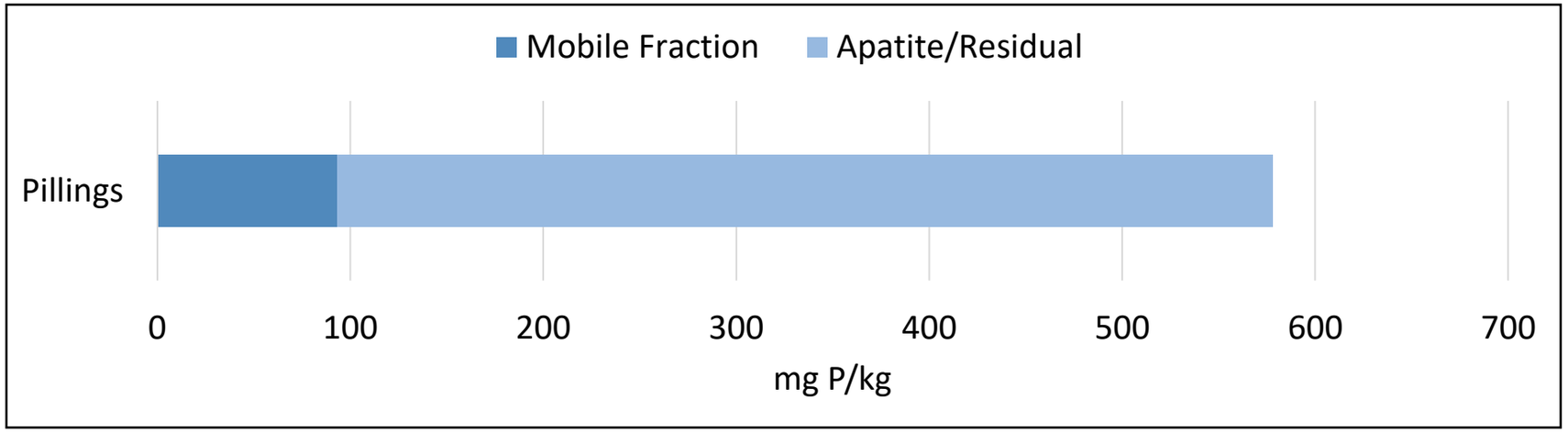
Gomphonema	29	0	29	0
Melosira	641	5,442	2,362	1,399
Meridion	0	0	0	0
Navicula	0	0	0	0
Nedium	0	0	0	0
Nitzschia	0	0	29	29
Opephora	0	0	0	0
Pinnularia	0	136	0	0
Pluerosigma	0	0	0	0
Rizosolenia	0	0	0	0
Stauroneis	0	0	0	0
Stephanodiscus	0	0	0	0
Surirella	0	0	0	0
Synedra	0	0	146	29
Tabellaria	0	0	0	0
CHRYSOPHYTES				
Chromulina	0	0	0	0
Chrysochromulina	0	0	0	0
Dinobryon	204	408	0	29
Mallomomus	0	0	0	0
Oochromonas	0	0	0	0
Synura	0	0	0	0
Tribonema	0	0	0	0
DINOFLAGELLATES				
Ceratium	0	0	0	0
Peridinium	0	0	0	0
	0	0	0	0
CRYPTOPHYTES	0	0	0	0
Chilomonas	0	0	0	0
Cryptomonas	29	0	0	29
Rhodomonas	0	0	0	0
EUGLENOPHYTES				
Cryptoglena	0	0	0	0
Euglena	0	0	0	0
Phacus	0	0	0	0
Trachelomonas	0	0	0	0
	0	0	0	0
NANNOPLANKTON	0	0	0	0

SePRO Research & Technology Campus

Laboratory Report: Level 1 Sediment Phosphorus Fractioning Analysis

Company Name:	**Water & Wetland, LLC**	**Project Name:**	Pillings Pond
Billing Address:	115 South St.	**Water Body:**	Pillings Pond
City, State, Zip:	Upton, MA 01568	**Size (ac.):**	90
Contact Person:	Colin Gosselin	**Average Depth (ft):**	**6**
Email Address:	colin@waterandwetland.com	**Collection Date:**	7/14/21
Telephone:	508-259-3153	**Chain of Custody:**	COC10368 **Reported:** **7/27/2021**

Sample ID	Sample Name	Apatite and Residual (mg P/kg)	Mobile Phosphorus† Fraction (mg P/kg)	Sum of Phosphorus Fractions (mg P/kg)	% Solids (% Dry Wt.)
CTM29100-1	Pillings	485	93	578	43



† Mobile phosphorus represents fractions of sediment phosphorus that are potentially bio-available in typical aquatic environments. All concentrations are reported based on dry weight

SeSCRIPT* Analysis

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