Pillings Pond

Dredge Feasibility Analysis

Lynnfield, Massachusetts

February 2024

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TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

1.0 Introduction

Pillings Pond is an approximately 96-acre waterbody located within a few miles of Lynnfield center. The shoreline is primarily made up of residential properties. According to the MASS GIS watershed layer, the watershed for Pillings Pond is made up of 2,131 acres, mostly consisting of residential areas (Figure 1). The anticipated inflow from a watershed of this size is expected to average 5-6.5 cubic feet per second during normal conditions and significantly increase during stormflow conditions. Public access to Pillings Pond is primarily through Rotary Park off Summer Street, which has a small public parking area next to the park which allows for limited cartop access. Over one hundred private residences of differing lot sizes abut Pillings Pond, most of which appear to have varying forms of private access to the Pond.

Two small tributaries flow into the northern portion of the Pond consisting of an unnamed tributary and Bates Brook. Bates Brook flows under Essex Street and Bourque Road prior to entering the Pond while the unnamed tributary drains under Forest Hill Avenue prior to flowing just to the north of Westover Drive prior to entering the Pond. Water flows out of Pillings Pond at its southern end through a concrete dam located just to the east of Rotary Park. The concrete dam allows water to exit the Pond through multiple weirs constructed at varying elevations within the dam. Discharge through the dam flows under Summer Street to another basin located to the northwest of Temple Road, before discharging into the Reedy Meadow wetland complex downstream. It should be noted that the 2,131 acres of contributing watershed area to Pillings Pond from the MASS GIS watershed layer also includes this basin downstream of the concrete dam and the Reedy Meadow wetlands complex.

Pillings Pond is designated as a Class A waterbody pursuant to the Massachusetts Surface Water Quality Standards at 314 CMR 4.06(6). It is listed in the Final Massachusetts Integrated List of Waters for the Clean Water Act 2018/2020 Reporting Cycle as a Category 5 water, requiring a Total Maximum Daily Load (TMDL) for the following impairments: algae, chlorophyll a, dissolved oxygen, dissolved oxygen supersaturation, total phosphorus, and transparency/clarity.

As with any impounded waterbody, the ponded area behind the dam accumulates sediment and debris that flows into the pond through many different sources within its watershed. In addition, the growth and decay of plants and other organic material will build up within the pond over time. As a result, Pillings Pond’s open water habitat value and recreational value has likely been impacted and could significantly be improved by deepening the water depth, specifically in the northwestern section of the Pond.

In addition, it appears the pond experiences significant algal blooms which were observed during the September and October sampling events by TRC field staff. The shallower water depths in the northern areas of the pond appear to be causing increased suspended solids that are constantly stirred up when boats and vessels navigate this area. Suspended solids in the water column increases the pond's turbidity and could be releasing nutrients into the water column. The increase in nutrients could be a factor of the on-going algal blooms that were observed during the field visits. The increase in turbidity and release of nutrients from the bottom sediments are likely degrading the water quality within Pillings Pond.

Summer Conditions at Pillings Pond with Extensive Algal Growth

The Town of Lynnfield (The Town) contracted with TRC Environmental (TRC) to assess the condition of the sediment within the pond and evaluate in-pond restoration options that will provide The Town with a long-term solution for restoring the pond's depth. Our assessment was limited to an evaluation of the pond's current bathymetry (water depth), sediment depth, and sediment quality. The assessment's primary goal was to determine the volume and quality of sediment contained within the pond and offer two conceptual dredging designs.

Dredging is a reliable approach for reversing the effects of pond eutrophication and restoring ecological and aesthetic characteristics of a waterbody since it restores water depths as well as removes the nutrient-rich sediments that have accumulated over time. The conceptual dredging designs presented herein consider not only removing the accumulated soft sediment, but also deepening and widening the bottom of the pond to allow for more desirable boat navigation that will not constantly stir up the bottom sediments.

Ultimately, the goal for the Town's restoration of the pond is understood to be to retain the pond's historic character as an open water amenity within the town for recreation while also maintaining the site's aesthetic appeal and value as an ecological resource and open water habitat.

2.0 Sediment Depth Analysis

On September 1 and October 12, 2023, TRC assessed water depth, sediment depth and conducted sediment sampling at Pillings Pond. The goal of this analysis was to quantify the volume of soft sediment accumulated within the pond and determine the soft sediment's physical and chemical properties. Methodologies are summarized below.

TRC scientist sediment depth probing conducted on September 1, 2023.

2.1 Sediment Depth and Bathymetry

TRC sampled a total of 86 locations along 19 transects within Pillings Pond (Figure 2). At each GPS recorded location, a tile probe was held to the pond bottom to determine water depth and then pushed into the soft sediment until refusal was achieved. Refusal is the point where the sediment probe could no longer be pushed deeper through the soft sediments. The distance between the sediment-water interface and first refusal was recorded as the soft sediment depth.

The southeastern half of Pillings Pond was found to have greater water depths, reaching more than 15 feet. The greater water depths in this area are not surprising because this is where the pond was dredged in the 1990s. The average water depth measured across Pillings Pond was approximately 5.8 feet, with a maximum water depth of approximately 20 feet recorded near the southeastern section of the pond (Figure 3). The pond's total water volume is approximately 170,000,000 gallons. Sediment depth throughout the Pond averaged approximately 4.6 feet, with the greatest sediment depth measured by TRC being approximately 12 feet (Figure 4). Soft sediment volume within the whole footprint of the pond was calculated to be approximately 755,000 cubic yards, however for the purposes of this dredging feasibility analysis, TRC calculated the soft sediment volume in the northwestern section of the pond, the area not previously dredged, north of transect 14 shown on Figure 2, to be approximately 550,000 cubic yards.

Sediment Core Sample from Pillings Pond. A thick (>1 foot) layer of accumulated organic material (e.g., roots and dead plants) makes up the top layer of soft sediment.

2.2 Sediment Sampling

Sediment coring and sampling was conducted based on Massachusetts Department of Environmental Protection (MassDEP) requirements for the 401 Water Quality Certificate application, a requirement for any dredging project. On October 12, 2023, TRC obtained nine sediment cores from the western portion of the pond where sediment depths were observed to be greatest. The process of combining sediment samples from different coring locations is commonly known as compositing. Three cores were obtained from the northwestern portion of the pond and the material from these three cores were composited into a single sediment sample “C-1”. Six cores were obtained from six locations within the central portion of the pond and composited into sediment samples “C-2” and “C-3”. GPS was used to navigate to the nine planned sample locations, and a peat corer was then used to collect sediment core samples in 2-foot intervals at each location until the full depth of soft sediment was assessed. Each 2-foot sediment core sample was photographed and described for its grain size composition, color, moisture content, and organic content (see Appendix A for core photos). Sediment coring locations are shown on Figure 4.

The three sediment samples obtained were transferred under chain-of-custody to Phoenix Environmental Laboratory (Phoenix) of Manchester, Connecticut for chemical and physical analysis. Each sample was analyzed for total organic carbon (TOC), VOCs, extractable petroleum hydrocarbons (EPH) with target polynuclear aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and metals including arsenic, cadmium, chromium, copper, lead, mercury, nickel, and zinc. The results of this chemical and physical analysis of the sediment sampled from Pillings Pond is summarized in Section 2.3 below.

2.3 Sediment Testing Results

Laboratory results for chemical analysis are reported in Appendix B, appended to the end of this report. Copies of the laboratory reports are included in Appendix C. Laboratory results for grain size analysis are reported in Table 1 below.

Table 1 Grain Size Analysis of Sediment Samples - Pillings Pond October 12, 2023

Analysis	Unit	Core 1 (C-1)	Core 2 (C-2)	Core 3 (C-3)
Gravel	%	0	0	0
Sand	%	0.4	0.9	0.5
Fines	%	99.6	99.1	99.5

Sediment chemistry data was compared to the Massachusetts Contingency Plan (MCP) Reportable Concentration Soil Standards. The MCP defines different soil and groundwater types generally based on the exposure pathway. The Massachusetts Landfill Criteria provides information about the acceptance levels of contaminated soils at Massachusetts landfills (both lined and unlined). The results in Appendix B were also compared MA DEP's Background Levels of Polycyclic and Aromatic Hydrocarbons and Metals in Soil (MA DEP, 2002) which were developed by MA DEP for unimpacted naturally occurring background levels for native soils. These background concentrations can be used to further assess the results of the initial sediment testing. This will ultimately be determined through the MassDEP's 401 Water Quality Certification process. It should be noted that the MCP reportable concentration standards apply to upland soils and thus are not directly applicable to sediments within a waterbody. However, the MCP reportable concentration standards would apply to any sediment removed from a waterbody intended for upland reuse or placement.

Sediment chemistry results were, for the most part, found to be below MCP reportable concentration standards (Appendix B). The only exception were samples C-1 and C-2 which exceeded the MCP reportable concentration standards for arsenic. Sample C-3 was found to be below MCP reportable concentration standards. However, all samples were well below the MA Landfill Criteria for arsenic at an unlined or lined landfall.

There were several other metals detected in the samples including chromium, copper, lead, nickel and zinc. Of these detections, only chromium, copper (C-3 sample) and nickel were detected at concentrations higher than MA DEP's background levels for native soils, however, all other metals detected were at concentrations lower than the MCP reportable concentration standards and below the MA Landfill Criteria at an unlined or lined landfall.

The methyl ethyl ketone detected in samples C-1 and C-3 was found to be below the MCP reportable concentration standard. However, the detection of methyl ethyl ketone may require additional sediment sampling to determine concentrations within the pond's sediments. Methyl ethyl ketone is the only contaminant that is a VOC, while the other detected contaminants are all metals. Methyl ethyl ketone is used as a solvent and common in many industries. It is used in the manufacture of synthetic rubber, paraffin wax, and to make other chemical products (Center of Disease Control, 2023). All other analytes were below the laboratory's reporting limits.

As the sediment was found to be well beneath the MA Landfill Criteria for lined and unlined landfills, it is likely that there will be few, if any, restrictions on its disposal. Although, additional testing will be required before a final determination can be made. The implications of arsenic in the samples will be determined through the MassDEP's 401 Water Quality Certification process. As part of the permitting process, the state will likely require additional sampling to better understand the extent of the contamination, and this will determine where the sediment may be reused or disposed. Any material that is not suitable for beneficial upland reuse would need to either be trucked to a site for disposal (e.g., to a lined landfill) or could potentially be amended with clean material possibly from within the pond (such as by over dredging into underlying clean sands) to mitigate the concentrations to suitable levels prior to disposal. It is also possible that the in-pond restoration plan could be designed to isolate and leave the contaminated material within the pond to avoid excessive costs for removing and disposing of contaminated material.

The grain size analysis presented in Table 1 shows that the soft sediment within the pond is primarily fine sized particles (between 99.6, 99.1 and 99.5% of the total sample) with sand making up the balance of the material. This material will dewater very slowly and will likely require some form of advanced treatment such as large geotextile dewatering bags, belt filter presses, or possibly the use of coagulants to extract moisture in a manner sufficient to allow for construction to proceed at an economical pace.

3.0 Dredging Feasibility

The dredging of Pillings Pond will be an expensive restoration effort, but dredging is the only realistic approach that can restore depth to the waterbody and achieve many years of improved conditions. Dredging has been proven to improve water quality, but typically only after the source/s of nutrients to the pond are reduced to prevent rapid accumulations of new organics.

Dredging can also work as a plant control technique when either a light limitation is imposed through increased water depth or when enough soft sediment is removed to reveal a less hospitable substrate for plant growth (e.g. hard bottom or other nutrient-poor substrate). Light limitation through increased depth is possible at Pillings Pond, particularly since water clarity is already relatively low. A target depth of at least 10 feet of water depth would be needed to achieve light limitation in the pond, although dredging to the underlying hard bottom in other areas may also achieve the desired result.

3.1 Resource Areas

Although there are wetland resources associated with Pillings Pond that would be affected by the restoration work envisioned, the impacts associated with this work are expected to be limited primarily to potential construction access areas within or near the pond margin (Land Under Water and Bank resource areas) and the result will be an improvement to the overall wetland habitat and ecological value of the pond.

There are a few wetland areas mainly located in the extreme and north and south coves of Pillings Pond, as well as two wetland areas along the southwestern shoreline and one wetland area along the northeastern shoreline of Pillings Pond, according to MASS GIS. Additionally, there are two hydrologically connected streams at the north end of the pond (Bates Brook and an unnamed tributary). There is also a small unnamed tributary along the northeastern shoreline adjacent to Edgemere Road. Impacts to these resource areas would need to be considered as part of any dredging project (Figure 5). These areas will need to be avoided if dredging is pursued and impacts could be minimized if dredging were to occur during winter (as dry dredging) or at any time if hydraulic dredging were the methodology used.

TRC has reviewed the Natural Heritage and Endangered Species Program (NHESP) database and found no portion of the pond to be mapped as habitat associated with rare, threatened, or endangered species, however, the Reedy Meadows Conservation Area downstream of Pillings Pond is listed as a NHESP priority habitat of rare species (Figure 5).

3.2 Potential Dredging Volume

As previously mentioned in Section 2.1, the entire volume of soft sediment in Pillings Pond was calculated to be approximately 755,000 cubic yards (cy) based on our field assessment. The majority of this soft sediment was located in the northwestern section of the pond. Considering the southeastern section of the Pillings Pond was previously dredged and was found to have less soft sediment depths when compared to the northwestern section of the pond, both conceptual dredge designs focus on the northwestern portion of the pond.

Dredge concept design 1 presented in Figure 6, considers dredging the soft sediment material. TRC has calculated that if approximately 550,000 cubic yards (cy) of soft sediment material is dredged, the ponds volume would increase by over 111 million gallons of water and its average depth would be increased by more than 3.3 feet (Figure 6). With an expected cost range of about \$25-\$50 per cubic yard of dredge material, assuming the dry dredging methodology, a project of this scale could potentially be expected to cost between \$14 to \$28 million to design, permit and complete.

The second dredge design concept presented in Figure 7 is based on targeting the deepest approximate elevation of the bottom of soft sediment from each transect shown in Figure 2. Dredge concept design 2 proposes to widen the bottom width of the pond to the approximate elevations of the bottom of soft sediment and using consistent 3:1 side slopes. Dredge concept design 2 yields a total volume of sediment to be removed of approximately 855,000 cubic yards. If 855,000 cubic yards of sediment were removed from the pond, the pond would nearly double its water volume (an increase of 172 million gallons) and its average depth (with an increase of more than 5.2 feet). Using an expected cost range of about \$25-\$50 per cubic yard of dredge material, assuming the dry dredging methodology, a project of this scale could potentially be expected to cost between \$21 to \$43 million to design, permit and complete.

Given the lower dredge volume approach of concept design 1 presented in Figure 6 achieves the goals for pond restoration at a lower cost, we have assumed that this approach to restoration would be the preferred option by the Town in our analysis below. The lower dredge volume will also increase the likelihood that a location of disposal/reuse of the sediment can be accomplished within the boundaries of the Town.

3.3 Dredge Methodologies

Hydraulic Dredging: Hydraulic dredging is performed using a large pump on a floating vessel, where a cutterhead and pumping system are used to suck up sediment and water in a slurry form. Hydraulic dredging can thus be performed while water levels are maintained throughout the pond. Hydraulic dredging will minimize some of the ecological impacts to the pond and adjacent wetland resources while maintaining water levels for some recreational uses throughout the dredging process.

Hydraulic dredging can save costs compared to conventional dry dredging for very large projects but is often less economical than dry dredging for smaller scale projects. This is because hydraulic dredging will require a larger and more sophisticated containment area to dewater the slurry/sediment as it is removed from the pond. This approach may prove to be more cost effective and less environmentally disruptive at Pillings Pond. However, the water that is pumped with the removed sediment will need to be drained from the sediment prior to its ultimate disposal at any on site location. This is commonly achieved by pumping the dredge slurry to an area adjacent to a waterbody and allowing the water to drain out of the sediment and back into the waterbody prior to disposal.

Geotubes Used for Dewatering at Onondaga Lake, NY.

When space is limited, the use of advanced dewatering techniques such as the use of Geotubes (geotextile fabric for dewatering) or a belt-filter press machine can be used to dewater the sediments, but these add additional costs over traditional dewatering containment. All external sediment dewatering options will require land adjacent to or in the vicinity (within 2 miles with pumping) of the pond to be made available for the dewatering process. An area of at least 5 acres would be required for using Geotubes, while the use of a belt filter press system would require less than 1 acre of space.

Belt Filter Press with Dewatered Sediment

A hydraulic dredging project at Pillings Pond would cost on the order of $39 million for design, permitting and construction with an assumed average cost of $70/cy. These costs can vary based on the type of dredging equipment employed which will be based partly on permitting, partly on cost, and partly on the availability and proximity of space for dewatering and disposal of the sediment.

Dry Dredging: Removal of the sediment from the pond using conventional equipment such as excavators can also be a very successful approach to dredging Pillings Pond. Dry dredging will require the pond to be drained and the water in-flows to be managed throughout the dredging process to avoid reflooding of the pond while the work is underway. This approach is quite disruptive to fish and wildlife and in many cases the permitting authorities will require fish and/or turtles to be collected and relocated during the initial draining of the system to reduce potential impacts. This can add costs if done with professional help but can also be achieved using local volunteers in some instances.

For Pillings Pond, there is a small amount of gravity drainage possible at the pond (perhaps 3-4 feet) that can be achieved through removal of the flashboards at the pond outlet. It is likely the full pond dewatering would need to be achieved through actively pumping water from the pond downstream. This active pumping would be an added cost to the dry dredge approach and would also add additional noise from the operation of pumps and/or generators that would need to be operated consistently to maintain low water levels. The rate of pumping would also be limited by the ability of the small outlet channel to drain downstream.

Outlet system at Pillings Pond along Summer Street.

Dry dredging will have significant impacts to aquatic life, has the potential to result in introduction of non-native plant species, and would significantly impact the ability to use the pond for several months during construction.

A major benefit of dry dredging is that there a many more local contractors available that can perform this work since the equipment is not as specialized as the equipment used for hydraulic dredging. This results in potentially more bids on the project and this often translates into a lower cost per cubic yard for the project. Costs for dry dredging are typically in the range of $25 to $50 per cubic yard in Massachusetts, although these costs vary widely with economic conditions, seasonal timing, project size and project location. Based on these considerations, dry dredging of 550,000 cy from the pond (Figure 6) could be completed for a cost on the order of $22 million (at $40/cy), a savings of about $17 million over the cost for a similar scale hydraulic dredging project.

If cost is the primary factor in determining which approach to pursue, then dry dredging is the clear winner. If other factors, such as impacts to the pond wildlife or the need to maintain water levels for recreation are higher priorities, then dry dredging is not the recommended method for Pillings Pond.

Dry dredging has a potential advantage of also finding a local contractor that may be willing to take on the work at a very competitive rate in instances where the contractor is willing to do the work at significantly reduced rates to obtain the material, which has some value. This also may allow for a reduced on-site storage or disposal area being needed since the material would ultimately be trucked away for use elsewhere.

3.4 Sediment Disposal Options

The sediment results (Appendix B) support that the sediment is suitable for management at either an unlined or lined in-state landfill. The sediment results do not preclude the potential for upland management of the material, however, this alternative should be discussed further with MA DEP during a pre-application meeting or consultation. Two of the arsenic concentrations and the average of the three concentrations exceed the most restrictive MCP reportable concentration standard for arsenic so it is unlikely that unrestricted upland reuse would be acceptable to MA DEP unless additional sampling demonstrated lower concentrations of arsenic in the sediment. A sediment sampling plan developed in consult with MA DEP as part of the 401 WQC application will be used to determine where exceedances in the pond are occurring and whether these exceedances will ultimately result in the material being left in place, required for special disposal, or allowed for removal and upland placement.

At the time of this report, the Town has not identified a suitable upland site and additional investigation may be warranted should The Town wish to proceed with dredging. Identifying a site in the vicinity of the pond for reuse, disposal and/or dewatering would be a logical next step toward the implementation of a dredging project for Pillings Pond. The town should realistically plan for a one or more sediment disposal locations totaling between 15-25 acres.

Disposal of dredge material as close to the pond as possible will be the most economical regardless of dredge methodology chosen. It is also possible to use a site local to the pond for temporary dewatering and stockpiling and then transport the material to its ultimate disposal or reuse location, but this added step and need for space may increase the cost of the project and delay its completion. The material could be trucked to a town landfill, vacant land, cemetery, golf course, or other property with adequate space for the placement or reuse of the material. The greater the distance from the pond, the greater the trucking cost.

Any efforts planned would need to be included in the project's design and permitting. Permitting authorities, including MA DEP, will not issue a permit for dredging without knowing where the material will be stockpiled and ultimately reused or disposed.

In addition to the space required for the actual dewatering of the sediment (Section 3.3), an additional challenge for placing this much dredge material will be the ability to create a useable site following the placement of the material. Dredge material is relatively unstable and unsuitable for use as a base for truck access. It does not contain sufficiently large-grained sands or gravel and as such, will not provide sufficient drainage and permeability. Even once the water has been extracted through in-pond dewatering, filter presses or Geotubes, the material will need to be covered with additional sand and gravel or would need to have sand and gravel incorporated into it for it to become useful material.

The cost for obtaining 550,000 cy of clean sand to mix with the 550,000 cy of dredge material, should this be necessary, would add on the order of $5,000,000 to the project cost assuming a relatively local source is available. It may also be possible to over-dredge the pond to obtain coarse grained material from below the muck to reduce these costs.

3.5 Alternatives to Dredging

Dredging is the only approach to pond restoration that increases depth and can also be used to remove nutrient rich sediments that contribute to algal blooms, sediment suspension, and other negative water quality conditions. If increasing depth is the primary goal for The Town, then dredging is the most appropriate approach to restoring Pillings Pond. If a goal is to also reduce the impact of the sediment on in-pond water quality, then it is worth considering alternatives to dredging such as nutrient inactivation and sediment inversion.

No Action

If Pillings Pond is left unmanaged, the pond (especially the northwestern section) will eventually fill to the point where it will become an emergent wetland habitat. This may take decades but will accelerate over time. A pond that has been created by an impoundment, such as Pillings Pond, will fill in faster than ponds with a natural outlet that allows sediment to move through the system. Therefore, active management is necessary to maintain the Pillings Pond and its function as open water habitat for fish, wildlife, and recreation. Given that the Town and local residents are already concerned with the amount of infilling that has occurred, the no action alternative is not expected to meet the goals of the community.

Dam Removal

Many communities in Massachusetts have been faced with the challenges of an infilling impounded lake or pond. These communities must balance the needs of the residents that use and love the pond with the costs for restoring and maintaining these systems. Since these systems are not naturally formed, they do not maintain themselves at no cost over the long term. One alternative some communities have opted for has been to remove the dam to allow for the return of a naturally free-flowing stream system. This saves money over the cost of dredging and has the added benefit of eliminating the ongoing costs of aquatic vegetation management, dam inspections and maintenance, etc. There are ecological benefits to this approach as well and the newly exposed land can become naturalized over time to become an amenity for the local residents and community.

This approach also has significant costs for design, engineering, and construction as the outlet controls cannot simply be opened, rather, the whole impoundment area must be excavated wide enough to allow for the free-flowing stream to pass even under high flow scenarios so that the dam does not back up water and re-form a pond during very wet periods. Additionally, the loss of sediment from the pond area to downstream systems (as the stream cuts a new stream bed through the pond bottom's soft sediment) must be evaluated and possibly mitigated to avoid creation of downstream infilling, blockages, or flooding.

Dam removal will not achieve the Town's goal for maintaining the pond.

Nutrient Inactivation

Nutrient inactivation is typically used to control algae blooms and improve water clarity in ponds and ponds with low flushing rates, such as Pillings Pond. This action targets dissolved phosphorus (the form most readily available to plants and algae) and traditionally involves the addition of alum (aluminum sulfate), iron (III) chloride, polyaluminum chloride (PAC) or even a lanthanum clay that bind to the phosphorus to allow it to become locked in the pond sediments.

Nutrient inactivation is usually conducted by applying alum directly to a pond as a single dose or in multiple doses when a higher application rate is required. Alum applied near the surface will initially strip available phosphorus from the water column as it settles to bottom of the pond. Once incorporated into bottom sediments, the alum will also bind phosphorus in the sediments, which results in long-term control of internal phosphorus recycling.

Additional testing of the phosphorus content in the pond's water, assessment of the oxygen levels in the pond during stratification and testing of phosphorus levels in the sediment would be needed to determine whether alum is the correct solution and if so, to determine the correct alum application rate. These tests are needed to identify the actual dose of nutrient inactivation product that will be necessary to achieve meaningful reduction of phosphorus levels in Pillings Pond and for filing the required Notice of Intent (NOI) with the Town of Lynnfield. The cost for this initial study and permitting effort would be on the order of $75,000 while the cost for the actual alum application, if determined to be appropriate, is likely to be on the order of $400,000.

Nutrient inactivation would not increase the pond depth so this alternative would not meet all the Town's goals, but would represent a significant cost savings over dredging if the goal was to only address the water quality issues in the pond. Nutrient inactivation could be pursued immediately as a short-term strategy for improving in-pond conditions while the town continues to pursue dredging as a long-term solution.

Sediment Inversion

Sediment inversion, also known as reverse layering, is a process similar to dredging, but does not involve permanent removal of any sediments from the pond or alteration of average depth. During this process, clean sand is brought up from underlying sediment layers and used to bury the nutrient-laden fine sediments at the surface. The sediment inversion process is complex and requires a specially designed hydraulic jetting barge. One advantage of sediment inversion over dredging is that it does not require a federal permit (although other state and local permits would still be necessary). However, sediment inversion is a relatively new procedure that has not yet established a significant track record. Therefore, both the costs and risks associated with undertaking a sediment inversion project are likely to be higher than with proven methods such as dredging or nutrient inactivation.

For Pillings Pond, an additional concern is that the soft organic material is underlain by both coarse sand and gravel. Although coarse sand would be ideal for sediment inversion, the gravel would not be as easily transferred from below the muck to on top of the muck. Additionally, the depth of the underlying sand and gravel would need to be of sufficient volume to provide for at least a 1.5 to 2-foot layer of material over the muck. Additional sediment coring with a vibracore system would be necessary to adequately assess the depth and extent of sand and gravel material beneath Pillings Pond's muck.

Sediment inversion is not a recommended approach over dredging since it does not increase depth and still carries a relatively high cost. Sediment inversion is not recommended over the use of alum for nutrient inactivation since it costs far more, and the results achieved have not been proven to be long lasting given that the technique is relatively new.

3.6 Permitting Process

A dredging project will require filing an Environmental Notification Form (ENF) with the Massachusetts Environmental Policy Act (MEPA) Office since more than 10,000 cubic yards of sediment would likely be dredged and the dredge footprint envisioned will exceed one half acre. A dredge project that accomplishes the Town's goals will require filing an ENF.

In addition to the ENF, the project will require a Notice of Intent (NOI) under the Massachusetts Wetlands Protection Act (WPA) from Lynnfield to permit work within the buffer zone of the pond and below the water line. TRC believes that that project may be eligible to be permitted as an Ecological Restoration Limited Project. Taking advantage of this permitting pathway, which was introduced in the revised state wetland regulations, should provide a simpler path forward under this regulatory program. Under current regulations, the fill or excavation of 100 cubic yards of sediment or more from the pond or disturbance of 5,000 square feet or more will require a 401 Water Quality Certification from MA DEP. Therefore, the work at Pillings Pond will require 401 Water Quality Certification.

Section 404 of the Clean Water Act regulates the discharge of dredged, excavated, or fill material in wetlands, streams, rivers, and other waters of the U.S. The United States Army Corps of Engineers (USACE) is the federal agency authorized to issue Section 404 permits for certain activities conducted in wetlands or other U.S. waters.

Costs to prepare the required engineering design and supporting permit documents for all the above listed permits will be on the order of $275,000 including an extensive amount of additional sediment testing as part of the 401 WQC permitting process.

4.0 Summary

Dredging at Pillings Pond is feasible, however, the costs that would be required to fund such a project will be relatively large. Costs for dredging the priority area in the northwestern section of Pillings Pond, yielding 550,000 cy of soft sediment, along with its ultimate disposal at a nearby location would be on the order of $14-$28 million assuming dry dredging. Costs for this approach will depend upon a range of factors, however finding a large available site in the immediate vicinity of the pond will be significant. Such a site would need to be at least 15 acres to contain the full amount of the sediment.

If dredging is believed to be a viable long-term restoration option, the next steps would be:

1. Assessment of specific scope and extent of dredge program including area to be dredged, potential disposal or reuse sites, pond access point/s, and possible funding sources.
2. Additional chemical and physical analysis of the sediments in areas targeted for dredging. Although MA DEP is likely to be willing to modify its basic requirements based on our initial screening, they typically will expect one core collected for each 1,000 cubic yards of sediment proposed to be dredged. A project targeting the 550,000 cubic yards may require 550 sediment cores and up to 185 additional sediment samples for laboratory analysis within the proposed dredge footprint.
3. Development of an engineering design for submission to permitting authorities.
4. Initiation of the permitting process including an ENF filing for MEPA review, filing local Notices of Intent under the Wetlands Protection Act, filing for a Section 401 Water Quality Certificate from MA DEP, and seeking a USACE Section 404 Permit for dredging.

These four activities combined should be expected to cost about $275,000 for Pillings Pond but are essential if dredging is to be advanced as a management option. Additional design costs would include final engineering design following the permitting process (incorporating any accepted changes resulting from these reviews) along with the development of a bid specification package for the project. Once the contractor has been selected, construction oversight by a third-party engineer would also be recommended.

5.0 References

Center of Disease Control, “Methyl Ethyl Ketone” Accessed on April 4, 2023. (https://www.cdc.gov/niosh/topics/methylethylketone/default.html).

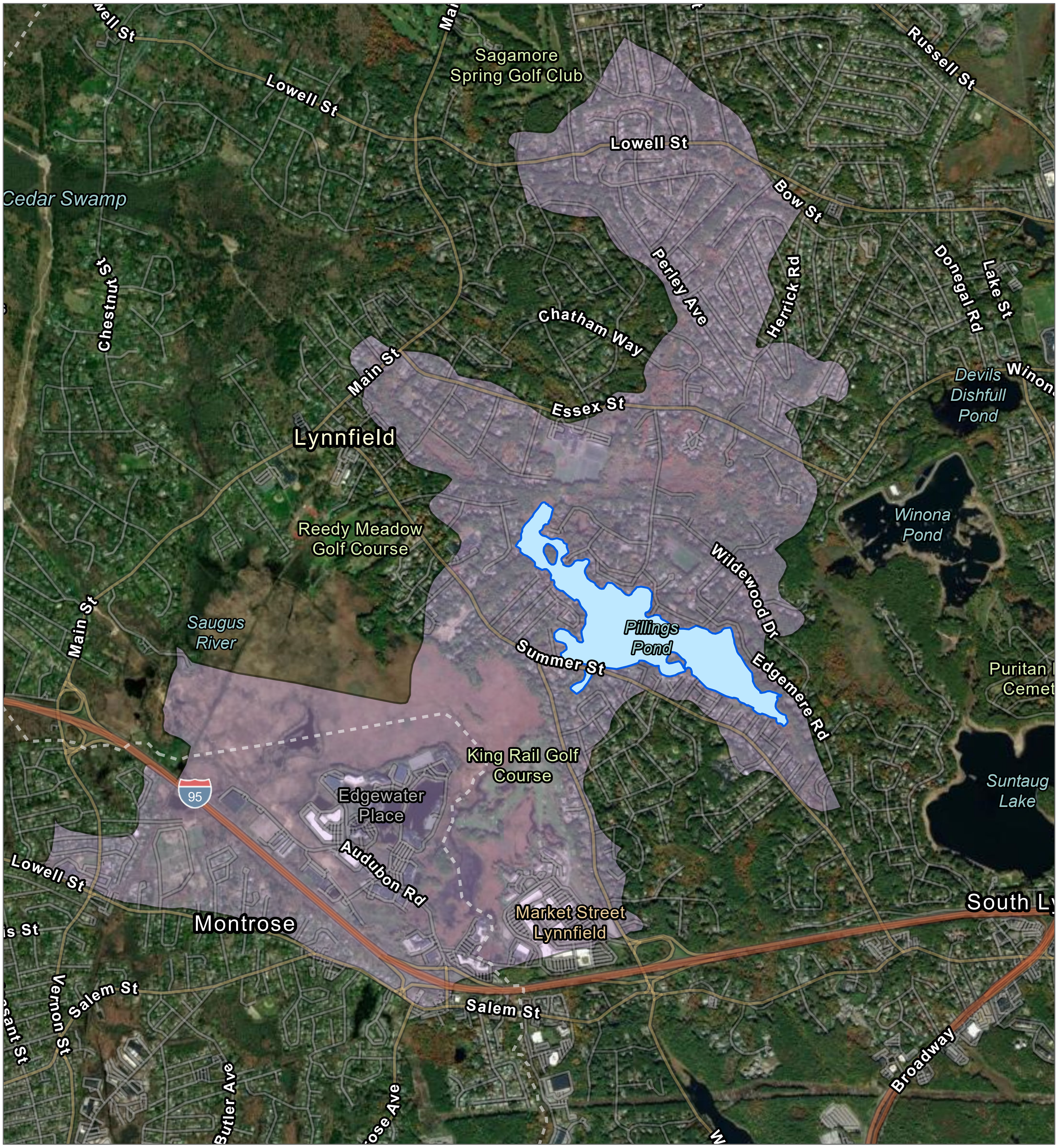
Massachusetts Department of Environmental Protection (MADEP), 2014. Massachusetts Contingency Plan 310 CMR 40.0000 S-1/GW-1 Criteria.

Massachusetts Department of Environmental Protection (MADEP), 2020. RCS-1 Applicable Reportable Concentration for soil category S-1 per 310 CMR 40.0000, Subpart P (Massachusetts Oil and Hazardous Material List)

Massachusetts Department of Environmental Protection (MADEP), 1997. Landfill Criteria per Policy # COMM-97-001, Reuse and Disposal of Contaminated Soil at Massachusetts Landfills.

Massachusetts Department of Environmental Protection (MADEP), 2002. Technical Update: Background Levels of Polycyclic and Aromatic Hydrocarbons and Metals in Soil.

Figures



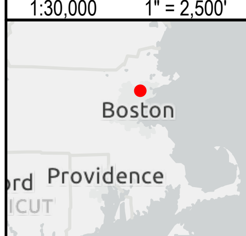
PILLINGS POND (100.3 ACRES)

PILLINGS POND DRAINAGE SUB-BASIN (2,131.4 ACRES)

BASE MAP: USGS COLOR ORTHO IMAGERY
DATA SOURCES: MASSGIS, HYDROGRAPHY, 2019; MASSGIS, DRAINAGE SUB-BASINS, 2007

N

0 1,000 2,000
FEET
1:30,000 1" = 2,500'



PROJECT:
PILLINGS POND DREDGE FEASIBILITY STUDY
TOWN OF LYNNFIELD, MA

TITLE:
DRAINAGE SUB-BASIN MAP

DRAWN BY:	J. BERTHERMAN	PROJ. NO.:	507355.0000.0000
CHECKED BY:	J. TREACY	**FIGURE 1**	
APPROVED BY:	C. NIELSEN		
DATE:	NOVEMBER 2023		

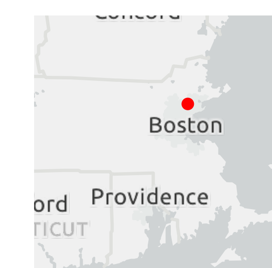
TRC
10 HEMINGWAY DRIVE
2ND FLOOR
EAST PROVIDENCE, RI 02915
PHONE: 401.330.1236

FILE: 507355_PILLINGSPOND_2023

COORDINATE SYSTEM: NAD 1983 STATEPLANE MASSACHUSETTS MAINLAND FIPS 2001; MAP ROTATION: 0
SAVED BY: JBERTHERMAN ON 11/28/2023, 15:15:24 PM; FILE PATH: T:\1-PROJECTS\TOWN_OF_LYNNFIELD_MA\PILLINGS_POND_2023\2-APRX\507355_PILLINGSPOND_2023\507355_PILLINGSPOND_2023.APRX; LAYOUT NAME: WATERSHED

SURVEY LOCATIONS
TRANSECTS

BASE MAP: ESRI "WORLD IMAGERY" ONLINE SERVICE LAYER 2021.
DATA SOURCES: TRC, SURVEY LOCATIONS, 09/01/2023; MASSDEP, HYDROGRAPHY, 2019



1:5,000
1" = 417'
0 500 1,000 FEET

PROJECT:
PILLINGS POND DREDGE FEASIBILITY STUDY
PILLINGS POND, TOWN OF LYNNFIELD, MA

TITLE:
BATHYMETRY AND SEDIMENT THICKNESS SURVEY LOCATIONS

DRAWN BY:	J. BERTHERMAN	PROJ. NO.:	507355.0000.0000
CHECKED BY:	J. TREACY		**FIGURE 2**
APPROVED BY:	C. NIELSEN		
DATE:	NOVEMBER 2023		

TRC
10 HEMINGWAY DRIVE
2ND FLOOR
EAST PROVIDENCE, RI 02915
PHONE: 401.330.1236

FILE: 507355_PillingsPond_2023.aprx

Coordinate System: NAD 1983 StatePlane Massachusetts Mainland FIPS 2001 Feet; Map Rotation: 0
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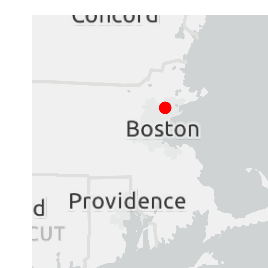
BATHYMETRY (5-FOOT DEPTH CONTOURS)

- 0-5 FT
- 5-10 FT
- 10-15 FT
- 15+ FT

BASE MAP: ESRI "WORLD IMAGERY" ONLINE SERVICE LAYER 2021.
DATA SOURCES: TRC, BATHYMETRY, 09/01/2023; MASSDEP, HYDROGRAPHY, 2019



N

1:5,000
1" = 417'

0 500 1,000 FEET

PROJECT: PILLINGS POND DREDGE FEASIBILITY STUDY PILLINGS POND, TOWN OF LYNNFIELD, MA			
TITLE: BATHYMETRY MAP			
DRAWN BY:	J. BERTHERMAN	PROJ. NO.:	507355.0000.0000
CHECKED BY:	J. TREACY	FIGURE 3	
APPROVED BY:	C. NIELSEN		
DATE:	NOVEMBER 2023		

TRC
10 HEMINGWAY DRIVE
2ND FLOOR
EAST PROVIDENCE, RI 02915
PHONE: 401.330.1236

FILE: 507355_PillingsPond_2023.aprx

Coordinate System: NAD 1983 2011 StatePlane Massachusetts Mnld FIPS 2001 FtUS; Map Rotation: 0
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SEDIMENT SAMPLING LOCATIONS

SEDIMENT THICKNESS (2-FOOT CONTOURS)

- 0-2 FT
- 2-4 FT
- 4-6 FT
- 6-8 FT
- 8-10 FT
- 10 FT

BASE MAP: ESRI WORLD IMAGERY ONLINE SERVICE LAYER 2021.
DATA SOURCES: TRC, SEDIMENT SAMPLING LOCATIONS, 10/12/2023; TRC, SEDIMENT THICKNESS, 09/01/2023; MASSDEP, HYDROGRAPHY, 2019

N

1:5,000
1" = 417'

0 500 1,000 FEET

PROJECT: PILLINGS POND DREDGE FEASIBILITY STUDY PILLINGS POND, TOWN OF LYNNFIELD, MA			
TITLE: SEDIMENT THICKNESS AND SAMPLING LOCATIONS			
DRAWN BY:	J. BERTHERMAN	PROJ. NO.:	507355.0000.0000
CHECKED BY:	J. TREACY	FIGURE 4	
APPROVED BY:	C. NIELSEN		
DATE:	NOVEMBER 2023		
TRC		10 HEMINGWAY DRIVE 2ND FLOOR EAST PROVIDENCE, RI 02915 PHONE: 401.330.1236	
FILE:		507355_PillingsPond_2023.aprx	

Coordinate System: NAD 1983 StatePlane Massachusetts Mainland FIPS 2001 Feet; Map Rotation: 0
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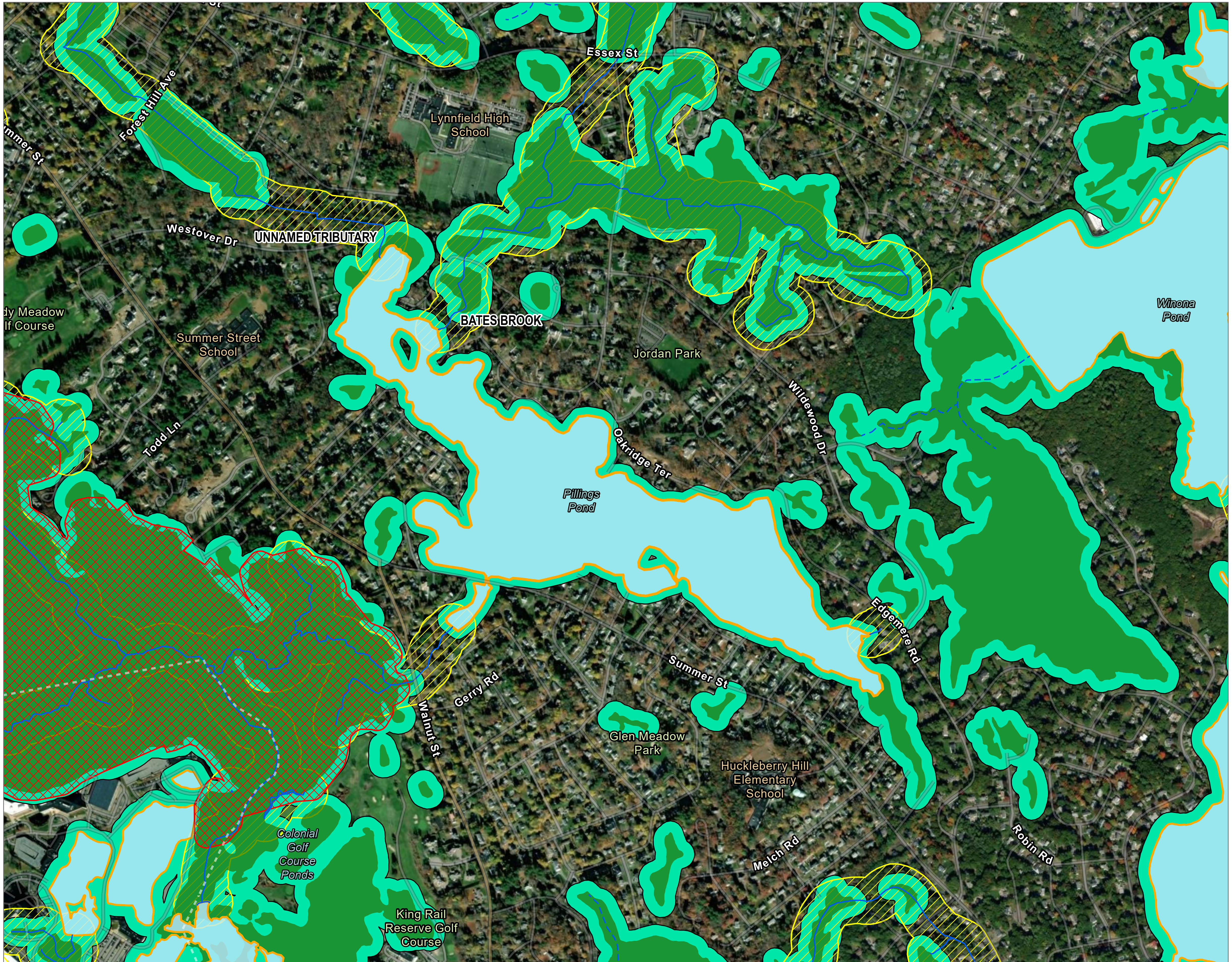
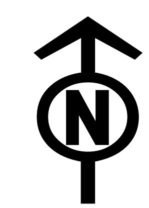


PERENNIAL RIVER
INTERMITTENT STREAM
INLAND BANK
LAND UNDER WATER (LUW)
WETLAND
100-FOOT BUFFER ZONE
200-FOOT RIVERFRONT AREA
NHESP HABITAT

BASE MAP: ESRI, WORLD IMAGERY, ONLINE SERVICE LAYER 2021.
DATA SOURCES: MASSDEP, HYDROGRAPHY, 2019; MASSDEP, WETLANDS, 2017; MASSGIS, NHESP ESTIMATED HABITATS OF RARE SPECIES, 2021



1:10,000
1" = 833'
0 1,000 2,000 FEET

PROJECT: PILLINGS POND DREDGE FEASIBILITY STUDY PILLINGS POND, TOWN OF LYNNFIELD, MA	
TITLE: WETLAND RESOURCE AREAS	
DRAWN BY: J. BERTHERMAN	PROJ. NO.: 507355.0000.0000
CHECKED BY: J. TREACY	FIGURE 5
APPROVED BY: C. NIELSEN	
DATE: FEBRUARY 2024	
TRC	10 HEMINGWAY DRIVE 2ND FLOOR EAST PROVIDENCE, RI 02915 PHONE: 401.330.1236
FILE: 507355_PillingsPond_2023.aprx	

Coordinate System: NAD 1983 StatePlane Massachusetts Mainland FIPS 2001; Map Rotation: 0
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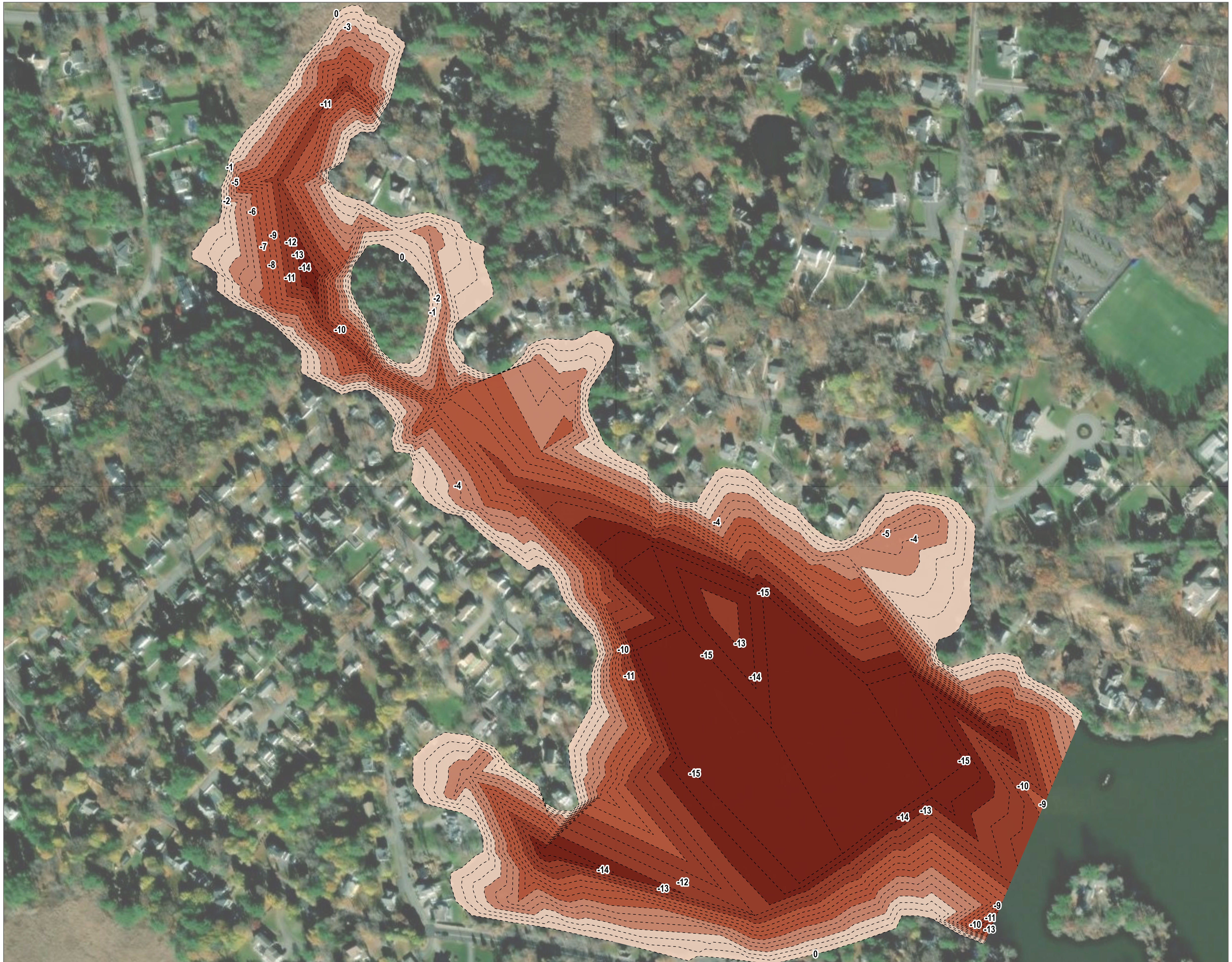

1-FT DREDGE DESIGN CONTOUR LINES

PROPOSED DREDGE DEPTH BELOW WATER SURFACE

- -15FT
- -15FT TO -14FT
- -14FT TO -13FT
- -13FT TO -12FT
- -12FT TO -11FT
- -11FT TO -10FT
- -10FT TO -9FT
- -9FT TO -8FT
- -8FT TO -7FT
- -7FT TO -6FT
- -6FT TO -5FT
- -5FT TO -4FT
- -4FT - -3FT
- -3FT TO -2FT
- -2FT TO -1FT
- -1FT TO 0FT

NOTES:
1: NEGATIVE VALUES REPRESENT THE DEPTH BELOW THE ASSUMED WATER SURFACE ELEVATION OF 0.

BASE MAP: ESRI "WORLD IMAGERY" ONLINE SERVICE LAYER 2023.
DATA SOURCES: TRC, DREDGE CONCEPT DESIGN 1, 2024

N

1:3,500
1" = 292'

0 250 500 FEET

PROJECT:
PILLINGS POND DREDGE FEASIBILITY STUDY
PILLINGS POND, TOWN OF LYNNFIELD, MA

TITLE:
DREDGING CONCEPT DESIGN 1

DRAWN BY:	J. BERTHERMAN	PROJ. NO.:	507355.0000.0000
CHECKED BY:	J. TREACY	**FIGURE 6**	
APPROVED BY:	C. NIELSEN		
DATE:	JANUARY 2024		

TRC

10 HEMINGWAY DRIVE
2ND FLOOR
EAST PROVIDENCE, RI 02915
PHONE: 401.330.1236

FILE: 507355_PillingsPond_2023.aprx

Coordinate System: NAD 1983 StatePlane Massachusetts Mainland FIPS 2001 Feet; Map Rotation: 0
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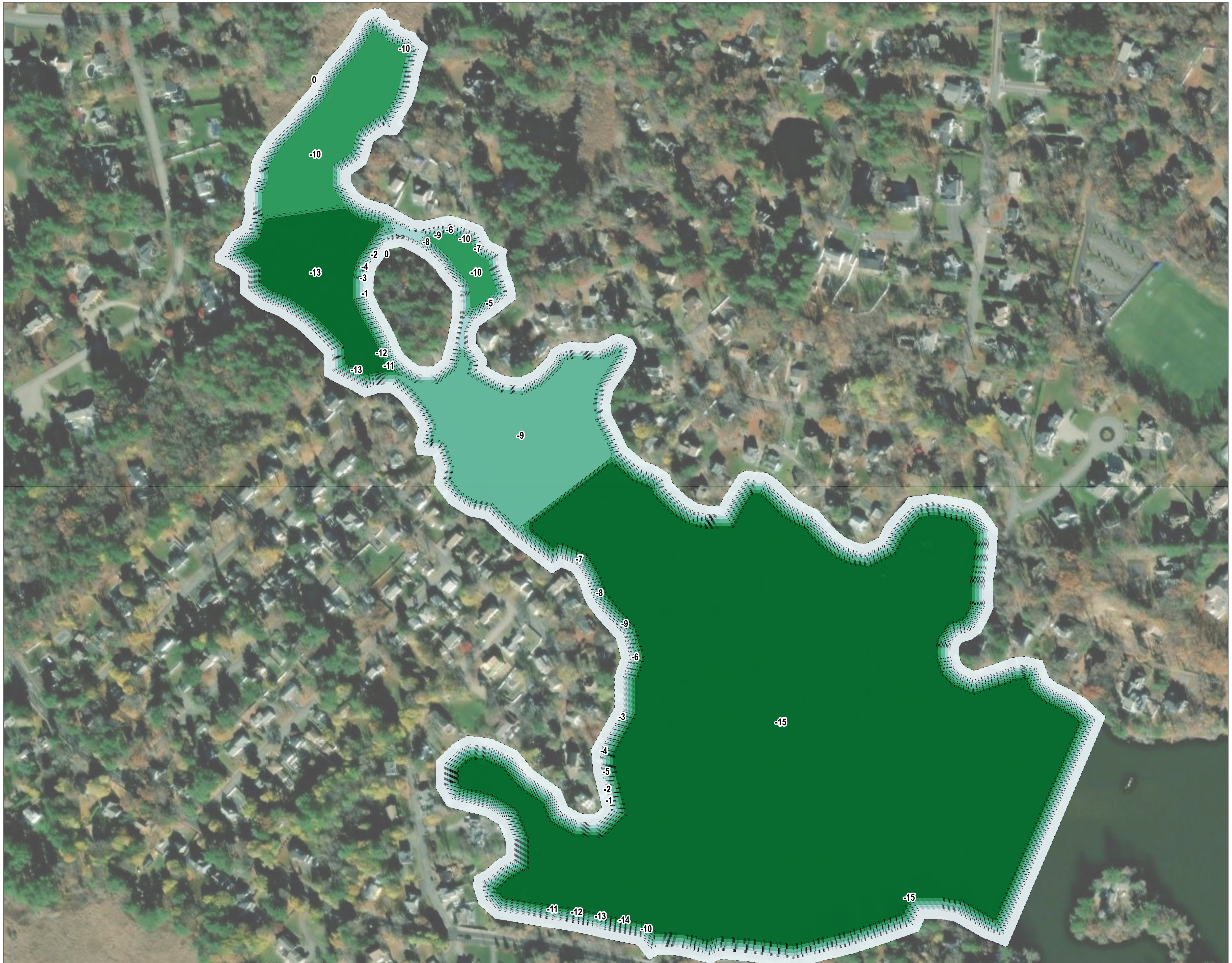

1-FT DREDGE DESIGN CONTOUR LINES

PROPOSED DREDGE DEPTH BELOW WATER SURFACE

- -15FT
- -15FT TO -14FT
- -14FT TO -13FT
- -13FT TO -12FT
- -12FT TO -11FT
- -11FT TO -10FT
- -10FT TO -9FT
- -9FT TO -8FT
- -8FT TO -7FT
- -7FT TO -6FT
- -6FT TO -5FT
- -5FT TO -4FT
- -4FT TO -3FT
- -3FT TO -2FT
- -2FT TO -1FT
- -1FT TO 0FT

NOTES:
1: NEGATIVE VALUES REPRESENT THE DEPTH BELOW THE ASSUMED WATER SURFACE ELEVATION OF 0.

BASE MAP: ESRI "WORLD IMAGERY" ONLINE SERVICE LAYER 2023.
DATA SOURCES: TRC, DREDGE CONCEPT DESIGN 2, 2024

N

1:3,500
1" = 292'

0 250 500 FEET

PROJECT:
PILLINGS POND DREDGE FEASIBILITY STUDY
PILLINGS POND, TOWN OF LYNNFIELD, MA

TITLE:
DREDGING CONCEPT DESIGN 2

DRAWN BY:	J. BERTHERMAN	PROJ. NO.:	507355.0000.0000
CHECKED BY:	J. TREACY	FIGURE 7	
APPROVED BY:	C. NIELSEN		
DATE:	JANUARY 2024		

TRC
10 HEMINGWAY DRIVE
2ND FLOOR
EAST PROVIDENCE, RI 02915
PHONE: 401.330.1236

FILE: 507355_PillingsPond_2023.aprx

Coordinate System: NAD 1983 StatePlane Massachusetts Mainland FIPS 2001 Feet; Map Rotation: 0
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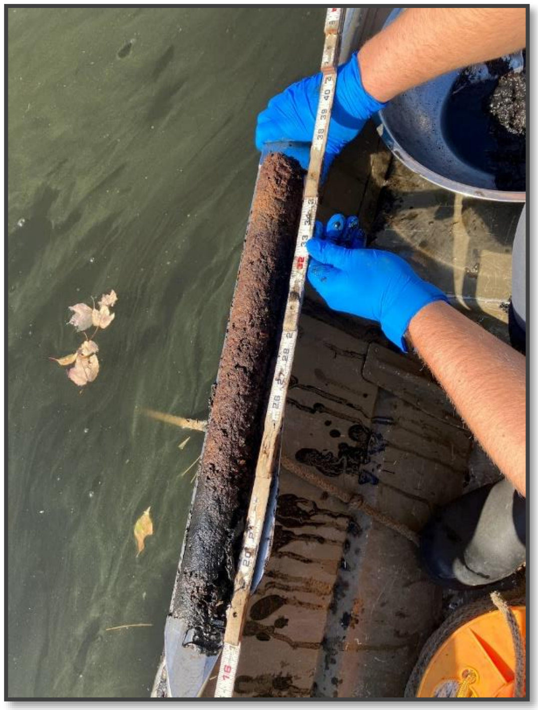
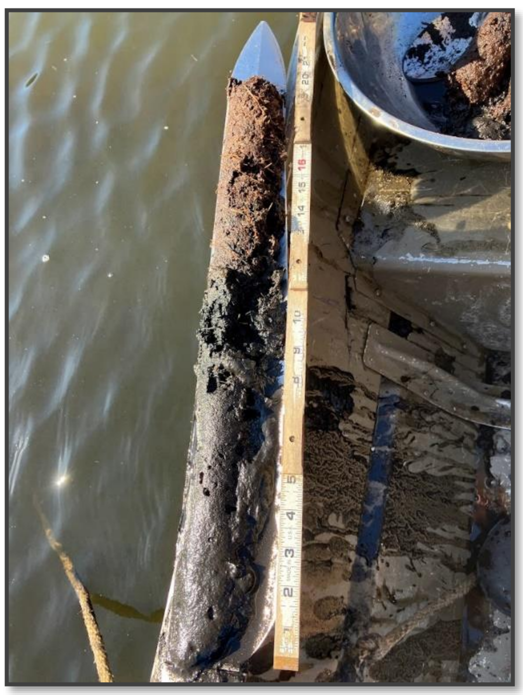
Appendix A: Core Photos

Photograph No.: 1
Sample Location 1, C-1A 0-50 cm

Photograph No.: 2
Sample Location 1, C-1A 35-75 cm



Photograph No.: 3
Sample Location 1, C-1A 60-93 cm



Photograph No.: 4
Sample Location 2, C-1B 0-50 cm

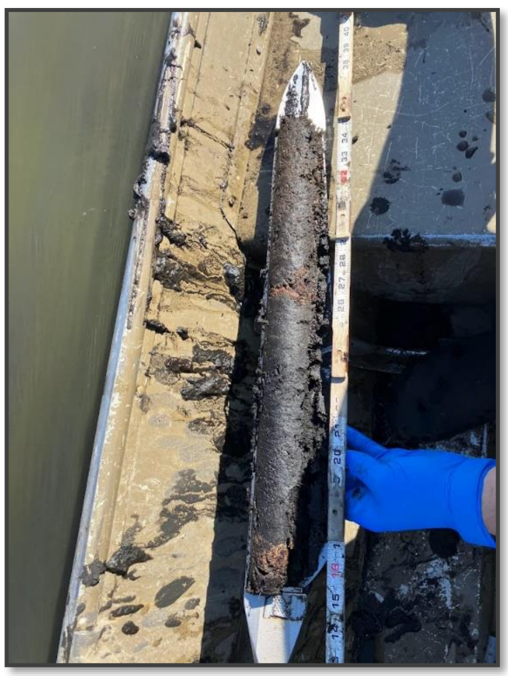
Photograph No.: 5
Sample Location 2, SC-1B 35-75 cm

Photograph No.: 6
Sample Location 3, C-1C 0-50 cm

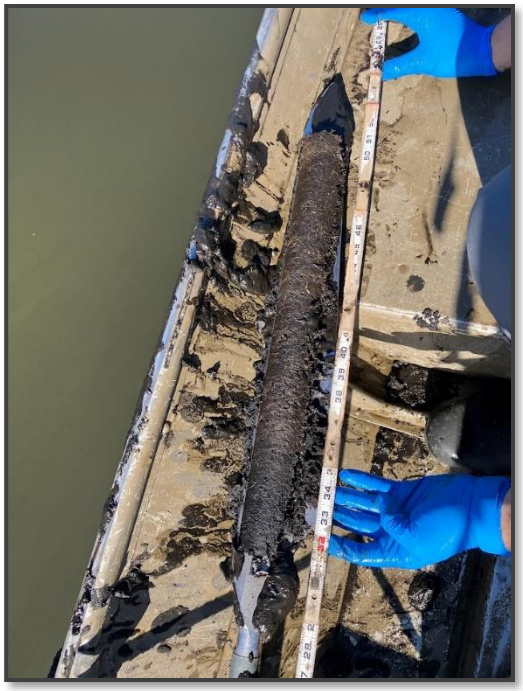
Photograph No.: 7
Sample Location 3, C-1C 25-60 cm

Photograph No.: 8
Sample Location 3, C-1C 40-85 cm

Photograph No.: 9
Sample Location 4, C-2A 0-50 cm



Photograph No.: 10
Sample Location 4, C-2A 50-100 cm

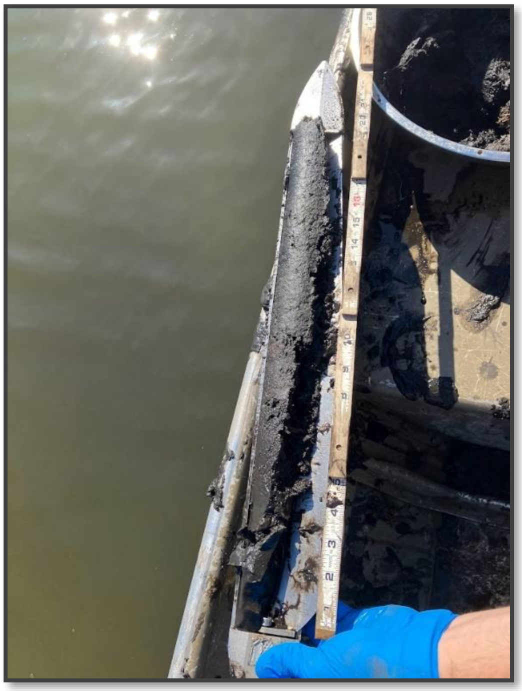


Photograph No.: 11
Sample Location 4, C-2A 100-150 cm

Photograph No.: 12
Sample Location 5, C-2B 0-50 cm

Photograph No.: 13
Sample Location 5, C-2B 50-100 cm

Photograph No.: 14
Sample Location 5, C-2B 100-150 cm



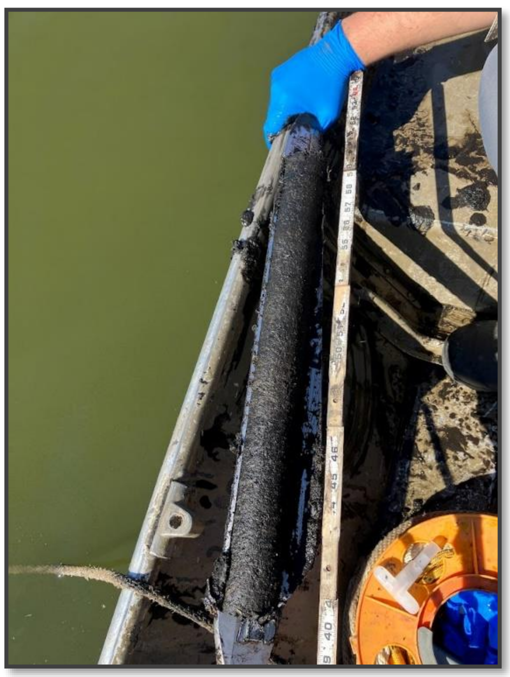
Photograph No.: 15
Sample Location 6, C-2C 0-50 cm

Photograph No.: 16
Sample Location 6, C-2C 50-100 cm

Photograph No.: 13
Sample Location 6, C-2C 100-150 cm

Photograph No.: 14
Sample Location 7, C-3A 0-50 cm

Photograph No.: 15
Sample Location 7, C-3A 50-100 cm



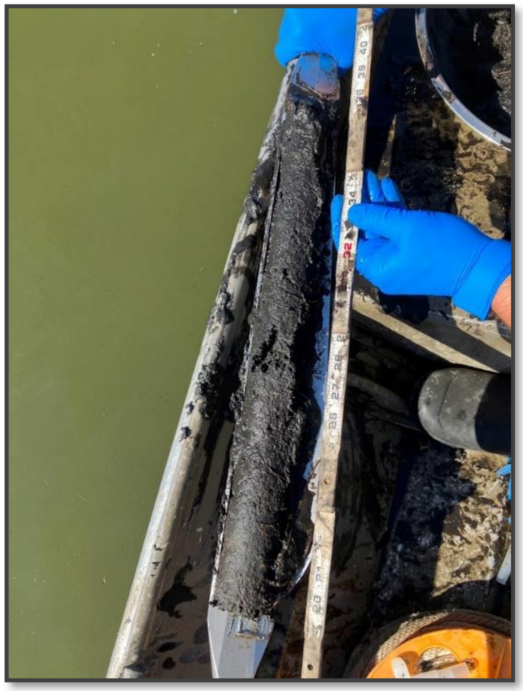
Photograph No.: 16
Sample Location 7, C-3A 100-150 cm

Photograph No.: 13
Sample Location 8, C-3B 0-50 cm

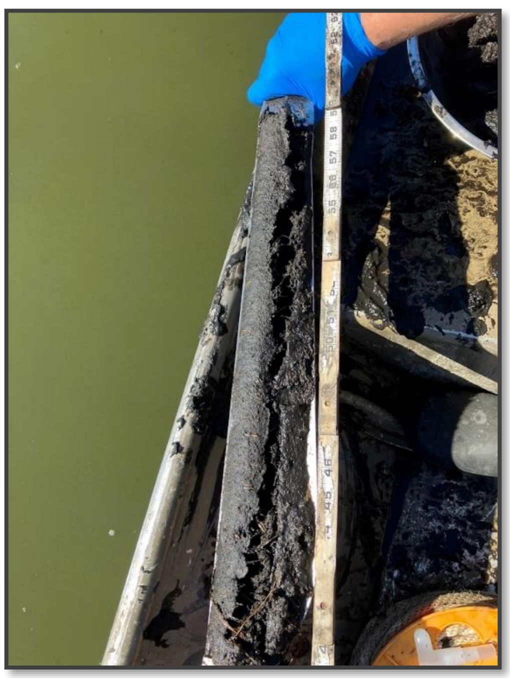
Photograph No.: 14
Sample Location 8, C-3B 50-100 cm

Photograph No.: 15
Sample Location 8 C-3B 100-150 cm

Photograph No.: 16
Sample Location 9, C-3C 0-50 cm



Photograph No.: 15
Sample Location 9, C-3C 50-100 cm



Photograph No.: 16
Sample Location 9, C-3C 100-150 cm

Appendix B: Chemical Analysis of Sediment Samples

Appendix B. Chemical Analysis of Sediment Samples - Pillings Pond October 12, 2023

Analyte	Units	MCP[1]	MA Landfill Criteria[2] Unlined	MA Landfill Criteria[2] Lined	MassDEP Background[3]	C-1	C-2	C-3
Miscellaneous/Inorganics								
Percent Moisture	%	NS	NS	NS	- -	**89**	**86**	**90**
Percent Solid	%	NS	NS	NS	- -	**11**	**14**	**10**
Total Organic Carbon	mg/kg	NS	NS	NS	- -	**308,000**	**316,000**	**306,000**
Metals, Total								
Arsenic, Total	mg/kg	20	40	40	20	**21.5**	**27.3**	**16.3**
Cadmium, Total	mg/kg	70	30	80	2	< 2.9	< 2.4	< 3.0
Chromium, Total	mg/kg	100	1000	1000	30	**50.8**	**83**	**32.1**
Copper, Total	mg/kg	1000	NS	NS	40	**32.6**	**35.7**	**43.4**
Lead, Total	mg/kg	200	1000	2000	100	**22.1**	**17.3**	**25.3**
Mercury, Total	mg/kg	20	10	10	0.3	< 0.21	< 0.18	< 0.25
Nickel, Total	mg/kg	600	NS	NS	20	**179**	**137**	**91**
Zinc, Total	mg/kg	1000	NS	NS	100	**29.7**	**21.1**	**35.2**
Polychlorinated Biphenyls (PCBs) By SW8082A								
PCB-1016	mg/kg	1	2	2	- -	<1.0	<1.0	<0.67
PCB-1221	mg/kg	1	2	2	- -	<1.0	<1.0	<0.67
PCB-1232	mg/kg	1	2	2	- -	<1.0	<1.0	<0.67
PCB-1242	mg/kg	1	2	2	- -	<1.0	<1.0	<0.67
PCB-1248	mg/kg	1	2	2	- -	<1.0	<1.0	<0.67
PCB-1254	mg/kg	1	2	2	- -	<1.0	<1.0	<0.67
PCB-1260	mg/kg	1	2	2	- -	<1.0	<1.0	<0.67
PCB-1262	mg/kg	1	2	2	- -	<1.0	<1.0	<0.67
PCB-1268	mg/kg	1	2	2	- -	<1.0	<1.0	<0.67
Volatile Organic Compounds (VOCs) By SW8260C								
1,1,1,2-Tetrachloroethane	mg/kg	0.1	NS	NS	- -	<0.062	<0.053	<0.069
1,1,1-Trichloroethane	mg/kg	30	NS	NS	- -	<0.062	<0.053	<0.069
1,1,2,2-Tetrachloroethane	mg/kg	0.005	NS	NS	- -	<0.005	<0.005	<0.005
1,1,2-Trichloroethane	mg/kg	0.1	NS	NS	- -	<0.062	<0.053	<0.069
1,1-Dichloroethane	mg/kg	0.4	NS	NS	- -	<0.062	<0.053	<0.069

Analyte	Units	MCP[1]	MA Landfill Criteria[2] Unlined	MA Landfill Criteria[2] Lined	MassDEP Background[3]	C-1	C-2	C-3
1,1-Dichloroethene	mg/kg	3	NS	NS	- -	<0.062	<0.053	<0.069
1,1-Dichloropropene	mg/kg	NS	NS	NS	- -	<0.062	<0.053	<0.069
1,2,3-Trichlorobenzene	mg/kg	NS	NS	NS	- -	<5.1	<4.3	<5.8
1,2,3-Trichloropropane	mg/kg	100	NS	NS	- -	<5.1	<4.3	<5.8
1,2,4-Trichlorobenzene	mg/kg	2	NS	NS	- -	<2	<2	<2
1,2,4-Trimethylbenzene	mg/kg	NS	NS	NS	- -	<5.1	<4.3	<5.8
1,2-Dibromo-3-chloropropane	mg/kg	10	NS	NS	- -	<5.1	<4.3	<5.8
1,2-Dibromoethane	mg/kg	0.1	NS	NS	- -	<0.0062	<0.0053	<0.0069
1,2-Dichlorobenzene	mg/kg	9	NS	NS	- -	<5.1	<4.3	<5.8
1,2-Dichloroethane	mg/kg	0.1	NS	NS	- -	<0.062	<0.053	<0.069
1,2-Dichloropropane	mg/kg	0.1	NS	NS	- -	<0.062	<0.053	<0.069
1,3,5-Trimethylbenzene	mg/kg	10	NS	NS	- -	<5.1	<4.3	<5.8
1,3-Dichlorobenzene	mg/kg	3	NS	NS	- -	<3	<3	<3
1,3-Dichloropropane	mg/kg	500	NS	NS	- -	<0.062	<0.053	<0.069
1,4-Dichlorobenzene	mg/kg	0.7	NS	NS	- -	<0.7	<0.7	<0.7
1,4-Dioxane	mg/kg	0.2	NS	NS	- -	< 0.2	< 0.2	< 0.2
2,2-Dichloropropane	mg/kg	NS	NS	NS	- -	<0.062	<0.053	<0.069
2-Chlorotoluene	mg/kg	NS	NS	NS	- -	<5.1	<4.3	<5.8
2-Hexanone	mg/kg	100	NS	NS	- -	<0.31	<0.26	<0.34
2-Isopropyltoluene	mg/kg	100	NS	NS	- -	<5.1	<4.3	<5.8
4-Chlorotoluene	mg/kg	NS	NS	NS	- -	<5.1	<4.3	<5.8
4-Methyl-2-pentanone	mg/kg	0.4	NS	NS	- -	<0.31	<0.26	<0.34
Acetone	mg/kg	6	NS	NS	- -	<3.1	<2.6	<3.4
Acrylonitrile	mg/kg	NS	NS	NS	- -	<0.062	<0.053	<0.069
tert-amyl methyl ether	mg/kg	NS	NS	NS	- -	<0.062	<0.053	<0.069
Benzene	mg/kg	2	NS	NS	- -	<0.062	<0.053	<0.069
Bromobenzene	mg/kg	100	NS	NS	- -	<5.1	<4.3	<5.8
Bromochloromethane	mg/kg	NS	NS	NS	- -	<0.062	<0.053	<0.069
Bromodichloromethane	mg/kg	0.1	NS	NS	- -	<0.062	<0.053	<0.069
Bromoform	mg/kg	0.1	NS	NS	- -	<0.062	<0.053	<0.069
Bromomethane	mg/kg	0.5	NS	NS	- -	<0.062	<0.053	<0.069
Carbon Disulfide	mg/kg	100	NS	NS	- -	<0.062	<0.053	<0.069

Analyte	Units	MCP[1]	MA Landfill Criteria[2]		MassDEP Background[3]	C-1	C-2	C-3
			Unlined	Lined				
Carbon tetrachloride	mg/kg	5	NS	NS	- -	<0.062	<0.053	<0.069
Chlorobenzene	mg/kg	1	NS	NS	- -	<0.062	<0.053	<0.069
Chloroethane	mg/kg	100	NS	NS	- -	<0.062	<0.053	<0.069
Chloroform	mg/kg	0.2	NS	NS	- -	<0.062	<0.053	<0.069
Chloromethane	mg/kg	100	NS	NS	- -	<0.062	<0.053	<0.069
cis-1,2-Dichloroethene	mg/kg	0.1	NS	NS	- -	<0.062	<0.053	<0.069
cis-1,3-Dichloropropene	mg/kg	0.01	NS	NS	- -	<0.01	<0.01	<0.01
Dibromochloromethane	mg/kg	0.005	NS	NS	- -	< 0.005	< 0.005	< 0.005
Dibromomethane	mg/kg	500	NS	NS	- -	<0.062	<0.053	<0.069
Dichlorodifluoromethane	mg/kg	1000	NS	NS	- -	<0.062	<0.053	<0.069
Diethyl ether	mg/kg	100	NS	NS	- -	<0.062	<0.053	<0.069
Di-isopropyl ether	mg/kg	100	NS	NS	- -	<0.062	<0.053	<0.069
Ethylbenzene	mg/kg	40	NS	NS	- -	<0.062	<0.053	<0.069
Ethyl tert-butyl ether	mg/kg	0.1	NS	NS	- -	<0.062	<0.053	<0.069
Hexachlorobutadiene	mg/kg	30	NS	NS	- -	<5.1	<4.3	<5.8
Isopropylbenzene	mg/kg	NS	NS	NS	- -	<5.1	<4.3	<5.8
p/m-Xylene	mg/kg	100	NS	NS	- -	<0.062	<0.053	<0.069
Methyl Ethyl Ketone	mg/kg	4	NS	NS	- -	**0.42**	< 0.32	**0.54**
Methyl t-butyl ether (MTBE)	mg/kg	0.1	NS	NS	- -	<0.1	<0.1	<0.1
Methylene chloride	mg/kg	0.1	NS	NS	- -	<0.1	<0.1	<0.1
Naphthalene	mg/kg	4	NS	NS	- -	<1	<4	<4
n-Butylbenzene	mg/kg	NS	NS	NS	- -	<5.1	<4.3	<5.8
n-Propylbenzene	mg/kg	100	NS	NS	- -	<5.1	<4.3	<5.8
o-Xylene	mg/kg	NS	NS	NS	- -	<0.062	<0.053	<0.069
p-Isopropyltoluene	mg/kg	NS	NS	NS	- -	<5.1	<4.3	<5.8
sec-Butylbenzene	mg/kg	NS	NS	NS	- -	<5.1	<4.3	<5.8
Styrene	mg/kg	3	NS	NS	- -	<0.062	<0.053	<0.069
tert-Butylbenzene	mg/kg	NS	NS	NS	- -	<5.1	<4.3	<5.8
Tetrachloroethene	mg/kg	1	NS	NS	- -	<0.062	<0.053	<0.069
Tetrahydrofuran (THF)	mg/kg	500	NS	NS	- -	<0.12	<0.11	<0.14
Toluene	mg/kg	30	NS	NS	- -	<0.062	<0.053	<0.069
Total Xylenes	mg/kg	100	NS	NS	- -	<0.062	<0.053	<0.069

Analyte	Units	MCP[1]	MA Landfill Criteria[2] Unlined	MA Landfill Criteria[2] Lined	MassDEP Background[3]	C-1	C-2	C-3
trans-1,2-Dichloroethene	mg/kg	1	NS	NS	- -	<0.062	<0.053	<0.069
trans-1,3-Dichloropropene	mg/kg	0.01	NS	NS	- -	<0.01	<0.01	<0.01
trans-1,4-dichloro-2-butene	mg/kg	NS	NS	NS	- -	<10	<8.5	<12
Trichloroethene	mg/kg	0.3	NS	NS	- -	<0.062	<0.053	<0.069
Trichlorofluoromethane	mg/kg	1000	NS	NS	- -	<0.062	<0.053	<0.069
Trichlorotrifluoroethane	mg/kg	NS	NS	NS	- -	<0.12	<0.11	<0.14
Vinyl chloride	mg/kg	0.7	NS	NS	- -	<0.062	<0.053	<0.069
Total VOCs	mg/kg	NS	4	10	- -	**0.42**	0.0	**0.54**
Polynuclear Aromatic Hydrocarbons (PAHs) By SW8270D								
2-Methylnaphthalene	mg/kg	1	NS	NS	0.5	<4.4	<3.4	<4.7
Acenaphthene	mg/kg	4	NS	NS	0.5	<4	<3.4	<4
Acenaphthylene	mg/kg	1	NS	NS	0.5	<4.4	<3.4	<4.7
Anthracene	mg/kg	1000	NS	NS	1	<4.4	<3.4	<4.7
Benz(a)anthracene	mg/kg	7	NS	NS	2	<4.4	<3.4	<4.7
Benzo(a)pyrene	mg/kg	2	NS	NS	2	<4.4	<3.4	<4.7
Benzo(b)fluoranthene	mg/kg	7	NS	NS	2	<4.4	<3.4	<4.7
Benzo(ghi)perylene	mg/kg	1000	NS	NS	1	<4.4	<3.4	<4.7
Benzo(k)fluoranthene	mg/kg	70	NS	NS	1	<4.4	<3.4	<4.7
Chrysene	mg/kg	70	NS	NS	2	<4.4	<3.4	<4.7
Dibenz(a,h)anthracene	mg/kg	1	NS	NS	0.5	<4.4	<3.4	<4.7
Fluoranthene	mg/kg	1000	NS	NS	4	<4.4	<3.4	<4.7
Fluorene	mg/kg	1000	NS	NS	1	<4.4	<3.4	<4.7
Indeno(1,2,3-cd)pyrene	mg/kg	7	NS	NS	1	<4.4	<3.4	<4.7
Naphthalene	mg/kg	4	NS	NS	0.5	<4	<3.4	<4
Phenanthrene	mg/kg	10	NS	NS	3	<4.4	<3.4	<4.7
Pyrene	mg/kg	1000	NS	NS	4	<4.4	<3.4	<4.7
Total SVOCs	mg/kg	NS	100	100	- -	<4.4	<3.4	<4.7
Extractable Petroleum Hydrocarbons (EPH) Ranges By MA EPH 5/2019								
C11-C22 Aromatics, Adjusted	mg/kg	1000	NS	NS	- -	< 0.59	< 0.47	< 0.66
C19-C36 Aliphatics	mg/kg	3000	NS	NS	- -	< 0.59	< 0.47	< 0.66
C9-C18 Aliphatics	mg/kg	1000	NS	NS	- -	< 0.59	< 0.47	< 0.66

Analyte	Units	MCP[1]	MA Landfill Criteria[2] Unlined	Lined	MassDEP Background[3]	C-1	C-2	C-3

1: MADEP, 2014. Massachusetts Contingency Plan - RCS-1 - Applicable Reportable Concentration for soil category S-1 per 310 CMR

2: MADEP, 1997. Landfill Criteria per Policy # COMM-97-001, Reuse and Disposal of Contaminated Soil at Massachusetts

3: MADEP, Technical Update: Background Levels of Polycyclic and Aromatic Hydrocarbons and Metals in Soil, 2002

Bold concentrations exceed the laboratory reporting limit.

< = Analyte not dectected above laboratory reporting limit.

NS = No Standard Promulgated

#	Bold red and green shaded concentrations exceedance MCP RCS-1 Criteria
#	Beige shaded RLs exceed the MCP RCS-1 Criteria

Appendix C: Laboratory Reports

Friday, February 02, 2024

Attn: James Treacy
ESS Group Inc. A TRC Company
10 Hemingway Drive 2nd Floor
Riverside, RI 02915-2224

Project ID: PILLINGS POND (507355.0000.0000 PHASE 1)
SDG ID: GCP25418
Sample ID#s: CP25418 - CP25420

This laboratory is in compliance with the NELAC requirements of procedures used except where indicated.

This report contains results for the parameters tested, under the sampling conditions described on the Chain Of Custody, as received by the laboratory. This report is incomplete unless all pages indicated in the pagination at the bottom of the page are included.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

A scanned version of the COC form accompanies the analytical report and is an exact duplicate of the original.

Enclosed are revised Analysis Report pages. Please replace and discard the original pages. If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200. The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Sincerely yours,

Phyllis Shiller

Phyllis Shiller
Laboratory Director

NELAC - #NY11301
CT Lab Registration #PH-0618
MA Lab Registration #M-CT007
ME Lab Registration #CT-007
NH Lab Registration #213693-A,B
NJ Lab Registration #CT-003
NY Lab Registration #11301
PA Lab Registration #68-03530
RI Lab Registration #63
VT Lab Registration #VT11301

587 East Middle Turnpike, P.O. Box 370, Manchester, CT 06040
Telephone (860) 645-1102

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

NY # 11301

SDG Comments

February 02, 2024

SDG I.D.: GCP25418

Version 2:
Criteria was added and analyses were re-evaluated to meet criteria.

PHOENIX
Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Sample Id Cross Reference

February 02, 2024

SDG I.D.: GCP25418

Project ID: PILLINGS POND (507355.0000.0000 PHASE 1)

Client Id	Lab Id	Matrix
C-1	CP25418	SEDIMENT
C-2	CP25419	SEDIMENT
C-3	CP25420	SEDIMENT

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

February 02, 2024

FOR: Attn: James Treacy
ESS Group Inc. A TRC Company
10 Hemingway Drive 2nd Floor
Riverside, RI 02915-2224

Sample Information		Custody Information		Date	Time
Matrix:	SEDIMENT	Collected by:		10/12/23	10:30
Location Code:	TRC-RI	Received by:	SW	10/13/23	14:45
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCP25418
Phoenix ID: CP25418

Project ID: PILLINGS POND (507355.0000.0000 PHASE 1)
Client ID: C-1

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Arsenic	21.5	5.8	mg/Kg	1	10/23/23	CPP	SW6010D
Cadmium	< 2.9	2.9	mg/Kg	1	10/23/23	CPP	SW6010D
Chromium	50.8	2.9	mg/Kg	1	10/23/23	CPP	SW6010D
Copper	32.6	5.8	mg/kg	1	10/23/23	CPP	SW6010D
Mercury	< 0.21	0.21	mg/Kg	2	10/16/23	GW	SW7471B
Nickel	179	2.9	mg/Kg	1	10/23/23	CPP	SW6010D
Lead	22.1	2.9	mg/Kg	1	10/23/23	CPP	SW6010D
Zinc	29.7	5.8	mg/Kg	1	10/23/23	CPP	SW6010D
Percent Moisture	89	0.1	%		10/14/23	EG	P.E.L.
Percent Solid	11		%		10/14/23	CV	SW846-%Solid
Tot.Org.Carbon	308000	100	mg/kg	1	10/19/23	EG	L. Kahn
Field Extraction	Completed				10/12/23		SW5035A
Mercury Digestion	Completed				10/16/23	AL/AL	SW7471B
EPH Extraction	Completed				10/13/23	C/K	SW3545A
Soil Extraction for PCB	Completed				10/13/23	C/A	SW3546
Soil Extraction for SVOA PAH	Completed				10/16/23	H/F	SW3546
Total Metals Digest	Completed				10/13/23	L/AG	SW3050B
Tot.Org.Carbon Preparation	Completed				10/14/23	EG	
Sieve Test	Completed		%		10/17/23	*	ASTM C136, C117
Ext. Petroleum Hydrocarbons	Completed				10/13/23		MADEP EPH-19
Polychlorinated Biphenyls							
PCB-1016	ND	1000	ug/Kg	5	10/14/23	SC	SW8082A
PCB-1221	ND	1000	ug/Kg	5	10/14/23	SC	SW8082A
PCB-1232	ND	1000	ug/Kg	5	10/14/23	SC	SW8082A
PCB-1242	ND	1000	ug/Kg	5	10/14/23	SC	SW8082A
PCB-1248	ND	1000	ug/Kg	5	10/14/23	SC	SW8082A

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
PCB-1254	ND	1000	ug/Kg	5	10/14/23	SC	SW8082A
PCB-1260	ND	1000	ug/Kg	5	10/14/23	SC	SW8082A
PCB-1262	ND	1000	ug/Kg	5	10/14/23	SC	SW8082A
PCB-1268	ND	1000	ug/Kg	5	10/14/23	SC	SW8082A
QA/QC Surrogates							
% DCBP	77		%	5	10/14/23	SC	30 - 150 %
% DCBP (Confirmation)	78		%	5	10/14/23	SC	30 - 150 %
% TCMX	87		%	5	10/14/23	SC	30 - 150 %
% TCMX (Confirmation)	83		%	5	10/14/23	SC	30 - 150 %

Volatiles

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
1,1,1,2-Tetrachloroethane	ND	62	ug/Kg	1	10/16/23	PS	SW8260D
1,1,1-Trichloroethane	ND	62	ug/Kg	1	10/16/23	PS	SW8260D
1,1,2,2-Tetrachloroethane	ND	5	ug/Kg	1	10/16/23	PS	SW8260D
1,1,2-Trichloroethane	ND	62	ug/Kg	1	10/16/23	PS	SW8260D
1,1-Dichloroethane	ND	62	ug/Kg	1	10/16/23	PS	SW8260D
1,1-Dichloroethene	ND	62	ug/Kg	1	10/16/23	PS	SW8260D
1,1-Dichloropropene	ND	62	ug/Kg	1	10/16/23	PS	SW8260D
1,2,3-Trichlorobenzene	ND	5100	ug/Kg	50	10/16/23	PS	SW8260D
1,2,3-Trichloropropane	ND	5100	ug/Kg	50	10/16/23	PS	SW8260D
1,2,4-Trichlorobenzene	ND	2000	ug/Kg	50	10/16/23	PS	SW8260D
1,2,4-Trimethylbenzene	ND	5100	ug/Kg	50	10/16/23	PS	SW8260D
1,2-Dibromo-3-chloropropane	ND	5100	ug/Kg	50	10/16/23	PS	SW8260D
1,2-Dibromoethane	ND	6.2	ug/Kg	1	10/16/23	PS	SW8260D
1,2-Dichlorobenzene	ND	5100	ug/Kg	50	10/16/23	PS	SW8260D
1,2-Dichloroethane	ND	62	ug/Kg	1	10/16/23	PS	SW8260D
1,2-Dichloropropane	ND	62	ug/Kg	1	10/16/23	PS	SW8260D
1,3,5-Trimethylbenzene	ND	5100	ug/Kg	50	10/16/23	PS	SW8260D
1,3-Dichlorobenzene	ND	3000	ug/Kg	50	10/16/23	PS	SW8260D
1,3-Dichloropropane	ND	62	ug/Kg	1	10/16/23	PS	SW8260D
1,4-Dichlorobenzene	ND	700	ug/Kg	50	10/16/23	PS	SW8260D
2,2-Dichloropropane	ND	62	ug/Kg	1	10/16/23	PS	SW8260D
2-Chlorotoluene	ND	5100	ug/Kg	50	10/16/23	PS	SW8260D
2-Hexanone	ND	310	ug/Kg	1	10/16/23	PS	SW8260D
2-Isopropyltoluene	ND	5100	ug/Kg	50	10/16/23	PS	SW8260D
4-Chlorotoluene	ND	5100	ug/Kg	50	10/16/23	PS	SW8260D
4-Methyl-2-pentanone	ND	310	ug/Kg	1	10/16/23	PS	SW8260D
Acetone	ND	3100	ug/Kg	1	10/16/23	PS	SW8260D
Acrylonitrile	ND	62	ug/Kg	1	10/16/23	PS	SW8260D
Benzene	ND	62	ug/Kg	1	10/16/23	PS	SW8260D
Bromobenzene	ND	5100	ug/Kg	50	10/16/23	PS	SW8260D
Bromochloromethane	ND	62	ug/Kg	1	10/16/23	PS	SW8260D
Bromodichloromethane	ND	62	ug/Kg	1	10/16/23	PS	SW8260D
Bromoform	ND	62	ug/Kg	1	10/16/23	PS	SW8260D
Bromomethane	ND	62	ug/Kg	1	10/16/23	PS	SW8260D
Carbon Disulfide	ND	62	ug/Kg	1	10/16/23	PS	SW8260D
Carbon tetrachloride	ND	62	ug/Kg	1	10/16/23	PS	SW8260D
Chlorobenzene	ND	62	ug/Kg	1	10/16/23	PS	SW8260D
Chloroethane	ND	62	ug/Kg	1	10/16/23	PS	SW8260D
Chloroform	ND	62	ug/Kg	1	10/16/23	PS	SW8260D

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference	
Chloromethane	ND	62	ug/Kg	1	10/16/23	PS	SW8260D	
cis-1,2-Dichloroethene	ND	62	ug/Kg	1	10/16/23	PS	SW8260D	
cis-1,3-Dichloropropene	ND	10	ug/Kg	1	10/16/23	PS	SW8260D	
Dibromochloromethane	ND	5.0	ug/Kg	1	10/16/23	PS	SW8260D	
Dibromomethane	ND	62	ug/Kg	1	10/16/23	PS	SW8260D	
Dichlorodifluoromethane	ND	62	ug/Kg	1	10/16/23	PS	SW8260D	
Ethylbenzene	ND	62	ug/Kg	1	10/16/23	PS	SW8260D	
Hexachlorobutadiene	ND	5100	ug/Kg	50	10/16/23	PS	SW8260D	
Isopropylbenzene	ND	5100	ug/Kg	50	10/16/23	PS	SW8260D	
m&p-Xylene	ND	62	ug/Kg	1	10/16/23	PS	SW8260D	
Methyl Ethyl Ketone	420	370	ug/Kg	1	10/16/23	PS	SW8260D	
Methyl t-butyl ether (MTBE)	ND	100	ug/Kg	1	10/16/23	PS	SW8260D	
Methylene chloride	ND	100	ug/Kg	1	10/16/23	PS	SW8260D	
Naphthalene	ND	1000	ug/Kg	50	10/16/23	PS	SW8260D	
n-Butylbenzene	ND	5100	ug/Kg	50	10/16/23	PS	SW8260D	
n-Propylbenzene	ND	5100	ug/Kg	50	10/16/23	PS	SW8260D	
o-Xylene	ND	62	ug/Kg	1	10/16/23	PS	SW8260D	
p-Isopropyltoluene	ND	5100	ug/Kg	50	10/16/23	PS	SW8260D	
sec-Butylbenzene	ND	5100	ug/Kg	50	10/16/23	PS	SW8260D	
Styrene	ND	62	ug/Kg	1	10/16/23	PS	SW8260D	
tert-Butylbenzene	ND	5100	ug/Kg	50	10/16/23	PS	SW8260D	
Tetrachloroethene	ND	62	ug/Kg	1	10/16/23	PS	SW8260D	
Tetrahydrofuran (THF)	ND	120	ug/Kg	1	10/16/23	PS	SW8260D	
Toluene	ND	62	ug/Kg	1	10/16/23	PS	SW8260D	
Total Xylenes	ND	62	ug/Kg	1	10/16/23	PS	SW8260D	
trans-1,2-Dichloroethene	ND	62	ug/Kg	1	10/16/23	PS	SW8260D	
trans-1,3-Dichloropropene	ND	10	ug/Kg	1	10/16/23	PS	SW8260D	
trans-1,4-dichloro-2-butene	ND	10000	ug/Kg	50	10/16/23	PS	SW8260D	
Trichloroethene	ND	62	ug/Kg	1	10/16/23	PS	SW8260D	
Trichlorofluoromethane	ND	62	ug/Kg	1	10/16/23	PS	SW8260D	
Trichlorotrifluoroethane	ND	120	ug/Kg	1	10/16/23	PS	SW8260D	
Vinyl chloride	ND	62	ug/Kg	1	10/16/23	PS	SW8260D	
QA/QC Surrogates								
% 1,2-dichlorobenzene-d4	90		%	1	10/16/23	PS	70 - 130 %	
% Bromofluorobenzene	65		%	1	10/16/23	PS	70 - 130 %	3
% Dibromofluoromethane	112		%	1	10/16/23	PS	70 - 130 %	
% Toluene-d8	85		%	1	10/16/23	PS	70 - 130 %	
% 1,2-dichlorobenzene-d4 (50x)	96		%	50	10/16/23	PS	70 - 130 %	
% Bromofluorobenzene (50x)	98		%	50	10/16/23	PS	70 - 130 %	
% Dibromofluoromethane (50x)	102		%	50	10/16/23	PS	70 - 130 %	
% Toluene-d8 (50x)	93		%	50	10/16/23	PS	70 - 130 %	

Oxygenates & Dioxane

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
1,4-Dioxane	ND	200	ug/Kg	1	10/16/23	PS	SW8260D (OXY)
Diethyl ether	ND	62	ug/Kg	1	10/16/23	PS	SW8260D (OXY)
Di-isopropyl ether	ND	62	ug/Kg	1	10/16/23	PS	SW8260D (OXY)
Ethyl tert-butyl ether	ND	62	ug/Kg	1	10/16/23	PS	SW8260D (OXY)
tert-amyl methyl ether	ND	62	ug/Kg	1	10/16/23	PS	SW8260D (OXY)

Project ID: PILLINGS POND (507355.0000.0000 PHASE 1)
Client ID: C-1

Phoenix I.D.: CP25418

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Polynuclear Aromatic HC							
2-Methylnaphthalene	ND	700	ug/Kg	1	10/17/23	PS	SW8270D
Acenaphthene	ND	4000	ug/Kg	1	10/17/23	PS	SW8270D
Acenaphthylene	ND	1000	ug/Kg	1	10/17/23	PS	SW8270D
Anthracene	ND	4400	ug/Kg	1	10/17/23	PS	SW8270D
Benz(a)anthracene	ND	4400	ug/Kg	1	10/17/23	PS	SW8270D
Benzo(a)pyrene	ND	2000	ug/Kg	1	10/17/23	PS	SW8270D
Benzo(b)fluoranthene	ND	4400	ug/Kg	1	10/17/23	PS	SW8270D
Benzo(ghi)perylene	ND	4400	ug/Kg	1	10/17/23	PS	SW8270D
Benzo(k)fluoranthene	ND	4400	ug/Kg	1	10/17/23	PS	SW8270D
Chrysene	ND	4400	ug/Kg	1	10/17/23	PS	SW8270D
Dibenz(a,h)anthracene	ND	700	ug/Kg	1	10/17/23	PS	SW8270D
Fluoranthene	ND	4400	ug/Kg	1	10/17/23	PS	SW8270D
Fluorene	ND	4400	ug/Kg	1	10/17/23	PS	SW8270D
Indeno(1,2,3-cd)pyrene	ND	4400	ug/Kg	1	10/17/23	PS	SW8270D
Naphthalene	ND	4000	ug/Kg	1	10/17/23	PS	SW8270D
Phenanthrene	ND	4400	ug/Kg	1	10/17/23	PS	SW8270D
Pyrene	ND	4400	ug/Kg	1	10/17/23	PS	SW8270D
QA/QC Surrogates							
% 2-Fluorobiphenyl	75		%	1	10/17/23	PS	30 - 130 %
% Nitrobenzene-d5	72		%	1	10/17/23	PS	30 - 130 %
% Terphenyl-d14	81		%	1	10/17/23	PS	30 - 130 %
MA EPH Aliphatic/Aromatic Ranges							
C11-C22 Aromatic Hydrocarbons 1,2	ND	590	mg/Kg	1	10/19/23	AW	MA EPH 5/2019
C11-C22 Aromatic Hydrocarbons Un	ND	590	mg/Kg	1	10/19/23	AW	MA EPH 5/2019
C19-C36 Aliphatic Hydrocarbons 1*	ND	590	mg/Kg	1	10/19/23	AW	MA EPH 5/2019
C9-C18 Aliphatic Hydrocarbons 1*	ND	590	mg/Kg	1	10/19/23	AW	MA EPH 5/2019
QA/QC Surrogates							
% 1-chlorooctadecane (aliphatic)	67		%	1	10/19/23	AW	40 - 140 %
% 2-Bromonaphthalene (Fractionation)	82		%	1	10/19/23	AW	40 - 140 %
% 2-Fluorobiphenyl (Fractionation)	92		%	1	10/19/23	AW	40 - 140 %
% o-terphenyl (aromatic)	66		%	1	10/19/23	AW	40 - 140 %

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference

3 = This parameter exceeds laboratory specified limits.
Massachusetts does not offer certification for Soil/Solid matrices.

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

MAEPH:
1* Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range.
2* C11-C22 Aromatic Hydrocarbons exclude the concentration of Target PAH analytes eluting in that range.

* See Attached. Sieve Analysis performed by Tri State Materials Testing Lab, LLC. Accredited by the National Voluntary Laboratory Accreditation Program; NVLAP Lab Code 200010-0.

PCB Comment:
Due to low percent solid in the sample, an elevated RL was reported.

Volatile Comment:
There was a suppression of the last internal standard in the low level analysis, all affected compounds are reported from the methanol preserved high level analysis which did not exhibit this interference.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

Phyllis Shiller

Phyllis Shiller, Laboratory Director
February 02, 2024
Reviewed and Released by: Phyllis Shiller, Laboratory Director

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

February 02, 2024

FOR: Attn: James Treacy
ESS Group Inc. A TRC Company
10 Hemingway Drive 2nd Floor
Riverside, RI 02915-2224

Sample Information		Custody Information		Date	Time
Matrix:	SEDIMENT	Collected by:		10/12/23	11:20
Location Code:	TRC-RI	Received by:	SW	10/13/23	14:45
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCP25418
Phoenix ID: CP25419

Project ID: PILLINGS POND (507355.0000.0000 PHASE 1)
Client ID: C-2

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Arsenic	27.3	4.9	mg/Kg	1	10/23/23	CPP	SW6010D
Cadmium	< 2.4	2.4	mg/Kg	1	10/23/23	CPP	SW6010D
Chromium	83.0	2.4	mg/Kg	1	10/23/23	CPP	SW6010D
Copper	35.7	4.9	mg/kg	1	10/23/23	CPP	SW6010D
Mercury	< 0.18	0.18	mg/Kg	2	10/16/23	GW	SW7471B
Nickel	137	2.4	mg/Kg	1	10/23/23	CPP	SW6010D
Lead	17.3	2.4	mg/Kg	1	10/23/23	CPP	SW6010D
Zinc	21.1	4.9	mg/Kg	1	10/23/23	CPP	SW6010D
Percent Moisture	86	0.1	%		10/14/23	EG	P.E.L.
Percent Solid	14		%		10/14/23	CV	SW846-%Solid
Tot.Org.Carbon	316000	100	mg/kg	1	10/19/23	EG	L. Kahn
Field Extraction	Completed				10/12/23		SW5035A
Mercury Digestion	Completed				10/16/23	AL/AL	SW7471B
EPH Extraction	Completed				10/13/23	C/K	SW3545A
Soil Extraction for PCB	Completed				10/13/23	C/A	SW3546
Soil Extraction for SVOA PAH	Completed				10/16/23	H/F	SW3546
Total Metals Digest	Completed				10/13/23	L/AG	SW3050B
Tot.Org.Carbon Preparation	Completed				10/14/23	EG	
Sieve Test	Completed		%		10/17/23	*	ASTM C136, C117
Ext. Petroleum Hydrocarbons	Completed				10/13/23		MADEP EPH-19
Polychlorinated Biphenyls							
PCB-1016	ND	1000	ug/Kg	5	10/14/23	SC	SW8082A
PCB-1221	ND	1000	ug/Kg	5	10/14/23	SC	SW8082A
PCB-1232	ND	1000	ug/Kg	5	10/14/23	SC	SW8082A
PCB-1242	ND	1000	ug/Kg	5	10/14/23	SC	SW8082A
PCB-1248	ND	1000	ug/Kg	5	10/14/23	SC	SW8082A

Ver 2

Project ID: PILLINGS POND (507355.0000.0000 PHASE 1) Phoenix I.D.: CP25419
Client ID: C-2

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
PCB-1254	ND	1000	ug/Kg	5	10/14/23	SC	SW8082A
PCB-1260	ND	1000	ug/Kg	5	10/14/23	SC	SW8082A
PCB-1262	ND	1000	ug/Kg	5	10/14/23	SC	SW8082A
PCB-1268	ND	1000	ug/Kg	5	10/14/23	SC	SW8082A
QA/QC Surrogates							
% DCBP	88		%	5	10/14/23	SC	30 - 150 %
% DCBP (Confirmation)	85		%	5	10/14/23	SC	30 - 150 %
% TCMX	88		%	5	10/14/23	SC	30 - 150 %
% TCMX (Confirmation)	83		%	5	10/14/23	SC	30 - 150 %
Volatiles							
1,1,1,2-Tetrachloroethane	ND	53	ug/Kg	1	10/14/23	PS	SW8260D
1,1,1-Trichloroethane	ND	53	ug/Kg	1	10/14/23	PS	SW8260D
1,1,2,2-Tetrachloroethane	ND	5.0	ug/Kg	1	10/14/23	PS	SW8260D
1,1,2-Trichloroethane	ND	53	ug/Kg	1	10/14/23	PS	SW8260D
1,1-Dichloroethane	ND	53	ug/Kg	1	10/14/23	PS	SW8260D
1,1-Dichloroethene	ND	53	ug/Kg	1	10/14/23	PS	SW8260D
1,1-Dichloropropene	ND	53	ug/Kg	1	10/14/23	PS	SW8260D
1,2,3-Trichlorobenzene	ND	4300	ug/Kg	50	10/16/23	PS	SW8260D
1,2,3-Trichloropropane	ND	4300	ug/Kg	50	10/16/23	PS	SW8260D
1,2,4-Trichlorobenzene	ND	2000	ug/Kg	50	10/16/23	PS	SW8260D
1,2,4-Trimethylbenzene	ND	4300	ug/Kg	50	10/16/23	PS	SW8260D
1,2-Dibromo-3-chloropropane	ND	4300	ug/Kg	50	10/16/23	PS	SW8260D
1,2-Dibromoethane	ND	5.3	ug/Kg	1	10/14/23	PS	SW8260D
1,2-Dichlorobenzene	ND	4300	ug/Kg	50	10/16/23	PS	SW8260D
1,2-Dichloroethane	ND	53	ug/Kg	1	10/14/23	PS	SW8260D
1,2-Dichloropropane	ND	53	ug/Kg	1	10/14/23	PS	SW8260D
1,3,5-Trimethylbenzene	ND	4300	ug/Kg	50	10/16/23	PS	SW8260D
1,3-Dichlorobenzene	ND	3000	ug/Kg	50	10/16/23	PS	SW8260D
1,3-Dichloropropane	ND	53	ug/Kg	1	10/14/23	PS	SW8260D
1,4-Dichlorobenzene	ND	700	ug/Kg	50	10/16/23	PS	SW8260D
2,2-Dichloropropane	ND	53	ug/Kg	1	10/14/23	PS	SW8260D
2-Chlorotoluene	ND	4300	ug/Kg	50	10/16/23	PS	SW8260D
2-Hexanone	ND	260	ug/Kg	1	10/14/23	PS	SW8260D
2-Isopropyltoluene	ND	4300	ug/Kg	50	10/16/23	PS	SW8260D
4-Chlorotoluene	ND	4300	ug/Kg	50	10/16/23	PS	SW8260D
4-Methyl-2-pentanone	ND	260	ug/Kg	1	10/14/23	PS	SW8260D
Acetone	ND	2600	ug/Kg	1	10/14/23	PS	SW8260D
Acrylonitrile	ND	53	ug/Kg	1	10/14/23	PS	SW8260D
Benzene	ND	53	ug/Kg	1	10/14/23	PS	SW8260D
Bromobenzene	ND	4300	ug/Kg	50	10/16/23	PS	SW8260D
Bromochloromethane	ND	53	ug/Kg	1	10/14/23	PS	SW8260D
Bromodichloromethane	ND	53	ug/Kg	1	10/14/23	PS	SW8260D
Bromoform	ND	53	ug/Kg	1	10/14/23	PS	SW8260D
Bromomethane	ND	53	ug/Kg	1	10/14/23	PS	SW8260D
Carbon Disulfide	ND	53	ug/Kg	1	10/14/23	PS	SW8260D
Carbon tetrachloride	ND	53	ug/Kg	1	10/14/23	PS	SW8260D
Chlorobenzene	ND	53	ug/Kg	1	10/14/23	PS	SW8260D
Chloroethane	ND	53	ug/Kg	1	10/14/23	PS	SW8260D
Chloroform	ND	53	ug/Kg	1	10/14/23	PS	SW8260D

Ver 2

Project ID: PILLINGS POND (507355.0000.0000 PHASE 1)
Client ID: C-2

Phoenix I.D.: CP25419

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Chloromethane	ND	53	ug/Kg	1	10/14/23	PS	SW8260D
cis-1,2-Dichloroethene	ND	53	ug/Kg	1	10/14/23	PS	SW8260D
cis-1,3-Dichloropropene	ND	10	ug/Kg	1	10/14/23	PS	SW8260D
Dibromochloromethane	ND	5	ug/Kg	1	10/14/23	PS	SW8260D
Dibromomethane	ND	53	ug/Kg	1	10/14/23	PS	SW8260D
Dichlorodifluoromethane	ND	53	ug/Kg	1	10/14/23	PS	SW8260D
Ethylbenzene	ND	53	ug/Kg	1	10/14/23	PS	SW8260D
Hexachlorobutadiene	ND	4300	ug/Kg	50	10/16/23	PS	SW8260D
Isopropylbenzene	ND	4300	ug/Kg	50	10/16/23	PS	SW8260D
m&p-Xylene	ND	53	ug/Kg	1	10/14/23	PS	SW8260D
Methyl Ethyl Ketone	ND	320	ug/Kg	1	10/14/23	PS	SW8260D
Methyl t-butyl ether (MTBE)	ND	100	ug/Kg	1	10/14/23	PS	SW8260D
Methylene chloride	ND	100	ug/Kg	1	10/14/23	PS	SW8260D
Naphthalene	ND	4000	ug/Kg	50	10/16/23	PS	SW8260D
n-Butylbenzene	ND	4300	ug/Kg	50	10/16/23	PS	SW8260D
n-Propylbenzene	ND	4300	ug/Kg	50	10/16/23	PS	SW8260D
o-Xylene	ND	53	ug/Kg	1	10/14/23	PS	SW8260D
p-Isopropyltoluene	ND	4300	ug/Kg	50	10/16/23	PS	SW8260D
sec-Butylbenzene	ND	4300	ug/Kg	50	10/16/23	PS	SW8260D
Styrene	ND	53	ug/Kg	1	10/14/23	PS	SW8260D
tert-Butylbenzene	ND	4300	ug/Kg	50	10/16/23	PS	SW8260D
Tetrachloroethene	ND	53	ug/Kg	1	10/14/23	PS	SW8260D
Tetrahydrofuran (THF)	ND	110	ug/Kg	1	10/14/23	PS	SW8260D
Toluene	ND	53	ug/Kg	1	10/14/23	PS	SW8260D
Total Xylenes	ND	53	ug/Kg	1	10/14/23	PS	SW8260D
trans-1,2-Dichloroethene	ND	53	ug/Kg	1	10/14/23	PS	SW8260D
trans-1,3-Dichloropropene	ND	10	ug/Kg	1	10/14/23	PS	SW8260D
trans-1,4-dichloro-2-butene	ND	8500	ug/Kg	50	10/16/23	PS	SW8260D
Trichloroethene	ND	53	ug/Kg	1	10/14/23	PS	SW8260D
Trichlorofluoromethane	ND	53	ug/Kg	1	10/14/23	PS	SW8260D
Trichlorotrifluoroethane	ND	110	ug/Kg	1	10/14/23	PS	SW8260D
Vinyl chloride	ND	53	ug/Kg	1	10/14/23	PS	SW8260D
QA/QC Surrogates							
% 1,2-dichlorobenzene-d4	93		%	1	10/14/23	PS	70 - 130 %
% Bromofluorobenzene	61		%	1	10/14/23	PS	70 - 130 % [3]
% Dibromofluoromethane	104		%	1	10/14/23	PS	70 - 130 %
% Toluene-d8	86		%	1	10/14/23	PS	70 - 130 %
% 1,2-dichlorobenzene-d4 (50x)	96		%	50	10/16/23	PS	70 - 130 %
% Bromofluorobenzene (50x)	98		%	50	10/16/23	PS	70 - 130 %
% Dibromofluoromethane (50x)	100		%	50	10/16/23	PS	70 - 130 %
% Toluene-d8 (50x)	93		%	50	10/16/23	PS	70 - 130 %

Oxygenates & Dioxane

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
1,4-Dioxane	ND	200	ug/Kg	1	10/14/23	JLI	SW8260D (OXY)
Diethyl ether	ND	53	ug/Kg	1	10/14/23	JLI	SW8260D (OXY)
Di-isopropyl ether	ND	53	ug/Kg	1	10/14/23	JLI	SW8260D (OXY)
Ethyl tert-butyl ether	ND	53	ug/Kg	1	10/14/23	JLI	SW8260D (OXY)
tert-amyl methyl ether	ND	53	ug/Kg	1	10/14/23	JLI	SW8260D (OXY)

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Polynuclear Aromatic HC							
2-Methylnaphthalene	ND	700	ug/Kg	1	10/17/23	PS	SW8270D
Acenaphthene	ND	3400	ug/Kg	1	10/17/23	PS	SW8270D
Acenaphthylene	ND	1000	ug/Kg	1	10/17/23	PS	SW8270D
Anthracene	ND	3400	ug/Kg	1	10/17/23	PS	SW8270D
Benz(a)anthracene	ND	3400	ug/Kg	1	10/17/23	PS	SW8270D
Benzo(a)pyrene	ND	2000	ug/Kg	1	10/17/23	PS	SW8270D
Benzo(b)fluoranthene	ND	3400	ug/Kg	1	10/17/23	PS	SW8270D
Benzo(ghi)perylene	ND	3400	ug/Kg	1	10/17/23	PS	SW8270D
Benzo(k)fluoranthene	ND	3400	ug/Kg	1	10/17/23	PS	SW8270D
Chrysene	ND	3400	ug/Kg	1	10/17/23	PS	SW8270D
Dibenz(a,h)anthracene	ND	700	ug/Kg	1	10/17/23	PS	SW8270D
Fluoranthene	ND	3400	ug/Kg	1	10/17/23	PS	SW8270D
Fluorene	ND	3400	ug/Kg	1	10/17/23	PS	SW8270D
Indeno(1,2,3-cd)pyrene	ND	3400	ug/Kg	1	10/17/23	PS	SW8270D
Naphthalene	ND	3400	ug/Kg	1	10/17/23	PS	SW8270D
Phenanthrene	ND	3400	ug/Kg	1	10/17/23	PS	SW8270D
Pyrene	ND	3400	ug/Kg	1	10/17/23	PS	SW8270D
QA/QC Surrogates							
% 2-Fluorobiphenyl	77		%	1	10/17/23	PS	30 - 130 %
% Nitrobenzene-d5	66		%	1	10/17/23	PS	30 - 130 %
% Terphenyl-d14	95		%	1	10/17/23	PS	30 - 130 %
MA EPH Aliphatic/Aromatic Ranges							
C11-C22 Aromatic Hydrocarbons 1,2	ND	470	mg/Kg	1	10/17/23	AW	MA EPH 5/2019
C11-C22 Aromatic Hydrocarbons Un	ND	470	mg/Kg	1	10/17/23	AW	MA EPH 5/2019
C19-C36 Aliphatic Hydrocarbons 1*	ND	470	mg/Kg	1	10/17/23	AW	MA EPH 5/2019
C9-C18 Aliphatic Hydrocarbons 1*	ND	470	mg/Kg	1	10/17/23	AW	MA EPH 5/2019
QA/QC Surrogates							
% 1-chlorooctadecane (aliphatic)	53		%	1	10/17/23	AW	40 - 140 %
% 2-Bromonaphthalene (Fractionation)	89		%	1	10/17/23	AW	40 - 140 %
% 2-Fluorobiphenyl (Fractionation)	92		%	1	10/17/23	AW	40 - 140 %
% o-terphenyl (aromatic)	66		%	1	10/17/23	AW	40 - 140 %

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference

3 = This parameter exceeds laboratory specified limits.
Massachusetts does not offer certification for Soil/Solid matrices.

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

MAEPH:
1* Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range.
2* C11-C22 Aromatic Hydrocarbons exclude the concentration of Target PAH analytes eluting in that range.

* See Attached. Sieve Analysis performed by Tri State Materials Testing Lab, LLC. Accredited by the National Voluntary Laboratory Accreditation Program; NVLAP Lab Code 200010-0.

PCB Comment:
Due to low percent solid in the sample, an elevated RL was reported.

Volatile Comment:
There was a suppression of the last internal standard in the low level analysis, all affected compounds are reported from the methanol preserved high level analysis which did not exhibit this interference.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

Phyllis Shiller

Phyllis Shiller, Laboratory Director
February 02, 2024
Reviewed and Released by: Phyllis Shiller, Laboratory Director

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

February 02, 2024

FOR: Attn: James Treacy
ESS Group Inc. A TRC Company
10 Hemingway Drive 2nd Floor
Riverside, RI 02915-2224

Sample Information		Custody Information		Date	Time
Matrix:	SEDIMENT	Collected by:		10/12/23	12:00
Location Code:	TRC-RI	Received by:	SW	10/13/23	14:45
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCP25418
Phoenix ID: CP25420

Project ID: PILLINGS POND (507355.0000.0000 PHASE 1)
Client ID: C-3

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Arsenic	16.3	6.0	mg/Kg	1	10/23/23	CPP	SW6010D
Cadmium	< 3.0	3.0	mg/Kg	1	10/23/23	CPP	SW6010D
Chromium	32.1	3.0	mg/Kg	1	10/23/23	CPP	SW6010D
Copper	43.4	6.0	mg/kg	1	10/23/23	CPP	SW6010D
Mercury	< 0.25	0.25	mg/Kg	2	10/16/23	GW	SW7471B
Nickel	91.0	3.0	mg/Kg	1	10/23/23	CPP	SW6010D
Lead	25.3	3.0	mg/Kg	1	10/23/23	CPP	SW6010D
Zinc	35.2	6.0	mg/Kg	1	10/23/23	CPP	SW6010D
Percent Moisture	90	0.1	%		10/14/23	EG	P.E.L.
Percent Solid	10		%		10/14/23	CV	SW846-%Solid
Tot.Org.Carbon	306000	100	mg/kg	1	10/19/23	EG	L. Kahn
Field Extraction	Completed				10/12/23		SW5035A
Mercury Digestion	Completed				10/16/23	AL/AL	SW7471B
EPH Extraction	Completed				10/17/23	C/D	SW3545A
Soil Extraction for PCB	Completed				10/16/23	C/A	SW3546
Soil Extraction for SVOA PAH	Completed				10/16/23	H/F	SW3546
Total Metals Digest	Completed				10/13/23	L/AG	SW3050B
Tot.Org.Carbon Preparation	Completed				10/14/23	EG	
Sieve Test	Completed		%		10/17/23	*	ASTM C136, C117
Ext. Petroleum Hydrocarbons	Completed				10/13/23		MADEP EPH-19
Polychlorinated Biphenyls							
PCB-1016	ND	670	ug/Kg	2	10/17/23	SC	SW8082A
PCB-1221	ND	670	ug/Kg	2	10/17/23	SC	SW8082A
PCB-1232	ND	670	ug/Kg	2	10/17/23	SC	SW8082A
PCB-1242	ND	670	ug/Kg	2	10/17/23	SC	SW8082A
PCB-1248	ND	670	ug/Kg	2	10/17/23	SC	SW8082A

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
PCB-1254	ND	670	ug/Kg	2	10/17/23	SC	SW8082A
PCB-1260	ND	670	ug/Kg	2	10/17/23	SC	SW8082A
PCB-1262	ND	670	ug/Kg	2	10/17/23	SC	SW8082A
PCB-1268	ND	670	ug/Kg	2	10/17/23	SC	SW8082A
QA/QC Surrogates							
% DCBP	76		%	2	10/17/23	SC	30 - 150 %
% DCBP (Confirmation)	71		%	2	10/17/23	SC	30 - 150 %
% TCMX	80		%	2	10/17/23	SC	30 - 150 %
% TCMX (Confirmation)	69		%	2	10/17/23	SC	30 - 150 %
Volatiles							
1,1,1,2-Tetrachloroethane	ND	69	ug/Kg	1	10/16/23	PS	SW8260D
1,1,1-Trichloroethane	ND	69	ug/Kg	1	10/16/23	PS	SW8260D
1,1,2,2-Tetrachloroethane	ND	5.0	ug/Kg	1	10/16/23	PS	SW8260D
1,1,2-Trichloroethane	ND	69	ug/Kg	1	10/16/23	PS	SW8260D
1,1-Dichloroethane	ND	69	ug/Kg	1	10/16/23	PS	SW8260D
1,1-Dichloroethene	ND	69	ug/Kg	1	10/16/23	PS	SW8260D
1,1-Dichloropropene	ND	69	ug/Kg	1	10/16/23	PS	SW8260D
1,2,3-Trichlorobenzene	ND	5800	ug/Kg	50	10/16/23	PS	SW8260D
1,2,3-Trichloropropane	ND	5800	ug/Kg	50	10/16/23	PS	SW8260D
1,2,4-Trichlorobenzene	ND	2000	ug/Kg	50	10/16/23	PS	SW8260D
1,2,4-Trimethylbenzene	ND	5800	ug/Kg	50	10/16/23	PS	SW8260D
1,2-Dibromo-3-chloropropane	ND	5800	ug/Kg	50	10/16/23	PS	SW8260D
1,2-Dibromoethane	ND	6.9	ug/Kg	1	10/16/23	PS	SW8260D
1,2-Dichlorobenzene	ND	5800	ug/Kg	50	10/16/23	PS	SW8260D
1,2-Dichloroethane	ND	69	ug/Kg	1	10/16/23	PS	SW8260D
1,2-Dichloropropane	ND	69	ug/Kg	1	10/16/23	PS	SW8260D
1,3,5-Trimethylbenzene	ND	5800	ug/Kg	50	10/16/23	PS	SW8260D
1,3-Dichlorobenzene	ND	3000	ug/Kg	50	10/16/23	PS	SW8260D
1,3-Dichloropropane	ND	69	ug/Kg	1	10/16/23	PS	SW8260D
1,4-Dichlorobenzene	ND	700	ug/Kg	50	10/16/23	PS	SW8260D
2,2-Dichloropropane	ND	69	ug/Kg	1	10/16/23	PS	SW8260D
2-Chlorotoluene	ND	5800	ug/Kg	50	10/16/23	PS	SW8260D
2-Hexanone	ND	340	ug/Kg	1	10/16/23	PS	SW8260D
2-Isopropyltoluene	ND	5800	ug/Kg	50	10/16/23	PS	SW8260D
4-Chlorotoluene	ND	5800	ug/Kg	50	10/16/23	PS	SW8260D
4-Methyl-2-pentanone	ND	340	ug/Kg	1	10/16/23	PS	SW8260D
Acetone	ND	3400	ug/Kg	1	10/16/23	PS	SW8260D
Acrylonitrile	ND	69	ug/Kg	1	10/16/23	PS	SW8260D
Benzene	ND	69	ug/Kg	1	10/16/23	PS	SW8260D
Bromobenzene	ND	5800	ug/Kg	50	10/16/23	PS	SW8260D
Bromochloromethane	ND	69	ug/Kg	1	10/16/23	PS	SW8260D
Bromodichloromethane	ND	69	ug/Kg	1	10/16/23	PS	SW8260D
Bromoform	ND	69	ug/Kg	1	10/16/23	PS	SW8260D
Bromomethane	ND	69	ug/Kg	1	10/16/23	PS	SW8260D
Carbon Disulfide	ND	69	ug/Kg	1	10/16/23	PS	SW8260D
Carbon tetrachloride	ND	69	ug/Kg	1	10/16/23	PS	SW8260D
Chlorobenzene	ND	69	ug/Kg	1	10/16/23	PS	SW8260D
Chloroethane	ND	69	ug/Kg	1	10/16/23	PS	SW8260D
Chloroform	ND	69	ug/Kg	1	10/16/23	PS	SW8260D

Project ID: PILLINGS POND (507355.0000.0000 PHASE 1) Phoenix I.D.: CP25420
Client ID: C-3

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference	
Chloromethane	ND	69	ug/Kg	1	10/16/23	PS	SW8260D	
cis-1,2-Dichloroethene	ND	69	ug/Kg	1	10/16/23	PS	SW8260D	
cis-1,3-Dichloropropene	ND	10	ug/Kg	1	10/16/23	PS	SW8260D	
Dibromochloromethane	ND	5	ug/Kg	1	10/16/23	PS	SW8260D	
Dibromomethane	ND	69	ug/Kg	1	10/16/23	PS	SW8260D	
Dichlorodifluoromethane	ND	69	ug/Kg	1	10/16/23	PS	SW8260D	
Ethylbenzene	ND	69	ug/Kg	1	10/16/23	PS	SW8260D	
Hexachlorobutadiene	ND	5800	ug/Kg	50	10/16/23	PS	SW8260D	
Isopropylbenzene	ND	5800	ug/Kg	50	10/16/23	PS	SW8260D	
m&p-Xylene	ND	69	ug/Kg	1	10/16/23	PS	SW8260D	
Methyl Ethyl Ketone	540	410	ug/Kg	1	10/16/23	PS	SW8260D	
Methyl t-butyl ether (MTBE)	ND	100	ug/Kg	1	10/16/23	PS	SW8260D	
Methylene chloride	ND	100	ug/Kg	1	10/16/23	PS	SW8260D	
Naphthalene	ND	4000	ug/Kg	50	10/16/23	PS	SW8260D	
n-Butylbenzene	ND	5800	ug/Kg	50	10/16/23	PS	SW8260D	
n-Propylbenzene	ND	5800	ug/Kg	50	10/16/23	PS	SW8260D	
o-Xylene	ND	69	ug/Kg	1	10/16/23	PS	SW8260D	
p-Isopropyltoluene	ND	5800	ug/Kg	50	10/16/23	PS	SW8260D	
sec-Butylbenzene	ND	5800	ug/Kg	50	10/16/23	PS	SW8260D	
Styrene	ND	69	ug/Kg	1	10/16/23	PS	SW8260D	
tert-Butylbenzene	ND	5800	ug/Kg	50	10/16/23	PS	SW8260D	
Tetrachloroethene	ND	69	ug/Kg	1	10/16/23	PS	SW8260D	
Tetrahydrofuran (THF)	ND	140	ug/Kg	1	10/16/23	PS	SW8260D	
Toluene	ND	69	ug/Kg	1	10/16/23	PS	SW8260D	
Total Xylenes	ND	69	ug/Kg	1	10/16/23	PS	SW8260D	
trans-1,2-Dichloroethene	ND	69	ug/Kg	1	10/16/23	PS	SW8260D	
trans-1,3-Dichloropropene	ND	10	ug/Kg	1	10/16/23	PS	SW8260D	
trans-1,4-dichloro-2-butene	ND	10000	ug/Kg	50	10/16/23	PS	SW8260D	
Trichloroethene	ND	69	ug/Kg	1	10/16/23	PS	SW8260D	
Trichlorofluoromethane	ND	69	ug/Kg	1	10/16/23	PS	SW8260D	
Trichlorotrifluoroethane	ND	140	ug/Kg	1	10/16/23	PS	SW8260D	
Vinyl chloride	ND	69	ug/Kg	1	10/16/23	PS	SW8260D	
QA/QC Surrogates								
% 1,2-dichlorobenzene-d4	92		%	1	10/16/23	PS	70 - 130 %	
% Bromofluorobenzene	64		%	1	10/16/23	PS	70 - 130 %	3
% Dibromofluoromethane	99		%	1	10/16/23	PS	70 - 130 %	
% Toluene-d8	86		%	1	10/16/23	PS	70 - 130 %	
% 1,2-dichlorobenzene-d4 (50x)	97		%	50	10/16/23	PS	70 - 130 %	
% Bromofluorobenzene (50x)	99		%	50	10/16/23	PS	70 - 130 %	
% Dibromofluoromethane (50x)	103		%	50	10/16/23	PS	70 - 130 %	
% Toluene-d8 (50x)	94		%	50	10/16/23	PS	70 - 130 %	

Oxygenates & Dioxane

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
1,4-Dioxane	ND	200	ug/Kg	1	10/16/23	JLI	SW8260D (OXY)
Diethyl ether	ND	69	ug/Kg	1	10/16/23	JLI	SW8260D (OXY)
Di-isopropyl ether	ND	69	ug/Kg	1	10/16/23	JLI	SW8260D (OXY)
Ethyl tert-butyl ether	ND	69	ug/Kg	1	10/16/23	JLI	SW8260D (OXY)
tert-amyl methyl ether	ND	69	ug/Kg	1	10/16/23	JLI	SW8260D (OXY)

Project ID: PILLINGS POND (507355.0000.0000 PHASE 1) Phoenix I.D.: CP25420

Client ID: C-3

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference	
Polynuclear Aromatic HC								
2-Methylnaphthalene	ND	700	ug/Kg	1	10/17/23	PS	SW8270D	
Acenaphthene	ND	4000	ug/Kg	1	10/17/23	PS	SW8270D	
Acenaphthylene	ND	1000	ug/Kg	1	10/17/23	PS	SW8270D	
Anthracene	ND	4700	ug/Kg	1	10/17/23	PS	SW8270D	
Benz(a)anthracene	ND	4700	ug/Kg	1	10/17/23	PS	SW8270D	
Benzo(a)pyrene	ND	2000	ug/Kg	1	10/17/23	PS	SW8270D	
Benzo(b)fluoranthene	ND	4700	ug/Kg	1	10/17/23	PS	SW8270D	
Benzo(ghi)perylene	ND	4700	ug/Kg	1	10/17/23	PS	SW8270D	
Benzo(k)fluoranthene	ND	4700	ug/Kg	1	10/17/23	PS	SW8270D	
Chrysene	ND	4700	ug/Kg	1	10/17/23	PS	SW8270D	
Dibenz(a,h)anthracene	ND	700	ug/Kg	1	10/17/23	PS	SW8270D	
Fluoranthene	ND	4700	ug/Kg	1	10/17/23	PS	SW8270D	
Fluorene	ND	4700	ug/Kg	1	10/17/23	PS	SW8270D	
Indeno(1,2,3-cd)pyrene	ND	4700	ug/Kg	1	10/17/23	PS	SW8270D	
Naphthalene	ND	4000	ug/Kg	1	10/17/23	PS	SW8270D	
Phenanthrene	ND	4700	ug/Kg	1	10/17/23	PS	SW8270D	
Pyrene	ND	4700	ug/Kg	1	10/17/23	PS	SW8270D	
QA/QC Surrogates								
% 2-Fluorobiphenyl	80		%	1	10/17/23	PS	30 - 130 %	
% Nitrobenzene-d5	72		%	1	10/17/23	PS	30 - 130 %	
% Terphenyl-d14	100		%	1	10/17/23	PS	30 - 130 %	
MA EPH Aliphatic/Aromatic Ranges								
C11-C22 Aromatic Hydrocarbons 1,2	ND	660	mg/Kg	1	10/19/23	AW	MA EPH 5/2019	
C11-C22 Aromatic Hydrocarbons Un	ND	660	mg/Kg	1	10/19/23	AW	MA EPH 5/2019	
C19-C36 Aliphatic Hydrocarbons 1*	ND	660	mg/Kg	1	10/19/23	AW	MA EPH 5/2019	
C9-C18 Aliphatic Hydrocarbons 1*	ND	660	mg/Kg	1	10/19/23	AW	MA EPH 5/2019	
QA/QC Surrogates								
% 1-chlorooctadecane (aliphatic)	34		%	1	10/19/23	AW	40 - 140 %	3
% 2-Bromonaphthalene (Fractionation)	75		%	1	10/19/23	AW	40 - 140 %	
% 2-Fluorobiphenyl (Fractionation)	79		%	1	10/19/23	AW	40 - 140 %	
% o-terphenyl (aromatic)	29		%	1	10/19/23	AW	40 - 140 %	3

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference

3 = This parameter exceeds laboratory specified limits.
Massachusetts does not offer certification for Soil/Solid matrices.

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected   BRL=Below Reporting Level
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

MAEPH:
1* Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range.
2* C11-C22 Aromatic Hydrocarbons exclude the concentration of Target PAH analytes eluting in that range.

* See Attached. Sieve Analysis performed by Tri State Materials Testing Lab, LLC. Accredited by the National Voluntary Laboratory Accreditation Program; NVLAP Lab Code 200010-0.

Volatile Comment:
There was a suppression of the last internal standard in the low level analysis, all affected compounds are reported from the methanol preserved high level analysis which did not exhibit this interference.

EPH Comment
Poor surrogate recovery due to sample matrix. Sample was re-extracted with similar results.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Phyllis Shiller

Phyllis Shiller, Laboratory Director
February 02, 2024
Reviewed and Released by: Phyllis Shiller, Laboratory Director

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102

QA/QC Report

February 02, 2024

QA/QC Data

SDG I.D.: GCP25418

Parameter	Blank	Blk RL	Sample Result	Dup Result	Dup RPD	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits
QA/QC Batch 701888 (mg/kg), QC Sample No: CP25430 2X (CP25418, CP25419, CP25420)													
Mercury - Soil	BRL	0.02	<0.03	<0.03	NC	109	115	5.4	113	109	3.6	75 - 125	20
Comment:													
Additional Mercury criteria: LCS acceptance range for waters is 80-120% and for soils is 75-125%													
QA/QC Batch 701753 (mg/kg), QC Sample No: CP25320 (CP25418, CP25419, CP25420)													
ICP Metals - Soil													
Arsenic	BRL	0.67	5.36	5.37	0.20	94.2	94.9	0.7	97.4			75 - 125	35
Cadmium	BRL	0.33	0.92	0.99	NC	94.2	98.3	4.3	98.5			75 - 125	35
Chromium	BRL	0.33	20.1	21.6	7.20	95.3	97.1	1.9	99.7			75 - 125	35
Copper	BRL	0.67	8.0	8.19	2.30	94.5	94.7	0.2	98.6			75 - 125	35
Lead	BRL	0.33	6.73	7.39	9.30	98.4	99.0	0.6	101			75 - 125	35
Nickel	BRL	0.33	10.8	11.5	6.30	93.1	93.3	0.2	98.7			75 - 125	35
Zinc	BRL	0.67	22.0	24.4	10.3	93.1	94.1	1.1	101			75 - 125	35
Comment:													
Additional: LCS acceptance range is 80-120% MS acceptance range 75-125%.													

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QA/QC Report

February 02, 2024

QA/QC Data

SDG I.D.: GCP25418

Parameter	Blank	Blk RL	Sample Result	Dup Result	Dup RPD	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits
QA/QC Batch 702561 (mg/kg), QC Sample No: CP25892 (CP25418, CP25419, CP25420)													
Tot.Org.Carbon	BRL	100	138	140	NC	97.7						75 - 125	30

Comment:

Additional: LCS acceptance range is 85-115% MS acceptance range 75-125%.

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QA/QC Report

February 02, 2024

QA/QC Data

SDG I.D.: GCP25418

Parameter	Blank	Blk RL	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits	
QA/QC Batch 701735 (mg/kg), QC Sample No: CP22815 (CP25418, CP25419)											
Extractable Petroleum Hydrocarbons - Sediment											
C11-C22 Aromatic Hydrocarbons U	ND	3.3							40 - 140	25	
C9-C18 Aliphatic Hydrocarbons 1*	ND	3.3	65	65	0.0	64	64	0.0	40 - 140	25	
C19-C36 Aliphatic Hydrocarbons 1*	ND	3.3	79	76	3.9	72	63	13.3	40 - 140	25	
C11-C22 Aromatic Hydrocarbons 1	ND	3.3	75	70	6.9	74	73	1.4	40 - 140	25	
C9 - Nonane	ND	0.67	40	42	4.9	37	39	5.3	40 - 140	25	m
C-10 Decane	ND	0.67	54	57	5.4	50	54	7.7	40 - 140	25	
C12 - Dodecane	ND	0.67	73	62	16.3	62	63	1.6	40 - 140	25	
C14 - Tetradecane	ND	0.67	67	69	2.9	71	71	0.0	40 - 140	25	
C16 - Hexadecane	ND	0.67	74	76	2.7	82	77	6.3	40 - 140	25	
C18 - Octadecane	ND	0.67	83	86	3.6	84	81	3.6	40 - 140	25	
C19 - Nonadecane	ND	0.67	81	84	3.6	55	49	11.5	40 - 140	25	
C20 - Eicosane	ND	0.67	82	85	3.6	41	23	56.3	40 - 140	25	m,r
C22 - Docosane	ND	0.67	76	73	4.0	52	53	1.9	40 - 140	25	
C24 - Tetracosane	ND	0.67	81	83	2.4	70	72	2.8	40 - 140	25	
C26 - Hexacosane	ND	0.67	79	82	3.7	84	76	10.0	40 - 140	25	
C28 - Octacosane	ND	0.67	75	79	5.2	84	72	15.4	40 - 140	25	
C30 - Tricotane	ND	0.67	74	39	61.9	99	76	26.3	40 - 140	25	l,r
C36 - Hexatriacontane	ND	0.67	81	86	6.0	92	80	14.0	40 - 140	25	
% 1-chlorooctadecane (aliphatic)	88	%	80	82	2.5	63	33	62.5	40 - 140	25	m,r
% o-terphenyl (aromatic)	83	%	79	74	6.5	81	77	5.1	40 - 140	25	
% 2-Fluorobiphenyl (Fractionation)	85	%	95	83	13.5	91	83	9.2	40 - 140	25	
% 2-Bromonaphthalene (Fractionati	77	%	80	75	6.5	82	64	24.7	40 - 140	25	
% 2-Methylnaphthalene BT		%	0	0	NC				0 - 5		
% Naphthalene BT		%	0	0	NC				0 - 5		

Comment:

Additional EPH fractionation criteria: Breakthrough criteria (BT) is 0 to 5%

Parameter	Blank	Blk RL	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits	
QA/QC Batch 702164 (mg/kg), QC Sample No: CP26500 (CP25420)											
Extractable Petroleum Hydrocarbons - Sediment											
C11-C22 Aromatic Hydrocarbons U	ND	3.3							40 - 140	25	
C9-C18 Aliphatic Hydrocarbons 1*	ND	3.3	70	69	1.4	63	65	3.1	40 - 140	25	
C19-C36 Aliphatic Hydrocarbons 1*	ND	3.3	86	85	1.2	56	66	16.4	40 - 140	25	
C11-C22 Aromatic Hydrocarbons 1	ND	3.3	71	72	1.4	41	60	37.6	40 - 140	25	r
C9 - Nonane	ND	0.67	39	39	0.0	31	31	0.0	40 - 140	25	l,m
C-10 Decane	ND	0.67	55	55	0.0	47	46	2.2	40 - 140	25	
C12 - Dodecane	ND	0.67	64	64	0.0	62	61	1.6	40 - 140	25	
C14 - Tetradecane	ND	0.67	74	75	1.3	74	76	2.7	40 - 140	25	
C16 - Hexadecane	ND	0.67	86	85	1.2	85	86	1.2	40 - 140	25	
C18 - Octadecane	ND	0.67	101	100	1.0	81	93	13.8	40 - 140	25	
C19 - Nonadecane	ND	0.67	95	93	2.1	65	85	26.7	40 - 140	25	r
C20 - Eicosane	ND	0.67	96	94	2.1	60	80	28.6	40 - 140	25	r

QA/QC Data

SDG I.D.: GCP25418

Parameter	Blank	Blk RL	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits	
C22 - Docosane	ND	0.67	80	80	0.0	51	64	22.6	40 - 140	25	
C24 - Tetracosane	ND	0.67	91	89	2.2	57	68	17.6	40 - 140	25	
C26 - Hexacosane	ND	0.67	90	89	1.1	53	70	27.6	40 - 140	25	r
C28 - Octacosane	ND	0.67	86	84	2.4	33	60	58.1	40 - 140	25	m,r
C30 - Tricotane	ND	0.67	84	82	2.4	53	80	40.6	40 - 140	25	r
C36 - Hexatriacontane	ND	0.67	70	70	0.0	73	20	114.0	40 - 140	25	m,r
% 1-chlorooctadecane (aliphatic)	76	%	80	77	3.8	48	66	31.6	40 - 140	25	r
% o-terphenyl (aromatic)	77	%	81	84	3.6	65	85	26.7	40 - 140	25	r
% 2-Fluorobiphenyl (Fractionation)	70	%	84	85	1.2	86	97	12.0	40 - 140	25	
% 2-Bromonaphthalene (Fractionati	63	%	65	64	1.6	65	75	14.3	40 - 140	25	
% 2-Methylnaphthalene BT		%	0	0	NC				0 - 5		
% Naphthalene BT		%	0	0	NC				0 - 5		

Comment:

Additional EPH fractionation criteria: Breakthrough criteria (BT) is 0 to 5%

QA/QC Batch 701734 (ug/Kg), QC Sample No: CP24505 2X (CP25418, CP25419)

Polychlorinated Biphenyls - Sediment

Parameter	Blank	Blk RL	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits
PCB-1016	ND	33	103	96	7.0	103	104	1.0	40 - 140	30
PCB-1221	ND	33							40 - 140	30
PCB-1232	ND	33							40 - 140	30
PCB-1242	ND	33							40 - 140	30
PCB-1248	ND	33							40 - 140	30
PCB-1254	ND	33							40 - 140	30
PCB-1260	ND	33	103	94	9.1	97	99	2.0	40 - 140	30
PCB-1262	ND	33							40 - 140	30
PCB-1268	ND	33							40 - 140	30
% DCBP (Surrogate Rec)	87	%	105	96	9.0	100	104	3.9	30 - 150	30
% DCBP (Surrogate Rec) (Confirm	83	%	103	95	8.1	95	94	1.1	30 - 150	30
% TCMX (Surrogate Rec)	81	%	97	90	7.5	97	100	3.0	30 - 150	30
% TCMX (Surrogate Rec) (Confirm	77	%	93	85	9.0	91	87	4.5	30 - 150	30

QA/QC Batch 702020 (ug/Kg), QC Sample No: CP25879 2X (CP25420)

Polychlorinated Biphenyls - Sediment

Parameter	Blank	Blk RL	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits
PCB-1016	ND	33	88	90	2.2	70	85	19.4	40 - 140	30
PCB-1221	ND	33							40 - 140	30
PCB-1232	ND	33							40 - 140	30
PCB-1242	ND	33							40 - 140	30
PCB-1248	ND	33							40 - 140	30
PCB-1254	ND	33							40 - 140	30
PCB-1260	ND	33	87	83	4.7	61	74	19.3	40 - 140	30
PCB-1262	ND	33							40 - 140	30
PCB-1268	ND	33							40 - 140	30
% DCBP (Surrogate Rec)	108	%	114	111	2.7	88	104	16.7	30 - 150	30
% DCBP (Surrogate Rec) (Confirm	109	%	109	108	0.9	91	108	17.1	30 - 150	30
% TCMX (Surrogate Rec)	86	%	93	93	0.0	72	90	22.2	30 - 150	30
% TCMX (Surrogate Rec) (Confirm	89	%	96	98	2.1	82	97	16.8	30 - 150	30

QA/QC Batch 701968 (ug/kg), QC Sample No: CP24801 (CP25418, CP25419, CP25420)

Polynuclear Aromatic HC - Sediment

Parameter	Blank	Blk RL	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits
2-Methylnaphthalene	ND	230	76	84	10.0	87	79	9.6	40 - 140	30
Acenaphthene	ND	230	75	84	11.3	82	80	2.5	40 - 140	30
Acenaphthylene	ND	230	73	82	11.6	81	79	2.5	40 - 140	30
Anthracene	ND	230	84	92	9.1	88	85	3.5	40 - 140	30
Benz(a)anthracene	ND	230	77	85	9.9	81	84	3.6	40 - 140	30

QA/QC Data

SDG I.D.: GCP25418

Parameter	Blank	Blk RL	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits	
Benzo(a)pyrene	ND	230	84	93	10.2	89	91	2.2	40 - 140	30	
Benzo(b)fluoranthene	ND	230	80	87	8.4	85	86	1.2	40 - 140	30	
Benzo(ghi)perylene	ND	230	85	98	14.2	88	93	5.5	40 - 140	30	
Benzo(k)fluoranthene	ND	230	74	81	9.0	77	80	3.8	40 - 140	30	
Chrysene	ND	230	82	91	10.4	86	86	0.0	40 - 140	30	
Dibenz(a,h)anthracene	ND	230	84	95	12.3	85	90	5.7	40 - 140	30	
Fluoranthene	ND	230	90	94	4.3	98	99	1.0	40 - 140	30	
Fluorene	ND	230	79	91	14.1	86	88	2.3	40 - 140	30	
Indeno(1,2,3-cd)pyrene	ND	230	83	94	12.4	85	90	5.7	40 - 140	30	
Naphthalene	ND	230	70	76	8.2	81	72	11.8	40 - 140	30	
Phenanthrene	ND	230	84	93	10.2	87	88	1.1	40 - 140	30	
Pyrene	ND	230	91	96	5.3	99	99	0.0	40 - 140	30	
% 2-Fluorobiphenyl	73	%	73	79	7.9	80	77	3.8	30 - 130	30	
% Nitrobenzene-d5	70	%	65	85	26.7	77	66	15.4	30 - 130	30	
% Terphenyl-d14	90	%	91	94	3.2	99	97	2.0	30 - 130	30	

Comment:

Additional 8270 criteria: 10% of compounds can be outside of acceptance criteria as long as recovery is at least 10%. (Acid surrogates acceptance range for aqueous samples: 10-110%, for soils 30-130%)

QA/QC Batch 701928 (ug/kg), QC Sample No: CP24400 (CP25419)

Volatiles - Sediment (Low Level)

Parameter	Blank	Blk RL	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits	
1,1,1,2-Tetrachloroethane	ND	5.0	106	108	1.9	87			70 - 130	20	
1,1,1-Trichloroethane	ND	5.0	116	116	0.0	90			70 - 130	20	
1,1,2,2-Tetrachloroethane	ND	3.0	112	111	0.9	80			70 - 130	20	
1,1,2-Trichloroethane	ND	5.0	108	109	0.9	89			70 - 130	20	
1,1-Dichloroethane	ND	5.0	112	113	0.9	99			70 - 130	20	
1,1-Dichloroethene	ND	5.0	111	104	6.5	94			70 - 130	20	
1,1-Dichloropropene	ND	5.0	113	114	0.9	89			70 - 130	20	
1,2-Dibromoethane	ND	5.0	105	105	0.0	82			70 - 130	20	
1,2-Dichloroethane	ND	5.0	103	105	1.9	88			70 - 130	20	
1,2-Dichloropropane	ND	5.0	113	115	1.8	92			70 - 130	20	
1,3-Dichloropropane	ND	5.0	115	116	0.9	84			70 - 130	20	
1,4-dioxane	ND	100	102	97	5.0	96			40 - 160	20	
2,2-Dichloropropane	ND	5.0	146	142	2.8	88			70 - 130	20	l
2-Hexanone	ND	25	90	87	3.4	68			40 - 160	20	
4-Methyl-2-pentanone	ND	25	93	93	0.0	85			40 - 160	20	
Acetone	ND	10	75	68	9.8	85			40 - 160	20	
Acrylonitrile	ND	5.0	102	99	3.0	83			70 - 130	20	
Benzene	ND	1.0	113	115	1.8	89			70 - 130	20	
Bromochloromethane	ND	5.0	97	97	0.0	89			70 - 130	20	
Bromodichloromethane	ND	5.0	113	116	2.6	88			70 - 130	20	
Bromoform	ND	5.0	106	105	0.9	75			70 - 130	20	
Bromomethane	ND	5.0	108	107	0.9	107			40 - 160	20	
Carbon Disulfide	ND	5.0	122	115	5.9	87			70 - 130	20	
Carbon tetrachloride	ND	5.0	119	118	0.8	92			70 - 130	20	
Chlorobenzene	ND	5.0	100	101	1.0	82			70 - 130	20	
Chloroethane	ND	5.0	117	112	4.4	107			70 - 130	20	
Chloroform	ND	5.0	108	109	0.9	90			70 - 130	20	
Chloromethane	ND	5.0	94	95	1.1	101			40 - 160	20	
cis-1,2-Dichloroethene	ND	5.0	111	109	1.8	88			70 - 130	20	
cis-1,3-Dichloropropene	ND	5.0	128	132	3.1	83			70 - 130	20	l
Dibromochloromethane	ND	3.0	106	106	0.0	85			70 - 130	20	
Dibromomethane	ND	5.0	109	110	0.9	86			70 - 130	20	

QA/QC Data

SDG I.D.: GCP25418

Parameter	Blank	Blk RL	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits	
Dichlorodifluoromethane	ND	5.0	98	97	1.0	93			40 - 160	20	
Diethyl ether	ND	5.0	89	79	11.9	98			70 - 130	20	
Di-isopropyl ether	ND	5.0	100	105	4.9	102			70 - 130	20	
Ethyl tert-butyl ether	ND	5.0	120	120	0.0	93			70 - 130	20	
Ethylbenzene	ND	1.0	104	105	1.0	86			70 - 130	20	
m&p-Xylene	ND	2.0	102	104	1.9	83			70 - 130	20	
Methyl ethyl ketone	ND	5.0	88	87	1.1	80			40 - 160	20	
Methyl t-butyl ether (MTBE)	ND	1.0	125	117	6.6	89			70 - 130	20	
Methylene chloride	ND	5.0	113	103	9.3	93			70 - 130	20	
o-Xylene	ND	2.0	105	107	1.9	86			70 - 130	20	
Styrene	ND	5.0	102	104	1.9	76			70 - 130	20	
tert-amyl methyl ether	ND	5.0	126	128	1.6	87			70 - 130	20	
Tetrachloroethene	ND	5.0	93	96	3.2	88			70 - 130	20	
Tetrahydrofuran (THF)	ND	5.0	88	87	1.1	87			70 - 130	20	
Toluene	ND	1.0	110	112	1.8	87			70 - 130	20	
trans-1,2-Dichloroethene	ND	5.0	109	104	4.7	89			70 - 130	20	
trans-1,3-Dichloropropene	ND	5.0	141	141	0.0	78			70 - 130	20	l
Trichloroethene	ND	5.0	96	98	2.1	91			70 - 130	20	
Trichlorofluoromethane	ND	5.0	103	100	3.0	103			70 - 130	20	
Trichlorotrifluoroethane	ND	5.0	89	83	7.0	98			70 - 130	20	
Vinyl chloride	ND	5.0	114	113	0.9	99			70 - 130	20	
% 1,2-dichlorobenzene-d4	94	%	99	100	1.0	100			70 - 130	20	
% Bromofluorobenzene	107	%	109	108	0.9	100			70 - 130	20	
% Dibromofluoromethane	102	%	103	101	2.0	99			70 - 130	20	
% Toluene-d8	100	%	110	111	0.9	101			70 - 130	20	

Comment:

The MSD is not reported for this LL soil batch.

Additional 8260 criteria: 10% of compounds can be outside of acceptance criteria as long as recovery is 10%.
The RPD criteria for the LCS/LCSD is 20%,
The MS/MSD RPD criteria is listed above.

QA/QC Batch 702085 (ug/kg), QC Sample No: CP24404 (CP25418, CP25420)

Volatiles - Sediment (Low Level)

Parameter	Blank	Blk RL	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits	
1,1,1,2-Tetrachloroethane	ND	5.0	104	107	2.8	96	97	1.0	70 - 130	20	
1,1,1-Trichloroethane	ND	5.0	113	118	4.3	99	100	1.0	70 - 130	20	
1,1,2,2-Tetrachloroethane	ND	3.0	111	112	0.9	106	103	2.9	70 - 130	20	
1,1,2-Trichloroethane	ND	5.0	101	104	2.9	96	95	1.0	70 - 130	20	
1,1-Dichloroethane	ND	5.0	109	113	3.6	108	109	0.9	70 - 130	20	
1,1-Dichloroethene	ND	5.0	105	107	1.9	95	94	1.1	70 - 130	20	
1,1-Dichloropropene	ND	5.0	110	115	4.4	89	94	5.5	70 - 130	20	
1,2-Dibromoethane	ND	5.0	100	102	2.0	90	91	1.1	70 - 130	20	
1,2-Dichloroethane	ND	5.0	97	100	3.0	97	97	0.0	70 - 130	20	
1,2-Dichloropropane	ND	5.0	106	111	4.6	99	99	0.0	70 - 130	20	
1,3-Dichloropropane	ND	5.0	109	112	2.7	93	94	1.1	70 - 130	20	
1,4-dioxane	ND	100	91	96	5.3	102	114	11.1	40 - 160	20	
2,2-Dichloropropane	ND	5.0	146	150	2.7	95	98	3.1	70 - 130	20	l
2-Hexanone	ND	25	87	84	3.5	65	65	0.0	40 - 160	20	
4-Methyl-2-pentanone	ND	25	88	87	1.1	89	88	1.1	40 - 160	20	
Acetone	ND	10	73	65	11.6	96	93	3.2	40 - 160	20	
Acrylonitrile	ND	5.0	96	95	1.0	88	87	1.1	70 - 130	20	
Benzene	ND	1.0	108	113	4.5	95	97	2.1	70 - 130	20	
Bromochloromethane	ND	5.0	92	94	2.2	101	99	2.0	70 - 130	20	
Bromodichloromethane	ND	5.0	109	114	4.5	96	97	1.0	70 - 130	20	

Parameter	Blank	Blk RL	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits	
Bromoform	ND	5.0	107	109	1.9	82	86	4.8	70 - 130	20	
Bromomethane	ND	5.0	108	113	4.5	100	106	5.8	40 - 160	20	
Carbon Disulfide	ND	5.0	119	120	0.8	83	83	0.0	70 - 130	20	
Carbon tetrachloride	ND	5.0	120	126	4.9	100	102	2.0	70 - 130	20	
Chlorobenzene	ND	5.0	97	100	3.0	84	88	4.7	70 - 130	20	
Chloroethane	ND	5.0	109	121	10.4	107	111	3.7	70 - 130	20	
Chloroform	ND	5.0	102	107	4.8	100	99	1.0	70 - 130	20	
Chloromethane	ND	5.0	94	97	3.1	102	104	1.9	40 - 160	20	
cis-1,2-Dichloroethene	ND	5.0	104	112	7.4	102	98	4.0	70 - 130	20	
cis-1,3-Dichloropropene	ND	5.0	125	131	4.7	88	89	1.1	70 - 130	20	l
Dibromochloromethane	ND	3.0	105	108	2.8	96	96	0.0	70 - 130	20	
Dibromomethane	ND	5.0	103	107	3.8	97	97	0.0	70 - 130	20	
Dichlorodifluoromethane	ND	5.0	106	109	2.8	84	86	2.4	40 - 160	20	
Diethyl ether	ND	5.0	76	75	1.3	105	94	11.1	70 - 130	20	
Di-isopropyl ether	ND	5.0	97	101	4.0	112	111	0.9	70 - 130	20	
Ethyl tert-butyl ether	ND	5.0	112	114	1.8	105	103	1.9	70 - 130	20	
Ethylbenzene	ND	1.0	102	106	3.8	87	92	5.6	70 - 130	20	
m&p-Xylene	ND	2.0	100	104	3.9	83	88	5.8	70 - 130	20	
Methyl ethyl ketone	ND	5.0	84	79	6.1	86	86	0.0	40 - 160	20	
Methyl t-butyl ether (MTBE)	ND	1.0	113	117	3.5	99	143	36.4	70 - 130	20	m,r
Methylene chloride	ND	5.0	100	103	3.0	112	102	9.3	70 - 130	20	
o-Xylene	ND	2.0	102	107	4.8	89	92	3.3	70 - 130	20	
Styrene	ND	5.0	99	102	3.0	74	77	4.0	70 - 130	20	
tert-amyl methyl ether	ND	5.0	118	120	1.7	96	96	0.0	70 - 130	20	
Tetrachloroethene	ND	5.0	93	97	4.2	85	92	7.9	70 - 130	20	
Tetrahydrofuran (THF)	ND	5.0	82	81	1.2	96	99	3.1	70 - 130	20	
Toluene	ND	1.0	106	110	3.7	90	92	2.2	70 - 130	20	
trans-1,2-Dichloroethene	ND	5.0	103	105	1.9	92	95	3.2	70 - 130	20	
trans-1,3-Dichloropropene	ND	5.0	134	140	4.4	82	83	1.2	70 - 130	20	l
Trichloroethene	ND	5.0	90	95	5.4	90	95	5.4	70 - 130	20	
Trichlorofluoromethane	ND	5.0	102	107	4.8	107	108	0.9	70 - 130	20	
Trichlorotrifluoroethane	ND	5.0	86	88	2.3	98	97	1.0	70 - 130	20	
Vinyl chloride	ND	5.0	114	120	5.1	100	102	2.0	70 - 130	20	
% 1,2-dichlorobenzene-d4	93	%	98	99	1.0	104	102	1.9	70 - 130	20	
% Bromofluorobenzene	106	%	110	109	0.9	94	95	1.1	70 - 130	20	
% Dibromofluoromethane	104	%	103	100	3.0	106	105	0.9	70 - 130	20	
% Toluene-d8	101	%	110	111	0.9	101	101	0.0	70 - 130	20	

Comment:

Additional 8260 criteria: 10% of compounds can be outside of acceptance criteria as long as recovery is 10%.
The RPD criteria for the LCS/LCSD is 20%,
The MS/MSD RPD criteria is listed above.

QA/QC Batch 702085H (ug/kg), QC Sample No: CP24404 50X (CP25418 (50X) , CP25419 (50X) , CP25420 (50X))

Volatiles - Sediment (High Level)

Parameter	Blank	Blk RL	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits	
1,2,3-Trichlorobenzene	ND	250	111	94	16.6	101	115	13.0	70 - 130	20	
1,2,3-Trichloropropane	ND	250	107	93	14.0	87	100	13.9	70 - 130	20	
1,2,4-Trichlorobenzene	ND	250	112	97	14.4	102	116	12.8	70 - 130	20	
1,2,4-Trimethylbenzene	ND	250	113	98	14.2	98	109	10.6	70 - 130	20	
1,2-Dibromo-3-chloropropane	ND	250	120	96	22.2	92	108	16.0	70 - 130	20	r
1,2-Dichlorobenzene	ND	250	105	91	14.3	99	109	9.6	70 - 130	20	
1,3,5-Trimethylbenzene	ND	250	112	98	13.3	99	109	9.6	70 - 130	20	
1,3-Dichlorobenzene	ND	250	102	89	13.6	98	109	10.6	70 - 130	20	
1,4-Dichlorobenzene	ND	250	105	92	13.2	100	111	10.4	70 - 130	20	

QA/QC Data

SDG I.D.: GCP25418

Parameter	Blank	Blk RL	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits	
2-Chlorotoluene	ND	250	101	89	12.6	86	95	9.9	70 - 130	20	
2-Isopropyltoluene	ND	250	112	98	13.3	104	114	9.2	70 - 130	20	
4-Chlorotoluene	ND	250	102	88	14.7	99	110	10.5	70 - 130	20	
Bromobenzene	ND	250	100	86	15.1	98	109	10.6	70 - 130	20	
Hexachlorobutadiene	ND	250	122	108	12.2	107	122	13.1	70 - 130	20	
Isopropylbenzene	ND	250	105	93	12.1	100	111	10.4	70 - 130	20	
Naphthalene	ND	250	112	93	18.5	99	116	15.8	70 - 130	20	
n-Butylbenzene	ND	250	126	110	13.6	107	120	11.5	70 - 130	20	
n-Propylbenzene	ND	250	110	94	15.7	101	113	11.2	70 - 130	20	
p-Isopropyltoluene	ND	250	113	97	15.2	102	114	11.1	70 - 130	20	
sec-Butylbenzene	ND	250	113	99	13.2	102	114	11.1	70 - 130	20	
tert-Butylbenzene	ND	250	108	94	13.9	102	113	10.2	70 - 130	20	
trans-1,4-dichloro-2-butene	ND	250	166	138	18.4	87	101	14.9	70 - 130	20	l
% 1,2-dichlorobenzene-d4	96	%	100	99	1.0	102	102	0.0	70 - 130	20	
% Bromofluorobenzene	98	%	109	109	0.0	99	99	0.0	70 - 130	20	
% Dibromofluoromethane	102	%	101	104	2.9	101	100	1.0	70 - 130	20	
% Toluene-d8	93	%	110	111	0.9	103	102	1.0	70 - 130	20	

Comment:

Additional 8260 criteria: 10% of compounds can be outside of acceptance criteria as long as recovery is 10%.
The RPD criteria for the LCS/LCSD is 20%,
The MS/MSD RPD criteria is listed above.

l = This parameter is outside laboratory LCS/LCSD specified recovery limits.
m = This parameter is outside laboratory MS/MSD specified recovery limits.
r = This parameter is outside laboratory RPD specified recovery limits.

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

RPD - Relative Percent Difference
LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample Duplicate
MS - Matrix Spike
MS Dup - Matrix Spike Duplicate
NC - No Criteria
Intf - Interference

Phyllis Shiller, Laboratory Director
February 02, 2024

Friday, February 02, 2024

Criteria: MA: S1

State: MA

Sample Criteria Exceedances Report

GCP25418 - TRC-RI

SampNo	Acode	Phoenix Analyte	Criteria	Result	RL	Criteria	RL Criteria	Analysis Units
CP25418	AS-SM	Arsenic	MA / CMR 310.40.1600 / S1 (mg/kg)	21.5	5.8	20	20	mg/Kg
CP25418	AS-SM	Arsenic	MA / SOIL S-1 STANDARDS / S-1 Soil & GW-1	21.5	5.8	20	20	mg/Kg
CP25419	AS-SM	Arsenic	MA / CMR 310.40.1600 / S1 (mg/kg)	27.3	4.9	20	20	mg/Kg
CP25419	AS-SM	Arsenic	MA / SOIL S-1 STANDARDS / S-1 Soil & GW-1	27.3	4.9	20	20	mg/Kg

Phoenix Laboratories does not assume responsibility for the data contained in this exceedance report. It is provided as an additional tool to identify requested criteria exceedences. All efforts are made to ensure the accuracy of the data (obtained from appropriate agencies). A lack of exceedence information does not necessarily suggest conformance to the criteria. It is ultimately the site professional's responsibility to determine appropriate compliance.

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

ACCREDITED IN ACCORDANCE WITH nelac NY # 11301

Analysis Comments

February 02, 2024 SDG I.D.: GCP25418

The following analysis comments are made regarding exceptions to criteria not already noted in the Analysis Report or QA/QC Report:

VOA Narration

CHEM14 10/13/23-2: CP25419

The following Initial Calibration compounds did not meet RSD% criteria: Chloroethane 27% (20%)
The following Initial Calibration compounds did not meet maximum RSD% criteria: None.

Up to eight compounds can be outside of ICAL %RSD criteria and up to sixteen compounds can be outside of CCAL %Dev criteria if less than 40%.

CHEM14 10/16/23-1: CP25418, CP25419, CP25420

The following Initial Calibration compounds did not meet RSD% criteria: Chloroethane 27% (20%)
The following Initial Calibration compounds did not meet maximum RSD% criteria: None.

Up to eight compounds can be outside of ICAL %RSD criteria and up to sixteen compounds can be outside of CCAL %Dev criteria if less than 40%.

Cooler: Yes ☐ No ☐
Coolant: IPK ☑ ICE ☐ No ☐
Temp 1.5 °C Pg of

PHOENIX
Environmental Laboratories, Inc.

CT/MA/RI CHAIN OF CUSTODY RECORD

587 East Middle Turnpike, P.O. Box 370, Manchester, CT 06040
Email: makrina@phoenixlabs.com Fax (860) 645-0823
Client Services (860) 645-1102

Data Delivery/Contact Options:
☐ Fax:
☐ Phone:
☑ Email: jtreacy@trccompanies.com

Customer: TRC Companies
Address: 10 Hemingway Drive
East Providence, RI 02915

Project: Pillings Pond (507355.0000.0000 Phase 1)
Report to: jtreacy@trccompanies.com
Invoice to: TRC Vendor Portal
Quote #

Project P.O:

This section MUST be completed with Bottle Quantities.

Client Sample - Information - Identification
Sampler's Signature: Joseph Butt Date: 10/12/23

Matrix Code:
DW=Drinking Water **GW**=Ground Water **SW**=Surface Water **WW**=Waste Water
RW=Raw Water **SE**=Sediment **SL**=Sludge **S**=Soil **SD**=Solid **W**=Wipe **OIL**=Oil
B=Bulk **L**=Liquid **X** = ____________(Other)

PHOENIX USE ONLY SAMPLE #	Customer Sample Identification	Sample Matrix	Date Sampled	Time Sampled	*MS/MSD (May be billable at analysis unit rate)	Grain size	% water	TOC	Metals (As, Cd, Cr, Cu, Pb, Hg, Ni, Zn)	PCB	PAH	EPH	% solids	High and low level VOC			GL Amber 4 oz. As is	Soil VOA Vials [X] methanol [X] H_2O	GL Soil container (32) oz	GL Soil container (8) oz	40 ml VOA Vial [ ] As is [ ] HCl	GL Amber 1000ml [ ] As is [ ] H_2SO_4	PL As is [ ] 250ml [ ] 500ml [ ] 1000ml	PL H_2SO_4 [ ] 250ml [ ] 500ml	PL HNO_3 250ml	PL NaOH 250ml	Bacteria Bottle w/thio	Bacteria Bottle as is
25418	C-1	SE	10/12/2023	1030		X	X	X	X	X	X	X	X	X			1	3	1	2								
25419	C-2	SE	10/12/2023	1120		X	X	X	X	X	X	X	X	X			1	3	1	2								
25420	C-3	SE	10/12/2023	1200		X	X	X	X	X	X	X	X	X			1	3	1	2								

Relinquished by:	Accepted by:	Date:	Time:
Joseph Butt	[signature]	10-13-23	935
[signature]	[signature]	10/13/23	14:45

Comments, Special Requirements or Regulations:

Turnaround Time:
☐ 1 Day*
☐ 2 Days*
☐ 3 Days*
☐ 4 Days*
☐ 5 Days*
☑ Standard
☐ Other

RI
☐ RES DEC
☐ I/C DEC
☐ GA Leachability
☐ GB Leachability
☐ GA -GW Objectives
☐ GB -GW Objectives
☐ Other

CT
☐ RCP Cert
☐ GWPC
☐ SWPC
☐ GA PMC
☐ GB PMC
☐ SWPC
☐ RES DEC
☐ I/C DEC

MA
☐ MCP Certification
☐ GW-1
☐ GW-2
☐ GW-3
☐ S-1
☐ S-2
☐ S-3
☐ SW Protection
☐ RCS-1 / RCGW-1
☐ RCS-2 / RCGW-2
☐

Data Format
☑ Excel
☑ PDF
☐ GIS/Key
☐ EQuIS
☐ Other

Data Package
☐ Tier II Checklist*
☐ Full Data Package*
☑ Phoenix Std
☐ Other

State where samples were collected: MA

***MS/MSD are considered site samples and will be billed as such in accordance with the prices quoted.**

* SURCHARGES MAY APPLY

* SURCHARGE APPLIES

GRAIN SIZE DISTRIBUTION TEST DATA

10/17/2023

Client: : Phoenix Environmental Laboratories, Inc Date: 10/17/2023
Project: : GCP 25418
Project Number: : GCP 25418
Location: Onsite
Depth: N/A **Sample Number:** 860-23
Material Description: Marine Sediments
Liquid Limit: N/A **Plastic Limit:** N/A
USCS Classification: N/A **AASHTO Classification:** N/A
Test Date: 10/17/2023
Testing Remarks: ASTM C 117, ASTM C 136 (Sample ID= CP 25418)
Tested by: SC **Checked by:** IC
Test Date: 10/17/2023 **Technician:** SC
Test remarks: ASTM C 117, ASTM C 136 (Sample ID= CP 25418)

Sieve Test Data (ASTM C117 & C136)

Post #200 Wash Test Weights (grams): Dry Specimen+Tare = 1.10
Tare Wt. = 0.00

Minus #200 from wash = 99.6%

Specimen Weights
Dry specimen+tare (gms.) = 268.80
Tare (gms.) = 0.00

Cumulative pan tare (gms.) = 0.00

Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Passing	Percent Retained
#4	0.00	100.0	0.0
#10	0.00	100.0	0.0
#40	0.20	99.9	0.1
#60	0.60	99.8	0.2
#100	0.80	99.7	0.3
#200	1.00	99.6	0.4

Pan + tare = 0 Tare = 0 Loss during sieving = 0.0%
Total loss (wash+pan/specimen) = 99.6%

Results

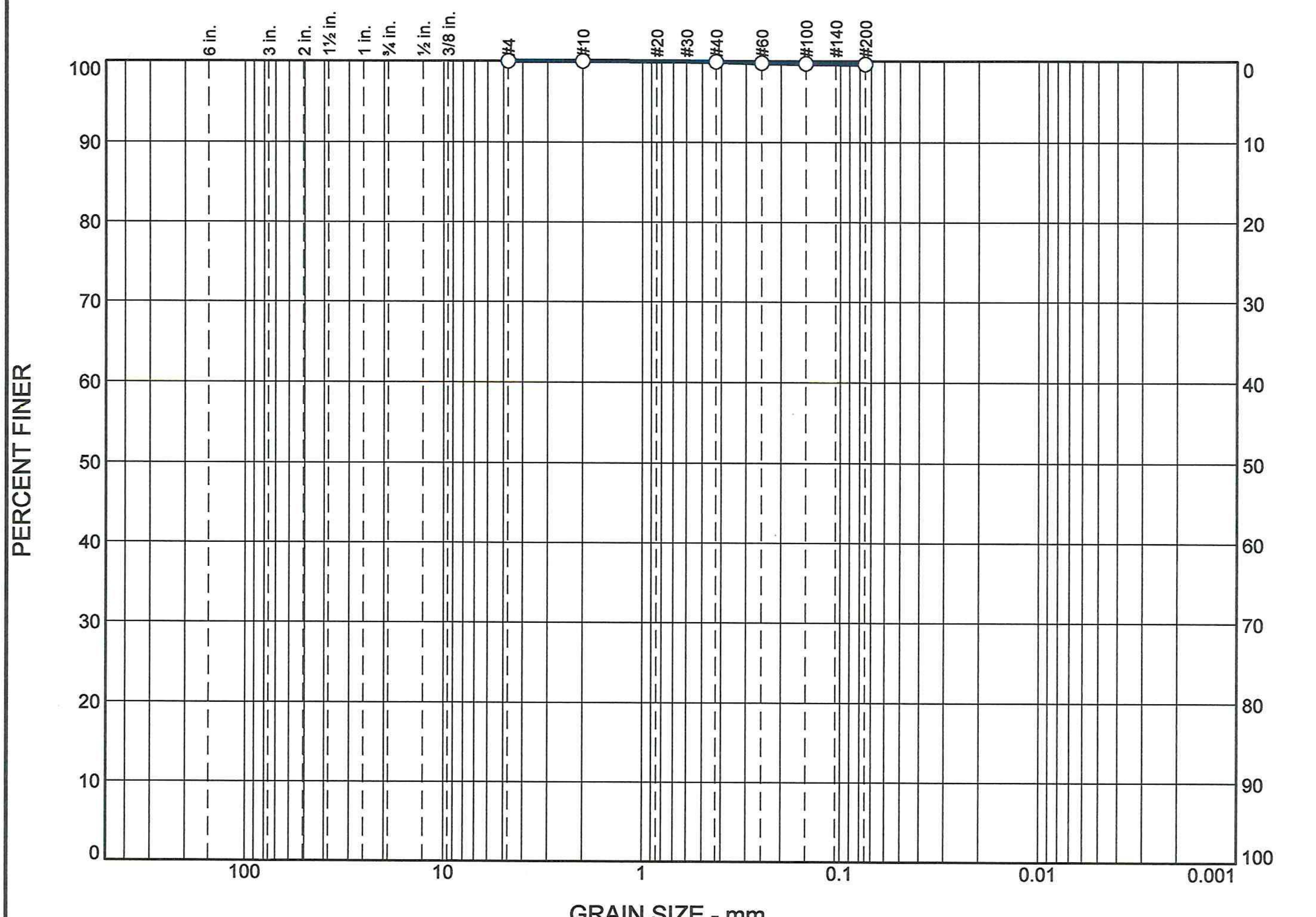
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.4			99.6

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}

Fineness Modulus
0.01

Tri State Materials Testing Lab

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.0	0.1	0.3	99.6	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	N/A	N/A								

MATERIAL DESCRIPTION	TEST DATE	USCS	NM
○ Marine Sediments	10/17/2023	N/A	

Project No. : GCP 25418 **Client:** : Phoenix Environmental Laboratories, Inc Date: 10/17/2023

Project: : GCP 25418

○ **Source of Sample:** Onsite **Depth:** N/A **Sample Number:** 860-23

Remarks:

○ ASTM C 117, ASTM C 136 (Sample ID= CP 25418)

Tri State Materials Testing Lab

Berlin, Connecticut

Figure

Tested By: SC **Checked By:** IC

GRAIN SIZE DISTRIBUTION TEST DATA

10/17/2023

Client: : Phoenix Environmental Laboratories, Inc
Project: : GCP 25418
Project Number: : GCP 25418
Location: Onsite
Depth: N/A
Material Description: Marine Sediments
Liquid Limit: N/A
USCS Classification: N/A
Test Date: 10/17/2023
Testing Remarks: ASTM C 117, ASTM C 136 (Sample ID= CP 25419)
Tested by: SC
Test Date: 10/17/2023 **Technician:** SC
Test remarks: ASTM C 117, ASTM C 136 (Sample ID= CP 25419)

Date: 10/17/2023

Sample Number: 861-23

Plastic Limit: N/A
AASHTO Classification: N/A

Checked by: IC

Sieve Test Data (ASTM C117 & C136)

Post #200 Wash Test Weights (grams): Dry Specimen+Tare = 2.50
Tare Wt. = 0.00

Minus #200 from wash = 99.0%

Specimen Weights
Dry specimen+tare (gms.) = 258.30
Tare (gms.) = 0.00

Cumulative pan tare (gms.) = 0.00

Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Passing	Percent Retained
#4	0.00	100.0	0.0
#10	0.20	99.9	0.1
#40	0.90	99.7	0.3
#60	1.70	99.3	0.7
#100	2.10	99.2	0.8
#200	2.40	99.1	0.9

Pan + tare = 0 Tare = 0 Loss during sieving = 0.0%
Total loss (wash+pan/specimen) = 99.0%

Results

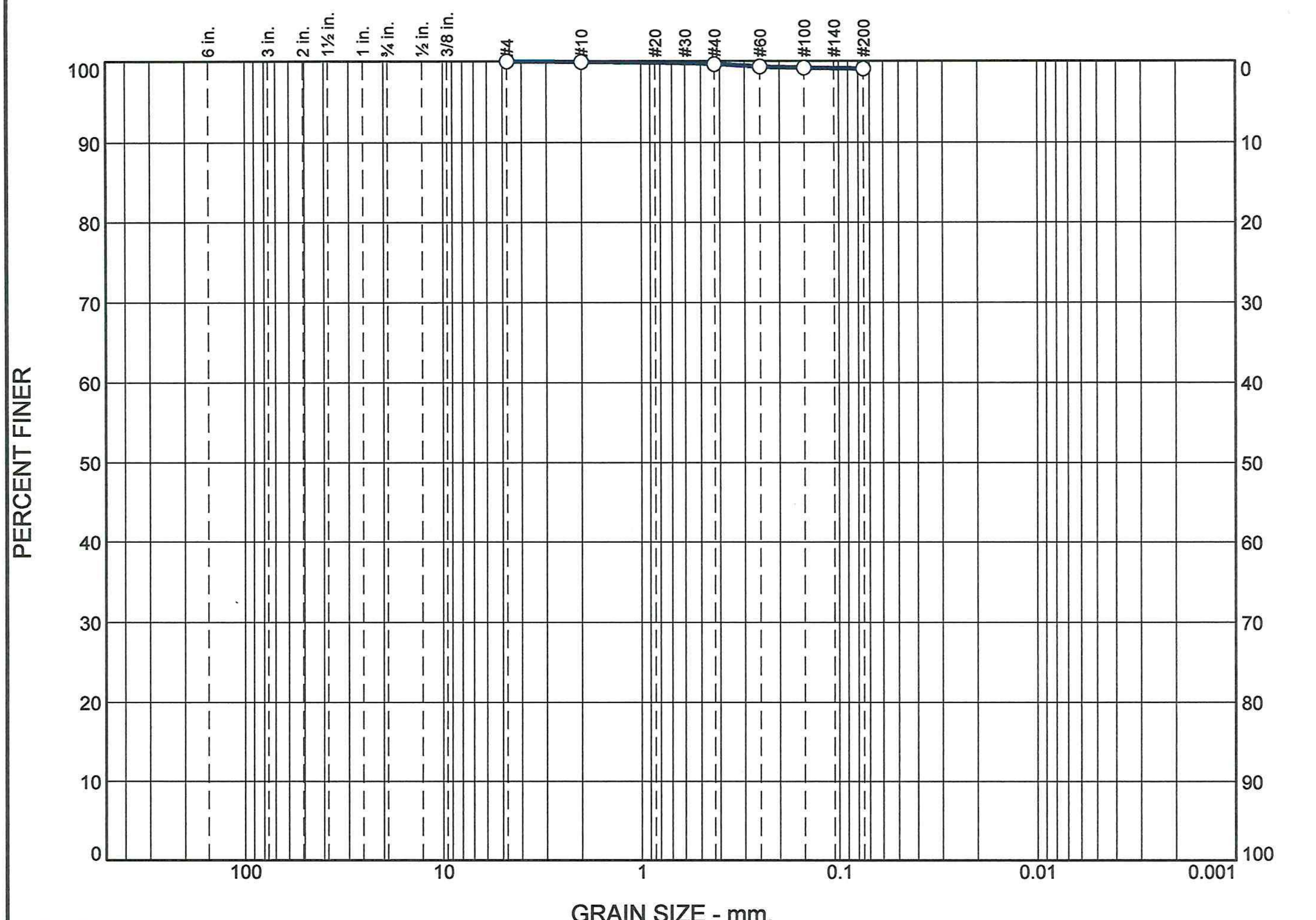
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.1	0.2	0.6	0.9			99.1

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}

Fineness Modulus
0.02

Tri State Materials Testing Lab

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.1	0.2	0.6	99.1	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	N/A	N/A								

MATERIAL DESCRIPTION	TEST DATE	USCS	NM
○ Marine Sediments	10/17/2023	N/A	

Project No. : GCP 25418 **Client:** : Phoenix Environmental Laboratories, Inc Date: 10/17/2023

Project: : GCP 25418

○ **Source of Sample:** Onsite **Depth:** N/A **Sample Number:** 861-23

Remarks:

○ ASTM C 117, ASTM C 136 (Sample ID= CP 25419)

Tri State Materials Testing Lab

Berlin, Connecticut

Figure

Tested By: SC **Checked By:** IC

GRAIN SIZE DISTRIBUTION TEST DATA

10/17/2023

Client: : Phoenix Environmental Laboratories, Inc   Date: 10/17/2023
Project: : GCP 25418
Project Number: : GCP 25418
Location: Onsite
Depth: N/A   **Sample Number:** 862-23
Material Description: Marine Sediments
Liquid Limit: N/A   **Plastic Limit:** N/A
USCS Classification: N/A   **AASHTO Classification:** N/A
Test Date: 10/17/2023
Testing Remarks: ASTM C 117, ASTM C 136 (Sample ID= CP 25420)
Tested by: SC   **Checked by:** IC
Test Date: 10/17/2023   **Technician:** SC
Test remarks: ASTM C 117, ASTM C 136 (Sample ID= CP 25420)

Sieve Test Data (ASTM C117 & C136)

Post #200 Wash Test Weights (grams): Dry Specimen+Tare = 1.70
Tare Wt. = 0.00

Minus #200 from wash = 99.5%

Specimen Weights
Dry specimen+tare (gms.) = 334.50
Tare (gms.) = 0.00

Cumulative pan tare (gms.) = 0.00

Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Passing	Percent Retained
#4	0.00	100.0	0.0
#10	0.10	100.0	0.0
#40	0.80	99.8	0.2
#60	1.40	99.6	0.4
#100	1.60	99.5	0.5
#200	1.70	99.5	0.5

Pan + tare = 0   Tare = 0   Loss during sieving = 0.0%
Total loss (wash+pan/specimen) = 99.5%

Results

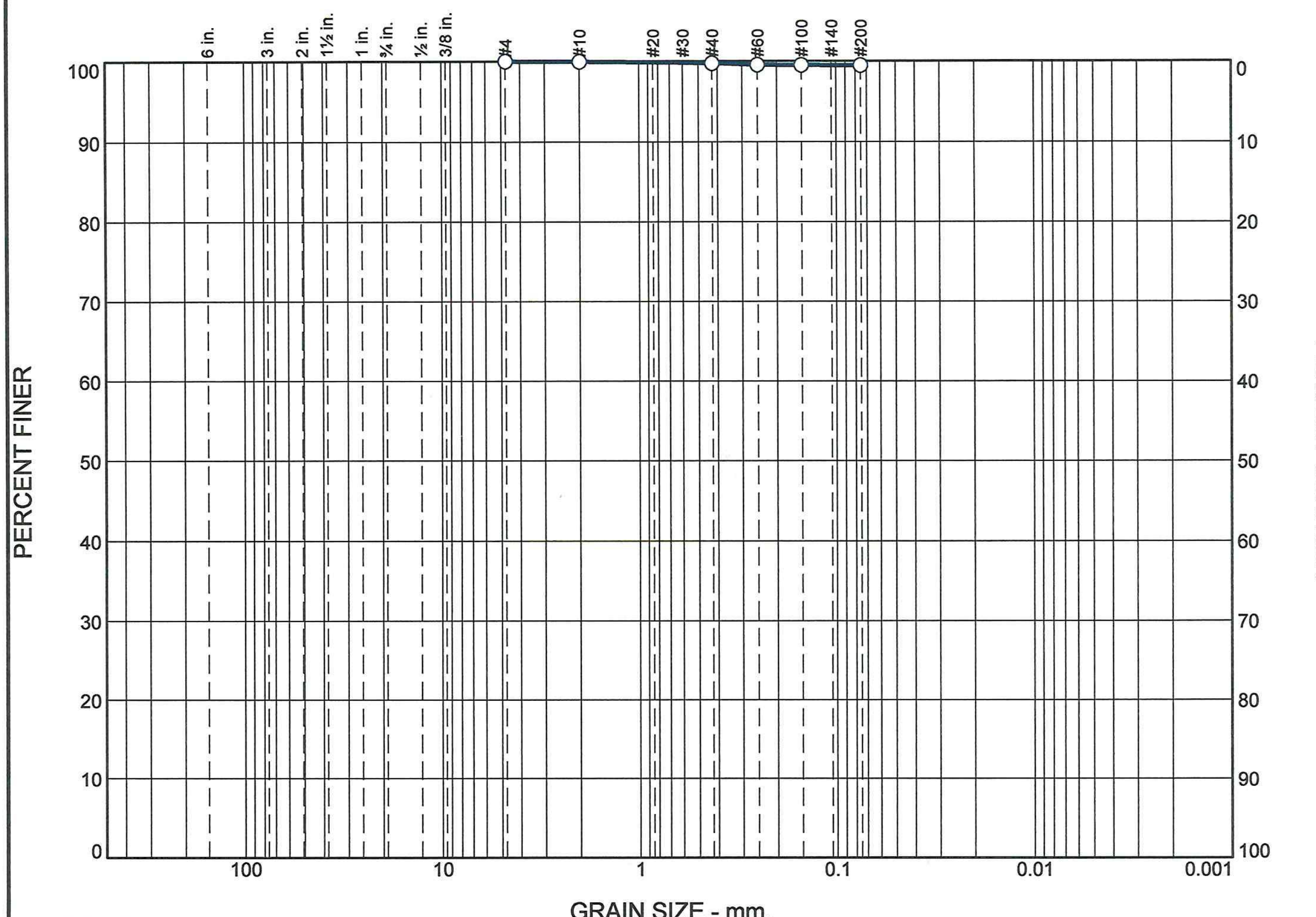
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.5			99.5

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}

Fineness Modulus
0.01

Tri State Materials Testing Lab

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.0	0.2	0.3	99.5	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	N/A	N/A								

MATERIAL DESCRIPTION	TEST DATE	USCS	NM
○ Marine Sediments	10/17/2023	N/A	

Project No. : GCP 25418 **Client:** : Phoenix Environmental Laboratories, Inc Date: 10/17/2023

Project: : GCP 25418

○ **Source of Sample:** Onsite **Depth:** N/A **Sample Number:** 862-23

Remarks:

○ ASTM C 117, ASTM C 136 (Sample ID= CP 25420)

Tri State Materials Testing Lab

Berlin, Connecticut

Figure

Tested By: SC **Checked By:** IC

860-86

Cooler: Yes ☐ No ☐
Coolant: IPK ☐ ICE ☐ No ☐
Temp °C Pg of

PHOENIX
Environmental Laboratories, Inc.

CHAIN OF CUSTODY RECORD

Page 1 of 1

587 East Middle Turnpike, P.O. Box 370, Manchester, CT 06040
Email: info@phoenixlabs.com Fax (860) 645-0823
Client Services (860) 645-8726

Contact Options:
☐ Fax: 860-645-0823
☐ Phone: 800-827-5426
☐ Email: HelenG@PhoenixLabs.com

Customer: Tri State Materials Testing Lab
Address: 60 Woodland Rd
Berlin, CT
(203) 949-7733

Project #: GCP25418
Report to: HelenG@PhoenixLabs.com / Helen Geoghegan
Invoice to: AccountsPayable@PhoenixLabs.com
Quote# :

Project P.O: GCP25418

This section MUST be completed with Bottle Quantities.

Client Sample - Information - Identification

Sampler's Signature ______ Date: ______

Matrix Code:
DW=Drinking Water **GW**=Ground Water **SW**=Surface Water **WW**=Waste Water
RW=Raw Water **SE**=Sediment **SL**=Sludge **S**=Soil **SD**=Solid **W**=Wipe
OIL=Oil **B**=Bulk **L**=Liquid

Analysis Request

Phoenix Sample ID	Sample Comment	Sample Matrix	Date Sampled	Time Sampled	Sieve Test ASTM C136, C117	32 oz Glass Jar
CP25418		SED	10/12/2023	10:30 AM	x	1
CP25419		SED	10/12/2023	11:20 AM	x	1
CP25420		SED	10/12/2023	12:00 PM	x	1

Relinquished by:	Accepted by:	Date:	Time:
[illegible]		10-16-23	

Turnaround:
☐ 1 Day
☐ 2 Days
☐ 3 Days
☐ 5 Days
☐ 10 Days
☒ Standard
☐ Other____

Report Type:
☒ Standard PDF
☐ Full Data Package
☐ NJ Reduced Deliverable
☐ NJ Full Deliverable
☐ NY ASP B

EDD Format:
☐ Excel
☐ GIS/Key
☐ EQuIS
☐ NJ Hazsite EDD
☐ NY EZ EDD (ASP)
☐ Other:______

State Criteria:

What State were samples collected? MA

Comments, Special Requirements or Regulations:

Please send notice as soon as possible not exceeding 24 hours of obtaining valid data, of the results of all drinking [illegible]er samples that exceed any EPA or Department-established maximum contaminant level, maximum residual disinfectant level or reportable concentration.
Please notify Phoenix Environmental Laboratories, Inc. immediately and prior to conducting analysis if certification is not held for the analyses requested.