REMEDIAL ACTION PLAN
Bartlett Arboretum
Stamford, Connecticut

Prepared for

The City of Stamford
Stamford, Connecticut

Prepared by

TRC
Windsor, Connecticut

February 2012

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TRC Project No. 176301.0000.0000

February 2012

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1.0 INTRODUCTION

TRC Environmental Corporation (TRC) was retained by the City of Stamford to prepare this Remedial Action Plan (RAP) for the property known as the Bartlett Arboretum located at 151 Brookdale Road, Stamford, Connecticut (Figure 1). This RAP has been developed based on information from previous site investigations, including a Phase I environmental site assessment (ESA) conducted by TRC (September 2010) and a Phase II ESA completed by TRC (July 2011).

1.1 Objectives

This RAP has been prepared to address contaminated soil impacts identified at the site. The objectives of activities described in this RAP are as follows:

- To mitigate potential impact to the environment from the areas of soil contamination on the site by reducing the concentrations of contaminants in the soils above the ground water table.

- To achieve compliance with the applicable Connecticut Department of Energy and Environmental Protection (CTDEEP) Remediation Standards Regulations (RSRs). Although this site is not currently subject to the requirements of the Transfer Act, the Voluntary Cleanup Program nor a Consent Order, the investigation data were evaluated relative to the criteria presented in the RSRs to determine the magnitude of releases and the need for remediation.

- To protect the health of the general public visiting the site and those that work at the site.

- To create no adverse impacts to the environment during remedial activities.

To meet these objectives, the following are presented in this RAP:

- An evaluation of the technical and economic feasibility of implementing various alternative physical remediation strategies and identification of that which is most technically practical.

- The criteria necessary to evaluate impacted soils requiring remediation and criteria to confirm that the remedial goals are achieved.

- The details related to the completion of the remedial actions, associated sampling and reporting.

1.2 Remediation Strategy Considerations

To achieve the soil standards, this RAP presents proposed remedial action alternatives. These remedial actions will either consist of physical remediation of soil to achieve compliance, the use of the exemptions or exceptions within the RSRs (inaccessible soil - 22a-133k-2(b)(3) or environmentally isolated soil - 22a-133k(c)(4)(b)) or a combination of both methods. In order to evaluate which is the most appropriate course of action at this site, the following factors were considered:

- The site is located in an area where the ground water is classified as GA by the Connecticut Department of Energy and Environmental Protection (CTDEEP). The requirement in areas where the ground water is GA-classified is to remediate soils to the depth of the seasonal low water table.

- The site is a public park with no restricted access planned for the impacted areas. As such, the Residential Direct Exposure Criteria (RDEC) in the RSRs would apply, as is the case at all sites, regardless of use, where an Environmental Land Use Restriction (ELUR) is not recorded.

It should be noted that groundwater was also assessed during the 2011 site investigation. As indicated in the TRC Phase II ESA, concentrations of several metals were reported to exceed Ground Water Protection Criteria (GWPC) when analyzed for total metals analysis. However, when the ground water samples were analyzed for dissolved metals, only barium and zinc were detected, both at concentrations below the GWPC. As noted in the Phase II report, the submitted ground water samples were observed to be very turbid and the exceedances were likely contributed to the turbidity in the samples submitted for total analysis. As such, it does not appear that the ground water at this site is impacted and it has been determined for the purposes of the RAP that there is not currently a need to remediate ground water.

2.0 SITE DESCRIPTION AND BACKGROUND

2.1 Site Description

The Bartlett Arboretum and Gardens (see Figure 2), currently owned by the City of Stamford, has been an arboretum since 1965 when the site was purchased by the State of Connecticut from the F. A. Bartlett Tree Expert Company. Prior to 1965 the F.A. Bartlett Tree Expert Company used the site as a tree research and training facility (see Phase II ESA, Section 1.4.2 for additional information). Other activities that have taken place at the site since 1965 have included limited amounts of research and educational courses. The parcel of land on which the site is located consists of approximately 64 acres.

There are currently five structures located in the southwestern portion of the site, including the visitor center (also known as the main house), a cottage (used primarily for storage), a maintenance garage, a greenhouse, and the Silver Education Center. A previous structure (the former education center building) was located within the footprint of the Silver Education Center. The former education center building was demolished during the summer of 2010. The remainder of the southwestern portion of the site contains two small asphalt-paved parking areas, lawn areas, and numerous gardens and plant collections.

The majority of the central portion of the site is comprised of forested land, several acres of wetlands, and a small pond. A small open meadow is located in the eastern portion of the site, along High Ridge Road.

The area surrounding the site is comprised primarily of residential and institutional properties, with the exception of the Scofield Magnet School, which is present to the northwest of the site.

2.2 Environmental History

As indicated above, Phase I and Phase II investigations were conducted at the site in 2010 and 2011, respectively. The following is a summary of the findings of the investigations. Table 1, which summarizes the analytical findings of the areas identified during the investigations, is included as supporting documentation. Figure 2 shows the Phase II sampling locations and Figures 3 through 5 show the impacted areas defined as a result of the investigations.

Drilling of soil borings and installation of seven temporary ground water monitoring wells at the site confirmed that the site is generally underlain silt with some fine-to-medium sand and varying amounts of gravel. Depth to water at the site was observed to range from 1.5

to 12 feet below grade (ftbg). The results of the soil sampling conducted as part of the Phase II investigation indicated the following:

The primary constituents of concern in soil confirmed by the investigations are pesticides, arsenic and lead. The following is a summary, by constituent, of the investigation findings:

Pesticides

One or more of the pesticides 4,4-DDE, 4,4-DDT and 4,4-DDD with concentrations that exceed the RDEC were detected in three soil samples (SB-10 (0-2), SB-24 (0-2) and SB-25 (0-2)). Sample location SB-10 (0-2) was located within the Area of Concern (AOC) identified in the Phase II as AOC-1 and more definitively, along the southern portion of the property just west of Poorhouse Brook. Samples SB-24 (0-2) and SB-25 (0-2) were both located within Potential Area of Concern (PAOC)-9 (the former Bartlett Tree Surgery School), which is centered along the southern portion of the property, just east of Poorhouse Brook. The pesticide impacts are shallow and are likely associated with topical applications.

Arsenic

Elevated concentrations of arsenic that exceed the RDEC were detected in soil samples SB-5 (0-2), SB-6 (0-2), and SB-20 (0-5). In addition, samples SB-5 (0-2) and SB-20 (0-2), had leachable concentrations that exceed the GA PMC (but that are not present at hazardous levels). Samples SB-5 (0-2) and SB-6 (0-2) were located within AOC-1 towards the central western portion of the property. Sample SB-20 (0-2) was located within AOC-6 in the vicinity of the former barn. The elevated concentrations of arsenic at these locations are likely due to a combination of naturally occurring elemental arsenic and topical applications of pesticides containing arsenic, as evident by arsenic being detected within the shallow soils (0 to 2 ftbg) and deeper soils consistently across the site. As noted in the Phase II report, a slightly elevated concentration of arsenic was detected in the sample SB-29 (0-2) located in PAOC-11. The arsenic concentration at this location is presumed to be representative of background concentrations (as stated above).

Lead

A concentration of leachable lead in excess of the GA PMC was also detected in the soil sample SB-5 (0-2). As with the elevated concentration of arsenic in this particular sample, the leachable lead is also likely due to pesticide applications.

The appropriate remedial actions for the contaminated soil on the site are outlined in the following sections. A feasibility analysis was completed to develop an efficient and cost-effective remediation technology for the contaminated soil.

3.0 REMEDIAL ALTERNATIVES ANALYSIS

3.1 RSR Provision Evaluation

As indicated in Section 1, soil remediation may entail the use of physical methods and/or the use of various provisions within the RSRs to achieve compliance with the regulations. Specifically, there are provisions within the RSRs that allow soils to be rendered inaccessible (to attain compliance with the DEC) and/or environmentally isolated (to attain compliance with the PMC). As indicated on Figure 2, neither provision is applicable to this site as the areas with the constituents of concern are not currently inaccessible nor environmentally isolated nor will a final remedy for these areas allow for these institutional controls. Therefore, physical remediation is the only remedial option available to conform to the RSRs.

3.2 Review of Possible Physical Remedial Alternatives for Soil

Items to be considered in the selection of appropriate physical remedial actions for pesticides and metals-impacted soils at the site include:

- **Media impacted and degree of impacts**: The affected medium addressed by this RAP is soil. Pesticide concentrations range up to 15,000 micrograms per kilogram (ug/kg) with SPLP pesticide concentrations ranging up to 0.14 micrograms per liter (ug/L). Concentrations of total arsenic ranged up to 280 milligrams per kilogram (mg/kg), with a SPLP concentration of 0.26 milligrams per liter (mg/L). A SPLP lead concentration was detected at 0.032 mg/L. Table 1 provides a full summary of the analytical data for the above identified areas obtained during the investigations.

- **Regulatory requirements**: The applicable standards are the numerical criteria established by Connecticut's RSRs. Specifically, without an Environmental Land Use Restriction (ELUR) to limit the use of the site to strictly industrial/commercial purposes, the RDEC and the GA PMC apply to soil at this site. The RDEC and GA PMC for the various constituents slated for remediation at this site are listed in the following table:

COC	RDEC	GA PMC
Arsenic	10 mg/kg	0.01 mg/L*
Lead	400 mg/kg	0.015 mg/L*
4,4-DDE	1,800 ug/kg	15 ug/L**
4,4-DDD	2,600 ug/kg	1 ug/L**
4,4-DDT	1,800 ug/kg	1 ppb*

* - Based on SPLP analysis.
** 10X the GWPC (based on SPLP analysis)

- **Volume of contaminated material (soil) requiring action**: The total volume of impacted soils requiring remediation is estimated at approximately 45 cubic yards. This includes the three areas in AOC-1, one area in AOC-6 and two areas in PAOC-9.

- **Site accessibility to equipment, soil depth, and surface features**: In general, accessibility is only a concern with the impacted soils located in PAOC-9. This location is isolated by a small brook (Poorhouse Brook) and will require the placement of a temporary bridge. The brook is approximately 5 feet wide and can be accessed by spanning the brook with steel road plates for the transport of small excavation equipment (i.e., mini-excavator and skid steer). The proximity of one of the locations in PAOC-9 will also require coordination with the City of Stamford Environmental Protection Board with respect to activities within the wetland buffer.

  Due to the shallow depths of the impacted-soil, it is expected that all the excavation areas can be executed with small pieces of heavy equipment (i.e., mini-excavator or small back hoe). The impacted soil is anticipated to extend to depths of approximately 2 ftbg and measure approximately 10 feet by 10 feet in width in each of the various impacted areas.

- **Physical and biological properties of the contaminants of concern**: The organic compounds of concern at this site include chlorinated pesticides. Chlorinated pesticides are very resilient to biodegradation. Furthermore, when 4,4-DDT decomposes it produces a simpler yet still toxic compound 4,4-DDD (one of the constituents of concern).

  The inorganic constituents of concern at this site include arsenic and lead. Metals are not subject to breakdown or degradation by any means.

- **Properties of the contaminated material**: In general, the impacted material is silt with fine sand with varying amounts of gravel.

- **Other impacts, such as the presence of hazardous vapors or ground water contamination, which may dictate immediate actions**: With the exception of the total metal concentrations, there were no constituents detected at concentrations in excess of regulatory criteria in the ground water during the sampling associated with the Phase II investigation. As stated in Section 2.2, the elevated concentrations of the metals were likely due to the high solids content of the collected samples.

- **Site use, ability to accommodate disruption during action**: The site is currently operated as an arboretum by the City of Stamford. The locations of the areas to be remediated via soil excavation are outside the limits of facility operations but within some public areas. Minimal disruption to site activities is anticipated. Any disruption will likely be due to site construction vehicles and can easily be accommodated.

- **Cost of the applicable alternatives**: Costs are a consideration in comparing technologies which could be effective in achieving the applicable standards. Cost is a secondary consideration to schedule or other factors, such as the degree of hazard.

The remedial approaches considered to address the pesticides and metals impacts to soil at the site are presented below:

No Action/Natural Biodegradation

The no-action alternative would result in impacted soils remaining in place and would rely on biodegradation by naturally occurring soil bacteria and volatilization of the residual contaminant mass to gradually reduce concentrations. This method is not applicable to metals-impacted soils.

Applicability/Limitations: Natural biodegradation will not result in rapid reduction of the pesticides as they are derived from chlorinated chemical synthesis and are extremely resilient to decomposition. As in the case of 4,4-DDT, it decomposes into 4,4-DDE and 4,4-DDD, both constituents of concern. Therefore, the concentrations would continue to exceed the RDEC and/or the GB PMC for a long period of time.

Effectiveness: The effectiveness and rate of natural biodegradation would depend on the presence and populations of particular microbes that consume the pesticides and break them down into simpler elements. In addition, the effectiveness and growth of the microbial populations can be governed by the availability of nutrients (oxygen, nitrates, phosphorous, moisture, etc.), which are not known at this time. It is anticipated that natural biodegradation would not decrease the organics concentrations to below the applicable criteria in an acceptable time frame.

Other Considerations: The no-action alternative would not require additional permits and would cause no additional disruption to the site operations.

Costs: The no-action alternatives would not result in any immediate or short-term costs. In the event that impacted soils are removed during the course of site redevelopment or improvement, those soils would then need to be properly handled, sampled, disposed of and replaced.

The no-action/natural biodegradation alternative is not considered appropriate, as it would not result in timely remediation of the site to the applicable criteria and it is not applicable for metals-impacted soils.

Bioremedation Applications

Bioremediation utilizes contaminant-consuming bacteria to degrade compounds to relatively innocuous byproducts (carbon dioxide and water). Indigenous bacteria are utilized, when present in sufficient numbers, or preselected bacteria can be added to the system, if needed. An engineered bioremediation system can take many forms (e.g., biopile, landfarm), but the objective is to create optimal conditions to enhance biological breakdown of the contaminants. This consists of the addition of nutrients, moisture, and/or oxygen, as necessary, to encourage bioremediation. In the event of anaerobic bioremediation, actions may be taken to reduce oxygen concentrations. This technology has not proven practicable when applied to the remediation of recalcitrant pesticides nor is it applicable to metals-impacted soils.

Soil Removal

Soil removal consists of the excavation and removal of the impacted soils, stockpiling of soils, collection of confirmatory samples, disposal or treatment of impacted soils and site restoration. Soils would be removed from the site by a licensed contractor and could be disposed of or put to beneficial use (e.g., asphalt batching). On-site treatment, where treatment equipment is brought to the site to process the excavated soils, is usually applied only to sites with large volumes of soil and where there is adequate room to stockpile and handle soils.

Effectiveness/Limitations: Soil removal is a practical and effective alternative for soils which are not amendable to in-situ treatment (such as metals and pesticide-impacted soils) and/or where impacted soils are accessible to excavation equipment or can be removed by hand. Soil removal may also be more cost-efficient or preferred to in-situ treatment where the volumes of impacted soils are relatively small or where time constraints would not allow in-situ treatment. Soil removal may be impossible or cost-prohibitive where soils are inaccessible or where access is difficult (e.g., deep soils, soils under roads, utility interferences, etc.). The most significant impacts at this site appear to be at shallow depths and would generally be easily accessible to excavation equipment. Soil removal could be completed in a period of several days, depending on the extent. Excavation contractors and soil treatment/disposal facilities are readily available.

Other Considerations: Soil excavation may require permits and will require site restoration. Soil removal activities would obstruct small portions of the site for the duration of the soil removal and site restoration. Equipment access is limited in the area of the impacted soils associated with PAOC-9 and will require the use of a temporary bridge to transport equipment and soil over Poorhouse Brook. In addition other controls will have to be installed to protect the watercourse and associated wetlands from the excavated material as it is transported over it.

Costs: The range of costs will be based on soil volumes of approximately 45 cubic yards and the assumptions that the excavations would need to extend to depths of approximately 2 ftbg. Applicable costs include: soil removal and treatment/disposal; confirmatory sampling and analysis; site restoration and documentation.

This technology is appropriate to meet the time schedule and applicable criteria for remediation of the site.

3.3 Selected Remedial Approach

Soil removal is the preferred remedial approach to augment to the use of the RSR provisions as a remedial strategy (see Section 3.1). Soil removal has been chosen for the following reasons:

- Soil removal is anticipated to be feasible (impacted soils are at shallow depths and are accessible either by equipment or by hand) and effective.
- The estimated volume of soil favors excavation and off-site treatment/disposal versus in-situ technologies.
- Soil removal can be accomplished in considerably less time than the other alternatives, allowing completion of remediation in a period of a few weeks from the start of the remediation process.

3.4 Post Remedial Activities

No additional post-remedial activities will be required upon the removal of the impacted soils. Compliance with the RSRs will be confirmed with the post-excavation samples.

4.0 PROCEDURES

As discussed above, soil excavation was chosen as the most viable remedial technology for the site based on effectiveness for all classes of contaminants that require remediation at this site. Figures 3 through 5 depict the areas where soil removal will be required. Details for implementing this remedial option are outlined below. Pre-remediation activities should include obtaining any City of Stamford permits needed to complete the excavation.

4.1 Soil Excavation Activities

A site visit will be made by the licensed remediation contractor prior to mobilization. This will allow for the contractor to re-prioritize activities, if necessary, to complete the scope of work in the most efficient and effective manner. During that visit, the initial areas of excavation will be demarcated (paint marking), utility locations and their proximity to work areas will be determined and equipment decontamination and staging areas will be determined. In addition, the contractor shall mark the site and contact "Call Before You Dig" a minimum of three days prior to any intrusive activities at the site.

Following mobilization to the site and set-up of the staging and decontamination areas, the excavations will proceed generally as follows:

- On-site storm drains (if any are discovered) or drainage swales will be protected with hay bale dikes or filter fabric material under the grate to prevent runoff of excavated fill materials into the storm water drainage system. Silt fences and/or staked hay bales will be installed at the edges of disturbed areas, as necessary, to prevent soil transport from the work areas.

- Adequately sized steel road plate(s) will be utilized to span Poorhouse Brook to access the soils in PAOC-9. The length of the road plate shall be considered to provide adequate footing on each side of the brook. In addition, the plate(s) shall be wide enough to provide protection of the watercourse from potential spillage during the transport of soils over the brook.

- Fill/soils will be removed from the impacted area to the depth limits indicated by the previous sampling. Each impacted location will initially be excavated to the dimensions of 10 feet by 10 feet to 2 feet in depth followed by the collection of confirmation samples. There are no visual or olfactory indicators (i.e., staining or odors) associated with the constituents of concern.

- Excavated material may either be live-loaded into transport vehicles (with prior disposal facility approval) or transported and consolidated in a centralized waste stockpile area. Stockpiled soils will be placed on two layers of 6-mil plastic sheeting.

The pile(s) will then be covered with plastic and secured at the edges with sand bags or hay bales to anchor the cover and prevent pile runoff from contacting surrounding areas.

- Soils will be removed until sampling indicates that all soils with contaminant concentrations exceeding the applicable RSR criteria have been removed (see Section 4.3 -Confirmatory Sampling).

- Confirmatory samples will be collected in accordance with the methods and frequencies as outlined in Section 4.3.

4.2 Transport and Disposal

The excavated soils will be characterized to the satisfaction of the receiving facility using either a combination of existing analytical data and pre-characterization data or samples of stockpiled soils prior to removal from the site. All excavated fill/soils will be loaded from the excavation or stockpile directly into dump trucks or rolloffs. The treatment facility will provide documentation of receipt and treatment of the soil.

4.3 Confirmatory Sampling

Confirmatory sampling will be performed by the environmental consultant following soil removal. The results of the confirmatory sampling will indicate whether additional soil removal is required or if soil removal is complete, and backfilling and closing of the excavation may proceed.

The confirmatory sampling will include sampling of the base of the excavation to assure that the lower limits of impacts have been reached and sampling of the sidewalls to assure that the lateral extent of the impacts have been removed. General guidelines for sample frequency are provided below. Each sample will be analyzed for the constituent of concern (COC) identified within the area that required excavation.

In general, confirmatory samples from the base of the excavations will be collected at a frequency of 1 per every 200 square feet for all analytes. For the sidewalls, confirmatory samples will be collected at a frequency of 1 per every 20 linear feet of excavation for every 5 feet of depth of the excavation. The minimum sampling will consist of the collection of four sidewall samples and one base sample. Confirmatory sample results will be compared to the applicable RDEC and GA PMC to provide confirmation that compliance has been achieved at each excavation location.

All confirmatory soil samples, including blind duplicates (collected at a frequency of one

per 20 per analysis) and a rinsate blank will be placed on ice, kept cool (approximately 4 degrees Centigrade) and will be delivered to a Connecticut-certified laboratory following proper chain-of-custody procedures.

4.4 Waste Characterization Sampling

The proposed treatment facility will be selected prior to initiation of excavation. If possible, available sample analytical data will be used for waste soil characterization. Additional sampling and analysis may be required prior to acceptance by the facility.

4.5 Backfilling and Restoration

Backfilling of the excavated areas will be performed following the receipt of analytical data which documents that impacted soils have been removed. Backfill soils will be obtained from a known borrow source and will be analyzed prior to use on-site. One sample per source will be analyzed for VOCs, PAHs, ETPH, PCBs, pesticides and CT RSR 15 metals. Analytical results will be compared to the RDEC and the GA PMC.

Soils will be placed and compacted in 12-inch lifts. The final fill level, including 6-inches of top soil, will be consistent with the current grade.

4.6 Equipment Decontamination

All equipment which has contacted the impacted materials will be dry decontaminated prior to leaving the site using a brushes and tools to knock-off the soils. Should it be necessary, a steam cleaner or power washer may be employed to decontaminate the equipment. Decontamination soils will be included with the soils being transported off-site for disposal and any waters will be contained in drums for off-site disposal. Drums containing water will be removed from the site promptly to avoid freezing.

5.0 DOCUMENTATION

Documentation of the field activities will be performed on a daily basis by the contractor and the environmental consultant during the field activities and will be summarized at the conclusion of the field activities in a Remedial Action Report (RAR) completed by the environmental consultant.

5.1 Field Notes

The consultant's field inspector will maintain a daily log of on-site activities. That log will include, but not be limited to the following:

- Daily health and safety meetings.
- Personnel and equipment on-site.
- Field procedures.
- Excavation progress and extents.
- Confirmatory sample information (locations, analyses performed and sample handling).
- Instructions provided to field personnel by the project manager.

5.2 Photographs

Photographs will be taken of representative activities, such as excavation, sampling, and stockpiling. The final extents of the excavations will also be photographed. Copies of selected photographs will be included in the RAR.

5.3 Survey

The extents of the excavations will be documented by reference to existing fixed features, such as buildings. The RAR will include documentation of the extent and depths of the excavation.

5.4 Transport and Treatment Certifications

Manifests for the removal of the fill/soils and certifications of the treatment of the fill/soils will be obtained from the transporter and from the treatment facility. These forms will be included in the RAR.

5.5 Report

The RAR will be prepared by the environmental consultant upon receipt of all analytical data confirming that soil removal was complete and receipt of certifications of treatment from the treatment facility. The RAR will include the following.

- A description of field procedures
- Confirmatory sample locations and analytical results
- A photographic record of the excavations and backfilling
- Waste disposal/treatment documentation (manifest and weight tickets)
- Figures showing the extent of excavations

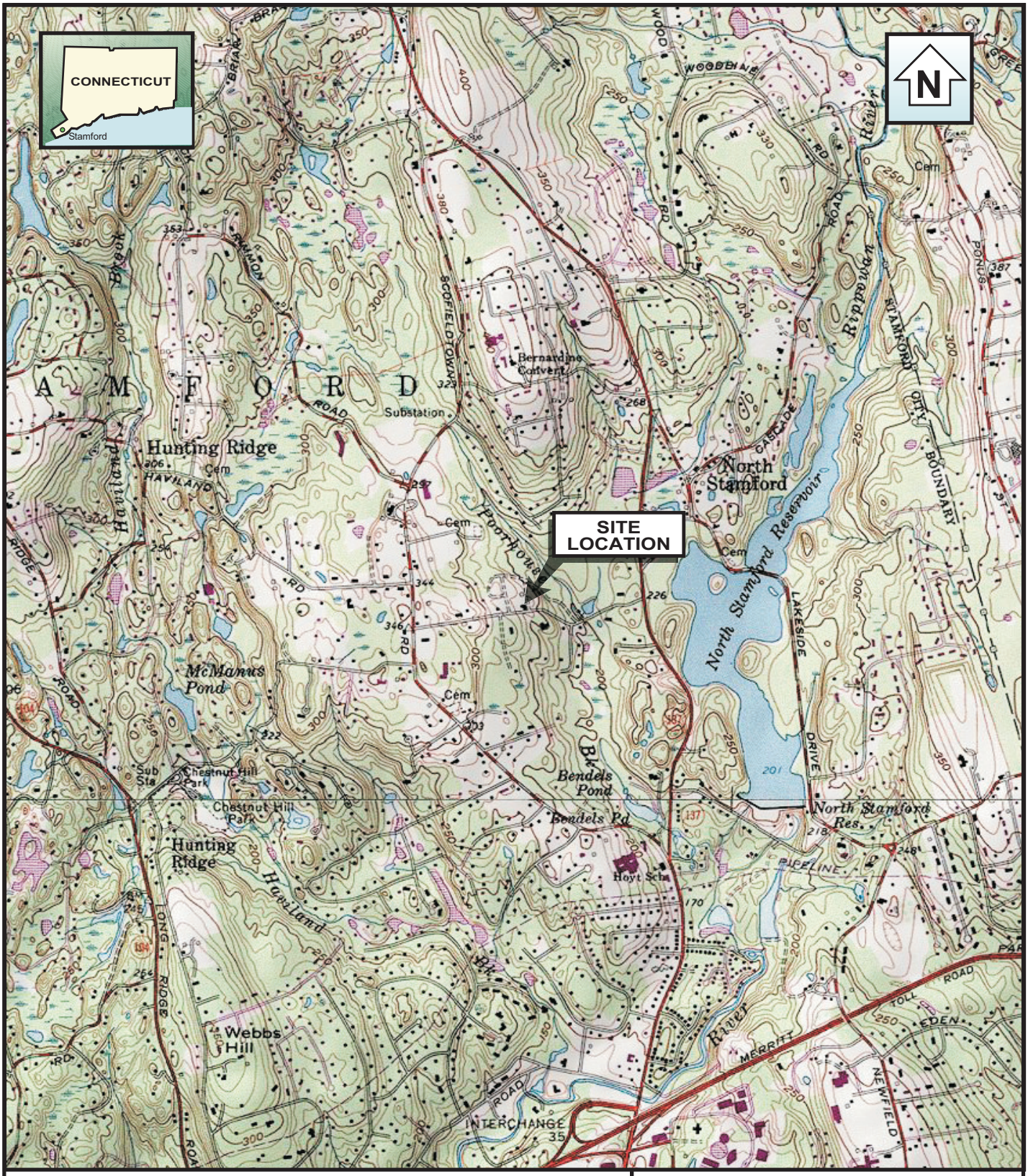
TABLES

Table 1
Phase II Soil Sample Analytical Results
Bartlett Arboretum
Stamford, CT

Sample Designation: Sample Area Sample Interval (ft bgs): Sample Date: **Analytes**	**Units**	**SB-5(0-2)** **AOC-1** **0-2** **4/13/2011**	**SB-6(0-2)** **AOC-1** **0-2** **4/13/2011**	**SB-10(0-2)** **AOC-1** **0-2** **4/14/2011**	**SB-20(0-2)** **AOC-6** **0-2** **4/14/2011**	**SB-24(0-2)** **PAOC-9** **0-2** **4/18/2011**	**SB-25(0-2)** **PAOC-9** **0-2** **4/18/2011**	**CT RSR Criteria**	
								RES DEC	**GA PMC**
Chlorinated Pesticides by EPA Method 8081B					ND		ND		
4,4-DDE	ug/kg	160	43	**3,600E**		**6,600E**	**2,100**	1,800	NE
4,4-DDT	ug/kg			**6,000E**		**15,000E**	**5,100E**	1,800	NE
4,4-DDD	ug/kg			880		**3,200**	860	2,600	NE
SPLP Chlorinated Pesticides by EPA Method 8081B		NA	NA	ND	NA		ND		10 x GWPC
Dieldrin	ug/L					0.002		--	0.02
4,4-DDT	ug/L					0.14		--	1
Total CT RSR 15 Metals by EPA Method 6010									
Arsenic	mg/kg	**18**	**68**	29	**280**	5.9	9.1	10	--
Barium	mg/kg	66	79	51	56	80	52	4,700	--
Cadmium	mg/kg				1.5	1.3		34	--
Chromium	mg/kg	11	20	28	30	39	25	NE	--
Copper	mg/kg	13	25	49	18	27	16	2,500	--
Lead	mg/kg	72	240	89	65	100	39	400	--
Nickel	mg/kg	6.9	15	15	18	16	13	1,400	--
Vanadium	mg/kg	14	34	49	40	36	37	470	--
Zinc	mg/kg	52	70	79	**460**	120	54	20,000	--
SPLP CT RSR 15 Metals by EPA Method 6020A			ND	ND			ND		
Arsenic	mg/L	0.022			0.26			--	0.01
Lead	mg/L	0.032			0.014			--	0.015
Zinc	mg/L	0.034			0.11	0.042		--	5

Notes:
1) Only constituents which were detected are included in this table.
2) mg/kg = milligrams per kilogram; mg/L = milligrams per liter; ug/kg = micrograms per kilogram
3) RES DEC = Residential Direct Exposure Criteria; GA PMC = GA Pollutant Mobility Criteria
4) Total metals concentrations are comparable to the RES DEC only; SPLP concentrations are comparable to the GA PMC.
5) NE = Not established; ND = the analyte was not detected above the method detection limit (MDL).
6) Numbers in **BOLD** indicate the detected concentration exceeds the RES DEC.
Numbers that are shaded indicate the detected concentration exceeds the GA PMC.

FIGURES



0 2000
SCALE FEET

0 1
SCALE MILE

1:24000

BASE CREATED WITH TOPO™ © 1996 WILDFLOWERS PRODUCTIONS,
www.topo.com 7.5' USGS TOPOGRAPHIC MAP

TRC

21 Griffin Road North
Windsor, CT 06095
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BARTLETT ARBORETUM
STAMFORD, CONNECTICUT

FIGURE 1
WORK PLAN

Date: 02/12 | **Project No.** 176301.0000.000000

PERS/JWALESZCZYK/HAZ/177467 STAMFORD.FH10

COUSINS RD
LARKSPUR RD
HANNAHS RD
N STAMFORD RD
HIGH RIDGE RD
BROOKDALE RD
BUD LN
BROOKDALE DR
AOC-6
SB-20
SB-19
SB-21
Approximate Location of Former Barn
SB-30
PAOC-12
SB-8
SB-22
PAOC-7
AOC-1
SB-5
SB-6
AOC-4C
Maintenance Building
Greenhouse
SB-3
SB-4
AOC-5A
PAOC-8
SB-23
SB-14
SB-13
SB-16
SB-17
SB-11
SB-12
SB-15
SB-18
AOC-3
AOC-4A
AOC-5C
Cottage
AOC-2
SB-2
SB-1
Visitor Center
PAOC-10
SB-26
SB-9
PAOC-9
SB-24
SB-25
SB-10
Brookdale Pond
SB-7
AOC-5B
AOC-4B
SB-29
SB-28
SB-27
PAOC-11

Legend

- Subject Property
- Stream
- Wetland
- Former Structure
- Walkway
- Roadways
- Building Footprint

AOC Areas

- AOC-2, 3 & 6
- AOC-1

Features

- Drain
- Leach Pit
- Prop Tank
- UST

Sampling Locations

- Boring/Well
- Soil Boring

N
W E
S

0 250 500 Feet

TRC
21 Griffin Road North
Windsor, CT 06095
(860) 298-9692

Bartlett Arboretum
Stamford, Connecticut

Site Plan - Environmental Sampling Locations

Figure: 2	Date: 02/21/12	Project No: 176301.0000.0000

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Legend

- Subject Property
- Stream
- Wetland
- Former Structure
- Walkway
- Roadways
- Building Footprint
- Proposed Excavation Area
- COC=Constituent Of Concern

AOC Areas

- AOC-2, 3 & 6
- AOC-1

Features

- Drain
- Leach Pit
- Prop Tank
- UST

Sampling Locations

- Boring/Well
- Soil Boring

N W E S

0 50 100 Feet

TRC
21 Griffin Road North
Windsor, CT 06095
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Stamford, Connecticut

AOC-1
(SB-5 & SB-6)

Figure: 3 | Date: 02/21/12 | Project No: 176301.0000.0000

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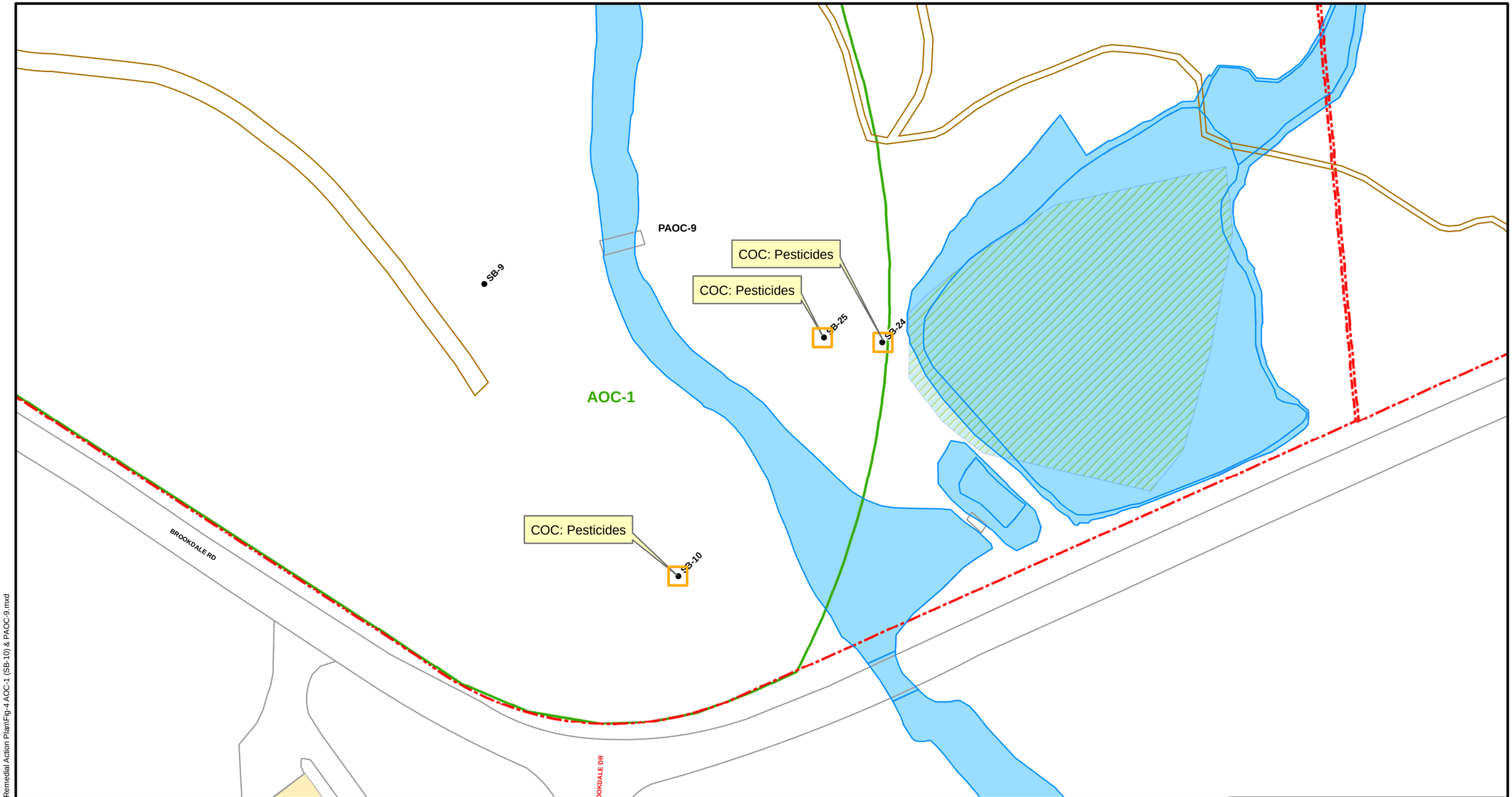

Legend

- Subject Property
- Stream
- Wetland
- Former Structure
- Walkway
- Roadways
- Building Footprint
- Proposed Excavation Area
- COC=Constituent Of Concern

AOC Areas

- AOC-2, 3 & 6
- AOC-1

Features

- Drain
- Leach Pit
- Prop Tank
- UST

Sampling Locations

- Boring/Well
- Soil Boring

N W E S

0 50 100 Feet

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Stamford, Connecticut

AOC-1
(SB-10) and PAOC-9

Figure: 4 | Date: 02/21/12 | Project No: 176301.0000.0000

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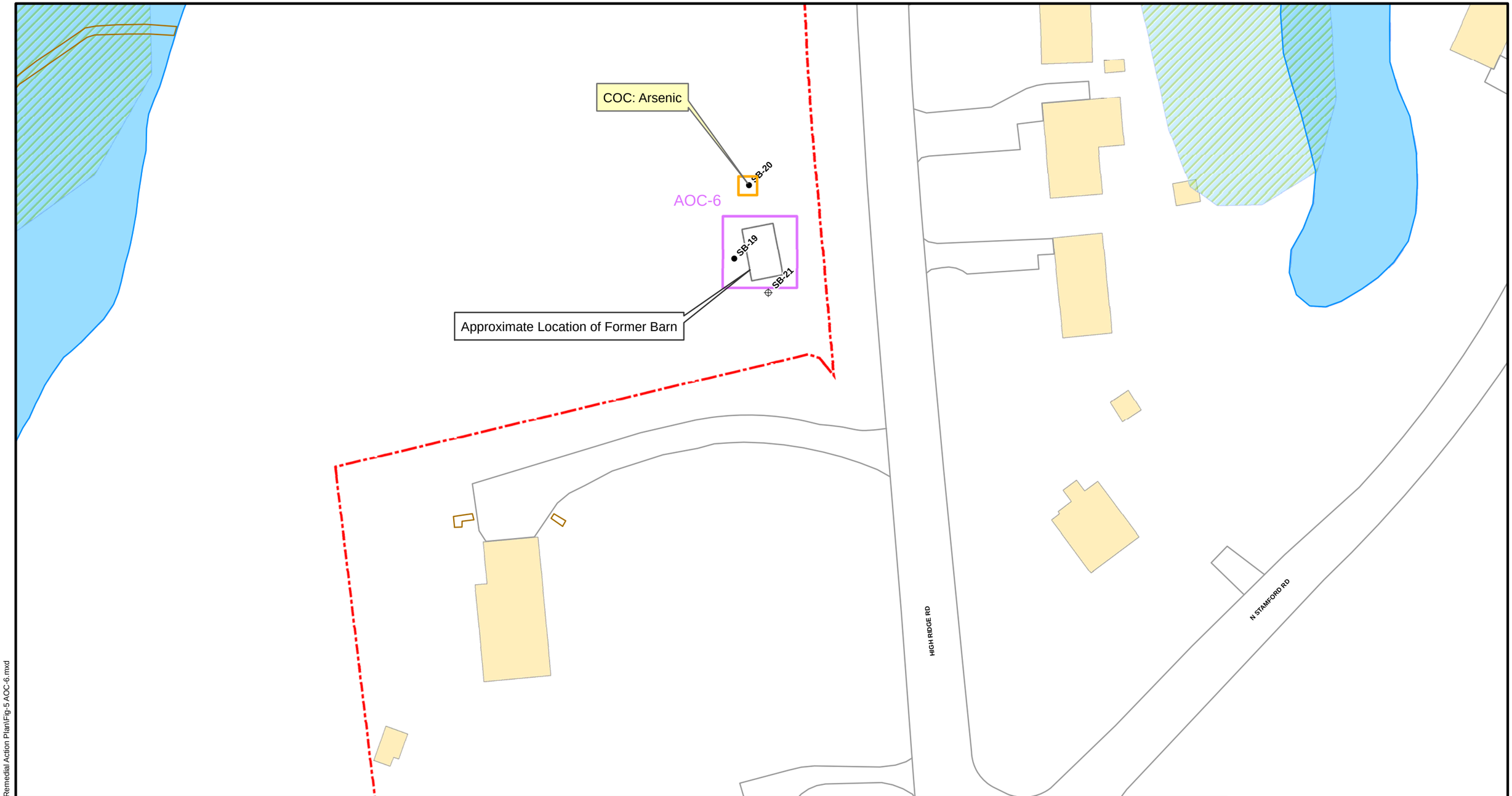

Legend

- Subject Property
- Stream
- Wetland
- Former Structure
- Walkway
- Roadways
- Building Footprint
- Proposed Excavation Area
- COC=Constituent Of Concern

AOC Areas

- AOC-2, 3 & 6
- AOC-1

Features

- Drain
- Leach Pit
- Prop Tank
- UST

Sampling Locations

- Boring/Well
- Soil Boring

N W E S

0 50 100 Feet

TRC

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Stamford, Connecticut

AOC-6

Figure: 5	Date: 02/21/12	Project No: 176301.0000.0000

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