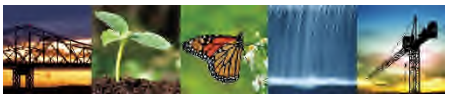


Proactive by Design

GEOTECHNICAL
ENVIRONMENTAL
ECOLOGICAL
WATER
CONSTRUCTION MANAGEMENT

1350 Main Street
Suite 1400
Springfield, MA 01103
T: 413.726.2100
F: 413.732.1249
www.gza.com

April 24, 2017
File No. 15.0166521.00

Massachusetts Department of Environmental Protection
Western Regional Office
436 Dwight Street
Springfield, MA 01103

Re: Release Abatement Measure Plan
123 Pine Street
Holyoke, Massachusetts
Release Tracking Number 1-20114

To Whom It May Concern,

On behalf of the City of Holyoke ("the City"), GZA GeoEnvironmental, Inc. (GZA) has prepared this Release Abatement Measure (RAM) Plan for the proposed: 1) removal, containerization and disposal of soil impacted by No. 2 fuel oil, and 2) confirmatory soil sampling of the removal area at 123 Pine Street in Holyoke, Massachusetts (the Site). The Massachusetts Department of Environmental Protection (MassDEP) assigned Release Tracking Number (RTN) 1-20114 to this release based on exceedances of applicable Massachusetts Contingency Plan (MCP, 310 CMR 40.0000) Reportable Concentrations (RC's) in soils at the Site. However, as described in a November 10, 2017 Letter of Responsibility (LOR) from MassDEP, the City currently maintains exempt status as a municipality, with regard to this release. Therefore, the Response Actions described in this RAM are being conducted on a voluntary basis.

This RAM Plan and the work described herein are subject to the Limitations presented in Appendix A. This Plan has been prepared in accordance with Section 40.0444 of the MCP, and supports the RAM Plan Transmittal Form (BWSC-106) contained in Appendix B in printed versions of this report. This RAM Plan was submitted electronically via eDEP in accordance with the current MassDEP policy.

The following sections of this document are intended to address the specific requirements for RAM Plans, as outlined in the MCP at 310 CMR 40.0444(1).

(a) The name, address, telephone number and relationship to the site of the person assuming responsibility for conducting the Release Abatement Measure.

The person assuming responsibility for this RAM is:

City of Holyoke Office of Planning and Economic Development
20 Korean Veterans Plaza
Holyoke, MA 01040

Telephone: (413) 322-5655
Attn: Debbie Oppermann

The Licensed Site Professional (LSP) overseeing the RAM is:

Guy Dalton
(LSP License No. 1450)
GZA GeoEnvironmental, Inc.
1350 Main Street, Suite 1400
Springfield, MA 01103
Phone: (413) 726-2104

(b) A description of the release or threat of release, site conditions and surrounding receptors.

Figure 1 provides a Site Locus Map that shows the location of the Site with respect to surrounding topographical and cultural features. Figure 2 provides a Site Plan that shows the disposal Site boundary as well as the locations of the proposed RAM activities.

A description of the Site, the release, and surrounding receptors are presented in the subsections that follow.

Site Description

The Site consists of approximately 0.126-acre of land improved with a 15,100-square foot vacant residential apartment building in the eastern-central portion of Holyoke, Massachusetts. The rest of the Site consists of grassy areas. The building was previously heated by steam from an oil-fired furnace.

Description of Release

Soil in the basement at the Site has been impacted by a release of petroleum hydrocarbons, specifically, No. 2 Fuel Oil. The suspected source of the contamination is two former aboveground storage tanks (ASTs) which were removed from the Site on July 5 of 2016, following the completion of an ASTM Phase I Environmental Site Assessment (ESA) performed by GZA for the City in April 2016. The Phase I ESA indicated that one of the two former ASTs exhibited corrosion near its base, with oil-stained concrete beneath.

During removal of the ASTs by the City's contractor, Associated Building Wreckers (ABW), one of the tanks began to leak No. 2 fuel oil onto the floor. Prior to removal, the tanks were presumed to be empty based upon a fuel gauge located on top of the tanks which was later determined not to be functional. It was estimated at the time of the release that less than the MCP Reportable Quantity of ten gallons of fuel oil were released to the floor. During removal, ABW applied absorbent material to the released fuel oil, which was then removed from the floor and containerized for off-Site disposal. On the same day the ASTs were removed by the City's contractor, GZA collected soil samples BSMT-2 and BSMT-3 from the Site (sample BSMT-1 was not analyzed) via hand auger methods, which were located as shown on Figure 2. The samples were collected from beneath either bare earth or compromised portions of the thin concrete basement floor near the former tank locations (and location of release), from depths of approximately three to nine inches below the floor. As shown in Table 1, the Extractable Petroleum Hydrocarbon (EPH) analyses performed by ESS Laboratory of Cranston, RI (ESS) via MADEP-EPH and EPH8270 methods indicated that sample BSMT-2 exceeded the applicable

Reportable Concentrations (RCS-1) for several constituents including C_9-C_{18} Aliphatics (19,990 mg/kg), C_{19}-C_{36} Aliphatics (4,500 mg/kg), C_{11}-C_{12} Aromatics (1,890 mg/kg) 2-methylnaphthalene (43.8 mg/kg) and naphthalene (12.1 mg/kg). Therefore, these detections represented a 120-day Reportable Condition under the MCP. Although C_9-C_{18} Aliphatics was detected above laboratory method reporting limits (MRLs) in the BSMT-3 sample, the concentration (27.3 mg/kg) was well below the reportable concentration for this constituent.

On August 18, 2016, GZA returned to the Site to collect additional soil samples "123 Pine - S-4" through "123 Pine – S-7" beneath the basement floor, to delineate the extent of the release. The samples were collected from a depth of three to nine inches below the floor of the basement, except for sample "123 Pine – S-6", which was a continuation of the original BSMT-2 sample, and which was collected from a depth of approximately twelve to eighteen inches below the floor. All of the delineation samples were analyzed by ESS for EPH. As shown on Table 1, samples were (conservatively) compared to the MCP S-1, S-2 and S-3 GW-2 and GW-3 standards. Although there were detections of EPH constituents in two of these samples, none exceeded the aforementioned standards.

Based upon the analytical results described above, the release appears to be limited to the BSMT-2 sample area and extends to approximately nine to twelve inches below the floor of the basement.

Surrounding Receptors

According to the City of Holyoke's Geographic Information Systems (GIS) webpage, the Site is located in an area zoned as Downtown Residential, but abuts an area to the northeast which is zoned for Limited Business. The Site is bounded to the north and northwest by residential lots located along Beech Street, a community garden to the northeast and Pine Street to the east-southeast. According to GZA's Phase I ESA, an automotive frame shop, a towing company, and a landscaping business are all located across Pine Street to the south-southwest.

A review of the Priority Resources Map developed for Holyoke by MassDEP (attached as Appendix C), indicates that there is no NHESP estimated habitat of rare wildlife within 500 feet of the Site. According to the map, the Site is not located within any surface water supply, public water supply or wellhead protection areas. The Site is not located within a Non-Potential Drinking Water Source Area.

(c) The objective(s), specific plan(s) and proposed implementation schedule for the Release Abatement Measure, including as appropriate, descriptions, plans and/or sketches of the site, any proposed structures to be constructed or installed in the project area, and any proposed investigative and/or remedial installations.

The objective of this RAM Plan is to describe the procedures to be followed for the removal and management of petroleum-impacted soil at the Site. In addition, this RAM Plan will also describe the excavation monitoring and post-excavation sampling and analysis procedures to be followed.

The RAM will include the excavation, containerization, and transport and off-Site disposal of between approximately 0.5 to 1 CY of petroleum-impacted Site soils from the Site. Based on Site characterization data and observations, impacted soil is located from just below the basement floor to approximately twelve inches below the floor in the area of sample BSMT-2. GZA's subcontractor will hand-excavate to the lateral and vertical extents based on the direction of on-Site GZA personnel. It is not an objective to reach non-detectable levels for EPH.

GZA's subcontractor will dispose of the impact soil as state-regulated oily solids at the Veolia TSDF Solvent Recycling & Energy Recovery 10 Day In-Transit Service & Sales Center, in West Carrollton, Ohio.

Once GZA has determined that the excavation has reached the target depths and lateral extents, GZA will collect and submit post-excavation soil samples to a Massachusetts-certified laboratory for confirmation of cleanup goals (below applicable S-1, S-2 and S-3 standards for the constituents which exceeded reportable concentrations). Once GZA has received laboratory results for the post-excavation soil samples and confirmed that the target cleanup goals have been achieved, GZA will utilize the confirmatory data to perform a Site-specific Method 1 Risk Characterization which will be included as part of a Permanent Solution Statement for the Site.

(d) A statement as to whether Remediation Waste, Remedial Wastewater and/or Remedial Additives will be excavated, collected, stored, treated, discharged, applied, reused, or otherwise managed at the Site.

It is anticipated that one type of Remediation Waste will be generated under this RAM Plan: petroleum-impacted soil. Soil impacted with petroleum hydrocarbons will be generated during the hand-excavation for the RAM. These soils will be temporarily containerized for off-Site disposal as described in the previous section.

GZA anticipates that the hand tools will require only gross decontamination to remove residual petroleum-impacted soils. Therefore, no wash/rinse waters will be generated during equipment decontamination.

(e) Where appropriate, a proposed environmental monitoring plan for implementation during and/or after the Release Abatement Measure.

A GZA representative will be present during RAM activities to document the work, and to observe that the work is conducted in accordance with this RAM Plan. The excavation area will be backfilled with clean soil following the removal of petroleum-impacted soils and receipt of analytical data indicating that the remediation goal has been achieved.

(f) A listing of federal, state and/or local permits likely to be needed to conduct the Release Abatement Measure.

No federal, state or local permits are required to conduct this RAM.

(g) The seal and signature of the Licensed Site Professional who prepared the Release Abatement Measure.

The seal and signature of the LSP overseeing the RAM, Guy P. Dalton (License Number 1450), is included on the MassDEP Transmittal Form BWSC-106. A copy of this form is attached to this RAM Plan as Appendix B.

(h) The certification required at 310 CMR 40.0442(5) if greater than 1,500 cubic yards of Remediation Waste are to be excavated and managed at the disposal site.

It is not anticipated that greater than 1,500 CY of soil will be excavated and managed under this RAM. GZA estimates that approximately 0.5 to 1.0 CY of impacted soil materials will be excavated and managed during the excavation and removal of petroleum-impacted soil.

(i) Any other information that the Department, during its review and evaluation of the Release Abatement Measure Plan, determines to be necessary to complete said plan, in view of site-specific circumstances and conditions.

No such additional information has been identified.

In accordance with Section 40.1403 of the MCP, the Chief Municipal Officer and Health Department for the City of Holyoke have been notified of the implementation of this RAM. Copies of the respective notification letters are contained in Appendix D.

If you should have any questions concerning this Release Abatement Measure Plan, as outlined above, feel free to contact Adam Cote or Guy Dalton at (413) 726-2100.

Very truly yours,
GZA GEOENVIRONMENTAL, INC.

Adam Cote, CHMM
Assistant Project Manager

Gordon T. Brookman, LSP
Consultant/Reviewer

Guy P. Dalton, LSP
Associate Principal

cc: Debbie Oppermann, City of Holyoke Office of Planning & Economic Development

Attachments: Figure 1 – MassDEP Phase 1 Site Assessment Map
Figure 2 – Site Plan
Appendix A – Limitations
Appendix B – RAM Transmittal Form (BWSC-106)
Appendix C – MassDEP Priority Resource Map
Appendix D – Public Notice Letters
Appendix E – Laboratory Data

FIGURES

MassDEP - Bureau of Waste Site Cleanup

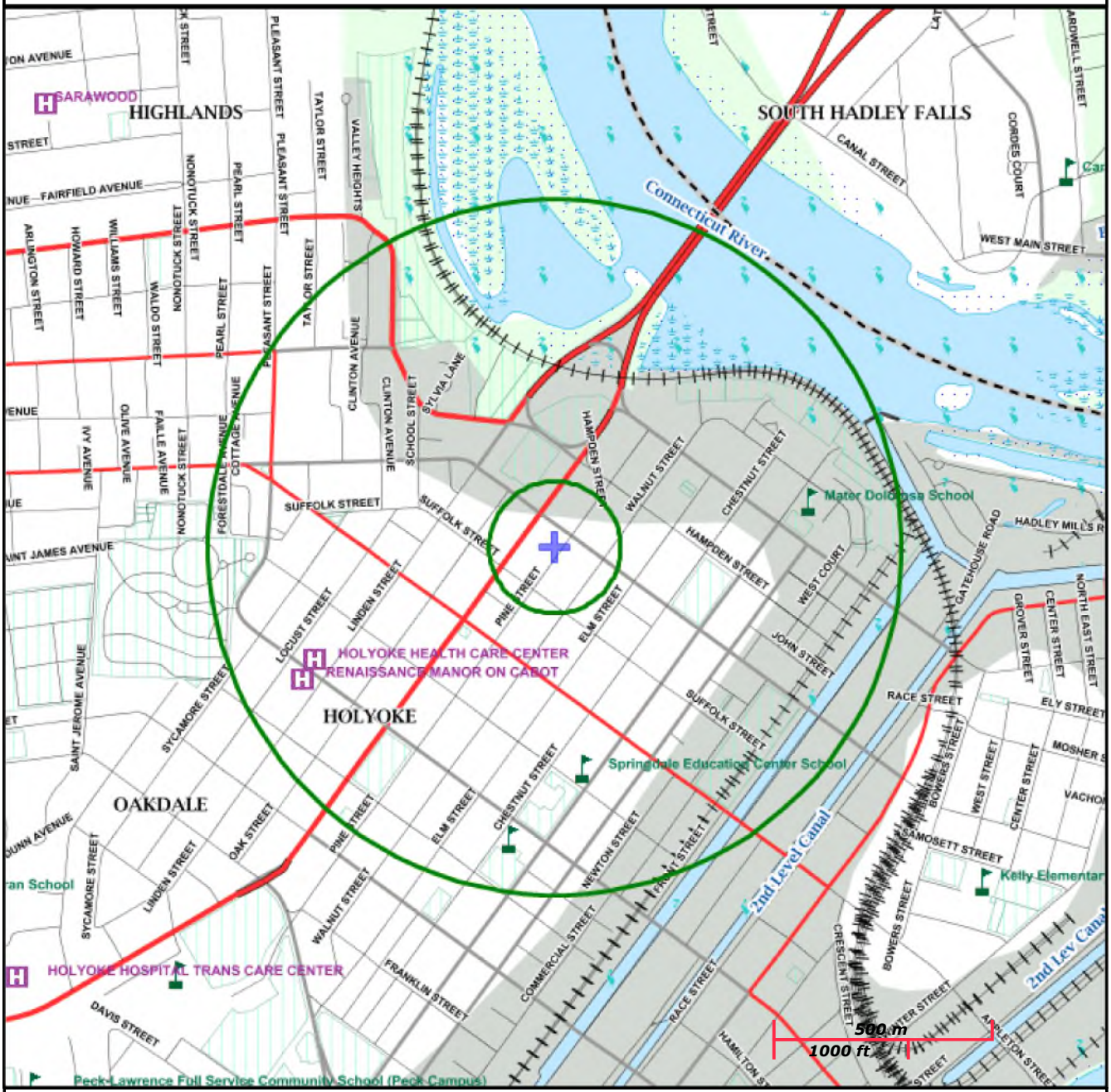
Phase 1 Site Assessment Map: 500 feet & 0.5 Mile Radii

Site Information:
123 PINE STREET, HOLYOKE, MA
123 PINE STREET HOLYOKE, MA
1-000020114

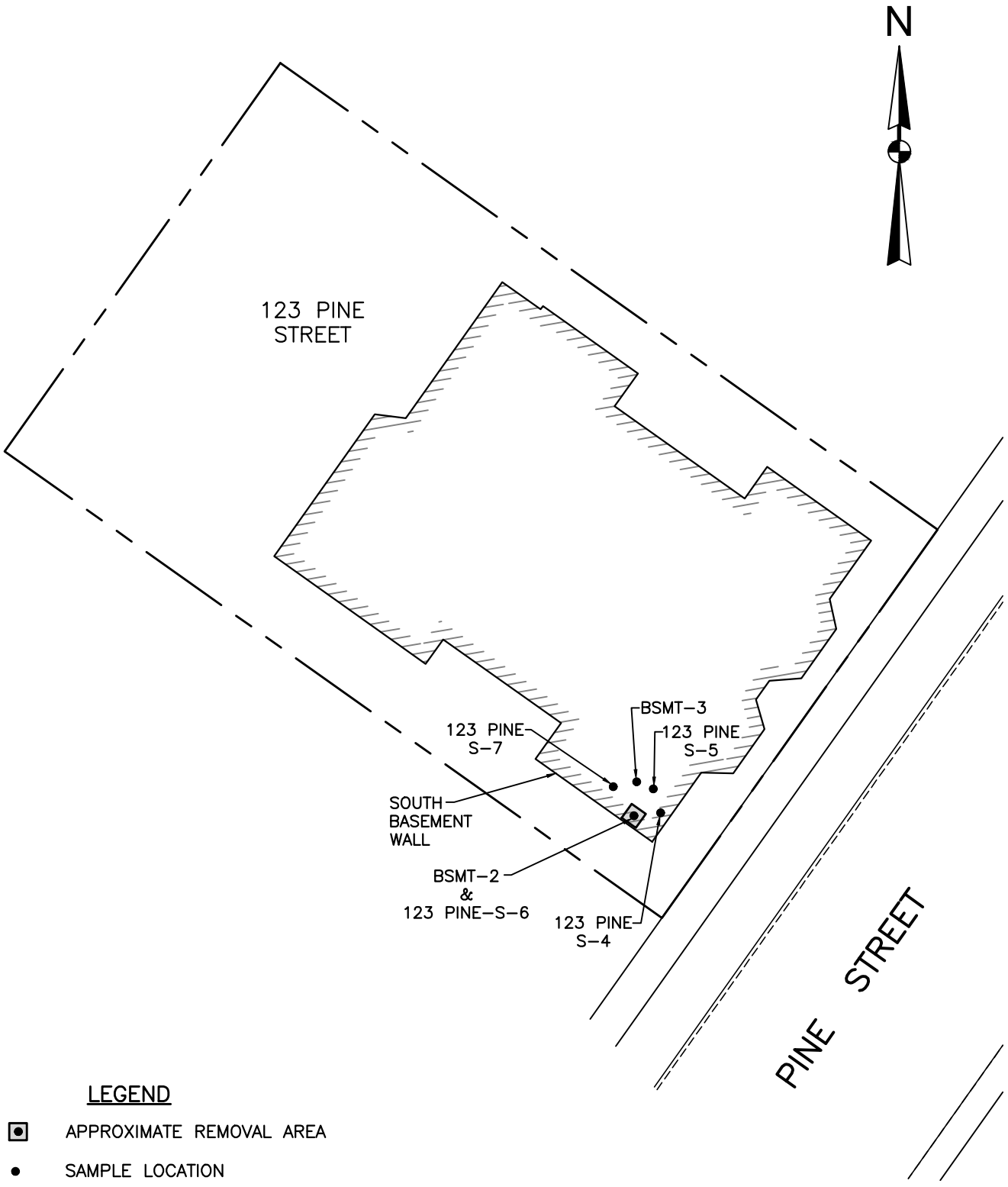
NAD83 UTM Meters:
5192379mN , -8083183mE (Zone: 18)
April 21, 2017

The information shown is the best available at the date of printing. However, it may be incomplete. The responsible party and LSP are ultimately responsible for ascertaining the true conditions surrounding the site. Metadata for data layers shown on this map can be found at: http://www.mass.gov/mgis/.

MassDEP
Commonwealth of Massachusetts
Department of Environmental Protection



Roads: Limited Access, Divided, Other Hwy, Major Road, Minor Road, Track, Trail
Boundaries: Town, County, DEP Region; Train; Powerline; Pipeline; Aqueduct
Basins: Major,PWS; Streams: Perennial, Intermittent, Man Made Shore, Dam
Aquifers: Medium Yield, High Yield, EPA Sole Source
Non Potential Drinking Water Source Area: Medium, High (Yield)
PWS Protection Areas: Zone II, IWPA, Zone A
Hydrography: Open Water, PWS Reservoir, Tidal Flat
Wetlands: Freshwater, Saltwater, Cranberry Bog
FEMA 100yr Floodplain; Protected Open Space; ACEC
Est. Rare Wetland Wildlife Hab; Vernal Pool: Cert., Potential
Solid Waste Landfill; PWS: Com.GW,SW, Emerg.,Non-Com.



NO.	ISSUE/DESCRIPTION	BY	DATE

123 PINE STREET
HOLYOKE, MA

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:
CITY OF HOLYOKE, MA
OFFICE FOR COMMUNITY DEVELOPMENT

RAM PLAN
APPROXIMATE SOIL SAMPLE/REMOVAL AREA

PROJ MGR: AC	REVIEWED BY: GD	CHECKED BY: AC	FIGURE 2
DESIGNED BY: AC	DRAWN BY: EDM	SCALE: NTS	
DATE: APRIL 2017	PROJECT NO. 15.0166521.00	REVISION NO. -	

APPENDIX A

LIMITATIONS

USE OF REPORT

1. GZA GeoEnvironmental, Inc. (GZA) prepared this report on behalf of, and for the exclusive use of our Client for the stated purpose(s) and location(s) identified in the Proposal for Services and/or Report. Use of this report, in whole or in part, at other locations, or for other purposes, may lead to inappropriate conclusions; and we do not accept any responsibility for the consequences of such use(s). Further, reliance by any party not expressly identified in the agreement, for any use, without our prior written permission, shall be at that party's sole risk, and without any liability to GZA.

STANDARD OF CARE

2. GZA's findings and conclusions are based on the work conducted as part of the Scope of Services set forth in the Proposal for Services and/or Report and reflect our professional judgment. These findings and conclusions must be considered not as scientific or engineering certainties, but rather as our professional opinions concerning the limited data gathered during the course of our work. Conditions other than described in this report may be found at the subject location(s).

3. GZA's services were performed using the degree of skill and care ordinarily exercised by qualified professionals performing the same type of services, at the same time, under similar conditions, at the same or a similar property. No warranty, expressed or implied, is made. Specifically, GZA does not and cannot represent that the Site contains no hazardous material, oil, or other latent condition beyond that observed by GZA during its study. Additionally, GZA makes no warranty that any response action or recommended action will achieve all of its objectives or that the findings of this study will be upheld by a local, state or federal agency.

4. In conducting our work, GZA relied upon certain information made available by public agencies, Client and/or others. GZA did not attempt to independently verify the accuracy or completeness of that information. Inconsistencies in this information which we have noted, if any, are discussed in the Report.

SUBSURFACE CONDITIONS

5. The generalized soil profile(s) provided in our Report are based on widely-spaced subsurface explorations and are intended only to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized, and were based on our assessment of subsurface conditions. The composition of strata, and the transitions between strata, may be more variable and more complex than indicated. For more specific information on soil conditions at a specific location refer to the exploration logs. The nature and extent of variations between these explorations may not become evident until further exploration or construction. If variations or other latent conditions then become evident, it will be necessary to reevaluate the conclusions and recommendations of this report.

6. Water level readings have been made, as described in this Report, in and monitoring wells at the specified times and under the stated conditions. These data have been reviewed and interpretations have been made in this report. Fluctuations in the level of the groundwater however occur due to temporal or spatial variations in areal recharge rates, soil heterogeneities, the presence of subsurface utilities, and/or natural or artificially induced perturbations. The observed water table may be other than indicated in the Report.

COMPLIANCE WITH CODES AND REGULATIONS

7. We used reasonable care in identifying and interpreting applicable codes and regulations necessary to execute our scope of work. These codes and regulations are subject to various, and possibly contradictory, interpretations. Interpretations and compliance with codes and regulations by other parties is beyond our control.

SCREENING AND ANALYTICAL TESTING

8. GZA collected environmental samples at the locations identified in the Report. These samples were analyzed for the specific parameters identified in the report. Additional constituents, for which analyses were not conducted, may be present in soil, groundwater, surface water, sediment and/or air. Future Site activities and uses may result in a requirement for additional testing.

9. Our interpretation of field screening and laboratory data is presented in the Report. Unless otherwise noted, we relied upon the laboratory's QA/QC program to validate these data.

10. Variations in the types and concentrations of contaminants observed at a given location or time may occur due to release mechanisms, disposal practices, changes in flow paths, and/or the influence of various physical, chemical, biological or radiological processes. Subsequently observed concentrations may be other than indicated in the Report.

INTERPRETATION OF DATA

11. Our opinions are based on available information as described in the Report, and on our professional judgment. Additional observations made over time, and/or space, may not support the opinions provided in the Report.

ADDITIONAL INFORMATION

12. In the event that the Client or others authorized to use this report obtain additional information on environmental or hazardous waste issues at the Site not contained in this report, such information shall be brought to GZA's attention forthwith. GZA will evaluate such information and, on the basis of this evaluation, may modify the conclusions stated in this report.

ADDITIONAL SERVICES

13. GZA recommends that we be retained to provide services during any future investigations, design, implementation activities, construction, and/or property development/ redevelopment at the Site. This will allow us the opportunity to: i) observe conditions and compliance with our design concepts and opinions; ii) allow for changes in the event that conditions are other than anticipated; iii) provide modifications to our design; and iv) assess the consequences of changes in technologies and/or regulations.

APPENDIX B

RAM TRANSMITTAL FORM (BWSC-106)

Massachusetts Department of Environmental Protection

eDEP Transaction Copy

Here is the file you requested for your records.

To retain a copy of this file you must save and/or print.

Username:	**RKAPLAN1**
Transaction ID:	**919153**
Document:	**BWSC106 Release Abatement Measure Transmittal Form**
Size of File:	**173.73K**
Status of Transaction:	**In Process**
Date and Time Created:	**4/24/2017:8:45:03 AM**

Note: This file only includes forms that were part of your transaction as of the date and time indicated above. If you need a more current copy of your transaction, return to eDEP and select to “Download a Copy” from the Current Submittals page.

Massachusetts Department of Environmental Protection
Bureau of Waste Site Cleanup

BWSC 106

Release Tracking Number
1 - 20114

RELEASE ABATEMENT MEASURE (RAM) TRANSMITTAL FORM

Pursuant to 310 CMR 40.0444 - 0446 (Subpart D)

A. SITE LOCATION:

1. Site Name/Location Aid: FORMER ALPINE APARTMENTS
2. Street Address: 123 PINE STREET
3. City/Town: HOLYOKE 4. Zip Code: 010400000

☐ 5. Check here if the disposal site that is the source of the release is Tier Classified. Check the current Tier Classification Category.

☐ a. Tier I ☐ b. Tier ID ☐ c. Tier II

B. THIS FORM IS BEING USED TO: (check all that apply)

1. List Submittal Date of Initial RAM Plan (if previously submitted): _____ (mm/dd/yyyy)

☑ 2. Submit an **Initial Release Abatement Measure (RAM) Plan**.

☐ a. Check here if the RAM is being conducted as part of the construction of a permanent structure. If checked, you must specify what type of permanent structure is to be erected in or in the immediate vicinity of the area where the RAM is to be conducted.

b. Specify type of permanent structure: (check all that apply) ☐ i. School ☐ ii. Residential ☐ iii. Commercial

☐ iv. Industrial ☐ v. Other Specify: _____

☐ 3. Submit a **Modified RAM Plan** of a previously submitted RAM Plan.

☐ 4. Submit a **RAM Status Report**.

☐ 5. Submit a **Remedial Monitoring Report**. (This report can only be submitted through eDEP, concurrent with a RAM Status Report.)

a. Type of Report: (check one) ☐ i. Initial Report ☐ ii. Interim Report ☐ iii. Final Report

b. Frequency of Submittal:

☐ i. A Remedial Monitoring Report(s) submitted every six months, concurrent with a RAM Status Report.
☐ ii. A Remedial Monitoring Report(s) submitted annually, concurrent with a RAM Status Report.

c. Number of Remedial Systems and/or Monitoring Programs: _____

A separate BWSC106A, RAM Remedial Monitoring Report, must be filled out for each Remedial System and/or Monitoring Program addressed by this transmittal form.

☐ 6. Submit a **RAM Completion Statement**.

☐ 7. Submit a **Revised RAM Completion Statement**.

8. Provide Additional RTNs:

☐ a. Check here if this RAM Submittal covers additional Release Tracking Numbers (RTNs). RTNs that have been previously linked to a Primary Tier Classified RTN do not need to be listed here. This section is intended to allow a RAM to cover more than one unclassified RTN and not show permanent linkage to a Primary Tier Classified RTN.

b. Provide the additional Release Tracking Number(s) covered by this RAM Submittal. ☐ - ☐ ☐ - ☐

☐ 9. Include in the **RAM Plan** or **Modified RAM Plan** a **Plan for the Application of Remedial Additives** near a sensitive receptor, pursuant to 310 CMR 40.0046(3).

(All sections of this transmittal form must be filled out unless otherwise noted above)

C. RELEASE OR THREAT OF RELEASE CONDITIONS THAT WARRANT RAM:

1. Media Impacted and Receptors Affected: (check all that apply)

☐ a. Paved Surface ☑ b. Basement ☐ c. School
☐ d. Public Water Supply ☐ e. Surface Water ☐ f. Zone 2 ☐ g. Private Well ☐ h. Residence ☑ i. Soil
☐ j. Ground Water ☐ k. Sediments ☐ l. Wetland ☐ m. Storm Drain ☐ n. Indoor Air ☐ o. Air
☐ p. Soil Gas ☐ q. Sub-Slab Soil Gas ☐ r. Critical Exposure Pathway ☐ s. NAPL ☐ t. Unknown
☐ u. Others Specify: _____

2. Sources of the Release or TOR: (check all that apply)

☐ a. Transformer ☐ b. Fuel Tank ☐ c. Pipe
☐ d. OHM Delivery ☑ e. AST ☐ f. Drums ☐ g. Tanker Truck ☐ h. Hose ☐ i. Line
☐ j. UST Describe: _____ ☐ k. Vehicle ☐ l. Boat/Vessel
☐ m. Unknown ☐ n. Other: _____

3. Type of Release or TOR: (check all that apply)

☐ a. Dumping ☐ b. Fire ☑ c. AST Removal ☐ d. Overfill
☐ e. Rupture ☐ f. Vehicle Accident ☐ g. Leak ☐ h. Spill ☐ i. Test Failure ☐ j. TOR Only
☐ k. UST Removal Describe: _____
☐ l. Unknown ☐ m. Other: _____

4. Identify Oils and Hazardous Materials Released: (check all that apply)

☑ a. Oils ☐ b. Chlorinated Solvents
☐ c. Heavy Metals ☐ d. Others Specify:

D. DESCRIPTION OF RESPONSE ACTIONS: (check all that apply, for volumes list cumulative amounts)

☐ 1. Assessment and/or Monitoring Only
☐ 2. Temporary Covers or Caps
☐ 3. Deployment of Absorbent or Containment Materials
☐ 4. Temporary Water Supplies
☐ 5. Structure Venting System/HVAC Modification System
☐ 6. Temporary Evacuation or Relocation of Residents
☐ 7. Product or NAPL Recovery
☐ 8. Fencing and Sign Posting
☐ 9. Groundwater Treatment Systems
☐ 10. Soil Vapor Extraction
☐ 11. Remedial Additives
☐ 12. Air Sparging
☐ 13. Active Exposure Pathway Mitigation System
☐ 14. Passive Exposure Pathway Mitigation System
☐ 15. Monitored Natural Attenuation
☐ 16. In-Situ Chemical Oxidation

D. DESCRIPTION OF RESPONSE ACTIONS (cont.): (check all that apply, for volumes list cumulative amounts)

☑ 17. Excavation of Contaminated Soils

☑ a. Re-use, Recycling or Treatment ☐ i. On Site Estimated volume in cubic yards

☑ ii. Off Site Estimated volume in cubic yards 1

iia. Receiving Facility: VEOLIA Town: WEST CARROLLTON State: OH

iib. Receiving Facility: Town: State:

iii. Describe: DRUMMED SOILS SHIPPED TO PROPER SOIL RECYCLING FACILITY.

☐ b. Store ☐ i. On Site Estimated volume in cubic yards

☐ ii. Off Site Estimated volume in cubic yards

iia. Receiving Facility: Town: State:

iib. Receiving Facility: Town: State:

☐ c. Landfill ☐ i. Cover Estimated volume in cubic yards

Receiving Facility: Town: State:

☐ ii. Disposal Estimated volume in cubic yards

Receiving Facility: Town: State:

☐ 18. Removal of Drums, Tanks or Containers:

a. Describe Quantity and Amount:

b. Receiving Facility: Town: State:

c. Receiving Facility: Town: State:

☐ 19. Removal of Other Contaminated Media:

a. Specify Type and Volume:

b. Receiving Facility: Town: State:

c. Receiving Facility: Town: State:

☐ 20. Other Response Actions:

Describe:

☐ 21. Use of Innovative Technologies:

Describe:

E. LSP SIGNATURE AND STAMP :

I attest under the pains and penalties of perjury that I have personally examined and am familiar with this transmittal form, including any and all documents accompanying this submittal. In my professional opinion and judgment based upon application of (i) the standard of care in 309 CMR 4.02(1), (ii) the applicable provisions of 309 CMR 4.02(2) and (3), and 309 CMR 4.03(2), and (iii) the provisions of 309 CMR 4.03(3), to the best of my knowledge, information and belief,

> if Section B of this form indicates that a **Release Abatement Measure Plan** is being submitted, the response action(s) that is (are) the subject of this submittal (i) has (have) been developed in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, (ii) is (are) appropriate and reasonable to accomplish the purposes of such response action(s) as set forth in the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000 and (iii) comply(ies) with the identified provisions of all orders, permits, and approvals identified in this submittal;

> if Section B of this form indicates that a **Release Abatement Measure Status Report** and/or **Remedial Monitoring Report** is being submitted, the response action(s) that is (are) the subject of this submittal (i) is (are) being implemented in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, (ii) is (are) appropriate and reasonable to accomplish the purposes of such response action(s) as set forth in the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000 and (iii) comply (ies) with the identified provisions of all orders, permits, and approvals identified in this submittal;

> if Section B of this form indicates that a **Release Abatement Measure Completion Statement** is being submitted, the response action(s) that is (are) the subject of this submittal (i) has (have) been developed and implemented in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, (ii) is (are) appropriate and reasonable to accomplish the purposes of such response action(s) as set forth in the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000 and (iii) comply(ies) with the identified provisions of all orders, permits, and approvals identified in this submittal:

I am aware that significant penalties may result, including, but not limited to, possible fines and imprisonment, if I submit information which I know to be false, inaccurate or materially incomplete.

1. LSP #:	1450				
2. First Name:	GUY P	3. Last Name:	DALTON		
4. Telephone:	4137762104	5. Ext.:		6. Email:	guy.dalton@gza.com
7. Signature:					
8. Date:	(mm/dd/yyyy)	9. LSP Stamp:			

F. PERSON UNDERTAKING RAM:

1. Check all that apply: ☐ a. change in contact name ☐ b. change of address ☑ c. change in the person undertaking response actions

2. Name of Organization: CITY OF HOLYOKE

3. Contact First Name: DEBBIE 4. Last Name: OPPERMANN

5. Street: 20 KOREAN VETERAN'S PLAZA, #40 6. Title: SENIOR PROJECT MANAGER

7. City/Town: HOLYOKE 8. State: MA 9. ZIP Code: 010400000

10. Telephone: 4133225575 11. Ext.: 12. Email: oppermannd@holyoke.or

G. RELATIONSHIP TO RELEASE OR THREAT OF RELEASE OF PERSON UNDERTAKING RAM:

☑ Check here to change relationship

☑ 1. RP or PRP ☑ a. Owner ☐ b. Operator ☐ c. Generator ☐ d. Transporter

☐ e. Other RP or PRP Specify:

☐ 2. Fiduciary, Secured Lender or Municipality with Exempt Status (as defined by M.G.L. c. 21E, s. 2)

☐ 3. Agency or Public Utility on a Right of Way (as defined by M.G.L. c. 21E, s. 5(j))

☐ 4. Any Other Person Undertaking RAM Specify Relationship:

H. REQUIRED ATTACHMENT AND SUBMITTALS:

☐ 1. Check here if any Remediation Waste, generated as a result of this RAM, will be stored, treated, managed, recycled or reused at the site following submission of the RAM Completion Statement. You must submit a Phase IV Remedy Implementation Plan along with the appropriate transmittal form (BWSC108).

☐ 2. Check here if the Response Action(s) on which this opinion is based, if any, are (were) subject to any order(s), permit(s) and/or approval(s) issued by DEP or EPA. If the box is checked, you MUST attach a statement identifying the applicable provisions thereof.

☑ 3. Check here to certify that the Chief Municipal Officer and the Local Board of Health have been notified of the implementation of a Release Abatement Measure.

☐ 4. Check here if any non-updatable information provided on this form is incorrect, e.g. Release Address/Location Aid. Send corrections to bwsc.edep@state.ma.us.

☐ 5. If a RAM Compliance Fee is required for this RAM, check here to certify that a RAM Compliance Fee was submitted to DEP, P. O. Box 4062, Boston, MA 02211.

☑ 6. Check here to certify that the LSP Opinion containing the material facts, data, and other information is attached.

RELEASE ABATEMENT MEASURE (RAM) TRANSMITTAL FORM

Pursuant to 310 CMR 40.0444 - 0446 (Subpart D)

I. CERTIFICATION OF PERSON UNDERTAKING RAM:

1. I, _____ , attest under the pains and penalties of perjury (i) that I have personally examined and am familiar with the information contained in this submittal, including any and all documents accompanying this transmittal form, (ii) that, based on my inquiry of those individuals immediately responsible for obtaining the information, the material information contained in this submittal is, to the best of my knowledge and belief, true, accurate and complete, and (iii) that I am fully authorized to make this attestation on behalf of the entity legally responsible for this submittal. I/the person or entity on whose behalf this submittal is made am/is aware that there are significant penalties, including, but not limited to, possible fines and imprisonment, for willfully submitting false, inaccurate, or incomplete information.

2. By: _____ (Signature)

3. Title: SENIOR PROJECT MANAGER

4. For: CITY OF HOLYOKE (Name of person or entity recorded in Section F)

5. Date: _____ (mm/dd/yyyy)

☐ 6. Check here if the address of the person providing certification is different from address recorded in Section F.

7. Street: _____

8. City/Town: _____ 9. State: _____ 10. ZIP Code: _____

11. Telephone: _____ 12. Ext.: _____ 13. Email: _____

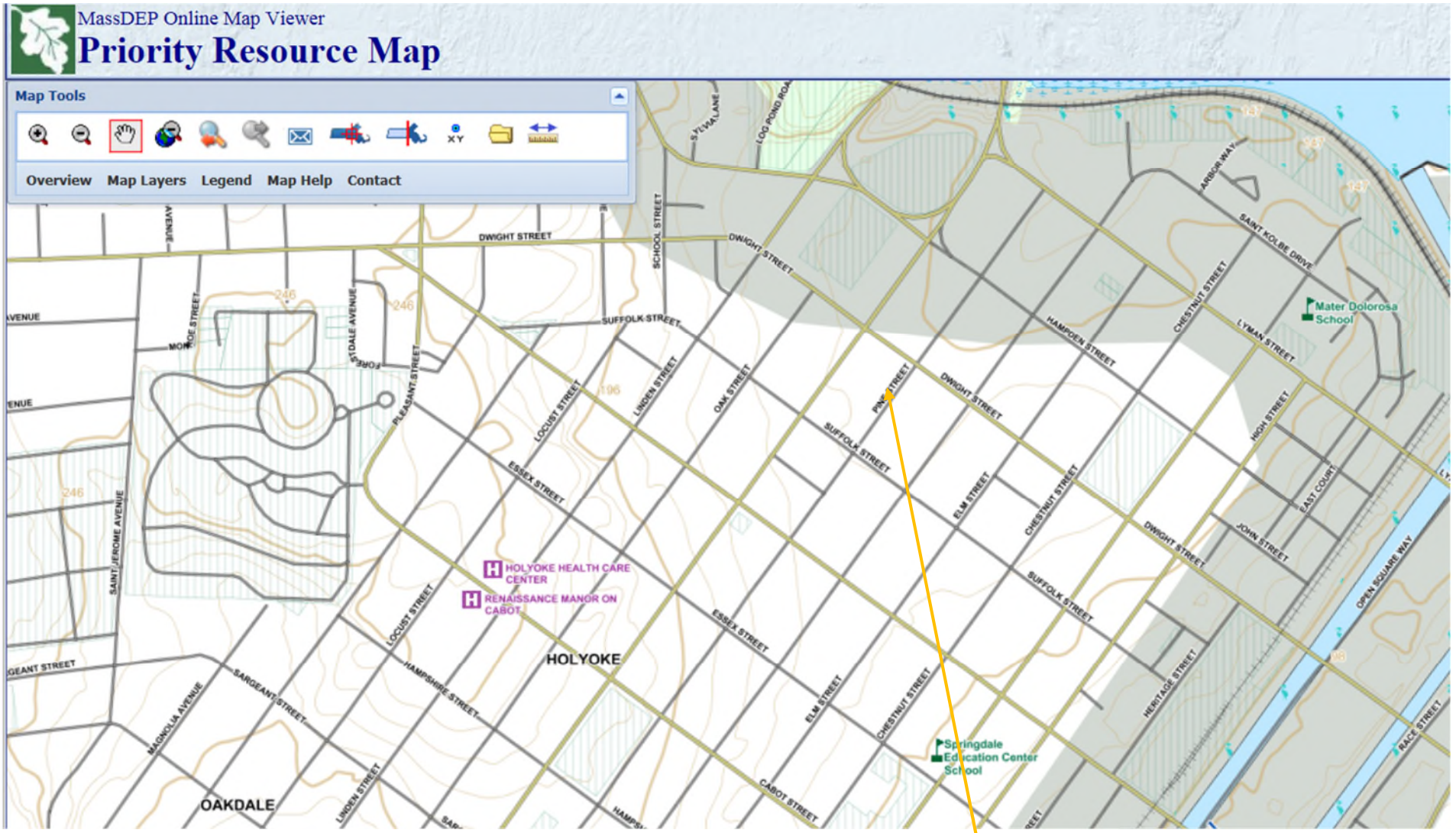
YOU ARE SUBJECT TO AN ANNUAL COMPLIANCE ASSURANCE FEE OF UP TO $10,000 PER BILLABLE YEAR FOR THIS DISPOSAL SITE. YOU MUST LEGIBLY COMPLETE ALL RELEVANT SECTIONS OF THIS FORM OR DEP MAY RETURN THE DOCUMENT AS INCOMPLETE. IF YOU SUBMIT AN INCOMPLETE FORM, YOU MAY BE PENALIZED FOR MISSING A REQUIRED DEADLINE

Date Stamp (DEP USE ONLY:)

APPENDIX C

MASS DEP PRIORITY RESOURCE MAP

Appendix C – Priority Resources Map



MassDEP Online Map Viewer

MassDEP
Massachusetts Department of Environmental Protection

Map Legend

APPENDIX D

PUBLIC NOTICE LETTERS

Proactive by Design

GEOTECHNICAL
ENVIRONMENTAL
ECOLOGICAL
WATER
CONSTRUCTION MANAGEMENT

1350 Main Street
Suite 1400
Springfield, MA 01103
413.726.2100
www.gza.com

April 21, 2017
File No. 15.0166521.00

The Honorable Alex Morse
Office of the Mayor
536 Dwight Street
Holyoke, Massachusetts 01040

Re: Notice of Release Abatement Measure (RAM)
123 Pine Street
Holyoke, Massachusetts
Release Tracking Number (RTN) 1-20114

Dear Mayor Morse:

On behalf of the City of Holyoke, GZA GeoEnvironmental, Inc. (GZA) is providing this notification that a Release Abatement Measure (RAM) will be implemented at the above-referenced Site in accordance with the applicable provisions of the Massachusetts Contingency Plan (MCP, 310 CMR 40.0000).

The objective of the RAM Plan is to manage the hand-excavation, containerization and off-Site disposal of soil with petroleum hydrocarbons (No. 2 fuel oil), and post-excavation soil sampling and analysis of the excavation area. Initiation of RAM field activities is anticipated to begin within one to three weeks of submission of this letter and the associated RAM Plan to the Massachusetts Department of Environmental Protection (MassDEP). GZA anticipates that RAM activities will be concluded within approximately one to two weeks of initiation, depending upon the completion of off-Site disposal of petroleum-impacted soil.

This submittal is provided in accordance with 310 CMR 40.1403(3)(d) and 310 CMR 40.1403(3)(h).

Very truly yours,
GZA GEOENVIRONMENTAL, INC.

Adam Cote, CHMM
Assistant Project Manager

Gordon T Brookman, LSP
Consultant/Reviewer

Guy P. Dalton, LSP
Associate Principal

Cc: Marcos Marrero, Department of Planning and Economic Development
Debbie Opermann, Department of Planning and Economic Development

Proactive by Design

GEOTECHNICAL
ENVIRONMENTAL
ECOLOGICAL
WATER
CONSTRUCTION MANAGEMENT

1350 Main Street
Suite 1400
Springfield, MA 01103
413.726.2100
www.gza.com

April 21, 2017
File No. 15.0166521.00

Mr. Brian Fitzgerald
Board of Health, Director
20 Korean Veterans Plaza
Holyoke, Massachusetts 01040

Re: Notice of Release Abatement Measure (RAM)
123 Pine Street
Holyoke, Massachusetts
Release Tracking Number (RTN) 1-20114

Dear Mayor Morse:

On behalf of the City of Holyoke, GZA GeoEnvironmental, Inc. (GZA) is providing this notification that a Release Abatement Measure (RAM) will be implemented at the above-referenced Site in accordance with the applicable provisions of the Massachusetts Contingency Plan (MCP, 310 CMR 40.0000).

The objective of the RAM Plan is to manage the hand-excavation, containerization and off-Site disposal of soil with petroleum hydrocarbons (No. 2 fuel oil), and post-excavation soil sampling and analysis of the excavation area. Initiation of RAM field activities is anticipated to begin within one to three weeks of submission of this letter and the associated RAM Plan to the Massachusetts Department of Environmental Protection (MassDEP). GZA anticipates that RAM activities will be concluded within approximately one to two weeks of initiation, depending upon the completion of off-Site disposal of petroleum-impacted soil.

This submittal is provided in accordance with 310 CMR 40.1403(3)(d) and 310 CMR 40.1403(3)(h).

Very truly yours,
GZA GEOENVIRONMENTAL, INC.

Adam Cote, CHMM
Assistant Project Manager

Gordon T Brookman, LSP
Consultant/Reviewer

Guy P. Dalton, LSP
Associate Principal

Cc: Marcos Marrero, Department of Planning and Economic Development
Debbie Opermann, Department of Planning and Economic Development

APPENDIX E

LABORATORY DATA

CERTIFICATE OF ANALYSIS

Adam Cote
GZA GeoEnvironmental, Inc.
1350 Main Street, Suite 1400
Springfield, MA 01103

RE: 123 Pine Street (15.0166521)
ESS Laboratory Work Order Number: 1607072

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.

Laurel Stoddard
Laboratory Director

REVIEWED
By ESS Laboratory at 2:11 pm, Jul 18, 2016

Analytical Summary
The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

The test results present in this report are in compliance with NELAC Standards, A2LA and/or client Quality Assurance Project Plans (QAPP). The laboratory has reviewed the following: Sample Preservations, Hold Times, Initial Calibrations, Continuing Calibrations, Method Blanks, Blank Spikes, Blank Spike Duplicates, Duplicates, Matrix Spikes, Matrix Spike Duplicates, Surrogates and Internal Standards. Any results which were found to be outside of the recommended ranges stated in our SOPs will be noted in the Project Narrative.

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: 123 Pine Street

ESS Laboratory Work Order: 1607072

SAMPLE RECEIPT

The following samples were received on July 07, 2016 for the analyses specified on the enclosed Chain of Custody Record.

To achieve CAM compliance for MCP data, ESS Laboratory has performed and reviewed all QA/QC Requirements and Performance Standards listed in each method. Holding times and preservation have also been reviewed. All CAM requirements have been achieved unless noted in the project narrative.

Each method has been set-up in the laboratory to reach required MCP standards. The methods for aqueous VOA and Soil Methanol VOA have known limitations for certain analytes. The regulatory standards may not be achieved due to these limitations. In addition, for all methods, matrix interferences, dilutions, and %Solids may elevate method reporting limits above regulatory standards. ESS Laboratory can provide, upon request, a Data Checker (regulatory standard comparison spreadsheet) electronic deliverable which will highlight these exceedances.

Lab Number	Sample Name	Matrix	Analysis
1607072-01	BSMT-2	Soil	EPH8270, MADEP-EPH
1607072-02	BSMT-3	Soil	EPH8270, MADEP-EPH

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: 123 Pine Street ESS Laboratory Work Order: 1607072

PROJECT NARRATIVE

MADEP-EPH Extractable Petroleum Hydrocarbons
1607072-01 **Surrogate recovery(ies) diluted below the MRL (SD).**
1-Chlorooctadecane (% @ 40-140%)

No other observations noted.

End of Project Narrative.

DATA USABILITY LINKS

Definitions of Quality Control Parameters

Semivolatile Organics Internal Standard Information

Semivolatile Organics Surrogate Information

Volatile Organics Internal Standard Information

Volatile Organics Surrogate Information

EPH and VPH Alkane Lists

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: 123 Pine Street

ESS Laboratory Work Order: 1607072

CURRENT SW-846 METHODOLOGY VERSIONS

Analytical Methods

1010A - Flashpoint
6010C - ICP
6020A - ICP MS
7010 - Graphite Furnace
7196A - Hexavalent Chromium
7470A - Aqueous Mercury
7471B - Solid Mercury
8011 - EDB/DBCP/TCP
8015D - GRO/DRO
8081B - Pesticides
8082A - PCB
8100M - TPH
8151A - Herbicides
8260B - VOA
8270D - SVOA
8270D SIM - SVOA Low Level
9014 - Cyanide
9038 - Sulfate
9040C - Aqueous pH
9045D - Solid pH (Corrosivity)
9050A - Specific Conductance
9056A - Anions (IC)
9060A - TOC
9095B - Paint Filter
MADEP 04-1.1 - EPH / VPH

Prep Methods

3005A - Aqueous ICP Digestion
3020A - Aqueous Graphite Furnace / ICP MS Digestion
3050B - Solid ICP / Graphite Furnace / ICP MS Digestion
3060A - Solid Hexavalent Chromium Digestion
3510C - Separatory Funnel Extraction
3520C - Liquid / Liquid Extraction
3540C - Manual Soxhlet Extraction
3541 - Automated Soxhlet Extraction
3546 - Microwave Extraction
3580A - Waste Dilution
5030B - Aqueous Purge and Trap
5030C - Aqueous Purge and Trap
5035 - Solid Purge and Trap

SW846 Reactivity Methods 7.3.3.2 (Reactive Cyanide) and 7.3.4.1 (Reactive Sulfide) have been withdrawn by EPA. These methods are reported per client request and are not NELAP accredited.

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: 123 Pine Street

ESS Laboratory Work Order: 1607072

MassDEP Analytical Protocol Certification Form

MADEP RTN: _____

This form provides certification for the following data set: **1607072-01 through 1607072-02**

Matrices: ( ) Ground Water/Surface Water (X) Soil/Sediment ( ) Drinking Water ( ) Air ( ) Other:_____

CAM Protocol (check all that apply below):

( ) 8260 VOC CAM II A	( ) 7470/7471 Hg CAM III B	( ) MassDEP VPH CAM IV A	( ) 8081 Pesticides CAM V B	( ) 7196 Hex Cr CAM VI B	( ) MassDEP APH CAM IX A
( ) 8270 SVOC CAM II B	( ) 7010 Metals CAM III C	(X) MassDEP EPH CAM IV B	( ) 8151 Herbicides CAM V C	( ) 8330 Explosives CAM VIII A	( ) TO-15 VOC CAM IX B
( ) 6010 Metals CAM III A	( ) 6020 Metals CAM III D	( ) 8082 PCB CAM V A	( ) 6860 Perchlorate CAM VIII B	( ) 9014 Total Cyanide/PAC CAM VI A	

Affirmative responses to questions A through F are required for "Presumptive Certainty" status

A	Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding times?	Yes (X) No ( )
B	Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed?	Yes (X) No ( )
C	Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances?	Yes (X) No ( )
D	Does the laboratory report comply with all the reporting requirements specified in the CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	Yes (X) No ( )
E	a. VPH, EPH, APH and TO-15 only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications).	Yes (X) No ( )
	b. APH and TO-15 Methods only: Was the complete analyte list reported for each method?	Yes ( ) No ( )
F	Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all "No" responses to Questions A through E)?	Yes (X) No ( )

Responses to Questions G, H and I below are required for "Presumptive Certainty" status

G	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocols(s)?	Yes (X) No ( )*
	***Data User Note:* Data that achieve "Presumptive Certainty" status may not necessarily meet the data usability and representativeness requirements described in 310 CMR 40. 1056 (2)(k) and WSC-07-350.**	
H	Were **all** QC performance standards specified in the CAM protocol(s) achieved?	Yes ( ) No (X)*
I	Were results reported for the complete analyte list specified in the selected CAM protocol(s)?	Yes (X) No ( )*

All negative responses must be addressed in an attached laboratory narrative.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: _____ Date: July 18, 2016

Printed Name: Laurel Stoddard Position: Laboratory Director

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: 123 Pine Street
Client Sample ID: BSMT-2
Date Sampled: 07/05/16 12:40
Percent Solids: 90
Initial Volume: 24.4
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 1607072
ESS Laboratory Sample ID: 1607072-01
Sample Matrix: Soil
Units: mg/kg dry

Prepared: 7/7/16 18:10

MADEP-EPH Extractable Petroleum Hydrocarbons

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
C9-C18 Aliphatics1	**19900** (341)		MADEP-EPH		20	ZLC	07/13/16 1:15	CZG0125	CG60715
C19-C36 Aliphatics1	**4500** (341)		MADEP-EPH		20	ZLC	07/13/16 1:15	CZG0125	CG60715
C11-C22 Unadjusted Aromatics1	**1960** (85.2)		EPH8270		5	VSC	07/14/16 17:02	CZG0181	CG60715
C11-C22 Aromatics1,2	**1890** (85.2)		EPH8270			VSC	07/14/16 17:36		[CALC]
2-Methylnaphthalene	**43.8** (5.68)		EPH8270		25	VSC	07/14/16 17:36	CZG0181	CG60715
Acenaphthene	**2.97** (2.27)		EPH8270		5	VSC	07/14/16 17:02	CZG0181	CG60715
Naphthalene	**12.1** (2.27)		EPH8270		5	VSC	07/14/16 17:02	CZG0181	CG60715
Phenanthrene	**7.67** (2.27)		EPH8270		5	VSC	07/14/16 17:02	CZG0181	CG60715
Acenaphthylene	ND (1.14)		EPH8270		5	VSC	07/14/16 17:02	CZG0181	CG60715
Anthracene	ND (2.27)		EPH8270		5	VSC	07/14/16 17:02	CZG0181	CG60715
Benzo(a)anthracene	ND (2.27)		EPH8270		5	VSC	07/14/16 17:02	CZG0181	CG60715
Benzo(a)pyrene	ND (2.27)		EPH8270		5	VSC	07/14/16 17:02	CZG0181	CG60715
Benzo(b)fluoranthene	ND (2.27)		EPH8270		5	VSC	07/14/16 17:02	CZG0181	CG60715
Benzo(g,h,i)perylene	ND (2.27)		EPH8270		5	VSC	07/14/16 17:02	CZG0181	CG60715
Benzo(k)fluoranthene	ND (2.27)		EPH8270		5	VSC	07/14/16 17:02	CZG0181	CG60715
Chrysene	ND (2.27)		EPH8270		5	VSC	07/14/16 17:02	CZG0181	CG60715
Dibenzo(a,h)Anthracene	ND (1.14)		EPH8270		5	VSC	07/14/16 17:02	CZG0181	CG60715
Fluoranthene	ND (2.27)		EPH8270		5	VSC	07/14/16 17:02	CZG0181	CG60715
Fluorene	**5.51** (2.27)		EPH8270		5	VSC	07/14/16 17:02	CZG0181	CG60715
Indeno(1,2,3-cd)Pyrene	ND (2.27)		EPH8270		5	VSC	07/14/16 17:02	CZG0181	CG60715
Pyrene	ND (2.27)		EPH8270		5	VSC	07/14/16 17:02	CZG0181	CG60715

	%Recovery	Qualifier	Limits
Surrogate: 1-Chlorooctadecane	*%*	*SD*	*40-140*
Surrogate: 2-Bromonaphthalene	*48 %*		*40-140*
Surrogate: 2-Fluorobiphenyl	*62 %*		*40-140*
Surrogate: O-Terphenyl	*64 %*		*40-140*

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: 123 Pine Street
Client Sample ID: BSMT-3
Date Sampled: 07/05/16 12:50
Percent Solids: 92
Initial Volume: 24.5
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 1607072
ESS Laboratory Sample ID: 1607072-02
Sample Matrix: Soil
Units: mg/kg dry

Prepared: 7/7/16 18:10

MADEP-EPH Extractable Petroleum Hydrocarbons

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
C9-C18 Aliphatics1	**27.3** (16.7)		MADEP-EPH		1	ZLC	07/13/16 2:03	CZG0125	CG60715
C19-C36 Aliphatics1	ND (16.7)		MADEP-EPH		1	ZLC	07/13/16 2:03	CZG0125	CG60715
C11-C22 Unadjusted Aromatics1	ND (16.7)		EPH8270		1	VSC	07/14/16 15:54	CZG0181	CG60715
C11-C22 Aromatics1,2	ND (16.7)		EPH8270			VSC	07/14/16 15:54		[CALC]
2-Methylnaphthalene	ND (0.22)		EPH8270		1	VSC	07/14/16 15:54	CZG0181	CG60715
Acenaphthene	ND (0.44)		EPH8270		1	VSC	07/14/16 15:54	CZG0181	CG60715
Naphthalene	ND (0.44)		EPH8270		1	VSC	07/14/16 15:54	CZG0181	CG60715
Phenanthrene	ND (0.44)		EPH8270		1	VSC	07/14/16 15:54	CZG0181	CG60715
Acenaphthylene	ND (0.22)		EPH8270		1	VSC	07/14/16 15:54	CZG0181	CG60715
Anthracene	ND (0.44)		EPH8270		1	VSC	07/14/16 15:54	CZG0181	CG60715
Benzo(a)anthracene	ND (0.44)		EPH8270		1	VSC	07/14/16 15:54	CZG0181	CG60715
Benzo(a)pyrene	ND (0.44)		EPH8270		1	VSC	07/14/16 15:54	CZG0181	CG60715
Benzo(b)fluoranthene	ND (0.44)		EPH8270		1	VSC	07/14/16 15:54	CZG0181	CG60715
Benzo(g,h,i)perylene	ND (0.44)		EPH8270		1	VSC	07/14/16 15:54	CZG0181	CG60715
Benzo(k)fluoranthene	ND (0.44)		EPH8270		1	VSC	07/14/16 15:54	CZG0181	CG60715
Chrysene	ND (0.44)		EPH8270		1	VSC	07/14/16 15:54	CZG0181	CG60715
Dibenzo(a,h)Anthracene	ND (0.22)		EPH8270		1	VSC	07/14/16 15:54	CZG0181	CG60715
Fluoranthene	ND (0.44)		EPH8270		1	VSC	07/14/16 15:54	CZG0181	CG60715
Fluorene	ND (0.44)		EPH8270		1	VSC	07/14/16 15:54	CZG0181	CG60715
Indeno(1,2,3-cd)Pyrene	ND (0.44)		EPH8270		1	VSC	07/14/16 15:54	CZG0181	CG60715
Pyrene	ND (0.44)		EPH8270		1	VSC	07/14/16 15:54	CZG0181	CG60715

	%Recovery	Qualifier	Limits
Surrogate: 1-Chlorooctadecane	*80 %*		*40-140*
Surrogate: 2-Bromonaphthalene	*78 %*		*40-140*
Surrogate: 2-Fluorobiphenyl	*73 %*		*40-140*
Surrogate: O-Terphenyl	*75 %*		*40-140*

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: 123 Pine Street

ESS Laboratory Work Order: 1607072

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
MADEP-EPH Extractable Petroleum Hydrocarbons										
Batch CG60715 - 3546										
Blank										
C19-C36 Aliphatics1	ND	15.0	mg/kg wet							
C9-C18 Aliphatics1	ND	15.0	mg/kg wet							
Decane (C10)	ND	0.5	mg/kg wet							
Docosane (C22)	ND	0.5	mg/kg wet							
Dodecane (C12)	ND	0.5	mg/kg wet							
Eicosane (C20)	ND	0.5	mg/kg wet							
Hexacosane (C26)	ND	0.5	mg/kg wet							
Hexadecane (C16)	ND	0.5	mg/kg wet							
Hexatriacontane (C36)	ND	0.5	mg/kg wet							
Nonadecane (C19)	ND	0.5	mg/kg wet							
Nonane (C9)	ND	0.5	mg/kg wet							
Octacosane (C28)	ND	0.5	mg/kg wet							
Octadecane (C18)	ND	0.5	mg/kg wet							
Tetracosane (C24)	ND	0.5	mg/kg wet							
Tetradecane (C14)	ND	0.5	mg/kg wet							
Triacontane (C30)	ND	0.5	mg/kg wet							
Surrogate: 1-Chlorooctadecane	*1.70*		mg/kg wet	*2.000*		*85*	*40-140*			
Blank										
2-Methylnaphthalene	ND	0.20	mg/kg wet							
Acenaphthene	ND	0.40	mg/kg wet							
Acenaphthylene	ND	0.20	mg/kg wet							
Anthracene	ND	0.40	mg/kg wet							
Benzo(a)anthracene	ND	0.40	mg/kg wet							
Benzo(a)pyrene	ND	0.40	mg/kg wet							
Benzo(b)fluoranthene	ND	0.40	mg/kg wet							
Benzo(g,h,i)perylene	ND	0.40	mg/kg wet							
Benzo(k)fluoranthene	ND	0.40	mg/kg wet							
C11-C22 Aromatics1,2	ND	15.0	mg/kg wet							
C11-C22 Unadjusted Aromatics1	ND	15.0	mg/kg wet							
Chrysene	ND	0.40	mg/kg wet							
Dibenzo(a,h)Anthracene	ND	0.20	mg/kg wet							
Fluoranthene	ND	0.40	mg/kg wet							
Fluorene	ND	0.40	mg/kg wet							
Indeno(1,2,3-cd)Pyrene	ND	0.40	mg/kg wet							
Naphthalene	ND	0.40	mg/kg wet							
Phenanthrene	ND	0.40	mg/kg wet							
Pyrene	ND	0.40	mg/kg wet							
Surrogate: 2-Bromonaphthalene	*1.92*		mg/kg wet	*2.000*		*96*	*40-140*			
Surrogate: 2-Fluorobiphenyl	*1.84*		mg/kg wet	*2.000*		*92*	*40-140*			
Surrogate: O-Terphenyl	*1.97*		mg/kg wet	*2.000*		*98*	*40-140*			
LCS										
C19-C36 Aliphatics1	18.1	15.0	mg/kg wet	16.00		113	40-140			
C9-C18 Aliphatics1	11.7	15.0	mg/kg wet	12.00		97	40-140			

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: 123 Pine Street

ESS Laboratory Work Order: 1607072

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
MADEP-EPH Extractable Petroleum Hydrocarbons										
Batch CG60715 - 3546										
Decane (C10)	1.1	0.5	mg/kg wet	2.000		57	40-140			
Docosane (C22)	1.7	0.5	mg/kg wet	2.000		87	40-140			
Dodecane (C12)	1.2	0.5	mg/kg wet	2.000		62	40-140			
Eicosane (C20)	1.7	0.5	mg/kg wet	2.000		85	40-140			
Hexacosane (C26)	1.7	0.5	mg/kg wet	2.000		86	40-140			
Hexadecane (C16)	1.6	0.5	mg/kg wet	2.000		79	40-140			
Hexatriacontane (C36)	1.5	0.5	mg/kg wet	2.000		75	40-140			
Nonadecane (C19)	1.7	0.5	mg/kg wet	2.000		85	40-140			
Nonane (C9)	0.9	0.5	mg/kg wet	2.000		46	30-140			
Octacosane (C28)	1.6	0.5	mg/kg wet	2.000		81	40-140			
Octadecane (C18)	1.7	0.5	mg/kg wet	2.000		85	40-140			
Tetracosane (C24)	1.7	0.5	mg/kg wet	2.000		83	40-140			
Tetradecane (C14)	1.4	0.5	mg/kg wet	2.000		70	40-140			
Triacontane (C30)	1.6	0.5	mg/kg wet	2.000		81	40-140			
Surrogate: 1-Chlorooctadecane	*1.74*		mg/kg wet	*2.000*		*87*	*40-140*			
LCS										
2-Methylnaphthalene	1.14	0.20	mg/kg wet	2.000		57	40-140			
Acenaphthene	1.28	0.40	mg/kg wet	2.000		64	40-140			
Acenaphthylene	1.32	0.20	mg/kg wet	2.000		66	40-140			
Anthracene	1.38	0.40	mg/kg wet	2.000		69	40-140			
Benzo(a)anthracene	1.46	0.40	mg/kg wet	2.000		73	40-140			
Benzo(a)pyrene	1.60	0.40	mg/kg wet	2.000		80	40-140			
Benzo(b)fluoranthene	1.56	0.40	mg/kg wet	2.000		78	40-140			
Benzo(g,h,i)perylene	1.57	0.40	mg/kg wet	2.000		79	40-140			
Benzo(k)fluoranthene	1.57	0.40	mg/kg wet	2.000		78	40-140			
C11-C22 Aromatics1,2	ND	15.0	mg/kg wet							
C11-C22 Unadjusted Aromatics1	24.9	15.0	mg/kg wet	34.00		73	40-140			
Chrysene	1.52	0.40	mg/kg wet	2.000		76	40-140			
Dibenzo(a,h)Anthracene	1.53	0.20	mg/kg wet	2.000		76	40-140			
Fluoranthene	1.44	0.40	mg/kg wet	2.000		72	40-140			
Fluorene	1.33	0.40	mg/kg wet	2.000		66	40-140			
Indeno(1,2,3-cd)Pyrene	1.59	0.40	mg/kg wet	2.000		79	40-140			
Naphthalene	1.20	0.40	mg/kg wet	2.000		60	40-140			
Phenanthrene	1.37	0.40	mg/kg wet	2.000		69	40-140			
Pyrene	1.46	0.40	mg/kg wet	2.000		73	40-140			
Surrogate: 2-Bromonaphthalene	*1.86*		mg/kg wet	*2.000*		*93*	*40-140*			
Surrogate: 2-Fluorobiphenyl	*1.81*		mg/kg wet	*2.000*		*91*	*40-140*			
Surrogate: O-Terphenyl	*1.85*		mg/kg wet	*2.000*		*92*	*40-140*			
LCS										
2-Methylnaphthalene Breakthrough	0.0		%				0-5			
Naphthalene Breakthrough	0.0		%				0-5			
LCS Dup										
C19-C36 Aliphatics1	17.9	15.0	mg/kg wet	16.00		112	40-140	1	25	
C9-C18 Aliphatics1	11.1	15.0	mg/kg wet	12.00		92	40-140	5	25	

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: 123 Pine Street

ESS Laboratory Work Order: 1607072

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
MADEP-EPH Extractable Petroleum Hydrocarbons										
Batch CG60715 - 3546										
Decane (C10)	1.1	0.5	mg/kg wet	2.000		54	40-140	4	25	
Docosane (C22)	1.8	0.5	mg/kg wet	2.000		88	40-140	0.9	25	
Dodecane (C12)	1.2	0.5	mg/kg wet	2.000		59	40-140	5	25	
Eicosane (C20)	1.7	0.5	mg/kg wet	2.000		86	40-140	0.4	25	
Hexacosane (C26)	1.7	0.5	mg/kg wet	2.000		87	40-140	1	25	
Hexadecane (C16)	1.6	0.5	mg/kg wet	2.000		78	40-140	2	25	
Hexatriacontane (C36)	1.5	0.5	mg/kg wet	2.000		77	40-140	3	25	
Nonadecane (C19)	1.7	0.5	mg/kg wet	2.000		86	40-140	0.4	25	
Nonane (C9)	0.9	0.5	mg/kg wet	2.000		44	30-140	3	25	
Octacosane (C28)	1.6	0.5	mg/kg wet	2.000		81	40-140	0.1	25	
Octadecane (C18)	1.7	0.5	mg/kg wet	2.000		84	40-140	0.5	25	
Tetracosane (C24)	1.7	0.5	mg/kg wet	2.000		83	40-140	0.4	25	
Tetradecane (C14)	1.3	0.5	mg/kg wet	2.000		66	40-140	6	25	
Triacontane (C30)	1.6	0.5	mg/kg wet	2.000		81	40-140	0.7	25	
Surrogate: 1-Chlorooctadecane	*1.74*		mg/kg wet	*2.000*		*87*	*40-140*			
LCS Dup										
2-Methylnaphthalene	1.19	0.20	mg/kg wet	2.000		60	40-140	4	30	
Acenaphthene	1.31	0.40	mg/kg wet	2.000		66	40-140	2	30	
Acenaphthylene	1.35	0.20	mg/kg wet	2.000		67	40-140	2	30	
Anthracene	1.42	0.40	mg/kg wet	2.000		71	40-140	3	30	
Benzo(a)anthracene	1.55	0.40	mg/kg wet	2.000		78	40-140	6	30	
Benzo(a)pyrene	1.68	0.40	mg/kg wet	2.000		84	40-140	5	30	
Benzo(b)fluoranthene	1.67	0.40	mg/kg wet	2.000		84	40-140	7	30	
Benzo(g,h,i)perylene	1.63	0.40	mg/kg wet	2.000		82	40-140	4	30	
Benzo(k)fluoranthene	1.62	0.40	mg/kg wet	2.000		81	40-140	3	30	
C11-C22 Aromatics1,2	ND	15.0	mg/kg wet							
C11-C22 Unadjusted Aromatics1	25.5	15.0	mg/kg wet	34.00		75	40-140	2	25	
Chrysene	1.58	0.40	mg/kg wet	2.000		79	40-140	4	30	
Dibenzo(a,h)Anthracene	1.59	0.20	mg/kg wet	2.000		79	40-140	4	30	
Fluoranthene	1.53	0.40	mg/kg wet	2.000		76	40-140	6	30	
Fluorene	1.42	0.40	mg/kg wet	2.000		71	40-140	6	30	
Indeno(1,2,3-cd)Pyrene	1.64	0.40	mg/kg wet	2.000		82	40-140	3	30	
Naphthalene	1.23	0.40	mg/kg wet	2.000		62	40-140	2	30	
Phenanthrene	1.46	0.40	mg/kg wet	2.000		73	40-140	6	30	
Pyrene	1.54	0.40	mg/kg wet	2.000		77	40-140	5	30	
Surrogate: 2-Bromonaphthalene	*1.89*		mg/kg wet	*2.000*		*95*	*40-140*			
Surrogate: 2-Fluorobiphenyl	*1.81*		mg/kg wet	*2.000*		*90*	*40-140*			
Surrogate: O-Terphenyl	*1.93*		mg/kg wet	*2.000*		*96*	*40-140*			
LCS Dup										
2-Methylnaphthalene Breakthrough	0.0		%				0-5		200	
Naphthalene Breakthrough	0.0		%				0-5		200	

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: 123 Pine Street ESS Laboratory Work Order: 1607072

Notes and Definitions

U	Analyte included in the analysis, but not detected
SD	Surrogate recovery(ies) diluted below the MRL (SD).
D	Diluted.
ND	Analyte NOT DETECTED at or above the MRL (LOQ), LOD for DoD Reports, MDL for J-Flagged Analytes
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
DL	Detection Limit
I/V	Initial Volume
F/V	Final Volume
§	Subcontracted analysis; see attached report
1	Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
2	Range result excludes concentrations of target analytes eluting in that range.
3	Range result excludes the concentration of the C9-C10 aromatic range.
Avg	Results reported as a mathematical average.
NR	No Recovery
[CALC]	Calculated Analyte
SUB	Subcontracted analysis; see attached report

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: 123 Pine Street

ESS Laboratory Work Order: 1607072

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

ENVIRONMENTAL

Rhode Island Potable and Non Potable Water: LAI00179
http://www.health.ri.gov/find/labs/analytical/ESS.pdf

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750
http://www.ct.gov/dph/lib/dph/environmental_health/environmental_laboratories/pdf/OutofStateCommercialLaboratories.pdf

Maine Potable and Non Potable Water, and Solid and Hazardous Waste: RI00002
http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/documents/AllLabs.xls

Massachusetts Potable and Non Potable Water: M-RI002
http://public.dep.state.ma.us/Labcert/Labcert.aspx

New Hampshire (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 2424
http://des.nh.gov/organization/divisions/water/dwgb/nhelap/index.htm

New York (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: 11313
http://www.wadsworth.org/labcert/elap/comm.html

New Jersey (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: RI006
http://datamine2.state.nj.us/DEP_OPRA/OpraMain/pi_main?mode=pi_by_site&sort_order=PI_NAMEA&Select+a+Site:=58715

United States Department of Agriculture Soil Permit: P330-12-00139

Pennsylvania: 68-01752
http://www.depweb.state.pa.us/portal/server.pt/community/labs/13780/laboratory_accreditation_program/590095

ESS Laboratory Sample and Cooler Receipt Checklist

Client: GZA - Springfield, MA - GZA/CMT

Shipped/Delivered Via: ESS Courier

ESS Project ID: 1607072
Date Received: 7/6/2016
Project Due Date: 7/13/2016
Days for Project: 5 Day

1. Air bill manifest present? No
   Air No.: NA
2. Were custody seals present? No
3. Is radiation count <100 CPM? Yes
4. Is a Cooler Present? Yes
   Temp: 3.0 Iced with: Ice
5. Was COC signed and dated by client? Yes
6. Does COC match bottles? Yes
7. Is COC complete and correct? Yes
8. Were samples received intact? Yes
9. **Were labs informed about short holds & rushes?** Yes / No / (NA)
10. Were any analyses received outside of hold time? Yes / (No)

11. Any Subcontracting needed? Yes / (No)
    ESS Sample IDs:
    Analysis:
    TAT:
12. Were VOAs received? Yes / (No)
    a. Air bubbles in aqueous VOAs? Yes / (No)
    b. Does methanol cover soil completely? Yes / No / (NA)

13. Are the samples properly preserved? (Yes) / No
    a. If metals preserved upon receipt: Date: Time: By:
    b. Low Level VOAs brought to freezer: Date: Time: By:

Sample Receiving Notes:

14. Was there a need to contact Project Manager? Yes / (No)
    a. Was there a need to contact the client? Yes / (No)
    Who was contacted? Date: Time: By:

Sample Number	Container ID	Proper Container	Air Bubbles Present	Sufficient Volume	Container Type	Preservative	Record pH (Cyanide and 608 Pesticides)
01	48903	Yes	NA	Yes	8 oz. Jar - Unpres	NP	
02	48902	Yes	NA	Yes	8 oz. Jar - Unpres	NP	

2nd Review
Are barcode labels on correct containers? (Yes) / No

Completed By: Date & Time: 7/6/16 1715 WR 7/7/16
Reviewed By: Date & Time: 7/6/16 2052
Delivered By: 7/6/16 2052

ESS Laboratory

Division of Thielsch Engineering, Inc.

185 Frances Avenue, Cranston RI 02910-2211
Tel. (401)461-7181 Fax (401)461-4486
www.esslaboratory.com

CHAIN OF CUSTODY

ESS Lab # 1607072

Turn Time ✓ Standard Other_____

Regulatory State: (MA) RI CT NH NJ NY ME Other_____

Is this project for any of the following:(please circle)
(MA-MCP) Navy USACE CT DEP Other_____

Reporting Limits - _____

Electonic Deliverables *Excel Access PDF

Co. Name: G2A GeoEnvironmental, Inc.	Project #: 15.0165521	Project Name: 123 Pine St	
Contact Person: Adam Cote	Proj. Location: Holyoke, MA		
Address: 1350 Main Street (Suite 1402)	City, State: Springfield, MA	Zip: 01103	PO #:
Tel.	email:		

Analysis: MA EPH

ESS Lab ID	Date	Collection Time	Grab -G Composite-C	Matrix	Sample ID	Pres Code	# of Containers	Type of Container	Vol of Container	MA EPH
	7/5/16	1230	G	S	BSMT-1	1	1	AG	8oz	X
1	↓	1240	G	S	BSMT-2	1	1	AG	8oz	X
2	↓	1250	G	S	BSMT-3	1	1	AG	8oz	X
					Hold Sample BSMT-1					

Container Type: P-Poly G-Glass AG-Amber Glass S-Sterile V-VOA

Matrix: S-Soil SB-Solid D-Sludge WW-Wastewater GW-Groundwater SW-Surface Water DW-Drinking Water O-Oil W-Wipes F-Filter

Cooler Present ✓ Yes ____ No

Seals Intact ____ Yes ____ No NA:____

Cooler Temperature: 3.0 not ice

Internal Use Only

[-] Pickup

[ ] Technician____

Preservation Code: 1-NP, 2-HCl, 3-H2SO4, 4-HNO3, 5-NaOH, 6-MeOH, 7-Asorbic Acid, 8-ZnAct, 9-_____

Sampled by: Adam Cote

Comments:

Relinquished by: (Signature, Date & Time)	Received by: (Signature, Date & Time)	Relinquished by: (Signature, Date & Time)	Received by: (Signature, Date & Time)
Adam Cote	G2A Springfield - Sample Fridge	G2A fridge (Adam Cote) 7-6-16 14:14	7-6-16 14:14
7-6-16 17:07	7/6/16 1715		

By circling MA-MCP, client acknowledges samples were collected in accordance with MADEP CAM VIIA

Please fax to the laboratory all changes to Chain of Custody

Report Method Blank & Laboratory Control Sample Results

CERTIFICATE OF ANALYSIS

Adam Cote
GZA GeoEnvironmental, Inc.
1350 Main Street, Suite 1400
Springfield, MA 01103

RE: 123 Pine Street (15.0166521.00)
ESS Laboratory Work Order Number: 1608558

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.

Laurel Stoddard
Laboratory Director

REVIEWED
By ESS Laboratory at 3:33 pm, Aug 26, 2016

Analytical Summary
The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

The test results present in this report are in compliance with NELAC Standards, A2LA and/or client Quality Assurance Project Plans (QAPP). The laboratory has reviewed the following: Sample Preservations, Hold Times, Initial Calibrations, Continuing Calibrations, Method Blanks, Blank Spikes, Blank Spike Duplicates, Duplicates, Matrix Spikes, Matrix Spike Duplicates, Surrogates and Internal Standards. Any results which were found to be outside of the recommended ranges stated in our SOPs will be noted in the Project Narrative.

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: 123 Pine Street

ESS Laboratory Work Order: 1608558

SAMPLE RECEIPT

The following samples were received on August 19, 2016 for the analyses specified on the enclosed Chain of Custody Record.

To achieve CAM compliance for MCP data, ESS Laboratory has performed and reviewed all QA/QC Requirements and Performance Standards listed in each method. Holding times and preservation have also been reviewed. All CAM requirements have been achieved unless noted in the project narrative.

Each method has been set-up in the laboratory to reach required MCP standards. The methods for aqueous VOA and Soil Methanol VOA have known limitations for certain analytes. The regulatory standards may not be achieved due to these limitations. In addition, for all methods, matrix interferences, dilutions, and %Solids may elevate method reporting limits above regulatory standards. ESS Laboratory can provide, upon request, a Data Checker (regulatory standard comparison spreadsheet) electronic deliverable which will highlight these exceedances.

Lab Number	Sample Name	Matrix	Analysis
1608558-01	123 Pine - S-4	Soil	EPH8270, MADEP-EPH
1608558-02	123 Pine - S-5	Soil	EPH8270, MADEP-EPH
1608558-03	123 Pine - S-6	Soil	EPH8270, MADEP-EPH
1608558-04	123 Pine - S-7	Soil	EPH8270, MADEP-EPH

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: 123 Pine Street

ESS Laboratory Work Order: 1608558

PROJECT NARRATIVE

No unusual observations noted.

End of Project Narrative.

DATA USABILITY LINKS

Definitions of Quality Control Parameters

Semivolatile Organics Internal Standard Information

Semivolatile Organics Surrogate Information

Volatile Organics Internal Standard Information

Volatile Organics Surrogate Information

EPH and VPH Alkane Lists

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: 123 Pine Street

ESS Laboratory Work Order: 1608558

CURRENT SW-846 METHODOLOGY VERSIONS

Analytical Methods

1010A - Flashpoint
6010C - ICP
6020A - ICP MS
7010 - Graphite Furnace
7196A - Hexavalent Chromium
7470A - Aqueous Mercury
7471B - Solid Mercury
8011 - EDB/DBCP/TCP
8015D - GRO/DRO
8081B - Pesticides
8082A - PCB
8100M - TPH
8151A - Herbicides
8260B - VOA
8270D - SVOA
8270D SIM - SVOA Low Level
9014 - Cyanide
9038 - Sulfate
9040C - Aqueous pH
9045D - Solid pH (Corrosivity)
9050A - Specific Conductance
9056A - Anions (IC)
9060A - TOC
9095B - Paint Filter
MADEP 04-1.1 - EPH / VPH

Prep Methods

3005A - Aqueous ICP Digestion
3020A - Aqueous Graphite Furnace / ICP MS Digestion
3050B - Solid ICP / Graphite Furnace / ICP MS Digestion
3060A - Solid Hexavalent Chromium Digestion
3510C - Separatory Funnel Extraction
3520C - Liquid / Liquid Extraction
3540C - Manual Soxhlet Extraction
3541 - Automated Soxhlet Extraction
3546 - Microwave Extraction
3580A - Waste Dilution
5030B - Aqueous Purge and Trap
5030C - Aqueous Purge and Trap
5035 - Solid Purge and Trap

SW846 Reactivity Methods 7.3.3.2 (Reactive Cyanide) and 7.3.4.1 (Reactive Sulfide) have been withdrawn by EPA. These methods are reported per client request and are not NELAP accredited.

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: 123 Pine Street

ESS Laboratory Work Order: 1608558

MassDEP Analytical Protocol Certification Form

MADEP RTN: _____

This form provides certification for the following data set: **1608558-01 through 1608558-04**

Matrices: ( ) Ground Water/Surface Water (X) Soil/Sediment ( ) Drinking Water ( ) Air ( ) Other:_____

CAM Protocol (check all that apply below):

( ) 8260 VOC CAM II A	( ) 7470/7471 Hg CAM III B	( ) MassDEP VPH CAM IV A	( ) 8081 Pesticides CAM V B	( ) 7196 Hex Cr CAM VI B	( ) MassDEP APH CAM IX A
( ) 8270 SVOC CAM II B	( ) 7010 Metals CAM III C	(X) MassDEP EPH CAM IV B	( ) 8151 Herbicides CAM V C	( ) 8330 Explosives CAM VIII A	( ) TO-15 VOC CAM IX B
( ) 6010 Metals CAM III A	( ) 6020 Metals CAM III D	( ) 8082 PCB CAM V A	( ) 6860 Perchlorate CAM VIII B	( ) 9014 Total Cyanide/PAC CAM VI A	

Affirmative responses to questions A through F are required for "Presumptive Certainty" status

A	Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding times?	Yes (X) No ( )
B	Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed?	Yes (X) No ( )
C	Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances?	Yes (X) No ( )
D	Does the laboratory report comply with all the reporting requirements specified in the CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	Yes (X) No ( )
E	a. VPH, EPH, APH and TO-15 only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications).	Yes (X) No ( )
	b. APH and TO-15 Methods only: Was the complete analyte list reported for each method?	Yes ( ) No ( )
F	Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all "No" responses to Questions A through E)?	Yes (X) No ( )

Responses to Questions G, H and I below are required for "'Presumptive Certainty" status

G	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocols(s)?	Yes (X) No ( )*
	***Data User Note:* Data that achieve "Presumptive Certainty" status may not necessarily meet the data usability and representativeness requirements described in 310 CMR 40. 1056 (2)(k) and WSC-07-350.**	
H	Were **all** QC performance standards specified in the CAM protocol(s) achieved?	Yes (X) No ( )*
I	Were results reported for the complete analyte list specified in the selected CAM protocol(s)?	Yes (X) No ( )*

All negative responses must be addressed in an attached laboratory narrative.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: _____ Date: August 26, 2016

Printed Name: Laurel Stoddard Position: Laboratory Director

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: 123 Pine Street
Client Sample ID: 123 Pine - S-4
Date Sampled: 08/18/16 10:15
Percent Solids: 98
Initial Volume: 24.6
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 1608558
ESS Laboratory Sample ID: 1608558-01
Sample Matrix: Soil
Units: mg/kg dry

Prepared: 8/22/16 12:49

MADEP-EPH Extractable Petroleum Hydrocarbons

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
C9-C18 Aliphatics1	ND (15.5)		MADEP-EPH		1	ZLC	08/24/16 7:58	CZH0398	CH62218
C19-C36 Aliphatics1	ND (15.5)		MADEP-EPH		1	ZLC	08/24/16 7:58	CZH0398	CH62218
C11-C22 Unadjusted Aromatics1	ND (15.5)		EPH8270		1	VSC	08/24/16 4:01	CZH0424	CH62218
C11-C22 Aromatics1,2	ND (15.5)		EPH8270			VSC	08/24/16 4:01		[CALC]
2-Methylnaphthalene	ND (0.21)		EPH8270		1	VSC	08/24/16 4:01	CZH0424	CH62218
Acenaphthene	ND (0.41)		EPH8270		1	VSC	08/24/16 4:01	CZH0424	CH62218
Naphthalene	ND (0.41)		EPH8270		1	VSC	08/24/16 4:01	CZH0424	CH62218
Phenanthrene	ND (0.41)		EPH8270		1	VSC	08/24/16 4:01	CZH0424	CH62218
Acenaphthylene	ND (0.21)		EPH8270		1	VSC	08/24/16 4:01	CZH0424	CH62218
Anthracene	ND (0.41)		EPH8270		1	VSC	08/24/16 4:01	CZH0424	CH62218
Benzo(a)anthracene	ND (0.41)		EPH8270		1	VSC	08/24/16 4:01	CZH0424	CH62218
Benzo(a)pyrene	ND (0.41)		EPH8270		1	VSC	08/24/16 4:01	CZH0424	CH62218
Benzo(b)fluoranthene	ND (0.41)		EPH8270		1	VSC	08/24/16 4:01	CZH0424	CH62218
Benzo(g,h,i)perylene	ND (0.41)		EPH8270		1	VSC	08/24/16 4:01	CZH0424	CH62218
Benzo(k)fluoranthene	ND (0.41)		EPH8270		1	VSC	08/24/16 4:01	CZH0424	CH62218
Chrysene	ND (0.41)		EPH8270		1	VSC	08/24/16 4:01	CZH0424	CH62218
Dibenzo(a,h)Anthracene	ND (0.21)		EPH8270		1	VSC	08/24/16 4:01	CZH0424	CH62218
Fluoranthene	ND (0.41)		EPH8270		1	VSC	08/24/16 4:01	CZH0424	CH62218
Fluorene	ND (0.41)		EPH8270		1	VSC	08/24/16 4:01	CZH0424	CH62218
Indeno(1,2,3-cd)Pyrene	ND (0.41)		EPH8270		1	VSC	08/24/16 4:01	CZH0424	CH62218
Pyrene	ND (0.41)		EPH8270		1	VSC	08/24/16 4:01	CZH0424	CH62218

	%Recovery	Qualifier	Limits
Surrogate: 1-Chlorooctadecane	*68 %*		*40-140*
Surrogate: 2-Bromonaphthalene	*57 %*		*40-140*
Surrogate: 2-Fluorobiphenyl	*73 %*		*40-140*
Surrogate: O-Terphenyl	*69 %*		*40-140*

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: 123 Pine Street
Client Sample ID: 123 Pine - S-5
Date Sampled: 08/18/16 10:32
Percent Solids: 94
Initial Volume: 24.4
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 1608558
ESS Laboratory Sample ID: 1608558-02
Sample Matrix: Soil
Units: mg/kg dry

Prepared: 8/22/16 12:49

MADEP-EPH Extractable Petroleum Hydrocarbons

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
C9-C18 Aliphatics1	ND (16.3)		MADEP-EPH		1	ZLC	08/24/16 8:45	CZH0398	CH62218
C19-C36 Aliphatics1	**16.4** (16.3)		MADEP-EPH		1	ZLC	08/24/16 8:45	CZH0398	CH62218
C11-C22 Unadjusted Aromatics1	ND (16.3)		EPH8270		1	VSC	08/24/16 4:38	CZH0424	CH62218
C11-C22 Aromatics1,2	ND (16.3)		EPH8270			VSC	08/24/16 4:38		[CALC]
2-Methylnaphthalene	ND (0.22)		EPH8270		1	VSC	08/24/16 4:38	CZH0424	CH62218
Acenaphthene	ND (0.43)		EPH8270		1	VSC	08/24/16 4:38	CZH0424	CH62218
Naphthalene	ND (0.43)		EPH8270		1	VSC	08/24/16 4:38	CZH0424	CH62218
Phenanthrene	ND (0.43)		EPH8270		1	VSC	08/24/16 4:38	CZH0424	CH62218
Acenaphthylene	ND (0.22)		EPH8270		1	VSC	08/24/16 4:38	CZH0424	CH62218
Anthracene	ND (0.43)		EPH8270		1	VSC	08/24/16 4:38	CZH0424	CH62218
Benzo(a)anthracene	ND (0.43)		EPH8270		1	VSC	08/24/16 4:38	CZH0424	CH62218
Benzo(a)pyrene	ND (0.43)		EPH8270		1	VSC	08/24/16 4:38	CZH0424	CH62218
Benzo(b)fluoranthene	ND (0.43)		EPH8270		1	VSC	08/24/16 4:38	CZH0424	CH62218
Benzo(g,h,i)perylene	ND (0.43)		EPH8270		1	VSC	08/24/16 4:38	CZH0424	CH62218
Benzo(k)fluoranthene	ND (0.43)		EPH8270		1	VSC	08/24/16 4:38	CZH0424	CH62218
Chrysene	ND (0.43)		EPH8270		1	VSC	08/24/16 4:38	CZH0424	CH62218
Dibenzo(a,h)Anthracene	ND (0.22)		EPH8270		1	VSC	08/24/16 4:38	CZH0424	CH62218
Fluoranthene	ND (0.43)		EPH8270		1	VSC	08/24/16 4:38	CZH0424	CH62218
Fluorene	ND (0.43)		EPH8270		1	VSC	08/24/16 4:38	CZH0424	CH62218
Indeno(1,2,3-cd)Pyrene	ND (0.43)		EPH8270		1	VSC	08/24/16 4:38	CZH0424	CH62218
Pyrene	ND (0.43)		EPH8270		1	VSC	08/24/16 4:38	CZH0424	CH62218

	%Recovery	Qualifier	Limits
Surrogate: 1-Chlorooctadecane	*65 %*		*40-140*
Surrogate: 2-Bromonaphthalene	*49 %*		*40-140*
Surrogate: 2-Fluorobiphenyl	*70 %*		*40-140*
Surrogate: O-Terphenyl	*65 %*		*40-140*

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: 123 Pine Street
Client Sample ID: 123 Pine - S-6
Date Sampled: 08/18/16 10:43
Percent Solids: 89
Initial Volume: 24.9
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 1608558
ESS Laboratory Sample ID: 1608558-03
Sample Matrix: Soil
Units: mg/kg dry

Prepared: 8/22/16 12:49

MADEP-EPH Extractable Petroleum Hydrocarbons

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
C9-C18 Aliphatics1	**384** (17.0)		MADEP-EPH		1	ZLC	08/24/16 9:32	CZH0398	CH62218
C19-C36 Aliphatics1	**88.9** (17.0)		MADEP-EPH		1	ZLC	08/24/16 9:32	CZH0398	CH62218
C11-C22 Unadjusted Aromatics1	**84.4** (17.0)		EPH8270		1	VSC	08/24/16 5:14	CZH0424	CH62218
C11-C22 Aromatics1,2	**83.4** (17.0)		EPH8270			VSC	08/24/16 5:14		[CALC]
2-Methylnaphthalene	**0.95** (0.23)		EPH8270		1	VSC	08/24/16 5:14	CZH0424	CH62218
Acenaphthene	ND (0.45)		EPH8270		1	VSC	08/24/16 5:14	CZH0424	CH62218
Naphthalene	ND (0.45)		EPH8270		1	VSC	08/24/16 5:14	CZH0424	CH62218
Phenanthrene	ND (0.45)		EPH8270		1	VSC	08/24/16 5:14	CZH0424	CH62218
Acenaphthylene	ND (0.23)		EPH8270		1	VSC	08/24/16 5:14	CZH0424	CH62218
Anthracene	ND (0.45)		EPH8270		1	VSC	08/24/16 5:14	CZH0424	CH62218
Benzo(a)anthracene	ND (0.45)		EPH8270		1	VSC	08/24/16 5:14	CZH0424	CH62218
Benzo(a)pyrene	ND (0.45)		EPH8270		1	VSC	08/24/16 5:14	CZH0424	CH62218
Benzo(b)fluoranthene	ND (0.45)		EPH8270		1	VSC	08/24/16 5:14	CZH0424	CH62218
Benzo(g,h,i)perylene	ND (0.45)		EPH8270		1	VSC	08/24/16 5:14	CZH0424	CH62218
Benzo(k)fluoranthene	ND (0.45)		EPH8270		1	VSC	08/24/16 5:14	CZH0424	CH62218
Chrysene	ND (0.45)		EPH8270		1	VSC	08/24/16 5:14	CZH0424	CH62218
Dibenzo(a,h)Anthracene	ND (0.23)		EPH8270		1	VSC	08/24/16 5:14	CZH0424	CH62218
Fluoranthene	ND (0.45)		EPH8270		1	VSC	08/24/16 5:14	CZH0424	CH62218
Fluorene	ND (0.45)		EPH8270		1	VSC	08/24/16 5:14	CZH0424	CH62218
Indeno(1,2,3-cd)Pyrene	ND (0.45)		EPH8270		1	VSC	08/24/16 5:14	CZH0424	CH62218
Pyrene	ND (0.45)		EPH8270		1	VSC	08/24/16 5:14	CZH0424	CH62218

	%Recovery	Qualifier	Limits
Surrogate: 1-Chlorooctadecane	*60 %*		*40-140*
Surrogate: 2-Bromonaphthalene	*50 %*		*40-140*
Surrogate: 2-Fluorobiphenyl	*64 %*		*40-140*
Surrogate: O-Terphenyl	*55 %*		*40-140*

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: 123 Pine Street
Client Sample ID: 123 Pine - S-7
Date Sampled: 08/18/16 10:54
Percent Solids: 96
Initial Volume: 24.6
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 1608558
ESS Laboratory Sample ID: 1608558-04
Sample Matrix: Soil
Units: mg/kg dry

Prepared: 8/22/16 12:49

MADEP-EPH Extractable Petroleum Hydrocarbons

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
C9-C18 Aliphatics1	ND (15.9)		MADEP-EPH		1	ZLC	08/24/16 10:20	CZH0398	CH62218
C19-C36 Aliphatics1	ND (15.9)		MADEP-EPH		1	ZLC	08/24/16 10:20	CZH0398	CH62218
C11-C22 Unadjusted Aromatics1	ND (15.9)		EPH8270		1	VSC	08/24/16 5:51	CZH0424	CH62218
C11-C22 Aromatics1,2	ND (15.9)		EPH8270			VSC	08/24/16 5:51		[CALC]
2-Methylnaphthalene	ND (0.21)		EPH8270		1	VSC	08/24/16 5:51	CZH0424	CH62218
Acenaphthene	ND (0.42)		EPH8270		1	VSC	08/24/16 5:51	CZH0424	CH62218
Naphthalene	ND (0.42)		EPH8270		1	VSC	08/24/16 5:51	CZH0424	CH62218
Phenanthrene	ND (0.42)		EPH8270		1	VSC	08/24/16 5:51	CZH0424	CH62218
Acenaphthylene	ND (0.21)		EPH8270		1	VSC	08/24/16 5:51	CZH0424	CH62218
Anthracene	ND (0.42)		EPH8270		1	VSC	08/24/16 5:51	CZH0424	CH62218
Benzo(a)anthracene	ND (0.42)		EPH8270		1	VSC	08/24/16 5:51	CZH0424	CH62218
Benzo(a)pyrene	ND (0.42)		EPH8270		1	VSC	08/24/16 5:51	CZH0424	CH62218
Benzo(b)fluoranthene	ND (0.42)		EPH8270		1	VSC	08/24/16 5:51	CZH0424	CH62218
Benzo(g,h,i)perylene	ND (0.42)		EPH8270		1	VSC	08/24/16 5:51	CZH0424	CH62218
Benzo(k)fluoranthene	ND (0.42)		EPH8270		1	VSC	08/24/16 5:51	CZH0424	CH62218
Chrysene	ND (0.42)		EPH8270		1	VSC	08/24/16 5:51	CZH0424	CH62218
Dibenzo(a,h)Anthracene	ND (0.21)		EPH8270		1	VSC	08/24/16 5:51	CZH0424	CH62218
Fluoranthene	ND (0.42)		EPH8270		1	VSC	08/24/16 5:51	CZH0424	CH62218
Fluorene	ND (0.42)		EPH8270		1	VSC	08/24/16 5:51	CZH0424	CH62218
Indeno(1,2,3-cd)Pyrene	ND (0.42)		EPH8270		1	VSC	08/24/16 5:51	CZH0424	CH62218
Pyrene	ND (0.42)		EPH8270		1	VSC	08/24/16 5:51	CZH0424	CH62218

	%Recovery	Qualifier	Limits
Surrogate: 1-Chlorooctadecane	*68 %*		*40-140*
Surrogate: 2-Bromonaphthalene	*59 %*		*40-140*
Surrogate: 2-Fluorobiphenyl	*73 %*		*40-140*
Surrogate: O-Terphenyl	*65 %*		*40-140*

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: 123 Pine Street

ESS Laboratory Work Order: 1608558

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
MADEP-EPH Extractable Petroleum Hydrocarbons										
Batch CH62218 - 3546										
Blank										
C19-C36 Aliphatics1	ND	15.0	mg/kg wet							
C9-C18 Aliphatics1	ND	15.0	mg/kg wet							
Decane (C10)	ND	0.5	mg/kg wet							
Docosane (C22)	ND	0.5	mg/kg wet							
Dodecane (C12)	ND	0.5	mg/kg wet							
Eicosane (C20)	ND	0.5	mg/kg wet							
Hexacosane (C26)	ND	0.5	mg/kg wet							
Hexadecane (C16)	ND	0.5	mg/kg wet							
Hexatriacontane (C36)	ND	0.5	mg/kg wet							
Nonadecane (C19)	ND	0.5	mg/kg wet							
Nonane (C9)	ND	0.5	mg/kg wet							
Octacosane (C28)	ND	0.5	mg/kg wet							
Octadecane (C18)	ND	0.5	mg/kg wet							
Tetracosane (C24)	ND	0.5	mg/kg wet							
Tetradecane (C14)	ND	0.5	mg/kg wet							
Triacontane (C30)	ND	0.5	mg/kg wet							
Surrogate: 1-Chlorooctadecane	*1.42*		mg/kg wet	*2.000*		*71*	*40-140*			
Blank										
2-Methylnaphthalene	ND	0.20	mg/kg wet							
Acenaphthene	ND	0.40	mg/kg wet							
Acenaphthylene	ND	0.20	mg/kg wet							
Anthracene	ND	0.40	mg/kg wet							
Benzo(a)anthracene	ND	0.40	mg/kg wet							
Benzo(a)pyrene	ND	0.40	mg/kg wet							
Benzo(b)fluoranthene	ND	0.40	mg/kg wet							
Benzo(g,h,i)perylene	ND	0.40	mg/kg wet							
Benzo(k)fluoranthene	ND	0.40	mg/kg wet							
C11-C22 Aromatics1,2	ND	15.0	mg/kg wet							
C11-C22 Unadjusted Aromatics1	ND	15.0	mg/kg wet							
Chrysene	ND	0.40	mg/kg wet							
Dibenzo(a,h)Anthracene	ND	0.20	mg/kg wet							
Fluoranthene	ND	0.40	mg/kg wet							
Fluorene	ND	0.40	mg/kg wet							
Indeno(1,2,3-cd)Pyrene	ND	0.40	mg/kg wet							
Naphthalene	ND	0.40	mg/kg wet							
Phenanthrene	ND	0.40	mg/kg wet							
Pyrene	ND	0.40	mg/kg wet							
Surrogate: 2-Bromonaphthalene	*1.85*		mg/kg wet	*2.000*		*92*	*40-140*			
Surrogate: 2-Fluorobiphenyl	*1.95*		mg/kg wet	*2.000*		*97*	*40-140*			
Surrogate: O-Terphenyl	*1.64*		mg/kg wet	*2.000*		*82*	*40-140*			
LCS										
C19-C36 Aliphatics1	13.9	15.0	mg/kg wet	16.00		87	40-140			
C9-C18 Aliphatics1	7.8	15.0	mg/kg wet	12.00		65	40-140			

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: 123 Pine Street

ESS Laboratory Work Order: 1608558

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
MADEP-EPH Extractable Petroleum Hydrocarbons										
Batch CH62218 - 3546										
Decane (C10)	0.9	0.5	mg/kg wet	2.000		45	40-140			
Docosane (C22)	1.6	0.5	mg/kg wet	2.000		82	40-140			
Dodecane (C12)	1.0	0.5	mg/kg wet	2.000		51	40-140			
Eicosane (C20)	1.5	0.5	mg/kg wet	2.000		74	40-140			
Hexacosane (C26)	1.5	0.5	mg/kg wet	2.000		74	40-140			
Hexadecane (C16)	1.3	0.5	mg/kg wet	2.000		66	40-140			
Hexatriacontane (C36)	1.4	0.5	mg/kg wet	2.000		69	40-140			
Nonadecane (C19)	1.5	0.5	mg/kg wet	2.000		74	40-140			
Nonane (C9)	0.7	0.5	mg/kg wet	2.000		37	30-140			
Octacosane (C28)	1.5	0.5	mg/kg wet	2.000		74	40-140			
Octadecane (C18)	1.4	0.5	mg/kg wet	2.000		71	40-140			
Tetracosane (C24)	1.5	0.5	mg/kg wet	2.000		75	40-140			
Tetradecane (C14)	1.1	0.5	mg/kg wet	2.000		55	40-140			
Triacontane (C30)	1.5	0.5	mg/kg wet	2.000		75	40-140			
Surrogate: 1-Chlorooctadecane	*1.44*		mg/kg wet	*2.000*		*72*	*40-140*			
LCS										
2-Methylnaphthalene	1.24	0.20	mg/kg wet	2.000		62	40-140			
Acenaphthene	1.36	0.40	mg/kg wet	2.000		68	40-140			
Acenaphthylene	1.36	0.20	mg/kg wet	2.000		68	40-140			
Anthracene	1.54	0.40	mg/kg wet	2.000		77	40-140			
Benzo(a)anthracene	1.60	0.40	mg/kg wet	2.000		80	40-140			
Benzo(a)pyrene	1.69	0.40	mg/kg wet	2.000		84	40-140			
Benzo(b)fluoranthene	1.65	0.40	mg/kg wet	2.000		82	40-140			
Benzo(g,h,i)perylene	1.67	0.40	mg/kg wet	2.000		83	40-140			
Benzo(k)fluoranthene	1.73	0.40	mg/kg wet	2.000		86	40-140			
C11-C22 Aromatics1,2	ND	15.0	mg/kg wet							
C11-C22 Unadjusted Aromatics1	26.8	15.0	mg/kg wet	34.00		79	40-140			
Chrysene	1.66	0.40	mg/kg wet	2.000		83	40-140			
Dibenzo(a,h)Anthracene	1.65	0.20	mg/kg wet	2.000		83	40-140			
Fluoranthene	1.58	0.40	mg/kg wet	2.000		79	40-140			
Fluorene	1.45	0.40	mg/kg wet	2.000		73	40-140			
Indeno(1,2,3-cd)Pyrene	1.63	0.40	mg/kg wet	2.000		82	40-140			
Naphthalene	1.22	0.40	mg/kg wet	2.000		61	40-140			
Phenanthrene	1.55	0.40	mg/kg wet	2.000		78	40-140			
Pyrene	1.62	0.40	mg/kg wet	2.000		81	40-140			
Surrogate: 2-Bromonaphthalene	*1.82*		mg/kg wet	*2.000*		*91*	*40-140*			
Surrogate: 2-Fluorobiphenyl	*1.87*		mg/kg wet	*2.000*		*94*	*40-140*			
Surrogate: O-Terphenyl	*1.72*		mg/kg wet	*2.000*		*86*	*40-140*			
LCS										
2-Methylnaphthalene Breakthrough	0.0		%				0-5			
Naphthalene Breakthrough	0.0		%				0-5			
LCS Dup										
C19-C36 Aliphatics1	13.6	15.0	mg/kg wet	16.00		85	40-140	2	25	
C9-C18 Aliphatics1	7.8	15.0	mg/kg wet	12.00		65	40-140	0.2	25	

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: 123 Pine Street

ESS Laboratory Work Order: 1608558

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
MADEP-EPH Extractable Petroleum Hydrocarbons										
Batch CH62218 - 3546										
Decane (C10)	0.9	0.5	mg/kg wet	2.000		45	40-140	1	25	
Docosane (C22)	1.5	0.5	mg/kg wet	2.000		73	40-140	12	25	
Dodecane (C12)	1.0	0.5	mg/kg wet	2.000		50	40-140	0.8	25	
Eicosane (C20)	1.5	0.5	mg/kg wet	2.000		73	40-140	2	25	
Hexacosane (C26)	1.5	0.5	mg/kg wet	2.000		73	40-140	2	25	
Hexadecane (C16)	1.3	0.5	mg/kg wet	2.000		65	40-140	3	25	
Hexatriacontane (C36)	1.4	0.5	mg/kg wet	2.000		69	40-140	0.6	25	
Nonadecane (C19)	1.4	0.5	mg/kg wet	2.000		72	40-140	2	25	
Nonane (C9)	0.7	0.5	mg/kg wet	2.000		37	30-140	0.7	25	
Octacosane (C28)	1.5	0.5	mg/kg wet	2.000		73	40-140	2	25	
Octadecane (C18)	1.4	0.5	mg/kg wet	2.000		69	40-140	2	25	
Tetracosane (C24)	1.5	0.5	mg/kg wet	2.000		73	40-140	2	25	
Tetradecane (C14)	1.1	0.5	mg/kg wet	2.000		53	40-140	3	25	
Triacontane (C30)	1.5	0.5	mg/kg wet	2.000		74	40-140	2	25	
Surrogate: 1-Chlorooctadecane	*1.41*		mg/kg wet	*2.000*		*71*	*40-140*			
LCS Dup										
2-Methylnaphthalene	1.18	0.20	mg/kg wet	2.000		59	40-140	4	30	
Acenaphthene	1.29	0.40	mg/kg wet	2.000		65	40-140	5	30	
Acenaphthylene	1.31	0.20	mg/kg wet	2.000		65	40-140	4	30	
Anthracene	1.49	0.40	mg/kg wet	2.000		74	40-140	4	30	
Benzo(a)anthracene	1.50	0.40	mg/kg wet	2.000		75	40-140	7	30	
Benzo(a)pyrene	1.63	0.40	mg/kg wet	2.000		82	40-140	3	30	
Benzo(b)fluoranthene	1.65	0.40	mg/kg wet	2.000		82	40-140	0.1	30	
Benzo(g,h,i)perylene	1.61	0.40	mg/kg wet	2.000		80	40-140	4	30	
Benzo(k)fluoranthene	1.51	0.40	mg/kg wet	2.000		75	40-140	14	30	
C11-C22 Aromatics1,2	ND	15.0	mg/kg wet							
C11-C22 Unadjusted Aromatics1	25.1	15.0	mg/kg wet	34.00		74	40-140	6	25	
Chrysene	1.56	0.40	mg/kg wet	2.000		78	40-140	6	30	
Dibenzo(a,h)Anthracene	1.58	0.20	mg/kg wet	2.000		79	40-140	4	30	
Fluoranthene	1.49	0.40	mg/kg wet	2.000		74	40-140	6	30	
Fluorene	1.36	0.40	mg/kg wet	2.000		68	40-140	7	30	
Indeno(1,2,3-cd)Pyrene	1.56	0.40	mg/kg wet	2.000		78	40-140	5	30	
Naphthalene	1.17	0.40	mg/kg wet	2.000		59	40-140	4	30	
Phenanthrene	1.46	0.40	mg/kg wet	2.000		73	40-140	6	30	
Pyrene	1.54	0.40	mg/kg wet	2.000		77	40-140	5	30	
Surrogate: 2-Bromonaphthalene	*1.61*		mg/kg wet	*2.000*		*80*	*40-140*			
Surrogate: 2-Fluorobiphenyl	*1.96*		mg/kg wet	*2.000*		*98*	*40-140*			
Surrogate: O-Terphenyl	*1.62*		mg/kg wet	*2.000*		*81*	*40-140*			
LCS Dup										
2-Methylnaphthalene Breakthrough	0.0		%				0-5		200	
Naphthalene Breakthrough	0.0		%				0-5		200	

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: 123 Pine Street

ESS Laboratory Work Order: 1608558

Notes and Definitions

U	Analyte included in the analysis, but not detected
ND	Analyte NOT DETECTED at or above the MRL (LOQ), LOD for DoD Reports, MDL for J-Flagged Analytes
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
DL	Detection Limit
I/V	Initial Volume
F/V	Final Volume
§	Subcontracted analysis; see attached report
1	Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
2	Range result excludes concentrations of target analytes eluting in that range.
3	Range result excludes the concentration of the C9-C10 aromatic range.
Avg	Results reported as a mathematical average.
NR	No Recovery
[CALC]	Calculated Analyte
SUB	Subcontracted analysis; see attached report

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: 123 Pine Street

ESS Laboratory Work Order: 1608558

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

ENVIRONMENTAL

Rhode Island Potable and Non Potable Water: LAI00179
http://www.health.ri.gov/find/labs/analytical/ESS.pdf

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750
http://www.ct.gov/dph/lib/dph/environmental_health/environmental_laboratories/pdf/OutofStateCommercialLaboratories.pdf

Maine Potable and Non Potable Water, and Solid and Hazardous Waste: RI00002
http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/documents/AllLabs.xls

Massachusetts Potable and Non Potable Water: M-RI002
http://public.dep.state.ma.us/Labcert/Labcert.aspx

New Hampshire (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 2424
http://des.nh.gov/organization/divisions/water/dwgb/nhelap/index.htm

New York (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: 11313
http://www.wadsworth.org/labcert/elap/comm.html

New Jersey (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: RI006
http://datamine2.state.nj.us/DEP_OPRA/OpraMain/pi_main?mode=pi_by_site&sort_order=PI_NAMEA&Select+a+Site:=58715

United States Department of Agriculture Soil Permit: P330-12-00139

Pennsylvania: 68-01752
http://www.depweb.state.pa.us/portal/server.pt/community/labs/13780/laboratory_accreditation_program/590095

ESS Laboratory Sample and Cooler Receipt Checklist

Client: GZA - Springfield, MA - GZA/CMT

Shipped/Delivered Via: ESS Courier

ESS Project ID: 1608558
Date Received: 8/19/2016
Project Due Date: 8/26/2016
Days for Project: 5 Day

1. Air bill manifest present? No
   Air No.: NA
2. Were custody seals present? No
3. Is radiation count <100 CPM? Yes
4. Is a Cooler Present? Yes
   Temp: 1.6 Iced with: Ice
5. Was COC signed and dated by client? Yes
6. Does COC match bottles? Yes
7. Is COC complete and correct? Yes
8. Were samples received intact? Yes
9. **Were labs informed about short holds & rushes?** Yes / No / (NA)
10. Were any analyses received outside of hold time? Yes / (No)

11. Any Subcontracting needed? Yes / (No)
    ESS Sample IDs:
    Analysis:
    TAT:
12. Were VOAs received? Yes / (No)
    a. Air bubbles in aqueous VOAs? Yes / No
    b. Does methanol cover soil completely? Yes / No / NA

13. Are the samples properly preserved? (Yes) / No
    a. If metals preserved upon receipt: Date: Time: By:
    b. Low Level VOAs brought to freezer: Date: Time: By:

Sample Receiving Notes:

14. Was there a need to contact Project Manager? Yes / (No)
    a. Was there a need to contact the client? Yes / No
    Who was contacted? Date: Time: By:

Sample Number	Container ID	Proper Container	Air Bubbles Present	Sufficient Volume	Container Type	Preservative	Record pH (Cyanide and 608 Pesticides)
01	62338	Yes	NA	Yes	4 oz. Jar - Unpres	NP	
02	62337	Yes	NA	Yes	4 oz. Jar - Unpres	NP	
03	62336	Yes	NA	Yes	4 oz. Jar - Unpres	NP	
04	62335	Yes	NA	Yes	4 oz. Jar - Unpres	NP	

2nd Review
Are barcode labels on correct containers? (Yes) / No

Completed By: Date & Time: 8/19/16 1442
Reviewed By: Adam Bys 150 Date & Time: 8/19/16 1450
Delivered By: Adam Bys 150 8/19/16 1450

ESS Laboratory

Division of Thielsch Engineering, Inc.

185 Frances Avenue, Cranston, RI 02910-2211
Tel. (401) 461-7181 Fax (401) 461-4486
www.esslaboratory.com

CHAIN OF CUSTODY

ESS Lab # 1608558

Turn Time ✓ Standard Other_____

Regulatory State: MA RI CT NH NJ NY ME Other_____

Is this project for any of the following:(please circle)
MA-MCP Navy USACE CT DEP Other_____

Reporting Limits - _____

Electonic Deliverables Excel Access PDF

Co. Name: GZA GeoEnvironmental	Project #: 15.0166521.00	Project Name: 123 Pine Street, Holyoke, MA	
Contact Person: Adam Cote	Address: 1350 Main Street - Suite 1400		
City: Springfield	State: MA	Zip: 01103	PO #: —
Tel.: 413-726-2100	Fax: —	email: adam.cote@gza.com	

ESS Lab ID	Date	Collection Time	Grab -G Composite-C	Matrix	Sample ID	Pres Code	# of Containers	Type of Container	Vol of Container	Analysis: MA-EPH w/ HC Ranges + Targets									
1	8/18/16	10:15	G	S	123 Pine - S-4	1	1	AG	4oz	X									
2	↓	10:32	↓	↓	123 Pine - S-5	1	1	↓	↓	X									
3	↓	10:43	↓	↓	123 Pine - S-6	1	1	↓	↓	X									
4	↓	10:54	↓	↓	123 Pine - S-7	1	1	↓	↓	X									

Container Type: P-Poly G-Glass AG-Amber Glass S-Sterile V-VOA

Matrix: S-Soil SD-Solid D-Sludge WW-Wastewater GW-Groundwater SW-Surface Water DW-Drinking Water O-Oil W-Wipes F-Filter

Cooler Present ✓ Yes ____ No

Seals Intact ____ Yes ____ No NA: ✓

Cooler Temperature: 1.6 Ice

Internal Use Only

[✓] Pickup

[ ] Technician___

Preservation Code: 1-NP, 2-HCl, 3-H2SO4, 4-HNO3, 5-NaOH, 6-MeOH, 7-Asorbic Acid, 8-ZnAct, 9-_____

Sampled by : D. Harris

Comments:

Relinquished by: (Signature, Date & Time)	Received by: (Signature, Date & Time)	Relinquished by: (Signature, Date & Time)	Received by: (Signature, Date & Time)
8/18/16 1330	GZA Fridge 8/18/16 1330	8/19/16	8/19/16 10:30
8/19/16 14:30	8/19/16 1437		

* By circling MA-MCP, client acknowledges samples were collected in accordance with MADEP CAM VIIA

Please fax to the laboratory all changes to Chain of Custody

1 (White) Lab Copy
2 (Yellow) Client Receipt