



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Region 1

5 Post Office Square, Suite 100

BOSTON, MA 02109-3912

CERTIFIED MAIL RETURN RECEIPT REQUESTED

OCT 03 2014

Marc Ciampa
Senior Project Manager
P. Caliacco Construction
1373 Washington Street
Weymouth, MA 02189

Re: Authorization to discharge under the Remediation General Permit (RGP) – MAG910000.
Massachusetts Water Resources Authority (MWRA) Contract 7066 site located at 4 West Street,
Reading, MA 01867, Middlesex County; Authorization # MAG910644

Dear Mr. Ciampa:

Based on the review of a Notice of Intent (NOI) submitted by Edward M. Patch from Environmental Management Professionals on behalf of MWRA for the site referenced above, the U.S. Environmental Protection Agency (EPA) hereby authorizes you, as the named Operator to discharge in accordance with the provisions of the RGP at that site. Your authorization number is listed above.

The checklist enclosed with this RGP authorization indicates the pollutants which you are required to monitor. Also indicated on the checklist are the effluent limits, test methods and minimum levels (MLs) for each pollutant. Please note that the checklist does not represent the complete requirements of the RGP. Operators must comply with all of the applicable requirements of this permit, including influent and effluent monitoring, narrative water quality standards, record keeping, and reporting requirements, found in Parts I and II, and Appendices I – VIII of the RGP. See EPA's website for the complete RGP and other information at: <http://www.epa.gov/region1/npdes/mass.html#dgp>.

Please note the enclosed checklist includes parameters which you marked "Believed Present". Other pollutants, petroleum hydrocarbons and total BTX have been added to account for the possibility of contamination from gas stations that are contiguous to the site construction.

Also, please note that the metals included on the checklist are dilution dependent pollutants and subject to limitations based on selected dilution ranges and technology-based ceiling limitations. For each parameter the dilution factor 5.12 for this site is within a dilution range greater than five to ten (>5 to 10), established in the RGP. (See the RGP Appendix IV for Massachusetts

facilities). Therefore, the limits for arsenic of 50 ug/L, copper of 26 ug/L, lead of 6.5 ug/L, nickel of 145 ug/L and iron of 5,000 ug/L, are required to achieve permit compliance at your site.

This general permit and authorization to discharge will expire on September 9, 2015. You have reported that this project will terminate on December 1, 2014. You are required to submit a Notice of Termination (NOT) to the attention of the contact person indicated below within 30 days of project completion.

Thank you in advance for your cooperation in this matter. Please contact Victor Alvarez at 617-918-1572 or Alvarez.Victor@epa.gov, if you have any questions.

Sincerely,



Thelma Murphy, Chief
Storm Water and Construction
Permits Section

Enclosure

cc: Robert Kubit, MassDEP
Jeffrey Zager, Town of Reading PWD
Edward M. Patch, EMP, Inc.

**2010 Remediation General Permit
Summary of Monitoring Parameters^[1]**

NPDES Authorization Number:		MAG910644
Authorization Issued:	October, 2014	
Facility/Site Name:	MWRA CONTRACT 7066	
Facility/Site Address:	Water Resources Authority (MWRA), 4 West St. Reading, MA 01867	
	Email address of owner: Jeremiah.sheehan@mwra.com	
Legal Name of Operator:	P. Caliacco Construction	
Operator contact name, title, and Address:	Marc Ciampa, Senior Project Manager	
	Email: mciampa@pcaliaco.com	
Estimated date of The Project Completion:	December 1, 2014	
Category and Sub-Category:	Category I. Petroleum Related Site Remediation. Subcategory A. Gasoline Only Sites	
RGP Termination Date:	September 2015	
Receiving Water:	Aberjona River	

Monitoring & Limits are applicable if checked. All samples are to be collected as grab samples

	<u>Parameter</u>	<u>Effluent Limit/Method#/ML</u> (All Effluent Limits are shown as Daily Maximum Limit, unless denoted by a **, in that case it will be a Monthly Average Limit)
✓	1. Total Suspended Solids (TSS)	30 milligrams/liter (mg/L) **, 50 mg/L for hydrostatic testing ** Me#160.2/ML5ug/L
	2. Total Residual Chlorine (TRC) ¹	Freshwater = 11 ug/L ** Saltwater = 7.5 ug/L **/ Me#330.5/ML 20ug/L
✓	3. Total Petroleum Hydrocarbons (TPH)	5.0 mg/L/ Me# 1664A/ML 5.0mg/L
	4. Cyanide (CN) ^{2, 3}	Freshwater = 5.2 ug/l ** Saltwater = 1.0 ug/L **/ Me#335.4/ML 10ug/L
	5. Benzene (B)	5ug/L /50.0 ug/L for hydrostatic testing only/ Me#8260C/ML 2 ug/L
	6. Toluene (T)	(limited as ug/L total BTEX)/ Me#8260C/ML 2ug/L
	7. Ethylbenzene (E)	(limited as ug/L total BTEX) Me#8260C/ML 2ug/L
	8. (m,p,o) Xylenes (X)	(limited as ug/L total BTEX) Me#8260C/ML 2ug/L
✓	9. Total Benzene, Toluene, Ethyl Benzene, and Xylenes (BTEX) ⁴	100 ug/L/ Me#8260C/ ML 2ug/L

	10. Ethylene Dibromide (EDB) (1,2- Dibromoethane)	0.05 ug/l/ Me#8260C/ ML 10ug/L
✓	11. Methyl-tert-Butyl Ether (MtBE)	70.0 ug/l/Me#8260C/ML 10ug/L
	12.tert-Butyl Alcohol (TBA) (TertiaryButanol)	Monitor Only(ug/L)/Me#8260C/ML 10ug/L
	13. tert-Amyl Methyl Ether (TAME)	Monitor Only(ug/L)/Me#8260C/ML 10ug/L
	14. Naphthalene ⁵	20 ug/L /Me#8260C/ML 2ug/L
	15. Carbon Tetrachloride	4.4 ug/L /Me#8260C/ ML 5ug/L
	16. 1,2 Dichlorobenzene (o-DCB)	600 ug/L /Me#8260C/ ML 5ug/L
	17. 1,3 Dichlorobenzene (m-DCB)	320 ug/L /Me#8260C/ ML 5ug/L
	18. 1,4 Dichlorobenzene (p-DCB)	5.0 ug/L /Me#8260C/ ML 5ug/L
	18a. Total dichlorobenzene	763 ug/L - NH only /Me#8260C/ ML 5ug/L
	19. 1,1 Dichloroethane (DCA)	70 ug/L /Me#8260C/ ML 5ug/L
	20. 1,2 Dichloroethane (DCA)	5.0 ug/L /Me#8260C/ ML 5ug/L
	21. 1,1 Dichloroethene (DCE)	3.2 ug/L/Me#8260C/ ML 5ug/L
	22. cis-1,2 Dichloroethene (DCE)	70 ug/L/Me#8260C/ ML 5ug/L
	23. Methylene Chloride	4.6 ug/L/Me#8260C/ ML 5ug/L
	24. Tetrachloroethene (PCE)	5.0 ug/L/Me#8260C/ ML 5ug/L
	25. 1,1,1 Trichloro-ethane (TCA)	200 ug/L/Me#8260C/ ML 5ug/L
	26. 1,1,2 Trichloro-ethane (TCA)	5.0 ug/L /Me#8260C/ ML 5ug/L
	27. Trichloroethene (TCE)	5.0 ug/L /Me#8260C/ ML 5ug/L
	28. Vinyl Chloride (Chloroethene)	2.0 ug/L /Me#8260C/ ML 5ug/L
	29. Acetone	Monitor Only(ug/L)/Me#8260C/ML 50ug/L
	30. 1,4 Dioxane	Monitor Only /Me#1624C/ML 50ug/L
	31. Total Phenols	300 ug/L Me#420.1&420.2/ML 2 ug/L/ Me# 420.4 /ML 50ug/L
	32. Pentachlorophenol (PCP)	1.0 ug/L /Me#8270D/ML 5ug/L, Me#604 &625/ML 10ug/L
	33. Total Phthalates (Phthalate esters) ⁶	3.0 ug/L ** /Me#8270D/ML 5ug/L, Me#606/ML 10ug/L& Me#625/ML 5ug/L
	34. Bis (2-Ethylhexyl) Phthalate [Di- (ethylhexyl) Phthalate]	6.0 ug/L /Me#8270D/ML 5ug/L, Me#606/ML 10ug/L & Me#625/ML 5ug/L
	35. Total Group I Polycyclic Aromatic Hydrocarbons (PAH)	10.0 ug/L
	a. Benzo(a) Anthracene ⁷	0.0038 ug/L /Me#8270D/ ML 5ug/L, Me#610/ML 5ug/L& Me#625/ML 5ug/L
	b. Benzo(a) Pyrene ⁷	0.0038 ug/L /Me#8270D/ ML 5ug/L, Me#610/ML 5ug/L& Me#625/ML 5ug/L
	c. Benzo(b)Fluoranthene ⁷	0.0038 ug/L /Me#8270D/ ML 5ug/L, Me#610/ML 5ug/L& Me#625/ML 5ug/L
	d. Benzo(k)Fluoranthene ⁷	0.0038 ug/L /Me#8270D/ ML 5ug/L,

		Me#610/ML 5ug/L & Me#625/ML 5ug/L
	e. Chrysene ⁷	0.0038 ug/L / Me#8270D/ML 5ug/L, Me#610/ML 5ug/L & Me#625/ML 5ug/L
	f. Dibenzo(a,h)anthracene ⁷	0.0038 ug/L / Me#8270D/ML 5ug/L, Me#610/ML 5ug/L & Me#625/ML 5ug/L
	g. Indeno(1,2,3-cd) Pyrene ⁷	0.0038 ug/L / Me#8270D/ML 5ug/L, Me#610/ML 5ug/L & Me#625/ML 5ug/L
	36. Total Group II Polycyclic Aromatic Hydrocarbons (PAH)	100 ug/L
	h. Acenaphthene	X/Me#8270D/ML 5ug/L, Me#610/ML 5ug/L & Me#625/ML 5ug/L
	i. Acenaphthylene	X/Me#8270D/ML 5ug/L, Me#610/ML 5ug/L & Me#625/ML 5ug/L
	j. Anthracene	X/Me#8270D/ML 5ug/L, Me#610/ML 5ug/L & Me#625/ML 5ug/L
	k. Benzo(ghi) Perylene	X/Me#8270D/ML 5ug/L, Me#610/ML 5ug/L & Me#625/ML 5ug/L
	l. Fluoranthene	X/Me#8270D/ML 5ug/L, Me#610/ML 5ug/L & Me#625/ML 5ug/L
	m. Fluorene	X/Me#8270D/ML 5ug/L, Me#610/ML 5ug/L & Me#625/ML 5ug/L
	n. Naphthalene ⁵	20 ug/L / Me#8270/ML 5ug/L, Me#610/ML 5ug/L & Me#625/ML 5ug/L
	o. Phenanthrene	X/Me#8270D/ML 5ug/L, Me#610/ML 5ug/L & Me#625/ML 5ug/L
	p. Pyrene	X/Me#8270D/ML 5ug/L, Me#610/ML 5ug/L & Me#625/ML 5ug/L
	37. Total Polychlorinated Biphenyls (PCBs) ^{8, 9}	0.000064 ug/L / Me# 608/ ML 0.5 ug/L
✓	38. Chloride	Monitor only / Me# 300.0/ ML 100 ug/L

	Metal parameter	Total Recoverable Metal Limit @ H ¹⁰ = 50 mg/l CaCO ₃ for discharges in Massachusetts (ug/l) ^{11/12}		Minimum level = ML	
		Freshwater			
	39. Antimony	5.6/ML	10	ML 10	
✓	40. Arsenic **	50		ML	20
	41. Cadmium **	0.2			10
	42. Chromium III (trivalent) **	48.8			15
	43. Chromium VI (hexavalent) **	11.4		ML	10
✓	44. Copper **	26		ML	15
✓	45. Lead **	13		ML	20
	46. Mercury **	0.9		ML	0.2
✓	47. Nickel **	145		ML	20
	48. Selenium **	5		ML	20
	49. Silver	1.2		ML	10

	50. Zinc **	66.6	ML	15
✓	51. Iron	5,000	ML	20

	Other Parameters	Limit
✓	52. Instantaneous Flow	Site specific in CFS
✓	53. Total Flow	Site specific in CFS
✓	54. pH Range for Class A & Class B Waters in MA	6.5-8.3; 1/Month/Grab ¹³
	55. pH Range for Class SA & Class SB Waters in MA	6.5-8.3; 1/Month/Grab ¹³
	56. pH Range for Class B Waters in NH	6.5-8; 1/Month/Grab ¹³
	57. Daily maximum temperature - Warm water fisheries	83°F; 1/Month/Grab ¹⁴
	58. Daily maximum temperature - Cold water fisheries	68°F; 1/Month/Grab ¹⁴
	59. Maximum Change in Temperature in MA - Any Class A water body	1.5°F; 1/Month/Grab ¹⁴
	60. Maximum Change in Temperature in MA - Any Class B water body- Warm Water	5°F; 1/Month/Grab ¹⁴
	61. Maximum Change in Temperature in MA - Any Class B water body - Cold water and Lakes/Ponds	3°F; 1/Month/Grab ¹⁴
	62. Maximum Change in Temperature in MA - Any Class SA water body - Coastal	1.5°F; 1/Month/Grab ¹⁴
	63. Maximum Change in Temperature in MA - Any Class SB water body - July to September	1.5°F; 1/Month/Grab ¹⁴
	64. Maximum Change in Temperature in MA -Any Class SB water body - October to June	4°F; 1/Month/Grab ¹⁴

Footnotes:

Although the maximum values for TRC are 11ug/l and 7.5 ug/l for freshwater, and saltwater respectively, the compliance limits are equal to the minimum level (ML) of the test method used as listed in Appendix VI (i.e., Method 330.5, 20 ug/l).

² Limits for cyanide are based on EPA's water quality criteria expressed as micrograms per liter. There is currently no EPA approved test method for free cyanide. Therefore, total cyanide must be reported.

³ Although the maximum values for cyanide are 5.2 ug/l and 1.0 ug/l for freshwater and saltwater, respectively, the compliance limits are equal to the minimum level (ML) of the Method 335.4 as listed in Appendix VI (i.e., 10 ug/l).

⁴ BTEX = sum of Benzene, Toluene, Ethylbenzene, and total Xylenes.

⁵ Naphthalene can be reported as both a purgeable (VOC) and extractable (SVOC) organic compound. If both VOC and SVOC are analyzed, the highest value must be used unless the QC criteria for one of the analyses is not met. In such cases, the value from the analysis meeting the QC criteria must be used.

⁶ The sum of individual phthalate compounds(not including the #34, Bis (2-Ethylhexyl) Phthalate . The compliance limits are equal to the minimum level (ML) of the test method used as listed in Appendix VI.

Total values calculated for reporting on NOIs and discharge monitoring reports shall be calculated by adding the measured concentration of each constituent. If the measurement of a constituent is less than the ML, the permittee shall use a value of zero for that constituent. For each test, the permittee shall also attach the raw data for each constituent to the discharge monitoring report, including the minimum level and minimum detection

level for the analysis.

⁷ Although the maximum value for the individual PAH compounds is 0.0038 ug/l, the compliance limits are equal to the minimum level (ML) of the test method used as listed in Appendix VI.

⁸ In the November 2002 WQC, EPA has revised the definition of Total PCBs for aquatic life as total PCBs is the sum of all homologue, all isomer, all congener, or all "Oroclor analyses." Total values calculated for reporting on NOIs and discharge monitoring reports shall be calculated by adding the measured concentration of each constituent. If the measure of a constituent is less than the ML, the permittee shall use a value of zero for that constituent. For each test, the permittee shall also attach the raw data for each constituent to the discharge monitoring report, including the minimum level and minimum detection level for the analysis.

⁹ Although the maximum value for total PCBs is 0.000064 ug/l, the compliance limit is equal to the minimum level (ML) of the test method used as listed in Appendix VI (i.e., 0.5 ug/l for Method 608 or 0.00005 ug/l when Method 1668a is approved).

¹⁰ Hardness. Cadmium, Chromium III, Copper, Lead, Nickel, Silver, and Zinc are Hardness Dependent.

¹¹ For a Dilution Factor (DF) from 1 to 5, metals limits are calculated using DF times the base limit for the metal. See Appendix IV. For example, iron limits are calculated using $DF \times 1,000 \text{ ug/L}$ (the iron base limit). Therefore DF is 1.5, the iron limit will be 1,500 ug/L; DF 2, then iron limit = $1,000 \times 2 = 2,000 \text{ ug/L}$, etc. not to exceed the $DF=5$.

¹² Minimum Level (ML) is the lowest level at which the analytical system gives a recognizable signal and acceptable calibration point for the analyte. The ML represents the lowest concentration at which an analyte can be measured with a known level of confidence. The ML is calculated by multiplying the laboratory-determined method detection limit by 3.18 (see 40 CFR Part 136, Appendix B).

¹³ pH sampling for compliance with permit limits may be performed using field methods as provided for in EPA test Method 150.1.

¹⁴ Temperature sampling per Method 170.1



ENVIRONMENTAL MANAGEMENT PROFESSIONALS, INC.

94 Sawyer Lane
Marshfield, MA 02050
781-834-3822 • Fax 781-834-7110

September 15, 2014

U.S. Environmental Protection Agency
RGP-NOC Processing Municipal Assistance Unit (CMU)
1 Congress Street, Suite 1100
Boston, MA 02114-2023

VIA: NPDES.Generalpermits@EPA.gov

Attention: RGP-NOC Processing
RE: NIH West Street Improvements
MWRA Contract 7066
Reading, MA 01867
Notice of Intent for Construction Dewatering Discharge Under
Massachusetts Remedial General Permit MAG910000

To Whom It May Concern:

On behalf of P. Caliacco Corp. (Caliacco), Environmental Management Professionals, Inc. (EMP) is providing a summary of the site and groundwater quality information in support of an application for approval from the U.S. Environmental Protection Agency (EPA) for the temporary discharge of groundwater into the Aberjona River via a storm drain system during construction at the above referenced site. Refer to Figure 1: *Project Location Plan* for the general site locus.

Operator

The operator is:
P. Caliacco Corp.
1373 Washington Street
Weymouth, MA 02189
Attention: Mr. Marc Ciampa
Telephone: 781-340-0400
Email: Mciampa@caliacco.com

Owner

The owner is:
Massachusetts Water Resources Authority
2 Griffin Way
Chelsea, MA 02150
Attention: Mr. Jerry Sheehan
Telephone: 857-259-9046
Email: Jeremiah.sheehan@mwra.com

Site Location and Current Conditions

The section of the utility improvements project seeking coverage under the NPDES Remediation General Permit (RGP) will be a 350 linear foot section on Washington Street in Woburn, MA extending into West Street in Reading, MA. The roadways have been public right-of-ways for at least the past 80 years.

The site and surrounding properties are serviced by public utilities including gas, water and electricity. Stormwater is collected in catch basins that discharge via storm drains to the Aberjona River.

Site Environmental Setting and Surrounding Historical Places

Based on the current Massachusetts Geographic Information Systems (GIS) Department of Environmental Protection (DEP) Priority Resources Map of this section of Woburn and Reading (*See Figure 2*), the subject site is not located within the boundaries of a Potentially Productive Aquifer or within a Zone II, Interim Wellhead Protection Area as defined by the Massachusetts Department of Environmental Protection. There are no known public or private drinking water supply wells, no Areas of Critical Environmental Concern, no fish habitats, no habitats of Species of Special Concern or Threatened or Endangered Species within 500 feet of the subject site. There are no surface water bodies or wetland areas located on or close proximity to the section of the construction site seeking coverage under the RGP. The nearest surface water is an unnamed pond approximately 1,500 feet to the west, and the receiving water, the Arberjona River, is an impaired water body classified by the DEP as a Class B Surface Water See Attachment 1: *2012 Waterbody Report for Aberjona River*. No Protected Open Spaces are located on or within 500 feet of the subject work area. No areas designated as solid waste facilities (landfills) are located within 0.5 miles of the subject site.

A review of the most recent federal listing of threatened and endangered species published by the U.S. Fish and Wildlife Service identified no threatened and/or endangered species at or in the vicinity of the project or the discharge location and/or the Aberjona River. In addition, a review of the Massachusetts Division of Fisheries and Wildlife on-line database identified no threatened or endangered species at the point of discharge and/or the Aberjona River. See Attachment 2: *US Fish & Wildlife Documentation*.

A review of the most recent National Register of Historical Places for Middlesex County and the Massachusetts Historical Commission website MACRIS did not identify records or addresses of Historic Places that exist in the immediate vicinity of the section of the project seeking coverage under the RGP. See Attachment 3: *MACRIS Data File*.

Release Site History

There are two Massachusetts Department of Environmental Protection (MADEP) listed release sites in the immediate vicinity of the work area. Both properties have been impacted with gasoline from underground storage tank leaks. The first is located on 482 Washington Street in Woburn (Release Tracking Number (RTN) 3-12114). The initial notification associated with this RTN occurred in 2004. Currently, the property is a self-service gasoline station owned by Public America. The regulatory status of this site is a Phase V operation and maintenance of sub slab dewatering and ventilation systems of residences on Dragon Court west/ south west of the site. The second location is the property abutting Public America. This site is a full service Mobil Station with an address



of 2 West Street in Reading. The initial notification under RTN 3-21024 occurred in 2001; after significant soil and groundwater remediation, the site received a class A-2 Response Action Outcome in 2006. According to environmental reports generated for these releases, the ground water flow in the area is predominantly in a west to south westerly direction. This groundwater flow and associated contaminant plume is presumably down gradient of the utility project on Washington Street and West Street which are located east/ south east of the release areas.

On June 12 and June 20, 2014 EMP obtained groundwater samples from B3-OW; an existing monitoring well located on a traffic island between the two gas stations. This well is located less than 10 feet northwest of the project alignment. A review of the results of chemical testing indicated that lead and nickel were present in the groundwater but at concentrations below effluent limits in the permit. Other metals such as arsenic, copper and iron were also present at concentrations above the freshwater limit. However, the concentration of these metals were below permit discharge limits after applying the applicable dilution factor (DF) of the receiving water as indicated in Appendix IV. The concentration of total suspended solids (TSS) in the sample exceeded the discharge criteria limits identified in Appendix III of the permit.

Proposed Scope of Work

The scope of this project includes, but is not limited to the installation of approximately 2,400 linear feet of 36-inch water main beginning on Washington Street in Woburn and continuing in a northerly direction on West Street in Reading, MA. Specific soil management activities will include excavation, field screening, stockpiling, sampling, testing, on-site reuse and transportation and disposal of excess soils displaced during the construction project. For reasons previously identified in this document, construction dewatering will require the discharge of collected groundwater into the storm drain system under the requested Remedial General Permit. A review of relevant drainage plans provided by the Town of Woburn indicates that a storm water drain adjacent to the planned construction area connects to an 18-inch RCP pipe that flows in a southerly direction on Washington Street. The pipe then flows onto Dragon Court in a westerly direction past the Edison Substation the flows south and outlets to a resource area behind 7 Constitution Way which flows to Commerce Way where drainage is received by Halls Brook which discharges into the Arberjona River. The location of relevant drain with relation to the subject site is indicated on Figure 3 (*Discharge Point*). Figure 4 shows the route of the storm drain on Washington Street (*Site Drainage Maps*). Actual volumes of contaminated site media, soils and groundwater, to be managed will be determined as on-site activities occur.

In the event that impacted soils with contaminant concentrations above the applicable RC-S1 reporting values and/or groundwater exceeding the GW-2/3 values the construction activity will be performed as a Utility Related Abatement Measure (URAM) in accordance with the Massachusetts Contingency Plan 310 CMR 40.0460.



Construction Site Dewatering

Groundwater will be managed through a series of sumps within the utility trench and subsequently pumped to a 20,000 gallon weir tank for equalization and solids removal. The dewatering flow will pass through a duplex bag filter system prior to entering into a storm drain located on the northwest shoulder of 4 West Street.

If compliance sampling indicates that total residual metals or potentially volatile organic compounds (VOC) associated with a previous gasoline release on 4 West Street are present in the discharge at concentrations above the applicable RGP limits, vessels containing granular activated carbon (GAC) for VOC removal and/or green sand or ion exchange resin will be added to the treatment process for metals removal.

Summary of Groundwater Analysis

On June 12 and June 20, 2014 Environmental Management Professionals, Inc. obtained samples of groundwater from monitoring well B3-OW and submitted the sample to ESS Laboratory of Cranston, Rhode Island a certified laboratory for analysis for the presence of parameters required under the EPA's Remediation General Permit (RGP) Appendix III, including total suspended solids (TSS), total residual chlorine, total petroleum hydrocarbons (TPH), cyanide, volatile organic compounds (VOCs) including total benzene, toluene, ethylbenzene and xylenes (BTEX), poly-aromatic hydrocarbons (PAHs), total phenols, pesticides and PCBs, and total recoverable metals. Because Q/A Q/C activities performed by the laboratory when analyzing for 1,4, Dioxane did not leave an adequate volume of sample to analyze all VOC's by method 8260B, an additional sample obtained on June 20, 2014 was subsequently analyzed for the requisite parameters. See Attachment 4: *June 24, 2014 ESS Report 1406294*.

The results of field and laboratory analysis indicate the following:

1. **pH:** The pH tested in the field sample exhibited a pH level of 7.1 Standard Units (S.U.) which is within the recommended range of 6.5 to 8.5 S.U. for discharge into freshwater.
2. **TSS:** Total suspended solids (TSS) were detected in the tested sample at a concentration of 119 mg/L, which is above the upper limit of 30 mg/L established by the EPA for discharge into surface water.
3. **VOCs:** The VOC Methyl tert-butyl ether (MTBE) was detected in the tested sample at 5.2 ug/L which is above the laboratory's method detection limits but below the RGP limit of 70 ug/L.
4. **TPH:** Laboratory analysis of the groundwater sample indicated no detectable levels of TPH.
5. **PAH and Total Phenols:** The laboratory reported no detectable levels of Total Group I PAHs, Total Group II PAHs or Total Phenols above limits for discharges into surface water including the ML in Appendix VI of the permit.
6. **PCBs:** The laboratory results indicated no detectable levels of PCBs.
7. **Cyanide:** Cyanide was not detected in the tested groundwater sample at a concentration in excess of the laboratory method detection limit of 0.5 mg/L.



8. **Total Metals:** The laboratory data indicated no detectable levels of antimony, cadmium, chromium III, selenium, chromium VI, mercury or silver in the submitted groundwater samples. The detected levels of lead @ 0.9ug/L and nickel at 10.5ug/L are below the EPA effluent limits of 1.3ug/L and 29.0ug/L respectively for discharge to a freshwater body. The detected level of iron at 2860ug/L, arsenic at 16.4ug/L and copper at 25.9ug/L exceed the EPA effluent limit of 1,000ug/L, 10ug/L and 5.2ug/L respectively for discharge into a freshwater body. However, based on calculations of the applicable dilution factor as shown below, the detected concentration of iron, arsenic and copper does not exceed the corresponding dilution concentration of 5,000ug/L for iron 51.2ug/L for arsenic and 26.6ug/L for copper.

Dilution Factor Application for Total Iron, Arsenic

As mentioned above, total iron was detected at a concentration of 2,860ug/L; arsenic was detected at 16.4ug/L and copper at 25.9ug/L. The EPA freshwater effluent limitation for iron is 1,000ug/L, arsenic is 10ug/L and copper is 5.2ug/L. As a result, a Dilution Factor (DF) was calculated for the detected level of iron and arsenic pursuant to the procedure contained in RGP MAG910000, Appendix V. The purpose of the DF calculation is to establish Total Recoverable Limits for metals, taking into consideration the anticipated dilution of the detected analyte upon discharge into the Arberjona River. The calculated DF was then used to find the appropriate Dilution Range Concentration (DRC) contained in MAG910000, Appendix IV.

The DF was calculated using the following equation:

$$DF = (Q_d + Q_s) / Q_d$$

Where the Q_d is the maximum discharge flow rate and Q_s is the receiving water flow rate minimum for seven consecutive days with a recurrence interval of 10 years or (7Q10 flow).

The assumed Maximum Flow Rate is assumed to be 50 gallons per minute or 0.1115 cubic feet per second (cfs) and the Minimum Flow Rate calculated by the USGS *Streamstats* GIS Database (*Attachment 5*) at the location of discharge into the Arberjona River for 7 consecutive days with a recurrence interval of 10 years (7Q10 flow) is 0.46 thus resulting in a DF of 5.12. See *Attachment 6: Dilution Factor Calculation*.

Therefore, based on the calculation of the applicable dilution factor, the detected level of iron at 2,860ug/L, arsenic at 16.4ug/L and copper at 25.9ug/L does not exceed the dilution concentration of 5,000ug/L applicable to iron 51.2ug/L for arsenic and 26.6ug/L for copper when discharging into a freshwater body.

Groundwater Treatment

It is our opinion that the level of iron, arsenic, copper and TSS detected in the tested sample from monitoring well B3-OW was due to the accumulation of sediment. To



mitigate sediment in the discharge water as a result of construction activities, a sedimentation tank(s) and a bag filter(s) will be used to settle particulate matter out of the water to ensure allowable discharge limits prior to discharge. A schematic of the treatment system is shown on Attachment 7 (*Groundwater Treatment System*).

To document the effectiveness of the treatment system, samples of the discharge water will be obtained and tested for the presence of TSS and total metals prior to the start of discharge into the storm drain system. Should the pre-startup testing indicate that the levels of these contaminants in the effluent exceed the limits established under the RGP, additional treatment of the effluent, potentially including the addition of green sand filters or ion exchange resin will be implemented prior to initial discharge. In addition, should other contaminants be detected within the discharge water during the construction dewatering phase of the project, at levels that exceed the effluent limitations, mitigative measures will be implemented to meet the allowable discharge limits.

Summary and Conclusions

The purpose of this report is to assess site environmental conditions and groundwater data to support an application for a Massachusetts Remedial General Permit for off-site discharge of groundwater which will be encountered during construction of the NIH West Street Transmission Main in Reading, MA.

In summary, the results of the groundwater laboratory analyses indicate that most of the analytes were either not detected above the laboratory's detection limits or were detected at concentrations below the RGP effluent limitations when applying the dilution factor.

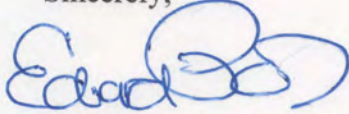
It is our opinion that the levels of iron, arsenic, copper and TSS detected in the sample from monitoring well B3-OW were due to the accumulation of sediment. To mitigate sediment in the discharge water as a result of construction activities, a sedimentation tank will be used to settle particulate matter out of the water to meet allowable discharge limits prior to discharge. A bag filter(s) will also be added at the outlet from the tank before the effluent is discharged into the storm drain system to remove the metals and TSS.

Based on the results of groundwater chemical analyses discussed above, considering dilution, it is our opinion that no additional treatment of the groundwater prior to discharge will be necessary. It is our opinion that the metals are sorbed to the sediment in the groundwater, and the sediment will be settled out and filtered prior to discharge. It is therefore anticipated that metals or TSS will not be present in the discharge above permit limits. If during the start-up phase of this discharge data indicates that the subject metals are present at concentrations that exceed permit limits additional treatment, potentially including green sand filters or ion exchange resin, will be included in the treatment process.



I trust that the attached information satisfies your permit requirements. If you have any questions or comments, please contact me at 781/834-3822 or by email at Tpatch@envmgtpro.com.

Sincerely,



Edward M. Patch
President

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BEST MANAGEMENT PRACTICES PLAN

National Pollutant Discharge Elimination System – Remediation General Permit

Temporary Construction Dewatering

NIH West Street Improvements

MWRA Contract 7066

West Street Reading, MA. 01867

A Notice Of Intent (NOI) for a Remediation General Permit (RGP) under the National Pollutant Discharge Elimination System (NPDES) is being submitted to the US Environmental Protection Agency (EPA) on behalf of P. Caliacco Construction, by Environmental Management Professionals, Inc. in anticipation of temporary construction site dewatering planned to occur during proposed utility improvements at the above referenced site (the Site). This Best Management Practices Plan (BMPP) was prepared in accordance with the general requirements of the NPDES RGP, and related guidance documentation provided by the EPA. The BMPP is included as an Appendix to the NOI and will be posted at the Site during the time of the work as specified in the NOI.

Water Treatment and Management

Construction dewatering will be conducted from sumps located inside the utility trenches. The treatment system will include an equalization tank, pumps, and filtration at a minimum to reduce low concentrations of total suspended solids (TSS) and Total Metals. This NOI has been prepared for the management of dewatering from the Site; please refer to Figure 1: Site Locus for an overview of the immediate area surrounding the Site. The proposed work area is referred to as West Street bounded by residential and commercial buildings consisting of gasoline stations and convenient stores.

Discharge Monitoring and Compliance

Routine Operation & Maintenance (O&M) will be completed on the water treatment system. Maintenance will include checking the condition of the treatment system equipment such as the settling tank, bag filters, hoses, pumps and flow meter. Collection of samples throughout the treatment system to verify the treatment system discharge is in compliance with the RGP. In the event that the system effluent is not within the discharge criteria of the RGP, modification to the treatment system may occur until discharge compliance can be consistently achieved. Please refer to Figure 5 for a layout of the proposed treatment system.

The total monthly discharge will be monitored by a non-resettable flow meter and totalizer. Monthly monitoring reports will be compiled and maintained at the Site. Employees who have direct or indirect responsibility for enduring compliance with the RGP will be trained by the treatment system operator.

Management of Treatment System Materials

No potential sources of pollutants other than TSS and naturally occurring metals associated with the TSS are anticipated during the construction dewatering activities. Dewatering effluent will be pumped directly to the treatment system from the excavation via hoses and sumps to minimize handling. Site security for the treatment system will be covered in the project site security plan. Sediment collected in the weir tank used in the treatment system will be characterized and disposed of as soil at an appropriate receiving facility in accordance with the applicable laws and regulations. Any bag filters will be containerized and disposed of to an appropriate receiving facility. If used, any media (i.e., ion exchange resin or green sand) will be profiled and recycled at an approved receiving facility.



ENVIRONMENTAL MANAGEMENT PROFESSIONALS, INC.

B. Suggested Form for Notice of Intent (NOI) for the Remediation General Permit

1. General facility/site information. Please provide the following information about the site:

a) Name of facility/site: MWRA Contract 7066		Facility/site mailing address:			
Location of facility/site:		Street: 4 West Street			
longitude: 71.12419 W	Facility SIC code(s):	162			
latitude: 42.50834 N					
b) Name of facility/site owner:		Town: Reading			
Email address of facility/site owner: Jeremiah.sheehan@mwra.com		State: MA		Zip: 01867	
Telephone no. of facility/site owner: 857-259-9046		County: Middlesex			
Fax no. of facility/site owner:		Owner is (check one): 1. Federal ☐ 2. State/Tribal ☒			
Address of owner (if different from site):		3. Private ☐ 4. Other ☐ if so, describe: Massachusetts Water Resources Authority			
Street: 2 Griffin Way					
Town: Chelsea	State: MA	Zip: 02150	County: Middlesex		
c) Legal name of operator:	Operator telephone no.: 781-340-0400				
P Caliacco Construction	Operator fax no.:		Operator email: mciampa@pcaliacco.com		
Operator contact name and title: Marc Ciampa Senior Project Manager					
Address of operator (if different from owner):		Street: 1373 Washington Street			
Town: Weymouth	State: MA	Zip: 02189	County: Norfolk		

d) Check Y for "yes" or N for "no" for the following: 1. Has a prior NPDES permit exclusion been granted for the discharge? Y ☐ N ☒, if Y, number: 2. Has a prior NPDES application (Form 1 & 2C) ever been filed for the discharge? Y ☐ N ☒, if Y, date and tracking #: 3. Is the discharge a "new discharge" as defined by 40 CFR 122.2? Y ☒ N ☐ 4. For sites in Massachusetts, is the discharge covered under the Massachusetts Contingency Plan (MCP) and exempt from state permitting? Y ☐ N ☒	
e) Is site/facility subject to any State permitting, license, or other action which is causing the generation of discharge? Y ☐ N ☒ If Y, please list: 1. site identification # assigned by the state of NH or MA: 2. permit or license # assigned: 3. state agency contact information: name, location, and telephone number:	f) Is the site/facility covered by any other EPA permit, including: 1. Multi-Sector General Permit? Y ☐ N ☒, if Y, number: 2. Final Dewatering General Permit? Y ☐ N ☒, if Y, number: 3. EPA Construction General Permit? Y ☒ N ☐, if Y, number: MA012A281 4. Individual NPDES permit? Y ☐ N ☒, if Y, number: 5. any other water quality related individual or general permit? Y ☐ N ☒, if Y, number:
g) Is the site/facility located within or does it discharge to an Area of Critical Environmental Concern (ACEC)? Y ☐ N ☒	
h) Based on the facility/site information and any historical sampling data, identify the sub-category into which the potential discharge falls.	
Activity Category	Activity Sub-Category
I - Petroleum Related Site Remediation	A. Gasoline Only Sites ☒ B. Fuel Oils and Other Oil Sites (including Residential Non-Business Remediation Discharges) ☐ C. Petroleum Sites with Additional Contamination ☐
II - Non Petroleum Site Remediation	A. Volatile Organic Compound (VOC) Only Sites ☐ B. VOC Sites with Additional Contamination ☐ C. Primarily Heavy Metal Sites ☐
III - Contaminated Construction Dewatering	A. General Urban Fill Sites ☐ B. Known Contaminated Sites ☐

IV - Miscellaneous Related Discharges

- A. Aquifer Pump Testing to Evaluate Formerly Contaminated Sites ☐
 B. Well Development/Rehabilitation at Contaminated/Fomerly Contaminated Sites ☐
 C. Hydrostatic Testing of Pipelines and Tanks ☐
 D. Long-Term Remediation of Contaminated Sumps and Dikes ☐
 E. Short-term Contaminated Dredging Drain Back Waters (if not covered by 401/404 permit) ☐

2. Discharge information. Please provide information about the discharge, (attaching additional sheets as necessary) including:

a) Describe the discharge activities for which the owner/applicant is seeking coverage:

The scope of work under MWRA Contract 7066 is the installation of new 36 inch water main. Site dewatering will be necessary to perform the water main installation. The discharge associated with this permit application is for the initial 350 linear feet of excavation on West Street in Reading.

b) Provide the following information about each discharge:

1) Number of discharge points: <u>1</u>	2) What is the maximum and average flow rate of discharge (in cubic feet per second, ft ³ /s)? Max. flow <u>0.1115</u> Is maximum flow a design value ? Y ☐ N ☒ Average flow (include units) <u>0.1115 cubic ft/s</u> Is average flow a design value or estimate? <u>Estimate</u>																																								
3) Latitude and longitude of each discharge within 100 feet: <table border="1"> <tr> <td>pt. 1: lat</td> <td><u>42.50834 N</u></td> <td>long</td> <td><u>71.12419 W</u></td> <td>pt. 2: lat.</td> <td></td> <td>long</td> <td></td> </tr> <tr> <td>pt. 3: lat</td> <td></td> <td>long</td> <td></td> <td>pt. 4: lat.</td> <td></td> <td>long</td> <td></td> </tr> <tr> <td>pt. 5: lat</td> <td></td> <td>long</td> <td></td> <td>pt. 6: lat.</td> <td></td> <td>long</td> <td></td> </tr> <tr> <td>pt. 7: lat</td> <td></td> <td>long</td> <td></td> <td>pt. 8: lat.</td> <td></td> <td>long</td> <td></td> </tr> <tr> <td colspan="4"></td> <td colspan="4">etc.</td> </tr> </table>		pt. 1: lat	<u>42.50834 N</u>	long	<u>71.12419 W</u>	pt. 2: lat.		long		pt. 3: lat		long		pt. 4: lat.		long		pt. 5: lat		long		pt. 6: lat.		long		pt. 7: lat		long		pt. 8: lat.		long						etc.			
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				etc.																																					
4) If hydrostatic testing, total volume of the discharge (gals): <u></u>	5) Is the discharge intermittent ☒ or seasonal ☐ ? Is discharge ongoing? Y ☐ N ☒																																								
c) Expected dates of discharge (mm/dd/yy): start <u>10/1/2014</u> end <u>12/01/2014</u>																																									
d) Please attach a line drawing or flow schematic showing water flow through the facility including: 1. sources of intake water. 2. contributing flow from the operation. 3. treatment units. and 4. discharge points and receiving waters(s). Flow Schematic is attached.																																									

3. Contaminant information.

a) Based on the sub-category selected (see Appendix III), indicate whether each listed chemical is **believed present** or **believed absent** in the potential discharge. Attach additional sheets as needed.

<u>Parameter *</u>	<u>CAS Number</u>	<u>Believed Absent</u>	<u>Believed Present</u>	<u># of Samples</u>	<u>Sample Type (e.g., grab)</u>	<u>Analytical Method Used (method #)</u>	<u>Minimum Level (ML) of Test Method</u>	<u>Maximum daily value concentration (ug/l)</u>	<u>mass (kg)</u>	<u>Average daily value concentration (ug/l)</u>	<u>mass (kg)</u>
1. Total Suspended Solids (TSS)		☐	☒	1	Grab	SM2540D	5,000	19,000	32.48	119,000	32.48
2. Total Residual Chlorine (TRC)		☒	☐	1	Grab	4500 CLE	10.0	<10.0	0	<10.0	0
3. Total Petroleum Hydrocarbons (TPH)		☒	☐	1	Grab	1664A	5000	<500	0	<5000	0
4. Cyanide (CN)	57125	☒	☐	1	Grab	4500 CN	5.0	<5.0	0	<5.0	0
5. Benzene (B)	71432	☒	☐	1	Grab	8260	1.0	<1.0	0	<1.0	0
6. Toluene (T)	108883	☒	☐	1	Grab	8260	1.0	<1.0	0	<1.0	0
7. Ethylbenzene (E)	100414	☒	☐	1	Grab	8260	1.0	<1.0	0	<1.0	0
8. (m,p,o) Xylenes (X)	108883; 106423; 95476; 1330207	☒	☐	1	Grab	8260	2.0	<2.0	0	<2.0	0
9. Total BTEX ²	n/a	☒	☐	1	Grab	8260/	1.0	<6.0	0	<6.0	0
10. Ethylene Dibromide (EDB) (1,2-Dibromoethane) ³	106934	☒	☐	1	Grab	8260	1.5	<1.5	0	<1.5	0
11. Methyl-tert-Butyl Ether (MTBE)	1634044	☐	☒	1	Grab	8260	1.0	5.2	0.0014	5.2	0.0014
12. tert-Butyl Alcohol (TBA) (Tertiary-Butanol)	75650	☒	☐	1	Grab	8260	25.0	<25.0	0	<25.0	0

* Numbering system is provided to allow cross-referencing to Effluent Limits and Monitoring Requirements by Sub-Category included in Appendix III, as well as the Test Methods and Minimum Levels associated with each parameter provided in Appendix VI.

² BTEX = Sum of Benzene, Toluene, Ethylbenzene, total Xylenes.

³ EDB is a groundwater contaminant at fuel spill and pesticide application sites in New England.

<u>Parameter *</u>	<u>CAS Number</u>	<u>Believed Absent</u>	<u>Believed Present</u>	<u># of Samples</u>	<u>Sample Type (e.g., grab)</u>	<u>Analytical Method Used (method #)</u>	<u>Minimum Level (ML) of Test Method</u>	<u>Maximum daily value</u>		<u>Average daily value</u>	
								<u>concentration (ug/l)</u>	<u>mass (kg)</u>	<u>concentration (ug/l)</u>	<u>mass (kg)</u>
13. tert-Amyl Methyl Ether (TAME)	9940508	☒	☐	1	Grab	8260	1.0	<1.0	0	<1.0	0
14. Naphthalene	91203	☒	☐	1	Grab	8260	1.0	<1.0	0	<1.0	0
15. Carbon Tetrachloride	56235	☒	☐	1	Grab	8260	1.0	<1.0	0	<1.0	0
16. 1,2 Dichlorobenzene (o-DCB)	95501	☒	☐	1	Grab	8260	1.0	<1.0	0	<1.0	0
17. 1,3 Dichlorobenzene (m-DCB)	541731	☒	☐	1	Grab	8260	1.0	<1.0	0	<1.0	0
18. 1,4 Dichlorobenzene (p-DCB)	106467	☒	☐	1	Grab	8260	1.0	<1.0	0	<1.0	0
18a. Total dichlorobenzene		☒	☐	1	Grab	8260	1.0	<1.0	0	<1.0	0
19. 1,1 Dichloroethane (DCA)	75343	☒	☐	1	Grab	8260	1.0	<1.0	0	<1.0	0
20. 1,2 Dichloroethane (DCA)	107062	☒	☐	1	Grab	8260	1.0	<1.0	0	<1.0	0
21. 1,1 Dichloroethene (DCE)	75354	☒	☐	1	Grab	8260	1.0	<1.0	0	<1.0	0
22. cis-1,2 Dichloroethene (DCE)	156592	☒	☐	1	Grab	8260	1.0	<1.0	0	<1.0	0
23. Methylene Chloride	75092	☒	☐	1	Grab	8260	2.0	<2.0	0	<2.0	0
24. Tetrachloroethene (PCE)	127184	☒	☐	1	Grab	8260	1.0	<1.0	0	<1.0	0
25. 1,1,1 Trichloro-ethane (TCA)	71556	☒	☐	1	Grab	8260	1.0	<1.0	0	<1.0	0
26. 1,1,2 Trichloro-ethane (TCA)	79005	☒	☐	1	Grab	8260	1.0	<1.0	0	<1.0	0
27. Trichloroethene (TCE)	79016	☒	☐	1	Grab	8260	1.0	<1.0	0	<1.0	0

<u>Parameter *</u>	<u>CAS Number</u>	<u>Believed Absent</u>	<u>Believed Present</u>	<u># of Samples</u>	<u>Sample Type (e.g., grab)</u>	<u>Analytical Method Used (method #)</u>	<u>Minimum Level (ML) of Test Method</u>	<u>Maximum daily value</u>		<u>Average daily value</u>	
								<u>concentration (ug/l)</u>	<u>mass (kg)</u>	<u>concentration (ug/l)</u>	<u>mass (kg)</u>
28. Vinyl Chloride (Chloroethene)	75014	☒	☐	1	Grab	8260	1.0	<1.0	0	<1.0	0
29. Acetone	67641	☒	☐	1	Grab	8260	1.0	<1.0	0	<1.0	0
30. 1,4 Dioxane	123911	☒	☐	1	Grab	8260	0.2	<0.2	0	<0.2	0
31. Total Phenols	108952	☒	☐	1	Grab	420.1	100	<100	0	<100	0
32. Pentachlorophenol (PCP)	87865	☒	☐	1	Grab	8270	0.84	<0.84	0	<0.84	0
33. Total Phthalates (Phthalate esters) ⁴		☒	☐	1	Grab	8270	2.34	<2.34	0	<2.34	0
34. Bis (2-Ethylhexyl) Phthalate [Di-(ethylhexyl) Phthalate]	117817	☒	☐	1	Grab	8270	2.34	<2.34	0	<2.34	0
35. Total Group I Polycyclic Aromatic Hydrocarbons (PAH)		☒	☐	1	Grab	0270	<0.05	<0.05	0	<0.05	0
a. Benzo(a) Anthracene	56553	☒	☐	1	Grab	8270	0.05	<0.05	0	<0.05	0
b. Benzo(a) Pyrene	50328	☒	☐	1	Grab	8270	0.05	<0.05	0	<0.05	0
c. Benzo(b) Fluoranthene	205992	☒	☐	1	Grab	8270	0.05	<0.05	0	<0.05	0
d. Benzo(k) Fluoranthene	207089	☒	☐	1	Grab	8270	0.05	<0.05	0	<0.05	0
e. Chrysene	21801	☒	☐	1	Grab	8270	0.05	<0.05	0	<0.05	0
f. Dibenzo(a,h)anthracene	53703	☒	☐	1	Grab	8270	0.05	<0.05	0	<0.05	0
g. Indeno(1,2,3-cd) Pyrene	193395	☒	☐	1	Grab	8270	0.05	<0.05	0	<0.05	0
36. Total Group II Polycyclic Aromatic Hydrocarbons (PAH)		☒	☐	1	Grab	8270	0.19	<0.19	0	<0.19	0

⁴ The sum of individual phthalate compounds.

<u>Parameter *</u>	<u>CAS Number</u>	<u>Believed Absent</u>	<u>Believed Present</u>	<u># of Samples</u>	<u>Sample Type (e.g., grab)</u>	<u>Analytical Method Used (method #)</u>	<u>Minimum Level (ML) of Test Method</u>	<u>Maximum daily value concentration (ug/l)</u>	<u>mass (kg)</u>	<u>Average daily value concentration (ug/l)</u>	<u>mass (kg)</u>
h. Acenaphthene	83329	☒	☐	1	Grab	8270	0.19	<0.19	0	<0.19	0
i. Acenaphthylene	208968	☒	☐	1	Grab	8270	0.19	<0.19	0	<0.19	0
j. Anthracene	120127	☒	☐	1	Grab	8270	0.19	<0.19	0	<0.19	0
k. Benzo(ghi) Perylene	191242	☒	☐	1	Grab	8270	0.19	<0.19	0	<0.19	0
l. Fluoranthene	206440	☒	☐	1	Grab	8270	0.19	<0.19	0	<0.19	0
m. Fluorene	86737	☒	☐	1	Grab	8270	0.19	<0.19	0	<0.19	0
n. Naphthalene	91203	☒	☐	1	Grab	8270	0.19	<0.19	0	<0.19	0
o. Phenanthrene	85018	☒	☐	1	Grab	8270	0.19	<0.19	0	<0.19	0
p. Pyrene	129000	☒	☐	1	Grab	8270	0.19	<0.19	0	<0.19	0
37. Total Polychlorinated Biphenyls (PCBs)	85687; 84742; 117840; 84662; 131113; 117817.	☒	☐	1	Grab	8082A	0.09	<0.09	0	<0.09	0
38. Chloride	16887006	☒	☐	1	Grab	300.0	250	582.0			
39. Antimony	7440360	☒	☐	1	Grab	6020	0.5	<0.5	0	<0.5	0
40. Arsenic	7440382	☐	☒	1	Grab	6020	1.0	16.4	0.004	16.4	0.004
41. Cadmium	7440439	☒	☐	1	Grab	6020	0.2	<0.2	0	<0.2	0
42. Chromium III (trivalent)	16065831	☒	☐	1	Grab	Calc	10	<10	0	<10	0
43. Chromium VI (hexavalent)	18540299	☒	☐	0							
44. Copper	7440508	☐	☒	1	Grab	6020	0.5	25.9	0.007	25.9	0.007
45. Lead	7439921	☐	☒	1	Grab	6010	0.2	0.9	0.0002	0.9	0.0002
46. Mercury	7439976	☒	☐	1	Grab	7470	0.2	<0.2	0	<0.2	0
47. Nickel	7440020	☐	☒	1	Grab	6020	0.2	10.5	0.002	10.5	0.002
48. Selenium	7782492	☒	☐	1	Grab	6020	2.0	<2.0	0	<2.0	0
49. Silver	7440224	☒	☐	1	Grab	6020	0.2	<0.2	0	<0.2	0
50. Zinc	7440666	☒	☐	1	Grab	6020	25.0	<25	0	<25.0	0
51. Iron	7439896	☐	☒	1	Grab	6010	50	2860	0.780	2860	0.780
Other (describe):		☐	☐								

Parameter *	CAS Number	Believed Absent	Believed Present	# of Samples	Sample Type (e.g., grab)	Analytical Method Used (method #)	Minimum Level (ML) of Test Method	Maximum daily value concentration (ug/l)	mass (kg)	Average daily value concentration (ug/l)	mass (kg)
		☐	☐								
		☐	☐								

b) For discharges where **metals** are believed present, please fill out the following (attach results of any calculations):

<i>Step 1:</i> Do any of the metals in the influent exceed the effluent limits in Appendix III (i.e., the limits set at zero dilution)? Y ☒ N ☐		If yes, which metals? Iron, Arsenic, Copper
<i>Step 2:</i> For any metals which exceed the Appendix III limits, calculate the dilution factor (DF) using the formula in Part I.A.3.c (step 2) of the NOI instructions or as determined by the State prior to the submission of this NOI. What is the dilution factor for applicable metals? Metal: Iron DF: 5 Metal: Arsenic DF: 51.2 Metal: Copper DF: 26.6 Metal: _____ DF: _____ Etc.		Look up the limit calculated at the corresponding dilution factor in Appendix IV. Do any of the metals in the influent have the potential to exceed the corresponding effluent limits in Appendix IV (i.e., is the influent concentration above the limit set at the calculated dilution factor)? Y ☐ N ☒ If Y, list which metals:

4. Treatment system information. Please describe the treatment system using separate sheets as necessary, including:

a) A description of the treatment system, including a schematic of the proposed or existing treatment system:

The water from the utility trench excavation will be pumped into a frac tank for settling, then through two bag filter units in parallel and a flow meter with a totalizer prior to discharge,

b) Identify each applicable treatment unit (check all that apply):	Frac. tank ☒	Air stripper ☐	Oil/water separator ☐	Equalization tanks ☐	Bag filter ☒	GAC filter ☐
	Chlorination ☐	De-chlorination ☐	Other (please describe):			

c) Proposed **average** and **maximum flow rates** (gallons per minute) for the discharge and the **design flow rate(s)** (gallons per minute) of the treatment system:

Average flow rate of discharge 50 gpm Maximum flow rate of treatment system 50 gpm
Design flow rate of treatment system 75 gpm

d) A description of chemical additives being used or planned to be used (attach MSDS sheets):

None

5. Receiving surface water(s). Please provide information about the receiving water(s), using separate sheets as necessary:

a) Identify the discharge pathway:	Direct to receiving water ☐	Within facility (sewer) ☐	Storm drain ☒	Wetlands ☐	Other (describe):
------------------------------------	--	--	---	-----------------------------------	-------------------------------

b) Provide a narrative description of the discharge pathway, including the name(s) of the receiving waters:

The storm drain located on West Street is discharged to an unnamed pond prior to entering Halls Brook which subsequently discharges to the Arbejona River

c) Attach a detailed map(s) indicating the site location and location of the outfall to the receiving water:
1. For multiple discharges, number the discharges sequentially.

2. For indirect dischargers, indicate the location of the discharge to the indirect conveyance and the discharge to surface water
The map should also include the location and distance to the nearest sanitary sewer as well as the locus of nearby sensitive receptors (based on USGS topographical mapping), such as surface waters, drinking water supplies, and wetland areas.

d) Provide the state water quality classification of the receiving water Class B

e) Provide the reported or calculated seven day-ten year low flow (7Q10) of the receiving water 5.12 cfs
Please attach any calculation sheets used to support stream flow and dilution calculations.

f) Is the receiving water a listed 303(d) water quality impaired or limited water? Y ☒ N ☐ If yes, for which pollutant(s)?

Is there a final TMDL? Y ☐ N ☒ If yes, for which pollutant(s)?

6. ESA and NHPA Eligibility.

Please provide the following information according to requirements of Permit Parts I.A.4 and I.A.5 Appendices II and VII.

a) Using the instructions in Appendix VII and information on Appendix II, under which criterion listed in Part I.C are you eligible for coverage under this general permit? A ☒ B ☐ C ☐ D ☐ E ☐ F ☐
b) If you selected Criterion D or F, has consultation with the federal services been completed? Y ☐ N ☐ Underway ☐
c) If consultation with U.S. Fish and Wildlife Service and/or NOAA Fisheries Service was completed, was a written concurrence finding that the discharge is "not likely to adversely affect" listed species or critical habitat received? Y ☐ N ☐
d) Attach documentation of ESA eligibility as described in the NOI instructions and required by Appendix VII, Part I.C, Step 4.
e) Using the instructions in Appendix VII, under which criterion listed in Part II.C are you eligible for coverage under this general permit? 1 ☒ 2 ☐ 3 ☐
f) If Criterion 3 was selected, attach all written correspondence with the State or Tribal historic preservation officers, including any terms and conditions that outline measures the applicant must follow to mitigate or prevent adverse effects due to activities regulated by the RGP.

7. Supplemental information.

Please provide any supplemental information. Attach any analytical data used to support the application. Attach any certification(s) required by the general permit.
Based on a review of the MassDEP Resource Priority Map and the MassGIS Priority Habitat and Estimated Habitat Natural Heritage and Endangered Species Program Map, no areas of priority or estimated habitats or rare species were identified at the Site/work zone area relative to the proposed discharge (see attached maps). Therefore, it was determined that Criterion A in Section 6 (a) was applicable.

8. Signature Requirements: The Notice of Intent must be signed by the operator in accordance with the signatory requirements of 40 CFR Section 122.22, including the following certification:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, I certify that the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I certify that I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

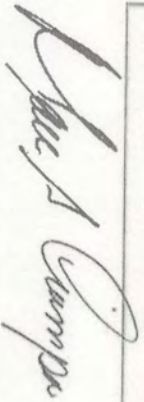
Facility/Site Name:	MMWA Contract 7066 NIH West Street Improvements
Operator signature:	
Printed Name & Title:	Marc Ciampa Project Manager
Date:	September 15, 2014

Figure 1
Project Location Plan



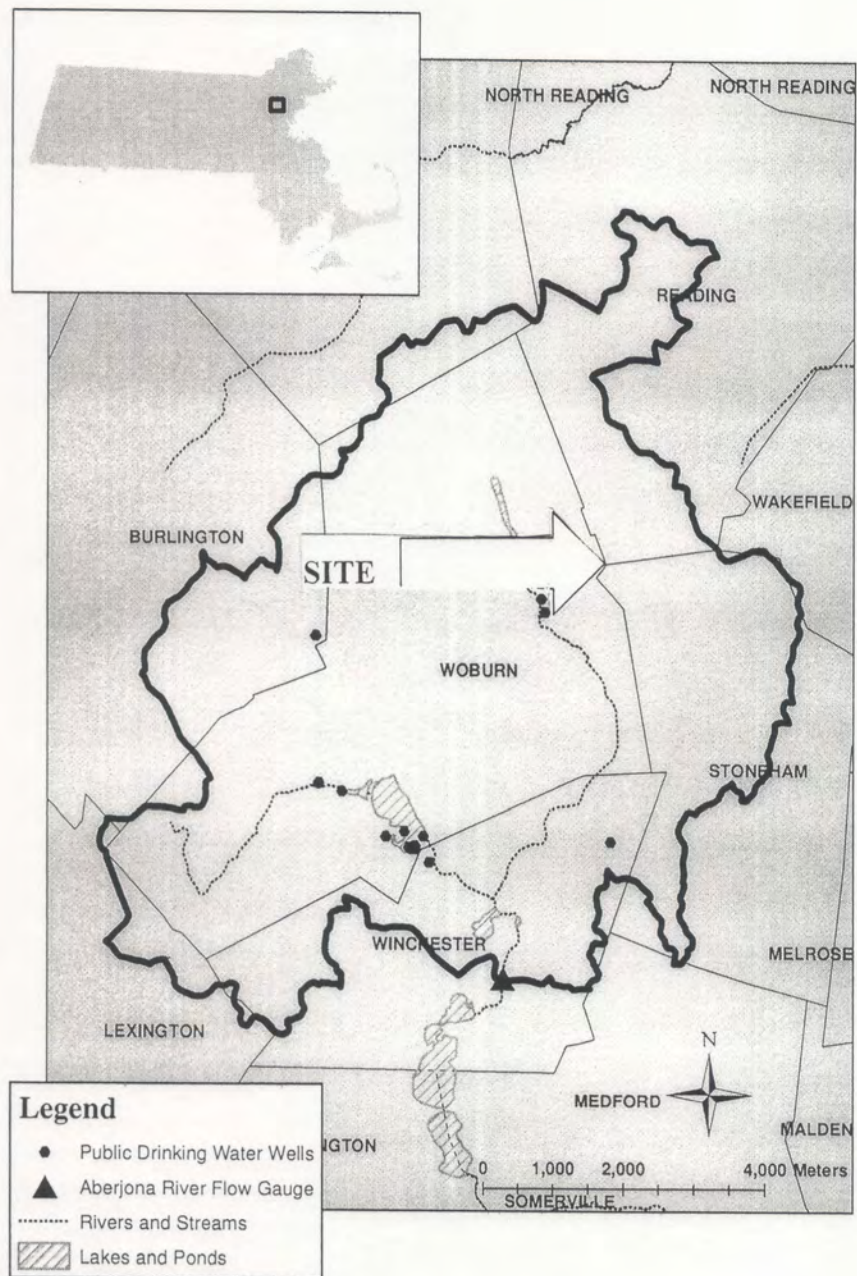


Figure 2. Abjerona River basin in eastern Massachusetts. USGS stream gage is indicated by the triangle.

Figure 2

**Massachusetts Geographic Information Systems (GIS) Department of
Environmental Protection (DEP) Priority Resources Map**



MassDEP - Bureau of Waste Site Cleanup

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

Site Information:

READING, MA

NAD83 UTM Meters:
4708405mN, 325520mE (Zone: 19)
July 22, 2014

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.

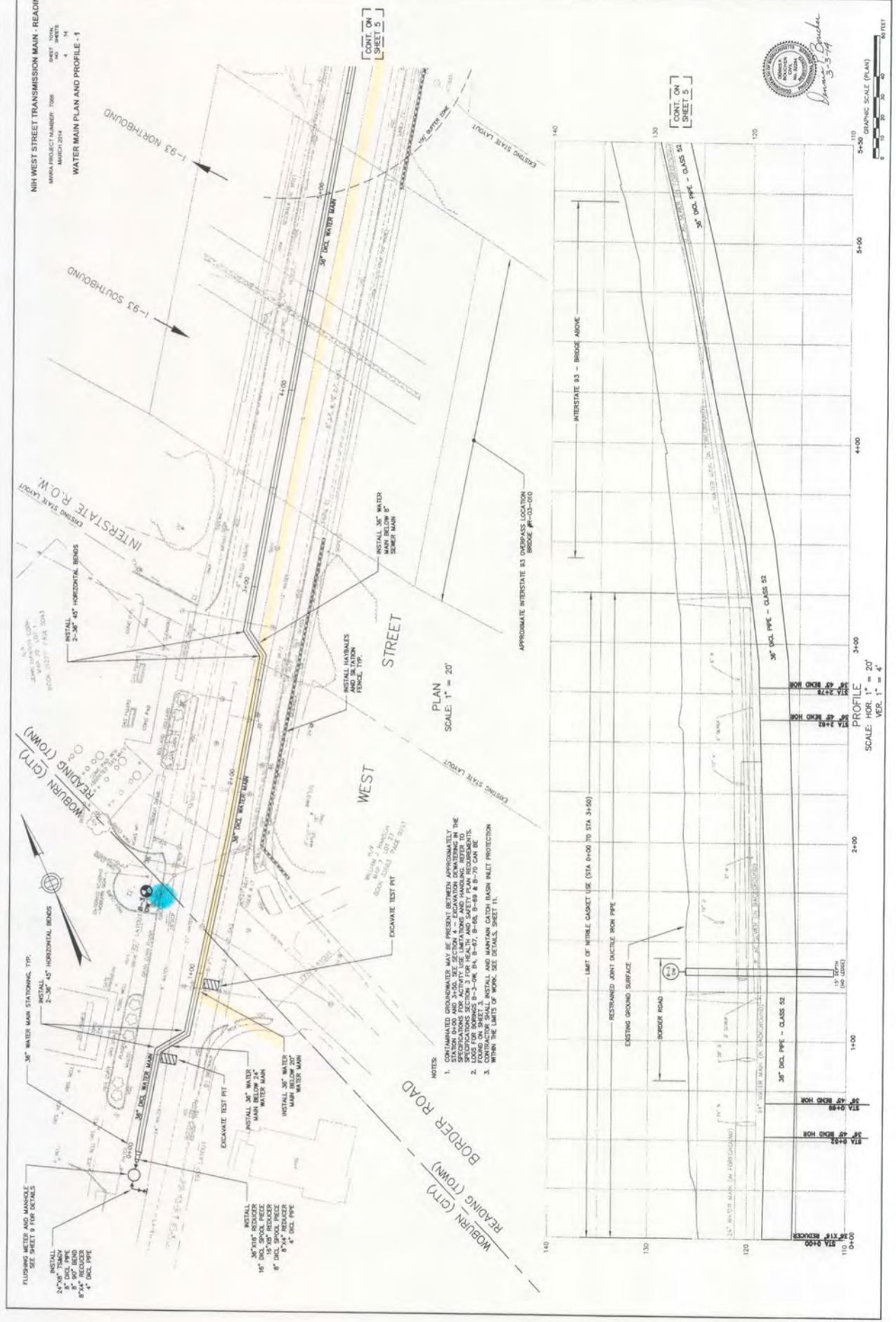
Figure 3
Discharge Point



NIH WEST STREET TRANSMISSION MAIN - READING

MWRA PROJECT NUMBER: 7066	SHEET TOTAL
MARCH 2014	NO. SHEETS
	4 14

WATER MAIN PLAN AND PROFILE - 1



IN CHARGE OF _____
DESIGNED BY _____
DRAIN BY _____
CHECKED BY _____

Figure 4
Site Drainage Maps





Stormwater Conveyance to Aberjona River



SITE DRAINAGE



Attachment 1

2012 Waterbody Report for Aberjona River



ENVIRONMENTAL MANAGEMENT PROFESSIONALS, INC.



Watershed Assessment, Tracking & Environmental Results

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- [Water](#)
- [WATERS](#)
- [Water Quality Assessment and TMDL Information](#)
- Waterbody Quality Assessment Report

[Return to home page](#)

On This Page

- [Water Quality Assessment Status](#)
- [Causes of Impairment](#)
- [Probable Sources Contributing to Impairments](#)
- [TMDLs That Apply to This Waterbody](#)
- [Previous Causes of Impairment Now Attaining All Uses](#)

State: [Massachusetts](#)

Waterbody ID: MA71-01

Location: Source just south of Birch Meadow Drive, Reading to inlet Upper Mystic Lake at Mystic Valley Parkway, Winchester (portion culverted underground). (through former pond segments Judkins Pond MA71021 and Mill Pond MA71031).

State Waterbody Type: River

EPA Waterbody Type: Rivers and Streams

Water Size: 9.1

Units: miles

Watershed Name: [Charles](#)

[Waterbody History Report](#)

Data are also available for these years: [2010](#) [2006](#) [2004](#) [2002](#) [1998](#)

2012 Waterbody Report for Aberjona River

Click on the waterbody for an interactive map

Features

- [About This Database \(Integrated Report\)](#)
- [Assessing Water Quality \(Questions and Answers\)](#)
- [Integrated Reporting Guidance](#)
- [Previous National Water Quality Reports](#)
- [EnviroMapper for Water](#)
- [AskWATERS](#)
- [EPA WATERS Homepage](#)
- [Exchange Network](#)
- [Assessment Database](#)
- [Statewide Statistical Surveys](#)
- [How's My Waterway Local Search tool](#)
- [Pollution Categories Summary Document](#)
- [Nitrogen and Phosphorus Pollution Data Access Tool \(NPDAT\)](#)

Water Quality Assessment Status for Reporting Year 2012

The overall status of this waterbody is Impaired.

[Description of this table](#)

Designated Use	Designated Use Group	Status
Aesthetic	Aesthetic Value	Impaired
Fish Consumption	Aquatic Life Harvesting	Not Assessed
Fish, Other Aquatic Life And Wildlife	Fish, Shellfish, And Wildlife Protection And Propagation	Impaired
Primary Contact Recreation	Recreation	Impaired
Secondary Contact Recreation	Recreation	Impaired

[Top of page](#)

Causes of Impairment for Reporting Year 2012

[Description of this table](#)

Cause of Impairment	Cause of Impairment Group	Designated Use(s)	State TMDL Development Status
Ammonia, Un-ionized	Ammonia	Fish, Other Aquatic Life	TMDL needed

		And Wildlife	
Aquatic Macroinvertebrate Bioassessments	Cause Unknown - Impaired Biota	Fish, Other Aquatic Life And Wildlife	TMDL needed
Arsenic	Metals (other than Mercury)	Fish, Other Aquatic Life And Wildlife	TMDL needed
Dissolved Oxygen	Organic Enrichment/Oxygen Depletion	Fish, Other Aquatic Life And Wildlife	TMDL needed
Escherichia Coli (E. Coli)	Pathogens	Primary Contact Recreation, Secondary Contact Recreation	TMDL needed
Phosphorus, Total	Nutrients	Fish, Other Aquatic Life And Wildlife	TMDL needed
Physical Substrate Habitat Alterations	Habitat Alterations	Fish, Other Aquatic Life And Wildlife	Non-pollutant impairment
Sediment Bioassay	Total Toxics	Fish, Other Aquatic Life And Wildlife	TMDL needed
Turbidity	Turbidity	Aesthetic, Secondary Contact Recreation, Primary Contact Recreation	TMDL needed

[Top of page](#)

Probable Sources Contributing to Impairment for Reporting Year 2012

[Description of this table](#)

<u>Probable Source</u>	<u>Probable Source Group</u>	<u>Cause(s) of Impairment</u>
Cercla Npl (Superfund) Sites	Legacy/Historical Pollutants	Sediment Bioassay
Channelization	Hydromodification	Physical Substrate Habitat Alterations
Contaminated Sediments	Legacy/Historical Pollutants	Sediment Bioassay
Municipal Point Source Discharges	Municipal Discharges/Sewage	Ammonia, Un-ionized

Source Unknown	Unknown	Aquatic Macroinvertebrate Bioassessments; Arsenic; Dissolved Oxygen; Escherichia Coli (E. Coli); Phosphorus, Total; Turbidity
Unspecified Urban Stormwater	Urban-Related Runoff/Stormwater	Escherichia Coli (E. Coli); Sediment Bioassay; Turbidity

[Top of page](#)

TMDLs That Apply to this waterbody

No TMDL data have been recorded by EPA for this waterbody.

[Top of page](#)

Previous Causes of Impairments Now Attaining All Uses

No causes of impairment are recorded as attaining all uses for this waterbody.

[Top of page](#)

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http://iaspub.epa.gov/tmdl_waters10/attains_waterbody.control?p_list_id=MA71-01&p_cycle=2012&p_report_type=

Attachment 2

US Fish & Wildlife Documentation



ENVIRONMENTAL MANAGEMENT PROFESSIONALS, INC.



United States Department of the Interior

FISH AND WILDLIFE SERVICE

New England Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5087
<http://www.fws.gov/newengland>



January 7, 2014

To Whom It May Concern:

This project was reviewed for the presence of federally listed or proposed, threatened or endangered species or critical habitat per instructions provided on the U.S. Fish and Wildlife Service's New England Field Office website:

<http://www.fws.gov/newengland/EndangeredSpec-Consultation.htm>

Based on information currently available to us, no federally listed or proposed, threatened or endangered species or critical habitat under the jurisdiction of the U.S. Fish and Wildlife Service are known to occur in the project area(s). Preparation of a Biological Assessment or further consultation with us under section 7 of the Endangered Species Act is not required. No further Endangered Species Act coordination is necessary for a period of one year from the date of this letter, unless additional information on listed or proposed species becomes available.

Thank you for your cooperation. Please contact Maria Tur of this office at 603-223-2541 if we can be of further assistance.

Sincerely yours,

Thomas R. Chapman
Supervisor
New England Field Office

FEDERALLY LISTED ENDANGERED AND THREATENED SPECIES IN MASSACHUSETTS

COUNTY	SPECIES	FEDERAL STATUS	GENERAL LOCATION/HABITAT	TOWNS
Barnstable	Piping Plover	Threatened	Coastal Beaches	All Towns
	Roseate Tern	Endangered	Coastal beaches and the Atlantic Ocean	All Towns
	Northeastern beach tiger beetle	Threatened	Coastal Beaches	Chatham
	Sandplain gerardia	Endangered	Open areas with sandy soils.	Sandwich and Falmouth.
	Northern Red-bellied Cooter	Endangered	Inland Ponds and Rivers	Bourne (north of the Cape Cod Canal)
Berkshire	Bog Turtle	Threatened	Wetlands	Egremont and Sheffield
Bristol	Piping Plover	Threatened	Coastal Beaches	Fairhaven, Dartmouth, Westport
	Roseate Tern	Endangered	Coastal beaches and the Atlantic Ocean	Fairhaven, New Bedford, Dartmouth, Westport
	Northern Red-bellied Cooter	Endangered	Inland Ponds and Rivers	Taunton
Dukes	Roseate Tern	Endangered	Coastal beaches and the Atlantic Ocean	All Towns
	Piping Plover	Threatened	Coastal Beaches	All Towns
	Northeastern beach tiger beetle	Threatened	Coastal Beaches	Aquinnah and Chilmark
	Sandplain gerardia	Endangered	Open areas with sandy soils.	West Tisbury
Essex	Small whorled Pogonia	Threatened	Forests with somewhat poorly drained soils and/or a seasonally high water table	Gloucester, Essex and Manchester
	Piping Plover	Threatened	Coastal Beaches	Gloucester, Essex, Ipswich, Rowley, Revere, Newbury, Newburyport and Salisbury
Franklin	Northeastern bulrush	Endangered	Wetlands	Montague, Warwick
	Dwarf wedgemussel	Endangered	Mill River	Whately
Hampshire	Small whorled Pogonia	Threatened	Forests with somewhat poorly drained soils and/or a seasonally high water table	Hadley
	Puritan tiger beetle	Threatened	Sandy beaches along the Connecticut River	Northampton and Hadley
	Dwarf wedgemussel	Endangered	Rivers and Streams.	Hatfield, Amherst and Northampton
Hampden	Small whorled Pogonia	Threatened	Forests with somewhat poorly drained soils and/or a seasonally high water table	Southwick
Middlesex	Small whorled Pogonia	Threatened	Forests with somewhat poorly drained soils and/or a seasonally high water table	Groton
Nantucket	Piping Plover	Threatened	Coastal Beaches	Nantucket
	Roseate Tern	Endangered	Coastal beaches and the Atlantic Ocean	Nantucket
	American burying beetle	Endangered	Upland grassy meadows	Nantucket
Plymouth	Piping Plover	Threatened	Coastal Beaches	Scituate, Marshfield, Duxbury, Plymouth, Wareham and Mattapoisett
	Northern Red-bellied Cooter	Endangered	Inland Ponds and Rivers	Kingston, Middleborough, Carver, Plymouth, Bourne, Wareham, Halifax, and Pembroke
	Roseate Tern	Endangered	Coastal beaches and the Atlantic Ocean	Plymouth, Marion, Wareham, and Mattapoisett.
Suffolk	Piping Plover	Threatened	Coastal Beaches	Winthrop
Worcester	Small whorled Pogonia	Threatened	Forests with somewhat poorly drained soils and/or a seasonally high water table	Leominster

- Eastern cougar and gray wolf are considered extirpated in Massachusetts.
- Endangered gray wolves are not known to be present in Massachusetts, but dispersing individuals from source populations in Canada may occur statewide.
- Critical habitat for the Northern Red-bellied Cooter is present in Plymouth County.

Revised 10/7/2011

Attachment 3

MACRIS Data File



Massachusetts Cultural Resource Information

MACRIS

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Results

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☐ PDF

☒ Spreadsheet

Below are the results of your search, using the following search criteria:

Town(s): Reading

Street Name: West St

Resource Type(s): Building

For more information about this page and how to use it, [click here](#)

Inv. No.	Property Name	Street	Town	Year
REA.101	Weston, Abijah Jr. House	63 West St	Reading	c 17
REA.296		79-81 West St	Reading	19
REA.102	Weston, Jabez House	86 West St	Reading	c 17
REA.297		87 West St	Reading	18
REA.299		93 West St	Reading	19
REA.300		96 West St	Reading	19
REA.301		99 West St	Reading	19
REA.302		100 West St	Reading	19
REA.303		103 West St	Reading	c 18
REA.304		104 West St	Reading	19
REA.305		115 West St	Reading	c 19
REA.105	Johnson, Alden S. House	116 West St	Reading	c 18
REA.306		119 West St	Reading	19
REA.307		120 West St	Reading	19
REA.308		126 West St	Reading	19

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Below are the results of your search, using the following search criteria:

Town(s): Reading

Street Name: West St

Resource Type(s): Building

For more information about this page and how to use it, [click here](#)

Inv. No.	Property Name	Street	Town	Year
REA.309		129 West St	Reading	19
REA.106	Parker, Samuel House	132 West St	Reading	c 17
REA.310		133 West St	Reading	19
REA.313		146 West St	Reading	19
REA.314		149 West St	Reading	c 18
REA.315		150 West St	Reading	19
REA.316		156 West St	Reading	19
REA.317		157 West St	Reading	19
REA.108	Nichols, David House	168 West St	Reading	c 18
REA.320		174 West St	Reading	19
REA.321		175 West St	Reading	19
REA.322		178 West St	Reading	19
REA.323		179 West St	Reading	c 18
REA.324		182 West St	Reading	18
REA.325		187 West St	Reading	c 18

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Results

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Below are the results of your search, using the following search criteria:

Town(s): Reading

Street Name: West St

Resource Type(s): Building

For more information about this page and how to use it, [click here](#)

Inv. No.	Property Name	Street	Town	Year
REA.326		188 West St	Reading	c 19
REA.327		192-194 West St	Reading	19
REA.328		195 West St	Reading	c 18
REA.329		196 West St	Reading	19
REA.330		200 West St	Reading	19
REA.109	Bancroft, Francis J. House	201 West St	Reading	c 17
REA.110	Leathe, John Brooks House	206 West St	Reading	r 18
REA.331	Leathe, James B. House	212-214 West St	Reading	c 18
REA.332		215 West St	Reading	c 18
REA.111	Temple and Dragon Corner Store	218 West St	Reading	r 18
REA.333		221 West St	Reading	19
REA.335		228 West St	Reading	19
REA.137	Weston, Ephraim House	229 West St	Reading	c 18
REA.138	Bancroft, Samuel House	232 West St	Reading	c 17
REA.336		233 West St	Reading	19

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Below are the results of your search, using the following search criteria:

Town(s): Reading

Street Name: West St

Resource Type(s): Building

For more information about this page and how to use it, [click here](#)

Inv. No.	Property Name	Street	Town	Year
REA.337		237 West St	Reading	19
REA.338		239 West St	Reading	19
REA.139	Buxton, Albert House	240 West St	Reading	c 18
REA.339		241 West St	Reading	19
REA.340		245 West St	Reading	19
REA.341		246 West St	Reading	19
REA.342		251 West St	Reading	19
REA.343		252 West St	Reading	19
REA.344		256 West St	Reading	19
REA.345	Weston, E. House	257 West St	Reading	18
REA.346		265 West St	Reading	18
REA.347		266 West St	Reading	18
REA.348		269 West St	Reading	c 18
REA.140	Temple, Jonathan House	299 West St	Reading	17
REA.258	Bancroft, Thomas House	320 West St	Reading	c 17

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Below are the results of your search, using the following search criteria:

Town(s): Reading

Street Name: West St

Resource Type(s): Building

For more information about this page and how to use it, [click here](#)

Inv. No.	Property Name	Street	Town	Year
REA.141	Norris, Lewis House	441 West St	Reading	c 18

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Attachment 4

June 24, 2014 ESS Report 1406294



ENVIRONMENTAL MANAGEMENT PROFESSIONALS, INC.



CERTIFICATE OF ANALYSIS

Ted Patch
Environmental Management Professionals
94 Sawyer Lane
Marshfield, MA 02050

RE: H1H West Street (MWRA 7066)
ESS Laboratory Work Order Number: 1406294

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 2:43 pm, Jun 24, 2014

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.



ESS Laboratory
Division of Thielsch Engineering, Inc.

BAL Laboratory

*The Microbiology Division
of Thielsch Engineering, Inc.*



CERTIFICATE OF ANALYSIS

Client Name: Environmental Management Professionals
Client Project ID: H1H West Street

ESS Laboratory Work Order: 1406294

SAMPLE RECEIPT

The following samples were received on June 12, 2014 for the analyses specified on the enclosed Chain of Custody Record.

The samples and analyses listed below were analyzed in accordance with the 2010 Remediation General Permit under the National Pollutant Discharge Elimination System (NPDES).

The percent recovery of silver (Ag) in the ICSAB for EPA 6020 was outside the 80-120% QC acceptance limits.

Sample 1406294-02 was received on June 23, 2014

<u>Lab Number</u>	<u>Sample Name</u>	<u>Matrix</u>	<u>Analysis</u>
1406294-01	B-3 OW	Ground Water	1664A, 2540D, 300.0, 420.1, 4500 CN CE, 4500-Cl E, 6010B, 6020A, 7196A, 7470A, 8011, 8082A, 8270D, 8270D SIM, Calc
1406294-02	B-3 OW	Ground Water	8260B



CERTIFICATE OF ANALYSIS

Client Name: Environmental Management Professionals
Client Project ID: H1H West Street

ESS Laboratory Work Order: 1406294

PROJECT NARRATIVE

8011 1,2-Dibromoethane / 1,2-Dibromo-3-chloropropane

CF41608-BS2 Surrogate recovery(ies) above upper control limit (S+).
Pentachloroethane (290% @ 30-150%)

8260B Volatile Organic Compounds

CF42326-BS1 Blank Spike recovery is above upper control limit (B+).
Acetone (142% @ 70-130%)

8270C(SIM) Polynuclear Aromatic Hydrocarbons

CF41207-BLK1 Surrogate recovery(ies) above upper control limit (S+).
2,4,6-Tribromophenol (208% @ 15-110%)

CF41207-BS1 Surrogate recovery(ies) above upper control limit (S+).
2,4,6-Tribromophenol (205% @ 15-110%)

CF41207-BSD1 Surrogate recovery(ies) above upper control limit (S+).
2,4,6-Tribromophenol (172% @ 15-110%)

CXF0163-CCV1 Continuing Calibration recovery is above upper control limit (C+).
Di-n-octylphthalate (143% @ 80-120%), Pentachlorophenol (149% @ 70-130%)

CXF0163-CCV1 Surrogate recovery(ies) above upper control limit (S+).
2,4,6-Tribromophenol (340% @ 70-130%)

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: Environmental Management Professionals
Client Project ID: HH West Street

ESS Laboratory Work Order: 1406294

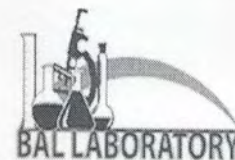
CURRENT SW-846 METHODOLOGY VERSIONS

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



CERTIFICATE OF ANALYSIS

Client Name: Environmental Management Professionals
Client Project ID: H1H West Street
Client Sample ID: B-3 OW
Date Sampled: 06/12/14 09:20
Percent Solids: N/A

ESS Laboratory Work Order: 1406294
ESS Laboratory Sample ID: 1406294-01
Sample Matrix: Ground Water
Units: ug/L

Extraction Method: 3005A

Total Metals Aqueous

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Antimony	ND (0.5)		6020A		2	JP	06/17/14 15:11	50	25	CF41604
Arsenic	16.4 (1.0)		6020A		2	JP	06/17/14 15:11	50	25	CF41604
Cadmium	ND (0.2)		6020A		2	JP	06/17/14 15:11	50	25	CF41604
Chromium	ND (10)		6010B		1	JP	06/19/14 16:02	50	25	CF41601
Chromium (III)	ND (10)		Calc		1	EEM	06/19/14 16:02	1	1	[CALC]
Copper	25.9 (0.5)		6020A		2	JP	06/17/14 15:11	50	25	CF41604
Iron	2860 (50)		6010B		1	JP	06/19/14 16:02	50	25	CF41601
Lead	0.9 (0.2)		6020A		2	JP	06/17/14 15:11	50	25	CF41604
Mercury	ND (0.20)		7470A		1	JP	06/17/14 12:19	20	40	CF41605
Nickel	10.5 (0.2)		6020A		2	JP	06/17/14 15:11	50	25	CF41604
Selenium	ND (2.0)		6020A		2	JP	06/17/14 15:11	50	25	CF41604
Silver	ND (0.2)		6020A		2	JP	06/17/14 15:11	50	25	CF41604
Zinc	ND (25)		6010B		1	JP	06/19/14 16:02	50	25	CF41601



CERTIFICATE OF ANALYSIS

Client Name: Environmental Management Professionals
Client Project ID: H1H West Street
Client Sample ID: B-3 OW
Date Sampled: 06/12/14 09:20
Percent Solids: N/A
Initial Volume: 1070
Final Volume: 1
Extraction Method: 3510C

ESS Laboratory Work Order: 1406294
ESS Laboratory Sample ID: 1406294-01
Sample Matrix: Ground Water
Units: ug/L
Analyst: TAJ
Prepared: 6/13/14 15:50
Cleanup Method: 3665A

8082A Polychlorinated Biphenyls (PCB)

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (0.09)		8082A		1	06/13/14 23:14		CF41306
Aroclor 1221	ND (0.09)		8082A		1	06/13/14 23:14		CF41306
Aroclor 1232	ND (0.09)		8082A		1	06/13/14 23:14		CF41306
Aroclor 1242	ND (0.09)		8082A		1	06/13/14 23:14		CF41306
Aroclor 1248	ND (0.09)		8082A		1	06/13/14 23:14		CF41306
Aroclor 1254	ND (0.09)		8082A		1	06/13/14 23:14		CF41306
Aroclor 1260	ND (0.09)		8082A		1	06/13/14 23:14		CF41306
Aroclor 1262	ND (0.09)		8082A		1	06/13/14 23:14		CF41306
Aroclor 1268	ND (0.09)		8082A		1	06/13/14 23:14		CF41306

	<u>%Recovery</u>	<u>Qualifier</u>	<u>Limits</u>
Surrogate: Decachlorobiphenyl	78 %		30-150
Surrogate: Decachlorobiphenyl [2C]	67 %		30-150
Surrogate: Tetrachloro-m-xylene	77 %		30-150
Surrogate: Tetrachloro-m-xylene [2C]	81 %		30-150



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CERTIFICATE OF ANALYSIS

Client Name: Environmental Management Professionals
Client Project ID: H1H West Street
Client Sample ID: B-3 OW
Date Sampled: 06/12/14 09:20
Percent Solids: N/A
Initial Volume: 1070
Final Volume: 1
Extraction Method: 3520C

ESS Laboratory Work Order: 1406294
ESS Laboratory Sample ID: 1406294-01
Sample Matrix: Ground Water
Units: ug/L
Analyst: IBM
Prepared: 6/16/14 19:04

8270D(SIM) Semi-Volatile Organic Compounds w/ Isotope Dilution

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,4-Dioxane	ND (0.2)		8270D		1	06/18/14 16:54	CXF0241	CF41631
		<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>				
<i>Surrogate: 1,4-Dioxane-d8</i>		86 %		15-115				



CERTIFICATE OF ANALYSIS

Client Name: Environmental Management Professionals
Client Project ID: H1H West Street
Client Sample ID: B-3 OW
Date Sampled: 06/12/14 09:20
Percent Solids: N/A
Initial Volume: 1070
Final Volume: 0.25
Extraction Method: 3510C

ESS Laboratory Work Order: 1406294
ESS Laboratory Sample ID: 1406294-01
Sample Matrix: Ground Water
Units: ug/L
Analyst: IBM
Prepared: 6/13/14 9:30

8270C(SIM) Polynuclear Aromatic Hydrocarbons

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Acenaphthene	ND (0.19)		8270D SIM		1	06/16/14 23:47	CXF0207	CF41207
Acenaphthylene	ND (0.19)		8270D SIM		1	06/16/14 23:47	CXF0207	CF41207
Anthracene	ND (0.19)		8270D SIM		1	06/16/14 23:47	CXF0207	CF41207
Benzo(a)anthracene	ND (0.05)		8270D SIM		1	06/16/14 23:47	CXF0207	CF41207
Benzo(a)pyrene	ND (0.05)		8270D SIM		1	06/16/14 23:47	CXF0207	CF41207
Benzo(b)fluoranthene	ND (0.05)		8270D SIM		1	06/16/14 23:47	CXF0207	CF41207
Benzo(g,h,i)perylene	ND (0.19)		8270D SIM		1	06/16/14 23:47	CXF0207	CF41207
Benzo(k)fluoranthene	ND (0.05)		8270D SIM		1	06/16/14 23:47	CXF0207	CF41207
bis(2-Ethylhexyl)phthalate	ND (2.34)		8270D SIM		1	06/16/14 23:47	CXF0207	CF41207
Butylbenzylphthalate	ND (2.34)		8270D SIM		1	06/16/14 23:47	CXF0207	CF41207
Chrysene	ND (0.05)		8270D SIM		1	06/16/14 23:47	CXF0207	CF41207
Dibenzo(a,h)Anthracene	ND (0.05)		8270D SIM		1	06/16/14 23:47	CXF0207	CF41207
Diethylphthalate	ND (2.34)		8270D SIM		1	06/16/14 23:47	CXF0207	CF41207
Dimethylphthalate	ND (2.34)		8270D SIM		1	06/16/14 23:47	CXF0207	CF41207
Di-n-butylphthalate	ND (2.34)		8270D SIM		1	06/16/14 23:47	CXF0207	CF41207
Di-n-octylphthalate	ND (2.34)		8270D SIM		1	06/16/14 23:47	CXF0207	CF41207
Fluoranthene	ND (0.19)		8270D SIM		1	06/16/14 23:47	CXF0207	CF41207
Fluorene	ND (0.19)		8270D SIM		1	06/16/14 23:47	CXF0207	CF41207
Indeno(1,2,3-cd)Pyrene	ND (0.05)		8270D SIM		1	06/16/14 23:47	CXF0207	CF41207
Naphthalene	ND (0.19)		8270D SIM		1	06/16/14 23:47	CXF0207	CF41207
Pentachlorophenol	ND (0.84)		8270D SIM		1	06/16/14 23:47	CXF0207	CF41207
Phenanthrene	ND (0.19)		8270D SIM		1	06/16/14 23:47	CXF0207	CF41207
Pyrene	ND (0.19)		8270D SIM		1	06/16/14 23:47	CXF0207	CF41207

	<u>%Recovery</u>	<u>Qualifier</u>	<u>Limits</u>
Surrogate: 1,2-Dichlorobenzene-d4	35 %		30-130
Surrogate: 2,4,6-Tribromophenol	90 %		15-110
Surrogate: 2-Fluorobiphenyl	51 %		30-130
Surrogate: Nitrobenzene-d5	49 %		30-130
Surrogate: p-Terphenyl-d14	85 %		30-130



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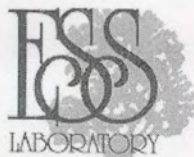
CERTIFICATE OF ANALYSIS

Client Name: Environmental Management Professionals
Client Project ID: H1H West Street
Client Sample ID: B-3 OW
Date Sampled: 06/12/14 09:20
Percent Solids: N/A

ESS Laboratory Work Order: 1406294
ESS Laboratory Sample ID: 1406294-01
Sample Matrix: Ground Water

Classical Chemistry

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Units</u>	<u>Batch</u>
Chloride	582 (250)		300.0		500	JLK	06/17/14 15:42	mg/L	CF41713
Hexavalent Chromium	ND (10)		7196A		1	EEM	06/12/14 17:35	ug/L	CF41243
Phenols	ND (100)		420.1		1	EEM	06/16/14 15:30	ug/L	CF41617
Total Cyanide (LL)	ND (0.0050)		4500 CN CE		1	JLK	06/17/14 11:40	mg/L	CF41709
Total Petroleum Hydrocarbon	ND (5)		1664A		1	CRR	06/17/14 12:00	mg/L	CF41731
Total Residual Chlorine	ND (10)		4500-Cl E		1	EEM	06/12/14 17:48	ug/L	CF41244
Total Suspended Solids	119 (5)		2540D		1	JLK	06/17/14 14:35	mg/L	CF41710



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CERTIFICATE OF ANALYSIS

Client Name: Environmental Management Professionals
Client Project ID: H1H West Street
Client Sample ID: B-3 OW
Date Sampled: 06/12/14 09:20
Percent Solids: N/A
Initial Volume: 35
Final Volume: 2
Extraction Method: 504/8011

ESS Laboratory Work Order: 1406294
ESS Laboratory Sample ID: 1406294-01
Sample Matrix: Ground Water
Units: ug/L
Analyst: JXS
Prepared: 6/16/14 8:30

8011 1,2-Dibromoethane / 1,2-Dibromo-3-chloropropane

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,2-Dibromoethane	ND (0.015)		8011		1	JXS	06/16/14 13:24		CF41608
		<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>					
<i>Surrogate: Pentachloroethane</i>		116 %		30-150					



CERTIFICATE OF ANALYSIS

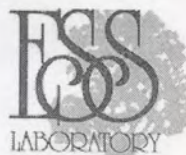
Client Name: Environmental Management Professionals
Client Project ID: H1H West Street
Client Sample ID: B-3 OW
Date Sampled: 06/20/14 00:00
Percent Solids: N/A
Initial Volume: 5
Final Volume: 5
Extraction Method: 5030B

ESS Laboratory Work Order: 1406294
ESS Laboratory Sample ID: 1406294-02
Sample Matrix: Ground Water
Units: ug/L
Analyst: MD

8260B Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
1,1,1-Trichloroethane	ND (1.0)		8260B		1	06/23/14 21:51	CXF0294	CF42326
1,1,2-Trichloroethane	ND (1.0)		8260B		1	06/23/14 21:51	CXF0294	CF42326
1,1-Dichloroethane	ND (1.0)		8260B		1	06/23/14 21:51	CXF0294	CF42326
1,1-Dichloroethene	ND (1.0)		8260B		1	06/23/14 21:51	CXF0294	CF42326
1,2-Dichlorobenzene	ND (1.0)		8260B		1	06/23/14 21:51	CXF0294	CF42326
1,2-Dichloroethane	ND (1.0)		8260B		1	06/23/14 21:51	CXF0294	CF42326
1,3-Dichlorobenzene	ND (1.0)		8260B		1	06/23/14 21:51	CXF0294	CF42326
1,4-Dichlorobenzene	ND (1.0)		8260B		1	06/23/14 21:51	CXF0294	CF42326
Acetone	ND (10.0)		8260B		1	06/23/14 21:51	CXF0294	CF42326
Benzene	ND (1.0)		8260B		1	06/23/14 21:51	CXF0294	CF42326
Carbon Tetrachloride	ND (1.0)		8260B		1	06/23/14 21:51	CXF0294	CF42326
cis-1,2-Dichloroethene	ND (1.0)		8260B		1	06/23/14 21:51	CXF0294	CF42326
Ethylbenzene	ND (1.0)		8260B		1	06/23/14 21:51	CXF0294	CF42326
Methyl tert-Butyl Ether	5.2 (1.0)		8260B		1	06/23/14 21:51	CXF0294	CF42326
Methylene Chloride	ND (2.0)		8260B		1	06/23/14 21:51	CXF0294	CF42326
Naphthalene	ND (1.0)		8260B		1	06/23/14 21:51	CXF0294	CF42326
Tertiary-amyl methyl ether	ND (1.0)		8260B		1	06/23/14 21:51	CXF0294	CF42326
Tertiary-butyl Alcohol	ND (25.0)		8260B		1	06/23/14 21:51	CXF0294	CF42326
Tetrachloroethene	ND (1.0)		8260B		1	06/23/14 21:51	CXF0294	CF42326
Toluene	ND (1.0)		8260B		1	06/23/14 21:51	CXF0294	CF42326
Trichloroethene	ND (1.0)		8260B		1	06/23/14 21:51	CXF0294	CF42326
Vinyl Chloride	ND (1.0)		8260B		1	06/23/14 21:51	CXF0294	CF42326
Xylene O	ND (1.0)		8260B		1	06/23/14 21:51	CXF0294	CF42326
Xylene P,M	ND (2.0)		8260B		1	06/23/14 21:51	CXF0294	CF42326

	%Recovery	Qualifier	Limits
Surrogate: 1,2-Dichloroethane-d4	93 %		70-130
Surrogate: 4-Bromofluorobenzene	88 %		70-130
Surrogate: Dibromofluoromethane	96 %		70-130
Surrogate: Toluene-d8	94 %		70-130



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CERTIFICATE OF ANALYSIS

Client Name: Environmental Management Professionals

Client Project ID: H1H West Street

ESS Laboratory Work Order: 1406294

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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Total Metals Aqueous

Batch CF41601 - 3005A

Blank

Chromium	ND	10	ug/L							
Iron	ND	50	ug/L							
Zinc	ND	25	ug/L							

LCS

Chromium	260	10	ug/L	250.0		104	80-120			
Iron	1310	50	ug/L	1250		105	80-120			
Zinc	257	25	ug/L	250.0		103	80-120			

LCS Dup

Chromium	261	10	ug/L	250.0		104	80-120	0.4	20	
Iron	1300	50	ug/L	1250		104	80-120	0.4	20	
Zinc	258	25	ug/L	250.0		103	80-120	0.3	20	

Batch CF41604 - 3005A

Blank

Antimony	ND	0.5	ug/L							
Arsenic	ND	1.0	ug/L							
Cadmium	ND	0.2	ug/L							
Copper	ND	0.5	ug/L							
Lead	ND	0.2	ug/L							
Nickel	ND	0.2	ug/L							
Selenium	ND	2.0	ug/L							
Silver	ND	0.2	ug/L							

LCS

Antimony	28.3	2.5	ug/L	25.00		113	80-120			
Arsenic	25.9	5.0	ug/L	25.00		103	80-120			
Cadmium	26.7	1.0	ug/L	25.00		107	80-120			
Copper	27.9	2.5	ug/L	25.00		112	80-120			
Lead	29.9	1.0	ug/L	25.00		119	80-120			
Nickel	26.1	1.0	ug/L	25.00		104	80-120			
Selenium	27.6	10.0	ug/L	25.00		111	80-120			
Silver	28.1	1.0	ug/L	25.00		113	80-120			

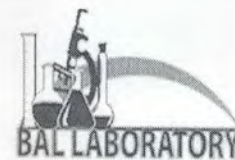
LCS Dup

Antimony	28.1	2.5	ug/L	25.00		112	80-120	0.9	20	
Arsenic	26.3	5.0	ug/L	25.00		105	80-120	2	20	
Cadmium	26.8	1.0	ug/L	25.00		107	80-120	0.2	20	
Copper	27.1	2.5	ug/L	25.00		109	80-120	3	20	
Lead	28.0	1.0	ug/L	25.00		112	80-120	6	20	
Nickel	26.2	1.0	ug/L	25.00		105	80-120	0.4	20	
Selenium	27.6	10.0	ug/L	25.00		110	80-120	0.3	20	
Silver	28.1	1.0	ug/L	25.00		113	80-120	0.04	20	

Batch CF41605 - 245.1/7470A

Blank

Mercury	ND	0.20	ug/L							
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CERTIFICATE OF ANALYSIS

Client Name: Environmental Management Professionals
Client Project ID: H1H West Street

ESS Laboratory Work Order: 1406294

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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Total Metals Aqueous

Batch CF41605 - 245.1/7470A

LCS

Mercury	5.85	0.20	ug/L	6.000		97	80-120			
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LCS Dup

Mercury	6.35	0.20	ug/L	6.000		106	80-120	8	20	
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8082A Polychlorinated Biphenyls (PCB)

Batch CF41306 - 3510C

Blank

Aroclor 1016	ND	0.10	ug/L							
Aroclor 1221	ND	0.10	ug/L							
Aroclor 1232	ND	0.10	ug/L							
Aroclor 1242	ND	0.10	ug/L							
Aroclor 1248	ND	0.10	ug/L							
Aroclor 1254	ND	0.10	ug/L							
Aroclor 1260	ND	0.10	ug/L							
Aroclor 1262	ND	0.10	ug/L							
Aroclor 1268	ND	0.10	ug/L							

Surrogate: Decachlorobiphenyl	0.0403		ug/L	0.05000		81	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.0362		ug/L	0.05000		72	30-150			
Surrogate: Tetrachloro-m-xylene	0.0379		ug/L	0.05000		76	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.0426		ug/L	0.05000		85	30-150			

LCS

Aroclor 1016	0.89	0.10	ug/L	1.000		89	40-140			
Aroclor 1260	0.79	0.10	ug/L	1.000		79	40-140			

Surrogate: Decachlorobiphenyl	0.0396		ug/L	0.05000		79	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.0356		ug/L	0.05000		71	30-150			
Surrogate: Tetrachloro-m-xylene	0.0447		ug/L	0.05000		89	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.0467		ug/L	0.05000		93	30-150			

LCS Dup

Aroclor 1016	0.84	0.10	ug/L	1.000		84	40-140	6	20	
Aroclor 1260	0.75	0.10	ug/L	1.000		75	40-140	5	20	

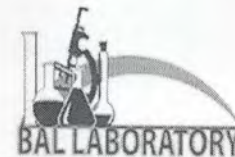
Surrogate: Decachlorobiphenyl	0.0396		ug/L	0.05000		79	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.0352		ug/L	0.05000		70	30-150			
Surrogate: Tetrachloro-m-xylene	0.0421		ug/L	0.05000		84	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.0408		ug/L	0.05000		82	30-150			

8260B Volatile Organic Compounds

Batch CF42326 - 5030B

Blank

1,1,1-Trichloroethane	ND	1.0	ug/L							
1,1,2-Trichloroethane	ND	1.0	ug/L							



CERTIFICATE OF ANALYSIS

Client Name: Environmental Management Professionals
Client Project ID: H1H West Street

ESS Laboratory Work Order: 1406294

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8260B Volatile Organic Compounds

Batch CF42326 - 5030B

1,1-Dichloroethane	ND	1.0	ug/L							
1,1-Dichloroethene	ND	1.0	ug/L							
1,2-Dichlorobenzene	ND	1.0	ug/L							
1,2-Dichloroethane	ND	1.0	ug/L							
1,3-Dichlorobenzene	ND	1.0	ug/L							
1,4-Dichlorobenzene	ND	1.0	ug/L							
Acetone	ND	10.0	ug/L							
Benzene	ND	1.0	ug/L							
Carbon Tetrachloride	ND	1.0	ug/L							
cis-1,2-Dichloroethene	ND	1.0	ug/L							
Ethylbenzene	ND	1.0	ug/L							
Methyl tert-Butyl Ether	ND	1.0	ug/L							
Methylene Chloride	ND	2.0	ug/L							
Naphthalene	ND	1.0	ug/L							
Tertiary-amyl methyl ether	ND	1.0	ug/L							
Tertiary-butyl Alcohol	ND	25.0	ug/L							
Tetrachloroethene	ND	1.0	ug/L							
Toluene	ND	1.0	ug/L							
Trichloroethene	ND	1.0	ug/L							
Vinyl Chloride	ND	1.0	ug/L							
Xylene O	ND	1.0	ug/L							
Xylene P,M	ND	2.0	ug/L							
Surrogate: 1,2-Dichloroethane-d4	22.9		ug/L	25.00		92	70-130			
Surrogate: 4-Bromofluorobenzene	22.4		ug/L	25.00		89	70-130			
Surrogate: Dibromofluoromethane	24.1		ug/L	25.00		96	70-130			
Surrogate: Toluene-d8	22.3		ug/L	25.00		89	70-130			

LCS

1,1,1-Trichloroethane	11.2		ug/L	10.00		112	70-130			
1,1,2-Trichloroethane	10.6		ug/L	10.00		106	70-130			
1,1-Dichloroethane	10.3		ug/L	10.00		103	70-130			
1,1-Dichloroethene	10.4		ug/L	10.00		104	70-130			
1,2-Dichlorobenzene	11.7		ug/L	10.00		117	70-130			
1,2-Dichloroethane	10.5		ug/L	10.00		105	70-130			
1,3-Dichlorobenzene	10.9		ug/L	10.00		109	70-130			
1,4-Dichlorobenzene	10.9		ug/L	10.00		109	70-130			
Acetone	71.1		ug/L	50.00		142	70-130			
Benzene	11.0		ug/L	10.00		110	70-130			
Carbon Tetrachloride	10.0		ug/L	10.00		100	70-130			
cis-1,2-Dichloroethene	10.6		ug/L	10.00		106	70-130			
Ethylbenzene	9.9		ug/L	10.00		99	70-130			
Methyl tert-Butyl Ether	9.7		ug/L	10.00		97	70-130			
Methylene Chloride	11.0		ug/L	10.00		110	70-130			
Naphthalene	10.7		ug/L	10.00		107	70-130			
Tertiary-amyl methyl ether	9.9		ug/L	10.00		99	70-130			
Tertiary-butyl Alcohol	57.5		ug/L	50.00		115	70-130			

B+



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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8260B Volatile Organic Compounds

Batch CF42326 - 5030B

Tetrachloroethene	10.5		ug/L	10.00		105	70-130			
Toluene	10.8		ug/L	10.00		108	70-130			
Trichloroethene	10.6		ug/L	10.00		106	70-130			
Vinyl Chloride	8.7		ug/L	10.00		87	70-130			
Xylene O	10.9		ug/L	10.00		109	70-130			
Xylene P,M	20.4		ug/L	20.00		102	70-130			
Surrogate: 1,2-Dichloroethane-d4	25.6		ug/L	25.00		102	70-130			
Surrogate: 4-Bromofluorobenzene	22.7		ug/L	25.00		91	70-130			
Surrogate: Dibromofluoromethane	28.0		ug/L	25.00		112	70-130			
Surrogate: Toluene-d8	23.3		ug/L	25.00		93	70-130			

LCS Dup

1,1,1-Trichloroethane	10.2		ug/L	10.00		102	70-130	9	25	
1,1,2-Trichloroethane	10.2		ug/L	10.00		102	70-130	4	25	
1,1-Dichloroethane	10.1		ug/L	10.00		101	70-130	2	25	
1,1-Dichloroethene	10.1		ug/L	10.00		101	70-130	3	25	
1,2-Dichlorobenzene	10.8		ug/L	10.00		108	70-130	7	25	
1,2-Dichloroethane	10.0		ug/L	10.00		100	70-130	5	25	
1,3-Dichlorobenzene	10.9		ug/L	10.00		109	70-130	0.3	25	
1,4-Dichlorobenzene	10.8		ug/L	10.00		108	70-130	0.9	25	
Acetone	63.2		ug/L	50.00		126	70-130	12	25	
Benzene	10.2		ug/L	10.00		102	70-130	7	25	
Carbon Tetrachloride	10.0		ug/L	10.00		100	70-130	0.4	25	
cis-1,2-Dichloroethene	10.8		ug/L	10.00		108	70-130	1	25	
Ethylbenzene	9.1		ug/L	10.00		91	70-130	9	25	
Methyl tert-Butyl Ether	9.6		ug/L	10.00		96	70-130	1	25	
Methylene Chloride	10.3		ug/L	10.00		103	70-130	7	25	
Naphthalene	9.9		ug/L	10.00		99	70-130	7	25	
Tertiary-amyl methyl ether	9.8		ug/L	10.00		98	70-130	0.5	25	
Tertiary-butyl Alcohol	51.1		ug/L	50.00		102	70-130	12	25	
Tetrachloroethene	9.2		ug/L	10.00		92	70-130	13	25	
Toluene	10.6		ug/L	10.00		106	70-130	1	25	
Trichloroethene	10.8		ug/L	10.00		108	70-130	1	25	
Vinyl Chloride	8.6		ug/L	10.00		86	70-130	0.9	25	
Xylene O	10.1		ug/L	10.00		101	70-130	8	25	
Xylene P,M	19.9		ug/L	20.00		99	70-130	2	25	
Surrogate: 1,2-Dichloroethane-d4	26.4		ug/L	25.00		106	70-130			
Surrogate: 4-Bromofluorobenzene	22.4		ug/L	25.00		90	70-130			
Surrogate: Dibromofluoromethane	27.3		ug/L	25.00		109	70-130			
Surrogate: Toluene-d8	23.0		ug/L	25.00		92	70-130			

8270D(SIM) Semi-Volatile Organic Compounds w/ Isotope Dilution

Batch CF41631 - 3520C

Blank

1,4-Dioxane	ND	0.2	ug/L							
Surrogate: 1,4-Dioxane-d8	4.16		ug/L	5.000		83	15-115			



ESS Laboratory
Division of Thielsch Engineering, Inc.

BAL Laboratory

The Microbiology Division
of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: Environmental Management Professionals
Client Project ID: H1H West Street

ESS Laboratory Work Order: 1406294

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8270D(SIM) Semi-Volatile Organic Compounds w/ Isotope Dilution

Batch CF41631 - 3520C

LCS

1,4-Dioxane	8.2	0.2	ug/L	10.00		82	40-140			
Surrogate: 1,4-Dioxane-d8	4.04		ug/L	5.000		81	15-115			

LCS Dup

1,4-Dioxane	7.8	0.2	ug/L	10.00		78	40-140	5	20	
Surrogate: 1,4-Dioxane-d8	4.09		ug/L	5.000		82	15-115			

8270C(SIM) Polynuclear Aromatic Hydrocarbons

Batch CF41207 - 3510C

Blank

Acenaphthene	ND	0.20	ug/L							
Acenaphthylene	ND	0.20	ug/L							
Anthracene	ND	0.20	ug/L							
Benzo(a)anthracene	ND	0.05	ug/L							
Benzo(a)pyrene	ND	0.05	ug/L							
Benzo(b)fluoranthene	ND	0.05	ug/L							
Benzo(g,h,i)perylene	ND	0.20	ug/L							
Benzo(k)fluoranthene	ND	0.05	ug/L							
bis(2-Ethylhexyl)phthalate	ND	2.50	ug/L							
Butylbenzylphthalate	ND	2.50	ug/L							
Chrysene	ND	0.05	ug/L							
Dibenzo(a,h)Anthracene	ND	0.05	ug/L							
Diethylphthalate	ND	2.50	ug/L							
Dimethylphthalate	ND	2.50	ug/L							
Di-n-butylphthalate	ND	2.50	ug/L							
Di-n-octylphthalate	ND	2.50	ug/L							
Fluoranthene	ND	0.20	ug/L							
Fluorene	ND	0.20	ug/L							
Indeno(1,2,3-cd)Pyrene	ND	0.05	ug/L							
Naphthalene	ND	0.20	ug/L							
Pentachlorophenol	ND	0.90	ug/L							
Phenanthrene	ND	0.20	ug/L							
Pyrene	ND	0.20	ug/L							
Surrogate: 1,2-Dichlorobenzene-d4	1.48		ug/L	2.500		59	30-130			
Surrogate: 2,4,6-Tribromophenol	7.79		ug/L	3.750		208	15-110			S+
Surrogate: 2-Fluorobiphenyl	1.78		ug/L	2.500		71	30-130			
Surrogate: Nitrobenzene-d5	2.20		ug/L	2.500		88	30-130			
Surrogate: p-Terphenyl-d14	2.11		ug/L	2.500		84	30-130			

LCS

Acenaphthene	2.45	0.20	ug/L	4.000		61	40-140			
Acenaphthylene	2.49	0.20	ug/L	4.000		62	40-140			
Anthracene	2.84	0.20	ug/L	4.000		71	40-140			
Benzo(a)anthracene	2.83	0.05	ug/L	4.000		71	40-140			
Benzo(a)pyrene	2.72	0.05	ug/L	4.000		68	40-140			



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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8270C(SIM) Polynuclear Aromatic Hydrocarbons

Batch CF41207 - 3510C

Benzo(b)fluoranthene	2.83	0.05	ug/L	4.000		71	40-140			
Benzo(g,h,i)perylene	2.67	0.20	ug/L	4.000		67	40-140			
Benzo(k)fluoranthene	3.07	0.05	ug/L	4.000		77	40-140			
bis(2-Ethylhexyl)phthalate	4.09	2.50	ug/L	4.000		102	40-140			
Butylbenzylphthalate	3.60	2.50	ug/L	4.000		90	40-140			
Chrysene	2.95	0.05	ug/L	4.000		74	40-140			
Dibenzo(a,h)Anthracene	2.84	0.05	ug/L	4.000		71	40-140			
Diethylphthalate	3.11	2.50	ug/L	4.000		78	40-140			
Dimethylphthalate	2.91	2.50	ug/L	4.000		73	40-140			
Di-n-butylphthalate	3.03	2.50	ug/L	4.000		76	40-140			
Di-n-octylphthalate	3.78	2.50	ug/L	4.000		94	40-140			
Fluoranthene	2.96	0.20	ug/L	4.000		74	40-140			
Fluorene	2.68	0.20	ug/L	4.000		67	40-140			
Indeno(1,2,3-cd)Pyrene	2.82	0.05	ug/L	4.000		70	40-140			
Naphthalene	2.19	0.20	ug/L	4.000		55	40-140			
Pentachlorophenol	4.86	0.90	ug/L	4.000		122	30-130			
Phenanthrene	2.79	0.20	ug/L	4.000		70	40-140			
Pyrene	3.14	0.20	ug/L	4.000		78	40-140			
Surrogate: 1,2-Dichlorobenzene-d4	1.49		ug/L	2.500		60	30-130			
Surrogate: 2,4,6-Tribromophenol	7.68		ug/L	3.750		205	15-110			S+
Surrogate: 2-Fluorobiphenyl	1.88		ug/L	2.500		75	30-130			
Surrogate: Nitrobenzene-d5	2.07		ug/L	2.500		83	30-130			
Surrogate: p-Terphenyl-d14	2.23		ug/L	2.500		89	30-130			

LCS Dup

Acenaphthene	2.46	0.20	ug/L	4.000		61	40-140	0.4	20	
Acenaphthylene	2.52	0.20	ug/L	4.000		63	40-140	1	20	
Anthracene	2.84	0.20	ug/L	4.000		71	40-140	0.2	20	
Benzo(a)anthracene	2.79	0.05	ug/L	4.000		70	40-140	1	20	
Benzo(a)pyrene	2.72	0.05	ug/L	4.000		68	40-140	0.3	20	
Benzo(b)fluoranthene	2.96	0.05	ug/L	4.000		74	40-140	4	20	
Benzo(g,h,i)perylene	2.65	0.20	ug/L	4.000		66	40-140	0.8	20	
Benzo(k)fluoranthene	2.85	0.05	ug/L	4.000		71	40-140	7	20	
bis(2-Ethylhexyl)phthalate	4.01	2.50	ug/L	4.000		100	40-140	2	20	
Butylbenzylphthalate	3.53	2.50	ug/L	4.000		88	40-140	2	20	
Chrysene	2.89	0.05	ug/L	4.000		72	40-140	2	20	
Dibenzo(a,h)Anthracene	2.93	0.05	ug/L	4.000		73	40-140	3	20	
Diethylphthalate	3.08	2.50	ug/L	4.000		77	40-140	0.7	20	
Dimethylphthalate	2.93	2.50	ug/L	4.000		73	40-140	1	20	
Di-n-butylphthalate	3.02	2.50	ug/L	4.000		76	40-140	0.4	20	
Di-n-octylphthalate	3.70	2.50	ug/L	4.000		92	40-140	2	20	
Fluoranthene	2.98	0.20	ug/L	4.000		75	40-140	0.7	20	
Fluorene	2.72	0.20	ug/L	4.000		68	40-140	1	20	
Indeno(1,2,3-cd)Pyrene	2.90	0.05	ug/L	4.000		73	40-140	3	20	
Naphthalene	2.23	0.20	ug/L	4.000		56	40-140	1	20	
Pentachlorophenol	4.61	0.90	ug/L	4.000		115	30-130	5	20	



CERTIFICATE OF ANALYSIS

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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8270C(SIM) Polynuclear Aromatic Hydrocarbons

Batch CF41207 - 3510C

Phenanthrene	2.77	0.20	ug/L	4.000		69	40-140	0.5	20	
Pyrene	3.01	0.20	ug/L	4.000		75	40-140	4	20	
Surrogate: 1,2-Dichlorobenzene-d4	1.37		ug/L	2.500		55	30-130			
Surrogate: 2,4,6-Tribromophenol	6.45		ug/L	3.750		172	15-110			S+
Surrogate: 2-Fluorobiphenyl	1.70		ug/L	2.500		68	30-130			
Surrogate: Nitrobenzene-d5	1.96		ug/L	2.500		78	30-130			
Surrogate: p-Terphenyl-d14	1.94		ug/L	2.500		78	30-130			

Classical Chemistry

Batch CF41243 - General Preparation

Blank

Hexavalent Chromium	ND	10	ug/L							
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LCS

Hexavalent Chromium	0.5		mg/L	0.4998		100	90-110			
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LCS Dup

Hexavalent Chromium	0.5		mg/L	0.4998		99	90-110	0.3	20	
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Batch CF41244 - General Preparation

Blank

Total Residual Chlorine	ND	10	ug/L							
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LCS

Total Residual Chlorine	2		mg/L	2.250		100	85-115			
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Batch CF41617 - General Preparation

Blank

Phenols	ND	100	ug/L							
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LCS

Phenols	98	100	ug/L	100.0		98	80-120			
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LCS

Phenols	1010	100	ug/L	1000		101	80-120			
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Batch CF41709 - TCN Prep

Blank

Total Cyanide (LL)	ND	0.0050	mg/L							
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LCS

Total Cyanide (LL)	0.0203	0.0050	mg/L	0.02006		101	90-110			
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LCS

Total Cyanide (LL)	0.150	0.0050	mg/L	0.1504		100	90-110			
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LCS Dup

Total Cyanide (LL)	0.144	0.0050	mg/L	0.1504		96	90-110	4	20	
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Batch CF41710 - General Preparation

Blank

Total Suspended Solids	ND	5	mg/L							
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LCS



CERTIFICATE OF ANALYSIS

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Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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Classical Chemistry

Batch CF41710 - General Preparation

Total Suspended Solids	64		mg/L	65.00		98	80-120			
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Batch CF41713 - General Preparation

Blank										
Chloride	ND	0.5	mg/L							

LCS										
Chloride	2.8		mg/L	2.500		110	90-110			

Batch CF41731 - General Preparation

Blank										
Total Petroleum Hydrocarbon	ND	5	mg/L							

LCS										
Total Petroleum Hydrocarbon	14	5	mg/L	19.38		72	66-114			

8011 1,2-Dibromoethane / 1,2-Dibromo-3-chloropropane

Batch CF41608 - 504/8011

Blank										
1,2-Dibromoethane	ND	0.015	ug/L							

Surrogate: Pentachloroethane	0.257		ug/L	0.2000		128	30-150			
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LCS										
1,2-Dibromoethane	0.244	0.015	ug/L	0.2000		122	60-140			

Surrogate: Pentachloroethane	0.263		ug/L	0.2000		131	30-150			
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LCS										
1,2-Dibromoethane	0.085	0.015	ug/L	0.08000		106	60-140			

Surrogate: Pentachloroethane	0.232		ug/L	0.08000		290	30-150			S+
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CERTIFICATE OF ANALYSIS

Client Name: Environmental Management Professionals

Client Project ID: H1H West Street

ESS Laboratory Work Order: 1406294

Notes and Definitions

U	Analyte included in the analysis, but not detected
S+	Surrogate recovery(ies) above upper control limit (S+).
D	Diluted.
C+	Continuing Calibration recovery is above upper control limit (C+).
B+	Blank Spike recovery is above upper control limit (B+).
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



ESS Laboratory
Division of Thielsch Engineering, Inc.

BAL Laboratory
*The Microbiology Division
of Thielsch Engineering, Inc.*



CERTIFICATE OF ANALYSIS

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Client Project ID: H1H West Street

ESS Laboratory Work Order: 1406294

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

ENVIRONMENTAL

Department of Defense (DoD) Environmental Laboratory Accreditation Program (ELAP)

A2LA Accredited: Testing Cert# 2864.01

<http://www.a2la.org/scopepdf/2864-01.pdf>

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: RI0002

<http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/documents/AHLLabs.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

CHEMISTRY

A2LA Accredited: Testing Cert # 2864.01

Lead in Paint, Phthalates, Lead in Children's Metals Products (Including Jewelry)

<http://www.A2LA.org/dirsearchnew/newsearch.cfm>

CPSC ID# 1141

Lead Paint, Lead in Children's Metals Jewelry

<http://www.cpsc.gov/cgi-bin/labapplist.aspx>

Sample and Cooler Receipt Checklist

Client: Environmental Management Services
Client Project ID: _____
Shipped/Delivered Via: ESS Courier

ESS Project ID: 14060294
Date Project Due: 6/19/14 6/21/14
Days For Project: 5 Day MB 1405
12/14 6/23/14

Items to be checked upon receipt:

1. Air Bill Manifest Present?

* No

Air No.:

2. Were Custody Seals Present?

No

3. Were Custody Seals Intact?

N/A

4. Is Radiation count < 100 CPM?

Yes

5. Is a cooler present?

Yes

Cooler Temp: 3.4Iced With: Ice

6. Was COC included with samples?

Yes

7. Was COC signed and dated by client?

Yes

8. Does the COC match the sample

Yes

9. Is COC complete and correct?

Yes

10. Are the samples properly preserved?

Yes

11. Proper sample containers used?

Yes

12. Any air bubbles in the VOA vials?

N/A

13. Holding times exceeded?

No

14. Sufficient sample volumes?

Yes

15. Any Subcontracting needed?

No

16. Are ESS labels on correct containers?

Yes/No

17. Were samples received intact?

Yes/No

ESS Sample IDs: _____

Sub Lab: _____

Analysis: _____

TAT: _____

18. Was there need to call project manager to discuss status? If yes, please explain.

Who was called?: _____

By whom? _____

Sample Number	Properly Preserved	Container Type	# of Containers	Preservative
1	Yes	40 ml - VOA	3	HCL
2	Yes	40 ml - VOA	3	HCL

Completed By: UnibroDate/Time: 6/23/14 10:05Reviewed By: EODate/Time: 6/23/14 16:25

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

Page 1 of 1

Turn Time If faster than 5 days, prior approval by laboratory is required # _____ Standard Other MA RI CT NH NJ NY ME Other Is this project for any of the following: USACE (Other) USARP MPDES RGP MA-MCP Navy		Reporting Limits USEPA MPDES RGP APPENDIX VI Electronic Deliverable Format: Excel Access PDF Other Yes No		ESS LAB PROJECT ID 1406294						
Co. Name ENVIRONMENTAL MANAGEMENT PRO MURA 7066 Address 94 SAWYERS LANE City MARSHFIELD MA State Zip 02050 Telephone # 781-984-3922 Fax # PO# Email Address tpachodenvmgpro.com		Project # HIGH WEST STREET Project Name (20 Char. or less)		Write Required Analysis VOC CYANIDE TPH TSS, TPC, CHLORIDE Type of Containers Number of Containers Pres Code 1, 2, 13 P.G. 3, 4, 9						
ESS LAB Sample #	Date	Collection Time	COMP	GRAB	MATRIX	Sample Identification (20 Char. or less)	Pres Code	TSS, TPC, CHLORIDE TPH VOC TOTAL PHENOLS PAH SIM: PHTHANES PCB METALS TOTAL C, C III, C IV		
1	6-12-14	0920		✓	GW	B-3 GW	1, 2, 13 P.G. 3, 4, 9			
Container Type: P-Poly G-Glass S-Sterile V-VOA Cooler Present Yes No Seals Intact Yes No NA: 3.4 Cooler Temp: 3.4 Relinquished by: (Signature) 6/12/14 1500 Relinquished by: (Signature) 6/12/14 1500			Matrix: S-Soil SD-Solid D-Sludge WW-Waste Water GW-Ground Water SW-Surface Water DW-Drinking Water O-Oil W-Wipes F-Filters Preservation Code 1-NH 2-HCL 3-H2SO4 4-HNO3 5-NaOH, 6-MeOH, 7-Asorbic Acid, 8-ZnAc, 9-ICE Sampled by: EMP Comments: TESTS PER USEPA MPDES RGP APPENDIX III CATEGORY - I, TEST METHODS AND MINIMUM LEVELS PER APPENDIX VI							
Received by: (Signature) 6/12/14 1500 Relinquished by: (Signature) 6/12/14 1500			Received by: (Signature) 6/12/14 1500 Relinquished by: (Signature) 6/12/14 1500							

*By circling MA-MCP, client acknowledges samples were collected

Please fax all changes to Chain of Custody in writing.

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

Attachment 5

USGS Streamstats GIS Database



ENVIRONMENTAL MANAGEMENT PROFESSIONALS, INC.



StreamStats Data-Collection Station Report

USGS Station Number 01102500
 Station Name ABERJONA RIVER AT WINCHESTER, MA

[Click here to link to available data on NWIS-Web for this site.](#)

Descriptive Information

Station Type Gaging Station, continuous record
 Location
 Gage
 Regulation and Diversions
 Regulated? True
 Period of Record 1939-present
 Remarks Flow affected by diversions. Some regulation by Winchester at dam 1800 feet upstream.
 Latitude (degrees NAD83) 42.44731778
 Longitude (degrees NAD83) -71.13894278
 Hydrologic unit code 01090001
 County 017-Middlesex
 HCDN2009 No

Physical Characteristics

Characteristic Name	Value	Units	Citation Number
Descriptive Information			
State_Code	25	dimensionless	30
Datum_of_Latitude_Longitude	NAD83	dimensionless	30
District_Code	25	dimensionless	30
Begin_date_of_record	4/16/1939 days		41
End_date_of_record	9/30/2003 days		41
Number_of_days_of_record	23544 days		41
Number_of_days_GT_0	23544 days		41
Active_station	Yes	Yes or No	41
Basin Dimensional Characteristics			
Drainage_Area	24.1	square miles	30

Streamflow Statistics

Statistic Name	Value	Units	Citation Number	Years of Record	Standard Error, percent	Variance log-10	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Start Date	End Date	Remarks
Low-Flow Statistics											
7_Day_2_Year_Low_Flow	0.92	cubic feet per second	19	Y							
7_Day_10_Year_Low_Flow	0.46	cubic feet per second	19	Y							
Flow-Duration Statistics											
1_Percent_Duration	189.06	cubic feet per second	41	Y	65						
5_Percent_Duration	96	cubic feet per second	41	Y	65						
10_Percent_Duration	69	cubic feet per second	41	Y	65						
20_Percent_Duration	45	cubic feet per second	41	Y	65						
25_Percent_Duration	38	cubic feet per second	41	Y	65						
30_Percent_Duration	33	cubic feet per second	41	Y	65						
40_Percent_Duration	24	cubic feet per second	41	Y	65						
50_Percent_Duration	17	cubic feet per second	41	Y	65						
60_Percent_Duration	12	cubic feet per second	41	Y	65						
70_Percent_Duration	7.37	cubic feet per second	41	Y	65						
75_Percent_Duration	5.6	cubic feet per second	41	Y	65						
80_Percent_Duration	4.1	cubic feet per second	41	Y	65						
90_Percent_Duration	1.5	cubic feet per second	41	Y	65						
95_Percent_Duration	0.8	cubic feet per second	41	Y	65						
99_Percent_Duration	0.5	cubic feet per second	41	Y	65						
General Flow Statistics											

Minimum_daily_flow	0.25	cubic feet per second	41	Y	65
Maximum_daily_flow	1110	cubic feet per second	41	Y	65
Std_Dev_of_daily_flows	43.751	cubic feet per second	41	Y	65
Average_daily_streamflow	29.691	cubic feet per second	41	Y	65

Base Flow Statistics

Number_of_years_to_compute_BFI	64	years	42	Y	65
Average_BFI_value	0.469	dimensionless	42	Y	65
Std_dev_of_annual_BFI_values	0.065	dimensionless	42	Y	65

Citations

Citation Number	Citation Name and URL
19	Wandle, S.W., Jr., 1984, Gazetteer of Hydrologic Characteristics of Streams in Massachusetts--Coastal River Basins of the North Shore and Massachusetts Bay: U.S. Geological Survey Water-Resources Investigations Report 84-4281
30	Imported from NWIS file
41	Wolock, D.M., 2003, Flow characteristics at U.S. Geological Survey streamgages in the conterminous United States: U.S. Geological Survey Open-File Report 03-146, digital data set
42	Wolock, D.M., 2003, Base-flow index grid for the conterminous United States: U.S. Geological Survey Open-File Report 03-263, digital data set

Attachment 6

Dilution Factor Calculation



DILUTION FACTOR CALCULATION

$$DF = \frac{(Q_d + Q_s)}{Q_d}$$

$$Q_d = 50 \text{ gpm} = .1115 \text{ FT}^3/\text{SEC}$$

$$Q_s = \text{RECEIVING WATER} = 0.46 \text{ FT}^3/\text{SEC}$$

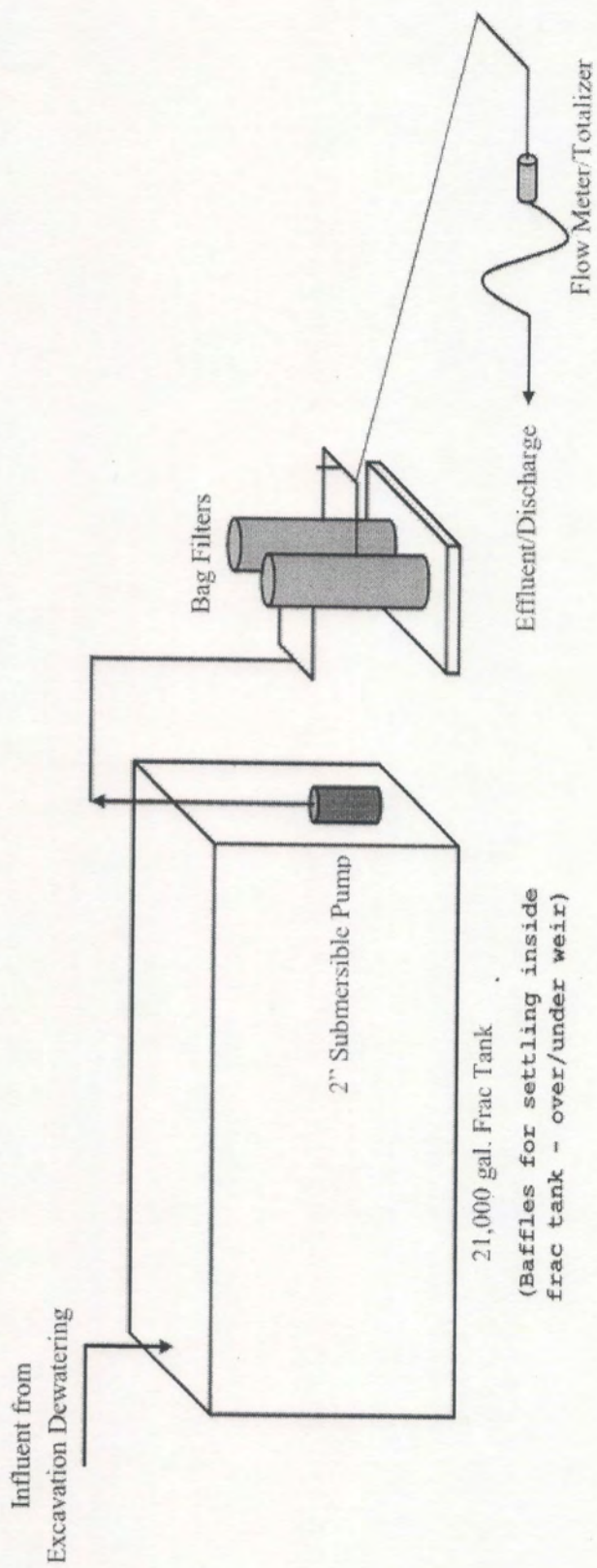
$$DF = \frac{.1115 \text{ FT}^3 + 0.46 \text{ FT}^3}{.1115 \text{ FT}^3} = 5.12$$

Attachment 7

Groundwater Treatment System



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Schematic of Water Treatment System