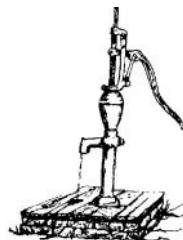


WELL NO. 3 REPLACEMENT WELL EXPLORATION RESULTS AND PUMP TEST PROPOSAL

Medfield, Massachusetts

October 2020



ENVIRONMENTAL
 PARTNERS

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1. INTRODUCTION

1.1. BACKGROUND

The Town of Medfield Wells 3 and 4 are registered public water sources with a Massachusetts Department of Environmental Protection (MassDEP) issued registered withdrawal rate of 0.92 million gallons per day (MGD). Well 3 has a reported safe yield of 1.2 MGD and Well 4 has a safe yield of 1.01 MGD. The Town of Medfield Water Department (the Town) has not been utilizing Well 4 for several decades due to water quality concerns.

The Town is planning to replace Well 3 due to lost pumping capacity and the deterioration in water quality, with increasing concentrations of iron and manganese. In addition the well screen in Well 3 has collapsed and the original 12-inch well has been lined with an 8-inch well screen and can pump only a fraction of its previous output. As Well 3 has been in use for approximately 50 years, it is likely that this well is approaching the limit of its useful service life. Although the MassDEP approved safe yield for Well 3 is 1.2 MGD, Well 3 has been operating at diminished capacity (approximately 0.54 MGD maximum) due to hydraulic restrictions of the replacement well screen installed in the early 2000s. Well 3 was redeveloped in spring 2020 and since then its pumping capacity has decreased from 375 gpm to less than 300 gpm.

The Town needs Well 3 to be usable up to its safe yield to provide water source flexibility to reduce reliance on Well 6, Well 1 and Well 2 and provide system redundancy. To further support this need, the Town is in the process of re-activating Well 4 so the well will be available for use next year should Well 3 production continue to decline.

The current MassDEP Guidelines allow for locating a replacement well within 250 feet of a production well. If the replacement well is located within 50 feet of the existing production well, the permitting process with MassDEP is streamlined. EP on behalf of the Town conducted exploratory drilling within 50-feet of Well 3 and identified a suitable location for public water supply development (TW-1). Figure 1 (attached) locates Medfield Well 3 and the proposed replacement well location (TW-1). The proposed replacement well is located approximately 30-35 feet west of existing Well 3.

For all public water supply wells, the MassDEP requires that the Town or District own and control a Zone I protective radius around the well. For wells with an approved pumping rate greater than 70 gpm, the Zone I protective radius is 400 feet. Land uses within the 400-foot Zone I must be exclusively for public water supply protection.

Figure 1 shows the 400-foot Zone I radius for the proposed replacement well. The 400-foot Zone I for both the existing and proposed replacement well is in compliance with Zone I requirements with the exception of the Massachusetts Department of Transportation (MassDOT) railroad line that bisects the Zone I and is located approximately 150 feet west of the existing Well 3. A railroad right-of-way is not a consistent land use for public water supply protection. The Town owns the property within the Zone I, to the northeast and southwest of the railroad line, and this land within the Zone I is designated exclusively for public water supply protection.

1.2. EVALUATION OF OTHER POTENTIAL WATER SUPPLY SITES

EP on behalf of the Town conducted a desktop site screening study and exploration activities to try to locate a potential new source public water supply source with a conforming Zone I area, to make up the lost capacity from Well 3. The results of these investigations are summarized below.

2017 DESKTOP STUDY AND NEW SOURCE EXPLORATION

In 2017, EP performed a desktop site screening analysis and exploration for a new water supply source within the Town. The desktop study included a review of Town owned parcels with sufficient area to support a 400-foot Zone I radius. These parcels were reviewed for surficial geology, potential for aquifer material, nearby environmental receptors, nearby land uses, and potential sources or contamination.

Sixteen Town owned sites were identified as having sufficient size to support the full 400-foot Zone I radius. Of these 16 parcels: four parcels were not considered potential public water supply sites, because of their current land uses (i.e., wastewater treatment plants, landfills etc.); two parcels are existing public water supply sites; and three parcels had low potential for public water supply development because of thin or absent aquifer material (till or shallow bedrock). Seven sites were selected for further evaluation for development of a new source water supply.

Exploratory drilling for a new source public water supply was performed at the four highest ranked potential well sites. Anywhere from two to nine borings were drilled at each of these four sites to evaluate the potential for public water supply development. At each site borings were drilled to refusal. Potential aquifer and a potential public water supply site was not identified at any of the four locations.

EP conducted additional exploratory drilling around Well 4 between October 30 and November 10, 2017. A total of six (6) borings were completed on site, in efforts to find a suitable location for a potential replacement well (shown on Figure 2). All borings were located at least 150-feet away from wetlands and within 250-feet of the existing Well 4, to comply with DEP requirements. Three borings located to the west of Well 4 were completed initially, with no suitable aquifer material observed. An additional exploratory borings was installed between Well 3 and Well 4, with no potential aquifer material identified. A sixth boring, installed to the north of Well 4, appeared to have suitable aquifer material over the same screen interval as Well 4 and could provide a suitable replacement for Well 4, but not for Well 3.

2019-2020 EXPLORATION AND RESULTS

In 2019, EP conducted a desktop screening of the Well 3 site area to identify potential locations for exploratory drilling, where the Town had a conforming Zone I radius. This area was identified as more than 400-ft from the existing railroad right-of-way, a minimum of 150-ft from Mine Brook, and within the area mapped as a high or medium yield aquifer zone.

EP and subcontractor Maher Services to conduct exploration activities for a new source within this conforming Zone I area. Five borings were drilled in the proposed exploration area. Unsuitable

aquifer material was identified in all five borings, and therefore no test wells were installed. Figure 2 shows these five borings. The material observed at these boring locations consisted primarily of fine silty sand from 0 to 20 feet bgs, and silt with trace to little fine sand from 20 feet to refusal. Refusal at the five locations ranged from 47.5 and 62 feet bgs. After five borings were completed with no suitable aquifer material identified, drilling exploration was terminated.

After completion of the exploratory activities, in order to address water supply concerns within the Town, a replacement well for Well No. 3 is proposed to make up the lost pumping capacity from Well 3 and provide redundancy for the Medfield public water system.

1.3. SCOPE OF WORK

EP contracted with Maher Services, Inc. of North Reading, Massachusetts, a Massachusetts certified water supply well driller, to conduct exploratory drilling with a Geoprobe® drilling rig with the goal of locating a replacement well within 250 feet of Well 3, but preferably within 50 feet of Well 3. Prior to initiating field activities, Town files were reviewed to evaluate the condition of existing wells around Well 3, and to assist in locating a potential replacement well. Observation wells were observed at three locations around the Well 3 pump house building, as shown on Figure 3 Site Plan. Potential drilling locations were limited due to the presence of overhead wires and underground utility lines.

Based on discussions with Mr. David O'Toole, with the Medfield Water Department, the existing well couplet OW-11A and OW-11B, had previously been identified as a potential replacement well location. A short term specific capacity test (20 to 30 minutes each) was performed on both observation wells OW-11A and OW-11B, to evaluate the condition of these wells and the production potential for a replacement well at this location. The specific capacities of wells OW-11A and OW-11B prior to any redevelopment were 125 gpm/ft and 132 gpm/ft, respectively, suggesting that the location should be further evaluated.

This report documents the test well installation and pump test results that were used to determine the feasibility of installing a replacement well at that location. Wells OW-11A and OW-11B were redeveloped, a two-inch test well was installed within two-feet of these wells and a two-hour pump test was conducted to calculate the specific capacity of the formation and well yield, and collect samples for preliminary water quality data.

2. METHODOLOGY

2.1. DRILLING METHODS AND WELL INSTALLATION

Environmental Partners subcontracted Maher Services of North Reading, Massachusetts to drill a test boring and install a test well within 50 feet of the existing Well 3 and conducted specific capacity testing. Maher Services used a Geoprobe® direct push drilling rig to install a 2-inch diameter test well (TW-1) approximately 2-feet from existing wells OW-11A and OW-11B (see Figure 3).

The boring for TW-1 was drilled to a total depth of 60 feet below ground surface (bgs) and the well installed was constructed of 2-inch diameter 50-slot stainless steel screen and schedule 40 PVC riser. The well screen in TW-1 was set from 48 to 58 feet bgs, to match the screen interval of Well 3. TW-1 has natural gravel pack, and bentonite chips from 5-15 feet bgs.

Wells OW-11A and OW-11B are both located approximately 2 feet from TW-1 and were used as observation wells for the 2-hour pumping test.

After installation, the well was developed by pumping until the discharge was clear. The development water was initially dark red/brown, but cleared up with further development. The test well was completed with a concrete collar and locking, protective steel casing, and the well casing painted bright yellow for visibility. Maher also redeveloped Wells OW-11A and OW-11B to ensure good hydraulic connectivity with the aquifer.

2.2. LITHOLOGIC LOGGING

The two-inch test well was installed with a Geoprobe drilling rig and continuous five-foot cores were collected from the ground surface to refusal in order to obtain detailed lithologic data and support design of the replacement production well. Samples were examined in the field and a detailed lithologic log was prepared for the test boring using the Unified Soil Classification System for descriptive terms and relative amounts of each grain size. The boring log for TW-1 is included in Appendix A.

2.3. CONSTANT RATE TESTING

On January 19, 2017, a 2-hour constant rate test was performed on TW-1 at a pump rate of 76 gpm, which was the maximum capacity of the pump. An air pump was used for the aquifer testing. The discharge was directed through a 4-inch diameter hose and into a 55 gallon drum to measure flow rates. Pump test water was discharged approximately 80-100 feet southeast of the test site.

In accordance with normal well operating procedures, Well 3 was pumped from 2:00 PM to 2:00 AM on January 18th and then shut off in preparation for the 2 hour pumping test to be completed the following day. TW-1 was pumped for two hours and ten minutes, from 8:52 AM to 11:02 AM, when the pump was shut off. Test well recovery measurements were recorded from 11:02 AM to 11:32 AM.

Manual water level measurements were collected in the 2-foot observation wells (OW-11A and OW-11B) and at a third existing observation well (OW-12) located approximately 55 feet from TW-1. Well OW-13 could not be opened and was not used as an observation well. Water level measurements in

the observation wells were collected at regular intervals during the pump test using an electronic water level probe.

2.4. WATER QUALITY SAMPLING

Water quality sampling was performed as part of the constant rate testing. All water quality samples were collected from the discharge line. At the end of the constant rate test, prior to shut down, water samples were collected for field measurements of pH, specific conductance, and temperature using a calibrated YSI field meter and laboratory analysis of the following:

- Inorganic Compounds – Sulfate
- Secondary Contaminants (TDS, Color, pH, Alkalinity, Hardness, pH, Chloride, Turbidity)
- Metals (Aluminum, Calcium, Copper, Iron, Magnesium, Manganese, Potassium, Silver, Zinc)
- Volatile organic compounds by EPA Method 524.2

EP collected groundwater samples for laboratory analysis and samples were submitted to ESS Laboratory in Cranston, Rhode Island, a Massachusetts state certified laboratory. Copies of the laboratory analytical reports are included in Appendix B. These field and laboratory analyses were selected to provide an initial screening of groundwater quality because they are commonly used to evaluate groundwater quality for public water supply and to determine the need for water treatment.

3. RESULTS OF FIELD INVESTIGATIONS

3.1. WELLS INSTALLED FOR THIS STUDY

The following table summarizes the well construction information for Well 3, the newly installed test well (TW-1) and other observation wells.

TABLE 1: SUMMARY OF ELM STREET WELL NO. 3 EXPLORATORY WELLS

<i>Location</i>	<i>Date Installed</i>	<i>TD BGS</i>	<i>Screen Interval</i>	
			<i>Top BGS</i>	<i>Bottom BGS</i>
Well 3	1967	58.6	48	58
TW-1	1/18/17	60.00	48.00	58.00
OW-11A	1990s	57.06	-	-
OW-11B	1990s	57.5	-	-
OW-12	Unknown			

Notes: Wells installed under this SOW are shown in **BOLD**

TD = total depth

BGS=below ground surface

Aquifer testing was performed on TW-1 and wells OW-11A, OW-11B and OW-12 were used for observation wells to monitor water levels during the pumping test. Wells OW-11A and OW-11B are located within approximately two feet of TW-1 and OW-12 is located approximately 60 feet from TW-1. As indicated in the above table the screen intervals for OW-11A and OW-11B are not known, but based on a total depth of 57 feet bgs, the screen is likely from 47 to 57 feet bgs.

3.2. SITE GEOLOGY

A detailed lithologic log for boring TW-1 is included in Appendix A. In general, the lithology at TW-1 consisted of coarse sand and gravel to a depth of 7 feet bgs; clay, silt and fine sand from 7 to 12 feet bgs; and predominately medium to coarse sands with gravel/cobbles and minor interbedded layers of fine sand or silt from 12 to 46 feet bgs. Depth to water table was at approximately 7 feet bgs. No material was recovered from 47 to 60 feet bgs, possibly due to large cobbles getting stuck in the core sampler. At well depths greater than approximately 40 feet bgs, the test well lost a considerable amount of water down the borehole during drilling, indicating potentially productive aquifer material. A summary of the lithology at TW-1 is described in Table 2 below.

TABLE 2: SOIL DESCRIPTIONS

Depth (feet bgs)	TW-1 Soil Descriptions
0 - 7	Sand and grave
7 - 12	Clayey silt
12 - 15	Silty sand
15 - 25	Coarse sand and gravel with cobbles
25 - 30	Fine sand
30 - 35	Medium to coarse sand and gravel
35 - 43	Coarse sand and gravel
43 - 45	Sandy silt
45 - 47	Coarse sand and gravel
47 - 60	No Recover

Based on this information, the well screen for TW-1 was set from 48 to 58 feet bgs, which is the same screen interval as Well 3.

3.3. AQUIFER TEST RESULTS

A two hour and ten minute pump test was performed on TW-1 on January 19, 2017. The pump was turned on at 8:52 AM and turned off at 11:02 AM. TW-1 was pumped at the maximum capacity of the pump, which was 76 gpm. Flow rate was measured periodically during the pump test with a 55-gallon drum at the discharge location.

Well 3 was turned off approximately 21 hours prior to the start of the test and water levels had recovered to relatively static conditions prior to starting the pump test.

An estimated specific capacity for TW-1 was calculated using conventional specific capacity calculation methods (i.e., pumping rate divided by feet of drawdown) with drawdown measured in both OW-11A and OW-11B. The following table summarized the specific capacity data.

TABLE 3: TW-1 SPECIFIC CAPACITY

Location	OW-11A	OW-11B
Static Water Level (feet TOC)	6.22	6.23
Water Level at End of Test (feet TOC)	6.65	6.63
Total Drawdown (feet)	0.43	0.40
Pumping Rate (gpm)	76	76
Specific Capacity (gpm/foot of drawdown)	177	190

Notes: All water level measurements from top of casing (TOC)

Water levels in OW-11A and OW-11B recovered to static water levels within 30 minutes after pump shut down. To confirm the results of the TW-1 pumping test, OW-11B was subsequently pumped for 30 minutes and drawdown measured in TW-1. OW-11B was pumped at 73 gpm and measured drawdown in TW-1 was 0.37 feet, resulting in a calculated specific capacity of 197 gpm/foot and confirming that the wells are in good hydraulic connection.

The following table presents the calculated potential well yield for TW-1. The potential well yield was calculated using the same method as is used for calculating an approvable yield under MassDEP Guidelines and Policies for Public Water Systems Chapter 4.3.1.5. The potential well yield is a product of the *available water x specific capacity x safety factor*, and it is derived below.

TABLE 4: TW-1 POTENTIAL WELL YIELD

Depth of Pumping Well (feet bgs)	Length of Screen (feet bgs)	Static Water Level (feet bgs)	Safety Factor	Available Water Less 5-foot safety factor (feet)
58	10.0	5.23	5.0	37.77

Available Water (ft)	Specific Capacity (gpm/ft)	Safety Factor	Pumping Capacity (gpm)
37.77	177 - 190	0.75	5,013 - 5,382

Note: the 0.75 multiplier is only applied if the pumping test was conducted on a test well rather than the final production well.

As indicated in the above calculations, the potential well yield at location TW-1 ranged from 5,013 to 5,381 gpm or approximately 7 million gallons per day (MGD), including a 0.75 safety factor. The above calculations are for site screening purposes and are based on preliminary data from a single 2-hour constant rate test. A longer-term pumping test from a larger diameter production well may be needed to determine aquifer properties for development of a public water supply.

3.4. WATER QUALITY TESTING

Water quality samples for field and laboratory analyses were collected at the end of the two-hour constant rate pumping test. The results from the field analysis of groundwater quality samples are summarized in the following Table 5.

TABLE 5: TW-1R FIELD ANALYTICAL RESULTS

Field Parameter	MCL/ Secondary MCL	TW-1
pH	6.5 – 8.5 ⁽²⁾	5.90
Specific Conductance (µS/cm ^{°C})	NSA	135.4
Temperature (degrees C)	NSA	7.7
Odor	NSA	None
Dissolved Oxygen	NSA	7.78
Turbidity	1.0	0.91

Notes: NSA = no standard available

MCL = Massachusetts Maximum Contaminant Level

⁽²⁾ = Standard is a Secondary MCL

As shown above, in Table 5, groundwater pH measured in the field at the end of the 2 hour constant rate test at TW-1 is 5.90, which is below the Massachusetts Secondary MCL of 6.5-8.5. The low pH measured at the TW-1 is consistent with pH values measured at Well 3.

Table 6 below lists the results from laboratory analysis of groundwater quality samples and Appendix B includes the laboratory analytical reports.

TABLE 6: TW-1 LABORATORY ANALYTICAL RESULTS

Parameter	MCL/ Secondary MCL/ Guideline	TW-1 6/4/2013
VOCs (µg/l)	Varies	BDL
Total Metals (mg/l)		
Aluminum	0.05 - 0.2 ⁽²⁾	BDL
Calcium	N/A	11.1
Copper	1.3 ^(TT)	BDL
Iron	0.3 ⁽²⁾	BDL
Magnesium	N/A	3.71
Manganese	0.03 ⁽³⁾ /0.05 ⁽²⁾	BDL
Potassium	N/A	BDL
Silver	0.1 ⁽²⁾	BDL
Zinc	5 ⁽²⁾	BDL
Hardness	N/A	42.9
Inorganic Chemistry (mg/l)		
Alkalinity	N/A	22
Chloride	250	18.1
Color	15	ND
Sulfate	250	11.3
Total Dissolved Solids	500	84

Notes:

BDL – Below Laboratory Detection Limit

MassDEP Standards are from MassDEP's *Massachusetts Drinking Water Standards, Winter 2020* and are Maximum Contaminant Levels (MCLs) unless noted otherwise.

^(TT) MCL is and Action Level for Treatment Technique

⁽²⁾ Standard is a Secondary MCL

⁽³⁾ Standard is a Drinking Water Guideline

In summary, the field and laboratory results show that the water quality at TW-1 is excellent. As indicated in the above table, all analytes were within Massachusetts Drinking Water Standards (MCLs), Secondary MCLs and Guidelines, except pH, which is slightly acidic. Water from Well 3 is currently treated with potassium hydroxide for pH adjustment. Iron and manganese were not detected above method detection limits.

Historical water quality data from Well 3 had elevated levels of iron and manganese. The water quality results from TW-1 would need to be confirmed with a longer term pumping test. For comparison purposes, data provided in the MassDEP System Modification BRP WS22D Approval Letter, MassDEP Transmittal No. X268160, dated November 15, 2015, indicated water quality at Well 3 had iron around

0.03 mg/L and manganese between 0.158 and 0.244 mg/L. The pH was around 6.3 and there was little apparent color (around 2 c.u.).

In summary, the purpose of this exploration program was to identify a potential replacement well location for Well 3, which has an approved safe yield of 1.2 MGD. Pump test data from exploratory TW-1 indicate that this location is suitable for a replacement well for Well 3 and can more than adequately replace the existing capacity of Well 3, with a potential pumping capacity of up to 7 MGD.

4. PUMP TEST PROPOSAL

4.1. PROPOSED WELL NO. 1 REPLACEMENT WELL LOCATION

The proposed replacement well for Well 3 will be located approximately 35-40 feet west of the original Well 3. Aquifer material was identified at TW-1 between 45 and 60 feet bgs. The proposed replacement well for Well 3 will be located within 10 feet of TW-1. The Town owns the property within the 400-foot Zone I radius, except a railroad right-of-way bisects the Zone 1 approximately 130 feet southwest of the proposed replacement well location (150 feet from existing Well 3). The Zone I is discussed in detail in Section 1.2. The Town has not identified another source within the Town that could replace the Well 3 capacity. Well 3 provides approximately 25 percent of the Town's water and provides a valuable water supply source.

In accordance with *Chapter 4 – Groundwater Supply Development and Source Approval Process*, Chapter 4.15,

“MassDEP approvals of replacement wells will be considered on a case-by-case basis. Replacement Well means a new well(s)/wellfield installed to replace or supplement an approved well(s)/wellfield, where the proposed well(s)/wellfield will be situated within 50 feet of the original well(s)/wellfield for wells with approved yields of less than 100,000 gpd, and within 250 feet for wells with approved yields of 100,000 gpd or greater.”

The location of the proposed replacement well is within these guidelines.

Figure 4 shows land uses in the vicinity of the replacement well. As shown, land uses within the 400-foot Zone I of the replacement well are suitable for wellhead protection (except the railroad right-of-way) and include forest, wetland, forested wetland, bare or open land, transitional, and brushland.

A review of the MassDEP state listed hazardous waste sites indicate that there are no hazardous waste site located within a 0.5-mile radius of the proposed replacement well location.

4.2. REPLACEMENT WELL INSTALLATION AND PUMP TEST

4.2.1 Replacement Well Installation and Development

EP proposes to install an 18-inch replacement well for Well 3 and conduct a 48-hour pump test. The proposed pump test will be conducted upon approval from MassDEP.

A 24-inch borehole will be drilled to an estimated depth of 60 feet bgs, or refusal. A 10-foot section of 18-inch diameter stainless steel, continuous wire wrapped screen will be installed. The well casing will consist of 18-inch diameter carbon steel to the ground surface. A SiLibeads® gravel pack will be installed around the well screen and up to 20 feet above the well screen. Two feet of transition sand will be installed above the SiLibeads® and bentonite grout tremied around the casing up to 10 feet bgs. The top 10 feet will be left open to allow for installation of the production well equipment (vault, piping, electrical connections, and pitless adapter).

The well will be developed using a combination of air lift, surge blocks, jetting and/or pumping until it is determined that:

- additional development time will not improve the specific capacity,
- turbidity is less than 5 NTU,
- production water is clear of sand, and
- specific conductance is stable.

4.2.2 Pump Test Set-Up

Beginning at least two days prior to the pump test, during the pump test, and two days after the pump test or until 95 percent recovery in the test production well is achieved, Well 3 will be turned off.

MassDEP Chapter 4 – Groundwater Supply Development and Source Approval Process 4.15 states that *“The approved pumping rate of the replacement well(s)/wellfield shall not exceed the approved pumping rate of the original source.”* The proposed pumping rate for the test is 833 gpm or 1.2 MGD, which is the safe yield for Well 3, provided a minimum of 5-feet of water remains above the top of the well screen.

The proposed pump test discharge location will be on Town property, approximately 1,500 feet to the southwest.

Constant water level logging will be conducted prior to, during and after the 48-hour pumping test using water level data loggers in order to evaluate normal water level fluctuations and drawdown effects during the test. At a minimum logging will take place in the replacement production well, TW-1 and OW-12. Water level readings will be taken every minute for the first 10 minutes, every 10 minutes for the first hour and once per hour until shutdown. Water level readings will be taken at the same frequency for during recovery. Recovery readings will be taken for as many days as the pumping well was pumped, or until the water level in the replacement production well recovers 95 percent of drawdown at stabilization, whichever occurs first.

Water levels will also be collected from an ambient background well at the Medfield landfill. Precipitation during the pumping test will be evaluated using the nearest weather underground station on Pine Hill Drive in North Walpole – (KMAWALPO19), located approximately 0.5 miles northeast from Well 3, and listed on the weather underground website (www.wunderground.com). These values will be displayed with the water level logger data to evaluate any water level recovery that may take place from precipitation events during the pump test.

4.2.3 Pump Test Duration

A 48-hour constant rate test is proposed for the Well 3 replacement production well. Both manual measurements and logging with pressure transducers of water levels will be recorded and plotted prior to, during and after shut down of the test. The pump test will run for a minimum of 48-hours. MassDEP will be notified prior to startup and prior to shut down of the pumping test. If based on water level measurements a “stable” drawdown is not achieved after 48-hours of pumping, then the duration of the pump test may be extended, based on discussions with MassDEP. The pump test will

continue until either a stable drawdown is achieved, or enough data is collected to document that the pumping rate can be sustained with at least 5-feet of water remaining above the well screen.

4.2.4 Water Quality Testing

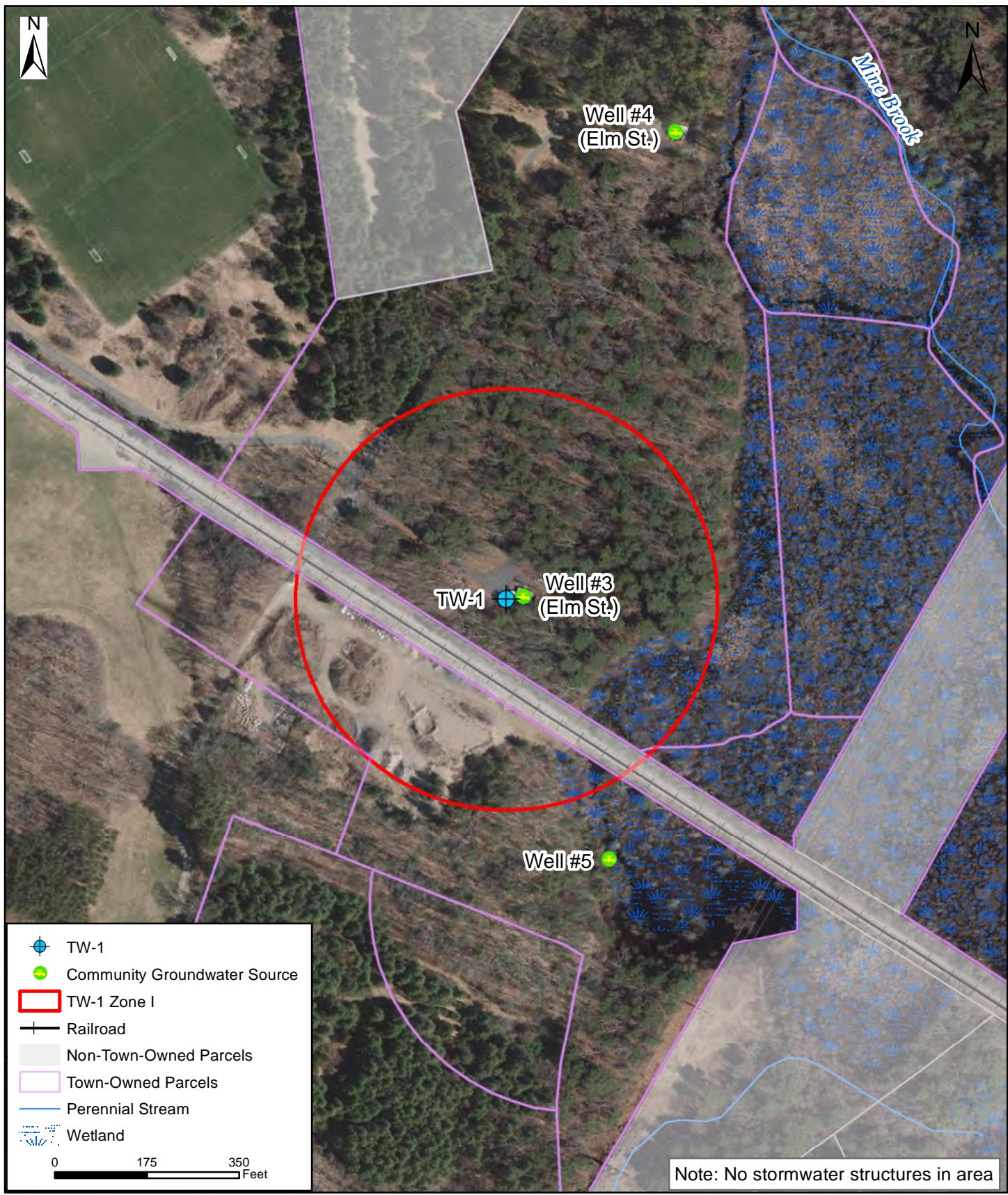
Water quality samples will be collected prior to shutdown of the pumping test in accordance with the requirements of MassDEP's *Chapter 4 – Groundwater Supply Development and Source Approval Process Section 4.15.1.4(e)*. The samples will be analyzed for coliform bacteria, volatile organic compounds, secondary contaminants, nitrate, and nitrite. Odor, pH, specific conductance, oxidation-reduction potential, dissolved oxygen, carbon dioxide, and temperature will be measured in the field. In accordance with U.S. EPA Drinking Water Health Advisories and MassDEP Office of Research and Standards Guidelines, a sample will be collected and analyzed for 14 per- and polyfluoroalkyl substances, including PFOA, PFOS, PFNA, PFHxS, PFHpA, and PFB). All laboratory analyses will be performed by a Massachusetts certified laboratory. Analysis of additional parameters in Appendix A is not recommended, because the well is located within 50-feet from the existing Well 3, which is regularly tested for water quality.

In accordance with MassDEP's *Chapter 4 – Groundwater Supply Development and Source Approval Process Section 4.18*, "Groundwater sources located 150 feet or more horizontally from a surface water feature are exempt from MPA sampling ... "Surface water feature" is defined as an area continuously inundated with flowing or standing water. Wetlands or low lying areas that are only periodically flooded are not considered surface water features." As shown on Figure 5, the proposed replacement well is located more than 150 feet from any MassDEP/USGS surface water feature. Therefore, the proposed replacement well is exempt from microscopic particulate analysis (MPA) testing.

5. REFERENCES

Massachusetts Department of Environmental Protection (DEP), March 2008, *Chapter 4 - Groundwater Supply Development and Source Approval Process*, updated August 27, 2017.

FIGURES



**Figure 1: Site Map
Replacement Well #3
Medfield Water Department
October 2020**

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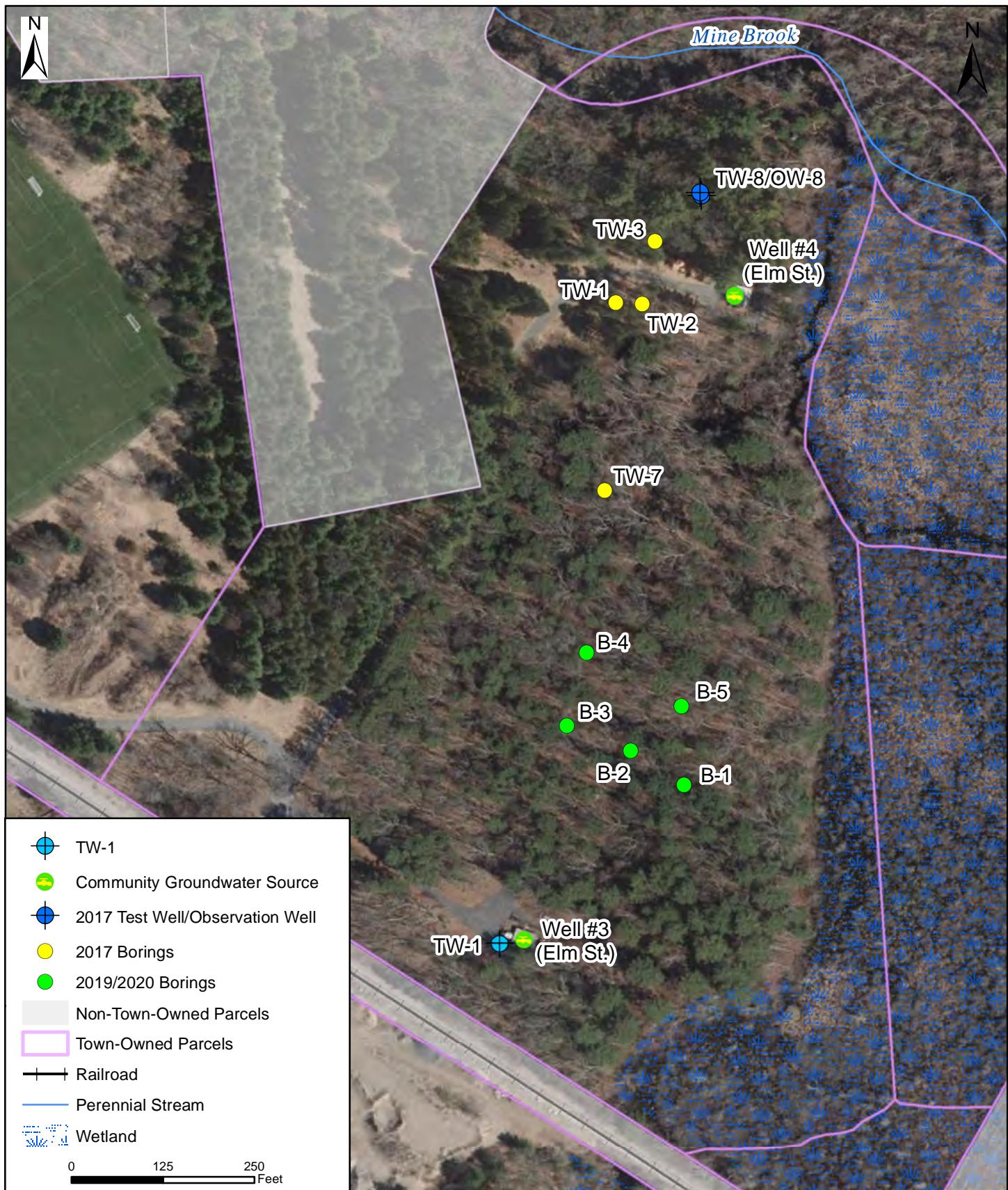


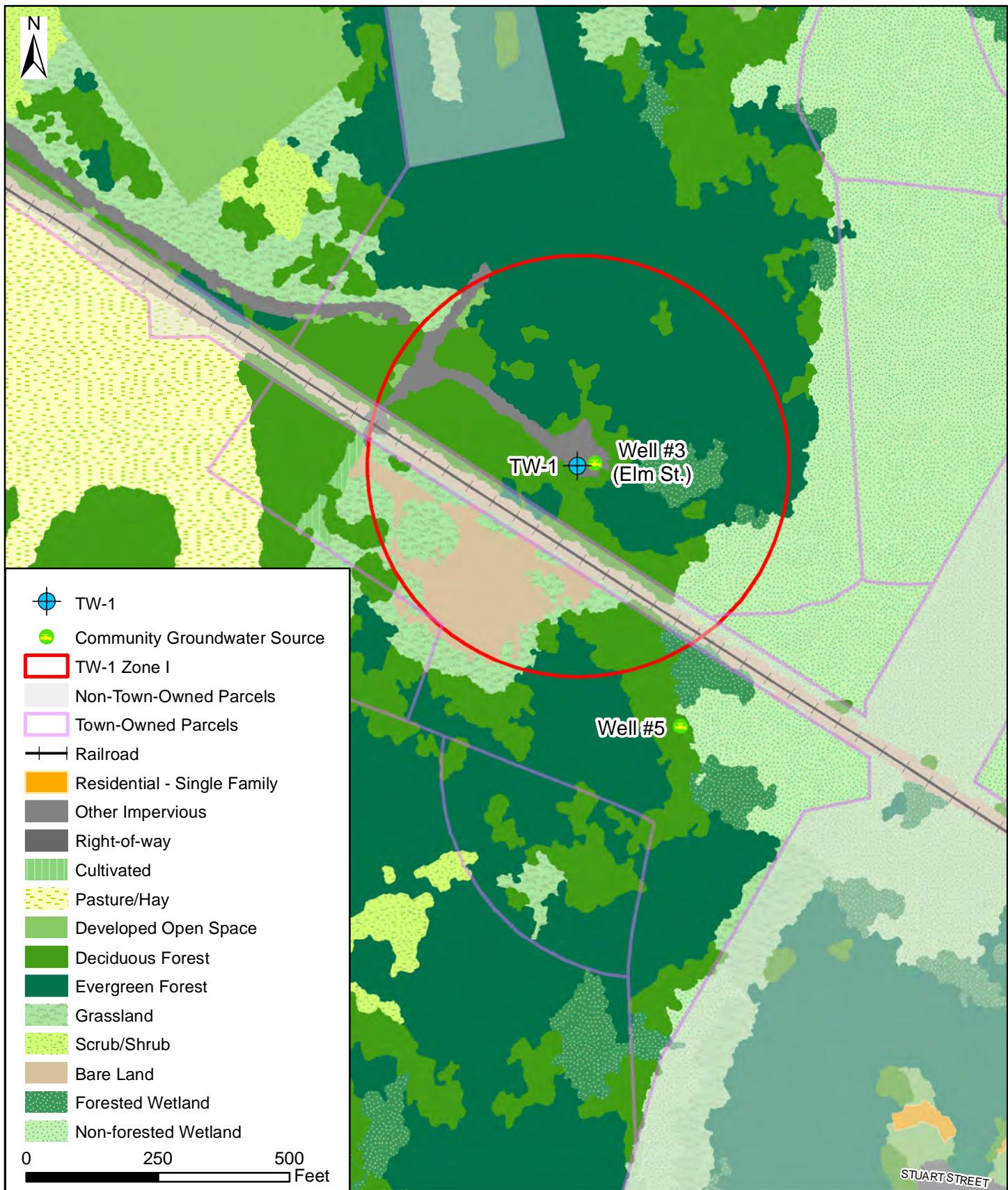
Figure 2: Exploratory Boring Locations
Replacement Well #3
Medfield Water Department
October 2020



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**Figure 3: Site Plan with
New and Existing Well Locations
Replacement Well #3
Medfield Water Department
October 2020**



**Figure 4: Land Use Map
Replacement Well #3
Medfield Water Department
October 2020**

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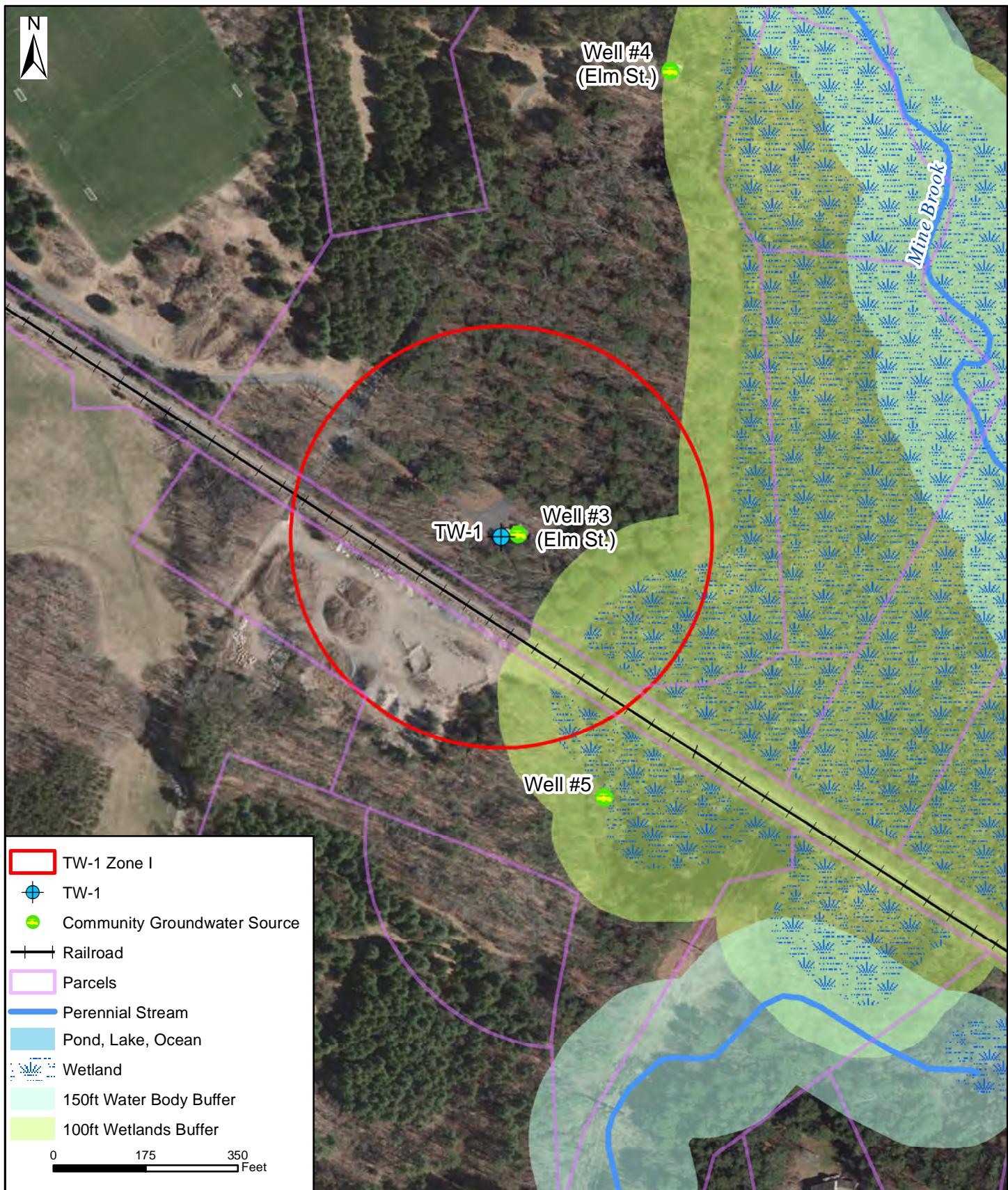
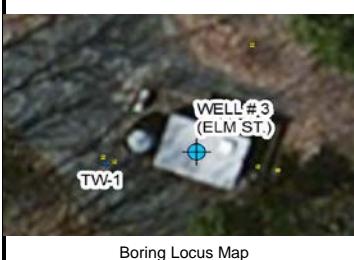


Figure 5: Surface Water Features and Buffers
Replacement Well #3
Medfield Water Department
October 2020

APPENDIX A
BORING LOGS AND WELL CONSTRUCTION DIAGRAMS

BORING LOG

Project: Medfield Well #3 Replacement
 Location: Medfield, MA
 Client: Medfield Water Department
 Driller: Maher Services
 Drilling Methods: Geoprobe 7822DT
 Weather: Raining, 35°
 Performed By: MAC Date: 1/18/2017
 Checked By: AMP



Boring Locus Map

Boring No: TW-1

Sampling Method: 3.135" diameter, 60" core

Approx. Ground Elevation:

Approx. Groundwater Elevation:

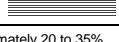
Date/Time of Groundwater Elevation:

Datum: NA1983

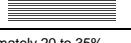
Project No. :

Depth (feet)	Sample No.	Pen./Rec.	Soil Description	Stratum Change Depth (feet)		Well Construction Observations	Note No.
1			0-5" asphalt, 5-10" tan coarse sand and gravel, 10-21" bright orange silty sand, 21-28" brown coarse sand and cobbles, 28-42" tan very coarse sand, 42-48" tan medium sand.	COARSE SAND AND GRAVEL			
2				SILTY SAND			
3	1	60"/48"		COARSE SAND AND COBBLES			
4				MEDIUM SAND			
5				VERY COARSE SAND			1
6			60-80" brown, very coarse sand, 80-109" light brown, dense clayey silt/silt.	SILTY SAND			2
7				CLAYEY SILT			
8	2	60"/49"					
9							
10							
11			120-145" light brown clayey silt/silt, 145-155" bright orange/brown silty fine/medium sand with small cobble fragments.				
12							
13	3	60"/35"					
14							
15							
16			180-196" very large rocks/cobbles, with some very coarse sand and gravel, brown.	COARSE SAND AND COBBLES			
17							
18	4	60"/16"					
19							
20							
NOTES:			LEGEND	Riser		Bentonite	
1. Bentonite chips placed from 5-15 feet bgs.			UT - Undisturbed Tube Sample	Screen			
2. Water table ~6.5 feet bgs.			Trace - Approximately 0 to 10%	Some - Approximately 20 to 35%			
			Little - Approximately 10 to 20%	And - Approximately 35 to 50%			
			0-10 Coarse Soil N Value - Loose	30-50 Coarse Soil N Value - Dense			
			10-30 Coarse Soil N Value - Medium Dense	>50 Coarse Soil N Value - Very Dense			
			0-4 Fine Soil N Value - Soft	8-15 Fine Soil N Value - Stiff			>30 Fine Soil N Value - Hard
			4-8 Fine Soil N Value - Medium Stiff	15-30 Fine Soil N Value - Very Stiff			

BORING LOG

Project: Medfield Well #3 Replacement Location: Medfield, MA Client: Medfield Water Department Driller: Maher Services Drilling Methods: Geoprobe 7822DT Weather: Raining, 35° Performed By: MAC Date: 1/18/2017 Checked By: AMP				Boring No: TW-1 Sampling Method: 3.135" diameter, 60" core Approx. Ground Elevation: Approx. Groundwater Elevation: Date/Time of Groundwater Elevation: Datum: NA1983 Project No. :			
Depth (feet)	Sample No.	Pen./Rec.	Soil Description	Stratum Change Depth (feet)		Well Construction Observations	Note No.
21			240-258" coarse sand and large cobbles and gravel.	COARSE SAND AND GRAVEL			
22							
23	5	60"/18"		FINE SAND			
24							
25				MEDIUM SAND AND GRAVEL			
26			300-335" light brown/orange, fine sand.				
27				VERY COARSE SAND AND GRAVEL			
28	6	60"/35"					
29				COBBLES AND GRAVEL			
30			360-369" brown, medium sand with some gravel, 369-378" brown, very coarse sand and 50% gravel and cobbles.				
31				COARSE SAND AND GRAVEL			
32							
33	7	60"/18"		COARSE SAND AND GRAVEL			
34							
35			420-429" cobbles and gravel, 429-435" cobbles and gravel with coarse sand, 435-445" coarse sand and gravel.	COBBLES AND GRAVEL			
36							
37				COARSE SAND AND GRAVEL			
38	8	60"/25"					
39				COARSE SAND AND GRAVEL			
40							
NOTES:			LEGEND UT - Undisturbed Tube Sample Trace - Approximately 0 to 10% Little - Approximately 10 to 20% 0-10 Coarse Soil N Value - Loose 10-30 Coarse Soil N Value - Medium Dense 0-4 Fine Soil N Value - Soft 4-8 Fine Soil N Value - Medium Stiff	Riser  Screen  Some - Approximately 20 to 35% And - Approximately 35 to 50%		Bentonite  Some - Approximately 20 to 35% And - Approximately 35 to 50%	>30 Fine Soil N Value - Hard >30 Fine Soil N Value - Hard

BORING LOG

Project: Medfield Well #3 Replacement Location: Medfield, MA Client: Medfield Water Department Driller: Maher Services Drilling Methods: Geoprobe 7822DT Weather: Raining, 35° Performed By: MAC Date: 1/18/2017 Checked By: AMP				Boring No: TW-1 Sampling Method: 3.135" diameter, 60" core Approx. Ground Elevation: Approx. Groundwater Elevation: Date/Time of Groundwater Elevation: Datum: NA1983 Project No. :			
Depth (feet)	Sample No.	Pen./Rec.	Soil Description	Stratum Change Depth (feet)		Well Construction Observations	Note No.
41			480-498" 50% coarse sand and 50% gravel, well sorted, 499" iron oxidation feature, black/orange, 500-509" orange/brown sandy silt.	COARSE SAND AND GRAVEL			
42				SANDY SILT			
43	9	60"/29"					
44							
45							
46			540-556" tan/brown coarse sand and gravel.	COARSE SAND AND GRAVEL			
47							
48	10	60"/16"					3
49							
50							
51							
52							
53	11	60"/0"	-				
54							
55							
56							
57							
58	12	60"/0"	-				
59							
60							4
NOTES: 3. Stainless steel 50 slot screen set from 48-58 feet bgs. 4. No refusal hit at 60 feet bgs, but decided to end boring at this point due to lack of recovery.			LEGEND UT - Undisturbed Tube Sample Trace - Approximately 0 to 10% Little - Approximately 10 to 20% 0-10 Coarse Soil N Value - Loose 10-30 Coarse Soil N Value - Medium Dense 0-4 Fine Soil N Value - Soft 4-8 Fine Soil N Value - Medium Stiff	Riser  Screen  Some - Approximately 20 to 35% And - Approximately 35 to 50% 30-50 Coarse Soil N Value - Dense >50 Coarse Soil N Value - Very Dense 8-15 Fine Soil N Value - Stiff >30 Fine Soil N Value - Hard 15-30 Fine Soil N Value - Very Stiff	Bentonite 		

APPENDIX B
LABORATORY ANALYTICAL REPORTS



CERTIFICATE OF ANALYSIS

Anne Marie Petricca
Environmental Partners Group
1900 Crown Colony Drive, Suite 402
Quincy, MA 02169

RE: Medfield Water Treatment Wells (P16-0122)

ESS Laboratory Work Order Number: 1701390

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



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



CERTIFICATE OF ANALYSIS

Client Name: Environmental Partners Group
Client Project ID: Medfield Water Treatment Wells

ESS Laboratory Work Order: 1701390

SAMPLE RECEIPT

The following samples were received on January 19, 2017 for the analyses specified on the enclosed Chain of Custody Record.

Lab Number	Sample Name	Matrix	Analysis
1701390-01	TW-1	Drinking Water	200.7, 2320B, 2540C, 300.0, 524.2, HACH



CERTIFICATE OF ANALYSIS

Client Name: Environmental Partners Group
Client Project ID: Medfield Water Treatment Wells

ESS Laboratory Work Order: 1701390

PROJECT NARRATIVE

524.2 Volatile Organic Compounds

C7A0296-CCV1

Continuing Calibration %Diff/Drift is below control limit (CD-).

Acetone (24% @ 20%)

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 Partners Group

Client Project ID: Medfield Water Treatment Wells

ESS Laboratory Work Order: 1701390

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
8015C - GRO/DRO
8081B - Pesticides
8082A - PCB
8100M - TPH
8151A - Herbicides
8260B - VOA
8270D - SVOA
8270D SIM - SVOA Low Level
9014 - Cyanide
9038 - Sulfate
9040C - Aqueous pH
9045D - Solid pH (Corrosivity)
9050A - Specific Conductance
9056A - Anions (IC)
9060A - TOC
9095B - Paint Filter
MADEP 04-1.1 - EPH / VPH

Prep Methods

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

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



CERTIFICATE OF ANALYSIS

Client Name: Environmental Partners Group

Client Project ID: Medfield Water Treatment Wells

Client Sample ID: TW-1

Date Sampled: 01/19/17 10:57

Percent Solids: N/A

ESS Laboratory Work Order: 1701390

ESS Laboratory Sample ID: 1701390-01

Sample Matrix: Drinking Water

Units: mg/L

Extraction Method: 200.7/6010BNoDigest

Total Metals

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	I/V	F/V	Batch
Aluminum	ND (0.050)		200.7		1	KJK	01/25/17 14:38	10	10	CA72505
Calcium	11.1 (0.500)		200.7		1	KJK	01/25/17 14:38	10	10	CA72505
Copper	ND (0.020)		200.7		1	KJK	01/25/17 14:38	10	10	CA72505
Hardness	42.9 (2.07)		200.7		1	KJK	01/26/17 11:20	1	1	[CALC]
Iron	ND (0.100)		200.7		1	KJK	01/25/17 14:38	10	10	CA72505
Magnesium	3.71 (0.200)		200.7		1	KJK	01/26/17 11:20	10	10	CA72505
Manganese	ND (0.020)		200.7		1	KJK	01/25/17 14:38	10	10	CA72505
Potassium	ND (1.00)		200.7		1	KJK	01/25/17 14:38	10	10	CA72505
Silver	ND (0.010)		200.7		1	KJK	01/25/17 14:38	10	10	CA72505
Zinc	ND (0.0500)		200.7		1	KJK	01/25/17 14:38	10	10	CA72505



CERTIFICATE OF ANALYSIS

Client Name: Environmental Partners Group
 Client Project ID: Medfield Water Treatment Wells
 Client Sample ID: TW-1
 Date Sampled: 01/19/17 10:57
 Percent Solids: N/A
 Initial Volume: 25
 Final Volume: 25
 Extraction Method: 524.2

ESS Laboratory Work Order: 1701390
 ESS Laboratory Sample ID: 1701390-01
 Sample Matrix: Drinking Water
 Units: ug/L
 Analyst: GEM

524.2 Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
1,1,1,2-Tetrachloroethane	ND (0.500)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
1,1,1-Trichloroethane	ND (0.500)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
1,1,2,2-Tetrachloroethane	ND (0.400)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
1,1,2-Trichloro-1,2,2-trifluoroethane	ND (1.00)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
1,1,2-Trichloroethane	ND (0.500)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
1,1-Dichloroethane	ND (0.500)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
1,1-Dichloroethene	ND (0.500)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
1,1-Dichloropropene	ND (0.500)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
1,2,3-Trichlorobenzene	ND (0.500)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
1,2,3-Trichloropropane	ND (0.500)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
1,2,4-Trichlorobenzene	ND (0.500)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
1,2,4-Trimethylbenzene	ND (0.500)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
1,2-Dichlorobenzene	ND (0.500)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
1,2-Dichloroethane	ND (0.500)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
1,2-Dichloropropane	ND (0.500)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
1,3,5-Trimethylbenzene	ND (0.500)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
1,3-Dichlorobenzene	ND (0.500)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
1,3-Dichloropropane	ND (0.500)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
1,4-Dichlorobenzene	ND (0.500)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
2,2-Dichloropropane	ND (0.500)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
2-Butanone	ND (5.00)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
2-Chlorotoluene	ND (0.500)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
4-Chlorotoluene	ND (0.500)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
4-Isopropyltoluene	ND (0.500)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
4-Methyl-2-Pentanone	ND (5.00)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
Acetone	ND (5.00)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
Benzene	ND (0.500)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
Bromobenzene	ND (0.500)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
Bromochloromethane	ND (0.500)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
Bromodichloromethane	ND (0.500)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
Bromoform	ND (0.500)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
Bromomethane	ND (0.500)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331



CERTIFICATE OF ANALYSIS

Client Name: Environmental Partners Group
 Client Project ID: Medfield Water Treatment Wells
 Client Sample ID: TW-1
 Date Sampled: 01/19/17 10:57
 Percent Solids: N/A
 Initial Volume: 25
 Final Volume: 25
 Extraction Method: 524.2

ESS Laboratory Work Order: 1701390
 ESS Laboratory Sample ID: 1701390-01
 Sample Matrix: Drinking Water
 Units: ug/L
 Analyst: GEM

524.2 Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Carbon Tetrachloride	ND (0.500)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
Chlorobenzene	ND (0.500)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
Chloroethane	ND (0.500)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
Chloroform	ND (0.500)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
Chloromethane	ND (0.500)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
cis-1,2-Dichloroethene	ND (0.500)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
cis-1,3-Dichloropropene	ND (0.300)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
Dibromochloromethane	ND (0.400)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
Dibromomethane	ND (0.500)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
Dichlorodifluoromethane	ND (0.500)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
Di-isopropyl ether	ND (1.00)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
Ethyl tertiary-butyl ether	ND (1.00)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
Ethylbenzene	ND (0.500)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
Hexachlorobutadiene	ND (0.400)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
Isopropylbenzene	ND (0.500)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
Methyl tert-Butyl Ether	ND (0.500)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
Methylene Chloride	ND (0.500)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
Naphthalene	ND (0.500)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
n-Butylbenzene	ND (0.500)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
n-Propylbenzene	ND (0.500)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
sec-Butylbenzene	ND (0.500)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
Styrene	ND (0.500)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
tert-Butylbenzene	ND (0.500)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
Tertiary-amyl methyl ether	ND (1.00)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
Tertiary-butyl Alcohol	ND (25.0)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
Tetrachloroethene	ND (0.500)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
Tetrahydrofuran	ND (2.00)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
Toluene	ND (0.500)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
trans-1,2-Dichloroethene	ND (0.500)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
trans-1,3-Dichloropropene	ND (0.300)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
Trichloroethene	ND (0.500)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331
Trichlorofluoromethane	ND (0.500)	524.2	524.2	1	1	01/23/17 13:38	C7A0296	CA72331



CERTIFICATE OF ANALYSIS

Client Name: Environmental Partners Group
 Client Project ID: Medfield Water Treatment Wells
 Client Sample ID: TW-1
 Date Sampled: 01/19/17 10:57
 Percent Solids: N/A
 Initial Volume: 25
 Final Volume: 25
 Extraction Method: 524.2

ESS Laboratory Work Order: 1701390
 ESS Laboratory Sample ID: 1701390-01
 Sample Matrix: Drinking Water
 Units: ug/L
 Analyst: GEM

524.2 Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Vinyl Chloride	ND (0.200)		524.2		1	01/23/17 13:38	C7A0296	CA72331
Xylenes (Total)	ND (1.00)		524.2		1	01/23/17 13:38		[CALC]
<hr/>								
	%Recovery		Qualifier	<i>Limits</i>				
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	90 %			<i>80-120</i>				
<i>Surrogate: 4-Bromofluorobenzene</i>	93 %			<i>80-120</i>				



CERTIFICATE OF ANALYSIS

Client Name: Environmental Partners Group

Client Project ID: Medfield Water Treatment Wells

Client Sample ID: TW-1

Date Sampled: 01/19/17 10:57

Percent Solids: N/A

ESS Laboratory Work Order: 1701390

ESS Laboratory Sample ID: 1701390-01

Sample Matrix: Drinking Water

Classical Chemistry

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Units	Batch
Alkalinity as CaCO ₃	22 (2)	2320B			1	JLK	01/20/17 22:00	mg/L	CA72032
Chloride	18.1 (5.0)	300.0			10	EEM	01/24/17 16:58	mg/L	CA72425
Color	ND (5)	HACH			1	JLK	01/19/17 20:18	Color Units	CA71939
Sulfate	11.3 (10.0)	300.0			10	EEM	01/24/17 16:58	mg/L	CA72425
Total Dissolved Solids	84 (10)	2540C			1	EEM	01/23/17 16:50	mg/L	CA72318



CERTIFICATE OF ANALYSIS

Client Name: Environmental Partners Group
Client Project ID: Medfield Water Treatment Wells

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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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Total Metals

Batch CA72505 - 200.7/6010BNoDigest

Blank

Aluminum	ND	0.050	mg/L
Calcium	ND	0.500	mg/L
Copper	ND	0.020	mg/L
Hardness	ND	2.07	mg/L
Iron	ND	0.100	mg/L
Magnesium	ND	0.200	mg/L
Manganese	ND	0.020	mg/L
Potassium	ND	1.00	mg/L
Silver	ND	0.010	mg/L
Zinc	ND	0.0500	mg/L

LCS

Aluminum	2.40	mg/L	2.500	96	85-115
Calcium	5.20	mg/L	5.000	104	85-115
Copper	0.495	mg/L	0.5000	99	85-115
Hardness	33.9	mg/L			
Iron	2.52	mg/L	2.500	101	85-115
Magnesium	5.08	mg/L	5.000	102	85-115
Manganese	0.500	mg/L	0.5000	100	85-115
Potassium	25.0	mg/L	25.00	100	85-115
Silver	0.249	mg/L	0.2500	100	85-115
Zinc	0.496	mg/L	0.5000	99	85-115

524.2 Volatile Organic Compounds

Batch CA72331 - 524.2

Blank

1,1,1,2-Tetrachloroethane	ND	0.500	ug/L
1,1,1-Trichloroethane	ND	0.500	ug/L
1,1,2,2-Tetrachloroethane	ND	0.400	ug/L
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	1.00	ug/L
1,1,2-Trichloroethane	ND	0.500	ug/L
1,1-Dichloroethane	ND	0.500	ug/L
1,1-Dichloroethene	ND	0.500	ug/L
1,1-Dichloropropene	ND	0.500	ug/L
1,2,3-Trichlorobenzene	ND	0.500	ug/L
1,2,3-Trichloropropane	ND	0.500	ug/L
1,2,4-Trichlorobenzene	ND	0.500	ug/L
1,2,4-Trimethylbenzene	ND	0.500	ug/L
1,2-Dichlorobenzene	ND	0.500	ug/L
1,2-Dichloroethane	ND	0.500	ug/L
1,2-Dichloropropane	ND	0.500	ug/L
1,3,5-Trimethylbenzene	ND	0.500	ug/L
1,3-Dichlorobenzene	ND	0.500	ug/L
1,3-Dichloropropane	ND	0.500	ug/L



CERTIFICATE OF ANALYSIS

Client Name: Environmental Partners Group
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ESS Laboratory Work Order: 1701390

Quality Control Data

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

Batch CA72331 - 524.2

1,4-Dichlorobenzene	ND	0.500	ug/L
2,2-Dichloropropane	ND	0.500	ug/L
2-Butanone	ND	5.00	ug/L
2-Chlorotoluene	ND	0.500	ug/L
4-Chlorotoluene	ND	0.500	ug/L
4-Isopropyltoluene	ND	0.500	ug/L
4-Methyl-2-Pentanone	ND	5.00	ug/L
Acetone	ND	5.00	ug/L
Benzene	ND	0.500	ug/L
Bromobenzene	ND	0.500	ug/L
Bromochloromethane	ND	0.500	ug/L
Bromodichloromethane	ND	0.500	ug/L
Bromoform	ND	0.500	ug/L
Bromomethane	ND	0.500	ug/L
Carbon Tetrachloride	ND	0.500	ug/L
Chlorobenzene	ND	0.500	ug/L
Chloroethane	ND	0.500	ug/L
Chloroform	ND	0.500	ug/L
Chloromethane	ND	0.500	ug/L
cis-1,2-Dichloroethene	ND	0.500	ug/L
cis-1,3-Dichloropropene	ND	0.300	ug/L
Dibromochloromethane	ND	0.400	ug/L
Dibromomethane	ND	0.500	ug/L
Dichlorodifluoromethane	ND	0.500	ug/L
Di-isopropyl ether	ND	1.00	ug/L
Ethyl tertiary-butyl ether	ND	1.00	ug/L
Ethylbenzene	ND	0.500	ug/L
Hexachlorobutadiene	ND	0.400	ug/L
Isopropylbenzene	ND	0.500	ug/L
Methyl tert-Butyl Ether	ND	0.500	ug/L
Methylene Chloride	ND	0.500	ug/L
Naphthalene	ND	0.500	ug/L
n-Butylbenzene	ND	0.500	ug/L
n-Propylbenzene	ND	0.500	ug/L
sec-Butylbenzene	ND	0.500	ug/L
Styrene	ND	0.500	ug/L
tert-Butylbenzene	ND	0.500	ug/L
Tertiary-amyl methyl ether	ND	1.00	ug/L
Tertiary-butyl Alcohol	ND	25.0	ug/L
Tetrachloroethene	ND	0.500	ug/L
Tetrahydrofuran	ND	2.00	ug/L
Toluene	ND	0.500	ug/L
trans-1,2-Dichloroethene	ND	0.500	ug/L
trans-1,3-Dichloropropene	ND	0.300	ug/L
Trichloroethene	ND	0.500	ug/L



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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524.2 Volatile Organic Compounds

Batch CA72331 - 524.2

Trichlorofluoromethane	ND	0.500	ug/L							
Vinyl Chloride	ND	0.200	ug/L							
Xylene O	ND	0.500	ug/L							
Xylene P,M	ND	1.00	ug/L							
Xylenes (Total)	ND	1.00	ug/L							
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	4.69		ug/L	5.000		94	80-120			
<i>Surrogate: 4-Bromofluorobenzene</i>	4.61		ug/L	5.000		92	80-120			

LCS

1,1,1,2-Tetrachloroethane	9.01		ug/L	10.00		90	70-130			
1,1,1-Trichloroethane	9.07		ug/L	10.00		91	70-130			
1,1,2,2-Tetrachloroethane	9.07		ug/L	10.00		91	70-130			
1,1,2-Trichloro-1,2,2-trifluoroethane	7.77		ug/L	10.00		78	70-130			
1,1,2-Trichloroethane	9.25		ug/L	10.00		93	70-130			
1,1-Dichloroethane	9.58		ug/L	10.00		96	70-130			
1,1-Dichloroethene	9.50		ug/L	10.00		95	70-130			
1,1-Dichloropropene	9.49		ug/L	10.00		95	70-130			
1,2,3-Trichlorobenzene	9.33		ug/L	10.00		93	70-130			
1,2,3-Trichloropropane	9.41		ug/L	10.00		94	70-130			
1,2,4-Trichlorobenzene	9.38		ug/L	10.00		94	70-130			
1,2,4-Trimethylbenzene	9.11		ug/L	10.00		91	70-130			
1,2-Dichlorobenzene	8.62		ug/L	10.00		86	70-130			
1,2-Dichloroethane	9.29		ug/L	10.00		93	70-130			
1,2-Dichloropropane	9.26		ug/L	10.00		93	70-130			
1,3,5-Trimethylbenzene	9.32		ug/L	10.00		93	70-130			
1,3-Dichlorobenzene	8.80		ug/L	10.00		88	70-130			
1,3-Dichloropropane	9.62		ug/L	10.00		96	70-130			
1,4-Dichlorobenzene	8.64		ug/L	10.00		86	70-130			
2,2-Dichloropropane	10.4		ug/L	10.00		104	70-130			
2-Butanone	44.9		ug/L	50.00		90	70-130			
2-Chlorotoluene	9.17		ug/L	10.00		92	70-130			
4-Chlorotoluene	8.90		ug/L	10.00		89	70-130			
4-Isopropyltoluene	9.35		ug/L	10.00		94	70-130			
4-Methyl-2-Pentanone	46.0		ug/L	50.00		92	70-130			
Acetone	38.9		ug/L	50.00		78	70-130			
Benzene	9.42		ug/L	10.00		94	70-130			
Bromobenzene	8.99		ug/L	10.00		90	70-130			
Bromochloromethane	8.41		ug/L	10.00		84	70-130			
Bromodichloromethane	9.43		ug/L	10.00		94	70-130			
Bromoform	9.05		ug/L	10.00		91	70-130			
Bromomethane	9.18		ug/L	10.00		92	70-130			
Carbon Tetrachloride	9.25		ug/L	10.00		93	70-130			
Chlorobenzene	8.81		ug/L	10.00		88	70-130			
Chloroethane	9.24		ug/L	10.00		92	70-130			
Chloroform	9.20		ug/L	10.00		92	70-130			
Chloromethane	10.5		ug/L	10.00		105	70-130			



CERTIFICATE OF ANALYSIS

Client Name: Environmental Partners Group
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ESS Laboratory Work Order: 1701390

Quality Control Data

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

Batch CA72331 - 524.2

cis-1,2-Dichloroethene	8.93		ug/L	10.00	89	70-130				
cis-1,3-Dichloropropene	9.71		ug/L	10.00	97	70-130				
Dibromochloromethane	8.54		ug/L	10.00	85	70-130				
Dibromomethane	8.87		ug/L	10.00	89	70-130				
Dichlorodifluoromethane	9.76		ug/L	10.00	98	70-130				
Di-isopropyl ether	9.37		ug/L	10.00	94	70-130				
Ethyl tertiary-butyl ether	9.20		ug/L	10.00	92	70-130				
Ethylbenzene	9.22		ug/L	10.00	92	70-130				
Hexachlorobutadiene	9.04		ug/L	10.00	90	70-130				
Isopropylbenzene	7.69		ug/L	10.00	77	70-130				
Methyl tert-Butyl Ether	9.19		ug/L	10.00	92	70-130				
Methylene Chloride	9.29		ug/L	10.00	93	70-130				
Naphthalene	9.17		ug/L	10.00	92	70-130				
n-Butylbenzene	9.62		ug/L	10.00	96	70-130				
n-Propylbenzene	9.51		ug/L	10.00	95	70-130				
sec-Butylbenzene	9.07		ug/L	10.00	91	70-130				
Styrene	9.16		ug/L	10.00	92	70-130				
tert-Butylbenzene	9.10		ug/L	10.00	91	70-130				
Tertiary-amyl methyl ether	9.09		ug/L	10.00	91	70-130				
Tertiary-butyl Alcohol	44.4		ug/L	50.00	89	70-130				
Tetrachloroethene	8.97		ug/L	10.00	90	70-130				
Tetrahydrofuran	9.20		ug/L	10.00	92	70-130				
Toluene	9.28		ug/L	10.00	93	70-130				
trans-1,2-Dichloroethene	9.19		ug/L	10.00	92	70-130				
trans-1,3-Dichloropropene	8.97		ug/L	10.00	90	70-130				
Trichloroethene	9.28		ug/L	10.00	93	70-130				
Trichlorofluoromethane	8.10		ug/L	10.00	81	70-130				
Vinyl Chloride	9.57		ug/L	10.00	96	70-130				
Xylene O	8.85		ug/L	10.00	89	70-130				
Xylene P,M	17.7		ug/L	20.00	88	70-130				
Xylenes (Total)	26.5		ug/L							
Surrogate: 1,2-Dichlorobenzene-d4	4.28		ug/L	5.000	86	80-120				
Surrogate: 4-Bromofluorobenzene	4.56		ug/L	5.000	91	80-120				

LCS Dup

1,1,1,2-Tetrachloroethane	9.69		ug/L	10.00	97	70-130	7	20		
1,1,1-Trichloroethane	10.0		ug/L	10.00	100	70-130	10	20		
1,1,2,2-Tetrachloroethane	9.43		ug/L	10.00	94	70-130	4	20		
1,1,2-Trichloro-1,2,2-trifluoroethane	8.45		ug/L	10.00	85	70-130	8	20		
1,1,2-Trichloroethane	9.56		ug/L	10.00	96	70-130	3	20		
1,1-Dichloroethane	10.1		ug/L	10.00	101	70-130	5	20		
1,1-Dichloroethene	10.2		ug/L	10.00	102	70-130	7	20		
1,1-Dichloropropene	10.2		ug/L	10.00	102	70-130	7	20		
1,2,3-Trichlorobenzene	9.84		ug/L	10.00	98	70-130	5	20		
1,2,3-Trichloropropane	10.4		ug/L	10.00	104	70-130	10	20		
1,2,4-Trichlorobenzene	10.1		ug/L	10.00	101	70-130	7	20		



CERTIFICATE OF ANALYSIS

Client Name: Environmental Partners Group
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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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524.2 Volatile Organic Compounds

Batch CA72331 - 524.2

1,2,4-Trimethylbenzene	9.88		ug/L	10.00	99	70-130	8	20		
1,2-Dichlorobenzene	9.34		ug/L	10.00	93	70-130	8	20		
1,2-Dichloroethane	9.69		ug/L	10.00	97	70-130	4	20		
1,2-Dichloropropane	9.76		ug/L	10.00	98	70-130	5	20		
1,3,5-Trimethylbenzene	10.1		ug/L	10.00	101	70-130	8	20		
1,3-Dichlorobenzene	9.41		ug/L	10.00	94	70-130	7	20		
1,3-Dichloropropane	10.3		ug/L	10.00	103	70-130	6	20		
1,4-Dichlorobenzene	9.25		ug/L	10.00	93	70-130	7	20		
2,2-Dichloropropane	10.5		ug/L	10.00	105	70-130	1	20		
2-Butanone	47.5		ug/L	50.00	95	70-130	6	20		
2-Chlorotoluene	9.37		ug/L	10.00	94	70-130	2	20		
4-Chlorotoluene	9.58		ug/L	10.00	96	70-130	7	20		
4-Isopropyltoluene	9.79		ug/L	10.00	98	70-130	5	20		
4-Methyl-2-Pentanone	50.2		ug/L	50.00	100	70-130	9	20		
Acetone	41.8		ug/L	50.00	84	70-130	7	20		
Benzene	10.2		ug/L	10.00	102	70-130	8	20		
Bromobenzene	9.63		ug/L	10.00	96	70-130	7	20		
Bromochloromethane	9.06		ug/L	10.00	91	70-130	7	20		
Bromodichloromethane	9.86		ug/L	10.00	99	70-130	4	20		
Bromoform	10.1		ug/L	10.00	101	70-130	11	20		
Bromomethane	10.1		ug/L	10.00	101	70-130	9	20		
Carbon Tetrachloride	10.0		ug/L	10.00	100	70-130	8	20		
Chlorobenzene	9.40		ug/L	10.00	94	70-130	6	20		
Chloroethane	9.90		ug/L	10.00	99	70-130	7	20		
Chloroform	9.70		ug/L	10.00	97	70-130	5	20		
Chloromethane	11.1		ug/L	10.00	111	70-130	6	20		
cis-1,2-Dichloroethene	9.72		ug/L	10.00	97	70-130	8	20		
cis-1,3-Dichloropropene	10.5		ug/L	10.00	105	70-130	8	20		
Dibromochloromethane	9.14		ug/L	10.00	91	70-130	7	20		
Dibromomethane	9.56		ug/L	10.00	96	70-130	7	20		
Dichlorodifluoromethane	9.79		ug/L	10.00	98	70-130	0.3	20		
Di-isopropyl ether	10.0		ug/L	10.00	100	70-130	7	20		
Ethyl tertiary-butyl ether	10.0		ug/L	10.00	100	70-130	9	20		
Ethylbenzene	10.1		ug/L	10.00	101	70-130	9	20		
Hexachlorobutadiene	9.77		ug/L	10.00	98	70-130	8	20		
Isopropylbenzene	8.32		ug/L	10.00	83	70-130	8	20		
Methyl tert-Butyl Ether	9.76		ug/L	10.00	98	70-130	6	20		
Methylene Chloride	9.74		ug/L	10.00	97	70-130	5	20		
Naphthalene	9.83		ug/L	10.00	98	70-130	7	20		
n-Butylbenzene	10.1		ug/L	10.00	101	70-130	5	20		
n-Propylbenzene	10.2		ug/L	10.00	102	70-130	7	20		
sec-Butylbenzene	9.72		ug/L	10.00	97	70-130	7	20		
Styrene	10.0		ug/L	10.00	100	70-130	9	20		
tert-Butylbenzene	9.34		ug/L	10.00	93	70-130	3	20		
Tertiary-amyl methyl ether	10.0		ug/L	10.00	100	70-130	10	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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524.2 Volatile Organic Compounds

Batch CA72331 - 524.2

Tertiary-butyl Alcohol	46.2		ug/L	50.00	92	70-130	4	25	
Tetrachloroethene	9.69		ug/L	10.00	97	70-130	8	20	
Tetrahydrofuran	9.36		ug/L	10.00	94	70-130	2	20	
Toluene	10.0		ug/L	10.00	100	70-130	8	20	
trans-1,2-Dichloroethene	10.1		ug/L	10.00	101	70-130	9	20	
trans-1,3-Dichloropropene	9.80		ug/L	10.00	98	70-130	9	20	
Trichloroethene	9.82		ug/L	10.00	98	70-130	6	20	
Trichlorofluoromethane	8.48		ug/L	10.00	85	70-130	5	20	
Vinyl Chloride	9.91		ug/L	10.00	99	70-130	3	20	
Xylene O	9.14		ug/L	10.00	91	70-130	3	20	
Xylene P,M	18.8		ug/L	20.00	94	70-130	6	20	
Xylenes (Total)	27.9		ug/L						
Surrogate: 1,2-Dichlorobenzene-d4	4.41		ug/L	5.000	88	80-120			
Surrogate: 4-Bromofluorobenzene	4.39		ug/L	5.000	88	80-120			

Classical Chemistry

Batch CA71939 - General Preparation

Blank

Color	ND	5	Color Units
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Batch CA72032 - General Preparation

Blank

Alkalinity as CaCO3	ND	10	mg/L
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LCS

Alkalinity as CaCO3	98	mg/L	99.20	99	85-115
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Batch CA72318 - General Preparation

Blank

Total Dissolved Solids	ND	10	mg/L
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LCS

Total Dissolved Solids	340	mg/L	337.0	101	80-120
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Batch CA72425 - General Preparation

Blank

Chloride	ND	0.5	mg/L
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Sulfate	ND	1.0	mg/L
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LCS

Chloride	2.3	mg/L	2.500	92	90-110
Sulfate	4.6	mg/L	4.994	92	90-110



CERTIFICATE OF ANALYSIS

Client Name: Environmental Partners Group

Client Project ID: Medfield Water Treatment Wells

ESS Laboratory Work Order: 1701390

Notes and Definitions

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



CERTIFICATE OF ANALYSIS

Client Name: Environmental Partners Group

Client Project ID: Medfield Water Treatment Wells

ESS Laboratory Work Order: 1701390

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

ENVIRONMENTAL

Rhode Island Potable and Non Potable Water: LAI00179

<http://www.health.ri.gov/find/labs/analytical/ESS.pdf>

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750

http://www.ct.gov/dph/lib/dph/environmental_health/environmental_laboratories/pdf/OutofStateCommercialLaboratories.pdf

Maine Potable and Non Potable Water, and Solid and Hazardous Waste: RI00002

<http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/partners/labCert.shtml>

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.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx>

ESS Laboratory Sample and Cooler Receipt Checklist

Client: EPG - Environmental Partners Group - TB/MM

ESS Project ID: 1701390
 Date Received: 1/19/2017
 Project Due Date: 1/26/2017
 Days for Project: 5 Day

Shipped/Delivered Via: ESS Courier

1. Air bill manifest present? Air No.: <u>NA</u>	<input type="checkbox"/> No	6. Does COC match bottles? <input type="checkbox"/> Yes
2. Were custody seals present?	<input type="checkbox"/> No	7. Is COC complete and correct? <input type="checkbox"/> Yes
3. Is radiation count <100 CPM?	<input type="checkbox"/> Yes	8. Were samples received intact? <input type="checkbox"/> Yes
4. Is a Cooler Present? Temp: <u>0.1</u> Iced with: <u>Ice</u>	<input type="checkbox"/> Yes	9. Were labs informed about <u>short holds & rushes</u> ? <input checked="" type="checkbox"/> Yes / <input type="checkbox"/> No / <input type="checkbox"/> NA
5. Was COC signed and dated by client?	<input type="checkbox"/> Yes	10. Were any analyses received outside of hold time? <input type="checkbox"/> Yes / <input checked="" type="checkbox"/> No

11. Any Subcontracting needed? Yes / No
 ESS Sample IDs:
 Analysis: _____
 TAT: _____

12. Were VOAs received?
 a. Air bubbles in aqueous VOAs?
 b. Does methanol cover soil completely?
 Yes / No
 Yes / No
 Yes / No / NA

13. Are the samples properly preserved?
 a. If metals preserved upon receipt:
 b. Low Level VOA vials frozen:

Yes / No
 Date: _____ Time: _____ By: _____
 Date: _____ Time: _____ By: _____

Sample Receiving Notes:

14. Was there a need to contact Project Manager?
 a. Was there a need to contact the client?
 Who was contacted? _____ Date: _____ Time: _____ By: _____

Sample Number	Container ID	Proper Container	Air Bubbles Present	Sufficient Volume	Container Type	Preservative	Record pH (Cyanide and 608 Pesticides)
01	100049	Yes	No	Yes	VOA Vial - HCl	HCl	
01	100050	Yes	No	Yes	VOA Vial - HCl	HCl	
01	100051	Yes	No	Yes	VOA Vial - HCl	HCl	
01	100052	Yes	NA	Yes	1L Poly - Unpres	NP	
01	100053	Yes	NA	Yes	250 mL Poly - HNO3	HNO3	

2nd Review

Are barcode labels on correct containers?

Yes / No

Completed By: Paula
 Reviewed By: Paula
 Delivered By: Paula

Date & Time: 1/19/17 1651

Date & Time: 1/19/17 1703

1/19/17 1703



CERTIFICATE OF ANALYSIS

Client Name: Environmental Partners Group

Client Project ID: Medfield Water Treatment Wells

ESS Laboratory Work Order: 1701390

Items for Project Management Review

524.2 Volatile Organic Compounds

C7A0296-CCV1 Acetone

CD-: Continuing Calibration %Diff/Drift is below control (CD-).

Acetone

Exceeds lower control limit

Classical Chemistry

Total Metals



CERTIFICATE OF ANALYSIS

Client Name: Environmental Partners Group

Client Project ID: Medfield Water Treatment Wells

ESS Laboratory Work Order: 1701390

PROJECT COMPLETION CHECKLIST

All Reports:

1. Has Report been Paginated?	Yes	No	
2. Has Report been Digitally Signed?	Yes	No	
3. Has MCP/RPC Sheet been filled out?	Yes	No	N/A
4. Have PRM and Fax Sheet been removed from the Project?	Yes	No	
5. Is the correct Chain of Custody attached to the Report?	Yes	No	
6. Is the correct Cooler Receipt attached to the Report?	Yes	No	N/A

Contact Person: _____

EDD: _____

E-Mail: _____

1. Does e-mail address in Element match the COC/CSR?	Yes	No	
1a. If No, did you contact Customer Service?	Yes	No	N/A
2. Are there any CCs for the report?	Yes	No	
3a If Yes, did you include them?	Yes	No	N/A
4. Did you save a copy of the e-mail in the Work Order Folder?	Yes	No	

Client Connect: _____

1. Did you save Report in CORRECT ClientConnect Folder?	Yes	No	N/A
2. Did you save EDD in CORRECT ClientConnect Folder?	Yes	No	N/A

Fax: _____

1. Does fax number in Element match the COC?	Yes	No	
1a. Did you contact Customer Service?	Yes	No	N/A
2. Was the fax "rejected" for any reason?	Yes	No	
2a. Was the project re-faxed?	Yes	No	N/A
2b. Was Customer Service notified?	Yes	No	N/A

Updated to Faxed:

Yes No N/A

Initials: _____

Date: _____

ESS Laboratory

Division of Thielsch Engineering, Inc.



Our certified laboratory provides a full range of services, including the following:

- Soil Characterization
- Petroleum Fingerprinting
- Priority Pollutant Analysis
- Groundwater, Wastewater and Drinking Water Analyses
- PCBs and Pesticides Analysis
- Trace Metals (ICAP/Furnace) Analysis
- Inorganic Analysis by Classic Methods, Flow Analyzer, and Ion Chromatography
- Organics by GC/Mass Spectroscopy
- Microbiology Analysis
- Massachusetts EPH/VPH Analysis
- Siloxanes
- Field Screening and Sample Technician Services

FAX

Date: _____

To: Anne Marie Petricca

Company: Environmental Partners Group

Project Name: Medfield Water Treatment Wells

ESS Work Order: 1701390

Fax: (617) 657-0201

Comments:

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Number of pages (including this cover):

Date: _____ Faxed: _____ Initials: _____ Time: _____



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