Maynard White Pond Treatment and Transmission Study

Evaluation of Water Supply and Demand

July 31, 2019

Prepared for:

Department of Public Works,
Maynard, MA

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Abbreviations

µg/L	Microgram/Liter
ASR	Annual Statistical Report
CEMU	Confidently Estimated Municipal Use
CFU	Colony-Forming Unit
CWA	Clean Water Act
D/DBPR	Disinfectants/Disinfection By-Product Rule
DBP	Disinfection Byproduct
DCR	Department of Conservation and Recreation
DWP	Drinking Water Program
EPA	Environmental Protection Agency
ESWTR	Enhanced Surface Water Treatment Rule
GAC	Granular Activated Carbon
GPCD	Gallons Per Capita Per Day
GPM	Gallons Per Minute
HHA	Haloacetic Acid
LCR	Lead and Copper Rule
MAPC	Metropolitan Area Planning Council
MassDEP	Massachusetts Department of Environmental Protection
MCL	Maximum Contaminant Level
MEPA	Massachusetts Environmental Policy Act Office
MGD	Million Gallons per Day
MMCL	Massachusetts Maximum Contaminant Level
MPA	Microscopic Particulate Analysis
MSDRD	Middlesex South District Registry of Deeds
ng/L	Nanogram/Liter
NOI	Notice of Intent
NPDWR	National Primary Drinking Water Regulations
NTU	Nephelometric Turbidity Unit
O&M	Operation and Maintenance
OMR	Old Marlboro Road
ORSG	MassDEP Office of Research and Standards Guideline

pCi/L	Picocuries/Liter
PCN	Pre-Construction Notification
PFAS	Per- and Polyfluoroalkyl Substances
Pos/Neg	Positive/Negative
ppt	Parts Per Trillion
PWS	Public Water Supplier
RDA	Request for Determination of Applicability
RGPCD	Residential Gallons Per Capita Per Day
SCADA	Supervisory Control and Data Acquisition
SDWA	Safe Drinking Water Act
SMCL	Secondary Maximum Contaminant Level:
SU	Standard Unit
SVNF	Self-Verification Notification Form
TBD	To Be Debated
TCR	Total Coliform Rule
THM	Trihalomethane
TT	Treatment Technique
UAW	Unaccounted-for Water
US	United States
USACOE	US Army Corps of Engineers
USFW	United States Fish and Wildlife
UV	Ultraviolet
VHB	Vanasse Hangen Brustlin, Inc.
WMA	Water Management Act
WTP	Water Treatment Plant

1.0 INTRODUCTION

The Town of Maynard currently has seven groundwater well sources located within three well fields and one inactive surface water source. The groundwater sources are all located within the Town of Maynard, the well fields are located off Rockland Avenue, Old Marlboro Road, and Great Road. The surface water source, White Pond, is located at the border between the Towns of Hudson and Stow.

The Town receives most of its water supply from the Rockland Avenue Water Treatment Plant (WTP) to meet its water demands. However, if this treatment facility experiences a mechanical failure and goes offline, the Town would not have sufficient redundancy to meet average and maximum day demands due to capacity and treatment deficiencies associated with the other available water resources.

The Town has identified the need to evaluate its current water resources and determine how to best achieve fully redundant capacity in the future. As part of this evaluation, Stantec has assessed potential source water alternatives and respective water yield. This report includes a review of alternatives to determine a recommended approach for how the Town should proceed with future water supply development.

As part of this study, Stantec reviewed historical data and previous study recommendations and findings from the following documents:

- May 1991 Report on White Pond Pilot Session No. 1
- December 1991 Report on White Pond Pilot Session No. 2
- April 1994 White Pond Water Treatment Facility Basis of Design Report
- February 1999 Long Range Capital Planning Study Draft Report
- January 2012 Assessment of Water Resources Report (Woodard & Curran)
- May 2012 White Pond Citizens Study Committee Final Report
- MassDEP Annual Statistical Reports (ASRs)
- MassDEP Water Management Act permits
- Laboratory reports for water quality analysis performed on wells

The following potential water sources and treatment options were identified and assessed by Stantec:

- New White Pond WTP and Transmission Line
- New Well 04A at the Existing Well 4 Well Field
- Replacement Well 06G at Rockland Avenue Well Field
- Re-activating Well 03G at Old Marlboro Road
- Evaluating an exploratory well drilled at Rockland Avenue well field that has never been used

2.0 WATER SUPPLY

Approximately 16 years after Town establishment, the Town of Maynard petitioned the Commonwealth of Massachusetts for water rights to White Pond. On May 25, 1888 a bill was passed giving the Town rights to the pond (see extract from Private and Special Statutes of the Commonwealth of Massachusetts, Ch. 407 in Appendix A). The Town constructed three miles of pipe within the following year to carry water from White Pond to the Town by gravity; this pipeline was replaced in the early 1940's. In order to provide pressure, water was first pumped from White Pond to a reservoir on the top of Summer Hill to provide pressure for distribution.

Since the 1960s, the Town has drilled over 200 test wells throughout its jurisdiction. Seven of those test wells produced acceptable quantities and quality of water and have since been used for potable water supply. These wells are scattered within the three well field sites operated by the Town. See This well source is discussed further in Section 2.1.3.

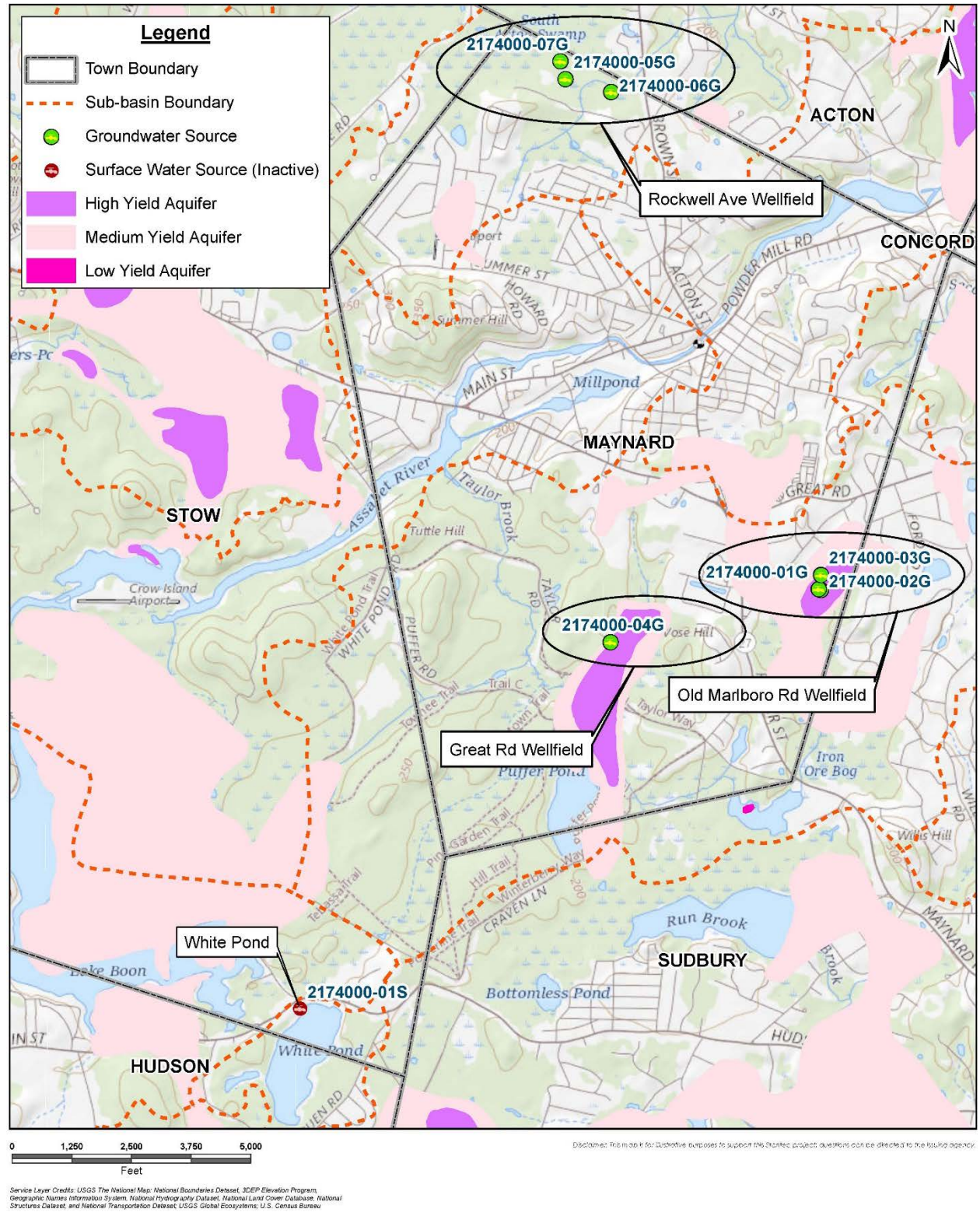
Figure 2-1 for a map of the Town's water sources and well fields.

In the late 1990s, White Pond was decommissioned as an active source of potable water due to more stringent surface water drinking standards under the EPA Surface Water Treatment Rule, and the Town switched completely to groundwater for its water supply. Although currently offline, White Pond remains a viable water supply option to be considered for meeting increasing water demands in the future.

The Town of Maynard holds a Massachusetts Water Management Act (WMA) permit (9P4-2-14-174.01) for an average annual daily withdrawal volume of 1.09 million gallons per day (MGD), which includes the groundwater wells and White Pond. The registered wells are further limited to a maximum daily withdrawal volume equal to the Zone II approved rate. See Table 2-1 for allowed withdrawal volumes for the groundwater sources.

Based on existing treatment plant functional capacity, the Town cannot meet peak day water demands when the Rockland Ave WTP, which is the Town's largest source of water, is offline. In recent years, the Town has conducted surveys to identify other viable groundwater well sources in order to meet this deficit. Well 4A, located northeast of existing Well 4 has shown promising pumping results indicating that it could be an additional groundwater source for the Town. This well source is discussed further in Section 2.1.3.

Figure 2-1: Maynard Water Supply Sources



2.1 GROUNDWATER SOURCES

Table 2-1 summarizes each of the wells' maximum pumping capacity, current average flowrates, and permitted withdrawal rates.

Table 2-1: Withdrawal from Groundwater Sources

Source	MassDEP Permitted Withdrawal [1] MGD	Mechanical Pumping Capacity [2] MGD	Annual Average Flowrate Pumped [3] MGD
Rockland Avenue			
Well #2 (2174000-05G)	0.465	0.432	0.264
Well #3 (2174000-06G)	0.287	0.432	0.305
Well #5 (2174000-07G)	0.379	Not Available	0.166
Old Marlboro Road			
Well #1 (2174000-01G)	0.870	0.576	0.155 [4]
Well #1A (2174000-02G)		0.288	
Well #3 (2174000-03G)		0.504	0.000
Great Road			
Well #4 (2174000-04G)	0.38	0.648	0.113
Total Permitted Withdrawal Volume from All Wells	**1.090**		
Annual Average Pumped from All Wells			**1.003**

[1] Source: Water Withdrawal Permit No. 9P4-2-14-174.01.

[2] From Woodard & Curran's 2012 report

[3] Annual Average Flowrate Pumped reflects the average pumping rate reported by the Town in the 2018 ASR for Wells #2 and #5 for the whole year, while the value for Well #3 is the average pumping rate for the whole year reported by the Town in the 2017 ASR (this well was inoperable for all of 2018).

[4] Well #1A is a satellite well to Well #1; the combined flowrate of the two wells is measured rather than individual flow rates.

The mechanical pumping capacity is the maximum well production that the pump will allow based on its physical limitations. The average flowrate pumped is based on the annual average flowrate pumped as reported in the 2017 or 2018 MassDEP ASR.

Many of the Town's wells are experiencing reduced pumping capacities due to high concentrations of iron and manganese in the groundwater that accumulate on the well screens, thereby gradually reducing pumping capacity. The wells at the Old Marlboro Road and Great Road wellfields have historically been cleaned once a year using Pantonite™ PM77, which is a mixture of organic and inorganic acids, formulated to address iron and manganese biofouling encrustations. The wells at the Rockland Avenue wellfield, which went online in 2012, were cleaned for the first time in early 2019. Typically these cleaning events result in successfully restoring flow capacities at wells.

2.1.1 Rockland Avenue Wellfield

The Rockland Avenue Wellfield consists of three bedrock wells that went online in 2000. These wells extend to a depth of approximately 450 feet below the ground surface into bedrock. The well water is treated for iron and manganese at a greensand filtration WTP located at Rockland Avenue. The Rockland Avenue Wellfield had a combined average flowrate of 0.462 MGD in 2018 with wells 2174000-05G (#2) and 2174000-07G (#5) operating. Well 2174000-06G (#3) was offline because of poor water quality and issues encountered in the field when attempting to rehabilitate the well.

After Well 2174000-06G was rehabilitated in 2018, it was placed back online in early 2019. At that time, it was noted by operational staff that the well was only able to produce a maximum of 0.2 MGD, which is less than the annual average 0.304 MGD that it produced in 2017. Since the well was put back online, the water quality has been observed to be extremely variable and has very high concentrations of iron, total dissolved solids, and turbidity, high color, and relatively high concentrations of manganese compared to the two other wells at Rockland Avenue. The poor water quality has resulted in shorter filter run times at the WTP and difficulties in operating the WTP. Shorter filter run times results in more frequent backwashing of filters, which produces more residual waste from the plant and reduces the water production rate of the Rockland Ave WTP.

In April 2019, Stantec provided onsite laboratory and analytical support at the Rockland Avenue WTP where baseline operational parameters were measured and documented, and jar testing was performed to determine oxidant demands of the water. It was observed that manganese levels and color in the blended raw water would fluctuate from day to day and throughout the day. The fluctuating raw water quality is unpredictable, making it impossible to predict when the water quality will change and to what extent it may vary. Findings and recommendations from Stantec's jar testing study are documented in the memo entitled "Rockland Avenue Water Treatment Plant Bench Scale Study & Treatment Optimization Recommendations" (Chamberlain, 2019).

There is a fourth groundwater well located within the Rockland Avenue Wellfield that was initially explored when the other wells were developed in 2000. This fourth well was never permitted by MassDEP for use in the drinking water system, and hence never used. Stantec has recommended that the Town evaluate a water sample from the well, as it could provide a potential alternate groundwater source in the future.

2.1.2 Old Marlboro Road Wellfield

The Old Marlboro Road (OMR) Wellfield consists of three gravel packed wells that went online in 1963. These wells extend to a depth of approximately 35 feet below the ground surface. Well 2174000-02G (#1A) serves as a satellite well that helps Well 2174000-01G (#1) maintain capacity. The wells at OMR WTP presently operate at approximately 18% of the permitted withdrawal for the wellfield and 11% of total mechanical pumping capacity. The primary reason for the low pumping rates is because Well 2174000-03G (#3), which makes up close to 37% of the total well pumping capacity at the OMR Wellfield, has been inactive for 10 years. Additionally, Well 2174000-01G and Well 2174000-02G are limited to lower pumping rates due to raw water quality issues (i.e., color, iron, and manganese) as well as disinfectant byproduct formation concerns. As pumping rates increase at these wells, the color of the

raw water increases significantly, and the increased iron and manganese concentrations put stress on the WTP filters.

Approximately 10 years ago a decrease in the water quality from Well 2174000-03G was observed, with a notable change in the color of the water. At this same time, it was also observed that the wetland area near OMR well field was behaving differently than it had been historically. It is believed that the hydrogeology of the Well 2174000-03G area was impacted after a housing development was built in the bordering Town of Sudbury, located upslope from the Old Marlboro Road Wellfield. Prior to the development, there was a seasonal stream that fed the wetlands. That stream no longer exists.

Due to the significant decrease in water quality, Well 2174000-03G was taken offline in 2010. As part of exploratory efforts to identify alternative water sources during the summer of 2018, the Town conducted a full suite of water quality testing to determine whether Well 2174000-03G could be brought back online. The water quality analysis included the following:

- Microscopic Particulate Analysis (MPA) to determine if the groundwater is under direct influence of surface water
- Inorganic compounds
- Total Coliform
- Radionuclides
- Secondary Contaminants
- Volatile Organic Compounds
- Synthetic Organic Contaminants

Results from water quality analyses performed on raw water from Well 2174000-03G can be found in Appendix AB. Table 2-2 provides a summary of contaminants that were found to either exceed or be right below regulatory limits.

Table 2-2: Summary of Contaminants at Elevated Levels

Contaminant	Result	Regulation
Arsenic	0.009	MCL = 0.01 mg/L
Color	150	SMCL = 15 color units
Iron	11.3	SMCL = 0.3 mg/L
Manganese	0.729	SMCL = 0.05 mg/L
Sodium	49	ORSG = 20 mg/L

MCL: Maximum Contaminant Level
SMCL: Secondary Maximum Contaminant Level
ORSG: MassDEP Office of Research and Standards Guideline

Based on the water quality testing results, it is not recommended that Well 2174000-03G be brought back online at this time. The elevated iron and color will make treatment processes at the WTP more challenging, increase chemical usage and associated costs, and shorten filter run times which will require more frequent backwash cycles and hence higher power costs and higher volumes of water wasted as backwash. Plant staff would need to spend even more time and exercise greater operational control to address the challenges posed by the addition of Well 2174000-03G to the raw blended water (from Wells

2174000-01G and -02G). All these factors combined make it difficult to justify putting Well 2174000-03G back online.

In 2018, the OMR Wellfield provided an average of 0.155 MGD. OMR WTP operators report that Wells 2174000-01G and -02G could potentially provide a maximum volume of 0.36 MGD. However, this may not be a sustainable solution to meet long-term additional water demand for the Town. As the wells are pumped at high rates, the aquifer will draw down, and water quality will degrade even further. As a result, the wells may experience recurring clogging issues and require more frequent cleaning. It is recommended that the pumping rates from Wells 2174000-01G and -02G be increased only as required to avoid a restrictive water ban on Town residents. OMR WTP staff should monitor the raw and finished water quality more closely during times of increased pumping rates to ensure treatment is adequate. OMR staff should also be aware of the possibility of more frequent backwashing of the filters given that more iron and manganese would be encountered by the filter vessels as pumping rates increase.

Upgrades to the OMR WTP are currently in progress; construction is anticipated to be completed by the end of October 2019. The goal of the WTP upgrades are to improve the performance and finished water quality at this plant. The upgrades include filter media replacement, filter controls upgrades, replacement of a chemical bulk storage tank, switching from hypochlorite to potassium permanganate for the pre-filtration oxidant, replacing malfunctioning flow meters, and installation of a backwash Parshall flume, in addition to other miscellaneous improvements.

2.1.3 Great Road Wellfield

The Great Road Wellfield consists of one gravel packed well, Well 2174000-04G, which went online in 1975. The Great Road Wellfield is more commonly referred to as the “Well 4 Wellfield” This well extends to a depth of approximately 72 feet below the ground surface. Because of high levels of iron and manganese in the groundwater pumped, Well 2174000-04G requires annual cleaning. In 2018, it was only able to provide an annual average of 0.113 MGD. An additional well (presently referred to as “Well 4A”) was drilled in the wellfield in 2018. Pumping tests determined that it could be a viable groundwater source supplementing the Well 4 WTP with an additional 0.35 MGD on average. The permit application for use of this new well was submitted in April 2019, it is currently under review with MassDEP.

Well 4A water will be pumped to the Well 4 WTP, where the water will be treated using chemical oxidant and greensand filtration for iron and manganese removal. An evaluation of the treatment facility will be required to determine what upgrades or improvements will be required at the WTP in order to treat the additional flows. The Well 4 WTP was originally designed with space to allow for future expansion, including an additional filter vessel. Due to the relatively low flow rates at Well 4 WTP, even with the new source included the existing three 9-foot diameter filters are anticipated to be able to handle the additional load. It is likely that upgrades to all the chemical feed systems with larger tanks and chemical feed pumps will be necessary. Evaluation of the WTP’s backwash supply/discharge systems, electrical system, backup generator, process instrumentation and SCADA will be performed as part of the process of bringing Well 4A online.

2.2 SURFACE WATER SOURCE

2.2.1 White Pond

White Pond is reported to have a safe yield of 0.72 MGD with a potential of 1 MGD withdrawal based on the Assessment of Water Resources Report (Woodard & Curran, 2012). In 1942, a 13,100-ft, 10-inch diameter asbestos-cement water transmission line was built to convey water from the Pond to the Town of Maynard. The treatment system consisted of a chlorination and pumping station located close to the Pond on Town of Maynard owned property.

In the 1990s, when more stringent surface water treatment regulations requiring filtration as well as disinfection were enforced by the US EPA and MassDEP, the Town did not adjust its surface treatment scheme but chose instead to abandon White Pond as a water source. Both the chlorination system and pumping station are inoperable now; they have been abandoned in place along with the 10-inch transmission main. Potable use of the water from White Pond would require water be conveyed to a permanent facility for treatment before distribution to customers.

At a point in time, the Massachusetts Fire Academy located north of White Pond had a direct gravity feed from White Pond to its site. The Fire Academy used White Pond as source water for firefighting activities. Now that the US Fire Academy receives its water supply from the neighboring Town of Sudbury, they do not use White Pond as a source of water.

The Town maintains sole water rights to White Pond (see Appendix A), which represents a significant volume of potential future source water. As part of this study, the feasibility and requirements to treat White Pond water for use in the Town's drinking water supply will be evaluated in detail; see Section 5.0. The transmission main from White Pond runs through United States Fish and Wildlife (USFW) land, within the towns of Hudson and Stow. The easements associated with the transmission main property is further discussed in Section 6.0.

3.0 WATER DEMAND

The factors that determine the demand requirements of a water supply system include the population served, type of water usage (e.g. domestic, commercial, and industrial), unaccounted for water (e.g. leakage, breaks, main flushing, theft), and flows for fire protection service.

3.1 HISTORICAL POPULATION

Figure 3-1 and Table 3-1 show the historical population of the Town of Maynard. Except for some years in the early 2000s, and then in 2010 and 2018, the population of Maynard has experienced an overall gradual upward trend.

Figure 3-1: Historical Population in the Town of Maynard, MA

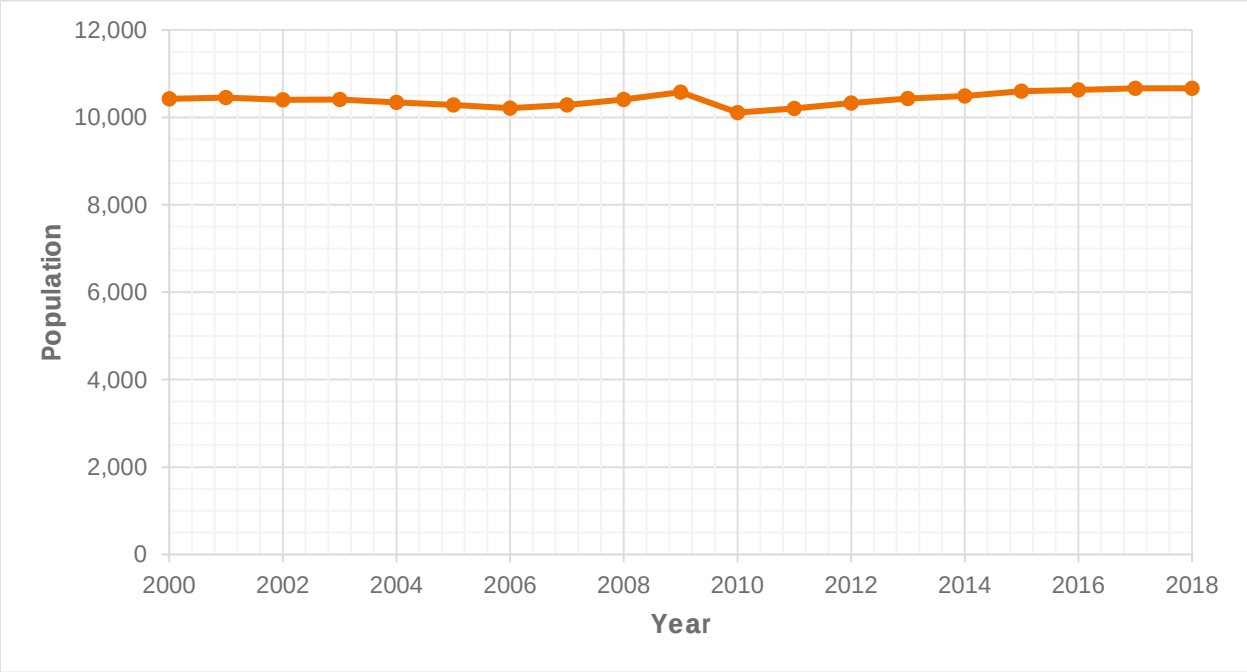


Table 3-1: Maynard, MA Historical Population

Year	US Census Population	Percentage Change
2000	10,423	–
2001	10,454	0.3%
2002	10,400	-0.5%
2003	10,406	0.1%
2004	10,342	-0.6%
2005	10,281	-0.6%
2006	10,210	-0.7%
2007	10,285	0.7%
2008	10,406	1.2%
2009	10,574	1.6%
2010	10,110	-4.4%
2011	10,206	0.9%
2012	10,328	1.2%
2013	10,428	1.0%
2014	10,492	0.6%
2015	10,602	1.0%
2016	10,626	0.2%
2017	10,665	0.4%
2018	10,665	0.0%

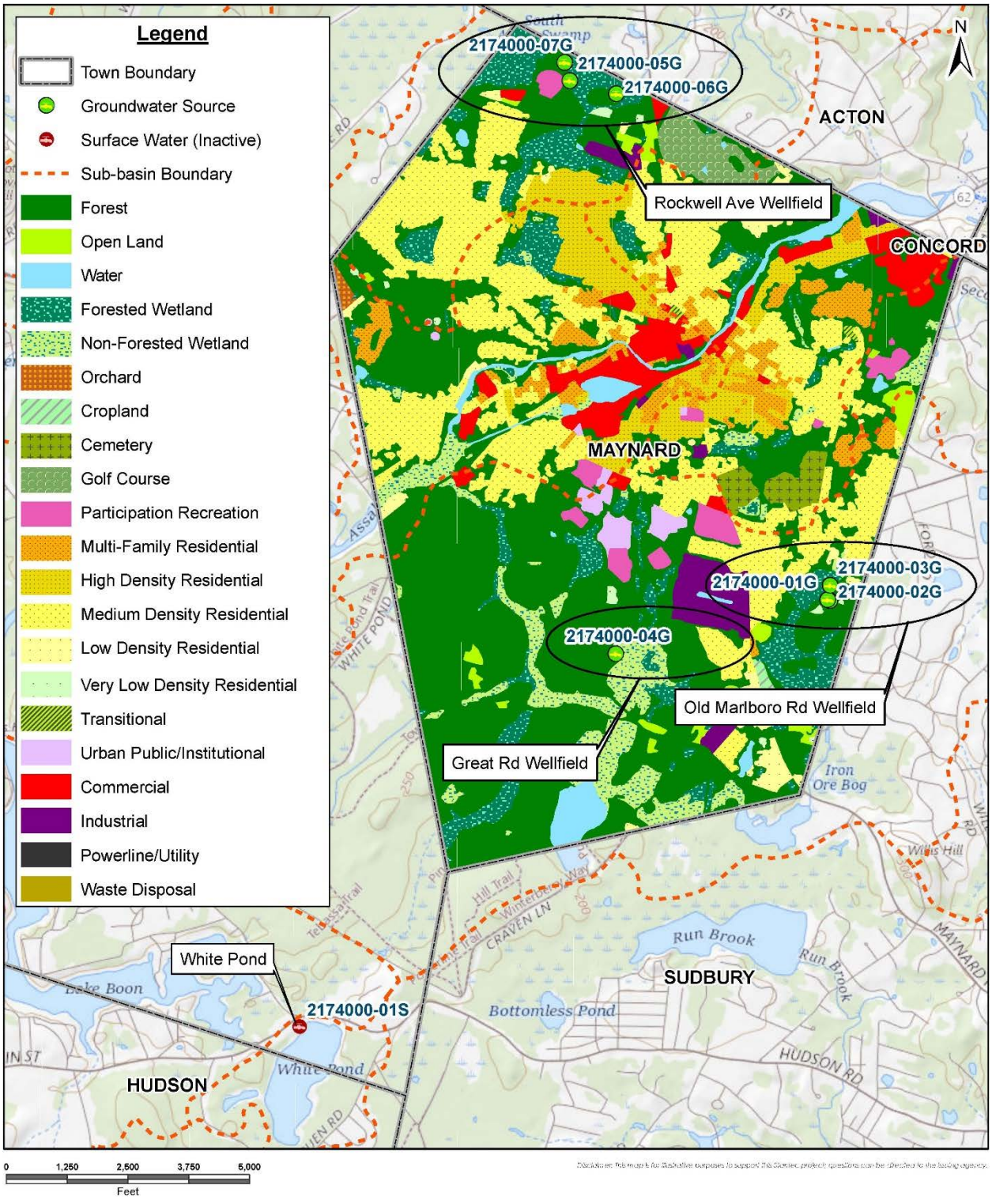
Source: United States Census Records for data from 2000 through 2017, and Maynard 2018 ASR for 2018 Data

3.2 LAND USE AND DEVELOPMENT

The rate at which development takes place and the type of development that occurs is determined by market forces, as well as quality of infrastructure, public facilities, environmental conditions, and other considerations. Without planning and adequate controls, future development can have adverse impacts on a community's water system.

The Town of Maynard has a total area of 5.4 square miles, of which 5.2 square miles is land and 0.2 square miles is water. Figure 3-2 shows how the land is used within the Town of Maynard, and Table 3-2 provides a summary distribution of each land use. Most of the land in Maynard is categorized as forested. The next major uses include medium density residential followed by forested wetland.

Figure 3-2: Land Use



Service Layer Credits: USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; USGS Global Ecosystems; U.S. Census Bureau

Table 3-2: Land Use Percentage Distribution

Land Use	Percentage	Land Use	Percentage
Forest	87.50%	Participation Recreation	0.22%
Medium Density Residential	3.85%	Open Land	0.20%
Forested Wetland	2.19%	Cemetery	0.16%
Non-Forested Wetland	1.56%	Urban Public/Institutional	0.13%
High Density Residential	0.92%	Orchard	0.10%
Commercial	0.70%	Very Low Density Residential	0.04%
Multi-Family Residential	0.69%	Cropland	0.03%
Water	0.55%	Waste Disposal	0.03%
Low Density Residential	0.48%	Transitional	0.01%
Industrial	0.41%	Powerline/Utility	0.001%
Golf Course	0.22%		

The Town of Maynard is currently experiencing an increase in housing developments and continued development is anticipated over the next decade. The major housing developments that are either currently under construction or in planning phases include the following:

- Maynard Crossing/129 Parker Street
    - 296,000 sf mixed use development
    - 323 residential units
    - Estimated water demands (per Onsite Engineering Inc., 2016):
        - 65 GPM max day
- Maynard Point/42 Summer Street
    - 20 residential units
    - Estimated water demands (per Stantec's Developer Review Memo, 2019):
        - 1.5 GPM average day
        - 3.0 GPM max day
        - 4.5 GPM peak hour
- Maynard Square/115 Main Street
    - 29 residential units
    - 2000 sf retail space
    - Estimated water demands (per Stantec's Developer Review Memo, 2019):
        - 2.2 GPM average day
        - 4.3 GPM max day
        - 6.5 GPM peak hour
- Powder Mill Place (joint project between Maynard and Acton)
    - Maynard's portion will feature 74 units
    - Estimated water demands (per Town using 310 CMR 15.00: Septic Systems "Title 5"):
        - 9.8 GPM average day

Additionally, the Mill & Main Place development is a project being undertaken by Lincoln Property Company at the mill complex (formerly known as Clock Tower Place). Currently, the mill is mostly occupied, though there are some empty units that are still available to small businesses. Stantec had a meeting with Master Plan Committee representatives to discuss potential future development in the Mill; based on this conversation it was determined that no significant additional water demands are anticipated from this development.

As development projects continue to be considered in Town, it should remain part of the Town's approval process to review all developers' plans for drinking water and sewer requirements. There is limited impact that future development can have on the Town's water demands unless significant changes to zoning regulations are implemented due to limited available land in Maynard.

3.3 WATER USE CATEGORIES

Water consumption is typically comprised of residential, commercial, and industrial demands as well as Confidently Estimated Municipal Use (CEMU) and Unaccounted-for Water (UAW). A description of demand types is provided in Table 3-3.

Table 3-3: Finished Water Use Categories

Use Category	Category Description
Commercial/Business	Water used in restaurants, service stations, and retail establishments
Industrial	Water used in manufacturing and warehousing facilities
Municipal/Institutional/ Non-profits	Water used for municipal purposes, including schools, playing fields, municipal buildings, treatment plant; non-profits such as churches; non-residential institutions such as private schools
Residential	Water used in residences and apartments
CEMU	Water confidently estimated for municipal use (e.g. fire protection and training, hydrant/water main flushing, flow testing, bleeders/blow offs, tank overflow and drainage, sewer system flushing, street cleaning)
UAW	Water that includes all unmetered uses (e.g. leaks, and water main breaks, fire flows)
Other	Water used for purposes not included in above categories

3.3.1 Water Usage by User Class

As presented in the Town of Maynard's 2018 Annual Statistical Report, the Town has 4,034 service connections; of which 3878 are residential connections, 106 are commercial/business connections, 10 are industrial connections and 40 are municipal/institutional/nonprofits. Table 3-4 presents the average metered water consumption by user classification in 2018. Most of the metered water use is residential, followed by municipal/institutional/non-profits, commercial/business, and industrial. CEMU and UAW volumes are not metered and therefore not included in Table 3-4.

Table 3-4: Metered Water Consumption per User Classification in 2018

Use Category	No. of Service Connections	Total Volume (MGY)	Percent Use (as a % of metered water)
Residential	3,878	192.71	91.2%
Commercial/Business	106	10.22	4.8%
Industrial	10	1.42	0.7%
Municipal/Institutional/Non-profits	40	6.95	3.3%
TOTAL	4,034	211.30	100.0%

Table 3-5 provides a summary of the historical total water usage by user class as a percentage of annual water produced from 2010 through 2018. The percentage of water used for the Residential class increased over the study period. From 2014 onwards, percentage of water used for Commercial and Industrial decreased, while that of Municipal/ Institutional/Non-profits experienced a slight increase. The highest CEMU percentage use over the past 4 years occurred in 2017; this was attributed to significant hydrant/water main flushing and water main construction and fire protection and training. While the UAW percentage has experienced a continuous decreasing trend over the period of study, it is still higher than the performance standard of 10% established by Massachusetts under the Water Management Act.

Table 3-5: Historical Water Usage by User Class as Percent of Annual Water Produced

Year	Residential	Commercial/ Business	Agricultural	Industrial	Municipal/ Institutional/ Non-profits	Other	Total CEMU	UAW	Total
2010	58.5%	3.8%	–	0.6%	0.6%	–	0.0%	36.5%	100.0%
2011	68.6%	4.5%	–	0.6%	5.2%	–	1.1%	20.0%	100.0%
2012	58.7%	10.1%	–	1.5%	5.4%	–	0.8%	23.5%	100.0%
2013	62.3%	11.3%	–	0.4%	2.1%	–	1.3%	22.6%	100.0%
2014	70.2%	5.2%	–	3.4%	2.2%	–	3.3%	15.6%	100.0%
2015	74.6%	4.9%	–	3.8%	2.3%	–	0.4%	13.9%	100.0%
2016	71.8%	4.5%	–	2.7%	2.3%	–	0.9%	17.7%	100.0%
2017	73.0%	2.3%	–	0.3%	2.4%	–	6.2%	15.8%	100.0%
2018	77.1%	4.1%	–	0.6%	2.8%	–	2.0%	13.5%	100.0%
AVG	68.3%	5.6%	–	1.6%	2.8%	–	1.8%	19.9%	100.0%

3.3.2 Confidently Estimated Municipal Use and Unaccounted-for Water

CEMU is the amount of water quantified by the Town of Maynard in its ASR for purposes such as fire protection, hydrant flushing, bleeders/blow offs, source meter calibration adjustments, construction uses, and major watermain breaks.

Unaccounted-for water (UAW) is often difficult to quantify. It typically consists of unmetered water usage such as leaks, water theft, or meter malfunction/misregistration. It is calculated by subtracting the sum of

the total metered water usage and total CEMU from the total finished water produced and available for distribution.

UAW has averaged 19.9% over the study period. However, the Town of Maynard's Water Management Act registration requires UAW to be 10% or lower. Therefore, Stantec has assumed that the Town of Maynard will continue to implement strategies to ensure that this 10% or lower UAW requirement is met by the end of the 25-year planning period in 2045.

3.4 WATER CONSUMPTION PROJECTIONS

Population projections provide the basis for projecting future water demands and assessing system needs. When demand is estimated for a water system, multiple values are calculated including average day, maximum day, and peak hour demands. The average daily rate of consumption, which represents the average amount of water delivered by the system over the course of a typical day, is used to determine adequacy of system supplies (i.e., sources of water). The maximum daily rate of consumption, which represents the maximum amount of water delivered by the system in any given 24-hour period, is used to determine the adequacy of pumping facilities and system piping. Peak hourly rate of consumption, which is the maximum water delivered by the system over an hour period, and maximum daily demand plus fire flow requirements is used to determine the adequacy of storage facilities, transmission mains and distribution mains.

3.4.1 Domestic Water Consumption

Population, zoning, and water consumption habits collectively influence the pattern of domestic (residential) water use. Since consumption is primarily dependent on the population served, domestic water consumption is often expressed in terms of gallons per capita per day (GPCD). Currently the municipal water system supplies 100% of the Town of Maynard's water. This analysis assumes that the water system will continue to supply 100% of the Town's population.

Projected water use is essential in determining the future adequacy of the supply system. The following method was used for determining future residential water demands:

1. Consumption records from 2010 through 2018 supplied by the Town were analyzed (see Table 3-6).
2. Historical residential demands were divided by the population to determine historical per capita residential demand.
3. Future population projections were estimated.
4. Average historical per capita residential demand was multiplied by the projected population for future years to calculate average domestic water demands for future planning years.

Table 3-6: Historical Town Water Use – Million Gallons per Year (MGY)

Year	Water Produced	Residential	Commercial/ Business	Industrial	Municipal/Institutional/ Non-profits	Total CEMU	UAW
2010	342.1	200.0	13.0	2.0	2.0	0.2	124.9
2011	293.0	201.1	13.1	1.9	15.2	3.1	58.6
2012	289.0	169.6	29.1	4.2	15.7	2.4	68.0
2013	302.3	188.4	34.1	1.4	6.2	3.9	68.4
2014	301.7	211.8	15.8	10.4	6.7	10.0	47.0
2015	284.3	212.2	13.9	10.9	6.7	1.2	39.5
2016	283.8	203.8	12.9	7.6	6.7	2.5	50.3
2017	274.1	200.0	6.4	0.8	6.6	17.0	43.3
2018	250.0	192.7	10.2	1.4	7.0	4.9	33.8
AVERAGE	291.1	197.7	16.5	4.5	8.1	5.0	59.3

Table 3-7 illustrates the daily residential consumption per capita for years 2010 through 2018. Consumption rates varied from 44.9 to 55.3 residential gallons per capita per day (RGPCD) with an average of approximately 51.8 RGPCD. Residential water use has been gradually decreasing over the last five years as a result of continued conservation efforts by costumers to stay below the RGPCD performance standard of 65 gallons for public water suppliers (PWS) permittees established by Massachusetts under the Water Management Act.

Table 3-7: Historical Daily Residential per Capita Water Demand

Year	Population Served [1]	Daily Residential Water Use [2] (GPD)	Residential Gallons per Capita per Day (RGPCD)
2010	10,110	547,945	54.2
2011	10,206	550,959	54.0
2012	10,328	463,388	44.9
2013	10,428	516,027	49.5
2014	10,492	580,274	55.3
2015	10,602	581,370	54.8
2016	10,626	556,831	52.4
2017	10,665	547,945	51.4
2018	10,665	527,973	49.5
AVERAGE	10,458	541,412	51.8

[1] As estimated by the United States Census Records
[2] As presented in Annual Statistical Reports by the Town of Maynard

3.4.2 Population Projections

Evaluation of the water supply of the Town of Maynard must consider future as well as present populations. Any change in population would influence water supply needs. To support long term water supply planning, a 25-year planning horizon is used. Approximate future populations for the Town of

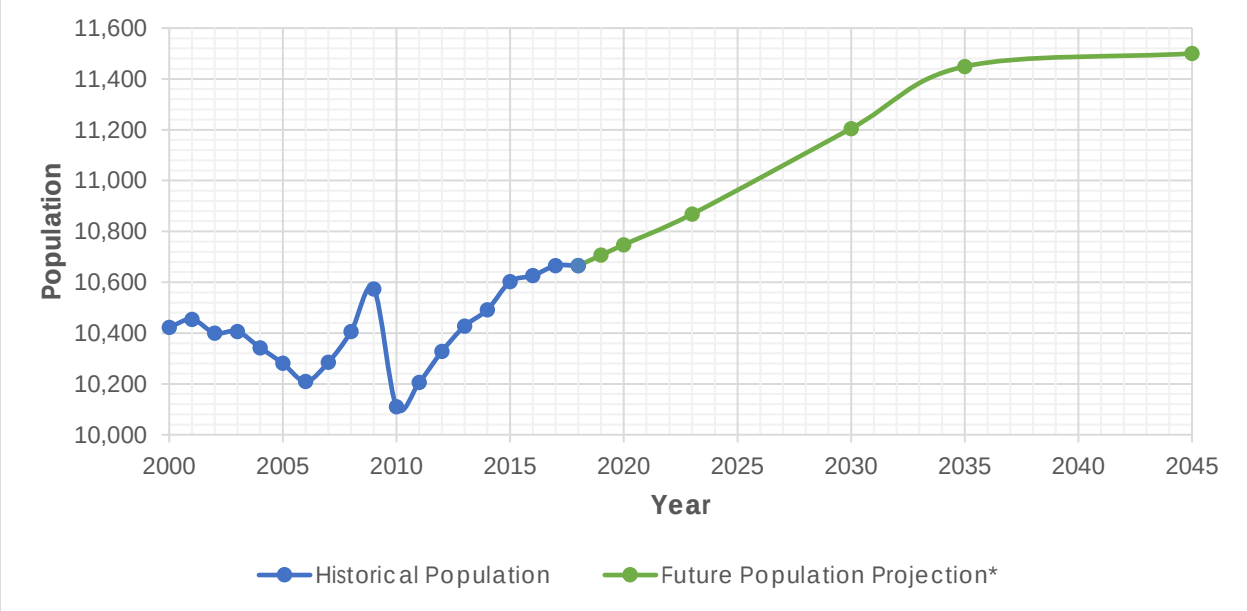
Maynard were determined for the years 2019 through 2045. Data from the March 2013 Maynard Community Life Center Committee Final Report, which quoted population projections from the MAPC MetroFuture 2035 Update Report, was referenced for population in the years 2020, 2030, and 2035. Data for 2023 came from correspondence with VHB planners working on the Town of Maynard's Master Plan. Stantec estimated the population for 2019 given the data trend from 2018 to 2020. Based on conversations with the Master Plan consultants and on the lack of available land for further major development, it is anticipated that the population of Maynard will start to stabilize after 2035, reaching a total population of approximately 11,500 by 2045. Table 3-8 provides a summary of the projected population from 2019 through 2045, which served as the basis for estimating future water use consumption in this report.

Table 3-8: Population Projections

Year	Projected Population	Data Source
2019	10,707	Stantec Estimate
2020	10,748	MetroFuture
2023	10,868	Master Plan
2030	11,205	MetroFuture
2035	11,449	MetroFuture
2045	11,500	Stantec Estimate

The historical and projected population data are presented in Figure 3-3. The model estimates a continuous increase in population from 2018 through 2045 for the Town of Maynard.

Figure 3-3: Historical and Projected Population Trends



* Based on Population Projections Data from Stantec's Estimation, MetroFuture 2035 Update and Maynard's Master Plan

3.4.3 Future Residential Water Demands

The average residential water use from 2010 to 2018, 51.8 RGPCD, was used for the projection of future average annual domestic water use. Table 3-9 shows the projected annual residential consumption rates through 2045.

Table 3-9: Projected Daily Residential per Capita Water Demand

Year	Stantec Estimated Population Projection	Daily Residential Water Use (GPD)
2019	10,707	554,314
2020	10,748	556,462
2023	10,868	562,675
2030	11,205	580,123
2035	11,449	592,755
2045	11,500	595,396

3.5 TOTAL WATER REQUIREMENTS

One of the objectives of this report is to estimate future water demands and use these estimates to determine the resiliency of the current water system supply. Estimated future water demands include residential, commercial, industrial, municipal/institutional/non-profits, confidently estimated municipal use, and unaccounted-for water usage. Residential demand is dependent on changes in population. Commercial and industrial demands depend on changes in economic development. As population and commercial and industrial activities increase, the amount of water needed increases. Future water demands, both average day and maximum day, were estimated through use of the population and residential water demand projections previously presented in Table 3-9 and assuming a steady reduction in UAW from 2019 through 2045. Additionally, a conservative estimate of an additional 5% water demands was incorporated into the average and maximum day demands to account for unknown future developments.

3.5.1 Average Day Demand

The Average Day Demand (ADD) in 2018 was 0.685 MGD. To project future water demands, the residential water use was estimated based on historical residential gallons per capita per day multiplied by the population projections developed for 2019, 2020, 2025, 2030, 2035 and 2045 (see Table 3-9). Stantec assumed that UAW will continue to decrease so that the UAW requirement of 10% or lower is met by 2045. The average daily demand for all other water consumption categories were estimated for the planning period based on the 2018 percentage of total demand. The projected average day demands are presented as a percent of total daily demand in Table 3-10, and the corresponding daily demand volumes are presented in Table 3-11.

Table 3-10: Projected Percentage Average Day Demand by Category

Year	Total Demand	Residential	Commercial/ Business	Industrial	Municipal/Institutional/ Non-profits	Total CEMU	UAW
2019	100.0%	68.3%	5.6%	1.6%	2.8%	1.8%	19.9%
2020	100.0%	68.4%	5.7%	1.6%	2.9%	1.9%	19.5%
2025	100.0%	68.6%	5.9%	1.9%	3.1%	2.1%	18.4%
2030	100.0%	69.2%	6.5%	2.4%	3.7%	2.6%	15.7%
2035	100.0%	69.5%	6.9%	2.8%	4.0%	3.0%	13.8%
2045	100.0%	70.3%	7.6%	3.5%	4.8%	3.8%	10.0%

Table 3-11: Projected Average Day Demand (MGD) by Category

Year	Total Demand	Residential	Commercial/ Business	Industrial	Municipal/Institutional/ Non-profits	Total CEMU	UAW
2019	0.817	0.558	0.046	0.013	0.023	0.015	0.163
2020	0.816	0.560	0.046	0.013	0.023	0.015	0.159
2025	0.813	0.566	0.047	0.013	0.023	0.015	0.150
2030	0.812	0.584	0.048	0.013	0.024	0.015	0.128
2035	0.811	0.597	0.049	0.014	0.025	0.016	0.112
2045	0.781	0.599	0.049	0.014	0.025	0.016	0.078

* The decline in water demand from 2035 to 2045 is due to the decrease in UAW.

In the year 2045, the average day demand is projected to be 0.781 MGD based on population projects and a decrease in unaccounted for water. To account for commercial development currently in the planning/construction phases and for future unidentified development, Stantec recommends including an additional 5% of daily water demands into the 2045 average day demand. For the 25-year planning period it is recommended that the Town use an average daily demand of 0.82 MGD.

3.5.2 Maximum Day Demand

The maximum day demand is the largest volume of water used over a single 24-hour period. The ratio of maximum to average daily consumption is generally higher for residential use than it is for industrial and commercial use. Consumers can easily double or triple their average daily consumption by activities such as lawn watering, car washing, and swimming pool use. The maximum day demand from 2018 was 1.04 MGD per the ASR of that year. Table 3-12 provides a summary of the historical maximum day demand, average day demand and maximum day to average day ratio.

Table 3-12: Historical Maximum and Average Day Demands

Year	Maximum Day Demand (MGD)	Average Day Demand (MGD)	Maximum Day to Average Day Ratio
2010	1.08	0.94	1.2
2011	1.35	0.80	1.7
2012	1.51	0.79	1.9
2013	1.33	0.83	1.6
2014	1.29	0.83	1.6
2015	1.29	0.79	1.6
2016	1.48	0.78	1.9
2017	1.19	0.75	1.6
2018	1.04	0.69	1.5
AVERAGE	1.28	0.80	1.6

The projected maximum day demands from 2019 through 2045 are presented in Table 3-13. These were calculated by multiplying the projected average day demand for those years with the average of the maximum day to average day ratio from the historical period of 2010 through 2018. The 2045 average day demand in Table 3-13 is higher than the total demand presented for that year in Table 3-11 because it includes the additional 5% daily water demands resulting from future development.

Table 3-13: Projected Maximum and Average Day Demands

Demand Type	2019	2020	2023	2030	2035	2045
Average Day	0.82	0.82	0.81	0.81	0.81	0.82
Maximum Day (1.6*×Average Day)	1.31	1.31	1.30	1.30	1.30	1.31

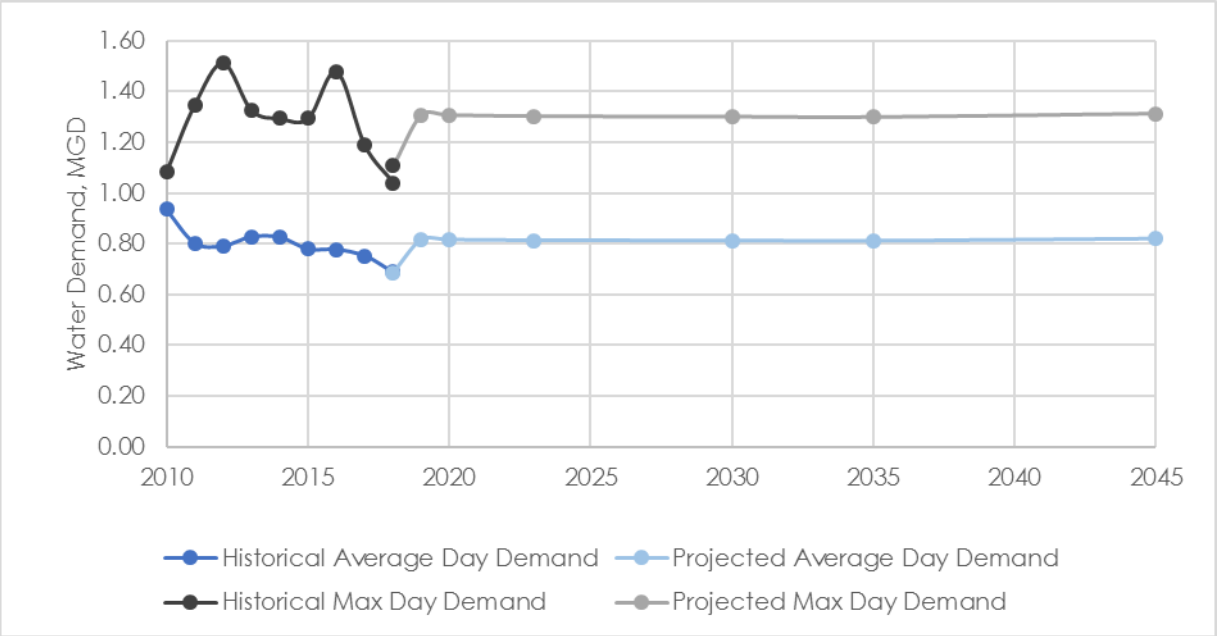
*1.6 is the average of the maximum day to average day ratio from the study period of 2010 through 2018.

Historical and projected average day demands and maximum day demands through the 2045 planning period are illustrated in Figure 3-4.

According to the ASRs submitted by the Town, the relatively high max demand in 2012 occurred in the middle of summer on July 11, and the relatively high max demand in 2014 was found to be mostly attributed to hydrant/water main flushing, water main construction, and fire protection and training. Notwithstanding these values, a general decreasing trend is observed from 2010 through 2018 for both average day demand and maximum day demand. This may be due to increased conservation efforts by the Town to reduce water loss and public awareness of their water supplies and the need for conservation. Additionally, the Town had a restricted water use ban in place for most of 2018 that resulted in lower water demands.

It is anticipated that the average demand and associated maximum day demand for 2019 through 2045 timeframe will increase gradually as development in the service area reaches buildout capacity. In 2045, it is expected that both average day demand and maximum day demand will slightly decrease from 2035 because it is assumed that the UAW requirement of 10% or lower would have been met by then.

Figure 3-4: Historical and Projected Average Day Demand and Maximum Day Demand



For the 25-year planning period it is recommended that the Town use a maximum daily demand of 1.3 MGD.

3.6 LAKE BOON WATER NEEDS

Lake Boon is on the Massachusetts 303d list for Nuisance Aquatic Plants and is threatened with high phosphorus loadings that can result in algal blooms and continued water quality degradation (Massachusetts Department of Environmental Protection, 2016). Residents in the area have in the past expressed interest in obtaining water from Maynard if and when a new surface water treatment plant treating water from White Pond was put online.

In the Woodard & Curran January 2012 report, they referenced Chapter 407 of the Acts of 1888 entitled "An Act to Supply the Town of Maynard with Water" (Act) that was granted under the Massachusetts state legislation to allow the Town of Maynard water rights to White Pond and also added that:

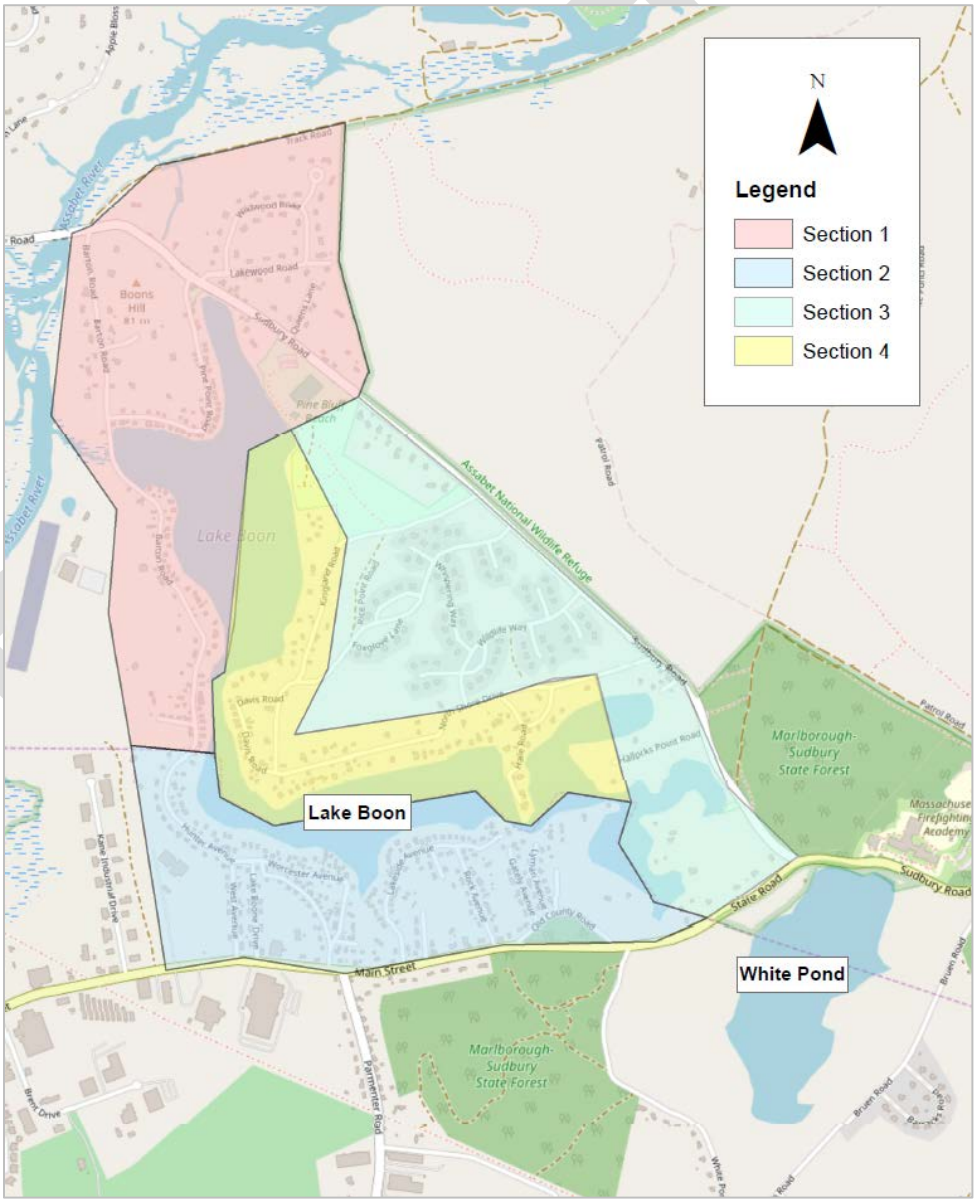
The Town's Town Council, Blatman, Bobroski, and Mead LLC, reviewed the act and it was Town Council's opinion that …"Because the Act specifies that the Town may draw the water that it requires from White Pond, it is clear that [the] Act intends the water to be used for the Town and not sold to any third party for use in another Town."

Stantec recommends that the Town's legal counsel revisit this issue to determine whether there is a potential to provide the Lake Boon area with water, as this could be a source of revenue for the Town, especially during periods of low water demand in Maynard. Table 3-14 provides a summary of the water demands estimated for the areas surrounding Lake Boon.

Table 3-14: Lake Boon Water Demands

Section	Approximate Number of Residential Properties	Water Demand (GPD)
1	124	37,200
2	220	66,000
3	95	28,500
4	96	28,800
TOTAL	535	160,500

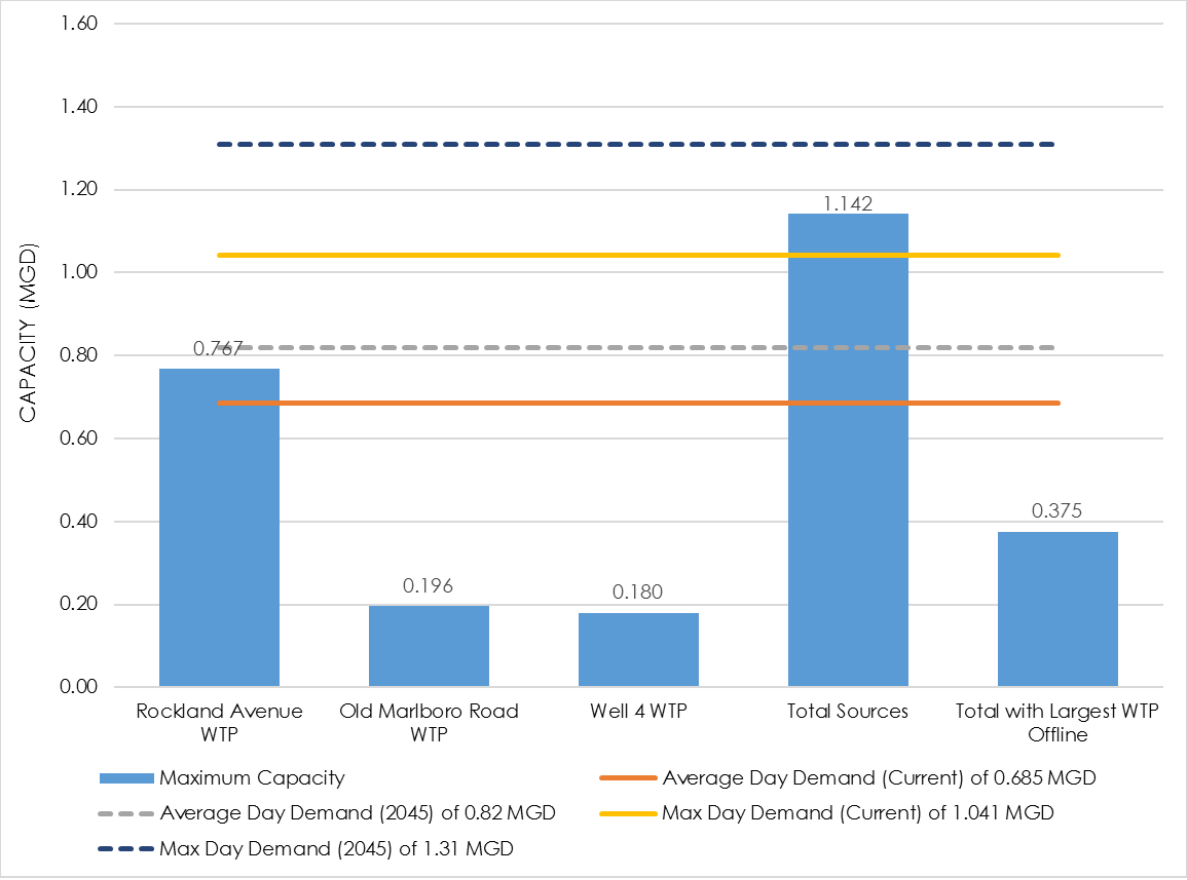
Figure 3-5: Lake Boon Area



4.0 ALTERNATIVES TO MEET DEMAND AND REDUNDANCY

The ability of the Town's existing water system to meet long term goals were evaluated by comparing the current water supply (groundwater sources) to the current and future water demands, as presented in Section 3.0. Figure 4-1 illustrates the Town's water supply capacity in comparison to the current and future average and maximum day demands. The Town of Maynard is not able to meet its future maximum day demands with the volume of water it is able to pump from its existing groundwater sources. The Town's water treatment system is not fully redundant; if the largest WTP were not able to operate, the Town would not be able to meet average or maximum day demands. If an emergency like this were to occur, the Town would need to issue a severe water use restriction and receive drinking water from the neighboring towns. Maynard currently has two interconnections with the Town of Acton and has the capability to receive emergency water from the Town of Sudbury via a hydrant-to-hydrant connection.

Figure 4-1: Water Supply vs. Demand – Historical Operational Data (2017 and 2018)



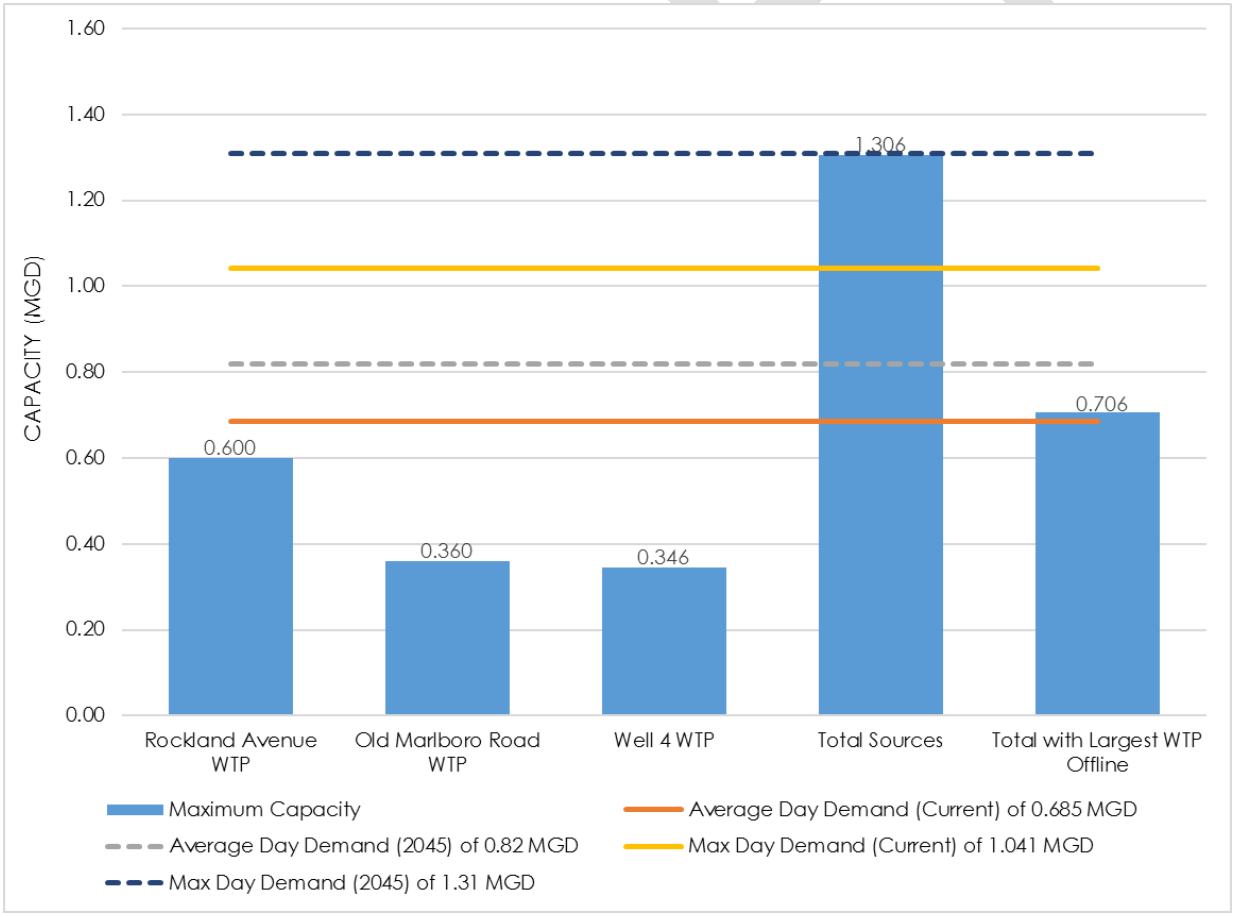
To address the water system's shortcomings with regards to water supplies, both short- and long-term solutions need to be considered. The short-term solutions represent an immediate need for the Town and must rely on existing groundwater sources. Short-term goals include meeting immediate water demands,

provide high quality water, and avoiding a water ban while awaiting long term solutions. A short-term solution will not provide a fully redundant drinking water system.

Although Figure 4-1 shows that average day demands are currently not met, there is capability to increase pumping rates. Figure 4-2 is based on average historical operations, and well pump rates vary daily to meet fluctuating demands and are physically capable of operating at higher pumping rates. Based on historical pumping data, higher pumping rates can be achieved, at least for a short period of time. The recommended approach for meeting the short-term goals in the immediate future is to maximize all of the existing well pumping rates to meet daily water demands.

Figure 4-2 illustrates the Town's water supply capacity with the proposed increased pumping rates of their existing groundwater wells that are currently operable. As seen in Figure 4-2, by increasing the well pumping rates to the maximum values deemed achievable by the operators, the existing groundwater supplies can meet average and maximum day demands. Additionally, the Town has two finished water storage tanks with enough operational storage to meet demand during higher daily demand periods.

Figure 4-2: Water Supply vs. Demand – Increased Well Pumping Rates (Summer 2019)



It is not recommended to operate the wells at these high pumping rates indefinitely. Doing this will likely result in degradation of the water quality, making treatment at the WTPs more complicated. Pumping the wells at these high rates will also result in the need to clean the wells more frequently, which can be an expensive maintenance activity. Over-pumping may also affect the recharge capacity of the groundwater resources, resulting in long term impacts to the Town's water supply regarding both quality and quantity of water available. Increasing the well pumping rates should only be considered a short-term solution that will allow the Town to meet immediate demands while avoiding the need to issue a restrictive water ban during summer months. Implementing water use restrictions should also be considered prior to increasing well pumping rates.

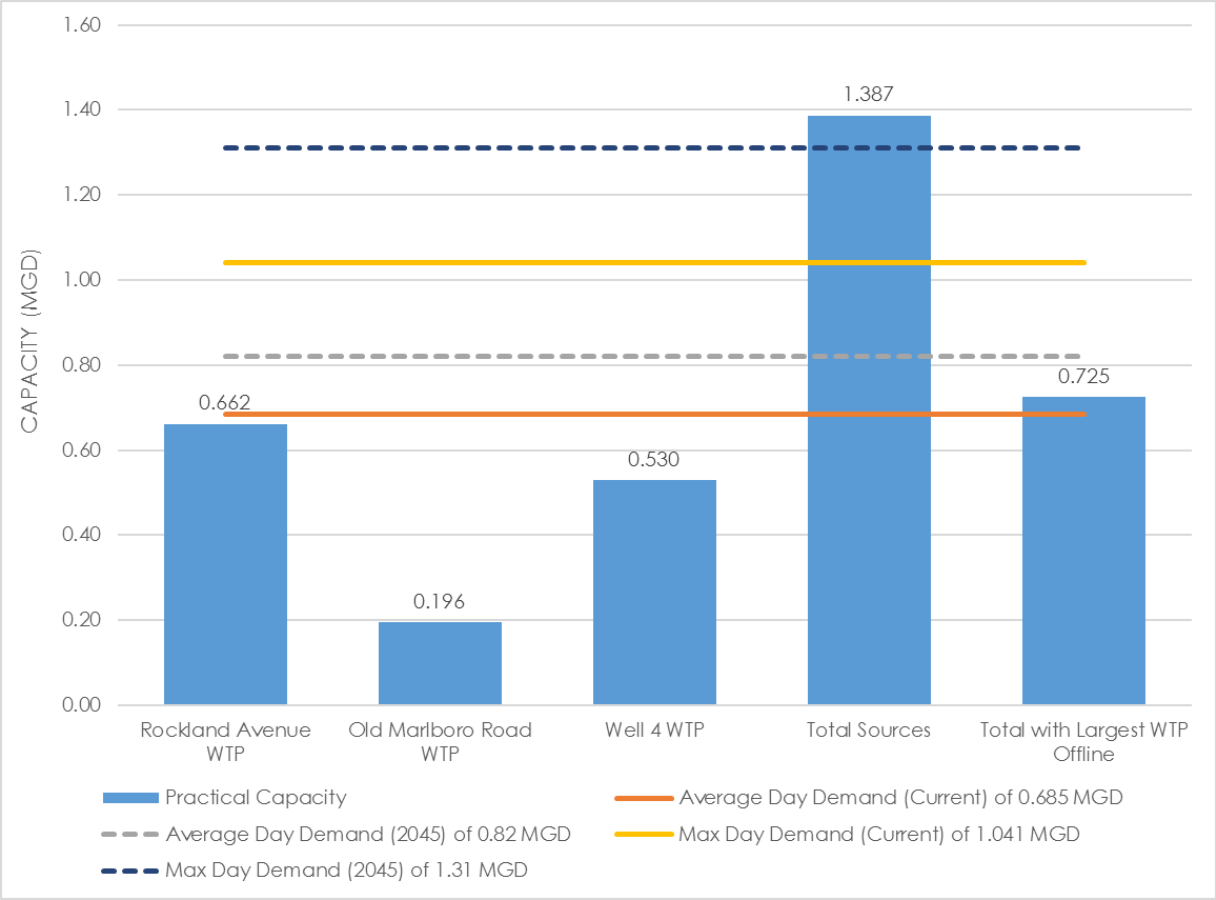
The long-term goals for the Town are to achieve a fully redundant drinking water system, meet future average and maximum day demands, provide a continuous supply of high-quality drinking water to customers, and ensure sustainable and efficient WTP operations. The remaining focus of this report evaluates potential long-term solutions that would meet the Town's goals.

Stantec has reviewed potential new water sources and improvements to existing sources that would increase capacity. Stantec has also explored all combinations of sources to determine possible solutions to meeting average and maximum day demands in the future. The following sections describe the alternatives evaluated and recommendations made to ensure the Town's goals of high-quality water, redundant finished water supply, and effective WTP operations can be met in the future.

4.1 CURRENT OPERATIONS + NEW WELL 4A

This scenario considers that Well 2174000-06G has successfully been brought online to supplement the Rockland WTP with an additional 0.20 MGD capacity. It also considers the 0.350 MGD that the new Well 4A will add to the water supply from the Well 4 WTP in the near future. It was assumed that all other wells would achieve the same average pumping rates from 2018. As shown in Figure 4-3, this scenario does not provide a fully redundant system, as the maximum day demand will not be met with the largest WTP offline. This solution relies on the continued use of groundwater that has experienced a degradation of water quality in recent years, resulting in operational challenges and inefficiencies in the WTP processes. This water supply scenario is a reasonable solution to pursue in the short term, while a more sustainable and redundant long-term solution is pursued. If additional water supply is needed to meet maximum day demands, pumping rates of existing wells can be increased for short periods of time or the Town can utilize water from interconnected Towns.

Figure 4-3: Water Supply vs. Demand – Well 4A Online

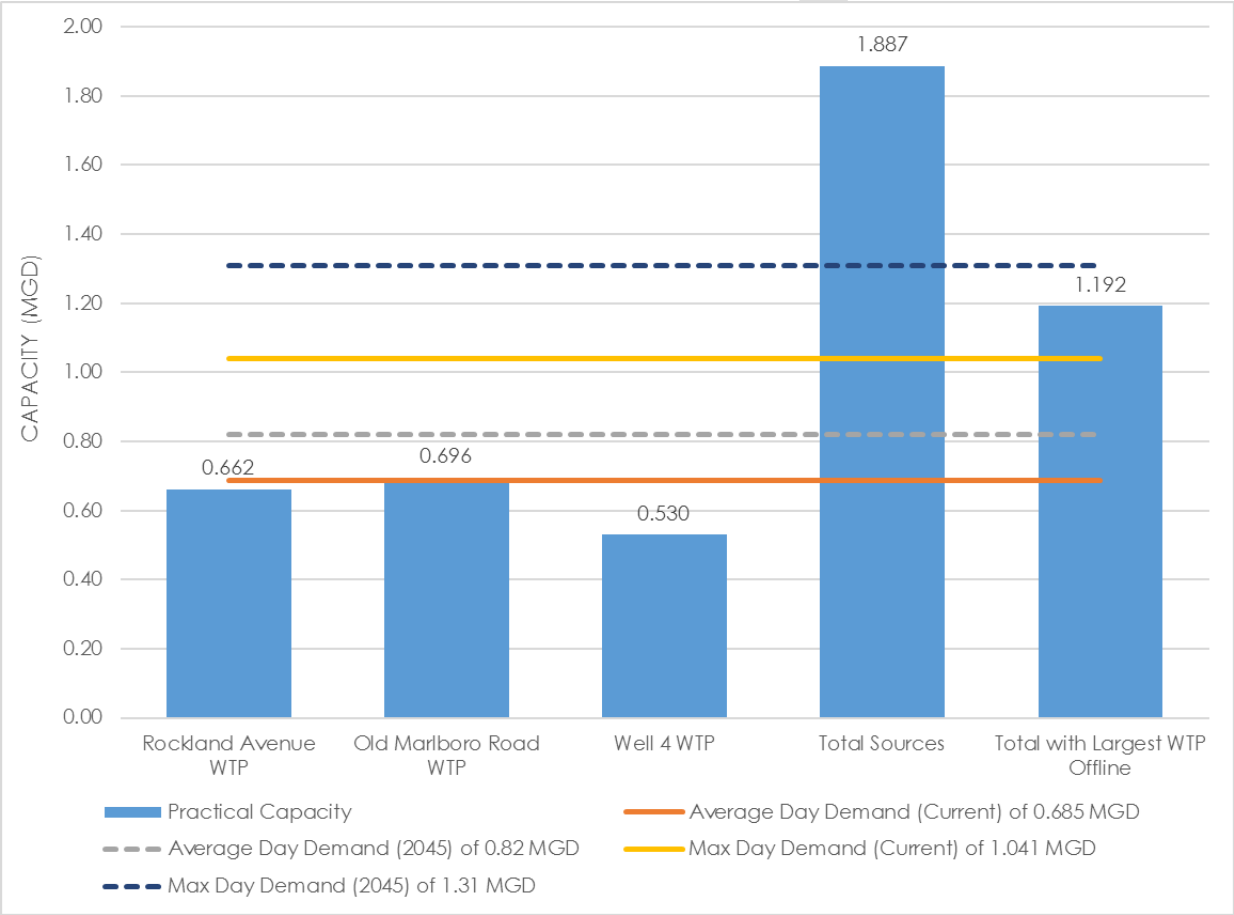


4.2 CURRENT OPERATIONS + NEW WELL 4A + WELL 2174000-03G (AT OMR)

This scenario is similar to the one presented in Section 4.1 with the assumption that Well 2174000-03G can be rehabilitated to supply the OMR WTP with an additional 0.50 MGD. However, the water from this well is known to be challenging with significantly higher color than other wells at OMR. Bringing this well online at the OMR WTP would necessitate treatment upgrades, including pretreatment for color. Woodard & Curran (2012 Assessment of Water Resources Report) recommended dissolved air flotation, ballasted flocculation system (i.e., Actiflo package system), and/or membrane filtration treatment systems at OMR WTP for the treatment of Well 03G in combination with the other OMR wells. Before implementing a treatment alternative, a pilot test is required by MassDEP to confirm effectiveness. In addition to color treatment, there is the potential that the wells will require more frequent cleaning since the color treatment occurs after well pumping at the treatment plant. In 2012, Woodard & Curran estimated the cost of OMR treatment upgrades to be $3.9 Million. Due to inflation since 2012, these costs would now be approximately 12% higher in terms of 2019 US dollars, equal to approximately $4.4 Million.

Figure 4-4 illustrates water supply capacity from each WTP in this scenario. This scenario does not provide a redundant system, as the maximum day demand will not be met with the largest WTP offline. The reliability of Well 2174000-03G as a water source remains questionable even after rehabilitation. Additionally, this scenario would continue to rely on the existing well water at Rockland Avenue, which has experienced a degradation of water quality in recent years, resulting in operational challenges and inefficiencies in the WTP processes.

Figure 4-4: Water Supply vs. Demand – Well 4A and Well 2174000-03G Online

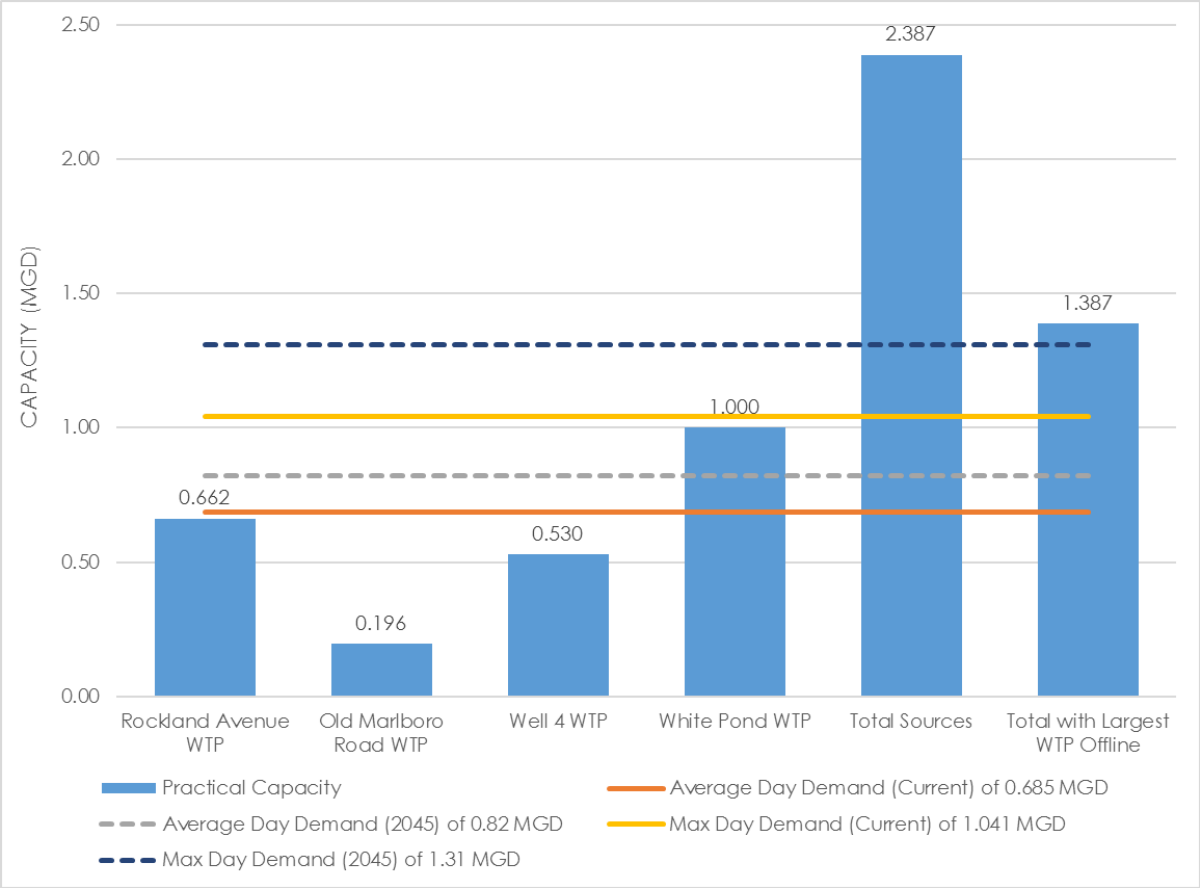


4.3 CURRENT OPERATIONS + NEW WELL 4A + WHITE POND

This scenario is similar to the one presented in Section 4.1 with the addition of a 1.0 MGD supply from White Pond. This is the only potential water supply scenario that does provide a fully redundant drinking water treatment system, ensuring that demands are met even when the largest WTP is offline. Figure 4-5 illustrates water supply capacity from each WTP in this scenario. In this scenario, a new surface water treatment plant will be required to treat White Pond water. The potential treatment technology, location, and estimated costs for a new White Pond WTP is discussed in detail in Section 5.0 of this report. In addition to providing a fully redundant system in the future, this scenario provides the advantage of no

longer needing to rely on the Town's groundwater sources that have been experiencing degrading water quality in recent years. A new White Pond WTP could provide enough capacity to meet average day demands both now and in the future. Groundwater supplies would only be required during high demand periods and at relatively low flows, so the best quality water could be selected for use during these periods rather than having to operate all of the wells and WTPs.

Figure 4-5: Water Supply vs. Demand – White Pond and Well 4A Online



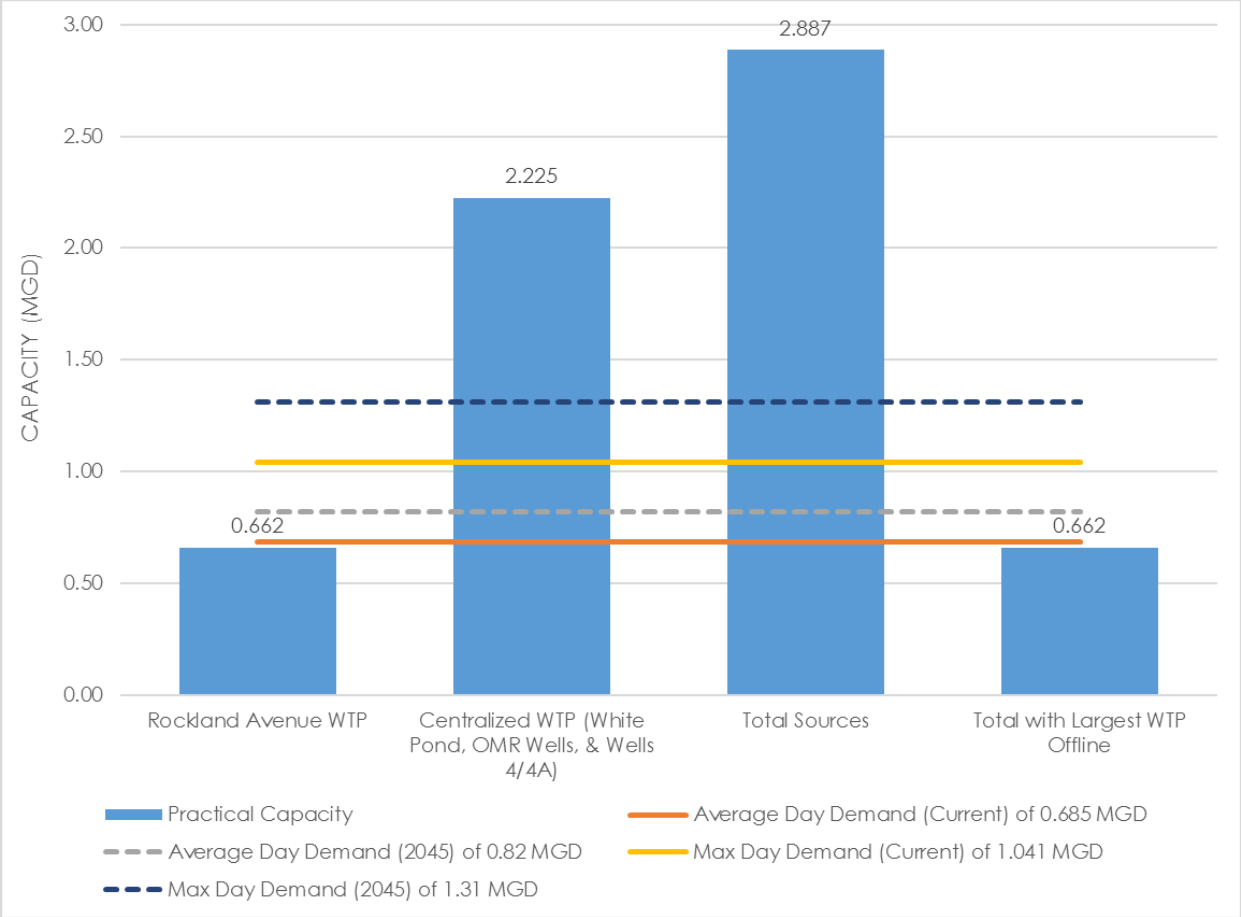
4.4 CENTRALIZED WTP FOR WHITE POND, OMR WELLS, & WELLS 4/4A + ROCKLAND AVE WTP

This scenario is similar to the one presented in Section 3 in that the White Pond source will be brought back online and a new treatment plant will be required. However, in this scenario a centralized WTP would be constructed in a central location in town that would allow for the combined treatment of White Pond surface water and OMR and Well 4/4A groundwater. This would allow for OMR Well 2174000-03G to be placed back online, as the new treatment process would be adequate for treating this challenging water source. Figure 4-6 illustrates water supply capacity from each WTP in this scenario.

This option provides the Town with the greatest supply capacity. In this scenario, the new WTP would have a large capacity (2.2 MGD); if the largest WTP were to experience an emergency that put the entire WTP out of operations, the Town's remaining drinking water source (Rockland Ave WTP) would not have enough capacity to meet average or maximum daily demands now or in the future. This scenario should still be considered as a potential long-term solution though, as it presents the Town with several advantages, including: maximizing water supply capacity, a centralized WTP to maximize staff efficiency, and elimination of the need to regularly treat unpredictable and decreasing raw water quality from Rockland Avenue and OMR well fields with existing Greensand filter plants. Concerns with redundancy could be addressed through the design process of the new WTP by incorporating redundant treatment trains, redundant critical equipment, and providing 100% backup emergency power with a generator.

This option could potentially be implemented in several phases, with the first phase including building the new WTP for treatment of OMR and Well 4/4A well water. The first phase could be implemented while the permitting issues with White Pond raw water transmission are resolved (see Section 6.0). The second phase would include construction of a White Pond raw water transmission main to deliver water from White Pond to the new WTP located in Town.

Figure 4-6: Water Supply vs. Demand – Well 2174000-06G, Well 2174000-03G, Well 4A and White Pond



4.5 RECOMMENDATIONS

4.5.1 Near Term

In order to address immediate concerns with water demands during the high demand summer months, a near term solution that has been recommended and is currently being implemented by the Town is to increase the pumping capacity at all currently operating wells. This solution is intended to meet water demands while avoiding a more restrictive water ban during summer months. Based on historical pumping rates and operator input, it is recommended to operate as follows:

- OMR WTP at 180 GPM
- Well 4 WTP 240 GPM
- Rockland Ave WTP at 420 GPM

Typically, the OMR and Well 4 WTPs would be operated approximately 8h/day, while the Rockland Ave WTP will continue operating until the storage tanks are full.

Taking this approach would require operators to spend an excessive amount of time monitoring well levels, storage tank levels, and water quality (raw and finished water from each source/WTP). While it is possible that the demands can be met with such steps, there is the risk of degrading water quality due to over pumping of the aquifers, which would lead to more frequent water quality issues and challenging operations at the WTPs, especially at the Rockland Ave and OMR WTPs.

4.5.2 Medium Term

The medium-term recommended solution is to develop and permit the new Well 4A, which will supplement the water system with an additional 0.350 MGD. Additionally, once the current OMR Upgrades project is complete (anticipated Fall 2019), a higher output could be achieved from this plant with reduced risk of DBPs forming in the distribution system. Until treatment upgrades are completed, it is unknown how much additional capacity might be gained at the OMR WTP. The medium-term solution does not provide full redundancy, but it does take a big step towards providing enough capacity to meet average day and maximum day demands with all WTPs operational.

4.5.3 Long Term

The recommended long-term solution is to pursue White Pond as the Town's primary drinking water source. This solution provides greater redundancy, increased water supply, and the opportunity for improved water quality and operational efficiencies. Treatment of White Pond water could be achieved at one of two locations: (1) new WTP at the White Pond site or (2) new centralized WTP on Town-owned land near the Well 4 WTP. The benefit to treating water at a centralized WTP is that the Town could reduce the number of WTPs that need to be operated and maintained. The centralized WTP could be designed to treat White Pond surface water and well water from OMR and Well 4 well fields. This would eliminate the need for the Well 4 and OMR WTPs.

This long-term solution and the various location and treatment alternatives are further discussed in proceeding sections.

5.0 NEW SURFACE WATER TREATMENT PLANT

The recommended long-term solution is to treat White Pond water at a new water treatment plant. This section describes the rules and regulations that the new surface water treatment plant would have to conform to, treatment alternatives for White Pond water, footprint and costs associated with the alternatives, evaluation of alternatives, and recommendations.

5.1 SUMMARY OF DRINKING WATER REGULATIONS

The Safe Drinking Water Act (SDWA) is the federal law that protects public drinking water supplies throughout the nation. Under the SDWA, Environmental Protection Agency (EPA) sets standards for drinking water quality. The Massachusetts Department of Environmental Protections (MassDEP) is the responsible state agency for enforcing these regulations. Development of a new surface water treatment plant to treat White Pond water must ensure the finished water quality and plant design adheres to all the relevant drinking water regulations enforced by the MassDEP.

This section summarizes the relevant regulatory requirements for a new surface water treatment plant, with a focus on the treatment and water quality requirements. Monitoring and reporting are important regulatory requirements that must be followed but will not be discussed in detail in this report.

The regulations that pertain to operations and management of a surface water treatment source include:

- Surface Water Treatment Rule (SWTR) and Enhanced Surface Water Treatment Rule (ESWTR)
- Filter Backwash Recycling Rule
- National Primary Drinking Water Regulations (i.e., contaminant standards)
- National Secondary Drinking Water Standards
- Massachusetts Drinking Water Guidelines
- Stage 1 and Stage 2 Disinfectants/Disinfection By-Product Rule (D/DBPR)
- Revised Total Coliform Rule (TCR)
- Lead and Copper Rule (LCR)

5.1.1 Surface Water Treatment Rules

The surface water treatment rule established in June 1989 has experienced multiple levels of revisions and additions. The additions that apply to establishing a new surface water treatment plant at White Pond include the Filter Backwash Recycling Rule (June 2001) and the Long Term 2 Enhanced Surface Water Treatment Rule (January 2006).

The purpose of these surface water treatment rules is to reduce illnesses caused by pathogens in drinking water such as Giardia lamblia, Legionella, and Cryptosporidium. These rules require surface water treatment plants to filter and disinfect water sources before it is distributed to the public; providing protection from microbial pathogens as well as disinfection byproducts.

The filter backwash recycling rule requires all backwash water to go through all the processes in the system's conventional or direct filtration treatment system.

The Long Term 2 Enhanced Surface Water Treatment Rule targets additional Cryptosporidium treatment requirements and methods of reducing microbial pathogens and disinfection by-products simultaneously.

5.1.2 National Primary Drinking Water Regulations

The National Primary Drinking Water Regulations (NPDWR) are legally enforceable primary standards and treatment techniques that apply to public water systems. Primary standards, or maximum contaminant levels (MCLs), and treatment techniques (TT) protect public health by limiting the levels of contaminants in drinking water. The Massachusetts MCLs listed in the state drinking water regulations (310 CMR 22.00) consist of US EPA MCLs plus a few MCLs set specifically by Massachusetts. The standards are enforced by the DEP's Drinking Water Program (DWP). Massachusetts may adopt a more stringent standard than the US EPA based on an independent review of primary or secondary data.

MCLs established by the NPDWR and Massachusetts DEP DWP are summarized in Table 5-1; Massachusetts MCLs are only provided if they differ from the EPA NPDWR.

Table 5-1: MCLs Established by SWTRs

Contaminant	MCL or TT Limit	Public Health Goal	Massachusetts MCL (mg/L)
ORGANICS			
Acrylamide	0.050% dosed at 1.000 mg/L	0.000 mg/L	
Alachlor	0.002 mg/L	0.000 mg/L	
Atrazine	0.003 mg/L	0.003 mg/L	
Benzene	0.005 mg/L	0.000 mg/L	
Benzo(a)pyrene	0.200 µg/L	0.000 µg/L	
Carbofuran	0.040 mg/L	0.040 mg/L	
Carbon tetrachloride	0.005 mg/L	0.000 mg/L	
Chlordane	0.002 mg/L	0.000 mg/L	
Chlorobenzene	0.100 mg/L	0.100 mg/L	
2,4-D (2,4-Dichlorophenoxyacetic acid)	0.070 mg/L	0.070 mg/L	
Dalapon	0.200 mg/L	0.200 mg/L	
1,2-Dibromo-3-chloropropane (DBCP)	0.200 µg/L	0.000 µg/L	
1,2-Dichlorobenzene (o-DCB)	0.600 mg/L	0.600 mg/L	
1,4-Dichlorobenzene (p-DCB)	0.075 mg/L	0.075 mg/L	0.005
1,2-Dichloroethane	0.005 mg/L	0.005 mg/L	
1,1-Dichloroethylene	0.007 mg/L	0.007 mg/L	
cis-1,2-Dichloroethylene	0.070 mg/L	0.070 mg/L	
trans-1,2-Dichloroethylene	0.100 mg/L	0.100 mg/L	

Contaminant	MCL or TT Limit	Public Health Goal	Massachusetts MCL (mg/L)
ORGANICS			
Dichloromethane	0.005 mg/L	0.000 mg/L	
1,2-Dichloropropane	0.005 mg/L	0.000 mg/L	
Di(2-ethylhexyl)-adipate	0.400 mg/L	0.400 mg/L	
Di(2-ethylhexyl)-phthalate	0.006 mg/L	0.000 mg/L	
Dinoseb	0.007 mg/L	0.007 mg/L	
Diquat	0.020 mg/L	0.020 mg/L	
Endothall	0.100 mg/L	0.100 mg/L	
Endrin	0.002 mg/L	0.002 mg/L	
Epichlorohydrin	0.010 percent dosed at 20.00 mg/L	0.000 mg/L	
Ethylbenzene	0.700 mg/L	0.700 mg/L	
Ethylene dibromide (EDB)	0.050 µg/L	0.000 µg/L	0.00002
Glyphosate	0.700 mg/L	0.700 mg/L	
Heptachlor	0.400 µg/L	0.000 µg/L	
Heptachlor epoxide	0.200 µg/L	0.000 µg/L	
Hexachlorobenzene	0.001 mg/L	0.000 µg/L	
Hexachlorocyclopentadiene	0.050 mg/L	0.050 mg/L	
Lindane	0.200 µg/L	0.200 µg/L	
Methoxychlor	0.040 mg/L	0.040 mg/L	
Oxamyl (Vydate)	0.200 mg/L	0.200 mg/L	
PCBs (Polychlorinated biphenyls)	0.500 µg/L	0.000 µg/L	
Pentachlorophenol	0.001 mg/L	0.000 mg/L	
Picloram	0.500 mg/L	0.500 mg/L	
Simazine	0.004 mg/L	0.004 mg/L	
Styrene	0.100 mg/L	0.100 mg/L	
2,3,7,8-TCDD (Dioxin)	0.030 ng/L	0.000 ng/L	
Tetrachloroethylene	0.005 mg/L	0.000 mg/L	
Toluene	1.000 mg/L	1.000 mg/L	
Toxaphene	0.003 mg/L	0.000 mg/L	
2,4,5-TP (Silvex)	0.050 mg/L	0.050 mg/L	
1,2,4-Trichlorobenzene	0.070 mg/L	0.070 mg/L	
1,1,1-Trichloroethane	0.200 mg/L	0.200 mg/L	
1,1,2-Trichloroethane	0.005 mg/L	0.003 mg/L	
Trichloroethylene	0.005 mg/L	0.000 mg/L	
Vinyl chloride	0.002 mg/L	0.000 mg/L	
Xylenes (total)	10.00 mg/L	10.00 mg/L	

Contaminant	MCL or TT Limit	Public Health Goal	Massachusetts MCL (mg/L)
INORGANICS			
Antimony	0.006 mg/L	0.006 mg/L	
Arsenic	0.010 mg/L	0.000 mg/L	
Asbestos	7.000 million fibers/L	7.000 million fibers/L	
Barium	2.000 mg/L	2.000 mg/L	
Beryllium	0.004 mg/L	0.004 mg/L	
Cadmium	0.005 mg/L	0.005 mg/L	
Chromium (total)	0.100 mg/L	0.100 mg/L	
Copper	1.300 mg/L (in more than 10% of samples)	1.300 mg/L	
Cyanide (as free cyanide)	0.200 mg/L	0.200 mg/L	
Fluoride	4.000 mg/L	4.000 mg/L	
Lead	0.015 mg/L (in more than 10% of samples)	0.000 mg/L	
Mercury (inorganic)	0.002 mg/L	0.002 mg/L	
Nitrate (As N)	10.00 mg/L	10.00 mg/L	
Nitrate/Nitrite (total)	–	–	10
Nitrite (As N)	1.000 mg/L	1.000 mg/L	
Perchlorate	–	–	0.002
Selenium	0.050 mg/L	0.050 mg/L	
Thallium	0.002 mg/L	0.500 µg/L	
DISINFECTION BYPRODUCTS			
Bromate	0.010 mg/L	0.000 mg/L	
Chlorite	1.000 mg/L	0.800 mg/L	
Haloacetic acids (HAA5) (for chlorinated supplies only): including monochloroacetic acid, dichloroacetic acid, trichloroacetic acid, bromoacetic acid and dibromoacetic acid	0.060 mg/L	Different for each	
Total trihalomethanes (for chlorinated supplies only)	0.080 mg/L	Different for each	
DISINFECTANTS			
Chloramines (as Cl_2)	4.000 mg/L	4.000 mg/L	
Chlorine (as Cl_2)	4.000 mg/L	4.000 mg/L	
Chlorine dioxide (as ClO_2)	0.800 mg/L	0.800 mg/L	
MICROORGANISMS			
Cryptosporidium	99.00% removal	zero	TT

E. coli	–	–	310 CMR 22.05
Giardia lamblia	99.90% removal	zero	TT
Heterotrophic plate count	<500 colonies/mL	<500 colonies/mL	TT
Legionella	No limit	No limit	TT
Turbidity	0.300 NTU	0.300 NTU	TT
Viruses (enteric)	<5.000% of samples positive in one month	zero	TT
Total Coliforms	99.90% inactivation	zero	Indicator used in tiered monitoring protocol in the Revised Total Coliform Rule
Fecal Indicator (*E. coli*, enterococci, coliphage)	Repeat samples that are positive	zero	Indicator used in tiered monitoring protocol in the Ground Water Rule
RADIONUCLIDES			
Beta particle and photon radioactivity	4.000 millirems per year	4.000 millirems per year	
Gross alpha radiation	15.00 pCi/L	0.000 pCi/L	
Radium (226 + 228)	5.000 pCi/L	0.000 pCi/L	
Uranium	30.00 µg/L	0.000 µg/L	

5.1.3 National Secondary Drinking Water Regulations

In addition to MCLs, EPA has established National Secondary Drinking Water Regulations (NSDWRs) that set non-mandatory water quality standards for 15 contaminants. EPA does not enforce these "secondary maximum contaminant levels" (SMCLs). They are established as guidelines to assist public water systems in managing their drinking water for aesthetic considerations, such as taste, color, and odor. These contaminants are not considered to present a risk to human health at the SMCL. These contaminants are summarized in Table 5-2.

Table 5-2: National Secondary Drinking Water Regulations

Chemicals/Parameter	MCL or TT Limit	Massachusetts SMCL (mg/L)
Aluminum	0.05 to 0.2 mg/L	0.05 to 0.2
Chloride	250 mg/L	250
Color	15 color units	15 color units
Copper	1 mg/L	1
Corrosivity	noncorrosive	non-corrosive
Fluoride	2 mg/L	2
Foaming agents	0.5 mg/L	0.5

Iron	0.3 mg/L	0.3
Manganese	0.05 mg/L	0.05
Methyl tertiary butyl ether	–	0.020-0.040
Odor	3 threshold odor numbers	3 threshold odor numbers
pH	6.5 - 8.5	6.5 - 8.5
Silver	0.1 mg/L	0.1
Sulfate	250 mg/L	250
Total dissolved solids (TDS)	500 mg/L	500
Zinc	5 mg/L	5

5.1.4 Massachusetts Office of Research and Standards Guidelines

The MassDEP Office of Research and Standards (ORS) issues guidance for chemicals other than those with Massachusetts MCLs in drinking water. These ORS guidance values are known as ORS Guidelines (ORSG) and are usually developed for use by Departmental programs in the absence of any other federal standards or guidance; see Table 5-3.

Table 5-3: MassDEP ORS Guidelines

Contaminant	ORSG (mg/L)
Acetone	6.3
Aldicarb1	0.003
Aldicarb sulfone2	0.002
Aldicarb sulfoxide3	0.004
Bromomethane	0.01
Chloroform4	0.07
Dichlorodifluoromethane	1.4
1,1-Dichloroethane	0.07
1,3-Dichloropropene	0.0004
1,4-Dioxane	0.0003
Ethylene glycol	14
Manganese	General Population: 0.3 (lifetime); 1.0 (limit exposure to > 1.0 mg/L to 10 days)
	Infants < 1 year old: 0.3 (limit exposure to > 0.3 mg/L to 10 days)
Methyl ethyl ketone	4
Methyl isobutyl ketone	0.35
Methyl tertiary butyl ether	0.07
Metolachlor	0.1

Contaminant	ORSG (mg/L)
Naphthalene	0.14
Nickel7	0.1
N-Nitrosodimethylamine (NDMA)	0.00001
Petroleum Hydrocarbons	
TPH	0.2
Aliphatics	
C_5-C_8	0.3
C_9-C_{12}	0.7
C_9-C_{18}	0.7
C_{19}-C_{36}	14
Aromatics:	
C_6-C_8	use guidance for individual chemicals
C_9-C_{10}	0.2
C_{11}-C_{22}	0.2
Per- and Polyfluoroalkyl Substances (PFAS)	0.00007
Sodium	20
Tertiary-Amyl Methyl Ether (TAME)	0.09
Tertiary Butyl Alcohol (TBA)	0.12
Tetrahydrofuran	0.6
1,1,2-Trichloro-1,2,2-trifluoroethane (FREON 113)	210

5.1.5 Disinfectants/Disinfection Byproducts Rule

Drinking water treatment plants must use a method of disinfection to kill or deactivate microbial pathogens such as Giardia, Cryptosporidium, and viruses. However, methods of disinfection can react with naturally occurring material in the water to form disinfection byproducts (DBPs) including Trihalomethanes (THMs), Haloacetic acids (HAAs), Chlorite, and Bromate. The EPA has developed Stage 1 and Stage 2 Disinfectants and Disinfection Byproducts Rules to reduce drinking water exposure to DBPs that pose a threat to human health. The rules set MCLs to common DPBs as well as compliance monitoring requirements for THMs and HAAs.

5.1.6 Total Coliform Rule

The Total Coliform Rule was revised on February 13, 2013. This rule sets an MCL for E. coli in drinking water, sampling requirements, corrective actions, and record keeping requirements. Total coliforms are a group of related bacteria that are (with few exceptions) not harmful to humans. A variety of bacteria, parasites, and viruses, known as pathogens, can potentially cause health problems if humans ingest them. EPA considers total coliforms a useful indicator of other pathogens in drinking water. Total coliforms are used to determine the adequacy of water treatment and the integrity of the distribution system.

5.1.7 Drinking Water Regulations Under Review/Development

5.1.7.1 Lead and Copper Rule

In 2007, the EPA revised the Lead and Copper Rule to enhance implementation in the areas of monitoring, treatment, customer awareness, and lead service line replacement. This rule requires systems to monitor drinking water at customer taps. If lead concentrations exceed an action level of 15 ppb or copper concentrations exceed an action level of 1.3 ppm in more than 10% of the taps sampled, the distribution and treatment system must undergo certain actions to prevent corrosion. If the action level for lead is exceeded, the public water utility must also inform the public about methods to protecting their health as well as replacing lead service pipes under their control. EPA is considering Long-Term Revisions to the Lead and Copper Rule to improve public health protection by making substantive changes and to streamline the rule requirements.

Whenever a new water treatment system is put online, or changes to existing treatment plant is implemented the potential impacts to the system's corrosion control methods must be studied to ensure lead and copper levels are not negatively impacted by treatment changes.

5.1.7.2 Perchlorate

Perchlorate is a naturally occurring compound that is also used in rocket propellants, munitions, fireworks, matches, and signal flares. In 2011, the EPA established that this contaminant meets the SDWA criteria for regulation as a contaminant. Since that time, EPA has reviewed the best available scientific data and has published a notice of proposed rulemaking. EPA is currently seeking comment on a proposed perchlorate MCL. Massachusetts has established an enforceable standard for perchlorate in drinking water at 2 µg/L.

5.1.7.3 Per- and Polyfluoroalkyl Substances (PFAS)

PFAS are emerging contaminants that have been found in many water sources. PFAS are a family of chemicals used since the 1950s to manufacture stain-resistant, water-resistant, and non-stick products. Certain types of firefighting foam—historically used by the U.S. military, local fire departments, and airports to fight oil and gasoline fires—may contain PFAS. Studies indicate that exposure to sufficiently elevated levels of certain PFAS may cause a variety of health effects including developmental effects in fetuses and infants, effects on the thyroid, liver, kidneys, certain hormones and the immune system. Some studies suggest a cancer risk may also exist in people exposed to higher levels of some PFAS. Scientists and regulators are still working to study and better understand the health risks posed by exposures to PFAS, and MassDEP is following developments in this burgeoning area closely.

MassDEP requires Public Water Suppliers to test all new sources of drinking water for PFAS. In May 2016, the EPA issued a lifetime Health Advisory (HA) of 70 parts per trillion (0.07 ug/L) for the combination of two PFAS chemicals, PFOS and PFOA, in drinking water. In June 2018, due to similar health concerns, MassDEP established an ORSG level for drinking water that extended the EPA advisory to include the following three additional PFAS chemicals: PFNA, PFHxS, and PFHpA, because these

compounds share very similar chemical structures and the available data indicates they are likely to exhibit similar toxicities. The ORSG level is 70 parts per trillion (ppt) and applies to the total summed level of all five compounds.

In January 2019, MassDEP announced its intention to initiate the process to develop an MCL for a group of Per- and Polyfluoroalkyl Substances (PFAS).

5.2 WHITE POND WATER QUALITY

The raw quality data from the 1991 Pilot Study was considered when evaluating possible alternatives to treating the raw water from White Pond as well as PFAS data from 2018. A complete data set of the raw water data can be found in Appendix D. Table 5-4 provides a brief summary of the data from these two sources.

Table 5-4: Summary of White Pond Raw Water Quality Data

Parameter	Raw Water Concentration		Regulatory Limit	
Alkalinity	7.5	mg/L		
Ammonia	ND	mg/L		
Arsenic	ND	mg/L	0.010	MMCL (mg/L)
Calcium	4.3	mg/L		
Chloride	16	mg/L	250	SMCL (mg/L)
Chlorine	ND	mg/L	4	MMCL (mg/L)
Coliform Bacteria	Neg	Pos/Neg	0	MCLG
Color	4	CU	15	SMCL (CU)
Conductivity	78	umhos/cm		
Copper	ND	mg/L	1	SMCL (mg/L)
Corrosivity	-3.4	SU	Non-corrosive	SMCL
Fecal Bacteria	NT	Pos/Neg	0	MCLG
Fluoride	ND	mg/L	2	SMCL (mg/L)
Foaming Agents	ND	mg/L	0.5	SMCL (mg/L)
Hardness	15.3	mg/L		
Iron	0.01	mg/L	0.3	SMCL (mg/L)
Lead	ND	mg/L	0.015	MMCL (mg/L)
Magnesium	1.1	mg/L		
Manganese	0.01	mg/L	0.05	SMCL (mg/L)
Nitrate	ND	mg/L	10	MMCL (mg/L)
Nitrite	ND	mg/L	1	MMCL (mg/L)
Odor	ND	ton	3	SMCL (threshold odor numbers)
PFAS	0.068	µg/L	0.070	ORSG (µg/L)
pH	6.2	1	6.5-8.5	SMCL

Parameter	Raw Water Concentration		Regulatory Limit	
Potassium	0.84	mg/L		
Sediment	Neg	Pos/Neg		
Sodium	10.9	mg/L	20	ORSG (mg/L)
Standard Plate Count	NT	CFU	0	MCLG
Sulfate	9	mg/L	250	SMCL (mg/L)
Total Dissolved Solids	46.8	mg/L	500	SMCL (mg/L)
Turbidity	0.7	NTU	5	MMCL (NTU)

5.3 SURFACE WATER TREATMENT SYSTEM PROCESS

5.3.1 Raw Water Intake & Screening

The existing 12-inch intake structure is set at seven (7) feet below the surface water elevation. The pond is approximately 22 feet deep, allowing the intake structure to be lowered to provide for additional capacity within the pond. It is recommended that a new intake structure be constructed at a lower elevation to potentially increase the yield of the pond. An analysis of the pond's yield is beyond the scope of this report, but a new intake structure constructed at a lower elevation could increase the yield.

The purpose of an intake is to ensure that adequate quantities of the best available quality of raw water can be withdrawn from White Pond. The intake structure to be installed at White Pond should be constructed to allow water withdrawals at multiple levels to limit the influence of seasonal variations on the raw water's physical-chemical and/or biological profile. The entry ports will remain submerged at all times to depths sufficient to avoid issues with sheets of ice forming during the winter months, floating debris, and to preclude the entraining of air.

Passive screening allows water through the intake ports at a low, uniform velocity. Water passes through the screen while debris and aquatic life remain in the water. Passive intake screens can handle large quantities of water, increase flow equalization, and reduce headloss. An intake screen can be combined with an airburst system to optimize performance and reduce cleaning costs.

A raw water intake line will connect the intake ports to a wetwell located underneath a new pump house.

5.3.2 Raw Water Pumping & Storage

The existing water pump station is located at an elevation of 192 feet, approximately 50 feet from the edge of White Pond that has an approximate surface water elevation of 187 feet. Based on FEMA maps, the 100-year floodplain for the pond is approximated to be near the pond edge of water (Woodard & Curran, 2012). It is recommended that a new raw water intake pump station be moved at a higher elevation on the site that is adequately located outside of the 100-year floodplain.

There will be at least two raw water pumps at the new pump house. These will convey the raw water from the wetwell to the new surface water treatment facility that will be located either at White Pond itself or in

the Town of Maynard. The capacity of the raw water pumping and storage will be sized to ensure continuous raw water supply to the treatment plant. The raw water pumping capacity should be equal to the average rate of demand on the maximum day, which is assumed to be 2 MGD for this evaluation.

5.3.3 Chemical Pretreatment

5.3.3.1 pH Adjustment

According to the pilot study done in 1991 by Dufresne-Henry (now Stantec), the pH of the raw water at White Pond was less than 7 and the alkalinity was found to be less than 10. Surface waters with low pH/alkalinity typically require pre-treatment with lime, caustic soda, or soda/pot- ash to increase the pH to a level that provides optimum coagulation.

Lime is available as hydrated or slaked lime ($Ca(OH)_2$) and quicklime (CaO), and can be used to increase both the pH and alkalinity of the water. It is inexpensive but can be difficult to handle and the pH of the treated water generally changes slowly with dosage changes. Lime is slurry fed, which is an operations and maintenance intensive process. Quicklime, when added to water, produces an exothermic reaction that generates considerable heat. Lime adds hardness as well as aluminum and turbidity to the water.

Sodium hydroxide (caustic soda) is very hazardous if not handled carefully. It can cause severe burns and damage the eyes. pH control can be difficult for systems using caustic soda, particularly for waters with low levels of alkalinity, because of the large changes in pH that can occur as the result of a small change in dosage.

Sodium carbonate (soda ash) and potassium carbonate (potash) are dry compounds that are relatively safe to handle compared to caustic soda. These carbonate chemicals will not cause skin irritation. They dissolve more readily than lime. When soda ash or potassium carbonate is added to water, there is an increase in alkalinity as well as an increase in pH. Soda ash and potassium carbonate are safer and easier to handle, but there are disadvantages to using these pH adjustment chemicals primarily related to the fact that they are dry chemicals, including dust, high operational and maintenance costs, and increased operator attention.

5.3.3.2 Iron and Manganese Oxidation

The physical state and concentration of iron and manganese entering a treatment plant from a surface water may vary seasonally due to changes in in water quality during stratification and turnover. For instance, some surface water sources have low concentrations of particulate iron and manganese during most of the year, with a significant acute increase in soluble iron and manganese concentration during spring and/or fall turnover. During periods of lake turnover dissolved iron and manganese that has accumulated on the bottom of the lake can become more distributed in the water column due to the turbulence created in the water body. During turnover the water body becomes well mixed, and dissolved oxygen (DO) throughout the water body will result in iron and manganese converting from dissolved to oxidized (particulate) form. Between the change in DO and the mixing occurring, it is very common to experience manganese or iron spikes at the raw water intake during turnover.

Stratification, which occurs in the summer and winter months, is the separation of a water body into three layers due to density differences. After turnover occurs in the Spring and the water body continues to warm up, the layers no longer mix. This results in iron and manganese accumulation at the bottom of the lake. As stratification goes on, the bottom layer of a lake becomes anoxic. Since there is no oxygen present, the iron and manganese are reduced and convert to their dissolved form. If the raw water intake is located at a depth that is within this anoxic layer, increased levels of dissolved manganese or iron can be present in the raw water.

While the 1991 pilot study indicated a low concentration of 0.01mg/L for both iron and manganese at the time of pilot testing (late February), it is unknown if iron and manganese concentrations may increase during turnover and stratification events. The addition of a strong oxidant chemical such as potassium permanganate may be needed to treat seasonal elevated levels of iron and manganese coming to the treatment plant.

It is recommended to use an inline static mixer equipped with chemical injection lances for the addition of the oxidant, pH adjustment, and coagulation chemicals installed. Static mixers are efficient, economical, and require little to no maintenance. Since there is no straight pipe lengths requirement upstream or downstream of the mixer, inline sampling can be performed immediately after the mixer.

5.3.4 Coagulation

The addition of an inorganic coagulant to the pretreated water neutralizes the suspended particles in the water, which allows the particles to agglomerate and form heavier and larger flocs, creating an insoluble precipitate that more easily settles. Alkalinity will be consumed as part of the coagulation process, and pH of the chemically dosed raw water will decrease. While aluminum sulfate and ferric chloride proved to be effective coagulants during the 1991 pilot study, additional jar testing will be needed to determine coagulant dosage requirements during warm and cold weather conditions. Jar testing should also consider alternative coagulants such as ferric sulfate, aluminum chlorohydrate (ACH), and polyaluminum chloride (PACL). These alternative coagulants all have higher basicity than aluminum sulfate or ferric chloride and hence less of an impact on the pH of the dosed water, which may reduce the amount of pH adjustment chemical needed.

Generally, alum has been regarded as the first coagulant of choice because of its lower cost and its widespread availability. However, the same water may require less ACH or PAC. For instance, as a rule-of-thumb, ACH doses required will be approximately a third of those required when using alum. Other benefits to ACH include lower sludge production and the potential avoidance of post-treatment alkali dosing.

With rising concern about potential toxicity of residual aluminum in treated water, and regulatory limits for aluminum discharge to the environment, iron-based coagulants have been attracting increased attention in the field of water treatment. Iron-based coagulants tend be more expensive than alum on an equivalent dose basis. They also consume more alkalinity than alum, and hence tend to depress pH of the dosed water much more. However, ferric has been shown to be more effective at meeting very stringent manganese limits in the finished water. Ferric-based coagulants can be extremely corrosive and produce highly visible blood-/rust-colored stains whenever there are chemical spills and leaks.

Polymers are classified as cationic polymers (positively charged), anionic polymers (negatively charged), and nonionic polymers (neutrally charged). Regardless of which coagulant or combination of coagulants is used, they must be mixed very well with the water before they can form a heavier floc. The polymers (Betz 1160XL, American Cyanamid 572c, and Betz 1190) investigated in the 1991 pilot study were determined to have no significant impact to the coagulant process. However, the polymers recommended in the Trident system (see Section 5.4.2) and Actifloc system (see Section 5.4.3) will be investigated during future jar testing.

5.3.5 Flocculation

After the coagulant has been thoroughly mixed in the water, mixing in flocculation basins is slowed to allow water to come into contact with the forming floc and allow it to increase in size. The continued mixing is gentle to allow the floc to grow and gain weight, but fast enough to keep it in suspension until ready for the clarification process. The purpose of the flocculation process is to accelerate interparticle contact, thus promoting agglomeration of colloidal particles into larger floc for enhanced settling/clarification.

5.3.6 Clarification

Clarification is the general term used to describe the way that suspended solids are separated from a liquid, in this case, raw water. In the water treatment process, clarification is traditionally carried out by sedimentation. Suspended solids settle out naturally from the raw water due to gravity. The main aim of the clarification process is to remove any suspended solids that are heavier than water to reduce turbidity, and to reduce the load on the downstream processes. There are several approaches to enhance the clarification process, including tube or plate settlers and several available proprietary systems. A brief discussion of these variations follows.

5.3.6.1 Enhanced Settling with Plate Settlers

From the flocculation tanks, water enters the sedimentation basin through an inlet channel at very low velocity. Sedimentation basins enhanced with plate settlers can greatly increase settling process by reducing the distance a particle must travel to reach the sludge zone. Use of plate settlers to enhance the settling process can result in reduced detention times in sedimentation basins, resulting in smaller basins. A sludge collection mechanism such as a rake, which continuously travels across the bottom of the clarifier, scrapes the settled floc to the end of the basin, where sludge is collected and then pumped to the residuals management process.

5.3.6.2 Adsorption Clarification + Filtration Package System

WesTech's Trident package system includes an upflow adsorption clarification process that uses high-density plastic bead media, followed by a dual-media filter. During operation, chemically coagulated water is introduced into the bottom of the adsorption clarifier compartment where it passes upward through a bed of buoyant adsorption media. The adsorption clarifier combines the processes of flocculation and settling into a one-unit process. In passing through the adsorption media, the chemically coagulated water

is subjected to mixing, contact flocculation and clarification. Turbidity removal in the adsorption clarifiers is accomplished by adsorption of the coagulated, flocculated solids on the surfaces of the adsorption media and on previously attached solids. The flow then continues over a weir into the collection trough where it is distributed into the filtration chamber. The buoyant media is retained in the adsorption clarifier by a screen over the compartment.

The adsorption clarifier process must be cleaned frequently via a flushing process to remove solids from the buoyant media. When the clarifier flushing process is initiated, the waste gate and air scour valves are opened as raw water continues to flow. The air/water flush aggressively separates and removes the solids from the buoyant media. Solids are then discharged out through the waste pipe.

The backwash cycle for the filter process is initiated when a pre-set headloss condition or turbidity breakthrough is reached. The Trident inlet and outlet valves are closed, and the air scour valve is opened to allow an air scour cycle. Solids from the backwash are then removed by water flowing up into the collection trough and discharged out through the waste pipe. A filter-to waste sequence follows to ripen the filter media before returning the unit to service.

The Trident package system includes the following unit processes:

- In-line polymer mixing
- Adsorption clarifier
- Dual media filter, complete with backwash pumping and air scour

5.3.6.3 Ballasted Sand Flocculation + Settling

Actiflo is a compact process for high rate clarification, developed and patented by Veolia Water Technologies. The specificity of Actiflo resides in the use of microsand, which acts as a ballast for flocculated matter and accelerates its settling. The Actiflo® clarifier uses separate compartments for rapid mixing, flocculation, and sedimentation. Particles adhere to the microsand and are removed. Particles in the water adhere to the microsand and are removed from a center hopper in the sedimentation compartment, where clarification is enhanced with plate settling. Settled solids are pumped to a hydrocyclone where the sand is separated and reused. The lower-density sludge is discharged from the top of the hydrocyclone and is pumped to the residual management process.

The Actiflo® clarifier package system includes the following unit processes:

- Coagulation mixing tank and mixer
- Flocculation tank and mixer, where polymer and sand are mixed with coagulated water
- Settling tank with lamella settling plates and sludge scraper
- Microsand recirculation pumps
- Hydrocyclone for separating the microsand and floc particles

5.3.6.4 Dissolved Air Floatation

Dissolved Air Floatation (DAF) provides an alternative to the sedimentation process in a conventional treatment plant. DAF is particularly well-suited for waters with high algae content and cold, difficult to flocculate water. It is a proven, highly effective technology for removing low-density particulates from water. DAF is a drinking water clarification process that has been used in water and wastewater treatment for over 50 years.

After the flocculation process, the flocculated water is mixed in the reaction zone of the flotation tank with recycled clarified water that has been saturated with pressurized air. The saturation process is accomplished by taking a fraction of the throughput, typically 8-10% at design flow, and recycling it back to a pressure vessel. The packed tower saturator mixes the clarified water and pressurized air. The aerated water is then delivered to a distribution header that spans the width of the DAF flotation tank. As the recycle stream enters the flotation tank, the drop in pressure results in the release of the now supersaturated dissolved air. The microbubbles attach to floc in the water and create a layer of float (sludge) at the surface of the tank. The sludge is removed either by mechanical scrapping or hydraulic flooding over a weir. The clarified water is collected near the bottom of the tank and passes to the filters.

DAF manufacturers report that lower coagulant doses are needed because a pin floc is floated in lieu of a sweep floc that is settled. Case studies have also shown that higher sludge solids content is achieved when using the DAF process, which reduces the quantity of sludge to be handled in the residual management process.

The Leopold Clari-DAF® package system includes the following unit processes:

- Two-stage tapered flocculation equipment
- Recycle system equipment (e.g., pumps, air compressor, packed tower air saturation tank)
- Dissolved air floatation basin equipment (e.g., sluice gates, weirs, skimmer system, sludge beach, spray wash system

5.3.7 Filtration

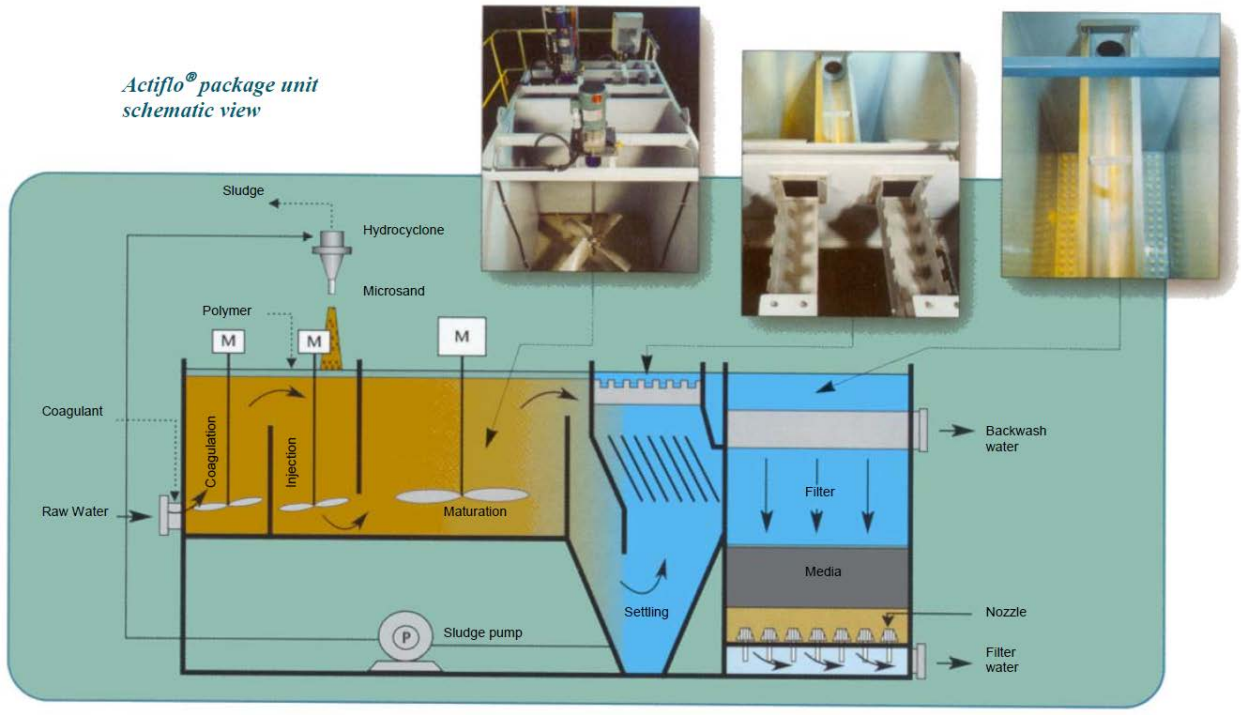
5.3.7.1 Gravity Filters

Rapid rate gravity filtration is the most widely used technology for removing turbidity and microbial contaminants from pretreated surface water. Flow is normally downwards, with the pretreated water passing through a granular bed. Solids accumulate within the voids and on the top surface of the filter bed. Plugging of the filter bed gradually occurs, and after a period of operation the filter bed must be backwashed. The backwash process typically involves water and air scour for the most effective cleaning of filter media.

Dual media filters, which can be used for rapid rate gravity filtration, typically consist of a coarse layer of anthracite above a fine layer of sand. Intermixing at the anthracite-sand interface reduces the void size in the lower portion of the anthracite layer, forcing it to remove floc that might otherwise pass through to the sand layer.

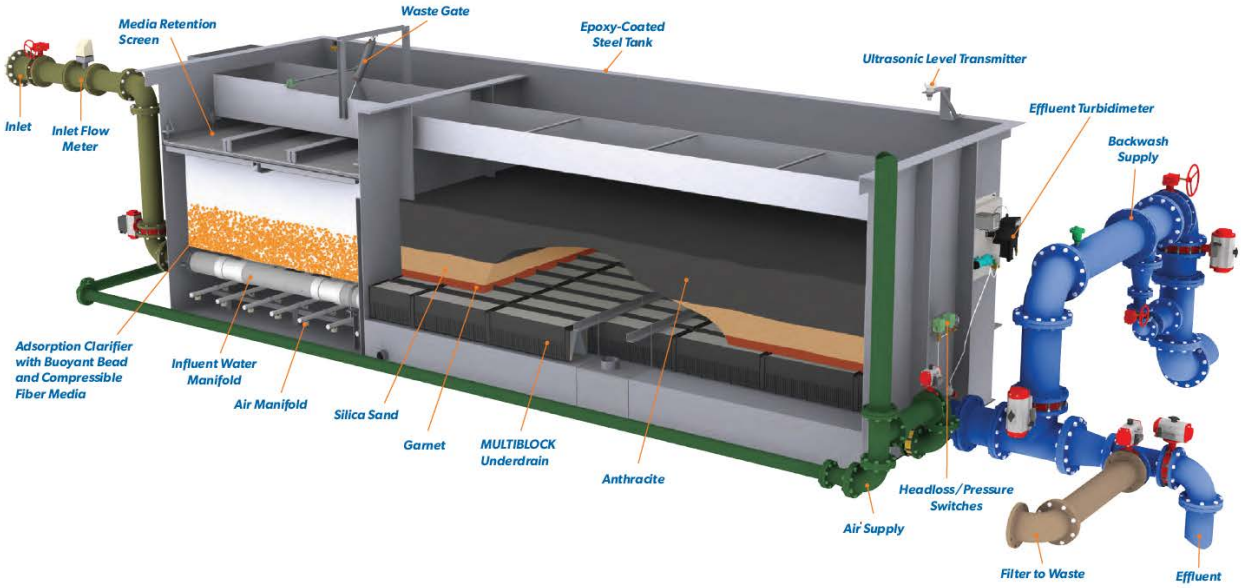
The Actifloc™ AFP (also called Actifilter) packaged system combines the Actiflo® clarifier and the Dusenflo® gravity filter in the same packaged unit (clarifier and filter; see Figure 5-1. As a dual media filter, the media bed for Dusenflo® filter will typically consist of a coarse layer of anthracite above a fine layer of sand.

Figure 5-1: Actifloc™ AFP System



The Trident package system (see Figure 5-2) includes multi-media filtration as part of its treatment train. Because of its multi-layer design, this type of filtration bed is capable of trapping and retaining a far larger number of particles than a dual media bed before backwashing becomes necessary. The capture of sediment and particulates throughout the entire depth of the filter bed allows it to operate for much longer periods of time. Per the manufacturer, the multi-media bed can produce lower finished water turbidities than a dual media filter. However, when polishing highly pretreated waters, the differences in filtrate quality are not as significant.

Figure 5-2: Trident Package System



5.3.7.2 Membrane Filters

Microfiltration is a hollow-fiber membrane system primarily used to treat slightly to moderately turbid surface water to produce potable water. It can replace conventional water treatment technology consisting of coagulation, flocculation, sedimentation, and media filtration. The process is pressure driven. The microfiltration membranes act similarly to a very fine sieve to retain particulate matter, while water and its soluble components pass through the membrane as filtrate. The retained solids are concentrated in a waste stream that is discharged from the membrane system. The pore size of the membrane and the integrity of the sealing mechanism controls the fraction of the particulate matter that is removed.

Pretreatment prior to the microfiltration unit eliminates large solids that could plug the hollow fibers. Typically, a self-cleaning screen/strainer capable of removing particles above 100 to 200 microns is all that is required for treatment prior to microfiltration. However, if scaling is a concern, steps to balance the alkalinity of the water should be taken. If iron and manganese are present, an oxidant would need to be added to force precipitation to occur prior to entering the membrane. Coagulation pretreatment may improve membrane flux performance, resulting in cost reductions of membrane equipment. Pilot testing is required to identify if the need for coagulation/sedimentation pretreatment prior to membrane filtration will reduce membrane costs.

5.3.8 PFAS Treatment

PFAS levels greater than the MassDEP ORSG of 0.070 ug/L have been reported in White Pond. Additional sampling of White Pond is recommended to verify PFAS levels. It is assumed though that PFAS treatment will be required of White Pond water. PFAS treatment research is rapidly growing right

now, but current research indicates the most effective way to remove PFAS is through activated carbon treatment (i.e., GAC), ion exchange resins, and high-pressure membranes, like nanofiltration or reverse osmosis.

Activated carbon is an effective adsorbent because it is a highly porous material and provides a large surface area to which contaminants may adsorb and is the most studied treatment for PFAS. Granular activated carbon (GAC) has been shown to effectively remove PFAS from drinking water when it is used in a flow through filter mode after particulates have already been removed. Calgon offers a coal-based GAC that effectively removes short chain PFAS and a re-agglomerated bituminous coal-based product for removal of an array of PFAS including both long- and short-chain compounds. The spent GAC containing adsorbed concentrations of PFAS can be thermally reactivated, thereby destroying the adsorbed contaminants and allowing the activated carbon to be recycled and reused.

For the purposes of this study, use of GAC filters were assumed to be necessary for PFAS removal.

5.3.9 Corrosion Control

At the completion of the water treatment process and prior to entering the distribution system, the finished water must not be corrosive. The 1991 pilot study included a corrosion study that found the finished water to be corrosive. Corrosive water causes pipe materials such as copper and lead to dissolve.

Alkalinity and pH adjustment through the addition of a chemical such as sodium carbonate can minimize the corrosivity of the finished water.

5.3.10 Disinfection

5.3.10.1 Ultraviolet + Chlorine

Ultraviolet (UV) radiation inactivates organisms when they absorb the light, which causes a photochemical reaction that alters molecular components essential to cell function and damages/kills exposed cells. UV radiation can protect the public from various pathogens including the *Cryptosporidium* and *Giardia*. The UV disinfection process requires much smaller footprint than a chlorine contact tank. UV radiation quickly dissipates in water; as a result, no residual is produced. Use of UV for disinfection has the advantage of significantly reducing DBPs, but a secondary chemical disinfectant would still be needed to maintain a residual throughout the distribution system.

Chlorine maintains a residual level in the finished water that can be monitored and controlled. It is an effective disinfectant for bacteria, viruses and *Giardia* cysts, but is not effective at inactivating *Cryptosporidium* oocysts at typical chlorine dosages. It can also help control biological growth in the distribution system. Addition of chlorine in the form of sodium hypochlorite increases the pH of the water because of the presence of hydroxyl radicals (OH^-) and excess sodium hydroxide used in the manufacture of sodium hypochlorite.

5.3.10.2 Chorine

Disinfection practice must balance the need to inactivate pathogens and eliminate the formation of undesirable DBPs. Chlorine is the most widely used disinfectant for water systems to prevent spread of disease-causing waterborne pathogens. A low residual level of disinfection ensures that the water remains safe once it leaves the water treatment plant until it arrives at the customer's tap.

The two main components of a chlorine disinfection system are the chemical dose system and the contact basin. Disinfectant dose is water specific and will require pilot studies to be determined.

5.3.11 Finished Water Storage and Pumping

A finished water clearwell is required to collect water after it has been treated and prior to being pumped to the Town's distribution system. The clearwell also serves as a reservoir for the backwash pumping systems and provides adequate contact time for the disinfection process. The finished water pumps should be capable of pumping the water at peak demands (assume 2 MGD for this study).

5.3.12 Residuals Management & Sanitary Waste Disposal

Backwash and solids are disposed to an onsite residual basin, lined sand drying bed, or temporary storage tank for offsite disposal if plant is located at White Pond or directly to Maynard's wastewater treatment system if plant is located in Maynard. Sanitary waste is disposed to an onsite subsurface disposal system if plant is located at White Pond or to Maynard's wastewater treatment system if the plant is located in Maynard.

5.3.13 Buildings

The treatment system, mechanical and electrical equipment, and control panels are located in a treatment facility building. Raw water pumps are housed in a covered pump station building. A typical facility site includes an access driveway, yard piping, and appropriate drainage. Electrical, instrumentation/control, security, HVAC, and plumbing systems are required.

5.4 SURFACE WATER TREATMENT ALTERNATIVES

For the purposes of this study, the evaluation of a new WTP has assumed an average daily flow of 1 MGD, with a maximum daily flow of 2 MGD. This assumption is based on treating White Pond source water only. If the Town were to pursue the option to build a centralized WTP, the average daily flow capacity of the WTP would increase to 2 MGD. If the Town decides to move forward with utilizing White Pond as a drinking water source, the next phase of the planning process would include preliminary design and would finalize the decision on the WTP location and capacity. It is anticipated that the same general treatment processes would be relevant for both scenarios, but the cost will increase for the centralized WTP due to the higher capacity.

Five alternatives were identified for White Pond source water treatment and are presented below along with process flow diagrams. Each of the alternatives was conceptually evaluated to determine an

estimate of building footprint requirements, operation and maintenance (O&M) costs, and construction costs. The treatment alternatives include redundant trains for all unit processes.

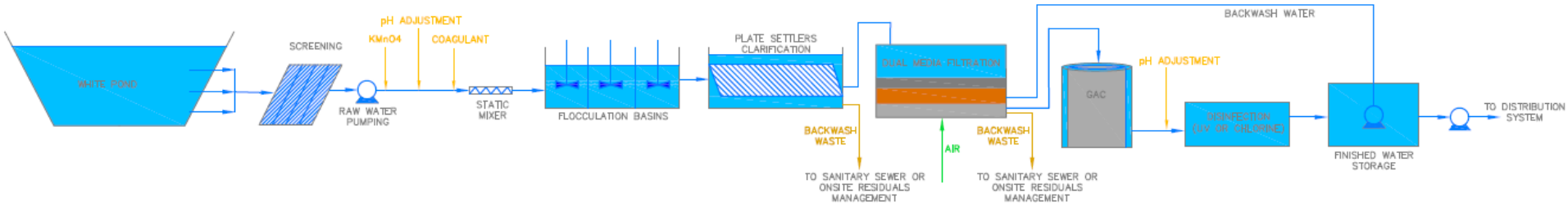
Vendors of large/critical equipment and package systems were contacted to determine process acceptability, equipment costs, operation and maintenance requirements, and footprint requirements for the major equipment. As needed, the Cost Estimating Manual for Water Treatment Facilities (Kawamura & McGivney, 2008) was consulted to determine an estimate of construction costs . Stantec's recent project experience with design and construction of WTPs was also utilized in the development of construction and O&M costs.

The footprint and cost estimates presented in this report are for planning purposes only and are based on conceptual engineering ideas; project definition is minimal at this point in time.

5.4.1 Alternative 1: Conventional Filtration Treatment

This is the most commonly used filtration system as it can accommodate any surface water, even those with very high or variable turbidity. It responds well to rapid changes in source water quality. Raw water enters the passive screens and fills up the wetwell underneath the pumphouse. It is then pumped to the surface water treatment facility. An oxidant, pH adjuster, and coagulant are mixed inline prior to the flocculation basins. The flocs are removed in the sedimentation basin enhanced with plate settlers and sent to the waste disposal process. The water then passes through the dual media filter and is further polished in the GAC filter for PFAS removal. Backwash waste from filters are sent to the waste disposal process. The filtered water is exposed to UV light and then chlorine in a chlorine contact tank for disinfection. The finished water is stored in a clearwell, where finished water and backwash pumps are located. Figure 5-3 illustrates the process flow diagram for this alternative.

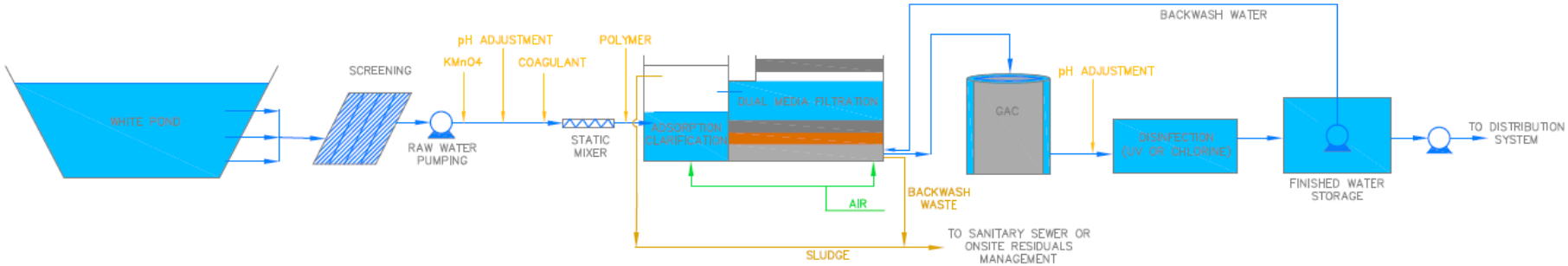
Figure 5-3: Process Flow Diagram for Conventional Treatment



5.4.2 Alternative 2: Adsorption Clarification

This alternative utilizes the pre-engineered Trident® Package Water Treatment System, which incorporates upflow adsorption clarification and filtration in a single package. Raw water enters the passive screens and fills up the wetwell underneath the pumphouse. It is then pumped to the surface water treatment facility. An oxidant, pH adjuster, and coagulant are added to the raw water prior to an inline static mixer. Typically a polymer (coagulant aid) is added after the inline static mixer before the Trident® Package Water Treatment System. The water is then further polished in the GAC filter for PFAS removal. Waste from the treatment system is sent to the waste disposal process. The filtered water is exposed to UV light and then chlorine in a chlorine contact tank for disinfection. The finished water is stored in a clearwell, where finished water and backwash pumps are located. Figure 5-4 illustrates the process flow diagram for this alternative.

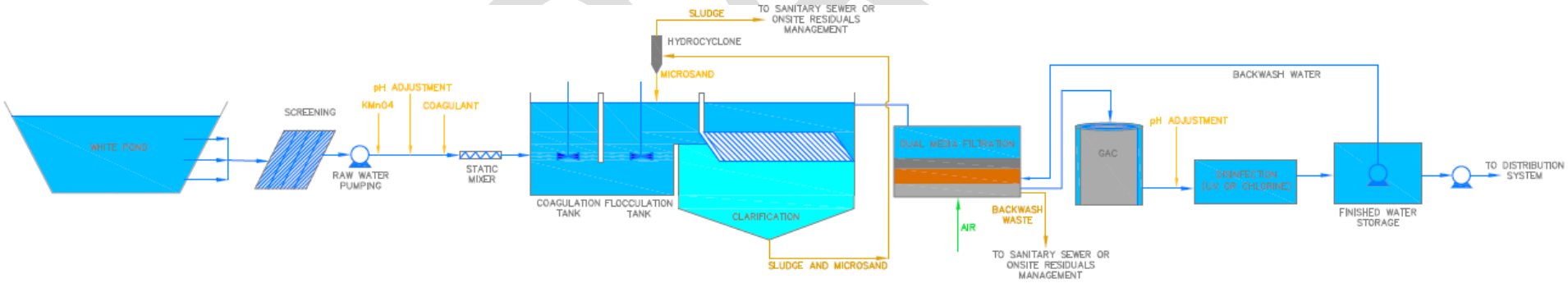
Figure 5-4: Process Flow Diagram for Adsorption Clarification



5.4.3 Alternative 3: Ballasted Sand Flocculation

This alternative utilizes the pre-engineered Actiflo®/Dusenflo® Package Water Treatment System. Raw water enters the passive screens and fills up the wetwell underneath the pumphouse. It is then pumped to the surface water treatment facility. The raw water enters the Actiflo®/Dusenflo® Package Water Treatment System which includes (1) a coagulation basin where a coagulant can be rapidly mixed into the raw water; (2) an flocculation basin where a polymer (as needed) and microsand are added and floc formation occurs; (3) settling tank with lamella plates to clarify the flocculated water – sludge generated here is continually pumped to a hydrocyclone, where sand and sludge are separated; the same hydrocyclone recycles the microsand back into the injection tank and the sludge is sent to the waste disposal process; (4) a gravity filtration compartment. The water is then further polished in the GAC filter for PFAS removal. Backwash waste from filters are sent to the waste disposal process. The filtered water is exposed to UV light and then chlorine in a chlorine contact tank for disinfection. The finished water is stored in a clearwell, where finished water and backwash pumps are located. Figure 5-5 illustrates the process flow diagram for this alternative.

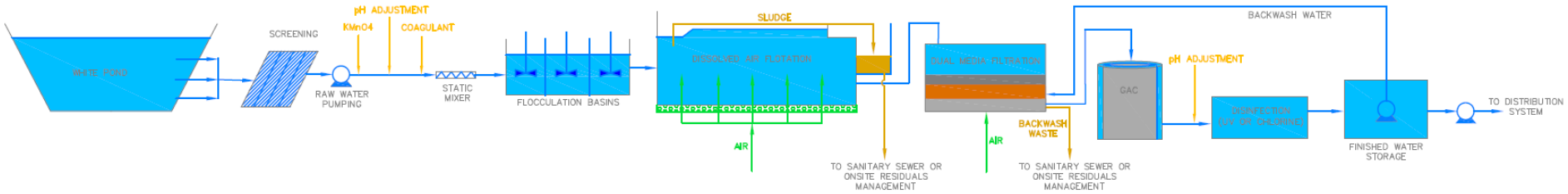
Figure 5-5: Process Flow Diagram for Ballasted Sand Flocculation



5.4.4 Alternative 4: Dissolved Air Floatation

This alternative includes all of treatment steps involved in conventional filtration (Alternative 1), with the exception that the clarifying process uses a DAF process. Raw water enters the passive screens and fills up the wetwell underneath the pumphouse. It is then pumped to the surface water treatment facility. An oxidant, pH adjuster, and coagulant are rapidly mixed into the raw water prior to the flocculation basins. The flocculated water then goes to the DAF basins where particles that have floated to the surface are skimmed off and sent to the waste disposal process. The clarified water then passes through the dual media filter and is further polished in the GAC filter for PFAS removal. Backwash waste from filters are sent to waste disposal process. The filtered water is exposed to UV light and then chlorine in a chlorine contact tank for disinfection. The finished water is stored in a clearwell, where finished water and backwash pumps are located. Figure 5-6 illustrates the process flow diagram for this alternative.

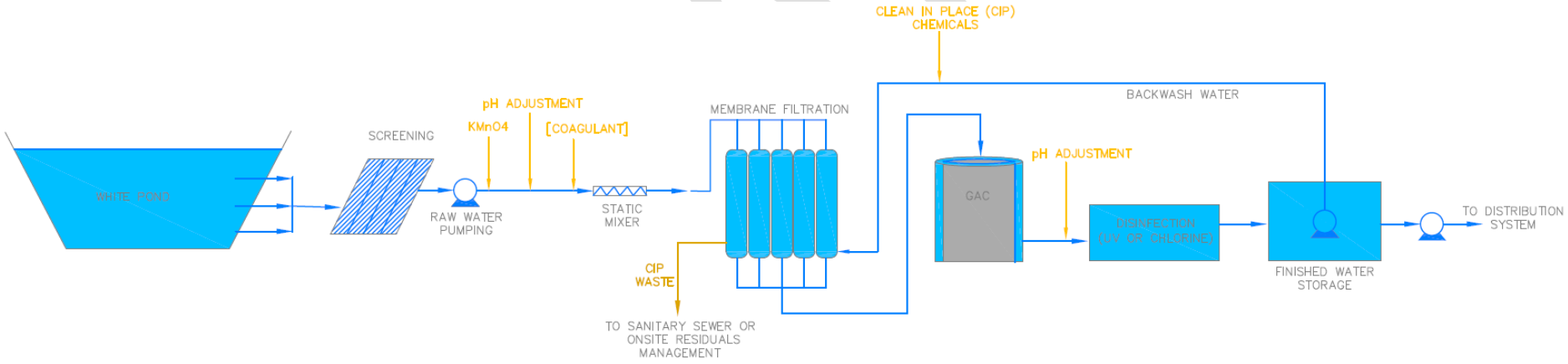
Figure 5-6: Process Flow Diagram for Dissolved Air Floatation



5.4.5 Alternative 5: Pressure Feed Membrane Filtration

This alternative uses membrane filtration as the separation treatment process. Raw water enters the passive screens and fills up the wetwell underneath the pumphouse. It is then pumped to the surface water treatment facility. An oxidant, pH adjuster, and coagulant (if needed) are added to the raw water prior to an inline static mixer. The chemically treated water then undergoes membrane filtration (microfiltration) and is further polished in the GAC filter for PFAS removal. Waste generated by both filter types are sent to the waste disposal process. The filtered water is exposed to UV light and then chlorine in a chlorine contact tank for disinfection. The finished water is stored in a clearwell, where finished water and backwash pumps are located. Figure 5-7 illustrates the process flow diagram for this alternative.

Figure 5-7: Process Flow Diagram for Pressure Feed Membrane Filtration



5.4.6 Alternatives Cost Comparison

Table 5-5 provides a summary of the conceptual cost estimates for each of the White Pond treatment alternatives.

Table 5-5: Conceptual Costs for New White Pond Surface Water Treatment Plant

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
	Conventional Filtration	**Adsorption Clarification (Trident®)**	**Ballasted Flocculation (Actiflo®)**	**Dissolved Air Floatation (Leopold® Clari-DAF®)**	**Membrane Filtration (Pall Aria™)**
ESTIMATED CONSTRUCTION COST	$21,746,000	$16,713,000	$20,567,000	$23,064,000	$18,594,000
ESTIMATED ANNUAL O&M COST	$167,000	$159,000	$174,000	$183,000	$181,000
ESTIMATED NPV of O&M COST	$2,908,000	$2,769,000	$3,030,000	$3,187,000	$3,152,000
ESTIMATED LIFECYCLE COST	**$24,650,000**	**$19,480,000**	**$23,600,000**	**$26,250,000**	**$21,750,000**

The following assumptions were made to develop potential costs:

- Costs are based on a plant design capacity of 1 MGD
- Costs are in 2019 dollars
- Construction costs include major equipment and tankage components detailed in Section 5.3, process piping, sludge disposal lagoons, and the WTP building as well as specialty systems such as electrical, instrumentation/control, HVAC, plumbing, yard piping, and site work.
- Contractor burdens and markups included in the construction cost estimates include contractor markups (13%), profit (5%), overhead & general conditions (2.5%), and bonds & insurance (1%)
- WTP building costs were based on the estimated footprint for each alternative
- Equipment vendors provided purchase cost estimates for major equipment and package systems.
- As needed, the Cost Estimating Manual for Water Treatment Facilities (Kawamura & McGivney, 2008) was consulted to determine an estimate of construction costs. Stantec's recent project experience with design and construction of WTPs was also utilized in the development of construction and O&M costs.
- Based on Association for the Advancement of Cost Engineering (AACE) guidance, the cost estimates presented in this report fall under the definition of a Class 4 cost estimate. The expected accuracy range for a Class 4 cost estimate is -15% to -30% on the low end and +20% to +50% on the high end. For this reason, a ***50% contingency is built into the construction cost estimates.***
- Cost of electricity was assumed $0.12/kW-hr
- Life cycle cost calculations assumed an interest rate of 3% over a 25-year period.

5.4.7 Alternatives Evaluation

Table 5-6 compares the five treatment alternatives and provides a summary of the footprint, O&M requirements, major equipment, ancillary equipment that will need to be added to package systems, chemicals needed, volume of waste generated, life cycle cost, pros and cons, and special considerations.

Table 5-6: Evaluation of Treatment Alternatives

Criteria	Alternative 1 Conventional Filtration	Alternative 2 Adsorption Clarification (Trident®)	Alternative 3 Ballasted Flocculation (Actiflo®/Dusenflo®)	Alternative 4 Dissolved Air Floatation (Leopold® Clari-DAF®)	Alternative 5 Membrane Filtration (Pall Aria™)
Treatment Suitability	• Able to treat the raw water & meet water quality goals/regulations	• Able to treat the raw water & meet water quality goals/regulations • Good quality raw water may not require this level of chemical intensive treatment; Trident excels at treatment of high turbidity waters.	• Able to treat the raw water & meet water quality goals/regulations • ActiFlo is excellent for poor quality waters and in locations where limited space is available; the good quality raw water may not require this level of treatment.	• Able to treat the raw water & meet water quality goals/regulations • If algae were a concern for White Pond, DAF may be well-suited for the water source. At this time, algae is not a concern. Continues raw water characterization is needed.	• Able to treat the raw water & meet water quality goals/regulations
Process Related Equipment	• Static Mixer • Oxidant feed system • pH adjustment system • Coagulant feed system • Flocculation basins • Clarification basins with plate settlers • Dual media filters with backwash pumps and air scour system • GAC filters with backwash pumps and air scour system • UV disinfection system • Chlorine feed system	• Static mixer • Oxidant feed system • pH adjustment system • Coagulant feed system • Polymer feed system • Adsorption clarifiers • Gravity media filters with air scour system • GAC filters with backwash pumps and air scour system • UV disinfection system • Chlorine contact tanks & finished water storage • Residual management system	• Oxidant feed system • pH adjustment system • Coagulant feed system • Polymer feed system • Rapid mixer • Coagulation, flocculation and settling tanks • Microsand recirculation system • Hydrocyclone recycle system • Filter air backwash blower and backwash pump	• Oxidant feed system • pH adjustment system • Coagulant feed system • Rapid Mixer • Flocculation mixers • Air compressor • Recycle pumps • Air saturation tank • Mechanical skimmers • Spray wash system • Dual media filters with backwash pumps and air scour system • GAC filters with backwash pumps and air scour system	• Static mixer • Oxidant feed system • pH adjustment system • Coagulant feed system (tentative) • Feed pumps and VFDs • Membrane system • Reverse filtration system (tank & pump) • Complete CIP system • Neutralization system • GAC filters with backwash pumps and air scour system • UV disinfection system • Chlorine feed system

Criteria	Alternative 1 Conventional Filtration	Alternative 2 Adsorption Clarification (Trident®)	Alternative 3 Ballasted Flocculation (Actiflo®/Dusenflo®)	Alternative 4 Dissolved Air Floatation (Leopold® Clari-DAF®)	Alternative 5 Membrane Filtration (Pall Aria™)
	• Residual management system • Chlorine contact tanks & finished water storage • Finished water pumping • System controls and instrumentation	• Finished water storage • Finished water pumping	• GAC filters with backwash pumps and air scour system • UV disinfection system • Chlorine feed system • Residual management system • Chlorine contact tanks & finished water storage • Finished water pumping	• UV disinfection system • Chlorine feed system • Residual management system • Chlorine contact tanks & finished water storage • Finished water pumping	• Residual management system • Chlorine contact tanks & finished water storage • Finished water pumping
Chemicals	• Oxidant • pH adjustment • Coagulant • Sodium hypochlorite	• Oxidant • pH adjustment • Coagulant • Polymer (tentative) • Sodium hypochlorite	• Oxidant • pH adjustment • Coagulant • Polymer (tentative) • Sodium hypochlorite	• Oxidant • pH adjustment • Coagulant • Polymer (tentative) • Sodium hypochlorite	• Oxidant • pH adjustment • Coagulant (tentative) • Sodium hypochlorite • Sodium hydroxide • Sodium bisulfide • Citric acid
Footprint	• 7,950 ft^2	• 6,540 ft^2	• 5,850 ft^2	• 7,950 ft^2	• 6,540 ft^2
Volume of Waste Generated	• 110,000 gal/day	• 76,000 gal/day	• 94,000 gal/day	• 72,000 gal/day	• 27,000 gal/day
Life Cycle Cost	• $24,650,000	• $19,480,000	• $23,600,000	• $26,250,000	• $21,740,000
O&M Requirements	• Chemical handling • Occasional plate settler washdown • Filter backwashing • GAC backwashing • Sludge disposal • UV lamp cleaning	• Chemical handling • Clarifier flushing (multiple times daily) • Filter backwashing • GAC backwashing • Sludge disposal • UV lamp cleaning	• Chemical handling • Microsand replenishment (annual) • Hydrocyclone and microsand recycle system maintenance • Filter backwashing • GAC backwashing • Sludge disposal • UV lamp cleaning	• Chemical handling • DAF basin spray down • DAF aeration system maintenance • Filter backwashing • GAC backwashing • Sludge disposal • UV lamp cleaning	• Chemical handling • Membrane module replacement (every 10 years) • Membrane system maintenance • GAC backwashing • Sludge disposal • UV lamp cleaning
Operator Certification	• Class II-T (with approval from DEP)	• Class II-T (with approval from DEP)	• Class II-T (with approval from DEP)	• Class II-T (with approval from DEP)	• Class II-T (with approval from DEP)

Criteria	Alternative 1 **Conventional Filtration**	Alternative 2 **Adsorption Clarification (Trident®)**	Alternative 3 **Ballasted Flocculation (Actiflo®/Dusenflo®)**	Alternative 4 **Dissolved Air Floatation (Leopold® Clari-DAF®)**	Alternative 5 **Membrane Filtration (Pall Aria™)**
Advantages	• Can handle high turbidity/color raw water • Proven, conventional surface water treatment • Well understood technology • Simple operations • Not relying on proprietary equipment or media	• Relatively small footprint • Lowest capital cost & life cycle cost • Mixed media filter may produce lower turbidity finished water • Easy to expand modular design • Effective removal of algae	• Smallest footprint • Very robust treatment process with stable performance • Quick response to treatment adjustments and raw water variations • Short startup time • Potential for reduced coagulant usage • Good for groundwater with high TOC and surface water with algae	• High solids content in sludge, resulting in lower sludge volumes • Very effective for removal of algae • Potentially lower coagulant dosage and flocculation time (no sweep floc required)	• Relatively small footprint • Relatively low life cycle cost • Significantly lower waste volume • Reliably superior finished water quality • Less sensitive to thermal and flow variations • Easy to expand modular design • >3.0 log credits for Giardia • High flow recovery and hence high net finished water production • Simpler operations with less operator interaction required
Disadvantages	• Coagulant & pH adjustment dosages require adjustment when influent water quality changes • Staff need to be adequately trained to carry out jar tests • Frequent monitoring of coagulation chemistry • Largest footprint • Potentially high use of treatment chemicals • Maintenance of mechanical clarified sludge removal system	• Need for clarifier flushing multiple times a day requires operator observation • Proprietary equipment & upflow clarifier buoyant media • Coagulant & pH adjustment dosages require adjustment when influent water quality changes • Staff need to be adequately trained to carry out jar tests • Frequent monitoring of coagulation chemistry	• Proprietary process • Coagulant & pH adjustment dosages require adjustment when influent water quality changes • Staff need to be adequately trained to carry out jar tests • Frequent monitoring of coagulation chemistry • Higher power consumption • More mechanical equipment to maintain	• Highest lifecycle cost • Largest footprint • More mechanical equipment to maintain • Higher energy cost • Lower produced water efficiency due to required internal DAF recycle ratio of ~10% of design flow • Process limited to low turbidity water (<30-50 NTU)	• If sanitary sewers are unavailable, membrane cleaning/flushing wastes will need to be neutralized prior to disposal • More chemical feed systems to maintain • More complex technology

Criteria	Alternative 1 Conventional Filtration	Alternative 2 Adsorption Clarification (Trident®)	Alternative 3 Ballasted Flocculation (Actiflo®/Dusenflo®)	Alternative 4 Dissolved Air Floatation (Leopold® Clari-DAF®)	Alternative 5 Membrane Filtration (Pall Aria™)
	• Low solids content in sludge, resulting in greater sludge volumes	• Low solids content in sludge, resulting in greater sludge volumes	• Microsand needs to be replenished annually • Low solids content in sludge, resulting in greater sludge volumes		
Considerations	• No special considerations	• Potential need of polymer and impacts on filterability of clarified water	• Potential need of polymer and impacts on filterability of clarified water • This treatment process may be more suitable if high color groundwater sources are combined with White Pond water at a centralized WTP; pilot testing will be needed.	• Potential need of polymer and impacts on filterability of clarified water • DAF sludge removal can be done via mechanical or hydraulic means	• Suspended solids concentration, hardness, and alkalinity prior to entering membrane • Process limited to Fe <2.0 mg/L, Mn <1.0 mg/L, and turbidity <50 NTU in feed

5.4.8 Treatment Recommendations

The White Pond water quality data provided in the 1991 Pilot Study Report indicates that the raw water is of good quality, with low color and low turbidity. Considering the raw water quality and the comparative evaluation of advantages and disadvantages presented in Table 5-4, Stantec recommends pilot testing of the membrane filtration system (Alternative 5) for the White Pond WTP. The major benefits to a membrane system are the small footprint, lower life cycle cost, simple operations, low residuals generation, and less importance on the chemical pretreatment of the water (i.e., coagulation). Although membranes are a more advanced treatment technology than the other alternatives, membrane systems are simple to operate and maintain.

Pilot testing during the “worst” water conditions will be important, to determine the treatment reliability with respect to potential high levels of iron, manganese, and organics in the surface water. Pilot testing of membrane system will also need to evaluate the need or benefits to providing coagulation or coagulation/sedimentation as pretreatment prior to membrane filtration.

Conventional treatment, although cost effective and relatively simple treatment technology, requires a relatively large footprint and more operator involvement in the daily monitoring of coagulation chemistry and filtration performance. The Actiflo® and Trident® package systems, are suitable for the raw water and have low footprint requirements but require use of proprietary package systems that may require additional maintenance for mechanical components. These package systems provide a very robust treatment system, perhaps more treatment than what is required for the relatively good raw water quality. Therefore, due to the cost and the disadvantages, these technologies were not recommended. The greatest advantage to implementing the DAF alternative would be the excellent algae removal capabilities, but the White Pond water is not anticipated to have significant algae issues. Otherwise, the DAF alternative does not provide any significant benefits.

As a second option, the Trident system (Alternative 2) is recommended. While this option entails the generation of considerably more waste than the membrane alternative, it can handle raw water with high levels of iron and manganese and has a wider range of parameters for optimal operation.

If water from the groundwater wells at OMR and Well 4 are combined with White Pond water for treatment at a central WTP, pilot testing the same technologies and recommendations apply. Although, depending on the blended raw water quality the Trident system may be the preferred treatment recommendation, with membranes as the second preferred alternative. Additional water quality characterization will need to be performed during the next phase of conceptual design and pilot testing to determine the preferred technologies for the centralized WTP option.

5.5 WATER TREATMENT PLANT SITING EVALUATION

This evaluation assumed a surface treatment plant sized for a 1 MGD design capacity and evaluated three potential options for the location of a new surface water treatment facility. Locations considered included the White Pond site and two locations in the Town of Maynard: the Old Marlboro Road Wellfield and WTP Site and the land surrounding the Well 4 WTP site. The locating and cost of raw/finished water

transmission is the major difference for each of these three options. Transmission main locating and costs are discussed in detail in Section 6.0.

5.5.1 White Pond Site

White Pond is located on Parcel R26-004 (7.5 acres) in Stow and owned by the Town of Maynard. The property is designated for water supply use and there is sufficient land for an onsite water treatment facility. The 1994 Basis of Design Report included a conceptual design of a water treatment facility located in the northwest corner of White Pond in Stow, MA. The Report indicated that subsurface material is adequate based on boring tests and all major utilities, with the exception of sewer, are available. A subsurface disposal system for sanitary waste and a residual lagoon for the plant sludge and backwash waste will be required. In terms of hydraulics, pumping would be required to convey raw water to the new surface water treatment plant at White Pond and finished water to the distribution system connection in Maynard.

5.5.2 Old Marlboro Road Site

Parcel 029.0-0000-0011.0 (3.55 acres of which is not wetland) is designated for water supply use and includes the OMR wells and groundwater treatment plant. A new surface water treatment plant built here would be designed to also treat the groundwater from the three wells onsite, and pumping to the distribution system would be through the existing water main connection that the Old Marlboro groundwater treatment plant uses.

5.5.3 Well 4 Site

Parcel 28-1 (64.3 acres) is designated for water supply use and includes Wells 4 & 4A (expected to be online in 2020), and the groundwater treatment plant. A new surface water treatment plant built here would also be designed to treat the groundwater from the wells onsite and potentially the wells from the OMR wellfield as well. This approach would allow for an adequate volume and high-quality finished water to be consistently supplied to the Town of Maynard even as raw water quality from the groundwater sources decreases. Pumping to the distribution system would be through the existing connection that the Well 4 groundwater treatment plant uses.

5.5.4 WTP Siting Recommendations

The recommended WTP location is at the Well 4 site since it is in Maynard, alleviating the need for intermunicipal coordination with Stow and onsite wastewater facilities. Additionally, siting the new WTP in Town would logistically be easier for operators; rather than having to operate and maintain water infrastructure across multiple towns, all WTPs will be located within the Town of Maynard. Siting of a new WTP at the Well 4 site also provides an opportunity to centralize groundwater and White Pond treatment at a single WTP, which would decrease the number of WTPs that the Town has to operate and maintain. This Parcel is designated for a water supply use and includes Well No. 4 and the associated WTP.

6.0 TRANSMISSION LINE ROUTING

The existing transmission main that originally transported water from White Pond to the Town's water distribution system needs replacement due to its age (over 65 years old) and materials of construction (asbestos cement). The existing water transmission main is 13,100-ft long and 10-inch diameter. The transmission main connects to Maynard's water distribution system at Winter Street in the vicinity of the Town's Highway Garage. The main has been physically disconnected from the Town's distribution system. Any White Pond treatment alternative will require that a new transmission main be constructed.

For all transmission line routing options considered as part of this alternative analysis, a 16-inch ductile iron water main was assumed. Three routes were evaluated for the transmission main (see Figure 6-1), as discussed in the following sections. For all options, based on an initial site walk and review of the proposed route with aerial photographs, it was assumed that the new transmission line can be installed with open cut methods as opposed to trenchless technologies.

6.1 CONVEY FINISHED WATER FROM WHITE POND WTP TO DISTRIBUTION SYSTEM THROUGH USFW LAND (OPTION 1)

This option would require construction of a new finished water transmission line (approximately 12,027 ft) adjacent to the existing transmission main within the paved Sudbury Road, and continue cross-country from Sudbury Road to White Pond Road in the unpaved trail/dirt road, and then through the unpaved White Pond Road in the Assabet River National Wildlife Refuge ("Wildlife Refuge"). The Wildlife Refuge is a heavy resource area with an unknown ledge profile and raises concerns about potential presence of historical artillery. Construction of this option would involve minimal traffic control, pavement and police costs. The new transmission line would end at the connection to an existing 10-inch pipe on Riverside Park in Maynard. The cost for this new finished water transmission line has been estimated to be approximately $5.4M (including 50% contingency).

6.2 CONVEY RAW WATER TO OMR WELL SITE (OPTION 2)

This option would require the construction of a new raw water transmission line (approximately 16,051 ft) within the paved Sudbury Road, then through Hudson Road, onwards through paved and unpaved sections of Winterberry Way in the Assabet River National Wildlife, and finally through the paved Parker Street/Route 27/Old Marlboro Road to connect to a new WTP at the existing OMR wellfield site.

Hudson Road is a narrow one lane road in each direction with no shoulders. Work through this road would require lane closure and possible road closure. Work through Winterberry Way would entail similar constraints as in Hudson Road, but less traffic is expected. The connection between Winterberry Way and Old Marlboro Road needs to be further investigated as it appears that these two roads are linked by an unpaved path that runs across Puffer Pond. Work on Old Marlboro Road would entail similar utility/traffic/restoration impacts as that on Winterberry Way. Work on Route 27, which is a State road, would require MassDOT permits and enforcement of more strict work hours and traffic management, and

involve backfill/restoration costs. The cost for this new raw water transmission line has been estimated to be approximately $9.9M (including 50% contingency).

6.3 CONVEY RAW WATER TO WELL 4 SITE (OPTION 3)

The first part of this pipeline routing is the same as Option 1, which includes the construction of a new raw water transmission line through the Wildlife Refuge. The second part of this transmission main will continue to the Well 4 wellfield site. The total main will be approximately 18,392 ft and routing is as follows: adjacent to the existing transmission main within the paved Sudbury Road, and continue cross-country from Sudbury Road to White Pond Road in the unpaved trail/dirt road, and then through the unpaved White Pond Road in the Assabet River National Wildlife Refuge, and finally through residential streets and cross-country (see Appendix C for LandTech report on this section of the pipeline) to a new centralized water treatment plant at the Well 4 site. Additionally, if the OMR wells are to be treated at the centralized WTP at the Well 4 site, construction of a new raw water transmission line of approximately 3,444 ft will be required to deliver water from the OMR wellfield through residential streets and then cross-country to the Well 4 site. This project would require traffic management, road restoration, and possibly significant clearing and grubbing. The total cost for the new raw water transmission lines conveying water from White Pond and the OMR wellfield is estimated to be approximately $9.2M (including 50% contingency).

6.4 CONVEY RAW OR FINISHED WATER FROM WHITE POND TO TOWN OF MAYNARD THROUGH TOWN OF SUDBURY (OPTIONS 4 AND 5)

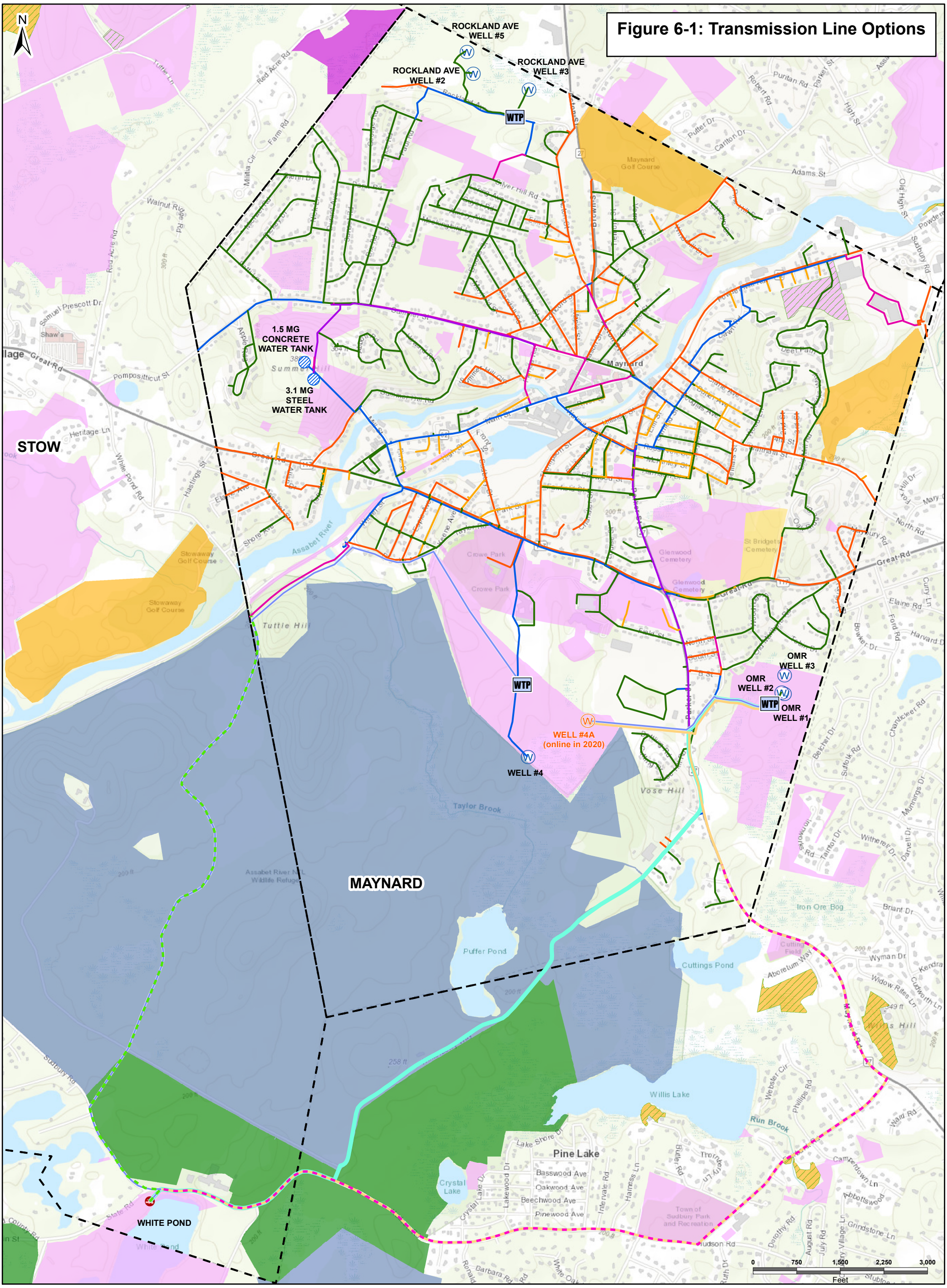
This option was identified and evaluated primarily because it avoids routing any part of the new transmission main through USFW property. Raw or finished water could be conveyed from White Pond to the southeastern part of the Town of Maynard by routing a new transmission main from White Pond east along Hudson Road (through the Town of Sudbury) and Fairbank Road, then north on Route 27. If finished water is conveyed along this route, the new transmission main can connect to the existing distribution system in Maynard, at the 8” pipe on Parker street. The length of this pipe would be approximately 19,505 ft, and the associated cost has been determined to be about $10.2M (including 30% contingency).

If it is decided to convey raw water from White Pond to a centralized WTP at either the OMR or Well 4 site, then the new transmission main will continue north on Parker Street, and then continue either east on Old Marlboro Road to the OMR wellfield site or continue west cross country to the Well 4 site. For transmission of raw water to either of the Well 4 or OMR sites the length of the pipe would be approximately 24,000 feet, and the associated cost has been determined to be about $14.2M (including 30% contingency).

6.5 TRANSMISSION LINE RECOMMENDATIONS

Of the four routes that were considered, Option 3 is recommended, based on permitting, cost and easement considerations. Although options 4 and 5 eliminate the need for work within the Wildlife Refuge, the cost of installing the transmission main along this route would be significantly higher than the other options and would require extensive coordination and permitting through the Town of Sudbury.

Figure 6-1: Transmission Line Options



Legend

Water Pipes
- 4" or smaller
- 6"
- 8"
- 10"
- 12"
- 16"

MassGIS Protected and Recreational OpenSpace
- Conservation Restriction
- Federal
- DCR-State Parks & Recreation
- Municipal
- Land Trust
- Non-Profit
- Private

Option 1 - FW from White Pond (using exisitng transmission line path)
- Pipe Length = 12,027 ft

Option 2 - RW from White Pond to New WTP at OMR
- Pipe Length = 16,051 ft

Option 3 - RW from White Pond and OMR to New WTP at Well 4
- Pipe Length = 18,392 ft (from White Pond); 3,444 ft (from OMR Wells)

Option 4 - FW from White Pond through Sudbury
- Pipe Length = 19,505 ft

Option 5 - RW from White Pond through Sudbury to New WTP at Well 4 or OMR
- Pipe Length = 23,611 ft (to Well 4A); 23,602 ft (to OMR)

7.0 PERMITTING & EASEMENTS

Potential local, state, and federal permits and easements required for the water treatment facility and transmission line are summarized in Table 7-1 and discussed in this section. These permits include those for water treatment plant and water transmission line construction.

7.1 SOURCE WATER DEVELOPMENT PERMIT – PILOT STUDY

MassDEP requires pilot testing for new WTP facilities to verify proposed treatment technologies meet MassDEP water quality regulations. MassDEP recommends that at least two different treatment processes be pilot tested. A Pilot Test Proposal must be provided to MassDEP for review and approval.

Pilot testing would need to evaluate how the primary and secondary disinfectants in the proposed treatment trains would meet contact time requirements, conforming to the Surface Water Treatment Rule. It would also have to indicate how corrosion control would be achieved. Any specific considerations that would influence the pilot testing and actual treatment would need to be included; for instance, whether intake ports at the different depths would be used to mitigate poor raw water quality during lake turnover. The Pilot Test Proposal should consider conducting the studies during extreme cold-water temperature conditions (normally January or February) as well as during extreme warm water conditions (normally August), and during problem periods identified by the raw water data or specific periods of consumer complaints. Proposed times for the pilot studies would need to be indicated in the Pilot Test Proposal. Pilot testing would need to include bench testing to determine anticipated residuals volumes.

Following the completion of the pilot study, a Final Pilot Test Report must be prepared and sent to MassDEP for concurrence and written approval.

7.2 TRANSMISSION MAIN EASEMENT

On February 14, 2019, Stantec met with the Town of Maynard Department of Public Works and the US Fish and Wildlife Service (FWS) to discuss the needs and requirements of both parties relative to the potential use of White Pond as a drinking water source in the future. FWS stated their needs for drinking water at their offices and a new maintenance building, which is located very close to the existing transmission main from White Pond. FSW expressed interest in a potential connection to the new pipeline, if the Town were to pursue transmission of finished water along White Pond Road in the future. FWS was not able to locate the easement or any legally binding documentation granting the easement needed for the installation of the pipeline through its property to the Town of Maynard. FWS stated that the new pipeline would need to be placed along the White Pond Road in its entirety in order to be approved.

Consequently, Stantec engaged LandTech to investigate the easement for the existing transmission main. LandTech pursued research to locate the easement documentation for the existing pipeline by reviewing documents and contacting various parties including:

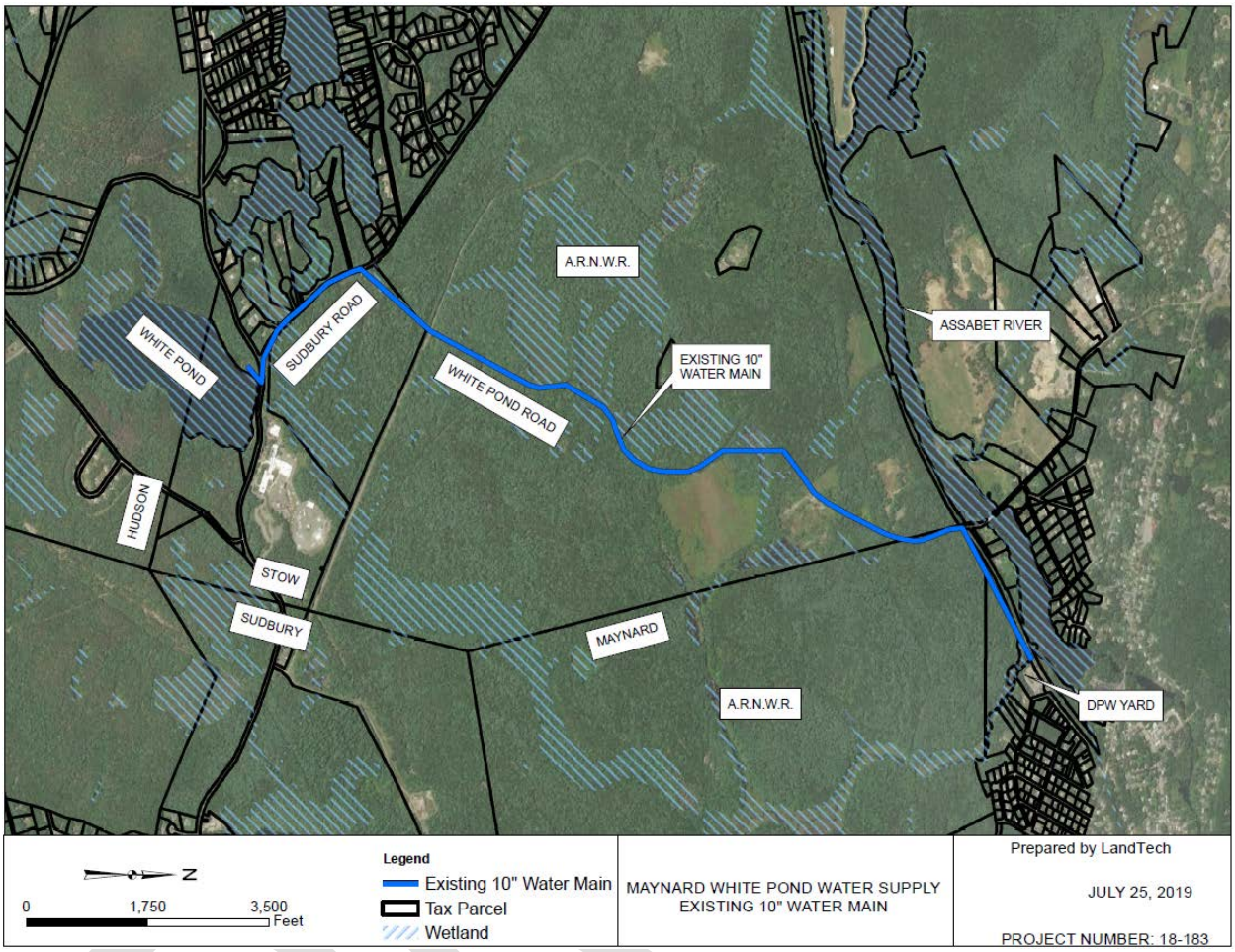
- Town historical documents and drawings; many of which reference the 10-inch water main but no indication of an easement document
- Assabet River National Wildlife Refuge (Sudbury, MA)
- Middlesex South District Registry of Deeds
- Town of Maynard DPW, Clerk
- U.S. Fish & Wildlife Service regional office (Hadley, MA)
- U.S. Army Corps of Engineers (Concord, MA)

The Middlesex South District Registry of Deeds provided the most pertinent information related to the easement (see Appendix E) through the USA Taking Documents pursuant to the Maynard Ordnance Depot construction dated from November 1942 to May 1943 recorded at the Middlesex South District Registry of Deeds. Takings No. 1, 2, 3 and 4 state “subject to existing easements for public roads and highways, for public utilities, for railroads and for pipelines”, but no plans cited in the Taking documents for each described parcel are recorded at the MSDRD. However, these plans may be available at the National Archive in Waltham, MA.

It is recommended that the Town continue to pursue these documents and have a surveyor plot the parcel descriptions provided in the Taking Documents located from MSDRD. Following the completion of this research, it is recommended that the Town engage a title examiner (attorney) to review the findings and engage the FWS to discuss the easements that will be necessary for the recommended treatment and transmission options.

Figure 7-1 shows the pathway for the existing 10-inch water main as determined by LandTech during a site walk that was completed in March 2019.

Figure 7-1: Existing 10-inch Water Main Route



7.3 PERMITTING NEEDS FOR CONSTRUCTION OF PROPOSED WATER TREATMENT PLANT AND TRANSMISSION LINE

Based on an initial review of MassGIS natural resource data layers and the potential local, state, and federal permits, it is anticipated that many of the permits, studies, consultations, and approvals will be the same regardless of the selected option for the route for the new transmission line, with a few notable exceptions:

- Options 1 and 3 (refer to Figure 6-1) will require approval under Article 97 of the state constitution for the change in use of public parklands originally taken or acquired for natural resource purposes, for the transmission line route through the Department of Conservation and Recreation (DCR) State Forest (Marlborough-Sudbury State Forest, parcel R26-005-1). Option 2 may avoid the need for this lengthy process as the transmission route stays within the right of way of Sudbury and Hudson roads when passing through the DCR forest. The presence of a legal easement and rights to install the water line may not require Article 97 approval; this determination must be made by legal counsel.

- Option 2 would require an additional Notice of Intent (NOI) for the Town of Sudbury, as the other options do not traverse Sudbury.

- Segments of the Option 3 transmission route appear to result in wetland/water impacts due to crossing Taylor Brook, a tributary to the Assabet River (parcel 23-000-3), and crossing a wetland (parcels 24-000-15, 24-000-14) to the northwest of the proposed WTP in Maynard. Due to these potential wetlands impacts, Option 3 may require a Water Quality Certification under Section 401 of the Clean Water Act from MassDEP and a Pre-Construction Notification application and permit from the US Army Corps of Engineers. These permits are required if final cumulative alteration to Waters of the US exceeds 5,000 square feet.

Table 7-1 provides a summary of the potential permits anticipated by for each of the three options under consideration. Options 4 and 5 have been eliminated from further analysis due to the estimated high costs of these alternatives.

Table 7-1: Potential Permitting/Approval Needs for Proposed Water Treatment Plant and Transmission Line

Permit/Approval	Regulatory Authority	Option			Need for Permit or Approval
		1	2	3	
Pilot Study A	MassDEP	X	X	X	
WTP Construction	MassDEP	X	X	X	
Request for Determination of Applicability (RDA) - Stow	WPA and local bylaw	X			Soil borings near wetland resources, Transmission line in road in wetlands buffer
RDA - Maynard	WPA and local bylaw		X	X	Soil borings in/near wetland resources.

Permit/Approval	Regulatory Authority	Option			Need for Permit or Approval
		1	2	3	
Notice of Intent (NOI) - Stow	WPA and local bylaw	X	X	X	Construction of WTP in buffer zone to Bank of White Pond (1) Transmission line in paved or unpaved roads (1, 2, & 3)
NOI - Maynard	WPA and local bylaw	X	X	X	Transmission line from White Pond Road to existing line in Maynard (1), Transmission line in paved or unpaved roads (1, 2, & 3), new WTP (2 & 3)
NOI - Sudbury	WPA and local bylaw		X		Transmission line in roadways passing through wetland resources in Sudbury
ENF/MEPA review	MEPA and regulations	X	X	X	One or more MEPA review thresholds exceeded
MESA Natural Heritage and Endangered Species Program review	MESA and regulations	X	X	X	Priority Habitat of Rare Species and Estimated Habitat of Rare Wildlife
Cultural/historical review	MA Antiquities Act and MEPA regulations	X	X	X	State funding and/or need for federal permit (SVNF or PCN)
Cultural Historical review: Phase 1A, Phase 1B	MA Antiquities Act and MEPA regulations	X	X?	X	State funding and/or need for federal permit and work within trails/roads within the Wildlife Refuge. Evidence for Native American artifacts in Wildlife Refuge.
Use of Article 97 land	DCR approval & 2/3 vote of state legislation	X		X	Transmission line construction on DCR property/Article 97 lands requires an act of state legislation, by 2/3 margin, to approve. DCR parcel R26-005-1
Self-Verification Notification Form	404 CWA/ MA General Permit US Army Corps of Engineers (GP USACOE)	X	X		Impacts to Waters of the US less than 5,000 sf for incidental impacts to wetlands along transmission line.
Pre-Construction Notification	404 CWA/ GP USACOE			X	Assume impacts to wetlands/waters > 5,000 sf for new sections of transmission line in Maynard
401 Water Quality Certification	401 CWA MassDEP			X	Assume impacts to wetlands/waters > 5,000 sf for new sections of transmission line in Maynard
Federal permit for work on federal lands	Permit type TBD	X	X	X	Depending on terms in existing easement. Possible need for new or re-negotiated easement for transmission line in Wildlife Refuge.

Acronyms:

CWA Clean Water Act

NOI Notice of Intent

ENF Environmental Notification Form

MEPA Massachusetts Environmental Policy Act

MESA Massachusetts Endangered Species Act
NHESP Natural Heritage and Endangered Species Program
PCN Pre-Construction Notification
RDA Request for Determination of Applicability
SVNF Self-verification Notification Form
WPA Wetlands Protection Act

The proceeding sections describe the permitting activities that will be required in the next phase of work, if the development of White Pond as a water source and a new transmission main is pursued.

7.3.1 Site Reconnaissance/Site Review

Stantec understands that there are sensitive resources within the Wildlife Refuge including wetlands and endangered species. To better understand the sensitive resources a site visit by a professional wetland scientist and a botanist/wildlife expert will be necessary to assess existing conditions. This site visit will allow us to ask specific questions and understand the site dynamics as we conduct early coordination meetings with the issuing permitting authorities including the NHESP, USFW Services (USFWS) staff and local wetland staff. The duration for this Task is estimated to be 30 days.

7.3.2 Initial Meetings/Early Coordination with Issuing Authorities

Stantec understands that there are a number of stakeholders with a vested interest in traversing both state and federal land. Additionally, we expect that the USFWS and NHESP will be advising and requiring endangered species studies for state and federal threatened and endangered species found in the Wildlife Refuge. Early coordination with Massachusetts DCR Parks and Recreation will be needed to facilitate discussion of concerns for potential use of Article 97 protected land. By meeting with the agencies early in the process, we will be able to address their concerns through both the design of the route and in the permit applications.

7.3.3 Prepare and File ENF with MEPA Office

The filing of the ENF with MEPA (typically at the preliminary design phase) represents the first permit application and solicits comments from both the public and issuing agencies. Similar to the early coordination effort discussed above, the MEPA review process solicits comments early on in the design process such that agency concerns can be addressed in the subsequent permit applications. The focus of the ENF will be providing a robust alternatives analysis in support of the preferred option. The option presented as the preferred route must represent the least damaging alternative with respect to impacts to natural resources. The goal of the ENF alternatives analysis is to identify the preferred option in the document and provide a thorough alternatives analysis, such that the MEPA Office does not require further alternative studies in subsequent documents. Depending on the final project design, other MEPA thresholds (i.e. Article 97 lands, endangered species) may be exceeded where Draft and Final Environmental Impact Reports will be required.

7.3.4 Field Investigations/Studies

In support of the various permit applications, a number of field studies/investigations will be required including wetland delineation, threatened and endangered species surveys and possibly historic/archaeological surveys.

7.3.5 Prepare and File Permit Applications

All previous tasks outlined above will be conducted prior to and in support of the permit applications to the various agencies noted in Table 7-1. The level of effort for this task will vary for the three options due to the fact that the majority of Options 1 and 3 traverses the Assabet River National Wildlife Refuge (NWR) and State forest, and the level of information and detail required will be substantially greater than that for Option 2, an alignment that lies almost entirely within/along existing paved roads. As part of the permit applications, it is anticipated that regulatory agencies will require mitigation plans for unavoidable impacts to wetlands and threatened and endangered species. Typically, the mitigation plans will include pre-construction, construction, and post construction mitigation and monitoring.

8.0 SUMMARY OF FINDINGS

The Town of Maynard needs to address concerns associated with the long-term sustainability and resiliency of their drinking water system. Almost all the Town's existing groundwater supplies are experiencing degrading water quality, specifically associated with an increase in color, iron, and manganese. The existing WTPs can treat the water such that compliance with drinking water rules are maintained, but the operations and maintenance of the wells and the WTPs are becoming more challenging and requiring more time from staff to optimize treatment and maintain the assets. The quality of the water from the well sources is not expected to improve with time; in fact the water quality may continue to degrade as the pumps continue to withdraw water from the aquifers. If these groundwater sources are to remain the Town's primary source of drinking water, treatment upgrades at individual groundwater treatment facilities may become necessary in the future to improve the water quality and simplify operations of these facilities.

In addition to water quality and operational concerns at the wells and WTPs, the Town is also experiencing increasing demands on their water supply. The supply/demand evaluation performed as part of this study concluded that the Town's existing water supplies and WTPs are unable to meet future maximum day demands under existing operational conditions. Additionally, if the largest WTP were to unexpectedly go offline, the Town would not be able to meet current or future average daily demands.

To address water supply concerns, the Town has conducted surveys to identify other viable groundwater well sources in order to meet this deficit. Well 4A, located northeast of existing Well 4 has shown promising pumping results indicating that it could be an additional groundwater source for the Town. Even with the addition of the new Well 4A, the Town would still not be able to meet current or future maximum day demands with the largest WTP out of service.

To provide full redundancy in the water supply system, the Town is pursuing the option to bring White Pond back online as a surface water supply. The treatment, siting, and transmission of water from White Pond were evaluated and the following recommendations made:

1. Bring the White Pond source back online
2. Build a new WTP to treat White Pond water, and potentially groundwater from the Well 4 and/or OMR wellfields
3. Locate the new WTP at the Well 4 site
4. Treat White Pond water with a membrane treatment system, or alternatively with the Trident package system
5. Transmit raw water from White Pond by following the existing transmission main routing through the USFW land and then through Town streets and cross-country to the Well 4 site.
6. Initiate pilot testing and permitting tasks as the next phase of work

8.1 PROJECT COSTS

Total project cost estimates are summarized in Table 8-1, including costs for pilot testing, permitting, design, and construction. Costs were developed assuming a new membrane WTP designed to treat 1 MGD at the Well 4 site and transmitting White Pond raw water via Option 3 presented in Section 6.0 (through the USFW life, parallel to the existing transmission main). These costs are for planning purposes only.

Table 8-1: White Pond Treatment & Transmission Project Cost Estimates

Cost Item	Cost
Pilot Study & Water Quality Characterization	$ $200,000
Treatment Plant Construction	$ 18,600,000
Transmission Line Construction	$ 9,200,000
Total Construction Cost	$ 27,800,000
Engineering (20% of Total Construction Cost)	$ 5,600,000
Permitting	$ 350,000
Project Cost	$ 33,950,000
Contingency (15% of Project Cost)	$ 5,100,000
Total Project Cost	$ 39,100,000

The following assumptions apply to the costs presented in Table 8-1:

- A 30-day pilot study during warm weather and cold weather conditions
- Construction costs include a 50% contingency.
- Engineering fees include design and construction services.

8.2 SCHEDULE

A proposed implementation schedule for the development of White Pond as a new source water, with a new treatment facility located at the Well 4 site and a new transmission main for raw water through the USFW land is presented in Table 8-2.

Table 8-2: Implementation Schedule

TASK	2019		2020				2021				2022				2023				2024			
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Meet with DEP Drinking Water Staff																						
Raw Water Characterization																						
Pilot Testing & Reporting																						
Easement Research/Negotiation w/ USFW			IF NEW EASEMENT NEEDED																			
Permitting																						
Conceptual Design																						
Detailed Design																						
Construction																						

9.0 REFERENCES

Chamberlain, K. (2019). *Rockland Avenue Water Treatment Plant Bench Scale Study & Treatment Optimization.* Burlington, MA: Stantec Consulting Services Inc.

Kawamura, S., & McGivney, W. T. (2008). *Cost Estimating Manual for Water Treatment Facilities.* John Wiley & Sons, Inc.

Marielle Stone, S. C. (2009). *Water Management Act Permit 9P4-2-14-174.01.* Commonwealth of Massachusetts Executive Office of Energy & Environmental Affairs Department of Environmental Protection.

Massachusetts Department of Environmental Protection. (2016). *Total Maximum Daily Loads of Phosphorus for Lake Boon.*

Appendix A TRACT FROM PRIVATE AND SPECIAL STATUTES OF THE COMMONWEALTH

[1881, 169; 1884, 182; 1887, 49.]

Chap. 406 AN ACT TO AUTHORIZE THE CITY COUNCIL OF THE CITY OF MALDEN TO DIVIDE SAID CITY INTO SEVEN WARDS AND TO CONFIRM THE ELECTION OF ALDERMEN AND COUNCILMEN IN SAID CITY.

Be it enacted, etc., as follows:

City of Malden may be divided into seven wards.

SECTION 1. Section three of chapter one hundred and sixty-nine of the acts of the year eighteen hundred and eighty-one, relative to the division of the city of Malden into wards, as amended by chapter forty-nine of the acts of the year eighteen hundred and eighty-seven, is hereby further amended so as to read as follows: — *Section 3.* The city council may in the year eighteen hundred and eighty-eight divide said city into seven wards, so that they shall contain, as nearly as may be consistent with well defined limits to each ward, an equal number of voters in each ward.

Election confirmed.

SECTION 2. The election of the members of the board of aldermen and of the common council of the city of Malden, held on the first Tuesday of December in the year eighteen hundred and eighty-seven, pursuant to the original provisions of chapter one hundred and sixty-nine of the acts of the year eighteen hundred and eighty-one, is hereby confirmed and made valid.

SECTION 3. This act shall take effect upon its passage.

Approved May 25, 1888.

[Accepted July 31, 1888.]

Chap. 407 AN ACT TO SUPPLY THE TOWN OF MAYNARD WITH WATER.

Be it enacted, etc., as follows:

Town of Maynard may supply itself with water.

SECTION 1. The town of Maynard may supply itself and its inhabitants with water for the extinguishment of fires, for domestic, manufacturing and other purposes; may establish fountains and hydrants, relocate and discontinue the same; may regulate the use of such water, and fix and collect rates to be paid for the use of the same.

May convey water from White pond lying in the towns of Hudson and Stow.

SECTION 2. The said town, for the purposes aforesaid and for the purpose of obtaining a supply of water, may draw and convey directly from White pond, so called, lying partly in the town of Hudson and partly in the town of Stow, so much of the waters thereof, and the waters that flow into and form the same as it may require; and it may take by purchase, or otherwise, and hold any water rights connected with said pond, and any springs and

May take water of ponds and water sources in Maynard.

streams tributary thereto, and the water of any other ponds or water sources, within the limits of said town of Maynard, and the water rights connected with any of said sources; and also all lands, rights of way and easements necessary for holding and preserving such water, and for conveying the same to any part of said town; and may erect upon the lands thus taken or held, proper dams, buildings, fixtures and other structures, and may make excavations, procure and operate machinery, and provide such other means and appliances as may be necessary for the establishment and maintenance of complete and effective water works; and may construct and lay down conduits, pipes and other works under, over or upon any lands, water courses, railroads or public or private ways, and along any such way, in such manner as when completed shall not unnecessarily obstruct the same; and for the purpose of constructing, maintaining and repairing such conduits, pipes and other works, and for all purposes of this act, said town may dig up, raise and embank any such lands or ways in such manner as to cause the least hindrance to public travel on such ways.

May construct and lay down conduits.

May dig up, etc., lands.

SECTION 3. The said town shall within ninety days after the taking of any lands, rights of way, water rights, water sources or easements as aforesaid, other than by purchase, file and cause to be recorded in the registry of deeds for the southern district of the county of Middlesex, a description thereof sufficiently accurate for identification, with a statement of the purpose for which the same is taken, signed by the water commissioners hereinafter provided for.

To cause to be recorded in registry of deeds a description of the land, etc., taken.

SECTION 4. The said town shall pay all damages sustained by any person or corporation in property by the taking of any land, right of way, water, water source, water right or easement, or any other thing done by said town under the authority of this act, except that said town shall not be liable to pay any damages resulting from taking water from said White pond, or from taking water from any other water source within the limits of said town, other than the state itself would be legally liable to pay. Any person or corporation entitled to damages as aforesaid under this act, who fails to agree with said town as to the amount of damages sustained, may have damages assessed and determined in the manner provided by law when land is taken

Town to pay damages.

Parties failing to agree may have damages assessed as when land is taken for highways.

for the laying out of highways by making application at any time within the period of three years from the taking of such land or other property or rights, or the doing of any other injury under the authority of this act; but no such application shall be made after the expiration of said three years. No application for assessment of damages shall be made for the taking of any water, water right, or any injury thereto, until the water is actually withdrawn or diverted by said town under the authority of this act.

Application for damages not to be made until water is diverted.

Maynard Water Loan not to exceed in the aggregate $75,000.

SECTION 5. The said town may, for the purpose of paying the necessary expenses and liabilities incurred under the provisions of this act, issue from time to time, bonds, notes or scrip to an amount not exceeding in the aggregate seventy-five thousand dollars; such bonds, notes and scrip shall bear on their face the words Maynard Water Loan; shall be payable at the expiration of periods not exceeding thirty years from the date of issue; shall bear interest payable semi-annually at a rate not exceeding six per centum per annum, and shall be signed by the treasurer of the town and countersigned by the water commissioners. The said town may sell such securities at public auction or private sale, or pledge the same for money borrowed for the purposes of this act, upon such terms and conditions as it may deem proper: *provided*, that such securities shall not be sold or pledged at less than the par value thereof. The said town shall pay the interest on said loan as it accrues, and shall provide, at the time of contracting said loan, for the establishment of a sinking fund, and shall annually after the expiration of five years from the first issuance of said loan, contribute to such fund a sum sufficient, with the accumulations thereof, to pay the principal of said loan at maturity. The said sinking fund shall remain inviolate and pledged to the payment of said loan, and shall be used for no other purpose.

May sell securities or pledge the same for money borrowed.

Sinking fund to be established.

May provide for annual proportionate payments in lieu of sinking fund.

SECTION 6. The said town instead of establishing a sinking fund may, at the time of authorizing said loan, provide for the payment thereof in such proportionate payments, after the expiration of five years from the first issuance of said loan, as will extinguish the same within the time prescribed in this act; and when such vote has been passed the amount required shall, without further vote, be assessed by the assessors of said town, in each year thereafter, until the debt incurred by said loan shall

be extinguished, in the same manner as other taxes are assessed, under the provisions of section thirty-four of chapter eleven of the Public Statutes.

Return required to state amount of sinking fund, etc., established.

SECTION 7. The return required by section ninety-one of chapter eleven of the Public Statutes shall state the amount of sinking fund established under this act, and if none is established, whether action has been taken in accordance with the provisions of the preceding section, and the amount raised and applied thereunder for the current year.

Town to raise annually by taxation, etc., sufficient to pay current expenses and interest.

SECTION 8. The said town shall raise annually by taxation a sum which, with the income derived from the water rates, will be sufficient to pay the current annual expenses of operating its water works, and the interest as it accrues on the bonds, notes and scrip issued as aforesaid by said town, and to make such contributions to the sinking fund and payments on the principal as may be required under the provisions of this act.

Penalty for wilfully corrupting or diverting water.

SECTION 9. Whoever wilfully or wantonly corrupts, pollutes or diverts any of the waters taken or held under this act, or injures any structure, work or other property owned, held or used by said town, under the authority and for the purposes of this act, shall forfeit and pay to said town three times the amount of damages assessed therefor, to be recovered in an action of tort; and, upon conviction of either of the above wilful or wanton acts, shall be punished by fine not exceeding three hundred dollars, or by imprisonment not exceeding one year.

Board of water commissioners to be elected.

SECTION 10. The said town shall, after its acceptance of this act, at a legal meeting called for the purpose, elect by ballot three persons to hold office, one until the expiration of three years, one until the expiration of two years and one until the expiration of one year from the next succeeding annual town meeting, to constitute a board of water commissioners; and at each annual town meeting thereafter one such commissioner shall be elected by ballot for the term of three years. All the authority granted to the town by this act, and not otherwise specially provided for, shall be vested in said board of water commissioners, who shall be subject, however, to such instructions, rules and regulations as said town may impose by its vote; the said commissioners shall be trustees of the sinking fund herein provided for, and a majority of

To be trustees of sinking fund.

said commissioners shall constitute a quorom for the transaction of business relative both to the water works and to the sinking fund; any vacancy occurring in said board from any cause may be filled for the remainder of the unexpired term by said town at any legal town meeting called for the purpose.

Vacancies in board.

Subject to acceptance by a two-thirds vote within three years.

SECTION 11. This act shall take effect upon its acceptance by a two-thirds vote of the voters of said town, present and voting thereon at a legal town meeting called for the purpose, within three years from its passage; but the number of meetings so called in any year shall not exceed three.

Repeal.

SECTION 12. So much of chapter one hundred and ninety-one of the acts of the year eighteen hundred and eighty as authorizes the town of Marlborough to take or hold any of the waters of said White pond is hereby repealed.

Approved May 25, 1888.

[Accepted June 28, 1888.]

[1887, 257.]

Chap. 408 AN ACT TO AUTHORIZE THE EAST MIDDLESEX STREET RAILWAY COMPANY TO FURTHER EXTEND ITS TRACKS IN THE CITY OF CHELSEA.

Be it enacted, etc., as follows:

May run its cars over tracks of other companies with consent of mayor and aldermen of Chelsea.

SECTION 1. The East Middlesex Street Railway Company is authorized, with the consent of the mayor and aldermen of the city of Chelsea, to run its cars over the tracks of other companies and operate its business from the junction of Everett avenue and Broadway across Broadway square, and through Winnisimmet street, to Chelsea ferry in said city of Chelsea.

SECTION 2. This act shall take effect upon its passage.

Approved May 25, 1888.

[1886, 127.]

Chap. 409 AN ACT TO REVIVE CHAPTER ONE HUNDRED AND TWENTY-SEVEN OF THE ACTS OF THE YEAR EIGHTEEN HUNDRED AND EIGHTY-SIX, ENTITLED AN ACT TO INCORPORATE THE PLAINVILLE WATER COMPANY.

Be it enacted, etc., as follows:

Plainville Water Company, act of incorporation revived.

SECTION 1. Chapter one hundred and twenty-seven of the acts of the year eighteen hundred and eighty-six, entitled an act to incorporate the Plainville Water Company is hereby revived, provided said company is organ-

Appendix B WELL 2174000-03G RAW WATER QUALITY ANALYSES RESULTS

R.I. ANALYTICAL
Specialists in Environmental Services

LABORATORY REPORT

Town of Maynard Massachusetts
Attn: Marie Morando
195 Main Street
Maynard, MA 01754

Date Received: 6/27/2018
Date Reported: 7/13/2018
P.O. #:

Work Order #: 1806-13443
Project Name: WELL #3 MONITORING

Enclosed are the analytical results and Chain of Custody for your project referenced above. The sample(s) were analyzed by our Warwick, RI laboratory unless noted otherwise. When applicable, indication of sample analysis at our Hudson, MA laboratory and/or subcontracted results are noted and subcontracted reports are enclosed in their entirety.

All samples were analyzed within the established guidelines of US EPA approved methods and in accordance with Massachusetts Department of Environmental Protection regulations under 310 CMR 42.00, unless otherwise noted at the end of a given sample's analytical results or in a case narrative. Laboratory certification status for a given analyte and/or method may be referenced on the enclosed Certification Summary.

The Detection Limit is defined as the lowest level that can be reliably achieved during routine laboratory conditions.

These results only pertain to the samples submitted for this Work Order # and this report shall not be reproduced except in its entirety.

We certify that the following results are true and accurate to the best of our knowledge. If you have

Approved by:

Dawne E. Smart
Data Reporting Manager

Massachusetts Department of Environmental Protection Laboratory Identification Numbers:
Warwick, RI M-RI015 Hudson, MA M-MA1117

R.I. Analytical Laboratories, Inc

Laboratory Report

Town of Maynard Massachusetts
Work Order #: 1806-13443
Project Name/PWS ID: WELL #3 MONITORING

Sample Number: 001
Sample Description: WELL #3 RAW RS 03G
Sample Type : GRAB
Sample Date / Time : 6/27/2018 @ 08:19

PARAMETER	SAMPLE RESULTS	DET. LIMIT	UNITS	METHOD	DATE/TIME ANALYZED	ANALYST
Radon 913	See Attached		pCi/L	EPA 913.0	6/29/18 0:00	*AS

*AS Radon analyzed by Accustar Laboratories.

R.I. Analytical Laboratories, Inc

Laboratory Report

Town of Maynard Massachusetts
Work Order #: 1806-13443
Project Name/PWS ID: WELL #3 MONITORING

Sample Number: 002
Sample Description: WELL #3 RAW RS 03G
Sample Type : GRAB
Sample Date / Time : 6/27/2018 @ 08:55

PARAMETER	SAMPLE RESULTS	DET. LIMIT	UNITS	METHOD	DATE/TIME ANALYZED		ANALYST
Volatile Organic Compounds							
Bromodichloromethane	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
Bromoform	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
Dibromochloromethane	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
Chloroform	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
Benzene	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
Carbon Tetrachloride	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
1,2-Dichloroethane	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
Trichloroethene	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
1,4-Dichlorobenzene	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
1,1-Dichloroethane	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
1,1,1-Trichloroethane	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
Vinyl Chloride	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
Bromobenzene	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
Bromomethane	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
Chlorobenzene	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
Chloroethane	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
Chloromethane	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
2-Chlorotoluene	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
4-Chlorotoluene	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
Dibromomethane	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
1,3-Dichlorobenzene	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
1,2-Dichlorobenzene	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
Trans-1,2-Dichloroethene	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
cis-1,2-Dichloroethene	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
Methylene Chloride	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
1,1-Dichloroethene	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
1,1-Dichloropropene	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
1,2-Dichloropropane	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
1,3-Dichloropropane	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
cis-1,3-Dichloropropene	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
trans-1,3-Dichloropropylene	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
2,2-Dichloropropane	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
Ethylbenzene	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
Styrene	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
1,1,2-Trichloroethane	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
1,1,1,2-Tetrachloroethane	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR

R.I. Analytical Laboratories, Inc

Laboratory Report

Town of Maynard Massachusetts
Work Order #: 1806-13443
Project Name/PWS ID: WELL #3 MONITORING

Sample Number: 002
Sample Description: WELL #3 RAW RS 03G
Sample Type : GRAB
Sample Date / Time : 6/27/2018 @ 08:55

PARAMETER	SAMPLE RESULTS	DET. LIMIT	UNITS	METHOD	DATE/TIME ANALYZED		ANALYST
1,1,2,2-Tetrachloroethane	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
Tetrachloroethene	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
1,2,3-Trichloropropane	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
Toluene	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
o-Xylene	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
m,p-Xylene	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
Xylenes	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
Bromochloromethane	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
n-Butylbenzene	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
Dichlorodifluoromethane	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
Trichlorofluoromethane	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
Isopropylbenzene	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
Hexachlorobutadiene	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
p-Isopropyltoluene	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
Naphthalene	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
n-Propylbenzene	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
Sec-butylbenzene	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
tert-Butylbenzene	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
1,2,3-Trichlorobenzene	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
1,2,4-Trichlorobenzene	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
1,2,4-Trimethylbenzene	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
1,3,5-Trimethylbenzene	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
MTBE	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
n-Hexane	<0.5	0.5	ug/l	EPA 524.2	6/28/18	18:54	RBR
Surrogates			RANGE	EPA 524.2	6/28/18	18:54	RBR
4-Bromofluorobenzene	102		80-120%	EPA 524.2	6/28/18	18:54	RBR
1,2-Dichlorobenzene-d4	101		80-120%	EPA 524.2	6/28/18	18:54	RBR

Sample Number: 003
Sample Description: WELL #3 RAW RS 03G
Sample Type : GRAB
Sample Date / Time : 6/27/2018 @ 08:45

PARAMETER	SAMPLE RESULTS	DET. LIMIT	UNITS	METHOD	DATE/TIME ANALYZED		ANALYST
Nitrite (as N)	<0.05	0.05	mg/l	EPA 300.0	6/28/18	0:05	HHC
Nitrate (as N)	<0.05	0.05	mg/l	EPA 300.0	6/28/18	0:05	HHC

R.I. Analytical Laboratories, Inc

Laboratory Report

Town of Maynard Massachusetts
Work Order #: 1806-13443
Project Name/PWS ID: WELL #3 MONITORING

Sample Number: 004
Sample Description: WELL #3 RAW RS 03G
Sample Type : GRAB
Sample Date / Time : 6/27/2018 @ 09:15

PARAMETER	SAMPLE RESULTS	DET. LIMIT	UNITS	METHOD	DATE/TIME ANALYZED	ANALYST
Total Coliform	44.8	1.0	MPN/100 ml	SM9223B 19-21ed Enum	6/27/18 10:29	GLP
E. Coli	4.1	1.0	MPN/100 ml	SM9223B 19-21ed Enum	6/27/18 10:29	GLP

Microbiological analysis performed at our Hudson, MA laboratory location. Refer to page 1 for physical address and certification numbers.

Sample Number: 005
Sample Description: WELL #3 RAW RS 03G
Sample Type : GRAB
Sample Date / Time : 6/27/2018 @ 09:10

PARAMETER	SAMPLE RESULTS	DET. LIMIT	UNITS	METHOD	DATE/TIME ANALYZED	ANALYST
Perchlorate	See Attached			EPA 331.0	7/7/18 20:32	*EF

*EF Perchlorate analyzed by Eurofins Eaton Analytical.

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION CERTIFICATION SUMMARY

MICROBIOLOGY

(Warwick and Hudson Laboratories)

Non-Potable Water		Potable Water	
Warwick only Fecal Coliform (Wastewater)	SM 9221E	Heterotrophic Plate Count *	SM 9215B
Fecal Coliform (Wastewater) *	SM 9222D	Total Coliform - Water Treatment and Distribution (P/A) *	SM 9222B, SM 9223
Hudson only E. coli (Ambient, Waste Water)	SM 9223B	***Hudson only*** Total Coliform (Source Enumeration)	SM 9223B
Enterococci (Ambient, Source Water)*	Enterolert	E. coli - Treatment and Distribution (P/A), Source Enumeration *	SM 9223, SM 9222G, SM 9223B
		Enterococci - Source (P/A) *	Enterolert

**** Indicates certification at both laboratory locations***

CHEMISTRY

(Warwick Laboratory Only)

Non-Potable Water		Potable Water	
Specific Conductivity	EPA 120.1	Turbidity	EPA 180.1
Iron, Titanium, Hardness (CaCO3); Total, Calcium, Magnesium, Sodium, Potassium	EPA 200.7	Sodium, Calcium	EPA 200.7
Aluminum, Antimony, Arsenic, Beryllium, Cadmium, Chromium, Cobalt, Copper, Lead, Manganese, Molybdenum, Nickel, Selenium, Silver, Thallium, Vanadium, Zinc	EPA 200.7, EPA 200.8	Barium, Beryllium, Cadmium, Chromium, Copper, Nickel, Silver	EPA 200.7, EPA 200.8
Mercury	EPA 245.1	Antimony, Arsenic, Lead, Selenium, Thallium	EPA 200.8
Nitrate, Sulfate, Chloride, Fluoride	EPA 300.0	Mercury	EPA 245.1
Ammonia	EPA 350.1, SM 4500-NH_3-B,H		
Phenolics, Total	EPA 420.1	Nitrate-N, Nitrite-N, Fluoride, Sulfate	EPA 300.0
Polychlorinated Biphenyls (Oil)	EPA 600/4-81-045	Volatile Organic Compounds, Trihalomethanes	EPA 524.2
Chlordane, Toxaphene, Aldrin, Alpha-BHC, Beta-BHC, Gamma-BHC, Delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan Sulfate, Endrin, Endrin Sulfate, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, Polychlorinated Biphenyls (Water)	EPA 608 until 7/1/18	Haloacetic Acids	EPA 552.2
Volatile Halocarbons, Volatile Aromatics	EPA 624 until 7/1/18	Alkalinity, Total	SM 2320B
SVOC– Acid Extractable, SVOC- Base/Neutral Extractable	EPA 625 until 7/1/18	Total Dissolved Solids	SM 2540C
Oil and Grease	EPA 1664	Chlorine, Free Residual	SM 4500-CL-G
Alkalinity; Total	SM 2320B	Cyanide, Total	SM 4500-CN-C,E
Non-Filterable Residue	SM 2540D	pH	SM 4500-H-B
Chloride	SM 4500-CL-B		
Chlorine, Total Residual	SM 4500-CL-G		
Cyanide, Total	SM 4500-CN,E		
Fluoride	SM 4500-F-B,D		
pH	SM 4500-H-B		
Kjeldahl Nitrogen	SM 4500-NORG-D		
Orthophosphate	SM 4500-P-E		
Phosphorous, Total	SM 4500-P-B,E		
Biochemical Oxygen Demand	SM 5210B		
Chemical Oxygen Demand	SM 5220D		
Total Organic Carbon	SM 5310C		

Please Note: **MA DEP does not offer certification for the soil/solid matrices or SW-846 methods.**

Radon in Water

NELAC NY 11769
NRPP 101193 AL
NRSB ARL0017

EPA 913.0 SM 20 7500 Rn
Liquid Scintillation

Laboratory Report for:

R.I. Analytical Laboratories, Inc.
41 Illinois Avenue
Warwick RI 02888

Property Tested:

Lab ID 1806 13443 001

Log Number	Device Number	Sample Location	Result pCi/L	Uncertainty pCi/L
2316660	1243262	03G Well 3	1260	+/- 110
2316661	1243263	03G Well 3	1360	+/- 110

Contact your State Radon Office for information about your radon in water test result. Links to State Radon Offices are available online at https://geopub.epa.gov/Radon/.

Comment: R.I. Analytical Laboratories, Inc. was e-mailed a copy of this report. A copy of this report was emailed to kphelan@rianalytical.com.

Distributed by: R.I. Analytical Laboratories, Inc.

Sample Collected:	06/27/2018	8:49 am	Date Received:	06/28/2018	Date Analyzed:	06/29/2018
			Date Logged:	06/28/2018	Date Reported:	06/29/2018

Report Reviewed By: _____ Report Approved By: _____

Shawn Price, Director of Laboratory Operations, AccuStar Labs

Disclaimer:

Factors contributing to uncertainty include statistical variations, daily and seasonal variations in radon concentrations, sample collection techniques and operation of the dwelling. Interference with test conditions may influence the test results.

This report may only be transferred to a third party in its entirety. Analytical results relate to the samples AS RECEIVED BY THE LABORATORY. Results shown on this report represent levels of radon gas measured between the dates shown in the room or area of the site identified above as "Property Tested". Incorrect information will affect results. The results may not be construed as either predictive or supportive of measurements conducted in any area of this structure at any other time. AccuStar Labs, its employees and agents are not responsible for the consequences of any action taken or not taken based upon the results reported or any verbal or written interpretation of the results.

11 Awl Street Medway MA 02053 888-480-8812 FAX 508-533-8831

eurofins | Eaton Analytical

LABORATORY REPORT

If you have any questions concerning this report, please do not hesitate to call us at (800) 332-4345 or (574) 233-4777.

STATE CERTIFICATION LIST

State	Certification	State	Certification
Alabama	40700	Missouri	880
Alaska	IN00035	Montana	CERT0026
Arizona	AZ0432	Nebraska	NE-OS-05-04
Arkansas	IN00035	Nevada	IN00035
California	2920	New Hampshire*	2124
Colorado	IN035	New Jersey*	IN598
Colorado Radiochemistry	IN035	New Mexico	IN00035
Connecticut	PH-0132	New York*	11398
Delaware	IN035	North Carolina	18700
Florida*	E87775	North Dakota	R-035
Georgia	929	Ohio	87775
Hawaii	IN035	Oklahoma	D9508
Idaho	IN00035	Oregon (Primary AB)*	4074-001
Illinois*	200001	Pennsylvania*	68-00466
Illinois Microbiology	17767	Puerto Rico	IN00035
Illinois Radiochemistry	IN00035	Rhode Island	LAO00343
Indiana Chemistry	C-71-01	South Carolina	95005
Indiana Microbiology	M-76-07	South Dakota	IN00035
Iowa	098	Tennessee	TN02973
Kansas*	E-10233	Texas*	T104704187-15-8
Kentucky	90056	Texas/TCEQ	TX207
Louisiana*	LA180008	Utah*	IN00035
Maine	IN00035	Vermont	VT-8775
Maryland	209	Virginia*	460275
Massachusetts	M-IN035	Washington	C837
Michigan	9926	West Virginia	9927 C
Minnesota*	018-999-338	Wisconsin	999766900
Mississippi	IN035	Wyoming	IN035
EPA	IN00035		

*NELAP/TNI Recognized Accreditation Bodies

Revision date: 01/02/2018

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LABORATORY CASE NARRATIVE

Client: R.I. Analytical

Report #: 420845CN

All method QC was within acceptance limits.

07/12/2018

Authorized Signature | Title | Date

eurofins | Eaton Analytical

110 South Hill Street
South Bend, IN 46617
Tel: (574) 233-4777
Fax: (574) 233-8207
1 800 332 4345

Laboratory Report

Client: R.I. Analytical

Attn: Kristin Phelan
41 Illinois Avenue
Warwick, RI 02888

Report: 420845
Priority: Standard Written
Status: Final
PWS ID: MA2174000

Sample Information

EEA ID #	Client ID	Method	Collected Date / Time	Collected By:	Received Date / Time
3975507	1806-13443-005 03GWell#3(Raw)	331.0	06/27/18 09:10	Client	06/29/18 09:15

Report Summary

Detailed quantitative results are presented on the following pages. The results presented relate only to the samples provided for analysis.

We appreciate the opportunity to provide you with this analysis. If you have any questions concerning this report, please do not hesitate to call Jim Vernon at (574) 233-4777.

Authorized Signature | Title | 07/12/2018 Date

Client Name: R.I. Analytical
Report #: 420845

Client Name: R.I. Analytical Report #: 420845

Sampling Point: 1806-13443-005 03GWell#3(Raw) PWS ID: MA2174000

General Chemistry									
Analyte ID #	**Analyte**	**Method**	**Reg Limit**	**MRL†**	**Result**	**Units**	**Preparation Date**	**Analyzed Date**	**EEA ID #**
14797-73-0	Perchlorate	331.0	2.0 *	0.05	< 0.05	ug/L	---	07/07/18 20:32	3975507

† EEA has demonstrated it can achieve these report limits in reagent water, but can not document them in all sample matrices.

Reg Limit Type:	MCL	SMCL	AL
Symbol:	*	^	!

Lab Definitions

Continuing Calibration Check Standard (CCC) / Continuing Calibration Verification (CCV) / Initial Calibration Verification Standard (ICV) / Initial Performance Check (IPC) - is a standard containing one or more of the target analytes that is prepared from the same standards used to calibrate the instrument. This standard is used to verify the calibration curve at the beginning of each analytical sequence, and may also be analyzed throughout and at the end of the sequence. The concentration of continuing standards may be varied, when prescribed by the reference method, so that the range of the calibration curve is verified on a regular basis. CCL, CCM, and CCH are the CCC standards at low, mid, and high concentration levels, respectively.

Internal Standards (IS) - are pure compounds with properties similar to the analytes of interest, which are added to field samples or extracts, calibration standards, and quality control standards at a known concentration. They are used to measure the relative responses of the analytes of interest and surrogates in the sample, calibration standard or quality control standard.

Laboratory Duplicate (LD) - is a field sample aliquot taken from the same sample container in the laboratory and analyzed separately using identical procedures. Analysis of laboratory duplicates provides a measure of the precision of the laboratory procedures.

Laboratory Fortified Blank (LFB) / Laboratory Control Sample (LCS) - is an aliquot of reagent water to which known concentrations of the analytes of interest are added. The LFB is analyzed exactly the same as the field samples. LFBs are used to determine whether the method is in control. FBL, FBM, and FBH are the LFB samples at low, mid, and high concentration levels, respectively.

Laboratory Method Blank (LMB) / Laboratory Reagent Blank (LRB) - is a sample of reagent water included in the sample batch analyzed in the same way as the associated field samples. The LMB is used to determine if method analytes or other background contamination have been introduced during the preparation or analytical procedure. The LMB is analyzed exactly the same as the field samples.

Laboratory Trip Blank (LTB) / Field Reagent Blank (FRB) - is a sample of laboratory reagent water placed in a sample container in the laboratory and treated as a field sample, including storage, preservation, and all analytical procedures. The FRB/LTB container follows the collection bottles to and from the collection site, but the FRB/LTB is not opened at any time during the trip. The FRB/LTB is primarily a travel blank used to verify that the samples were not contaminated during shipment.

Matrix Spike Duplicate Sample (MSD) / Laboratory Fortified Sample Matrix Duplicate (LFSMD) - is a sample aliquot taken from the same field sample source as the Matrix Spike Sample to which known quantities of the analytes of interest are added in the laboratory. The MSD is analyzed exactly the same as the field samples. Analysis of the MSD provides a measure of the precision of the laboratory procedures in a specific matrix. SDL, SDM, and SDH / LFSMDL, LFSMDM, and LFSMDH are the MSD or LFSMD at low, mid, and high concentration levels, respectively.

Matrix Spike Sample (MS) / Laboratory Fortified Sample Matrix (LFSM) - is a sample aliquot taken from field sample source to which known quantities of the analytes of interest are added in the laboratory. The MS is analyzed exactly the same as the field samples. The purpose is to demonstrate recovery of the analytes from a sample matrix to determine if the specific matrix contributes bias to the analytical results. MSL, MSM, and MSH / LFSML, LFSMM, and LFSMH are the MS or LFSM at low, mid, and high concentration levels, respectively.

Quality Control Standard (QCS) / Second Source Calibration Verification (SSCV) - is a solution containing known concentrations of the analytes of interest prepared from a source different from the source of the calibration standards. The solution is obtained from a second manufacturer or lot if the lot can be demonstrated by the manufacturer as prepared independently from other lots. The QCS sample is analyzed using the same procedures as field samples. The QCS is used as a check on the calibration standards used in the method on a routine basis.

Reporting Limit Check (RLC) / Initial Calibration Check Standard (ICCS) - is a procedural standard that is analyzed each day to evaluate instrument performance at or below the minimum reporting limit (MRL).

Surrogate Standard (SS) / Surrogate Analyte (SUR) - is a pure compound with properties similar to the analytes of interest, which is highly unlikely to be found in any field sample, that is added to the field samples, calibration standards, blanks and quality control standards before sample preparation. The SS is used to evaluate the efficiency of the sample preparation process.

Massachusetts Department of Environmental Protection - Drinking Water Program

Perchlorate Report

ClO_4

I. PWS INFORMATION: Please refer to your DEP Water Quality Sampling Schedule (WQSS) to help complete this form

PWS ID #: 2174000 **City / Town:** Warwick

PWS Name: Town of Maynard **PWS Class:** COM [X] NTNC [ ] TNC [ ]

DEP LOCATION (LOC) ID#	DEP Location Name	Sample Information	Date Collected	Collected By
	03G Well#3 (Raw)	[ ] (M)ultiple [ ] (R)aw [ ] (S)ingle [ ] (F)inished	06/27/18	Nate Dee

Routine or Special Sample	Original, Resubmitted or Confirmation Report	If Resubmitted Report, list below: (1) Reason for Resubmission	(2) Collection Date of Original Sample
[X] RS [ ] SS	[X] Original [ ] Resubmitted [ ] Confirmation	[ ] Resample [ ] Reanalysis [ ] Report Correction	

SAMPLE NOTES - Such as, if a Manifold/Multiple sample, list the source(s) that were on-line during sample collection.

II. ANALYTICAL LABORATORY INFORMATION:

Primary Lab MA Cert. #: M-RI015 **Primary Lab Name:** RI Analytical Laboratories, Inc. **Subcontracted? (Y/N)** Y

Analysis Lab MA Cert. #: M-IN035 **Analysis Lab Name:** EEA

CONTAMINANT	Result	UOM	MCL	MDL	MRL	Lab Method	Date Analyzed	Lab Sample ID#
PERCHLORATE	< 0.05	ug/L	2.0	0.012	0.05	EPA 331.0	07/07/2018	3975507
CONDUCTIVITY		umhos/cm	---					

Perchlorate analysis requires the use of a Massachusetts DEP approved laboratory.

Perchlorate concentrations between the Minimum Detection Limit (MDL) and the Minimum Reporting Level (MRL) must be reported as estimated (J) values (i.e. perchlorate is positively present but tentatively quantified).

All field samples with measured native perchlorate concentrations between 0.8 µg/L and 2.0 µg/L must be retested with and without a perchlorate spike approximately equal to the native perchlorate concentration.

LAB SAMPLE NOTES

Reanalysis and Spike Recovery (required for results between 0.8 µg/L and 2.0 µg/L or samples subject to pretreatment in method EPA 314.0)

Compound	Result (µg/L)	MDL (µg/L)	MRL (µg/L)	Spike Concentration (µg/L)	Spike Recovery (µg/L)	Lab Method	Date Analyzed
Perchlorate (reanalysis)							
Perchlorate (spike)							

Lab Report #: 420845

Note: This report may not be reproduced, except in full, without written approval from EEA.

Note: The results presented relate only to the samples provided for analysis.

I certify under penalties of law that I am the person authorized to fill out this form and the information contained herein is true, accurate and complete to the best extent of my knowledge.

Authorized Signature: [signature] ASM

Date: 07/12/2018

If not submitting these results electronically, mail TWO copies of this report to your DEP Regional Office no later than 10 days after the end of the month in which you received this report or no later than 10 days after the end of the reporting period, whichever is sooner.

DEP REVIEW STATUS (Initial & Date)	Review Comments		[ ] WQTS Data Entered
[ ] Accepted _____ [ ] Disapproved _____			

CHAIN OF CUSTODY RECORD

R.I. Analytical Laboratories, Inc.

41 Illinois Avenue
Warwick, RI 02888-3007
Tel: 800-937-2580
Fax: 401-738-1970

131 Coolidge St, Suite 105
Hudson, MA 01749-1331
Tel: 800-937-2580
Fax: 978-568-0078

420845

347889

Date Collected	Time Collected	Lab ID	Sample Identification	Grab or Composite	# of Containers & Type [C]	Preservation Code [P]	Matrix Code [M]		Perchlorate (RL 0.1 ug/L) - EPA 331.0	MA State form needed												
6/27/2018	9:10	1806-13443-005	03G Well #3 (Raw)	G	1P	NP	DW		X	X		3975507										

Send Report and Invoice to:	
Company Name:	R.I. Analytical Laboratories, Inc.
Address:	41 Illinois Avenue
City/State/Zip:	Warwick, RI 02888
Contact Person:	Kristen Phelan
Email:	kphelan@rianalytical.com; datareporting@rianalytical.com
Telephone:	401-737-8500 x 116

Subcontractor Information:	
Company Name:	Eurofins/Underwriters Laboratory
Address:	110 South Hill Street
City/State/Zip:	Southbend, IN 46617
Contact Person:	Jim Vernon
Email:	
Telephone:	800-332-4345

Relinquished By	Date	Time	Received by	Date	Time
TQuarterMous	6.28.18	1500		6.29.18	0915

Turn Around Time	
X	15 Days
	Rush ____ (Days)

Project Comments

If MCL is exceeded, notify Kristen Mayo (800-937-2580 x109) and Ruben Parrilla (800-937-2580 x160/cell #(617) 893-0257)

PO # : 499

Temperature Upon Receipt 2.0 °C

Date Shipped:	6/28/2018
X	UPS-RIAL
X	Overnight
X	Shipped on Ice
WO #:	1806-13443

Containers: P=Poly, G=Glass, AG=Amber Glass, V=Vial, St=Sterile Preservatives: A=Ascorbic Acid, NH4=NH_4Cl, H=HCl, M=MeOH, N=HNO_3, NP=None, S=H_2SO_4, SB=$NaHSO_4$, SH=NaOH, T=$Na_2S_2O_3$, Z=ZnOAc

Matrix Codes: GW=Groundwater, SW=Surface Water, WW=Wastewater, DW=Drinking Water, S=Soil, SL=Sludge, A=Air, B=Bulk/Solid, O=_____

PWS Name:	Town of Maynard - DPW
Location:	Maynard, MA
PWS ID#:	2174000
PWS Class:	COM

Sampled By:	Nate Lee
Date Collected:	6/27/2018

For RIAL WO#: 1806-13443

Sample Location	Source Code	Location Code	Source Treated?	Collected after Treatment?	Manifolded?	Sample Type	Routine or Special Sample	Original, Resub or Confirm.	Multiple or Single?	Raw or Finished?
Well #3 Raw	2174000	03G	NA	NA	NA	RS	Routine	Original	Single	Raw

R.I. ANALYTICAL
Specialists in Environmental Services

CHAIN OF CUSTODY RECORD

41 Illinois Avenue
Warwick, RI 02888-3007
800-937-2580 • Fax: 401-738-1970

131 Coolidge St., Suite 105
Hudson, MA 01749-1331
800-937-2580 • Fax: 978-568-0078

Date Collected	Time Collected	Field Sample Identification	Grab or Composite	# of Containers & Type C	Preservation Code P	Matrix Code M	Provide eDEP upload of results	Radon	VOC+MTBE	NO3 + NO3	Total Coliform	Perchlorate
6/27	8:49	03G Well #3 (RAW)	G	2G	NP	DW	X	X				
6-27	8:55	03G	G	2G	H	DW	X		X			
6-27	8:45	03G	G	1P	NP	DW	X			X		
6-27	9:15	03G	G	1P	T	DW	X				X	
6-27	9:10	03G	G	1P	NP	DW	X					X
—	—	Trip Blank	G	2V	H	PS	X		X			

Coliform Analyzed in Hudson

Client Information

Company Name:	Town of Maynard Massachusetts – DPW
Address:	195 Main Street
City / State / Zip:	Maynard, MA 01754
Telephone:	978-897-1317 Fax: 978-897-7290
Contact Person:	Marie Morando

Project Information

Project Name:	Well #3 Monitoring
P.O. Number:	Project Number:
Report To:	Marie Morando Phone: 978-897-1317 Fax 978-897-7290
Sampled by:	Email report to these addresses: amiklosko@townofmaynard.net, tmullally@townofmaynard.net, mmorando@townofmaynard.net
Quote No:	

Relinquished By Signatures	Date	Time	Received By Signatures	Date	Time
	6-27-18	9:43		6/27/18	943
	6/27/18	1600	RL	6-27-18	1600
RL	6-27-18	1800		6-27-18	1800

Turn Around Time

	Normal	X	EMAIL Report
X	5-7 Business days		
	Rush – Date Due: ___/___/___		

Project Comments

Circle if applicable: GW-1, GW-2, GW-3, S-1, S-2, S-3 MCP Data Enhancement QC Package? **No**

4-7

* Total coliform ran as Quanti-Tray EP 6/27

PWSID: 2174000

Temp. Upon Receipt 16.5°C

Lab Use Only

	Sample Pick Up Only
	RIAL sampled; attach field hours
X	Shipped on ice
	Workorder No: 1806-13443

Containers: P=Poly, G=Glass, AG=Amber Glass, V=Vial, St=Sterile Preservatives: A=Ascorbic Acid, NH4=NH_4Cl, H=HCl, M=MeOH, N=HNO_3, NP=None, S=H_2SO_4, SB=$NaHSO_4$, SH=NaOH, T=$Na_2S_2O_3$, Z=ZnOAc
Matrix Codes: GW=Groundwater, SW=Surface Water, WW=Wastewater, DW=Drinking Water, S=Soil, SL=Sludge, A=Air, B=Bulk/Solid, WP=Wipe, O=_____

R.I. ANALYTICAL
Specialists in Environmental Services

LABORATORY REPORT

Town of Maynard Massachusetts
Attn: Marie Morando
195 Main Street
Maynard, MA 01754

Date Received: 6/25/2018
Date Reported: 7/10/2018
P.O. #:

Work Order #: 1806-13271
Project Name: INORGANIC MONITORING

Enclosed are the analytical results and Chain of Custody for your project referenced above. The sample(s) were analyzed by our Warwick, RI laboratory unless noted otherwise. When applicable, indication of sample analysis at our Hudson, MA laboratory and/or subcontracted results are noted and subcontracted reports are enclosed in their entirety.

All samples were analyzed within the established guidelines of US EPA approved methods and in accordance with Massachusetts Department of Environmental Protection regulations under 310 CMR 42.00, unless otherwise noted at the end of a given sample's analytical results or in a case narrative. Laboratory certification status for a given analyte and/or method may be referenced on the enclosed Certification Summary.

The Detection Limit is defined as the lowest level that can be reliably achieved during routine laboratory conditions.

These results only pertain to the samples submitted for this Work Order # and this report shall not be reproduced except in its entirety.

We certify that the following results are true and accurate to the best of our knowledge. If you have

Approved by:

Dawne E. Smart
Data Reporting Manager

Massachusetts Department of Environmental Protection Laboratory Identification Numbers:
Warwick, RI M-RI015 Hudson, MA M-MA1117

R.I. Analytical Laboratories, Inc

Laboratory Report

Town of Maynard Massachusetts
Work Order #: 1806-13271
Project Name/PWS ID: INORGANIC MONITORING

Sample Number: 001
Sample Description: WELL #3 RS RW03G
Sample Type : GRAB
Sample Date / Time : 6/25/2018 @ 10:10

PARAMETER	SAMPLE RESULTS	DET. LIMIT	UNITS	METHOD	DATE/TIME ANALYZED		ANALYST
Inorganic Contaminants							
Fluoride	<0.05	0.05	mg/l	EPA 300.0	6/25/18	21:50	HHC
Sulfate	13	1.0	mg/l	EPA 300.0	6/25/18	21:50	HHC
Total Cyanide	<0.01	0.01	mg/l	SM4500CN-C,E 18-22ed	6/29/18	18:35	OAG
Antimony	<0.002	0.002	mg/l	EPA 200.8	7/9/18	17:05	JRW
Arsenic	0.009	0.001	mg/l	EPA 200.8	7/9/18	17:05	JRW
Barium	0.042	0.01	mg/l	EPA 200.7	7/9/18	14:31	AGJ
Beryllium	<0.001	0.001	mg/l	EPA 200.7	7/9/18	14:31	AGJ
Cadmium	<0.00020	0.00020	mg/l	EPA 200.8	7/9/18	17:05	JRW
Chromium	<0.01	0.01	mg/l	EPA 200.7	7/9/18	14:31	AGJ
Nickel	0.016	0.01	mg/l	EPA 200.7	7/9/18	14:31	AGJ
Mercury	<0.0005	0.0005	mg/l	EPA 245.1	6/29/18	16:40	JRW
Selenium	<0.002	0.002	mg/l	EPA 200.8	7/9/18	17:05	JRW
Sodium	49	3.0	mg/l	EPA 200.7	7/9/18	14:31	AGJ
Thallium	<0.001	0.001	mg/l	EPA 200.8	7/9/18	17:05	JRW
Mercury Digestion				EPA 245.1	6/29/18	12:02	JNC

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION CERTIFICATION SUMMARY

MICROBIOLOGY

(Warwick and Hudson Laboratories)

Non-Potable Water		Potable Water	
Warwick only Fecal Coliform (Wastewater)	SM 9221E	Heterotrophic Plate Count *	SM 9215B
Fecal Coliform (Wastewater) *	SM 9222D	Total Coliform - Water Treatment and Distribution (P/A) *	SM 9222B, SM 9223
Hudson only E. coli (Ambient, Waste Water)	SM 9223B	***Hudson only*** Total Coliform (Source Enumeration)	SM 9223B
Enterococci (Ambient, Source Water)*	Enterolert	E. coli - Treatment and Distribution (P/A), Source Enumeration *	SM 9223, SM 9222G, SM 9223B
		Enterococci - Source (P/A) *	Enterolert

**** Indicates certification at both laboratory locations***

CHEMISTRY

(Warwick Laboratory Only)

Non-Potable Water		Potable Water	
Specific Conductivity	EPA 120.1	Turbidity	EPA 180.1
Iron, Titanium, Hardness (CaCO3); Total, Calcium, Magnesium, Sodium, Potassium	EPA 200.7	Sodium, Calcium	EPA 200.7
Aluminum, Antimony, Arsenic, Beryllium, Cadmium, Chromium, Cobalt, Copper, Lead, Manganese, Molybdenum, Nickel, Selenium, Silver, Thallium, Vanadium, Zinc	EPA 200.7, EPA 200.8	Barium, Beryllium, Cadmium, Chromium, Copper, Nickel, Silver	EPA 200.7, EPA 200.8
Mercury	EPA 245.1	Antimony, Arsenic, Lead, Selenium, Thallium	EPA 200.8
Nitrate, Sulfate, Chloride, Fluoride	EPA 300.0	Mercury	EPA 245.1
Ammonia	EPA 350.1, SM 4500-NH_3-B,H		
Phenolics, Total	EPA 420.1	Nitrate-N, Nitrite-N, Fluoride, Sulfate	EPA 300.0
Polychlorinated Biphenyls (Oil)	EPA 600/4-81-045	Volatile Organic Compounds, Trihalomethanes	EPA 524.2
Chlordane, Toxaphene, Aldrin, Alpha-BHC, Beta-BHC, Gamma-BHC, Delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan Sulfate, Endrin, Endrin Sulfate, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, Polychlorinated Biphenyls (Water)	EPA 608 until 7/1/18	Haloacetic Acids	EPA 552.2
Volatile Halocarbons, Volatile Aromatics	EPA 624 until 7/1/18	Alkalinity, Total	SM 2320B
SVOC– Acid Extractable, SVOC- Base/Neutral Extractable	EPA 625 until 7/1/18	Total Dissolved Solids	SM 2540C
Oil and Grease	EPA 1664	Chlorine, Free Residual	SM 4500-CL-G
Alkalinity; Total	SM 2320B	Cyanide, Total	SM 4500-CN-C,E
Non-Filterable Residue	SM 2540D	pH	SM 4500-H-B
Chloride	SM 4500-CL-B		
Chlorine, Total Residual	SM 4500-CL-G		
Cyanide, Total	SM 4500-CN,E		
Fluoride	SM 4500-F-B,D		
pH	SM 4500-H-B		
Kjeldahl Nitrogen	SM 4500-NORG-D		
Orthophosphate	SM 4500-P-E		
Phosphorous, Total	SM 4500-P-B,E		
Biochemical Oxygen Demand	SM 5210B		
Chemical Oxygen Demand	SM 5220D		
Total Organic Carbon	SM 5310C		

Please Note: **MA DEP does not offer certification for the soil/solid matrices or SW-846 methods.**

R.I. ANALYTICAL
Specialists in Environmental Services

CHAIN OF CUSTODY RECORD

41 Illinois Avenue
Warwick, RI 02888-3007
800-937-2580 • Fax: 401-738-1970

131 Coolidge St., Suite 105
Hudson, MA 01749-1331
800-937-2580 • Fax: 978-568-0078

06-19-18

Date Collected	Time Collected	Field Sample Identification	Grab or Composite	# of Containers & Type C	Preservation Code P	Matrix Code M	Provide State Reports	Inorganic Contaminants	Fluoride	Cyanide	Metals: Sb, As, Ba, Be, Cd, Cr, Hg, Ni, Se, Na, Tl
6-25-18	10:10	03G: Well #3 (Raw)	G	1 P	NP	DW			X		
			G	1 P	SH	DW	X	X		X	
			G	1 P	N	DW					X
			G	1 P	NP	DW					
			G	1 P	SH	DW					
			G	1 P	N	DW					
			G	1 P	NP	DW					
			G	1 P	SH	DW					
			G	1 P	N	DW					

E

Client Information

Company Name:	Town of Maynard Massachusetts – DPW
Address:	195 Main Street
City / State / Zip:	Maynard, MA 01754
Telephone:	978-897-1317 Fax: 978-897-7290
Contact Person:	Marie Morando

Project Information

Project Name:	Inorganic Monitoring
P.O. Number:	Project Number:
Report To:	Marie Morando Phone: 978-897-1317 Fax 978-897-7290
Sampled by:	Email report to these addresses: amiklosko@townofmaynard.net, tmullally@townofmaynard.net, mmorando@townofmaynard.net
Quote No:	

Relinquished By Signatures	Date	Time	Received By Signatures	Date	Time
	6-25-18	10:46		6/25/18	1047
	6/25/18	1600	RL	6-25-18	1600
RL	6-25-18	1700	FEDEX MAIL	6/25/18	1700

Turn Around Time

	Normal	X	EMAIL Report
	5-7 Business days		
	Rush – Date Due: ___/___/___		

Page 4 of 4

Project Comments

Circle if applicable: GW-1, GW-2, GW-3, S-1, S-2, S-3

MCP Data Enhancement QC Package? No

PWSID: 2174000

Temp. Upon Receipt 14.9° °C

Lab Use Only

	Sample Pick Up Only
	RIAL sampled; attach field hours
	Shipped on ice
Workorder No:	1806-13271

Containers: P=Poly, G=Glass, AG=Amber Glass, V=Vial, St=Sterile Preservatives: A=Ascorbic Acid, NH4=NH_4Cl, H=HCl, M=MeOH, N=HNO_3, NP=None, S=H_2SO_4, SB=$NaHSO_4$, SH=NaOH, T=$Na_2S_2O_3$, Z=ZnOAc
Matrix Codes: GW=Groundwater, SW=Surface Water, WW=Wastewater, DW=Drinking Water, S=Soil, SL=Sludge, A=Air, B=Bulk/Solid, WP=Wipe, O=_____

MORRELL ASSOCIATES
1661 OCEAN STREET / P.O. BOX 268
MARSHFIELD, MA 02050
(781) 837-1395

Microscopic Particulate Analysis Report: Giardia, Cryptosporidium, & Particulates

Sample Data:

Client:	Town of Maynard	Filter Type:	Faber M39R10A 1 micron
PWS ID #:	2174000-03G	Filter Color:	Dark Brown
Sample #:	Maynard3G.6/27/18	Water Color:	Light Brown
Sample Location:	Maynard, MA	Sediment Color:	Dark Brown
Sample Taken From:	2174000-03G	Temperature:	14.8˚
Date Sampled:	6/27/2018	pH:	7.5
Date Received:	6/28/2018	T.Chlorine:	NA
Date Processed:	6/28/2018	F.Chlorine:	NA
Chain of Custody:	GFS	Conductivity:	401
Courier:	FedEx	Volume Filtered:	1,584 Gallons
Analyst:	J. Morrell/J. Merritt	Pooled Sediment Volume:	150 uL
Water Type:	Groundwater	Pooled SedimentVolume uL/100 Gallons:	9.4
Water Source ID:	Drilled Well	Floatation Volume:	---
Well Depth:	50 feet	Final Pellet Volume:	150 uL

Giardia / Cryptosporidium Analysis: #/100 Gallons

Giardia Cyst Confirmed:	ND
Giardia Cyst Presumptive:	ND
Cryptosporidium Oocyst Confirmed:	ND
Cryptosporidium Oocyst Presumptive:	ND

Particulate Analysis: #/100 Gallons

Diatoms:	ND	Rotifers:	ND
Algae:	0.3	Rotifer Eggs:	ND
Protozoa:	ND	Crustaceans:	ND
Insects:	ND	Crustacean Eggs:	ND
Insect Fragments:	ND	Nematodes:	ND
Vegetative Debris:	4.2	Nematode Eggs:	ND
Large Amorphous Debris:	> 240		
Fine Amorphous Debris:	> 45,000		

Risk Factor Ratings: This sample received Zero Risk Factor Points. This sample is in the Low Risk Range.

Comments: The Algae detected were from the Phylum Dinoflagellata, Genus Peridinium.
ND denotes None Detected. NA denotes None Available.

Methodology: Consensus Method for Determining Groundwaters Under the Direct Influence of Surface Water Using Microscopic Particulate Analysis (MPA) and Immunofluorescent Antibody (IFA).

To the best of my knowledge, the information contained in this report is a true and accurate statement.

Analysis Reviewed By: _____

John E. Morrell, PhD, REHS/RS, CHO, Laboratory Director / Date

R.I. ANALYTICAL
Specialists in Environmental Services

LABORATORY REPORT

Town of Maynard Massachusetts
Attn: Marie Morando
195 Main Street
Maynard, MA 01754

Date Received: 6/25/2018
Date Reported: 7/3/2018
P.O. #:

Work Order #: 1806-13270
Project Name: SECONDARY CONTAMINANT MONITORING

Enclosed are the analytical results and Chain of Custody for your project referenced above. The sample(s) were analyzed by our Warwick, RI laboratory unless noted otherwise. When applicable, indication of sample analysis at our Hudson, MA laboratory and/or subcontracted results are noted and subcontracted reports are enclosed in their entirety.

All samples were analyzed within the established guidelines of US EPA approved methods and in accordance with Massachusetts Department of Environmental Protection regulations under 310 CMR 42.00, unless otherwise noted at the end of a given sample's analytical results or in a case narrative. Laboratory certification status for a given analyte and/or method may be referenced on the enclosed Certification Summary.

The Detection Limit is defined as the lowest level that can be reliably achieved during routine laboratory conditions.

These results only pertain to the samples submitted for this Work Order # and this report shall not be reproduced except in its entirety.

We certify that the following results are true and accurate to the best of our knowledge. If you have

Approved by:

Dawne E. Smart
Data Reporting Manager

Massachusetts Department of Environmental Protection Laboratory Identification Numbers:
Warwick, RI M-RI015 Hudson, MA M-MA1117

R.I. Analytical Laboratories, Inc

Laboratory Report

Town of Maynard Massachusetts
Work Order #: 1806-13270
Project Name/PWS ID: SECONDARY CONTAMINANT MONITORING

Sample Number: 001
Sample Description: WELL #3 (RAW) RW03G
Sample Type : GRAB
Sample Date / Time : 6/25/2018 @ 09:50

PARAMETER	SAMPLE RESULTS	DET. LIMIT	UNITS	METHOD	DATE/TIME ANALYZED		ANALYST
Secondary Contaminants							
pH	6.0		SU	SM4500H+B	6/25/18	21:00	JWC
Odor	1		TON	EPA 140.1	6/25/18	23:00	JWC
Apparent Color	150	50	Apparent C	SM2120B	6/26/18	21:25	JWC
Total Dissolved Solids	300	10	mg/l	SM2540C 18-21ed	6/29/18	9:08	BR
Turbidity	0.63	0.10	NTU	EPA 180.1	6/25/18	20:00	JWC
Alkalinity (as CaCO3)	33	1.0	mg/l	SM2320B 18-21ed	6/25/18	21:40	JWC
Surfactants (MBAS)	<0.10	0.10	mg/l	SM5540C 18-21ed	6/26/18	19:00	JWC
Sulfate	11	5.0	mg/l	EPA 300.0	6/25/18	22:05	HHC
Chloride	100	5.0	mg/l	EPA 300.0	6/25/18	22:05	HHC
Metals							
Aluminum	0.133	0.100	mg/l	EPA 200.7	7/3/18	12:36	AGJ
Calcium	22	0.25	mg/l	EPA 200.7	7/3/18	12:36	AGJ
Copper	0.0144	0.0050	mg/l	EPA 200.7	7/3/18	12:36	AGJ
Iron	11.3	0.0500	mg/l	EPA 200.7	7/3/18	12:36	AGJ
Magnesium	5.6	0.25	mg/l	EPA 200.7	7/3/18	12:36	AGJ
Manganese	0.729	0.0050	mg/l	EPA 200.7	7/3/18	12:36	AGJ
Potassium	5.1	1.0	mg/l	EPA 200.7	7/3/18	12:36	AGJ
Silver	<0.010	0.010	mg/l	EPA 200.7	7/3/18	12:36	AGJ
Zinc	0.015	0.010	mg/l	EPA 200.7	7/3/18	12:36	AGJ
Total Hardness	78	3.3	mg/l	EPA 200.7	7/3/18	12:36	AGJ

The pH analysis ideally should be performed in the field. The pH analysis was performed by the laboratory as soon as possible after receipt.

Surfactants (MBAS) - Calculated as LAS, mol wt. 342.

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION CERTIFICATION SUMMARY

MICROBIOLOGY

(Warwick and Hudson Laboratories)

Non-Potable Water		Potable Water	
Warwick only Fecal Coliform (Wastewater)	SM 9221E	Heterotrophic Plate Count *	SM 9215B
Fecal Coliform (Wastewater) *	SM 9222D	Total Coliform - Water Treatment and Distribution (P/A) *	SM 9222B, SM 9223
Hudson only E. coli (Ambient, Waste Water)	SM 9223B	***Hudson only*** Total Coliform (Source Enumeration)	SM 9223B
Enterococci (Ambient, Source Water)*	Enterolert	E. coli - Treatment and Distribution (P/A), Source Enumeration *	SM 9223, SM 9222G, SM 9223B
		Enterococci - Source (P/A) *	Enterolert

**** Indicates certification at both laboratory locations***

CHEMISTRY

(Warwick Laboratory Only)

Non-Potable Water		Potable Water	
Specific Conductivity	EPA 120.1	Turbidity	EPA 180.1
Iron, Titanium, Hardness (CaCO3); Total, Calcium, Magnesium, Sodium, Potassium	EPA 200.7	Sodium, Calcium	EPA 200.7
Aluminum, Antimony, Arsenic, Beryllium, Cadmium, Chromium, Cobalt, Copper, Lead, Manganese, Molybdenum, Nickel, Selenium, Silver, Thallium, Vanadium, Zinc	EPA 200.7, EPA 200.8	Barium, Beryllium, Cadmium, Chromium, Copper, Nickel, Silver	EPA 200.7, EPA 200.8
Mercury	EPA 245.1	Antimony, Arsenic, Lead, Selenium, Thallium	EPA 200.8
Nitrate, Sulfate, Chloride, Fluoride	EPA 300.0	Mercury	EPA 245.1
Ammonia	EPA 350.1, SM 4500-NH_3-B,H		
Phenolics, Total	EPA 420.1	Nitrate-N, Nitrite-N, Fluoride, Sulfate	EPA 300.0
Polychlorinated Biphenyls (Oil)	EPA 600/4-81-045	Volatile Organic Compounds, Trihalomethanes	EPA 524.2
Chlordane, Toxaphene, Aldrin, Alpha-BHC, Beta-BHC, Gamma-BHC, Delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan Sulfate, Endrin, Endrin Sulfate, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, Polychlorinated Biphenyls (Water)	EPA 608 until 7/1/18	Haloacetic Acids	EPA 552.2
Volatile Halocarbons, Volatile Aromatics	EPA 624 until 7/1/18	Alkalinity, Total	SM 2320B
SVOC– Acid Extractable, SVOC- Base/Neutral Extractable	EPA 625 until 7/1/18	Total Dissolved Solids	SM 2540C
Oil and Grease	EPA 1664	Chlorine, Free Residual	SM 4500-CL-G
Alkalinity; Total	SM 2320B	Cyanide, Total	SM 4500-CN-C,E
Non-Filterable Residue	SM 2540D	pH	SM 4500-H-B
Chloride	SM 4500-CL-B		
Chlorine, Total Residual	SM 4500-CL-G		
Cyanide, Total	SM 4500-CN,E		
Fluoride	SM 4500-F-B,D		
pH	SM 4500-H-B		
Kjeldahl Nitrogen	SM 4500-NORG-D		
Orthophosphate	SM 4500-P-E		
Phosphorous, Total	SM 4500-P-B,E		
Biochemical Oxygen Demand	SM 5210B		
Chemical Oxygen Demand	SM 5220D		
Total Organic Carbon	SM 5310C		

Please Note: **MA DEP does not offer certification for the soil/solid matrices or SW-846 methods.**

R.I. ANALYTICAL
Specialists in Environmental Services

CHAIN OF CUSTODY RECORD

41 Illinois Avenue
Warwick, RI 02888-3007
800-937-2580 • Fax: 401-738-1970

131 Coolidge St., Suite 105
Hudson, MA 01749-1331
800-937-2580 • Fax: 978-568-0078

06-18-18

Date Collected	Time Collected	Field Sample Identification	Grab or Composite	# of Containers & Type C	Preservation Code P	Matrix Code M	Provide State Reports	Secondary Contaminants	Alkalinity (Sample must be collected in a dedicated bottle with minimal Headspace)	Chloride, Total as Cl	Color, apparent	Threshold Odor Number	pH, Turbidity	Solids, Total Dissolved	Sulfate, Total as SO_4	Total as Al, Ca, Cu, Fe, Mg, Mn, K, Ag, Zn	Hardness, Total as $CaCO_3$
6-25-18	9:50 ~~10:50~~	03G: Well #3 (Raw)	G	1 P	NP	DW			X								
			G	1 P	NP	DW	X	X		X	X	X	X	X	X		
			G	1 P	N	DW										X	X

B

Client Information

Company Name:	Town of Maynard Massachusetts – DPW
Address:	195 Main Street
City / State / Zip:	Maynard, MA 01754
Telephone:	978-897-1317 Fax: 978-897-7290
Contact Person:	Marie Morando

Project Information

Project Name:	Secondary Contaminant Monitoring
P.O. Number:	Project Number:
Report To:	Marie Morando Phone: 978-897-1317 Fax 978-897-7290
Sampled by:	Email report to these addresses: amiklosko@townofmaynard.net, tmullally@townofmaynard.net, mmorando@townofmaynard.net
Quote No:	

Relinquished By Signatures	Date	Time	Received By Signatures	Date	Time
	6-25-18	10:46		6/25/18	1047
	6/25/18	1600	RL	6-25-18	1600
RL	6-25-18	1700	TQ Atmos	6-25-18	1720

Turn Around Time

	Normal	X	EMAIL Report
X	5-7 Business days		
	Rush – Date Due: ___/___/___		

Project Comments

Circle if applicable: GW-1, GW-2, GW-3, S-1, S-2, S-3

MCP Data Enhancement QC Package? **No**

PWSID: 2174000

Temp. Upon Receipt 14.9 °C

Lab Use Only

	Sample Pick Up Only
	RIAL sampled; attach field hours
	Shipped on ice
Workorder No:	1806-13270

Containers: P=Poly, G=Glass, AG=Amber Glass, V=Vial, St=Sterile Preservatives: A=Ascorbic Acid, NH4=NH_4Cl, H=HCl, M=MeOH, N=HNO_3, NP=None, S=H_2SO_4, SB=$NaHSO_4$, SH=NaOH, T=$Na_2S_2O_3$, Z=ZnOAc

Matrix Codes: GW=Groundwater, SW=Surface Water, WW=Wastewater, DW=Drinking Water, S=Soil, SL=Sludge, A=Air, B=Bulk/Solid, WP=Wipe, O=_____

R.I. ANALYTICAL
Specialists in Environmental Services

LABORATORY REPORT

Town of Maynard Massachusetts
Attn: Marie Morando
195 Main Street
Maynard, MA 01754

Date Received: 6/27/2018
Date Reported: 7/10/2018
P.O. #:

Work Order #: 1806-13452
Project Name: SOC MONITORING

Enclosed are the analytical results and Chain of Custody for your project referenced above. The sample(s) were analyzed by our Warwick, RI laboratory unless noted otherwise. When applicable, indication of sample analysis at our Hudson, MA laboratory and/or subcontracted results are noted and subcontracted reports are enclosed in their entirety.

All samples were analyzed within the established guidelines of US EPA approved methods and in accordance with Massachusetts Department of Environmental Protection regulations under 310 CMR 42.00, unless otherwise noted at the end of a given sample's analytical results or in a case narrative. Laboratory certification status for a given analyte and/or method may be referenced on the enclosed Certification Summary.

The Detection Limit is defined as the lowest level that can be reliably achieved during routine laboratory conditions.

These results only pertain to the samples submitted for this Work Order # and this report shall not be reproduced except in its entirety.

We certify that the following results are true and accurate to the best of our knowledge. If you have

Approved by:

Dawne E. Smart
Data Reporting Manager

Massachusetts Department of Environmental Protection Laboratory Identification Numbers:
Warwick, RI M-RI015 Hudson, MA M-MA1117

R.I. Analytical Laboratories, Inc

Laboratory Report

Town of Maynard Massachusetts
Work Order #: 1806-13452
Project Name/PWS ID: SOC MONITORING

Sample Number: 001
Sample Description: WELL #3 RAW RS RW03G
Sample Type : GRAB
Sample Date / Time : 6/27/2018 @ 09:00

PARAMETER	SAMPLE RESULTS	DET. LIMIT	UNITS	METHOD	DATE/TIME ANALYZED		ANALYST
SOC's							
EDB/DBCP	See Attached			EPA 504.1	7/2/18	21:15	*GS
SVOC in Drinking Water	See Attached			EPA 525.2	7/6/18	17:30	*GS
Chlorinated Pests Herb	See Attached			EPA 515.3	7/5/18	21:16	*GS
Chlorinated Pesticides	See Attached			EPA 505/508	7/3/18	4:00	*GS
Carbamates	See Attached			EPA 531.1	7/7/18	3:30	*GS

*GS SOC's analyzed by Granite State Analytical.

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION CERTIFICATION SUMMARY

MICROBIOLOGY

(Warwick and Hudson Laboratories)

Non-Potable Water		Potable Water	
Warwick only Fecal Coliform (Wastewater)	SM 9221E	Heterotrophic Plate Count *	SM 9215B
Fecal Coliform (Wastewater) *	SM 9222D	Total Coliform - Water Treatment and Distribution (P/A) *	SM 9222B, SM 9223
Hudson only E. coli (Ambient, Waste Water)	SM 9223B	***Hudson only*** Total Coliform (Source Enumeration)	SM 9223B
Enterococci (Ambient, Source Water)*	Enterolert	E. coli - Treatment and Distribution (P/A), Source Enumeration *	SM 9223, SM 9222G, SM 9223B
		Enterococci - Source (P/A) *	Enterolert

**** Indicates certification at both laboratory locations***

CHEMISTRY

(Warwick Laboratory Only)

Non-Potable Water		Potable Water	
Specific Conductivity	EPA 120.1	Turbidity	EPA 180.1
Iron, Titanium, Hardness (CaCO3); Total, Calcium, Magnesium, Sodium, Potassium	EPA 200.7	Sodium, Calcium	EPA 200.7
Aluminum, Antimony, Arsenic, Beryllium, Cadmium, Chromium, Cobalt, Copper, Lead, Manganese, Molybdenum, Nickel, Selenium, Silver, Thallium, Vanadium, Zinc	EPA 200.7, EPA 200.8	Barium, Beryllium, Cadmium, Chromium, Copper, Nickel, Silver	EPA 200.7, EPA 200.8
Mercury	EPA 245.1	Antimony, Arsenic, Lead, Selenium, Thallium	EPA 200.8
Nitrate, Sulfate, Chloride, Fluoride	EPA 300.0	Mercury	EPA 245.1
Ammonia	EPA 350.1, SM 4500-NH_3-B,H		
Phenolics, Total	EPA 420.1	Nitrate-N, Nitrite-N, Fluoride, Sulfate	EPA 300.0
Polychlorinated Biphenyls (Oil)	EPA 600/4-81-045	Volatile Organic Compounds, Trihalomethanes	EPA 524.2
Chlordane, Toxaphene, Aldrin, Alpha-BHC, Beta-BHC, Gamma-BHC, Delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan Sulfate, Endrin, Endrin Sulfate, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, Polychlorinated Biphenyls (Water)	EPA 608 until 7/1/18	Haloacetic Acids	EPA 552.2
Volatile Halocarbons, Volatile Aromatics	EPA 624 until 7/1/18	Alkalinity, Total	SM 2320B
SVOC– Acid Extractable, SVOC- Base/Neutral Extractable	EPA 625 until 7/1/18	Total Dissolved Solids	SM 2540C
Oil and Grease	EPA 1664	Chlorine, Free Residual	SM 4500-CL-G
Alkalinity; Total	SM 2320B	Cyanide, Total	SM 4500-CN-C,E
Non-Filterable Residue	SM 2540D	pH	SM 4500-H-B
Chloride	SM 4500-CL-B		
Chlorine, Total Residual	SM 4500-CL-G		
Cyanide, Total	SM 4500-CN,E		
Fluoride	SM 4500-F-B,D		
pH	SM 4500-H-B		
Kjeldahl Nitrogen	SM 4500-NORG-D		
Orthophosphate	SM 4500-P-E		
Phosphorous, Total	SM 4500-P-B,E		
Biochemical Oxygen Demand	SM 5210B		
Chemical Oxygen Demand	SM 5220D		
Total Organic Carbon	SM 5310C		

Please Note: **MA DEP does not offer certification for the soil/solid matrices or SW-846 methods.**

GRANITE STATE ANALYTICAL SERVICES, LLC
22 Manchester Road, Unit 2, Derry, NH 03038
Phone (800) 699-9920 (603) 432-3044 Fax (603) 434-4837
http://www.granitestateanalytical.com/

CERTIFICATE OF ANALYSIS FOR DRINKING WATER

DATE PRINTED: 07/10/2018

CLIENT NAME: R. I. Analytical Laboratories, Inc.

CLIENT ADDRESS: 41 Illinois Avenue
Warwick, RI 02888-3007

SAMPLE ID#: 1806-03726-001

SAMPLED BY: R. I. Analytical Laboratories, Inc.

SAMPLE ADDRESS: 1806-013452-001
03G Well #3 Raw

MORE LOC INFO:

Legend	
Passes	✓
Fails EPA Primary	⊗
Fails EPA Secondary	▽
Fails State Guideline	✕
Attention	⚠

DATE AND TIME COLLECTED: 06/27/2018 9:00AM
DATE AND TIME RECEIVED: 06/28/2018 1:21PM
ANALYSIS PACKAGE: SOC GSA MA
RECEIPT TEMPERATURE: ON ICE 5.7° CELSIUS
CLIENT JOB #

Test Description	Results	Test Units	Pass /Fail	DQ Flag	RL	Limit	Method	Analyst	Date-Time Analyzed
1,2-Dibromo-3-chloropropane (DBCP)*	<0.02	ug/L	✓		0.02	0.2 ug/L	EPA 504.1	KV-NH	07/02/18 9:15PM
Date Extracted	-					No Limit	EPA 504.1	JG-NH	07/02/18 9:00AM
Ethylene Dibromide (EDB)*	<0.02	ug/L	✓		0.02	0.05 ug/L	EPA 504.1	KV-NH	07/02/18 9:15PM
Aroclor 1016 Screen*	<0.2	ug/L			0.2	No Limit	EPA 505	KV-NH	07/03/18 4:00AM
Aroclor 1221 Screen*	<0.2	ug/L			0.2	No Limit	EPA 505	KV-NH	07/03/18 4:00AM
Aroclor 1232 Screen*	<0.2	ug/L			0.2	No Limit	EPA 505	KV-NH	07/03/18 4:00AM
Aroclor 1242 Screen*	<0.2	ug/L			0.2	No Limit	EPA 505	KV-NH	07/03/18 4:00AM
Aroclor 1248 Screen*	<0.2	ug/L			0.2	No Limit	EPA 505	KV-NH	07/03/18 4:00AM
Aroclor 1254 Screen*	<0.2	ug/L			0.2	No Limit	EPA 505	KV-NH	07/03/18 4:00AM
Aroclor 1260 Screen*	<0.2	ug/L			0.2	No Limit	EPA 505	KV-NH	07/03/18 4:00AM
Chlordane*	<0.2	ug/L	✓		0.2	2 ug/L	EPA 505	KV-NH	07/03/18 4:00AM
Date Extracted	-					No Limit	EPA 505	JG-NH	07/02/18 9:00AM
Toxaphene*	<1.0	ug/L	✓		1.0	3 ug/L	EPA 505	KV-NH	07/03/18 4:00AM
2,4,5-TP (Silvex)*	<0.25	ug/L	✓		0.25	50 ug/L	EPA 515.3	KV-NH	07/05/18 9:16PM
2,4-D*	<1	ug/L	✓		1	70 ug/L	EPA 515.3	KV-NH	07/05/18 9:16PM
Dalapon*	<1	ug/L	✓		1	200 ug/L	EPA 515.3	KV-NH	07/05/18 9:16PM
Date Extracted	-					No Limit	EPA 515.3	KV-NH	07/03/18 9:00AM
Dicamba*	<0.18	ug/L			0.18	No Limit	EPA 515.3	KV-NH	07/05/18 9:16PM
Dinoseb*	<0.5	ug/L	✓		0.5	7 ug/L	EPA 515.3	KV-NH	07/05/18 9:16PM
Pentachlorophenol*	<0.1	ug/L	✓		0.1	1 ug/L	EPA 515.3	KV-NH	07/05/18 9:16PM
Picloram*	<1.3	ug/L	✓		1.3	500 ug/L	EPA 515.3	KV-NH	07/05/18 9:16PM
2,4-Dichlorophenylacetic acid	110	%	✓			70-130%	EPA 515.3 - SS	KV-NH	07/05/18 9:16PM
Alachlor*	<0.1	ug/L	✓		0.1	2 ug/L	EPA 525.2	DD-NH	07/06/18 5:30PM
Aldrin*	<0.1	ug/L			0.1	No Limit	EPA 525.2	DD-NH	07/06/18 5:30PM
Atrazine*	<0.1	ug/L	✓		0.1	3 ug/L	EPA 525.2	DD-NH	07/06/18 5:30PM
Benzo(a)pyrene*	<0.1	ug/L	✓		0.1	0.2 ug/L	EPA 525.2	DD-NH	07/06/18 5:30PM
Butachlor*	<0.1	ug/L			0.1	No Limit	EPA 525.2	DD-NH	07/06/18 5:30PM
Date Extracted	-					No Limit	EPA 525.2	JG-NH	07/05/18 9:00AM
Di(2-ethylhexyl)adipate*	<0.6	ug/L	✓		0.6	400 ug/L	EPA 525.2	DD-NH	07/06/18 5:30PM
Di(2-ethylhexyl)phthalate*	<3	ug/L	✓		3	6 ug/L	EPA 525.2	DD-NH	07/06/18 5:30PM
Dieldrin*	<0.04	ug/L			0.04	No Limit	EPA 525.2	DD-NH	07/06/18 5:30PM

GRANITE STATE ANALYTICAL SERVICES, LLC
22 Manchester Road, Unit 2, Derry, NH 03038
Phone (800) 699-9920 (603) 432-3044 Fax (603) 434-4837
http://www.granitestateanalytical.com/

CERTIFICATE OF ANALYSIS FOR DRINKING WATER

DATE PRINTED: 07/10/2018

CLIENT NAME: R. I. Analytical Laboratories, Inc.

CLIENT ADDRESS: 41 Illinois Avenue
Warwick, RI 02888-3007

SAMPLE ID#: 1806-03726-001

SAMPLED BY: R. I. Analytical Laboratories, Inc.

SAMPLE ADDRESS: 1806-013452-001
03G Well #3 Raw

MORE LOC INFO:

Legend	
Passes	✓
Fails EPA Primary	⊗
Fails EPA Secondary	▽
Fails State Guideline	✕
Attention	⚠

DATE AND TIME COLLECTED: 06/27/2018 9:00AM
DATE AND TIME RECEIVED: 06/28/2018 1:21PM
ANALYSIS PACKAGE: SOC GSA MA
RECEIPT TEMPERATURE: ON ICE 5.7° CELSIUS
CLIENT JOB #

Test Description	Results	Test Units	Pass /Fail	DQ Flag	RL	Limit	Method	Analyst	Date-Time Analyzed
Endrin*	<0.1	ug/L	✓		0.1	2 ug/L	EPA 525.2	DD-NH	07/06/18 5:30PM
Heptachlor Epoxide*	<0.06	ug/L	✓		0.06	0.2 ug/L	EPA 525.2	DD-NH	07/06/18 5:30PM
Heptachlor*	<0.04	ug/L	✓		0.04	0.4 ug/L	EPA 525.2	DD-NH	07/06/18 5:30PM
Hexachlorobenzene*	<0.1	ug/L	✓		0.1	1 ug/L	EPA 525.2	DD-NH	07/06/18 5:30PM
Hexachlorocyclopentadiene*	<0.1	ug/L	✓		0.1	50 ug/L	EPA 525.2	DD-NH	07/06/18 5:30PM
Lindane*	<0.07	ug/L	✓		0.07	0.2 ug/L	EPA 525.2	DD-NH	07/06/18 5:30PM
Methoxychlor*	<0.1	ug/L	✓		0.1	40 ug/L	EPA 525.2	DD-NH	07/06/18 5:30PM
Metolachlor*	<0.1	ug/L			0.1	No Limit	EPA 525.2	DD-NH	07/06/18 5:30PM
Metribuzin*	<0.1	ug/L			0.1	No Limit	EPA 525.2	DD-NH	07/06/18 5:30PM
Propachlor*	<0.1	ug/L			0.1	No Limit	EPA 525.2	DD-NH	07/06/18 5:30PM
Simazine*	<0.1	ug/L	✓		0.1	4 ug/L	EPA 525.2	DD-NH	07/06/18 5:30PM
1,3-Dimethyl-2-nitrobenzene	100	%	✓			70-130%	EPA 525.2 - SS	DD-NH	07/06/18 5:30PM
Perylene-d12	99	%	✓			70-130%	EPA 525.2 - SS	DD-NH	07/06/18 5:30PM
Pyrene-d10	100	%	✓			70-130%	EPA 525.2 - SS	DD-NH	07/06/18 5:30PM
Triphenylphosphate	118	%	✓			70-130%	EPA 525.2 - SS	DD-NH	07/06/18 5:30PM
3-Hydroxycarbofuran*	<1	ug/L			1	No Limit	EPA 531.1	KV-NH	07/07/18 3:30AM
Aldicarb Sulfone*	<1	ug/L			1	No Limit	EPA 531.1	KV-NH	07/07/18 3:30AM
Aldicarb Sulfoxide*	<1	ug/L			1	No Limit	EPA 531.1	KV-NH	07/07/18 3:30AM
Aldicarb*	<1	ug/L			1	No Limit	EPA 531.1	KV-NH	07/07/18 3:30AM
Carbaryl*	<1	ug/L			1	No Limit	EPA 531.1	KV-NH	07/07/18 3:30AM
Carbofuran*	<0.9	ug/L	✓		0.9	40 ug/L	EPA 531.1	KV-NH	07/07/18 3:30AM
Date Extracted	-					No Limit	EPA 531.1	KV-NH	07/06/18 2:30PM
Methiocarb*	<1	ug/L			1	No Limit	EPA 531.1	KV-NH	07/07/18 3:30AM
Methomyl*	<1	ug/L			1	No Limit	EPA 531.1	KV-NH	07/07/18 3:30AM
Oxamyl (Vydate)*	<1	ug/L	✓		1	200 ug/L	EPA 531.1	KV-NH	07/07/18 3:30AM
Propoxur (Baygon)*	<1	ug/L			1	No Limit	EPA 531.1	KV-NH	07/07/18 3:30AM

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Phone (800) 699-9920 (603) 432-3044 Fax (603) 434-4837
http://www.granitestateanalytical.com/

CERTIFICATE OF ANALYSIS FOR DRINKING WATER

DATE PRINTED:	07/10/2018
CLIENT NAME:	R. I. Analytical Laboratories, Inc.
CLIENT ADDRESS:	41 Illinois Avenue Warwick, RI 02888-3007
SAMPLE ID#:	1806-03726-001
SAMPLED BY:	R. I. Analytical Laboratories, Inc.
SAMPLE ADDRESS:	1806-013452-001 03G Well #3 Raw
MORE LOC INFO:	

Legend
Passes
Fails EPA Primary
Fails EPA Secondary
Fails State Guideline
Attention

DATE AND TIME COLLECTED:	06/27/2018	9:00AM
DATE AND TIME RECEIVED:	06/28/2018	1:21PM
ANALYSIS PACKAGE:	SOC GSA MA	
RECEIPT TEMPERATURE:	ON ICE 5.7° CELSIUS	
CLIENT JOB #		

Test Description	Results	Test Units	Pass /Fail	DQ Flag	RL	Limit	Method	Analyst	Date-Time Analyzed

The results presented in this report relate to the samples listed above in the condition in which they were received.
RL: "Reporting limit" means the lowest level of an analyte that can be accurately recovered from the matrix of interest.

Data Qualifier (DQ) Flags: None

*** RI Certified Analysis**

Donald A. D'Anjou, Ph. D.
Laboratory Director

This analysis meets State of Rhode Island requirements except as noted.
State Certifications: | NH 1015 | MA M-NH003 | ME NH00003 | RI 101513 | VT VT-101507 |

R.I. ANALYTICAL
Specialists in Environmental Services

CHAIN OF CUSTODY RECORD

41 Illinois Avenue
Warwick, RI 02888-3007
800-937-2580 • Fax: 401-738-1970

131 Coolidge St., Suite 105
Hudson, MA 01749-1331
800-937-2580 • Fax: 978-568-0078

Date Collected	Time Collected	Field Sample Identification	Grab or Composite (04-19-18)	# of Containers & Type C	Preservation Code P	Matrix Code M	Provide eDEP upload of results	5oc
6-27	9:00	03G Well #3 Raw	G	7	T	DW	X	X
6-27	900	03G "	G	2	H	DW	X	X

Client Information

Company Name:	Town of Maynard Massachusetts – DPW
Address:	195 Main Street
City / State / Zip:	Maynard, MA 01754
Telephone:	978-897-1317 Fax: 978-897-7290
Contact Person:	Marie Morando

Project Information

Project Name:	SCC Monitoring		
P.O. Number:		Project Number:	
Report To:	Marie Morando	Phone: 978-897-1317	Fax 978-897-7290
Sampled by:		Email report to these addresses:	amiklosko@townofmaynard.net tmullally@townofmaynard.net mmorando@townofmaynard.net
Quote No:			

Relinquished By Signatures	Date	Time	Received By Signatures	Date	Time
	6-27-18	9:43		6/27/18	944
	6/27/18		VLP 6/27/18		

Turn Around Time

- Normal X EMAIL Report
- ~~5-7~~ Business days
- Rush – Date Due: ___/___/___

Project Comments

Circle if applicable: GW-1, GW-2, GW-3, S-1, S-2, S-3 MCP Data Enhancement QC Package? **No**

PWSID: 2174000

Temp. Upon Receipt 16.5°C

Lab Use Only

- Sample Pick Up Only
- RIAL sampled; attach field hours
- ~~Shipped on ice~~
- Workorder No: 1806-134452

Containers: P=Poly, G=Glass, AG=Amber Glass, V=Vial, St=Sterile Preservatives: A=Ascorbic Acid, NH4=NH_4Cl, H=HCl, M=MeOH, N=HNO_3, NP=None, S=H_2SO_4, SB=$NaHSO_4$, SH=NaOH, T=$Na_2S_2O_3$, Z=ZnOAc

Matrix Codes: GW=Groundwater, SW=Surface Water, WW=Wastewater, DW=Drinking Water, S=Soil, SL=Sludge, A=Air, B=Bulk/Solid, WP=Wipe, O=_____

R.I. ANALYTICAL
Specialists in Environmental Services

LABORATORY REPORT

Town of Maynard Massachusetts
Attn: Marie Morando
195 Main Street
Maynard, MA 01754

Date Received: 6/25/2018
Date Reported: 7/23/2018
P.O. #:

Work Order #: 1806-13278
Project Name: RADIUM 226 & 228 MONITORING

Enclosed are the analytical results and Chain of Custody for your project referenced above. The sample(s) were analyzed by our Warwick, RI laboratory unless noted otherwise. When applicable, indication of sample analysis at our Hudson, MA laboratory and/or subcontracted results are noted and subcontracted reports are enclosed in their entirety.

All samples were analyzed within the established guidelines of US EPA approved methods and in accordance with Massachusetts Department of Environmental Protection regulations under 310 CMR 42.00, unless otherwise noted at the end of a given sample's analytical results or in a case narrative. Laboratory certification status for a given analyte and/or method may be referenced on the enclosed Certification Summary.

The Detection Limit is defined as the lowest level that can be reliably achieved during routine laboratory conditions.

These results only pertain to the samples submitted for this Work Order # and this report shall not be reproduced except in its entirety.

We certify that the following results are true and accurate to the best of our knowledge. If you have

Approved by:

Dawne E. Smart
Data Reporting Manager

Massachusetts Department of Environmental Protection Laboratory Identification Numbers:
Warwick, RI M-RI015 Hudson, MA M-MA1117

R.I. Analytical Laboratories, Inc

Laboratory Report

Town of Maynard Massachusetts
Work Order #: 1806-13278
Project Name/PWS ID: RADIUM 226 & 228 MONITORING

Sample Number: 001
Sample Description: WELL #3 (RAW) RW 03G
Sample Type : GRAB
Sample Date / Time : 6/25/2018 @ 09:45

PARAMETER	SAMPLE RESULTS	DET. LIMIT	UNITS	METHOD	DATE/TIME ANALYZED	ANALYST
Radium 226	See Attached			RA-226 GA	7/17/18 16:20	*EF
Radium 228	See Attached			RA-228 GA	7/17/18 16:20	*EF

*EF Radium 226 & 228 analyzed by Eurofins Eaton Analytical.

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION CERTIFICATION SUMMARY

MICROBIOLOGY

(Warwick and Hudson Laboratories)

Non-Potable Water		Potable Water	
Warwick only Fecal Coliform (Wastewater)	SM 9221E	Heterotrophic Plate Count *	SM 9215B
Fecal Coliform (Wastewater) *	SM 9222D	Total Coliform - Water Treatment and Distribution (P/A) *	SM 9222B, SM 9223
Hudson only E. coli (Ambient, Waste Water)	SM 9223B	***Hudson only*** Total Coliform (Source Enumeration)	SM 9223B
Enterococci (Ambient, Source Water)*	Enterolert	E. coli - Treatment and Distribution (P/A), Source Enumeration *	SM 9223, SM 9222G, SM 9223B
		Enterococci - Source (P/A) *	Enterolert

**** Indicates certification at both laboratory locations***

CHEMISTRY

(Warwick Laboratory Only)

Non-Potable Water		Potable Water	
Specific Conductivity	EPA 120.1	Turbidity	EPA 180.1
Iron, Titanium, Hardness (CaCO3); Total, Calcium, Magnesium, Sodium, Potassium	EPA 200.7	Sodium, Calcium	EPA 200.7
Aluminum, Antimony, Arsenic, Beryllium, Cadmium, Chromium, Cobalt, Copper, Lead, Manganese, Molybdenum, Nickel, Selenium, Silver, Thallium, Vanadium, Zinc	EPA 200.7, EPA 200.8	Barium, Beryllium, Cadmium, Chromium, Copper, Nickel, Silver	EPA 200.7, EPA 200.8
Mercury	EPA 245.1	Antimony, Arsenic, Lead, Selenium, Thallium	EPA 200.8
Nitrate, Sulfate, Chloride, Fluoride	EPA 300.0	Mercury	EPA 245.1
Ammonia	EPA 350.1, SM 4500-NH_3-B,H		
Phenolics, Total	EPA 420.1	Nitrate-N, Nitrite-N, Fluoride, Sulfate	EPA 300.0
Polychlorinated Biphenyls (Oil)	EPA 600/4-81-045	Volatile Organic Compounds, Trihalomethanes	EPA 524.2
Chlordane, Toxaphene, Aldrin, Alpha-BHC, Beta-BHC, Gamma-BHC, Delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan Sulfate, Endrin, Endrin Sulfate, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, Polychlorinated Biphenyls (Water)	EPA 608 until 7/1/18	Haloacetic Acids	EPA 552.2
Volatile Halocarbons, Volatile Aromatics	EPA 624 until 7/1/18	Alkalinity, Total	SM 2320B
SVOC– Acid Extractable, SVOC- Base/Neutral Extractable	EPA 625 until 7/1/18	Total Dissolved Solids	SM 2540C
Oil and Grease	EPA 1664	Chlorine, Free Residual	SM 4500-CL-G
Alkalinity; Total	SM 2320B	Cyanide, Total	SM 4500-CN-C,E
Non-Filterable Residue	SM 2540D	pH	SM 4500-H-B
Chloride	SM 4500-CL-B		
Chlorine, Total Residual	SM 4500-CL-G		
Cyanide, Total	SM 4500-CN,E		
Fluoride	SM 4500-F-B,D		
pH	SM 4500-H-B		
Kjeldahl Nitrogen	SM 4500-NORG-D		
Orthophosphate	SM 4500-P-E		
Phosphorous, Total	SM 4500-P-B,E		
Biochemical Oxygen Demand	SM 5210B		
Chemical Oxygen Demand	SM 5220D		
Total Organic Carbon	SM 5310C		

Please Note: **MA DEP does not offer certification for the soil/solid matrices or SW-846 methods.**

eurofins | Eaton Analytical

750 Royal Oaks Drive, Suite 100
Monrovia, California 91016-3629
Tel: (626) 386-1100
Fax: (866) 988-3757
1 800 566 LABS (1 800 566 5227)

ilac-MRA

ANAB ACCREDITED ISO/IEC 17025 TESTING LABORATORY

AT-1807

Laboratory Report

for

Rhode Island Analytical Laboratory
41 Illinois Avenue
Warwick, RI 02888-3007
Attention: Alan Ford
Fax: 978-568-0078

NELAP RECOGNIZED TNI ACCREDITATION BODY

Utah ELCP CA00006

Date of Issue
07/21/2018

Linda Geddes

EUROFINS EATON ANALYTICAL, LLC

Report: 746940
Project: SUBCONTRACT
Group: Radiologicals

ZIA8: Vanessa Berry

Project Manager

* Accredited in accordance with TNI 2009 and ISO/IEC 17025:2005.
* Laboratory certifies that the test results meet all **TNI 2009 and ISO/IEC 17025:2005** requirements unless noted under the individual analysis.
* Following the cover page are State Certification List, ISO 17025 Accredited Method List, Acknowledgement of Samples Received, Comments, Hits Report, Data Report, QC Summary, QC Report and Regulatory Forms, as applicable.
* Test results relate only to the sample(s) tested.

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STATE CERTIFICATION LIST

State	Certification Number	State	Certification Number
Alabama	41060	**Mississippi**	Certified
Arizona	AZ0778	**Montana**	Cert 0035
Arkansas	Certified	**Nebraska**	Certified
California-Monrovia-ELAP	2813	**Nevada**	CA000062018
California-Colton- ELAP	2812	**New Hampshire ***	2959
Colorado	Certified	**New Jersey ***	CA 008
Connecticut	PH-0107	**New Mexico**	Certified
Delaware	CA 006	**New York ***	11320
Florida *	E871024	**North Carolina**	06701
Georgia	947	**North Dakota**	R-009
Guam	18-005R	**Oregon ***	CA200003-005
Hawaii	Certified	**Pennsylvania ***	68-565
Idaho	Certified	**Puerto Rico**	Certified
Illinois *	200033	**Rhode Island**	LAO00326
Indiana	C-CA-01	**South Carolina**	87016
Iowa - Asbestos	413	**South Dakota**	Certified
Kansas *	E-10268	**Tennessee**	TN02839
Kentucky	90107	**Texas ***	T104704230-17-13
Louisiana *	LA180000	**Utah (Primary AB) ***	CA00006
Maine	CA0006	**Vermont**	VT0114
Maryland	224	**Virginia ***	460260
Commonwealth of Northern Marianas Is.	MP0004	**Washington**	C838
Massachusetts	M-CA006	**EPA Region 5**	Certified
Michigan	9906	**Los Angeles County Sanitation Districts**	10264

* NELAP/TNI Recognized Accreditation Bodies

Eurofins Eaton Analytical, LLC
750 Royal Oaks Drive, Suite 100
Monrovia, CA 91016-3629
T | 626-386-1100
F | 866-988-3757
www.EurofinsUS.com/Eaton

The tests listed below are accredited and meet the requirements of ISO 17025 as verified by the ANSI-ASQ National Accreditation Board/ANAB.
Refer to Certificate and scope of accreditation (AT 1807) found at: http://www.eatonanalytical.com

SPECIFIC TESTS	METHOD OR TECHNIQUE USED	Environ-mental (Drinking Water)	Environ-mental (Waste Water)	Water as a Component of Food and Bev/Bev/ Bottled Water
1,4-Dioxane	EPA 522	x		x
2,3,7,8-TCDD	Modified EPA 1613B	x		x
Acrylamide	In House Method (2440)	x		x
Alkalinity	SM 2320B	x	x	x
Ammonia	EPA 350.1		x	x
Ammonia	SM 4500-NH3 H		x	x
Anions and DBPs by IC	EPA 300.0	x	x	x
Anions and DBPs by IC	EPA 300.1	x		x
Asbestos	EPA 100.2	x	x	
Bicarbonate Alkalinity as HCO3	SM 2320B	x	x	x
BOD / CBOD	SM 5210B		x	x
Bromate	In House Method (2447)	x		x
Carbamates	EPA 531.2	x		x
Carbonate as CO3	SM 2330B	x	x	x
Carbonyls	EPA 556	x		x
COD	EPA 410.4 / SM 5220D		x	
Chloramines	SM 4500-CL G	x	x	x
Chlorinated Acids	EPA 515.4	x		x
Chlorinated Acids	EPA 555	x		x
Chlorine Dioxide	SM 4500-CLO2 D	x		x
Chlorine -Total/Free/ Combined Residual	SM 4500-Cl G	x	x	x
Conductivity	EPA 120.1		x	
Conductivity	SM 2510B	x	x	x
Corrosivity (Langelier Index)	SM 2330B	x		x
Cryptosporidium	EPA 1623	x		x
Cyanide, Amenable	SM 4500-CN G	x	x	
Cyanide, Free	SM 4500CN F	x	x	x
Cyanide, Total	EPA 335.4	x	x	x
Cyanogen Chloride (screen)	In House Method (2470)	x		x
Diquat and Paraquat	EPA 549.2	x		x
DBP/HAA	SM 6251B	x		x
Dissolved Oxygen	SM 4500-O G		x	x
DOC	SM 5310C	x		x
E. Coli	(MTF/EC+MUG)	x		x
E. Coli	CFR 141.21(f)(6)(i)	x		x
E. Coli	SM 9223		x	
E. Coli (Enumeration)	SM 9221B.1/ SM 9221F	x		x
E. Coli (Enumeration)	SM 9223B	x		x
EDB/DCBP	EPA 504.1	x		
EDB/DBCP and DBP	EPA 551.1	x		x
EDTA and NTA	In House Method (2454)	x		x
Endothall	EPA 548.1	x		x
Endothall	In-house Method (2445)	x		x
Enterococci	SM 9230B	x	x	
Fecal Coliform	SM 9221 E (MTF/EC)	x		
Fecal Coliform	SM 9221C, E (MTF/EC)		x	
Fecal Coliform (Enumeration)	SM 9221E (MTF/EC)	x		x
Fecal Coliform with Chlorine Present	SM 9221E		x	
Fecal Streptococci	SM 9230B	x	x	
Fluoride	SM 4500-F C	x	x	x
Giardia	EPA 1623	x		x
Glyphosate	EPA 547	x		x
Gross Alpha/Beta	EPA 900.0	x	x	x
Gross Alpha Coprecipitation	SM 7110 C	x	x	x
Hardness	SM 2340B	x	x	x
Heterotrophic Bacteria	In House Method (2439)	x		x
Heterotrophic Bacteria	SM 9215 B	x		x
Hexavalent Chromium	EPA 218.6	x	x	x
Hexavalent Chromium	EPA 218.7	x		x
Hexavalent Chromium	SM 3500-Cr B		x	
Hormones	EPA 539	x		x
Hydroxide as OH Calc.	SM 2330B	x		x
Kjeldahl Nitrogen	EPA 351.2		x	
Legionella	CDC Legionella	x		x
Mercury	EPA 245.1	x	x	x
Metals	EPA 200.7 / 200.8	x	x	x
Microcystin LR	ELISA (2360)	x		x
NDMA	EPA 521	x		x
NDMA	TQ In house method based on EPA 521 (2425)	x		x
Nitrate/Nitrite Nitrogen	EPA 353.2	x	x	x
OCL, Pesticides/PCB	EPA 505	x		x
Ortho Phosphate	EPA 365.1	x	x	x
Ortho Phosphate	SM 4500P E			x
Ortho Phosphorous	SM 4500P E	x		
Oxyhalides Disinfection Byproducts	EPA 317.0	x		x
Perchlorate	EPA 331.0	x		x
Perchlorate (low and high)	EPA 314.0	x		x
Perfluorinated Alkyl Acids	EPA 537	x		x
pH	EPA 150.1	x		
pH	SM 4500-H+B	x	x	x
Phenylurea Pesticides/ Herbicides	In House Method, based on EPA 532 (2448)	x		x
Pseudomonas	IDEXX Pseudalert (2461)	x		x
Radium-226	GA Institute of Tech	x		x
Radium-228	GA Institute of Tech	x		x
Radon-222	SM 7500RN	x		x
Residue, Filterable	SM 2540C	x	x	x
Residue, Non-filterable	SM 2540D		x	
Residue, Total	SM 2540B		x	x
Residue, Volatile	EPA 160.4		x	
Semi-VOC	EPA 525.2	x		x
Semi-VOC	EPA 625		x	x
Silica	SM 4500-Si D	x	x	
Silica	SM 4500-SiO2 C	x	x	
Sulfide	SM 4500-$S^{=}$ D		x	
Sulfite	SM 4500-SO^{3}B	x	x	x
Surfactants	SM 5540C	x	x	x
Taste and Odor Analytes	SM 6040E	x		x
Total Coliform (P/A)	SM 9221 A, B	x		x
Total Coliform (Enumeration)	SM 9221 A, B, C	x		x
Total Coliform / E. coli	Colisure SM 9223	x		x
Total Coliform	SM 9221B		x	
Total Coliform with Chlorine Present	SM 9221B		x	
Total Coliform / E.coli (P/A and Enumeration)	SM 9223	x		x
TOC	SM 5310C	x	x	x
TOX	SM 5320B		x	
Total Phenols	EPA 420.1		x	
Total Phenols	EPA 420.4	x	x	x
Total Phosphorous	SM 4500 P E		x	
Turbidity	EPA 180.1	x	x	x
Turbidity	SM 2130B	x	x	
Uranium by ICP/MS	EPA 200.8	x		x
UV 254	SM 5910B	x		
VOC	EPA 524.2/EPA 524.3	x		x
VOC	EPA 624		x	x
VOC	EPA SW 846 8260	x		x
VOC	In House Method (2411)	x		x
Yeast and Mold	SM 9610	x		x

Acknowledgement of Samples Received

Addr: **Rhode Island Analytical Laboratory**
41 Illinois Avenue
Warwick, RI 02888-3007

Attn: Alan Ford
Phone: 978-568-0041 x132

Client ID: RIANALY
Folder #: 746940
Project: SUBCONTRACT
Sample Group: Radiologicals

Project Manager: Vanessa Berry
Phone:
PO #: 478

The following samples were received from you on **June 28, 2018** at **1745**. They have been scheduled for the tests listed below each sample. If this information is incorrect, please contact your service representative. Thank you for using Eurofins Eaton Analytical, LLC.

Sample #	Sample ID	Sample Date
201806280642	03G: Well #3 Raw	06/25/2018 0945
	Variable ID: 1806-13278-001	
	@RA226 GA @RA228 GA	

Test Description

@RA226 GA -- Radium 226

@RA228 GA -- Radium 228

CHAIN OF CUSTODY RECORD

R.I. Analytical Laboratories, Inc.

41 Illinois Avenue
Warwick, RI 02888-3007
Tel: 800-937-2580
Fax: 401-738-1970

131 Coolidge St, Suite 105
Hudson, MA 01749-1331
Tel: 800-937-2580
Fax: 978-568-0078

Date Collected	Time Collected	Lab ID	Sample Identification	Grab or Composite	# of Containers & Type [C]	Preservation Code [P]	Matrix Code [M]		Radium 226	Radium 228
6/25/2018	9:45	1806-13278-001	03G: Well #3 Raw	G	3P	N	DW		X	X

746 946

1Z F32 716 02 5755 3294

Send Report and Invoice to:		Subcontractor Information:	
Company Name:	R.I. Analytical Laboratories, Inc.	Company Name:	Eurofins/Eaton Analytical
Address:	41 Illinois Avenue	Address:	750 Royal Oaks Drive, #100
City/State/Zip:	Warwick, RI 02888	City/State/Zip:	Monrovia, CA 91016
Contact Person:	Kristen Phelan	Contact Person:	Vanessa Berry
Email:	kphelan@rianalytical.com; datareporting@rianalytical.com	Email:	VanessaBerry@eurofinsUS.com
Telephone:	401-737-8500 x 116	Telephone:	916-605-3373

Relinquished By	Date	Time	Received by	Date	Time
T Quartermous	6/26/18	1500	[signature] UPS	6/28/18	17:45

Turn Around Time	
X	Normal
	Rush _____ (Days)

Project Comments

Minimum volume needed to run both Radium 226/228 is 3L nitric preserved.

If MCL is exceeded, notify Kristen Mayo (800-937-2580 x109) and Ruben Parrilla (800-937-2580 x160/cell #(617) 893-0257)

PO # : 478

Temperature Upon Receipt °C

Date Shipped: 6/26/2018	
X	UPS (Receiving lab)
X	2nd Day
	Shipped on Ice
WO #:	1806-13278

Containers: P=Poly, G=Glass, AG=Amber Glass, V=Vial, St=Sterile Preservatives: A=Ascorbic Acid, NH4=NH_4Cl, H=HCl, M=MeOH, N=HNO_3, NP=None, S=H_2SO_4, SB=$NaHSO_4$, SH=NaOH, T=$Na_2S_2O_3$, Z=ZnOAc

Matrix Codes: GW=Groundwater, SW=Surface Water, WW=Wastewater, DW=Drinking Water, S=Soil, SL=Sludge, A=Air, B=Bulk/Solid, O=_____

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INTERNAL CHAIN OF CUSTODY RECORD

EEA Folder Number: 746940

SAMPLE TEMP RECEIVED:

Note: If samples are out of temperature range, let the ASMs know. ASMs will determine whether to proceed with analysis or not.

SAMPLES REC'D DAY OF COLLECTION? Yes / No

IR Gun ID = 6184 (Observation= 22.7 °C) (Corr.Factor 0 °C) (Final = 22.7 °C)

TYPE OF ICE: Real ____ Synthetic ____ No Ice 2 **CONDITION OF ICE:** Frozen ____ Partially Frozen ____ Thawed ____ N/A 2

METHOD OF SHIPMENT: Pick-Up / Walk-In / FedEx / UPS / DHL / Area Fast / Top Line / Other: _____

Compliance Acceptance Criteria:

1) **Chemistry:** >0, ≤ 6°C, not frozen (NELAP) (if received after 24 hrs of sample collection)

2) **Microbiology, Distribution:** < 10°C, not frozen (can be ≥10°C if received on ice the same day as sample collection, within 8 hours)

3) **Microbiology, Surface Water:** < 10°C (if received after 2 hours of sample collection)

If out of temperature range for both Chemistry and Microbiology samples and temperature does not confirm, then measure the temperature of each quadrant and record each temperature of the quadrants

1 = (Observation= ____ °C) (Corr.Factor ____ °C) (Final = ____ °C)	2 = (Observation= ____ °C) (Corr.Factor ____ °C) (Final = ____ °C)
3 = (Observation= ____ °C) (Corr.Factor ____ °C) (Final = ____ °C)	4 = (Observation= ____ °C) (Corr.Factor ____ °C) (Final = ____ °C)

4 **Dioxin (1613 or 2,3,7,8 TCDD):** must be between 0-4 °C, not frozen (if received after 24 hrs of sample collection)

5) **pH Check.** Manufacturer: _____ Lot Number: _____ pH strip type: 0 - 14 or _____ Expiration Date _____ Results: __

6) **Chlorine check.** Manufacturer: Sansafe. Lot No.: _____ Expiration Date: _____ Results _____

7) **VOA Headspace:** **No Samples with Headspace:** ☐ **Samples with Headspace (see below):** ☐

Headspace Documentation (use additional VOC Internal COFC for additional bottles)

Exempt from headspace concerns: Methods 515.4, HAA(6251,552), 505, SPME, @CH, 532LCMS, 556, 536, Anatoxin, LCMS methods using 40 ml vials, International clients:

Samp ID	Bottle #	None/<6 mm	>6mm

Samp ID	Bottle #	None/<6 mm	>6mm

Samp ID	Bottle #	None/<6 mm	>6mm

Samp ID	Bottle #	None/<6 mm	>6mm

Note Sample IDs which have dissimilar headspace (i.e. potential sampling errors): _____

	SIGNATURE	PRINT NAME	COMPANY/TITLE	DATE	TIME
RECEIVED BY:			Eurofins Eaton Analytical	6/28/18	17:45

PWS Name:	Town of Maynard - DPW
Location:	Maynard, MA
PWS ID#:	2174000
PWS Class:	COM

Sampled By:	
Date Collected:	6/25/2018

For RIAL WO#: 1806-13278

Sample Location	Source Code	Location Code	Source Treated?	Collected after Treatment?	Manifolded?	Sample Type	Routine or Special Sample	Original, Resub or Confirm.	Multiple or Single?	Raw or Finished?
03G: Well #3 (Raw)	2174000	03G	NA	NA	NA	RS	Routine	Original	Single	Finished

eurofins | Eaton Analytical

Tel: (626) 386-1100
Fax: (866) 988-3757
1 800 566 LABS (1 800 566 5227)

Laboratory Hits

Report: 746940
Project: SUBCONTRACT
Group: Radiologicals

Rhode Island Analytical Laboratory
Alan Ford
41 Illinois Avenue
Warwick, RI 02888-3007

Samples Received on:
06/28/2018 1745

Analyzed	Analyte	Sample ID	Result	Federal MCL	Units	MRL

SUMMARY OF POSITIVE DATA ONLY

eurofins | Eaton Analytical

Tel: (626) 386-1100
Fax: (866) 988-3757
1 800 566 LABS (1 800 566 5227)

Laboratory Data

Report: 746940
Project: SUBCONTRACT
Group: Radiologicals

Rhode Island Analytical Laboratory
Alan Ford
41 Illinois Avenue
Warwick, RI 02888-3007

Samples Received on:
06/28/2018 1745

Prepped	Analyzed	Prep Batch	Analytical Batch	Method	Analyte	Result	Units	MRL	Dilution
03G: Well #3 Raw (201806280642)							**Sampled on 06/25/2018 0945**		
	Variable ID: 1806-13278-001								
		Ra-226 GA - Radium 226							
07/02/18	07/17/18 16:20	1101988	1106255	(Ra-226 GA)	Radium 226	ND	pCi/L	1	1
07/02/18	07/17/18 16:20	1101988	1106255	(Ra-226 GA)	Radium 226 Min Detect Activity	0.45	pCi/L		1
07/02/18	07/17/18 16:20	1101988	1106255	(Ra-226 GA)	Radium 226 Two Sigma Error	ND	pCi/L	1	1
		RA-228 GA - Radium 228							
07/02/18	07/17/18 16:20	1102001	1106260	(RA-228 GA)	Radium 228	ND	pCi/L	1	1
07/02/18	07/17/18 16:20	1102001	1106260	(RA-228 GA)	Radium 228 Min Detect Activity	0.53	pCi/L		1
07/02/18	07/17/18 16:20	1102001	1106260	(RA-228 GA)	Radium 228 Two Sigma Error	ND	pCi/L	1	1

Rounding on totals after summation.
(c) - indicates calculated results

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Tel: (626) 386-1100
Fax: (866) 988-3757
1 800 566 LABS (1 800 566 5227)

Laboratory Comments

Report: 746940
Project: SUBCONTRACT
Group: Radiologicals

Rhode Island Analytical Laboratory
Alan Ford
41 Illinois Avenue
Warwick, RI 02888-3007

The Comments Report may be blank if there are no comments for this report.

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Tel: (626) 386-1100
Fax: (866) 988-3757
1 800 566 LABS (1 800 566 5227)

Laboratory QC Summary

Report: 746940
Project: SUBCONTRACT
Group: Radiologicals

Rhode Island Analytical Laboratory

Radium 226

Prep Batch: 1101988 **Analytical Batch: 1106255** **Analysis Date: 07/17/2018**

201806280642 03G: Well #3 Raw Analyzed by: XI4C

Radium 228

Prep Batch: 1102001 **Analytical Batch: 1106260** **Analysis Date: 07/17/2018**

201806280642 03G: Well #3 Raw Analyzed by: XI4C

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Tel: (626) 386-1100
Fax: (866) 988-3757
1 800 566 LABS (1 800 566 5227)

Laboratory QC

Report: 746940
Project: SUBCONTRACT
Group: Radiologicals

Rhode Island Analytical Laboratory

QC Type	Analyte	Native	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPDLimit (%)	RPD%
Radium 226 by Ra-226 GA									
Analytical Batch: 1106255							**Analysis Date: 07/16/2018**		
LCS1	Radium 226		11	9.26	pCi/L	87	(80-120)		
LCS2	Radium 226		11	9.40	pCi/L	88	(80-120)	20	1.5
MBLK	Radium 226			<1	pCi/L				
MS_201806280485	Radium 226	ND	11	8.25	pCi/L	77	(70-130)		
Radium 228 by RA-228 GA									
Analytical Batch: 1106260							**Analysis Date: 07/16/2018**		
LCS1	Radium 228		11	11.0	pCi/L	100	(80-120)		
LCS2	Radium 228		11	12.5	pCi/L	113	(80-120)	20	12
MBLK	Radium 228			<1	pCi/L				
MS_201806280485	Radium 228	ND	11	10.4	pCi/L	94	(70-130)		

Spike recovery is already corrected for native results.
Spikes which exceed Limits and Method Blanks with positive results are highlighted by Underlining.
Criteria for MS and Dup are advisory only, batch control is based on LCS. Criteria for duplicates are advisory only, unless otherwise specified in the method.
RPD not calculated for LCS2 when different a concentration than LCS1 is used.
RPD not calculated for Duplicates when the result is not five times the MRL (Minimum Reporting Level).
(S) - Indicates surrogate compound.
(I) - Indicates internal standard compound.

R.I. ANALYTICAL
Specialists in Environmental Services

CHAIN OF CUSTODY RECORD

41 Illinois Avenue
Warwick, RI 02888-3007
800-937-2580 • Fax: 401-738-1970

131 Coolidge St., Suite 105
Hudson, MA 01749-1331
800-937-2580 • Fax: 978-568-0078

06-18-18

Date Collected	Time Collected	Field Sample Identification	Grab or Composite	# of Containers & Type [C]	Preservation Code [P]	Matrix Code [M]	Provide eDEP upload of results	Radium 226 & 228
6-25-18	~~10:45~~	03G: Well #3 (Raw)	G	3P	N	DW	X	X
6-25-18	9:45							

Client Information

Company Name:	Town of Maynard Massachusetts – DPW
Address:	195 Main Street
City / State / Zip:	Maynard, MA 01754
Telephone:	978-897-1317 Fax: 978-897-7290
Contact Person:	Marie Morando

Project Information

Project Name:	Radium 226 & 228 Monitoring		
P.O. Number:		Project Number:	
Report To:	Marie Morando	Phone: 978-897-1317	Fax 978-897-7290
Sampled by:		Email report to these addresses:	amiklosko@townofmaynard.net tmullally@townofmaynard.net mmorando@townofmaynard.net
Quote No:			

Relinquished By Signatures	Date	Time	Received By Signatures	Date	Time
	6/25/18	10:45		6/25/18	1045
	6/25/18	1600	RL	6/25/18	1600
RL	6/25/18	1700	Questforwis	6-25-18	1700

Turn Around Time

	Normal	X	EMAIL Report
X	5-7 Business days		
	Rush – Date Due: ___/___/___		

Page 16 of 16

Project Comments

Circle if applicable: GW-1, GW-2, GW-3, S-1, S-2, S-3

MCP Data Enhancement QC Package? **No**

PWSID: 2174000

Temp. Upon Receipt 14.9°C

Lab Use Only

	Sample Pick Up Only
	RIAL sampled; attach field hours
X	~~Shipped~~ on ice
	Workorder No: 1806-13278

Containers: P=Poly, G=Glass, AG=Amber Glass, V=Vial, St=Sterile Preservatives: A=Ascorbic Acid, NH4=NH_4Cl, H=HCl, M=MeOH, N=HNO_3, NP=None, S=H_2SO_4, SB=$NaHSO_4$, SH=NaOH, T=$Na_2S_2O_3$, Z=ZnOAc

Matrix Codes: GW=Groundwater, SW=Surface Water, WW=Wastewater, DW=Drinking Water, S=Soil, SL=Sludge, A=Air, B=Bulk/Solid, WP=Wipe, O=_____

R.I. ANALYTICAL
Specialists in Environmental Services

LABORATORY REPORT

Town of Maynard Massachusetts
Attn: Marie Morando
195 Main Street
Maynard, MA 01754

Date Received: 6/25/2018
Date Reported: 7/23/2018
P.O. #:

Work Order #: 1806-13278
Project Name: RADIUM 226 & 228 MONITORING

Enclosed are the analytical results and Chain of Custody for your project referenced above. The sample(s) were analyzed by our Warwick, RI laboratory unless noted otherwise. When applicable, indication of sample analysis at our Hudson, MA laboratory and/or subcontracted results are noted and subcontracted reports are enclosed in their entirety.

All samples were analyzed within the established guidelines of US EPA approved methods and in accordance with Massachusetts Department of Environmental Protection regulations under 310 CMR 42.00, unless otherwise noted at the end of a given sample's analytical results or in a case narrative. Laboratory certification status for a given analyte and/or method may be referenced on the enclosed Certification Summary.

The Detection Limit is defined as the lowest level that can be reliably achieved during routine laboratory conditions.

These results only pertain to the samples submitted for this Work Order # and this report shall not be reproduced except in its entirety.

We certify that the following results are true and accurate to the best of our knowledge. If you have

Approved by:

Dawne E. Smart
Data Reporting Manager

Massachusetts Department of Environmental Protection Laboratory Identification Numbers:
Warwick, RI M-RI015 Hudson, MA M-MA1117

R.I. Analytical Laboratories, Inc

Laboratory Report

Town of Maynard Massachusetts

Work Order #: 1806-13278

Project Name/PWS ID: RADIUM 226 & 228 MONITORING

Sample Number: 001
Sample Description: WELL #3 (RAW) RW 03G
Sample Type : GRAB
Sample Date / Time : 6/25/2018 @ 09:45

PARAMETER	SAMPLE RESULTS	DET. LIMIT	UNITS	METHOD	DATE/TIME ANALYZED	ANALYST
Radium 226	See Attached			RA-226 GA	7/17/18 16:20	*EF
Radium 228	See Attached			RA-228 GA	7/17/18 16:20	*EF

*EF Radium 226 & 228 analyzed by Eurofins Eaton Analytical.

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION CERTIFICATION SUMMARY

MICROBIOLOGY

(Warwick and Hudson Laboratories)

Non-Potable Water		Potable Water	
Warwick only Fecal Coliform (Wastewater)	SM 9221E	Heterotrophic Plate Count *	SM 9215B
Fecal Coliform (Wastewater) *	SM 9222D	Total Coliform - Water Treatment and Distribution (P/A) *	SM 9222B, SM 9223
Hudson only E. coli (Ambient, Waste Water)	SM 9223B	***Hudson only*** Total Coliform (Source Enumeration)	SM 9223B
Enterococci (Ambient, Source Water)*	Enterolert	E. coli - Treatment and Distribution (P/A), Source Enumeration *	SM 9223, SM 9222G, SM 9223B
		Enterococci - Source (P/A) *	Enterolert

**** Indicates certification at both laboratory locations***

CHEMISTRY

(Warwick Laboratory Only)

Non-Potable Water		Potable Water	
Specific Conductivity	EPA 120.1	Turbidity	EPA 180.1
Iron, Titanium, Hardness (CaCO3); Total, Calcium, Magnesium, Sodium, Potassium	EPA 200.7	Sodium, Calcium	EPA 200.7
Aluminum, Antimony, Arsenic, Beryllium, Cadmium, Chromium, Cobalt, Copper, Lead, Manganese, Molybdenum, Nickel, Selenium, Silver, Thallium, Vanadium, Zinc	EPA 200.7, EPA 200.8	Barium, Beryllium, Cadmium, Chromium, Copper, Nickel, Silver	EPA 200.7, EPA 200.8
Mercury	EPA 245.1	Antimony, Arsenic, Lead, Selenium, Thallium	EPA 200.8
Nitrate, Sulfate, Chloride, Fluoride	EPA 300.0	Mercury	EPA 245.1
Ammonia	EPA 350.1, SM 4500-NH_3-B,H		
Phenolics, Total	EPA 420.1	Nitrate-N, Nitrite-N, Fluoride, Sulfate	EPA 300.0
Polychlorinated Biphenyls (Oil)	EPA 600/4-81-045	Volatile Organic Compounds, Trihalomethanes	EPA 524.2
Chlordane, Toxaphene, Aldrin, Alpha-BHC, Beta-BHC, Gamma-BHC, Delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan Sulfate, Endrin, Endrin Sulfate, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, Polychlorinated Biphenyls (Water)	EPA 608 until 7/1/18	Haloacetic Acids	EPA 552.2
Volatile Halocarbons, Volatile Aromatics	EPA 624 until 7/1/18	Alkalinity, Total	SM 2320B
SVOC– Acid Extractable, SVOC- Base/Neutral Extractable	EPA 625 until 7/1/18	Total Dissolved Solids	SM 2540C
Oil and Grease	EPA 1664	Chlorine, Free Residual	SM 4500-CL-G
Alkalinity; Total	SM 2320B	Cyanide, Total	SM 4500-CN-C,E
Non-Filterable Residue	SM 2540D	pH	SM 4500-H-B
Chloride	SM 4500-CL-B		
Chlorine, Total Residual	SM 4500-CL-G		
Cyanide, Total	SM 4500-CN,E		
Fluoride	SM 4500-F-B,D		
pH	SM 4500-H-B		
Kjeldahl Nitrogen	SM 4500-NORG-D		
Orthophosphate	SM 4500-P-E		
Phosphorous, Total	SM 4500-P-B,E		
Biochemical Oxygen Demand	SM 5210B		
Chemical Oxygen Demand	SM 5220D		
Total Organic Carbon	SM 5310C		

Please Note: **MA DEP does not offer certification for the soil/solid matrices or SW-846 methods.**

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750 Royal Oaks Drive, Suite 100
Monrovia, California 91016-3629
Tel: (626) 386-1100
Fax: (866) 988-3757
1 800 566 LABS (1 800 566 5227)

ilac-MRA

ANAB ACCREDITED ISO/IEC 17025 TESTING LABORATORY
AT-1807

Laboratory Report

for

Rhode Island Analytical Laboratory
41 Illinois Avenue
Warwick, RI 02888-3007
Attention: Alan Ford
Fax: 978-568-0078

NELAP RECOGNIZED TNI ACCREDITATION BODY
Utah ELCP CA00006

Date of Issue
07/21/2018

Linda Geddes
EUROFINS EATON
ANALYTICAL, LLC

ZIA8: Vanessa Berry
Project Manager

Report: 746940
Project: SUBCONTRACT
Group: Radiologicals

* Accredited in accordance with TNI 2009 and ISO/IEC 17025:2005.
* Laboratory certifies that the test results meet all **TNI 2009 and ISO/IEC 17025:2005** requirements unless noted under the individual analysis.
* Following the cover page are State Certification List, ISO 17025 Accredited Method List, Acknowledgement of Samples Received, Comments, Hits Report, Data Report, QC Summary, QC Report and Regulatory Forms, as applicable.
* Test results relate only to the sample(s) tested.

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STATE CERTIFICATION LIST

State	Certification Number	State	Certification Number
Alabama	41060	**Mississippi**	Certified
Arizona	AZ0778	**Montana**	Cert 0035
Arkansas	Certified	**Nebraska**	Certified
California-Monrovia-ELAP	2813	**Nevada**	CA000062018
California-Colton- ELAP	2812	**New Hampshire ***	2959
Colorado	Certified	**New Jersey ***	CA 008
Connecticut	PH-0107	**New Mexico**	Certified
Delaware	CA 006	**New York ***	11320
Florida *	E871024	**North Carolina**	06701
Georgia	947	**North Dakota**	R-009
Guam	18-005R	**Oregon ***	CA200003-005
Hawaii	Certified	**Pennsylvania ***	68-565
Idaho	Certified	**Puerto Rico**	Certified
Illinois *	200033	**Rhode Island**	LAO00326
Indiana	C-CA-01	**South Carolina**	87016
Iowa - Asbestos	413	**South Dakota**	Certified
Kansas *	E-10268	**Tennessee**	TN02839
Kentucky	90107	**Texas ***	T104704230-17-13
Louisiana *	LA180000	**Utah (Primary AB) ***	CA00006
Maine	CA0006	**Vermont**	VT0114
Maryland	224	**Virginia ***	460260
Commonwealth of Northern Marianas Is.	MP0004	**Washington**	C838
Massachusetts	M-CA006	**EPA Region 5**	Certified
Michigan	9906	**Los Angeles County Sanitation Districts**	10264

* NELAP/TNI Recognized Accreditation Bodies

The tests listed below are accredited and meet the requirements of ISO 17025 as verified by the ANSI-ASQ National Accreditation Board/ANAB.
Refer to Certificate and scope of accreditation (AT 1807) found at: http://www.eatonanalytical.com

SPECIFIC TESTS	METHOD OR TECHNIQUE USED	Environ-mental (Drinking Water)	Environ-mental (Waste Water)	Water as a Component of Food and Bev/Bev/ Bottled Water
1,4-Dioxane	EPA 522	x		x
2,3,7,8-TCDD	Modified EPA 1613B	x		x
Acrylamide	In House Method (2440)	x		x
Alkalinity	SM 2320B	x	x	x
Ammonia	EPA 350.1		x	x
Ammonia	SM 4500-NH3 H		x	x
Anions and DBPs by IC	EPA 300.0	x	x	x
Anions and DBPs by IC	EPA 300.1	x		x
Asbestos	EPA 100.2	x	x	
Bicarbonate Alkalinity as HCO3	SM 2320B	x	x	x
BOD / CBOD	SM 5210B		x	x
Bromate	In House Method (2447)	x		x
Carbamates	EPA 531.2	x		x
Carbonate as CO3	SM 2330B	x	x	x
Carbonyls	EPA 556	x		x
COD	EPA 410.4 / SM 5220D		x	
Chloramines	SM 4500-CL G	x	x	x
Chlorinated Acids	EPA 515.4	x		x
Chlorinated Acids	EPA 555	x		x
Chlorine Dioxide	SM 4500-CLO2 D	x		x
Chlorine -Total/Free/ Combined Residual	SM 4500-Cl G	x	x	x
Conductivity	EPA 120.1		x	
Conductivity	SM 2510B	x	x	x
Corrosivity (Langelier Index)	SM 2330B	x		x
Cryptosporidium	EPA 1623	x		x
Cyanide, Amenable	SM 4500-CN G	x	x	
Cyanide, Free	SM 4500CN F	x	x	x
Cyanide, Total	EPA 335.4	x	x	x
Cyanogen Chloride (screen)	In House Method (2470)	x		x
Diquat and Paraquat	EPA 549.2	x		x
DBP/HAA	SM 6251B	x		x
Dissolved Oxygen	SM 4500-O G		x	x
DOC	SM 5310C	x		x
E. Coli	(MTF/EC+MUG)	x		x
E. Coli	CFR 141.21(f)(6)(i)	x		x
E. Coli	SM 9223		x	
E. Coli (Enumeration)	SM 9221B.1/ SM 9221F	x		x
E. Coli (Enumeration)	SM 9223B	x		x
EDB/DCBP	EPA 504.1	x		
EDB/DBCP and DBP	EPA 551.1	x		x
EDTA and NTA	In House Method (2454)	x		x
Endothall	EPA 548.1	x		x
Endothall	In-house Method (2445)	x		x
Enterococci	SM 9230B	x	x	
Fecal Coliform	SM 9221 E (MTF/EC)	x		
Fecal Coliform	SM 9221C, E (MTF/EC)		x	
Fecal Coliform (Enumeration)	SM 9221E (MTF/EC)	x		x
Fecal Coliform with Chlorine Present	SM 9221E		x	
Fecal Streptococci	SM 9230B	x	x	
Fluoride	SM 4500-F C	x	x	x
Giardia	EPA 1623	x		x
Glyphosate	EPA 547	x		x
Gross Alpha/Beta	EPA 900.0	x	x	x
Gross Alpha Coprecipitation	SM 7110 C	x	x	x
Hardness	SM 2340B	x	x	x
Heterotrophic Bacteria	In House Method (2439)	x		x
Heterotrophic Bacteria	SM 9215 B	x		x
Hexavalent Chromium	EPA 218.6	x	x	x

SPECIFIC TESTS	METHOD OR TECHNIQUE USED	Environ-mental (Drinking Water)	Environ-mental (Waste Water)	Water as a Component of Food and Bev/Bev/ Bottled Water
Hexavalent Chromium	EPA 218.7	x		x
Hexavalent Chromium	SM 3500-Cr B		x	
Hormones	EPA 539	x		x
Hydroxide as OH Calc.	SM 2330B	x		x
Kjeldahl Nitrogen	EPA 351.2		x	
Legionella	CDC Legionella	x		x
Mercury	EPA 245.1	x	x	x
Metals	EPA 200.7 / 200.8	x	x	x
Microcystin LR	ELISA (2360)	x		x
NDMA	EPA 521	x		x
NDMA	TQ In house method based on EPA 521 (2425)	x		x
Nitrate/Nitrite Nitrogen	EPA 353.2	x	x	x
OCL, Pesticides/PCB	EPA 505	x		x
Ortho Phosphate	EPA 365.1	x	x	x
Ortho Phosphate	SM 4500P E			x
Ortho Phosphorous	SM 4500P E	x		
Oxyhalides Disinfection Byproducts	EPA 317.0	x		x
Perchlorate	EPA 331.0	x		x
Perchlorate (low and high)	EPA 314.0	x		x
Perfluorinated Alkyl Acids	EPA 537	x		x
pH	EPA 150.1	x		
pH	SM 4500-H+B	x	x	x
Phenylurea Pesticides/ Herbicides	In House Method, based on EPA 532 (2448)	x		x
Pseudomonas	IDEXX Pseudalert (2461)	x		x
Radium-226	GA Institute of Tech	x		x
Radium-228	GA Institute of Tech	x		x
Radon-222	SM 7500RN	x		x
Residue, Filterable	SM 2540C	x	x	x
Residue, Non-filterable	SM 2540D		x	
Residue, Total	SM 2540B		x	x
Residue, Volatile	EPA 160.4		x	
Semi-VOC	EPA 525.2	x		x
Semi-VOC	EPA 625		x	x
Silica	SM 4500-Si D	x	x	
Silica	SM 4500-SiO2 C	x	x	
Sulfide	SM 4500-$S^{=}$ D		x	
Sulfite	SM 4500-SO^{3}B	x	x	x
Surfactants	SM 5540C	x	x	x
Taste and Odor Analytes	SM 6040E	x		x
Total Coliform (P/A)	SM 9221 A, B	x		x
Total Coliform (Enumeration)	SM 9221 A, B, C	x		x
Total Coliform / E. coli	Colisure SM 9223	x		x
Total Coliform	SM 9221B		x	
Total Coliform with Chlorine Present	SM 9221B		x	
Total Coliform / E.coli (P/A and Enumeration)	SM 9223	x		x
TOC	SM 5310C	x	x	x
TOX	SM 5320B		x	
Total Phenols	EPA 420.1		x	
Total Phenols	EPA 420.4	x	x	x
Total Phosphorous	SM 4500 P E		x	
Turbidity	EPA 180.1	x	x	x
Turbidity	SM 2130B	x	x	
Uranium by ICP/MS	EPA 200.8	x		x
UV 254	SM 5910B	x		
VOC	EPA 524.2/EPA 524.3	x		x
VOC	EPA 624		x	x
VOC	EPA SW 846 8260	x		x
VOC	In House Method (2411)	x		x
Yeast and Mold	SM 9610	x		x

Acknowledgement of Samples Received

Addr: **Rhode Island Analytical Laboratory**
41 Illinois Avenue
Warwick, RI 02888-3007

Attn: Alan Ford
Phone: 978-568-0041 x132

Client ID: RIANALY
Folder #: 746940
Project: SUBCONTRACT
Sample Group: Radiologicals

Project Manager: Vanessa Berry
Phone:
PO #: 478

The following samples were received from you on **June 28, 2018** at **1745**. They have been scheduled for the tests listed below each sample. If this information is incorrect, please contact your service representative. Thank you for using Eurofins Eaton Analytical, LLC.

Sample #	Sample ID	Sample Date
201806280642	03G: Well #3 Raw	06/25/2018 0945
	Variable ID: 1806-13278-001	
	@RA226 GA @RA228 GA	

Test Description

@RA226 GA -- Radium 226

@RA228 GA -- Radium 228

CHAIN OF CUSTODY RECORD

R.I. Analytical Laboratories, Inc.

41 Illinois Avenue
Warwick, RI 02888-3007
Tel: 800-937-2580
Fax: 401-738-1970

131 Coolidge St, Suite 105
Hudson, MA 01749-1331
Tel: 800-937-2580
Fax: 978-568-0078

740,940

Date Collected	Time Collected	Lab ID	Sample Identification	Grab or Composite	# of Containers & Type [C]	Preservation Code [P]	Matrix Code [M]		Radium 226	Radium 228
6/25/2018	9:45	1806-13278-001	03G: Well #3 Raw	G	3P	N	DW		X	X

UPS Next Day Air
1Z F32 716 02 5755 3294

Send Report and Invoice to:	
Company Name:	R.I. Analytical Laboratories, Inc.
Address:	41 Illinois Avenue
City/State/Zip:	Warwick, RI 02888
Contact Person:	Kristen Phelan
Email:	kphelan@rianalytical.com; datareporting@rianalytical.com
Telephone:	401-737-8500 x 116

Subcontractor Information:	
Company Name:	Eurofins/Eaton Analytical
Address:	750 Royal Oaks Drive, #100
City/State/Zip:	Monrovia, CA 91016
Contact Person:	Vanessa Berry
Email:	VanessaBerry@eurofinsUS.com
Telephone:	916-605-3373

Relinquished By	Date	Time	Received by	Date	Time
T Quattromolo	6/26/18	1500	UPS	6/28/18	17:45

Turn Around Time	
X	Normal
	Rush ____ (Days)

Project Comments

Minimum volume needed to run both Radium 226/228 is 3L nitric preserved.

If MCL is exceeded, notify Kristen Mayo (800-937-2580 x109) and Ruben Parrilla (800-937-2580 x160/cell #(617) 893-0257)

PO # : 478

Temperature Upon Receipt ____ °C

Date Shipped: 6/26/2018	
X	UPS (Receiving lab)
X	2nd Day
	Shipped on Ice
WO #:	1806-13278

Containers: P=Poly, G=Glass, AG=Amber Glass, V=Vial, St=Sterile Preservatives: A=Ascorbic Acid, NH4=NH_4Cl, H=HCl, M=MeOH, N=HNO_3, NP=None, S=H_2SO_4, SB=$NaHSO_4$, SH=NaOH, T=$Na_2S_2O_3$, Z=ZnOAc

Matrix Codes: GW=Groundwater, SW=Surface Water, WW=Wastewater, DW=Drinking Water, S=Soil, SL=Sludge, A=Air, B=Bulk/Solid, O=_____

eurofins | Eaton Analytical

INTERNAL CHAIN OF CUSTODY RECORD

EEA Folder Number: 746940

SAMPLE TEMP RECEIVED:

Note: If samples are out of temperature range, let the ASMs know. ASMs will determine whether to proceed with analysis or not.

SAMPLES REC'D DAY OF COLLECTION? Yes / No

IR Gun ID = 6184 (Observation= 22.7 °C) (Corr.Factor 0 °C) (Final = 22.7 °C)

TYPE OF ICE: Real ____ Synthetic ____ No Ice 2 **CONDITION OF ICE:** Frozen ____ Partially Frozen ____ Thawed ____ N/A 2

METHOD OF SHIPMENT: Pick-Up / Walk-In / FedEx / UPS / DHL / Area Fast / Top Line / Other: _____

Compliance Acceptance Criteria:

1) **Chemistry:** >0, ≤ 6°C, not frozen (NELAP) (if received after 24 hrs of sample collection)

2) **Microbiology, Distribution:** < 10°C, not frozen (can be ≥10°C if received on ice the same day as sample collection, within 8 hours)

3) **Microbiology, Surface Water:** < 10°C (if received after 2 hours of sample collection)

If out of temperature range for both Chemistry and Microbiology samples and temperature does not confirm, then measure the temperature of each quadrant and record each temperature of the quadrants

1 = (Observation= ____ °C) (Corr.Factor ____ °C) (Final = ____ °C)	2 = (Observation= ____ °C) (Corr.Factor ____ °C) (Final = ____ °C)
3 = (Observation= ____ °C) (Corr.Factor ____ °C) (Final = ____ °C)	4 = (Observation= ____ °C) (Corr.Factor ____ °C) (Final = ____ °C)

4 **Dioxin (1613 or 2,3,7,8 TCDD):** must be between 0-4 °C, not frozen (if received after 24 hrs of sample collection)

5) **pH Check.** Manufacturer: _____ Lot Number: _____ pH strip type: 0 - 14 or _____ Expiration Date _____ Results: __

6) **Chlorine check.** Manufacturer: Sansafe. Lot No.: _____ Expiration Date: _____ Results _____

7) **VOA Headspace:** **No Samples with Headspace:** ☐ **Samples with Headspace (see below):** ☐

Headspace Documentation (use additional VOC Internal COFC for additional bottles)

Exempt from headspace concerns: Methods 515.4, HAA(6251,552), 505, SPME, @CH, 532LCMS, 556, 536, Anatoxin, LCMS methods using 40 ml vials, International clients:

Samp ID	Bottle #	None/<6 mm	>6mm

Samp ID	Bottle #	None/<6 mm	>6mm

Samp ID	Bottle #	None/<6 mm	>6mm

Samp ID	Bottle #	None/<6 mm	>6mm

Note Sample IDs which have dissimilar headspace (i.e. potential sampling errors): _____

	SIGNATURE	PRINT NAME	COMPANY/TITLE	DATE	TIME
RECEIVED BY:			Eurofins Eaton Analytical	6/28/18	17:45

PWS Name:	Town of Maynard - DPW
Location:	Maynard, MA
PWS ID#:	2174000
PWS Class:	COM

Sampled By:	
Date Collected:	6/25/2018

For RIAL WO#: 1806-13278

Sample Location	Source Code	Location Code	Source Treated?	Collected after Treatment?	Manifolded?	Sample Type	Routine or Special Sample	Original, Resub or Confirm.	Multiple or Single?	Raw or Finished?
03G: Well #3 (Raw)	2174000	03G	NA	NA	NA	RS	Routine	Original	Single	Finished

eurofins | Eaton Analytical

Tel: (626) 386-1100
Fax: (866) 988-3757
1 800 566 LABS (1 800 566 5227)

Laboratory Hits

Report: 746940
Project: SUBCONTRACT
Group: Radiologicals

Rhode Island Analytical Laboratory
Alan Ford
41 Illinois Avenue
Warwick, RI 02888-3007

Samples Received on:
06/28/2018 1745

Analyzed	Analyte	Sample ID	Result	Federal MCL	Units	MRL

SUMMARY OF POSITIVE DATA ONLY

eurofins | Eaton Analytical

Tel: (626) 386-1100
Fax: (866) 988-3757
1 800 566 LABS (1 800 566 5227)

Laboratory Data

Report: 746940
Project: SUBCONTRACT
Group: Radiologicals

Rhode Island Analytical Laboratory
Alan Ford
41 Illinois Avenue
Warwick, RI 02888-3007

Samples Received on:
06/28/2018 1745

Prepped	Analyzed	Prep Batch	Analytical Batch	Method	Analyte	Result	Units	MRL	Dilution
03G: Well #3 Raw (201806280642)							**Sampled on 06/25/2018 0945**		
	Variable ID: 1806-13278-001								
		Ra-226 GA - Radium 226							
07/02/18	07/17/18 16:20	1101988	1106255	(Ra-226 GA)	Radium 226	ND	pCi/L	1	1
07/02/18	07/17/18 16:20	1101988	1106255	(Ra-226 GA)	Radium 226 Min Detect Activity	0.45	pCi/L		1
07/02/18	07/17/18 16:20	1101988	1106255	(Ra-226 GA)	Radium 226 Two Sigma Error	ND	pCi/L	1	1
		RA-228 GA - Radium 228							
07/02/18	07/17/18 16:20	1102001	1106260	(RA-228 GA)	Radium 228	ND	pCi/L	1	1
07/02/18	07/17/18 16:20	1102001	1106260	(RA-228 GA)	Radium 228 Min Detect Activity	0.53	pCi/L		1
07/02/18	07/17/18 16:20	1102001	1106260	(RA-228 GA)	Radium 228 Two Sigma Error	ND	pCi/L	1	1

Rounding on totals after summation.
(c) - indicates calculated results

eurofins | Eaton Analytical

Tel: (626) 386-1100
Fax: (866) 988-3757
1 800 566 LABS (1 800 566 5227)

Laboratory Comments

Report: 746940
Project: SUBCONTRACT
Group: Radiologicals

Rhode Island Analytical Laboratory
Alan Ford
41 Illinois Avenue
Warwick, RI 02888-3007

The Comments Report may be blank if there are no comments for this report.

eurofins | Eaton Analytical

Tel: (626) 386-1100
Fax: (866) 988-3757
1 800 566 LABS (1 800 566 5227)

Laboratory QC Summary

Report: 746940
Project: SUBCONTRACT
Group: Radiologicals

Rhode Island Analytical Laboratory

Radium 226

Prep Batch: 1101988 **Analytical Batch: 1106255** **Analysis Date: 07/17/2018**

201806280642 03G: Well #3 Raw Analyzed by: XI4C

Radium 228

Prep Batch: 1102001 **Analytical Batch: 1106260** **Analysis Date: 07/17/2018**

201806280642 03G: Well #3 Raw Analyzed by: XI4C

eurofins | Eaton Analytical

Tel: (626) 386-1100
Fax: (866) 988-3757
1 800 566 LABS (1 800 566 5227)

Laboratory QC

Report: 746940
Project: SUBCONTRACT
Group: Radiologicals

Rhode Island Analytical Laboratory

QC Type	Analyte	Native	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPDLimit (%)	RPD%
Radium 226 by Ra-226 GA									
Analytical Batch: 1106255							**Analysis Date: 07/16/2018**		
LCS1	Radium 226		11	9.26	pCi/L	87	(80-120)		
LCS2	Radium 226		11	9.40	pCi/L	88	(80-120)	20	1.5
MBLK	Radium 226			<1	pCi/L				
MS_201806280485	Radium 226	ND	11	8.25	pCi/L	77	(70-130)		
Radium 228 by RA-228 GA									
Analytical Batch: 1106260							**Analysis Date: 07/16/2018**		
LCS1	Radium 228		11	11.0	pCi/L	100	(80-120)		
LCS2	Radium 228		11	12.5	pCi/L	113	(80-120)	20	12
MBLK	Radium 228			<1	pCi/L				
MS_201806280485	Radium 228	ND	11	10.4	pCi/L	94	(70-130)		

Spike recovery is already corrected for native results.
Spikes which exceed Limits and Method Blanks with positive results are highlighted by Underlining.
Criteria for MS and Dup are advisory only, batch control is based on LCS. Criteria for duplicates are advisory only, unless otherwise specified in the method.
RPD not calculated for LCS2 when different a concentration than LCS1 is used.
RPD not calculated for Duplicates when the result is not five times the MRL (Minimum Reporting Level).
(S) - Indicates surrogate compound.
(I) - Indicates internal standard compound.

Massachusetts Department of Environmental Protection - Drinking Water Program **R**

Radionuclide Report

I. PWS INFORMATION: Please refer to your DEP Water Quality Sampling Schedule (WQSS) to help complete this form

PWS ID #: 2174000 **City / Town:** MAYNARD

PWS Name: Town of Maynard - DPW **PWS Class:** COM ☒ NTNC ☐ TNC ☐

DEP LOCATION (LOC) ID#	DEP Location Name	Sample Information		Date Collected	Collected By
03G	Well #3 (Raw)	☐ (M)ultiple ☐ (S)ingle	☐ (R)aw ☒ (F)inished	6/25/2018	

Routine or Special Sample	Original, Resubmitted or Confirmation Report	If Resubmitted Report, list below: (1) Reason for Resubmission	(2) Collection Date of Original Sample
☒ RS ☐ SS	☒ Original ☐ Resubmitted ☐ Confirmation	☐ Resample ☐ Reanalysis ☐ Report Correction	

SAMPLE NOTES – (Such as, if a Manifold/Multiple sample, list any sources that were on-line line during sample collection).

II. ANALYTICAL LABORATORY INFORMATION:

Primary Lab MA Cert. #: M-CA006 **Primary Lab Name:** Eurofins Eaton Analytical **Subcontracted? (Y/N)** N

Was this sample composited by the Lab?	COMPOSITE SAMPLE NOTES List the composited source by DEP Source Code (XXXXXXX-XXX) and dates collected, up to four consecutive quarterly samples per single entry point.
☐	

LAB SAMPLE NOTES

Contaminant	RESULT	Std Dev (+/-)	MCL	MDL	Lab Method	Date Analyzed	Lab Sample ID#	Analysis Lab MA Cert#	Analysis Lab Name
GROSS ALPHA (pCi/L)									
URANIUM – *activity* (pCi/L)									

Report Uranium result and MDL in **(pCi/L)** as analyzed, otherwise use formula to calculate [Uranium µg/L x 0.67 = Uranium pCi/L]. Check this box if result is calculated ☐

ADJUSTED GROSS ALPHA (pCi/L)		----	15	The MCL for *Adjusted Gross Alpha* (Gross Alpha minus Uranium) is 15 pCi/L. A gross alpha measurement may be substituted for the uranium analysis, if the gross alpha result is equal to or less than 15 pCi/L. If gross alpha exceeds 15 pCi/L, uranium must also be measured.

URANIUM – *mass* (µg/L)			30						

Report Uranium result and MDL in **(µg/L)** as analyzed, otherwise use formula to calculate [Uranium pCi/L / 0.67 = Uranium µg/L]. Check this box if result is calculated ☐

RADIUM-226 (pCi/L)	<1	0		1	GA	7/17/2018	06280642	M-CA006	EEA
RADIUM-228 (pCi/L)	<1	0		1	GA	7/17/2018	06280642	M-CA006	EEA
COMBINED RADIUM (pCi/L)	<1	----	5	The MCL for *Combined Radium* (Radium-226 plus Radium-228) is 5 pCi/L. A gross alpha measurement may be substituted for the radium-226 analysis, if the gross alpha result is equal to or less than 5 pCi/L. If gross alpha exceeds 5 pCi/L, radium-226 must also be measured.					

GROSS BETA (pCi/L)			*						

*The MCL for gross beta is 4 mrem/year. If gross beta exceeds 50 pCi/L, analysis of the sample for Photon Activity shall be performed to identify the major radioactive constituents. Gross Beta testing is optional, unless specifically required by DEP.

RADON (pCi/L)			**						

**Radon testing is optional, unless specifically required by DEP. The MA guideline for Radon is 10,000 pCi/L. The EPA has proposed a radon MCL of 300 – 4000 pCi/L.

I certify under penalties of law that I am the person authorized to fill out this form and the information contained herein is true, accurate and complete to the best extent of my knowledge.

Primary Lab Director Signature: Linda Dobbs

Date: 7/23/2018

If not submitting these results electronically, mail TWO copies of this report to your DEP Regional Office no later than 10 days after the end of the month in which you received this report or no later than 10 days after the end of the reporting period, whichever is sooner.

DEP REVIEW STATUS (Initial & Date)	Review Comments		☐ WQTS Data Entered
☐ Accepted _____ ☐ Disapproved _____			

R.I. ANALYTICAL
Specialists in Environmental Services

CHAIN OF CUSTODY RECORD

41 Illinois Avenue
Warwick, RI 02888-3007
800-937-2580 • Fax: 401-738-1970

131 Coolidge St., Suite 105
Hudson, MA 01749-1331
800-937-2580 • Fax: 978-568-0078

06-18-18

Date Collected	Time Collected	Field Sample Identification	Grab or Composite	# of Containers & Type [C]	Preservation Code [P]	Matrix Code [M]	Provide eDEP upload of results	Radium 226 & 228
6-25-18	~~10:45~~	03G: Well #3 (Raw)	G	3P	N	DW	X	X
6-25-18	9:45							

Client Information

Company Name:	Town of Maynard Massachusetts – DPW
Address:	195 Main Street
City / State / Zip:	Maynard, MA 01754
Telephone:	978-897-1317 Fax: 978-897-7290
Contact Person:	Marie Morando

Project Information

Project Name:	Radium 226 & 228 Monitoring
P.O. Number:	Project Number:
Report To:	Marie Morando Phone: 978-897-1317 Fax 978-897-7290
Sampled by:	Email report to these addresses: amiklosko@townofmaynard.net; tmullally@townofmaynard.net; mmorando@townofmaynard.net
Quote No:	

Relinquished By Signatures	Date	Time	Received By Signatures	Date	Time
Town Rec	6/25/18	10:45		6/25/18	10:45
	6/25/18	1600	RL	6/25/18	1600
RL	6/25/18	1700	Overtown	6/25/18	1700

Turn Around Time

	Normal	X	EMAIL Report
X	5-7 Business days		
	Rush – Date Due: ___/___/___		

Page 1 of 1

Project Comments

Circle if applicable: GW-1, GW-2, GW-3, S-1, S-2, S-3 MCP Data Enhancement QC Package? No

PWSID: 2174000

Temp. Upon Receipt 14.9°C

Lab Use Only

	Sample Pick Up Only
	RIAL sampled; attach field hours
X	~~Shipped~~ on ice
	Workorder No: 1806-13278

Containers: P=Poly, G=Glass, AG=Amber Glass, V=Vial, St=Sterile Preservatives: A=Ascorbic Acid, NH4=NH_4Cl, H=HCl, M=MeOH, N=HNO_3, NP=None, S=H_2SO_4, SB=$NaHSO_4$, SH=NaOH, T=$Na_2S_2O_3$, Z=ZnOAc
Matrix Codes: GW=Groundwater, SW=Surface Water, WW=Wastewater, DW=Drinking Water, S=Soil, SL=Sludge, A=Air, B=Bulk/Solid, WP=Wipe, O=_____

Massachusetts Department of Environmental Protection - Drinking Water Program R

Radionuclide Report

I. PWS INFORMATION: Please refer to your DEP Water Quality Sampling Schedule (WQSS) to help complete this form

PWS ID #: 2174000 City / Town: Maynard

PWS Name: Town of Maynard PWS Class: COM ☒ NTNC ☐ TNC ☐

DEP LOCATION (LOC) ID#	DEP Location Name	Sample Information		Date Collected	Collected By
RW-036	Well #3	☐ (M)ultiple ☒ (S)ingle	☒ (R)aw ☐ (F)inished	6/27/18	Nate Dee

Routine or Special Sample	Original, Resubmitted or Confirmation Report	If Resubmitted Report, list below:	
		(1) Reason for Resubmission	(2) Collection Date of Original Sample
☐ RS ☒ SS	☒ Original ☐ Resubmitted ☐ Confirmation	☐ Resample ☐ Reanalysis ☐ Report Correction	

SAMPLE NOTES – (Such as, if a Manifold/Multiple sample, list any sources that were on-line line during sample collection).

1806-13443-001

II. ANALYTICAL LABORATORY INFORMATION:

Primary Lab MA Cert. #: N/A Primary Lab Name: AccuStar Labs Subcontracted? (Y/N) N

Was this sample composited by the Lab?	COMPOSITE SAMPLE NOTES List the composited source by DEP Source Code (XXXXXXX-XXX) and dates collected, up to four consecutive quarterly samples per single entry point.
☐	

LAB SAMPLE NOTES

Contaminant	RESULT	Std Dev (+/-)	MCL	MDL	Lab Method	Date Analyzed	Lab Sample ID#	Analysis Lab MA Cert#	Analysis Lab Name
GROSS ALPHA (pCi/L)									
URANIUM – *activity* (pCi/L)									
Report Uranium result and MDL in (pCi/L) as analyzed, otherwise use formula to calculate [Uranium µg/L x 0.67 = Uranium pCi/L]. Check this box if result is calculated ☐									
ADJUSTED GROSS ALPHA (pCi/L)		----	15	The MCL for *Adjusted Gross Alpha* (Gross Alpha minus Uranium) is 15 pCi/L. A gross alpha measurement may be substituted for the uranium analysis, if the gross alpha result is equal to or less than 15 pCi/L. If gross alpha exceeds 15 pCi/L, uranium must also be measured.						
URANIUM – *mass* (µg/L)			30						
Report Uranium result and MDL in (µg/L) as analyzed, otherwise use formula to calculate [Uranium pCi/L / 0.67 = Uranium µg/L]. Check this box if result is calculated ☐									
RADIUM-226 (pCi/L)									
RADIUM-228 (pCi/L)									
COMBINED RADIUM (pCi/L)		----	5	The MCL for *Combined Radium* (Radium-226 plus Radium-228) is 5 pCi/L. A gross alpha measurement may be substituted for the radium-226 analysis, if the gross alpha result is equal to or less than 5 pCi/L. If gross alpha exceeds 5 pCi/L, radium-226 must also be measured.						
GROSS BETA (pCi/L)			*						
*The MCL for gross beta is 4 mrem/year. If gross beta exceeds 50 pCi/L, analysis of the sample for Photon Activity shall be performed to identify the major radioactive constituents. Gross Beta testing is optional, unless specifically required by DEP.									
RADON (pCi/L)	1360	110 pCi/L	**		7500RN	6/29/18	1243263	N/A	AccuStar Labs
**Radon testing is optional, unless specifically required by DEP. The MA guideline for Radon is 10,000 pCi/L. The EPA has proposed a radon MCL of 300 – 4000 pCi/L.									

I certify under penalties of law that I am the person authorized to fill out this form and the information contained herein is true, accurate and complete to the best extent of my knowledge.

Primary Lab Director Signature: [signature]

Date: 07-12-18

If not submitting these results electronically, mail TWO copies of this report to your DEP Regional Office no later than 10 days after the end of the month in which you received this report or no later than 10 days after the end of the reporting period, whichever is sooner.

DEP REVIEW STATUS (Initial & Date) ☐ Accepted _____ ☐ Disapproved _____	Review Comments		☐ WQTS Data Entered

Massachusetts Department of Environmental Protection - Drinking Water Program R

Radionuclide Report

I. PWS INFORMATION: Please refer to your DEP Water Quality Sampling Schedule (WQSS) to help complete this form

PWS ID #: 2174000 City / Town: MAYNARD

PWS Name: Town of Maynard PWS Class: COM ☒ NTNC ☐ TNC ☐

DEP LOCATION (LOC) ID#	DEP Location Name	Sample Information		Date Collected	Collected By
RW-036	Well #3	☐ (M)ultiple ☒ (S)ingle	☒ (R)aw ☐ (F)inished	6/27/18	Nate Dee

Routine or Special Sample	Original, Resubmitted or Confirmation Report	If Resubmitted Report, list below: (1) Reason for Resubmission	(2) Collection Date of Original Sample
☐ RS ☒ SS	☒ Original ☐ Resubmitted ☐ Confirmation	☐ Resample ☐ Reanalysis ☐ Report Correction	

SAMPLE NOTES – (Such as, if a Manifold/Multiple sample, list any sources that were on-line line during sample collection)

18000 – 13443 -001

II. ANALYTICAL LABORATORY INFORMATION:

Primary Lab MA Cert. #: N/A Primary Lab Name: AccuStar Labs Subcontracted? (Y/N) N

Was this sample composited by the Lab?	COMPOSITE SAMPLE NOTES List the composited source by DEP Source Code (XXXXXXX-XXX) and dates collected, up to four consecutive quarterly samples per single entry point.
☐	

LAB SAMPLE NOTES

Contaminant	RESULT	Std Dev (+/-)	MCL	MDL	Lab Method	Date Analyzed	Lab Sample ID#	Analysis Lab MA Cert#	Analysis Lab Name
GROSS ALPHA (pCi/L)									
URANIUM – *activity* (pCi/L)									

Report Uranium result and MDL in (pCi/L) as analyzed, otherwise use formula to calculate [Uranium µg/L x 0.67 = Uranium pCi/L]. Check this box if result is calculated ☐

ADJUSTED GROSS ALPHA (pCi/L)		----	15	The MCL for *Adjusted Gross Alpha* (Gross Alpha minus Uranium) is 15 pCi/L. A gross alpha measurement may be substituted for the uranium analysis, if the gross alpha result is equal to or less than 15 pCi/L. If gross alpha exceeds 15 pCi/L, uranium must also be measured.

URANIUM – *mass* (µg/L)			30						

Report Uranium result and MDL in (µg/L) as analyzed, otherwise use formula to calculate [Uranium pCi/L / 0.67 = Uranium µg/L]. Check this box if result is calculated ☐

RADIUM-226 (pCi/L)									
RADIUM-228 (pCi/L)									

COMBINED RADIUM (pCi/L)		----	5	The MCL for *Combined Radium* (Radium-226 plus Radium-228) is 5 pCi/L. A gross alpha measurement may be substituted for the radium-226 analysis, if the gross alpha result is equal to or less than 5 pCi/L. If gross alpha exceeds 5 pCi/L, radium-226 must also be measured.

GROSS BETA (pCi/L)			*						

*The MCL for gross beta is 4 mrem/year. If gross beta exceeds 50 pCi/L, analysis of the sample for Photon Activity shall be performed to identify the major radioactive constituents. Gross Beta testing is optional, unless specifically required by DEP.

RADON (pCi/L)	1260	110 pCi/L	**		7500RN	06/29/18	1243262	N/A	AccuStar Labs

**Radon testing is optional, unless specifically required by DEP. The MA guideline for Radon is 10,000 pCi/L. The EPA has proposed a radon MCL of 300 – 4000 pCi/L.

I certify under penalties of law that I am the person authorized to fill out this form and the information contained herein is true, accurate and complete to the best extent of my knowledge.

Primary Lab Director Signature: [signature]

Date: 07-12-18

If not submitting these results electronically, mail TWO copies of this report to your DEP Regional Office no later than 10 days after the end of the month in which you received this report or no later than 10 days after the end of the reporting period, whichever is sooner.

DEP REVIEW STATUS (Initial & Date) ☐ Accepted _____ ☐ Disapproved _____	Review Comments		☐ WQTS Data Entered

Massachusetts Department of Environmental Protection - Drinking Water Program

Perchlorate Report

ClO_4

I. PWS INFORMATION: Please refer to your DEP Water Quality Sampling Schedule (WQSS) to help complete this form

PWS ID #: 2174000 **City / Town:** ~~Warwick~~ Maynard DEC 7/16/18

PWS Name: Town of Maynard **PWS Class:** COM [X] NTNC [ ] TNC [ ]

DEP LOCATION (LOC) ID#	DEP Location Name	Sample Information	Date Collected	Collected By
RW-036	03G Well#3 (Raw)	[ ] (M)ultiple [X] (R)aw [X] (S)ingle [ ] (F)inished	06/27/18	Nate Dee

Routine or Special Sample	Original, Resubmitted or Confirmation Report	If Resubmitted Report, list below: (1) Reason for Resubmission	(2) Collection Date of Original Sample
~~[X] RS~~ [X] SS	[X] Original [ ] Resubmitted [ ] Confirmation	[ ] Resample [ ] Reanalysis [ ] Report Correction	

DES 7/16/18

SAMPLE NOTES - Such as, if a Manifold/Multiple sample, list the source(s) that were on-line during sample collection.

II. ANALYTICAL LABORATORY INFORMATION:

Primary Lab MA Cert. #: M-RI015 **Primary Lab Name:** RI Analytical Laboratories, Inc. **Subcontracted? (Y/N)** Y

Analysis Lab MA Cert. #: M-IN035 **Analysis Lab Name:** EEA

CONTAMINANT	Result	UOM	MCL	MDL	MRL	Lab Method	Date Analyzed	Lab Sample ID#
PERCHLORATE	< 0.05	ug/L	2.0	0.012	0.05	EPA 331.0	07/07/2018	3975507
CONDUCTIVITY		umhos/cm	—					

Perchlorate analysis requires the use of a Massachusetts DEP approved laboratory.

Perchlorate concentrations between the Minimum Detection Limit (MDL) and the Minimum Reporting Level (MRL) must be reported as estimated (J) values (i.e. perchlorate is positively present but tentatively quantified).

All field samples with measured native perchlorate concentrations between 0.8 µg/L and 2.0 µg/L must be retested with and without a perchlorate spike approximately equal to the native perchlorate concentration.

LAB SAMPLE NOTES

Reanalysis and Spike Recovery (required for results between 0.8 µg/L and 2.0 µg/L or samples subject to pretreatment in method EPA 314.0)

Compound	Result (µg/L)	MDL (µg/L)	MRL (µg/L)	Spike Concentration (µg/L)	Spike Recovery (µg/L)	Lab Method	Date Analyzed
Perchlorate (reanalysis)							
Perchlorate (spike)							

Lab Report #: 420845

Note: This report may not be reproduced, except in full, without written approval from EEA.

Note: The results presented relate only to the samples provided for analysis.

I certify under penalties of law that I am the person authorized to fill out this form and the information contained herein is true, accurate and complete to the best extent of my knowledge.

Authorized Signature: [signature]

Date: 07/12/2018

If not submitting these results electronically, mail TWO copies of this report to your DEP Regional Office no later than 10 days after the end of the month in which you received this report or no later than 10 days after the end of the reporting period, whichever is sooner.

DEP REVIEW STATUS (Initial & Date)	Review Comments		[ ] WQTS Data Entered
[ ] Accepted _____ [ ] Disapproved _____			

Appendix C LANDTECH REPORT

C.1 POTENTIAL WATER LINE ROUTE RECONNAISSANCE REPORT FROM MAYNARD DPW YARD TO WELL #4 – LANDTECH CONSULTANTS, INC. / JULY 19, 2019

- Refer to Potential Water Line Route Reconnaissance Map on page C.2
- WP 1-10 easterly along Boeske Avenue from Maynard DPW yard to Taylor Road, thence southerly along Taylor Road to its terminus
- WP 10-12 southerly cross-country through woods from terminus of Taylor Road
- WP 12-16 southerly along a footpath
- WP 16-19 southerly cross-country through woods
- Rejoined hiking trial at WP 20, at wooden footbridge over stream
- WP 20- 24 continued southerly and easterly along footpath to Maynard Well #4

C.1.1 General Notes

- WP 1-10 along streets, approx. 2,300 feet;
- WP 10-24 through Town of Maynard parcels located east of the Assabet River National Wildlife Refuge property (boundary of ARNWR marked with signage), approx. 3,000 feet;
- Parcel Lines, Topographic relief (3-meter (~ 10-foot) contour interval) and Wetlands from MassGIS;
- No significant ledge outcroppings noted.

Appendix D WHITE POND RAW WATER QUALITY DATA

REPORT NO. 39101-05

AMERICAN ENVIRONMENTAL LABORATORIES, INC.

60 Elm Hill Ave. Leominster, MA 01453

(508) 534-1444

LAB ID #MA076 800-LAB-0094

SAMPLE INFORMATION

Requested By : Dufresne-Henry, Inc.
Address : Precision Park
City : N. Springfield, VT 05150
Sample ID : Raw - White Pond
Matrix : Water
ATTN: Robert Bentley
Sample Location (if different): Maynard Water Dept. 195 Main St. Maynard, MA

Date Received : 03/01/91
Date Analyzed : 03/04/91
Collected By : Robert Bentley

PARAMETER	RESULT	MCL LIMIT	BRIEF DESCRIPTION
Coliform Bacteria [P]	Neg	Pos/Neg	Animal/vegetational bact.
Fecal Bacteria	NT	Pos/Neg	Animal bacteria
Standard Plate Count	NT	No Limit	General water bacteria
Sodium	10.90	20.0 mg/l	Mass D.E.P. Guideline
Potassium [S]	0.84	No Limit	A component of salt
Copper [S]	ND	0-1.0 mg/l	Indicates plumbing corrosion
Iron [S]	0.01	0-0.30 mg/l	Brown stains, bitter taste
Manganese [S]	0.01	0-0.05 mg/l	May cause laundry staining
Magnesium	1.10	No Limit	A component of hardness
Calcium	4.30	No Limit	A component of hardness
Alkalinity [S]	7.50	No Limit	Ability to neutralize acid
Chlorine	ND	0-0.05 mg/l	A disinfectant (bleach)
Chloride [S]	16.00	0-250 mg/l	A component of salt
Hardness	15.30	No Limit	0-75 soft
Nitrate [P]	ND	10.0 mg/l	Indicator of biological waste
Nitrite	ND	1.0 mg/l	Indicator of organic waste
Ammonia	ND	No Limit	Gas from organic breakdown
Sulfate [S]	9.00	No Limit	A mineral, may cause odor
pH [S]	* 6.20	6.5-8.5	The acidic/basic condition
Conductivity	78.00	No Limit	Elec. resistance, umhos/cm
Sediment	Neg	Pos or Neg	Presence of sediments
Total Dissolved Solids [S]	46.80	0-500 mg/l	Total minerals present
Color [S]	4.00	0-15 cu	Clarity/Discoloration,(0-15)
Odor [S]	ND	0-3 ton	Odors due to contamination
Turbidity [P]	0.70	0-5 tu	Presence of particles
Arsenic [P]	ND	0.05mg/l	
Lead [P]	ND	0.05mg/l	

Comments:

For those items tested this sample meets the following EPA criteria for drinking water [x] Primary [ ] Secondary [ ] Neither.

Complete

Analyst : Scott Richmond

★ = Exceeds EPA Proposed MCL Limits
MDL = Minimum Detection Limit
MCL LIMIT = Proposed EPA Maximum contaminant level
ND = Level present is below detection limit
NT = Not Tested

REPORT NO. 39101-05

AMERICAN ENVIRONMENTAL LABORATORIES, INC.
60 Elm Hill Ave. Leominster, MA 01453
(508) 534-1444
LAB ID #MA076 800-LAB-0094

SAMPLE INFORMATION

Requested By : Dufrense-Henry, Inc.
Address : Precision Park
City : N. Springfield, VT 05150
Sample ID : Raw - White Pond
Matrix : Water
Sample Location (if different): Maynard Water Dept. 195 Main St. Maynard, MA

Date Received : 03/01/91
Date Analyzed : 03/01/91
Collected By : Robert Bentley
ATTN: Robert Bentley

PARAMETER	RESULT	MCL	MDL	UOM	METHOD NO.
Corrosivity	-3.4		-5.0/2.0	su	SM# 203
Fluoride	ND		0.20	mg/l	SM# 413C
Foaming Agents	ND		Pos/Neg	mg/l	Scrubber

Comments :F1-QC = NY #6047

Misc

Analyst : Scott Richmond

★ = Exceeds EPA Proposed MCL Limits
MDL = Minimum Detection Limit
MCL LIMIT = Proposed EPA Maximum contaminant level
ND = Level present is below detection limit
NT = Not Tested

REPORT NO. 39101-05

AMERICAN ENVIRONMENTAL LABORATORIES, INC. (508) 534-1444

60 Elm Hill Ave. Leominster, MA 01453 LAB ID #MA076 800-LAB-0094

SAMPLE INFORMATION

Requested By : Dufrense-Henry, Inc.
Address : Precision Park
City : N. Springfield, VT 05150
Sample ID : Raw - White Pond
Matrix : Water
Sample Location (if different): Maynard Water Dept. 195 Main St.

Date Received : 03/01/91
Date Analyzed : 03/05/91
Collected By : Robert Bentley
ATTN: Robert Bentley

PARAMETER	METHOD	RESULT (mg/l)	MCL (mg/l)	MDL (mg/l)
Arsenic	7060	ND	5.0	0.0002
Antimony	7041	ND	----	0.002
Beryllium	200.7	ND	100	0.0007
Cadmium	200.7	ND	1.0	0.006
Chromium	200.7	ND	5.0	0.006
Copper	200.7	ND	----	0.006
Lead	7421	ND	5.0	0.0005
Mercury	7470	ND	0.2	0.0002
Nickel	200.7	ND	----	0.006
Selenium	7740	ND	1.0	0.0005
Silver	200.7	ND	5.0	0.003
Thallium	7841	ND	----	0.005
Zinc	200.7	ND	----	0.004

Extraction Required: no
Method No. of Extraction: None
Quality Control Sample #: See Comments
Comments: QC-USEPA TR.MET.#1 WP-287 ICAP #7 WP-988 EP.TOX.#1 WP-1085
QC-USEPA QC-NY STATE #5213 WP-1183 CONC. #2 Blank - ND
13 Metals

Analyst : Francis A. Glodas

★ = Exceeds EPA Proposed MCL Limits
MDL = Minimum Detection Limit
MCL LIMIT = Proposed EPA Maximum contaminant level
ND = Level present is below detection limit
NT = Not Tested

REPORT NO. 39101-05

AMERICAN ENVIRONMENTAL LABORATORIES, INC. (508) 534-1444

60 Elm Hill Ave. Leominster, MA 01453 LAB ID #MA076 800-LAB-0094

SAMPLE INFORMATION

Requested By : Dufresne-Henry, Inc.
Address : Precision Park
City : North Springfield, VT 05150
Sample ID : Raw - White Pond
Matrix : Water
Sample Location (if different): Maynard Water Dept. 195 Main Street

Date Received : 03/01/91
Date Analyzed : 03/12/91
Collected By : Robert Bentley
ATTN: Robert Bentley

PARAMETER	RESULT (ppm)	MCL,(ppm)	MDL (ppm)
Aldrin	ND		0.004
a-BHC	ND		0.005
b-BHC	ND		0.006
d-BHC	ND		0.009
g-BHC	ND		0.006
Chlordane	ND		0.030
4,4'DDD	ND		0.020
4,4'DDE	ND		0.008
4,4'DDT	ND		0.020
Dieldrin	ND		0.008
Endosulfan I	ND		0.020
Endosulfan II	ND		0.006
Endosulfan Sulfate	ND		0.080
Endrin	ND		0.006
Endrin Aldehyde	ND		0.030
Heptachlor	ND		0.004
Heptachlor epoxide	ND		0.10
Toxaphene	ND		0.35
PCB 1016	ND		0.10
PCB 1221	ND		0.10
PCB 1232	ND		0.10
PCB 1242	ND		0.10
PCB 1248	ND		0.10
PCB 1254	ND		0.10
PCB 1260	ND		0.10

Matrix: Water
Sample Dilution: 500mls/1ml THF/HEX
Internal Standard: Yes 20ppb

Comments:

EPA 608

Analyst : Lisa Leclair

★ = Exceeds EPA Proposed MCL Limits
MDL = Minimum Detection Limit
MCL LIMIT = Proposed EPA Maximum contaminant level
ND = Level present is below detection limit
NT = Not Tested

REPORT NO. 39101-05

AMERICAN ENVIRONMENTAL LABORATORIES, INC.
(508) 534-1444
60 Elm Hill Ave. Leominster, MA 01453
LAB ID #MA076 800-LAB-0094

SAMPLE INFORMATION

Requested By : Dufrense-Henry, Inc.
Address : Precision Park
City : N. Springfield, VT 05150
Sample ID : Raw - White Pond
Matrix : Water
Sample Location (if different): 195 Main Street Maynard, MA

Date Received : 03/01/91
Date Analyzed : 03/04/91
Collected By : Robert Bentley
Maynard Water Dept.

PARAMETER	RESULT	MCL (ppb)	MDL (ppb)
Benzene	ND	5.0	0.5
Bromobenzene	ND		0.5
Bromochloromethane	ND		0.5
Bromodichloromethane THM	ND	100	0.5
Bromoform THM	ND		0.5
Bromomethane	ND		0.5
n-Butylbenzene	ND		0.5
sec-Butylbenzene	ND		0.5
tert-Butylbenzene	ND		0.5
Carbon-Tetrachloride	ND	5.0	0.5
Chlorobenzene	ND		0.5
Chloroethane	ND		0.5
Chloroform THM	ND		0.5
Chloromethane	ND		0.5
2-Chlorotoluene	ND		0.5
4-Chlorotoluene	ND		0.5
Dibromochloromethane THM	ND		0.5
1,2 Dibromo-3-chloro - propane	ND		0.5
1,2 Dibromoethane	ND		0.5
1,2 Dibromomethane	ND		0.5
1,2 Dichlorobenzene	ND		0.5
1,3 Dichlorobenzene	ND		0.5
1,4 Dichlorobenzene	ND	75.0	0.5
Dichlorodifluoromethane	ND		0.5
1,1 Dichloroethane	ND		0.5
1,2 Dichloroethane	ND	5.0	0.5
1,1 Dichloroethene	ND	7.0	0.5
cis-1,2 Dichloroethene	ND		0.5
Trans-1,2 Dichloroethene	ND		0.5
1,2 Dichloropropane	ND		0.5
1,3 Dichloropropane	ND		0.5

Report continued on next page...

EPA 524.2

Lisa Leclair
Analyst : _____

★ = Exceeds EPA Proposed MCL Limits
MDL = Minimum Detection Limit
MCL LIMIT = Proposed EPA Maximum contaminant level
ND = Level present is below detection limit
NT = Not Tested

REPORT NO. 39101-05

AMERICAN ENVIRONMENTAL LABORATORIES, INC.
(508) 534-1444
60 Elm Hill Ave. Leominster, MA 01453
LAB ID #MA076 800-LAB-0094

SAMPLE INFORMATION

Requested By : Dufrense-Henry, Inc.
Address : Precision Park
City : N. Springfield, VT 05150
Sample ID : Raw - White Pond
Matrix : Water
Sample Location (if different): 195 Main Street Maynard, MA

Date Received : 03/01/91
Date Analyzed : 03/04/91
Collected By : Robert Bentley
Maynard Water Dept.

PARAMETER	RESULT	MCL (ppb)	MDL (ppb)
2,2 Dichloropropane	ND		0.5
1,1 Dichloropropene	ND		0.5
cis-1,3 Dichloropropene	ND		0.5
trans-1,3 Dichloropropene	ND		0.5
Ethylbenzene	ND		0.5
Hexachlorobutadiene	ND		0.5
Isopropylbenzene	ND		0.5
p-Isopropyltoluene	ND		0.5
Methylene Chloride	ND		0.5
Napthalene	ND		0.5
n-Propylbenzene	ND		0.5
Styrene	ND		0.5
1,1,1,2 Tetrachloroethane	ND		0.5
1,1,2,2 Tetrachloroethane	ND		0.5
Tetrachloroethene	ND		0.5
Toluene	ND		0.5
1,2,3 Trichlorobenzene	ND		0.5
1,2,4 Trichlorobenzene	ND		0.5
1,1,1 Trichloroethane	ND	200	0.5
1,1,2 Trichloroethane	ND		0.5
Trichloroethene	ND	5.0	0.5
Trichlorofluoromethane	ND		0.5
1,2,3 Trichloropropane	ND		0.5
1,2,4 Trimethylbenzene	ND		0.5
1,3,5 Trimethylbenzene	ND		0.5
Vinyl Chloride	ND	2.0	0.5
o-Xylene	ND		0.5
m-Xylene	ND		0.5
p-Xylene	ND		0.5

Matrix: Water
Sample Dilution: None
Internal Standard: Yes 15ppb
Comments:

EPA 524.2

Analyst : Lisa Leclair

★ = Exceeds EPA Proposed MCL Limits
MDL = Minimum Detection Limit
MCL LIMIT = Proposed EPA Maximum contaminant level
ND = Level present is below detection limit
NT = Not Tested

REPORT NO. 39101-05B

AMERICAN ENVIRONMENTAL LABORATORIES, INC.
(508) 534-1444
60 Elm Hill Ave. Leominster, MA 01453
LAB ID #MA076 800-LAB-0094

SAMPLE INFORMATION

Requested By : Dufrense - Henry, Inc.
Address : Precision Park
City : N. Springfield, VT 05150
Sample ID : White Pond - Raw
Matrix : Water
Sample Location (if different): Maynard Water Dept. 195 Main St. Maynard, MA

Date Received : 03/01/91
Date Analyzed : 03/22/91
Collected By : Robert Bentley
ATTN: Bob Bentley

PARAMETER	RESULT	MCL	MDL	UOM	METHOD NO.
2,4-D	ND		4.0	ug/l	EPA# 515.1
2,4,5-TP (Silvex)	ND		1.0	ug/l	EPA# 515.1
2,4,5-T	ND		1.0	ug/l	EPA# 515.1

Comments :Analysis Contracted MA072

Misc

Analyst : Eric Koslowski

★ = Exceeds EPA Proposed MCL Limits
MDL = Minimum Detection Limit
MCL LIMIT = Proposed EPA Maximum contaminant level
ND = Level present is below detection limit
NT = Not Tested

Industrial & Environmental Analysts, Inc.
P.O. Box 626
Essex Junction, Vermont 05453
(802) 878-5138
FAX (802) 878-6765

REPORT: PARTICULATES, GIARDIA AND CRYPTOSPORIDIUM

SAMPLE DATA

Sample No.: 248-065-3
Sample Location: Maynard, MA
Sampling Date: 3/5/91
Date Received: 3/6/91
Water Type: Raw surface
Volume filtered: 93 gal.
Turbidity: 0.48

Filter Color: Brown, slimy
Chlorinated: No
Sediment Volume: 5.5 mL
Volume Floated: 1 mL
Pellet V After Float: 0.4 mL
Filter: CUNO DPPPY 1 μm
pH: 6.90

PARTICULATE ANALYSIS

Numbers reported are per 100 gal. ND = None detected.

Large Amorphous Debris: 2.88×10^5
Fine Amorphous Debris: 1.19×10^7
Vegetative Debris: 9.86×10^3
Diatoms: 2.06×10^6
Algae: 4.69×10^8
Rotifers: 3.25×10^4
Pollen: 1,972

Insects: ND
Insect Parts: ND
Crustaceans: 5.03×10^4
Crustacean Eggs: 4.14×10^4
Nematodes: 3.94×10^3
Nematode Eggs: ND
Other: 1.97×10^3 (Protozoa)

PARTICLE SIZING

Numbers reported are per 100 gal.

5-15 μm: 3.22×10^8
15-100 μm: 1.25×10^7
100-200um: 1.49×10^6
>200um: 4.47×10^5

GIARDIA AND CRYPTOSPORIDIUM

Samples were examined using immunofluorescent dual antibody staining. Sediment equivalent to 2.7 L of water was examined.

No Giardia cysts or Cryptosporidium oocysts were observed in this sample.

ANALYTICAL REPORT

Lab Number:	L1832770
Client:	GeoSyntec Consultants 289 Great Road Suite 105 Acton, MA 01720
ATTN:	Joe Jeray
Phone:	(978) 206-5757
Project Name:	BOYD COATINGS
Project Number:	BR0451
Report Date:	09/12/18

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com

Project Name: BOYD COATINGS
Project Number: BR0451

Lab Number: L1832770
Report Date: 09/12/18

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1832770-01	SW-WHITEPOND-08212018	WATER	HUDSON, MA	08/21/18 08:45	08/21/18
L1832770-02	WHITEPOND-08212018	SOIL	HUDSON, MA	08/21/18 09:15	08/21/18
L1832770-03	FIELD BLANK-08212018	WATER	HUDSON, MA	08/21/18 09:40	08/21/18
L1832770-04	EQUIPMENT BLANK-082118	WATER	HUDSON, MA	08/21/18 09:45	08/21/18

Project Name: BOYD COATINGS
Project Number: BR0451

Lab Number: L1832770
Report Date: 09/12/18

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. All specific QC information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY
For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

Project Name:	BOYD COATINGS	**Lab Number:**	L1832770
Project Number:	BR0451	**Report Date:**	09/12/18

Case Narrative (continued)

Perfluorinated Alkyl Acids by Isotope Dilution

WG1149371: Extracted Internal Standard recoveries were outside the acceptance criteria for individual analytes. Please refer to the surrogate section of the report for details.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Susan E O'Neil Susan O' Neil

Title: Technical Director/Representative Date: 09/12/18

ORGANICS

SEMIVOLATILES

Project Name: BOYD COATINGS
Project Number: BR0451
Lab Number: L1832770
Report Date: 09/12/18

SAMPLE RESULTS

Lab ID: L1832770-01
Client ID: SW-WHITEPOND-08212018
Sample Location: HUDSON, MA

Date Collected: 08/21/18 08:45
Date Received: 08/21/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 122,537(M)
Analytical Date: 09/11/18 23:20
Analyst: AJ

Extraction Method: EPA 537
Extraction Date: 08/29/18 10:30

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	2.67		ng/l	1.80	--	1
Perfluoroheptanoic Acid (PFHpA)	19.3		ng/l	1.80	--	1
Perfluorohexanesulfonic Acid (PFHxS)	12.5		ng/l	1.80	--	1
Perfluorooctanoic Acid (PFOA)	11.7		ng/l	1.80	--	1
Perfluorononanoic Acid (PFNA)	8.78		ng/l	1.80	--	1
Perfluorooctanesulfonic Acid (PFOS)	13.0		ng/l	1.80	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	91		31-159
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	78		30-139
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	96		47-153
Perfluoro[13C8]Octanoic Acid (M8PFOA)	86		36-149
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	87		34-146
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	83		42-146

Project Name: BOYD COATINGS
Project Number: BR0451
Lab Number: L1832770
Report Date: 09/12/18

SAMPLE RESULTS

Lab ID: L1832770-02
Client ID: WHITEPOND-08212018
Sample Location: HUDSON, MA

Date Collected: 08/21/18 09:15
Date Received: 08/21/18
Field Prep: Not Specified

Sample Depth:
Matrix: Soil
Analytical Method: 122,537(M)
Analytical Date: 08/26/18 11:56
Analyst: PB
Percent Solids: 81%

Extraction Method: EPA 537(M)
Extraction Date: 08/22/18 18:10

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/g	1.20	--	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/g	1.20	--	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/g	1.20	--	1
Perfluorooctanoic Acid (PFOA)	ND		ng/g	1.20	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/g	1.20	--	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/g	1.20	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	100		50-150
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	92		50-150
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	109		50-150
Perfluoro[13C8]Octanoic Acid (M8PFOA)	97		50-150
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	100		50-150
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	108		50-150

Project Name: BOYD COATINGS
Project Number: BR0451
Lab Number: L1832770
Report Date: 09/12/18

SAMPLE RESULTS

Lab ID: L1832770-03
Client ID: FIELD BLANK-08212018
Sample Location: HUDSON, MA

Date Collected: 08/21/18 09:40
Date Received: 08/21/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 122,537(M)
Analytical Date: 09/11/18 23:53
Analyst: AJ

Extraction Method: EPA 537
Extraction Date: 08/29/18 10:30

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	1.82	--	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	1.82	--	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	1.82	--	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	1.82	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	1.82	--	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	1.82	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	91		31-159
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	80		30-139
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	94		47-153
Perfluoro[13C8]Octanoic Acid (M8PFOA)	92		36-149
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	93		34-146
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	87		42-146

Project Name: BOYD COATINGS
Project Number: BR0451
Lab Number: L1832770
Report Date: 09/12/18

SAMPLE RESULTS

Lab ID: L1832770-04
Client ID: EQUIPMENT BLANK-082118
Sample Location: HUDSON, MA

Date Collected: 08/21/18 09:45
Date Received: 08/21/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 122,537(M)
Analytical Date: 09/12/18 00:10
Analyst: AJ

Extraction Method: EPA 537
Extraction Date: 08/29/18 10:30

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	1.80	--	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	1.80	--	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	1.80	--	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	1.80	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	1.80	--	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	1.80	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	88		31-159
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	76		30-139
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	94		47-153
Perfluoro[13C8]Octanoic Acid (M8PFOA)	84		36-149
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	89		34-146
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	85		42-146

Project Name: BOYD COATINGS
Project Number: BR0451

Lab Number: L1832770
Report Date: 09/12/18

Method Blank Analysis
Batch Quality Control

Analytical Method: 122,537(M)
Analytical Date: 08/26/18 10:33
Analyst: PB

Extraction Method: EPA 537(M)
Extraction Date: 08/22/18 18:07

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 02 Batch: WG1149371-1					
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/g	0.926	--
Perfluoroheptanoic Acid (PFHpA)	ND		ng/g	0.926	--
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/g	0.926	--
Perfluorooctanoic Acid (PFOA)	ND		ng/g	0.926	--
Perfluorononanoic Acid (PFNA)	ND		ng/g	0.926	--
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/g	0.926	--

Project Name: BOYD COATINGS
Project Number: BR0451

Lab Number: L1832770
Report Date: 09/12/18

Method Blank Analysis
Batch Quality Control

Analytical Method: 122,537(M)
Analytical Date: 08/26/18 10:33
Analyst: PB

Extraction Method: EPA 537(M)
Extraction Date: 08/22/18 18:07

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 02 Batch: WG1149371-1					

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	91		50-150
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	86		50-150
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	96		50-150
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	93		50-150
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	79		50-150
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	88		50-150
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	102		50-150
Perfluoro[13C8]Octanoic Acid (M8PFOA)	96		50-150
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	98		50-150
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	93		50-150
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	95		50-150
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	87		50-150
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	115		50-150
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	68		50-150
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	98		50-150
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	**8**	Q	50-150
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	78		50-150
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	96		50-150
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	96		50-150

Project Name: BOYD COATINGS
Project Number: BR0451

Lab Number: L1832770
Report Date: 09/12/18

Method Blank Analysis
Batch Quality Control

Analytical Method: 122,537(M)
Analytical Date: 08/31/18 17:44
Analyst: AJ

Extraction Method: EPA 537
Extraction Date: 08/29/18 10:30

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 01,03-04 Batch: WG1151711-1					
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	--
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	--
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	--
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	--
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	--
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	--

Project Name: BOYD COATINGS
Project Number: BR0451

Lab Number: L1832770
Report Date: 09/12/18

Method Blank Analysis
Batch Quality Control

Analytical Method: 122,537(M)
Analytical Date: 08/31/18 17:44
Analyst: AJ

Extraction Method: EPA 537
Extraction Date: 08/29/18 10:30

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 01,03-04 Batch: WG1151711-1					

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	91		2-156
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	104		16-173
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	99		31-159
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	146		1-313
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	83		21-145
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	93		30-139
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	101		47-153
Perfluoro[13C8]Octanoic Acid (M8PFOA)	94		36-149
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	145		1-244
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	92		34-146
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	92		42-146
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	79		38-144
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	152		7-170
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	115		1-181
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	84		40-144
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	14		1-87
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	127		23-146
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	90		24-161
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	104		33-143

Lab Control Sample Analysis

Batch Quality Control

Project Name: BOYD COATINGS
Project Number: BR0451

Lab Number: L1832770
Report Date: 09/12/18

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 02 Batch: WG1149371-2 WG1149371-3								
Perfluorobutanesulfonic Acid (PFBS)	106		105		50-150	1		30
Perfluoroheptanoic Acid (PFHpA)	98		99		50-150	1		30
Perfluorohexanesulfonic Acid (PFHxS)	103		111		50-150	7		30
Perfluorooctanoic Acid (PFOA)	105		102		50-150	3		30
Perfluorononanoic Acid (PFNA)	122		112		50-150	9		30
Perfluorooctanesulfonic Acid (PFOS)	97		99		50-150	2		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	85		91		50-150
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	83		88		50-150
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	87		97		50-150
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	89		102		50-150
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	73		81		50-150
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	83		89		50-150
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	97		100		50-150
Perfluoro[13C8]Octanoic Acid (M8PFOA)	87		96		50-150
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	99		117		50-150
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	85		88		50-150
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	90		96		50-150
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	87		87		50-150
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	103		110		50-150
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	77		73		50-150
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	94		102		50-150
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	**21**	Q	**39**	Q	50-150
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	76		78		50-150
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	101		100		50-150
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	89		89		50-150

Lab Control Sample Analysis

Batch Quality Control

Project Name: BOYD COATINGS
Project Number: BR0451

Lab Number: L1832770
Report Date: 09/12/18

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01,03-04 Batch: WG1151711-2 WG1151711-3								
Perfluorobutanesulfonic Acid (PFBS)	100		101		65-157	1		30
Perfluoroheptanoic Acid (PFHpA)	95		95		58-159	0		30
Perfluorohexanesulfonic Acid (PFHxS)	107		100		69-177	7		30
Perfluorooctanoic Acid (PFOA)	102		100		63-159	2		30
Perfluorononanoic Acid (PFNA)	110		116		68-171	5		30
Perfluorooctanesulfonic Acid (PFOS)	90		87		52-151	3		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	88		86		2-156
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	104		99		16-173
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	93		83		31-159
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	139		120		1-313
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	81		77		21-145
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	89		86		30-139
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	95		89		47-153
Perfluoro[13C8]Octanoic Acid (M8PFOA)	89		87		36-149
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	143		129		1-244
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	88		86		34-146
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	89		81		42-146
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	85		83		38-144
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	143		124		7-170
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	118		131		1-181
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	89		88		40-144
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	13		20		1-87
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	134		118		23-146
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	106		101		24-161
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	108		107		33-143

Lab Duplicate Analysis
Batch Quality Control

Project Name: BOYD COATINGS
Project Number: BR0451

Lab Number: L1832770
Report Date: 09/12/18

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 02 QC Batch ID: WG1149371-5 QC Sample: L1832770-02 Client ID: WHITEPOND-08212018						
Perfluoroheptanoic Acid (PFHpA)	ND	ND	ng/g	NC		30
Perfluorohexanesulfonic Acid (PFHxS)	ND	ND	ng/g	NC		30
Perfluorooctanoic Acid (PFOA)	ND	ND	ng/g	NC		30
Perfluorononanoic Acid (PFNA)	ND	ND	ng/g	NC		30
Perfluorooctanesulfonic Acid (PFOS)	ND	ND	ng/g	NC		30

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	92		86		50-150
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	109		94		50-150
Perfluoro[13C8]Octanoic Acid (M8PFOA)	97		92		50-150
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	100		89		50-150
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	108		98		50-150

INORGANICS
&
MISCELLANEOUS

Project Name: BOYD COATINGS
Project Number: BR0451

Lab Number: L1832770
Report Date: 09/12/18

SAMPLE RESULTS

Lab ID: L1832770-02
Client ID: WHITEPOND-08212018
Sample Location: HUDSON, MA

Date Collected: 08/21/18 09:15
Date Received: 08/21/18
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	80.8		%	0.100	NA	1	-	08/22/18 02:56	121,2540G	FN

Lab Duplicate Analysis

Batch Quality Control

Project Name: BOYD COATINGS
Project Number: BR0451

Lab Number: L1832770
Report Date: 09/12/18

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 02 QC Batch ID: WG1149083-1 QC Sample: L1832770-02 Client ID: WHITEPOND-08212018						
Solids, Total	80.8	72.6	%	11		20

Project Name: BOYD COATINGS
Project Number: BR0451

Lab Number: L1832770
Report Date: 09/12/18

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1832770-01A	Plastic 250ml Trizma preserved	A	NA		2.1	Y	Absent		A2-537-ISOTOPE(14)
L1832770-01B	Plastic 250ml Trizma preserved	A	NA		2.1	Y	Absent		A2-537-ISOTOPE(14)
L1832770-01C	Plastic 250ml Trizma preserved	A	NA		2.1	Y	Absent		A2-537-ISOTOPE(14)
L1832770-02A	Plastic 2oz unpreserved for TS	A	NA		2.1	Y	Absent		TS(7)
L1832770-02B	Plastic 8oz unpreserved for Grain Size	A	NA		2.1	Y	Absent		A2-537-ISOTOPE(28)
L1832770-03A	Plastic 250ml Trizma preserved	A	NA		2.1	Y	Absent		A2-537-ISOTOPE(14)
L1832770-04A	Plastic 250ml Trizma preserved	A	NA		2.1	Y	Absent		A2-537-ISOTOPE(14)
L1832770-04B	Plastic 250ml Trizma preserved	A	NA		2.1	Y	Absent		A2-537-ISOTOPE(14)
L1832770-04C	Plastic 250ml Trizma preserved	A	NA		2.1	Y	Absent		A2-537-ISOTOPE(14)

*Values in parentheses indicate holding time in days

Project Name:	BOYD COATINGS	**Lab Number:**	L1832770
Project Number:	BR0451	**Report Date:**	09/12/18

GLOSSARY

Acronyms

EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample¿s toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Footnotes

1	- The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Report Format: Data Usability Report

Project Name:	BOYD COATINGS	**Lab Number:**	L1832770
Project Number:	BR0451	**Report Date:**	09/12/18

Data Qualifiers

A - Spectra identified as "Aldol Condensation Product".

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

J - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

ND - Not detected at the reporting limit (RL) for the sample.

Report Format: Data Usability Report

Project Name:	BOYD COATINGS	**Lab Number:**	L1832770
Project Number:	BR0451	**Report Date:**	09/12/18

REFERENCES

121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

122 Determination of Selected Perfluorintated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS). EPA Method 537, EPA/600/R-08/092. Version 1.1, September 2009.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624: m/p-xylene, o-xylene
EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), Methyl methacrylate, 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
EPA 300: DW: Bromide
EPA 6860: SCM: Perchlorate
EPA 9010: NPW and SCM: Amenable Cyanide Distillation
SM4500: NPW: Amenable Cyanide, Dissolved Oxygen; SCM: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility
SM 2540D: TSS
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500CI-D, SM2320B, SM2540C, SM4500H-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N**, EPA 351.1, SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D.**
EPA 624: Volatile Halocarbons & Aromatics,
EPA 608: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, SM9222D.**

Mansfield Facility:

Drinking Water
EPA 200.7: Al, Ba, Be, Cd, Cr, Cu, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.
EPA 522.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

CHAIN OF CUSTODY

PAGE 1 OF 1

Date Rec'd in Lab: 8/21/18

ALPHA Job #: L1832770

ALPHA ANALYTICAL
8 Walkup Drive, Westboro, MA 01581, Tel: 508-898-9220
320 Forbes Blvd, Mansfield, MA 02048, Tel: 508-822-9300

Client Information

Client: Geosyntec
Address: 289 Great Road ste 202, Acton, MA 01720
Phone: 978-263-9588
Email: jjeray@geosyntec.com

Project Information

Project Name: Boyd Coatings
Project Location: Hudson, MA
Project #: BR0451
Project Manager: Joe Jeray
ALPHA Quote #:

Turn-Around Time

☒ Standard ☐ RUSH (only confirmed if pre-approved!)
Date Due:

Additional Project Information:
Please analyze only for project specific list (6 PFAS compounds)

Report Information - Data Deliverables

☒ ADEx ☒ EMAIL

Billing Information

☐ Same as Client info PO #:

Regulatory Requirements & Project Information Requirements

☐ Yes ☐ No MA MCP Analytical Methods ☐ Yes ☐ No CT RCP Analytical Methods
☐ Yes ☐ No Matrix Spike Required on this SDG? (Required for MCP Inorganics)
☐ Yes ☐ No GW1 Standards (Info Required for Metals & EPH with Targets)
☐ Yes ☐ No NPDES RGP
☐ Other State /Fed Program ____ Criteria ____

ANALYSIS

VOC: ☐ 8260 ☐ 624 ☐ 524.2; SVOC: ☐ ABN ☐ PAH; METALS: ☐ MCP 13 ☐ MCP 14 ☐ RCP 15; METALS: ☐ RCRA5 ☐ RCRA8 ☐ PP13; EPH: ☐ Ranges & Targets ☐ Ranges Only; VPH: ☐ Ranges & Targets ☐ Ranges Only; ☐ PCB ☐ PEST; TPH: ☐ Quant Only ☐ Fingerprint; PFAS EPA 537 mod Le List; Total Solids

SAMPLE INFO
Filtration ☐ Field ☐ Lab to do
Preservation ☐ Lab to do

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler Initials	PFAS EPA 537 mod Le List	Total Solids	Sample Comments	TOTAL # BOTTLES
32770 - 01	SW-WHITEPOND-08212018	8/21/18	0845	SW	LJP	X			3
02	WHITEPOND -08212018	↓	0915	SED	ZSG	X	+		2
03	FIELDBLANK -08212018	↓	0940	W	ZSG	X			1
04	EQUIPMENTBLANK-08212018	↓	0945	W	LJP	X			3

Preservative = trizma

	PFAS EPA 537 mod
Container Type	P
Preservative	O

Relinquished By:	Date/Time	Received By:	Date/Time
[signature]	08/21/18 1130	[signature] AAL	8/21/18 1130
[signature]	8/21/18 1340	[signature] AAL	8/21/18 1340

Container Type: P= Plastic, A= Amber glass, V= Vial, G= Glass, B= Bacteria cup, C= Cube, O= Other, E= Encore, D= BOD Bottle

Preservative: A= None, B= HCl, C= HNO_3, D= H_2SO_4, E= NaOH, F= MeOH, G= $NaHSO_4$, H = $Na_2S_2O_3$, I= Ascorbic Acid, J = NH_4Cl, K= Zn Acetate, O= Other

FORM NO: 01-01 (rev. 12-Mar-2012)

Appendix E USA TAKING DOCUMENTS - ANNOTATED (MAYNARD ORDNANCE DEPOT)

Maynard Ordnance Depot Land Takings (U.S.A.)
dated from November 13, 1942 to April 7, 1943

Taking No. 1 (November 13, 1942) (recorded MSDRD Book 6648, Page 377)

Tract No.	Area (Acres)	Owner	Notes
A-6	16.0	American Woolen Company	subject to existing easements for public roads and highways, for public utilities, for railroads and for pipelines
A-7	64	Edla Paananen	
B-111	29.50	Estate of John Erikson	
B-123	61	Estate of William B. Mullen	
B-126	7.68	American Woolen Company	
B-129	0.6	Estate of Edward F. Kronberg	
C-202	6	American Woolen Company	
C-203	2.81	State of Massachusetts	
C-207	8.6	Heirs of Asahel Balcom	
C-213	13.75	William H. Huntoon	
C-217	8.68	State of Massachusetts	
Total	**218.62**		

Taking No. 2 (November 18, 1942) (recorded MSDRD Book 6648, Page 384)

Tract No.	Area (Acres)	Owner	Notes
A-11	149.9	Mary Anderson	
A-68	32.9	Inhabitants of the Commonwealth of Massachusetts	subject to existing easements for public roads and highways, for public utilities, for railroads and for pipelines
B-109	14.6	Joseph M. O'Neill	
C-204	3.2	Unknown	
D-304	516.24	Commonwealth of Massachusetts	
D-306	5.2	Unknown	
D-314	23.5	Unknown	
Total	**745.54**		

Taking No. 3 (January 4, 1943) (recorded MSDRD Book 6656, Page 573)

Tract No.	Area (Acres)	Owner	Notes
C-220	19	Isaiah L. Pickard	subject to existing easements for public roads and highways, for public utilities, for railroads and for pipelines
Total	**19.00**		

Taking No. 4 (January 29, 1943) (recorded MSDRD Book 6660, Page 254)

Tract No.	Area (Acres)	Owner	Notes
A-12	40	Evelyn E. Lent	subject to existing easements for public roads and highways, for public utilities, for railroads and for pipelines
B-119	146	William H. Parker	
B-124	9	Emma Parker Scott	
B-125	13.5	Emma Parker Scott	
B-128	2	Ralph W. Brown	
C-223	3	George W. Nyman	
Total	**213.50**		

Taking No. 5 (March 4, 1943) (recorded MSDRD Book 6664, Page 208)

Tract No.	Area (Acres)	Owner	Notes
C-231	13.0	Stephen Darian	subject to existing easements for public roads and highways, for public utilities, for railroads and for pipelines
D-300	9.73	Helen M. Raynor	
Total	**22.73**		

Taking No. 6 (March 25, 1943) (recorded MSDRD Book 6669, Page 172)

Tract No.	Area (Acres)	Owner	Notes
D-305	3.2	Mary D. Hosmer	subject to existing easements for public roads and highways, for public utilities, for railroads and for pipelines
D-305A	17.04	Heirs of Asa S. Balcom	
Total	**20.24**		

Taking No.7 (May 6, 1943) (recorded MSDRD Book 6679, Page 315)

Tract No.	Area (Acres)	Owners	Notes
	2955.46	County of Middlesex, Town of Maynard, Town of Stow, Town of Hudson, Town of Sudbury	
Total	**2955.46**	(states 50 Acres in aggregate?)	

Taking (no #) (April 7, 1943) (recorded MSDRD Book 6671, Page 552)

Tract No.	Area (Acres)	Owner	Notes
D-309	48	Town of Maynard	perpetual easement for water intake structure & water line, together with the right to withdraw water from White Pond, so-called, for fire fighting purposes
Total	**48**		{note that this parcel lies south of Hudson Road, west of Concord Road (NKA Bruen Road) and east of White Pond}

Taking No. 1

6648-377

6648

377

in any of the conditions, covenants, agreements and stipulations in said mortgage as so extended, or of any herein contained, the holder of said mortgage shall in addition to all such holder's rights and powers under said mortgage, and in aid thereof, have the Statutory Power of Sale. WITNESS our hands and seals this day of Oct 30 1942 The Boston Five Cents Savings Bank By Harold K. Veazie Asst. Treasurer (Corporate seal) Antonietta Indingaro (seal) Nicola Indingaro (seal) COMMONWEALTH OF MASSACHUSETTS Suffolk ss. Boston, Mass., Oct 30 1942 Then personally appeared the above named Antonietta Indingaro and acknowledged the foregoing instrument to be her free act and deed, before me A.B. Merrill Notary Public (Notarial seal) My Commission expires 3/12/48

Middlesex ss. Nov. 27, 1942. 9h. 34m. A.M. Rec'd & Recorded.

IN THE DISTRICT COURT OF THE UNITED STATES

FOR THE DISTRICT OF MASSACHUSETTS

77

UNITED STATES OF AMERICA et al

DECREE OF CT., JUDGMENT ON THE DECLN. OF TAKING

UNITED STATES OF AMERICA, Petitioner, v. 3100 ACRES OF LAND, MORE OR LESS, SITUATE IN MIDDLESEX COUNTY, COMMONWEALTH OF MASSACHUSETTS, AND THE HEIRS OF HENRY M. WETHERBEE, ET AL., Defendants.	)	MISC. CIVIL NO. 6507

JUDGMENT ON DECLARATION OF TAKING NO. 1
(November 13, 1942.)

SWEENEY, J. This cause coming on for hearing upon motion of Edmund J. Brandon, United States Attorney in and for the District of Massachusetts, and Philip P. A. O'Connell, Special Assistant to the United States Attorney in and for the said District, attorneys for the petitioner herein, to enter a Judgment on Declaration of Taking No. 1 filed herein and upon consideration thereof and of the petition and declaration of taking No.1 filed herein and statutes in such cases made and provided, and it appearing to the satisfaction of the Court: - - - - - - - - - - - - - - - - -

FIRST, that the United States of America is entitled to acquire property by condemnation under judicial process for the purposes as set forth and prayed in said petition; - - - - - - - - - - - - - - - - - - -

SECOND, that declaration of taking No. 1 filed herein contains or has annexed thereto a statement of the authority under which and the public use for which the lands hereinafter described are taken, a description of the said lands taken sufficient for the identification thereof, a statement of the estate or interest taken for the said public use, a plan showing the lands taken, and a statement of the sum of money estimated

by the Secretary of War to be just compensation for the land taken in the sum of $16,710.00, and that said amount has been deposited into the registry of this Court for the use and benefit of the persons entitled thereto; -

THIRD, that said declaration of taking No. 1 filed herein contains a statement that the Secretary of War the head of the acquiring agency, is of the opinion that the ultimate award of just compensation will be within the limits prescribed by Congress as the price to be paid therefor; NOW, THEREFORE, it is ORDERED, ADJUDGED and DECREED that the title to the said lands, including all improvements thereon and appurtenances thereto, in fee simple absolute, subject, however, to existing easements for public roads and highways, for public utilities, for railroads and for pipe lines, vest in the United States of America upon the filing of said declaration of taking No. 1 and the depositing in the registry of this Court of the amount of estimated just compensation, which land is situate in the Towns of Maynard, Stow and Sudbury, County of Middlesex, and Commonwealth of Massachusetts, and more particularly described in Schedule "A" attached hereto and made a part hereof, and defined in map marked Schedule "B" attached to and made a part of Declaration of Taking No. 1 herewith filed. Said land is deemed to be condemned and taken for the United States of America, and the right to just compensation for the property so taken is vested in the persons entitled thereto; and the amount of such just compensation shall be ascertained and awarded in this proceeding and established by judgment herein pursuant to law, and This cause is held open for such further and other orders, judgments, and decrees as may be necessary in the premises. Entered this 13th day of November, 1942, at Boston, Massachusetts. BY THE COURT: Mary G.Traverse Deputy Clerk ENTER: Geo. C. Sweeney, J. 11-13-42 - - - - - - - - -

SCHEDULE "A"

The land which is the subject matter of this Declaration of Taking and of this condemnation aggregates 218.62 acres, more or less, situate and being in the County of Middlesex, State of Massachusetts. A description of the lands taken, together with a list of the purported owners thereof is as follows: -

TRACT NO. A-6

DESCRIPTION: A certain parcel of land situated in the Town of MAYNARD, County of Middlesex, State of Massachusetts, bounded and described as follows: Beginning at a point at land of Paananen, which point is South 8 degrees 00 minutes West, 3800 feet from the intersection of Great and

Taylor Roads; thence running North by land of an Unknown Owner 22 degrees 16 minutes East, 1280.0 feet; thence running North 7 degrees 30 minutes East along land of an Unknown Owner 215.0 feet; thence running North by land of an Unknown Owner 3 degrees 24 minutes East, 80.0 feet; thence running South by land of the American Woolen Company 37 degrees 30 minutes East 715.0 feet; thence running South by land of Simon and Salo, 22 degrees 20 minutes West 1280.0 feet; thence running North by land of Paananen 59 degrees 30 minutes West 466.0 feet, to the point of beginning. Containing 16.0 acres, more or less, on a plan of land drawn by Linwood B. Day, Assistant Engineering Aid, U.S. Engineers, Concord, Massachusetts, dated May 8, 1942. -

Name of Purported Owner: American Woolen Company

Address of Purported Owner: Maynard, Massachusetts

TRACT NO. A-7

DESCRIPTION: A certain parcel of land situated in the Town of MAYNARD, County of Middlesex, State of Massachusetts, being a part of the Puffer farm with the buildings thereon situated on the Northerly side of the road leading to Sudbury in said Maynard, containing 64 acres, more or less, bounded and described as follows: Beginning at the Southeast corner of the premises herein described on the Sudbury Road at a point about 200 feet Westerly of the Puffer house at a wall; thence on said wall and land of John Huikari North 69 degrees East 98 feet, North 45 degrees East 125 feet, North 39 degrees East 110 feet to the end of wall at a farm road; thence along the Southerly side of said farm road North 64 degrees West, 395 feet North 52 degrees West 70 feet, North 37 degrees West 77 feet to the center of a road leading through the farm to Maynard, thence along the center of said road North 25 degrees East, 238 feet, thence by a wall and land of Erich Huikari South 78 degrees East, 293 feet, South 65 degrees East, 400 feet to an angle; thence by said Erich Huikari land North 42¼ degrees East 200 feet, North 33½ degrees East, 526 feet to a dry ditch thence by said ditch South 53 degrees East 133 feet to a stake and stones on the side of a bank near the swamp; thence by land of Balcom, now or formerly, North 23 degrees 10 minutes East 324½ feet to a stake, thence, by land formerly of Levi Smith, North 59 degrees 30 minutes West 466 feet to the aforesaid road to Maynard; thence along said road South 30 degrees 15 minutes West 160 feet, South 21 degrees 30 minutes West 168 feet, to an angle; thence by land now or formerly of Lucy Newton and others North 64 degrees 30 minutes West 376 feet, North 72 degrees 35 minutes West 294 feet to a corner; thence by a wall North

28 degrees 30 minutes East, 400 feet, North 31 degrees 35 minutes East 417 feet, North 44 degrees 50 minutes East 342 feet to a bound stone; thence by the Taylor farm North 43 degrees West 141 feet, North 52 degrees 10 minutes West 75.5 feet to land now or formerly of Josephine Hendrickson; thence South 65 degrees 25 minutes West 190 feet, South 71 degrees West 590 feet to the Puffer Road, so called; thence Northerly by said road 162 feet, thence South 87 degrees West 94 feet, South 73 degrees 30 minutes West 150 feet, to the brook; thence North 47 degrees West 129 feet to land now or formerly of Newton; thence South 35 degrees West, 620 feet, South 67 degrees 30 minutes East, 540 feet more or less, to a brook; thence Southerly by the Brook to a point where the line between the premises herein described and said Newton land comes to the brook. Containing 64 acres, more or less. - - - - - - - - - - - - -

Name of purported Owner: Edla Paananen.

Address of Purported Owner: Maynard, Massachusetts

TRACT NO. B-111

DESCRIPTION: A certain parcel of land situated in the Town of STOW, County of Middlesex, State of Massachusetts, being bounded and described as follows: Beginning at a point on Davis Lane which point is 1310 feet from White Pond Road; thence running Westerly by Davis Lane 740 feet; thence running by land of Parker North 37 degrees West 290 feet; South 80 degrees West 122.1 feet; North 44 degrees 30 minutes West 874.5 feet to a point; thence running by the land of Haynes North 42 degrees 30 minutes East 278.5 feet; thence North 10 degrees West 287.1 feet; South 88 degrees East 97418 feet; thence running by land of Red Acre Farm Inc, South 6 degrees East 410 feet; South 46 degrees East 175 feet; South 76 degrees East 229 feet; thence running by land of Nelson South 4 degrees East 683.8 feet to point of beginning. Containing 29.50 acres, more or less. -

Name of Purported Owner: Estate of John Erikson.

Address of Purported Owner: Great Road,Maynard,Massachusetts

TRACT NO. B-123

DESCRIPTION: A certain piece or parcel of land located in the Town of STOW, County of Middlesex, State of Massachusetts, containing 61.0 acres of land, more or less, and bounded and described as follows: Beginning at a point at the Southwest corner of the premises at the Northwest corner of the land of Priest and at the Southeast corner of the land of Scott, thence by land of Scott North 36 degrees 30 minutes East 1235.0 feet; North 72 degrees 30 minutes West 730.0 feet; thence by land of

Underwood North 19 degrees 00 minutes East 1210.0 feet to the land of the American Woolen Company, thence by land of said American Woolen Company South 68 degrees 30 minutes East 705.0 feet; South 51 degrees 00 minutes East 363.0 feet; North 8 degrees 30 minutes East 260.0 feet to land of Scott; thence by land of said Scott South 82 degrees 00 minutes East 110.0 feet; South 71 degrees 00 minutes East 71.94 feet; South 51 degrees 00 minutes East 132.0 feet; South 37 degrees 30 minutes East 159.0 feet; South 23 degrees 00 minutes East 178.0 feet to land of Haynes; thence by land of said Haynes South 1 degree 00 minutes East 73.9 feet, South 29 degrees 30 minutes East 167.6 feet; South 47 degrees 00 minutes East 218.4 feet; South 59 degrees 00 minutes West 191.4 feet; South 10 degrees 30 minutes East 283.14 feet to land of Parker, thence by land of said Parker South 49 degrees 30 minutes West 130.0 feet to the land of Boeske, thence by land of said Boeske South 69 degrees 30 minutes West 800.0 feet, South 42 degrees 45 minutes West 1150.0 feet to the land of Priest, thence by land of said Priest North 69 degrees 00 minutes West 80.0 feet; South 54 degrees 00 minutes West 33.0 feet, North 49 degrees 00 minutes West 396.0 feet to the place or point of beginning. Containing 61 acres, more or less. - - - - - - - - - - - - - - - - - -

Name of Purported Owner: Estate of William B. Mullen.
Address of Purported Owner: c/o Adams and Blinn, 40 Court St., Boston, Massachusetts

TRACT NO. B-126

DESCRIPTION: A certain piece or parcel of land located in the Town of STOW, County of Middlesex, State of Massachusetts, containing 7.68 acres, more or less, bounded and described as follows: Beginning at a point on the South side of the Boston & Maine Railroad at the property corner of Scott, thence along the land of Scott, and land of Mullen South 8 degrees 30 minutes West 608 feet; thence along the land of Mullen North 51 degrees 00 minutes West 363 feet; North 68 degrees 30 minutes West 705 feet; thence by land of the Fitchburg Railroad Company North 19 degrees 00 minutes East 195 feet to the South side of said Railroad; thence along South side of same Railroad 970 feet more or less to the point or place of beginning. Containing 7.68 acres, more or less, on a plan of land drawn by James Cohn, Assistant Engineering Draftsman, U.S. Engineers, Concord, Massachusetts, dated June 17, 1942. - - - - - - - -

Name of Purported Owner: American Woolen Company
Address of Purported Owner: Maynard, Massachusetts.

TRACT NO. B-129

DESCRIPTION: A certain parcel of land situated in the Towns of MAYNARD

and STOW, in the County of Middlesex, State of Massachusetts. Beginning at the point of intersection of Puffer Road and White Pond Road; thence running Southerly by Puffer Road 500 feet; thence North 41 degrees 07 minutes West 204 feet; thence Northeasterly by White Pond Road 240 feet to the point of beginning, containing .6 of an acre, more or less. - - -

Name of Purported owner: Estate of Edward F. Kronberg

Address of Purported Owner: Unknown.

TRACT NO. C-202

DESCRIPTION: A certain parcel of land situated in the Town of STOW, County of Middlesex, State of Massachusetts, being bounded and described as follows: Beginning at a point on the Northwesterly corner of the premises herein described at a point on White Pond Road, thence running South by land of the State of Massachusetts, 64 degrees 15 minutes East 195.0 feet; thence running South by land of State of Massachusetts,17 degrees 30 minutes East, 625.0 feet; thence running South by land of the State of Massachusetts, 48 degrees 45 minutes West, 256.0 feet,which point is 300.0 feet North from the intersection of Hudson Road and White Pond Road; thence running Northerly on White Pond Road 890.0 feet,more or less; to the point of beginning, containing 6 acres, more or less, on a plan of land drawn by James Cohn, Assistant Engineering Draftsman,U.S. Engineers, Concord, Massachusetts, dated June 1, 1942. - - - - - - - - -

Name of Purported Owner: American Woolen Company.

Address of Purported Owner: Maynard, Massachusetts.

TRACT NO. C-203

DESCRIPTION: All that certain piece or parcel of land located in the Town of SUDBURY, County of Middlesex, State of Massachusetts, containing 2.81 acres, more or less, bounded and described as follows: Beginning at a point on Puffer Pond; thence South 29 degrees 10 minutes East 190.3 feet, more or less, to a point on Concord Road, which point is 3969.0 feet, more or less, from the intersection of said Concord Road and Puffer Road; thence Southwesterly on Concord Road 563 feet; thence by land of Hill North 15 degrees 11 minutes East 365 feet; North 72 degrees 11 minutes East 206 feet, more or less, thence Southeasterly on Puffer Pond 165 feet, more or less, to the point or place of beginning. Containing 2.81 acres, more or less. -

Name of Purported Owner: State of Massachusetts.

Address of Purported Owner: Boston, Massachusetts.

TRACT NO. C-207

DESCRIPTION: A certain parcel of land situated in the Town of MAYNARD,

County of Middlesex, State of Massachusetts, bounded and described as follows: Beginning at a point at land of Anderson and land of Newton, thence running by land of Anderson, North 17 degrees 10 minutes East, 583.0 feet; thence running by land of Anderson, South 69 degrees 00 minutes East, 1043.6 feet; thence running by land of Nyman, South 40 degrees 53 minutes West, 264.7 feet; thence running by land of Newton, North 67 degrees 00 minutes West, 495.0 feet; thence running by land of Newton, South 05 degrees 00 minutes West, 173.25 feet; thence running by land of Newton, North 72 degrees 00 minutes West, 470.0 feet, to the point of beginning. Containing 8.6 acres, more or less, on a plan of land drawn by James Cohn, Assistant Engineering Draftsman, U.S. Engineers, Concord, Massachusetts, dated May 30, 1942. - - - - - - - - - - - - -

Names of Purported Owners: Heirs of Asahel Balcom.

Address of Purported Owners: Unknown.

TRACT NO. C-213

DESCRIPTION: A certain tract of land situated in the Town of SUDBURY, County of Middlesex, State of Massachusetts, being bounded and described as follows: Beginning at a point on the South shore of Willis Pond at land of the Pine Lakes Development; thence running by land of the Pine Lakes Development, South 42 degrees 00 minutes West 210.0 feet; thence running by land of the Pine Lakes Development, North 74 degrees 00 minutes West, 900.0 feet, to land of Barton; thence running by land of Barton, North 26 degrees 00 minutes East, 750.0 feet, to land of Damon; thence running by land of Damon, South 68 degrees 00 minutes East, 700.0 feet, to Willis Pond; thence running Southerly on Willis Pond, 1075.0 feet, to the point of beginning. Containing 13.75 acres, more or less, on a plan of land drawn by James Cohn, Assistant Engineering Draftsman, U.S. Engineers, Concord, Massachusetts, dated May 22, 1942. - - - - - -

Name of Purported Owner: William H. Huntoon.
Address of Purported Owner: 38 Johnson Street, Saxonville Massachusetts

TRACT NO. C-217

DESCRIPTION: All that certain piece or parcel of land located in the Town of SUDBURY, County of Middlesex, State of Massachusetts, containing 8.68 acres, more or less, bounded and described as follows: Beginning at a point at the extreme Northwest corner of the premises herein described at the land of the Larkin Lumber Company and the land of Gately; thence by land of Larkin Lumber Company South 68 degrees 15 minutes East 468 feet to a point on the land now or formerly of Adaliza Puffer; thence by land of said Puffer South 10 degrees 30 minutes East 171.6 feet to the

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land of Hill; thence by land of Hill South 14 degrees 07 minutes East 160.79 feet; South 76 degrees 29 minutes West 368.73 feet; South 16 degrees 18 minutes East 510 feet to a point at Concord Road, which point is 6514 feet, more or less, from the intersection of said Concord Road and Puffer Road; thence Southwesterly on said Concord Road 260 feet; thence by land of Gately North 17 degrees 45 minutes West 547 feet; North 6 degrees 00 minutes East 686.4 feet to the point or place of beginning. Containing 8.68 acres, more or less. - - - - - - - - - - - - - - - - - -

Name of Purported Owner: State of Massachusetts

Address of Purported Owner: Boston, Massachusetts.

A true copy: Attest: James S. Allen Clerk. (Court seal)

Middlesex ss. Nov. 27, 1942. 9h. 51m. A.M. Rec'd & Recorded.

UNITED STATES OF AMERICA et al DECREE OF CT., JUDGMENT ON THE DECLN. OF TAKING

IN THE DISTRICT COURT OF THE UNITED STATES

FOR THE DISTRICT OF MASSACHUSETTS

UNITED STATES OF AMERICA, Petitioner, v. 3100 ACRES OF LAND, MORE OR LESS, SITUATE IN MIDDLESEX COUNTY, COMMONWEALTH OF MASSACHUSETTS, AND THE HEIRS OF HENRY M. WETHERBEE, ET AL., Defendants.	MISC. CIVIL NO. 6507

JUDGMENT ON DECLARATION OF TAKING NO. 2
(November 18, 1942.)

FORD, J. This cause coming on for hearing upon motion of Edmund J. Brandon, United States Attorney in and for the District of Massachusetts, and Philip P. A. O'Connell, Special Assistant to the United States Attorney in and for the said District, attorneys for the petitioner herein, to enter a judgment on Declaration of Taking No. 2 filed herein and upon consideration thereof and of the petition and Declaration of Taking No. 2 filed herein and statutes in such case made and provided, and it appearing to the satisfaction of the Court: - - - - - - - - - - - - - - - - -

FIRST, that the United States of America is entitled to acquire property by condemnation under judicial process for the purposes as set forth and prayed in said petition; -

SECOND, that Declaration of Taking No. 2 filed herein contains or has annexed thereto a statement of the authority under which and the public use for which the lands hereinafter described are taken, a description of the said lands taken sufficient for the identification thereof a statement of the estate or interest taken for the said public use, a plan showing the lands taken, and a statement of the sum of money estimated

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land of Hill; thence by land of Hill South 14 degrees 07 minutes East 160.79 feet; South 76 degrees 29 minutes West 368.73 feet; South 16 degrees 18 minutes East 510 feet to a point at Concord Road, which point is 6514 feet, more or less, from the intersection of said Concord Road and Puffer Road; thence Southwesterly on said Concord Road 260 feet; thence by land of Gately North 17 degrees 45 minutes West 547 feet; North 6 degrees 00 minutes East 686.4 feet to the point or place of beginning. Containing 8.68 acres, more or less. - - - - - - - - - - - - - - - - - - -

Name of Purported Owner: State of Massachusetts

Address of Purported Owner: Boston, Massachusetts.

A true copy: Attest: James S. Allen Clerk. (Court seal)

Middlesex ss. Nov. 27, 1942. 9h. 51m. A.M. Rec'd & Recorded.

IN THE DISTRICT COURT OF THE UNITED STATES

FOR THE DISTRICT OF MASSACHUSETTS

UNITED STATES OF AMERICA et al DECREE OF CT., JUDGMENT ON THE DECLN. OF TAKING

UNITED STATES OF AMERICA, Petitioner, v. 3100 ACRES OF LAND, MORE OR LESS, SITUATE IN MIDDLESEX COUNTY, COMMONWEALTH OF MASSACHUSETTS, AND THE HEIRS OF HENRY M. WETHERBEE, ET AL., Defendants.) MISC. CIVIL NO. 6507

JUDGMENT ON DECLARATION OF TAKING NO. 2
(November 18, 1942.)

FORD, J. This cause coming on for hearing upon motion of Edmund J. Brandon, United States Attorney in and for the District of Massachusetts, and Philip P. A. O'Connell, Special Assistant to the United States Attorney in and for the said District, attorneys for the petitioner herein, to enter a judgment on Declaration of Taking No. 2 filed herein and upon consideration thereof and of the petition and Declaration of Taking No. 2 filed herein and statutes in such case made and provided, and it appearing to the satisfaction of the Court: - - - - - - - - - - - - - - - - - -

FIRST, that the United States of America is entitled to acquire property by condemnation under judicial process for the purposes as set forth and prayed in said petition; -

SECOND, that Declaration of Taking No. 2 filed herein contains or has annexed thereto a statement of the authority under which and the public use for which the lands hereinafter described are taken, a description of the said lands taken sufficient for the identification thereof a statement of the estate or interest taken for the said public use, a plan showing the lands taken, and a statement of the sum of money estimated

by the Secretary of War to be just compensation for the land taken in the sum of $25,616.00, and that said amount has been deposited into the registry of this Court for the use and benefit of the persons entitled thereto; -

THIRD, that said Declaration of Taking No. 2 filed herein contains a statement that the Secretary of War, the head of the acquiring agency, is of the opinion that the ultimate award of just compensation will be within the limits prescribed by Congress as the price to be paid therefor; -

NOW, THEREFORE, it is ORDERED, ADJUDGED and DECREED that the title to the said lands, including all improvements thereon and appurtenances thereto, in fee simple absolute, subject, however, to existing easements for public roads and highways, for public utilities, for railroads and for pipe lines, vest in the United States of America upon the filing of said Declaration of Taking No. 2 and the depositing in the registry of this Court of the amount of estimated just compensation, which land is situate in the Towns of Maynard, Stow and Sudbury, County of Middlesex, and Commonwealth of Massachusetts, and more particularly described in Schedule "A" attached hereto and made a part hereof, and defined in map marked Schedule "B" attached to and made a part of Declaration of Taking No. 2 herewith filed. Said land is deemed to be condemned and taken for the United States of America, and the right to just compensation for the property so taken is vested in the persons entitled thereto; and the amount of such just compensation shall be ascertained and awarded in this proceeding and established by judgment herein pursuant to law, and This cause is held open for such further and other orders, judgments and decrees as may be necessary in the premises. Entered this 18th day of November, 1942, at Boston, Massachusetts. BY THE COURT: Mary G. Traverse Deputy Clerk ENTERED: Nov. 18 '42 F.J.W.F. D,J. - - - - - - - - - - -

SCHEDULE "A"

TRACT NO. A-11

DESCRIPTION: A certain parcel of land situated in Town of MAYNARD, County of Middlesex, Commonwealth of Massachusetts, being bounded and described as follows: Beginning at a point on Puffer Road, which point is two thousand nine hundred eighteen and twenty eight hundredths (2,918.28') feet from the intersection of Puffers Road and Concord Road; thence running along Puffer Road North 57 degrees 19' West four hundred forty and forty seven hundredths (440.47') feet, thence along Puffer Road North 59 degrees 36' West five hundred twenty-two and sixty hundredths (522.60')

feet; thence along Puffer Road at a radius of eight hundred fifty-eight and twenty-three hundredths (858.23') feet three hundred eighty four and thirty three hundredths (384.33') feet; thence north along Puffer Road 85 degrees 15' West seven hundred ninety one and ninety five hundredths (791.95') feet; thence along Puffer Road at a radius of four hundred thirty seven and twenty one hundredths (437.21' feet; two hundred and twenty six (226.0') feet; thence by land of Lent South 15 degrees 30' West nine hundred thirty-six and five tenths (936.5') feet; thence by land of the Commonwealth of Massachusetts South 14 degrees 30' West two hundred twenty and five tenths (220.5') feet; thence by land of Commonwealth of Massachusetts South 10 degrees 00' West three hundred five (305.0') feet; thence by land of Commonwealth of Massachusetts and Lehto South 16 degrees 30' West one thousand nine hundred fourteen feet (1914.0'); thence by land of Larkin Lumber Company north 88 degrees 30' East six hundred seventeen (617.0') feet; thence by land of Balcom North 17 degrees 10' East five hundred eighty three (583.0') feet; thence by land of Balcom and Nyman South 69 degrees 00' East one thousand six hundred forty-eight (1648.0') feet to Puffer pond; thence northerly on Puffer Pond one thousand five hundred sixty (1560.0') feet; thence by land of Huikari North 10 degrees 00' West five hundred sixty three (563.0') feet; thence by land of Huikari North 17 degrees 15' East two hundred nine (209.0') feet; thence by land of Huikari North 48 degrees 30' East seven hundred forty eight (748.0') feet to point of beginning. Containing one hundred forty nine and nine tenths (149.9) acres, more or less, on a plan of land drawn by James Cohn, Assistant Engineer Draftsman and Linwood B. Day, Assistant Engineering Aid, United States Engineers, Boston, Massachusetts, dated July 12, 1942. - - - -

Name of purported owner: Mary Anderson

Address of purported owner: Maynard, Massachusetts

TRACT NO. A-68

DESCRIPTION: A certain body of water, a Great Pond known as Puffer's Pond, Puffer's Lake and Arrowhead Lake, situated in the Townsof MAYNARD and SUDBURY, County of Middlesex, Commonwealth of Massachusetts, being bounded and described as follows: Beginning at a point on the Easterly shore of Puffer's Pond, which point is at a brook at land of Arrowhead Lake Shores and Laurila, thence running along Puffer Pond at land of the Arrowhead Lake Shores, two thousand, one hundred and fifty (2150.0') feet, more or less, to land of the Commonwealth of Massachusetts; thence along Puffer Pond by land of the Commonwealth of Massachusetts, one hun-

dred and sixty-five (165.0') feet, more or less, to land of Hill; thence along Puffer Pond by land of Hill, one hundred and forty (140.0') feet, more or less, to land of Nyman; thence along Puffer Pond by land of Nyman, one hundred and sixty-three (163.0') feet, more or less, to land of Anderson; thence along Puffer Pond by land of Anderson, one thousand, five hundred and sixty (1560.0') feet, more or less, to land of Huikari; thence along Puffer Pond by land of Huikari, five hundred and fifty (550.0') feet, more or less, to a brook at land of Laurila; thence along Puffer Pond by land of Laurila, five hundred and thirty (530.0') feet, more or less, the brook at the point of beginning. Containing thirty-two and nine-tenths (32.9) acres, more or less, on a plan of land drawn by James Cohn, Assistant Engineering Draftsman, U. S. Engineers, Concord, Massachusetts, dated June 20, 1942. -

Name of purported owner: Inhabitants of the Commonwealth of Massachusetts.

Address of purported owner;

TRACT NO. B-109

DESCRIPTION: A certain parcel of land situated in the Town of STOW, County of Middlesex, Commonwealth of Massachusetts, bounded and described as follows: Beginning at a point at the Southeasterly corner of the granted premises on Town Road which point is North 357.5' from the intersection of White Pond Road and Town Road; thence running by land of the Red Acre Farm Incorporated South 85 degrees West 541.2'; thence by land of Red Acre Farm Incorporated South 83⅓ degrees West 110.9'; thence by land of Red Acre Farm Incorporated North 62 degrees West 375.0'; thence by land of Red Acre Farm Incorporated South 63 degrees West 290.0'; thence by land of Red Acre Farm Incorporated North 13 degrees West 500.0' to land of Parker; thence by land of Parker North 83 degrees East, 60.0'; thence by land of Parker South 7 degrees East 40.0'; thence by land of Parker North 83 degrees East 75.0'; thence by land of Parker South 7 degrees East 70.0'; thence by land of Parker North 80 degrees East 260.0'; thence by land of Parker North 86 degrees East 501.6'; thence by land of Parker North 75 degrees East 44.9'; thence by land of Parker South 83 degrees 30' East 260.7' to Town Road; thence southerly by Town Road 620' to point of beginning. Being the same premises however otherwise bounded and described and conveyed to me by deed of Margaret T. Cronin, dated January 11, 1935, and recorded with Middlesex South District Deeds, Book 5912, Page 386. Containing fourteen and six tenths (14.6) acres, more or less, on a plan of land drawn by Linwood B. Day, Assistant Engineering Aid, U. S. Engineers, Concord, Massachusetts, dated May

14, 1942. -

Name of purported owner; Joseph M. O'Neill

Address of purported owner: Sudbury, Massachusetts

TRACT NO. C-204

DESCRIPTION: A certain parcel of land situated in the Town of STOW, County of Middlesex, Commonwealth of Massachusetts, being bounded and described as follows: Beginning at a point at the Southeasterly corner of the granted premises at land of Pickard, thence running by land of Pickard, North 26 degrees 30' East, four hundred (400.0') feet; thence running by land of the Commonwealth of Massachusetts North 82 degrees 00' West, four hundred and twenty-nine (429.0') feet; thence running by land of the Commonwealth of Massachusetts, South 1 degree 00' West, four hundred and fifty-two and one-tenth (452.1') feet; thence running by land of the Commonwealth of Massachusetts, North 86 degrees 00' East, two hundred fifty-two and five-tenths (252.5') feet, to the point of beginning Containing three and two-tenths (3.2) acres more or less, on a plan of land drawn by James Cohn, Assistant Engineering Draftsman, U.S. Engineers, Concord, Massachusetts, dated June 4, 1942. - - - - - - - -

Name of purported owner: Unknown

Address of purported owner: Unknown

TRACT NO. D-304

DESCRIPTION: A certain parcel of land situated in the Towns of SUDBURY, STOW, MAYNARD and HUDSON, Middlesex County, State of Massachusetts, bounded and described as follows: Beginning at a point on the Northerly side of the Boston & Maine R.R. which point is the intersection point of the Hudson and Marlboro and Sudbury town lines; thence running North 25 degrees 30' East fourteen hundred and ten (1410') feet by land of one Hosmer; thence still by land of Hosmer South 86 degrees 30' West three hundred and ninety-six (396') feet; South 46 degrees 15' West six hundred and sixty (660') feet; North 61 degrees 00' West two hundred and nineteen and five tenths (219.5') feet; North 65 degrees 00' West one hundred and twenty-seven and five tenths (127.5') feet; South 43 degrees 00' West five hundred and six and five tenths (506.5') feet to a point on the Northerly side of Boston & Maine R.R.; thence running on Northerly side of Boston & Maine R.R. fourteen hundred and forty (1440') feet to a point at Concord Road; thence by Concord Road three thousand, one hundred and thirty, more or less (3130') feet, more or less, to land now or formerly of Kirby; thence South 78 degrees 00' East six hundred and sixty (660') feet by land of Kirby; thence North 14 degrees 30' West

seven hundred and forty-two and five tenths (742.5') feet to a point on Easterly side of Concord Road; thence by said Concord Road nine hundred, more or less, (900') feet to a point near the intersection of Concord Road and Hudson Road; thence crossing said intersection to the Northerly side of Hudson Road to a point; thence Westerly on Northerly side of said road seven hundred, more or less, (700') feet to a point on other land of Commonwealth of Massachusetts; thence by said Commonwealth of Massachusetts land North 37 degrees 00' East four hundred and twenty (420') feet; North 25 degrees 30' West one hundred and thirty-eight and eighteen hundredths (138.18') feet; North 76 degrees 30' West three hundred and sixty (360) feet; North 66 degrees 16' West four hundred and thirty-five (435') feet; South 36 degrees 00' West two hundred and thirty-six (236') feet; North 66 degrees 16' West seven hundred and forty (740') feet to a point on Easterly side of White Pond Road; thence along said White Pond Road twenty-six (26') feet to land of American Woolen Company; thence by said land North 48 degrees 45 East two hundred and fifty-six (256') feet; North 26 degrees 30' West five hundred and ninety-three and four tenths (593.4'); North 64 degrees 15' West one hundred and ninety-five (195') feet to a point on White Pond Road; thence along Easterly side of White Pond Road seven hundred and fifty-nine (759') feet to a point on said road at land of Whitney; thence by Whitney land South 73 degrees 00' East four hundred and forty (440') feet; North 45 degrees 00' East two hundred and ninety-seven (297') feet to land of Mason; thence by land of said Mason and by land of one Johnson South 71 degrees 30' East eight hundred and thirty and eight tenths (830.8') feet; thence by land of Johnson North 24 degrees 45' East two hundred and twenty-three (223') feet; South 85 degrees 00' East one hundred and four (104') feet; North 15 degrees 00' East five hundred and sixty-six (566') feet to a point at land of Ford; thence by land of Ford North 21 degrees 00' East two hundred and sixty-three (263') feet; North 29 degrees 00' East fifty-six and five tenths (56.5') feet to a point at land of Wright; thence by said Wright land South 84 degrees 30' East six hundred and eighty-eight and three tenths (688.3') feet; North 20 degrees 15' East six hundred and three (603') feet to a point at land of Sippo; thence by land of said Sippo North 83 degrees 30' East four hundred and sixty-six and sixty-two hundredths (466.62') feet; North 22 degrees 00' East eleven hundred and eighty-two (1182') feet to a point at land of Lent; thence on land of Lent North 19 degrees 30' East four hundred and sixty-three and three tenths (463.3') feet; North 67 degrees 20' East seventy-nine and two

tenths (79.2') feet; South 64 degrees 14' East seven hundred and forty-seven and one tenth (747.1') feet to a point at land of Anderson; thence by land of said Anderson South 14 degrees 30' West two hundred and twenty and five tenths (220.5') feet; South 10 degrees 00' West three hundred and five (305') feet; South 16 degrees 30' West fifteen hundred and ninety four (1594') feet to land of Lehto; thence by Lehto land North 65 degrees 00' West four hundred and eighty-nine (489') feet to a point at land of one Fletcher; thence by land of Fletcher South 41 degrees 00' West three hundred and thirty (330') feet; thence South 15 degrees 30' West seven hundred and seventy-four and five tenths (774.5') feet; South 19 degrees 15' West four hundred and ninety-five (495') feet to a point at land of Pickard and owner, or owners, unknown; thence by said unknown North 82 degrees 00' West four hundred and twenty-nine (429') feet; south 1 degree 00' West four hundred and fifty-two and one tenth (452.1') feet; North 86 degrees 00' East two hundred and fifty-two and five tenths (252.5') feet to a point on land of one Pickard; thence by land of Pickard South 22 degrees 00' West five hundred and seventy (570') feet; South 11 degrees 30' East seven hundred and twelve and eight tenths (712.8') feet to a point on Hudson Road; thence along said road one hundred and fifty (150') feet Southwesterly to a point; thence crossing said road South 13 degrees 00' East one hundred and fifty-six and seven tenths, more or less (156.7) feet, more or less, by land of Cutting; thence by land of Cutting and Goodnow South 25 degrees 30' West sixteen hundred and sixty-seven and five tenths (1667.5') feet to intersection of town lines of Hudson, Sudbury and Stowe; thence still by land of Goodnow, Raynor, and other land of Goodnow South 62 degrees 00' East nineteen hundred and eleven (1911') feet to a point at land now or formerly belonging to S. D. Perry; thence by land of said Perry South 7 degrees 45' West fifteen hundred and thirty (1530') feet to a point on land belonging to Brookings; thence by land of Brookings South 89 degrees 30' West one hundred and fifteen and five tenths (115.5') feet; South 43 degrees 00' West five hundred and fifty (550') feet; South 24 degrees 00' East sixteen hundred and eighty-five (1685') feet to a point on land of Ford; thence by land of said Ford, and land of Pratt and Barton, North 62 degrees 00' West eighteen hundred and twenty (1820') feet; thence by land of Pratt and Barton South 28 degrees 00' West two hundred and eighty (280') feet to a point on land of Ford; thence by land of Ford South 31 degrees 00' West three hundred and seventy (370') feet to a point on the Northerly side of Boston & Maine R.R.; thence running North-

westerly on Northerly side of said Boston & Maine R.R. seventeen hundred and twenty (1720') feet to the place or point of beginning. Said premises containing 516.24 acres, more or less, according to a plan drawn by James Cohn, Assistant Engineering Draftsman, U. S. Engineers, dated June 16, 1942. -

Name of purported owner; Commonwealth of Massachusetts

Address of purported owner: Boston, Massachusetts

TRACT NO. D-306

DESCRIPTION: A certain parcel of land situated in the Towns of STOW and HUDSON, County of Middlesex, Commonwealth of Massachusetts, being bounded and described as follows: Beginning at a point at the Northeasterly corner of the granted premises which point is on Concord Road, at land of the Commonwealth of Massachusetts, in the Town of Stow, Massachusetts; thence running by land of the Commonwealth of Massachusetts, South 14 degrees 30' East, seven hundred forty-two and five-tenths (742.5') feet to a point just South of the Stow and Hudson Town Line; thence running by land of the Commonwealth of Massachusetts, in the Town of Hudson, North 78 degrees 00' West, six hundred and sixty (660.0') feet, to Concord Road; thence running Northeasterly on Concord Road, crossing the Stow and Hudson Town line, and running along Concord Road to the point of beginning, seven hundred and forty (740.0') feet. Containing five and two-tenths (5.2) acres, more or less, on a plan of land drawn by James Cohn, Assistant Engineering Draftsman, U. S. Engineers, Concord, Massachusetts, dated June 3, 1942. -

Name of purported owner: Unknown

Address of purported owner: Unknown

TRACT NO. D-314

DESCRIPTION: A certain parcel of land situated in the Town of SUDBURY, County of Middlesex, Commonwealth of Massachusetts, bounded and described as follows: Beginning at a point at the Northwesterly corner of the granted premises of land of Raynor and the Commonwealth of Massachusetts, thence running by land of Raynor, South 62 degrees 00' East, one hundred twenty-two and eighty-five (122.85') feet; thence running by land of Raynor, South 69 degrees 00' East, one hundred sixty one and fifteen-hundredths (161.15') feet; thence running by land of Raynor, North 27 degrees 00' East, two hundred sixty-seven and eighty-one hundredths (267.81') feet; thence running by land of Goodnow, South 62 degrees 40' East, five hundred and ten (510.0') feet; thence running by land of Brookings, South 27 degrees 00' West, six hundred and fifty (650.0') feet; thence running

by land of Brookings, South 9 degrees 00' West, eight hundred (800.0') feet; thence running by land of Brookings and crossing Fire line clearing and running on the Northerly side thereof, South 89 degrees 30' West six hundred and thirty (630.0') feet; thence running by land of the Commonwealth of Massachusetts, North 7 degrees 45' East, one thousand, five hundred and thirty (1530.0') feet, to the point of beginning. Containing 23.5 (twenty-three and five-tenths) acres, more or less, on a plan of land drawn by James Cohn, Assistant Engineering Draftsman, U.S. Engineers, Concord, Massachusetts, dated June 2, 1942. - - - - - - - - - -

Name of purported owner: Unknown

Address of purported owner: Unknown

A true copy: Attest: James S. Allen Clerk (Court seal)

Middlesex ss. Nov. 27, 1942. 9h. 51m. A.M. Rec'd & Recorded.

One word interlined.

LEXINGTON CO-OP. BK.

DISC.MORT.

Lexington Co-operative Bank of Lexington, Massachusetts, holder of a mortgage from Alice M. Ross et al to Lexington Co-operative Bank dated May 12, 1938 recorded with Middlesex South District Registry of Deeds Book 6207 Page 454 acknowledges satisfaction of the same IN WITNESS WHEREOF, the said Lexington Co-operative Bank has caused its corporate seal to be hereto affixed and these presents to be signed, acknowledged, and delivered in its name and behalf by W. E. Mulliken its Treasurer this seventeenth day of November A.D. 1942 Lexington Co-operative Bank By W. E. Mulliken Treasurer (Corporate seal) Signed and sealed in presence of. THE COMMONWEALTH OF MASSACHUSETTS Suffolk, ss Boston, November 17, 1942 Then personally appeared the above named W.E. Mulliken and acknowledged the foregoing instrument to be the free act and deed of the Lexington Co-operative Bank, before me Vivian C.Sanford Notary Public My commission expires Nov. 9, 1945. - - - - - - - - - -

Middlesex ss. Nov. 27, 1942. 9h.54m. A.M. Rec'd & Recorded.

ROSS et al to LEXINGTON CO-OP.BK.

We, Albert A. Ross and Alice M. Ross, his wife, in her right, both of Lexington, Middlesex County, Massachusetts, for consideration paid, grant to the Lexington Co-operative Bank situated in Lexington, Middlesex County, Massachusetts, with MORTGAGE COVENANTS to secure the payment of Fifty-eight Hundred and 00/100 ($5800.00) Dollars in Sixteen (16) years from this date, with interest thereon at the rate of Six (6%) per cent per annum, payable in monthly installments of $47.07 on the first day of each month hereafter, which payments shall first be applied to interest then due and the balance thereof remaining applied to princi-

Taking No. 3 6656-573

6656

573

amount of the principal sum now secured thereby, namely, Two thousand (2000) Dollars is, upon the following terms and conditions, hereby extended to December 6, 1945 That the rate of interest from December 6, 1942 shall be five and one-half (5½) per centum per annum, payable on the sixth day(s) of March, June, September and December in each year during said term and until said mortgage is fully paid. That all the holder's rights under said mortgage excepting as herein expressly changed, shall continue during the term hereof. The owner or owners and other subscriber or subscribers if any, hereto, other than the holder of said mortgage, jointly and severally if more than one, agree to perform and observe the conditions, covenants, agreements and stipulations of said mortgage as so extended and to pay the principal and interest secured thereby when due hereunder, and that for any breach of or default in any of the conditions, covenants, agreements and stipulations in said mortgage as so extended, or of any herein contained, the holder of said mortgage shall in addition to all such holder's rights and powers under said mortgage, and in aid thereof, have the Statutory Power of Sale. WITNESS our hands and seals this 6th day of Jan 1943 The Boston Five Cents Savings Bank By George A. Kyle Treasurer (Corporate seal) Elizabeth M.Cousins (seal) Percy H. Cousins (seal) COMMONWEALTH OF MASSACHUSETTS Suffolk ss. Boston, Mass., Jan 6th 1943 Then personally appeared the above named Elizabeth M. Cousins and acknowledged the foregoing instrument to be her free act and deed, before me James H. Simpson Notary Public My Commission expires Feb 21-1947 -

Middlesex ss. Jan. 14, 1943. 9h. 21m. A.M. Rec'd & Recorded.

IN THE DISTRICT COURT OF THE UNITED STATES
FOR THE DISTRICT OF MASSACHUSETTS

UNITED STATES OF AMERICA,
Petitioner,
v.
3100 ACRES OF LAND, MORE OR LESS, SITUATE IN MIDDLESEX COUNTY. COMMONWEALTH OF MASSACHUSETTS, AND THE HEIRS OF HENRY M. WETHERBEE, ET AL.,
Defendants.

MISC. CIVIL NO. 6507

DECLARATION OF TAKING NO. 3

UNITED STATES OF AMERICA et al

DECREE OF CT, JUDGMENT ON THE DECLN. OF TAKING

JUDGMENT ON DECLARATION OF TAKING NO. 3
(January 4, 1943.)

Sweeney, J. This cause coming on for hearing upon motion of Edmund J. Brandon, United States Attorney in and for the District of Massachusetts, and Philip P. A. O'Connell, Special Assistant to the United States Attorney in and for the said District, attorneys for the petitioner herein, to enter a judgment on Declaration of Taking No. 3 filed herein and upon

consideration thereof and of the petition and Declaration of Taking No. 3 filed herein and statutes in such case made and provided, and it appearing to the satisfaction of the Court: FIRST, that the United States of America is entitled to acquire property by condemnation under judicial process for the purposes as set forth and prayed in said petition; SECOND, that Declaration of Taking No. 3 filed herein contains or has annexed thereto a statement of the authority under which and the public use for which the lands hereinafter described are taken, a description of the said lands taken sufficient for the identification thereof a statement of the estate or interest taken for the said public use, a plan showing the lands taken, and a statement of the sum of money estimated by the Secretary of War to be just compensation for the land taken in the sum of $350.00, and that said amount has been deposited into the registry of this Court for the use and benefit of the persons entitled thereto; THIRD, that said Declaration of Taking No. 3 filed herein contains a statement that the Secretary of War, the head of the acquiring agency, is of the opinion that the ultimate award of just compensation will be within the limits prescribed by Congress as the price to be paid therefor; NOW, THEREFORE, it is ORDERED, ADJUDGED and DECREED that the title to the said lands, including all improvements thereon and appurtenances thereto, in fee simple absolute, subject, however, to existing easements for public roads and highways, for public utilities, for railroads and for pipe lines, vest in the United States of America upon the filing of said Declaration of Taking No. 3 and the depositing in the registry of this Court of the amount of estimated just compensation, which land is situate in the Towns of Sudbury and Stow, County of Middlesex, and Commonwealth of Massachusetts, and more particularly described in Schedule "A" attached hereto and made a part hereof, and defined in map marked Schedule "B" attached to and made a part of Declaration of Taking No. 3 herewith filed. Said land is deemed to be condemned and taken for the United States of America, and the right to just compensation for the property so taken is vested in the persons entitled thereto; and the amount of such just compensation shall be ascertained and awarded in this proceeding and established by judgment herein pursuant to law, and This cause is held open for such further and other orders, judgments and decrees as may be necessary in the premises. Entered this fourth day of January, 1943, at Boston, Massachusetts. By the Court: Mary G. Traverse Deputy Clerk Entered: Geo. C. Sweeney, J. 1-4-43 - - - - - - - - - - -

SCHEDULE "A" The land which is the subject matter of this Declaration

of Taking, aggregates 19 acres, more or less, situate and being in the County of Middlesex State of Massachusetts. A description of the lands taken, together with a list of the purported owners thereof, is as follows: Tract No. C-220

Description: A certain tract of land situated in the Town of SUDBURY and the Town of STOW, County of Middlesex, Commonwealth of Massachusetts, bounded and described as follows: Beginning at a point on Concord Road at land of Gately; thence running North 15 degrees, 30 minutes, West, seven hundred nineteen and four-tenths (719.4) feet; thence by land of Lehto, North 85 degrees, no minutes West, four hundred one and five tenths (401.5) feet; thence running North by land of Fletcher 82 degrees, no minutes, West, two hundred fourteen and five-tenths (214.5) feet; thence running South by land of an Unknown owner 26 degrees, 30 minutes West, four hundred (400.0) feet; thence running South by land of the Commonwealth of Massachusetts 22 degrees, no minutes West, five hundred and seventy feet; thence running South by land of the Commonwealth of Massachusetts, 11 degrees, 30 minutes East, seven hundred twelve and eight-tenths (712.8) feet; thence running Northeasterly on Concord Road, one thousand three hundred two and eighteen hundredths (1302.18) feet, to the point of beginning. Containing nineteen (19) acres, more or less.

Name of Owner
Address of purported owner — Isaiah L. Pickard
6 Highland Street
West Concord, Massachusetts

A true copy: Attest: James S. Allen Clerk. (Court seal) - - - - - - -

Middlesex ss. Jan. 14, 1943. 9h. 30m. A.M. Rec'd & Recorded.

One word over erasure.

United States Rubber Company, a corporation organized and existing under the laws of the State of New Jersey, having a place of business in Rockefeller Center, at No. 1230 Sixth Avenue, New York, N. Y., for consideration paid, hereby grants to Lawrence E. Hurley of the City of Medford, in the County of Middlesex and Commonwealth of Massachusetts with QUIT-CLAIM COVENANTS the parcels of land situated in the City of MELROSE, County of Middlesex, Commonwealth of Massachusetts, more particularly described as follows: PARCEL 1 Beginning at a stake in the southeasterly line of Brazil Street 390.18 feet southwesterly from a spike at the intersection of the southeasterly line of Brazil Street and the westerly line of Washington Street; thence continuing southwesterly along Brazil Street 60.06 feet to a spike; thence southeasterly at right angles to Brazil Street 100 feet to a stake; thence northeasterly at right angles to the last course 60.06 to a stake; thence northwesterly

UNITED STATES RUBBER CO.

to

HURLEY

* * * * * *
* U.S. *
* Rev. *
* Stamps *
* $3.30 *
* J.F.D. *
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* *
* * * * * *

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feet from the southwesterly line of Washington Street, thence, southwesterly (25.0) feet to a corner; thence, northwesterly along southwesterly line of Fiske Place (30.0) feet; thence, southwesterly (2,33) feet to a corner; thence, northerly (6.55) feet to a corner; thence southwesterly by land now or formerly Higgins (73.5) feet to a corner; thence, southeasterly by land now or formerly Italian American Citizen's Club Inc. (59.57) feet to a corner; thence northerly by land now or formerly Breedy (50.0) feet to a corner; thence, southerly by land now or formerly Breedy, (21.3) feet to a corner; thence, northeasterly by land now or formerly Mazmanian (65.07) feet to a corner; thence, northwesterly by land now or formerly Metropoulis (47.31) feet to the point of beginning. Containing (6453) square feet. The above parcel of land is shown upon a plan entitled "Plan of Land in Cambridge, Mass. belonging to Rose Nissenbaum, dated November 19, 1942, drawn by Donald J. Reardon, Surveyor." Rose Nissenbaum.

Middlesex ss. Feb. 8, 1943. 8h. 47m. A.M. Rec'd & Recorded.

See Book 6694 Page 453

UNITED STATES OF AMERICA et al

DECREE OF CT., JUDGMENT ON THE DECLN. OF TAKING

IN THE DISTRICT COURT OF THE UNITED STATES
FOR THE DISTRICT OF MASSACHUSETTS

UNITED STATES OF AMERICA,
Petitioner,
v.
3100 ACRES OF LAND, MORE OR LESS, SITUATE IN MIDDLESEX COUNTY, COMMONWEALTH OF MASSACHUSETTS, AND THE HEIRS OF HENRY M. WETHERBEE, ET AL.,
Defendants.

MISC. CIVIL NO. 6507
DECLARATION OF TAKING NO. 4

JUDGMENT ON DECLARATION OF TAKING NO. 4
(January 29, 1943.)

SWEENEY, J.

This cause coming on for hearing upon motion of Edmund J. Brandon, United States Attorney in and for the District of Massachusetts, and Philip P. A. O'Connell, Special Assistant to the United States Attorney in and for the said District, attorneys for the petitioner herein, to enter a judgment on Declaration of Taking No. 4 filed herein and upon consideration thereof and of the petition and Declaration of Taking No. 4 filed herein and statutes in such case made and provided, and it appearing to the satisfaction of the Court:

FIRST, that the United States of America is entitled to acquire property by condemnation under judicial process for the purposes as set forth and prayed in said petition;

SECOND, that Declaration of Taking No. 4 filed herein contains or has annexed thereto a statement of the authority under which and the public use for which the lands hereinafter described are taken, a description

of the said lands taken sufficient for the identification thereof a statement of the estate or interest taken for the said public use, a plan showing the lands taken, and a statement of the sum of money estimated by the Secretary of War to be just compensation for the land taken in the sum of $10,065.00, and that said amount has been deposited into the registry of this Court for the use and benefit of the persons entitled thereto; -

THIRD, that said Declaration of Taking No. 4 filed herein contains a statement that the Secretary of War, the head of the acquiring agency, is of the opinion that the ultimate award of just compensation will be within the limits prescribed by Congress as the price to be paid therefor; NOW, THEREFORE, it is ORDERED, ADJUDGED and DECREED that the title to the said lands, including all improvements thereon and appurtenances thereto, in fee simple absolute, subject, however, to existing easements for public roads and highways, for public utilities, for railroads and for pipe lines, vest in the United States of America upon the filing of said Declaration of Taking No. 4 and the depositing in the registry of this Court of the amount of estimated just compensation, which land is situate in the Towns of MAYNARD, SUDBURY and STOW, County of Middlesex, and Commonwealth of Massachusetts, and more particularly described in Schedule "A" attached hereto and made a part hereof, and defined in map marked Schedule "B" attached to and made a part of Declaration of Taking No. 4 herewith filed. Said land is deemed to be condemned and taken for the United States of America, and the right to just compensation for the property so taken is vested in the persons entitled thereto; and the amount of such just compensation shall be ascertained and awarded in this proceeding and established by judgment herein pursuant to law, and This cause is held open for such further and other orders, judgments and decrees as may be necessary in the premises. Entered this 29th day of January, 1943, at Boston, Massachusetts. - - - - - - - - - - - - - - - -

BY THE COURT:
Mary G. Traverse
Deputy Clerk

ENTERED:
Geo. C. Sweeney, J.
1-29-43

SCHEDULE "A"

The land which is the subject matter of this Declaration of Taking, aggregates 213.5 acres, more or less, situated and being in the County of Middlesex, State of Massachusetts. A description of the lands taken, together with a list of the purported owners thereof, is as follows: - -

Tract No. A-12 Description: A certain parcel of land situated in the

Town of Maynard, County of Middlesex, Commonwealth of Massachusetts, bounded and described as follows: Beginning at a point in the extreme Southeasterly corner of the within-described premises, on the Northerly side of Puffer Road, which point is the extreme Southwesterly corner of the land of one Paananen; thence running North 59 degrees, 36 minutes West along the Northerly line of said Puffer Road, 632.67 feet; thence continuing in a Northwesterly direction along said Northerly side of Puffer Road, on a curve with a radius of 239.56 feet, 107.28 feet; thence North 85 degrees 15 minutes West, 250.05 feet to land of C. B. Lent; thence turning and running North 06 degrees, 45 minutes East, 561 feet; thence turning and running North 54 degrees, 30 minutes West, 931.0 feet, to land of Sarvella; thence North 63 degrees, 00 minutes West, along the Sarvella land, 325 feet; thence South 12 degrees, no minutes West, on land of Sarvella, 30 feet; thence North 71 degrees, 00 minutes West, along Sarvella land, 75 feet; thence turning and running North 12 degrees, no minutes East, along land of Sarvella and Gately, 626.3 feet; thence turning and running South 69 degrees, 30 minutes East, on Gately land, 246.1 feet; thence turning and running North 51 degrees, 30 minutes East, along said Gately land 557.94 feet; thence North 62 degrees, 30 minutes East, 443 feet; thence turning and running Southeasterly by a brook, 590 feet; thence running by land of Paananen, South 35 degrees, no minutes West, 620 feet; thence running South 67 degrees, 30 minutes East, 608 feet; thence running Southerly by the said brook, 1343 feet; thence running by land of said Paananen, South 14 degrees, 15 minutes West, 413 feet, to the point of beginning. Containing 40 acres, more or less.

Name of purported owner — Evelyn E. Lent
Address of purported owner — 10 Fowler Street, Maynard, Massachusetts

Tract No. B-119 Description: A certain parcel of land located in the Town of Stow, County of Middlesex, Commonwealth of Massachusetts, being more particularly bounded and described as follows: Beginning at a point on Sudbury Road, which point is at the Southeasterly corner of the granted premises and the Southwesterly corner of land of Ford; thence running Northwesterly along Sudbury Road, 1000 feet to land of Lambert; thence the following five (5) courses by land of Lambert; North 12 degrees, 30 minutes East, 291.8 feet North 89 degrees East, 45.75' North 6 degrees East, 676.5' North 88 degrees West, 539.2' South 6 degrees West, 400.83' to Sudbury Road; thence Northwesterly along Sudbury Road, 500 feet to land of Priest; thence the following four (4) courses along land of said Priest: North 50 degrees, East, 594.0 feet North 41 degrees, 30 minutes,

West, 561.0 feet North 42 degrees, 30 minutes, East, 99.0 feet North 69 degrees, West, 400.16 feet to a point at land of Boeske thence along the land of Boeske, North 66 degrees, 09 minutes East, 1650.0 feet to land of Ralph Brown; thence South 56 degrees, East 196.2 feet along land of Ralph Brown to a point; thence turning and running North 67 degrees, 30 minutes East 580.0 feet by land of said Brown and land of R. & E. Brown to a point; thence turning and running North 56 degrees, West 350 feet along land of R. & E. Brown, to a point; thence turning and running South 67 degrees, 30 minutes West, 159.25 feet by land of R. & E. Brown to a point at land of Boeske; thence the following three courses by land of Boeske: North 36 degrees, West 24.0 feet North 59 degrees, West 258.7 feet North 48 degrees, West 160.9 feet to a point at land of Mullen thence along land of Mullen North 49 degrees, 30 minutes East, 130.0 feet to land of Haynes; thence along land of Haynes South 65 degrees, East 491.7 feet and North 56 degrees, East, 180.0 feet to land of Erickson; thence the following three (3) courses along land of Erickson; South 44 degrees, 30 minutes East, 874.5 feet North 80 degrees, East, 122.1 feet South 37 degrees, East, 270.0 feet to a point on Davis Lane; thence along Davis Lane 170 feet to land of Yurgaitis; thence along land of Yurgaitis, South 36 degrees, East 1170 feet to land of Ford; thence running South 42 degrees, West 3000 feet by land of Ford to point of beginning. Containing 146 acres, more or less. - - - - - - - - - - - - -

Name of purported owner — William H. Parker
Address of purported owner — Stow, Massachusetts

Tract No. B-124 Description: A certain parcel of land located in the Town of Stow, Middlesex County, Commonwealth of Massachusetts, being bounded and described as follows: Beginning at a point at the Northwesterly corner of land of one Priest, which point is at the Southwesterly corner of the granted premises, thence running North 36 degrees, 30 minutes East, one thousand two hundred and thirty-five (1235.0') feet by land of Mullen; thence turning and running North 77 degrees, 30 minutes West, seven hundred and thirty (730.0') feet by land of Mullen; thence turning and running South 1 degree 00 minutes West, one thousand one hundred and fifty (1150.') feet by other land of Scott, (which line is the boundary line of the Maynard Storage Depot Area), to the point of beginning. Containing 9 acres of land, more or less. - - - - - - - - -

Name of purported owner — Emma Parker Scott
Address of purported owner — Gleasondale, Massachusetts

Tract No. B-125 Description: A certain tract of land situated in the Town of Maynard, County of Middlesex, Commonwealth of Massachusetts,

bounded and described as follows: Beginning at a point on the Boston & Maine Railroad, which point is the Northwesterly corner of the granted premises at land of American Woolen Company; thence running South 8 degrees, 30 minutes, West, three hundred forty-eight (348.0') feet by land of said American Woolen Company to land of Mullen; thence running South 82 degrees, 00 minutes, East, one hundred ten (110.0') feet by land of Mullen; thence running South 71 degrees, 00 minutes East, seventy-one and ninety-four hundredths (71.94') feet by land of Mullen; thence running South 51 degrees, 00 minutes East, one hundred thirty-two (132.0) feet by land of Mullen; thence running South 37 degrees, 30 minutes East, one hundred fifty-nine (159.0') feet by land of Mullen; thence running South 23 degrees, 00 minutes East, one hundred seventy-eight (178.0') feet by land of Mullen, to land of Haynes; thence running North 47 degrees, 00 minutes East, one hundred forty (140.0') feet by land of Haynes; thence running North 56 degrees, 30 minutes East four hundred ten(410.0') feet by land of Haynes; thence running North 66 degrees, 00 minutes East eight hundred twenty (820.0') feet by land of Haynes to a point on the Boston & Maine Railroad; thence running Westerly along Boston & Maine Railroad sixteen hundred (1600.0') feet, more or less, to point of beginning. Containing thirteen point five (13.5) acres, more or less. - -

Name of purported owner — Emma Parker Scott
Address of purported owner — Gleasondale, Massachusetts

Tract No. B-128 Description: A certain parcel of land, situated in the Town of Stow, County of Middlesex, and Commonwealth of Massachusetts, more particularly bounded and described as follows: Beginning at a point at the Northeasterly corner of the granted premises, at land of W. H. Parker and running South 67 degrees, 30 minutes West, two hundred ninety (290.0) feet by land of said W. H. Parker; thence running North 56 degrees, 00 minutes West, three hundred fifty (350) feet, by land of said Parker, and land of one Boeske, thence running North 67 degrees, 30 minutes East, two hundred ninety (290.0) feet by land of said Boeske to land of Emma and R. W. Brown; thence running South 56 degrees, 00 minutes East, three hundred fifty feet by land of said Emma and R. W. Brown, to the point of beginning. Containing 2 acres, more or less. - - - - - -

Name of purported owner — Ralph W. Brown
Address of purported owner — Dongan Hills
Staten Island, New York

Tract No. C-223 Description: A certain parcel of land situated in the Westerly part of said Sudbury being bounded and described as follows: Beginning at a certain point on the land of Anderson and land now or formerly of Adaliza Puffer and running South 69 degrees, East six hundred

and four and forty hundredths (604.40') feet, more or less, by land of Anderson; thence turning and running Southeasterly on Puffer's Pond, one hundred and sixty-three (163') feet, more or less; thence turning and running North 76 degrees, 51 minutes, West, eight hundred and nineteen (819') feet, more or less, by land of Hill; thence turning and running North 40 degrees, 53 minutes East, two hundred and sixty-four and seven-tenths (264.7') feet by land now or formerly of Adaliza Puffer to the point of beginning. Containing three (3) acres, more or less. - - - -

Name of purported owner George W. Nyman
Address of purported owner 42 Church Street
Marlboro, Massachusetts

A true copy: Attest: James S. Allen Clerk. (Court seal). - - - - - - - -

Middlesex ss. Feb. 8, 1943. 8h. 54m. A.M. Rec'd & Recorded.

I, Arthur Goldberg of Malden, Middlesex County, Massachusetts, being married, for consideration paid, grant to Shirley Sugarman of Malden, Middlesex County, Massachusetts with QUITCLAIM COVENANTS the land in said MALDEN A certain parcel of land together with the buildings and improvements thereon situated in said Malden being shown as lot #31 on a Plan of Building Lots in Malden, drawn by Walter C. Stevens, Surveyor, December, 1900 recorded with Middlesex South District Deeds Plan Book 128 Plan 11, bounded and described as follows: Northeasterly by lot 32 on said plan ninty feet (90 ft.) Southeasterly by Harvard Street fifty feet (50 ft.) Southwesterly by Suffolk Street ninety feet (90 ft.) Northwesterly by lot 30 said plan fifty feet (50 ft.) Being the same land conveyed to me by Shirley Sugarman dated September 23, 1940, and recorded in the Middlesex South District Deeds Book, I, Florence Goldberg wife of said grantor, release to said grantee all rights of DOWER and HOMESTEAD and other interests therein. WITNESS our hands and seals this 23rd day of September 1940 Arthur Goldberg , Florence Goldberg , THE COMMONWEALTH OF MASSACHUSETTS Middlesex ss. September 23 1940 Then personally appeared the above-named Arthur Goldberg and acknowledged the foregoing instrument to be his free act and deed, before me Max Rosenblatt Notary Public My commission expires July 16 1943 - - - - - - -

Middlesex ss. Feb. 8, 1943. 9h. 0m. A.M. Rec'd & Recorded.

GOLDBERG to SUGARMAN

WE HEREBY CERTIFY that on the fourth day of February in the year one thousand nine hundred and forty-three we were present and saw Chester A. Dunlap, Treasurer for and in behalf of the Framingham Co-operative Bank the mortgagee named in a certain mortgage given by Charles

SPINAZOLA et ux's EST. to FRAMINGHAM CO-OP. BK. POSSN.

Taking No. 5 6664-208

6664

208

REISER to ALFORD et al ASST.

KNOW ALL MEN BY THESE PRESENTS, that I, Harry F. Reiser, of Bridgewater, in the County of Plymouth, and Commonwealth of Massachusetts, the Assignee and present holder of a certain mortgage deed given by Charles H. Cook to Orlando H. Alford, originally to secure payment of Five thousand dollars and interest of which Four thousand seven hundred sixty seven 86/100 dollars and interest now remain unpaid dated January 1st A.D. 1905, and recorded with Middlesex So. District Deeds, Book 3144 Page 147 in consideration of Four thousand seven Hundred and sixty seven and 86/100 dollars and interest paid Fifteen hundred eighty nine 29/100 dollars by Ellen B. Alford, of said Brookline, widow: Fifteen hundred eighty nine 29/100 dollars by Martha A. Alford of said Brookline, Singlewoman: Fifteen hundred eighty nine 28/100 Dollars by Edward B. Alford of said Brookline, the receipt whereof is hereby acknowledged, do hereby ASSIGN, transfer, release, and set over unto the said Ellen B. Alford, Martha A. Alford and Edward B. Alford in the proportions aforesaid the said mortgage deed, the real estate thereby conveyed, and the note, debt, and claim thereby secured. TO HAVE AND TO HOLD the same to the said Ellen B. Alford, Martha A. Alford and Edward B. Alford in the proportions aforesaid and their heirs and assigns, to their own use and behoof forever; subject, nevertheless, to the conditions therein contained and to redemption according to law; but without warranty on my part expressed or implied, and said note has been endorsed without recourse in any event. IN WITNESS WHEREOF I hereto set my hand and seal this Fourth day of February A.D. 1910. Harry F. Reiser (seal) Signed, sealed, and delivered in presence of , COMMONWEALTH OF MASSACHUSETTS. Suffolk ss. February 4 - 1910 Then personally appeared the above-named Harry F. Reiser and acknowledged the foregoing instrument by him subscribed to be his free act and deed, before me, Frank G. White Notary Public (Notarial seal) -

Middlesex ss. March 10, 1943. 9h. 10m. A.M. Rec'd & Recorded.

UNITED STATES OF AMERICA

DECREE OF CT., JUDGMENT ON DECLN. OF TAK.

IN THE DISTRICT COURT OF THE UNITED STATES
FOR THE DISTRICT OF MASSACHUSETTS

UNITED STATES OF AMERICA
Petitioner,

v.

3100 ACRES OF LAND, MORE OR LESS, SITUATE IN MIDDLESEX COUNTY, COMMONWEALTH OF MASSACHUSETTS, AND THE HEIRS OF HENRY M. WETHERBEE, ET AL.,
Defendants.

MISC. CIVIL NO. 6507

JUDGMENT ON DECLARATION OF TAKING NO. 5 (March 4, 1943.)

SWEENEY, J. This cause coming on for hearing upon motion of Edmund J. Brandon, United States Attorney in and for the District of Massachusetts,

and Philip P. A. O'Connell, Special Assistant to the United States Attorney in and for the said District, attorneys for the petitioner herein, to enter a Judgment on Declaration of Taking No. 5 filed herein and upon consideration thereof and of the petition and declaration of taking No.5 filed herein and statutes in such cases made and provided, and it appearing to the satisfaction of the Court: FIRST, that the United States of America is entitled to acquire property by condemnation under judicial process for the purposes as set forth and prayed in said petition; SECOND, that declaration of taking No. 5 filed herein contains or has annexed thereto a statement of the authority under which and the public use for which the lands hereinafter described are taken, a description of the said lands taken sufficient for the identification thereof, a statement of the estate or interest taken for the said public use, a plan showing the lands taken, and a statement of the sum of money estimated by the Secretary of War to be just compensation for the land taken in the sum of $3,750.00, and that said amount has been deposited into the registry of the Court for the use and benefit of the persons entitled thereto; THIRD, that said declaration of taking No. 5 filed herein contains a statement that the Secretary of War, the head of the acquiring agency, is of the opinion that the ultimate award of just compensation will be within the limits prescribed by Congress as the price to be paid therefor; NOW, THEREFORE, it is ORDERED, ADJUDGED and DECREED that the title to the said lands, including all buildings and improvements thereon and all appurtenances thereto, in fee simple absolute, subject, however, to existing easements for public roads and highways, for public utilities, for railroads and for pipe lines, vest in the United States of America upon the filing of said declaration of taking No. 5 and the depositing in the registry of this Court of the amount of estimated just compensation, which land is situate in the Town of SUDBURY, County of Middlesex and Commonwealth of Massachusetts, and more particularly described in Schedule "A" attached hereto and made a part hereof, and defined in map marked Schedule "B" attached to and made a part of declaration of taking No. 5 herewith filed. Said land is deemed to be condemned and taken for the United States of America, and the right to just compensation for the property so taken is vested in the persons entitled thereto; and the amount of such just compensation shall be ascertained and awarded in this proceeding and established by judgment herein pursuant to law, and This cause is held open for such further and other orders, judgments and decrees as may be necessary in the premises. Entered this 4th day of March,

1943, at Boston, Massachusetts. -

BY THE COURT:
Mary G. Traverse Deputy Clerk

ENTERED:
Geo. C. Sweeney, J.
3-4-43 3:20 P.M.

SCHEDULE "A"

The land which is the subject matter of this Declaration of Taking, aggregates 22.73 acres, more or less, situate and being in the County of Middlesex, State of Massachusetts. A description of the lands taken, together with a list of the purported owners thereof, is as follows:

Tract No. C-231 Description: A certain parcel of land, situated in the Town of SUDBURY, County of Middlesex, Commonwealth of Massachusetts, more particularly bounded and described as follows: Beginning at a point on the Concord Road, so-called; thence by land of Perkins, South 40 degrees, 00 minutes, East, 258.7 feet; South 14 degrees, 30 minutes East, 295.0 feet; South 15 degrees, 15 minutes East, 1089 feet, more or less, to a point on the North shore of Willis Pond; thence Northeasterly on the North shore of said Willis Pond, 550 feet, more or less, to a point; thence by land of Arrowhead Lake Shores development, North 37 degrees, West, 700 feet, more or less; North 18 degrees, 00 minutes West, 1000 feet to a point on the Concord Road, which point is 2921.0 feet, more or less, from the intersection of said Concord Road and Puffer Road, so-called; thence Southwesterly on Concord Road, so-called, 348.0 feet to the point or place of beginning. Containing 13.0 acres, more or less.

Name of purported owner Stephen Darian
Address of purported owner 1726 Dorchester Avenue
Boston, Massachusetts

Tract No. D-300 Description: A tract of land situated in the Town of SUDBURY, County of Middlesex, Commonwealth of Massachusetts, bounded and described as follows: Beginning at a point on Hudson Road, which point is two thousand three hundred and sixty-five (2365.0') feet Southeasterly from the intersection of Concord Road and Hudson Road; thence running South by land of Goodnow 45 degrees, 30 minutes West, one hundred eleven and ninety-two hundredths (111.92') feet; thence running North by land of Goodnow 62 degrees, 00 minutes West, one hundred and ten (110.0') feet; thence running South by land of Goodnow 31 degrees, 00 minutes West, one thousand two hundred eighty-seven and eighty-five hundredths (1287.85') feet; thence running South by land now or formerly of S. D. Perry, 62 degrees, 00 minutes East, one hundred twenty-two and eighty-five hundredths (122.85') feet; thence running South by land now or formerly of S. D. Perry, 69 degrees, 00 minutes East, one hundred sixty-one

and fifteen hundredths (161.15') feet; thence running North by land now or formerly of S. D. Perry and Goodnow 27 degrees 00 minutes East, seven hundred eighty-seven and eighty-one hundredths (787.81') feet; thence running South by land of Goodnow 62 degrees, 40 minutes East, two hundred and ten (210.0') feet; thence running North by land of Raynor 22 degrees, 15 minutes East, five hundred and forty (540.0') feet; thence running Northwesterly on Hudson Road two hundred and forty-seven (247.0') feet, to the point of beginning. Containing nine and seventy-three hundredths (9.73) acres, more or less. -

Name of purported owner Helen M. Raynor
Address of purported owner Hudson Road
Sudbury, Massachusetts

A true copy: Attest: James S. Allen Clerk. (Court seal) - - - - - -

Middlesex ss. March 10, 1943. 9h. 11m. A.M. Rec'd & Recorded.

One word over erasure

THE COMMONWEALTH OF MASSACHUSETTS. LAND COURT

Cambridge Federal Savings and Loan Association (Seal)
vs.
Sophie Barenberg

Case No. 6031
Misc. IN EQUITY

DECREE FOR SALE

CAMBRIDGE FEDERAL SAVS. AND LOAN ASSN. et al

DECREE OF CT. FOR SALE & APPVL.

This cause came on to be heard and was argued by counsel; and thereupon, upon consideration thereof, it is ORDERED, ADJUDGED and DECREED that the plaintiff be and it is hereby authorized and empowered to sell the property covered by the mortgage given by Sophie Barenberg, to the Cambridge Federal Savings and Laon Association, dated September 12, 1940, and registered as Document No. 167283, noted on Certificate of Title No. 40667, issued from the South Middlesex County Registry of Deeds, and also recorded with said Registry, Book 6418, Page 454, as set forth in the bill filed in said case without the intervention of a commissioner or special master in accordance with the powers contained in said mortgage and without any further notice than that required by the terms of said mortgage, and the statutes of said Commonwealth. -

By the Court. (Courtney, J.)
Attest: Robert E. French Recorder.
Entered: Jan. 20th, 1943

A true copy, Attest Robert E. French Recorder

APPROVAL OF SALE MAR 10 1943

The sale, having been made as duly authorized by the decree, is hereby approved. John E. Fenton Judge. -

Middlesex ss. March 12, 1943. 1h. 44m. P.M. Rec'd & Recorded.

BARENBERG'S Est. to CAMBRIDGE FEDERAL SAVS. AND LOAN ASSN.

Cambridge Federal Savings and Loan Association, an United States corporation, doing business in Cambridge in the County of Middlesex, holder of a mortgage from Sophie Barenberg to said Cambridge Federal Savings

Taking No. 6 6669-172

6669

172

recorded with Middlesex South District Registry of Deeds (At East Cambridge, Mass.) at the end of Book 5268, a copy of which plan is attached hereto as Schedule "B". Containing 7.37 acres, more or less. - - - - - -

Name of purported owner Town of Bedford, Massachusetts

Address of purported owner Bedford, Massachusetts

A true copy: Attest: James S. Allen Clerk. (Court seal) - - - - - - - - -

Middlesex ss. April 5, 1943. 8h. 30m. A.M. Rec'd & Recorded.

Two words over erasure.

UNITED STATES OF AMERICA

DECREE OF CT. JUDGMENT ON DECLN. OF TAKING

IN THE DISTRICT COURT OF THE UNITED STATES
FOR THE DISTRICT OF MASSACHUSETTS

UNITED STATES OF AMERICA,
Petitioner,
v.
3100 ACRES OF LAND, MORE OR LESS, SITUATE IN MIDDLESEX COUNTY, COMMONWEALTH OF MASSACHUSETTS, AND THE HEIRS OF HENRY M. WETHERBEE, ET AL.,
Defendants.

MISC. CIVIL NO. 6507

JUDGMENT ON DECLARATION OF TAKING NO. 6
(March 25, 1943.)

HEALEY, J. This cause coming on for hearing upon motion of Edmund J. Brandon, United States Attorney in and for the District of Massachusetts, and Philip P. A. O'Connell, Special Assistant to the United States Attorney in and for the said District, attorneys for the petitioner herein, to enter a Judgment on Declaration of Taking No. 6 filed herein and upon consideration thereof and of the petition and declaration of taking No. 6 filed herein and statutes in such cases made and provided, and it appearing to the satisfaction of the Court: FIRST, that the United States of America is entitled to acquire property by condemnation under judicial process for the purposes as set forth and prayed in said petition; SECOND, that declaration of taking No. 6 filed herein contains or has annexed thereto a statement of the authority under which and the public use for which the lands hereinafter described are taken, a description of the said lands taken sufficient for the identification thereof, a statement of the estate or interest taken for the said public use, a plan showing the lands taken, and a statement of the sum of money estimated by the Secretary of War to be just compensation for the land taken in the sum of $385.00, and that said amount has been deposited into the registry of the Court for the use and benefit of the persons entitled thereto; THIRD, that said declaration of taking No. 6 filed herein contains a statement that the Secretary of War, the head of the acquiring agency, is of the opinion that the ultimate award of just compensation will be within the limits prescribed by Congress as the price to be paid there-

for; NOW, THEREFORE, it is ORDERED, ADJUDGED and DECREED that the title to the said lands, including all buildings and improvements thereon and all appurtenances thereto, in fee simple absolute, subject, however, to existing easements for public roads and highways, for public utilities, for railroads and for pipe lines, vest in the United States of America upon the filing of said declaration of taking No. 6 and the depositing in the registry of the Court of the amount of estimated just compensation, which land is situate in the Town of Hudson, County of Middlesex, and Commonwealth of Massachusetts, and more particularly described in Schedule "A" attached hereto and made a part hereof and defined in map marked Schedule "B" attached to and made a part of declaration of taking No. 6 herewith filed. Said land is deemed to be condemned and taken for the United States of America, and the right to just compensation for the property so taken is vested in the persons entitled thereto; and the amount of such just compensation shall be ascertained and awarded in this proceeding and established by judgment herein pursuant to law, and This cause is held open for such further and other orders, judgments and decrees as may be necessary in the premises. Entered this 25th day of March, 1943, at Boston, Massachusetts. By the Court: Mary G. Traverse Deputy Clerk Entered: March 25, 1943 Arthur D. Healey, J. - - - - - -

SCHEDULE "A"

The land which is the subject matter of this Declaration of Taking, aggregates 20.24 acres, more or less, situate and being in the County of Middlesex, State of Massachusetts. A description of the land taken, together with the names of the purported owners thereof, is as follows:

Tract No. D-305

Description: A certain parcel of land situated in the Town of Hudson, County of Middlesex, State of Massachusetts, more particularly bounded and described as follows: Beginning at a point on the land of the Boston and Maine Railroad, which point is 610 feet, more or less, West, from the intersection of the Town Lines of Hudson, Marlboro, and Sudbury; thence continuing along the land of the Boston & Maine Railroad, a distance of 390 feet, more or less, to land of the Commonwealth of Massachusetts; thence the next two courses and distances along the land of the Commonwealth of Massachusetts, North 43 degrees, East, 506.5 feet, and South, 65 degrees, East 127.5 feet, to land of Balcom; thence along land of Balcom South 16 degrees, 30 minutes West, 580 feet, more or less, to the point of beginning. Containing 3.2 acres, more or less. - - - - - - -

Name of purported owner Mary D. Hosmer
Address of purported owner 126 Church Street
Winchester, Massachusetts

Tract No. D-305A

Description: A certain parcel of land situated in the Town of Hudson, County of Middlesex, State of Massachusetts, more particularly bounded and described as follows: Beginning at a point on the Northerly side line of Sudbury Road, in the Southwest corner of land of the Commonwealth of Massachusetts, and the Southeasterly corner of the granted land; thence running along Sudbury Road 685 feet, more or less, to the Boston & Maine Railroad, at point of intersection of the Hudson, Marlboro and Sudbury Town Lines; thence running along the Boston and Maine Railroad to land of Hosmer, a distance of 610 feet, more or less; thence running by land of Hosmer North 43 degrees, East 506.5 feet; thence continuing the next three courses and distances, by land of the Commonwealth of Massachusetts, South 65 degrees, East, 127.5 feet, North 46 degrees, 15 minutes East, 660 feet, and North 86 degrees, 30 minutes East, 396 feet to the Sudbury Hudson Town Line; thence along said town line and the land of the Commonwealth of Massachusetts, South 25 degrees, 30 minutes West, 1075.5 feet; thence along the land of the Commonwealth of Massachusetts, South 73 degrees, East, 595 feet, more or less, to the point of beginning. Containing 17.04 acres, more or less. -

Name of purported owner Heirs of Asa S. Balcom
Address of purported owner Unknown

A true copy: Attest: James S. Allen Clerk. (Court seal) - - - - - - - -

Middlesex ss. April 5, 1943. 8h. 30m. A.M. Rec'd & Recorded.

Two words over erasure.

RELIANCE CO-OP. BANK

DISC. MORTS.

KNOW ALL MEN BY THESE PRESENTS that the Reliance Co-operative Bank of Cambridge, Mass., the mortgagee named in a certain mortgage given by Mary A. O'Brien, dated July 13, 1936, and recorded with Middlesex South District Deeds, Book 6043, Page 571, and mortgage Dated February 21, A.D. 1941, and recorded with Middlesex South District Deeds Book 6473, Page 342, hereby acknowledges that it has received full payment and satisfaction of the same, and in consideration thereof it hereby cancels and DISCHARGES said mortgage. IN WITNESS WHEREOF, the said Reliance Co-operative Bank has caused its corporate seal to be hereunto affixed and these presents to be signed, acknowledged, and delivered in its name and behalf by Harry R. Andrews its Treasurer, this ninth day of April, A.D. 1943 Reliance Co-operative Bank By Harry R. Andrews Treasurer (Corporate seal) COMMONWEALTH OF MASSACHUSETTS Middlesex ss. April 9, 1943. Then personally appeared the above named Harry R. Andrews as Treasurer and acknowledged the foregoing instrument to be the free act and deed of the Reliance Co-operative Bank before me- Francis J. Roche, Notary Public My

Taking No. 7 6679-315

6679

315

IN THE DISTRICT COURT OF THE UNITED STATES
FOR THE DISTRICT OF MASSACHUSETTS

UNITED STATES OF AMERICA,
Petitioner,

v.

3100 ACRES OF LAND, MORE OR LESS, SITUATE IN MIDDLESEX COUNTY, COMMONWEALTH OF MASSACHUSETTS, AND THE HEIRS OF HENRY M. WETHERBEE, ET AL.,
Defendants

MISC. CIVIL NO. 6507

S

UNITED STATES OF AMERICA

DECREE OF CT., JUDGMENT ON THE DECLN. OF TAKING

JUDGMENT ON DECLARATION OF TAKING NO. 7
May 6, 1943

HEALEY, J. This cause coming on for hearing upon motion of Edmund J. Brandon, United States Attorney in and for the District of Massachusetts, and Philip P. A. O'Connell, Special Assistant to the United States Attorney in and for the said District, attorneys for the petitioner herein, to enter a Judgment on Declaration of Taking No. 7 filed herein and upon consideration thereof and of the petition and declaration of taking No. 7 filed herein and statutes in such cases made and provided, and it appearing to the satisfaction of the Court: FIRST, that the United States of America is entitled to acquire property by comdemnation under judicial process for the purposes as set forth and prayed in said petition; SECOND, that declaration of taking No 7 filed herein contains or has annexed thereto a statement of the authority under which and the public use for which the lands hereinafter described are taken, a description of the said lands taken sufficient for the identification thereof, a statement of the estate or interest taken for the said public use, a plan showing the lands taken, and a statement of the sum of money estimated by the Secretary of War to be just compensation for the land taken in the sum of $1.00, and that said amount has been deposited in the registry of the Court for the use and benefit of the persons entitled thereto; THIRD, that said Declaration of Taking No. 7 filed herein contains a statement that the Secretary of War, the head of the acquiring agency, is of the opinion that the ultimate award of just compensation will be within the limits prescribed by Congress as the price to be paid therefor; NOW, THEREFORE, it is ORDERED, ADJUDGED AND DECREED that the title in fee simple absolute to the public roads and highways located within the lands described in Schedule "A", excepting the highway known as Hudson Road, and that section of Concord Road, approximately one thousand (1000) feet in length, which lies between the point at which the southerly line of Hudson Road intersects the northwesterly line of Concord Road, and the point at which the northeasterly line of said Hudson Road intersects the southeasterly line of

Concord Road, vested in the United States of America upon the filing of said Declaration of Taking No. 7 and the depositing in the registry of the Court of the amount of estimated just compensation, which land is situate in the Towns of Sudbury, Hudson, Maynard and Stow, County of Middlesex and Commonwealth of Massachusetts, and more particularly described in Schedule "A" attached hereto and made a part hereof and defined in map marked Schedule "B" attached to and made a part of Declaration of Taking No. 7 herewith filed. Said land is deemed to be condemned and taken for the United States of America, and the right to just compensation for the property so taken is vested in the persons entitled thereto; and the amount of such just compensation shall be ascertained and awarded in this proceeding and established by judgment herein pursuant to law, and This cause is held open for such further and other orders, judgments and decrees as may be necessary in the premises. Entered this 6th day of May 1943, at Boston, Massachusetts. BY THE COURT: Mary G. Traverse Deputy Clerk. ENTERED: F.J.W.F. D, J.

SCHEDULE "A"

The land which is the subject matter of this Declaration of Taking aggregates 50 acres, more or less, situate and being in the County of Middlesex, State of Massachusetts. A description of the land taken, together with the names of the purported owners thereof, is as follows:

Description: All that certain piece or parcel of land located in the Towns of SUDBURY, HUDSON, MAYNARD and STOW, County of Middlesex and Commonwealth of Massachusetts, bounded and described as follows: Beginning at a point on the Northerly boundary line of the Boston and Maine Railroad (Mass. Central Division) right-of-way and at the intersection of the Hudson, Marlboro and Sudbury Town lines; thence running in a Northwesterly direction along said Northerly boundary line of Boston and Maine Railroad to the intersection of the said Northerly boundary line of the Boston and Maine Railroad right-of-way with the Easterly boundary line of Concord Road, so-called; thence running along the Easterly boundary line of said Concord Road, so-called, 800 feet, more or less, to a point; thence North 5 degrees, 30 minutes West, 830 feet, more or less, to a point on the Southwesterly shore of White Pond; thence running in a Northeasterly direction along the Easterly shore of White Pond, so-called, 3545 feet, more or less, to a point; thence North 76 degrees, 20 minutes East, 400 feet, more or less, North 37 degrees, 00 minutes East, 420.0 feet, North 25 degrees, 30 minutes West, 138.18 feet, North 76 degrees, 30 minutes, West 360.0 feet, North 66 degrees, 16 minutes, West, 435.0 feet, South 36 de-

grees, 00 minutes West, 236.0 feet, North 66 degrees, 16 minutes West, 740.0 feet, to the Easterly boundary line of White Pond Road, so-called; thence running along the Easterly boundary line of White Pond Road, so-called, 600 feet, more or less, to a point near the intersection of said White Pond Road, so-called, and Sudbury Road, so-called; thence crossing said intersection to the point of curve on the Easterly boundary line of Sudbury Road; thence running Northwesterly along the Easterly boundary line of Sudbury Road, so-called, 5759 feet, more or less, to a point; thence North 29 degrees, East, 221.8 feet, North 1 degree, 00 minutes East, 1150.0 feet, North 19 degrees, 00 minutes East 1405 feet, to a point on the Southerly boundary line of the right-of-way of the Boston and Maine Railroad (Marlboro Division). Thence running Easterly along the Southerly boundary of said railroad right-of-way to a point where the Southerly boundary of said railroad right-of-way intersects the Easterly boundary line of White Pond Road, so-called; thence still Easterly on the Southerly boundary line of the Boston and Maine Railroad, 490 feet, more or less, to a point; thence South 75 degrees, 00 minutes East, 2750 feet, North 80 degrees, 00 minutes, East, 75 feet, more or less, to the Easterly boundary line of Taylor Road, so-called, thence running Northerly along the Easterly boundary line of Taylor Road, so-called, 440 feet to a point; thence South 34 degrees, 15 minutes, East 1303 feet, South 25 degrees, 30 minutes East, 173.25 feet, South 8 degrees, 00 minutes West, 120 feet, South 37 degrees, 30 minutes East, 2560 feet, South 66 degrees, 00 minutes East, 601.92 feet, South 9 degrees, 45 minutes, East 934 feet, South 84 degrees, 30 minutes East, 200 feet, South 12 degrees, 00 minutes West, 254 feet, South 33 degrees, 30 minutes West, 53 feet, South 82 degrees, 00 minutes East, 467.5 feet, South 22 degrees, 00 minutes West, 934 feet, to a point on the Northerly boundary line of Concord Road, so-called; thence running Southwesterly along the Northerly boundary line of Concord Road, so-called, 693.9 feet to the point of curve on aforesaid Northerly boundary line of aforesaid Concord Road; thence crossing the intersection of Concord and Puffer Roads, so-called, in a southeasterly direction to the point of curve on the Westerly boundary line of Puffer Road, thence running Southeasterly along the Westerly boundary line of Puffer Road, so-called, 960 feet, more or less, to a point; thence South 18 degrees, 15 minutes West, 456 feet, North 80 degrees, 30 minutes West, 118 feet, to a point near the west abutment of the dam on the North side of Cuttings Pond, said point being 25 feet, more or less distant from the Northwest bank of said Pond; thence on a line, said line being 25 feet,

6679

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more or less, distant from the West and Southwest bank of said pond, 700 feet, more or less, to a point 25 feet, more or less, distant from the Southeast bank of the Pond; thence South 2 degrees, 30 minutes West 1500 feet, more or less, to the North shore of Willis Pond; thence running Westerly along the Northerly shore of Willis Pond 2921.5 feet, more or less, to a point; thence turning and running in a Southwesterly and then Easterly course by said Willis Pond, 1075 feet to a point; thence South 42 degrees, 00 minutes West, 210 feet, North 74 degrees, 00 minutes, West, 900 feet, South 26 degrees, 00 minutes West, 460 feet, North 74 degrees, 45 minutes West, 205.8 feet, South 15 degrees, 15 minutes, West, 150 feet, North 68 degrees, 00 minutes West, 337.3 feet; thence running South 41 degrees, 00 minutes, West 800 feet, more or less, Southwesterly across Bottomless Pond to a point on the Southwest side of said Pond; thence South 56 degrees, 15 minutes, West, 390 feet, more or less, South 44 degrees, 30 minutes, West, 270 feet, South 52 degrees, 43 minutes East, 53 feet, South 33 degrees, 00 minutes West, 100 feet, to a point on the Northerly boundary line of Hudson Road, so-called; thence running Southeasterly crossing said Hudson Road to a point on the Southerly boundary line of Hudson Road, said point being 2612 feet Southeasterly from the intersection of Concord Road and Hudson Road; thence South 22 degrees, 15 minutes West, 540 feet, South 62 degrees, 40 minutes East, 300 feet, more or less, South 27 degrees, West, 1170 feet, South 9 degrees, 00 minutes, West, 800 feet, South 89 degrees, 30 minutes West, 745.5 feet, South 43 degrees, 00 minutes, West, 550 feet, South 24 degrees, 00 minutes East, 1685 feet, North 62 degrees, 00 minutes West, 1820 feet, South 28 degrees, 00 minutes West, 280 feet, South 31 degrees, 00 minutes, West, 370 feet, to a point on the Northerly boundary line of the right-of-way of the Boston amd Maine Railroad (Mass. Central Division); thence running Northwesterly along the Northerly boundary line of said railroad right-of-way to the point or place of beginning, containing 2955.46 acres, more or less. -

Names of purported owners County of Middlesex, E.Cambridge, Mass.
Town of Maynard
Town of Stow
Town of Hudson
Town of Sudbury

A true copy: Attest: James S. Allen Clerk (Court seal) - - - - - -

Middlesex ss. May 22, 1943. 9h.27m.A.M. Rec'd & Recorded.

SHEEN to NARDONE et ux

I, Eliza J. Sheen of Arlington, Middlesex County, Massachusetts, widow, for consideration paid, grant to Alexander Nardone and Ermilinda

Taking for White Pond Water Intake Structure & Line

6671-552

6671

552

Peace My commission expires Sept. 11 1947 - - - - - - - - - - - - - - -

Middlesex ss. April 20, 1943. 9h. 10m. A.M. Rec'd & Recorded.

One word interlined

UNITED STATES OF AMERICA

DECREE OF CT. JUDGMENT ON THE DECLN. & OF TAKING

IN THE DISTRICT COURT OF THE UNITED STATES
FOR THE DISTRICT OF MASSACHUSETTS

UNITED STATES OF AMERICA,
Petitioner,
v.
48 ACRES OF LAND, MORE OR LESS, SITUATE IN MIDDLESEX COUNTY, COMMONWEALTH OF MASSACHUSETTS, AND THE TOWN OF MAYNARD, ET AL.,
Defendants.

MISC. CIVIL NO. 6694

JUDGMENT ON THE DECLARATION OF TAKING
(April 7, 1943.)

HAELEY, J. This cause coming on for hearing upon motion of Edmund J. Brandon, United States Attorney in and for the District of Massachusetts, and Philip P. A. O'Connell, Special Assistant to the United States Attorney in and for the said District, attorneys for the petitioner herein, to enter a judgment on the declaration of taking filed herein and for an order fixing the date for the surrender of possession of the land herein described to the petitioner, and upon consideration thereof and of the petition and declaration of taking filed herein and the statutes in such case made and provided, and it appearing to the satisfaction of the Court: FIRST, that the United States of America is entitled to acquire property by condemnation under judicial process for the purposes as set forth and prayed for in said petition; SECOND, that the declaration of taking filed herein contains, or has annexed thereto a statement of the authority under which and the public use for which the lands hereinafter described are taken, a description of the said lands taken, sufficient for the identification thereof, a statement of the estate or interest taken for the said public use, a plan showing the lands taken, and a statement of the sum of money estimated by the Secretary of War to be just compensation for the land taken, in the total sum of $100.00 and that said amount has been deposited into the registry of this Court for the use and benefit of the persons entitled thereto; THIRD, that the said declaration of taking filed herein contains a statement that the Secretary of War, the head of the acquiring agency, is of the opinion that the ultimate award of just compensation will be within the limits prescribed by Congress as the price to be paid therefor; NOW, THEREFORE, it is ORDERED, ADJUDGED and DECREED that a perpetual easement for the location, construction, maintenance, operation, and patrol of an intake structure and water line, together with the right to withdraw water from

White Pond, so-called, for fire fighting purposes, in, over, under, and across the land described in said Schedule "A", attached hereto and made a part hereof; to establish a safety zone, restricting the lands described in said Schedule "A" from human habitation; to cut timber, remove buildings, and any and all obstructions from said area, and including the right of ingress and egress to this land, reserving, however, to the land owner, their heirs and assigns, all such rights and privileges as may be used and enjoyed without interfering with, or abridging the easement acquired vest in the United States of America upon the filing of the said declaration of taking and the depositing in the registry of this Court of the amount of estimated just compensation, which land is situate in the Towns of HUDSON & STOW, County of Middlesex, Commonwealth of Massachusetts, and more particularly described in Schedule "A" attached hereto and made a part hereof, and shown on a tract map dated July 2, 1942, marked Schedule "B" attached to and made a part of declaration of taking herewith filed; and that said land is deemed to be condemned and taken for the United States of America, and the right to just compensation for the property so taken is vested in the persons entitled thereto; and the amount of such just compensation shall be ascertained and awarded in this proceeding and established by judgment herein pursuant to law, and It is FURTHER ORDERED, ADJUDGED and DECREED that possession of the hereinafter-described property shall surrendered forthwith to the United State of America and its duly authorized agents. It is FURTHER ORDERED that the United States Marshal be and he hereby is directed and instructed forthwith to serve an attested copy of this judgment upon any of the defendants now in possession of the hereinafter-described premises, or if no such defendants are found in actual possession of said premises, then he is ordered to post such attested copy at a conspicuous place upon said premises and forthwith make due return of said service to this Court. This cause is held open for such further and other orders, judgments and decrees as may be necessary in the premises. Entered this 7th day of April, 1943, at Boston, Massachusetts. - - - - - - - - - - - - - - - -

By the Court: Mary G. Traverse Deputy Clerk

Entered: April 7, 1943
Arthur D. Healey, J.

SCHEDULE "A"

The land which is the subject matter of this Declaration of Taking, and of this condemnation, aggregates 48 acres, more or less, situate and being in the County of Middlesex, State of Massachusetts. A description of the land taken, together with the name of the purported owner thereof,

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is as follows: Tract No. D-309 Description: A certain parcel of land situated in the Towns of Hudson and Stow, County of Middlesex, Commonwealth of Massachusetts, bounded and described as follows: Beginning at a point eight hundred (800.0') feet, more or less from the intersection of White Pond Road, and Concord Road; thence Northeasterly on Concord Road, three thousand seven hundred and fifty (3750.0') feet more or less, to the intersection of Hudson Road; thence Westerly on Hudson Road seven hundred (700.0') feet more or less; thence South 76 degrees, 20 minutes West, four hundred (400.0') feet, more or less, to the shore of White Pond; thence running Southerly on Easterly shore of White Pond, three thousand five hundred and forty-five (3545.0') feet, more or less, to a point on the Southerly shore of White Pond; thence South 5 degrees, 30 minutes East, eight hundred thirty (830.0') feet, more or less, to the point or place of beginning. Containing 48 acres, more or less. - -

Name of purported owner Town of Maynard

Address of purported owner Maynard, Massachusetts

A true copy: Attest: James S. Allen Clerk. (Court seal) - - - - - -

Middlesex ss. April 20, 1943. 9h. 31m. A.M. Rec'd & Recorded.

One word over erasure

E #6794
$12.22

WALTHAM COLLECTOR

DISC. WATER LIEN

THE COMMONWEALTH OF MASSACHUSETTS
CITY OF WALTHAM OFFICE OF THE COLLECTOR OF TAXES

THIS IS TO CERTIFY that the rates and charges for supplying or providing for water or rendering service or furnishing materials in connection therewith to or for the hereinafter described real estate, for which a lien attached as specified in a statement filed in Middlesex South District Registry of Deeds and recorded in Book 6534, Page 221, together with interest and costs thereon, have been paid. DESCRIPTION OF REAL ESTATE NAME OF RECORD OWNER: William G. Lamothe LOCATION OF PROPERTY: Situated at 66 Marivista Ave., land with buildings thereon, and bounded as follows: N'ly by Marivista Ave.; E'ly by land, now or formerly of City of Waltham; S'ly by land now or formerly of Day: W'ly by land now or formerly of Keith. H. W. Cutter Collector of Taxes for City of Waltham. (Corporate seal) THE COMMONWEALTH OF MASSACHUSETTS Middlesex South District, ss. April 14, 1943 Then personally appeared the above named Harlan W. Cutter, Collector of Taxes, and made oath that the foregoing statement by him subscribed is true, before me, Raymond J. Tracey Justice of the Peace My Commission expires Aug. 10, 1945 - - - - - - -

Middlesex ss. April 20, 1943. 9h. 46m. A.M. Rec'd & Recorded.