

**WAYLAND LONG TERM WATER SUPPLY
ALTERNATIVES ANALYSIS REPORT**

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APRIL 28, 2022

PREPARED FOR:



**TOWN OF WAYLAND,
MASSACHUSETTS**

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**LONG TERM WATER SUPPLY
ALTERNATIVES ANALYSIS
DRAFT REPORT**

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0 EXECUTIVE SUMMARY

Through this study, Kleinfelder worked with the Town of Wayland to evaluate its options for maintaining a reliable long-term drinking water supply. There are many important factors to be considered when deciding whether to invest in the existing in-town drinking water supplies, Massachusetts Water Resources Authority (MWRA) supply, or a hybrid solution. The major decision factors include feasibility of available capacity to meet demand, initial capital cost, recurring capital costs, water rates, and operations and maintenance costs. Kleinfelder determined lifecycle costs at net present value (NPV) for five long-term supply alternatives. For the alternatives utilizing MWRA supply, a second cost estimate is shown that does not include the MWRA entrance fee (in the event the fee is waived). The hybrid alternative assumed obtaining 1 million gallons per day (MGD) from MWRA and supplying the remaining demand (0.55 MGD) by the Happy Hollow Wells and decommissioning the other wells. These lifecycle costs are listed in table ES-1 below at 5, 25, and 50 year time points, and shown on Figure ES-1.

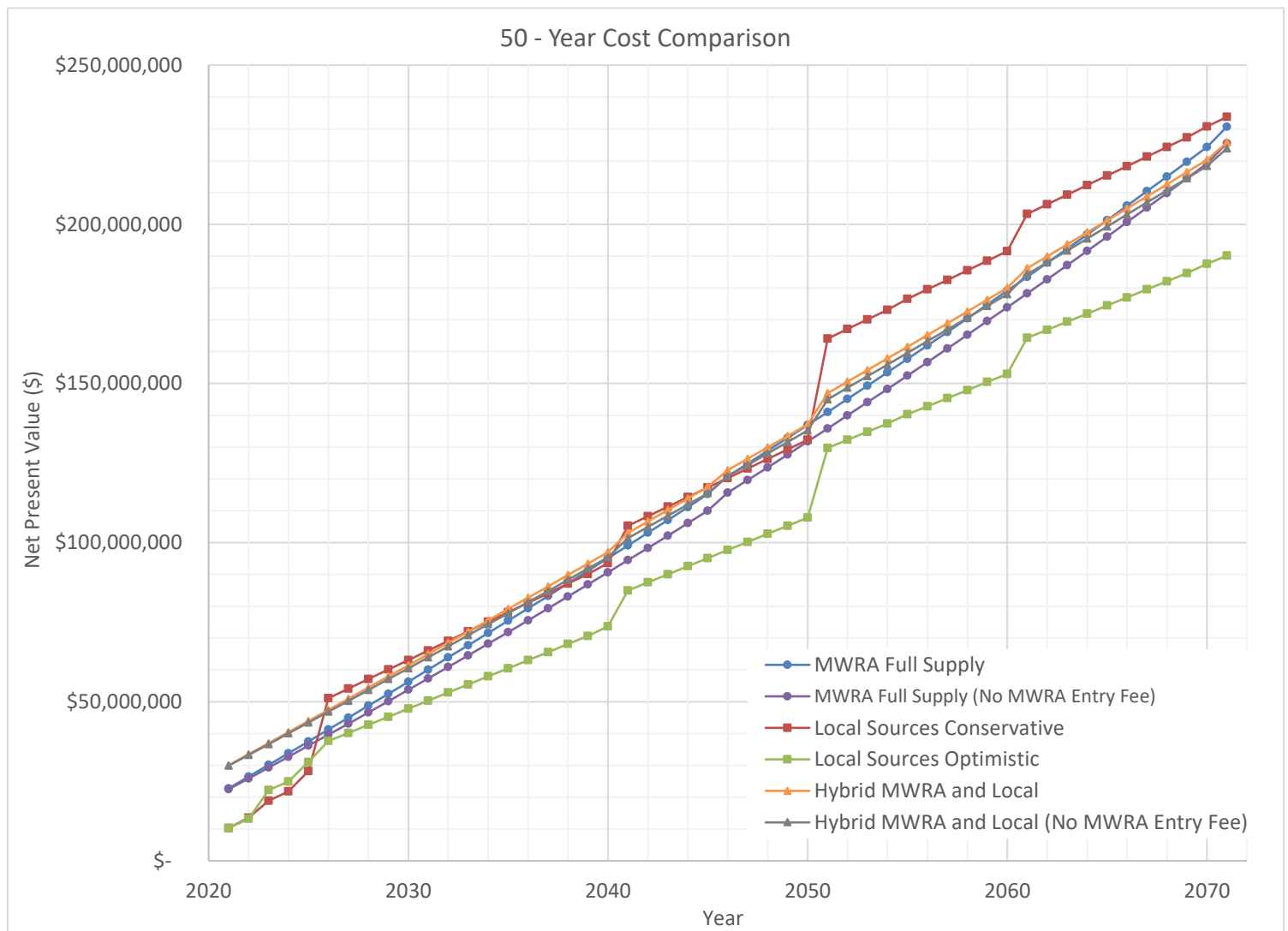
Table ES-1: Summary of Lifecycle Costs at Net Present Value

Supply Alternative	Lifecycle Costs at Net Present Value		
	2026	2046	2071
Wheeled Water, Framingham	\$ 80,000,000	\$ 320,000,000	\$ 675,000,000
Wheeled Water, Framingham (No MWRA Entry Fee)	\$ 79,000,000	\$ 315,000,000	\$ 670,000,000
Full MWRA Direct Supply	\$ 41,000,000	\$ 121,000,000	\$ 231,000,000
Full MWRA Direct Supply (No MWRA Entry Fee)	\$ 40,000,000	\$ 116,000,000	\$ 225,000,000
Local Sources - High End (Conservative Scenario)	\$ 51,000,000	\$ 120,000,000	\$ 234,000,000
Local Sources - Low End (Optimistic Scenario)	\$ 38,000,000	\$ 98,000,000	\$ 190,000,000
Hybrid - Happy Hollow 1.0 MGD, MWRA 0.55 MGD	\$ 47,000,000	\$ 123,000,000	\$ 226,000,000
Hybrid - Happy Hollow 1.0 MGD, MWRA 0.55 MGD (No MWRA Entry Fee)	\$ 47,000,000	\$ 121,000,000	\$ 224,000,000

As this analysis indicates, upgrading and maintaining the existing sources could lead to some significant savings in the long term, provided that the optimistic / low end scenario plays out and further contaminant issues do not arise. If, however, there are more costly upgrades needed (such as PFAS, iron and manganese, or other future regulated contaminant removal at all sources), this could bring the cost of supplying water from the existing sources very close to or greater than that of a full MWRA supply. Using a full MWRA supply versus a hybrid supply results in very similar long-term costs since the reduced

MWRA water purchase for the hybrid supply balances the added capital and O&M costs for maintaining the Happy Hollow Wells.

Figure ES-1: 50-Year Cost Comparison



These costs, however, are not the only factors to consider. There are several non-cost factors to consider. The future source water quality and complexity of operation and administration is much less certain while operating the local sources exclusively. Given the recent PFAS discoveries, this uncertainty may have decreased the community's tolerance for future risk. The risk and administration of source water and most regulatory compliance would be placed on the MWRA with a full MWRA supply. Operating its own independent water supply may be seen as a net benefit by some Wayland stakeholders. Or, the administrative and technical support provided by MWRA, along with funding support for distribution

improvements, could make this option more attractive. The many decision factors to consider are further detailed in Table ES-2 below.

Table ES-2: Alternatives and Decision Factors

Decision Factor	LOCAL SOURCES	FULL MWRA SUPPLY	HYBRID: LOCAL 1MGD / MWRA 0.55 MGD
Capacity to Supply Current & Future Needs	Local Source Treatment upgrades needed to meet demand; redundancy	Abundant Supply	Local Source Treatment upgrades needed to meet demand; redundancy
Capital Improvements (0-5 years)	Happy Hollow Well – Permanent PFAS Baldwin Pond – Ozone, compressor, filter upgrades; Replacement wells Chamberlain – PFAS Treatment Campbell Well – Replacement Well; Mn treatment New Storage Tank for local redundancy	Pump Station & Property Transmission Main Distribution System Upgrades	Happy Hollow Well – Permanent PFAS; Chloramine conversion Pump Station & Property Transmission Main Distribution System Upgrades Potentially - Chloramination
Potential Additional Capital Needs Within Planning Period	Routine plant upgrades Major plant upgrades potential future need Fe, Mn removal at Chamberlain, HH possible future need for PFAS removal Baldwin; Campbell Replacement of Chamberlain Well; others	Pump station upgrades	Routine plant upgrades Major plant upgrades potential future need Fe, Mn removal
Recurring Maintenance & Investment	Well redevelopment, pump station & WTP repairs; distribution system upkeep and replacement	pump station; distribution system upkeep and replacement	Well redevelopment, pump station & WTP repairs; distribution system upkeep and replacement
Uncertainties and Risks	Changes in water quality; drought, declines in yield; change in regulations, staff availability and training, Supply chain issues	Supply risk passed to MWRA	Changes in water quality; declines in yield; change in regulations, staff availability and training
Conservation / Restrictions	Meet Existing WMA Permit Requirements	TBD under ITA Agreement; likely 2d/week seasonal NE; meet MA Water Conservation Standards.	If give up WMA Permit (HH Well is registered), same as for MWRA supply
Permitting	N/A	Interbasin Transfer Act / MEPA	Interbasin Transfer Act / MEPA
Regulatory Compliance	Complex & Labor intensive	Distribution system only	Reduced from full Local
Operation / Maintenance Considerations	Supply Sampling, WTP, PS, Well, Tank maintenance, distribution sampling	Distribution sampling, PS & Tank maintenance	Supply Sampling, WTP, PS, Well, Tank maintenance, distribution sampling

Decision Factor	LOCAL SOURCES	FULL MWRA SUPPLY	HYBRID: LOCAL 1MGD / MWRA 0.55 MGD
Other Benefits	No concerns about switch to chloramination	Technical Assistance; interest free loans for main upgrades & lead service replacement; training	Technical Assistance; interest free loans for main upgrades & lead service replacement
Other Concerns	Public concern re: water quality Planning and executing of capital upgrades adds to administrative complexity.	Disruption due to water main construction ~ 4 miles	Disruption due to water main construction ~ 4 miles

Based on the long-term cost analysis, and in consideration of other factors, the Town may want to invest in partial MWRA supply as the lowest cost to add redundancy and reduce risk, while continuing the use of local supplies (with a focus on Happy Hollow while phasing out other sources) and seeking to secure newly available federal infrastructure funds for improvements. In such a case, we would recommend close monitoring of local supply water quality and use monitoring data to further inform future decisions should sources degrade.

Recent new discussions requiring more evaluation outside the scope of this study could help to further offset costs of connecting to MWRA including: wheeling water to and potential partnership with Natick, and possibly utilizing the Hultman aqueduct easement for transmission main installation.

1 BACKGROUND AND SCOPE

1.1 INTRODUCTION AND PURPOSE

Kleinfelder has prepared this long-term water supply alternatives analysis for the Town of Wayland in support of its ongoing effort to plan for reliable, long-term drinking water supply. The Town has been concerned about its water supply capacity and resiliency for some time. The recent discovery of per- and polyfluoroalkyl substances (PFAS) at levels over the newly promulgated Massachusetts Maximum Contaminant Limit (MCL) of 20 nanograms per liter (ng/L) PFAS6¹ at the Happy Hollow Wells has intensified the concerns about whether the existing sources of supply in Town will continue to be the most safe, reliable, and cost-effective supply options. The Town of Wayland recently studied whether to design and install temporary PFAS treatment at the Happy Hollow Wells or make an emergency connection to the Massachusetts Water Resources Authority (MWRA) Water System while it evaluates long term options. The Town had expressed interest in connecting to the MWRA long before the discovery of PFAS in the Town Wells, however the PFAS contamination levels increased the importance of this study. The MWRA is a public authority established in 1984 that provides wholesale water and sewer services to 3.1 million people and more than 5,500 large industrial users in 61 metro-Boston communities. The Town selected temporary treatment at Happy Hollow, but Kleinfelder understands that this option may not be suitable for long-term use. The evaluation of a permanent connection to the MWRA Water System is necessary for the Town to make an informed decision about whether to invest in significant treatment upgrades to its existing local supplies, or to obtain water from the MWRA, either in whole or in part, going forward. This report includes the engineering analysis, feasibility, and capital budget evaluations to help inform this decision.

1.2 BACKGROUND

The Town of Wayland's water system is maintained and operated by the Wayland Water Department (WWD), established in 1878. The water system serves the entire population of the Town and consists of approximately 106 miles of water main, ranging in diameter from 4 to 16 inches. Approximately one percent of the water mains are 16-inch diameter, 11 percent are 12-inch, six percent are 10-inch, 48 percent are 8-inch, 31 percent are 6-inch, and three percent are 4-inch. The water main pipe materials

¹ PFAS6 refers to the sum of the following compounds: PFOS, PFOA, PFHxS, PFNA, PFHpA and PFDA

include unlined and cement lined cast iron, ductile iron, PVC, HDPE, and asbestos cement. Approximately 62 percent of the system is unlined cast iron, 20 percent is cement lined cast iron, 15 percent is ductile iron, 1 percent is PVC, less than 1 percent is HDPE, and one percent is asbestos cement. The Town has one water storage facility located on Reeves Hill with a storage capacity of 2 million gallons. The Reeves Hill Storage Tank was constructed in 1959 and the addition of a booster pump station at the site followed in 1973.

The Town currently supplies water to its customers from four different well sites summarized in Table 1 below: the Happy Hollow Wells, Baldwin Pond Wells, Campbell Well, and Chamberlain Well. The Town had a fifth well site called the Meadowview Well, however it is now offline due to poor water quality. Existing source needs and challenges, capacities, and PFAS6 levels are shown in the table below.

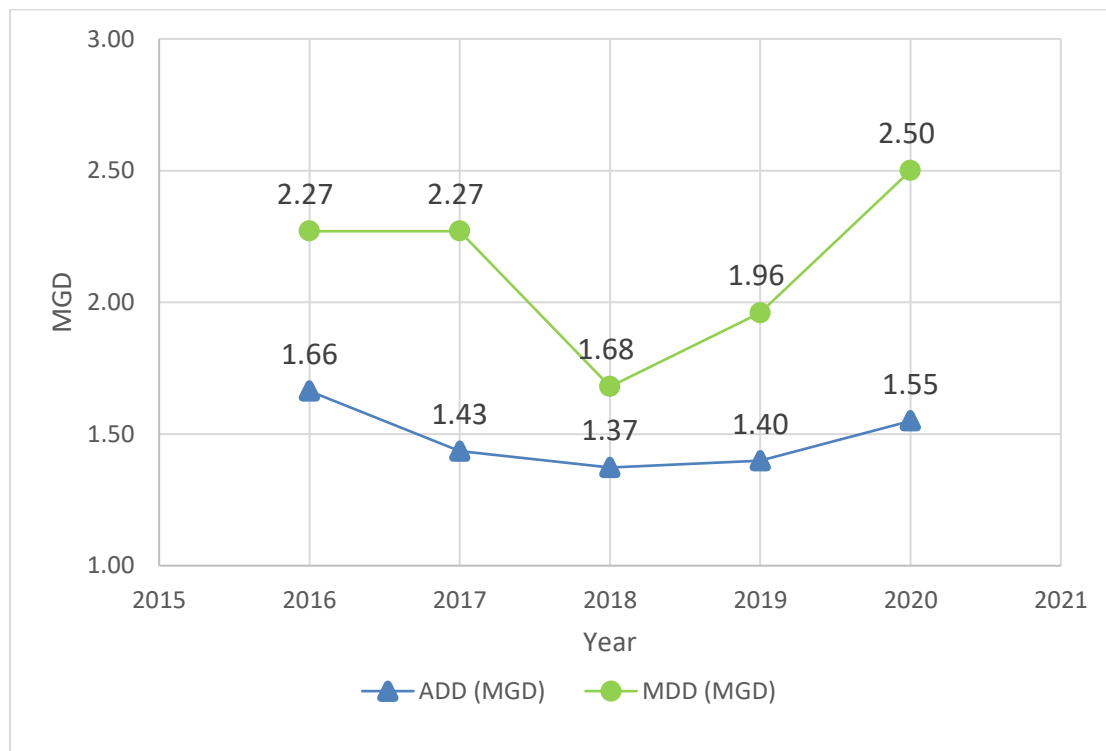
Table 1 - Existing Sources Summary

Source	Source Needs / Complexities / Uncertainties	Age of existing source	Approved Max Withdrawal (MGD)	Range of detected PFAS6 (ng/L)
Happy Hollow Wells (3) 1R, 2R, 3R	Temporary PFAS being installed. New permanent PFAS plant needed. Site has sufficient space.	2015 replaced wells	1.41	16-29
Baldwin Pond Wells	Membrane treatment facility processes are complex. Requires 3T Operator license - difficult to staff. Components have supply chain issues. Will not treat for PFAS and site is very tight for future upgrades, if needed.	Replacement Wells 1R (2009), 2 (2009), 3 (2009)	1.51	3-6
Campbell Well	Yield is limited – replacement well needed. Mn treatment needed.	1965	0.6	4-8
Chamberlain Well	Yield is limited. PFAS treatment may be needed	1991	0.828*	9-18

* limited to 0.11 MGD on annual average basis

Average Daily Demand (ADD) and Maximum Daily Demand (MDD) values for the Town from the past five years are plotted on the graph below.

Figure 1 - Annual ADD and MDD



Currently the Town holds a Water Management Act (WMA) Permit, dated May 2021, for the use of the Chamberlain Well for up to 0.11 MGD on an annual average basis. The other three sources are Registered, with a combined registration limit of 1.66 MGD, for a total approved withdrawal of 1.77 MGD. Under the WMA permit, the Town is required to limit water use to the maximum authorized annual average withdrawal volume, maintain 65 or less residential gallons per capita day (RGPCD), achieve 10% unaccounted for water (UAW) or less, and adhere to limits on seasonal nonessential outdoor water use (NOWU). From May through September, NOWU is restricted to 2 days per week and must take place between the hours of 5pm and 9am. Based on the new May 2021 WMA Permit, stricter seasonal restrictions will be imposed if the 65 RGPCD limits are not met, and if UAW is above 10%, a Water Loss Control program must be implemented. This would include a water audit, annual leak detection/repair, a meter inspection/replacement program, quarterly billing, and full cost system pricing. Conservation restrictions are discussed in more detail in Table 2 of Section 4.2. RGPCD and UAW values for the past five years are graphed below.

Figure 2 - Annual Residential Gallons Per Capita Day

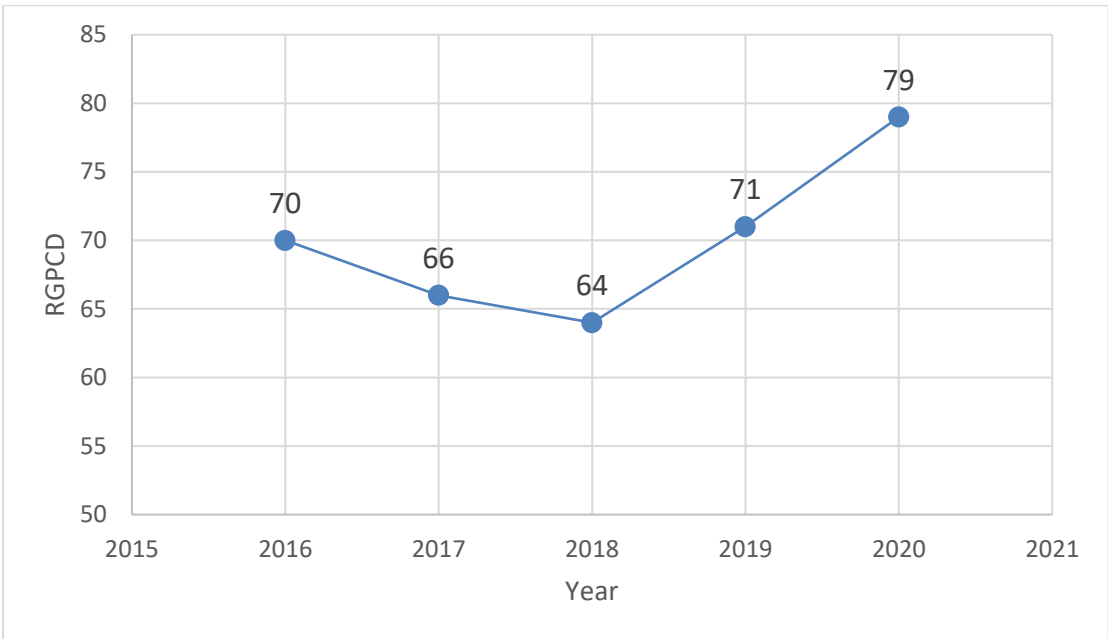
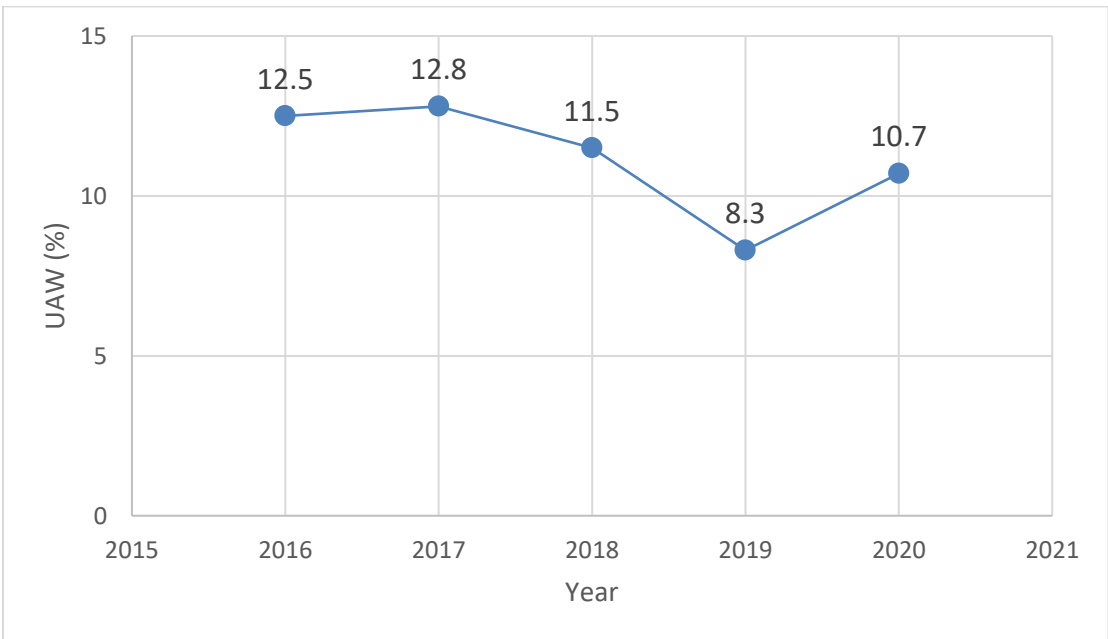


Figure 3 - Annual Unaccounted for Water



1.3 PROJECT SCOPE

As Kleinfelder began work to evaluate a full MWRA supply solution and consulted with the Town, the scope of this study was expanded to include additional research and discussion on all of Wayland's points of interest, including the option of a hybrid supply – using MWRA for summer peak use- as well as possibly purchasing water from Framingham. The final scope is defined as follows:

Task 1: Meetings and Presentation

- A. Facilitate the following meetings:
 - One kickoff meeting with Kleinfelder, Wayland DPW, and Tata & Howard.
 - Two progress meetings with the Town.
- B. Prepare and present the results of the Draft Report deliverable (Task 3) at one joint meeting of the Board of Selectmen and Board of Public Works.

Task 2: Permanent MWRA Connection – Hydraulic & Cost Evaluation

Perform the following tasks to evaluate the hydraulic feasibility, needs, and costs associated with a new permanent MWRA connection in the vicinity of MWRA's Shaft L in Framingham:

- A. Determine and/or validate average and maximum day demands in the Wayland water system by reviewing five years of MassDEP annual statistical reports.
- B. Coordinate with the MWRA modeling staff to determine minimum and maximum available hydraulic grades at Shaft L.
- C. Coordinate with the Town and Tata & Howard to request, receive, and review the Town's latest hydraulic model and associated calibration reports.
- D. Perform up to four steady state simulations of a new MWRA connection under various demand scenarios to determine a conceptual design for a connecting pipeline to the MWRA water system and necessary improvements to the Wayland water system, including whether a booster pump station is required.
- E. Prepare draft technical narrative to be incorporated into the Task 3 report deliverable summarizing modeling process and results.
- F. Develop conceptual level budgetary costs for infrastructure required to convey MWRA water of adequate flow and pressure through a new permanent connection to serve the entire Wayland system (mains, pumping station(s), flow control valves, etc.). Evaluate alternative routings,

construction methods such as trenchless technologies, and other opportunities to reduce cost and/or construction impacts.

- G. Estimate non-infrastructure costs associated with permanent MWRA supply, including: connection fee, wholesale cost of water, and the permit and approval processes required for becoming an MWRA water system member community.

Task 3: Alternatives Report

Prepare an Alternatives Report which includes a narrative addressing the following:

A. New MWRA Permanent Supply

- Infrastructure needs, capital costs, and non-infrastructure cost narrative from Task 2.
- Non-cost factors to be considered for this alternative, including:
 - Discussion of the potential for MWRA to enact water conservation regulations based on advocacy from stakeholders and impact on Town conservation restrictions.
- Summary discussion of potential partial MWRA use (blending) vs. total provision of water based on the results of the emergency connection project (by others).
- Summary discussion of disinfection residuals throughout system based on available information provided by the MWRA and the Town to Kleinfelder.

B. Additional Alternatives

Describe, at a conceptual level, the costs, non-cost implications, advantages and disadvantages for the following additional supply alternatives:

- Wheeled Water (purchase of MWRA water provided through the Framingham or Weston water systems).
 - Description of feasibility.
 - Review Framingham water system for pipe upgrade lengths.
 - Develop capital and operational cost estimates.
 - Evaluate and describe permitting considerations.
- Existing Sources:
 - Develop cost estimates for initial capital upgrades at local sources.
 - Develop cost estimates for increased operation and maintenance requirements of local sources.
 - Develop cost estimates for periodic capital upgrades for cost comparison over a 50-year planning cycle.

C. Added Scope Items

- Hultman Aqueduct-only connection.
 - Description of feasibility and reliability.
- Wheel water through Wayland to other communities for purchase.
 - Description of feasibility.
 - Evaluate and describe permitting considerations.
- Conduct survey of partially served communities.
 - Contact partially served community water systems to understand drivers for seeking MWRA water supply, constraints/restrictions for water use, and chlorine and chloramine blending considerations.
 - Discuss requirements for partially served communities with MassDEP Water Management Act program office.
- Evaluate MWRA water supply as a summer peaking option.
 - Develop cost estimates.
 - Evaluate / describe permitting and water restriction considerations.

In this Report, our analysis is presented in the following Sections:

Section 2 – Hydraulic Analysis

Section 3 – MWRA Water Supply (direct, and wheeled from Framingham)

Section 4 – Upgrades to Existing Sources

Section 5 – Lifecycle Cost Analysis

Section 6 – Summary and Conclusions

2 MWRA CONNECTION HYDRAULIC ANALYSIS

2.1 CONNECTION POINT FEASIBILITY SCREENING

The purpose of the hydraulic analysis was to determine a conceptual design for a connecting pipeline to the MWRA Water System and any necessary improvements to the Wayland water system, including whether a booster pump station is required. This conceptual design is detailed in Section 3.2. The first step in developing a conceptual design is determining the point of connection to the MWRA system. The Town asked Kleinfelder to evaluate the MWRA's Hultman and Weston Aqueducts as potential connection points within the Town. As informed by the MWRA, the Hultman Aqueduct would not be a reliable supply source due to its lower flow, lower hydraulic grade line, and high likelihood of being taken offline for long periods of maintenance in the future. The Weston Aqueduct was also ruled out because it is only used in an emergency. The MWRA MetroWest Tunnel is a far more reliable option in the MWRA Water System and the closest connection point to Wayland is the vicinity of MWRA's Shaft L, located to the west in Framingham. The MWRA indicated that connecting at the existing Framingham Elm Street Pump Station would be the most feasible option as detailed in the next section.

2.2 MODEL DEVELOPMENT OVERVIEW

Through coordination with the MWRA modeling staff, it was determined that the hydraulic grade of the MWRA Water System in the vicinity of Shaft L is 274 feet (NAVD88). Given that the maximum water elevation in the Town's Reeves Hill Storage Tank is 85 feet higher at 359 feet (NAVD88), a booster pump will be needed to pump water supply from the MWRA system into the Town's distribution system.

At the Elm Street Pump Station in Framingham, there is piping connecting the existing pump station to the MetroWest Tunnel that can accommodate a new pipeline connection for the Town of Wayland and possibly a new pump station for the Town's connection. From the Elm Street Pump Station, the most direct connection point via roadway to the Town of Wayland's distribution system is at the intersection of Old Connecticut Path and West Plain Street. See Section 3.2 for route details. Pending geotechnical investigation and an agreement with the MWRA, a second transmission main routing option could be

connecting with Old Connecticut Path along the Hultman Aqueduct easement, which would be approximately 1,000 feet shorter.

2.3 WATER DEMAND DATA

Kleinfelder reviewed the Massachusetts Department of Environmental Protection (MassDEP) public water supply annual statistical reports for the Wayland water system for the past ten years and found the water usage values from 2020 to be similar to the average ADDs and MDDs over this timeframe. Neither the population nor the water usage in Wayland are expected to increase so this makes the 2020 usage values an accurate representation of future water usage in the Town. As shown in Section 1.2, these values are a MDD of 2.5 MGD and an ADD of 1.55 MGD. The model is designed to simulate the peak hour demand (PHD) scenario, which can be determined by applying a peaking factor to the MDD. For a Town the size of Wayland, the typical peaking factor is 2. This is used to calculate a PHD of 5 MGD, which is equivalent to 3,500 gallons per minute (gpm). The existing hydraulic model provided by Tata & Howard was updated to model this peak hour demand scenario throughout the Town. Further details on the modeled alternatives and resulting system performances are discussed in Sections 3.2-3.5.

3 MWRA WATER SUPPLY



The Town of Wayland identified the MWRA Water System as a potential source of water supply long before the discovery of PFAS contaminants in all of the Town's existing drinking water sources, and PFAS contamination over the allowable limit in the Happy Hollow Wells. The MWRA Water System is supplied by the Quabbin and Wachusett Reservoirs and the water is treated at the MWRA's John J. Carroll Water Treatment Plant.

As a regional supplier, reliability and redundancy are key factors in MWRA's planning and operations. MWRA has two intake structures and conduits from Wachusett Reservoir to the Carroll WTP in Marlborough, the Cosgrove Tunnel and the Wachusett Aqueduct, providing redundancy from the reservoir to the treatment plant. The plant itself was designed in two halves, and has robust operating contingency modes to operate reliably under a variety of situations.

Downstream of the WTP, there are two parallel conduits all the way to the vicinity Route 128. By connecting to the MWRA water system at either Elm Street or Shaft L, Wayland would have access to these two redundant MWRA transmission pipelines - the MetroWest Tunnel and Hultman Aqueduct. The MetroWest Tunnel was constructed (completed in 2003) with the purpose of providing redundancy to the Hultman Aqueduct within MWRA's water transmission system. The two transmission pipelines can be operated in tandem or independently, allowing either to be taken offline for maintenance, operational needs or in the event of an emergency. The Metropolitan Tunnel Redundancy Program addresses redundancy concerns further downstream of either of the locations where Wayland would connect (essentially eastward from Route 128).

While MWRA's highly protected watersheds provide a natural barrier to any potential source water quality concerns in MWRA source, MWRA maintains a robust emergency preparedness program. MWRA staff regularly perform assessments and drills to ensure that any risks are mitigated, staff are prepared in the event of an emergency and any potential disruptions to water supply are avoided or minimized.

Section 3.1 below discusses the general requirements and benefits of admission to the MWRA Water System, as well as water quality and conservation considerations. Section 3.2. summarizes our evaluation of the feasibility of constructing a new pipeline and pump station to provide the Town with full MWRA water supply. Sections 3.3 through 3.5 discuss the water main upgrades required within the Town to obtain adequate water flow and pressure, along with the infrastructure and water purchase costs.

3.1 ADMISSION TO THE MWRA WATER SYSTEM

In addition to the constructability considerations of connecting to the MWRA Water System, there are regulatory requirements and non-infrastructure costs to consider. The figure to the left on the prior page outlines the MWRA admission process. This process typically takes on the order of two years to complete.

3.1.1 Regulatory Requirements

For a community to be admitted to the MWRA Water System, it must provide thorough documentation complying with the MWRA's Enabling Act. The Act ensures the applicant community has undertaken extensive measures to meet its water demands with their local sources and is still unable to meet its needs. In addition to providing detailed documentation, the community must also meet the following criteria, administered by the Massachusetts Water Resources Commission (WRC), and based on the MWRA Admission Policy (Admission of New Community to MWRA Water System Policy #: OP.10):

1. Approvals from the Secretary of Environmental Affairs through the Massachusetts Environmental Policy Act (MEPA) review process, the Water Resources Commission through the Interbasin Transfer Act (ITA) process, the MWRA Advisory Board, the MassDEP on local source feasibility, the General Court, and the Governor.
2. Description of efforts to develop all viable sources in the receiving area.
3. Implementation of all practical water conservation measures:
 - Full leak detection surveys should be completed within the previous two years of the application.
 - The water supply system should be 100% metered.
 - Unaccounted-for water should be 10% or less.
 - The proponent should provide documentation to show that there are sufficient sources of funding to maintain the system.

- The proponent should bill its customers at least quarterly based on actual meter readings.
 - A drought/emergency contingency plan should be in place.
 - All government and other public buildings under the control of the proponent should have been retrofit with water saving devices.
 - Records of water audits conducted on public facilities should be provided.
 - If the community's residential gallons per capita/day is greater than 65, the proponent should be implementing a comprehensive residential conservation program.
 - A broad-based public education program which attempts to reach every user at least two times per year, through such means as mailings, billboards, newspaper articles, cable television announcements or programs, or the use of other media, should be in place.
 - A program which identifies, ranks and works with all commercial, industrial and institutional customers according to amount of use in order to determine areas where the greatest potential for water savings exists, should be in place.
 - A program of land use controls to protect existing water supply sources of the receiving area that meet the requirements of the Department of Environmental Protection.
4. Determination that a reasonable instream flow will be maintained (from the donor basin).
 5. Results of new ground water supply pumping test if applicable.
 6. Development of Local Water Resources Management Plan.
 7. Provision of sufficient data to enable the Commission to evaluate whether the effects of the proposed transfer exacerbate the impacts of all past, authorized, or proposed transfers on streamflows in the donor basin.

After the MEPA review process and ITA process are complete, the application for admission is submitted to the MWRA. The MWRA then reviews the documentation and analyzes the impact of the proposed additional water demand on the MWRA Water System. Once approved, a Water Supply Agreement establishes terms and conditions. Typically, the admitted community must pay all construction costs associated with connecting the water system. Reviews conducted under the MEPA process and the ITA can also require conditions for approval. Performance standards for ITA approval are outlined below (see

Appendix A for full document). They reinforce some of the same admission requirements stated by the MWRA.

Interbasin Transfer Act Performance Standards

Unaccounted-for water should be 10% or less. The proponent should provide documentation of unaccounted-for water, in both gallons and percentage of the total water pumped and withdrawn, for each of the past five years. The plan by which the community intends to maintain or reduce this level should be included in the Local Water Resources Management Plan required under Criterion #7 listed above.

A drought/emergency contingency plan, as described in 313 CMR 4.02, should be in place. This plan should include seasonal use guidelines, measures for voluntary and mandatory water use restrictions and describe how these will be implemented. There should be a mechanism in place to tie water use restrictions to streamflow and/or surface water levels in the affected basin(s) where this information is available. The plan should become part of the Local Water Resources Management Plan required under Criterion #7.

If the community's residential gallons per capita per day is greater than 65, the proponent should be implementing a comprehensive residential conservation program that seeks to reduce residential water use through a retrofit, rebate, or other similarly effective program for encouraging installation of household water saving devices, including faucet aerators, showerheads and toilets and through efforts to reduce excessive outdoor water use.

A program which identifies, ranks, and works with all commercial, industrial and institutional customers according to amount of use in order to determine areas where the greatest potential for water savings exists, should be in place. The water supplier should make regular contact with these users to promote water conservation. Materials on water reuse and recirculation techniques should be provided, where appropriate.

3.1.2 Non-Capital Costs and Funding Sources

The MWRA's current FY22 water rates are \$4,387.28 per million gallons of water. Based on anticipated increases in operating and capital expenses for the MWRA water system, the MWRA has projected a 3.9% rate increase per year through FY31. Over the past five years the average rate increase has been 3.5% (personal communication, MWRA, June 2021).

An entrance fee is also charged to cover the new community's proportional costs of the MWRA Water System at the time of entry to the system. Entrance to the MWRA water system can be paid either as one lump sum payment or over 25 years without interest and with a three-year grace period. Communities that need to increase their approved withdrawal amount are also eligible for the interest free payment plan. The estimated amount of water supply needed from the MWRA is based on a detailed analysis of historic water use trends in the applicant community's water system including future water demand projections, available local supply, and resulting supply deficit. If the new community is already under an MWRA emergency supply agreement and has been assessed payments for that agreement, then those costs will be treated as credits towards the entrance fee. According to personal communications between the Town of Wayland and MWRA Advisory Board in April of 2022, there is a potential for the MWRA Advisory Board to vote to waive the MWRA entrance fee. Currently the MWRA entrance fee is calculated as explained below.

The current Net Asset Value (NAV) of the MWRA Water System is \$892,008,000 (personal communication, MWRA, July 2021). The average daily MWRA Water System water use for the year 2021 is approximately 192 MGD and the peak six-month average daily use is approximately 211 MGD. Kleinfelder used this data to calculate the total entrance fee for Wayland if the Town seeks admission for full water supply. As per the MWRA Policy OP.10, the entrance fee is based on the new member communities share of the MWRA system use. The entrance fee is calculated using the equation below.

$$\text{Entrance Fee} = \left(0.75 * NAV * \frac{ADD_{\text{Wayland}}}{ADD_{\text{MWRA}}} \right) + \left(0.25 * NAV * \frac{\text{Peak Six Months } ADD_{\text{Wayland}}}{\text{Peak Six Months } ADD_{\text{MWRA}}} \right)$$

$$\text{Entrance Fee} = \left(0.75 * \$892,008,000 * \frac{1.55 \text{ MGD}}{192 \text{ MGD}} \right) + \left(0.25 * \$892,008,000 * \frac{1.74 \text{ MGD}}{211 \text{ MGD}} \right) \cong \$7,245,000$$

Assuming a full MWRA supply, the entrance fee for Wayland would be approximately \$7,245,000. The total cost of the entrance fee will vary depending on whether the Town is fully or partially served by the MWRA. The entrance fee for a partial MWRA supply of 0.55 MGD would be calculated as follows.

$$\text{Entrance Fee} = \left(0.75 * \$892,008,000 * \frac{0.55 \text{ MGD}}{192 \text{ MGD}} \right) + \left(0.25 * \$892,008,000 * \frac{0.74 \text{ MGD}}{211 \text{ MGD}} \right) \cong \$2,697,000$$

The final entrance fee would be locked in at the time of the agreement signing. Understanding that there are significant costs facing communities who wish to connect to the MWRA or other regional water

supplies, the Massachusetts Legislature granted authority for additional financial incentives as outlined below.

MassDEP Drinking Water State Revolving Loan Fund (SRF) regulations, 310 CMR 45.00: The SRF provides low interest (currently 2%) loans for communities to finance eligible drinking water projects. The SRF regulations were amended to incorporate language from SECTION 23 of Chapter 259 of the Acts of 2014. *(e) The department shall promulgate regulations under section 7 establishing the types of eligible projects and criteria that the department shall use to evaluate applications for additional financial assistance, including principal forgiveness and additional financial incentives, consistent with the sustainability criteria as determined by the United States Environmental Protection Agency as required by the Water Resources Reform and Development Act of 2014. The financial assistance and financial incentives provided under these regulations shall be made available to projects appearing in the department's intended use plan the year following the release of regulations by the department and subsequent years. Such criteria may include, the following requirements, any 1 of which shall be sufficient to qualify the project for assistance: (i) the project is pursuant to a regional wastewater management plan that has been adopted by a regional planning agency with regulatory authority; (ii) **the project is necessary to connect a local or regional local governmental unit to a facility of the Massachusetts Water Resources Authority, if the local or regional local governmental unit has paid or committed to pay the entry fee of that authority;** (iii) the project is a green infrastructure project, as defined in section 26A of chapter 21, with consideration being given to projects that effectively combine green infrastructure with wastewater infrastructure and drinking water infrastructure projects; (iv) **the project uses regional water resources to offset, by at least 100 per cent, the impact of water withdrawals on local water resources in the watershed Basin of the receiving community;** (v) the project is a direct result of a disaster affecting the service area that is the subject of a declaration of emergency by the governor; (vi) the project is intended to provide public water supply to consumers whose groundwater or public or private wells are impacted by contamination; or (vii) the program is an innovative water project utilizing new technology, which improves environmental or treatment quality, reduces cost, increases access and availability of water, conserves water or energy or improves management, in the areas of drinking water, wastewater, stormwater, groundwater or coastal resources; provided, that the project has not been fully implemented, other than as a pilot project, previously in the commonwealth.*

While these regulatory revisions were intended to help communities defray the cost of the physical connection to the MWRA (or another regional supplier) by making such projects eligible for SRF financing,

the terms of the financing would still be dictated by the SRF program ranking system, which provides higher ranking, and greater degree of loan principal forgiveness for communities with lower household income. Currently, principal forgiveness (ranging 3 to 9%) is only available to communities with adjusted per capita income of 80% or lower. The most recent affordability calculation for Wayland indicates an APCI of 311% of the state average, so principal forgiveness is not anticipated. The SRF program does incentivize projects that would address PFAS contamination by providing a 0% interest loan. We believe this would be available to Wayland for either MWRA or local sources projects to address PFAS.

3.1.3 MWRA Community Benefits

The MWRA cites several community benefits for potential applicants to consider. According to information provided by MWRA (General Member Benefits, 2021) these include abundant supply, excellent water quality, and local assistance (technical, educational, and financial). The MWRA has abundant water supply and system capacity to continue to serve existing areas along with new communities to meet water demand requirements. MWRA's current water demand is well below its registered volume of 311.9 MGD.

The excellent water quality is due to protected watersheds and large reservoirs. The water leaving the reservoir is pure enough that the MWRA is not required by EPA rules to provide chemical filtration, unlike most other large surface water systems in the nation. The John J. Carroll Treatment Plant is fed from the Wachusett Reservoir and is treated with ozone, ultra-violet light, sodium carbonate, carbon dioxide, fluoride, and chloramines.

A Local Water System Assistance Program (LWSAP) is implemented by the MWRA. The program provides a total of \$725 million in 10-year, zero-interest loans for water system improvement projects. The financial assistance from the MWRA helps local water systems maintain and improve water quality. Fully supplied communities receive water quality lab services from the MWRA at no additional cost because they are covered under MWRA's compliance and sampling plans. MWRA collects, analyzes, and reports on any samples including raw water samples. Along with the lab services, the MWRA offers staff training at no cost. The training includes water quality, management of the distribution system, and public interest issues.

Another benefit the MWRA provides is technical and emergency assistance to communities in need. These services include emergency advice, troubleshooting, emergency disinfection equipment, special

water quality sampling, modeling assistance, equipment loans and advice to communities that have storage tank and water age problems. The MWRA cites their working relationship with the MassDEP as helping to assist in resolving issues. The MWRA encourages water conservation and provides education along with a variety of related services.

3.1.4 Water Conservation Requirements

To comply with the MWRA admission process for either partial or full supply, the Town would need to demonstrate that “all practical measures” have been implemented to conserve water, and that conservation measures are maintained in accordance with the Local Water Resources Management Plan that it develops under Interbasin Transfer Act Performance Standards. The specific water conservation requirements for a partial or full MWRA supply are summarized in

Table 2 below, and described in the Interbasin Performance Standards in Appendix A. In general, for recent ITA decisions, the Water Resources Commission appears to be pushing applicants towards current 2018 Massachusetts Water Conservation Standards as consistent with “all practical measures”. The 2018 Water Conservation Standards require nonessential outdoor use restrictions be imposed during a State Drought Condition. These conditions begin with Level 1 Drought (1 day per week watering before 9 a.m. or after 5 p.m.), increase to Level 2 (hand-held hoses or watering can only before 9 a.m. or after 5 p.m.) and ban nonessential outdoor use during Level 3 and 4 Drought.

For partial MWRA supply, if permitted wells are retained, the conservation requirements stated in the Town’s WMA permit would continue to apply. These are discussed in Section 4.2 (Table 7).

The communities surveyed in Section 3.1.6 which reported that they do not have water use restrictions joined the MWRA without pre-existing (WMA) permits and prior to the current admission policy performance standards. All of the more recent communities to join the MWRA Water System have some level of outdoor use restrictions and are required to document compliance with the 65 rgpcd and 10% UAW standard. A list of all MWRA supplied communities including the years they joined, agency joined under, and type of supply can be found in Appendix C.

Table 2 – MWRA Options Conservation Components & Requirements

Requirement	Partial MWRA w/ Registered Well(s)	Full MWRA
RGPCD	ITA Standards: Local Water Resources Mgmt plan If > 65 rgpcd: - Implement a comprehensive residential conservation program to reduce use via demand management (water saving devices, rebates) and efforts to reduce excessive outdoor water use Submit ASR annually	
UAW	ITA application requires 10% UAW is being achieved. Local Water Resources Management Plan “should include a comprehensive program to comply with state water conservation standards and to reach or maintain the goal of < 10% unaccounted-for water”	
Seasonal Nonessential Outdoor Use* (NOWU)	ITA Requires: A drought/emergency contingency plan, as described in 313 CMR 4.02, should be in place. This plan should include seasonal use guidelines, measures for voluntary and mandatory water use restrictions and describe how these will be implemented. There should be a mechanism in place to tie water use restrictions to streamflow and/or surface water levels in the affected basin(s) where this information is available. The plan should become part of the Local Water Resources Management Plan required under Criterion #7.	
GW Supply Protection	Repeat Best Effort to encourage Sudbury to include Zone II in Water Resource Protection District	N/A
Water Conservation Standards	LWRMP should meet Conservation Standards. Recent ITA approvals have required compliance with 2018 standards.	
Minimization of GW Basin impacts	If relinquish Permit, N/A	N/A
Baseline	If relinquish Permit, N/A	N/A

* Nonessential Outdoor Water Uses:

Nonessential outdoor water uses that are subject to mandatory restrictions include:

- irrigation of lawns via automatic irrigation systems or sprinklers;
- filling swimming pools;
- washing vehicles, except in a commercial car wash or as necessary for operator safety;
- washing exterior building surfaces, parking lots, driveways or sidewalks, except as necessary to apply surface treatments such as paint, preservatives, stucco, pavement or cement.

The following uses may be allowed when mandatory restrictions are in place:

- irrigation to establish a new lawn and new plantings during the months of May and September;
- irrigation of public parks and recreational fields before 9 a.m. and after 5 p.m.;
- irrigation of gardens, flowers and ornamental plants by means of a hand-held hose or drip irrigation system; and irrigation of lawns by means of a hand-held hose.

Water uses NOT subject to mandatory restrictions are those required:

- for health or safety reasons;

- by regulation;
- for the production of food and fiber;
- for the maintenance of livestock; or
- to meet the core functions of a business (for example, irrigation by golf courses as necessary to maintain tees, greens, and minimal fairway watering, or irrigation by plant nurseries as necessary to maintain stock).

3.1.5 Water Quality Compatibility

The Quabbin and Wachusett Reservoirs support more than two million people with a combined capacity of 477 billion gallons of water. The water in the reservoirs is tested for over 120 contaminants. The MWRA performs several hundred tests on the system a year. The MWRA provides water that meets the standards of the EPA and Massachusetts DEP. Along with the testing, the MWRA monitors their raw water and treated water for various parameters including disinfection, corrosivity, and organic and inorganic material in the water. The pH and the alkalinity of the Wachusett water is adjusted by the MWRA to reduce corrosivity, minimizing lead and copper from getting into the water from service lines and home plumbing systems. The pH of MWRA's distribution water is targeted at 9.3, while alkalinity is 40 mg/L. Through MassDEP requirements, samples from the plant must have a minimum pH level of 9.1 and 37 mg/L for alkalinity. Results from the samples must not be below these requirements for more than 9 days within a six-month period.

As previously stated, the MWRA water is treated with chloramines, unlike the finished water of Wayland, which is treated with chlorine. Obtaining partial MWRA water supply would create a mixing of water treated with chloramines and chlorine, which can cause water quality issues in the water system. Operators of distribution systems can however blend chlorine and chloramine with focused oversight without issues based on analysis and system modeling. If the Town is to consider blending, then it should also incorporate ammonia, nitrites, and monochloramines into its existing monitoring program to determine the chlorine status at different locations. The chlorine to chloramine ratio should be above 70:30 at all times based on the system's average daily use. Poor blending of chlorine and chloramine can result in taste and odor complaints. As mentioned in Section 3.1.4, the higher the pH in the mixing zones, the lower the probability of water quality issues. If the Town pursues partial MWRA water supply, it should consider switching from chlorine to chloramine treatment for their existing sources to minimize potential problems. The MWRA is working on an evaluation specific to Wayland and has requested additional data from Wayland. As our research with other partially served communities indicates, this is unlikely to be a significant issue. We do not recommend basing the decision on the results of this analysis.

3.1.6 Survey of Partially Served Communities

As part of this investigation into the feasibility of using the MWRA as a drinking water supply, Kleinfelder contacted partially served MWRA communities to hear about their experiences with the MWRA Water System. Below is a table summarizing these discussions with each community. All the communities that we interviewed joined the MWRA because they couldn't meet water demands using their existing local sources of supply. Their water supply shortfalls varied from seasonally, to year-round, or during certain years. The communities implement varying levels of outdoor water use restrictions based on the date of entry into MWRA and whether the community has a permit under the Water Management Act (WMA). None of the communities reported issues with blending chlorine and chloramine treated water, however Northborough did state that they would have issues due to their mineral rich groundwater. Woburn states that they have no issues if they keep the pH level elevated in mixing zones.

Table 3 – Interviews with Partially Served MWRA Communities

Community (Year Joined)	1. What were the drivers for seeking MWRA's water supply?	2. Any constraints or restrictions such as seasonal restrictions, that come with MWRA's water supply?	3. Did you experience any issues blending chlorine vs. chloramine disinfectant residuals? Compliance? Costs?	General Comments
Ashland (2020)	Ashland needed a supplemental connection due to their wells not being able to support their needs during times of drought.	Ashland's water use is governed by its ITA agreement and must meet ITA Performance Standards. Ashland has documented its Conservation Program is in accordance with 2018 MA Water Conservation Stds	Ashland also uses Chloramines so blending is not an issue. They did have an issue due to the fact that they use Orthophosphate for corrosion control and the MWRA does not. This became an issue with the DEP which required Ashland to add Ortho at the connection location which resulted in added cost for the town. Ashland had a hurdle with lead and copper sampling that they have since resolved with the DEP. DEP had asked for increased sampling to twice a year and doubled the amount of sample locations, this decision has since been reversed due to the connection not being a continuous supplement and that Ashland had added the Ortho injection at the connection site.	It has been a long and expensive process to construct Ashland's permanent emergency connection to the MWRA through the Town of Southborough.

Community (Year Joined)	1. What were the drivers for seeking MWRA's water supply?	2. Any constraints or restrictions such as seasonal restrictions, that come with MWRA's water supply?	3. Did you experience any issues blending chlorine vs. chloramine disinfectant residuals? Compliance? Costs?	General Comments
Needham (1954)	The driving force to seek MWRA supply was simply the demand for water and insufficient supply. Needham has three groundwater wells with a water management act (WMA) through DEP. The registered volume of water cannot exceed an annual average of 2.63 MGD. The annual average is around 3.4-3.5 MGD between both sources. Needham primarily supplements the water supply between the months of April and September. They periodically do maintenance on the wells (re-developments, equipment replacement) so the MWRA supply helps out then.	There's really no constraints or restrictions on the MWRA water supply. Needham has a continuous 10-year contract agreement with them. MWRA would ask communities to impose voluntary restrictions only if DEP declared a moderate to severe drought in their source water reservoirs but this is currently not a likely issue.	Needham hasn't experienced too many water quality complaints when it comes to blended free chlorine/chloramines source waters. Ideally Needham contacts the MWRA so they can flush section 80 prior to activating in the springtime when the water is stagnant to try and eliminate those complaints.	Needham has been an MWRA partially supplied community since the late 1950's. The MWRA recently upgraded the pump station in 2015 with Variable Frequency Drives (VFDs). They draw the water from the Quabbin Reservoir which is treated at the Carroll WTP in Marlboro and then fed through section 80 directly to Needham. For every million gallons of MWRA water pumped, it costs the town approximately \$1000.
Woburn (1972)	There are 5 existing wells in Woburn. They joined the MWRA when the industrial park got too big to meet demands within the town.	No restrictions from MWRA. Limited to 4 MGD in existing town wells.	Woburn uses chlorine. No issues in mixing zones. Need to keep ph up in the mixing zones or else there are issues with cloudy water. Had that issue a long time ago.	Woburn is one of the original members. They had e coli in the tank once and MWRA came in and took care of all of it. Zero complaints working with the MWRA. Need to notify dialysis centers. Woburn is upgrading plants for PFAS right now. Have dealt with iron and manganese in the past. Still more economical to keep existing wells running despite upgrades.

Community (Year Joined)	1. What were the drivers for seeking MWRA's water supply?	2. Any constraints or restrictions such as seasonal restrictions, that come with MWRA's water supply?	3. Did you experience any issues blending chlorine vs. chloramine disinfectant residuals? Compliance? Costs?	General Comments
Northborough (1954)	Could not fulfill supply with existing wells. 100% of water now comes from MWRA. The wells in Northborough have adequate supply for 3/4 of demand but they couldn't do a combined supply because of water compatibility issues.	No water use restrictions, indoor or outdoor.	Northborough would have had major issues in mixing zones due to chlorine and Ph issues. The existing wells are rock wells and shallow gravel packed wells which have a lot of minerals. Unidirectional flushing would be smart ahead of time because adding in MWRA flows can change flow directions/turbulence and dislodge debris within system.	No water quality issues or supply issues ever. 4,400 customers in Northborough, \$2.7 million budget per year. 50% goes to the authority. Percentage share of MWRA went up during COVID so operating expenses to MWRA went up.
Marlborough (1957)	Joined the MWRA because supply could not be met. The cities well could supply 1/3 of demand but there were issues with high chlorides in the water and concerns about lead service leachate so it was decommissioned in 2016. This makes the water department's job easier but they lost a redundant water source. If the pump station from the MWRA goes down they're in trouble. A redundant booster station is currently being designed/constructed.	MWRA could implement water use restrictions but they haven't. The Quabbin is reliable enough that it's unlikely. No RGPCD restrictions, just give the MWRA a projection of what they'll need.	There are high manganese levels in the existing source and the industrial parts of the city didn't like that. There are check valves to prevent town water from getting to them so in some areas blending is limited. No issues that they know of.	MWRA staff is very helpful. They're receptive and responsive to questions. Produce water quality reports. Costs the town more but it's been worth it. MWRA does leak detection if there are issues. The MWRA produces a higher quality water than the cities treatment plant was able to produce.
Winchester (1943)	Joined the MWRA because there wasn't enough supply within the town.	No water use restrictions. Just have to renew agreement every 2 years. Lots of complicated financials.	Never seen any issues with mixing. MWRA stays high with the pH to keep the lead counts down.	MWRA has been great but there have been recent coliform hits. All the rain has brought more fecal matter into the reservoir. First time it's happened in 35 years. Recommend the Abrahams Group for financial advice/services when dealing with MWRA.
Peabody (1965)	Can't provide enough water during peak times so MWRA is supplemental.	No	Peabody uses chloramines so there have never been issues.	MWRA supply is increased when treatment plants are down for upgrades but for the most part the majority of the supply comes from town wells. They considered going full MWRA but upgrades within the town were cheaper.

Community (Year Joined)	1. What were the drivers for seeking MWRA's water supply?	2. Any constraints or restrictions such as seasonal restrictions, that come with MWRA's water supply?	3. Did you experience any issues blending chlorine vs. chloramine disinfectant residuals? Compliance? Costs?	General Comments
Burlington (2020)	There are 7 wells at Burlington's groundwater wellfield. 3 of 7 had 1-4 dioxane levels too high so they Joined the MWRA to fill the void. They later found PFAS in the remaining 4 wells and reservoir. Burlington plans to install filtration at Mill Pond (Reservoir). They will permanently retire the groundwater plant once phase 2 is constructed. They've opted to not treat water from those wells due to cost but will keep filtering at reservoir for redundancy.	Water use restrictions are stated in the ITA agreement and are expected to be similar to Ashland's. 1 MGD for phase 1 connection. Phase 2 construction will begin early next year which could get to 6 MGD. Burlington is assuming there will be restrictions to be on the safe side. Still do odd even year-round.	No issues with blending reservoir water.	
Wellesley (1974)	Joined the MWRA for increased supply and for redundancy. Makes it much easier to run the system. Wellesley has 10 wells and 3 treatment plants. They treat for PFAS and are in the process of putting interim treatment in for early next year. A 40% rate adjustment will occur.	Stated that since Wayland has permitted wells, water use restrictions will still apply.	Wellesley hasn't had any issues. There is quite a bit of water in storage but no nitrification. There is some increased water age for parts of the Town that used to be served by wells and are now served by MWRA.	Boston's decrease in water use has increased Town entry fees. Would highly recommend being a partially served community. They care a lot about the redundancy. The MWRA can fail, Boston was under a boil order for a couple days in May 2010 when a coupling broke.

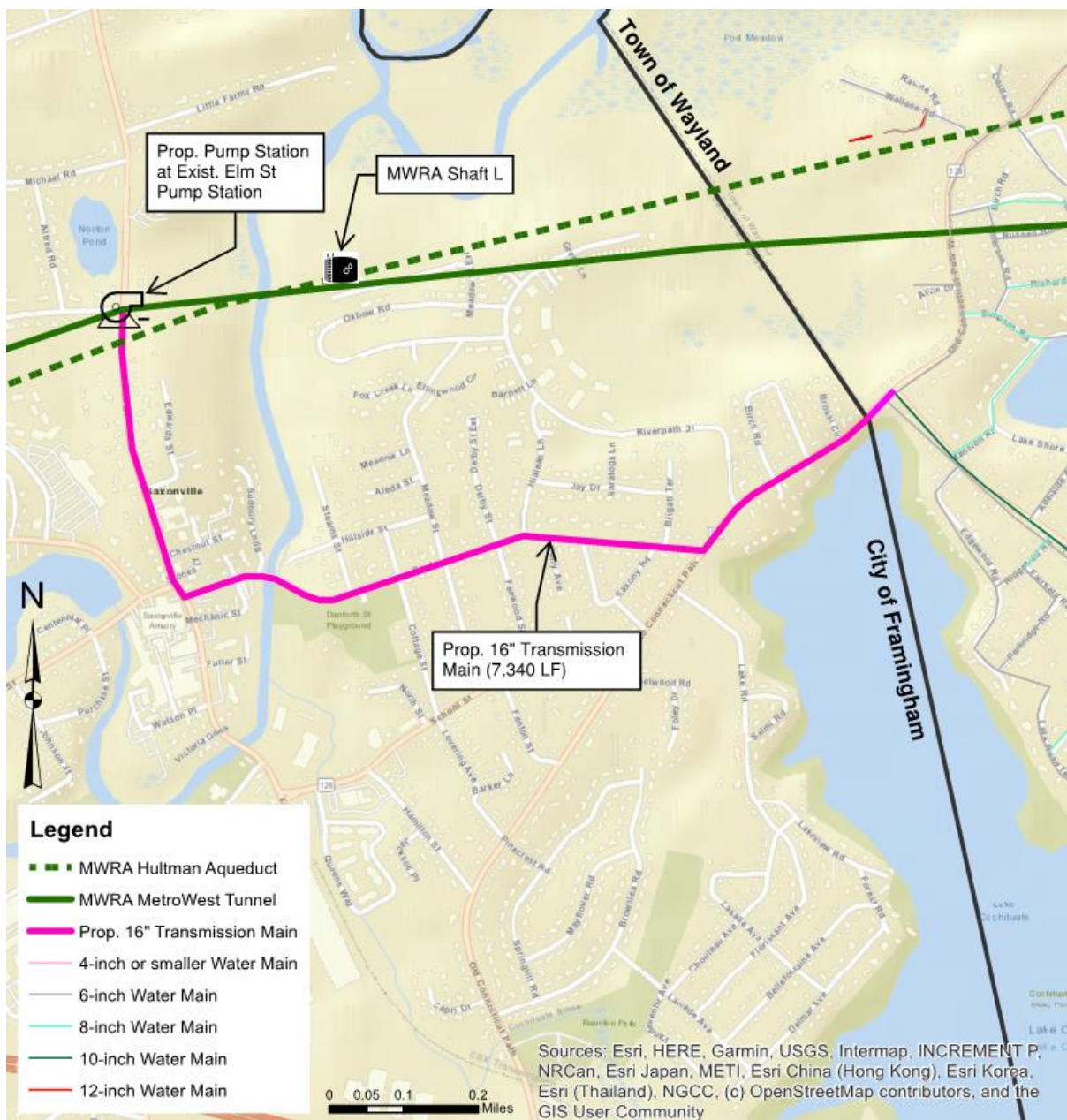
3.2 NEW INFRASTRUCTURE REQUIREMENTS

As explained in Section 2, a new pipeline connection and pump station would be needed to connect the Town's distribution system to the MWRA Water System. At the Elm St pump station in Framingham, there is existing piping suitable for the connection of Wayland's new pump station to the MWRA MetroWest Tunnel. Kleinfelder performed an analysis using the Town's hydraulic model to determine the necessary booster pump size and upgrades to the Town's existing water mains to supply the entire town with MWRA water under the peak hourly demand scenario developed in Section 2. The route of the pipeline, or water transmission main, that was included in the model simulation starts at the Elm Street Pump Station location in Framingham and runs south along Elm Street before turning east onto Danforth Street and connecting to Wayland's existing distribution system at the intersection of Old Connecticut Path and West Plain Street. This route is shown below in Figure 4.

According to recent information from MWRA (February 2022, verbal discussion), an additional route option for the transmission main is along the Hultman Aqueduct easement. This would run a length of approximately 6,020 feet (about 1,000 feet shorter). This route has unknown feasibility considerations which would need to be further evaluated, including geotechnical, constructability, and permitting constraints.

To meet peak water demands in Wayland, the booster pump must be designed to provide a flow rate of 5 MGD. The peak hour demand is used as the design point for the pump station because if the Reeves Hill Storage Tank were to go offline for repairs, the peak hour demand would need to be met solely by the MWRA supply. Using several model iterations with different pump design heads, it was determined that the pump must have a design head of 200 feet to supply the entire town.

Figure 4 - Proposed 16-inch Diameter Transmission Main Route



3.3 EXISTING WATER MAIN UPGRADE ALTERNATIVES

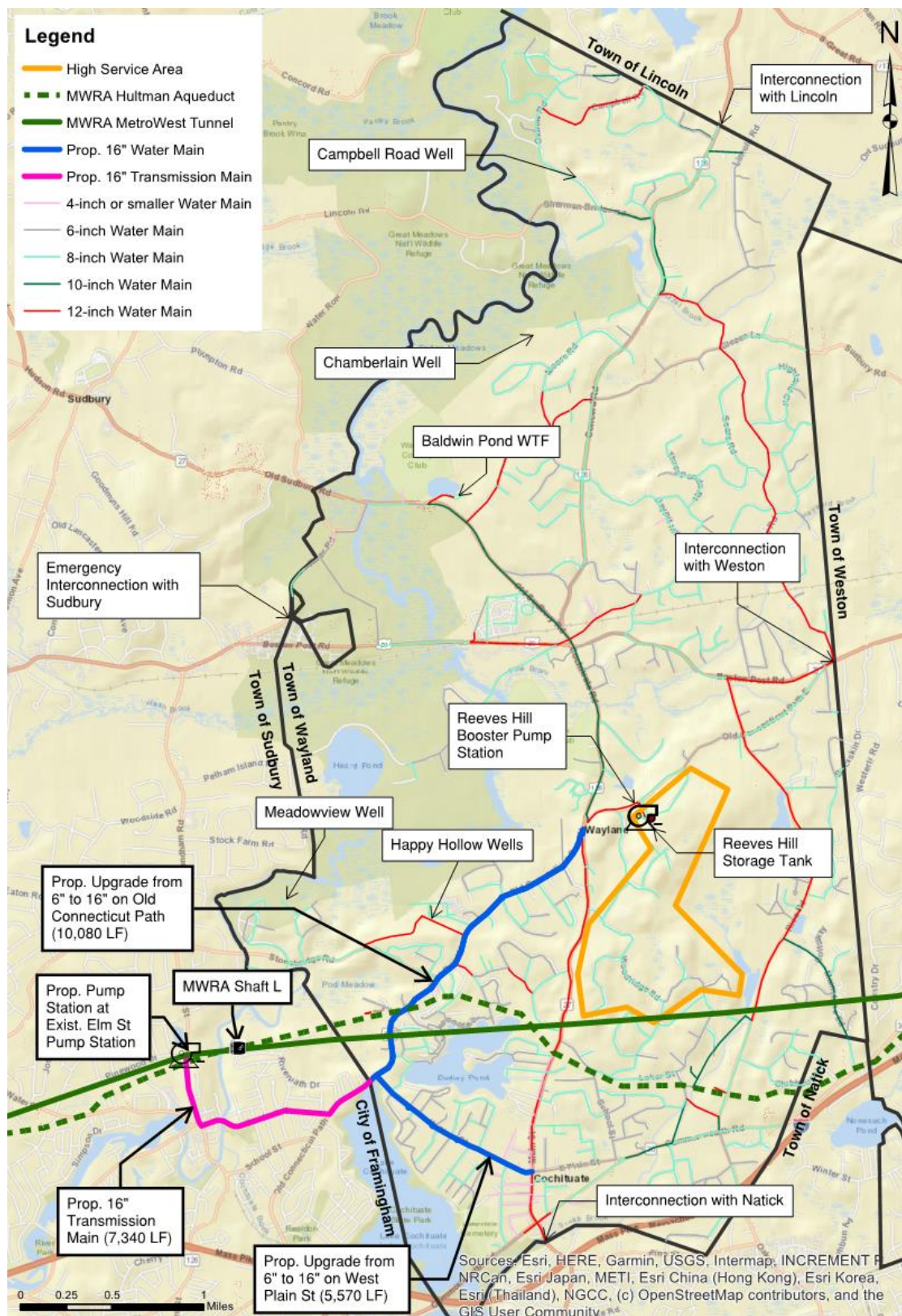
As mentioned above, the booster pump station requires a design point of 5 MGD at 200 feet of head. This design point was used for each existing water main upgrade alternative modeled in the hydraulic analysis. For each upgrade alternative, the pressure in the distribution system at the intersection of Old Connecticut Path and West Plain Street and the flow leaving Shaft L were used to assess the feasibility of the alternative. The analysis began with modeling the existing conditions of the distribution system, followed by modeling the connection of the existing distribution system to the proposed pump station. The remaining alternatives incrementally increased the lengths and sizes of pipe upgrades within the Town to reach the desired pressure of 80-90 psi and flow of 5 MGD. A summary of these values is shown in Table 4 below.

Table 4 - Modeled Alternatives

ID	Alternative Name	New 16" Pipe (LF)	New 12" Pipe (LF)	Pressure at Intersection of Old Connecticut Path and West Plain St (psi)	Flow from MWRA (MGD)
0	Existing Conditions, no MWRA connection	-	-	60 to 80	NA
1	Base connection to Pump Station at MWRA	7,340	-	156	0.9
2	West Plain St Upsize 6" to 16"	12,910	-	116	5.0
3	Old Connecticut Path Upsize 6" to 16"	17,420	-	97	5.0
4	12" Old Connecticut Path and 12" West Plain St	7,340	15,490	98	5.0
5	16" Old Connecticut Path and 16" West Plain St	22,830	-	86	5.0

Based on the hydraulic analysis, the MWRA Water System can fully supply the Town of Wayland with its peak water demand by installing a new booster pump station near either Shaft L or the Elm Street Pump Station location in Framingham and replacing approximately 15,500 feet of existing 6 inch diameter pipe within the Wayland distribution system with new 16 inch diameter pipe. In addition, a 16-inch diameter transmission main must also be installed in Framingham to connect the MWRA Water System to the Wayland distribution system. This proposed infrastructure is shown in Figure 5 below.

Figure 5 - Proposed Infrastructure for MWRA Connection



Alternatively, if the Town were to construct a 16" transmission main in the Hultman Aqueduct corridor, a different approach could be taken to upgrading the in-town water mains and maintaining adequate pressure. One water main upgrade option that was modeled and determined to provide adequate flow and pressure is shown below in Figure 6. The proposed improvements would not change system pressures except slightly near the connection point near either Old Connecticut Path and West Plain Street or Old Connecticut Path and the Hultman Aqueduct, depending on the chosen connection location. Customers would not observe increased pressures from the improvements. Further hydraulic analysis and review of the Town's capital investment plan could determine additional options for upgrading water mains.

The other option is wheeling MWRA water supply through the Framingham distribution system to the Wayland system. This alternative still requires the construction of a new booster pump station and the in-town pipe upgrades on Old Connecticut Path and West Plain Street, however instead of constructing a transmission main, only a 1,400 foot 16-inch diameter connecting pipe would be necessary to connect Wayland's distribution system to Framingham's. The 1,400-foot connecting pipe is shown in Figure 7. Water rate implications for this option are discussed in Section 3.5.

Figure 6 - Proposed MWRA Connection via Hultman Aqueduct Corridor

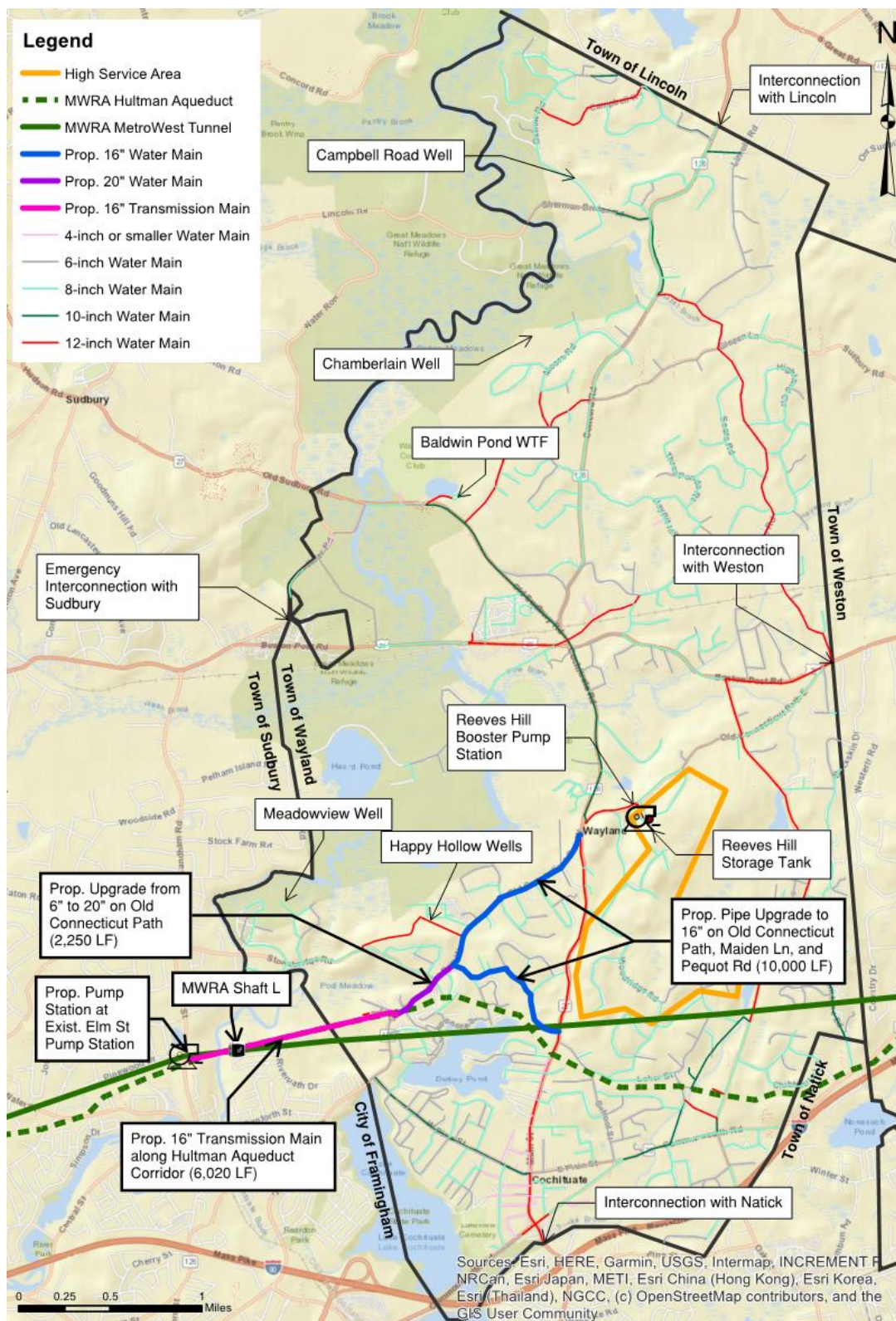
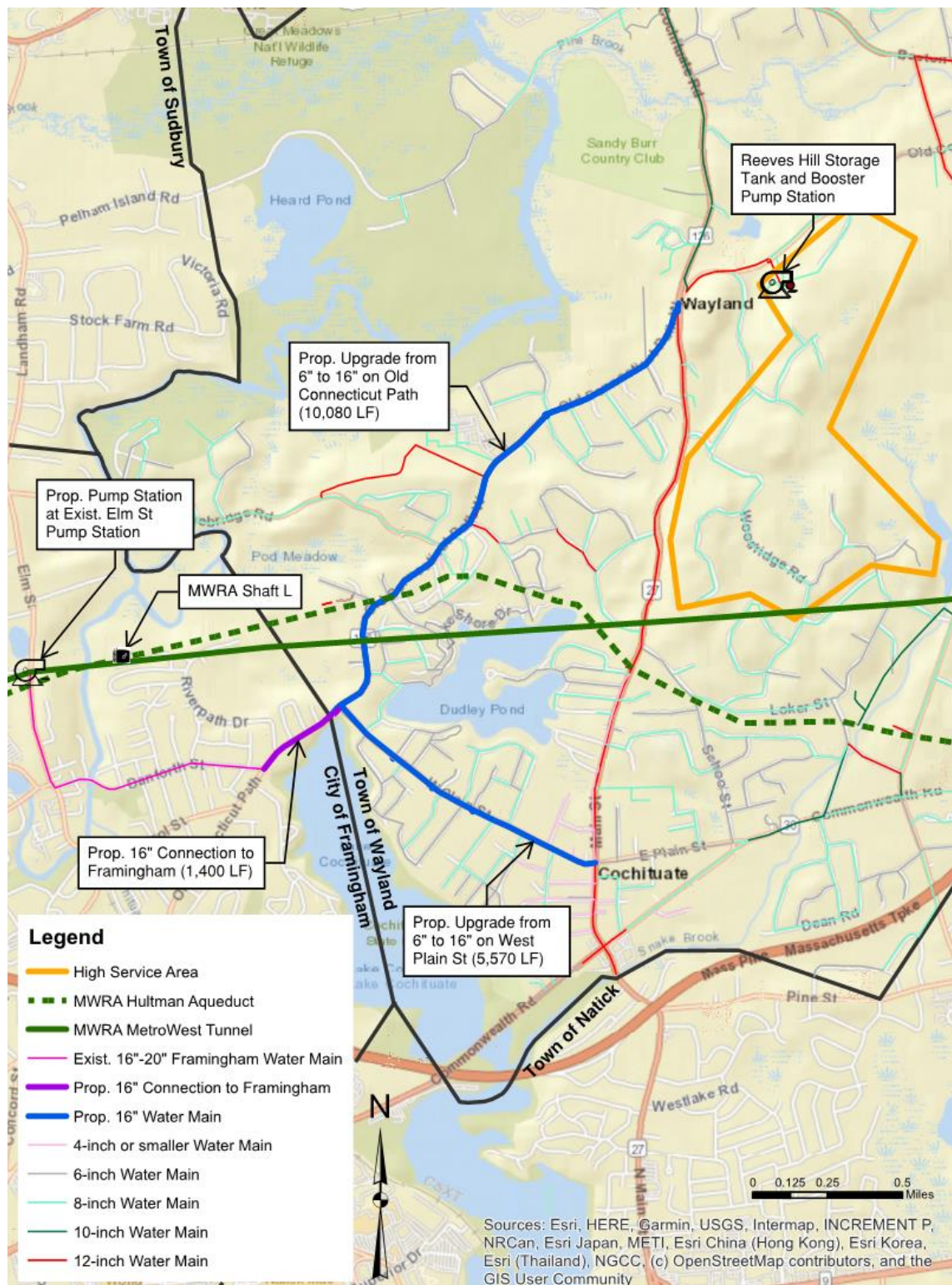


Figure 7 - Proposed Framingham Connection for Wheeling Water



3.4 INFRASTRUCTURE CAPITAL COSTS

The capital costs required to connect to the MWRA Water System are the booster pump station, the 16" diameter transmission main, and the 16" diameter water main upgrades within the Town. A booster pump station designed for 5 MGD at 200 feet of head requires a total pump horsepower (HP) of about 225. To accommodate a redundant pump, the booster pump station will need a total HP of about 300. The following is a list of planning-level conceptual design costs for the required infrastructure. The costs are based upon recent regional bid prices for similar projects and include a 20% allocation for engineering and a 30% allocation for contingency.

1. Booster pump station: approximately \$6,700,000.
 - This figure includes costs for mobilization/demobilization, the pump station building, interior pump station equipment, exterior fittings/piping necessary to connect to the transmission main, electric utility connection fees, and a back-up generator.
2. 7,300 feet of 16-inch diameter transmission main: approximately \$4,200,000.
 - This estimate includes the cost of full width paving on Framingham's roads.
3. 15,500 feet of 16-inch diameter water main upgrades within the Town: approximately \$7,700,000.
 - This estimate assumes only trench paving on Town roads.

Based on verbal discussion with MWRA, in lieu of item 2 above, a 6,020 foot, 16-inch diameter transmission main could be constructed along the Hultman Aqueduct easement. Assuming the same length-foot cost as the in-road option, this would cost approximately \$3,500,000 including contingency and engineering. Unknown factors in estimating this cost and the associated permitting requirements are the need to cross the Sudbury River and the need for geotechnical investigation along the Hultman. Along with all other aspects of the proposed MWRA connection, crossing the Sudbury River would be subject to MEPA review. If the transmission main were constructed along the Hultman, the approximate cost to construct the in-Town pipe upgrades shown in Figure 6 would be \$6,100,000.

Also in lieu of item 2 above, a 1,400 foot, 16-inch diameter, connection to Framingham's system for wheeling water would cost approximately \$740,000 including contingency and engineering.

Kleinfelder estimates that this work could be completed over the course of two construction seasons with two crews on each roadway. Construction interference and traffic impacts would be limited to the pump station location and delineated work zones within the roadways. Additional long-term costs that are not included above are routine operations and maintenance and future replacement of the pump station,

transmission main, and existing distribution system pipes. All infrastructure costs in this report are referenced to November 2021.

The cost of decommissioning existing wells can vary depending on the Town's intentions for the wells or property that are no longer in use. Costs can range from a few thousand dollars for grouting wells to hundreds of thousands for demolition / abatement of pump stations, equipment, and other structures at the sites. Given uncertainty and range, this was not factored into the costs. We would recommend that the Town maintain at least some low maintenance sources for emergency use (leaving them as-is). MassDEP will require a plan for emergency water supply under any scenario. For example, Reading and Wilmington continue to let their well sources and pump stations sit as-is.

3.5 WATER PURCHASE COST

Current MWRA water rates are \$4,320.63 for every million gallons (MG) supplied. The cost to Wayland for a year of full water supply from the MWRA is the Town's average day demand (ADD) of 1.55 MGD multiplied by \$4,320.63 multiplied by 365 days. This is approximately \$2.4 million. The MWRA expects water rates to increase at a rate of 3.9% every year. If Wayland were to wheel water through Framingham, the rates for water purchase would be determined by Framingham. Currently Framingham wheels MWRA water supply to the Town of Sherborn at a rate of \$17,058.82 per MG, which is almost four times the rate charged by the MWRA.

3.5.1 Future potential costs

Kleinfelder inquired of Kathrine Ronan at MWRA about the risk of PFAS impacting the MWRA water supply and if a water rate increase beyond what is planned would be needed to address PFAS issues. Below in italics is MWRA's response. It may not fully address the Board's concerns, but Wayland could continue to press MWRA on this topic:

MWRA has tested for the six regulated PFAS (PFAS) as required by MassDEP as well as a dozen other PFAS compounds, and has detected no more than trace amounts in finished water. These are levels too low to be quantified and MWRA easily meets the new standard. This is unsurprising given MWRA's well protected watersheds and reservoirs, which act as a natural barrier against both existing and emerging contaminants.

Together with MWRA, DCR's Division of Water Supply Protection manages and protects the watersheds and reservoirs through its Watershed Protection Plan. This extensive program

includes aggressive land acquisition and conservation efforts, land and wildlife management, water quality and hydrological monitoring, infrastructure improvements, public access management, security and emergency preparedness. All this lowers the likelihood of MWRA needing additional treatment in the future. Of course, MWRA will continue to ensure compliance with all water quality requirements now and into the future. MWRA's Carroll Water Treatment Plant was designed with additional space surrounding the facility, should additional treatment ever be required.

MassDEP is required to revisit the PFAS drinking water regulations every three years. The existing maximum contaminant level (MCL) could become more stringent and/or include additional PFAS compounds. As a result, the costs associated with treating for PFAS (or any other emerging contaminant) may increase, along with the cost of disposing of spent media. Should MWRA be required to install treatment for PFAS or some other emerging contaminant in the future, those costs would be shared by all of our member communities, significantly reducing the burden on any single community.

3.6 OPTIONS FOR SELLING WATER

As an MWRA supplied community, the Town would have the opportunity to sell water to adjacent communities. Currently Wayland's water distribution system already has emergency connections with Lincoln to the North, Weston to the East, Natick to the South, and Sudbury to the West. Of the four municipalities, Weston is the only one currently supplied with drinking water from the MWRA. Any community that wants to buy water from Wayland that is outside of the same river basin would need to go through the MWRA admissions process which would include MEPA and ITA reviews and including achieving UAW and RGPCD standards as well as developing a water conservation program which complies with current standards.

Wayland and Natick have recently begun discussions about a potential partnership to supplement their supplies with MWRA water. There is an existing 8" interconnection at North Main Street. In order to supplement water to Natick's system, the main would need to be upsized, however, the required volume desired by Natick and the sizing and infrastructure is unknown.

The additional steps that would be required to fully evaluate the cost of this option would be:

- Determine demands sought by Natick. Preliminary discussions between Wayland and Natick DPW suggest a volume on the order of 2 MGD (average daily) and 3 MGD (max day).

- Run additional hydraulic model scenarios for Wayland peak hourly demand and Wayland maximum day demand and for Wayland and Natick average day demand simultaneously
- Revise pipe upgrade recommendations and costs based on model results
- Revise pump station recommendations and costs based on model results
- Coordinate with Natick modeler; evaluate hydraulic grade line differences at town border to determine if booster station or pressure reducing valve is needed; determine cost of infrastructure at interconnection
- MWRA water quality evaluation for compatibility with Natick water

In addition, discussions should be held to assess the feasibility of a joint application to MWRA, and the establishment of a mutually beneficial pricing structure.

4 LOCAL SOURCES

4.1 INFRASTRUCTURE REQUIREMENTS TO UTILIZE LOCAL SOURCES

4.1.1 New Local Source

The alternative to obtaining MWRA Water Supply is for Wayland to utilize existing sources to a point where the Town can meet water demands and provide a safe and reliable long-term supply with some redundancy. This could theoretically include developing a new well site in the Town, and the feasibility of this option must be further explored in the Interbasin Transfer Application. However, from a preliminary review, a new local source does not appear to be feasible. Areas of high-yielding aquifers in the Town of Wayland are limited in extent (source: MassGIS online mapper, 2022), and already being utilized by their existing wells. Even if a new well site of sufficient yield could be identified, the New Source Approval process, from exploration to bringing a well online, typically takes at least seven, and often ten or more years, if feasible. The likely opposition to a new source by watershed advocates is nearly certain and could entirely derail the process, as happened in Framingham for its Birch Road Wells. Additionally, given the knowledge of PFAS contamination in the Town's aquifers, some concentration of PFAS would likely be found in a new well. For these reasons, a new local source can be ruled out for the current level of analysis.

4.1.2 Treatment Upgrades for Existing Local Sources

It is important to keep in mind the uncertainty of contaminants such as PFAS increasing in concentration in sources other than the Happy Hollow Wells and Chamberlain Well in the future, which would require expensive treatment upgrades. Additionally, the regulations for contaminants can be revised and the MCL may decrease, requiring advanced treatment for PFAS, or other reasonably foreseeable contaminants such as iron and manganese, at lower levels in the future. For this reason, Kleinfelder considered both a high- and low-end scenario for the capital upgrades needed to maintain a full in-town supply. The high-end scenario includes the cost of installing advanced treatment systems (such as PFAS removal or iron and manganese filtration) at each treatment facility. The low-end scenario only assumes advanced treatment at the Happy Hollow Wells and Chamberlain Well, where PFAS concentrations are higher. Kleinfelder referenced Tata & Howard's 2016 Capital Efficiency Plan for estimates of expected

plant upgrade costs in the near term and prior Kleinfelder projects as well as recent regional construction bid estimates for estimates of PFAS and iron/manganese removal costs.

4.1.3 Capital Cost for Local Sources

Table 5 and Table 6 below detail the high- and low-end initial capital costs to keep each treatment facility online and supplying safe drinking water. Capital cost estimates are based on recent bid prices for similar projects, designed for long term performance, which are on the order of \$5M per MGD (Millis MA, February 2022) for adding advanced treatment (e.g. PFAS and/or Fe & Mn removal). Granulated Activated Carbon (GAC) and Resin for PFAS removal would have similar lifecycle costs. Please refer to Section 5 for a 50-year lifecycle cost comparison between the Local Sources, MWRA, and Hybrid options, which further incorporates operation and maintenance and anticipated recurring capital upgrades such as periodic well replacement and facility improvements.

Table 5 - Essential Upgrades to Existing Sources (High End / Conservative)

Essential Upgrades to Existing Sources	Capital Costs
Happy Hollow Wells (1.41 MGD)	
Advanced Treatment	\$ 7,500,000
Baldwin Pond Wells (1.51 MGD)	
Filter/Prefilter Upgrades	\$ 870,000
Ozone Treatment	\$ 160,000
Chemical Feed System	\$ 130,000
Advanced Treatment	\$ 8,000,000
Chamberlain Well (0.8 MGD)	
Pump Station Upgrades	\$ 130,000
Advanced Treatment	\$ 4,000,000
Campbell Well (0.6 MGD)	
Pump Station Upgrades	\$ 60,000
Fe/Mn Removal	\$ 4,000,000
Advanced Treatment (eg. PFAS or Fe/Mn)	\$ 4,000,000
Total	\$ 28,850,000

Table 6 - Essential Upgrades to Existing Sources (Low End / Optimistic)

Essential Upgrades to Existing Sources	Capital Costs
Happy Hollow Wells (1.41 MGD)	
Advanced Treatment	\$ 7,500,000
Baldwin Pond Wells (1.51 MGD)	
Filter/Prefilter Upgrades	\$ 870,000
Ozone Treatment	\$ 160,000
Chemical Feed System	\$ 130,000
Advanced Treatment	\$ -
Chamberlain Well (0.11 MGD)	
Pump Station Upgrades	\$ 130,000
Advanced Treatment	\$ 4,000,000
Campbell Well (0.6 MGD)	
Pump Station Upgrades	\$ 60,000
Fe/Mn Removal	\$ 4,000,000
Advanced Treatment	\$ -
Total	\$ 16,850,000

4.2 WATER CONSERVATION REQUIREMENTS

If the Town were to invest in maintaining a full supply from the existing sources, the existing conservation requirements for these sources would remain. For a hybrid supply including the permitted source (Chamberlain Well), the conservation requirements stated in the Town's WMA permit would continue to apply. For partial MWRA supply, the hybrid scenario we have assumed for cost evaluation – keeping the registered Happy Hollow Wells operational – would allow the Town to give up its WMA Permit. However, based on our experience and research, it is challenging and a moving target to predict what specific conditions the Water Resources Commission would hold a new Interbasin Transfer Act applicant to for supplementing groundwater sources with MWRA, even if those are only registered sources. For example, given a recent request by Reading to change more stringent outdoor restrictions to the state Drought Management triggers, the WRC responded that Reading would have to not only give up their WMA registration for their wells (which are emergency only) but also extend restrictions to private wells. Clearly, the WRC is exerting a restrictive influence whenever possible to assure that communities meet performance metrics in the state conservation standards. Therefore we cannot definitively state that any

WMA Permit restrictions currently on Wayland will be lifted given a hybrid supply. Details would remain to be negotiated via the ITA process.

The requirements are defined in the Town's Water Management Act (WMA) permit and include a maximum daily average withdrawal rate for all permitted and registered wells of 1.77 MGD. Additionally, the Town's performance standard for residential gallons per capita day (RGPCD) is limited to 65 gallons or less. Measures for reducing unaccounted water (UAW) will continue to be required until 10% UAW or less is achieved for four consecutive years and water audit data validity scores are at least at level III (51-70) for those years. The seasonal limits on nonessential outdoor water use would continue to be defined by either calendar triggered restrictions or streamflow triggered restrictions. These restrictions are in place from May 1st through September 30th. Outdoor water uses defined as nonessential include irrigation of lawns via automatic irrigation systems or sprinklers, filling of swimming pools, and washing vehicles, buildings, parking lots, driveways, or sidewalks. All summer outdoor water use shall take place before 9 a.m. and after 5 p.m. when evaporation and transpiration rates are lower. Finally, the water conservation requirements would still include system water audits, leak detection, meter calibration, and public outreach/education, as stated in the Town's WMA permit (see attached in Appendix B). Further details on water use restrictions and conservation requirements are described in Table 7 below.

Table 7 - Local Sources Conservation Components & Requirements

Requirement	Current WMA Permit (May 2021)
RGPCD	Meet 65 or else Implement RGPCD Compliance Plan w/ minimum elements: • Demand management • Bylaw requiring climate control on all auto irrigation systems
UAW	Meet 10% for 2 of 3 years or else implement UAW Water Loss Control Program: • Water audit • Annual Leak detection / repair • Meter inspect/replace program • Quarterly billing • Full cost system pricing
Seasonal Nonessential Outdoor Use Restrictions	May 1 – Sept 30; outside of 9-5 For >65 rgpcd: 1 day / week only for <u>either</u> Calendar or Streamflow option ----- For 65 rgpcd or less: up to 2 days / week depending on Lowell gauge for either calendar or streamflow option Demonstrate ability to enforce by May 2022

Requirement	Current WMA Permit (May 2021)
	Notify the Public by 4/15 each year
GW Supply Protection	Repeat Best Effort to encourage Sudbury to include Zone II in Water Resource Protection District
Water Conservation Standards	2018 MA WCS are incorporated in Permit
Minimization of GW Basin impacts	Met through the above
Baseline	If withdrawals reach 1.72, mitigation must be in place. Mitigation is provided by the WHS infiltration basin.

5 LIFECYCLE (50-YEAR) COST COMPARISON

Connecting to the MWRA for full water supply or upgrading the existing sources of supply in the Town are both feasible options for meeting the water demands of the Town. The total cost of each alternative is a key factor for the Town to consider; therefore, Kleinfelder prepared a 50-year cost analysis using currently available information. The alternatives included in this cost analysis consist of:

- Full MWRA supply;
- Local Sources – Low End (a low-end cost estimate for upgrading the existing sources);
- Local Sources – High End (a high-end cost estimate for upgrading the existing sources), and;
- Hybrid Solution - a hybrid solution where the Town relies on the Happy Hollow Wells to supply roughly 1 MGD and the MWRA for the remaining 0.55 MGD.

For the alternatives utilizing MWRA supply, a second cost estimate is shown that omits the MWRA entrance fee (in case the fee is voted to be waived).

For the Hybrid solution, we chose the Happy Hollow Well site for the sole local supply investment, for the following reasons:

- Does not (currently) require treatment for iron and manganese.
- Has adequate land and space for expansion of treatment facility if needed.
- Treatment system lower complexity and newer than Baldwin Pond.

To estimate these 50-year costs, current operations and maintenance (O&M) and labor costs, provided by Wayland DPW, were used as a starting point and adjusted depending on the scenario. An annual inflation rate of 3% was assumed. Costs accounted for in the MWRA connection estimate include a new booster pump station (\$6,700,000), in-road transmission main (\$4,200,000), in-town water main upgrades (\$7,700,000), routine O&M costs (\$800,000 per year with 3% inflation), and the MWRA entrance fee and water rates for a full supply. The high-end existing source upgrade estimate includes costs for all the upgrades listed in Table 5 in Section 4.1, a new storage tank (\$4,000,000), well replacement every 20 years, pump station upgrades at 25 years, and increased routine O&M costs for advanced treatment systems (\$2,700,000 per year with 3% inflation). The low-end estimate includes all the items listed in Table 6, a new storage tank (\$4,000,000), well replacement every 20 years, pump station upgrades at 25 years, and less increased O&M and labor costs due to fewer facilities with

advanced treatment (\$2,400,000 per year with 3% inflation). The construction of a new storage tank is necessary for the existing source options because with the existing Reeve's Hill Storage Tank offline for maintenance, the Town would have difficulty meeting peak hour demand with the existing sources and no storage. The hybrid solution accounts for the construction of a new booster pump station (\$6,700,000), transmission main (\$4,200,000), in-town water main upgrades (\$7,700,000), the MWRA entrance fee for a partial supply, MWRA water rates, the installation of advanced treatment systems at the Happy Hollow Wells (\$7,500,000), well replacement at Happy Hollow every 20 years, pump station upgrades at 25 years, and continued labor and O&M for the PFAS removal at the Happy Hollow Wells (\$1,400,000 per year with 3% inflation). Based on our past experience with similar projects, the total permitting costs of the MEPA, ITA, and MWRA reviews for either the full MWRA or hybrid solutions were included at an estimated \$500,000.

The cost estimates were calculated using net present value (NPV) over a 50-year period to compare the sum of capital and recurring costs for each option and total approximately \$231,000,000 for the MWRA supply, \$234,000,000 for the high-end existing supply, \$190,000,000 for the low-end existing supply, and \$226,000,000 for the hybrid solution. Wheeling water through Framingham was considered in this 50-year cost comparison; however, the rates charged by Framingham are unknown at this time. If we assume that they would be similar to those charged to Sherborn, then this option would cost more than double the other alternatives at \$675,000,000. These values are summarized below in Table 8 and the rate at which these costs add up over time is shown in Figure 7 below.

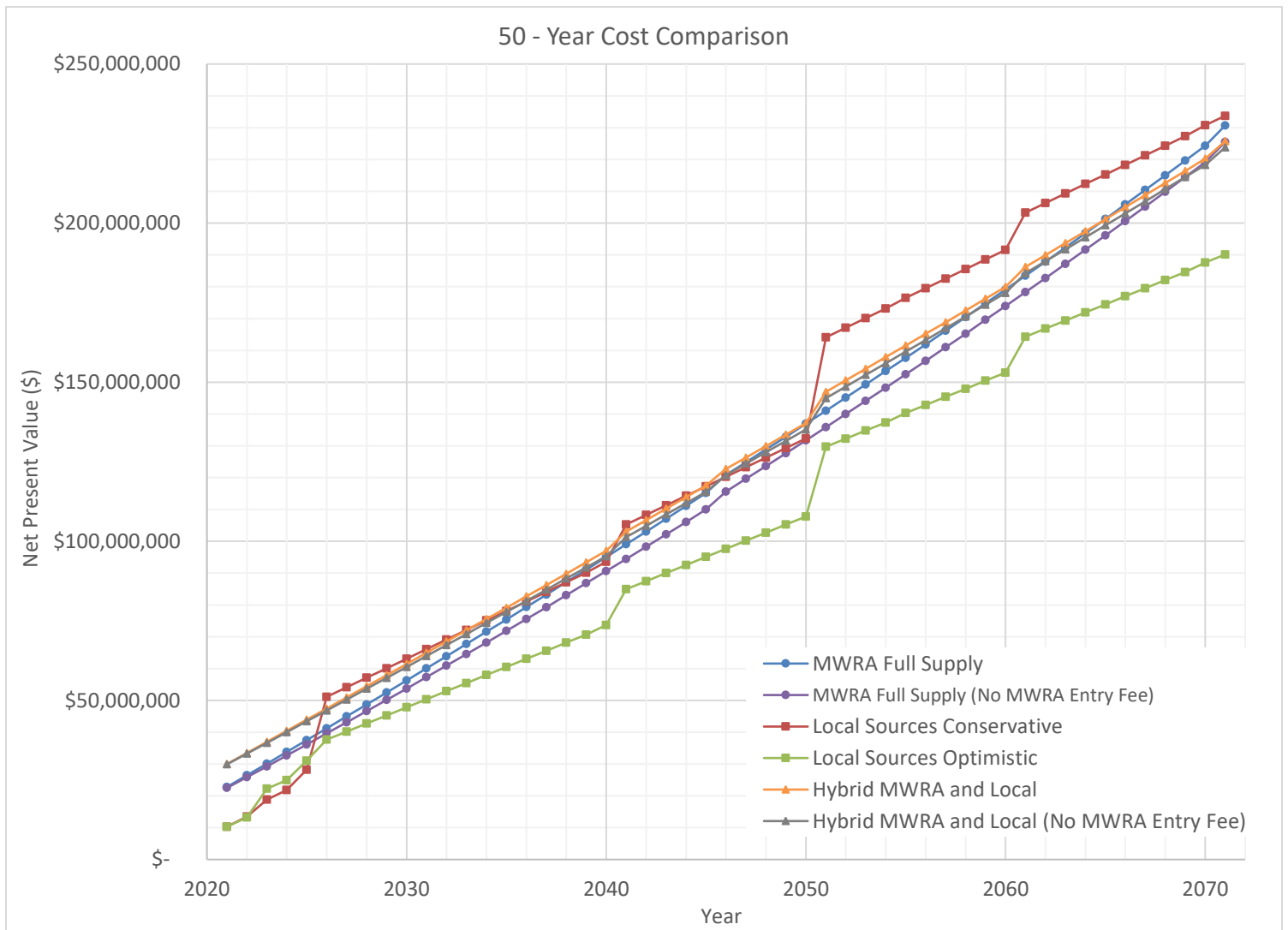
Table 8 - Summary of Lifecycle Costs at Net Present Value

Supply Alternative	Lifecycle Costs at Net Present Value		
	2026	2046	2071
Wheeled Water, Framingham	\$ 80,000,000	\$ 320,000,000	\$ 675,000,000
Wheeled Water, Framingham (No MWRA Entry Fee)	\$ 79,000,000	\$ 315,000,000	\$ 670,000,000
Full MWRA Direct Supply	\$ 41,000,000	\$ 121,000,000	\$ 231,000,000
Full MWRA Direct Supply (No MWRA Entry Fee)	\$ 40,000,000	\$ 116,000,000	\$ 225,000,000
Local Sources - High End (Conservative Scenario)	\$ 51,000,000	\$ 120,000,000	\$ 234,000,000
Local Sources - Low End (Optimistic Scenario)	\$ 38,000,000	\$ 98,000,000	\$ 190,000,000
Hybrid - Happy Hollow 1.0 MGD, MWRA 0.55 MGD	\$ 47,000,000	\$ 123,000,000	\$ 226,000,000
Hybrid - Happy Hollow 1.0 MGD, MWRA 0.55 MGD (No MWRA Entry Fee)	\$ 47,000,000	\$ 121,000,000	\$ 224,000,000

As this analysis indicates, upgrading and maintaining the existing sources could lead to some significant savings in the long term, provided that the optimistic / low end scenario plays out and further PFAS or new contaminant issues do not arise. If there are more costly upgrades needed however, this could bring the cost of supplying water from the existing sources very close to or greater than that of a full MWRA supply. Using a full MWRA supply versus a hybrid supply result in very similar long-term costs since the reduced MWRA water purchase for the hybrid supply balances the added capital and O&M costs for maintaining the Happy Hollow Wells.

One important consideration which has not currently been factored into the above analysis, is the possible cost offsets from the recently passed Infrastructure Investment and Jobs Act (i.e. the Bipartisan Infrastructure Law). This legislation provides a new and significant source of funding, including grants, particularly for the treatment of emerging contaminants, such as PFAS and potentially manganese. These funds could significantly reduce the initial capital investment in treatment for local sources if it is feasible to expend the money within the required timelines. It could also be feasible that such funds could be utilized for connecting to MWRA as a way to mitigate emerging contaminant impacts.

Figure 8 - 50-Year Cost Comparison



6 ALTERNATIVES COMPARISON AND SUMMARY

The decision facing the Town of Wayland regarding a long-term water supply solution is complex. As discussed throughout the report, there many important factors to be considered when deciding whether to invest in the existing in-town drinking water supplies, MWRA supply, or a hybrid solution. Major decision factors include feasibility of available capacity to meet demand, and multiple cost factors including initial capital, recurring significant capital, and operation and maintenance costs. However, these are not the only factors to consider. There are a number of non-cost factors to consider.

The decision to operate exclusively with local sources comes with a fairly high degree of uncertainty in terms of future source water quality and complexity of operation / administration. Given the anxiety deriving from the recent PFAS crisis, this uncertainty may have decreased the community's tolerance for future risk. A conversion to full MWRA supply places the risk and administration of source water and most regulatory compliance on the MWRA, while providing a robust source of supply redundancy. Operating its own independent water supply may be seen as a net benefit by some Wayland stakeholders. On the other hand, the administrative and technical support provided by MWRA, along with funding support for distribution improvements, could make this option more attractive.

Table 9 – Decision Factors for Each Water Supply Alternative

Decision Factor	LOCAL SOURCES	FULL MWRA SUPPLY	HYBRID: LOCAL 1MGD / MWRA 0.55 MGD
Capacity to Supply Current & Future Needs	Local Source Treatment upgrades needed to meet demand; redundancy	Abundant Supply	Local Source Treatment upgrades needed to meet demand; redundancy
Capital Improvements (0-5 years)	Happy Hollow Well – Permanent PFAS Baldwin Pond – Ozone, compressor, filter upgrades; Replacement wells Chamberlain – PFAS Treatment Campbell Well – Replacement Well; Mn treatment New Storage Tank for local redundancy	Pump Station & Property Transmission Main Distribution System Upgrades	Happy Hollow Well – Permanent PFAS; Chloramine conversion Pump Station & Property Transmission Main Distribution System Upgrades Potentially - Chloramination
Potential Additional Capital Needs Within Planning Period	Routine plant upgrades Major plant upgrades potential future need Fe, Mn removal at Chamberlain, HH possible future need for PFAS removal Baldwin; Campbell Replacement of Chamberlain Well; others	Pump station upgrades	Routine plant upgrades Major plant upgrades potential future need Fe, Mn removal at HH
Recurring Maintenance & Investment	Well redevelopment, pump station & WTP repairs; distribution system upkeep and replacement	pump station; distribution system upkeep and replacement	Well redevelopment, pump station & WTP repairs; distribution system upkeep and replacement
Uncertainties and Risks	Changes in water quality; drought, declines in yield; change in regulations, staff availability and training, Supply chain issues	Supply risk passed to MWRA	Changes in water quality; declines in yield; change in regulations, staff availability and training
Conservation / Restrictions	Meet Existing WMA Permit Requirements	TBD under ITA Agreement; likely 2d/week seasonal NE. Meet MA Water Conservation Standards.	Could give up WMA Permit (HH Well registered). Same as for MWRA supply
Permitting	N/A	Interbasin Transfer Act / MEPA	Interbasin Transfer Act / MEPA
Regulatory Compliance	Complex & Labor intensive	Distribution system only	Reduced from full Local

Decision Factor	LOCAL SOURCES	FULL MWRA SUPPLY	HYBRID: LOCAL 1MGD / MWRA 0.55 MGD
Operation / Maintenance Considerations	Supply Sampling, WTP,PS, Well, Tank maintenance, distribution sampling	Distribution sampling, PS & Tank maintenance	Supply Sampling, WTP,PS, Well, Tank maintenance, distribution sampling
Other Benefits	No concerns about switch to chloramination	Technical Assistance; interest free loans for main upgrades & lead service replacement	Technical Assistance; interest free loans for main upgrades & lead service replacement
Other Concerns	Public concern re: water quality Planning and executing of capital upgrades adds to administrative complexity.	Disruption due to water main construction ~ 4 miles	Disruption due to water main construction ~ 4 miles

Based on the long-term cost analysis, and in consideration of other factors, the Town may want to invest in partial MWRA supply as the lowest cost to add redundancy and reduce risk, while continuing the use of local supplies (with a focus on Happy Hollow while phasing out other sources) and seeking to secure newly available federal infrastructure funds for improvements. In such a case, we would recommend close monitoring of local supply water quality and use monitoring data to further inform future decisions should sources degrade.

Recent new discussions requiring more evaluation could help to further offset costs of connecting to MWRA including: wheeling water to and potential partnership with Natick, and possibly utilizing the Hultman aqueduct easement for transmission main installation.

Appendix A:

Interbasin Transfer Act

Performance Standards Guidance



THE COMMONWEALTH OF MASSACHUSETTS

WATER RESOURCES COMMISSION

100 CAMBRIDGE STREET, BOSTON MA 02114

Interbasin Transfer Act Performance Standards Guidance

INTRODUCTION

The Interbasin Transfer Act and regulations¹ require that the Water Resources Commission (WRC) base its review of a proposed interbasin transfer on the steps taken by the proponent to use viable inbasin sources, to undertake effective water conservation and management programs, and upon a review of the environmental effects of the proposed transfer. The Act and regulations describe eight criteria that the WRC must consider when making a decision to approve or deny an Interbasin Transfer application. This guidance describes performance standards provide for use by both applicants and the Commission to measure whether the criteria for effective water conservation and management programs are met. In addition, the application process is designed to provide the WRC with enough information to make a determination on the environmental impacts of the proposed project, as required under the regulations.

The performance standards are not new requirements. They are based on existing requirements found in the Interbasin Transfer Act and in the 2006 Water Conservation Standards.

Applicability

The performance standards apply only to “significant” interbasin transfers (i.e. those transfers of 1 million gallons per day or greater, or otherwise judged as significant by the WRC). Requests for Determination of Insignificance under the Interbasin Transfer Act are governed by the criteria listed under 313 CMR 4.04(4) and are not subject to these performance standards.

Application Process

The specific information required by the WRC from proponents of significant interbasin transfers is outlined in the regulations (313 CMR 4.04(5)). Application forms are available from the Department of Conservation and Recreation’s web site <http://www.mass.gov/eea/agencies/dcr/water-res-protection/interbasin-transfer-act/application-for-approval-increase-interbasin-transfer.html> , or by calling DCR’s Office of Water Resources at 617-626-1250 or 617-626-1350. Applications must provide sufficient information to allow the Commission to compare the proponent’s programs with the standards outlined in this guidance.

All proponents of significant interbasin transfers must comply with the regulations. However, as differing local conditions affect the type of information to be included in the application, it continues to be important that proponents meet with the Department of Conservation and Recreation’s (DCR) Office of Water Resources staff to discuss the application process before submitting an application for approval. This will help to ensure the applicant has correctly identified the information that must be

¹ Interbasin Transfer Act: M.G.L. c.21, §§ 8B-8D
Interbasin Transfer Regulations: 313 CMR 4.00

provided in the application.

The Interbasin Transfer Act requires that applicants meet certain of the criteria before approval can be given. However, in two instances the Commission may approve applications for significant interbasin transfers when the criteria, as further described in this guidance, have not been fully met. These are (1) if the actions to meet the standards, and appropriate deadlines, are included as part of an enforcement order or emergency declaration issued by the Department of Environmental Protection or (2) if local conditions make it infeasible to meet a particular performance standard, as described below.

Local Conditions

The Commission recognizes that in certain cases, local conditions may prevent a proponent from meeting or exceeding the “yardstick” that has been described in this guidance, even after a substantial effort has been made. In these cases, the proponent should explain why that standard cannot be met, demonstrate an alternate method of meeting intent of the criteria, and document any efforts that have been undertaken in order to comply with the standard. Therefore, the standards in this guidance are presented as presumptions that can be rebutted in cases where local conditions or other extenuating circumstances must be taken into consideration.

Two-year Transition Period

Substantial lead time may be needed for a proponent to meet some of the standards. Therefore the WRC has defined a two-year transition period from August 12, 1999, the date these standards were formally adopted, to August 12, 2001. This transition period has now expired, therefore, if documentation of actions required by these performance standards is not provided, the application will be judged incomplete until such time as the documentation is provided. In cases where the applicant clearly has not taken the action required by the performance standards, the proponent will be discouraged from applying until the standard is met. If an applicant does not meet the performance standards, is not under an enforcement order or emergency declaration, or cannot justify noncompliance due to local conditions, as described above, but decides to apply never-the-less, the application will be denied. If other criteria are met, the proponent can reapply once the performance standards are met.

Environmental Review

Two criteria, #5, Reasonable Instream Flow and #8, “Cumulative Impacts”, do not contain standards, as such. The Act makes it the WRC’s responsibility to decide if a reasonable instream flow will be maintained by the proposed transfer and if the cumulative impacts of the transfer are acceptable. Therefore, instead of performance standards, this guidance provides a description of the basic information to be included in the application under these criteria. The types of data required for each transfer will differ depending on the basin, subbasin, and the amount and timing of the transfer, etc.

Organization

The performance standards are divided into three sections. The first section provides guidance for interbasin transfers of water. The second section provides guidance for interbasin transfers of wastewater, and the third section provides guidance for interbasin transfers of wastewater triggered by a water supply development. Within each of these sections the guidance outlines the eight criteria by which the WRC must evaluate applications and then describes the measures the WRC will use to evaluate applications for of the respective type of transfer. The full text of the criteria, as it appears in the regulations, is given in Appendix A.

INTERBASIN TRANSFERS FOR WATER SUPPLY

This section of the guidance provides an outline of the eight criteria of the regulations by which the WRC must evaluate a proposed transfer and then more fully describes the measures the WRC will use to evaluate applications for transfers of water against the criteria. For each criterion, an abbreviated version of the criteria from the regulations is provided *in italics*. Immediately following are the performance standards in standard type-face. The full text of 313 CMR 4.05 Criteria for Evaluation of Applications for Approval appears in Appendix A.

(1) *MEPA Compliance*

The MEPA regulations (301 CMR 11.03(4)(a)2) require an Environmental Notification Form (ENF) and a mandatory Environmental Impact Report (EIR) for any “(n)ew interbasin transfer of water of 1,000,000 or more gpd or any amount determined significant by the Water Resources Commission.”

The intent of the Interbasin Transfer regulations (313 CMR 4.04(1)(c)) is that the EIR be used to address all issues required in the Interbasin Transfer application. The review of alternatives required under MEPA should include the review of viable alternatives as described in criterion 2.

Submittal of the EIR and Interbasin Transfer application should be concurrent. Therefore, proponents are urged to meet with DCR Water Resources staff before developing the EIR to ensure that analysis will satisfy the requirements under the Act.

The proponent must furnish a copy of the Secretary of Environmental Affairs certificate stating that the EIR properly complies with MEPA and its regulations to WRC staff so that the public comment and hearing process described in the Act can begin.

(2) *Develop all viable sources in the receiving area*

The following definitions appear in the regulations (313 CMR 4.02):

Viable Sources means a source which can provide drinking water that meets the current water quality standards promulgated by the Department of Environmental Quality Engineering (now the Department of Environmental Protection) at a production cost which is reasonable to costs recently incurred elsewhere in the Commonwealth, and which can be used while preserving reasonable instream flow as determined by the same criteria provided to evaluate impacts on the donor basin hereinafter provided.

Receiving Area means the area which makes use of the water supply which has been transferred between basins.

The proponent should use the EIR to discuss the water supply alternatives considered, but rejected. Reason for the rejection of these alternatives should be clearly stated.

This information should be included as part of the Local Water Resources Management Plan required under Criterion #7. In addition, as stated in the regulations, a local source must not cause unacceptable environmental damage.

GUIDANCE ON DETERMINING ECONOMIC VIABILITY OF IN-BASIN SOURCES

The decision on whether an in-basin alternative is viable is a case-specific decision made by the Water Resources Commission after reviewing the interbasin transfer application and EIR. There is no fixed standard by which economic *viability* is determined. Rather, this guidance outlines how proponents should provide cost and other economic data. This information only needs to be provided by proponents who claim that in-basin alternatives for water supply are not economically viable.

Reminder: Economic viability is only one of three reasons why an in-basin alternative may not be viable, the other two being technical feasibility and environmental impacts of using an in-basin source. It may be one of these reasons, or a combination of reasons why a proponent feels an in-basin alternative is not viable.

- **Costs:** Cost of in-basin option compared to the cost of the proposed interbasin transfer and compared to the costs of similar projects recently developed elsewhere in the Commonwealth presented as a net-present value of the capital, operating & maintenance costs, and salvage values of the projects. The discount rate used for this analysis should be the rate used by the U.S. Environmental Protection Agency. In addition, the costs of the alternatives should be compared to overall cost of providing service to demonstrate the marginal costs of the different alternatives (this marginal cost can be reflected in its effect on rates, as described below). This type of analysis provides life-cycle costs comparison between the alternatives and projects recently developed elsewhere in the Commonwealth. Proponents should compare these costs to those of other similar projects in the state to determine if the costs associated with the in-basin options are reasonable when compared to costs recently incurred elsewhere in the Commonwealth. When providing costs for conservation measures, the proponent should also identify the costs avoided by not constructing a water supply project that would be otherwise needed.
- **Rates:** Effect of the in-basin and interbasin transfer options on the water rates or on the cost per user served over the life of the project. Communities should compare the current and future rates against other similar communities and against the ability of their rate payers to pay the rates by presenting the rates as a percentage of median household income.

(3) *Must have implemented all practical water conservation measures*

1. A full leak detection survey should have been completed within the previous two years of the application. The proponent should provide documentation of their leak detection

survey and of the repair of leaks identified during the survey. Leak detection surveys should be completed by methods at least as comprehensive as those described in the MWRA's leak detection regulations (360 CMR 12.00).

2. The water supply system should be 100% metered, including public facilities served by the proponent. A program of meter repair and/or replacement must be in place. Documentation of annual calibration of master meters and a description of the calibration program should be included in the application.
3. Unaccounted-for water should be 10% or less. The proponent should provide documentation of unaccounted-for water, in both gallons and percentage of the total water pumped and withdrawn, for each of the past five years. The definition of accounted-for and unaccounted-for water for use in Interbasin Transfer applications is given in Appendix C. The plan by which the community intends to maintain or reduce this level should be included in the water resources management plan required under Criterion #7.
4. The proponent should provide documentation to show that there are sufficient sources of funding to maintain the system, including covering the costs of operation, proper maintenance, planned capital improvements, and water conservation. The rate structure must encourage water conservation. Appendix D provides guidance on developing rate structures to encourage water conservation.
5. The proponent should bill its customers at least quarterly based on actual meter readings. Bills should be easily understandable to the customer (e.g. providing water use in gallons and including comparison of the previous year's use for same period).
6. A drought/emergency contingency plan, as described in 313 CMR 4.02, should be in place. This plan should include seasonal use guidelines, measures for voluntary and mandatory water use restrictions and describe how these will be implemented. There should be a mechanism in place to tie water use restrictions to streamflow and/or surface water levels in the affected basin(s) where this information is available. The plan should become part of the Local Water Resources Management Plan required under Criterion #7.
7. All government and other public buildings under the control of the proponent should have been retrofit with water saving devices.
8. Proponents should provide records of water audits conducted on public facilities. The most recent audit should have occurred within two years prior to the application for Interbasin Transfer approval.
9. If the community's residential gallons per capita/day is greater than 65, the proponent should be implementing a comprehensive residential conservation program that seeks to reduce residential water use through a retrofit, rebate or other similarly effective program

for encouraging installation of household water saving devices, including faucet aerators, showerheads and toilets and through efforts to reduce excessive outdoor water use.

10. A broad-based public education program which attempts to reach every user at least two times per year, through such means as mailings, billboards, newspaper articles, cable television announcements or programs, or the use of other media, should be in place. Water suppliers should refer to the WRC's 2006 "Water Conservation Standards for the Commonwealth of Massachusetts" and the Massachusetts Water Works Association for recommended public education measures.
11. A program which identifies, ranks and works with all commercial, industrial and institutional customers according to amount of use in order to determine areas where the greatest potential for water savings exists, should be in place. The water supplier should make regular contact with these users to promote water conservation. Materials on water reuse and recirculation techniques should be provided, where appropriate.
12. A program of land use controls to protect existing water supply sources of the receiving area that meet the requirements of the Department of Environmental Protection.
13. As part of the local water resources management plan, there should be a long-term water conservation program, which complies with the 2006 Water Conservation Standards, in place. This plan should reflect the goal of maintaining unaccounted-for at 10% or less of all water used, and of reducing future residential water use through a comprehensive residential water conservation program, if residential gpcd is greater than 65. The water conservation program should also have a goal of operating the system to balance water supply with other environmental needs. If the transfer is approved, the proponent will need to submit a copy of its Public Water Supply Annual Statistical Report (required by DEP) to the Commission annually to demonstrate the continued effectiveness of the program.

(4) *Have implemented a Forestry Management Program*

For **surface** water sources currently used by the proponent, a written plan, which conforms with the 1996 DEP guidance for Developing a Local Surface Water Supply Protection Plan, should be in place for all watershed lands greater than ten (10) acres and under the control of the proponent. The plan should be approved by DCR or other appropriate agency and include:

- 1) A description of the property, including adequate boundary maps.
- 2) An inventory of its natural features with a special emphasis on the forest resource - forest stand or type maps and a quantitative assessment of forest growth, health and other attributes.
- 3) An inventory of water resources, including reservoirs, inlet and outlet streams, wetlands, and other water bodies
- 4) An inventory of other natural and cultural features (such as rare or threatened

specie habitat, ACECs, etc).

- 5) A 10 year plan of action listing proposed activities and their priorities.
- 6) A listing of the forestry best management practices (BMP) to be implemented. See Massachusetts Forestry Best Management Practices Manual available from DCR Division of Forest and Parks.
- 7) All timber harvesting activities must be carried out under a DCR-approved Forest Cutting Plan as described in 304 CMR 11.00, the Forest Practices regulations.
- 8) Evidence of implementation.
- 9) Demonstration that the plan of action can be carried out in a sustainable fashion
- 10) If the transfer is approved, the proponent will be expected to submit periodic reports to the WRC concerning the effectiveness of its program on water resources.

(5) *Maintain Reasonable Instream Flow*

The Act requires the WRC to determine that a reasonable instream flow will be maintained if the proposed transfer is approved. The regulations require the WRC to consider a broad range of environmental information, including the natural variability of flows in the affected river, flood flows, aquatic base flow, 7Q10 flow, stage, velocity, sediment regimen, etc.² when making a determination on whether or not a proposed interbasin transfer leaves a “reasonable instream flow”. Therefore, after review and analysis by its technical staff, the WRC must determine that this transfer would not have an adverse impact on these resources or on the other resource values listed under this criterion in the regulations. This criterion does not have a specific measure of performance. In order for the Commission to evaluate this criteria, the proponent will need to supply information required under 313 CMR 4.04(5)7, including:

- 1) A hydrograph showing the potential changes induced by the transfer.
- 2) Available information concerning resources named in the regulations that could be affected by the proposed transfer. This data should also include any site specific information that may be requested by the EOE agencies, as well as daily hydrographs which show the recorded streamflow, with the streamflow resulting from this transfer superimposed, for representative drought, normal and wet years. These years are to be determined in consultation with DCR’s Office of Water Resources.
- 3) A table showing daily streamflow for the representative years listed above, the streamflow resulting from this transfer and the percent reduction in streamflow resulting from this transfer.

² Refer to 313 CMR 4.04(5)7.c and 313 CMR 4.05(5)

(6) *Provide results of the pumping test*

The proponent must submit the results of the DEP-approved pumping test for any Interbasin Transfer Act application involving a new ground water supply source.

(7) *Develop a Local Water Resources Management Plan*

The goal of the plan is to integrate water supply and wastewater planning at the community, water district or water authority level. The plan should use existing information wherever possible to evaluate a range of alternatives and assist the proponent in making decisions to meet and control future water supply and wastewater needs in ways that minimize the impact on environmental resources, while providing a water supply and wastewater system that meets public health standards. The plan should address water and wastewater needs through infrastructure and institutional arrangements and include drought/emergency management plans and conservation programs. The plan should include a comprehensive program to comply with state water conservation standards and to reach or maintain the goal of $\leq 10\%$ unaccounted-for water and of reducing future residential water use through a comprehensive residential water conservation program. The plan also should describe how the water supply system will be operated so as to minimize environmental impacts, while meeting public health and safety needs.

The intention is that this plan will be used by the community, water district or water authority for planning purposes. It is not intended to be a detailed facilities plan or river basin plan. The proponent should meet with DCR, Office of Water Resources staff to discuss the scope of the local water resources management plan before submitting its application

An outline of the local water resources management plan is provided in Appendix B.

(8) *Cumulative Impacts*

The proponent must provide sufficient data to enable the Commission to evaluate whether the effects of the proposed transfer exacerbate the impacts of all past, authorized or proposed transfers on streamflows in the donor basin. This would include analysis of any water supply sources or sewer systems that have been recently developed or approved and therefore not captured by the historic hydrographs, consideration of any water supply sources in the new source approval or Water Management Act permitting processes, sewerage plans under development, etc.

INTERBASIN TRANSFER ACT PERFORMANCE STANDARDS GUIDANCE

INTERBASIN TRANSFERS OF WASTEWATER

Introduction

This section of the guidance provides an outline of the eight criteria of the regulations by which the WRC must evaluate a proposed transfer and then more fully describes the measures the WRC will use to evaluate applications for transfers of wastewater against the criteria. For each criterion, an abbreviated version of the criteria from the regulations is provided *in italics*. Immediately following are the performance standards in standard type-face. The full text of 313 CMR 4.05 Criteria for Evaluation of Applications for Approval appears in Appendix A.

(1) MEPA Compliance

The MEPA regulations (301 CMR 11.03(4)(a)2) require an Environmental Notification Form (ENF) and a mandatory Environmental Impact Report (EIR) for any “(n)ew interbasin transfer of water of 1,000,000 or more gpd or any amount determined significant by the Water Resources Commission.”

The intent of the Interbasin Transfer regulations (313 CMR 4.04(1)(c)) is that the EIR be used to address all issues required in the Interbasin Transfer application. The review of alternatives required under MEPA should include the review of viable alternatives as described in criterion 2.

Submittal of the EIR and Interbasin Transfer application should be concurrent. Therefore, proponents are urged to meet with DCR Water Resources staff before developing the EIR to ensure that analysis will satisfy the requirements under the Act.

The proponent must furnish a copy of the Secretary of Environmental Affairs certificate stating that the EIR properly complies with MEPA and its regulations to WRC staff so that the public comment and hearing process described in the Act can begin.

(2) Develop all viable sources in the receiving area

In 1987, the WRC developed guidance for interpreting the Interbasin Transfer Act’s regulations to apply to a wastewater transfer. The following definitions are from that guidance:

Present rate of a wastewater conveyance system is the hydraulic capacity plus any surcharging, as determined by DEP, of the wastewater system that actually facilitates the transfer out-of-basin.

A viable local source is a cost-effective, technologically feasible, environmentally

sound wastewater treatment system which treats and discharges wastewater within the basin of origin, and has been approved by DEP. Such systems can include, but are not limited to, conventional Title 5 systems, groundwater discharge systems, NPDES-regulated surface water discharge systems, alternative/innovative on-site systems or package treatment plants.

Receiving area is the community(ies) or portion of community(ies) whose wastewater is collected for discharge out of basin via an interbasin transfer.

The proponent should have completed a DEP-approved facilities plan which evaluates potential in-basin sources of disposal, including Title 5, groundwater and surface water discharges, as described in DEP's Comprehensive Wastewater Management Planning Guidance. If a proponent's facilities plan was completed prior to development of DEP's Comprehensive Wastewater Management Planning Guidance, but is being actively implemented, and DEP concurs that these issues have been adequately addressed, this can be substituted for a more recent plan. The proponent should have also investigated the feasibility of implementing DEP's wastewater reuse policy. Analysis of viable inbasin sources should be part of the alternatives analysis of the EIR.

GUIDANCE ON DETERMINING ECONOMIC VIABILITY OF IN-BASIN SOURCES

The decision on whether an in-basin alternative is viable is a case-specific decision made by the Water Resources Commission after reviewing the interbasin transfer application and EIR. There is no fixed standard by which economic *viability* is determined. Rather, this guidance outlines how proponents should provide cost and other economic data. This information only needs to be provided by proponents who claim that in-basin alternatives for wastewater disposal are not economically viable.

Reminder: Economic viability is only one of three reasons why an in-basin alternative may not be viable, the other two being technical feasibility and environmental impacts of using an in-basin source. It may be one of these reasons, or a combination of reasons why a proponent feels an in-basin alternative is not viable.

- **Costs:** Cost of in-basin option compared to the cost of the proposed interbasin transfer and compared to the costs of similar projects recently developed elsewhere in the Commonwealth presented as a net-present value of the capital, operating & maintenance costs, and salvage values of the projects. The discount rate used for this analysis should be the rate used by the U.S. Environmental Protection Agency. In addition, the costs of the alternatives should be compared to overall cost of providing service to demonstrate the marginal costs of the different alternatives (this marginal cost can be reflected in its effect on rates, as described below). This type of analysis provides life-cycle costs comparison between the alternatives and projects recently developed elsewhere in the Commonwealth. Proponents should compare these costs to those of other similar projects in the state to determine if the costs associated with the in-basin options are reasonable when compared to costs recently incurred elsewhere in the Commonwealth.

When providing costs for conservation measures or I/I removal, the proponent should also identify the costs avoided by not constructing a wastewater project that would be otherwise needed.

- **Rates:** Effect of the in-basin and interbasin transfer options on the sewer rates or on the cost per user served over the life of the project. Communities should compare the current and future rates against other similar communities and against the ability of their rate payers to pay the rates by presenting the rates as a percentage of median household income.

(3) *Must have implemented all practical water conservation measures*

For wastewater transfers, the WRC interprets “all practical measures to conserve water” to include, but not be limited to:

1) An active program to eliminate sources of inflow and infiltration that are cost- and value-effective to remove in the donor basin. These sources should have been identified in an Inflow and Infiltration (I/I) study or Sewer System Evaluation Study (SSES) that has been developed in accordance with DEP’s “Guidelines for Performing Infiltration/Inflow Analyses and Sewer System Evaluation Survey”.

This program should have received approval from the governing sewer system authority (DEP, MWRA or other regional sanitary district). The value effective analysis should be based on factors including, but not limited to: whether the basin or subbasin(s) from which the wastewater is being transferred is characterized as stressed (refer to DCR basin report or other appropriate document), the existence of sewer overflow conditions and magnitude of impacts on public and environmental health, and the overall levels of infiltration and inflow. The amounts of water lost through I/I should be placed in the context of the donor basin and reflect impacts to the environmental resources listed under 313 CMR 4.05(5) (Criterion 5).

2) If an existing wastewater transfer is in place, the proponent should have installed flow meters at location(s) sufficient to document wastewater flows out of basin. Use of regional sewer meters which document wastewater flows out of basin is acceptable where these meters are in place. Documentation on meter calibration should be included with the application.

Proponents should provide at least two years of data on the components of existing wastewater flow (sanitary, inflow, infiltration) with the application. Refer to DEP’s 1993 Guidelines for Performing Infiltration/Inflow Analyses and Sewer System Evaluation Survey (Section 5) for a methodology for estimating the components of wastewater flow.

3) To the extent the EIR identifies impacts that may need to be mitigated, the proponent

should propose measures to mitigate these impacts. Proponents should consider such measures as additional I/I reduction, impervious surface remediation, groundwater recharge, or stormwater management programs consistent with DEP stormwater guidance that keep water in the donor basin.

4) The proponent must demonstrate a commitment to continue to implement recommendations of the I/I removal program. For transfers that are approved, proponents can expect to be requested to submit annual reports to the WRC on these measures

5) A DEP-approved Operation and Maintenance plan for the wastewater system, as described in DEP's "Guidelines for Performing Operations and Maintenance on Collection Systems" (August 1989 or latest edition) should be in effect and should have been developed or updated within the five years of submitting an application for Interbasin Transfer.

6) For wastewater transfers where the proponent has control over the water supply system, the proponent should describe its program for implementing a water conservation program based on the state water conservation standards.

(4) *Have implemented a Forestry Management Program*

This criterion is not applicable to a wastewater transfer.

(5) *Maintain reasonable instream flow*

The Act makes it the WRC's responsibility to determine that a reasonable instream flow will be maintained if the proposed transfer is approved. Therefore, after review and analysis by its technical staff, the WRC must determine that this transfer would not have an adverse impact on the natural variability of flows in the affected river, will not significantly prolong low flow events, and will not result in significant adverse impact to the resource values listed under this criterion in the regulations including flood flows, aquatic base flow, 7Q10 flow, stage, velocity, sediment regimen, etc³. This criterion does not have a specific measure of performance. In order for the Commission to evaluate this criteria, the proponent will need to supply information required under 313 CMR 4.04(5)7, including:

- 1) A hydrograph showing the potential changes induced by the transfer.
- 2) Make every effort to secure and provide information concerning resources named in the regulations that could be affected by the proposed transfer. This data should also include any site specific information that may be requested by the EOEA agencies.

3 Refer to 313 CMR 4.04(5)7.c and 313 CMR 4.05(5)

Close consultation with DCR's Office of Water Resources is recommended to insure that the information provided reflects the conditions of a wastewater transfer.

(6) *Provide results of the pumping test*

This is not applicable to a wastewater transfer.

(7) *Develop a Local Water Resources Management Plan*

The goal of the plan is to integrate water supply and wastewater planning at the community, sewer district or sewer authority level. The plan should use existing information wherever possible to evaluate a range of alternatives and assist the proponent in making decisions to meet and control future water supply and wastewater needs in ways that minimize the impact on environmental resources, while providing a water supply and wastewater system that meets public health standards. The plan should address water and wastewater needs through infrastructure and institutional arrangements and include drought/emergency management plans and conservation programs. The plan should include a comprehensive program to comply with state water conservation standards and to reach or maintain the goal of $\leq 10\%$ unaccounted-for water and of reducing future residential water use through a comprehensive residential water conservation program. The plan also should describe how the water supply system will be operated so as to minimize environmental impacts, while meeting public health and safety needs.

The intention is that this plan will be used by the community, sewer district or sewer authority for planning purposes. It is not intended to be a detailed facilities plan or river basin plan. The proponent should meet with DCR, Office of Water Resources staff to discuss the scope of the local water resources management plan before submitting its application

An outline of the local water resources management plan is provided in Appendix B.

(8) *Cumulative Impacts*

The proponent must provide sufficient data to enable to Commission to evaluate whether or not the effects of the proposed transfer exacerbate the impacts of all past, authorized or proposed transfers on streamflows in the donor basin. This would include analysis of any water supply sources or sewer systems that have been recently developed or approved, consideration of any water supply sources in the new source approval or Water Management Act permitting processes, sewerage plans under development, etc.

INTERBASIN TRANSFER ACT GUIDANCE

WASTEWATER TRANSFER TRIGGERED BY DEVELOPMENT OF A LOCAL WATER SUPPLY SOURCE

In certain cases, the Interbasin Transfer Act is triggered by development of a water supply, to be used in the “donor” basin within a community, but transported out of basin and out of the community for treatment and disposal as wastewater. In these cases, the performance standards for both types of transfers will apply, in varying degrees, as described below.

For each criterion, an abbreviated version of the criteria from the regulations is provided *in italics*. Immediately following are the performance standards in standard type-face. The full text of 313 CMR 4.05 Criteria for Evaluation of Applications for Approval appears in Appendix A.

(1) *Compliance with MEPA*

This criterion, which is the same for both water and wastewater transfers, must be met.

(2) *Develop all viable sources in the receiving area*

The performance standards for a wastewater transfer apply to this type of transfer because it is considered a wastewater transfer.

(3) *Must have implemented all practical conservation measures*

The performance standards for **both** water and wastewater transfers apply because both water conservation and I/I removal minimize the transfer out of basin.

(4) *Forestry Management Plan*

The performance standards for water transfers apply if the community developing the water supply source has existing surface water sources.

(5) *Maintain reasonable instream flow*

The information required for water transfers applies.

(6) *Provide pump test results*

Applies if the water source being developed is a ground water source.

(7) *Local Water Resources Management Plan*

These standards, which are the same for both water and wastewater transfers, must be met.

(8) *Cumulative Impacts*

This information, which is the same for both water and wastewater transfers, must be met.

Appendix A
Interbasin Transfer Act Regulations
Criteria for Evaluation and Approval

313 CMR 4.05: *Criteria for Evaluation of Applications for Approval:* The Commission shall consider the following criteria in making its decision to approve or deny a proposed action to increase over the present rate of interbasin transfer of waters.

- (1) *That an environmental review, pursuant to M.G.L. c. 30, §§61 and 62H, inclusive, if required, has been complied with for the proposed increase.*
- (2) *That all reasonable efforts have been made to identify and develop all viable sources in the receiving area of the proposed interbasin transfer.*
- (3) *That all practical measures to conserve water have been taken in the receiving area, including but not limited to:*
 - (a) *The identification of distribution system sources of lost water, and where cost effective, the implementation of a program of leak detection and repair.*
 - (b) *Metering of all water users in the receiving area and a program of meter maintenance.*
 - (c) *Implementation of a rate structure which reflects the costs of operation, proper maintenance, proposed capital improvements, and water conservation and which encourage the same.*
 - (d) *Public information programs to promote water conservation, the use of water conserving devices, and industrial and commercial recycling and reuse.*
 - (e) *Contingency plans for limiting the use of water during seasonal or drought shortages.*
 - (f) *Implementation of land use controls to protect existing water supply sources of the receiving area that meet the requirements of the Department of Environmental Quality Engineering (now Environmental Protection) published in 310 CMR 22.20.*
- (4) *That a comprehensive forestry management program which balances water yields, wildlife habitat and natural beauty on watershed lands presently serving the receiving area and under the control of the proponent has been implemented.*
- (5) *That reasonable instream flow in the river from which the water is transferred is maintained. The Commission shall take into consideration in determining reasonable instream flow the impact of the proposed interbasin transfer on the streamflow dependent ecosystems and water uses to include:*
 - (a) *Length of the stream below the point of withdrawal.*
 - (b) *Effects on flood flows, intermediate flows and low flows.*
 - (c) *Effect on groundwater and surface water elevations.*
 - (d) *Significance of indigenous and anadromous fisheries and fauna and effects thereon*

- (e) Significance of wetlands and dependent flora and fauna and effects thereon.*
- (f) Effect on water quality, recreational uses, aesthetic values, areas of critical environmental concern and areas protected under Article 97 of the Amendments to the Massachusetts Constitution.*
- (g) Effect on established riparian uses and uses dependent on recharge from stream flow.*
- (h) Effect on hydropower production*
- (i) Effect on water withdrawals and undeveloped rights within the donor basin.*
- (j) Effect on other instream uses.*

- (6) In the case of groundwater withdrawals, the results of the pump test will be used to indicate the impact of the proposed withdrawal on static water levels, the cone of depression, the potential impacts on adjacent wells and lake and pond levels, and the potential to affect instream values as listed in 313 CMR 4.05(5)(a) through (j).*
- (7) That the communities and districts in the receiving area have adopted or are actively engaged in developing a local water resources management plan.*
- (8) The Commission shall consider the impacts of all past, authorized or proposed transfers on streamflows in the donor basin.*

Appendix B

Local Water Resources Management Plan Outline

The goal of the plan is to integrate water supply and wastewater planning at the community, water or sewer district, or water or sewer authority level. The plan should use existing information wherever possible to evaluate a range of alternatives and assist the proponent in making decisions to meet and control future water supply and wastewater needs in ways that minimize the impact on environmental resources, while providing a water supply and wastewater system that meets public health standards. The plan should address water and wastewater needs through infrastructure and institutional arrangements and include drought/emergency management plans and conservation programs. The plan should include a comprehensive program to comply with state water conservation standards and to reach or maintain the goal of $\leq 10\%$ unaccounted-for water and of reducing future residential water use through a comprehensive residential water conservation program. The plan also should describe how the water supply system will be operated so as to minimize environmental impacts, while meeting public health and safety needs.

The intention is that this plan will be used by the community, water or sewer district or water or sewer authority for planning purposes. It is not intended to be a detailed facilities plan or river basin plan. The proponent should meet with DCR, Office of Water Resources staff to discuss the scope of the local water resources management plan before submitting its application. This plan should include the following information. However, this information may need to be modified depending on the circumstances of the system (whether regional or local):

Background

- Description of hydrology of watershed and subbasins (available from the former DEM's river basin reports, USGS reports, and/or EOEAs Watershed Plans).
- Brief history and analysis of water supply system and water use.
- A list of all water, sewer, stormwater and other water resources related plans and information available for the community.

Water Supply

- Identify existing and potential water supplies in the community, Zone II delineations, Interim Wellhead Protection Areas, and/or Zones A and B delineations for surface water sources, and watershed boundaries.
- Describe source water protection programs, including compliance with DEP source water protection regulations.
- Identification of all water supply options, including local, regional and conservation options.

Wastewater and stormwater

- Describe existing wastewater and stormwater disposal methods. This should incorporate information in any existing DEP-approved water supply and wastewater facilities plan and should provide the percentage of town sewered (by population), areas of town sewered and the location of wastewater discharge.

- For municipalities with sewer systems, provide a description of the wastewater management plan, with data on components of the wastewater (infiltration, inflow, sanitary).
- A discussion of the DEP wastewater reuse policy, as applied to the community should be included.

Natural Resources

- Describe streamflow conditions in basin (available from the former DEM's river basin reports and/or USGS reports).
- Describe major water resource features and sensitive habitats, including rivers, streams and ponds, wetlands, vernal pools, fisheries, coastal areas and Areas of Critical Environmental Concern (ACECs) (available from the former DEM's river basin reports, DCR's ACEC program, EOE's Watershed Action Plan, Riverways Program Shoreline Surveys, DFWELE's Fisheries and Natural Heritage programs, USGS reports, any river management plans developed pursuant to National Wild and Scenic River Studies, reports developed by local environmental groups such as watershed associations or land trusts and/or regional planning agencies).

Regional Plans

- Describe any existing regional or watershed plans and how these plans relate to the plans of the local community. Refer to reports and plans developed by regional planning agencies, local watershed associations, and other appropriate regional and/or non-governmental agencies.

Future Plans

- Analysis of existing zoning and master plan, including a build-out analysis.
- Identification of future water and wastewater needs and various alternatives for meeting these needs.
- Summary and evaluation of water infrastructure plans based on build-out and future needs.
- Summary and evaluation of wastewater and stormwater infrastructure plans based on build-out and future needs.
- Overall summary based above information.

Analysis and Conclusions

- Discussion of a plan to meet future water and wastewater needs in a way that minimizes existing and potential future impacts to water and natural resources and describes plans for mitigating these impacts and the mechanisms through which the plan will be implemented.
- An action plan, with timetables for the implementation of the recommendations of the plan, a budget and identification of people responsible for implementation.

APPENDIX C

ACCOUNTED-FOR AND UNACCOUNTED-FOR WATER USES

For the purposes of Interbasin Transfer review, water uses should be broken down by specific category, as designated in the DEP Public Water Supply Annual Statistical Report.

Accounted-for water includes:

- ◆ Residential use
- ◆ Agricultural use
- ◆ Commercial use
- ◆ Industrial use
- ◆ Municipal use, including fire fighting, street cleaning, hydrant maintenance, and hydrant use for sewer flushing, where these uses can be confidently estimated. In the case of water use that is “confidently estimated” documentation of how the estimate was arrived at will need to be provided.
- ◆ Sales to other public water suppliers
- ◆ Process water, including bleeders, water main flushing (including new water mains), new water main filling, filter backwash, etc. where these uses can be confidently estimated. In the case of water use that is “confidently estimated” documentation of how the estimate was arrived at will need to be provided.
- ◆ Institutional/Tax exempt uses

Unaccounted-for water is the difference between water pumped or purchased and water that is metered or confidently estimated.

Unaccounted-for water should include:

- ◆ Master Meter Inaccuracies
- ◆ Domestic and Non-Domestic Meter Underregistration
- ◆ Errors in estimating for stopped meters
- ◆ Overregistering revenue meters
- ◆ Unauthorized hydrant openings
- ◆ Unavoidable leakage
- ◆ Recoverable leakage
- ◆ Illegal connections
- ◆ Standpipe overflows
- ◆ Data processing errors

Water suppliers may want to estimate the amount of unaccounted-for water by category, as required in Section D6 of DEP’s *Public Water Supply Annual Statistical Report (1998)*. This will enable them to target suspected sources of unaccounted-for water for reduction.

APPENDIX D

GUIDANCE ON THE DEVELOPMENT OF RATE STRUCTURES WHICH ENCOURAGE WATER CONSERVATION

The Interbasin Transfer regulations require proponents to implement a rate structure which reflects the costs of operation, proper maintenance, proposed capital improvements, and water conservation and which encourage the same (313 CMR 4.05(3)(c)).

Guidance: Proponents should refer to the American Water Works Association's Manual of Water Supply Practices: Water Rate Structures and Pricing, Seventh Edition (AWWA M34) and the 2006 WRC Water Conservation Standards to help demonstrate that the portion of this criterion dealing with rate structures has been met.

Rate development principals:

- Rate structures, including the elements of a rate structure that are intended to encourage conservation, should reflect the particular situation and needs of the community.
- Rates that encourage conservation can also achieve other objectives, such as lifeline rates or low-income affordability rates.
- Rates are only one component of a comprehensive water conservation program and should be designed to support and work with other elements of the program.

Funding Sources:

1. Is your water supply funded through an enterprise account or is some other accounting procedure used? If some other accounting procedure is used, describe. Are water supply revenues dedicated for water supply system use?
2. List the major cost categories covered by your rate revenues. Does it reflect the cost of operation, proper maintenance, proposed capital improvements, source protection and water conservation?
3. What elements of your water supply program are not covered by rates? How are these elements funded?

Rate Structure:

1. Provide your current rate structure.
2. Provide date of your most recent rate structure revision and a short description of the changes made.
3. Are there separate rates for different types of customers (residential, commercial, industrial, etc.)?
4. Describe how your rate structure encourages conservation. If your rate structure includes any of the following elements, describe their effectiveness.
 - Increasing block rates and number of customers in each block
 - Seasonal rates; include the number of residential customers which are billed at a higher use category due to seasonal water use and an average cost differential in a water bill for a customer whose seasonal use results in being billed at a higher use category.

- Excess use rates
- Goal-based rates
- Drought rates
- Second meter rates

Appendix B:
Town of Wayland
Water Management Act Permit



Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

Charles D. Baker
Governor

Karyn E. Polito
Lieutenant Governor

Kathleen A. Theoharides
Secretary

Martin Suuberg
Commissioner

May 5, 2021

Cherry C. Karlson, Chair
Wayland Board of Selectmen
41 Cochituate Road
Wayland, MA 01778

RE: Wayland-BWR\WMA
Renewal Application
WMA Permit #9P4-3-14-315.01
Action: Final Renewed Permit

Dear Ms. Karlson:

Please find the attached documents:

- FINAL Findings of Fact in Support of the New Permit #9P4-3-14-315.01; and
- FINAL Water Management Act Permit #9P4-3-14-315.01 (Concord Basin) for the Wayland Water Department.

The signature on this cover letter indicates formal issuance of the attached document. If you have any questions regarding this information, please contact Shi Chen via e-mail at shi.chen@mass.gov or Duane LeVangie via e-mail at duane.levangie@mass.gov.

Very truly yours,

Duane LeVangie,
Water Management Program Chief
Bureau of Water Resources

Y:\DWPActive\NERO\Wayland- 3315000-FINAL Permit 9P431431501-2021-5-05

Y:\DWPWMA\PermitRenewals\Concord\Wayland- 3315000-FINAL Permit 9P431431501-2021-5-05

Ecc: Jen Pederson, MWWA

Alison Field-Juma, OARS

Julia Blatt & Sarah Bower, Massachusetts Rivers Alliance

Don Millette, Wayland Water Department Superintendent

This information is available in alternate format. Contact Michelle Waters-Ekanem, Director of Diversity/Civil Rights at 617-292-5751.

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Massachusetts Department of Environmental Protection
One Winter Street, Boston MA 02108 • Phone: 617-292-5751
Communication For Non-English Speaking Parties - 310 CMR 1.03(5)(a)



1 English:

This document is important and should be translated immediately. If you need this document translated, please contact MassDEP's Diversity Director at the telephone numbers listed below.



2 Español (Spanish):

Este documento es importante y debe ser traducido inmediatamente. Si necesita este documento traducido, por favor póngase en contacto con el Director de Diversidad MassDEP a los números de teléfono que aparecen más abajo.



3 Português (Portuguese):

Este documento é importante e deve ser traduzida imediatamente. Se você precisa deste documento traduzido, por favor, entre em contato com Diretor de Diversidade da MassDEP para os números de telefone listados abaixo.



4(a) 中國（傳統） (Chinese (Traditional)):

本文件非常重要，應立即翻譯。如果您需要翻譯這份文件，請用下面列出的電話號碼與 MassDEP 的多樣性總監聯繫。



4(b) 中国（简体中文） (Chinese (Simplified)):

本文件非常重要，应立即翻译。如果您需要翻译这份文件，请用下面列出的电话号码与 MassDEP 的多样性总监联系。



5 Ayisyen (franse kreyòl) (Haitian) (French Creole):

Dokiman sa-a se yon bagay enpòtan epi yo ta dwe tradui imedyatman. Si ou bezwen dokiman sa a tradui, tanpri kontakte Divèsite Direktè MassDEP a nan nimewo telefòn ki nan lis pi ba a.



6 Việt (Vietnamese):

Tài liệu này là rất quan trọng và cần được dịch ngay lập tức. Nếu bạn cần dịch tài liệu này, xin vui lòng liên hệ với Giám đốc MassDEP đa dạng tại các số điện thoại được liệt kê dưới đây.



7 ប្រទេសកម្ពុជា (Kmer (Cambodian)):

ឯកសារនេះគឺមានសារៈសំខាន់និងគួរត្រូវបានបកប្រែភ្លាមៗ ប្រសិនបើអ្នកត្រូវបានបកប្រែ ឯកសារនេះសូមទំនាក់ទំនងឆ្នោតជាតិយក MassDEP នៅលេខទូរស័ព្ទដែលបានរាយ ខាងក្រោម។



8 Kriolu Kabuverdianu (Cape Verdean):

Es documento é importante e deve ser traduzido imidiatamente. Se bo precisa des documento traduzido, por favor contacta Director de Diversidade na MassDEP's pa es numero indicode li d'boche.



9 Русский язык (Russian):

Этот документ является важным и должно быть переведено сразу. Если вам нужен этот документ переведенный, пожалуйста, свяжитесь с директором разнообразия MassDEP по адресу телефонных номеров, указанных ниже.



10 العربية (Arabic):

هذه الوثيقة الهامة وينبغي أن تترجم على الفور. اذا كنت بحاجة الى هذه الوثيقة المترجمة، يرجى الاتصال مدير التنوع في PMassDE على أرقام الهواتف المدرجة أدناه.



11 한국어 (Korean):

이 문서는 중요하고 즉시 번역해야 합니다. 당신이 번역이 문서가 필요하다면 아래의 전화 번호로 MassDEP의 다양성 감독에 문의하시기 바랍니다.



12 հայերեն (Armenian):

Այս փաստաթուղթը շատ կարևոր է եւ պետք է թարգմանել անմիջապես. Եթե Ձեզ անհրաժեշտ է այս փաստաթուղթը թարգմանվել դիմել MassDEP բազմազանությունը տնօրեն է հեռախոսահամարների թվարկված են ստորև.



13 فارسی (Farsi (Persian):

این سند مهم است و باید فوراً ترجمه شده است. اگر شما نیاز به این سند ترجمه شده، لطفاً با ما تماس تنوع مدیر PMassDE در شماره تلفن های ذکر شده در زیر.



14 Français (French):

Ce document est important et devrait être traduit immédiatement. Si vous avez besoin de ce document traduit, s'il vous plaît communiquer avec le directeur de la diversité MassDEP aux numéros de téléphone indiqués ci-dessous.



15 Deutsch (German):

Dieses Dokument ist wichtig und sollte sofort übersetzt werden. Wenn Sie dieses Dokument übersetzt benötigen, wenden Sie sich bitte Diversity Director MassDEP die in den unten aufgeführten Telefonnummern.



16 Ελληνική (Greek):

Το έγγραφο αυτό είναι σημαντικό και θα πρέπει να μεταφραστούν αμέσως. Αν χρειάζεστε αυτό το έγγραφο μεταφράζεται, παρακαλούμε επικοινωνήστε Diversity Director MassDEP κατά τους αριθμούς τηλεφώνου που αναγράφεται πιο κάτω.



17 Italiano (Italian):

Questo documento è importante e dovrebbe essere tradotto immediatamente. Se avete bisogno di questo documento tradotto, si prega di contattare la diversità Direttore di MassDEP ai numeri di telefono elencati di seguito.



18 Język Polski (Polish):

Dokument ten jest ważny i powinien być natychmiast przetłumaczone. Jeśli potrzebujesz tego dokumentu tłumaczone, prosimy o kontakt z Dyrektorem MassDEP w różnorodności na numery telefonów wymienionych poniżej.



19 हिन्दी (Hindi):

यह दस्तावेज़ महत्वपूर्ण है और तुरंत अनुवाद किया जाना चाहिए. आप अनुवाद इस दस्तावेज़ की जरूरत है, नीचे सूचीबद्ध फोन नंबरों पर MassDEP की विविधता निदेशक से संपर्क करें.



Department of Environmental Protection

Charles D. Baker
Governor

Karyn E. Polito
Lieutenant Governor

Kathleen A. Theoharides
Secretary

Martin Suuberg
Commissioner

Findings of Fact in Support of FINAL Water Management Permit # 9P4-3-14-315.01 Town of Wayland

The Department of Environmental Protection (the Department or MassDEP) makes the following Findings of Fact in support of the attached Water Management Permit #9P4-3-14-315.01, and includes herewith its reasons for issuing the Permit and for conditions of approval imposed, as required by M.G.L. c. 21G, § 11. The issuance of this permit is in response to a Water Management Act (WMA) permit renewal application by the Town of Wayland.

The Department adopted revised Water Management Regulations at 310 CMR 36.00 on November 7, 2014, (described in greater detail below). Since that time, the Department has been working closely with each Water Management Act permittee to fully consider all aspects of their individual situations and ensure thoughtful and implementable permits.

The Town of Wayland Withdrawal Summary

The Town of Wayland (Wayland) is registered to withdraw an annual daily average volume of 1.66 million gallons per day (MGD) from seven groundwater sources (Wells 3315000-01G through -07G) in the Concord Basin. See Registration #3-14-315.02. On October 2003, the Department issued Wayland a WMA Permit in order to add the Chamberlain Well as an authorized withdrawal point and to increase the authorized volume. The registered wells were not added to the permit as withdrawal points, therefore they are limited to the registered withdrawal volume of 1.66 MGD.

The Permit Extensions

Wayland's WMA permit was initially set to expire on August 31, 2011. Prior to that date, the Permit Extension Act, Section 173 of Chapter 240 of the Acts of 2010, as amended by Sections 74 and 75 of Chapter 238 of the Acts of 2012, extended all existing permits by four years. Therefore, WMA permits for withdrawals in the Concord River basin were extended to August 31, 2015.

On April 8, 2015, the Department informed Wayland that the Department would need additional time before making a determination on the application in order to ensure that all permit renewal applicants in the Concord River Basin fully understood the new Water Management Regulations

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(discussed below), and to give proper consideration to all permit renewal applications within the basin. Pursuant to M.G.L. c. 30A, § 13, and 310 CMR 36.18(7), Wayland's permit continues in force and effect until the Department issues a final decision on the permit renewal application.

On August 27, 2015, Wayland applied to MassDEP for a permit renewal in the Concord River Basin. The Department published notice of the permit renewal application in the Environmental Monitor on December 9, 2015. No comments were received. On March 6, 2020, Wayland was issued a Permit Renewal Order to Complete (OTC) outlining specific information that was required to renew Wayland's permit. Wayland responded on June 29, 2020.

The expiration date for all permits going forward in the Concord River Basin will be August 31, 2031, in order to restore the staggered permitting schedule set forth in the regulations.

The Water Management Act (M.G.L. c. 21G)

The Water Management Act (Act) requires the Department to issue permits that balance a variety of factors including without limitation:

- Impact of the withdrawal on other water sources;
- Water available within the safe yield of the water source;
- Reasonable protection of existing water uses, land values, investments and enterprises;
- Proposed use of the water and other existing or projected uses of water from the water source;
- Municipal and Massachusetts Water Resources Commission (WRC) water resource management plans;
- Reasonable conservation consistent with efficient water use;
- Reasonable protection of public drinking water supplies, water quality, wastewater treatment capacity, waste assimilation capacity, groundwater recharge areas, navigation, hydropower resources, water-based recreation, wetland habitat, fish and wildlife, agriculture, flood plains; and
- Reasonable economic development and job creation.

Water Management Regulation Revisions

In 2010 the Executive Office of Energy and Environmental Affairs (EEA) convened the Sustainable Water Management Initiative (SWMI) for the purpose of incorporating the best available science into the management of the Commonwealth's water resources. SWMI was a multi-year process that included a wide range of stakeholders and support from the Departments of Environmental Protection, Fish and Game, and Conservation and Recreation. In November 2012 the *Massachusetts Sustainable Water Management Initiative Framework Summary* (<http://www.mass.gov/eea/docs/eea/water/swmi-framework-nov-2012.pdf>) was released.

On November 7, 2014, the Department adopted revised Water Management Regulations at 310 CMR 36.00 that incorporate elements of the SWMI framework and the Water Conservation Standards adopted by the Massachusetts WRC. The regulations reflect a carefully developed balance to protect the health of Massachusetts' water bodies while meeting the needs of businesses and communities for water.

Without limitation, the Department has incorporated the following into Water Management permitting:

- Safe yield determinations for the major river basins based on a new methodology developed through SWMI (see the Safe Yield in the Concord Basin section of this document or for more information on the Safe Yield methodology, go to the November 28, 2012 SWMI Framework Summary and Appendices);
- Water needs forecasts for public water suppliers developed by the Department of Conservation and Recreation, Office of Water Resources (DCR), using a methodology reviewed and approved by the Massachusetts WRC;
- Water supply protection measures for public water supplies including Zone II delineations for groundwater sources, and wellhead and surface water protection measures as required by Massachusetts Drinking Water Regulations (310 CMR 22.00);
- Water conservation standards reviewed and approved by the WRC in July 2006 and revised in July 2018 (<https://www.mass.gov/doc/massachusetts-water-conservation-standards-2/>) including without limitation;
 - performance standard of 65 residential gallons per capita day or less;
 - performance standard of 10% or less unaccounted for water;
 - seasonal limits on nonessential outdoor water use;
 - a water conservation program that includes leak detection and repair, full metering of the system and proper maintenance of the meters, periodic review of pricing, and education and outreach to residents and industrial and commercial water users; and
- Environmental protections developed through SWMI, including without limitation;
 - protection for coldwater fish resources;
 - minimization of withdrawal impacts in areas stressed by groundwater use;
 - mitigation of the impacts of increasing withdrawals.

Safe Yield in the Concord River Basin

This permit is being issued under the safe yield methodology adopted by the Department on November 7, 2014, and described in the regulations at 310 CMR 36.13. As of the date of issuance of this permit, the Safe Yield calculation for the Concord River Basin is 87.50 million gallons per day (MGD), and total registered and permitted withdrawals are 36.79 MGD. The withdrawals authorized by this renewed permit and all other permits currently being renewed in the Concord River Basin, will be within the safe yield of the Concord River Basin and may be further conditioned by the regulations.

Findings of Fact for Permit Conditions in Wayland's Water Management Act Permit

The Findings of Fact for the special conditions included in the permit generally describe the rationale and background for each special condition in the permit. This summary of permit special conditions is not intended to, and should not be construed as, modifying any of the permit special conditions. In the event of any ambiguity between this summary and the actual permit conditions, the permit language shall control.

Special Condition 1, Maximum Authorized Annual Average Withdrawal Volume, specifies the registered withdrawal volume of 1.66 MGD and a permitted increase of 0.11 MGD, for a

total of 1.77 MGD. The Department of Conservation and Recreation (DCR) recommended a temporary allocation of water be used in the renewed permit because a Water Needs Forecast (WNF) could not be completed due to the high unaccounted-for water (UAW) by Wayland during the years (2010-2014) evaluated. Wayland has taken steps to reduce their UAW in recent years and may contact DCR in the future to evaluate developing a WNF. Note that if more than 1.77 MGD is expected to be withdrawn, Wayland must obtain a new permit at the higher volume and will need a new WNF.

Special Condition 2, Maximum Authorized Daily Withdrawals from each Withdrawal Points, specifies the maximum daily withdrawal rates by source, according to MassDEP approved rates established by MassDEP's Drinking Water Program.

Special Condition 3, Ground Water Supply Protection, A portion of the Zone II area for the permitted Chamberlain Well extends into Sudbury. Wayland is required to repeat the Best Effort Requirements per 310 CMR 22.21 (1) to encourage the Town of Sudbury to include Wayland's Zone II in Sudbury's Water Resource Protection District within one year of the permit's issuance.

Special Condition 4, Performance Standards for Residential Gallons Per Capita Day Water Use and

Special Condition 5, Performance Standard for Unaccounted for Water are part of the *Water Conservation Standards for the Commonwealth of Massachusetts* adopted by the MA Water Resources Commission in July 2018 and can be found at <https://www.mass.gov/files/documents/2018/09/11/ma-water-conservation-standards-2018.pdf>.

The **Residential Gallons Per Capita Day** performance standard required of all PWS permittees is 65 RGPCD. Permittees that cannot meet the performance standard within the timeframe in the permit must meet Functional Equivalence requirements outlined in Appendix A.

Wayland's RGPCD for the last five years has not consistently met the performance standard, particularly during dry years. This permit limits nonessential outdoor water use to no more than 2 days per week whenever RGPCD is below 65 for the previous year, and to no more than 1 day per week whenever RGPCD is above 65 for the previous year.

Wayland's Residential Gallons Per Capita Day				
2018	2017	2016	2015	2014
64	66	70	63	65

The **Unaccounted for Water** performance standard required for all PWS permittees is 10% for 2 out of every 3 years. Permittees that cannot comply within the timeframe in the permit must meet Functional Equivalence requirements based on the AWWA/IWA Water Audits and Loss Control Programs, Manual of Water Supply Practices M36, as outlined in Appendix B. Wayland's recent UAW has been:

Wayland's Unaccounted-for-Water				
2018	2017	2016	2015	2014
11.5%	12.8%	12.5%	15.2%	16.1%

An audit based on the AWWA/IWA Water Audits and Loss Control Programs, Manual of Water Supply Practices M36 was completed by Tata & Howard, Inc for Wayland in 2018 using the water withdrawal data from the periods of 2013-2015. The data validity score for those three years covered in the audit was 68 out of 100, which met the Level III (51-70) requirement. A Leakage Component Analysis (LCA) was conducted to identify causes of real and apparent water loss. The LCA identified the background leakage to be 33.58 million gallons (mg) and the real losses to be 44.97 mg. In addition to the LCA, a Water Loss Control Program was developed. The program includes measures of conducting an audit annually based on the AWWA/IWA Water Audits and Loss Control Programs, Manual of Water Supply Practices M36, practicing good record keeping and tracking every breaks, leaks and flushing, etc., completing one leak detection survey annually, utilizing the Capital Efficiency Plan (CEP) to prioritize water distribution system improvements, implementing an Advanced Metering Infrastructure (AMI) and replacing water meters.

Within six months of the issuance of the final permit, Wayland should submit the proposed implementation schedule for each measure listed in the Water Loss Control Program and the funding sources for those measures. In particular, meter replacement shall be completed within one year of the project contract being awarded and the quarterly billing shall be implemented within one year of the completion of the meter replacement. Continued implementation of those measures will be a condition of the permit in place of meeting the 10% UAW performance standard. Discontinuation of the Water Loss Program may be approved by the Department when Wayland achieves below 10% UAW for four consecutive years and the water audit data validity scores are at least Level III (51-70) for the same four years.

Special Condition 6, Seasonal Limits on Nonessential Outdoor Water Use specifies the restrictions on nonessential outdoor water use from May through September and has changed since the existing permit issued in 2010. The options outlined in Special Condition 6 are based on whether reported RGPCD for the previous year was in compliance with the RGPCD Performance Standard (see Special Condition 5, Performance Standard for RGPCD).

In addition, outdoor water use by suppliers, like Wayland, with wells in August net groundwater depleted subbasins¹ is limited to one or two days per week to minimize withdrawals from depleted subbasins.

Each year Wayland may choose one of two options for implementing nonessential outdoor watering restrictions.

¹ Subbasins used for WMA permitting are the 1,395 subbasins delineated by the U.S. Geological Survey in *Indicators of Streamflow Alteration, Habitat Fragmentation, Impervious Cover, and Water Quality for Massachusetts Stream Basins* (Weiskel *et al.*, 2010, USGS SIR 2009-5272).

- **Calendar triggered restrictions** are in place from May 1st through September 30th. Many public water suppliers find this option easier to implement and enforce than the streamflow triggered approach
- **Streamflow triggered restrictions** are implemented at those times when streamflow falls below designated flow triggers measured at an assigned, web-based, real-time U.S. Geologic Survey (USGS) stream gage from May 1st through September 30th. At a minimum, restrictions commence when streamflow falls below the trigger for three consecutive days. Once implemented, the restrictions remain in place until streamflow at the assigned USGS local stream gage meets or exceeds the trigger streamflow for seven consecutive days.
- If Wayland selects the streamflow trigger approach, it has been assigned USGS stream gage #01099500 –Concord River below Meadow Brook, at Lowell, MA. The local gage streamflow triggers at this site are **427** cubic feet per second (cfs) for May and June, and **156** cfs for July, August and September. Should the reliability of flow measurement at this gage be so impaired as to question its accuracy, Wayland may request MassDEP’s review and approval to transfer to another gage to trigger restrictions. MassDEP reserves the right to require use of a different gage.
- **The 7-Day Low Flow Trigger**, at which restrictions increase, is incorporated into both Calendar and Streamflow Triggered restrictions in order to provide additional protection to streamflows when flows are very low. The 7-day low flow trigger is based on the median value of the annual 7-day low flows for the period of record. The 7 day low-flow trigger for the Concord River below Meadow Brook gage is **71** cfs.

Wayland may choose to implement limits on nonessential outdoor water use that are stricter than those required by the permit. This permit condition does not confer enforcement authority to the permittee. Within one year of the issuance of the final renewed permit, Wayland should demonstrate that it has the ability to implement and enforce this permit condition.

Special Condition 7, Requirement to Report Raw and Finished Water Volumes, ensures that the information necessary to evaluate compliance with the conditions included herein is accurately reported.

Special Condition 8, Water Conservation Requirements, incorporates the Water Conservation Standards for the Commonwealth of Massachusetts reviewed and approved by the Water Resources Commission in July 2018 (<https://www.mass.gov/doc/massachusetts-water-conservation-standards-2>). Upon request of MassDEP, Wayland shall report on its conservation efforts.

Special Condition 9, Minimization of Groundwater Withdrawal impacts in Stressed Subbasins, requires permittees with permitted groundwater sources in subbasins with net groundwater depletion (August NGD) of 25% or more during August to minimize their withdrawal impacts on those subbasins to the greatest extent feasible, through optimization of

groundwater source use, surface water releases to improve streamflows, outdoor water use restrictions and water conservation programs that go beyond standard Water Management permit requirements.

Wayland's permitted groundwater source (3315000-08G) is located in Subbasin 12077 which has an August NGD of 37.7%. Therefore, Wayland must prepare a Minimization Plan.

Based on the Department's records and information submitted by Wayland, the Department finds that minimization requirements will be met as follows:

- Wayland's sources are located in Subbasin 12077 (3315000-01G, 02G, 06G, 07G, 08G) with an August NGD of 37.7% and in Subbasin 12092 (3315000-03G, 04G, 05G) with an August NGD of 34.7%. This permit does not require that Wayland shift additional pumping to another subbasin because both subbasins have an August NGD of more than 25%.
- Wayland has no surface water supplies and, therefore cannot make releases to improve streamflow.
- The limits on nonessential outdoor water use set forth in Special Condition 6 are restrictions developed to minimize withdrawals in August net groundwater depleted subbasins.
- Wayland has started planning for an advanced metering infrastructure (AMI) implementation and water meter replacement program to improve meter reading accuracy and reduce water loss. Wayland is required to complete the meter replacement program within one year of the project contract being awarded and to implement the quarterly billing within one year of the completion of the meter replacement
- Wayland's Chapter 191 Lawn Irrigation Systems Bylaw, adopted by the Annual Town Meeting on April 3, 2003 under its common law police powers to protect public health and welfare, MGL.c.40, §21, and under the Town of Wayland's authority to regulate water use through its Board of Public Works pursuant to Chapter 80 of the Acts of 1878, includes application procedures, system requirements, rules and regulations, and violations and penalties to ensure proper installation and efficient operation of automatic sprinkler systems.

Special Condition 10, Mitigation of Impacts for Withdrawals that Exceed Baseline

Withdrawals, requires mitigation where feasible, for withdrawals over a baseline volume.

Baseline withdrawal means the volume of water withdrawn during calendar year 2005 plus 5%, or the average annual volume withdrawn from 2003 through 2005 plus 5%, whichever is greater provided that:

- a) baseline cannot be less than a permittee's registered volume;
- b) baseline cannot be greater than the permittee's authorized volume for 2005; and

- c) if during the period from 2003 to 2005, the permittee's withdrawals from the water source were interrupted due to contamination of the source or construction of a treatment plant, the Department will use best available data to establish a baseline volume from the water source.

Baseline Withdrawal and Mitigation Calculation: Wayland's baseline is 1.72 MGD, based on withdrawals made in 2005 plus 5%. Wayland's water withdrawals in recent years have been below the 1.72 MGD baseline.

Wayland's Annual Average Withdrawals (MGD)				
2019	2018	2017	2016	2015
1.40	1.37	1.45	1.66	1.47

Wayland requested to renew its existing permitted volume of 0.11 MGD for a total allocation of 1.77 MGD. No mitigation is required until Wayland's total water withdrawals reach 1.72 MGD. Mitigation measures must be in place prior to Wayland making withdrawals of more than the 1.72 MGD baseline.

The mitigation volume calculation below assumes that Wayland's future withdrawals will be discharged to on-site septic systems at the same rate (98%) as current water withdrawals. A "wastewater adjustment" is calculated for water withdrawn that is returned to the ground as wastewater within the same major basin. MassDEP will assume that 85% of water delivered to customers with septic systems will be returned to the ground within the same major basin as the withdrawal, thus reducing the amount of mitigation needed. After calculating the adjustment for authorized withdrawals over baseline that will be returned to groundwater through septic system discharge (Step 2 below), Wayland's total mitigation requirement will be up to 8,350 gallons per day (Step 3 below).

Wayland's Wastewater Adjustment Calculation for Mitigation	
1. Permitted amount above Baseline = 0.05 MGD	
• Permitted amount above Baseline: $1.77 - 1.72 = 0.05$ MGD	
2. Adjustment for Wastewater Discharge to Local Groundwater = 0.04165 MGD	
• 98% of increased withdrawals are delivered to areas with on-site septic systems: $0.05 \text{ MGD} \times 0.98 (98\%) = 0.049 \text{ MGD}$	
• 85% of water delivered to areas with on-site septic systems returns to groundwater: $0.049 \text{ MGD} \times 0.85 (85\%) = 0.04165 \text{ MGD}$	
3. Amount to be Mitigated after Adjustment for Wastewater Discharge to Local Groundwater = 0.00835 MGD	
• Permitted amount above baseline (0.05 MGD) – adjustment for wastewater discharge to local groundwater (0.04165 MGD) = 0.00835 MGD or 8,350 gallons per day	

Because Wayland's authorized volume exceeds its baseline volume, a mitigation plan is required. Wayland identified a stormwater recharge project at Wayland High School for its mitigation plan.

Stormwater BMPs that were built on or after January 1, 2005 that infiltrate stormwater from previously directly connected impervious surfaces² are eligible for Direct Mitigation credits. The BMP mitigation credit is calculated based on average annual precipitation, BMP design infiltration depth³, and the area of directly connected impervious surface built prior to 2005 re-directed to the BMP built on or after January 1, 2005. Wayland's stormwater BMPs at Wayland High School located at 264 Old Connecticut Path qualified for credits. Based on the information provided by Wayland, the BMPs were completed in 2012. The BMPs infiltrate a total of 0.013 MGD of stormwater.

Coldwater Fish Resource Protection was incorporated into the Water Management Regulations in November 2014. Coldwater Fish Resource Protection is not a condition of this permit because Wayland's withdrawals do not impact any waters that the MA Division of Fisheries and Wildlife has identified as supporting coldwater fish.

Public Comments

Notice of Wayland's draft permit being available for public comment was published in the MA Environmental Monitor on January 22, 2021. The comment period ran from January 22, 2021 to February 22, 2021. Comments were received from OARS, the watershed organization for the Sudbury, Assabet and Concord Rivers. Comments are summarized as the following:

1. Wayland Water Department should prepare a plan to reduce pumping of the Chamberlain well when it may have a deleterious impact on the Sudbury River's flow.
2. Wayland should implement quarterly billing and provide customers with information on their water consumption to improve its RGPCD values. Wayland should also finalize its Conservation Program submitted along with its OTC responses.
3. Wayland should develop a Drought Management Plan and revise the town's bylaw to bring it into conformity with the non-essential outdoor water use permit condition in the renewed permit. The use of private wells for irrigation and other non-essential outdoor water use should be in line with those on the public water supply when conservation restrictions are required.
4. Wayland should be required to implement at least six of the ten actions outlined in the Public Education and Outreach shown in Table 5 of the draft permit.
5. The stormwater projects that are included in the mitigation plan should be maintained in a manner that will allow them to continue to operate at their design capacity and effectiveness during the life of the permit.

² Directly connected impervious surfaces are those whose runoff discharges to a surface water body.

³ BMP design infiltration depth is the inches of runoff from 24 hours of precipitation that is infiltrated via a BMP in 72 hours, per MA Stormwater Handbook, Vol. 3, Ch. 1, page 25

Response to Comments

While the Department acknowledges OARS interest in requiring Wayland to reduce pumping from the Chamberlain Well when it may have a “deleterious” impact on the Sudbury River, the Department has not included such a requirement. We appreciate that OARS is trying to reduce pumping impacts during low flow periods and believe we have included a number of conservation and demand management requirements in the permit that will help reduce the combined summer withdrawals from all of Wayland’s sources. To require that Wayland reduce pumping from their one permitted well, will simply push the demand to their existing registered wells which are either further upstream on the Sudbury River or located on smaller tributaries.

The Performance Standard for Unaccounted for Water permit condition in the renewed permit requires Wayland to submit a schedule and implement the Water Loss Control Program which includes implementing Advanced Metering Infrastructure (AMI) and replacing water meters. Wayland responded that the automatic/radio-read metering program has been set up to include three project components which are each bid separately. The first contract including the procurement of an AMI and radio endpoints, and the second contract including the procurement of new water meters have already been bid and awarded. The third component for the installation of the new water meters and radio endpoints will be bid in the near future as the pandemic prevents home access for installation work. The renewed permit requires that the meter changeout be completed within one year of the installation contract being awarded and the quarterly billing being implemented within one year of the completion of the meter change out required in the Performance Standard for Unaccounted for Water permit condition.

Wayland responded that the submitted Draft Conservation Program is an ongoing program by the Town that is always evolving in terms of programs and education offered to the community. The renewed permit requires that Wayland report on its ongoing conservation efforts upon the request of MassDEP.

The renewed permit requires Wayland demonstrate that it has the ability to implement and enforce the Seasonal Limits on Nonessential Outdoor Water Use permit condition within one year of the issuance of the final permit.

The renewed permit does not include additional requirements on the Public Education and Outreach. However, should Wayland fail to meet the 65 RGPCD performance standard, an RGPCD plan with additional conservation measures will be required as outlined in the Appendix A to the renewed permit.

MassDEP has updated the Stormwater BMP Direct Mitigation Credit Certification Form to include the provisions that stormwater projects that are included in the mitigation plan be maintained in a manner that will allow them to continue to operate at their design capacity and effectiveness during the life of the permit. Wayland has signed and submitted the updated certification form as attached to the renewed permit.



Department of Environmental Protection

Charles D. Baker
Governor

Karyn E. Polito
Lieutenant Governor

Kathleen A. Theoharides
Secretary

Martin Suuberg
Commissioner

WATER WITHDRAWAL PERMIT
#9P4-3-14-315.01
TOWN OF WAYLAND

This renewal of Permit 9P4-3-14-315.01 is issued pursuant to the Massachusetts Water Management Act for the sole purpose of authorizing the withdrawal of a volume of water as stated below and subject to the following special and general conditions. This permit conveys no right in or to any property beyond the right to withdraw the volume of water for which it is issued.

PERMIT NUMBER: 9P4-3-14-315.01

RIVER BASIN: Concord

PERMITTEE: Town of Wayland

EFFECTIVE DATE: May 5, 2021

EXPIRATION DATE: August 31, 2031

NUMBER OF WITHDRAWAL POINTS:

Groundwater: 1

Surface Water: 0

USE: Public Water Supply

DAYS OF OPERATION: 365

Table 1: WITHDRAWAL POINT IDENTIFICATION

Source Name	PWS Source ID Code
Chamberlain Well	3315000-08G

SPECIAL CONDITIONS

1. Maximum Authorized Annual Average Withdrawal Volume

This permit authorizes the Town of Wayland (Wayland) to withdraw water from the Concord Basin at the rate described below (Table 2). This permitted volume is in addition to the 1.66 million gallons per day (MGD) that Wayland is authorized to withdraw from its sources in the Concord River Basin under its WMA Registration #3-14-315.02. The permitted volume is expressed both as an annual average daily withdrawal rate, MGD, and as a total annual withdrawal volume, million gallons per year (MGY), for each permit period over the term of this permit. The Department of Environmental Protection (MassDEP or the Department) bases these withdrawal volumes on the raw water withdrawn from the authorized withdrawal points and will use the raw water amount to assess compliance with the registered and permitted withdrawal volumes.

Table 2: Maximum Authorized Withdrawal Volumes

Permit Periods	Total Raw Water Withdrawal Volumes			
	Permit		Permit + Registration	
	Daily Average (MGD)	Total Annual (MGY)	Daily Average (MGD)	Total Annual (MGY)
5/05/2021 to 08/31/2026	0.11	40.15	0.11+1.66=1.77	646.05
09/01/2026 to 08/31/2031	0.11	40.15	0.11+1.66=1.77	646.05

2. Maximum Authorized Daily Withdrawals from each Withdrawal Point

Withdrawals from permitted withdrawal points are not to exceed the approved maximum daily volumes listed below without specific advance written approval from MassDEP (Table 3). The authorized maximum daily volume is the approved rate of each source. In no event shall the combined withdrawals from the individual withdrawal points exceed the withdrawal volumes authorized above in Special Condition 1.

Table 3: Maximum Daily Withdrawal Volumes

Source Name	PWS Source Code ID	Maximum Daily Rate (MGD)
Chamberlain Well	3315000-08G	0.828

3. Ground Water Supply Protection

According to MassDEP's records, Wayland is required to repeat the Best Effort Requirements per 310 CMR 22.21 (1) to encourage the Town of Sudbury to include Wayland's Zone II in Sudbury's Water Resource Protection District. Wayland shall complete this effort within one year of the permit's issuance. If you need assistance on groundwater supply protection requirements, please contact Catherine Hamilton of MassDEP's Boston Office at 617-556-1070.

4. Performance Standard for Residential Gallons Per Capita Day Water Use

Wayland's performance standard for residential gallons per capita day (RGPCD) is 65 gallons or less. Wayland shall be in compliance with this performance standard, if Wayland does not meet the standard, Wayland shall be in compliance with the functional equivalence requirements (Appendix A).

Wayland shall report its RGPCD water use annually in its Annual Statistical Report (ASR).

5. Performance Standard for Unaccounted for Water

Within six months of the issuance of the permit, Wayland shall submit the proposed implementation schedule for the following measures that are listed in its Water Loss Control Program (attached) and the funding sources for those measures:

- Conducting an audit based on the AWWA/IWA Water Audits and Loss Control Programs, Manual of Water Supply Practices M36 annually;
- Practicing good record keeping and tracking every breaks, leaks and flushing, etc.;
- Completing one leak detection survey annually;
- Utilizing the Capital Efficiency Plan (CEP) to prioritize water distribution system improvements;
- Implementing an Advanced Metering Infrastructure (AMI) and replacing water meters.

In addition, meter replacement shall be completed within one year of the project contract being awarded and the quarterly billing shall be implemented within one year of the completion of the meter replacement.

Continued implementation of those measures is required. Discontinuation of the Water Loss Program may be approved by the Department when Wayland achieves 10% UAW or less for four consecutive years and the water audit data validity scores are at least Level III (51-70) for the same four years.

6. Seasonal Limits on Nonessential Outdoor Water Use

Wayland shall limit nonessential outdoor water use through mandatory restrictions from May 1st through September 30th as outlined in below. To the extent feasible, all summer outdoor water use should take place before 9 a.m. and after 5 p.m. when evaporation and evapotranspiration rates are lower.

Wayland shall demonstrate that it has the ability to implement and enforce the nonessential outdoor water use restriction within one year of the issuance of the final permit.

Table 4: Seasonal Limits on Nonessential Outdoor Water Use

For Permittees meeting the 65 RGPCD Standard for the preceding year RGPCD ≤ 65 as reported in the ASR and accepted by MassDEP	
Calendar Triggered Restrictions	Nonessential outdoor water use is allowed: a) Two (2) days per week before 9 am and after 5 pm; and b) one (1) day per week before 9 am and after 5 pm when USGS stream gage 01108000 – Concord River at Meadow Brook, at Lowell MA falls below 71 cfs for three (3) consecutive days. Once streamflow triggered restrictions are implemented, they shall remain in place until streamflow at the gage meets or exceeds 71 cfs for seven (7) consecutive days.
Streamflow Triggered Restrictions	Nonessential outdoor water use is allowed: a) Two (2) days per week before 9 am and after 5 pm when USGS stream gage 01108000 – Concord River at Meadow Brook, Lowell, MA falls below: • May 1 – June 30: 427 cfs for three (3) consecutive days • July 1 – September 30: 156 cfs for three (3) consecutive days b) one (1) day per week before 9 am and after 5 pm when USGS stream gage 01108000 – Concord River at Meadow Brook, Lowell, MA falls below 71 cfs for three (3) consecutive days. Once implemented, the restrictions shall remain in place until streamflow at the gage meets or exceeds the trigger streamflow for seven (7) consecutive days.
For Permittees NOT meeting the 65 RGPCD standard for the preceding year RGPCD > 65 as reported in the ASR and accepted by MassDEP	
Calendar Triggered Restrictions	Nonessential outdoor water use is allowed one (1) day per week before 9 am and after 5pm;
Streamflow Triggered Restrictions	Nonessential outdoor water use is allowed one (1) day per week before 9 am and after 5 pm when USGS stream gage 01108000 – Concord River at Meadow Brook, Lowell, MA falls below: • May 1 – June 30: 427 cfs for three (3) consecutive days • July 1 – September 30: 156 cfs for three (3) consecutive days Once implemented, the restrictions shall remain in place until streamflow at the gage meets or exceeds the trigger streamflow for seven (7) consecutive days.

Instructions for Accessing Streamflow Website Information

If Wayland chooses Streamflow Triggered Restrictions, Wayland shall be responsible for tracking streamflows and drought advisories and recording and reporting to MassDEP when restrictions are implemented.

Streamflow information is available at the USGS National Water Information System (NWIS): Web Interface. The USGS NWIS default shows Massachusetts streamflows in real time, i.e., the most recent, usually quarterly hourly, reading made at each USGS stream gage.

Seasonal Limits on Nonessential Outdoor Water Use are implemented when the mean daily streamflow falls below the designated trigger for 3 consecutive days. The mean daily flow is not calculated until after midnight each day when the USGS computes the hourly data into a mean daily streamflow. As a result, permittees must use the mean daily streamflow from the preceding day when tracking streamflows.

Mean daily streamflow gage readings are available at the USGS NWIS Web Interface at <http://waterdata.usgs.gov/ma/nwis/current/?type=flow>.

- Scroll down to 01099500 – Concord River below Meadow Brook at Lowell, MA.
- Click on the gage number.
- Scroll down to “Provisional Date Subject to Revision – Available data for this site” and click on the drop-down menu.
- Click on “Time-series: Daily data” and hit GO.
- Scroll down to the “Available Parameters” box. Within the box, be sure “00060 Discharge (Mean)” is checked, then, under “Output Format” click “Table” and hit GO.
- Scroll down to “Daily Mean Discharge, cubic feet per second” table and find the current date on the table.
- Compare the cubic feet per second (cfs) measurement shown on the table to the cfs shown under Streamflow Triggered Restrictions above.

Wayland shall document compliance with the Seasonal Nonessential Outdoor Water Use Restrictions annually in its Annual Statistical Report (ASR) and indicate whether it anticipates implementing calendar triggered restrictions or streamflow triggered restrictions during the next year.

Restricted Nonessential Outdoor Water Uses

Nonessential outdoor water uses that are subject to mandatory restrictions include:

- irrigation of lawns via automatic irrigation systems or sprinklers;
- filling swimming pools;
- washing vehicles, except in a commercial car wash or as necessary for operator safety; and
- washing exterior building surfaces, parking lots, driveways or sidewalks, except as necessary to apply surface treatments such as paint, preservatives, stucco, pavement or cement.

The following uses may be allowed when mandatory restrictions are in place:

- irrigation to establish a new lawn and new plantings during the months of May and September;
- irrigation of public parks and recreational fields before 9 a.m. and after 5 p.m.;
- irrigation of gardens, flowers and ornamental plants by means of a hand-held hose or drip irrigation system; and
- irrigation of lawns by means of a hand-held hose.

Water uses NOT subject to mandatory restrictions are those required:

- for health or safety reasons;
- by regulation;
- for the production of food and fiber;
- for the maintenance of livestock; or
- to meet the core functions of a business (for example, irrigation by golf courses as necessary to maintain tees, greens, and minimal fairway watering, or irrigation by plant nurseries as necessary to maintain stock).

Public Notice of Seasonal Nonessential Outdoor Water Use Restrictions

Wayland shall notify its customers of the restrictions, including a detailed description of the restrictions and penalties for violating the restrictions, by April 15th each year.

Notice that restrictions have been put in place shall be filed each year with the Department within 14 days of the restriction's effective date. Filing shall be in writing on the form "Notification of Water Use Restrictions" available on MassDEP website.

Nothing in the permit shall prevent Wayland from implementing water use restrictions that are more stringent than those set forth in this permit.

7. Requirement to Report Raw and Finished Water Volumes

Wayland shall report annually on its ASR the raw water volumes and finished water volumes for the entire water system and the raw water volumes for individual water withdrawal points.

8. Water Conservation Requirements

At a minimum, Wayland shall implement the following conservation measures forthwith. Compliance with the water conservation requirements shall be reported to MassDEP upon request, unless otherwise noted below.

Table 5: Minimum Water Conservation Requirements	
System Water Audits and Leak Detection	
1.	At a minimum, conduct a full leak detection survey every three years. A full leak detection survey should be completed by December 31, 2021.
2.	Conduct leak detection of the entire distribution system within one year whenever the percentage of UAW increases by 5% or more (for example an increase from 3% to 8%) over the percentage reported on the ASR for the prior calendar year. Within 60 days of completing the leak detection survey, submit to the Department a report detailing the survey, any leaks uncovered as a result of the survey or otherwise, dates of repair and the estimated water savings as a result of the repairs.
3.	Conduct field surveys for leaks and repair programs in accordance with the AWWA Manual 36.
4.	Repair reports shall be kept available for inspection by the Department. The permittee shall establish a schedule for repairing leaks that is at least as stringent as the following:

- Leaks of 3 gallons per minute or more shall be repaired within 3 months of detection.
- Leaks of less than 3 gallons per minute at hydrants and appurtenances shall be repaired as soon as possible.
- Leaks of less than 3 gallons per minute shall be repaired in a timely manner, but in no event more than 6 months from detection, except that leaks in freeway, arterial or collector roadways shall be repaired when other roadwork is being performed on the roadway.
- Leaks shall be repaired in accordance with the permittee's priority schedule including leaks up to the property line, curb stop or service meter, as applicable.
- Permittee shall have water use regulations in place that require property owners to expeditiously repair leaks on their property.

The following exceptions may be considered:

- Repair of leakage detected during winter months can be delayed until weather conditions become favorable for conducting repairs;* and
- Leaks in freeway, arterial or collector roadways may be coordinated with other scheduled projects being performed on the roadway**.

*Reference: MWRA regulations 360 CMR 12.09

**Mass Highway or local regulations may regulate the timing of tearing up pavement to repair leaks.

Metering

1. Calibrate all source, treatment and finished water meters at least annually and report date of calibration on the ASR.
2. One hundred percent (100%) metering of the system is required. All water distribution system users shall have properly sized service lines and meters that meet AWWA calibration and accuracy performance standards as set forth in AWWA Manual M6 – Water Meters.
3. The permittee shall have an ongoing program to inspect individual service meters to ensure that all service meters accurately measure the volume of water used by its customers. The metering program shall include regular meter maintenance, including testing, calibration, repair, replacement and checks for tampering to identify and correct illegal connections. The plan shall continue to include placement of sufficient funds in the annual budget to calibrate, repair, or replace meters as necessary.

Pricing

1. Establish a water pricing structure that includes the full cost of operating the water supply system. Full cost pricing recovers all costs as applicable, including:
 - pumping and distribution equipment cost, repair and maintenance;
 - water treatment;
 - electricity;
 - capital investment, including planning, design and construction;
 - land purchase and protection;
 - debt service;

○ administrative costs including systems management, billing, accounting, customer service, service studies, rate analyses and long-range planning; ○ conservation program including audits, leak detection equipment, service and repair, meter replacement program, automated meter reading installation and maintenance, conservation devices, rebate program, public education program; ○ regulatory compliance; and ○ staff salaries, benefits training and professional development.
2. Evaluate rates at a minimum every three to five years and adjust costs as needed.
3. Permittee shall not use decreasing block rates. Decreasing block rates which charge lower prices as water use increases during the billing period, are prohibited by M.G.L. Chapter 40 Section 39L.
4. If billing frequency is less than quarterly (i.e. annual or biannual), implement quarterly or more frequent meter reading and billing as soon as practicable.
Residential and Public Sector Conservation
1. Meet all standards set forth in the Federal Energy Policy Act, 1992, and the Massachusetts Plumbing Code.
2. Meter or estimate water used by contractors using fire hydrants for pipe flushing and construction.
3. Wayland shall continue to ensure that water savings devices are installed in all municipal buildings as they are renovated, and shall ensure water conserving fixtures and landscaping practices are incorporating into the design of new municipal capital projects.
Industrial and Commercial Water Conservation
1. Wayland shall ensure implementation of water conservation practices, including the installation of WaterSense compliant low flow plumbing fixtures where applicable, and low water use landscaping in all development proposals.
Lawn and Landscape
1. Develop and adopt or update as necessary, a water use restriction bylaw, ordinance or regulation that authorizes enforcement of the seasonal limits on nonessential outdoor water use. MassDEP has developed the “DEP Model Outdoor Water Use Bylaw/Ordinance” to help municipalities and water districts implement seasonal water conservation requirements. The Model Bylaw also includes options for regulating private wells and in-ground irrigation systems. See http://www.mass.gov/eea/agencies/massdep/water/regulations/model-water-use-restriction-bylaw-ordinance.html NOTE: Wayland’s Bylaw 190, adopted by the Town of Wayland on May 6, 1998 with amendments noted where applicable, includes enforcement authority and establishes penalties for violations of the permit restrictions.

Public Education and Outreach
1. Develop and implement a water conservation and education plan designed to educate water customers on ways to conserve water. Without limitation, the plan may include the following actions: ○ Include in bill stuffers and/or bills, a work sheet to enable customers to track water use and conservation efforts and estimate the dollar savings; ○ Public space advertising/media stories on successes (and failures); ○ Conservation information centers perhaps run jointly with electric or gas company; ○ Speakers for community organizations; ○ Public service announcements; radio/T.V./audio-visual presentations; ○ Joint advertising with hardware stores to promote conservation devices; ○ Use of civic and professional organization resources; ○ Special events such as Conservation Fairs; ○ Develop materials that are targeted to schools with media that appeals to children, including materials on water resource projects and field trips; and ○ Provide multilingual materials as needed. 2. Upon request of MassDEP, permittee shall report on its public education and outreach efforts, including a summary of activities developed for specific target audiences, any events or activities sponsored to promote water conservation and copies of written materials.

9. Minimization of Groundwater Withdrawal Impacts in Stressed Subbasins

Wayland shall minimize the impacts of its groundwater withdrawals from its permitted source in Subbasin 12077, as follows:

- Implement seasonal limits on nonessential outdoor water use as outlined in Special Condition 6;
- Continue to implement the ongoing meter replacement program as outlined:
 - Within one year of the project contract being awarded, complete the meter replacement;
 - Within one year of the completion of the meter replacement, implement quarterly billing;
- Continue to enforce Chapter 191 Lawn Irrigation Systems Bylaw, which requires the proper installation and efficient operation of automatic sprinkler systems adopted by the Annual Town Meeting of the Town of Wayland on April 3, 2003.

10. Mitigation of Impacts for Withdrawals that Exceed Baseline Withdrawals

Wayland is required to mitigate up to 0.00835 MGD (8,350 gpd) for its permitted withdrawals over its 1.72 MGD baseline withdrawal rate. The mitigation requirement of 0.00835 MGD is met through the stormwater recharge project located at Wayland High School, 264 Old Connecticut Path in Wayland. The project was completed in 2012. According to the information provided, the Wayland High School project with a design infiltration depth of 1 inch would infiltrate 0.013 MGD of stormwater for the 5.6 acres of

directly connected impervious surface built before 2005 that was rerouted to the infiltration structure.

Wayland Water Department shall contact MassDEP should there be changes to the status of the mitigation project.

GENERAL CONDITIONS (applicable to all permittees)

1. **Duty to Comply** The permittee shall comply at all times with the terms and conditions of this permit, the Act and all applicable State and Federal statutes and regulations.
2. **Operation and Maintenance** The permittee shall at all times properly operate and maintain all facilities and equipment installed or used to withdraw up to the authorized volume so as not to impair the purposes and interests of the Act.
3. **Entry and Inspections** The permittee or the permittee's agent shall allow personnel or authorized agents or employees of the Department at reasonable times to enter and examine any property or inspect and copy any records for the purpose of determining compliance with this permit, the Act or the regulations published pursuant thereto, upon presentation of proper identification and an oral statement of purpose.
4. **Water Emergency** Withdrawal volumes authorized by this permit are subject to restriction in any water emergency declared by the Department pursuant to M.G.L. c. 21G, s. 15-17, M.G.L. c. 111, s. 160, or any other enabling authority.
5. **Transfer of Permits** This permit shall not be transferred in whole or in part unless and until the Department approves such transfer in writing, pursuant to a transfer application on forms provided by the Department requesting such approval and received by the Department at least thirty (30) days before the effective date of the proposed transfer. No transfer application shall be deemed filed unless it is accompanied by the applicable transfer fee established by 310 CMR 36.33.
6. **Duty to Report** The permittee shall submit annually, on the electronic Annual Statistical Report (eASR) accessed through the Department's eDEP website, a statement of the withdrawal. Such report must be submitted annually by the date identified on eDEP each year, unless the permittee has explicit permission from the MassDEP Drinking Water program for an extension of time.
7. **Duty to Maintain Records** The permittee shall be responsible for maintaining withdrawal records in sufficient detail to assess compliance with the conditions of this permit.
8. **Metering** All withdrawal points included within the permit shall be metered. Meters are to be calibrated annually.
9. **Amendment, Suspension or Termination** The Department may amend, suspend or terminate the permit in accordance with M.G.L. c. 21G and 310 CMR 36.29.

APPEAL RIGHTS AND TIME LIMITS

This permit is a decision of the Department. Any person aggrieved by this decision and any person who has been allowed pursuant to 310 CMR 1.01(7) to intervene in the adjudicatory proceeding that resulted in this decision may request an adjudicatory hearing. Any such request must be made in writing, by certified mail or hand delivered, and received by the Department within twenty-one (21) days of the date of receipt of this permit. No request for an appeal of this permit shall be validly filed unless a copy of the request is sent by certified mail, or delivered by hand to the local water resources management official in the city or town in which the withdrawal point is located; and for any person appealing this decision, who is not the applicant, unless such person notifies the permit applicant of the appeal in writing by certified mail or by hand within five (5) days of mailing the appeal to the Department.

CONTENTS OF HEARING REQUEST

The request for a hearing shall state specifically, clearly and concisely the facts which are the grounds for the appeal, the relief sought, and any additional information required by 310 CMR 1.01(6)(b) or other applicable law or regulation. For any person appealing this decision who is not the applicant, the request must include sufficient written facts to demonstrate status as a person aggrieved and documentation to demonstrate previous participation where required.

FILING FEE AND ADDRESS

The hearing request, together with a valid check, payable to the Commonwealth of Massachusetts in the amount of \$100 must be mailed to:

Commonwealth of Massachusetts
Department of Environmental Protection
P.O. Box 4062
Boston, MA 02211

The request shall be dismissed if the filing fee is not paid, unless the appellant is exempt or granted a waiver as described below.

EXEMPTIONS

The filing fee is not required if the appellant is a city or town (or municipal agency), county, district of the Commonwealth of Massachusetts, or a municipal housing authority.

WAIVER

The Department may waive the adjudicatory hearing filing fee for any person who demonstrates to the satisfaction of the Department that the fee will create an undue financial hardship. A person seeking a waiver must file, together with the hearing request, an affidavit setting forth the facts which support the claim of undue hardship.



Duane LeVangie, Program Chief
Water Management Act Program
Bureau of Water Resources

5/5/2021

Date

Appendix A–Functional Equivalence with the 65 Residential Gallons Per Capita Day Performance Standard

MassDEP will consider PWS permittees who cannot meet the 65 RGPCD performance standard to be functionally equivalent, and in compliance with their permit, if they have an on-going program in place that ensures best practices for controlling residential water use as described below.

If the permittee fails to document compliance with the RGPCD performance standard in any Annual Statistical Report (ASR), then the permittee must file with that ASR a Residential Gallons Per Capita Day Compliance Plan (RGPCD Plan) which shall include, at a minimum:

1. A description of the actions taken during the prior calendar year to meet the performance standard;
2. An analysis of the cause of the failure to meet the performance standard;
3. A description of the actions that will be taken to meet the performance standard which must include, at a minimum, at least one of the following:
 - a) a program that provides water saving devices such as faucet aerators and low flow shower heads at cost;
 - b) a program that provides rebates or other incentives for the purchase of low water use appliances (washing machines, dishwashers, and toilets), or
 - c) the adoption and enforcement of an ordinance, by-law or regulation to require the installation of moisture sensors or similar climate related control technology on all automatic irrigation systems;and may include, without limitation, the following:
 - d) the use of an increasing block water rate or a seasonal water rate structure as a tool to encourage water conservation;
 - e) a program that provides rebates or other incentives for the installation of moisture sensors or similar climate related control technology on automatic irrigation systems;
 - f) the adoption and enforcement of an ordinance, by-law or regulation to require that all new construction include water saving devices and low water use appliances;
 - g) the adoption and enforcement of an ordinance, by-law or regulation to require that all new construction minimize lawn area and/or irrigated lawn area, maximize the use of drought resistant landscaping, and maximize the use of top soil with a high water retention rate;
 - h) the implementation of a program to encourage the use of cisterns or rain barrels for outside watering;
 - i) the implementation of monthly or quarterly billing.
4. A schedule for implementation; and
5. An analysis of how the planned actions will address the specific circumstances that resulted in the failure to meet the performance standard.

If the permittee is already implementing one or more of these programs, it must include in its RGPCD plan the continued implementation of such program(s), as well as implementation of at least one additional program. All programs must include a public information component designed to inform customers of the program and to encourage participation in the program.

RGPCD plans may be amended to revise the actions that will be taken to meet the performance standard. Amended RGPCD plans must include the information set forth above.

If a RGPCD plan is required, the permittee must:

1. submit information and supporting documentation sufficient to demonstrate compliance with its RGPCD plan annually at the time it files its ASR, and
2. continue to implement the RGPCD plan until it complies with the performance standard and such compliance is documented in the permittee's ASR for the calendar year in which the standard is met.

Appendix B – Functional Equivalence: 10% Unaccounted for Water Performance Standard

MassDEP will consider PWS permittees who cannot meet the 10% UAW performance standard to be functionally equivalent, and in compliance with their permit, if they have an on-going program in place that ensures “best practices” for controlling water loss. The water loss control program will be based on annual water audits and guidance as described in the AWWA/IWA *Manual of Water Supply Practices – M36, Water Audits and Loss Control Programs* (AWWA M36).

If Wayland fails to document compliance with the Unaccounted for Water performance standard (UAW of 10% or less for 2 of the 3 most recent years throughout the permit period), then Wayland shall develop and implement a water loss control program following the AWWA M36 *Water Audits and Loss Control Programs* within 5 full calendar years of failing to meet the standard as follows:

1. Conduct an annual “top down” water audit, calculate the data validity level/score using AWWA Water Loss Control Committee’s Free Water Audit Software, and submit the AWWA WLCC Free Water Audit Software: Reporting Worksheet and data validity score annually with its Annual Statistical Report (ASR).
 - If a PWS’s data validity level/score is less than Level III (51-70), steps recommended through the audit(s) shall be taken to improve the reliability of the data prior to developing a long-term program to reduce real and apparent water losses.
 - Data with a validity score of 50 or less are considered too weak to be used to develop a component analysis or for infrastructure planning and maintenance.
 - Developing data with an acceptably strong validity score can be a multi-year process.
2. When the data validity score meets the Level III (51-70) requirement, conduct a component analysis to identify causes of real and apparent water loss and develop a program to control losses based on the results of the component analysis.
3. Within 5 full calendar years of failing to meet the standard, submit the component analysis and water loss control program with a proposed implementation schedule to the Department.
4. Continued implementation will be a condition of the permit in place of meeting the 10% UAW performance standard.
5. Upon request of the Department, the permittee shall report on its implementation of the water loss control program.

A PWS permittee may choose to discontinue the water loss program implementation if UAW, as reported on the ASR and approved by the Department, is below 10% for four consecutive years, and the water audit data validity scores are at least Level III (51-70) for the same four years.

NOTE FOR SMALL SYSTEMS: For small systems with less than 3,000 service connections or a service connection density of less than 16 connections per mile of pipeline,

the Unavoidable Annual Real Loss (UARL) calculation and the Infrastructure Leak Index (ILI) developed as the final steps of the top down water audit may not result in valid performance indicators, and may not be comparable to the UARL and ILI calculations for larger systems.

However, these small systems can benefit from developing reliable data and conducting an annual top down water audit. Small systems can rely on the real losses (gallons per mile of main per day) performance indicator developed in the water audit as a measure of real water loss when developing a water loss control program. The M36 Manual discusses the audit process for small systems, and includes a chapter to guide small systems in understanding the results of their audits and in developing a water loss control program (*Manual of Water Supply Practices – M36, Fourth Edition, Chapter 9: Considerations for Small Systems*, pp. 293-305).

MassDEP UAW Water Loss Control Measures: If Wayland is required to develop a Functional Equivalence Plan for the 10% Unaccounted for Water Performance Standard, and Wayland does not have a MassDEP-approved Water Loss Control Program in place within 5 full calendar years of failing to meet the standard, Wayland will be required to implement the MassDEP UAW Water Loss Control Measures outlined below:

- An annual water audit and leak detection survey, as described in the AWWA M36 Manual, of the entire system.
 - Within one year, repair 75% (by water volume) of all leaks detected in the survey that are under the control of the public water system;
 - Thereafter, repair leaks as necessary to reduce permittee's UAW to 10% or the minimum level possible.
- Meter inspection and, as appropriate, repair, replace and calibrate water meters:
 - Large Meters (2" or greater) – within one year
 - Medium Meters (1" or greater and less than 2") – within 2 years
 - Small Meters (less than 1") - within three years
 - Thereafter, calibrate and or replace all meters according to type and specification.
- Bill at least quarterly within three years.
- Water pricing structure sufficient to pay the full cost of operating the system.

Hardship - A permittee may present an analysis of the cost-effectiveness of implementing certain conservation measures included in the MassDEP UAW Water Loss Control Measures and offer alternative measures. Any analysis must explicitly consider environmental impacts and must produce equal or greater environmental benefits.

A permittee's hardship analysis shall:

- Document economic hardship and present an analysis demonstrating that implementation of specific measures will cause or exacerbate significant economic hardship;

- Present reasons why specific measures are not cost-effective because the cost would exceed the costs of alternative methods of achieving the appropriate standard; and
- Propose specific conservation measures that would result in equal or greater system-wide water savings or equal or greater environmental benefits than the conservation measures included in the MassDEP UAW Water Loss Control Measures.

MassDEP will review a permittee's detailed, written analysis to determine whether unique circumstances make specific Best Management Practices (BMPs) less cost-effective than alternatives, or infeasible for the permittee.

Appendix C:

Communities Supplied with MWRA Drinking Water

Communities Supplied with MWRA Drinking Water

<u>Community</u>	<u>Year Admitted</u>	<u>Agency</u>	<u>MWRA Supply</u>
Arlington	1895	MWD	Full
Boston	1895	MWD	Full
Brookline	1895	MWD	Full
Chelsea	1895	MWD	Full
Everett	1895	MWD	Full
Lexington	1895	MWD	Full
Malden	1895	MWD	Full
Medford	1895	MWD	Full
Melrose	1895	MWD	Full
Milton	1895	MWD	Full
Nahant	1895	MWD	Full
Newton	1895	MWD	Full
Quincy	1895	MWD	Full
Revere	1895	MWD	Full
Somerville	1895	MWD	Full
Stoneham	1895	MWD	Full
Swampscott	1895	MWD	Full
Watertown	1895	MWD	Full
Winthrop	1895	MWD	Full
Belmont	1895	MWD	Full
Framingham	1912	MDW	Full
Clinton	1923	MDC	Full
Southboro	1930	MDC	Full
LWD	1943	MDC	Full
Marblehead	1943	MDC	Full
Norwood	1943	MDC	Full
Saugus	1943	MDC	Full
Winchester	1943	MDC	Partial
Chicopee (CVA)	1948	MDC	Full
Wilbraham (CVA)	1948	MDC	Full
Waltham	1949	MDC	Full
Cambridge	1949	MDC	Emergency
Needham	1954	MDC	Partial
Northboro	1954	MDC	Full
South Hadley (CVA)	1957	MDC	Full
Marlboro	1957	MDC	Full
Wakefield	1957	MDC	Partial
Weston	1963	MDC	Full
Leominster	1964	MDC	Emergency
Peabody	1965	MDC	Partial
Canton	1967	MDC	Partial
Worcester	1971	MDC	Emergency
Woburn	1972	MDC	Partial
Wellesley	1974	MDC	Partial
Lynn (LWSC)	1982	MDC	Partial
Bedford	1993	MWRA OP.10	Partial
Stoughton	2002	MWRA OP.10	Partial
Reading	2005	MWRA OP.10	Full
Dedham (DWWD)	2005	MWRA OP.10	Partial
Westwood (DWWD)	2005	MWRA OP.10	Partial
Wilmington	2009	MWRA OP.10	Partial
Ashland	2020	MWRA OP.10	Partial
Burlington	2020	MWRA OP.10	Partial

MWD = Metropolitan Water District

MDC = Metropolitan District Commission

MWRA OP.10 = Massachusetts Water Resources Authority Operating Policy #10