

# Gray Water District Master Plan

## A. Mission Statement

- a. Provide customers with:
  - i. Safe, high quality drinking water
  - ii. Reliable, dependable, and timely service
  - iii. Fair and reasonable cost
  - iv. Adequate water for fire protection
- b. Conduct business in a professional, ethical, and courteous manner.
- c. Comply with applicable governmental rules and regulations.
- d. Provide ongoing planning of our infrastructure integrity.

B. Service Responsibilities – the Gray Water District (GWD) is responsible for source water development, well operation, drinking water treatment, water storage, water distribution, fire protection facilities and customer service. The entire service area is within the Town of Gray.

C. Customer Service – District personnel periodically review, evaluate, and implement changes to improve service.

- a. Water quality – The water obtained from the current sources located behind the GWD office at 80 Shaker Road and at 299 Yarmouth Road is of high quality and has a pleasant taste. Water quality is monitored by obtaining samples tested by certified laboratories on monthly, quarterly, and annual timetables to confirm that the water quality meets regulatory standards and requirements.
- b. Water quantity –The source wells have a sustainable capacity of 630,000 gpd.
- c. Future sources shall be developed as needed, meeting the standards set above. Note: The district continues to search for additional water sources that will be needed to meet the future needs of the local community.
- d. Reliability – other than the occasional interruption/outage, the district’s efforts to assure timely repairs, maintenance and expansion of the system are continuous. The planning and implementation process for developing a loop system in stages is part of the district’s commitment to customer service.

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- e. **Fire Protection – The Insurance Service Office (ISO) guidelines\* encourage a minimum standard for fire protection. The insurance classification obligates a public purveyor of water to provide:**
  - i. **Commercial buildings without sprinkler systems a minimum of 3,500 gallons per minute (gpm) @ 20 pounds per square inch (psi) for a period of three hours. (565,000 gallons)**
  - ii. **Residential subdivisions 250 gallons per minute (gpm) @ 20 pounds per square inch (psi) for a period of two hours. (30,000 gallons)**
  - iii. **The existing system satisfies the ISO guidelines.**

**\* 3,500 (ISO standard) – 600 (well pump capacity) + 240 (maximum day usage) x 180 minutes = 565,000 gallons**

- f. **Customer Service Commitment – The District strives to serve the customers and the community by providing.**
  - i. **Safe, clean water on a continuous basis at a fair cost**
  - ii. **Replies to service connection inquiries and service applications in reasonable timeframe.**

**D. Regulatory Compliance – The District routinely samples and tests the water to verify that the quality of the water satisfies Federal and State laws. Safe Drinking Water Act Rules and regulations are followed to ensure drinking water quality. The district meets or exceeds the requirements contained in the Ground Water Regulations, the Coliform Rule, the Lead and Copper Rule, the Disinfection By-Product Rule, the Maine Department of Human Services – Division of Health testing requirements and the Public Utilities Commission Regulations.**

## **E. System Capability**

- a. **Quantity (Maximum Day + ISO Fire Protection Standard) – The available system capability should equal the previous maximum delivery rate plus the ISO fire protection guideline. To meet this guideline, the Gray Water District should have 565,000\* gallons of water available to meet the maximum day pumping rate and the three-hour fire protection standard. The cumulative storage capacity of the system is currently 812,000 gallons (600,000 gallons at Weeks Hill and 212,000 gallons at Dry Mills).**
- b. **Pressure (Minimum of 20 pounds per square inch) – Public Utility Rules state that water utilities are required to deliver water to the water main at a minimum of 20 pounds per square inch. There are places in the system where the pressure is near the PUC minimum and may require a booster pump by the customer to provide adequate water pressure. Delivery pressure of 50 pounds per square inch is desirable.**

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- F. Source Protection - It is vital that the Gray Water District implements all reasonable steps to protect the water sources from contaminants and pollutants. Water protection initiatives include:**
- a. Local Zoning Ordinances – The GWD has no regulatory authority and therefore works with the Town of Gray on local ordinances as the main component to protect the source water supply from contamination. The Town of Gray has designated areas in the recharge area adjacent to the source well as the Well Head District (WH). Regulations for land within the Well Head District are intended to limit high contamination risk uses and to provide rules and performance standards to reduce the probability of harmful elements entering the water supply. The greatest risk of well supply contamination is the release of pollutants from areas adjacent to the capture zone and from chemical additives applied to the road surfaces by the MTA, MDOT and the Town of Gray.**
  - b. Monitoring Wells – The District operates and maintains a system of sentry wells, strategically positioned for early detection of salt and/or other contaminants that may enter the designated well recharge areas. The district also completes sampling and laboratory testing at locations up-gradient of the source wells to monitor for contamination and periodically reviews the need to install additional monitoring wells as adjacent development occurs.**
  - c. Purchase or Lease Adjacent Land – The District strives to purchase or lease land immediately adjacent to the well source sites to provide maximum control and surveillance for contaminants. Ideally the lands adjacent to water well sources are in a natural state to minimize contamination risks and support well recharge. However, it is not economically practical for the district to purchase large sections of land for protection purposes.**
  - d. Well Source Areas are fenced - to provide security, to discourage trespassing and tampering with equipment at the well locations.**
  - e. Connection contamination – Reductions are achieved by installing backflow prevention devices at service connection points to prevent the possibility of substances at customers’ tie-in points from entering the GWD system.**

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- f. **An inventory of known and potential pollution sources that could contaminate the wells has been prepared to monitor and implement contamination prevention steps. High Risk locations include:**
  - i. **Gray Recycle Center and capped landfill.**
  - ii. **Gray Public Works Maintenance Facility**
  - iii. **Gray Salt Shed**
  - iv. **Road salt added by MTA, MDOT and the Town of Gray**
  - v. **Highway spills from vehicle accidents**
  - vi. **Chemicals and Petroleum stored in the Well Head Protection Districts**
  - vii. **Active aggregate pit(s)**
  - viii. **Commercial entities in the recharge area**
  
- g. **Public Awareness and Education Information that stresses the need to protect our groundwater and list steps that homeowners and business enterprises can adopt and follow to reduce water pollution.**
  
- G. **Reliability – The District has a high service reliability. Maintaining or improving this performance standard will require new management systems and equipment replacements and upgrades to accommodate the increase in the number of customers and to maintain and renew the aging system. The following are steps being implemented to achieve greater reliability.**
  - a. **Replacement Program – aging pipe is replaced with new pipe as the opportunity permits us to upgrade the condition of mains and increase the size to accommodate reasonable anticipated growth.**
  
  - b. **Looping – The existing system is comprised of an array of single mains that do not allow for alternative routing to accommodate maintenance and emergency situations. The district has a long-range strategy to install additional mains to provide alternative routings (looping).**
  
  - c. **Valves – Additional valves in the distribution system are desirable to upgrade isolation capability when completing maintenance or repair work. Valves are currently added when replacement pipe is installed.**
  
  - d. **Redundancy – The GWD system is a basic system with little design or operating redundancy. The system consists of two supply sources with three pumps connected to supply lines to the transmission main, two storage tanks serving different areas and a distribution system that primarily supplying service areas via a single main. We can speculate here with a statement like, “The Board recognizes the importance of redundancy and as future infrastructure plans are developed, will attempt to include steps towards a redundant system.”**

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- H. **Cost Control - Operating and financial management practices implemented by the GWD to control costs to provide service at a reasonable cost include:**
  - a. **Operating efficiencies (Resource Utilization) – Electric power is the largest operating cost for the district. A long-term power contract has allowed the organization to keep electric usage rates stable. Time of day operation has resulted in a lower electric demand cost.**
  - b. **Operating effectiveness (Leakage) – Replacing older pipes and solid system maintenance has reduced leakage thereby reducing power and repair costs.**
  - c. **Investment implementation – Several water mains have been replaced in the last several years with larger pipes thereby reducing hydraulic loss in the system. Management will continue this investment strategy and take advantage of opportunities as they are realized.**
  - d. **Financial management – has resulted in prudent use of debt. Financial records are maintained and audited annually in accord with accepted accounting standards.**
  
- I. **Performance Measures – The following information is monitored to track system performance and pinpoint areas where improvement is necessary.**
  - a. **Number of customers**
  - b. **Water rates (cost)**
  - c. **Demand (monthly – gpd)**
  - d. **Number of service applications**
  - e. **Feet of replacement pipe installed**
  - f. **Feet of new pipe installed**
  - g. **Leakage Estimates**
  - h. **Number of service interruptions**
  - i. **Dates of water tank inspections**
  - j. **Dates of leak surveys**
  - k. **Operating Revenue**
  - l. **Operating Expense**
  - m. **Long Term Debt**
  - n. **Total Assets**
  - o. **IT upgrades**

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## J. Staffing

- a. **GWD employees** – There are currently three regular fulltime positions of the Gray Water District, the superintendent, an operator and an office manager. Supplemental part-time staff is utilized for special work and reports. Staffing needs are analyzed on a periodic basis to ensure that the district has the personnel to meet regulatory requirements and to stay current with current day technology.
- b. **Design – Revisions and expansion of the system** are designed by a local consulting firm under the direction of the superintendent.
- c. **Repair & Maintenance** – the repair and maintenance work on the system is performed by District employees or organizations under the direction of the superintendent.
- d. **Workplace Safety** – The District is committed to completing work functions in a manner that is safe for both the workers and the community.
- e. **Succession Plan** – The District succession plan is to utilize personnel from adjacent water utility organizations (i.e., Portland, Yarmouth, or Auburn Water Districts) on a temporary basis if an existing employee is not available for duty. The district cross trains employees to cover short term employee leave.

## K. System Facility Description

- a. **Water supply**
  - i. The well located at 80 Shaker Road consists of two source points. One is an 18 x 24-inch gravel packed well and the second a 12-inch developed well.
  - ii. The well located at 299 Yarmouth Road is a 10" gravel packed well.
- b. **Storage Tank Facilities**
  - i. **Weeks Hill Tank** –Replaced in 2014. Capacity is 600,000 gallons.
  - ii. **Dry Mills Tank (Mayberry Road)** –Constructed in 1962. Capacity is 212,000 gallons.

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- c. **Mechanical equipment**
  - i. **80 Shaker Road Pump houses – The well pump system consists of two pumps with separate connecting lines to the transmission system. The pumps are operated as redundant units in case one of the pumps is temporarily out of service.**
  - ii. **299 Yarmouth Road Pump Station with drilled well with submersible pump connecting to the transmission system.**
  - iii. **Main Isolation Valves – To allow system isolation for repairs**
  - iv. **Hydrants – Located for fire protection**
  - v. **Meters – To monitor system usage**
  - vi. **Backflow Preventers – To avoid cross contamination**
  - vii. **Emergency Power Generators - backup power**
- d. **Treatment Facilities – The only treatment that the Gray Water District currently utilizes is sodium silicate to provide corrosion control for system piping. A system to provide disinfection by applying liquid chlorine (sodium hypochlorite) is available on a standby basis if testing indicates that treatment is necessary.**
- e. **Pipe**
  - i. **Transmission Pipe (Water Pumps to Distribution System)**
    - 1. **2 – 8-inch pipe ductile lines**
  - ii. **Transmission Pipe (Storage Tank to distribution system)**
    - 1. **1 – 12-inch pipe, unlined cast iron, from Weeks Hill Storage Tank to distribution system**
    - 2. **1 – 10-inch pipe, cement lined cast iron, from Dry Mills**



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- f. Distribution Pipe (Transmission Pipe to Service Connections)**
  - i. Lewiston Road**
  - ii. West Gray Road**
  - iii. Portland Road**
  - iv. Shaker Road**
  - v. Mayberry Road**
  - vi. Yarmouth Road**
  - vii. Depot Road**
  - viii. Mayall Road**
  - ix. Town Farm Road**
  - x. George Perley Road**
  - xi. Center Road**
  - xii. Seagull Drive**
  - xiii. Libby Hill Road**
  - xiv. Weymouth Road**
  - xv. North Raymond Road**
  - xvi. See the system distribution map available at the district office.**
  
- L. Instrumentation & Controls (SCADA)**
  - a. Pumps that fill the water towers are operated by tank level control instrumentation**
  
  - b. Treatment systems are automated injection facilities**
  
- M. Emergency Response Plan – The GWD is a member of a mutual aid response arrangement of Maine water utilities. If an emergency occurs, the Maine Rural Water Association and neighboring utilities and Pineland would be contacted to provide assistance.**
  
- N. Security – The water supply facilities are fenced to provide security against intruders.**
  
- O. Finance Plan (Rate Objective) – The rate objective of the GWD is to provide rates that are fair and reasonable for the ratepayers and sufficient to adequately fund the system on a sustainable basis.**

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1. **Future Needs**
  - a. **Short Term - 5 year**
    - i. GIS mapping and data base initiative - ongoing
    - ii. New front fencing & parking lot
    - iii. Upgrade Pumphouse 2
    - iv. Replace old water mains
      1. Turnpike Crossing/ West Gray Rd (to be completed 2024)
      2. Lewiston Rd (to be completed 2024 -2025)
      3. Shaker Rd (to be completed in three phases, 2026-27)
      4. Yarmouth Rd
        - a. 900' of 10" CLP Main
    - v. Purchase additional land adjacent to water sources when practical
    - vi. Purchase new generator for Shaker Rd Pump Station
  - b. **Mid Term -10 year**
    - i. Develop a water tank on Libby Hill
    - ii. New Office Building
    - iii. Locate and develop additional well sources
    - iv. Water Filtration System
  - c. **Long Term - 20 year**
    - i. Replace old water mains
    - ii. Loop major mains
2. **Management Practices (Operating Decisions)**
  - a. **Water Main Replacement Strategy – The strategy regarding water main is to install larger mains when replacement mains are required to provide adequate flow and pressure and when pipe requires replacement to the maximum extent replacement feasible, water main replacements are completed in conjunction with construction projects to minimize cost.**
  - b. **System Expansion Plan – The system is extended as customers request service from the district. The district, by PUC Rule, invests only in water system facilities that enhance the general system. Individuals and Developers contracting for water main extensions advance to the district the estimated full cost of construction. Adjustments will be made for any difference between the estimated and actual cost after the work is completed.**

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## c. Policies

- i. **Size of New Water Main Extensions**
  1. **New water mains along major roads will be sized appropriately**
  2. **Laterals are individually designed on the bases of service demand and system capability**
- ii. **Pressure Criteria - The minimum pressure for a service connection is 20 p.s.i. The district strives for a pressure of 50 psi**
- iii. **Fire Protection Capacity - The District strives to adhere to the ISO fire protection guideline criteria.**
- iv. **Dead Ends – The District design guidelines call for a minimum of dead-end connections to minimize stagnant water in the system. Dead ends are equipped with flushing connections.**
- v. **Looping Program - The District water mains are a group of single pipes connecting to the water source. The design parameters call for alternative supplies to be installed when practical to reduce future service interruptions for maintenance.**
- vi. **Material Decisions – The District uses either high density polypropylene or ductile lined cast iron for new pipe.**
- vii. **Mechanical equipment is evaluated on a cost and efficiency basis to achieve the optimum investment.**
- viii. **Service Connections – New connections to the system are made when new customers complete service applications.**

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- d. Utility Agreements – The Gray Water District is a small water utility company. The ever-increasing regulatory demands and the added efficiencies that are more achievable for larger organizations dictate that we evaluate consolidations, mergers, partnerships, and interconnections with other utilities to further improve service and reduce the cost of service.**
  - i. Consolidations/Mergers – Consolidation or merger candidates include:**
    - 1. Yarmouth Water District**
    - 2. Pineland Farms**
    - 3. Portland Water District**
    - 4. Maine Water Company**
  - ii. Interconnections – The Gray Water District currently has an interconnection with Pineland Farms. Possible interconnection candidates include:**
    - 1. Yarmouth Water District**
    - 2. Portland Water District**
  - iii. Partnerships**
    - 1. Pineland mutual service agreement**