FY2015 Capital Plan
Water Department

February 3, 2014

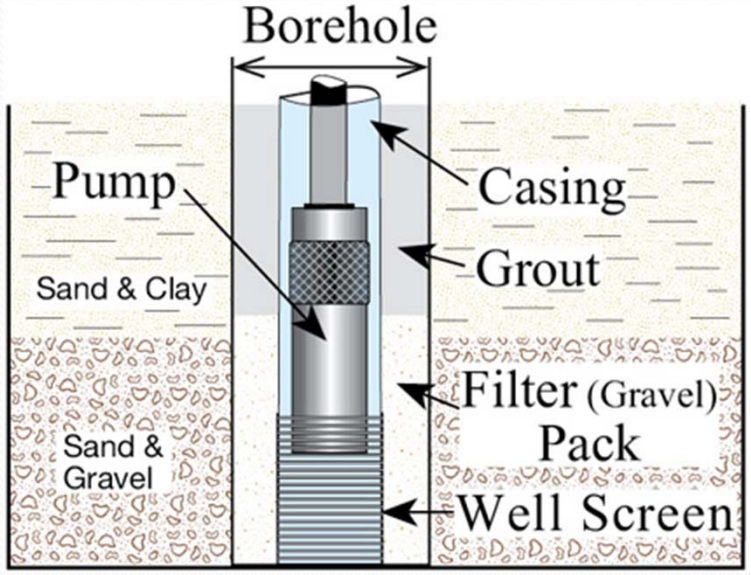
Updated March 21, 2014

Water Department
FY2015 Capital Requests

Project	Amount	Source
Perkins Row Station Design	$100,000	Retained Earnings
Storage Tank Repair	$250,000	Retained Earnings
Washington Street Main Replacement	$1.1 million	Bond
Treatment Plant Design	$800,000	Bond

Perkins Row Station Rehabilitation

- Phase I of project underway
  - Design, permit, construct & test gravel-packed wells
- Phase II:
  - Design and reconstruction of station's electrical, mechanical and control systems.
  - Similar project completed at North Street in early 2000's but vacuum wells not replaced.



Perkins Row Station Rehabilitation

- Phase II includes upgrading station components and bringing new wells online.
  - Install necessary piping to wells
  - Install new well pumps
  - Replace existing electrical controls
  - Modify control system to operate new wells
  - Install natural gas fired emergency generator
  - Remove old equipment & piping
  - Decommission existing vacuum wells

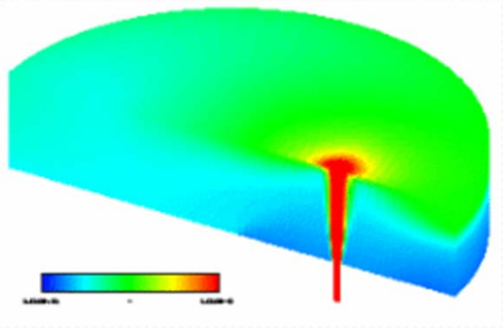
- Requesting $100,000 from retained earnings for design and permitting needed to start Phase II

Water Storage Tanks

- Two, ½ million gallon concrete tanks.
  - Boston Street constructed in 1949
  - Garden Street constructed in 1972
- Inspection conducted in 2011 identified deficiencies
  - Spalling & cracked concrete at both tanks
  - Corroded bolts on vent at Garden Street
  - Corroded hatch at Boston Street
- Repair work deferred one budget cycle due to funding concerns

Water Storage Tanks

- Requesting $250,000 from retained earnings for storage tank repair and improvements.
  - Design work currently underway.

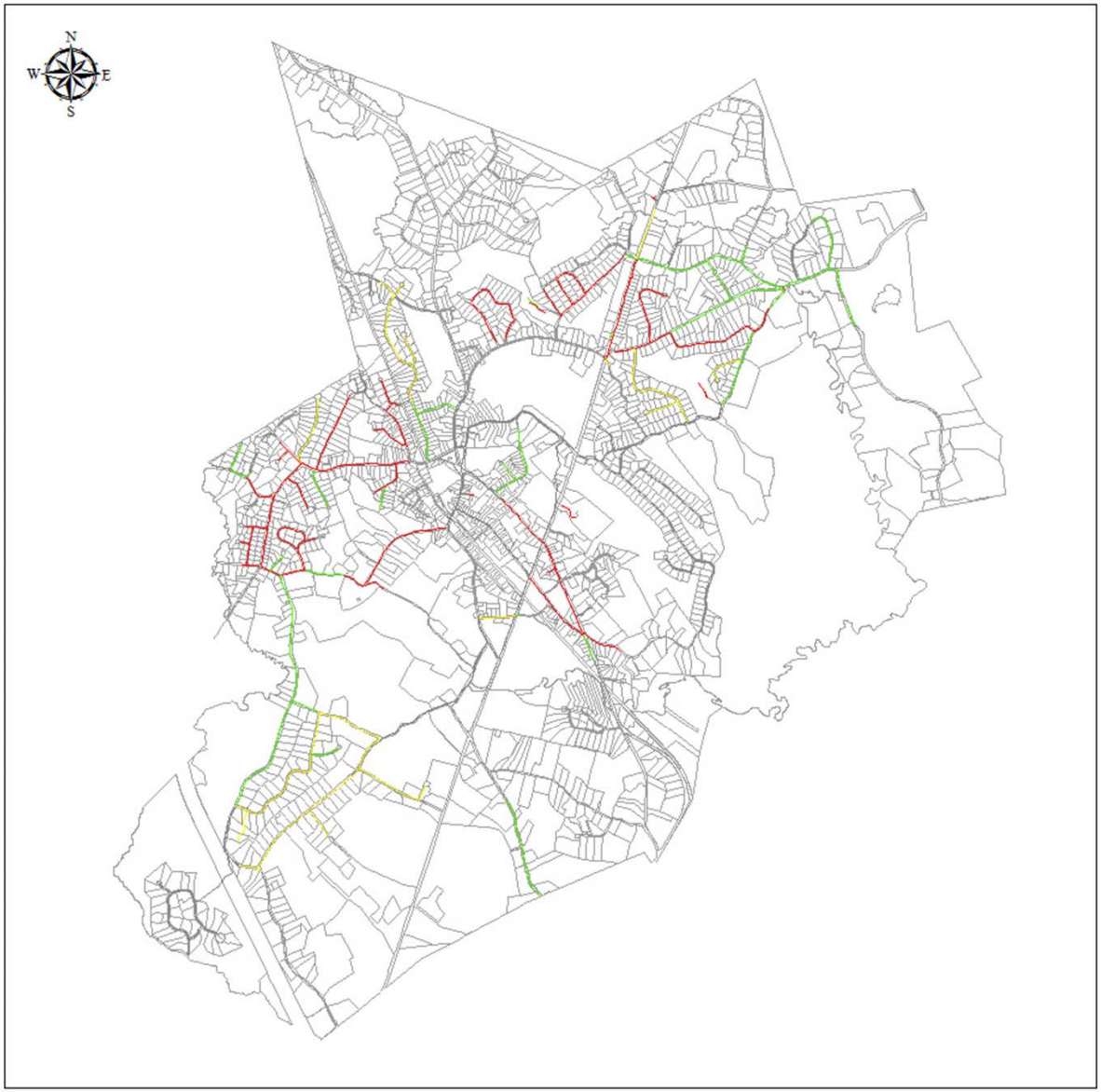


- Scope of work includes:
  - Repair work identified during inspections
  - Safety improvements
    - Roof access & fall prevention
  - Install active mixing system
    - Reduces temperature gradients - prevents internal ice damage and extends life of the tank.
    - Reduces chlorine gradients – water quality in the tank is more consistent.

Water Main Replacement

- Town owns approximately 50 miles of water main
  - Estimated lifetime new ductile iron mains approximately 100 years. Existing concrete pipe lifespan appears to be less.
  - Half-mile per year replacement cycle based on steady rate of installation/replacement.
  - Budget estimate is $1 million dollars per mile

- Weaknesses of simplified replacement model
  - Large portion of system installed in 1950's & 1960's
    - May lead to uneven replacement rate
  - Already replaced several miles of main due to frequent breaks
    - 100 year lifespan could be too generous for older pipe material



Capital Project Map

Date: 2/3/2014

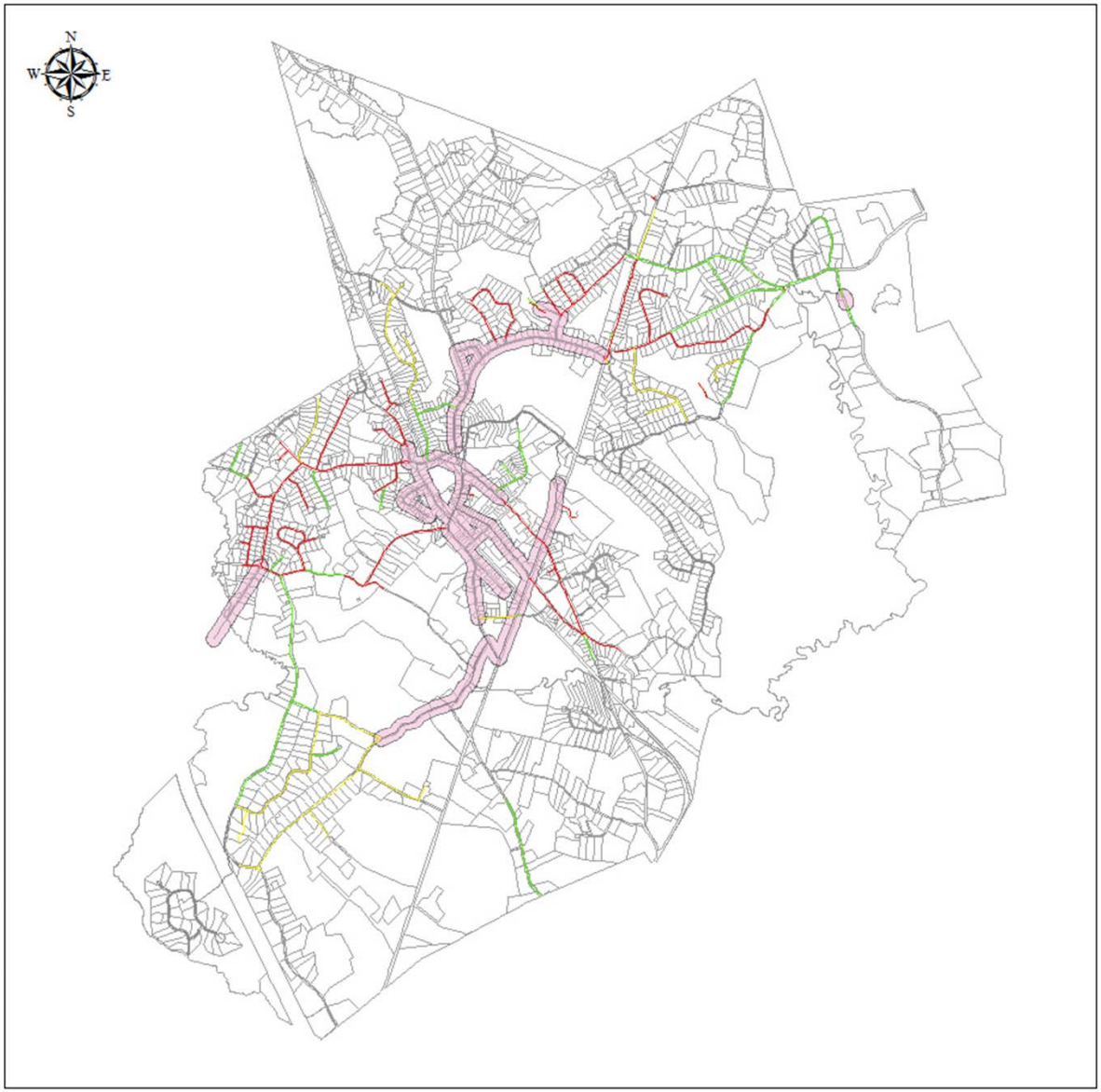
Legend

Water Lines By Installation Decade

Year_Installed

- 2010s
- 1940s
- 1950s
- 1960s
- 1970s
- 1980s
- 1990s
- 2000s

This map shows parcels and Town owned water mains coded by installation decade.



Capital Project Map

Date: 2/3/2014

Legend

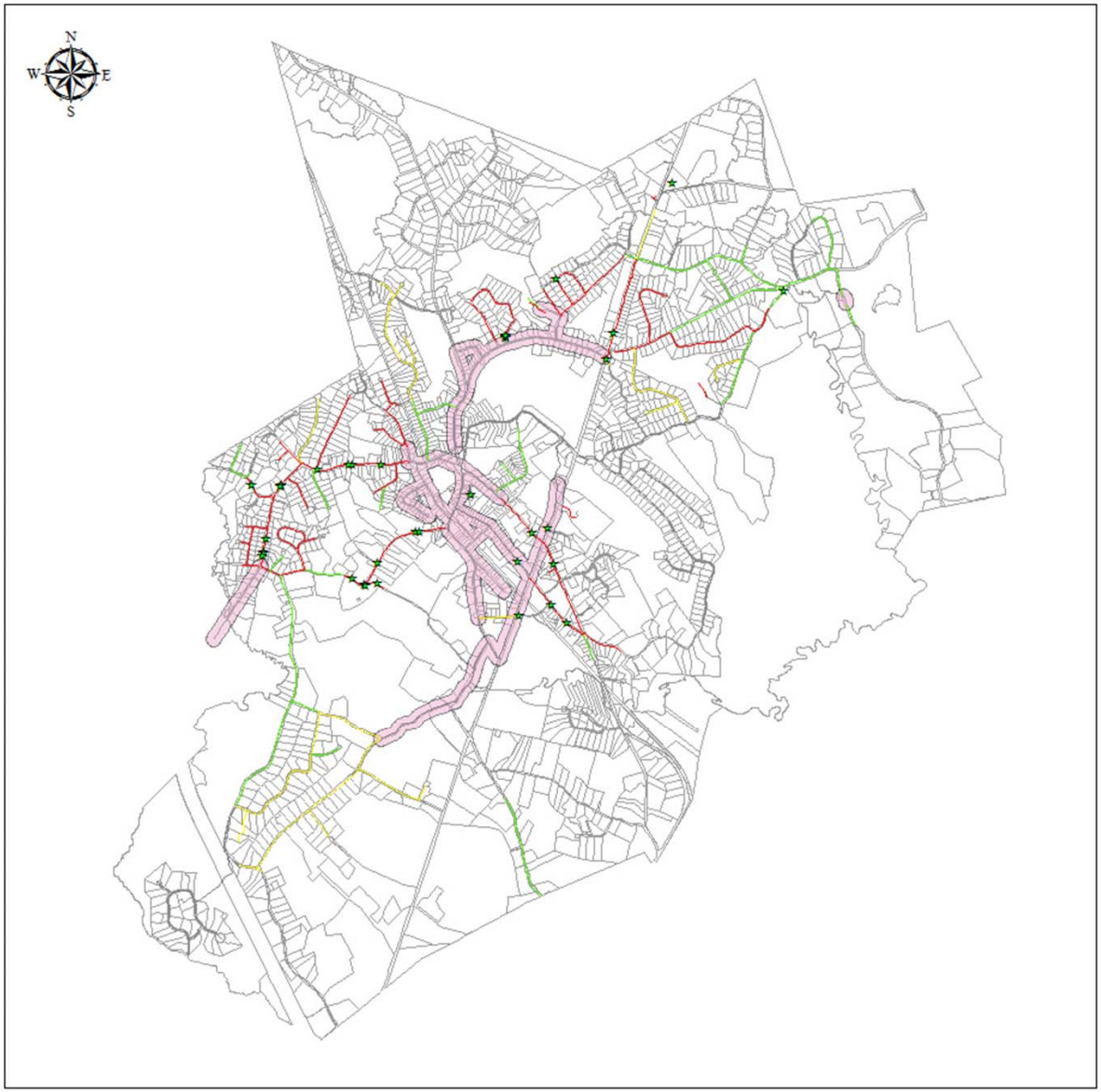
Water Lines By Installation Decade

Year_Installed

- 2010s
- 1940s
- 1950s
- 1960s
- 1970s
- 1980s
- 1990s
- 2000s
- Pipes already replaced

Pipes already replaced are highlighted in pink. Mains replaced due to frequent failure include:

- Lower Washington Street, Gail Street, Grove Street, High Street Extension (2006)
- Ipswich Road (2010)
- South Main Street, Summer Street, Park Street, Pemberton Road (1994)
- Central Street, Main Street (2012)



Capital Project Map

Date: 2/3/2014

Legend

★ Main Breaks on Active Pipelines

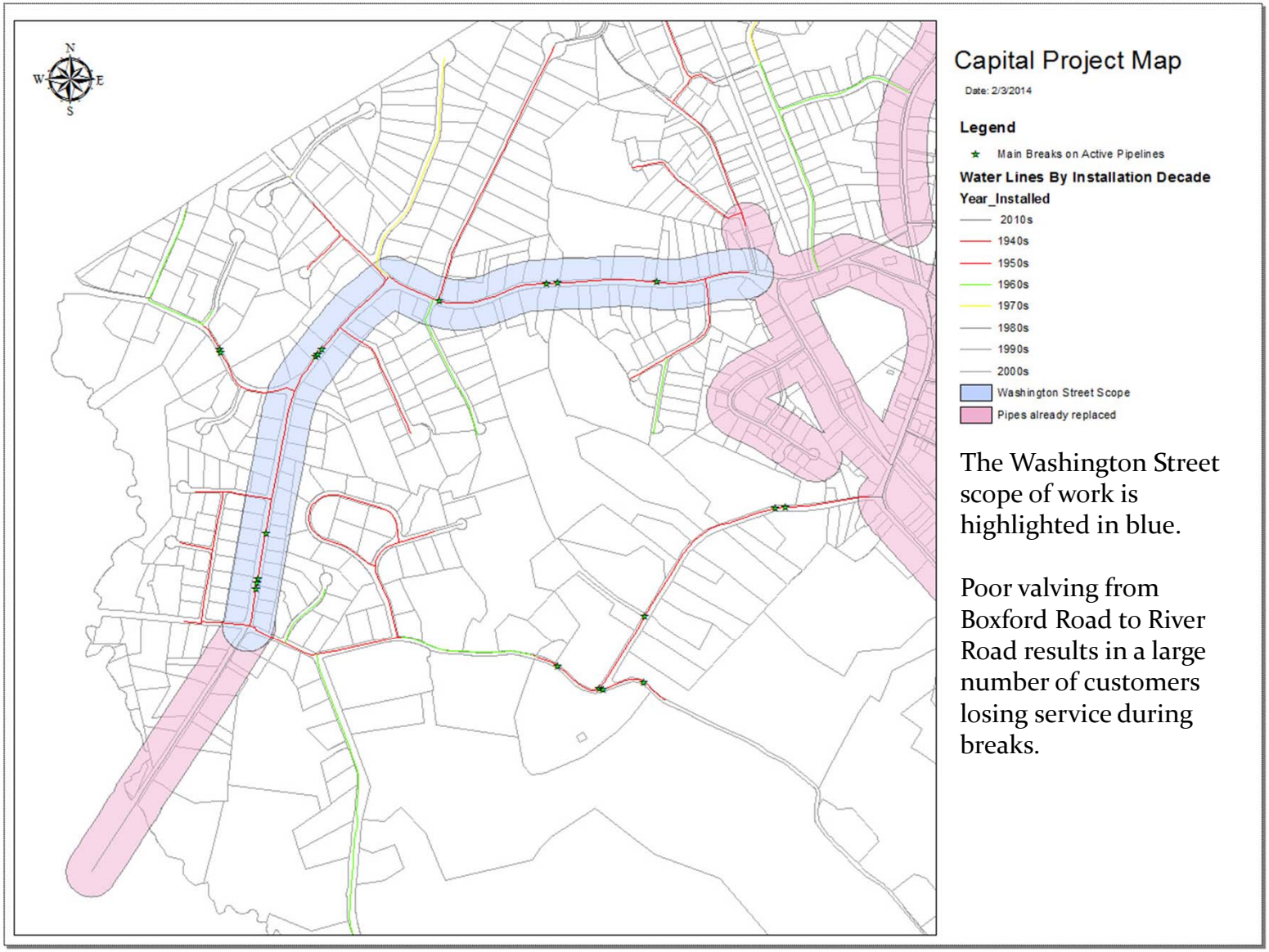
Water Lines By Installation Decade

Year_Installed

- 2010s
- 1940s
- 1950s
- 1960s
- 1970s
- 1980s
- 1990s
- 2000s
- Pipes already replaced

Water main breaks on active pipelines are shown as green stars.

Virtually all breaks have occurred on concrete pipes installed in the late 1940's and 1950's. This is an indication the material may not last 100 years.



The Washington Street scope of work is highlighted in blue.

Poor valving from Boxford Road to River Road results in a large number of customers losing service during breaks.

Washington Street Mains

- Replace main from approximately Colrain Road to River Road.
  - Increase main size to improve fire flow
  - Replace existing services in Town right-of-way
  - Replace fire hydrants and laterals
  - Replace existing lines to side streets
  - Install better valving
- Highway Department plans to resurface Washington Street in the near future. Coordinating this work with the main replacement is a better use of resources.

This is a typical water main break in an 8 inch concrete pipe. This section was removed from a break on Washington Street in October 2011.

Water Treatment

- Manganese contamination began in early to mid 2000's
  - Installed sequestrant treatment system to reduce particle formation
- Originally an unregulated secondary contaminant
  - Aesthetic concern
  - Not regulated
  - No required testing
- Now regulated by MassDEP
  - All suppliers required to test sources
  - If sources contain more than 0.3 mg/L
    - Distribution system testing
    - Public education
    - Submit plans on how source water concentrations will be reduced

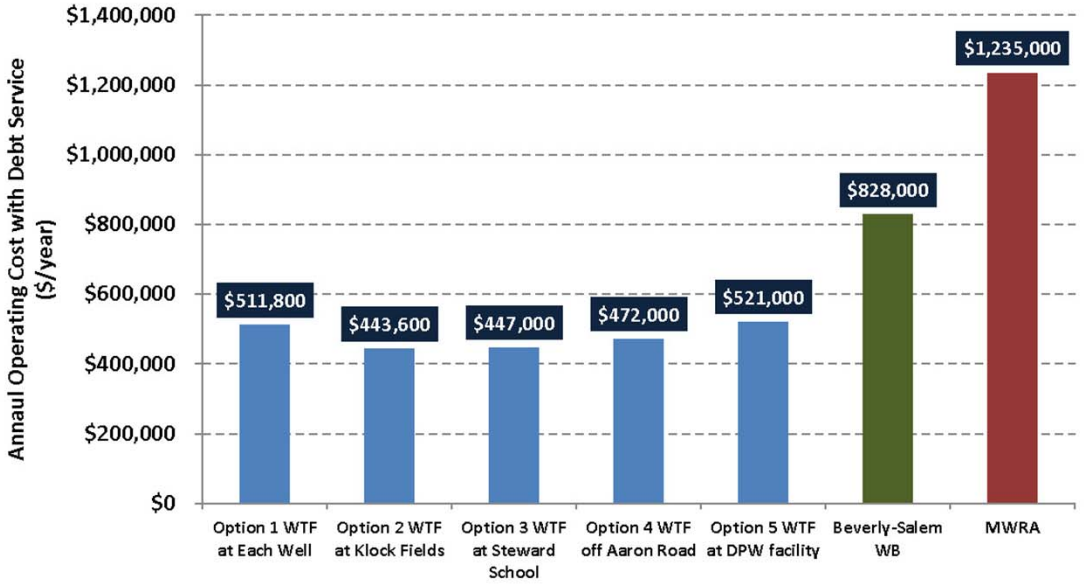
Water Treatment

- Water Supply & Treatment Alternative Study conducted in 2012:
  - Purchasing treated water
  - Building treatment plants at both sources
  - Building a centralized treatment plant
  - Compliance with drinking water regulations
    - Groundwater Rule
    - Groundwater Under the Direct Influence of Surface Water

- Construction of greensand filtration facility located at the Public Works Facility selected.

Water Treatment

FIGURE 5-5
COMPARISON OF ANNUAL OPERATING COSTS FOR TREATMENT ALTERNATIVES USING OXIDE-COATED HIGH RATE FILTRATION WITH MWRA*
TOPSFIELD, MA



*Costs in Figure 5-5 for the MWRA and BSWB infrastructure costs to extend water into the Town of Topsfield from the terminus of the MWRA system in Peabody or from the BSWB system.

Water Treatment

- Centralized greensand filter selected because:
  - Easiest and least expensive treatment alternative to operate
  - Provides compliance with Groundwater Rule
  - Provides protection against possible Surface Water Treatment Rule requirements
  - Adjacent towns unable/unwilling to supply water
    - High priority given to obtaining water from outside Ipswich River Basin.
  - MWRA connection fee and piping deemed too expensive.

Water Treatment

- Location selected because:
  - Small amount of uplands at sources
  - Public Works Facility already developed for similar purpose
  - Minimal permanent impact on residents and neighbors

Water Treatment

- Estimated cost of plant is $7 million including design and construction.

- Request for $800,000 bond authorization for:
  - State mandated Owner's Project Manager
  - Design of plant and transmission mains
  - Pilot testing
  - Permitting
  - Bidding services for construction

Budget Impacts

Project	Amount	Source	Bond Payment (Year 1 of 20)	Budget Increase*	Average Annual Bill Increase*
Perkins Row Station Design	$100,000	Retained Earnings	$0	0%	$0
Storage Tank Repair	$250,000	Retained Earnings	$0	0%	$0
Washington Street Main	$1.1 million	Bond	$99,000	10%	$56
Treatment Plant - Design	$800,000	Bond	$72,000	7.5%	$41
Treatment Plant - Construction Including 2% inflation for construction	$6.45 million	Bond	$580,543	60.5%	$330
Treatment Plant – Estimated Total	$7.25 million	Bond	$652,543	68%	$371

*Based on FY2014 budget, estimated system-wide water use and $545 current average annual cost.