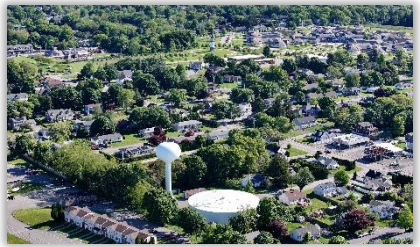
Bristol County Water Authority
Hydraulic and Pressure Zone Study
Two Problems – One Solution



Presenters:

Stephen Coutu, PE - Executive Director and Chief Engineer

Michael Crawford, PE - Deput Executive Director

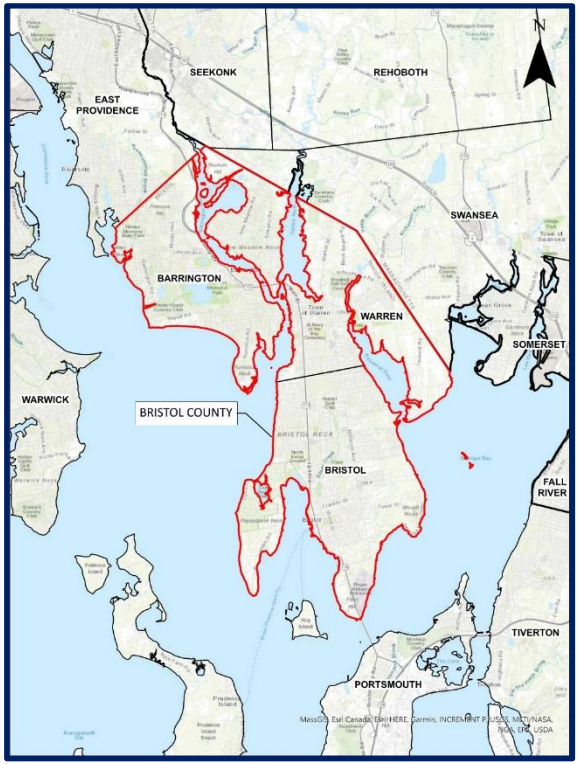
July 16, 2025

BCW BRISTOL COUNTY WATER AUTHORITY

PARE CORPORATION

BCWA History and Background

- BCWA created in 1981 by Rhode Island State Legislature
- Serves the communities of Barrington, Warren, and Bristol, RI
  - Serving over 49,000 people & 17,000 service connections
- Original system infrastructure dating back to before 1908

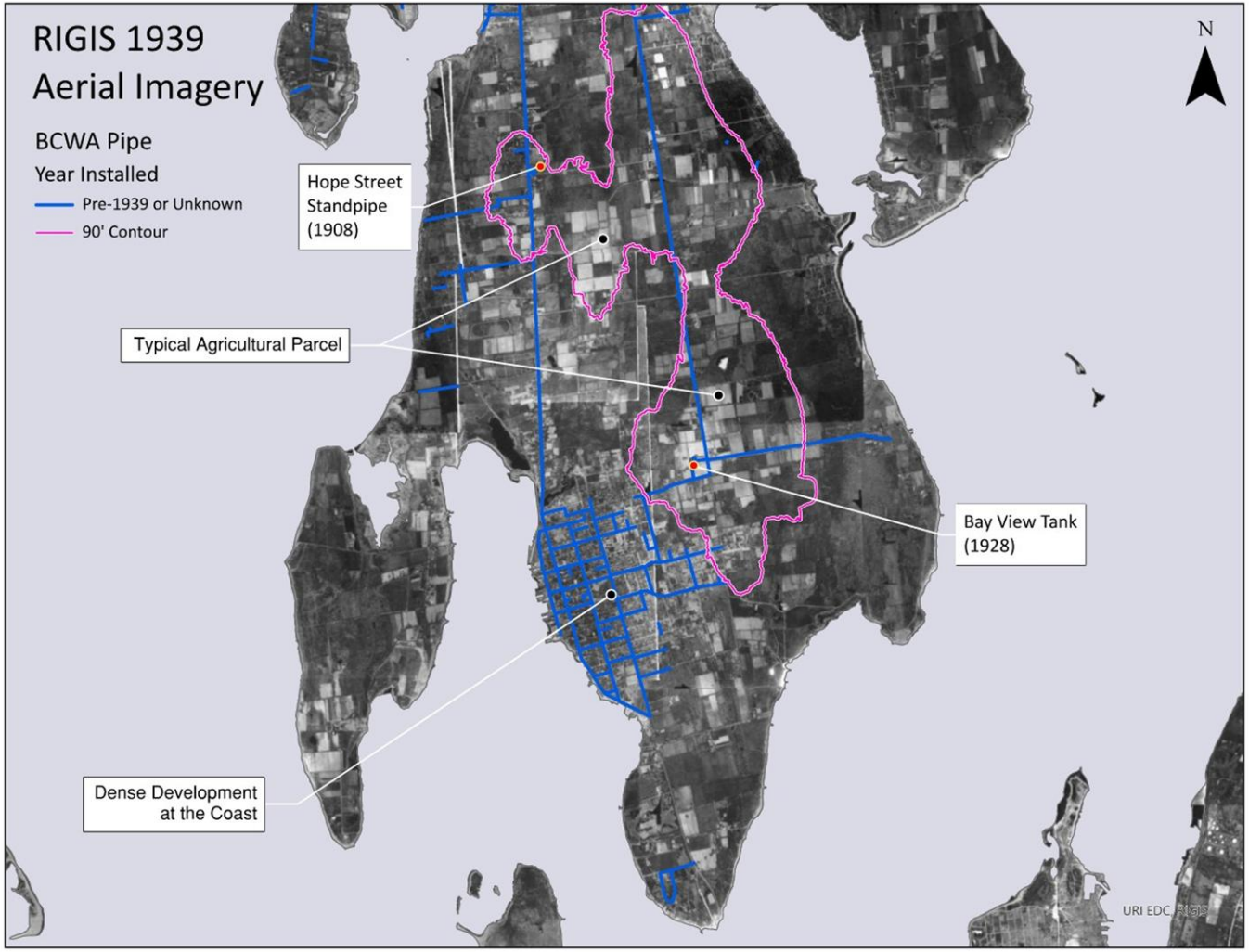


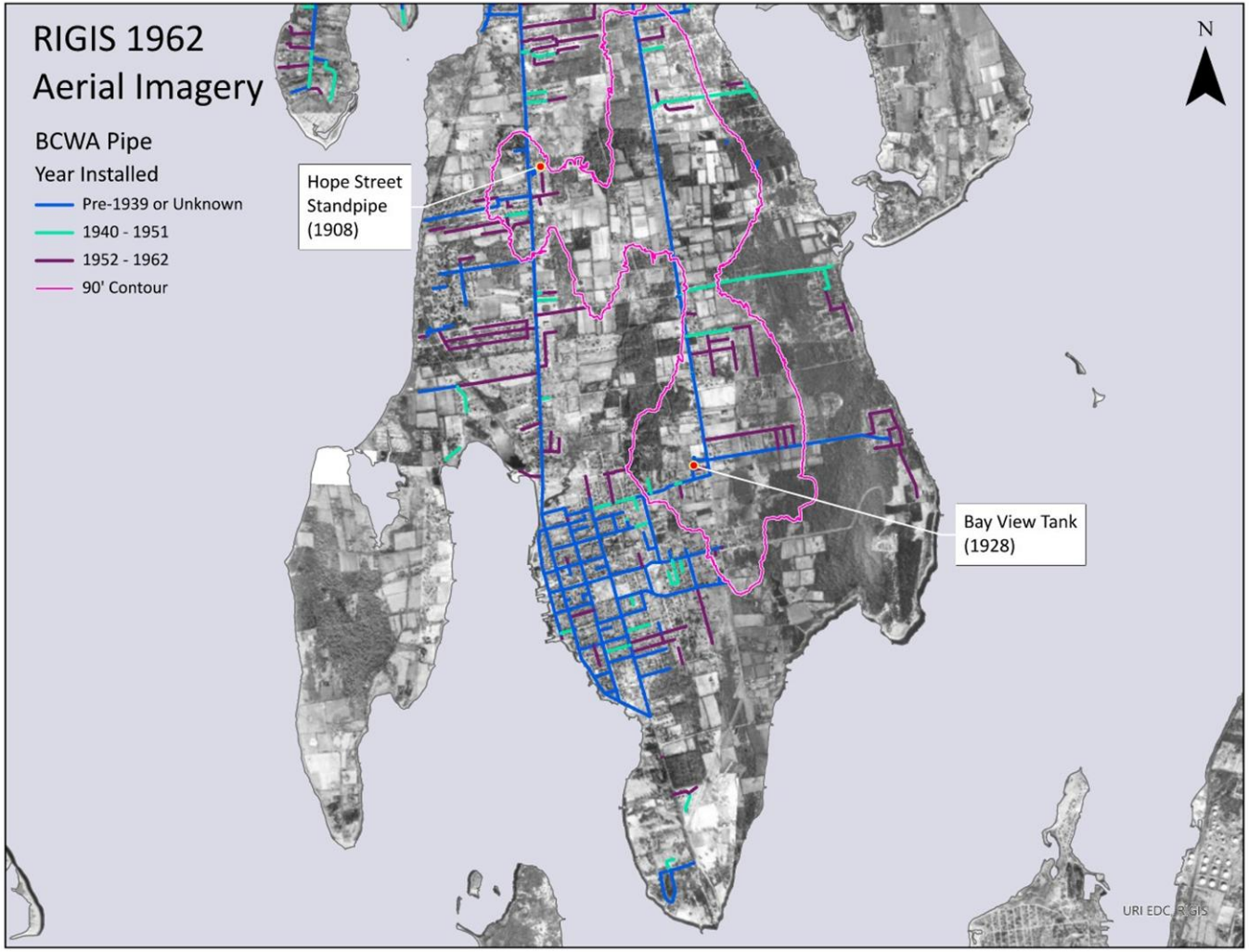
Study Purpose

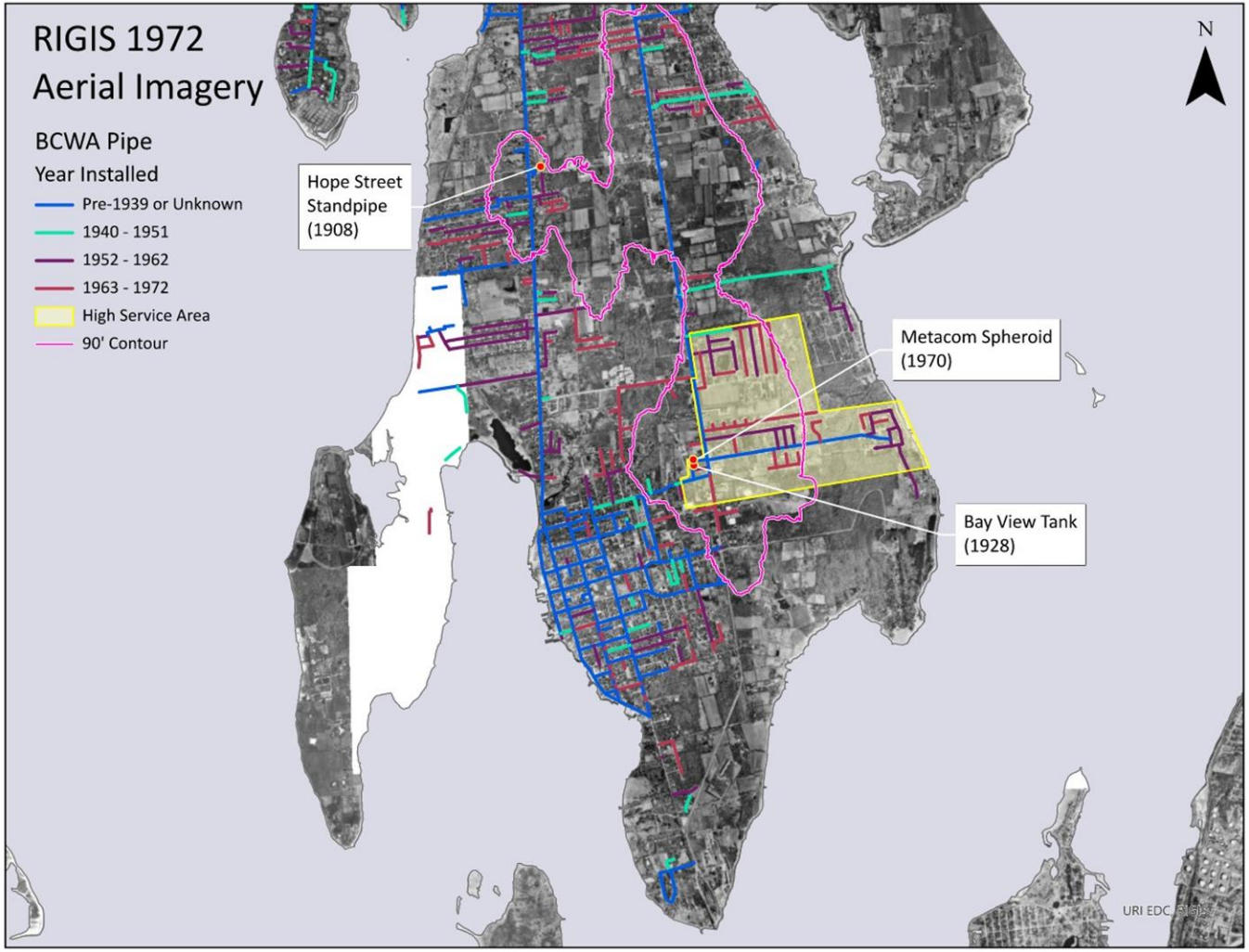
- For decades, BCWA's two major issues in the southern half of their system were:
    1. Water pressure between Hope Street and Metacom Avenue was very low.
    2. The Hope Street Standpipe was "locked up" most of the time.
- In 2008, BCWA commissioned Pare Corporation to develop their first-ever computerized hydraulic model and set about studying and rectifying longstanding issues in their system.

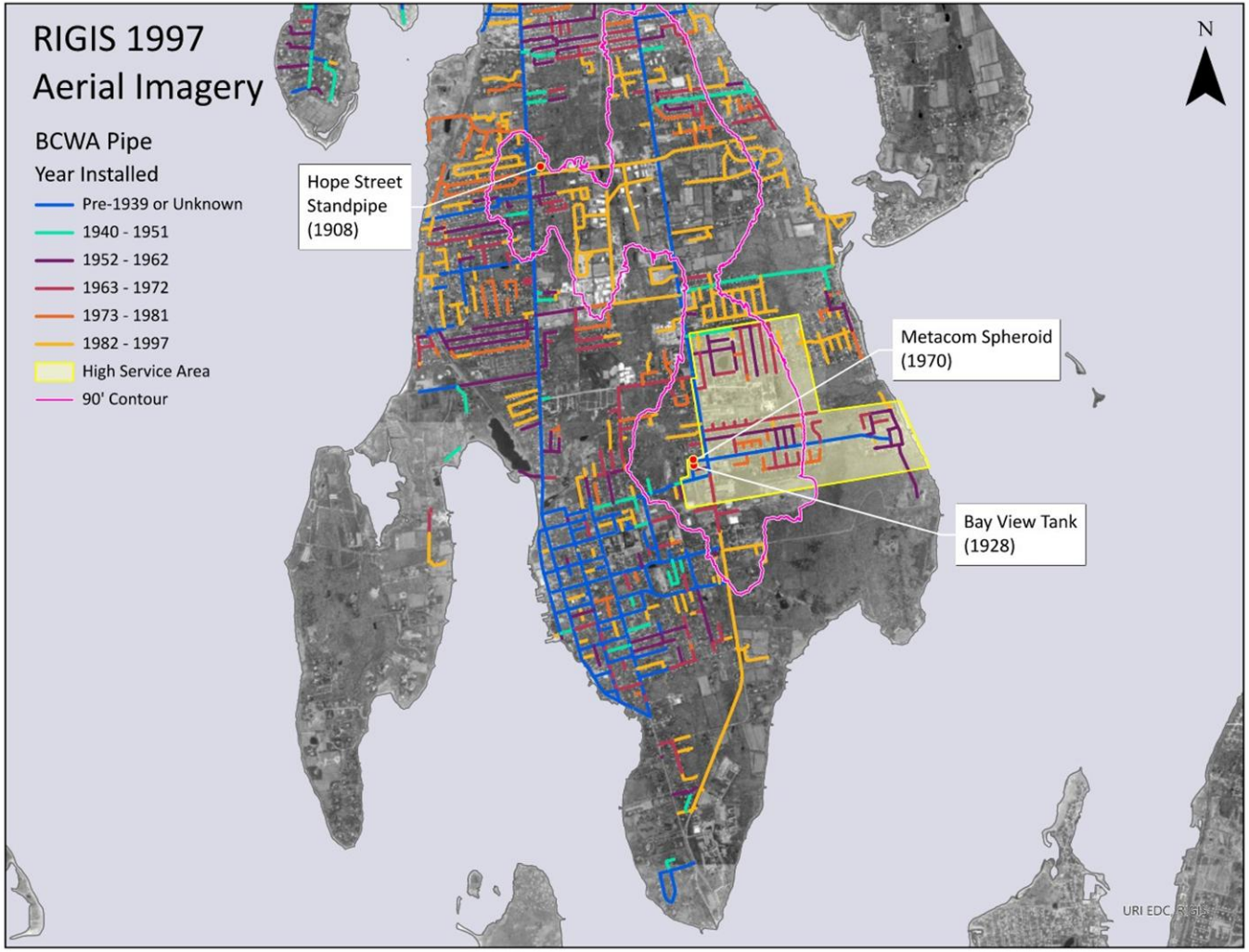
Issue 1: Low Pressure in Warren and Bristol

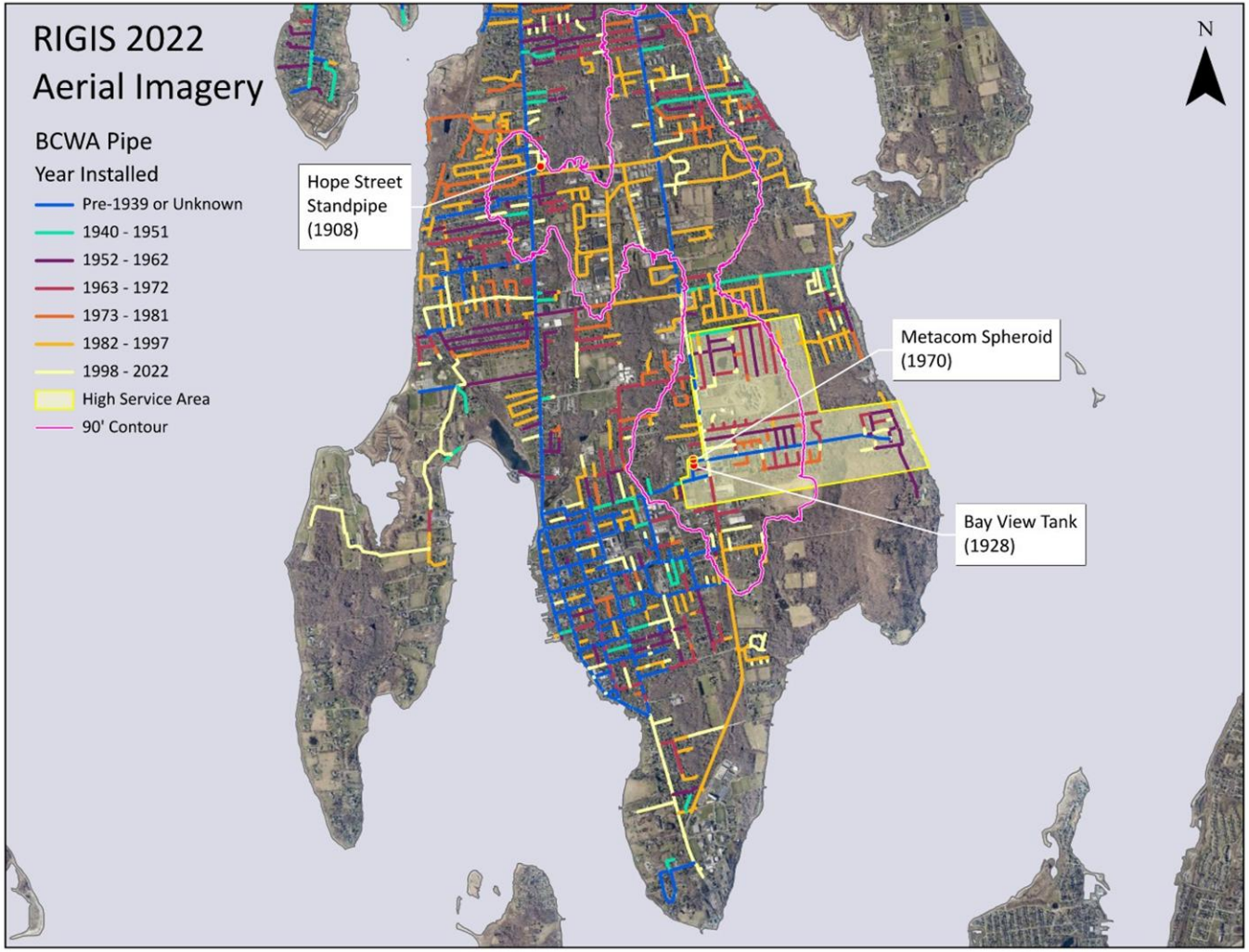
- Hope Street standpipe (ca 1908) and the Bay View storage tank (ca 1928) set the hydraulic gradient for most of the system – just above 180 feet MSL.
- The system gradient was adequate in the early 1900s when development was near the shore.
- As new developments moved uphill toward the tanks, their pressure fell.
- In general, customers above elevation 90 feet MSL have low pressure.


RIGIS 1939
Aerial Imagery
BCWA Pipe
Year Installed
Pre-1939 or Unknown
90' Contour
Hope Street
Standpipe
(1908)
Typical Agricultural Parcel
Bay View Tank
(1928)
Dense Development
at the Coast
N
URI EDC, RIGIS


RIGIS 1962
Aerial Imagery
BCWA Pipe
Year Installed
Pre-1939 or Unknown
1940 - 1951
1952 - 1962
90' Contour
Hope Street
Standpipe
(1908)
Bay View Tank
(1928)
N
URI EDC RIGIS

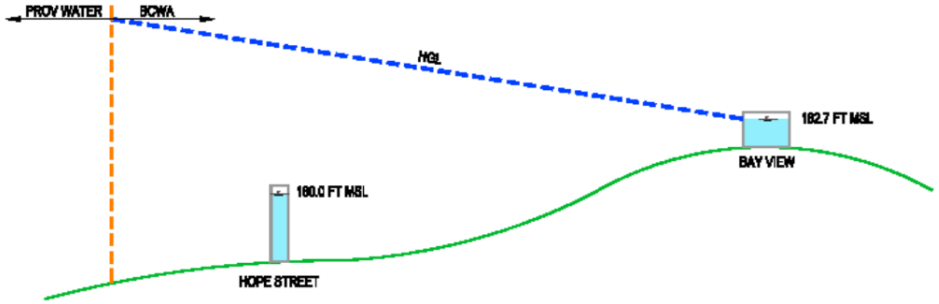

RIGIS 1972
Aerial Imagery
BCWA Pipe
Year Installed
Pre-1939 or Unknown
1940 - 1951
1952 - 1962
1963 - 1972
High Service Area
90' Contour
Hope Street
Standpipe
(1908)
Metacom Spheroid
(1970)
Bay View Tank
(1928)
N
URI EDC


RIGIS 1997
Aerial Imagery
BCWA Pipe
Year Installed
Pre-1939 or Unknown
1940 - 1951
1952 - 1962
1963 - 1972
1973 - 1981
1982 - 1997
High Service Area
90' Contour
Hope Street
Standpipe
(1908)
Metacom Spheroid
(1970)
Bay View Tank
(1928)
N
URI EDC, RIGIS


RIGIS 2022
Aerial Imagery
BCWA Pipe
Year Installed
Pre-1939 or Unknown
1940 - 1951
1952 - 1962
1963 - 1972
1973 - 1981
1982 - 1997
1998 - 2022
High Service Area
90' Contour
Hope Street Standpipe (1908)
Metacom Spheroid (1970)
Bay View Tank (1928)
N

Issue 2: Hope Street Standpipe

- Hope Street standpipe is a 0.5 MG storage tank built in 1908 with an overflow of 180 feet MSL
- Bay View is a 2.0 MG storage tank built in 1928 with an overflow of 182.7 feet MSL.
- Due to the differences in overflow elevations, water can g into Hope Street, but cannot come out – i.e., “locked up”.



HYDRAULIC GRADE LINE SCHEMATIC

Issue 2: Hope Street Standpipe (Continued)

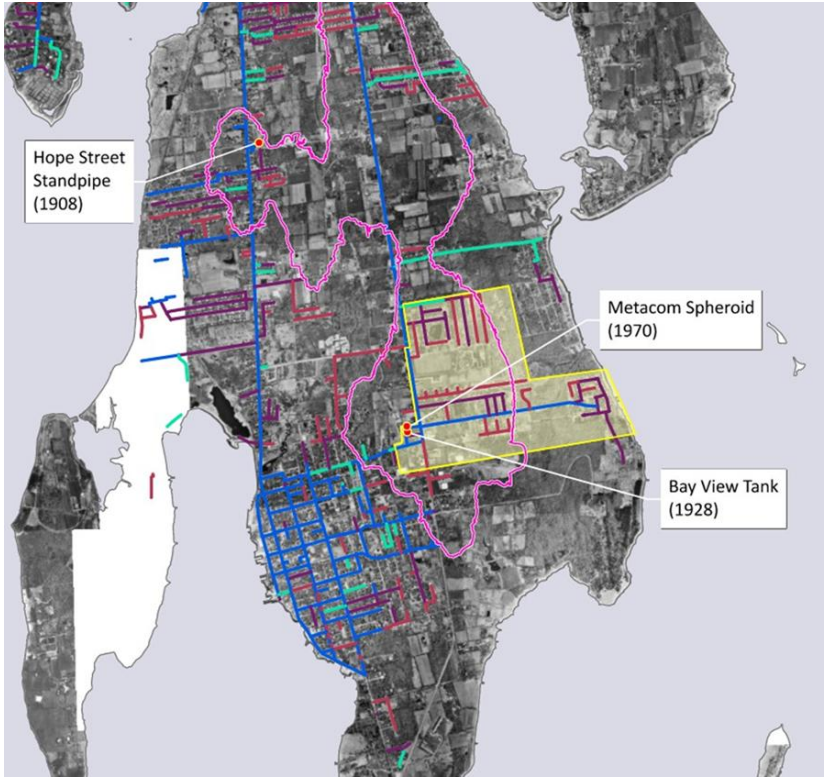
- Tank is only used for fire fighting, emergencies, and when Bay View comes off-line.
- Persistent water quality concern.
- Under-utilized asset.

The Solution

- How to fix the low-pressure issues in Warren and Bristol and “unlock” Hope Street.
- Several ideas were evaluated: create new pressure zones, build new tanks, demolish Hope Street, add pump zones, etc.
- In the end, only one solution made sense – expand the existing high service area.

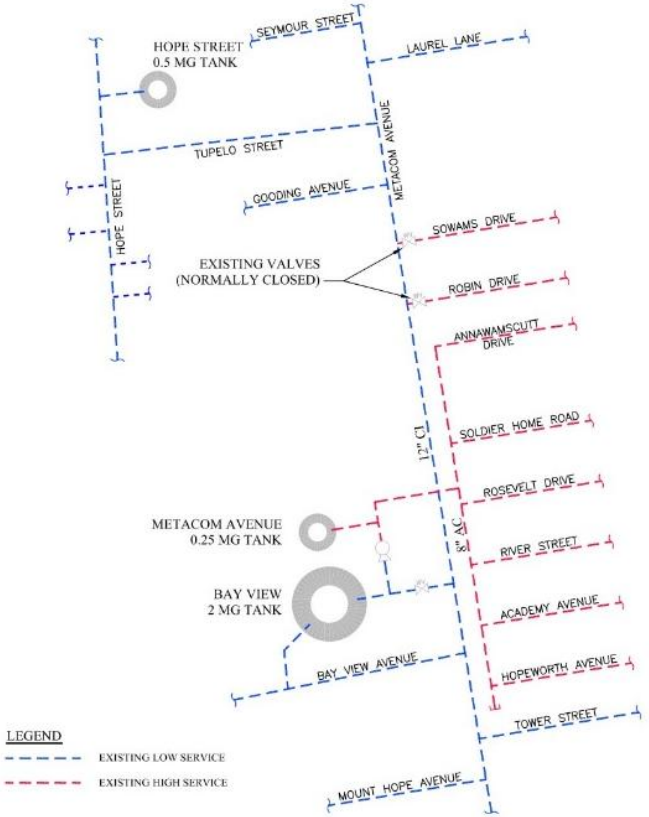
Expanded High Service Area

- BCWA's high service area was created in 1970 with the construction of the Metacom Spheroid (overflow of 265 feet MSL).
- Expansion of the HSA to everybody within the 90-foot contour would increase pressure and fire flow to hundreds of customers.



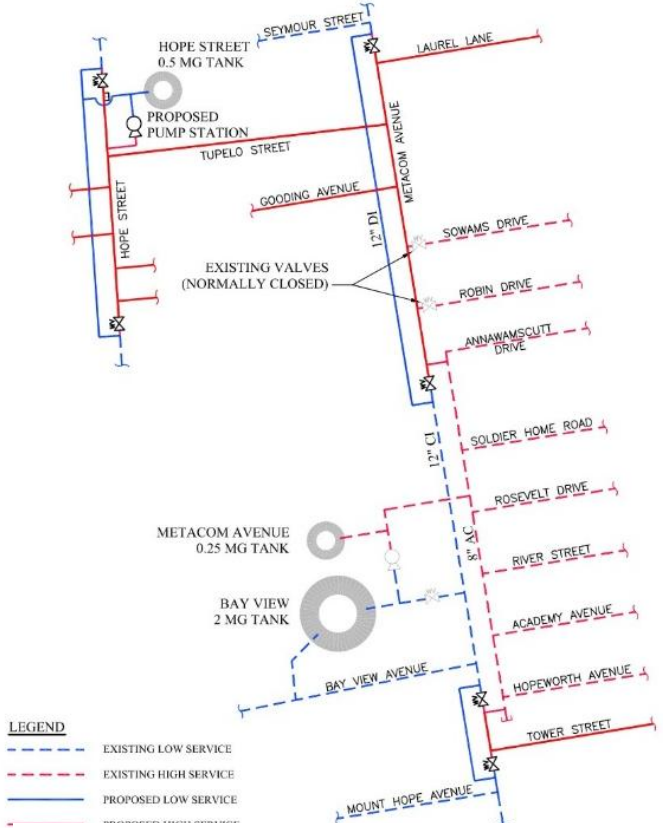
Expanded High Service Area Challenges

1. By expanding the existing high service area, flow to the southern half of Bristol is potentially cut-off.
2. Existing Metacom Spheroid (0.25 MG) is too small to support an expanded customer base.
3. The existing Metacom Pump Station wouldn't be able to keep up with the additional demand.



Solution to the 1st Challenge

- Either install entirely new high service area pipe network, or
- Repurpose existing low service pipe network and install low pressure by-pass pipes to carry low pressure water through the Expanded High Service Area.
- In the end, BCWA did a little of both.



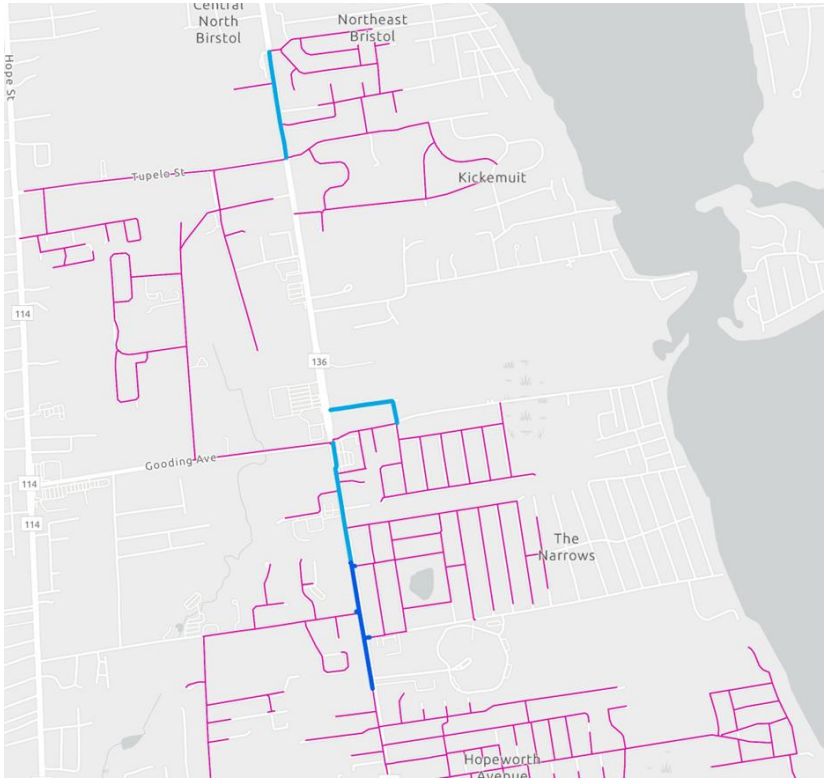
Solution to the 2nd and 3rd Challenges

- Build a new pump station at the base of the Hope Street standpipe.
- Pump out of the Hope Street tank into the Metacom tank.

- Converting Hope Street into “pumped storage” gives the tank new purpose.
- Additional pumping capacity to the Expanded High Service Area is added.
- Forced turnover in Hope Street tank solves water quality issues.

To Expand the High Service Area

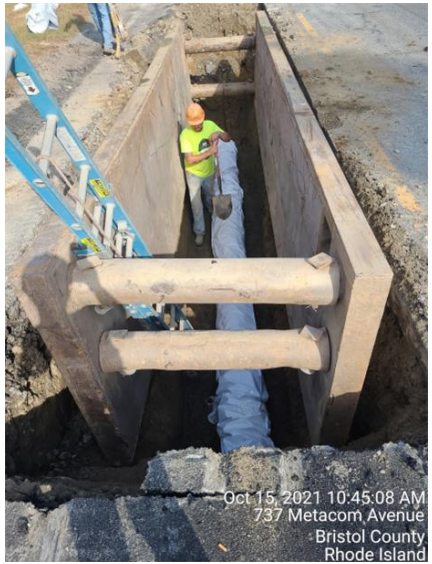
- BCWA installed:
  - 7,400 feet of 12-inch pipe
  - 1,000 feet of 6 and 8-inch pipe
  - 53 new valves
  - 1 new pressure reducing valve
- Built a new pump station and valve vault at Hope Street
- Built a new pump station at Metacom (for good measure).

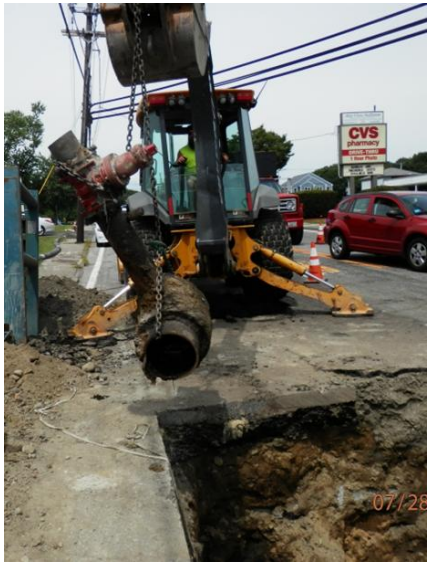


Benefits of Expanded High Service Area

- Project added 35 psi to hundreds of customers.
- Increased fire flow at dozens of hydrants in Bristol and Warren by a factor of 2x to 5x.
- Reduced the need for fire pumps in new construction.
- Increased usable storage in both the High Service Area and the Low Service Area (more usable storage in Bay View).

Metacom Avenue Water Main Installation





Phase 1 Completed 2017

Phase 2 Completed 2022

Metacom Pump Station Pre-Replacement

Old Metacom Pump Station in 2015

Metacom Pump Station Post-Replacement

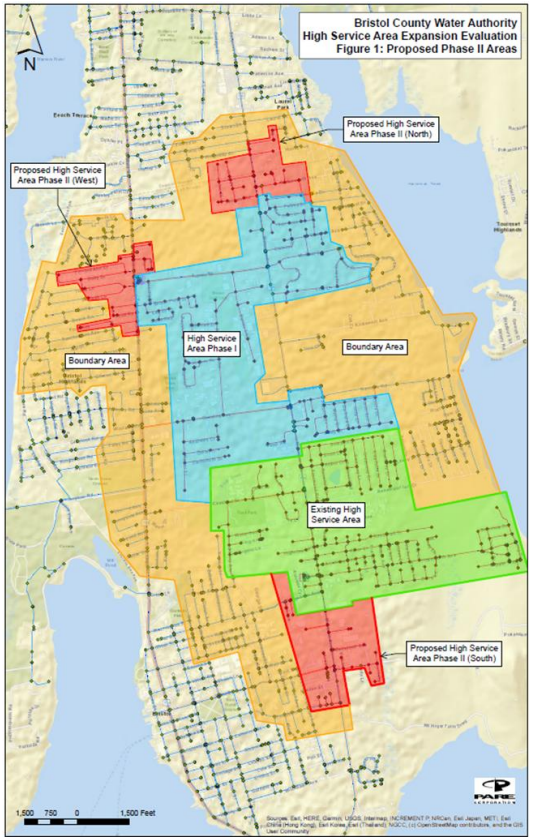
New Pump Station Completed in 2019

Hope Street Pump Station Construction

New Hope Street Pump Station Completed in 2025

Looking Ahead…

- Planning continues
  - Evaluation of expansion alternatives.
  - Continued reliance on our hydraulic model to support our planning efforts.



Questions?

Stephen Coutu, P.E.
(401) 245-2022
scoutu@bcwari.com

Michael Crawford, P.E.
(401) 245-2022
mcrawford@bcwari.com