The Climate Vulnerability of Fresh Water Supplies and Public Health

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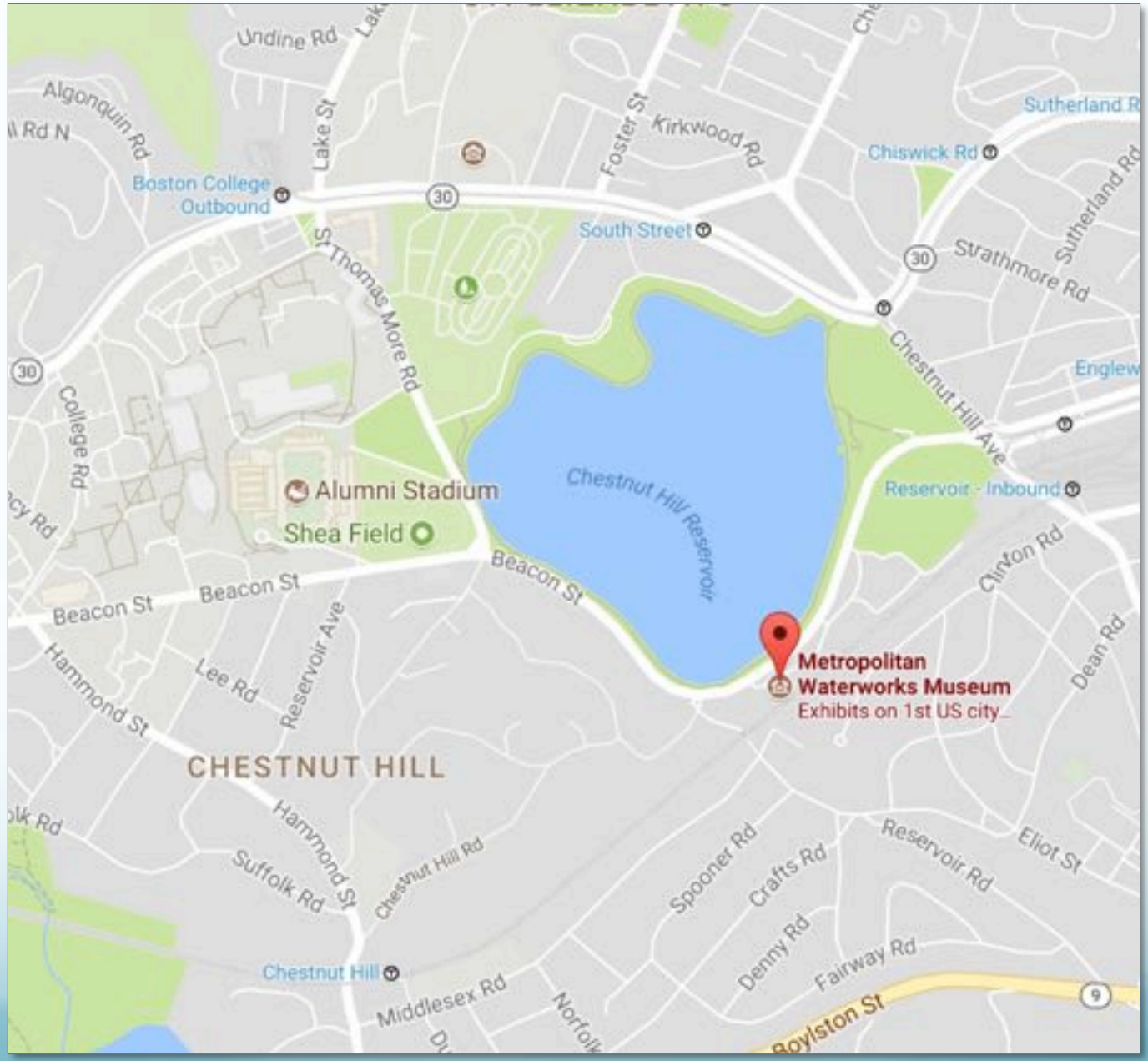
March 28, 2018


Undine Rd
Algonquin Rd
Rd N
Lake St
Foster St
Kirkwood Rd
Sutherland R
Chiswick Rd
Sutherland Rd
Boston College
Outbound
30
South Street
Strathmore Rd
St Thomas More Rd
Chestnut Hill Ave
Englew
College Rd
Alumni Stadium
Shea Field
Chestnut Hill Reservoir
Reservoir - Inbound
Beacon St
Beacon St
Beacon St
Clinton Rd
Dean Rd
Hammond St
Lee Rd
Reservoir Ave
Metropolitan
Waterworks Museum
Exhibits on 1st US city_
CHESTNUT HILL
Suffolk Rd
Hammond St
Chestnut Hill Rd
Spooner Rd
Crafts Rd
Reservoir Rd
Eliot St
Denny Rd
Fairway Rd
Chestnut Hill
Middlesex Rd
Boylston St
9


2ND RECEIVER
0
10
20
30
40
50
60
10
20
30
COUNTER

Before 1795 in Boston

www.stonestructures.org

- Before 1795, use of wells, cisterns, springs, dams to collect drinking water.
- No processing or purifications other than boiling or use in fermented or distilled beverages (beer, wine, spirits).
- The Great Spring at Spring Street and Lane in Boston.
- No public water infrastructure.

After 1795 in Boston

- After 1795, early public infrastructure began to develop.
- Wooden pipes carried drinking water from Jamaica Pond into Boston.
- Gravity-fed systems relied on reservoirs that provided water based on relative elevation above sea level.

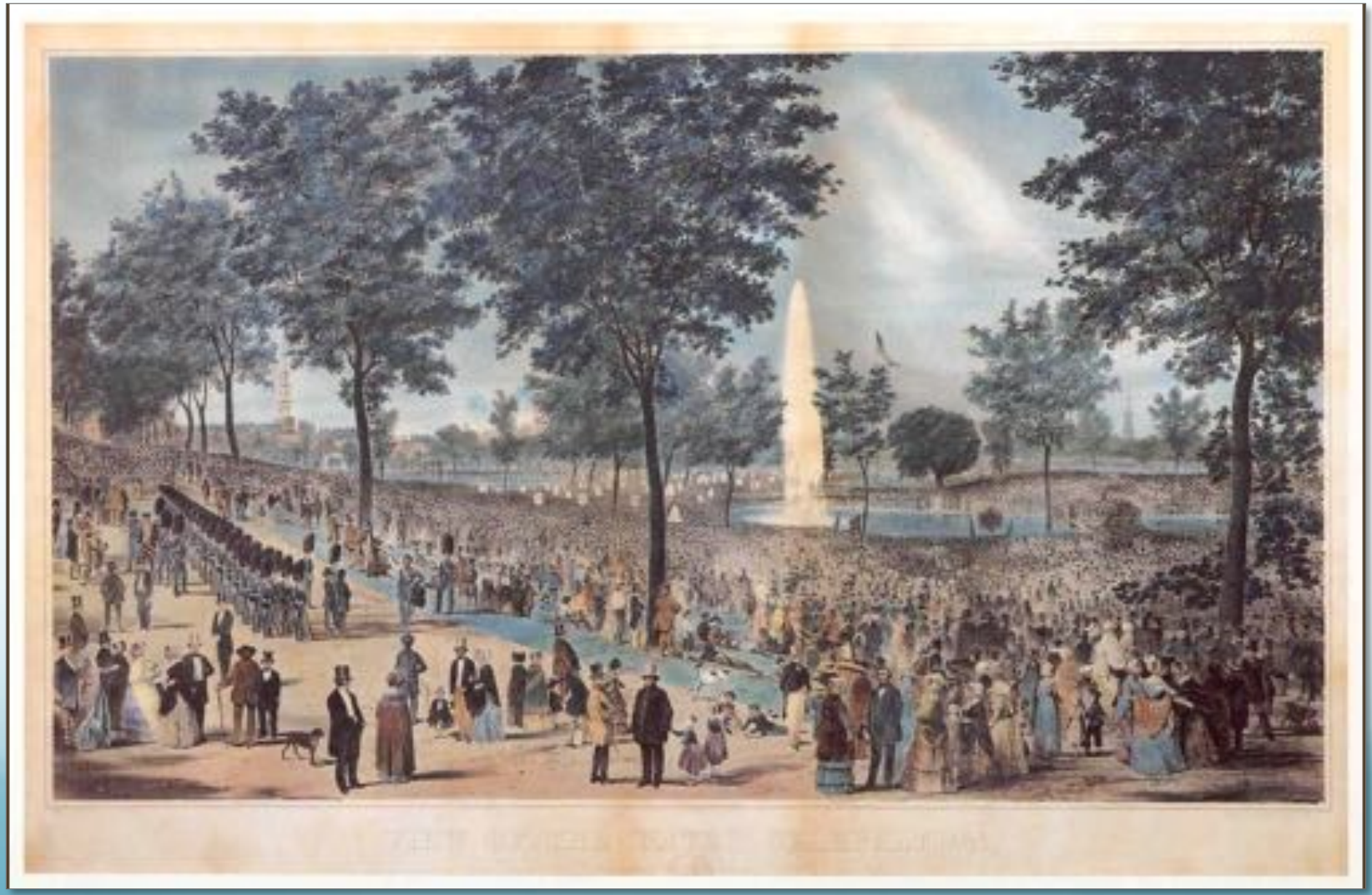
By J.H. Bufford's Lith. Modified by Anetode at en.wikipedia.

1845-1848 Lake Cochituate Water System: Natick to Beacon Hill

The Cochituate Aqueduct

www.millermicro.com/LCGatehouse.html

Boston Water Day
October 25, 1848

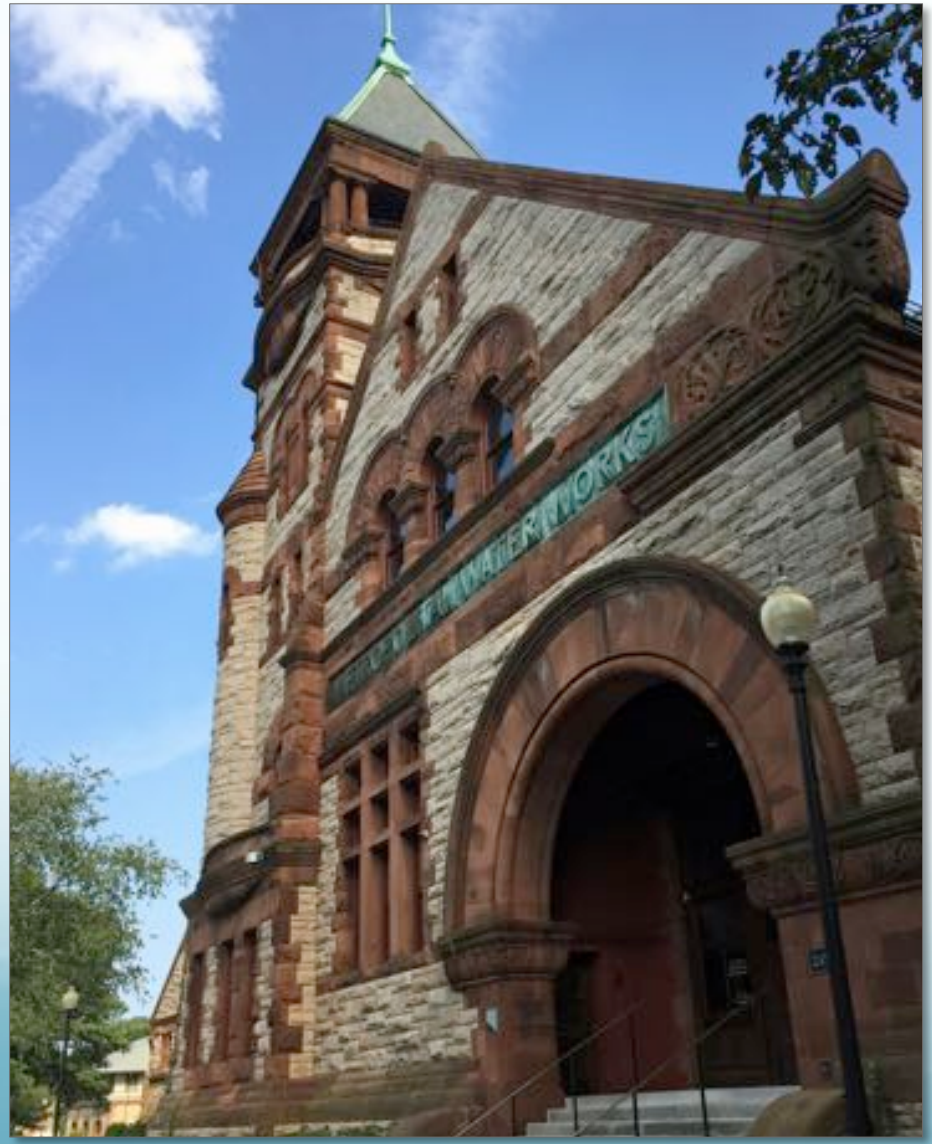


Boston Globe/ Jessica Rinaldi/ Sept 18, 2017

Great Fire 1872

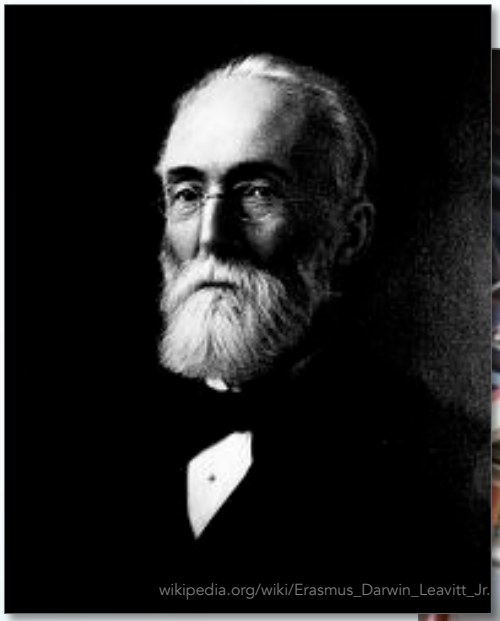
wikipedia.org/wiki/Great_Boston_fire_of_1872

Chestnut Hill High Service Station



- 1887 first Holly-Gaskill Engine installed
- 1895-1897 E.D. Leavitt Engine
- 1898 Allis-Chalmers
- 1922 Worthington-Snow
- 1974 Operations ceased
- 1991 Waterworks preservation effort
- 2005 MA Legislature approves sale and redevelopment
- 2011 Museum Opens

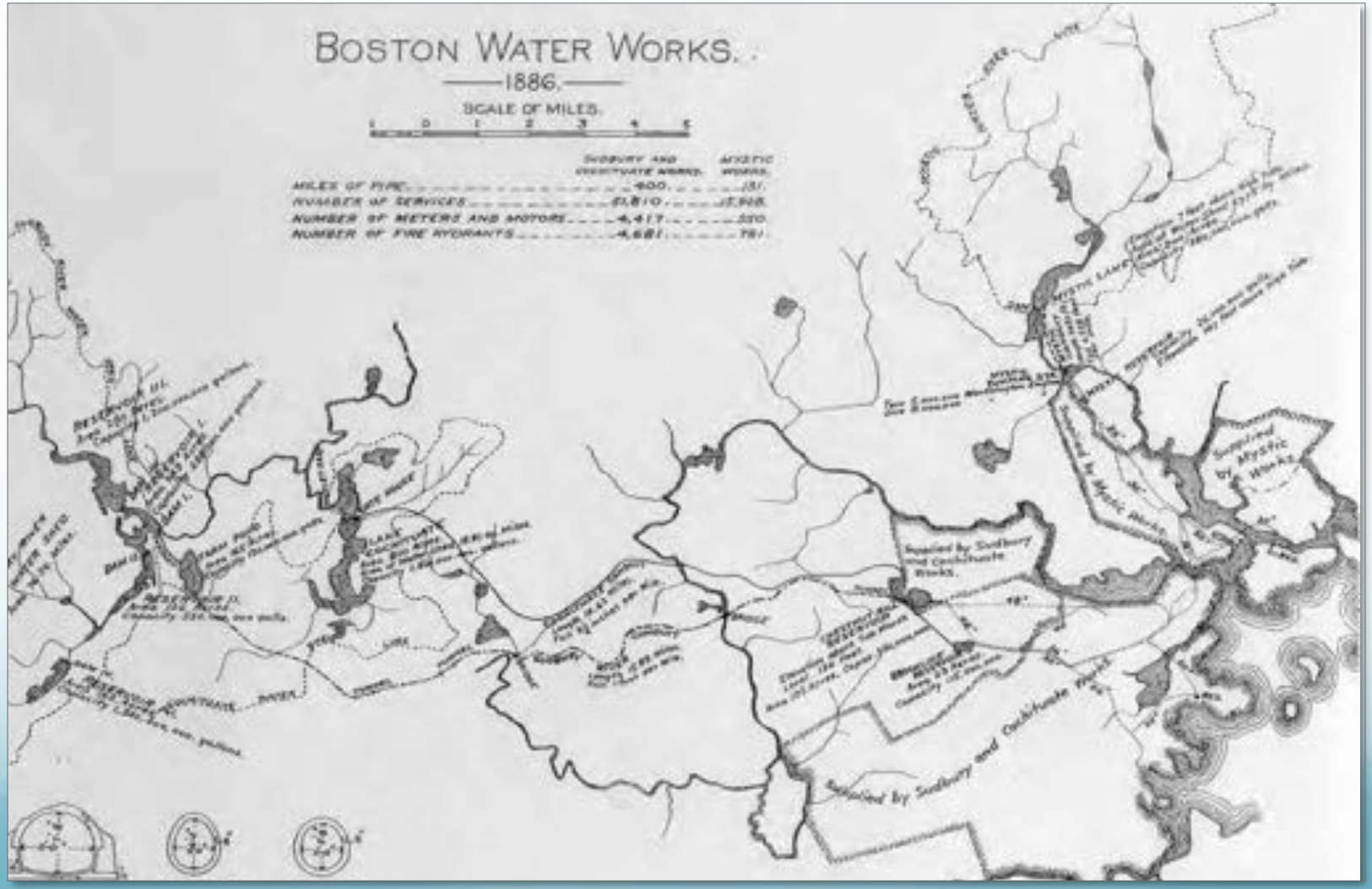
The Engineer:
Erasmus Leavitt & the Leavitt Engine

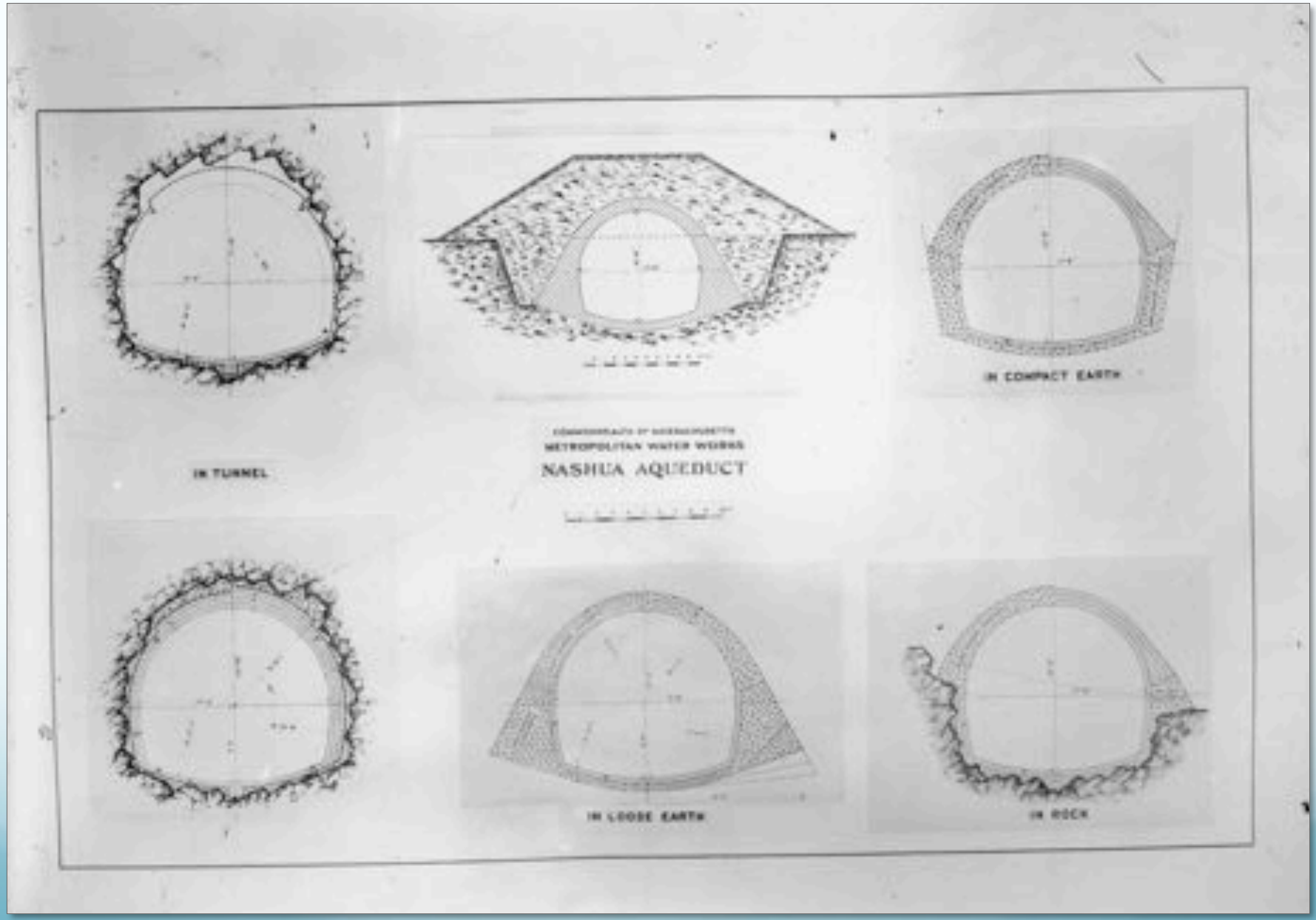


The Scientist: George C. Whipple

- American civil engineer and founder of the field of sanitary microbiology.
- Established the Chestnut Hill Laboratory 1889-1897 – the first scientific water quality testing station in the US.
- Identified sedimentary and microbiological contaminants in Boston's public drinking water.

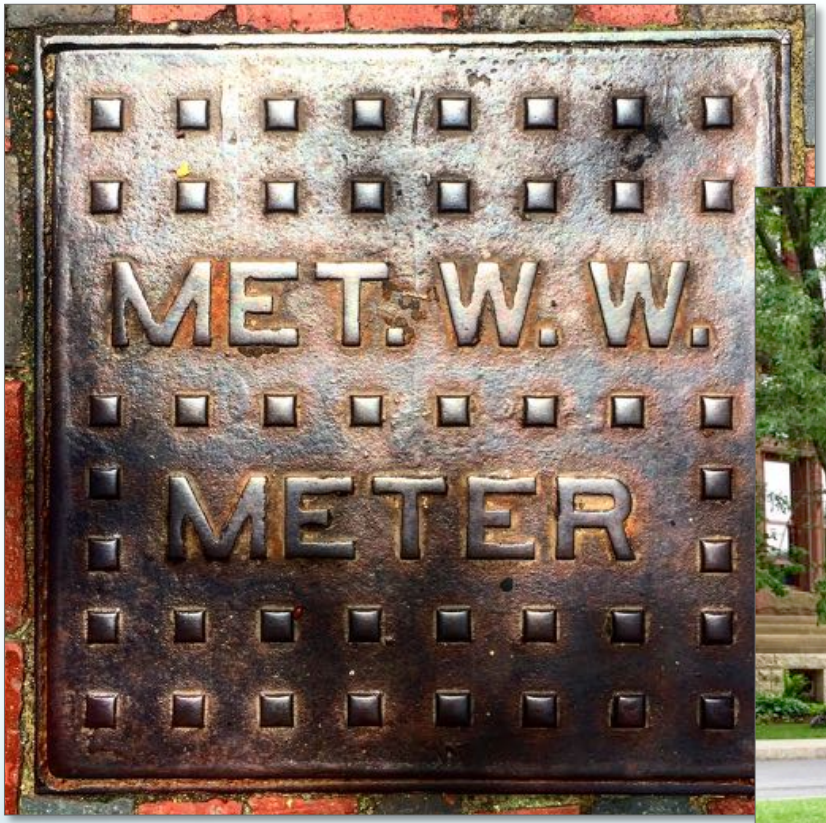
The 19th Century Water System

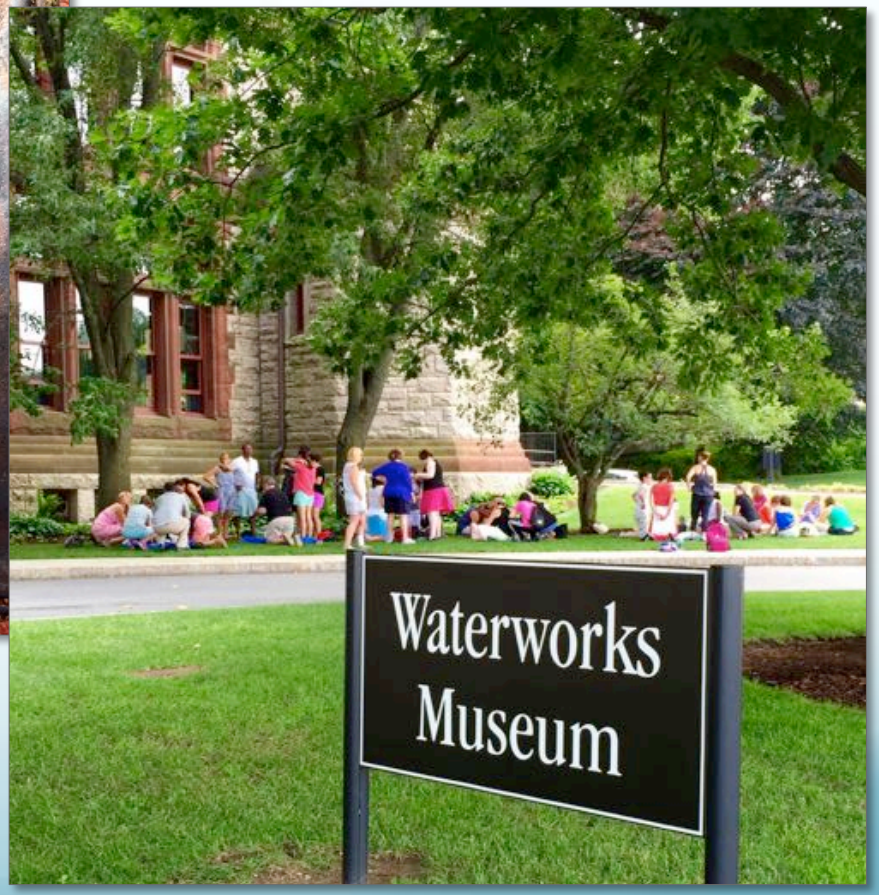




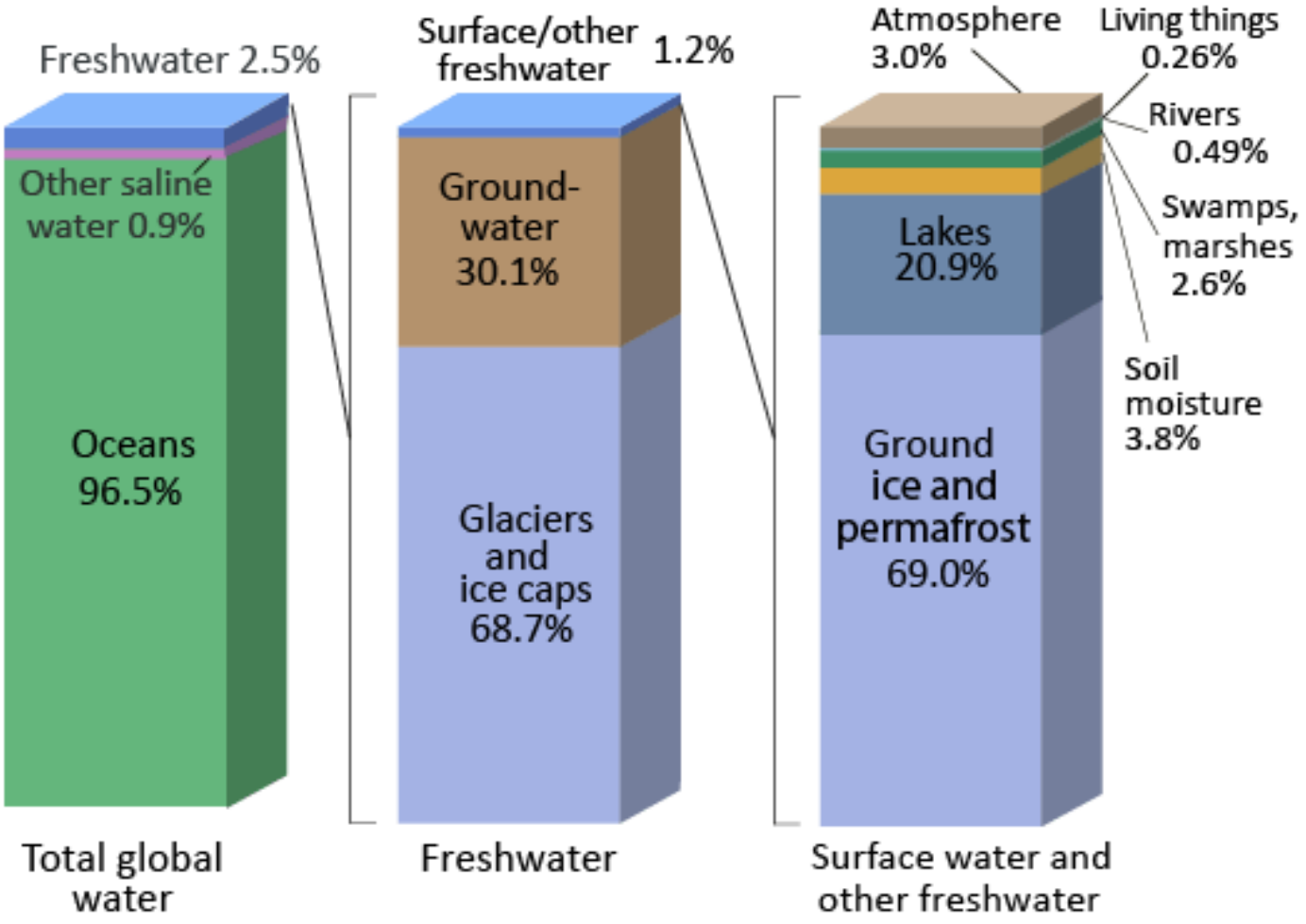

Digital Commonwealth

The Waterworks Today



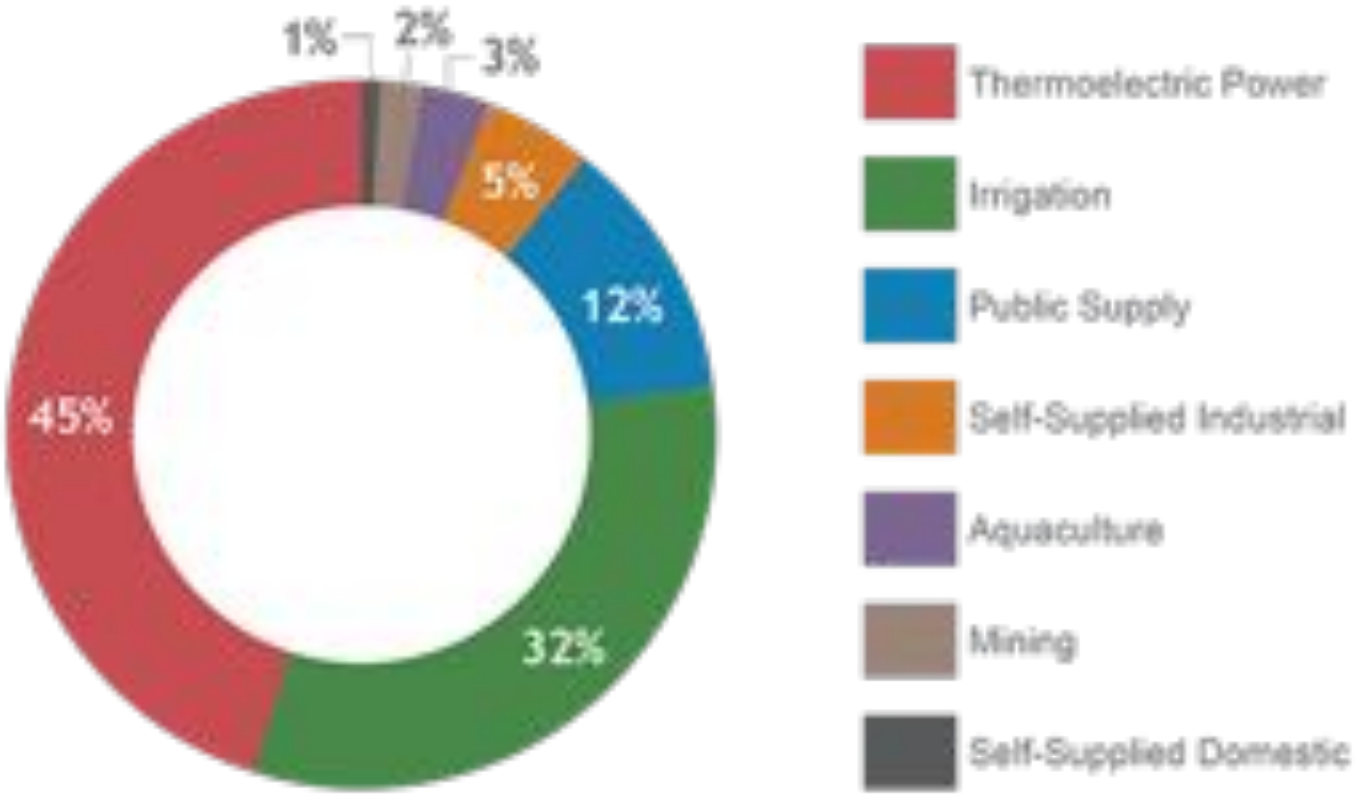


Where is Earth's Water?



Source: Igor Shiklomanov's chapter "World fresh water resources" in Peter H. Gleick (editor), 1993, Water in Crisis: A Guide to the World's Fresh Water Resources.
NOTE: Numbers are rounded, so percent summations may not add to 100.

U.S. Freshwater Withdrawals (2010)



*Livestock is approximately less than 1% of total use and is not included.

*Data comes from Maupin, M.A., Kenny, J.F., Hutson, S.S., Lovelace, J.K., Barber, N.L., and Linsey, K.S., 2014, Estimated use of water in the United States in 2010: U.S. Geological Survey Circular 1405, 56 p., http://dx.doi.org/10.3133/cir1405.

Today

A delectable treat based on beets – P6

Road deaths spike in W Cape – P5

Meet Proteas new star Ngidi – P6

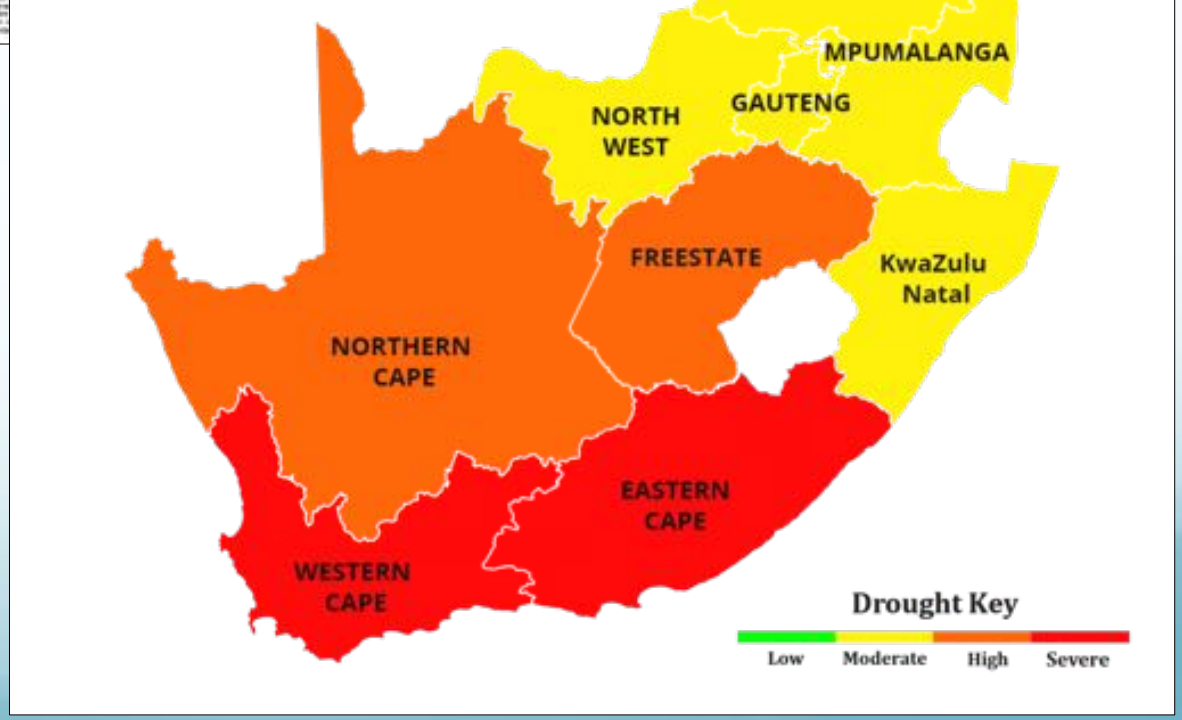
CAPE TIMES

PANIC STARTING TO SET IN

City bracing for Day Zero

Residents questioning how logistics of giving people water will work

Springing into




Volume of water stored [Giga-litres]
1000
750
500
250
0
2013
2014
2015
2016
2017
2018
Predicted
unavailable storage (13.5% of total)
unavailable storage (10% of total)
Jul 2013
Jan 2014
Jul 2014

Resilient Design in Boston: Solutions for Our Changing Landscape

The Metropolitan Waterworks Museum Presents Finalists from the *Boston Living with Water* Design Competition

The Metropolitan Waterworks Museum welcomes you to *Resilient Design in Boston: Solutions for Our Changing Landscape*.

The panels presented in the Overlook Gallery highlight the best in design and landscape planning made in response to the impact of climate change in Boston. These are the winning entries for the categories of Building, Neighborhood, and Infrastructure from the 2015 *Boston Living with Water* competition convened by the City. These proposals focused on three representative seaport neighborhoods whose location (the North End, the Fort Point Channel District, and the Columbia Point peninsula) would be affected by the rising Atlantic Ocean. The goal of the competition? A beautiful, sustainable waterfront.

More than 50 participating teams from Greater Boston and across the globe contributed designs for one or more of the three locations. These proposals addressed the immediate effect of climate change on thousands of buildings, residences, and infrastructure elements that circle Boston Harbor. Uniting these design studies is the central question: How can design address the effects of a rapidly changing climate in coastal communities?

The proposals answer this question by reaffirming the benefits of an iterative, community-based approach. Such investments in time and planning anticipate the detrimental effects of a warming climate with rising ocean levels and converge on flexible, adaptive strategies that work for resident populations. As a densely populated urban center, Boston is situated along a low, fragile coastline that with rising seas is subject to substantial erosion and catastrophic storm flooding. All of these changes have the potential to damage or destroy the homes, buildings, bridges, and tunnels that link our social networks and local economies.

In response, the *Boston Living with Water* competition generated thoughtful solutions to these potential problems. Throughout this exhibit, the proposals address five key issues that influenced the final designs. These issues include methods for rapid, cost-effective recovery from destructive natural events; the development of dual-purpose solutions that fit both socio-economic and ecological considerations; reinforcement of the community and its social support systems; the coordinated development of preparedness approaches with institutional and community stakeholders; and finally, phased implementation of flexible design solutions that respond creatively to changing conditions. The insights captured by these entries are simultaneously instructive and innovative, demonstrating again the value of such a smart approach to design.

Hosting the winners from the 2015 competition is a natural fit for the Waterworks Museum. As an organization with deep ties to the history of Boston's built environment, and to its abundant water resources, the Museum is pleased to partner with the City of Boston and the Boston Planning & Development Agency to celebrate these proposals with our community.

Please continue to the Overlook Gallery, where you can see the fascinating designs that have been created to consider one of our area's most pressing issues. We also hope that you will add your own thoughts and comments to our participatory wall about what will occur if sea levels continue to rise.

WATERWORKS MUSEUM

boston planning & development agency

BOSTON LIVING WITH WATER

ReDeBOSTON 2100

Regenerative Design International Exposition

Resilient, Energy Positive, & Transit-Oriented District

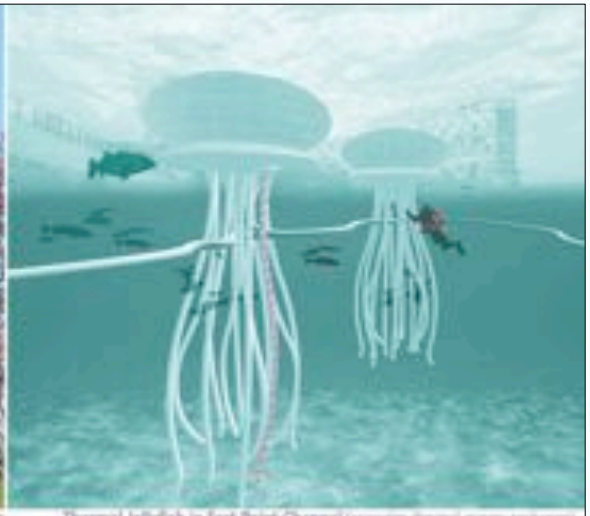
Raised Ground Plane

Tidal Basins, Land Wharves & Suspension Foot Bridges

18 Acres of Public Open Space, Boston Skyline Views Looking East Across Channel

Accessible Waterfront, Vibrant Community, Visitor Destination

Looking North on ReDe Avenue, District Renewable Energy Plant & Visitor Center



Thermal Jellyfish in Fort Point Channel (seawater thermal energy exchanger)

Renewable District Energy Network

Underground Thermal Storage

Looking West from Suspension Footbridge, Water Plaza Celebrates Illuminates ReDe District's Active Watersheet