



Metropolitan Water Tunnel Program

Town of Needham

Select Board Meeting

November 22, 2022



Topics

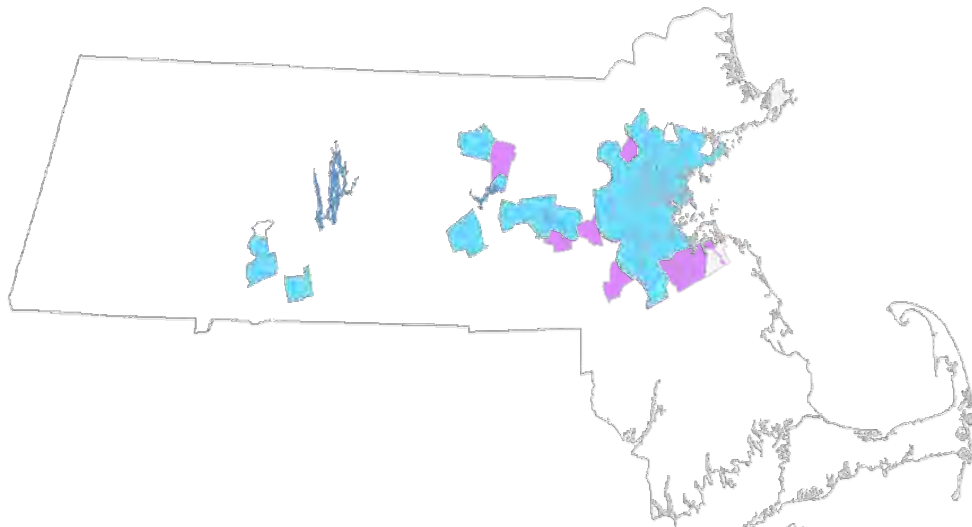
- MWRA
- Metropolitan Water Tunnel Program
- DEIR / Preferred Alternative
- Tunnel Program Schedule
- What Happens at a Shaft Site
- Possible Construction Impacts & Management
- Community & Stakeholder Outreach
- Where to Find Information / How to Contact Us
- Questions?



MWRA - What We Do ...

The MWRA ...

- provides wholesale water and wastewater services to over 3.1 million customers in 61 communities
- delivers an average of 200 million gallons per day to its water customers
- collects and treats an average of 350 million gallons of wastewater per day, with a peak capacity of 1.2 billion gallons



We have ...

- 102 miles of active transmission mains and tunnels (plus 43 miles on standby), including a number of deep rock pressure tunnels
- 284 miles of distribution mains with over 4,700 valves
- 5 years of storage for water supply
- 12 pump stations
- ~ 85% of our water is delivered by gravity

We Must...

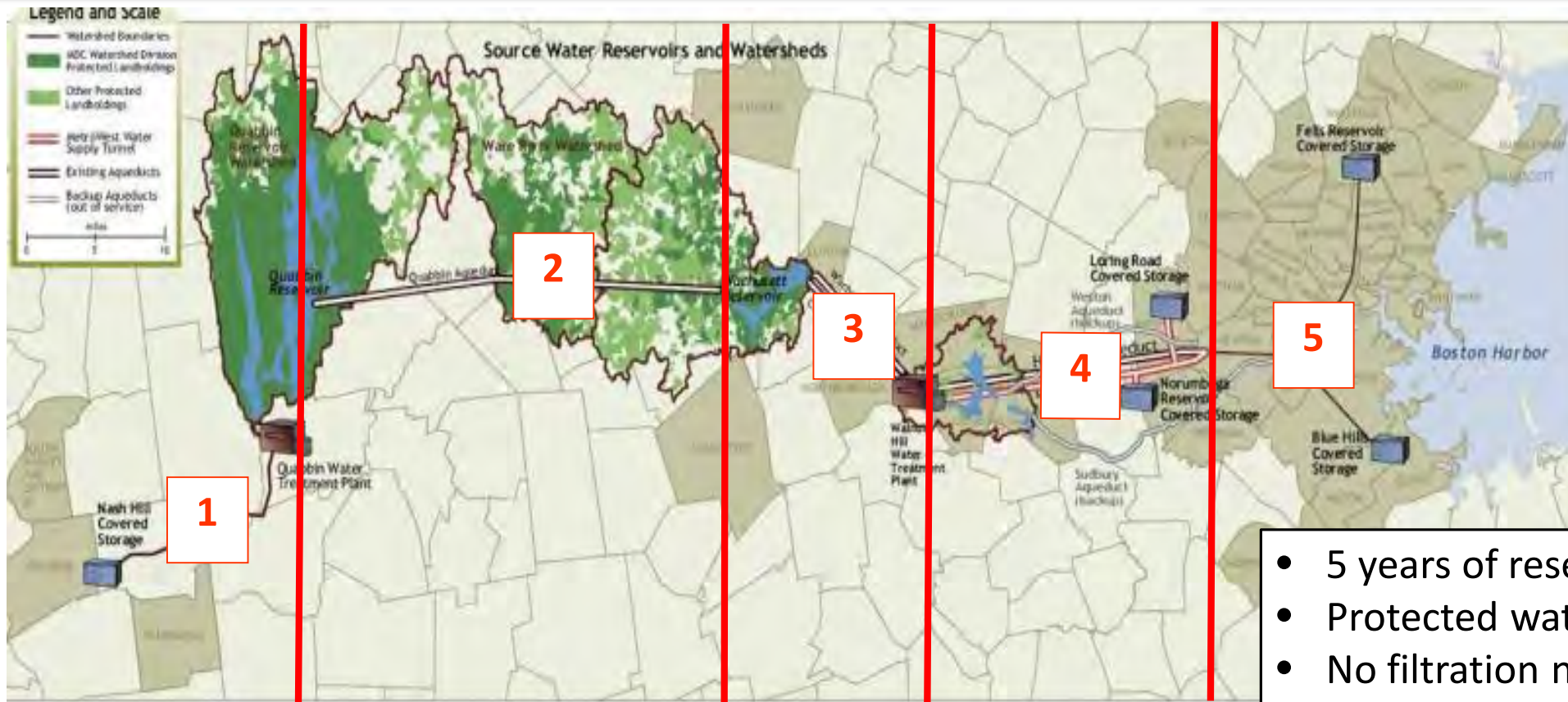
- Deliver water to protect public health, provide sanitation, and fire protection

We Need to....

- Have the ability to swiftly respond to a disruption in service
- Maintain and rehabilitate surface piping, key valves and tunnels on a periodic basis



MWRA Water System



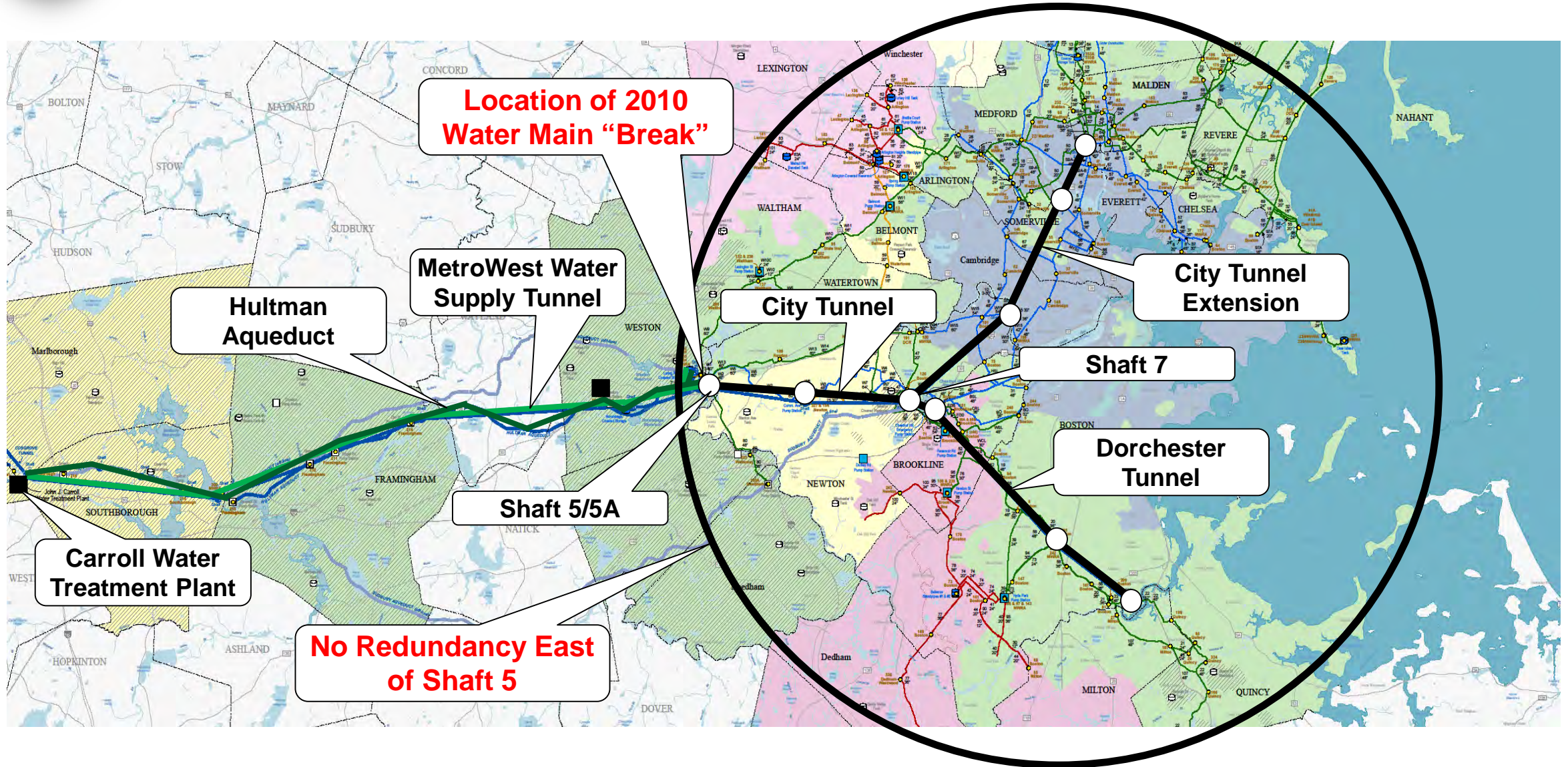
1. Chicopee Valley Aqueduct
2. Quabbin Aqueduct
3. Cosgrove Tunnel / Wachusett Aqueduct
4. MetroWest Tunnel / Hultman Aqueduct
5. Metropolitan Tunnels

- 2007 Improvements ✓
- Inspection planned ✓
- 2019 Improvements ✓
- 2003/2013 Improvements ✓
- Significant Needs ← Next!

- 5 years of reservoir capacity
- Protected watershed
- No filtration need
- Gravity fed distribution
- Great taste!



Metropolitan Tunnel System Serves About 60 Percent of Water Demand in Metropolitan Area





Metropolitan Water Tunnel Program Purpose

- Our current Metropolitan Tunnel System, servicing the Boston area, is in need of repair
- The tunnels, valves, chambers & pipelines are between 50 – 80 years old



- Currently we cannot maintain our tunnel system east of Shaft 5 in Weston because a shutdown of the entire Metropolitan Tunnel System would be required
- The Metropolitan Water Tunnel Program will solve that problem by creating a redundant water tunnel system allowing the old system to be completely taken offline for inspection, maintenance, and repair



Metropolitan Water Tunnel Program Goals

Protect Public Health, Provide Sanitation and Fire Protection

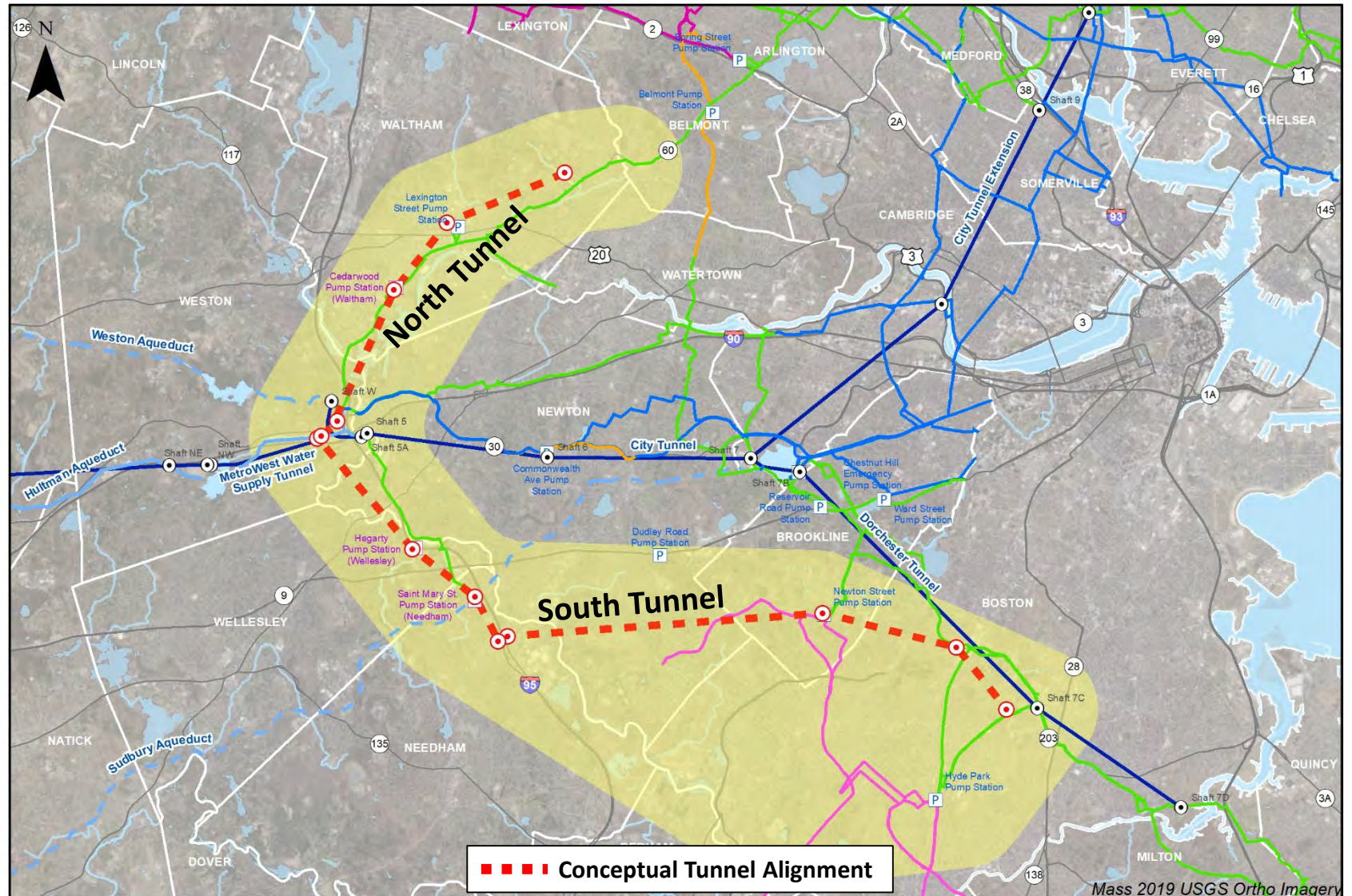
- Provide full redundancy for the Metropolitan Tunnel System:
 - Provide normal water service and fire protection when the existing tunnel system is out of service
 - Provide the ability to perform maintenance on existing tunnels year-round
 - Provide uninterrupted service in the event of an emergency shut down
 - Meet high day demand flow with no seasonal restrictions
 - Avoid activation of emergency reservoirs
 - Meet customer expectations for excellent water quality
- Result in no future boil orders!





Metropolitan Water Tunnel Program

- ~14.5 miles of deep, hard rock, pressure tunnel
- Tunnels will begin in the Weston (I-90/I-95 vicinity)
- Northern Tunnel - ~4.5 miles, ends in Waltham/Belmont line
- Southern Tunnel - ~10 miles, ends in Mattapan near American Legion
- Six intermediate connections to existing water infrastructure
- ~8,850 In ft of tunnel, ~350' deep below Needham
- Construction anticipated between 2027 and 2040





Metropolitan Water Tunnel Program

Construction Shaft Sites

- Fernald Property, Waltham
- I90/I95 Interchange, Weston
- **Highland Ave/I95 Interchange, Needham**
- American Legion, Mattapan

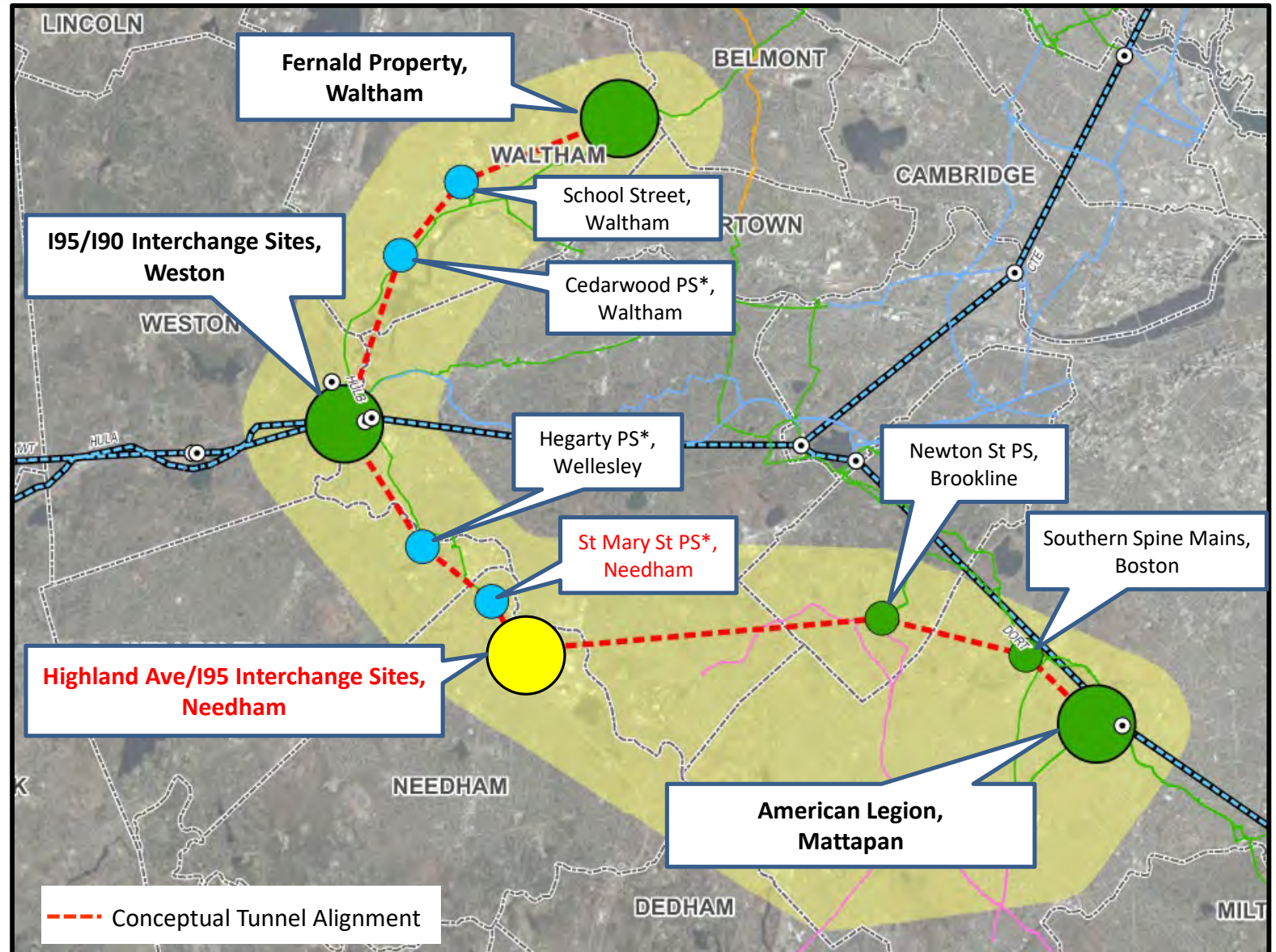
Connection Shaft Sites

- Lexington St Pump Station, Waltham
- Cedarwood Pump Station, Waltham
- Hegarty Pump Station, Wellesley
- **St. Mary Street Pump Station, Needham**
- Newton Street Pump Station, Brookline
- Southern Spine Mains, Boston

Final shaft locations subject to permits and real estate acquisition

* Non MWRA Pump Station

- Required Connection (required for system redundancy)
- Secondary Connection (provides local benefit)
- Construction Shaft (no connection)





Tunnel Program Schedule

- Overall Program Schedule
 - Preliminary Design is ongoing thru early Jan 2024
 - Currently planning a large geotechnical investigation program to start in 2023
 - Targeting Final Design to start in mid 2024
 - Targeting first tunnel construction contract to bid in 2027
 - Program completion by 2040
- Preliminary Design Status
 - Evaluate tunnel alignment alternatives
 - Geotechnical investigations
 - Environmental Impact Reports
 - Preliminary Design Report
 - Establish contract packages
 - Refine Program cost and schedule

We are Here





Draft Environmental Impact Report

- Submitted in October 2022
- Public comment period ends Dec 9, 2022
- Certificate will be issued on Dec 16, 2022
- Includes:
 - Alternatives evaluation process and results
 - Preferred Alternative + 2 backups
 - Details of proposed shaft sites (location, limits, purpose, duration, land needs, etc.)
 - Construction impacts at each site (traffic, noise, air quality, vibrations, water supply, wetlands impacts, etc.)
 - Proposed management of impacts (Section 61 Findings)
 - Stakeholder and community outreach
- www.mwra.com/mwtp/resources.html#docs

Massachusetts Water Resources Authority



Metropolitan Water Tunnel Program

Draft Environmental Impact Report

October 2022

PRELIMINARY DESIGN,
GEOTECHNICAL INVESTIGATION AND ENVIRONMENTAL IMPACT
REPORT

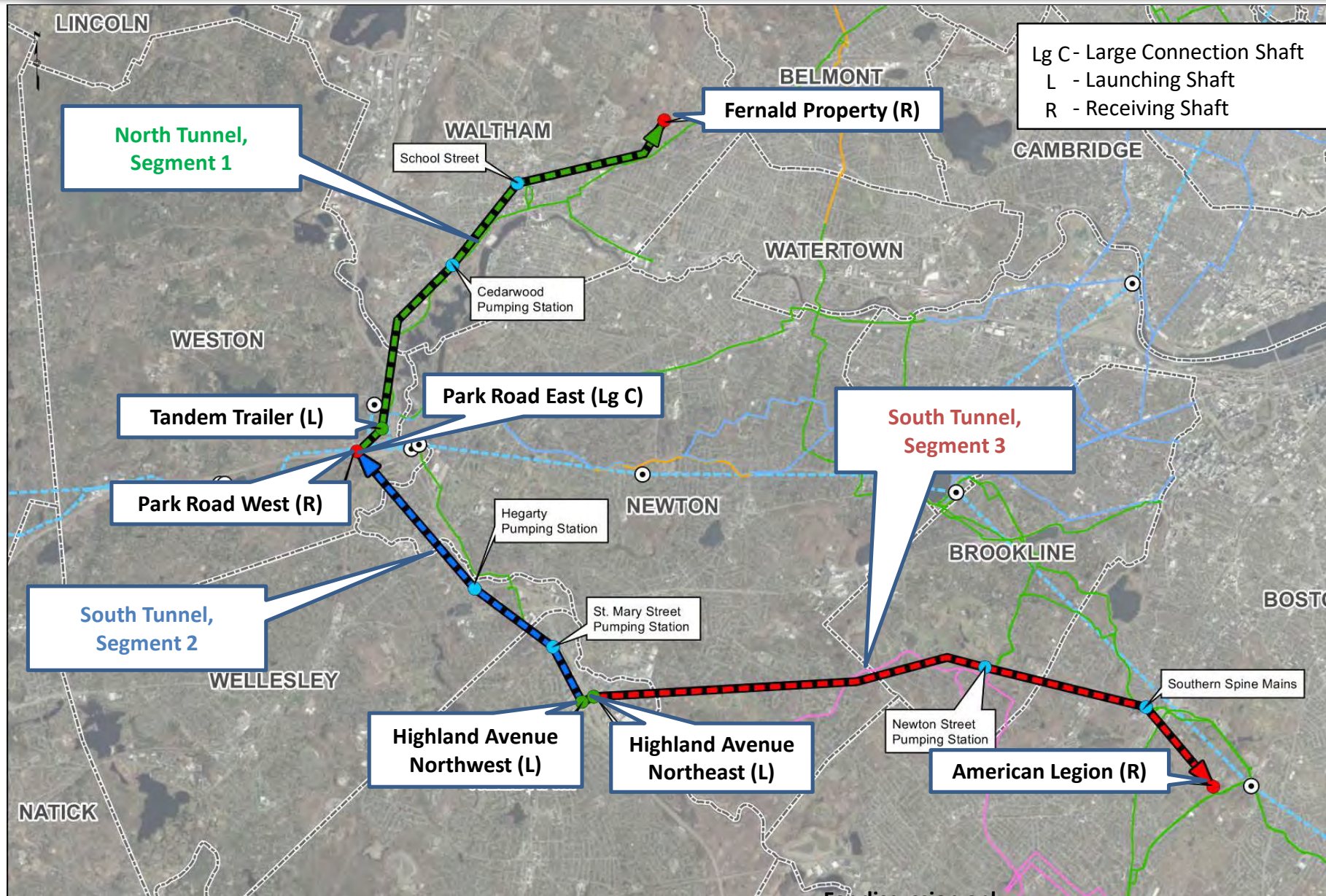
MWRA Contract 7159

Revision 0

Prepared by
CDM Smith in association with
VHB and JACOBS



Preferred Alternative



Preferred Alternative Includes:

- 14.7 miles to deep rock tunnel
- 3 launching shaft sites
- 3 receiving shaft sites
- 1 large connection shaft site
- 6 connection shaft sites
- 3 tunnel segments
 - Segment 1 = tunnel from Weston (Tandem Trailer) ~4.5 miles to Waltham (Fernald Property)
 - Segment 2 = tunnel from Needham (Highland Ave NW) ~3.4 miles to Weston (Park Road W)
 - Segment 3 = tunnel from Needham (Highland Ave NE) ~6.8 miles to Mattapan (American Legion)
- Tunnel system will operate as 2 tunnels (North Tunnel & South Tunnel)



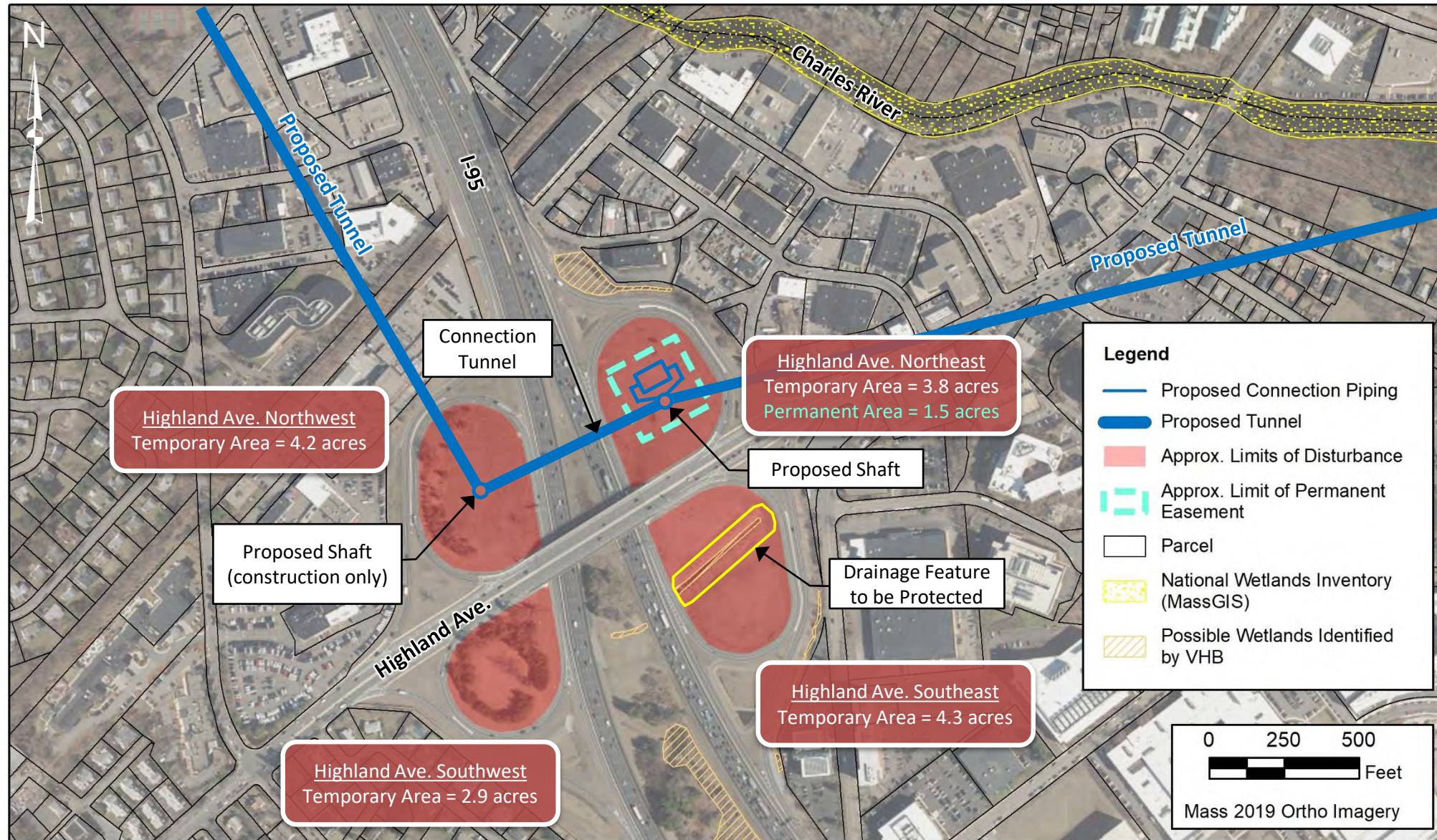
Highland Avenue Northwest and Northeast – Shaft Sites

Site Purpose:

- Launch TBM from Northwest Cloverleaf to Weston
- Launch TBM from Northeast Cloverleaf to Mattapan
- Connector tunnel below I-95
- Dewatering pipeline to Charles River

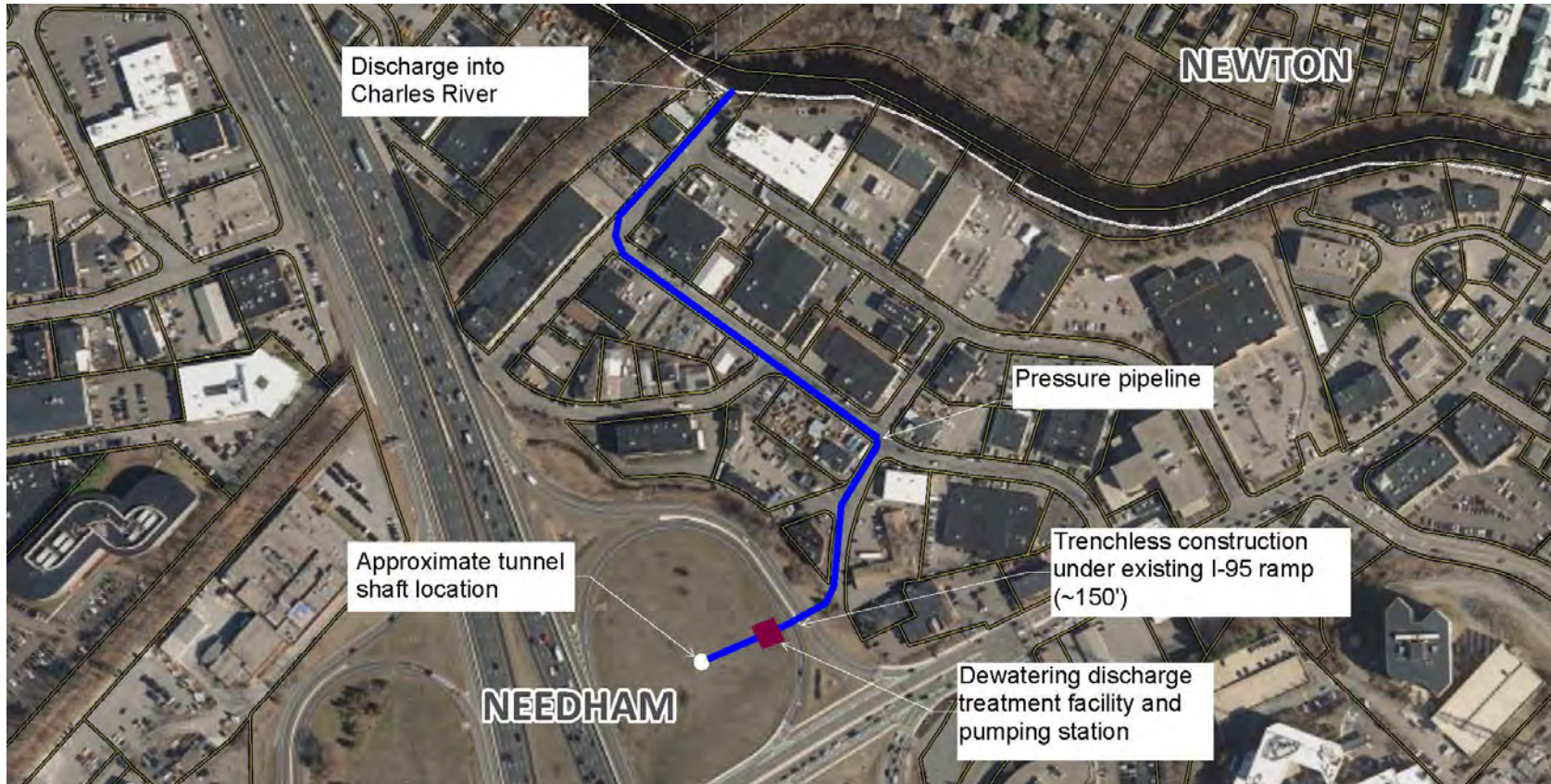
Site Characteristics:

- Controlled by MassDOT
- Coordination is ongoing
- Previously used for construction staging





Highland Ave - Dewatering Pipeline

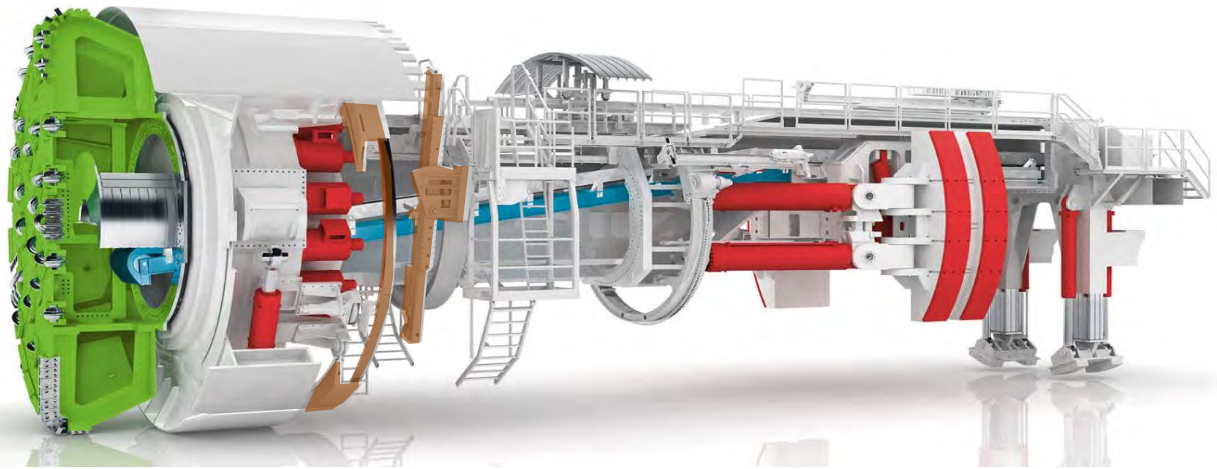


- New pipeline for construction dewatering and future unwatering of the tunnel
- Requires a short trenchless crossing of an I-95 Ramp
- New outfall to the Charles River

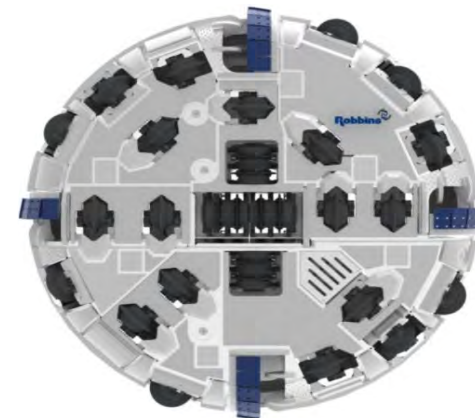


TBM Power Supply

- The tunnel boring machines (TBMs) are powered by electricity
- There is not sufficient power supply in the Highland Ave area to support the Program
- MWRA is working with Eversource to bring a new power source to the shaft sites, route TBD
- This new power infrastructure will remain after the Program is complete



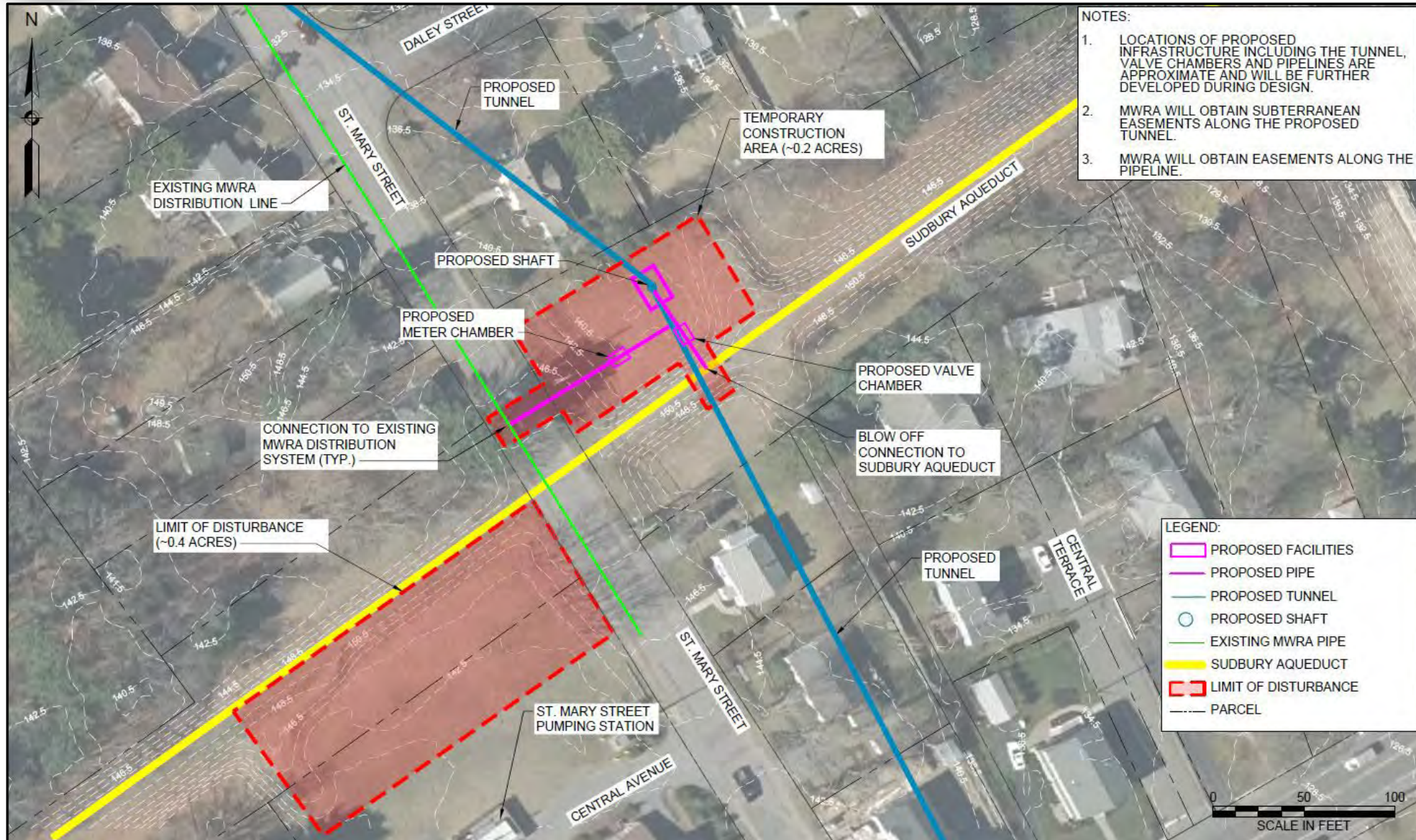
Source: www.herrenknecht.com



Source: www.robbins.com



St Mary St Pumping Station – Connection Shaft



- Most work on MWRA property
- Some in road work

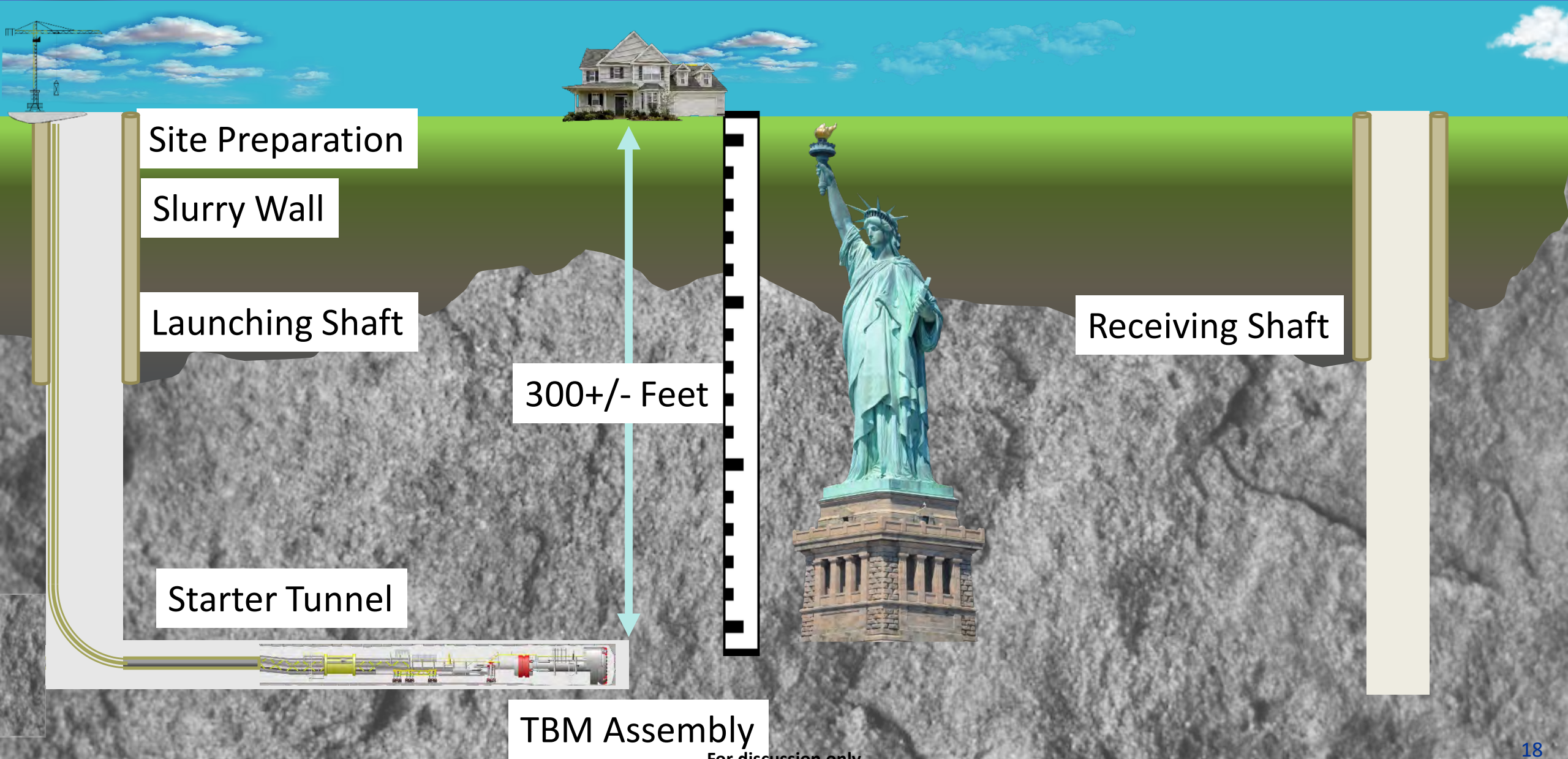


What Happens at a Shaft Site During Construction

- Each shaft site has a specific function during construction
 - TBM launching (L) ← Highland Avenue
 - TBM receiving (R)
 - Large connection (Lg C)
 - Connection (C) ← St. Mary Street PS
- Activity is dependent on site function and phase of construction
- Most work occurs below ground
- Level of activity at the ground surface will vary to support work underground
- Some utility work will extend outside the shaft site limits
- Most notable above ground activity will be trucking



Tunnel Sequence



For discussion only



Launch Shaft Site



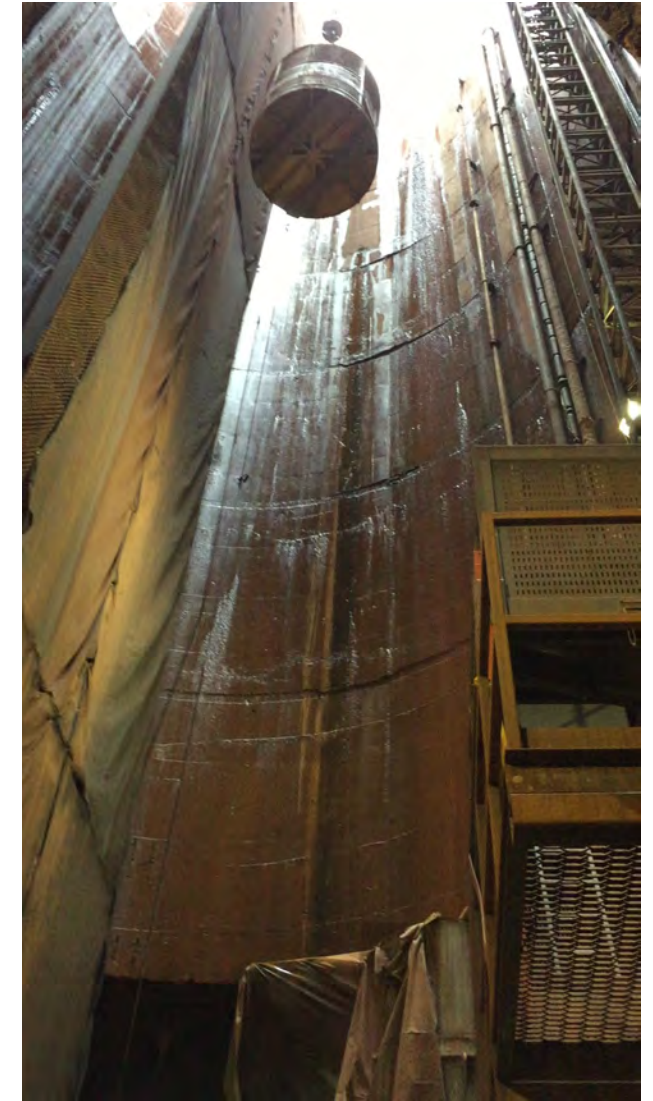
MWWST Shaft 5A – During Construction

Shaft 5/5A – Post Construction





Launching / Receiving Construction Shafts



- ~25' – 40' diameter
- ~250' – 400' deep
- Launching shaft is the only access to the tunnel until breakthrough into the receiving shaft



Permanent Infrastructure – Construction Shaft

Infrastructure is mostly below grade

- Top of shaft structure (~2 ft above grade)
- Valve chamber (~2 ft above grade)
- Connection piping (all buried)



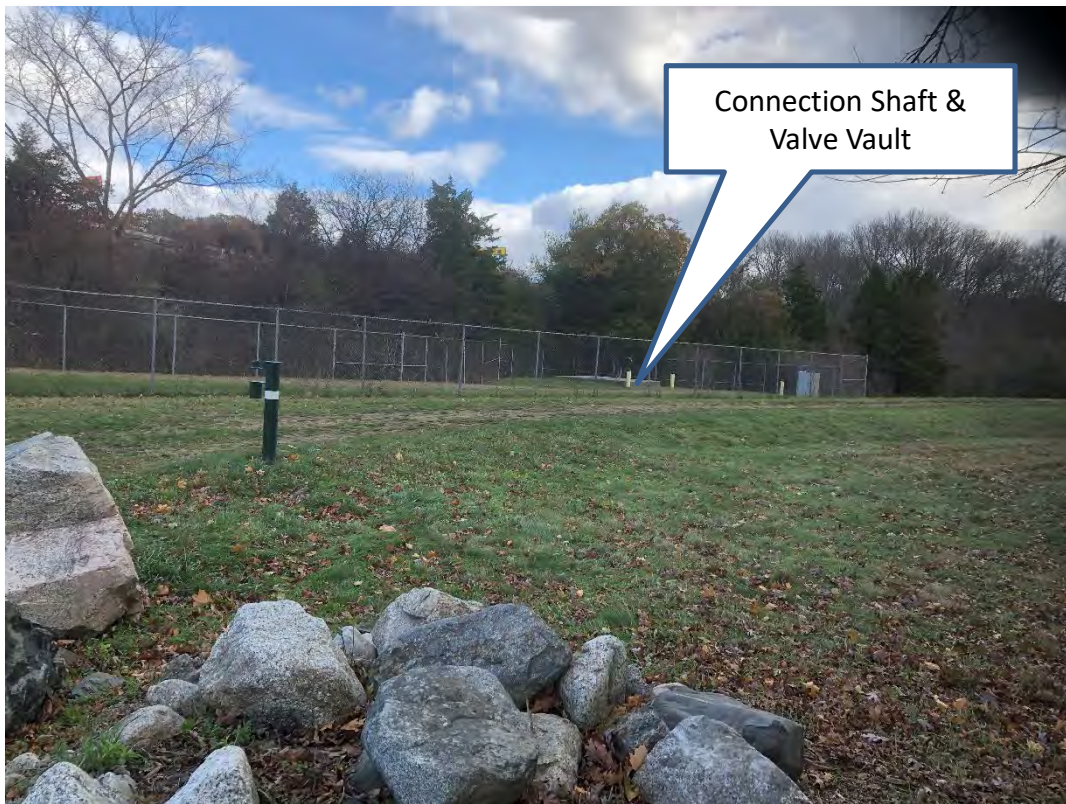
MWWST Shaft 5/5A



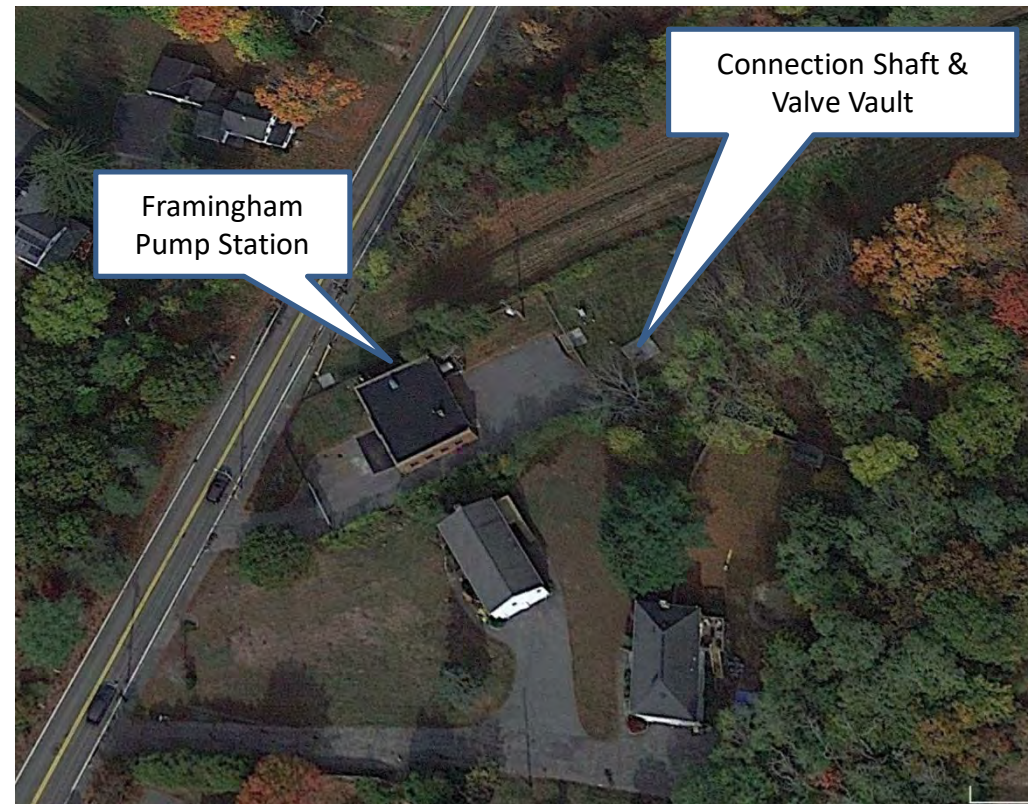
MWWST Shaft E



Permanent Infrastructure – Connection Shaft



Wellesley St Riser Shaft, Weston



Edgell Rd Riser Shaft, Framingham



Potential Construction Impacts & Planned Management

- Construction activity (amount and duration) and potential impacts will vary between shaft sites based on function & phase of construction
- Not all tunnel segments & shaft sites will be active at the same time
- Some sites (i.e., connection shaft sites) will have least and infrequent activity
- Some sites (i.e., launching shaft sites) will have the most activity
- Potential impacts include
 - Traffic
 - Water supply
 - Noise and vibrations



Traffic & Water Supply

- Traffic increases will be most noticeable near launching shaft sites at shift change
 - Less traffic is expected near receiving shaft site and least near connection shaft sites
 - Haul routes and hauling hours will be established, no exceptions
 - Police details and flaggers will be used to keep everyone moving
 - Wheel wash and street sweeping will help keep areas clean
-
- Tunnel construction will not impact the existing MWRA water tunnels
 - There are no public water supply wells close to the new tunnel alignment
 - Prior to construction any private wells near the tunnel alignment will be checked and monitored during construction
 - During construction water levels along the tunnel alignment will be monitored
 - The construction the contractor will limit groundwater inflow into the tunnel
 - A water supply contingency plan will be put in place, just in case



Noise & Vibrations

- Noise levels will vary by shaft site, function, and phase of construction
- Launch shaft site ~ 24/7 once TBM excavation begins
- Receiving shaft site – Mostly daytime work, some nighttime work
- Connection shaft site – Day time work, no night work planned
- Noise level criteria will be set & monitored during construction
- Permanent condition will not increase noise levels above existing
 - Construction methods will be adjusted to control vibrations
 - No blasting for connection shaft construction, use drilling methods
 - Rock removal for launch/receiving shafts will be done via controlled blasting
 - Max vibration criteria will be set & vibration monitoring will occur to protect nearby homes/businesses/infrastructure
 - Close coordination with local Fire Department, Emergency Personal, and MassDOT
- Additional details are presented in the DEIR, Chapter 7
- www.mwra.com/mwtp/resources.html#docs



Community & Stakeholder Outreach

- Met with all 10 communities in the study area
- Established a Working Group with representative from each community – ongoing meetings
- Meetings with key communities in which the tunnel will be constructed:
 - Town Management, Public Works, Public Safety/Fire Dept, Con-Com, etc.
- Met with key stakeholders:
 - EEA, MassDOT, DCR, DPH, DYS, and DCAMM
- Outreach will continue throughout design and construction



Where to Find Information / How to Contact Us

- <https://www.mwra.com/mwtp.html>
 - Program documents (ENF, DEIR)
 - Meeting notices, agendas, presentations, minutes
- Contact Us
 - Carmine DeMaria, Community Relations Coordinator
 - 617-305-5725
 - Carmine.DeMaria@mwra.com
 - Tunnels.info@mwra.com



Questions/Comments?



Thank you for your support!