Remote Headworks Upgrade

November 4, 2010

Chelsea Creek Headworks

- Comb. and Sep. Trib. Areas (brown shading)
- Flow discharge to North Met Relief Tunnel
- Peak Cap (350 MGD), Avg. Flow (135 MGD)

Columbus Park Headworks

- Mostly Combined Trib. Areas from Boston (yellow shading)
- Flow discharge to Boston Main Drainage Tunnel
- Peak Cap (182 MGD), Avg. Flow (40 MGD)

Ward Street Headworks

- Mostly Combined Trib. Areas Cambridge Boston & Brookline with flows from Waltham, Newton & Watertown (darker yellow shading)
- Flow discharge to Boston Main Drainage Tunnel
- Peak Cap (256 MGD), Avg. Flow (90 MGD)

Headworks Purpose

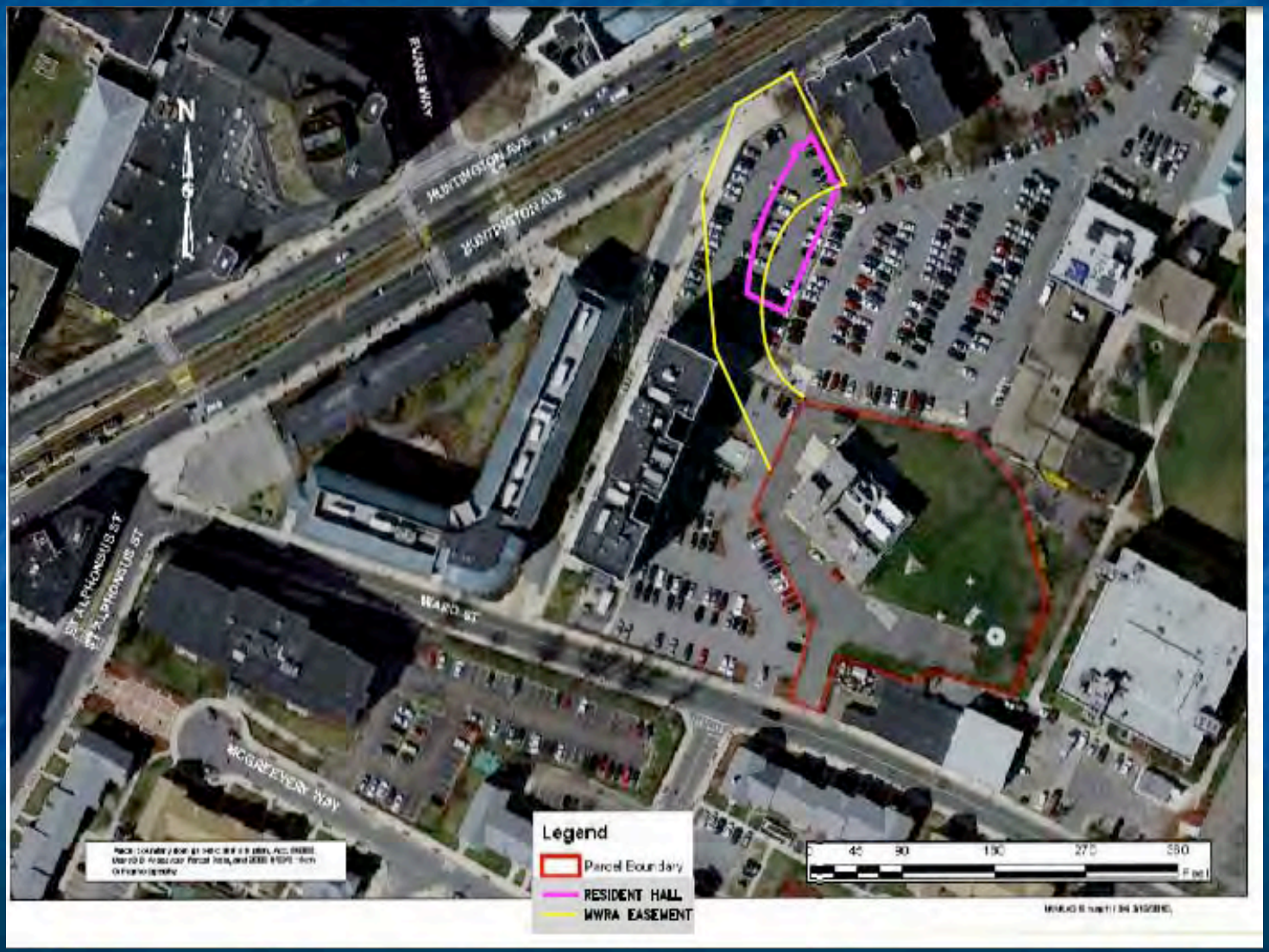
- Flow control, limited by tunnel capacity and Deer Island Capacity
- Screening and grit removal to protect the downstream tunnels and pumps at Deer Island
- Flow metering to pace DI pumps and measure flow contributions from Boston at WSHW & CPHW.

Location Plan

Chelsea Creek Headworks and Screen House – Parcel Boundary

Columbus Park – property boundary and dog park

Ward Street Property Boundary with easement and Future MassArt dormitory



Background

- All built in the 1960s, with major equipment replaced in 1987.
- Some miscellaneous updates since then include a new fuel storage tank and HVAC system at Chelsea Creek; and new roofs, windows and exterior doors at all facilities
- SCADA has been implemented at all three facilities with provision to accommodate additional monitoring and control to be implemented under the upgrade

Chelsea Creek

Columbus Park

Ward Street

Planned Upgrade

In August of 2009 Malcolm Pirnie completed Concept Design Reports for the headworks. The CDRs include a complete inventory and evaluation of equipment/components at each headworks. It was found that there was an urgent need for extensive upgrading of all three facilities.

The upgrade will include:

- Upgrade to the influent gates used for managing flows.
- Replacement and automation of all solids handling equipment including screens, grit collector systems, and solids conveyance systems
- Replacement of odor control and HVAC systems
- Replacement of ancillary systems, including emergency generators and fuel oil tanks
- Upgrading of instrumentation and control systems
- Security improvements
- New microwave communication towers
- Improvements required to meet applicable Massachusetts State Building Codes
- Improvements to the Building Exterior and Grounds

Typical Headworks Plan View

Major Facility Issues to be Addressed (1)

•**Influent Sluice Gates** (4 per facility) are used continuously during storm events to maintain max flows and protect the facility.

•Existing Gates are at the end of their useful life

•Existing Gates do not seat against the influent wall resulting in spraying wastewater during choking operations

•**Climber Screens** (4 per facility) currently require extensive maintenance.

•Screens fail frequently during storm events. If a standby screen is unavailable, additional facility choking is required or bypass of the screening channel over the floor is required.

•Climber screen will be replaced with Catenary screens.

Major Facility Issues to be Addressed (2)

Replacement of Grit Collection and Conveyance Systems

- Replacement of Chains and flights
- Conveyance system will be replace (currently use high pressure air to shoot grit and screening to dumpsters at street level). Final alternative yet to be selected.

Major Facility Issues to be Addressed (3)

- HVAC Systems are inefficient and are failing requiring replacement.
- Wet Scrubber Odor Control Systems requiring chemical and water will be replaced by Carbon Beds.
- Redundancy and flexibility in HVAC and Odor Control will be provided to ensure worker safety and treatment of odorous air.

Headworks Upgrade Schedule & Cost

The project is proceeding as one design and one construction project. Design will result in one specification with 3 sets of drawings. NTP issued on July 1, 2010 to Malcolm Pirnie for Contract 7206, Design and Construction Administration Services.

Major Milestones:

Preliminary Design Report:	March 2011
60% Design:	July 2011 (CM Contract 6802 begins)
90% Design:	October 2011
100% Design:	January 2012
Final Bid Documents:	June 2012
Construction NTP:	October 2012
Substantial Completion:	April 2016

Associated Costs:

Contract 7206 (Design and CA): $6,682,531 (actual)
Contract 6802 (CM Services): $6,500,000 (FY 2011 CIP)
Contract 7161 (Construction): $81,300,000 (FY 2011 CIP)

Major Project Challenges

- **Facilities Must maintain Full Capacity and be Fully Operational,** while being gutted and rebuilt. (i.e., 3 of the 4 channels at each facility remain operational at all times).
- **Construction access and staging areas ID will be a** challenge. Much of what is perceived as open space at each facility is actually over the underground grit chambers and will not be available for contractor use. This is a particular problem at Ward Street, where the site is tightest and abuts Wentworth Institute of Technology and MassArt.
- **Determining the Best Means to convey grit and screenings from the operating level to the ground level.**
- **Location of Carbon Towers given Limited Space Around Facilities**
- **Impact of current and future surrounding buildings on construction, operations and maintenance. (MassArt Dorms, etc.)**
- **Selecting Architectural options for physical enhancement of the headworks Building Exteriors.**