Automated Vehicle Locator Tracking System
Contract A606

October 12, 2016
Automated Vehicle Location System

GPS Vehicle Tracking

Vehicle Diagnostics with Maintenance Alerts

Fuel Management
• The Automated Vehicle Location (AVL) system is used by MWRA managers and supervisors to monitor approximately 435 MWRA vehicles
Sample Live Map View
Sample Map Display of a Route Replay
Sample Live Map View for Locating Vehicles
Benefits of AVL Technology for MWRA

• Improve MWRA’s emergency response capabilities
• Enhance vehicle maintenance through electronic engine diagnostics
• Increase driver and vehicle safety
• Improve work efficiencies/Reduce fuel costs
• Monitor compliance with MWRA Work Rules and Policies
Enhancements to Current AVL System

• Reports detailing odometer readings
• Fuel efficiency
• Accelerometer technology (detection of sudden acceleration/hard breaking)
• Vehicle maintenance alerts
• Power failure warnings
Enhancements to Current AVL System

• Tamper alerts

• Single sign-on (one sign on to access both reports and live data)

• The ability to service the vehicle without removing the AVL hardware

• User customization features such as the ability for staff to create a geofence and add or, remove from and re-assign vehicles on the system
Who Uses It and How

OPERATIONS MANAGERS
- Monitor geofence entries and exits
- Monitor crew routes
- Conduct Monthly AVL audits on AVL usage and crew work orders
- Crew Audit Reports
- Provide feedback to crew supervisors

FLEET MANAGEMENT
- Engine Diagnostics
- Preventive Maintenance
REPORT AND ANALYZE TRENDS SUCH AS:

- **Efficiencies**
  - Fuel – Idling, Usage
  - Routes/Drive Times
- **Schedules**
  - Work Rules - Lunch Hours
  - Leave/Return Chelsea/Southborough
  - Leave/Return Time at Facilities
- **Safety**
  - Speeding
  - Accident Rate
  - Response Use
Procurement Approach

• RFQ/P Approach
• Thorough review of functionality needed at MWRA
• Live Product Demonstration
• Selected Vendor:
  - Networkfleet Inc. at $427,490
  - 3-year term with an option to renew for two additional one year periods
Annual Industrial Waste Report
TRAC

October 12, 2016
Origin and History of the National Pretreatment Program

• Federal Water Pollution Control Act 1972 (Now known as the Clean Water Act)

• Legislation protecting surface water quality of the United States

• Established EPA to direct and implement regulations limiting pollutants discharged to surface waters of US (NPDES)

• Provided legal authority to establish National Pretreatment Program (June 1974) – to regulate industries that discharge to POTWs
Pretreatment Program Objectives

- Prevent pass through of pollutants into receiving waters
- Improve opportunities to recycle and reclaim municipal and industrial wastewaters and sludges
- Prevent interference with operation of treatment plant, including protecting worker health and safety

- Inspections
- Permitting
- Monitoring
- Enforcement
TRAC Organization and Staffing

- 43 staff involved in Inspecting and Permitting (17), Monitoring and Sampling (14), and Enforcing (10) MWRA Regulations

Industries; MBTA Commuter Rail; Mass DOT tunnels; Hypochlorite at CSO’s; Municipal; Local Limits; Special Projects; and Emergencies
Elements of the Pretreatment Program

- Regulations and Local Limits
- Industrial Survey
- Inspections
- Permitting
- Monitoring
- Enforcement
Why an Industrial Waste Pretreatment Program is an Important Component of Operating Agencies Like MWRA
Kentucky Sewer Explosions in the 1980s
The MWRA system has approximately 1200 permitted users 204 were Significant Industrial Users (SIUs)

- 900 Total Facility and gas/oil separator Inspections in FY15
- Over 270 Enforcement Actions for all Industries and separators
- Over 3500 monitoring actions in FY16 (sampling at industries, NPDES sampling at MWRA facilities, special projects and CSO Treatment studies)
TRAC Challenges, Opportunities and Initiatives

- Pending NPDES Permits – Local Limits
- Molybdenum
- Wipes- Flushable? And FOG (Fats. Oils and Grease)
- PIMS (Pretreatment Information Management System)
- Dental Amalgam Treatment Program
MWRA’s Outfall Monitoring Overview
2015 Results

October 12, 2016
MWRA Ambient Monitoring

- Moving discharge from Boston Harbor initially caused environmental concerns

- Comprehensive baseline monitoring required by regulators (1992-2000)

- Ambient monitoring required by DITP Permit (2000+)

- Major programmatic reviews in 2003 and 2009-10 led to reduced Ambient Monitoring requirements

- Monitoring focuses on studies of effluent, receiving water, sediment quality, and fish and shellfish
Outfall Monitoring Overview 2015 Highlights

- Effluent quality (Platinum 9 award!)

- Outfall Monitoring
  - Water quality good year-round
  - Sediment animal communities were healthy
  - Tissue contaminants low

Harbor/Bay icing, March 2015
2015 Was a Very Dry Year With Almost No Blending

Boston rainfall, 1990-2015

Average flow at DITP, 1999-2015
Total Solids Discharged (tons/day), 1990-2015

- Sludge
- Nut Island
- Deer Island
Metals remained low in 2015

Organic contaminants (not shown) are also effectively removed by source control, secondary treatment

Contaminants in DITP Effluent, 2015

Average pounds per day

<table>
<thead>
<tr>
<th>Year</th>
<th>Silver</th>
<th>Chromium</th>
<th>Lead</th>
<th>Nickel</th>
<th>Copper</th>
<th>Zinc</th>
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• No evidence of adverse outfall impact

• Dissolved oxygen in bottom waters stayed at healthy levels all year

• No red tide bloom in 2015

• Low abundances of a nuisance algae in May resulted in Contingency Plan threshold exceedance

• Surface and bottom waters were colder than average in winter and early spring, which delayed plankton growth
Boston Harbor Bacterial Water Quality


Most Boston Harbor projects complete (post-2007)

Geometric mean (colonies/100 mL)
Sampled during rainfall
 >=0.2 inches within 24 hours

- active treatment outfall
- closed treatment outfall
- active NITP sludge outfall
- closed NITP sludge outfall

Geometric mean (colonies/100 mL)
Sampled during rainfall
 >=0.2 inches within 24 hours

Blue contours meet swimming standard, red-purple contours exceed swimming standard

0 - 5
5 - 10
10 - 35
Sediment Monitoring in Boston Harbor and Massachusetts Bay

Collecting sediment profile images in Mass. Bay

Collecting sediment samples off Deer Island
Sediments in Massachusetts Bay Remain Healthy
Harbor Sediment Communities Recover From Pollution

Off Long Island

Deer Island Flats
Fish and Shellfish Monitoring
Diseased flounder were one cause of Boston Harbor being termed “Dirtiest in the Nation”
Liver tumors were last observed in 2004
Prevalence of liver tumor precursors has decreased substantially in Boston Harbor
Tumor precursors are decreasing near outfall as well; 2015 levels were the lowest yet observed
Chlordane in Flounder Filet

The graph shows the concentration of chlordane in flounder filet from 1995 to 2015. The y-axis represents the concentration in ng/g dry weight, and the x-axis represents the years from 1995 to 2015. The data is color-coded and includes markers for different sources or groups. The graph indicates a decrease in chlordane concentration over time, with a notable increase around 2001, which is labeled as 'Outfall Startup.'
Ambient Monitoring Confirms That Massachusetts Bay is Healthy
Chemical Incident at the
Clinton Wastewater Treatment Plant

October 12, 2016
Clinton Chemical Building

Chemical Building fill station at the north wall

Chemical Building pressure release vents at the south end
Chemical Delivery Station
Sodium Hypochlorite Pressure Relief Valve
Chemical Delivery Station – Lessons Learned: Locks Installed
Reservoir and Drought Status Update

October 12, 2016
Quabbin Reservoir Volume - First of the Month

% Capacity

Jan  Feb  Mar  Apr  May  Jun  Jul  Aug  Sep  Oct  Nov  Dec

Below Normal  Long Term -Ave  5Year-Ave  10 Year-Ave  2016

75%  85%  95%  105%
It Has Continued To Be Dry
## Status Looking Forward from October 1, 2016

<table>
<thead>
<tr>
<th></th>
<th>1-Month</th>
<th>3-Months</th>
<th>6-Months</th>
<th>12-Months</th>
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<td><strong>Median Yield</strong></td>
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<td><strong>Dry (75th Percentile)</strong></td>
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<td><strong>Driest (of Record)</strong></td>
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<td>Stage</td>
<td>Target Water Use Reduction</td>
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<td>Normal Operation</td>
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<td>Below Normal</td>
<td>Previous year’s use (Voluntary)</td>
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<td>Drought Warning</td>
<td>5% (Primarily Voluntary)</td>
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<td>Drought Emergency Stage 1</td>
<td>(Mandatory Restrictions)</td>
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<td>Stage 2</td>
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<td>Stage 3</td>
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Partial Users or Emergency Customers Taking Water

- Peabody
- Cambridge
- Worcester
- Cherry Valley Water District
- Ashland

Anticipating Taking Water

- Lynn
- Burlington
Quabbin’s Long-Term Track