

**Raytheon**

# Public Involvement Meeting Draft Phase I

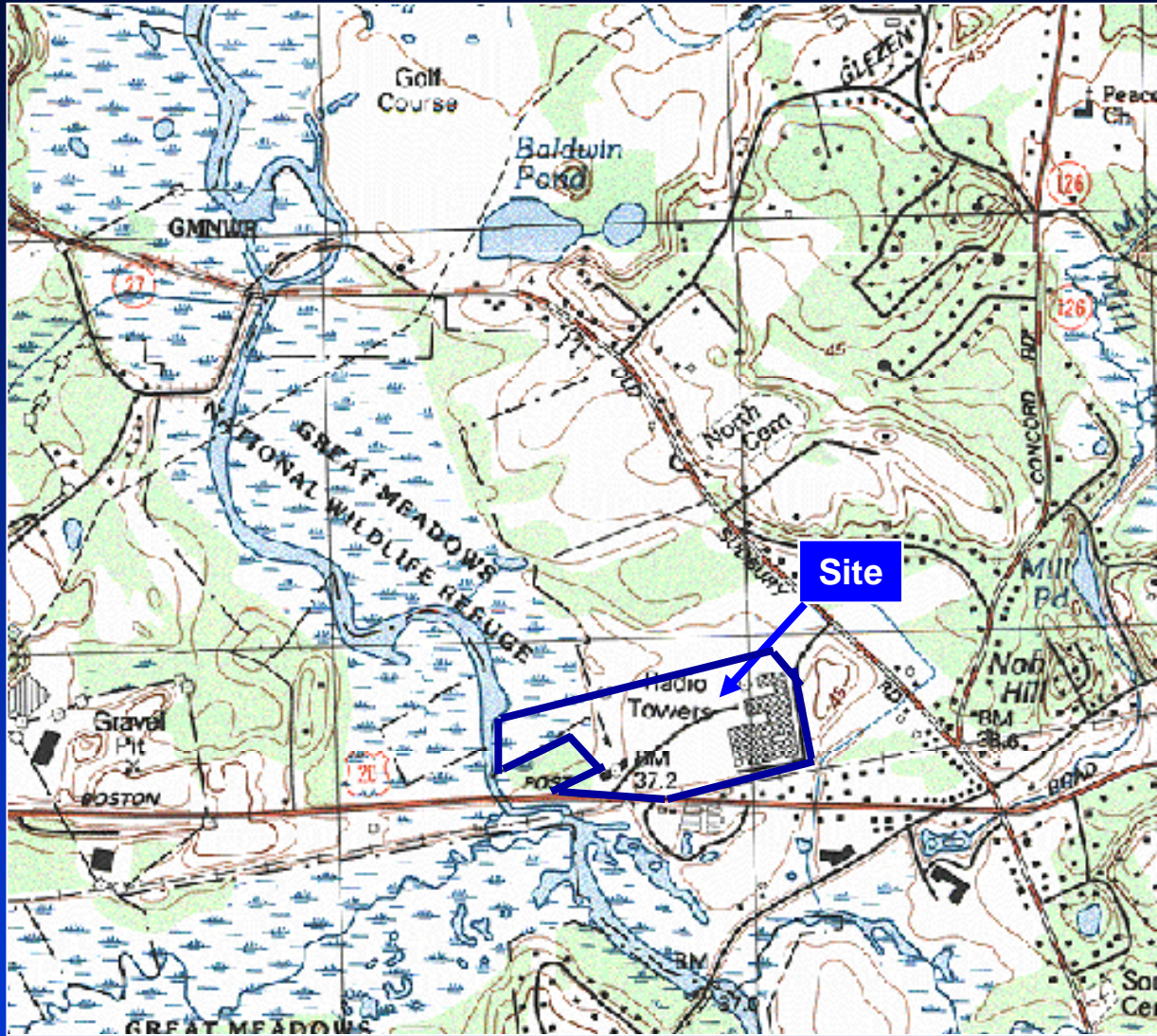
November 19, 2003

Former Raytheon Facility  
Wayland, Massachusetts

Presented by:  
Edwin P. Madera

# Purpose of Meeting

- **Phase I – Initial Site Investigation (Northern Area)**
  - Draft submitted to PIP repositories on November 12, 2003
- **Release Abatement Measure (RAM) Plan Completion Statement**
  - Draft submitted to PIP repositories on November 12, 2003
- **Wetland Excavation and Remediation Status**
- **Upcoming Reports**
- **Question and Answer Period**

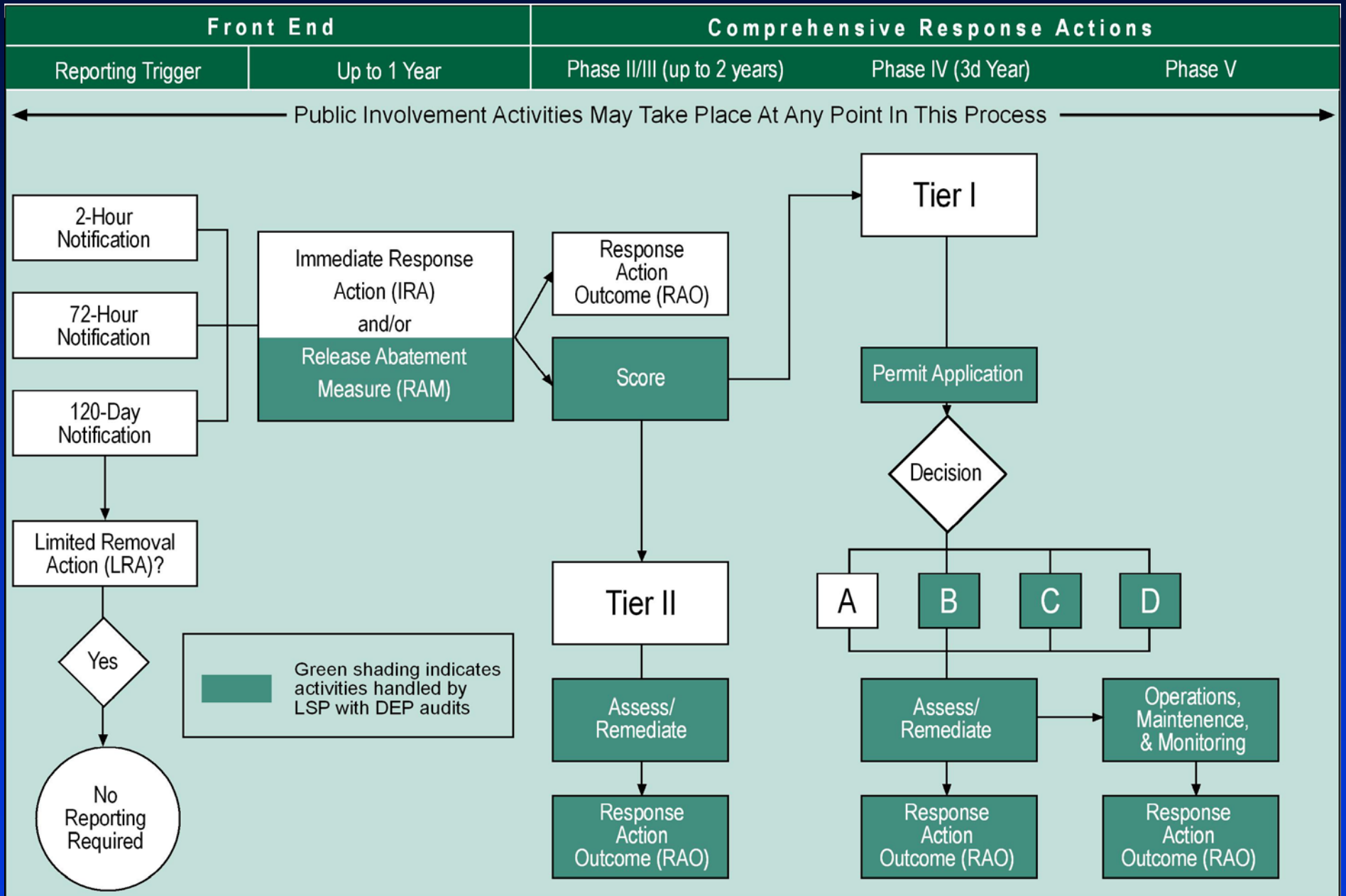


Locus Map

# Phase I - Initial Site Investigation

- **Phase I – Initial Site Investigation “Northern Area”**
  - Release Tracking Number (RTN) 3-22408:
    - Chlorinated volatile organic compounds (CVOCs) in groundwater in Northern Area of the Site
    - Arsenic in groundwater in Western Area of the Site
    - Methyl tert butyl ether (MTBE) in groundwater in Southern Area of the Site

# MA Contingency Plan Process



**Phase I – Initial Site Investigation  
(Groundwater Assessment)**





Arsenic

CVOCs

CVOCs (RTN 3-13302)

MTBE

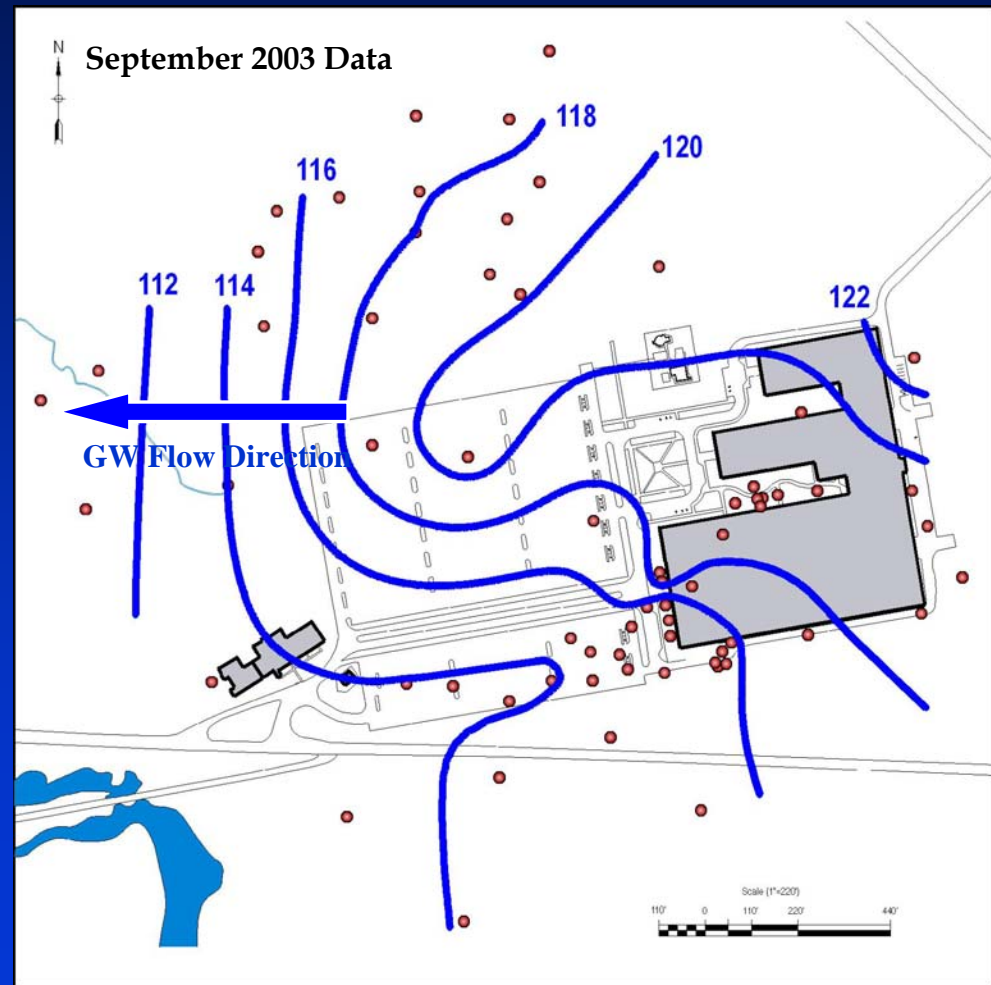




# Groundwater Flow – Shallow Overburden

**Raytheon**

- The 2003 data suggest that groundwater generally flows to the west
- Comprehensive gauging was conducted in:
  - April 2003
  - July 2003
  - September 2003
- Minimal seasonal variability

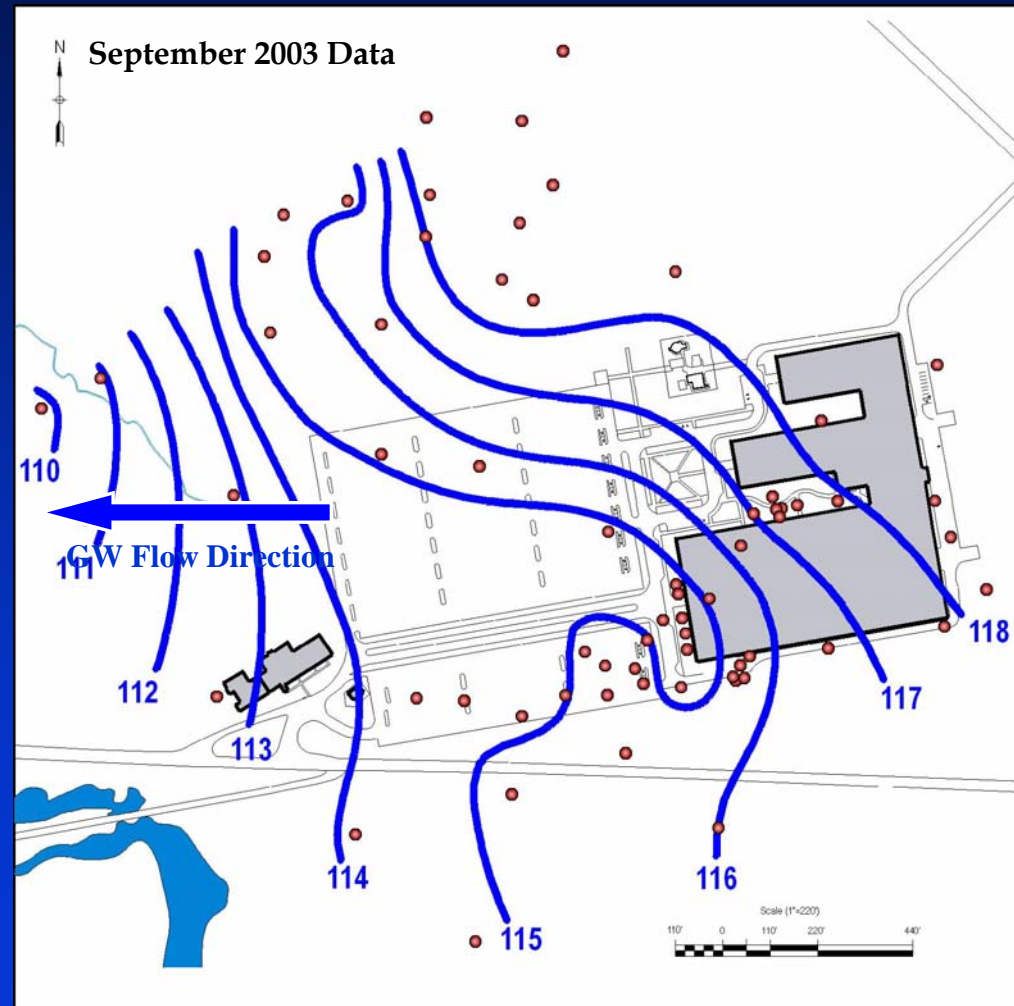




# Groundwater Flow – Deep Overburden

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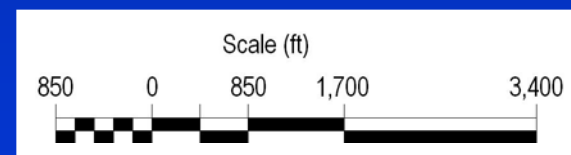
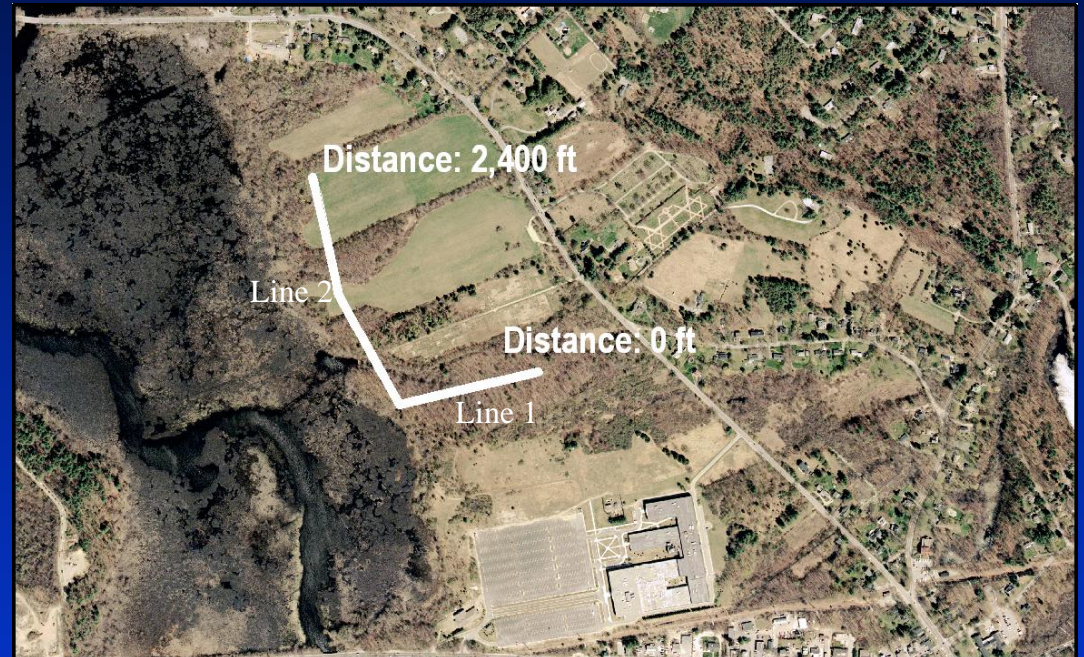
- The 2003 data suggest that groundwater generally flows to the west
- Comprehensive gauging was conducted in:
  - April 2003
  - July 2003
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- Minimal seasonal variability



# Northern Area - Assessment

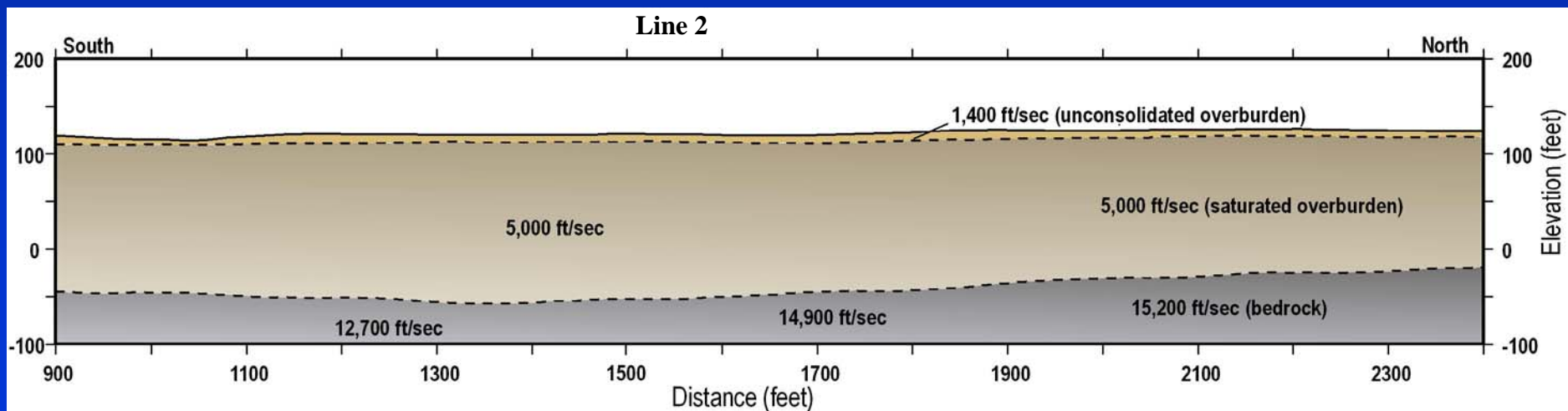
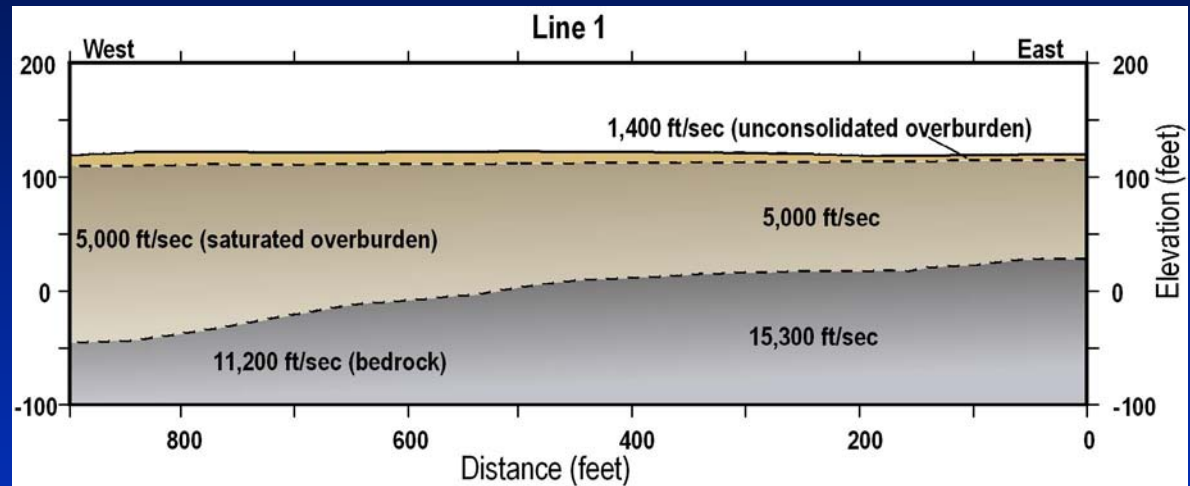
## Geophysical Survey

- Conducted surface geophysics to gather data necessary to design the proposed Waterloo Profiler investigation (Final Scope of Work (ERM, 2003))
- Conducted approximately 2,500 linear feet of seismic refraction surveys to estimate depth to top of bedrock



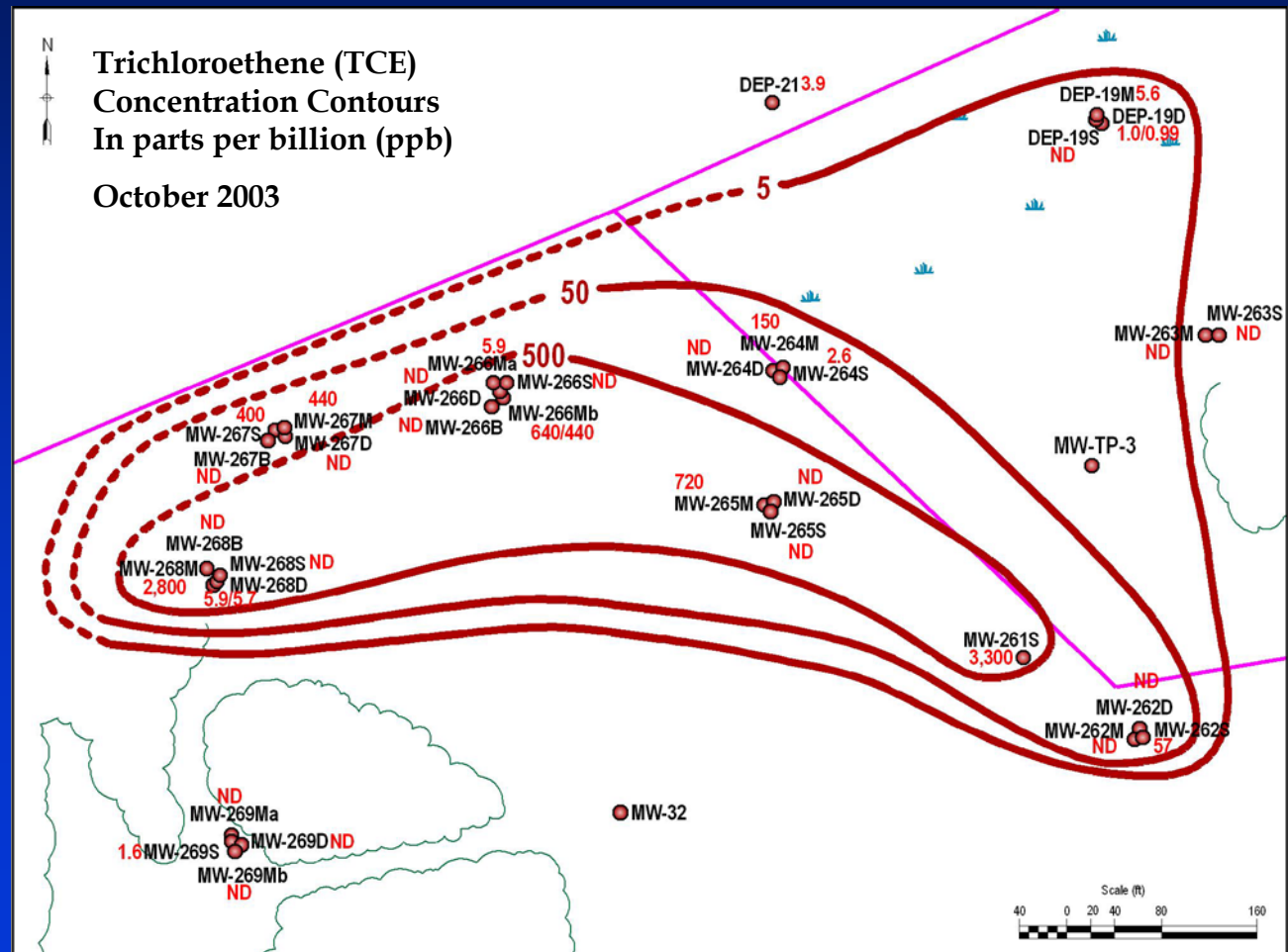
# Northern Area (Seismic Survey)

- Minimum depth to bedrock along Waterloo Profiler transect is approximately 85 feet
- Maximum depth to bedrock along Waterloo Profiler transect is approximately 180 feet



# Northern Area (CVOCs)

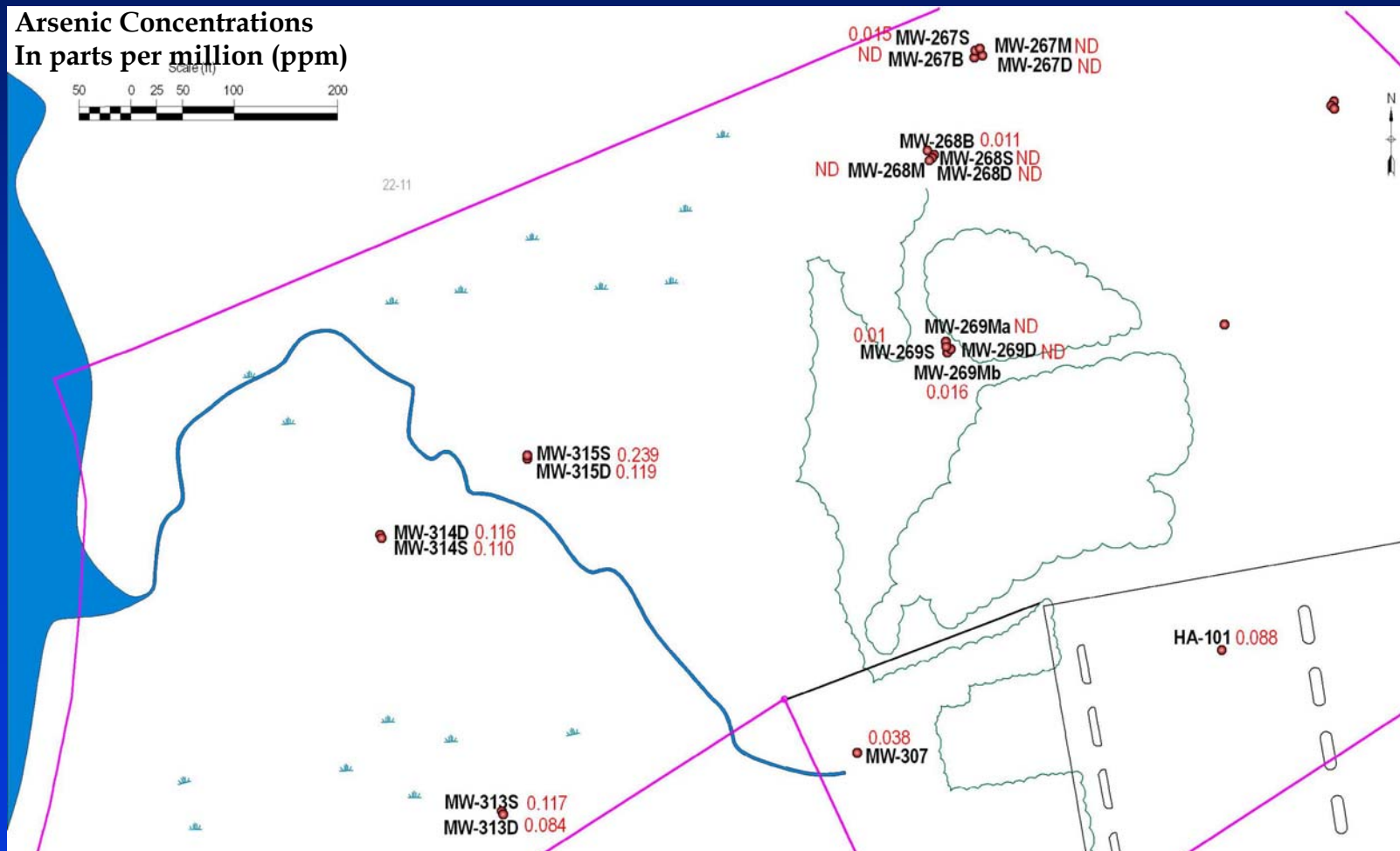
- Conducted groundwater sampling in:
  - April 2003
  - October 2003





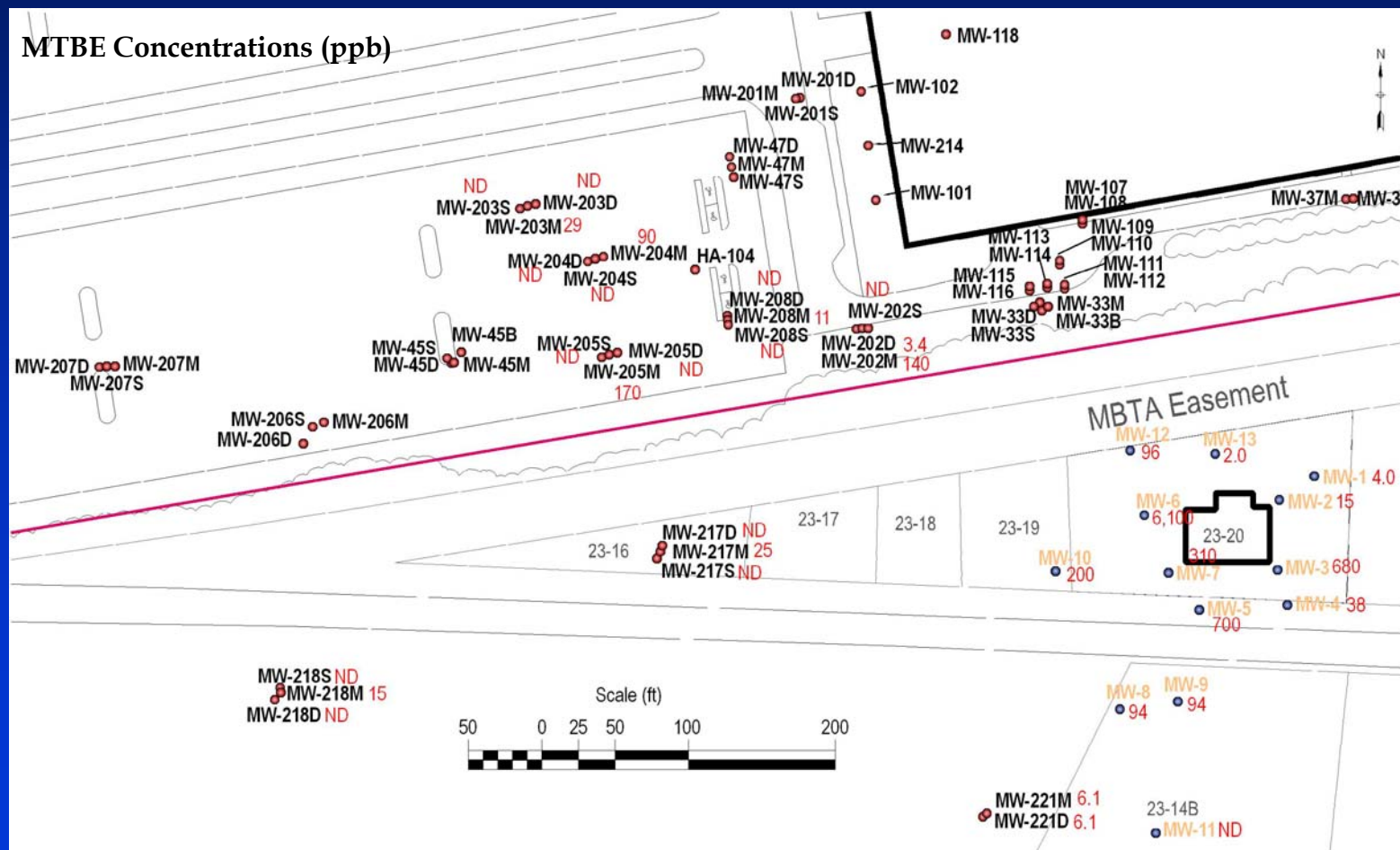
# Western Area (Arsenic)

- Arsenic has impacted groundwater quality in the Western Area



# Southern Area (MTBE)

- Release of MTBE believed from an adjacent property has impacted groundwater quality in the Southern Area



# Phase I Conclusions

- **CVOCs in groundwater above Reportable Concentrations (RC) GW-1 in the Northern Area**
- **MTBE in groundwater above RCGW-1 in the Southern Area**
- **Arsenic in groundwater above RCGW-1 in the Western Area**
- **Impacts to groundwater at the Site maintain a low potential to impact Site occupants or nearby receptors given current or potential future use scenarios**
- **The Site has been classified as Tier IB due to Site being within a drinking water aquifer protection area (Zone II)**
- **Conceptual Phase II Scope of Work (SOW)**
  - Continue with proposed SOW dated June 2003

# Upcoming Activities – Northern Area

- **SOW finalized on June 17, 2003**
- **RFDOA for seismic survey submitted June 13, 2003**
  - Received approval August 12, 2003
  - Conducted seismic survey September 2003
- **Submitted Notice of Intent to Conservation Commission on September 26, 2003**
  - To conduct vertical profiling
  - Advancing boreholes and install monitoring wells in wetland
  - Order of Conditions issued by Con Comm November 18, 2003



# **Release Abatement Measure (RAM) Plan Completion Statement**

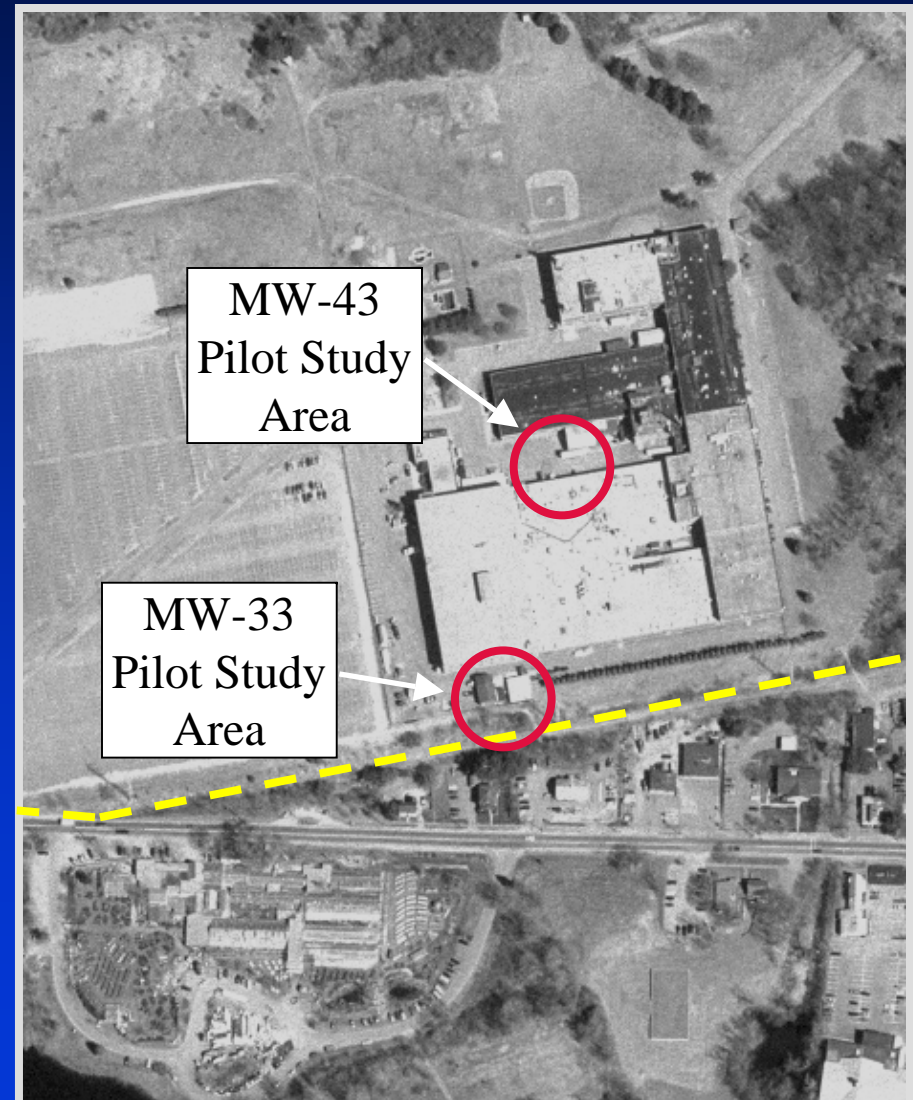
# RAM Completion

- **Initial RAM Plan**

- MW-43 Pilot Study Area
  - Gravity feed injection
  - One injection point
  - 250 gallons of 4%  $\text{NaMnO}_4$
- MW-33 Pilot Study Area
  - High pressure injection
  - One injection point
  - 2,500 gallons of 2%  $\text{KMnO}_4$

- **RAM Plan Modification #1**

- Expansion of MW-43 Pilot Study
  - High pressure injection
  - Five injection points
  - 9,000 gallons of 23%  $\text{NaMnO}_4$



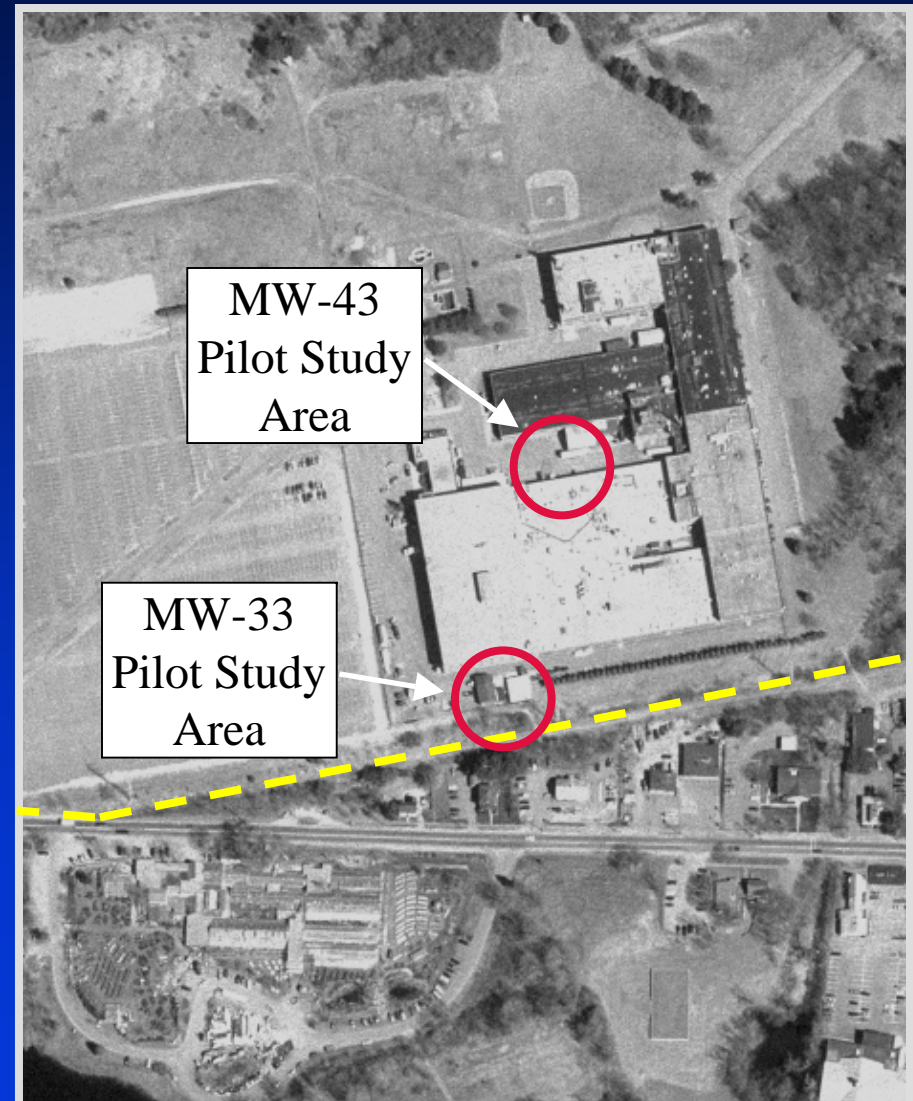
# RAM Completion Results

- **Initial RAM Plan**

- MW-43 Pilot Study Area
  - Radius of influence: 5–10 ft
  - Reduction in trichloroethene (TCE) concentration: 84%
- MW-33 Pilot Study Area
  - Radius of influence: >20 ft
  - Reduction in TCE concentration: 67%

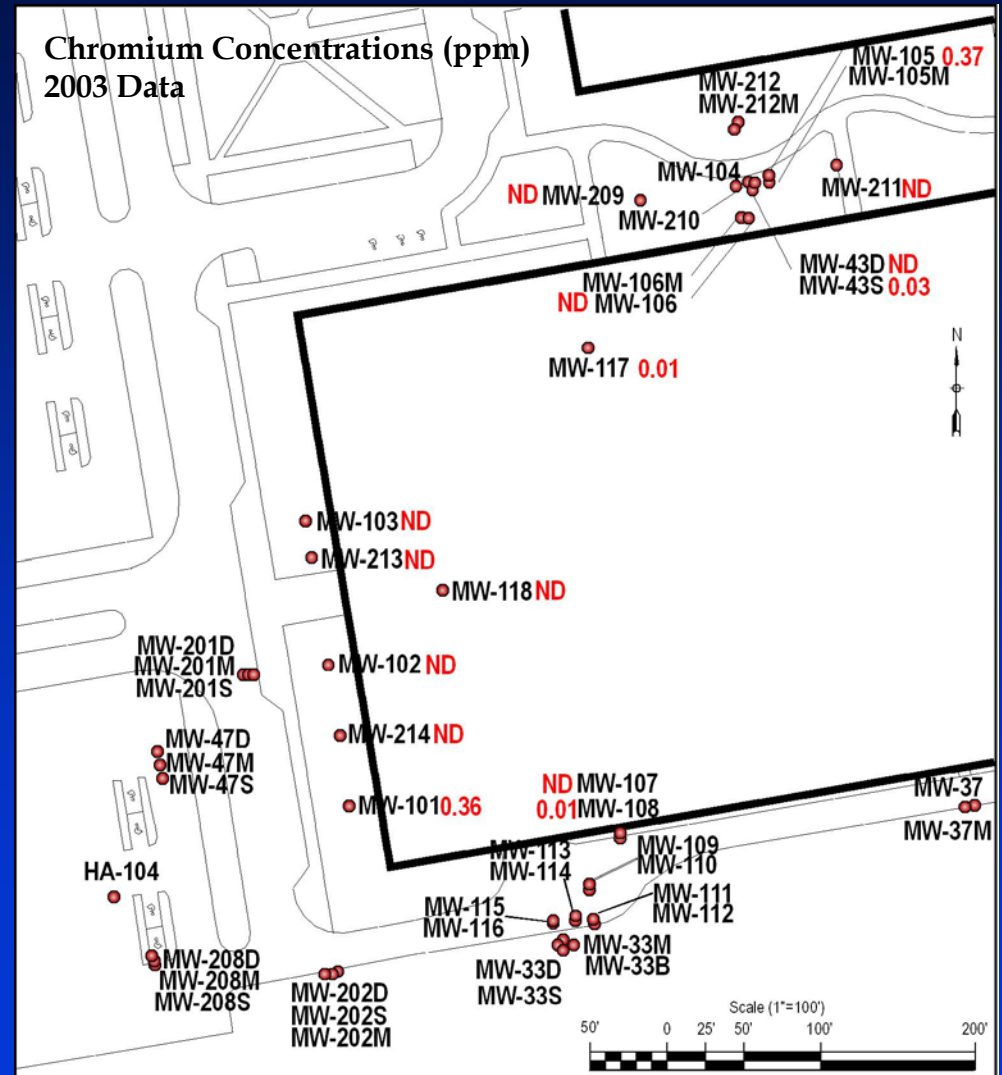
- **RAM Plan Modification #1**

- Expansion of MW-43 Pilot Study
  - Radius of influence: 15–30 ft
  - Reduction in TCE concentration: 92%



# RAM - Chromium

- Baseline groundwater sampling showed no chromium above RCGW-1
- Post permanganate injection sampling showed chromium concentrations above RCGW-1 for total chromium (0.1 ppm)
- Chromium exceedences located only in wells influenced by permanganate
- Downgradient wells show no chromium exceedences
- Localized condition due to permanganate's oxidizing properties
- Transient condition until permanganate is consumed
- Continue to monitor





# RAM Completion

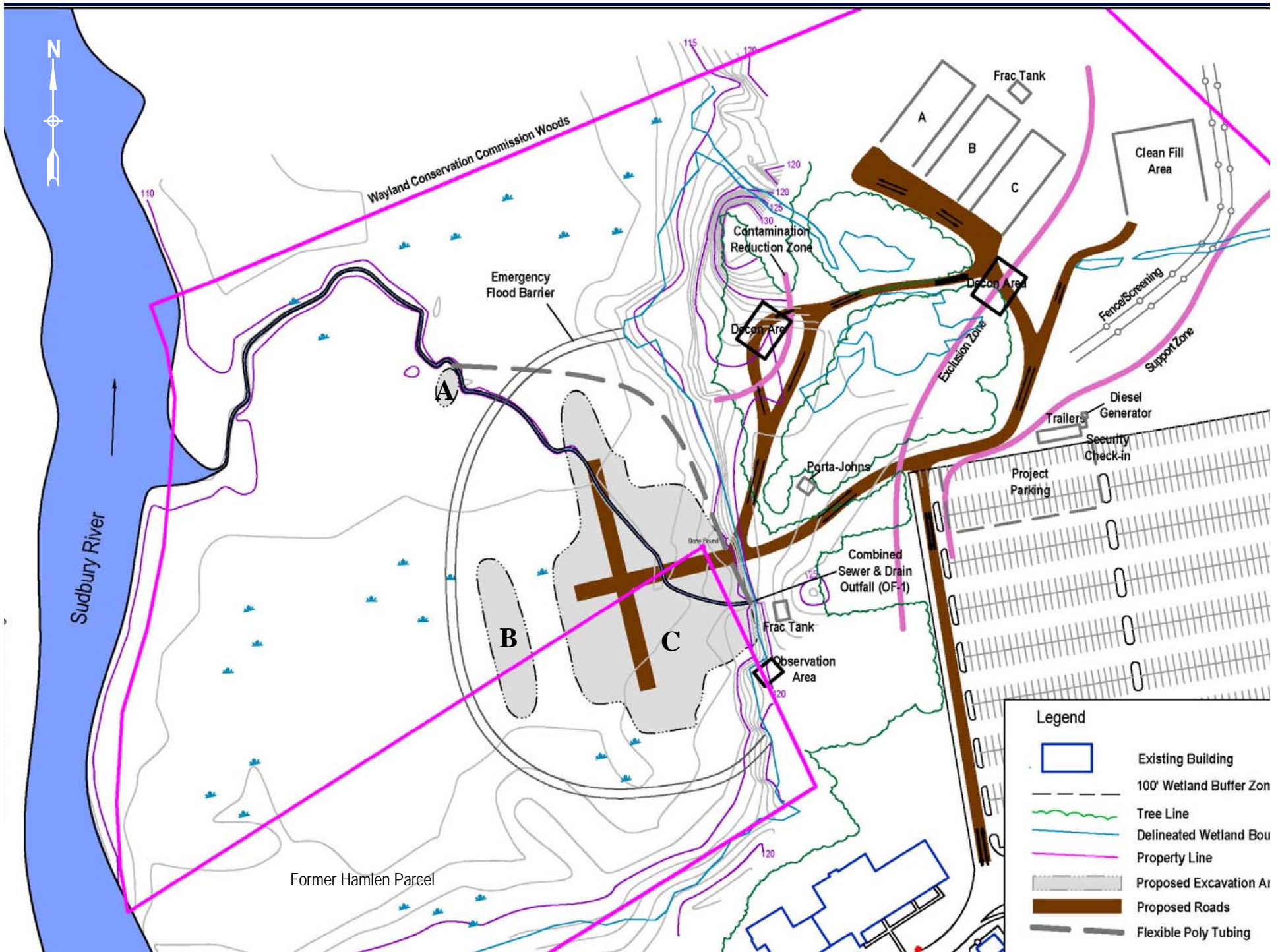
## Summary

- Permanganate is effective at destroying TCE in groundwater
- High pressure injection techniques provide increased radius of influence
- Chromium in groundwater detected above RCGW-1 in the pilot study area after additions of permanganate - RTN 3-22665
  - Link RTN 3-22665 to RTN 3-13302 (Tier IB 133939) main Site number
  - Chromium in groundwater is a transient condition
- Raytheon will transition in situ chemical oxidation remedial activities to Phase IV

# **Wetland Remediation and Restoration**

# Removal Actions To Date

- **Excavated 1.2 acres of wetland soil/sediment**
- **Obtained NPDES Permit for on-site water treatment**
- **Deployed the AquaDam**
- **Transported approximately 3,000 cubic yards (3,500 tons) of impacted soil to appropriately permitted facility**
- **Replaced approximately 80 feet of outfall pipe that was deteriorated**
- **Conducted verification sampling**
- **Achieved Area B remedial goals**





# Wetland Remediation Project **Raytheon**



Excavator



Construction Trailers

# Wetland Remediation Project **Raytheon**



Verification Sampling



↑  
Excavation Equipment



# Wetland Remediation Project **Raytheon**



Staging Area



Excavator



# Wetland Remediation Project **Raytheon**



↑  
Wet Weather

Deteriorated Outfall





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Replaced Outfall



Installing Replacement  
Outfall Pipe

# Site Visits

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- **Observation Area has been set-up**
- **Presentations at the Site**

Three presentations will be conducted on Site on  
November 20, 2003

- 1.) 9:00 am - 9:30 am
- 2.) 12:00 pm - 12:30 pm
- 3.) 2:00 pm - 2:30 pm

# Upcoming Reports/Documents

- **Northern Area Investigation (RTN#3-22408)**
  - Public comments on Draft Phase I and RAM Completion Report due on December 3, 2003:  
Edwin P. Madera  
Raytheon Company  
Mail Stop 1880  
528 Boston Post Road  
Sudbury, MA 01776
  - Final Phase I – Initial Site Investigation Report and RAM Completion, December 2003
  - GW Remediation of Southern Area, Spring 2004
  - Phase II Scope of Work, Summer 2004







**Q & A**