

Raytheon

Customer Success Is Our Mission

Site Status Update

Former Raytheon Facility Wayland, Massachusetts

Jonathan Hone

May 25, 2011

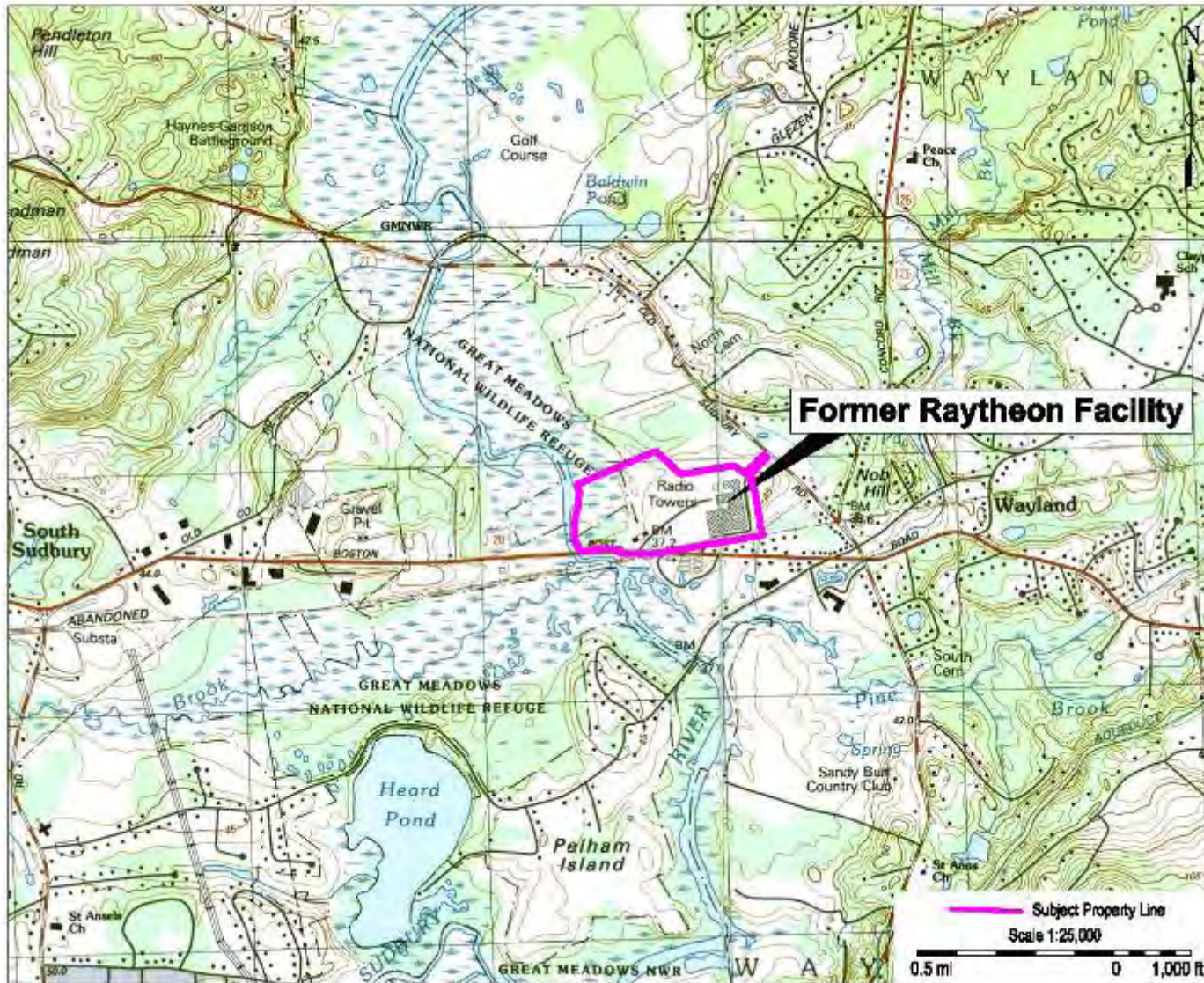
Outline

- Team Introductions

- General Site Overview

- Site Activities Update since November 2010
 - Site-Wide Groundwater Gauging and Monitoring
 - Northern Area Bioremediation
 - Monitoring Well Decommissioning

- Question and Answer Period



Site Overview



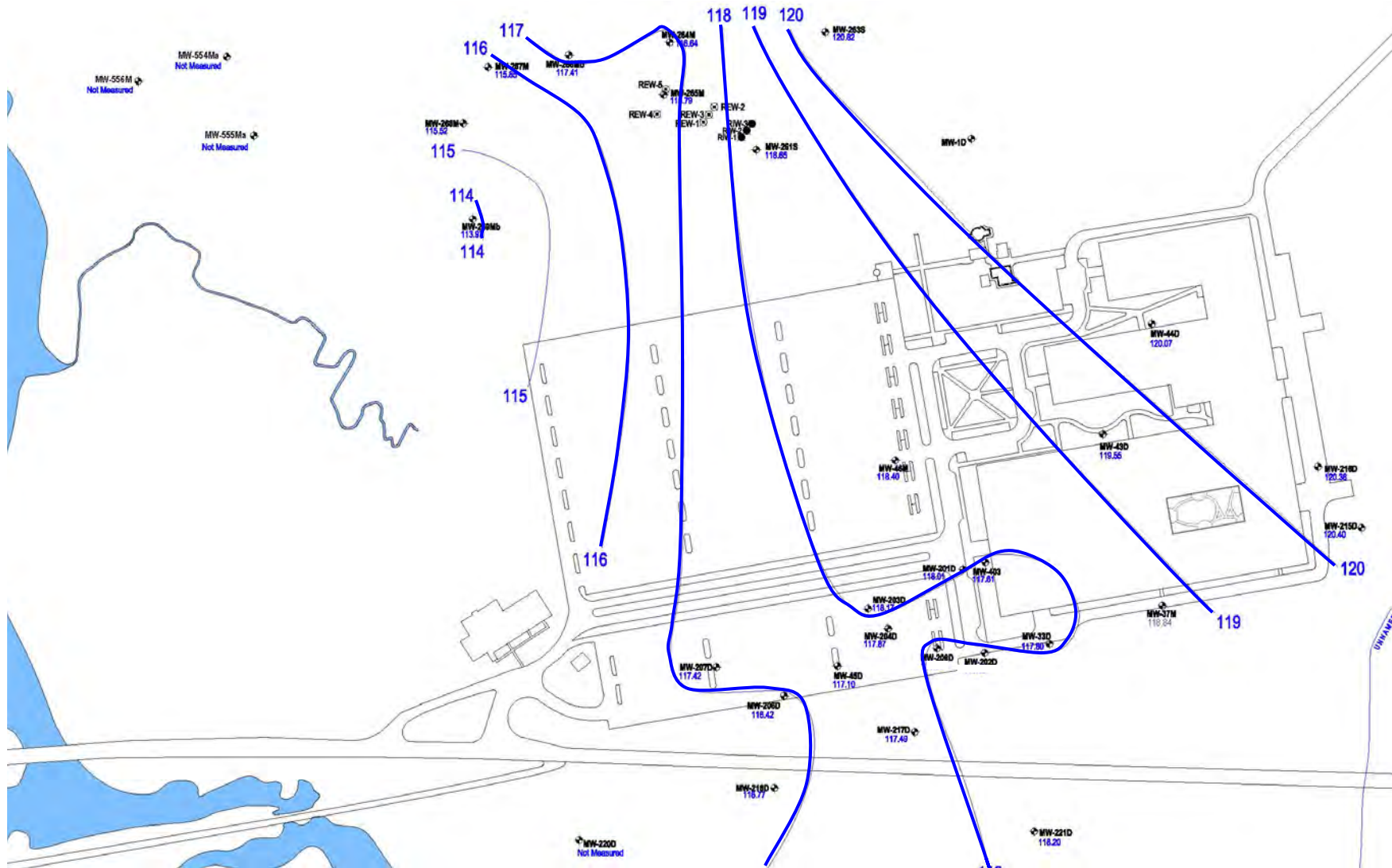
Update on Site Activities

Groundwater Gauging & Monitoring

Groundwater Monitoring

- Site-wide groundwater gauging round conducted on April 4, 2011
 - Water levels measured in 95 monitoring wells
- Groundwater Quality monitoring data summarized in Remedy Operation Status Submittal
 - Quarterly monitoring rounds conducted in February and April 2011

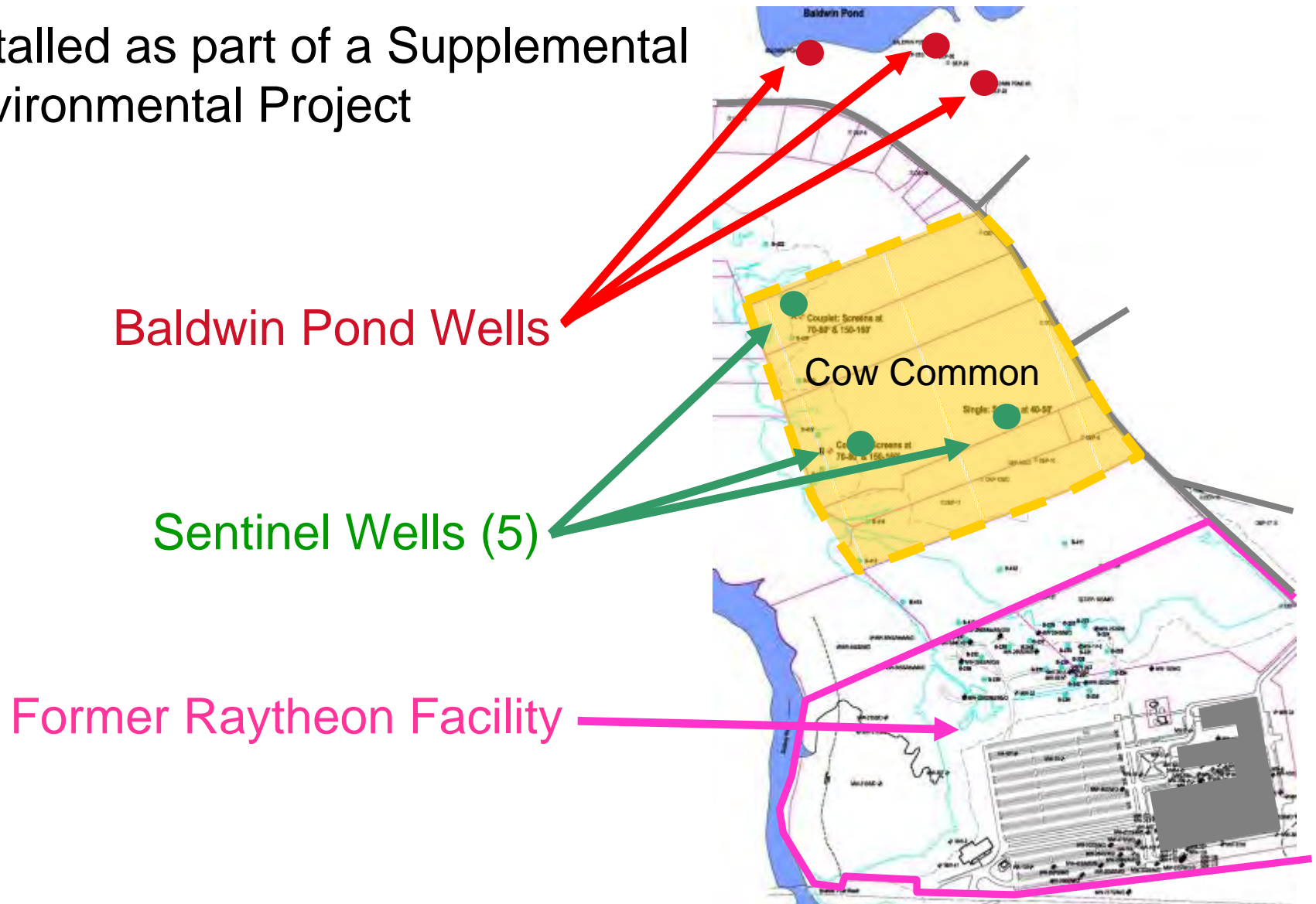
Site-Wide Groundwater Monitoring



April 2011 – Deep Aquifer
Elevation Contours

Cow Common/Sentinel Wells

- Installed as part of a Supplemental Environmental Project



Cow Common/Sentinel Wells

- Groundwater samples collected from wells in April 2011
 - Pursuant to agreement with Conservation Commission
 - Analyzed for VOCs by Method 8260B

- Compound detected in April
 - cis-1,2-Dichloroethene - 1.3 µg/L
 - Drinking Water Standard - 70 µg/L
 - Laboratory Method Detection Limit - 1 µg/L

- No detections of other previously identified compounds:
carbon disulfide, chloroform, ethyl-tert-butyl ether, toluene

Northern Area Bioremediation

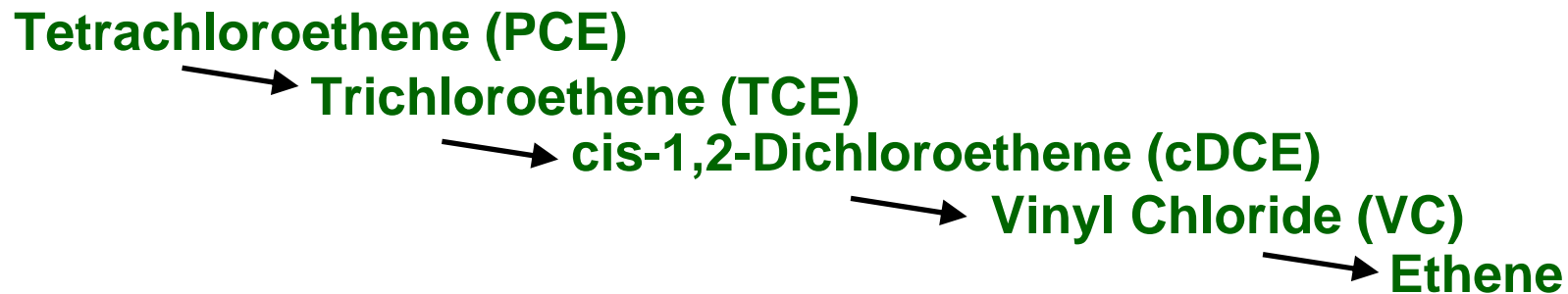
Enhanced Reductive Dechlorination

Northern Area



Bioremediation Progression

- Reductive Dechlorination: Process by which a consortia of microbes remove chlorine atoms from chlorinated solvents until all that is left is innocuous/harmless ethene
- A carbon source (lactate or vegetable oil) has been introduced to the naturally occurring microbes via injection wells to jump-start metabolic processes

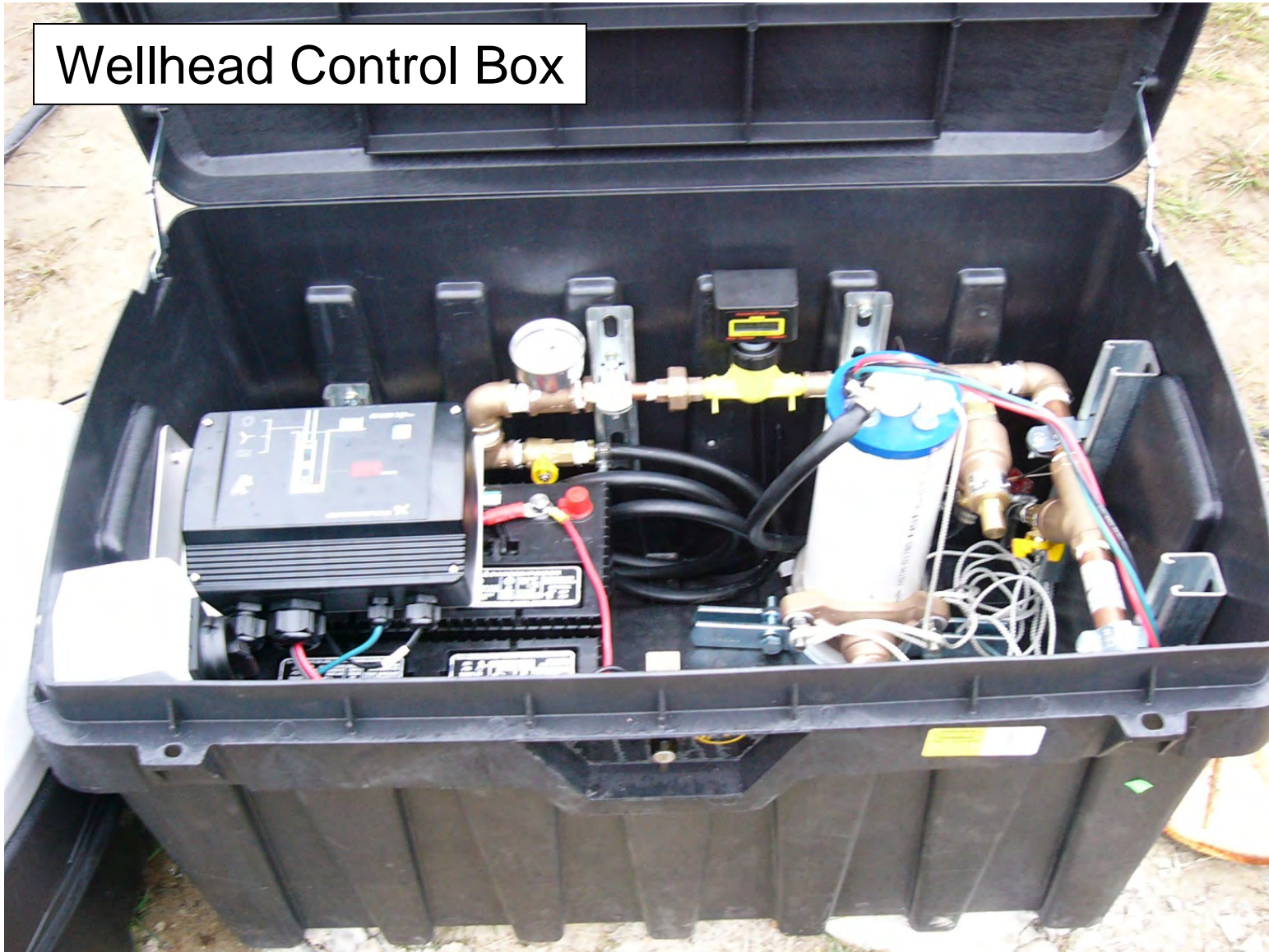


Recirculation System Details

- Increases subsurface mixing by inducing a greater hydraulic gradient by mechanical pumping
- Extraction wells are fitted with submersible pumps and control equipment to monitor flow, minimize possibility of leaks, and prevent damage to system
- Solar powered pumps and controls extract groundwater continuously at approximately 3-5 gallons per minute

Recirculation System Details

Wellhead Control Box

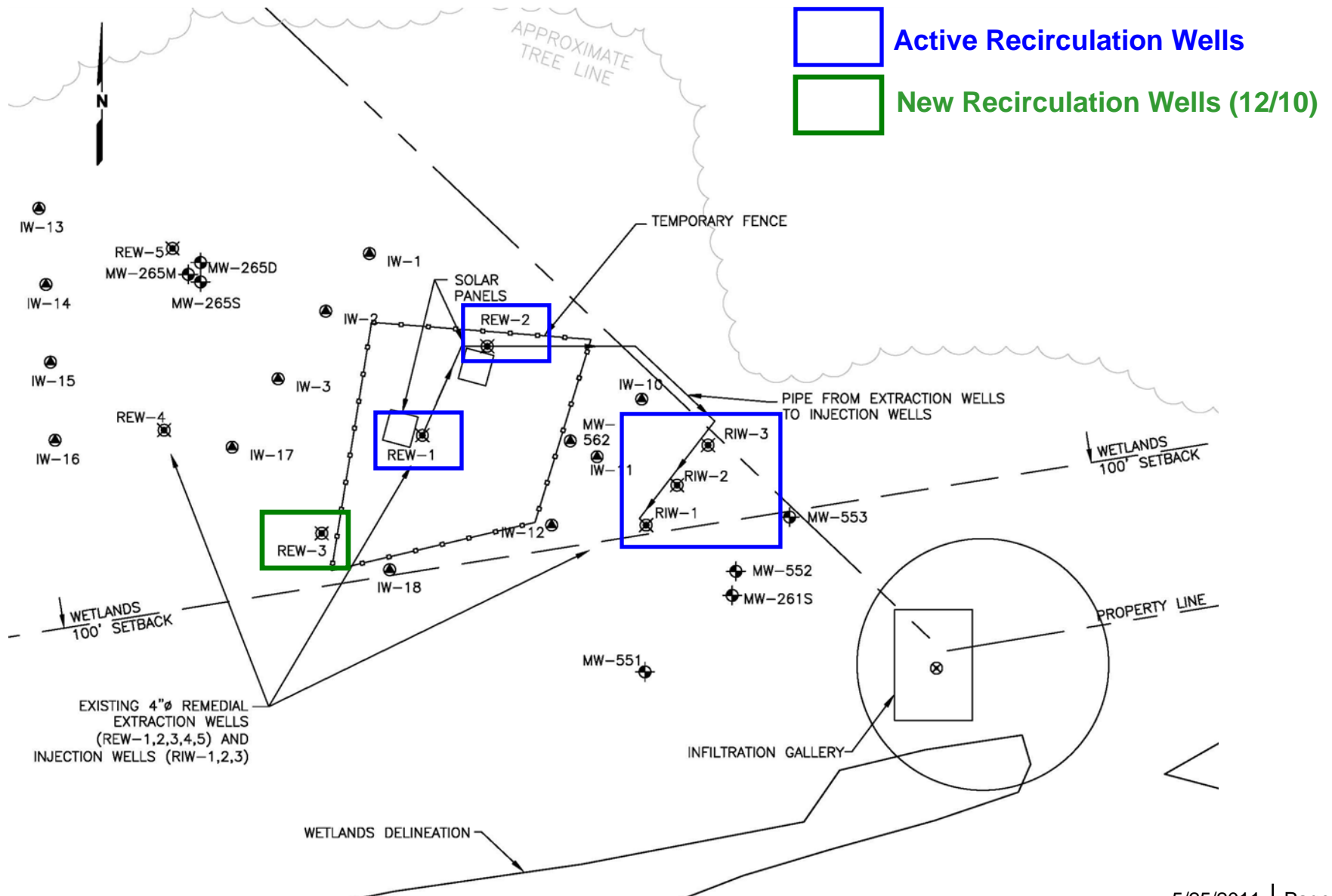


Recirculation System Details

Solar Panels



System Orientation



System Update

- Recirculation system initial start up: October 2010
 - Operated for 68 days from October to December 2010
 - Recirculated approximately 263,550 gallons of groundwater
 - 2 “feeding” events - Vegetable oil, alcohol, pH buffers, and nutrients added to the system

- System operation suspended during winter months due to freezing temperatures

- Restarted in March 2011
 - Recirculated approximately 400,000 gal groundwater in 2011

- Groundwater monitoring data are positive and encouraging

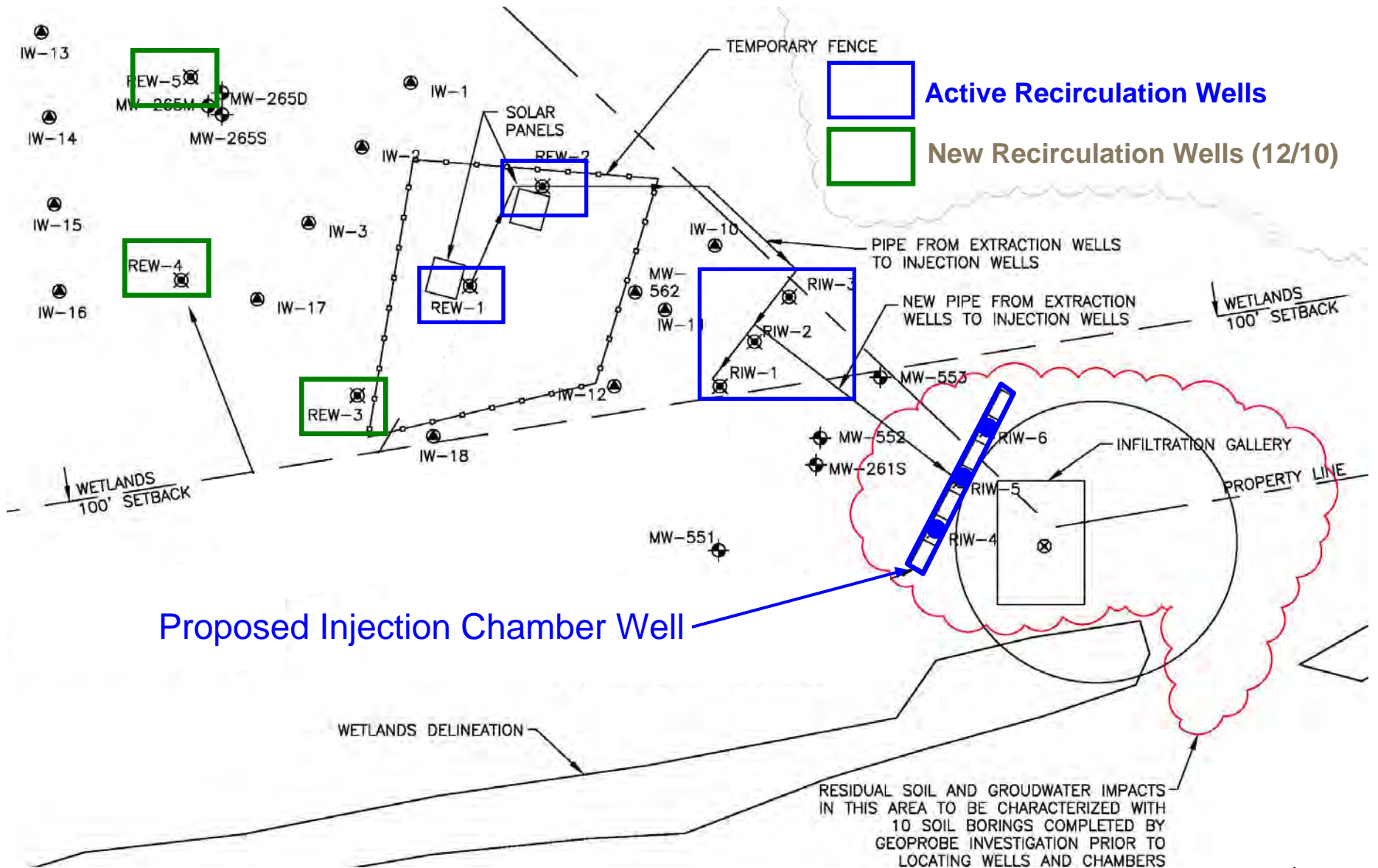
System Expansion

- Positive results to date support the expansion the system

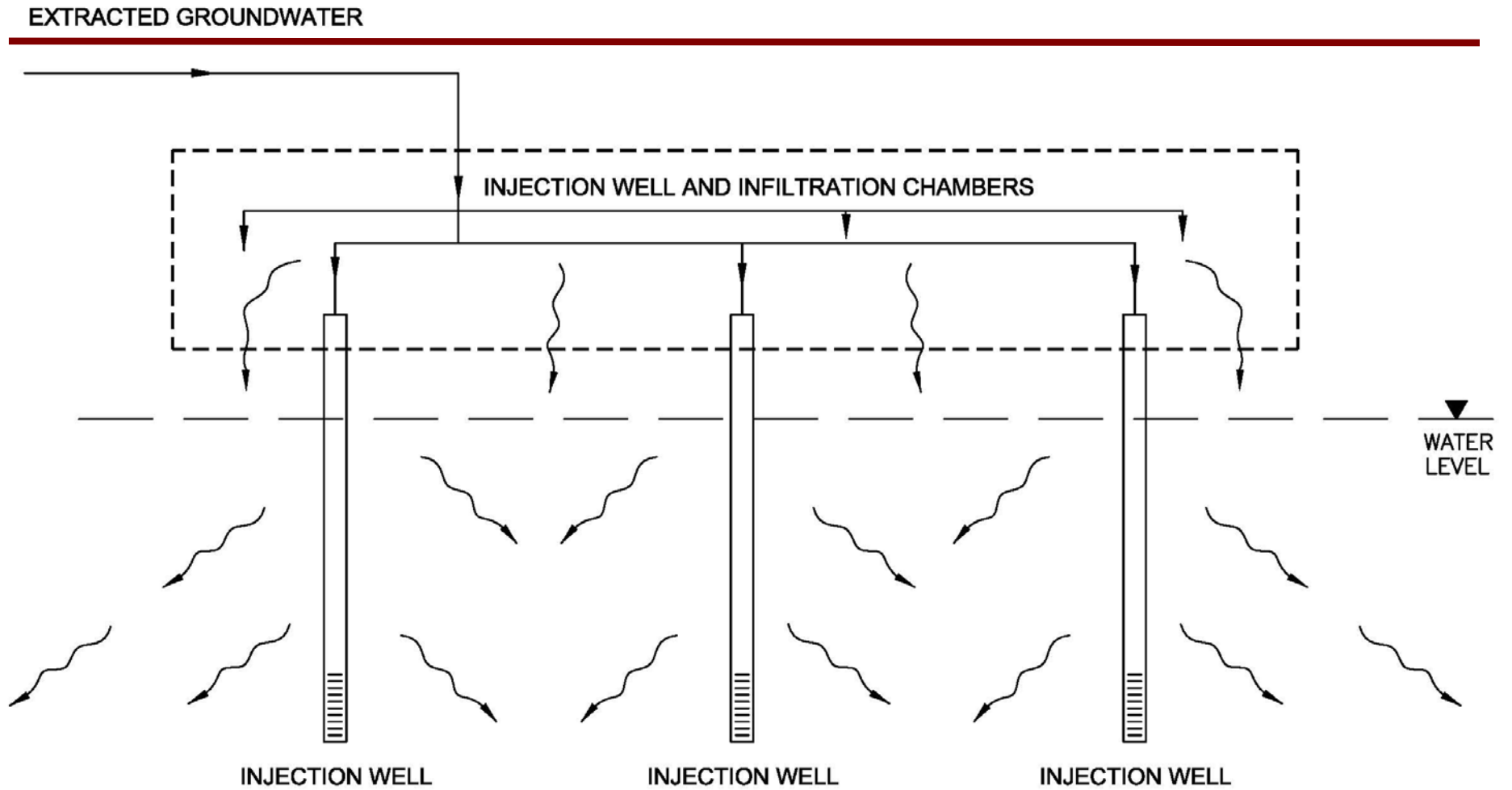
- Components of Northern Area system expansion
 - Bioaugmentation to enhance the microbial population
 - Additional groundwater investigation to refine installation locations
 - Installation of an injection chamber well (ICW) system
 - Entrench piping to allow winter operation

- Conservation Commission approved the system expansion due to its proximity to 100-foot Wetland Buffer Zone

System Expansion



System Expansion



Monitoring Well Decommissioning

Monitoring Well Decommissioning

- Select wells decommissioned in advance of the proposed property redevelopment footprint

- 98 wells decommissioned
 - Conducted from April 25 through May 2, 2011
 - 91 outdoor wells, primarily in Southern Area
 - 7 within the Main Building
 - Decommissioned in accordance with MassDEP *Standard References for Monitoring Wells*, Section 4.6

- Monitoring well network will be reinstalled after completion of site work for the redevelopment project

Q & A

PIP Schedule

- Raytheon will continue to make documents available at the information repositories (Public Library and Board of Health) and extranet web site
www.ermne.com; username – raytheon; password – wayland
- Next PIP meeting: Fall 2011