Naval Facilities Engineering Systems Command
NAVFAC MID-ATLANTIC

Department of Navy
Naval Weapons Industrial Reserve Plant
Restoration Advisory Board Meeting

NWIRP Bethpage Program Overview

Presented by:
Scott Sokolowski, Remedial Project Manager
NAVFAC Mid-Atlantic
16 November 2021

New Remedial Project Manager Introduction

- Jim Watts-Gravette took a new job with the Army Corps of Engineers in New Mexico
- Scott Sokolowski assumed the RPM role in October.
  - With NAVFAC Midlant since 2020
  - Been involved with Bethpage in various aspects since 2018
  - Geologist in the field of water resources and environmental remediation since 2005
  - Experience in private consulting and as an Environmental Project Manager for state superfund sites for the State of Montana
  - Worked on environmental projects in 12 different states from east coast to west coast
  - Served in the U.S. Army for over 9 years, enlisting in 1995 and separating from the Army as a Captain in 2005

Presentation Topics – NWIRP Bethpage Program Overview

- Site 1 General Update and Tree Planting
- Site 4 Biosparge System
- Operable Unit 2 (Offsite Groundwater) Explanation of Significant Differences Update
- Phase I Advanced Oxidation Process (1,4 Dioxane Treatment) and Remedial Well 4 Operation Update
- Upcoming Remedial Construction Projects, Data Collection, and Property Access

Site 1

Slide 1/2

- General Update
  - Remedial Action for Contaminated Soil is in its post construction Operation & Maintenance phase with quarterly inspections and site maintenance until February 2023
  - Soil Vapor Extraction System Expansion project will mobilize in late November 2021 with completion in February 2022

Site 1

Slide 2/2

- Tree Planting – Eastern Boundary Parallel to 11th Street
  - Previously planted trees had died due to poor drainage and large volumes of rain
  - Sixteen new evergreen trees were planted on top of the berm between established deciduous trees
  - In spring 2022 we will reevaluate if additional trees are needed to provide a complete screen along the eastern boundary

Site 4 Biosparge System

- A steam injection pilot study was run from April 2019 to May 2020
- An evaluation of the steam injection system was completed by the Navy in June 2020 and it was determined that: 1) the system was no longer recovering free product; 2) that it should be shut down
- The steam injection system was converted to the biosparge system and has been operating since July 2021
- Biosparging consists of injecting air or oxygen into the subsurface to increase the dissolved oxygen concentration in groundwater to promote aerobic biological degradation of the organic contaminant.
- The system will operate for the next four years.

Operable Unit 2 (Offsite Groundwater) Explanation of Significant Differences Update

- OU2 ESD was finalized and signed on 20 September 2021
- A Public Notice was published in five newspapers in the Bethpage area with a hard copy provided to Bethpage Public Library
- The ESD specifically identifies the following three additions to the ROD for OU2:

  1) Extension of hotspot treatment systems to allow capture and treatment of lower concentrations of contamination in groundwater;

  2) Capture of the OU2 plume near its leading edge; and

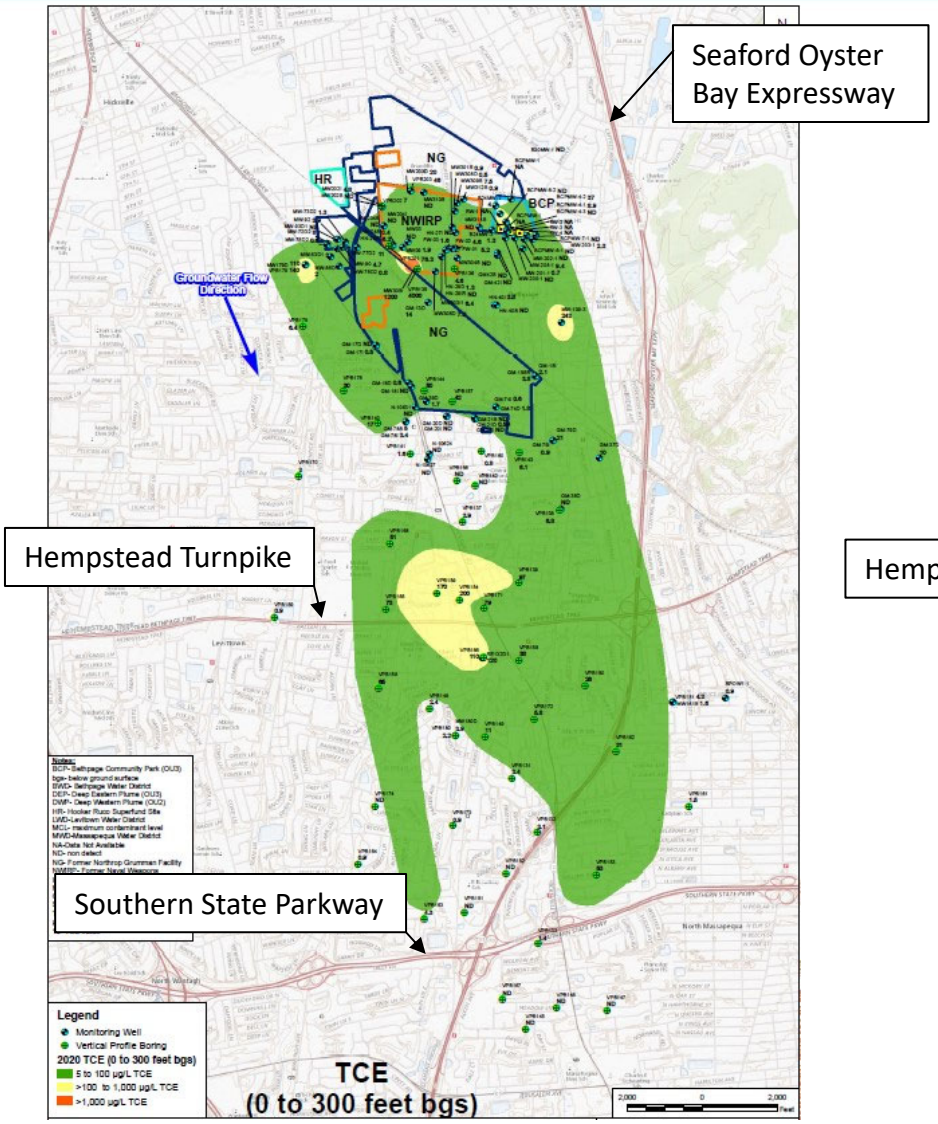
  3) Addition of 1,4-Dioxane as a chemical of concern and associated treatment

Drilling Program
Shallow and Intermediate Data Gaps

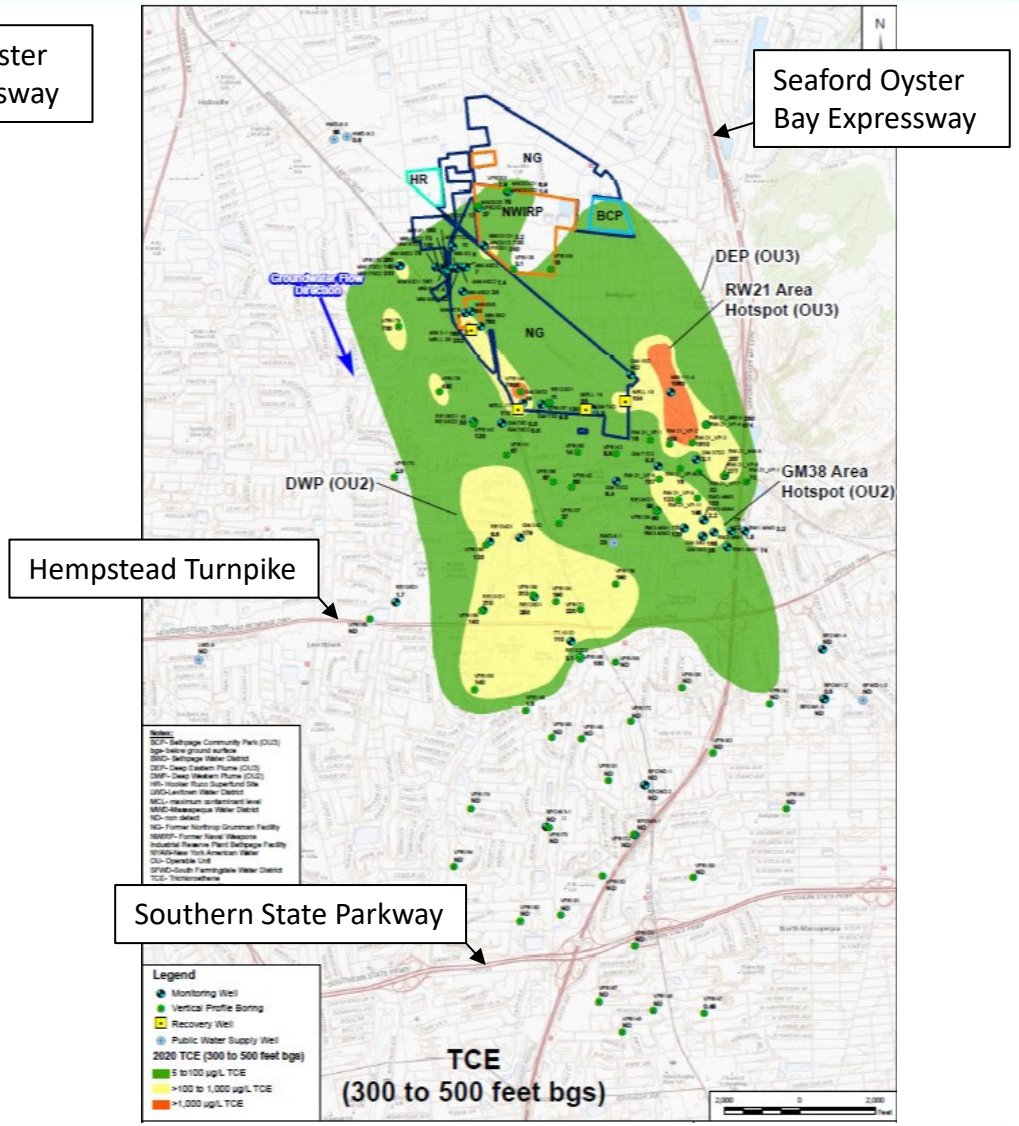
- To date, Navy's vertical profile boring and monitoring well installation program has focused on determining the extent of the deeper areas of OU2 plume
- Using data from monitoring well samples of groundwater, the plume is 'mapped' at four separate intervals:
  - ~50 to 300 feet below ground surface (termed shallow interval)
  - 300 to 500 feet below ground surface (intermediate interval)
  - 500 to 700 feet below ground surface (deep interval)
  - greater than 700 ft. below ground surface (deepest interval)
- Navy will undertake a drilling program to fill the data gaps in the shallow and intermediate intervals of the plume
- This data will also be used to determine locations for two recovery wells, RW10 and RW11, for Phase III Plant 2.

Navy-Northrop Grumman TCE Plume Maps

Shallow

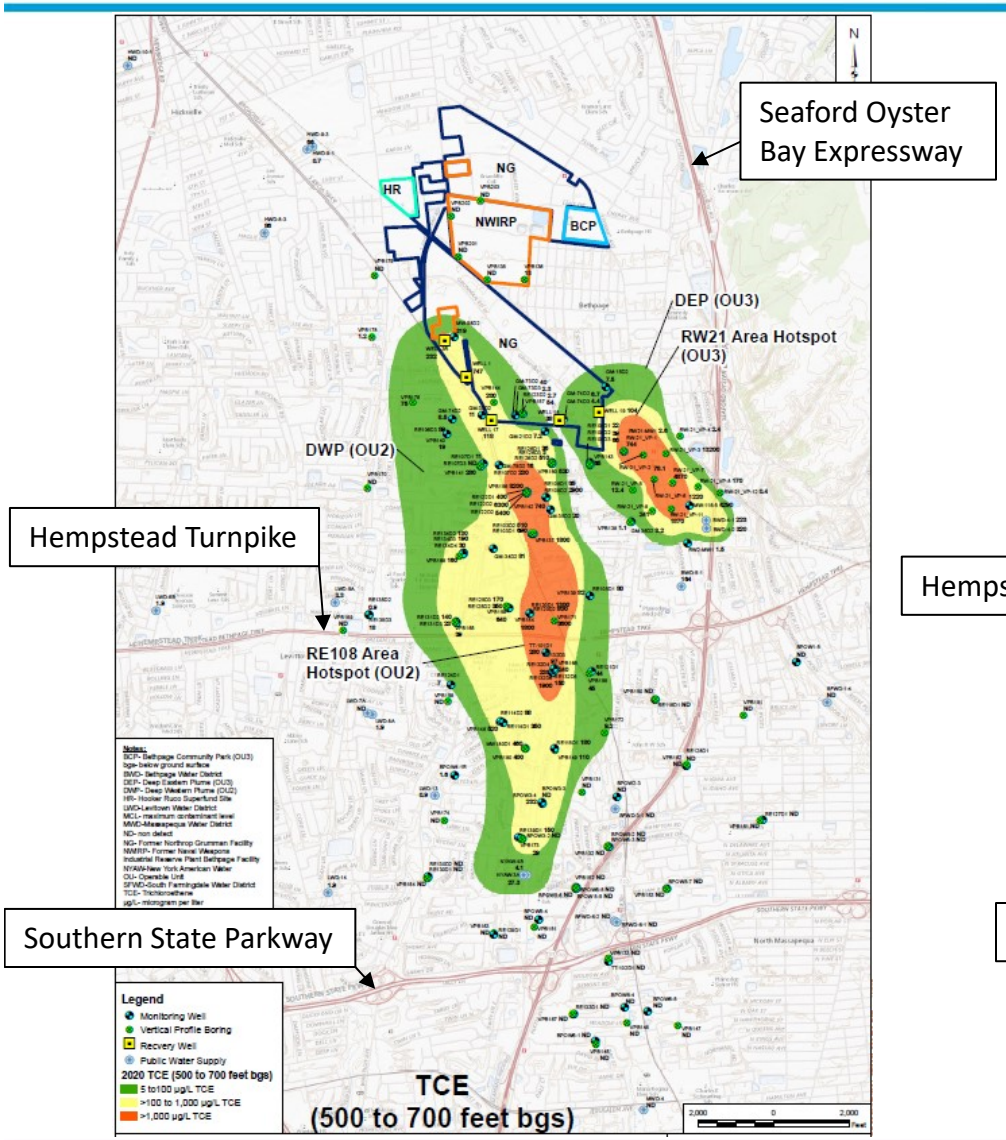


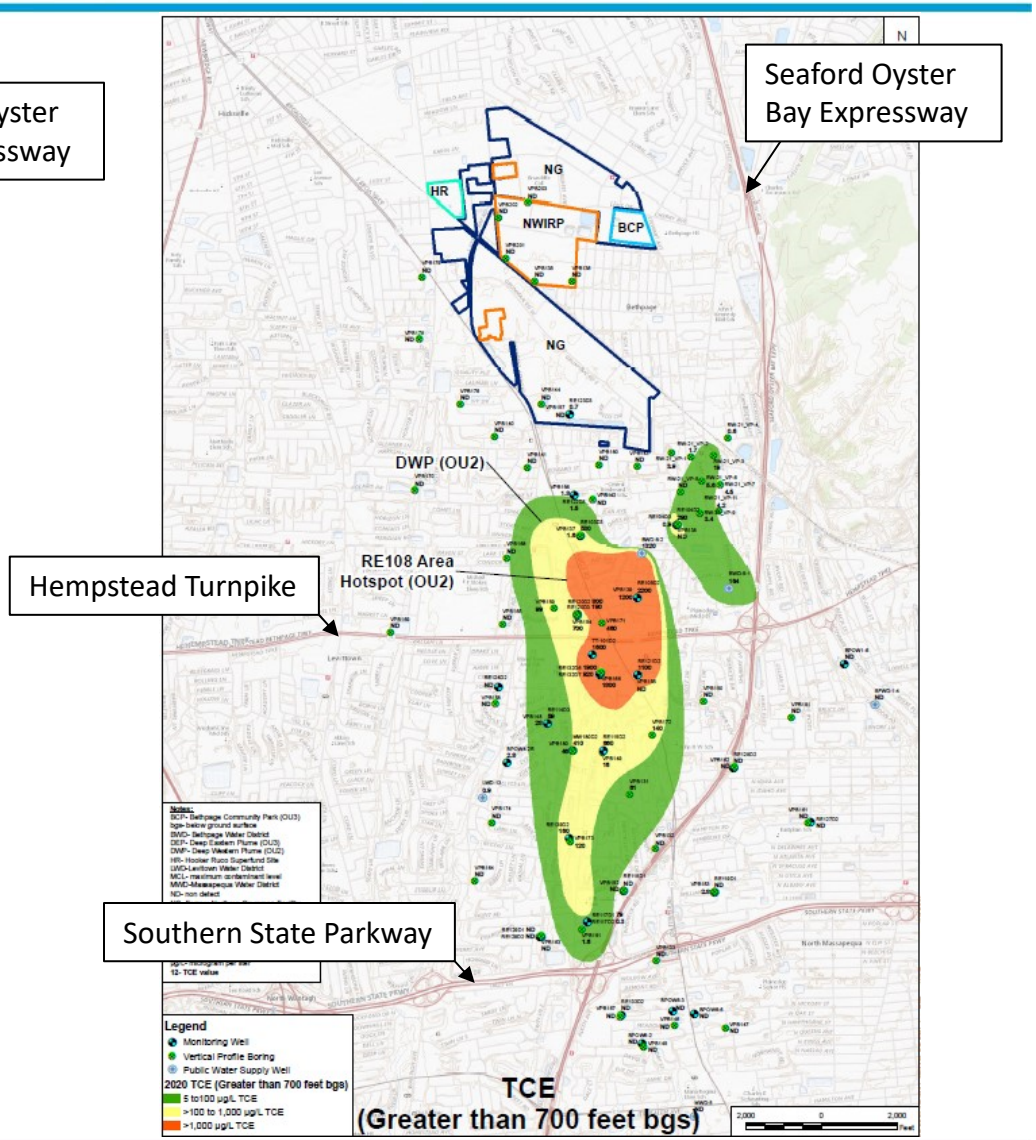
Intermediate



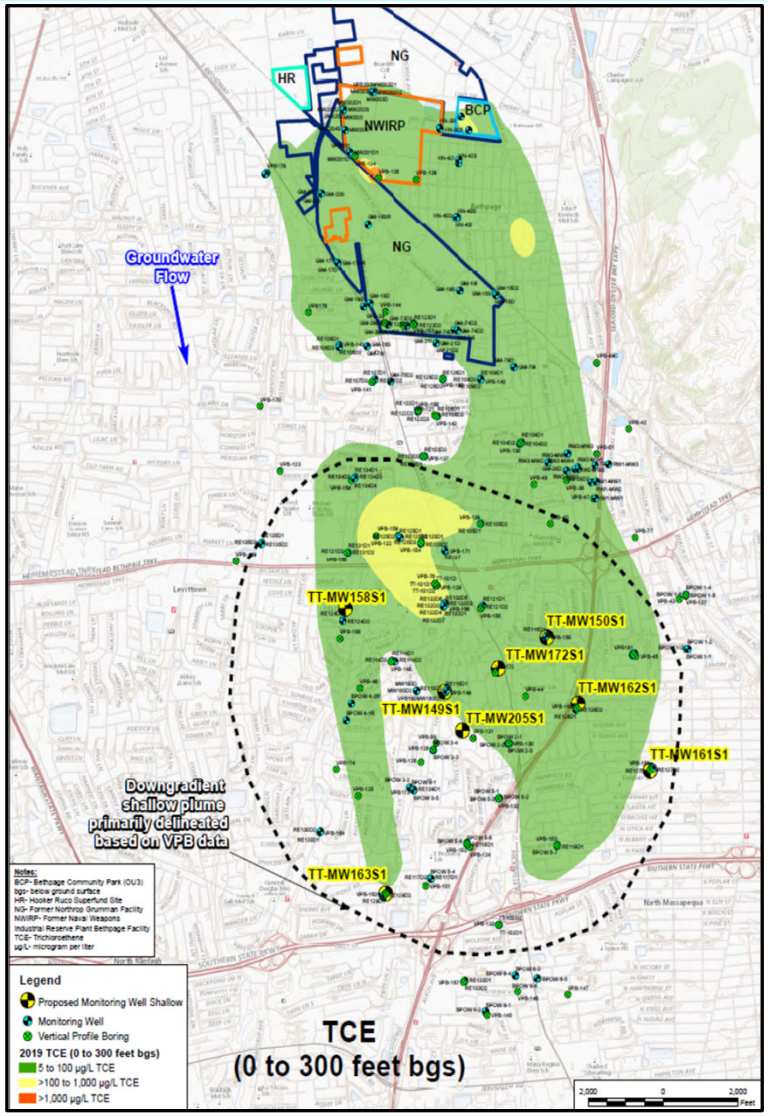
Navy-Northrop Grumman TCE Plume Maps

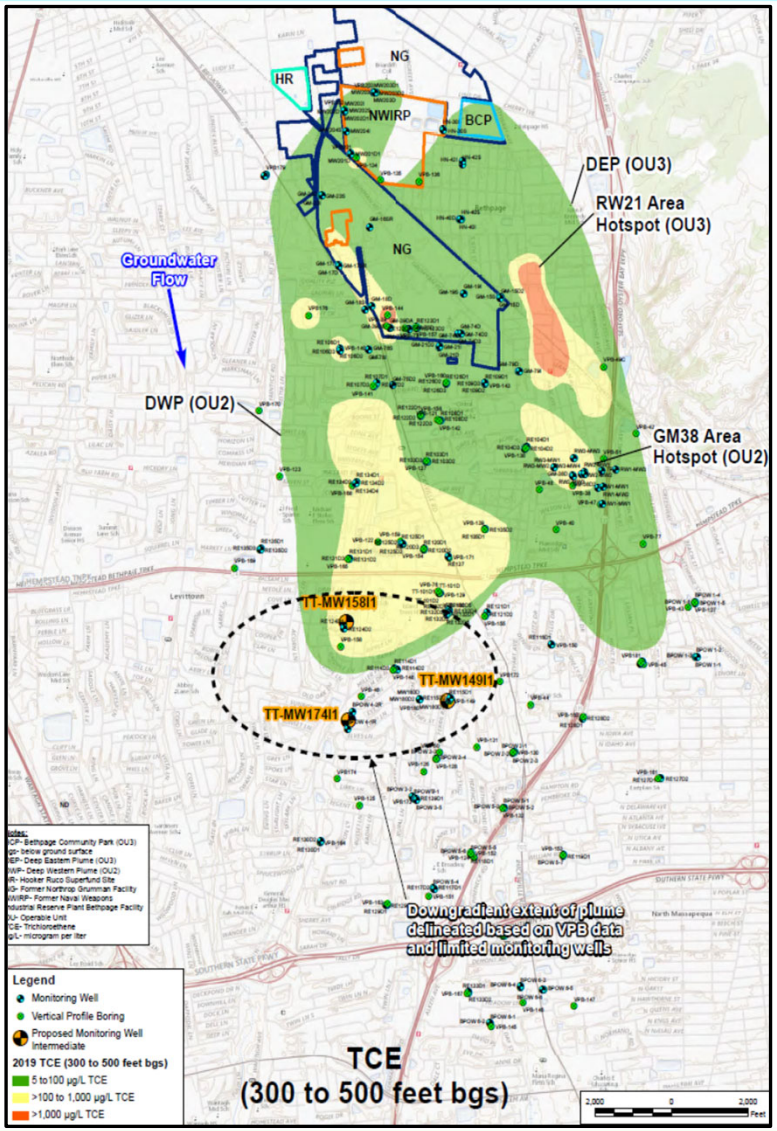
Deep





Planned Shallow and Intermediate Data Gap Wells





Phase I – RE108 Area Hotspot
AOP (1,4 Dioxane Treatment) and RW4 Operation

- The RW4 pipeline to the GM38 groundwater treatment plant was completed summer 2021.
- The advanced oxidation process unit, AOP, started operation in April 2021
- The GM38 groundwater treatment plant is operating as expected, water testing of the system is taking place biweekly and 1,4 dioxane and TCE are non-detect in the effluent

Upcoming Remedial Construction Projects, Data Collection, and Property Access

- Remedial Construction Projects
  - Recovery Wells 6a and 6b were completed in September 2021
  - Recovery Wells 7 and 8 will be completed early 2022
  - RE137 temporary treatment system (near the on-ramp from Hicksville Road onto Hempstead Turnpike heading south) online in December 2021
  - Phase II Groundwater Treatment Plant construction will be starting soon and is projected to be commissioned by December 2022

- Data Collection
  - Regular groundwater monitoring activities
  - Data gap study projected to start spring 2022

- Property Access
  - Access to Town of Oyster Bay and Town of Hempstead properties was sought in early 2021 but the Navy was unable to obtain access
  - The Navy is exploring its options under CERCLA to gain access to keep all construction projects on schedule

NEXT: Groundwater Monitoring Results
Dave Brayack, Tetra Tech

Naval Facilities Engineering Systems Command
NAVFAC MID-ATLANTIC

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Restoration Advisory Board Meeting

Operable Unit 2 Groundwater Monitoring and RE137 Interim Action Update

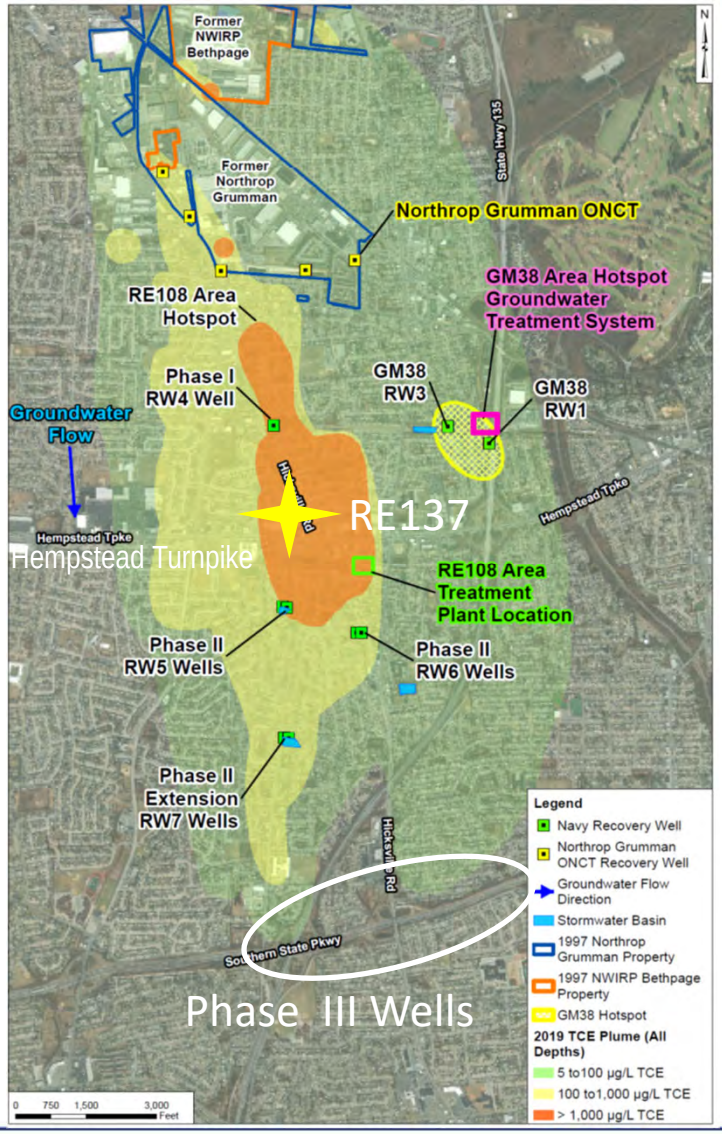
Presented by:
David Brayack, Project Manager
Tetra Tech
16 Nov 2021

Operable Unit 2 Groundwater Monitoring, Treatment, and Interim Action Update Outline

- OU2 Groundwater Remediation Overview
- OU2 Groundwater Monitoring
- OU2 Groundwater Fate and Transport Modeling
- RE137 Interim Action Update

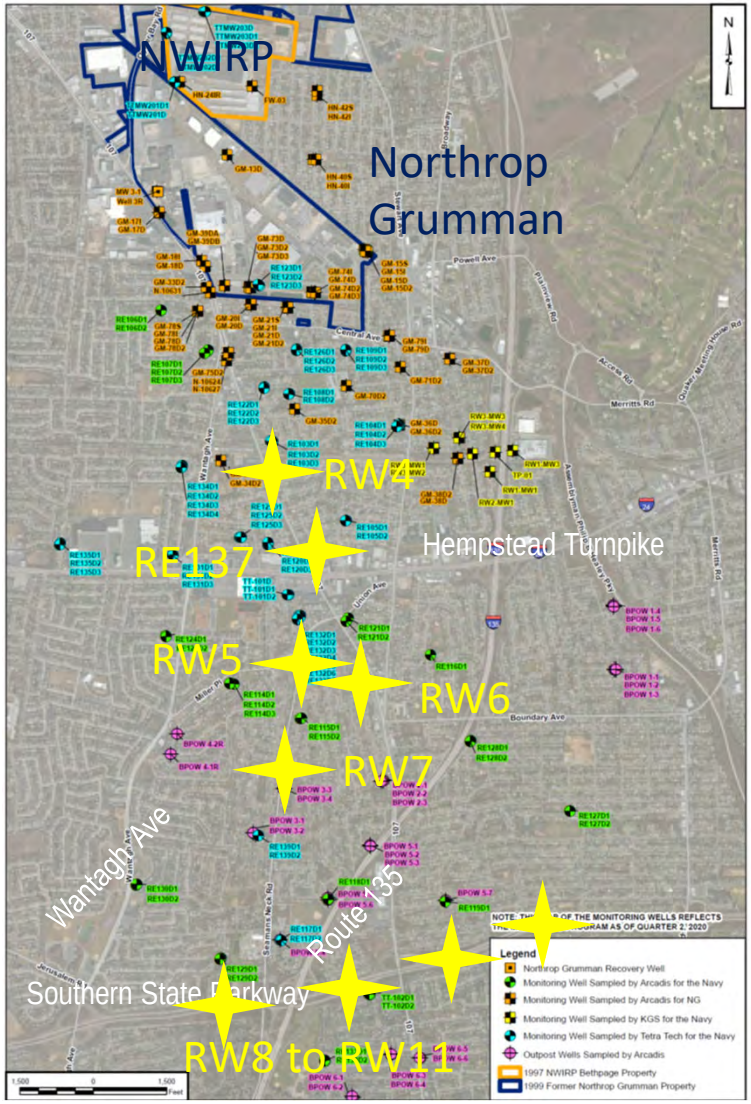
OU 2 Groundwater Remediation Overview

- Groundwater monitoring is used to track OU2 plume migration, attenuation, and cleanup
- Some monitoring wells are located outside of OU2 plume to evaluate potential impacts from other plumes in the area, in particular along the western edge
- Groundwater flow is the south southeast
- Northrop Grumman Onsite Containment System operating since 1998
- Navy GM38 Area Hotspot Treatment System operating since 2009
- Navy Phase I Recovery Well RW4 started operation in April 2021
- Navy RE137 Interim Treatment System is under construction
- Navy Phase II and Phase III systems are under construction



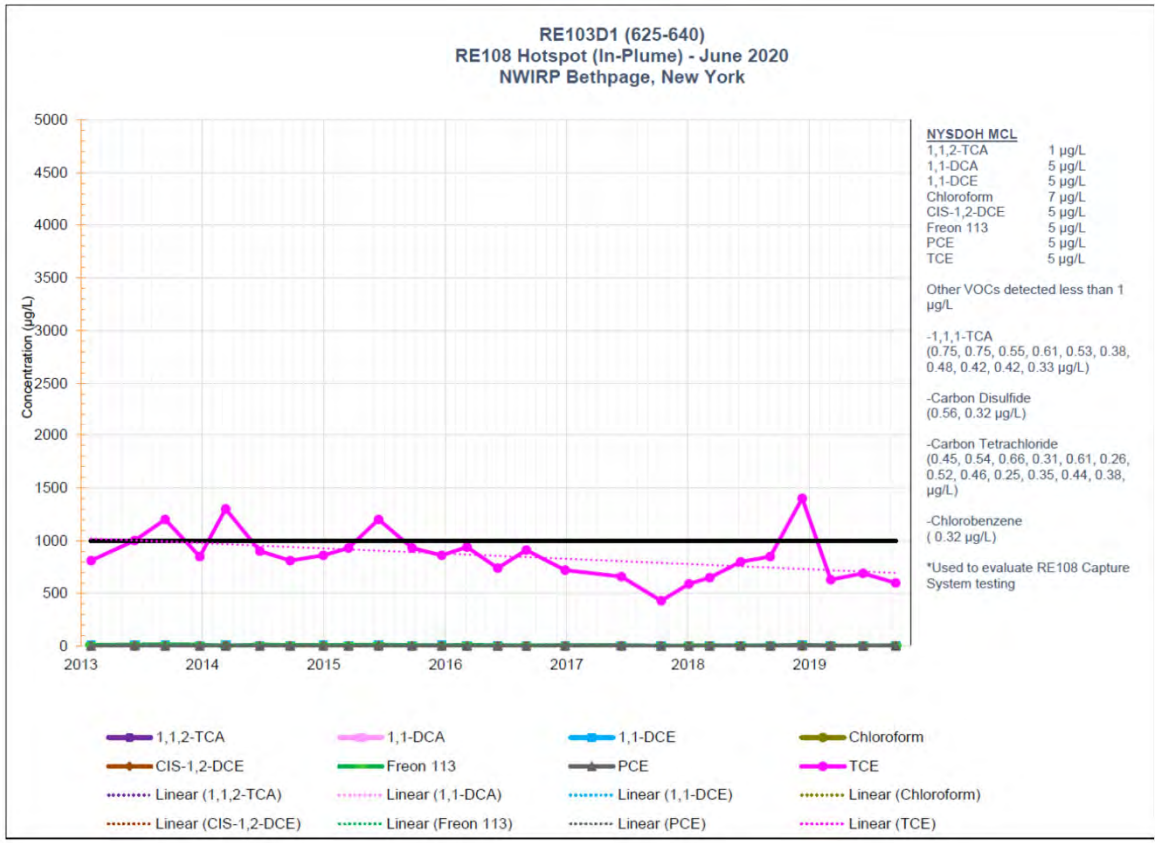
OU 2 Groundwater Monitoring Program

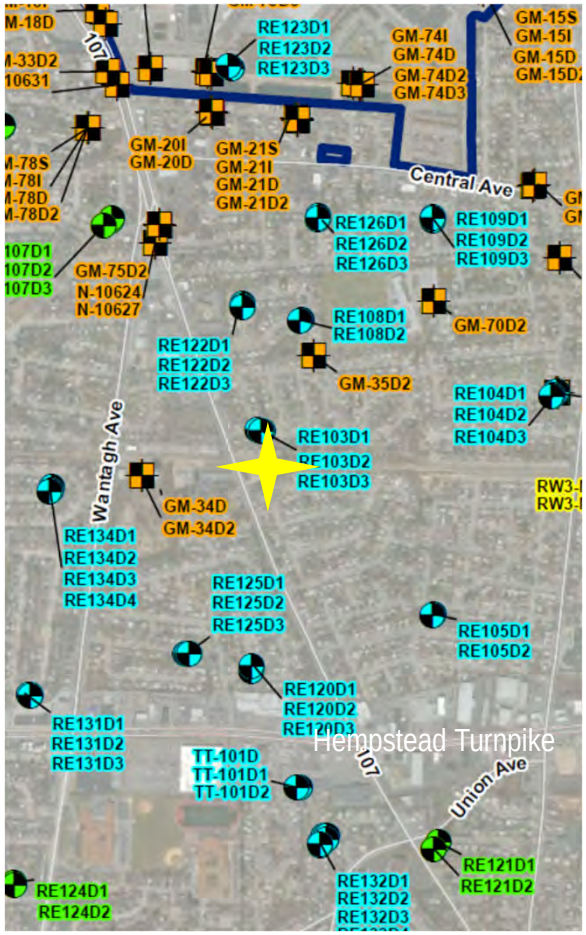
- Groundwater samples from approximately 180 wells are collected on a quarterly, semi-annual, or annual basis and analyzed for Volatile Organic Compounds (VOC) and 1,4-dioxane
- Navy is optimizing this program and will continue to collect data that is needed and modify sampling frequency as appropriate
- New monitoring wells are continuing to be added as needed:
  - Shallow groundwater (200 to 300 feet below ground surface)
  - Near recovery wells to support well capture zone analysis



OU 2 Groundwater Monitoring – Recovery Wells RW4

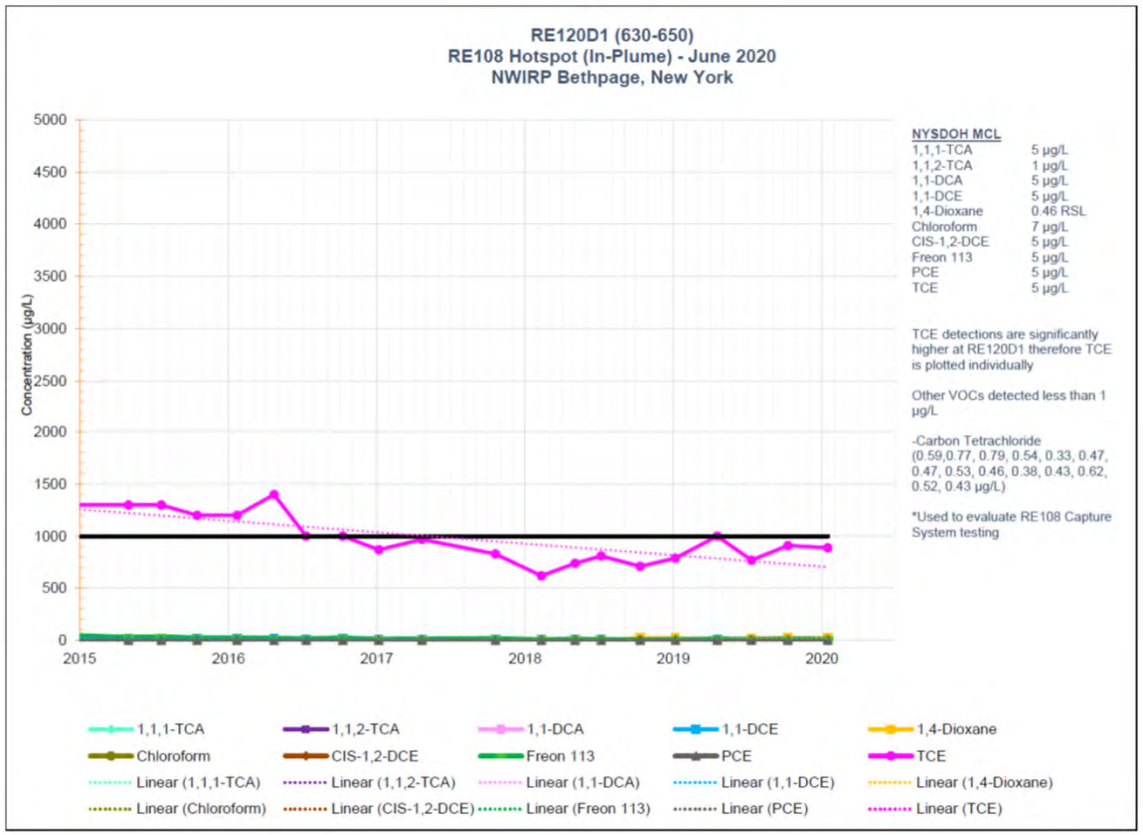
- Phase I Recovery Well RW4 is targeting groundwater near monitoring well RE103
- Note Trichloroethene (TCE) concentrations near 1,000 micrograms per liter (ug/L)
- Well and pipeline are installed and started operation in 2021

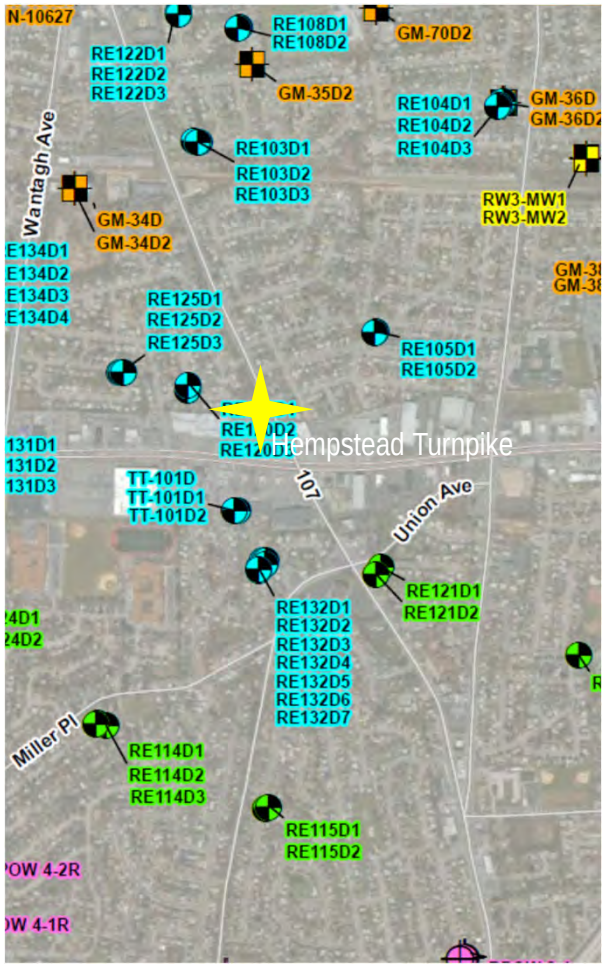




OU 2 Groundwater Monitoring – Recovery Well RE137

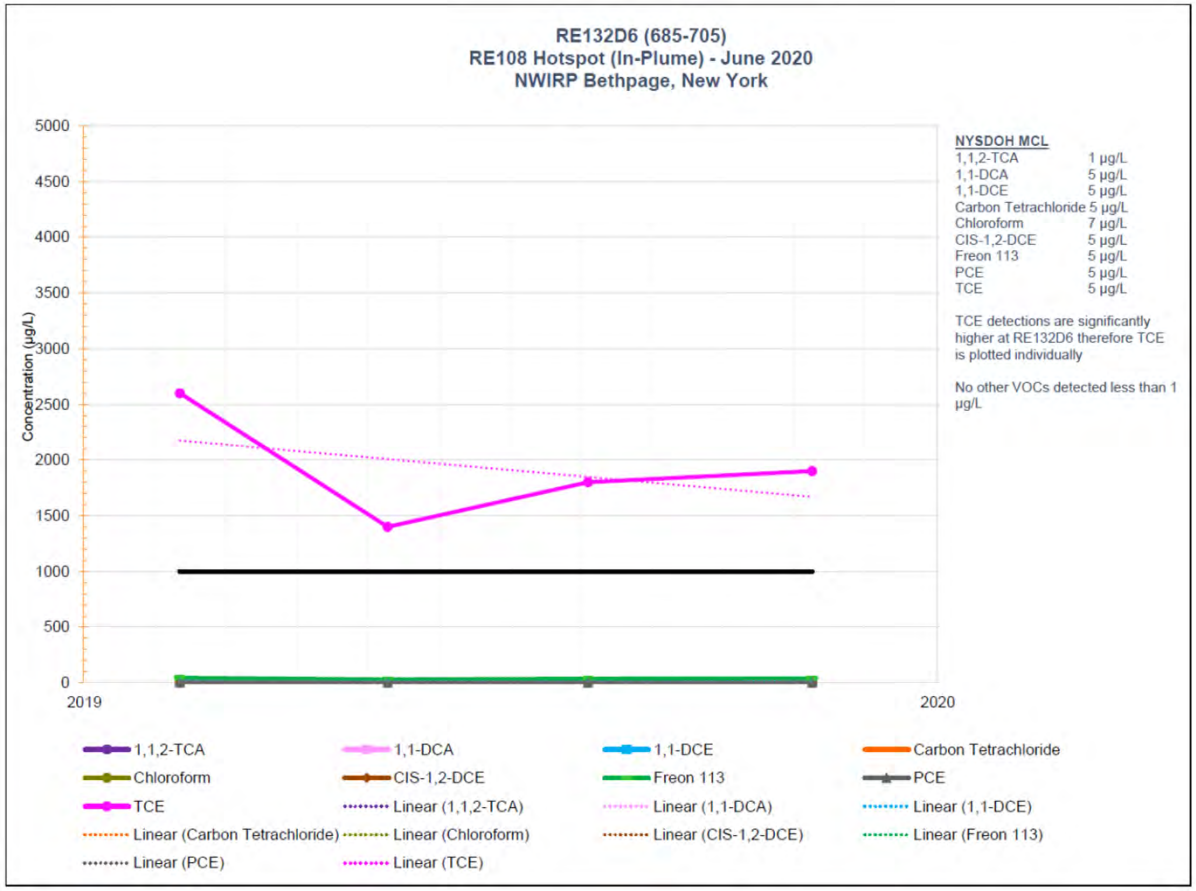
- Interim Treatment Recovery Well RE137 is targeting groundwater near monitoring well RE103
- Pilot testing is being conducted to determine potential benefits of groundwater extraction
- Well is installed and expected to be operating by the end of 2021

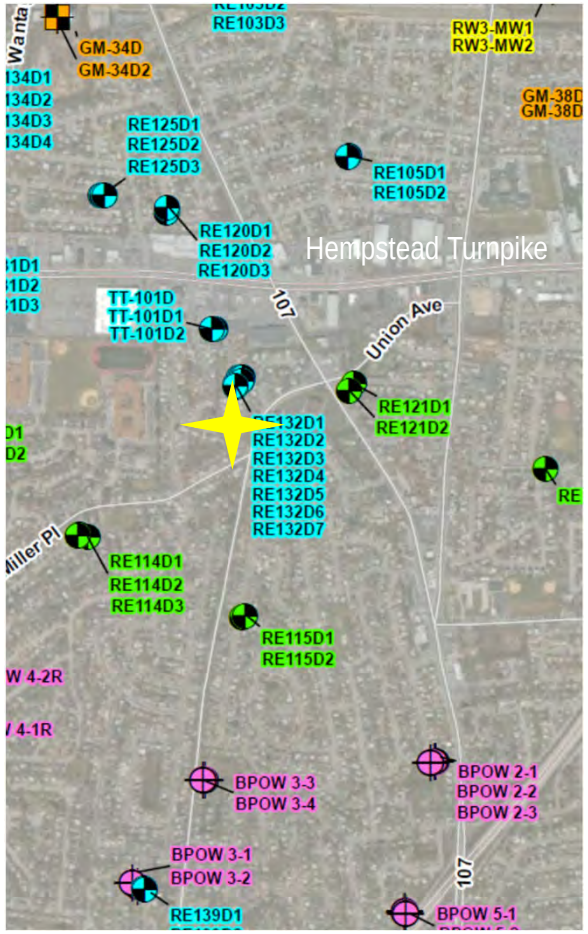




OU 2 Groundwater Monitoring – Recovery Well RW5

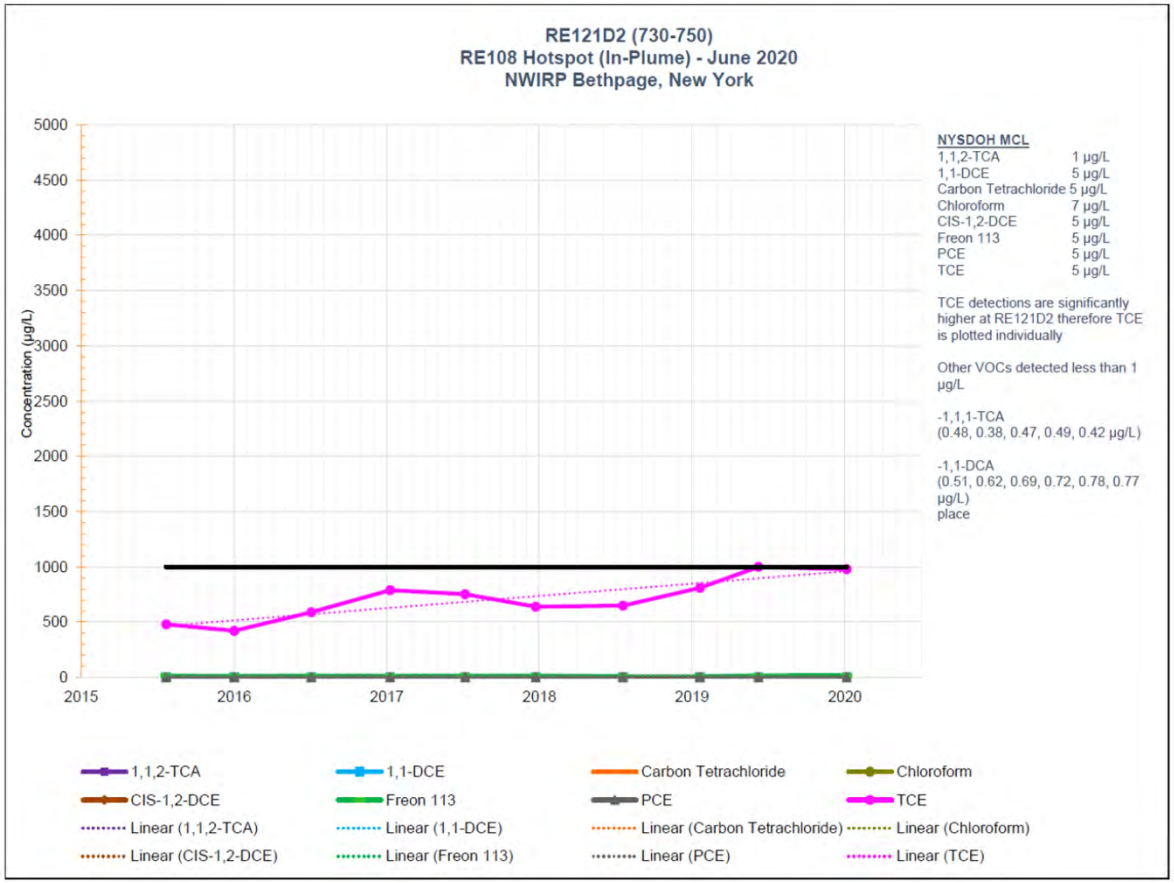
- Recovery Well RW5 is targeting groundwater near monitoring well RE132
- Well is planned for installation and operation in 2022

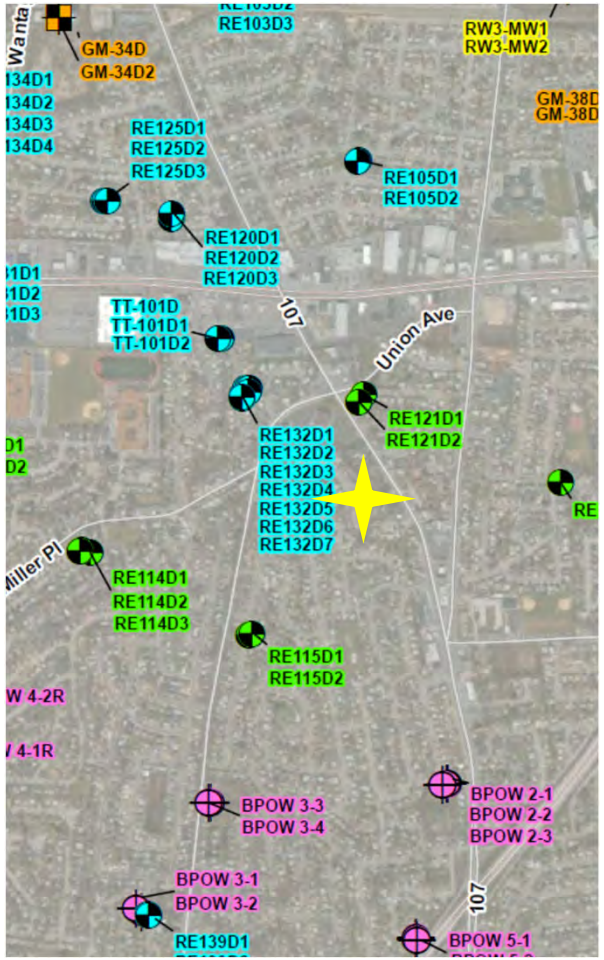




OU 2 Groundwater Monitoring – Recovery Well RW6

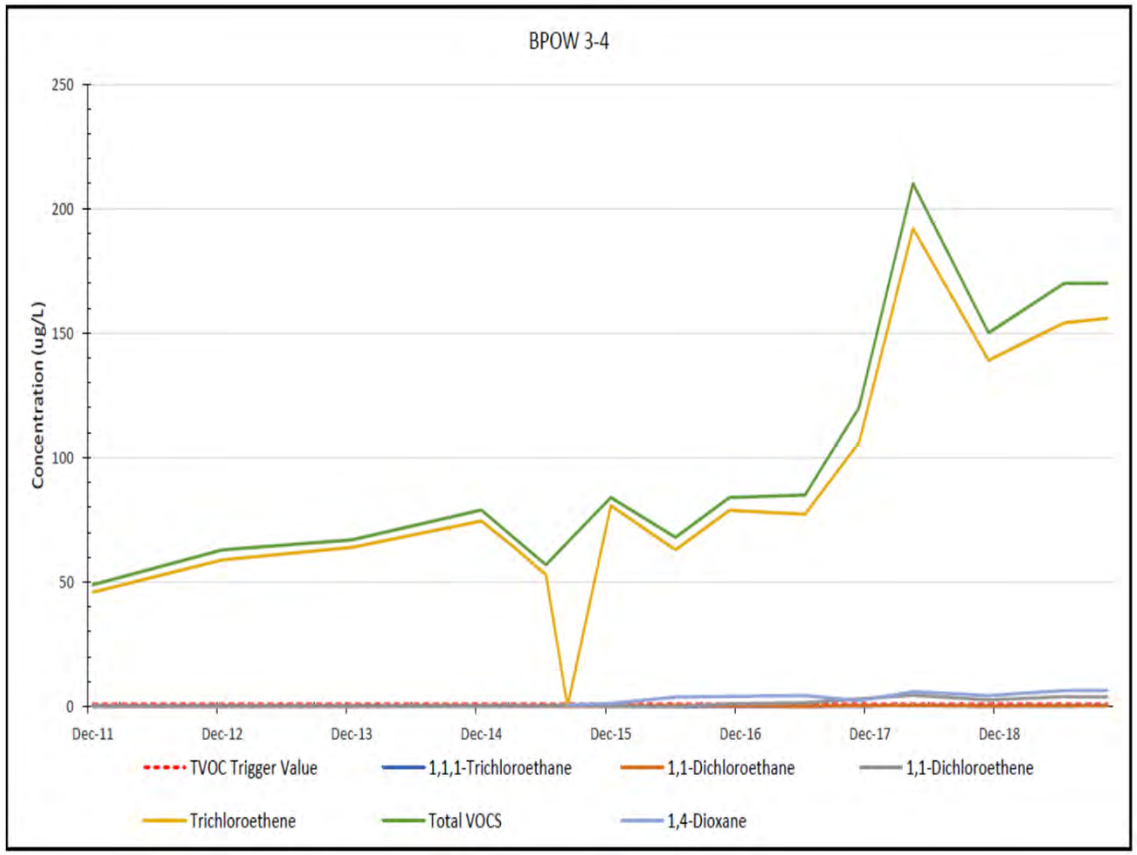
- Recovery Well RW6 is targeting groundwater near monitoring well RE121
- Increase TCE trend is evidence of plume moving into this area
- Well is installed and planned for operation in 2022

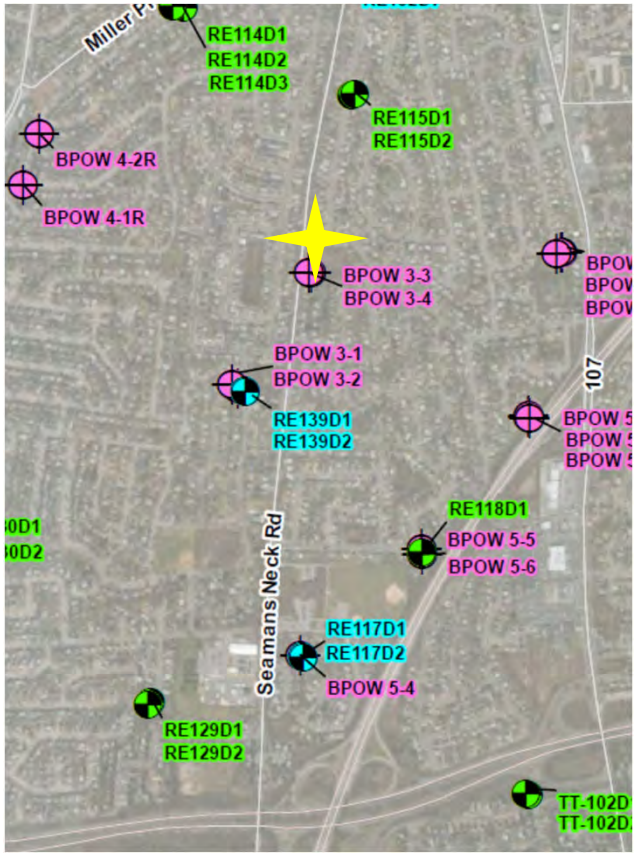




OU 2 Groundwater Monitoring – Recovery Well RW7

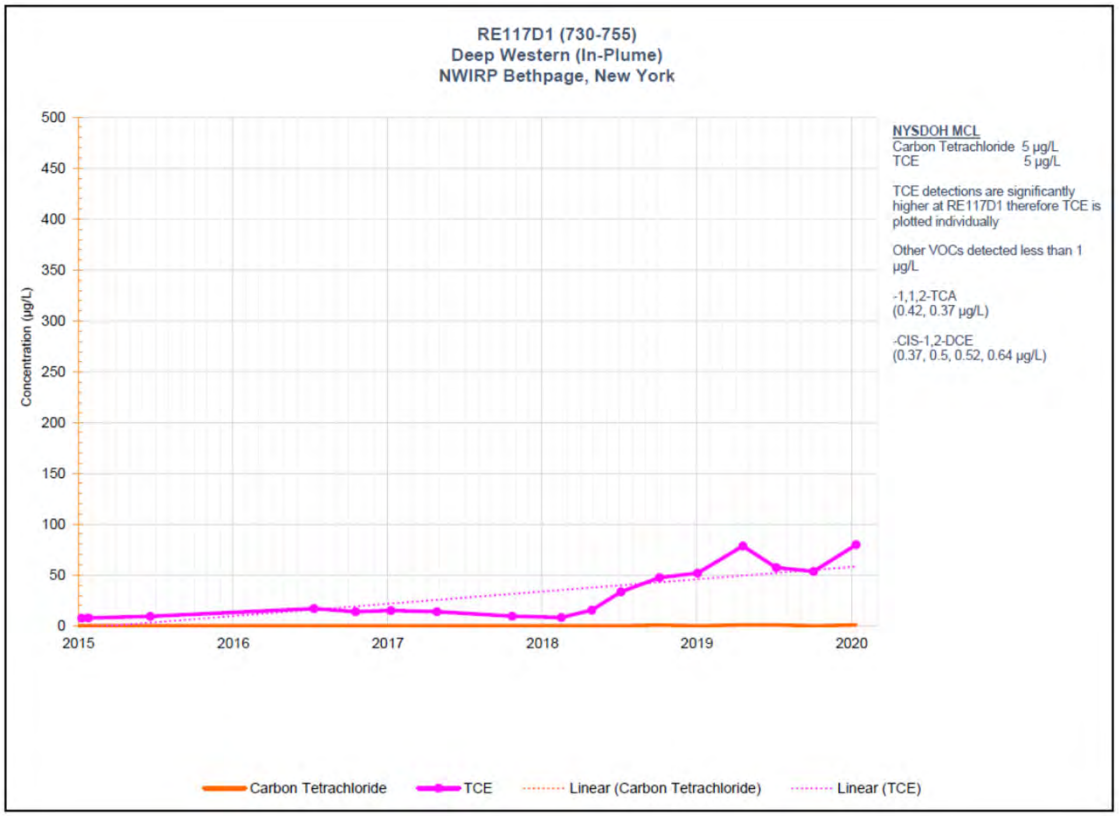
- Recovery Well RW7 is targeting groundwater near monitoring well BPOW 3-4
- Note increasing trend – Led to the Phase II Extension
- Well is being installed in late 2021/early 2022 and be in operation in 2022

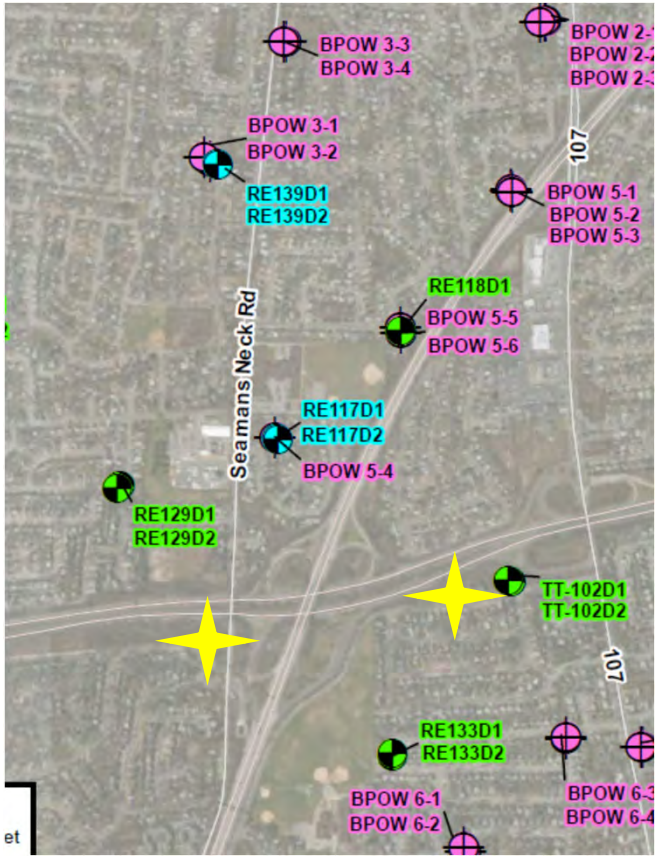




OU 2 Groundwater Monitoring – Recovery Well RW8 and RW9

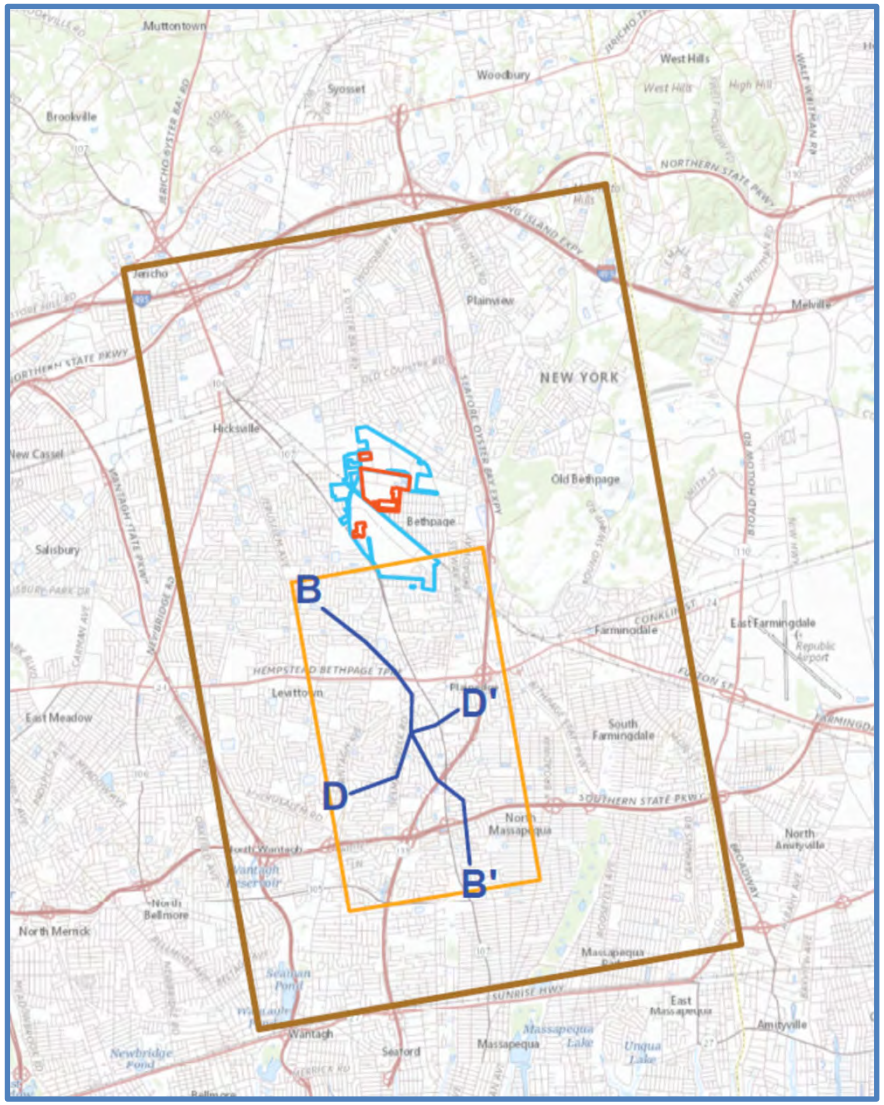
- Phase III Recovery Wells RW8 and RW9 are targeting groundwater near monitoring well RE117
- Note increasing trend – Led to the Phase III recovery wells
- Wells are to be installed in 2022 and be operation in 2024





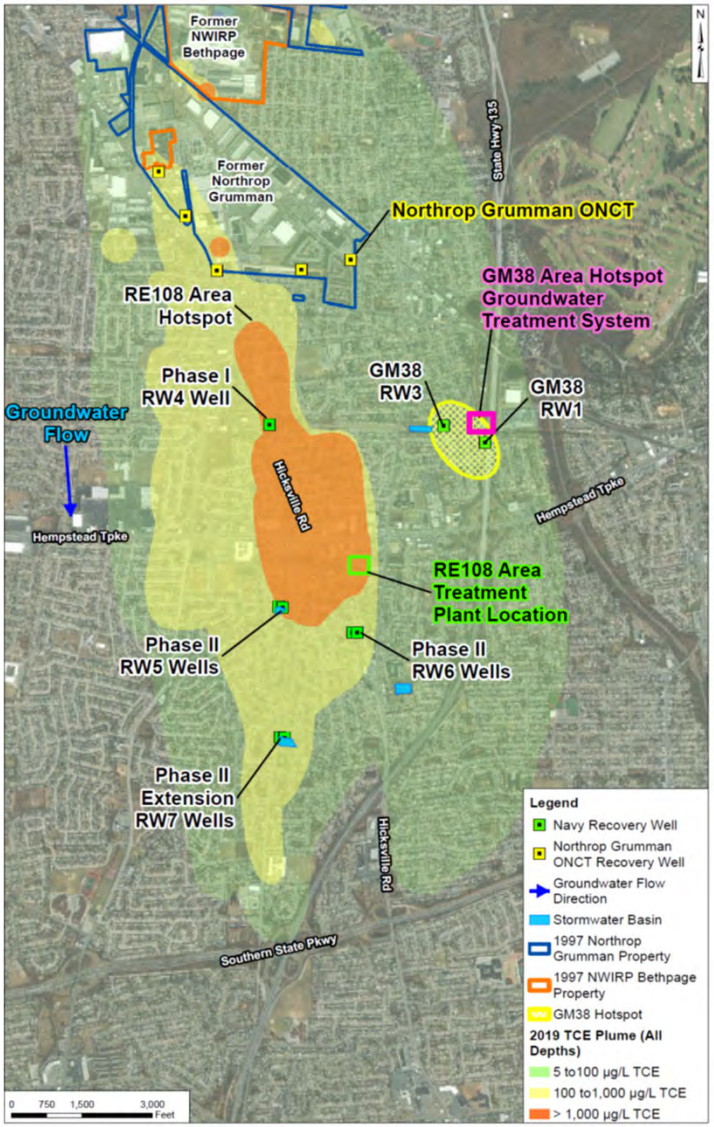
OU2 Groundwater Fate and Transport Modeling

- Navy has constructed a groundwater flow model to use as a tool to understand and predict the OU2 plume behavior
- Primary goals are to support the design and evaluate the effectiveness of Navy OU2 groundwater remediation systems.
- Model will also be used to provide guidance on any operation changes that may be required over time, including:
  - Pumping rates in individual wells
  - Need for new wells
- Model is approximately 42 square miles and 2 million cells.
- Note that the model is rotated by 10 degrees to match groundwater flow to the south southeast

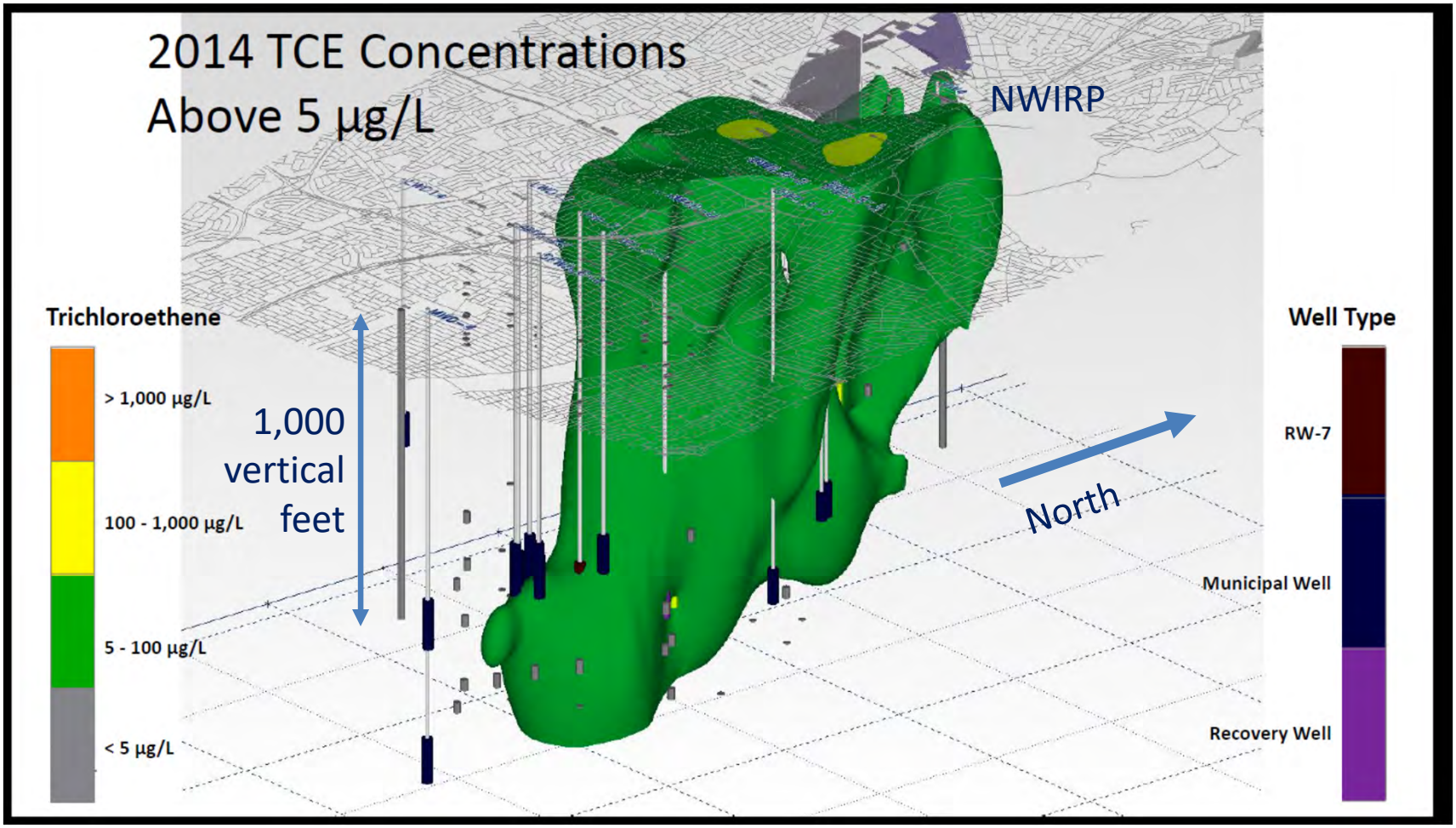


OU2 Groundwater Fate and Transport Modeling

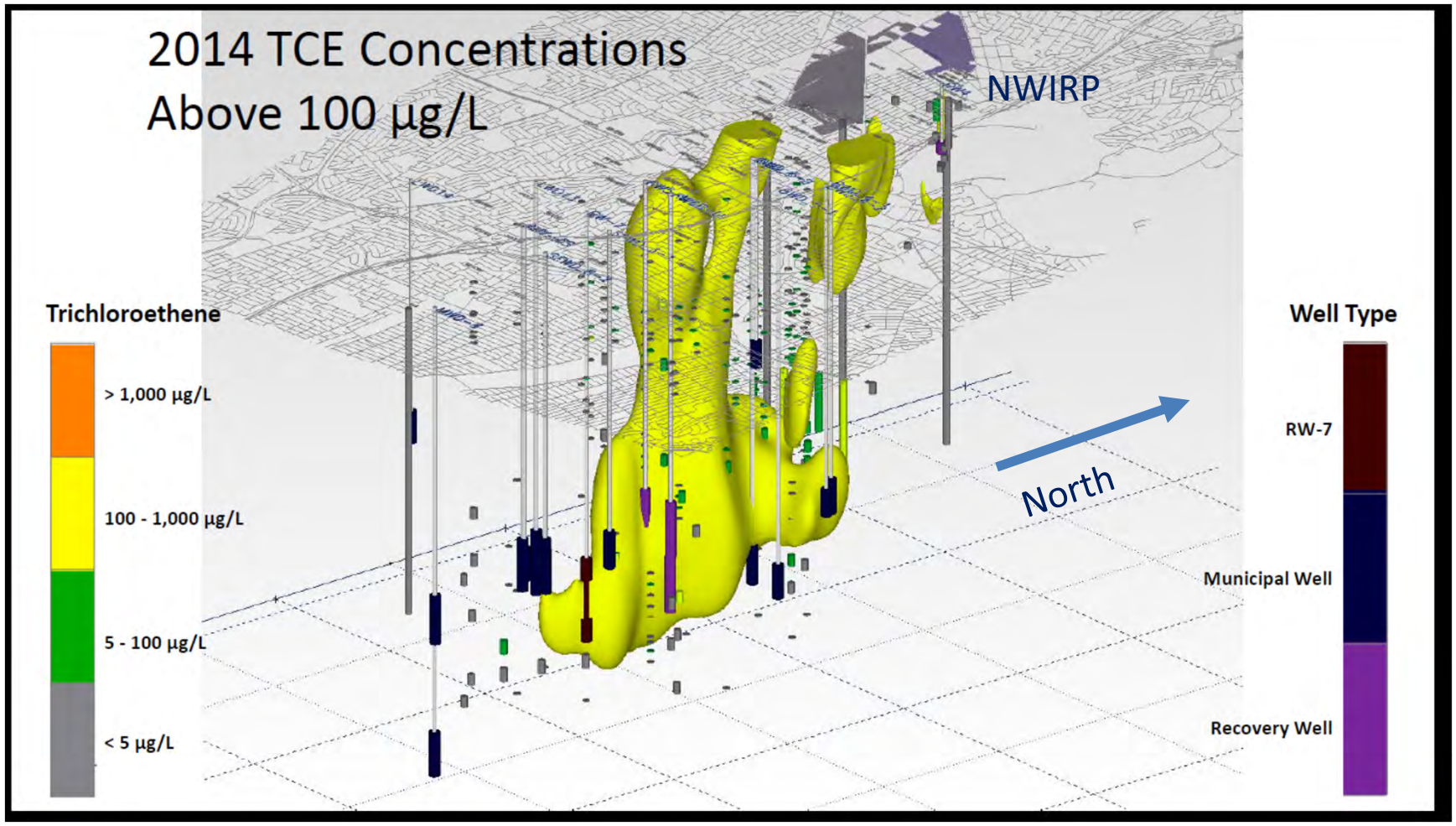
- Plume boundaries are shown using trichloroethene (TCE) as:
  - Green - 5 to 100 micrograms per liter (ug/L)
  - Yellow – 100 to 1,000 ug/L
  - Orange – greater than 1,000 ug/L
- Plumes are estimated using groundwater data from monitoring wells and vertical profile borings
- Plume shown may include groundwater contamination not associated with the OU2 Plume
- Three dimensional plumes are being developed to aid to remedial decisions



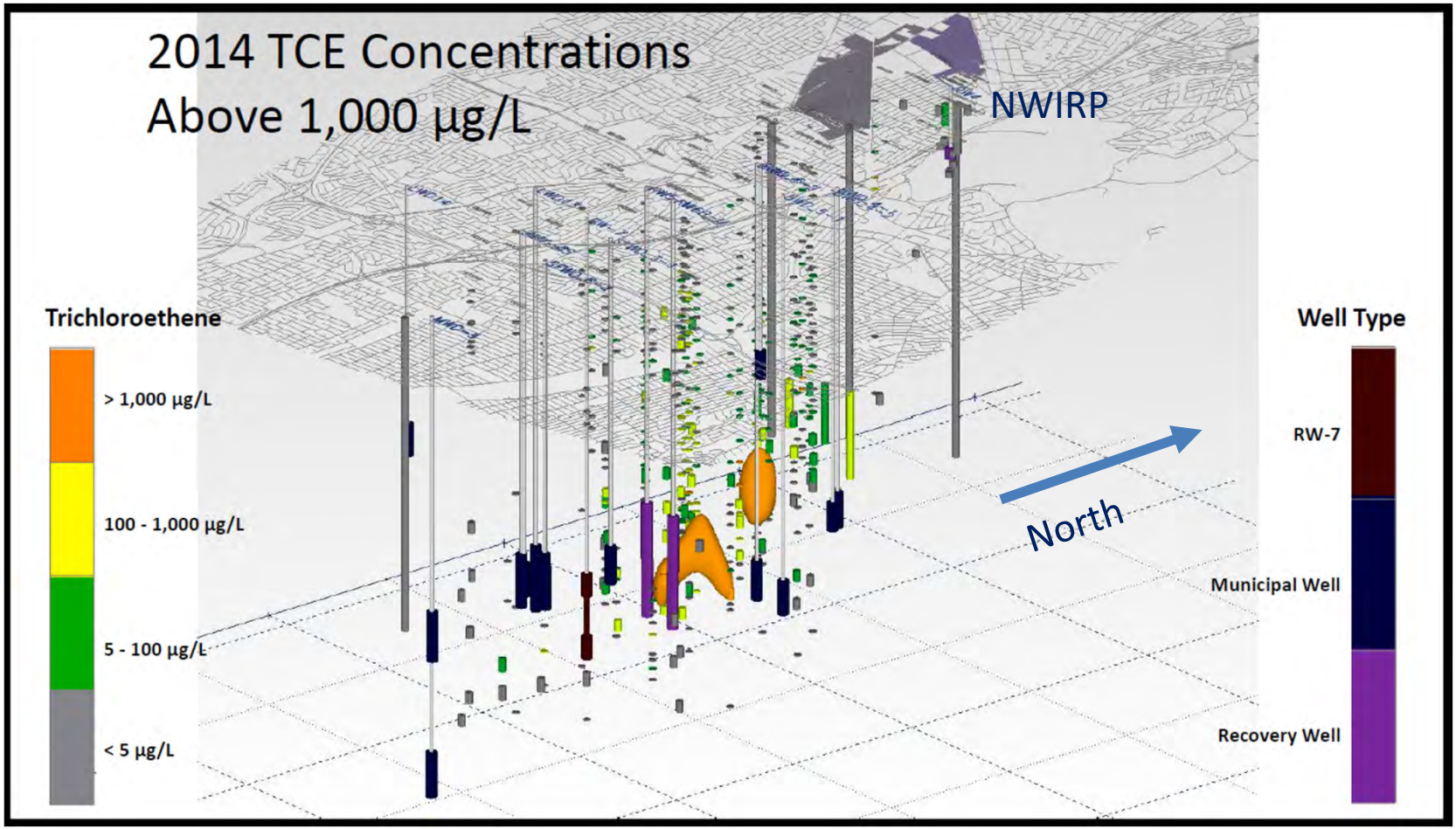
OU2 Groundwater Fate and Transport Modeling – 3D TCE Plume



OU2 Groundwater Fate and Transport Modeling – 3D TCE Plume

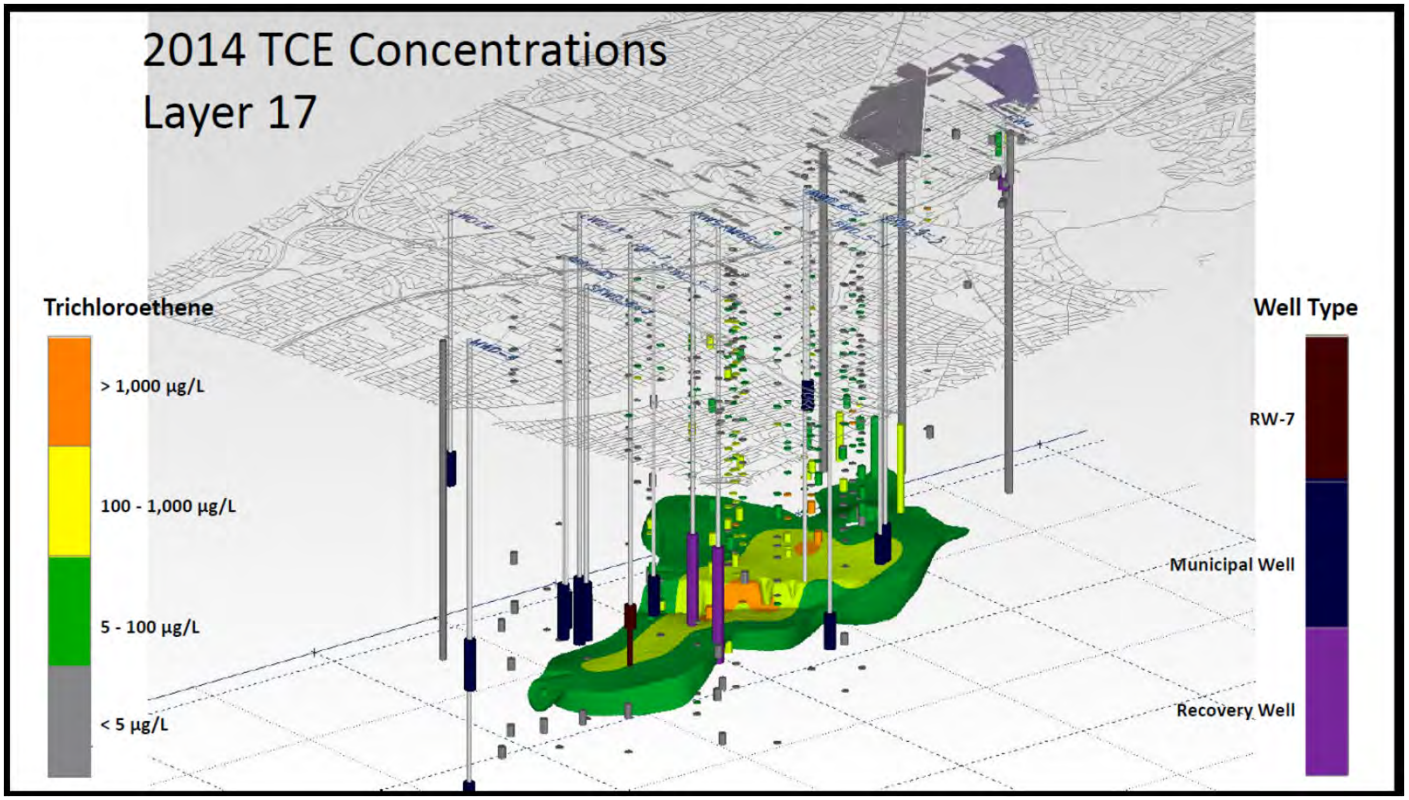


OU2 Groundwater Fate and Transport Modeling – 3D TCE Plume



OU2 Groundwater Fate and Transport Modeling – Model Layer 17

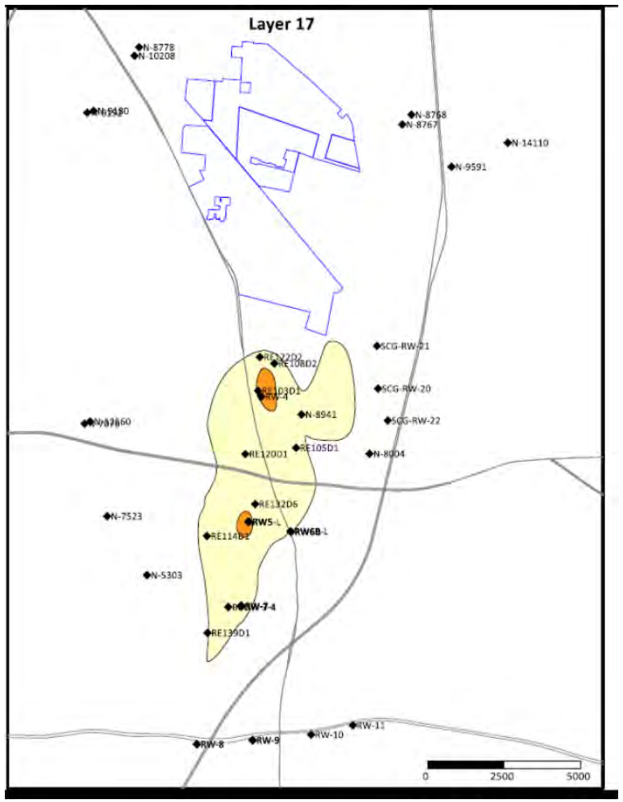
- Plume Layer 17 (approximately 700 to 750 feet below ground surface)
- Layer 17 is of primary interest because of contamination, high rate flow zone, and depth of water supplies in the area
- Layer 17 is also a target zone for remediation wells



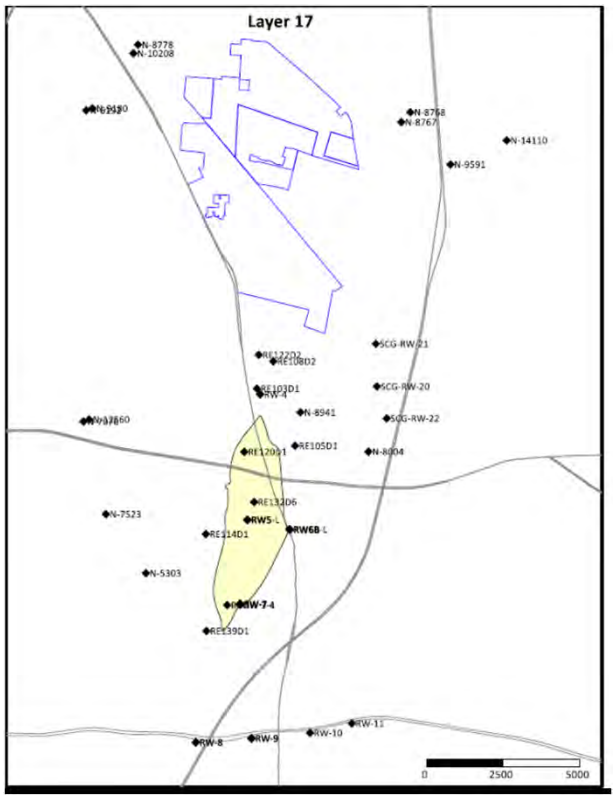
OU2 Groundwater Fate and Transport Modeling

- Preliminary Layer 17 plume cleanup estimates (greater than 100 ug/L TCE)
- Different layers and concentrations cleanup at different rates

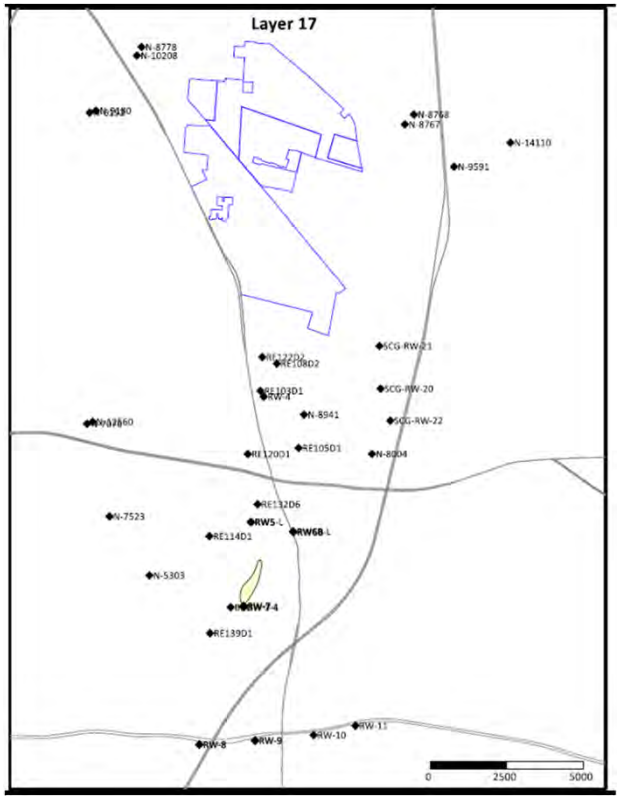
2020



2050

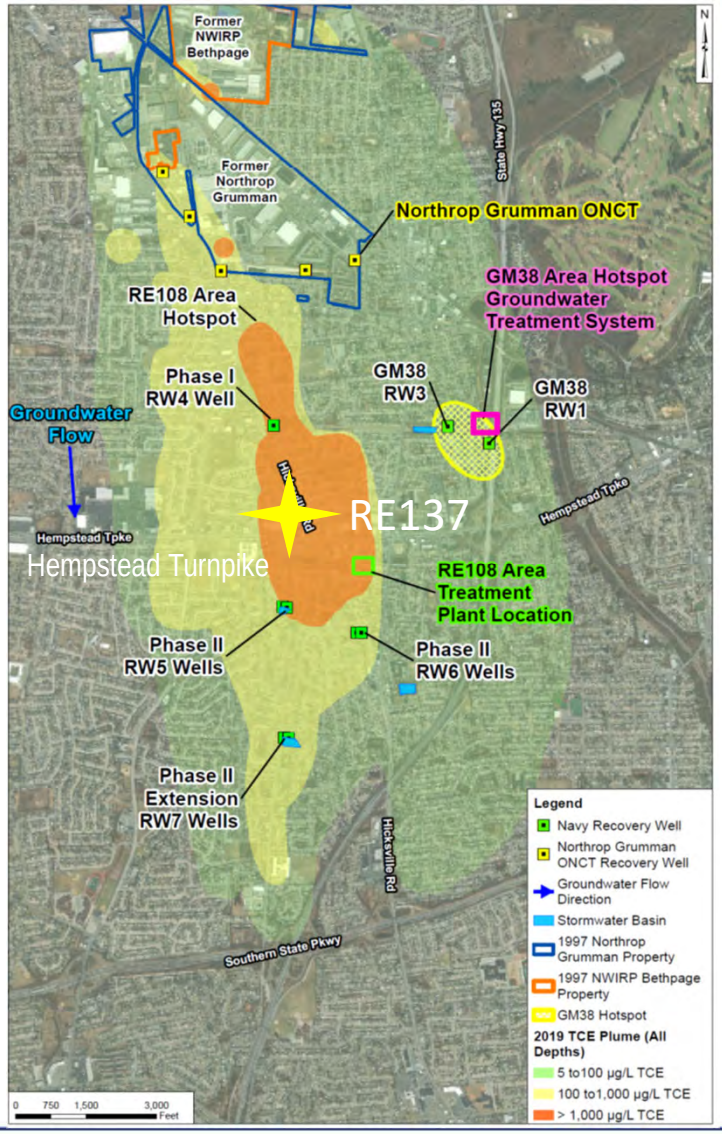


2070



RE137 Pilot-Scale Testing

- RE137 is a pumping test well that was originally considered as the location of a Phase II recovery well
- Based on pumping test results, the well was determined to be too far north to intercept the hotspot
- Interim pumping of this well is being conducted to evaluate potential benefits associated groundwater extraction at this location
- Test will run over 20 months, while groundwater monitoring is being conducted
- Treatment will consist of Advanced Oxidation Process (AOP) technology and granular activated carbon (GAC)
- System is currently under construction, with a startup planned for December 2021



Naval Facilities Engineering Systems Command
NAVFAC MID-ATLANTIC

Department of Navy
Naval Weapons Industrial Reserve Plant
Restoration Advisory Board Meeting

RE108 Phase II Groundwater Treatment Plant and Pipeline Construction and Operation

Presented by:
Stephen Matney, Project Manager
AGVIQ, LLC
16 November 2021

Presentation Topics

- RE108 Area Hotspot Treatment System - Phase II Overview
- RE108 Area Hotspot Treatment System – Phase II Status and Schedule
- Project Outreach and Monitoring
- Questions/Points of Contact

RE108 Area Hotspot Treatment System – Phase II System Overview

Construction of Water Treatment Plant

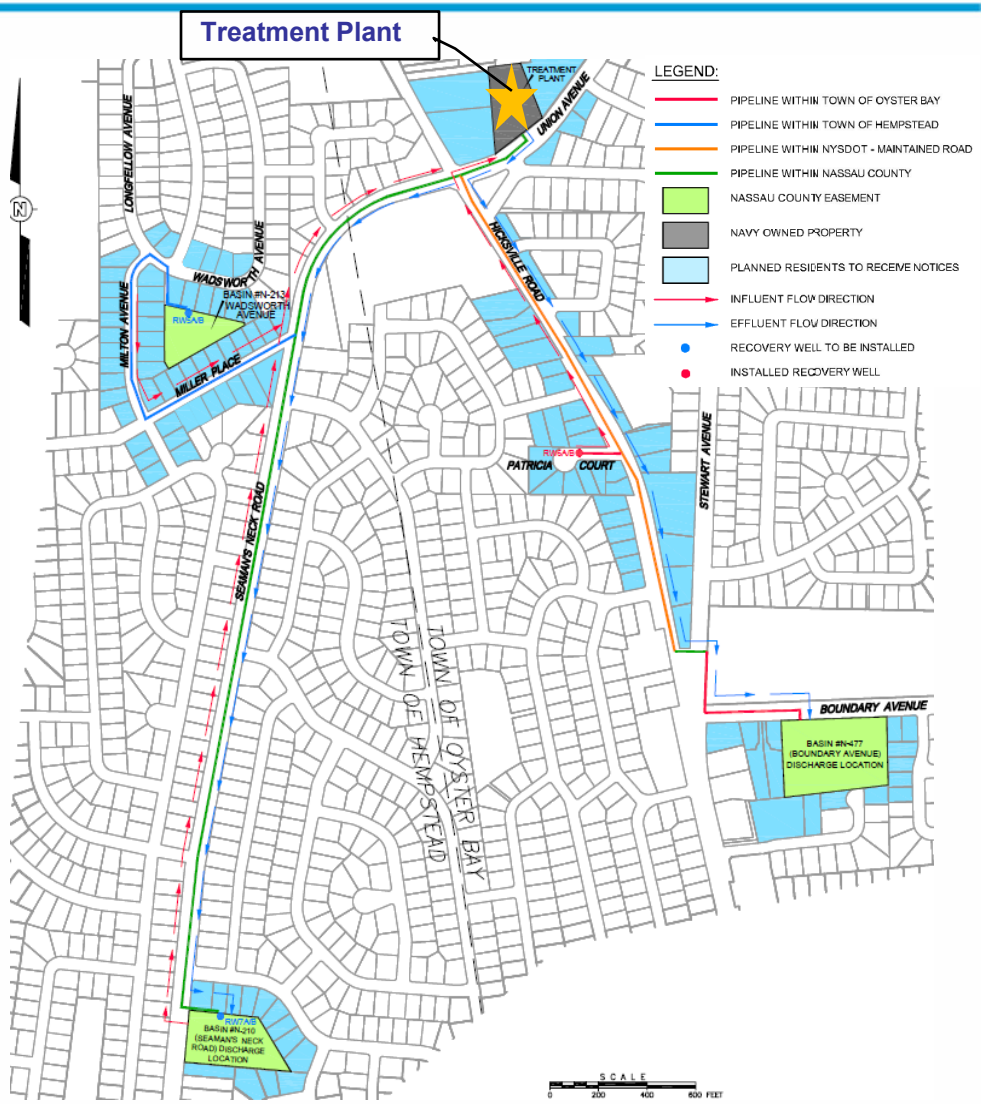
- To be constructed at 11 Union Avenue

Drilling and Installation of Recovery Wells (RWs)

- RW 5A/5B (Longfellow Avenue)
- RW 6A/6B (Patricia Court)
- RW 7A/7B (Seaman's Neck Road)

Installation of Influent and Effluent Pipelines

- RW 5A/5B Extraction Pipeline
- RW 6A/6B Extraction Pipeline
- RW 7A/7B Extraction Pipeline
- Effluent Pipeline to recharge basins N-477 (Boundary Avenue) and N-210 (Seaman's Neck Road)



RE108 Area Hotspot Treatment System – Phase II System Status and Schedule

- April 2021 - Demolition, site grading, and seeding of 11 Union Avenue completed
- September 2021 -The 100 percent design was completed and issued for construction by Tetra Tech.
- March 2021 - Tetra Tech began recovery well installation.
  - RW6A/B located on Patricia Court in the Town of Oyster Bay
  - RW7A/B located at Nassau County stormwater basin N-210
  - RW5A/5B located at Nassau County stormwater basin N-213
- December 2021 - Mobilization for construction of the Groundwater Treatment Plant at 11 Union Avenue.


11 Union Avenue After Demolition


RW6B Under Construction

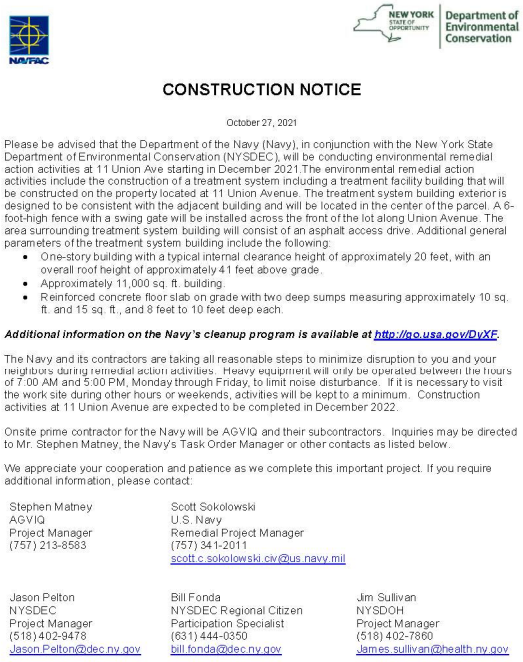
RE108 Area Hotspot Treatment System – Phase II System Status and Schedule

Project Activities	Estimated Dates
Construction of Water Treatment Plant	December 2021 – December 2022
Drilling and Installation of Recovery Wells	March 2021 – November 2022
Installation of Conveyance Pipelines	February 2022 – May 2022
Commissioning Operations	August 2022 – December 2022

Project Outreach and Monitoring

- AGVIQ and NAVFAC intend to conduct a Pre-construction meeting and routine progress update meetings throughout construction for representatives from the Town of Oyster Bar and the Town of Hempstead, property owners, and nearby residents.

- October 2021 – AGVIQ and NAVFAC hand-delivered Construction Notices to buildings/residents surrounding 11 Union Avenue and will hand-deliver Construction Notices to residences in close proximity of the pipeline work prior to start of construction.



NAVFAC

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

CONSTRUCTION NOTICE

October 27, 2021

Please be advised that the Department of the Navy (Navy), in conjunction with the New York State Department of Environmental Conservation (NYSDEC), will be conducting environmental remedial action activities at 11 Union Ave starting in December 2021.The environmental remedial action activities include the construction of a treatment system including a treatment facility building that will be constructed on the property located at 11 Union Avenue. The treatment system building exterior is designed to be consistent with the adjacent building and will be located in the center of the parcel. A 6-foot-high fence with a swing gate will be installed across the front of the lot along Union Avenue. The area surrounding treatment system building will consist of an asphalt access drive. Additional general parameters of the treatment system building include the following:

- One-story building with a typical internal clearance height of approximately 20 feet, with an overall roof height of approximately 41 feet above grade.
- Approximately 11,000 sq. ft. building.
- Reinforced concrete floor slab on grade with two deep sumps measuring approximately 10 sq. ft. and 15 sq. ft., and 8 feet to 10 feet deep each.

Additional information on the Navy's cleanup program is available at http://go.usa.gov/DvXF.

The Navy and its contractors are taking all reasonable steps to minimize disruption to you and your neighbors during remedial action activities. Heavy equipment will only be operated between the hours of 7:00 AM and 5:00 PM, Monday through Friday, to limit noise disturbance. If it is necessary to visit the work site during other hours or weekends, activities will be kept to a minimum. Construction activities at 11 Union Avenue are expected to be completed in December 2022.

Onsite prime contractor for the Navy will be AGVIQ and their subcontractors. Inquiries may be directed to Mr. Stephen Matney, the Navy's Task Order Manager or other contacts as listed below.

We appreciate your cooperation and patience as we complete this important project. If you require additional information, please contact:

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Remedial Project Manager
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Project Outreach and Monitoring (continued)

- The Navy and its contractors will take all reasonable steps to minimize disruption to the neighbors
  - Heavy equipment operations are limited to the hours between 8:00 AM and 5:00 PM to limit noise disturbance
  - Affected school bus schedules will be identified and construction operations modified, as appropriate, to limit interruption and safety risks to the students
  - Noise and dust monitoring will be conducted at the perimeter of the work zones

Questions/Points of Contact

Point of Contact	Name	Contact Information
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Naval Facilities Engineering Systems Command
NAVFAC MID-ATLANTIC

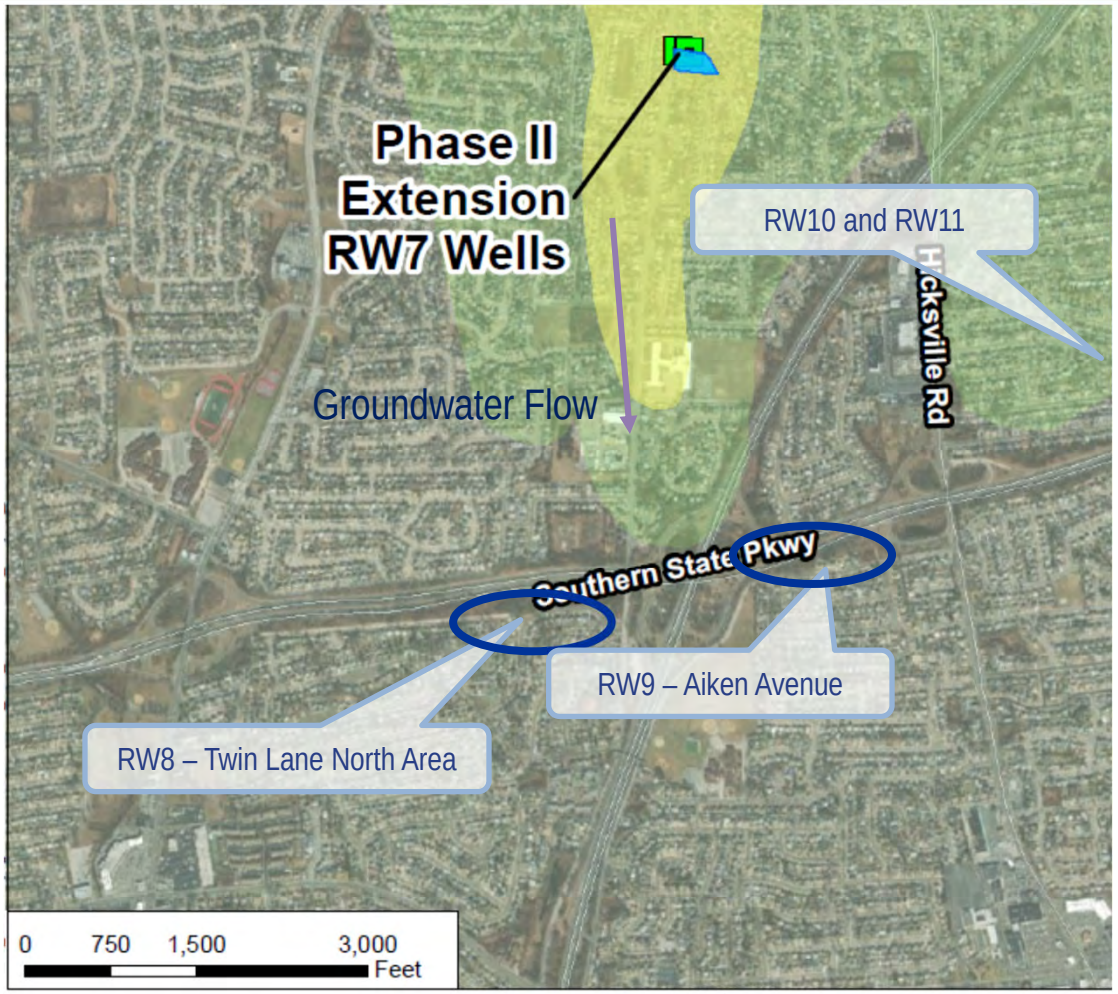
Department of Navy
Naval Weapons Industrial Reserve Plant
Restoration Advisory Board Meeting

Phase III (RW8 and RW9) – Southern Plume Intercept Treatment System Update

Presented by:
David Brayack, Project Manager
Tetra Tech
16 Nov 2021

Phase III – Southern Plume Intercept Treatment System, Borings, Wells, and Treatment Plant

- Location is based on extensive monitoring of plume migration and modeling of groundwater flow
- Additional pre-design investigations and testing are required in this area (well depth and pumping rates)
- Work is broken into Part A and B
- Part A - RW8 and RW9 target deep groundwater that is not captured by Recovery Well RW7 – Initial focus
- Part B – RW10 and RW11 wells possible to the northeast, with a separate treatment plant – shallow groundwater
- Part B System requirements are dependent on additional plume delineation planned for 2022



Phase III – Southern Plume Intercept Treatment System, Borings, Wells, and Treatment Plant

- Schedule - Drilling at Twin Lane North started in March 2021 (brush clearing and fencing), with four periods of activity anticipated:
  - Vertical Profile Boring (1) and wells (3) installation - April to August 2021
  - Recovery Well installation and aquifer testing - late 2021 to mid 2022 to support Pre-design data needs
  - Treatment System design 2022 to 2023 – finalize treatment requirements, building size, and location, piping runs, and discharge point
  - Treatment Plant construction and operation to start in 2024
- RW9 activities started in Oct 2021 and will be completed in 2022