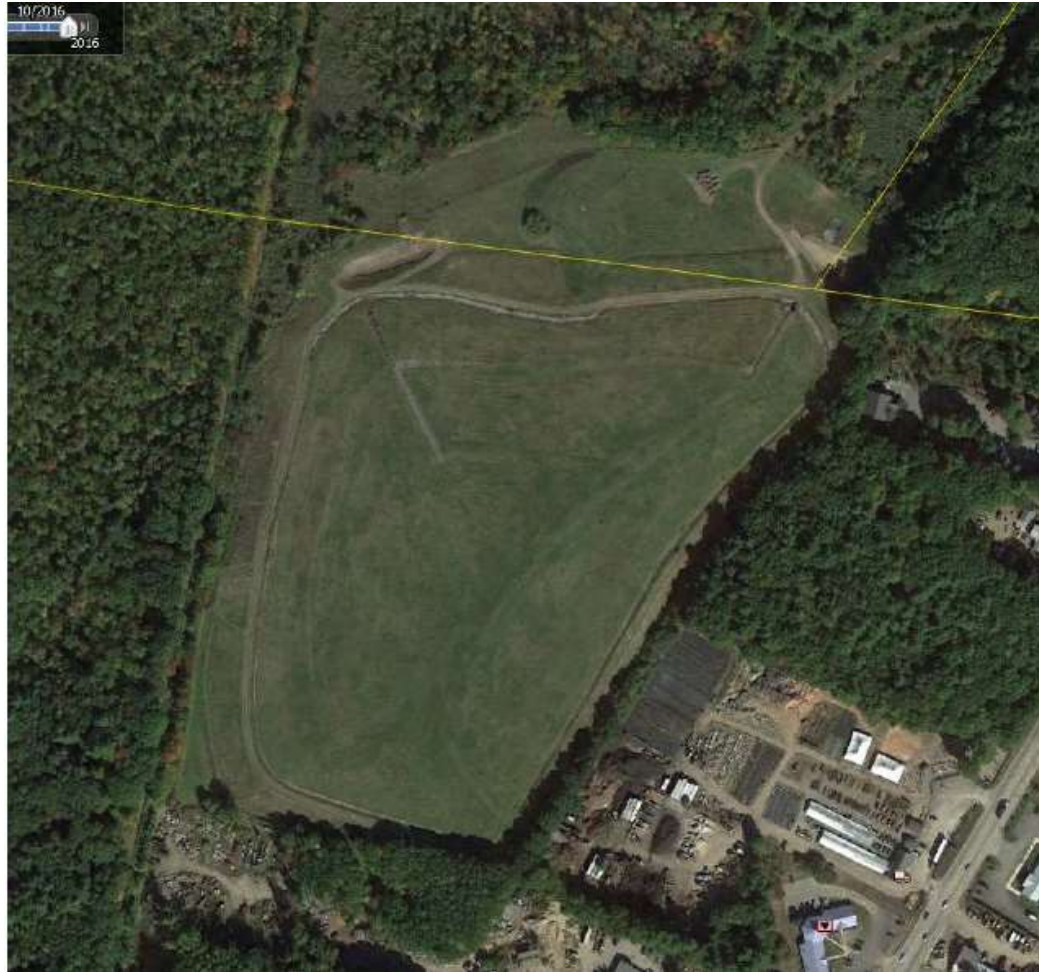




# Coakley Landfill Update



Public Meeting  
November 15, 2017  
North Hampton Town Hall

# Presentation Outline

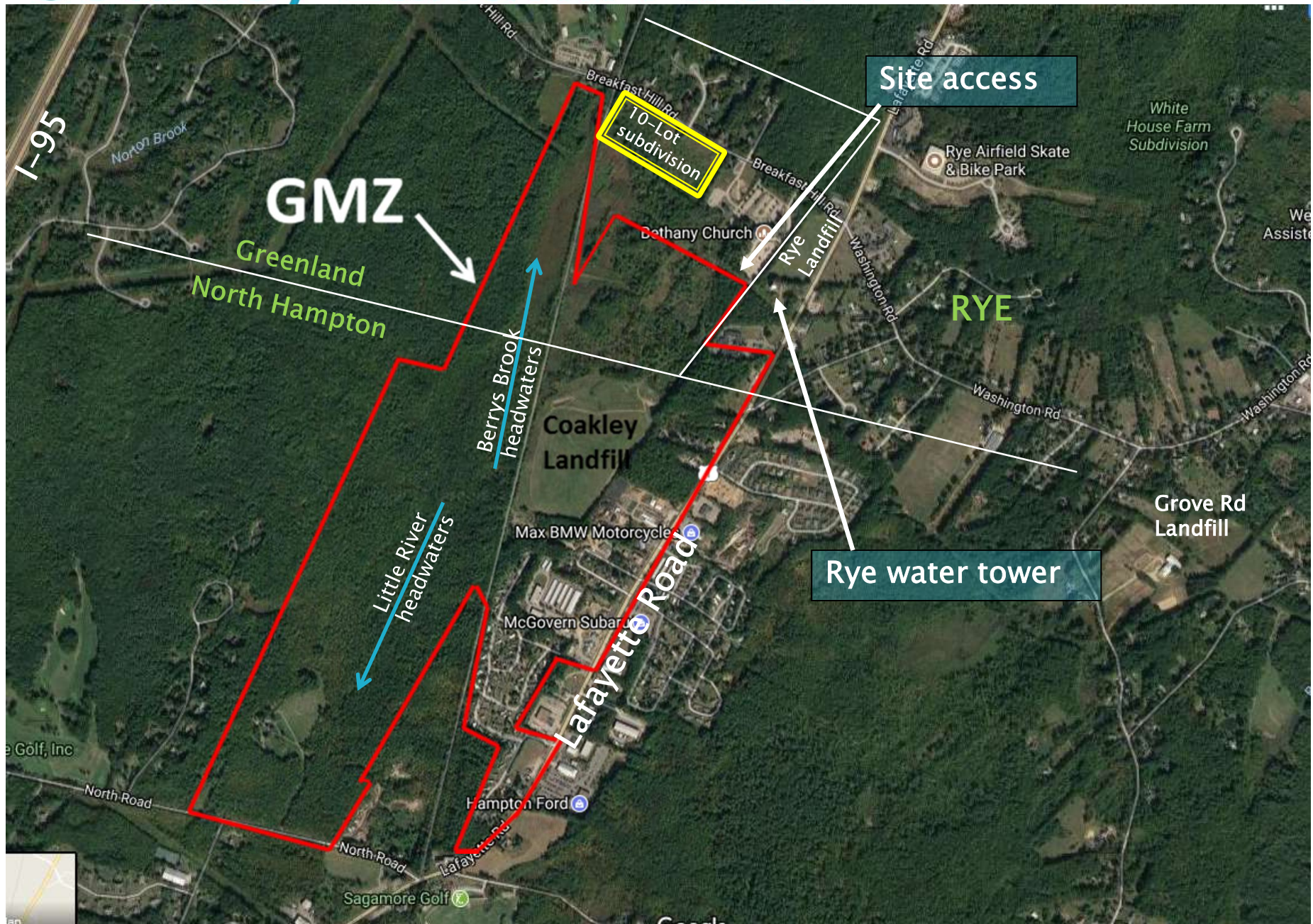


1. Site Background/History  
Drew Hoffman / NHDES
2. Recent and on-going fieldwork  
Mike Deyling / CES, Consultant to CLG
3. Current status and next steps  
Gerardo Millán-Ramos / US-EPA
4. Community Involvement  
Jim Murphy / US-EPA
5. Questions and discussion





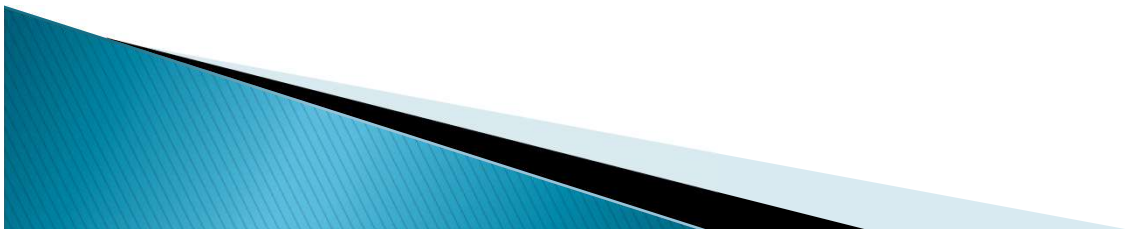
# Coakley Landfill Area



# Site Background

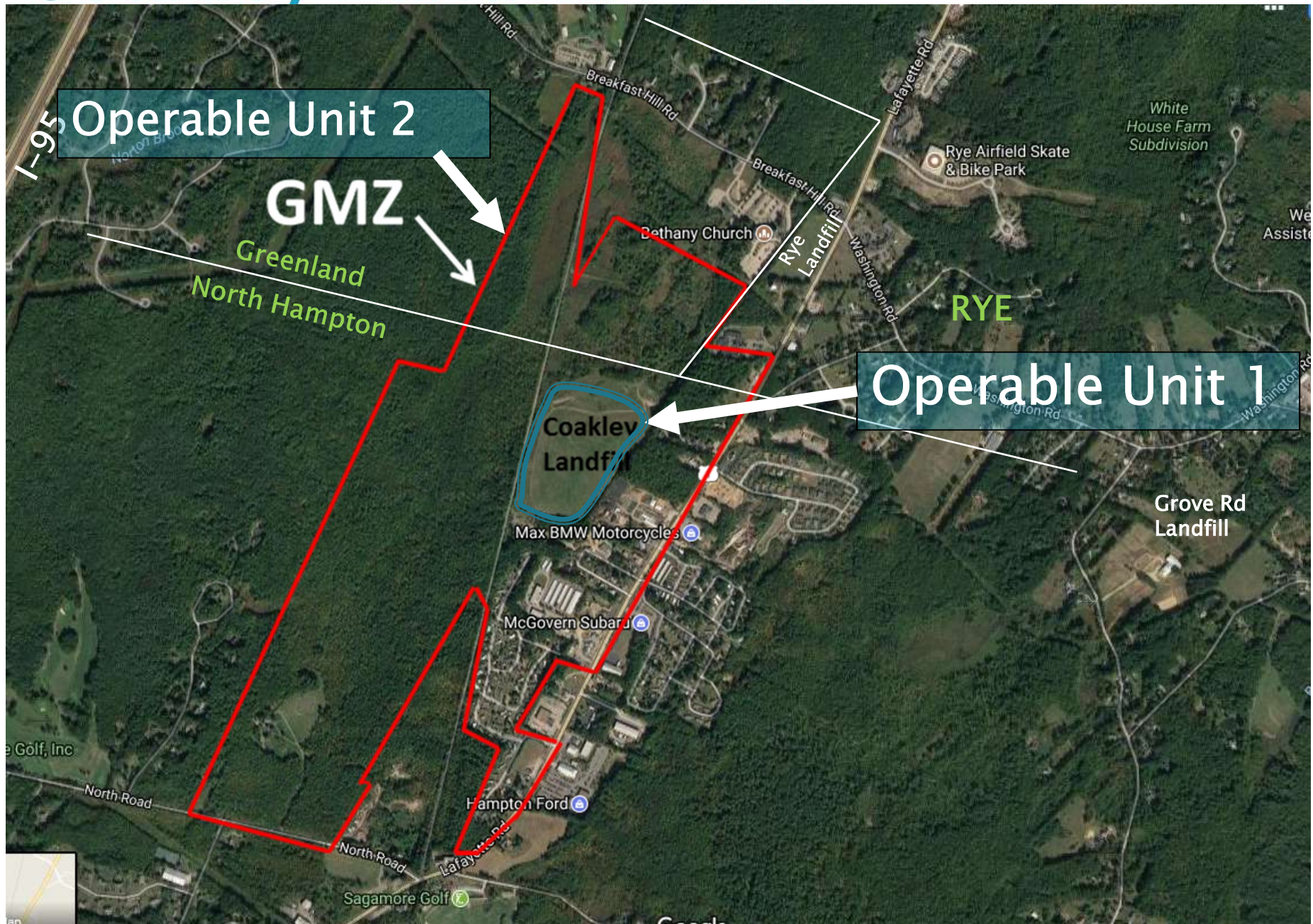


- 1972 - 1985 received waste & incinerator ash from Portsmouth, North Hampton, Newington, New Castle, and DOD facilities.
- 1979-83 area groundwater impacts to private wells identified
- 1983 listed on NPL
- 1983-1994 – Site investigation & PRP negotiations
- 1988-92 Public Health Assessment
- 1998 Construction of landfill cap completed
- 2001, 2006, 2011, 2016 – 5-Year Reviews
- 27 acre unlined landfill in North Hampton (Operable Unit-1)
- ~200 acre Groundwater Management Zone (GMZ) in North Hampton, Greenland, and Rye (Operable Unit-2)





# Coakley Landfill Area



# Remedy Background



- OU 1: Consolidation, capping, & fencing of landfill – 1998
  - Gas monitoring
  - Groundwater contamination
  - Most contaminants of concern below the cleanup level (except benzene, As, Mn)
  - At the time, extraction and treatment of gw determined not to be necessary
- OU 2: Natural Attenuation, Groundwater Monitoring, and Institutional Controls
- NHDES Groundwater Management Permit – 2008
- 2015 ESD incorporated 1,4-dioxane as COC





# Emergent Contaminant Timeline

## ▶ 1,4-Dioxane

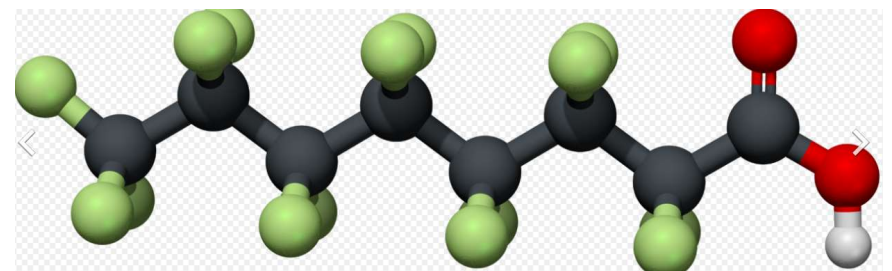
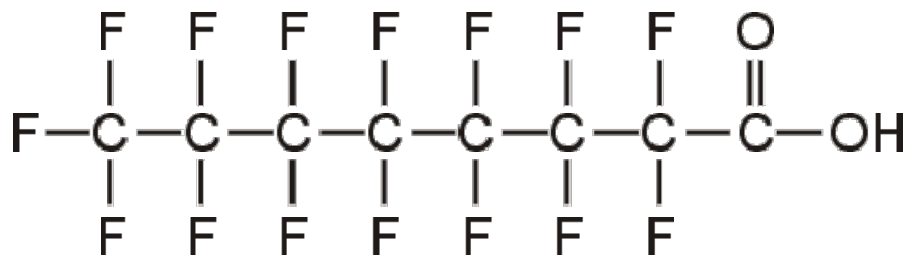
- 2008 – NHDES established GW sampling requirements
- 2009 – 1,4-dioxane discovered at Coakley
- 2015 – Incorporated as site COC through ESD

## ▶ PFAS (per- and polyfluoroalkyl substances)

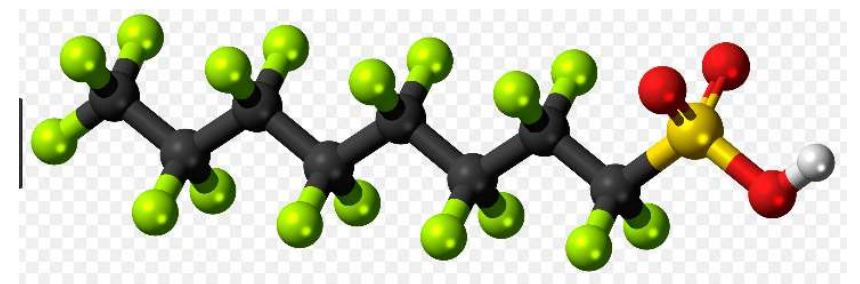
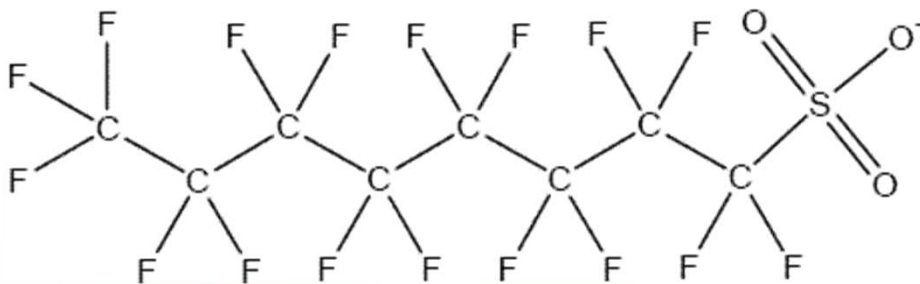
- 2014 – discovered at Pease AFB (Haven Well closure)
- 2016 –
  - Discovered near Saint Gobain (Merrimack/ Litchfield)
  - May – EPA released revised Drinking Water Health Advisory
  - June – NHDES emergency rule-making to adopt HA as AGQS
  - June/July – CLG sampled PFASs at Coakley (HA/AGQS exceeded)
  - NHDES initiates private water supply sampling
  - October – NHDES formally adopts AGQS for PFOA & PFOS

# PFOA and PFOS

- ▶ Perfluorooctanoic acid (PFOA – C8) primarily used as a surfactant in the production of other fluorochemicals, including PTFE (Teflon®), and in related manufacturing processes; often produced as its ammonium salt, ammonium perfluorooctanoate (APFO)



- ▶ Perfluorooctane sulfonate (PFOS) has variety of uses including surface treatments, paper coatings, firefighting foam





# Expansive Use of PFAS/PFCs

Commercial Products	Industrial Uses
Cookware (Teflon®, Nonstick) Fast Food Containers Candy Wrappers Microwave Popcorn Bags Personal Care Products (Shampoo, Dental Floss) Cosmetics (Nail Polish, Eye Makeup) <b>Car wash treatment products</b> Paints and Varnishes Stain Resistant Carpet Stain Resistant Chemicals (Scotchgard®) Water Resistant Apparel (Gore-Tex®) Cleaning Products Electronics Ski Wax	Photo Imaging Metal Plating Semiconductor Coatings Aviation Hydraulic Fluids Medical Devices Firefighting Aqueous Film-Forming Foam Insect Baits Printer and Copy Machine Parts Chemically Driven Oil Production Textiles, Upholstery, Apparel and Carpets Paper and Packaging Rubber and Plastics

## (2016 PRP Site Sampling for PFAS)



A PLAN IN THE APRIL 2010 POP TITLED "ENVIRONMENTAL MONITORING NETWORK" DATED 08/16/07 A PLAN IN THE 1999 SEDIMENT, SURFACE WATER AND GROUNDWATER MONITORING PLAN TITLED (ING, INC.), AND CITY OF PORTSMOUTH SUBMETER-GPS LOCATIONS FOR SITE MONITORING POINTS. Y WELL LOCATIONS BASED ON NH GRANIT AERIAL PHOTOGRAPHY AND THE ABOVE REFERENCE SITE TIONS AND SCALE ARE APPROXIMATE.

INES BASED ON AFOREMENTIONED PLANS. PROPERTIES IN GREENLAND ON BREAKFAST HILL ROAD  
NILAND TAX MAP R-1 (DATED APRIL 1, 2013).

UPON "GMZ BOUNDARY PLAN" DATED MAY 9, 2008 INCLUDED IN THE 2008 GMP APPLICATION  
OCIATES, AND 2013 GMZ EXPANSION AREA ESTABLISHED BY THE 2013 GMP DATED JANUARY 7, 2014.

**COAKLEY LANDFILL SUPERFUND SITE  
THAMPTON & GREENLAND, NEW HAMPSHIRE  
PRELIMINARY PEG CONCENTRATIONS (PBT)**

DWG: **FIGURE 1-2**

BY:	TND
-----	-----

DATE: 2016-02-16

REV:	DESCRIPTION:

REV DATE:

DESCRIPTION:

1

**CES**  **INC**



# NHDES Sampling Efforts

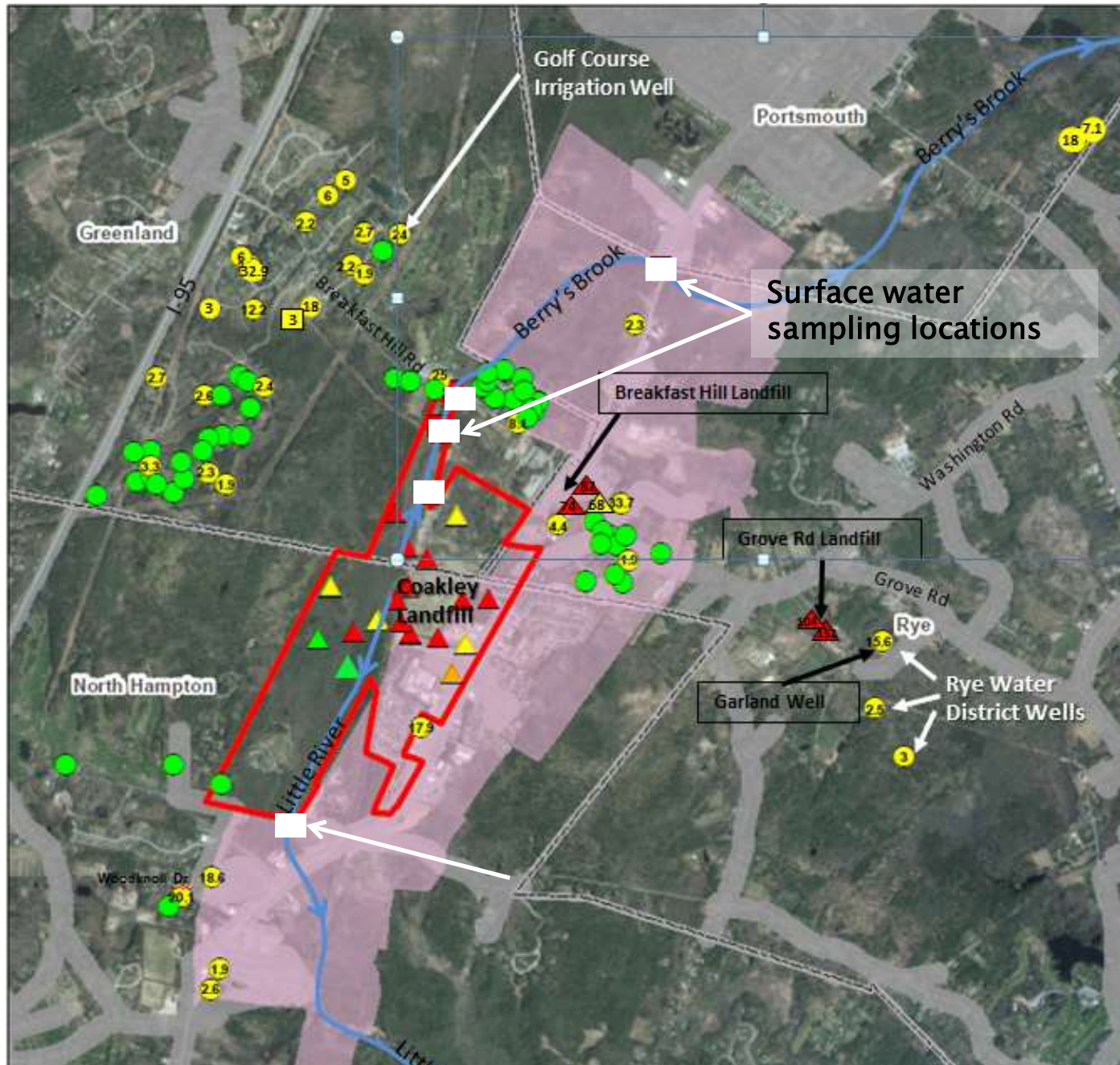
## Private Wells & SW Sampling



- ❑ MTBE able to expedite private well sampling
- ❑ NHDES trained personnel & contract laboratories
- ❑ 84 Private wells & 5 surface water locations
- ❑ Ensure area drinking water does not exceed EPA–Health Advisory/NH–AGQS
- ❑ Respond to public concern of SW contamination











# Recent PFAS Data




## COAKLEY AREA PFAS GROUNDWATER INVESTIGATION

 Coakley Landfill  
GMZ (Approximate)

### PFOA + PFOS (PPT)

Supply Well	Monitoring Well	
		≥70
		40 - <70
		<40
		ND

 Postcards Mailed

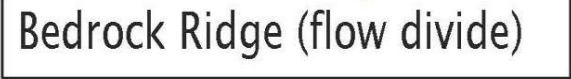
 Water Distribution

 Political Boundary



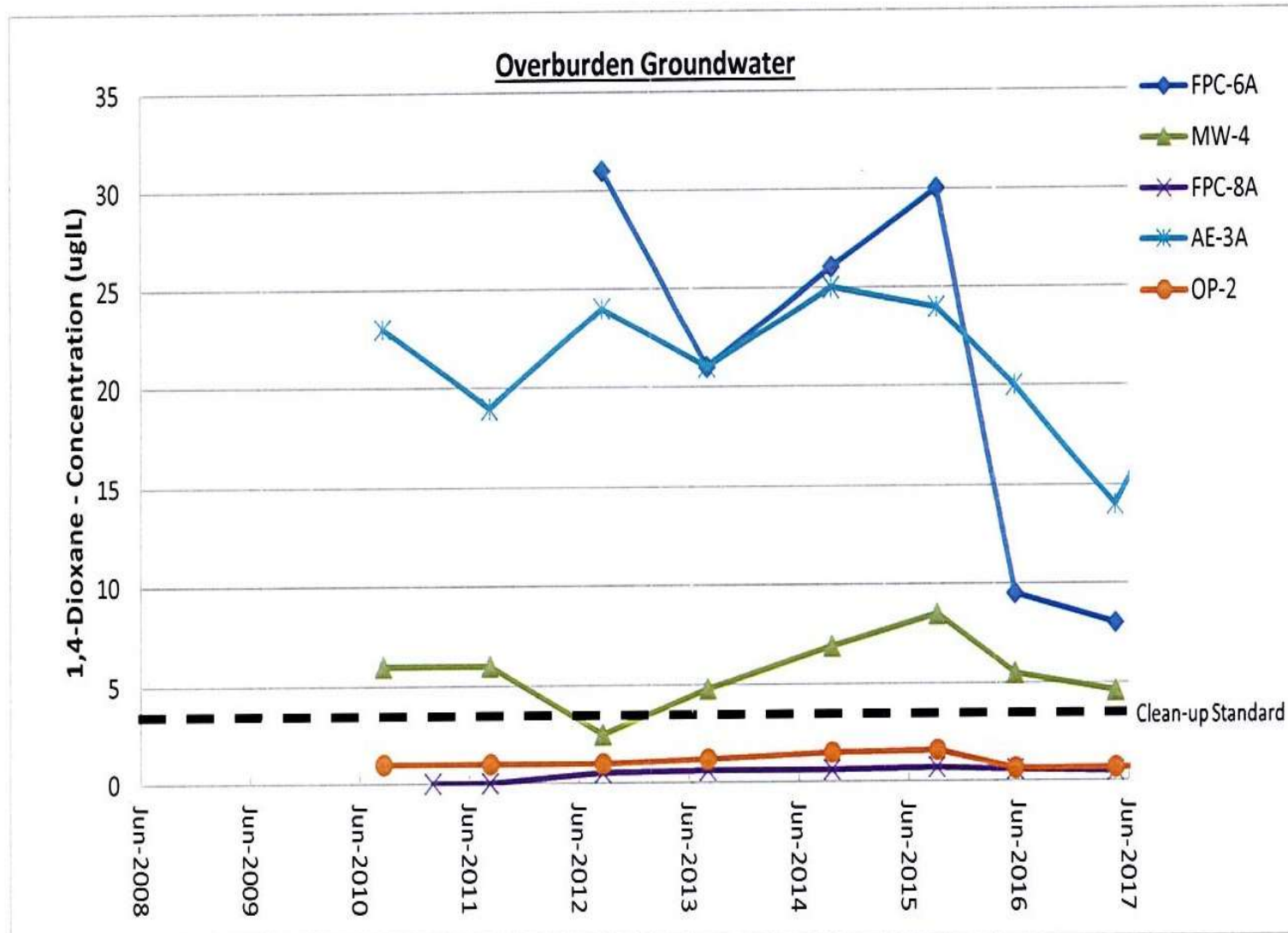


exist in all directions—predominantly north and west (Greenland)





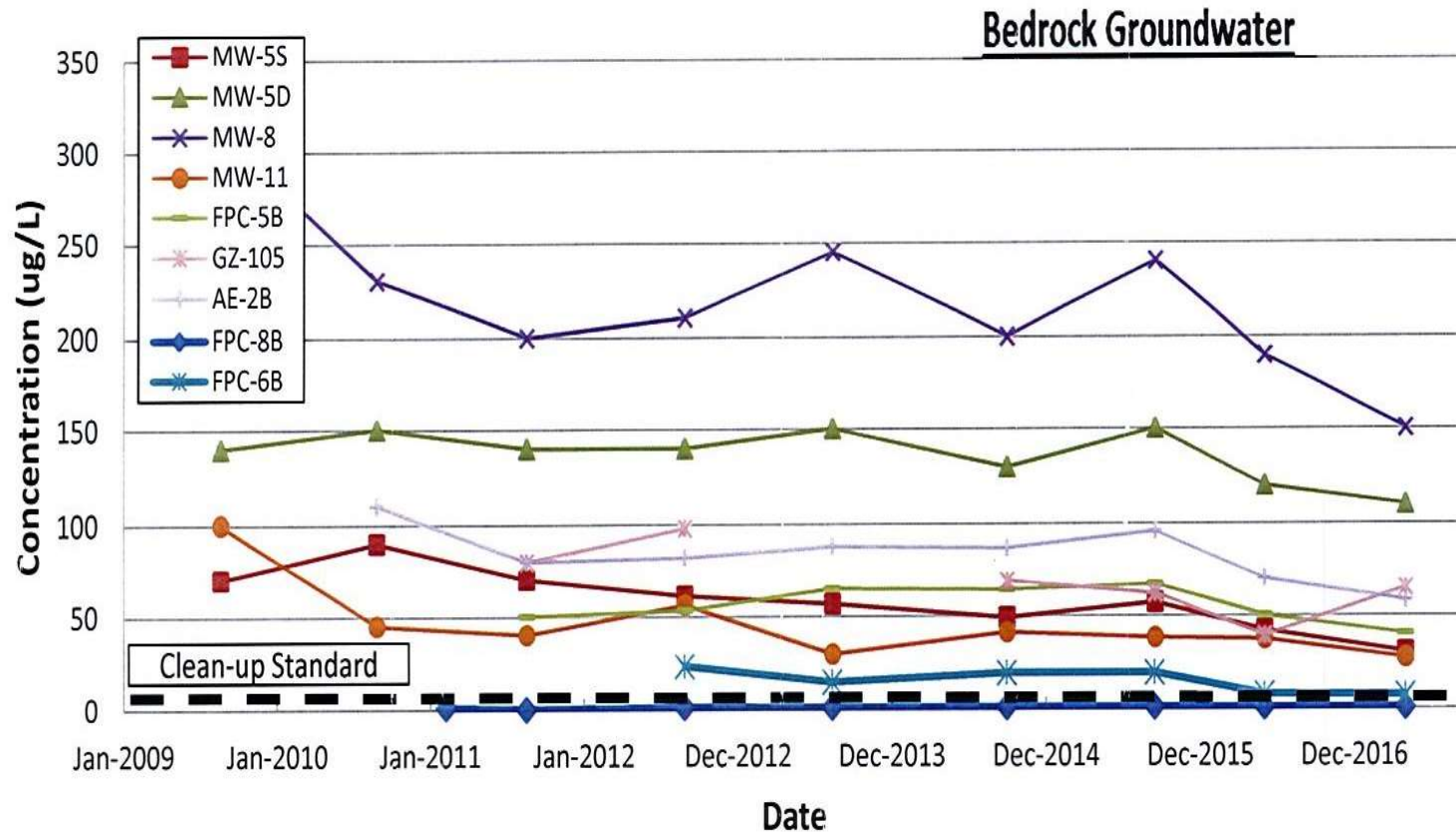
# TIME SERIES-1,4 DIOXANE



## NOTES:

1. Clean-up Standard for 1,4-dioxane is 3 ug/L.
2. Non-Detects are plotted at zero.
3. In instances where primary and duplicate samples were collected, the higher value is plotted.

# TIME SERIES-1,4 DIOXANE

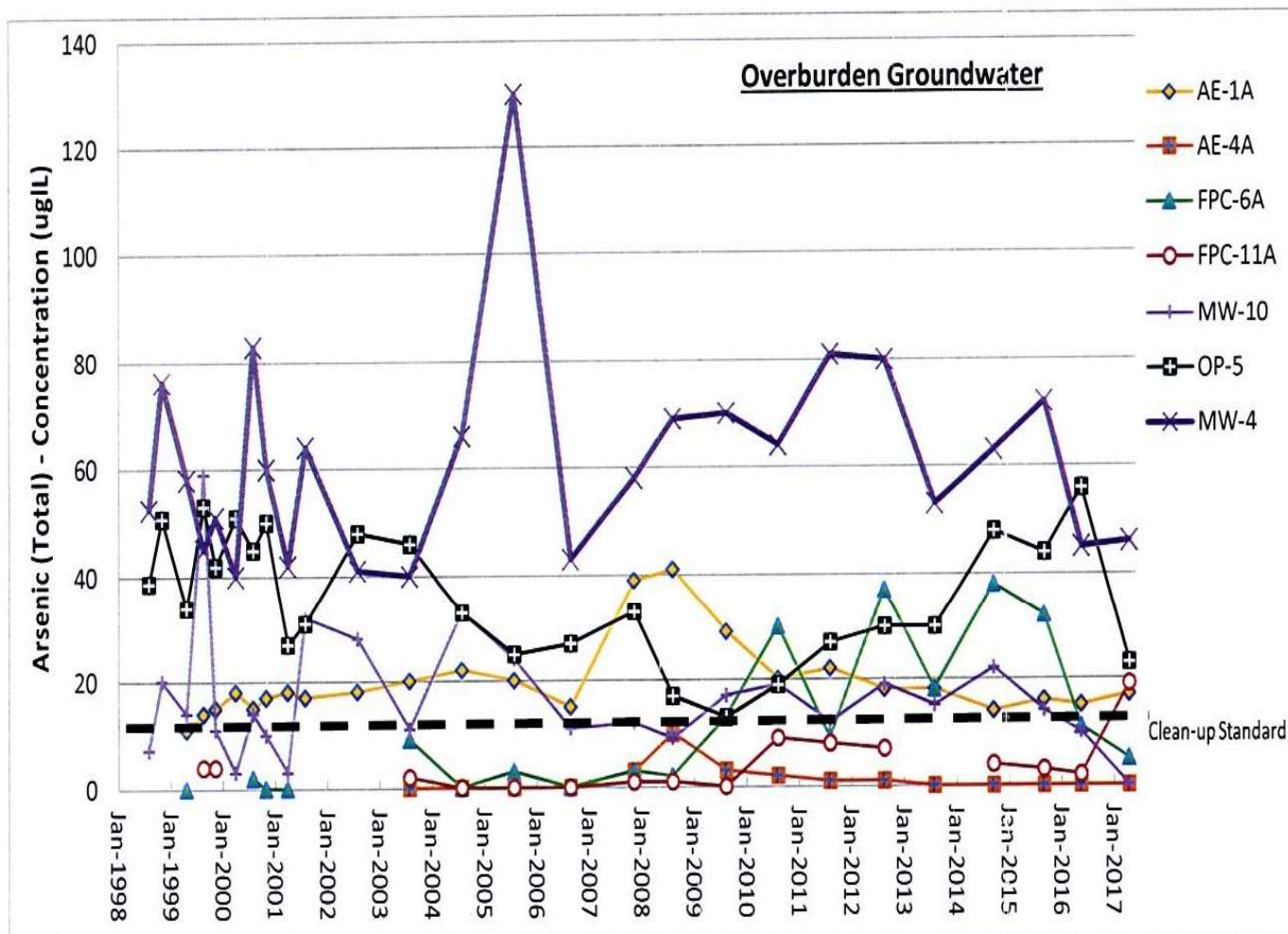


## NOTES:

1. Clean-up Standard for 1,4-Dioxane is 3 ug/L
2. Non-Detects are plotted at zero.
3. In instances where primary and duplicate samples were collected, the higher value is plotted.



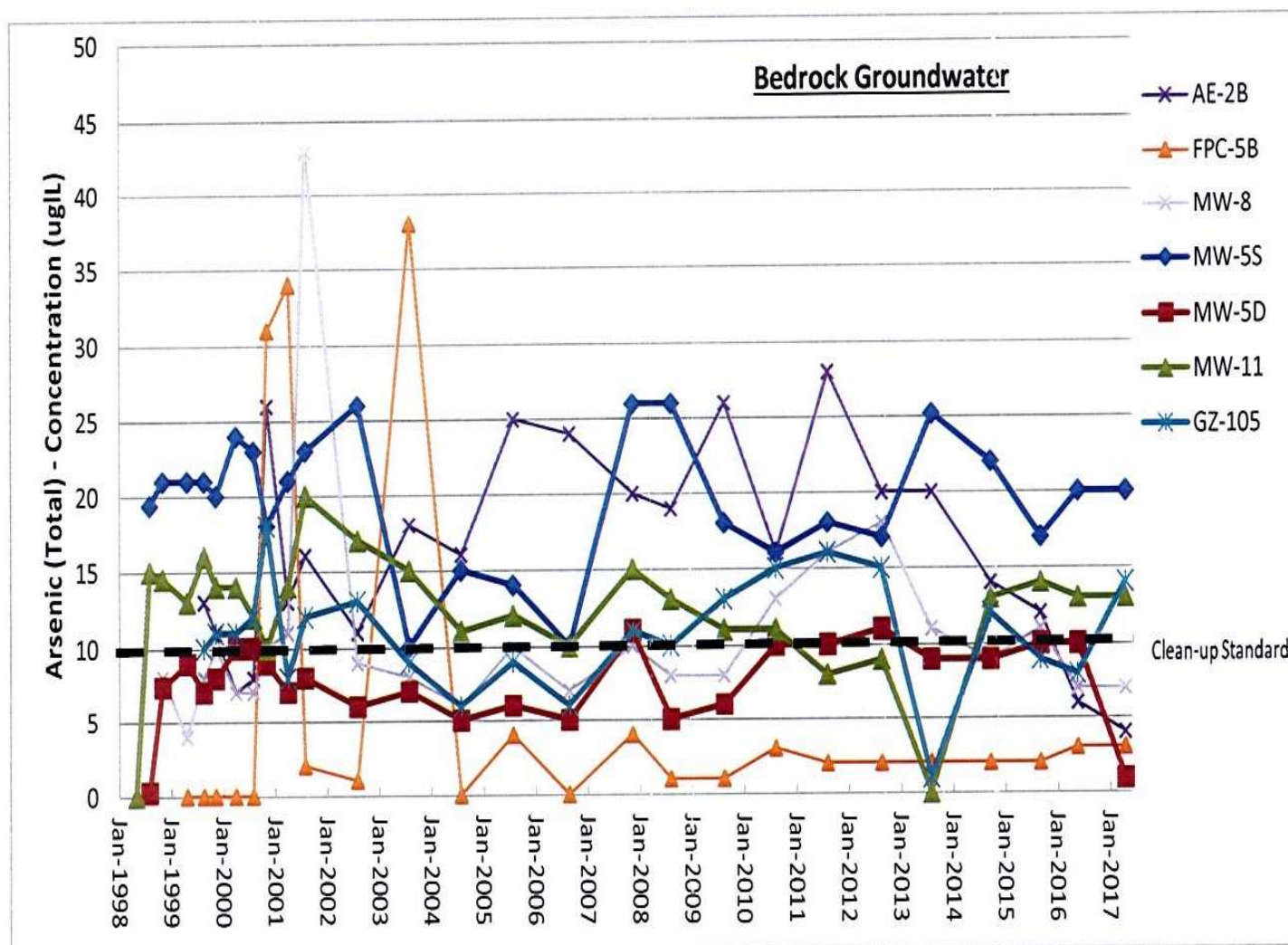
# TIME SERIES-ARSENIC



## NOTES:

1. Clean-up Standard Standard for Arsenic is 10 ug/L.
2. Non-Detects are plotted at zero.
3. In instances where primary and duplicate samples were collected, the higher value is plotted.
4. Total Arsenic results are plotted for events prior to Fall 2014. Beginning in Fall 2014 samples from all overburden wells were filtered (0.45 micron) at the time of sampling and Dissolved Arsenic results are plotted.

# TIME SERIES-ARSENIC

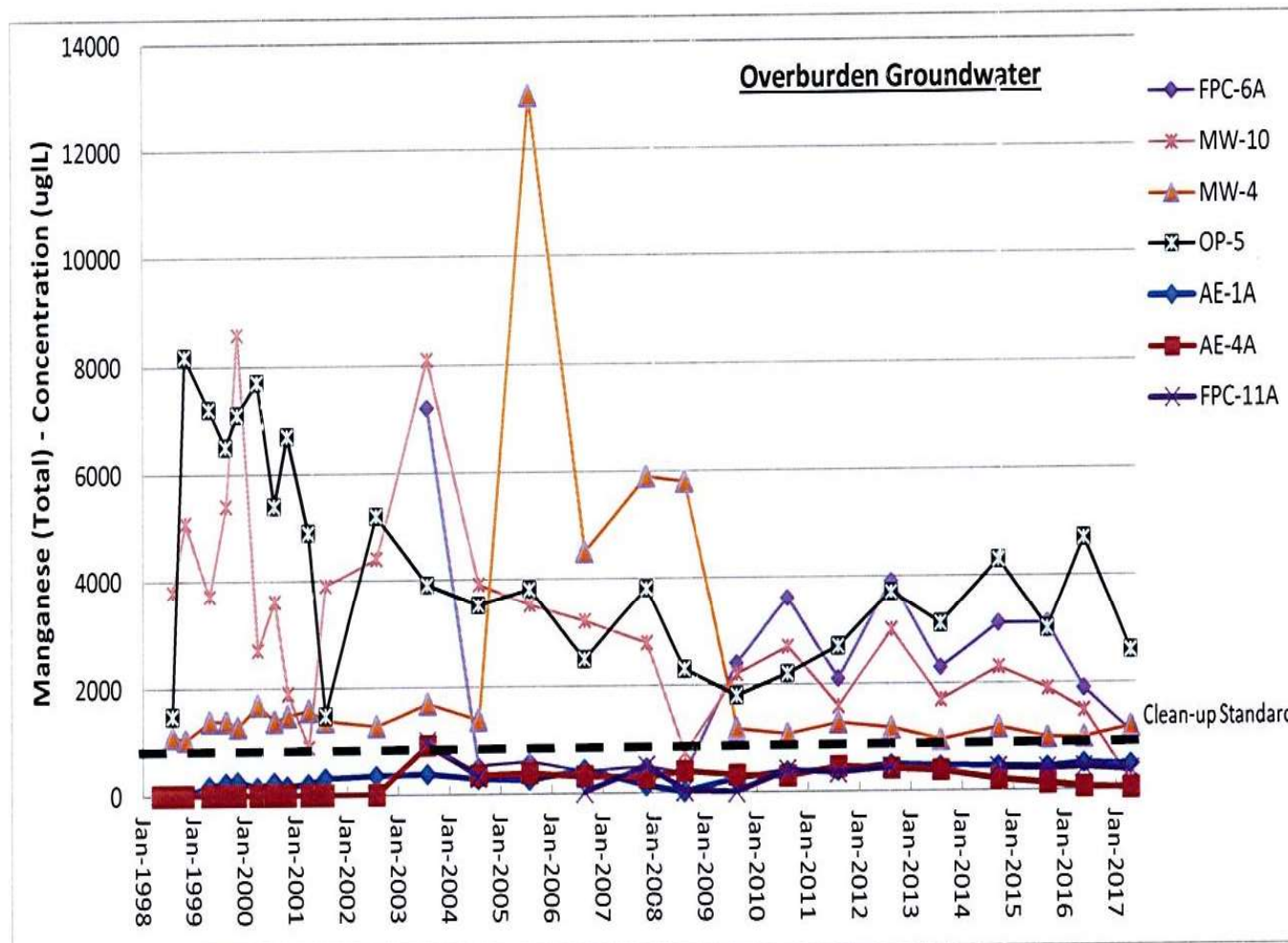


## NOTES:

1. Clean-up Standard for Arsenic is 10 ug/L.
2. Non-Detects are plotted at zero.
3. In instances where primary and duplicate samples were collected, the higher value is plotted.



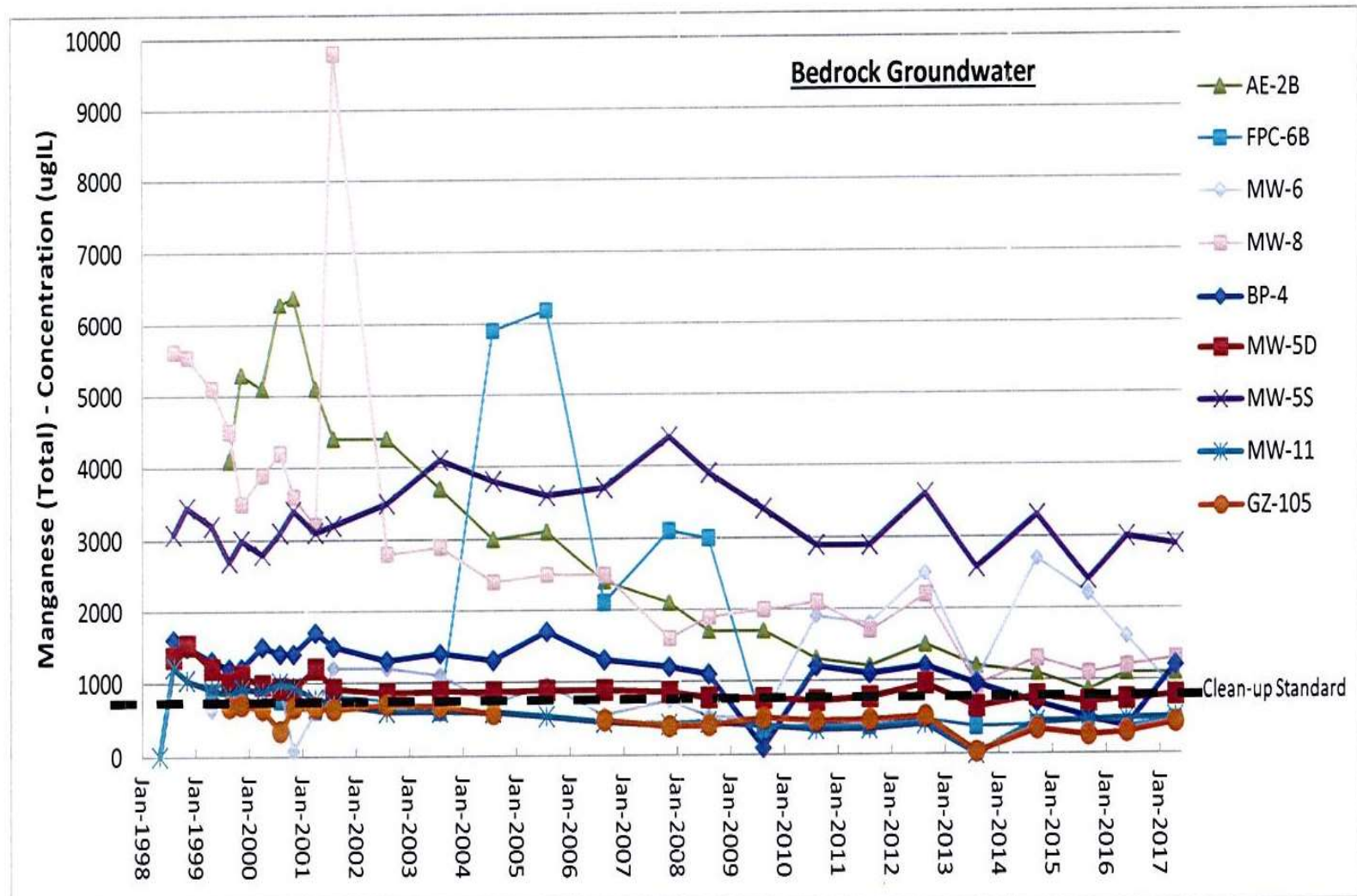
# TIME SERIES-MANGANESE



## NOTES:

1. Clean-up Standard for Manganese is 840 ug/L.
2. Non-Detects are plotted at zero.
3. In instances where primary and duplicate samples were collected, the higher value is plotted.
4. Total Manganese results are plotted for events prior to Fall 2014. Beginning in Fall 2014 samples from all overburden wells were filtered (0.45 micron) at the time of sampling and Dissolved Manganese results are plotted.

# TIME SERIES-MANGANESE

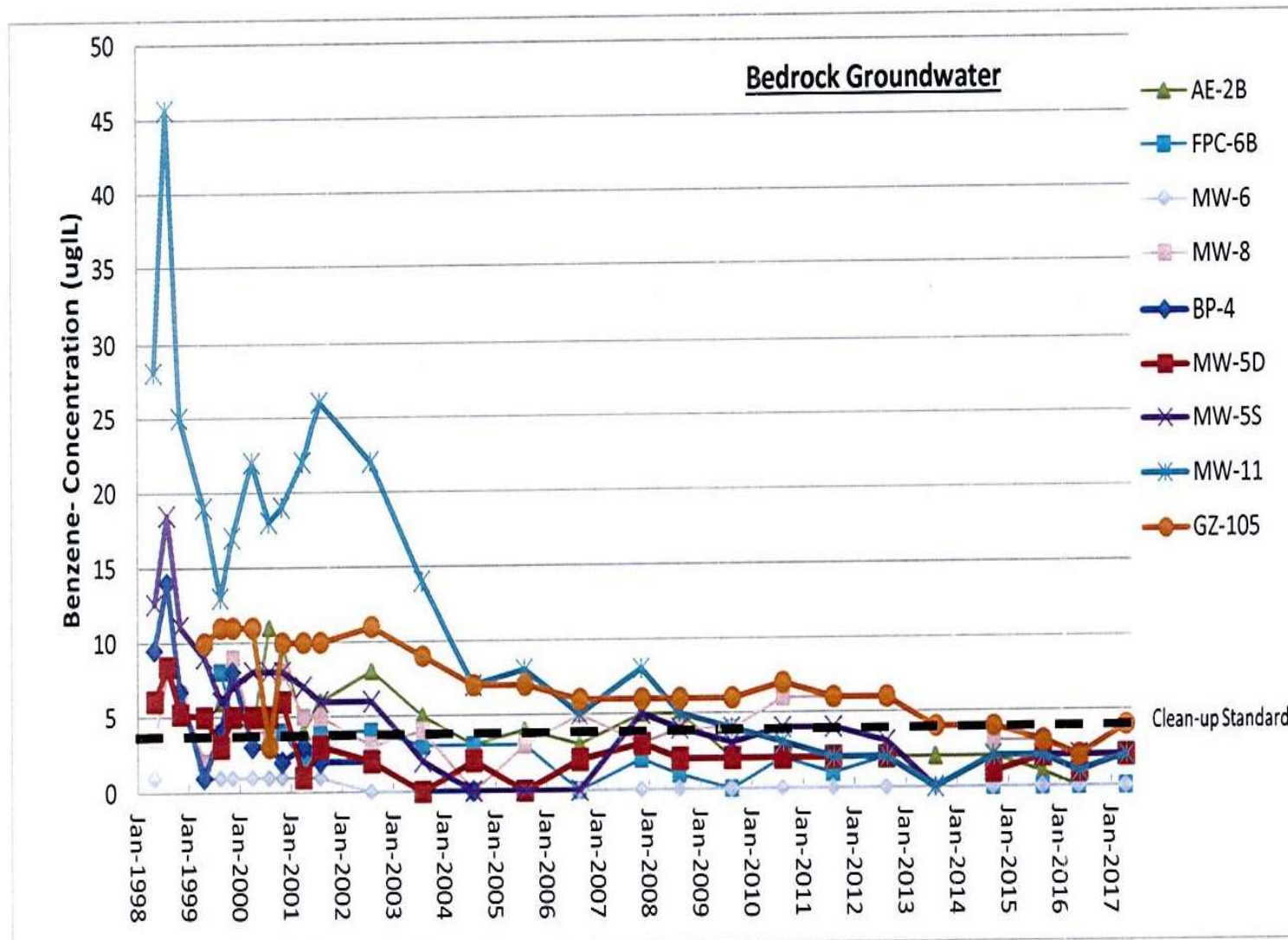


## NOTES:

1. Clean-up Standard for Manganese is 840 ug/L.
2. Non-Detects are plotted at zero.
3. In instances where primary and duplicate samples were collected, the higher value is plotted.



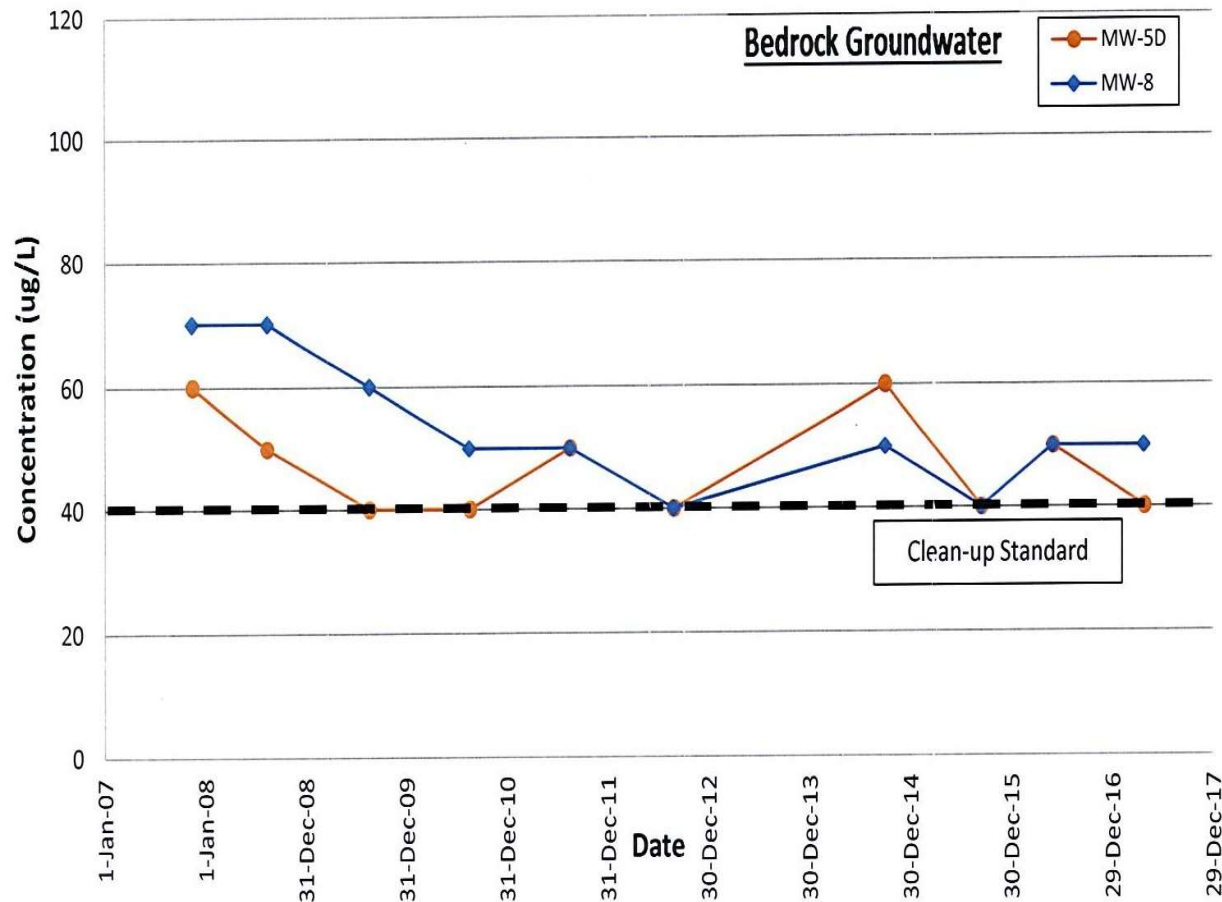
# TIME SERIES-BENZENE



## NOTES:

1. Clean-up Standard for Benzene is 5 ug/L.
2. Non-Detects are plotted at zero.
3. In instances where primary and duplicate samples were collected, the higher value is plotted.

# TIME SERIES-TERTIARY-BUTYL ALCOHOL

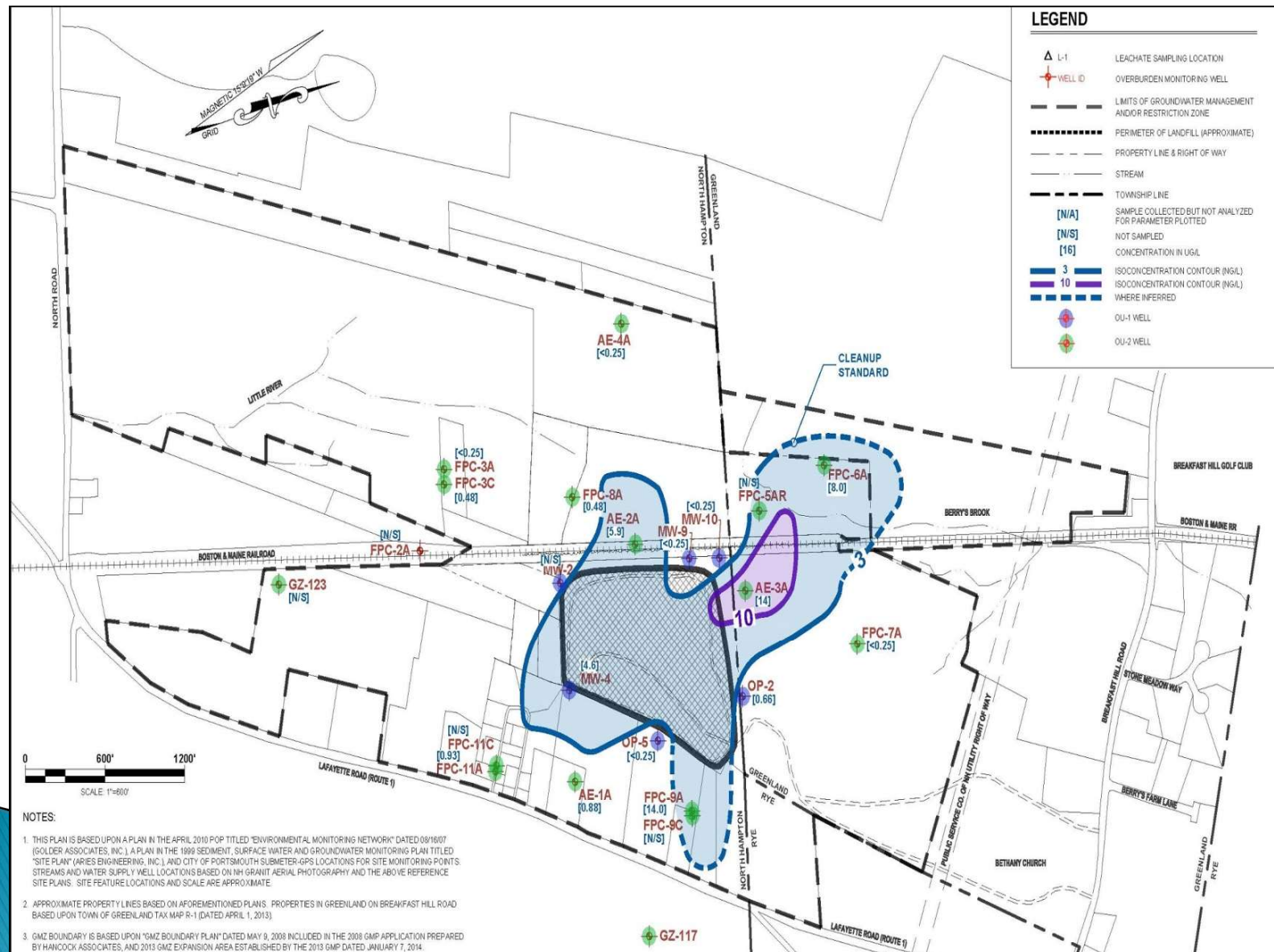


## NOTES:

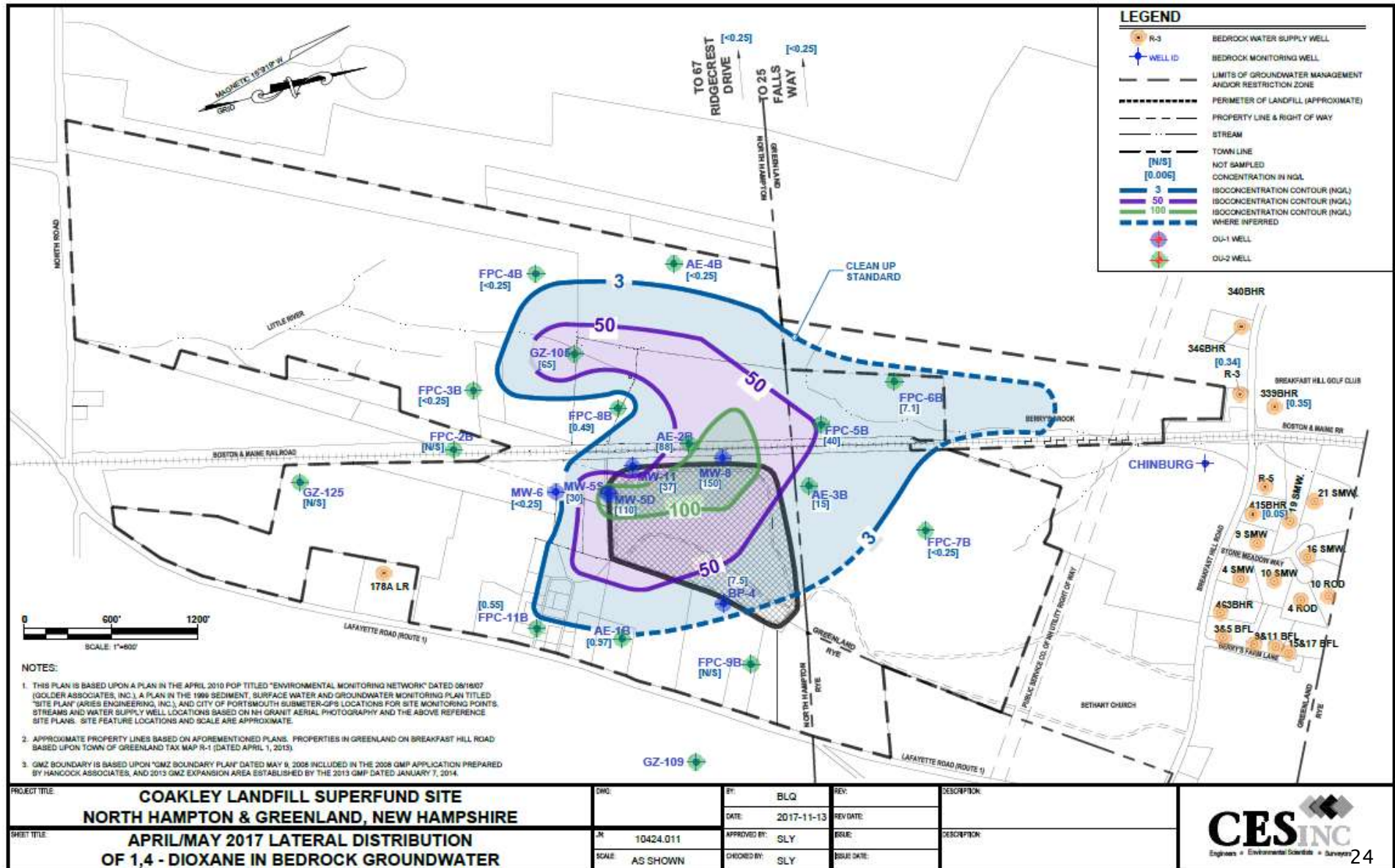
1. Clean-up Standard for Tertiary-butyl Alcohol (TBA) is 40 ug/L.
2. Since 2006, TBA has been reported at groundwater sampling points MW-5D and MW-8, only.



# LATERAL EXTENT 1,4 DIOXANE IN OVERBURDEN– APRIL/MAY 2017

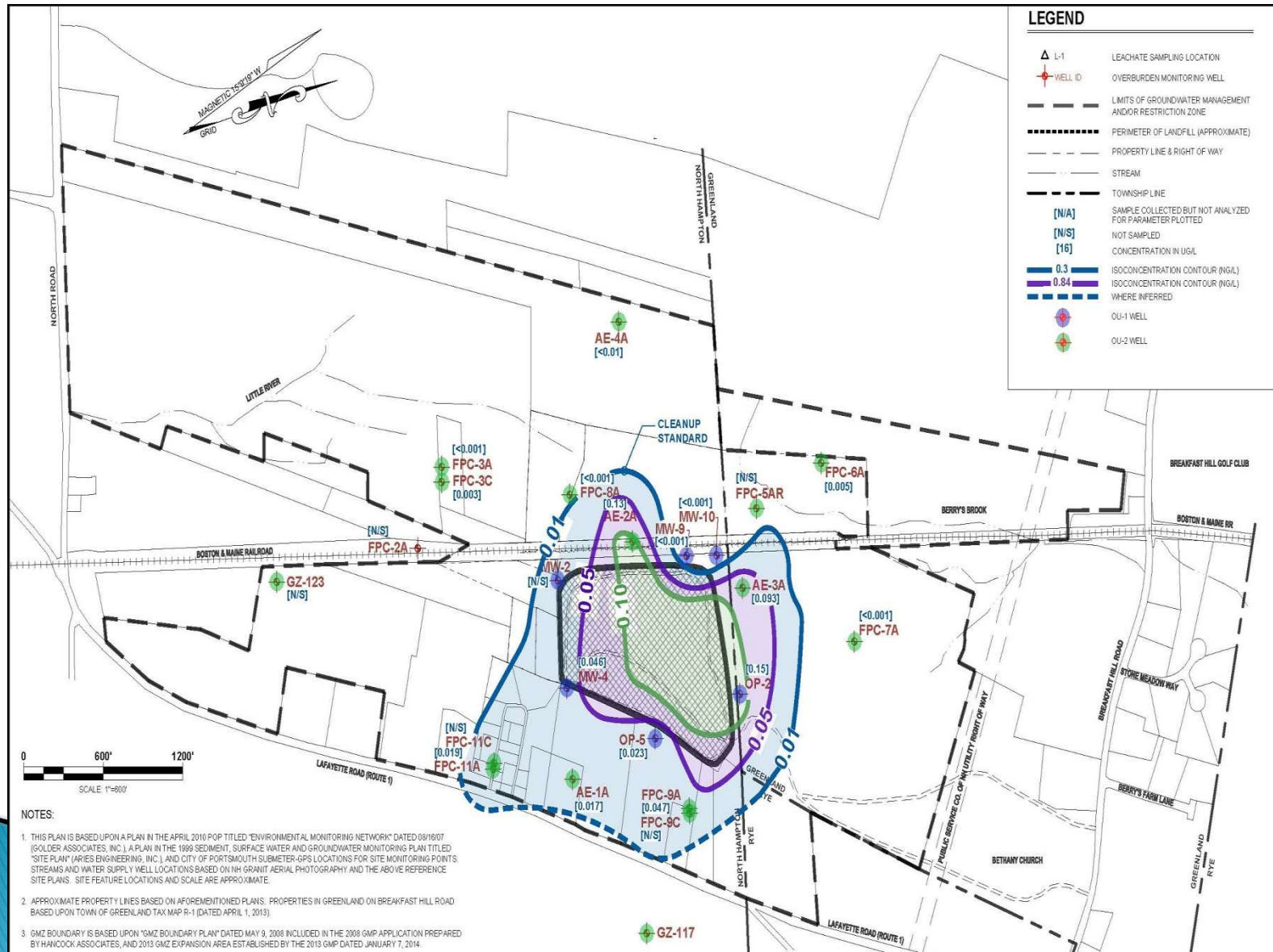


# LATERAL EXTENT 1,4 DIOXANE IN BEDROCK APRIL/MAY 2017

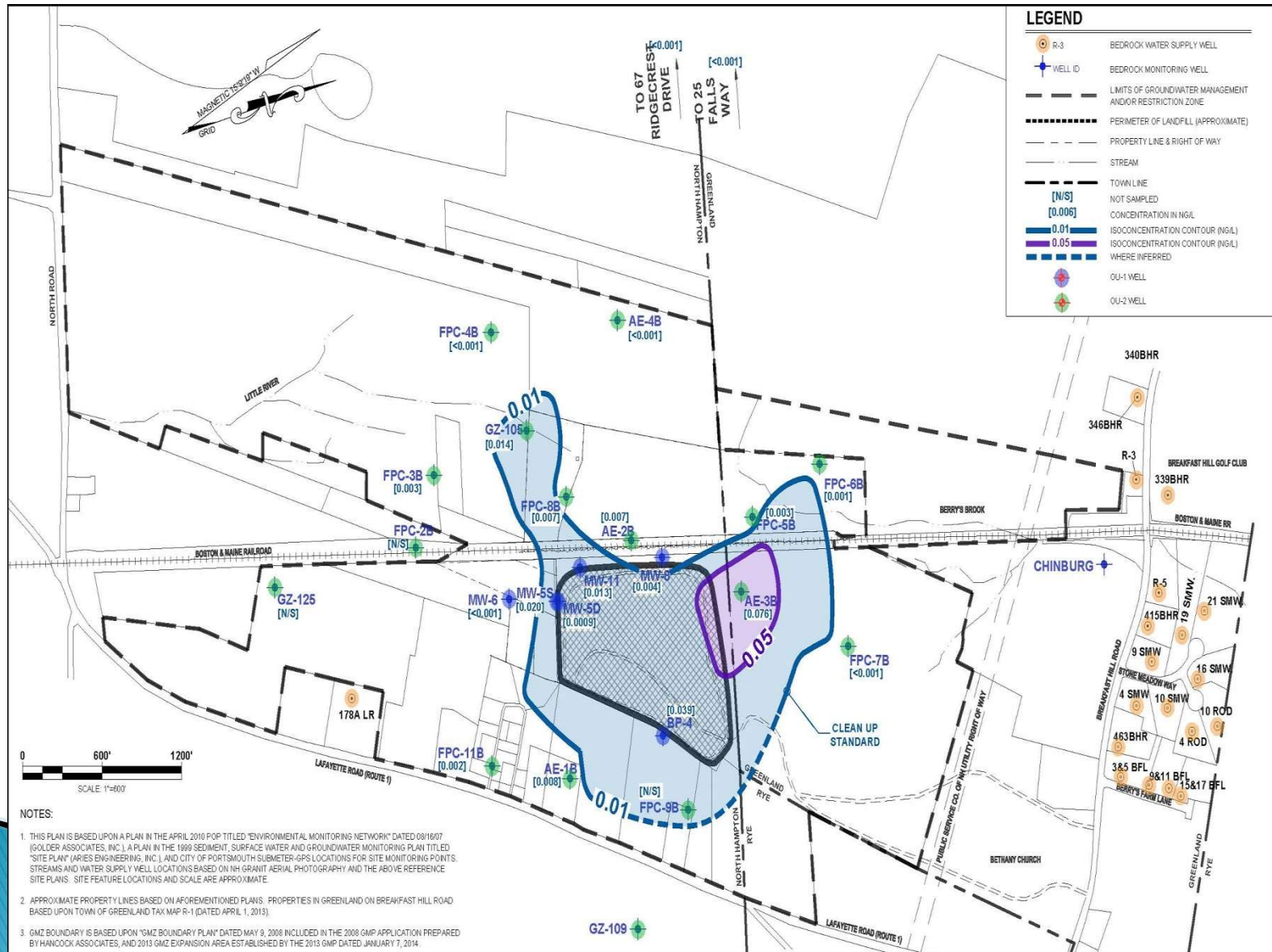




# LATERAL EXTENT DISSOLVED ARSENIC IN OVERBURDEN

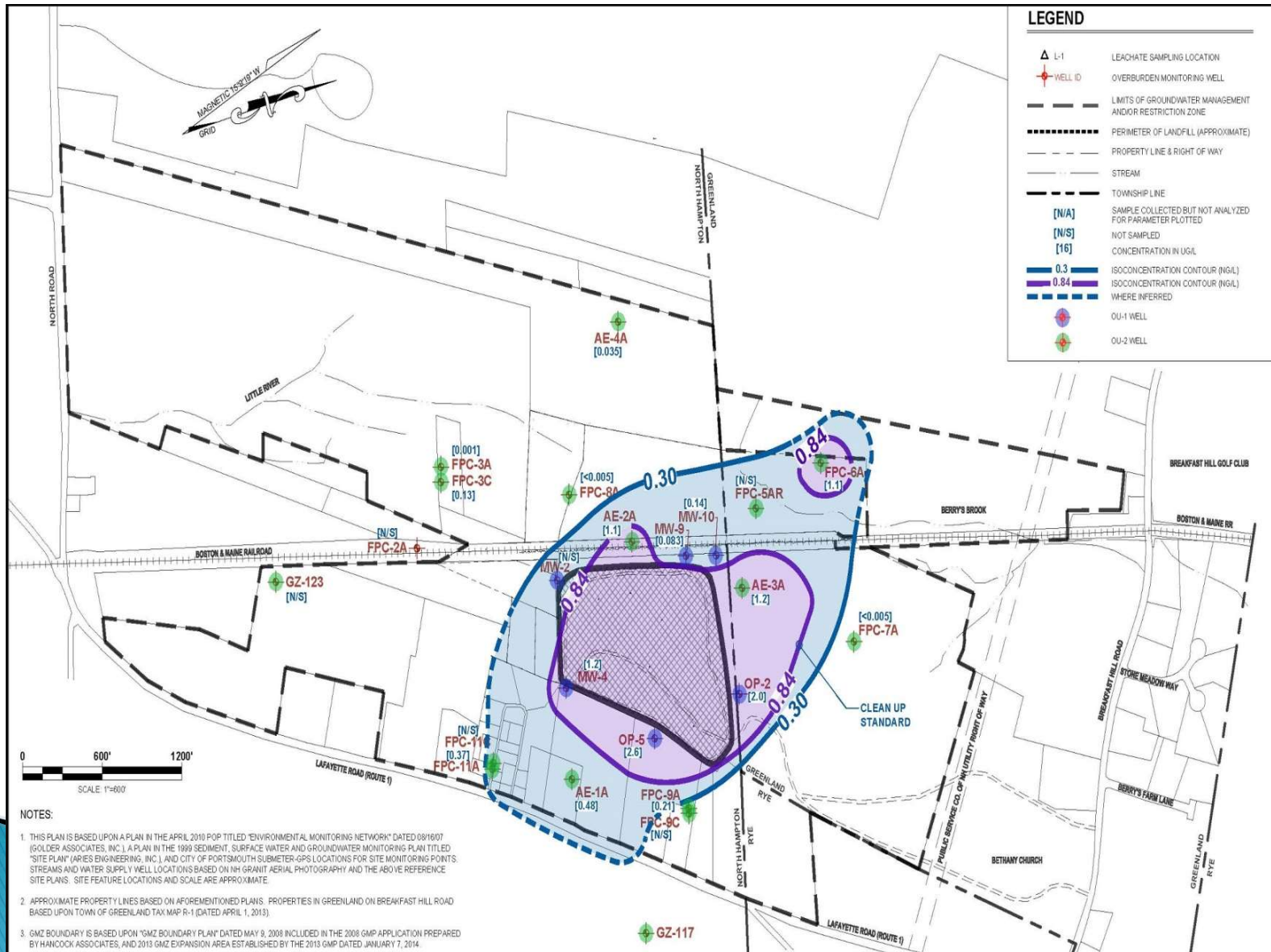


# LATERAL EXTENT TOTAL ARSENIC IN BEDROCK APRIL/MAY 2017



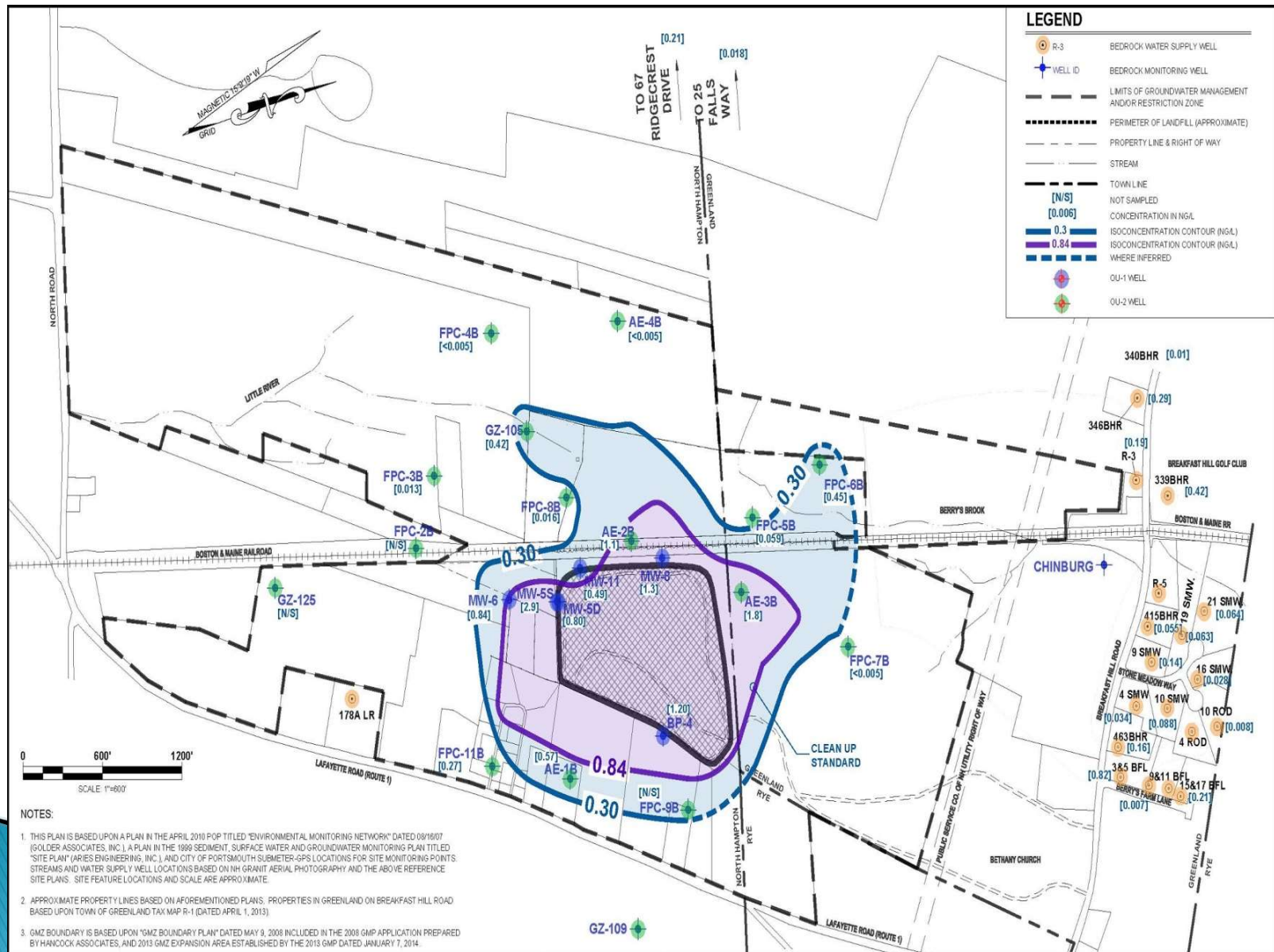


# LATERAL EXTENT DISSOLVED MANGANESE IN OVERBURDEN

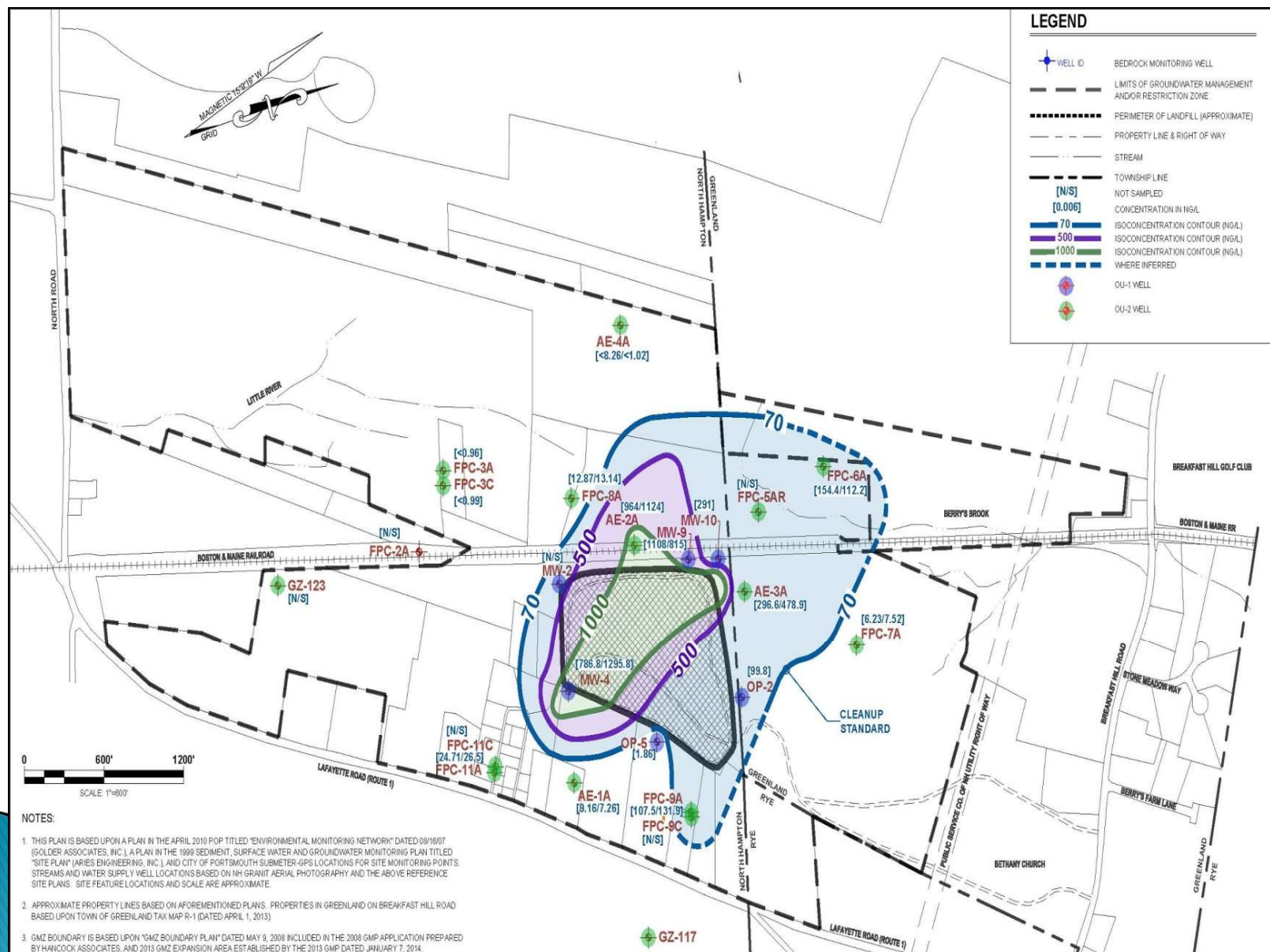




# LATERAL EXTENT TOTAL MANGANESE IN BEDROCK

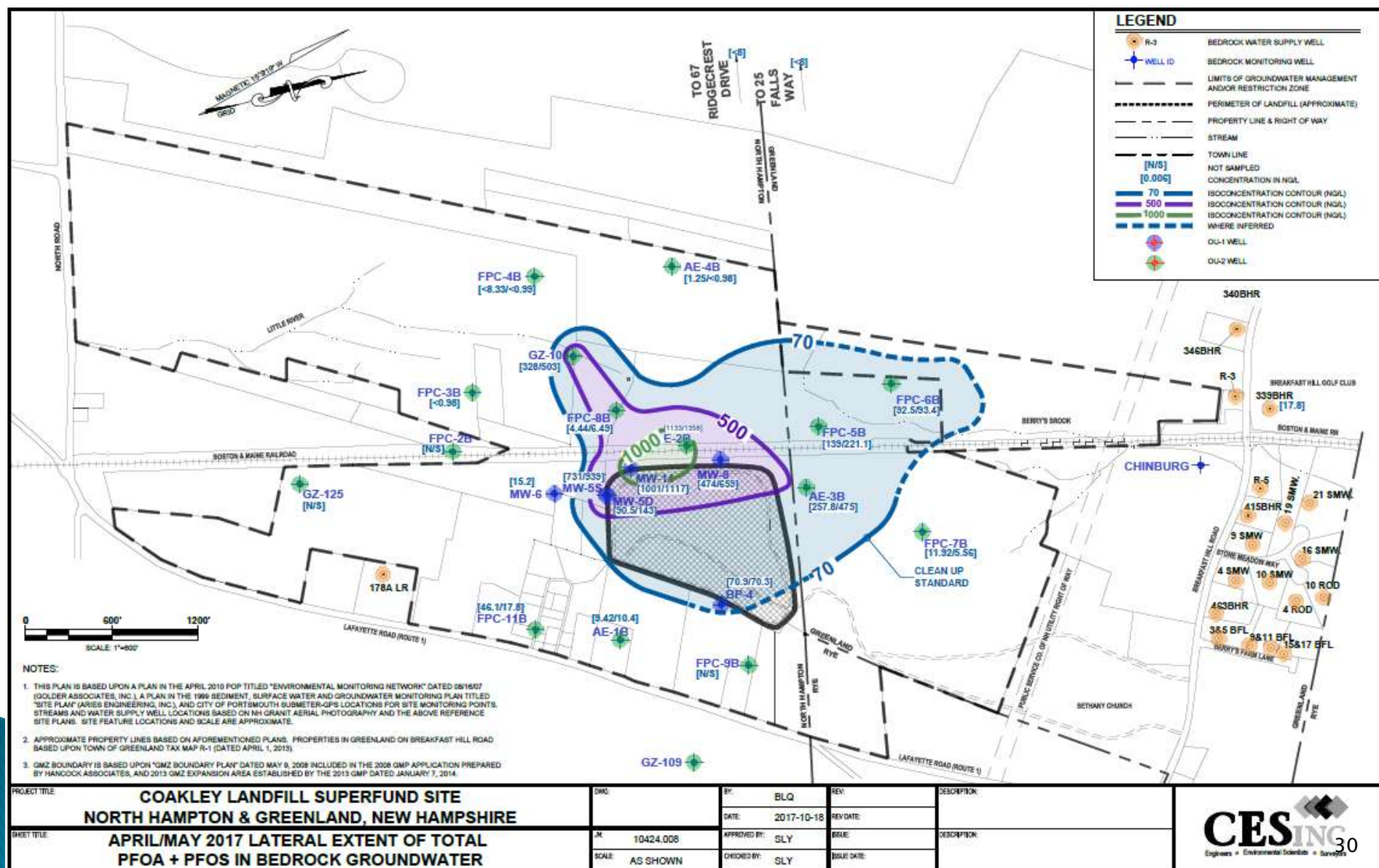


# LATERAL EXTENT COMBINED PFOA-PFOS IN OVERBURDEN – APRIL/MAY



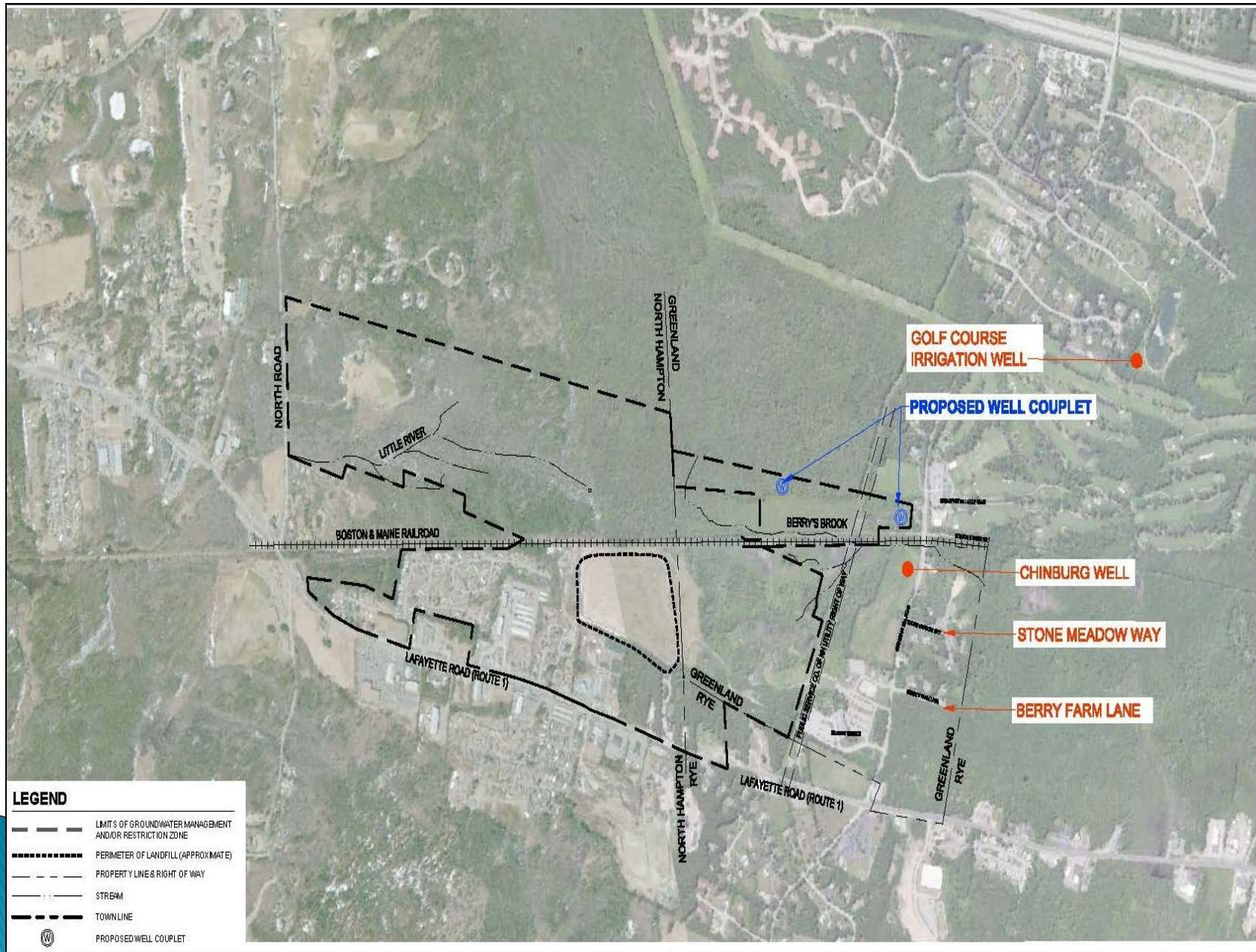


# LATERAL EXTENT COMBINED PFOA-PFOS IN BEDROCK – APRIL/MAY 2017

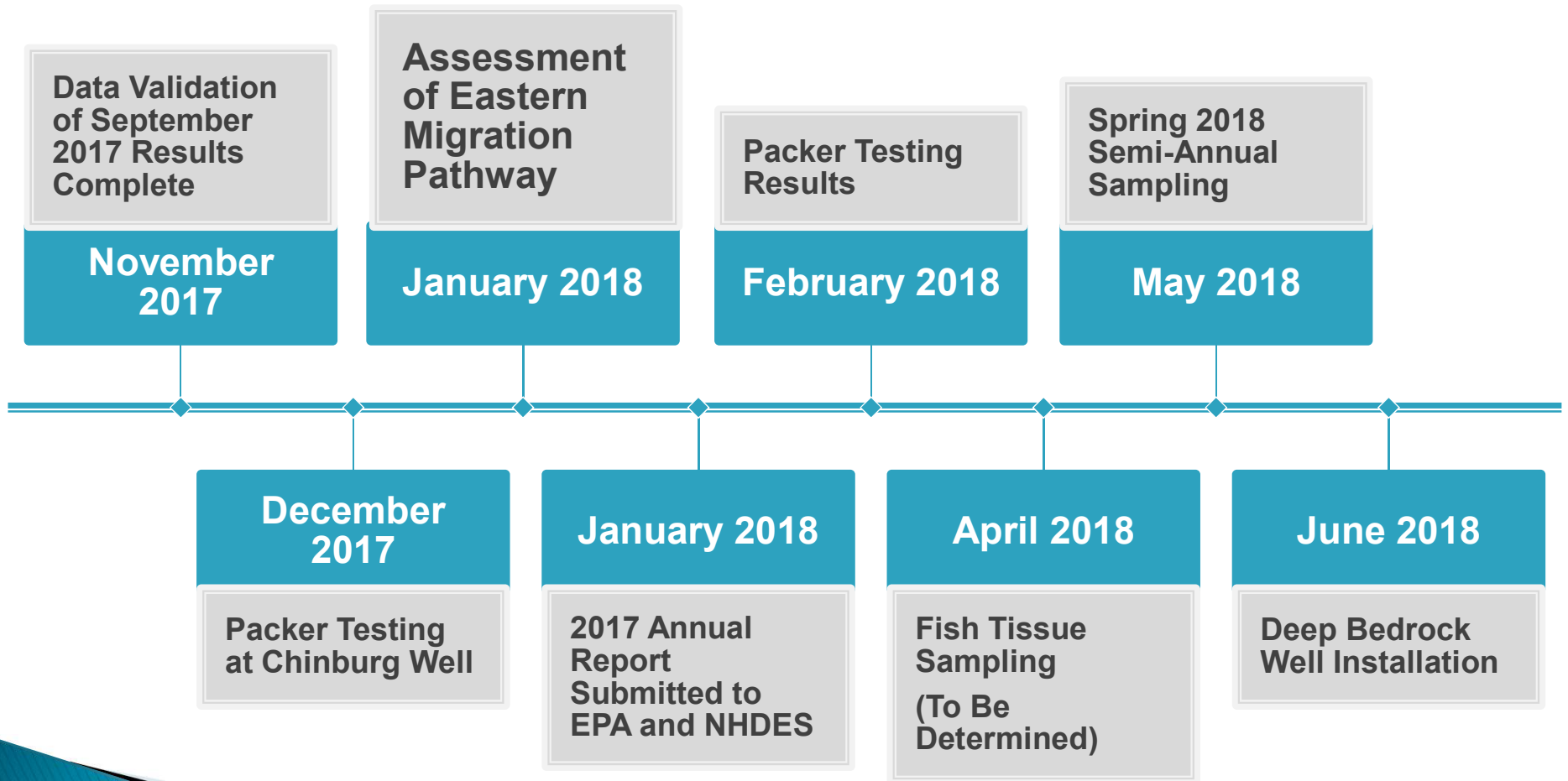




# DEEP BEDROCK EXPLORATION PLAN



# UPCOMING ACTIVITIES





# Maximum PFAS sample locations for each medium

SED-5	PFOA (ppt)	PFOS (ppt)
Sediment	16,900	164,000
45-day SL (child)	980,000	980,000
120-day SL (child)	369,000	369,000

## LEGEND

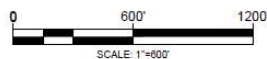
○ R-3	BEDROCK WATER SUPPLY WELL
△ L-1	LEACHATE SAMPLING LOCATION
★ WELL ID	OVERBURDEN MONITORING WELL
◆ WELL ID	BEDROCK MONITORING WELL
▲ SW-5	SURFACE WATER SAMPLING LOCATION
□ SED-5	SEDIMENT SAMPLING LOCATION
	2008 GROUNDWATER MANAGEMENT ZONE AND GROUNDWATER RESTRICTION AREA
	2013 GROUNDWATER MANAGEMENT ZONE EXPANSION AREA
---	LIMITS OF GROUNDWATER MANAGEMENT AND/OR RESTRICTION ZONE
- - - - -	PERIMETER OF LANDFILL (APPROXIMATE)
---	PROPERTY LINE & RIGHT OF WAY
---	STREAM
---	TOWNSHIP LINE
---	GEOLOGICAL CROSS SECTION

AE-2B	PFOA (ppt)	PFOS (ppt)	PFOA + PFOS (ppt)
Site groundwater	902	456	1,358
Drinking Water HA/AGQS	70	70	70

SW-103	PFOA (ppt)	PFOS (ppt)
Surface water	763	758

Site-Specific SW Screening Levels	PFOA (ppt)	PFOS (ppf)
45 days/year (child)	2,030	2,030
120 days/year (child)	760	760

Leachate Seep	PFOA (ppt)	PFOS (ppt)
GW from under cap	656	1,930



## NOTES:

- THIS PLAN IS BASED UPON A PLAN IN THE APRIL 2010 POP TITLED "ENVIRONMENTAL MONITORING NETWORK" DATED 08/16/07 (GOLDER ASSOCIATES, INC.), A PLAN IN THE 1999 SEDIMENT, SURFACE WATER AND GROUNDWATER MONITORING PLAN TITLED "SITE PLAN" (ARIES ENGINEERING, INC.), AND CITY OF PORTSMOUTH SUBMETER-GPS LOCATIONS FOR SITE MONITORING POINTS, STREAMS AND WATER SUPPLY WELL LOCATIONS BASED ON NH GRANITE AERIAL PHOTOGRAPHY AND THE ABOVE REFERENCE SITE PLANS. SITE FEATURE LOCATIONS AND SCALE ARE APPROXIMATE.
- APPROXIMATE PROPERTY LINES BASED ON AFOREMENTIONED PLANS. PROPERTIES IN GREENLAND ON BREAKFAST HILL ROAD BASED UPON TOWN OF GREENLAND TAX MAP R-1 (DATED APRIL 1, 2013).
- GMZ BOUNDARY IS BASED UPON "GMZ BOUNDARY PLAN" DATED MAY 9, 2008 INCLUDED IN THE 2008 GMP APPLICATION PREPARED BY HANCOCK ASSOCIATES, AND 2013 GMZ EXPANSION AREA ESTABLISHED BY THE 2013 GMP DATED JANUARY 7, 2014.

PROJECT TITLE: COAKLEY LANDFILL SUPERFUND SITE

DWG:

BY:

REV:

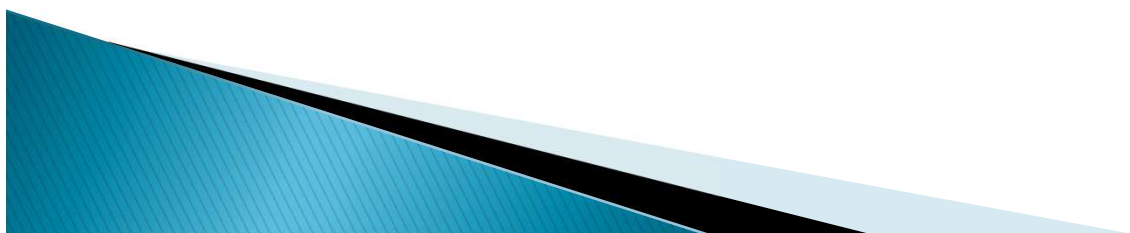
DESCRIPTION:





# Surface Water

- ✓ January 2018 – EPA developed site-specific surface water & sediment screening levels
  - Used to assess need for further sampling and risk evaluations
- ✓ Exposure assumptions (incidental ingestion):
  - Most conservative – 120 days/year for child (760 ppt)
  - More realistic – 45 days/year (2,030 ppt for PFOA/PFOS)
- ✓ Leachate seep and some SW samples exceeded the most conservative SLs, but not the more realistic SLs.



# Signage along Berrys Brook





# Fish Consumption

- ▶ Berrys Brook – put & take fishery approximately 5–miles downstream
- ▶ NHF&G stock brown trout May & October
- ▶ EPA has developed site–specific fish consumption screening levels
- ▶ EPA will request the CLG sample fish tissue & compare results to site–specific SLs



# Berrys Brook Surface Water Sampling Results for PFOA & PFOS

Through May 2017  
Locations approximate

Site-Specific SW Screening Levels	PFOA (ppt)	PFOS (ppf)
45 days/year	2,030	2,030
120 days/year	760	760

Sampler (date)	PFOA (ppt)	PFOS (ppf)
CLG SW-4 (5/2/17)	129	36

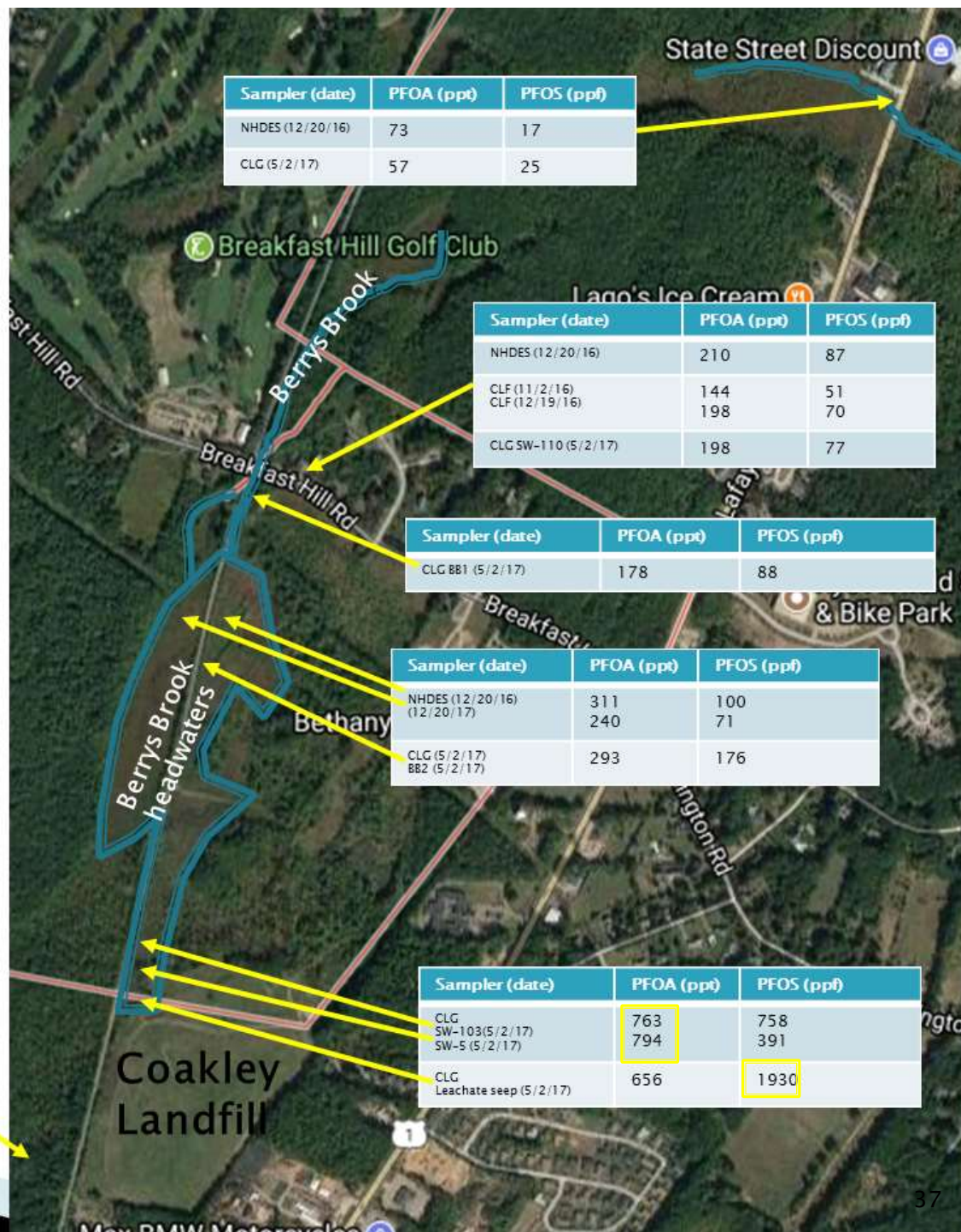
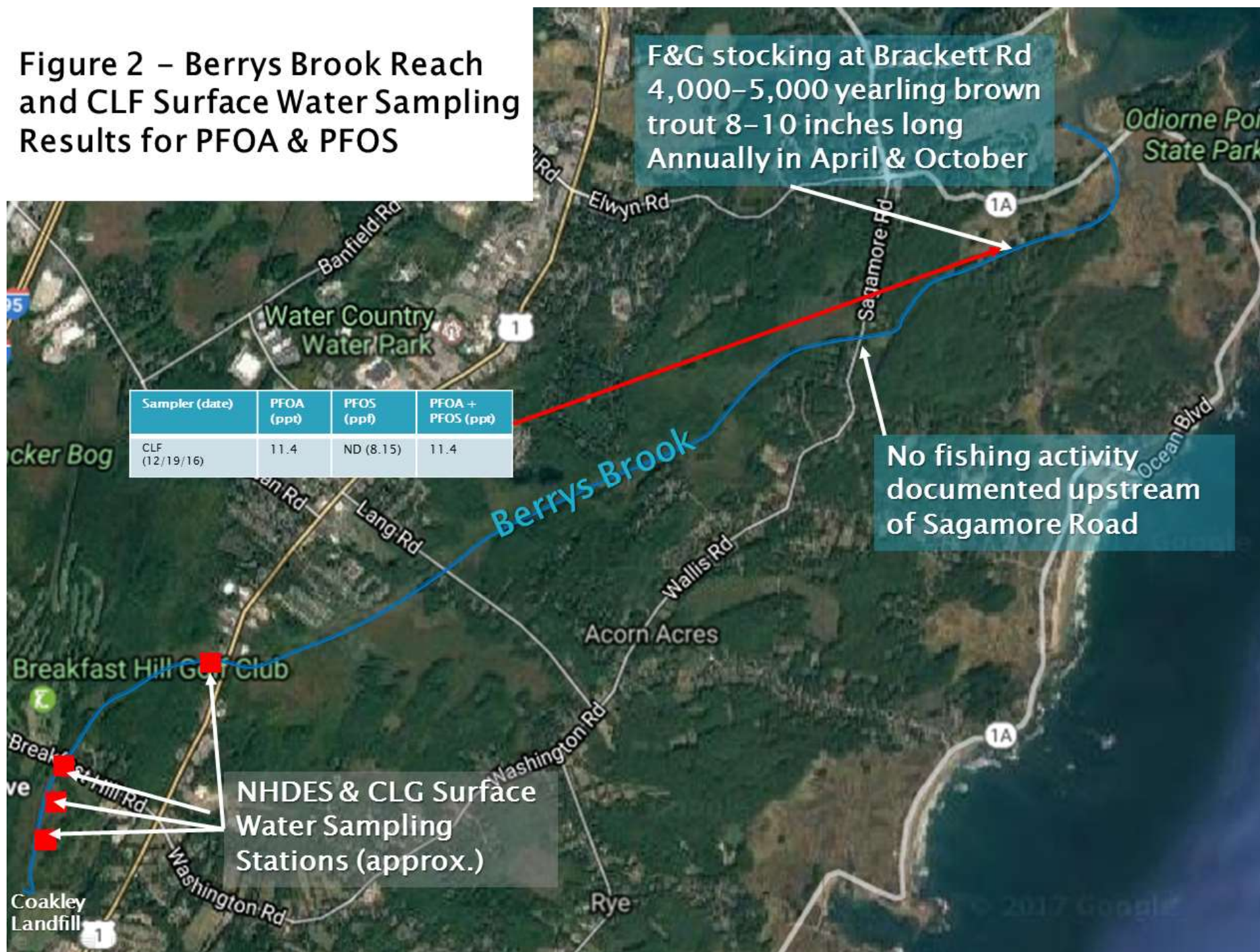




Figure 2 – Berrys Brook Reach and CLF Surface Water Sampling Results for PFOA & PFOS







# Current Site Status

- ▶ Site-wide gw/sw/sed sampling 2x per year
  - Fall round complete, report expected in January 2018
- ▶ Residential well sampling 2x per year
  - Fall round complete, report expected in January 2018
- ▶ Fish tissue sampling – pending
  - Agencies to provide guidelines and protocol to CLG
  - CLG to submit work plan to agencies for review
- ▶ Installation of two well couplets NW GMZ – pending
  - Deep bedrock well located on 10 Lot Subdivision off Breakfast Hill Rd
  - Completed Borehole geophysics
  - Sampling of specific fracture zones – pending

# Current Site Status (continued)

- ▶ Evaluate eastern GMZ boundary near well FPC-9
  - To evaluate GW flow discrepancy
  - Conducted well inventory
  - Assess well construction details
  - Determine suitability for water level and sampling
- ▶ EPA to issue site-specific fish tissue screening levels in November
- ▶ EPA will request CLG perform a deep bedrock investigation





# EPA's Addendum to 5-Yr Review

- ▶ Addendum to the Fourth Five Year Review finalized on 09/28/2017.
- ▶ Updated the protectiveness determination for the entire Site and concluded that the Remedy at the Site is protective in the short term.
- ▶ No human exposures above cleanup standards.
- ▶ Updated the status of the 2016 Five Year Review Issues/Recommendations.



# EPA's Addendum to 5-Yr Review

## (continued)

- ▶ Identified additional actions for the remedy to be protective in the long-term:
  - CLG to conduct a Deep Bedrock Investigation to further understanding of groundwater flow and the fate and transport of PFAS and COCs in the deep bedrock;
  - EPA to further evaluate risk for the potential exposure to PFAS from the incidental consumption of surface water and/or sediments;
  - Conduct fish-tissue sampling along Berrys Brook to determine whether there are any human exposures to PFAS that can be attributed to the landfill.
  
- ▶ The following is a link to the Addendum:  
<https://semspub.epa.gov/src/document/01/622624>.



# Options for Community Involvement

- ❑ Future public Meetings
- ❑ Regular email updates
- ❑ Neighborhood meetings



# Coakley Landfill

## Contact Information

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E-mail: [plbritz@cityofportsmouth.com](mailto:plbritz@cityofportsmouth.com)

