



Why Is the Navy Sampling Drinking Water Wells Nationwide?

To request sampling, click the sampling icon below the poster station or call 844-NBKBNGR (844-625-2647).

The Navy is committed to protecting our neighbors' drinking water and taking responsibility for our previous operations.

- In 2016, the EPA established a drinking water lifetime health advisory for two currently unregulated PFAS, specifically PFOS and PFOA.
- The most common historical Navy use of PFOS and PFOA was in firefighting foam.
- The Navy no longer uses firefighting foam for training.
- In 2016, the Navy issued a protective policy to identify and prioritize sites with the potential for exposure to PFOS and PFOA.
- The Navy has started assessing bases to identify and address the potential for exposure to PFOS and PFOA.
- The Navy has identified possible PFAS release areas. We need your help to determine if there are impacts to drinking water wells.



ACRONYMS & ABBREVIATIONS

EPA U.S. Environmental Protection Agency
PFAS per- and polyfluoroalkyl substances

PFOA perfluorooctanoic acid
PFOS perfluorooctane sulfonate



Path Forward

To request sampling, click the sampling icon below the poster station or call **844-NBKBNGR (844-625-2647)**.

- The Navy will be involved until necessary actions are complete.
- The science and regulation are evolving; Washington State is developing State Action Levels for five PFAS in drinking water.
- Public involvement is encouraged throughout the process.
- NBK Bangor's website will be updated throughout the clean-up process.

Removal Actions May be implemented at any time within the process

- A response implemented in an expedited manner to address situations that require prompt action
- Removal action response type is based on situation, urgency, and required planning period

- Emergency Removal Action
Response required immediately

The Navy will provide bottled water for cooking and drinking to households whose water exceeds the EPA lifetime health advisory for PFOS and/or PFOA.

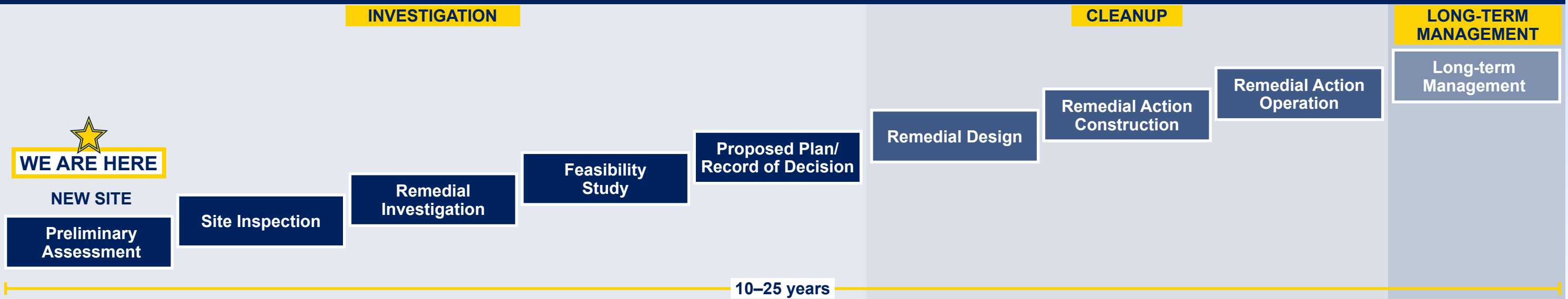
- Time-Critical Removal Action
- Non-Time-Critical Removal Action

Time-Critical and Non-Time-Critical Removal Actions may include:

- Point of service treatment
- Hook up to alternative source
- New well
- Others to be determined

Environmental Clean-Up Process

Activity boxes do not indicate the relative length of any activity.



ACRONYMS & ABBREVIATIONS

EPA U.S. Environmental Protection Agency
NBK Naval Base Kitsap

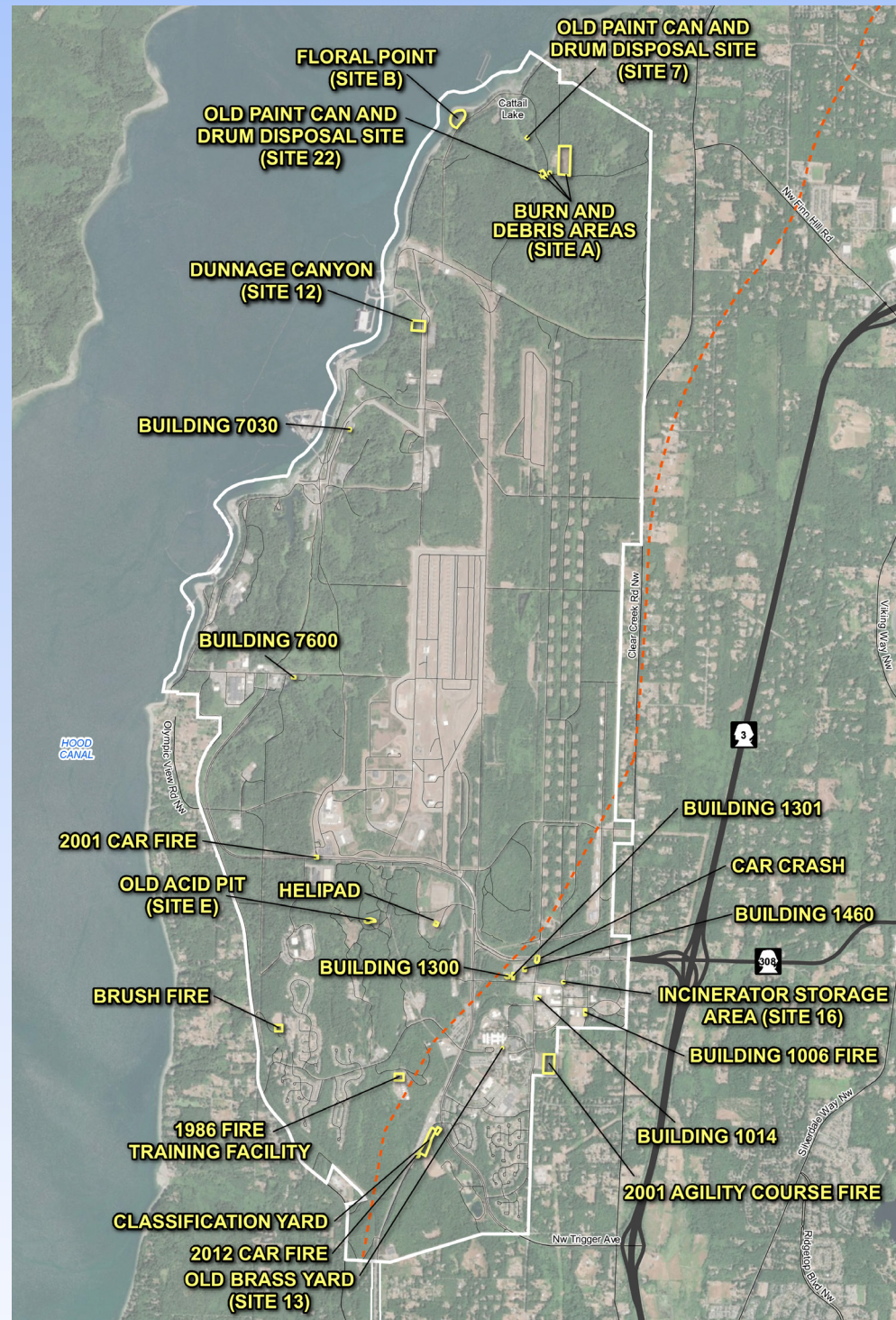
PFAS per- and polyfluoroalkyl substances
PFOA perfluorooctanoic acid

PFOS perfluorooctane sulfonate



Potential On-Base PFAS Releases

To request sampling, click the sampling icon below the poster station or call 844-NBKBNGR (844-625-2647).



- A Preliminary Assessment is underway because of previous uses of PFAS-containing materials, such as firefighting foam.
- NBK Bangor is following the EPA's Environmental Cleanup Process for assessment of PFAS releases.

- 23 on-base areas have been identified as potential PFAS release areas.
- Findings are documented in a Preliminary Assessment report, which regulators are currently reviewing. The final version will be available by the end of 2020.

LEGEND

	Installation boundary		Potential PFAS release area
	Shallow aquifer groundwater divide		0 0.5 1 mile N

ACRONYMS & ABBREVIATIONS

EPA U.S. Environmental Protection Agency

NBK Naval Base Kitsap

PFAS per- and polyfluoroalkyl substances



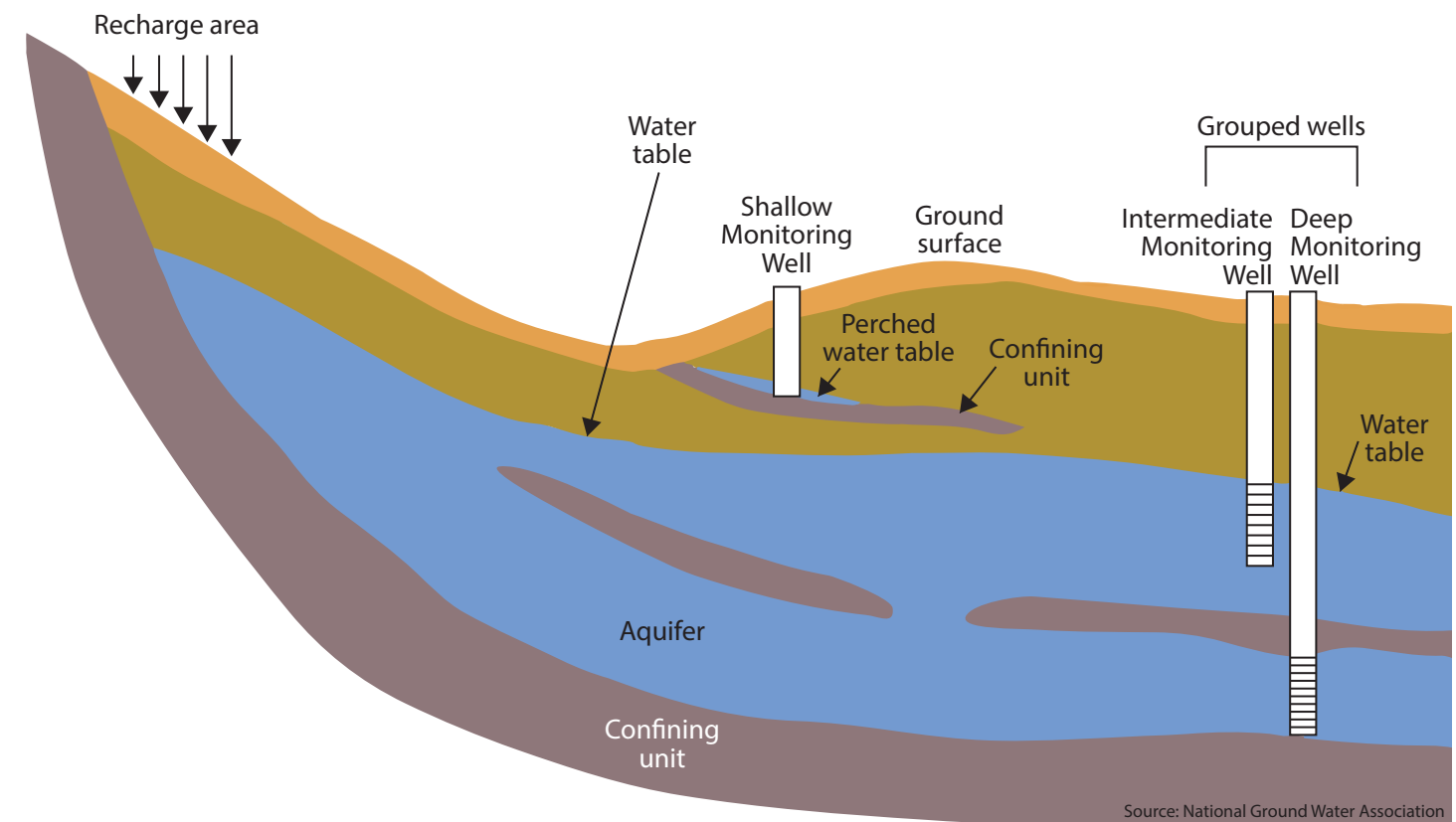
NBK Bangor Site Inspection

To request sampling, click the sampling icon below the poster station or call **844-NBKBNGR (844-625-2647)**.

Objectives of Site Inspection

- The objective of the site inspection is to confirm if there is a release of PFAS to soil and/or groundwater and develop the conceptual site model:
 - Measuring PFOS and PFOA concentrations in on-base soil and groundwater (beginning 2021)
 - Determining aquifer characteristics, including groundwater flow and direction
 - Identifying potentially impacted off-base drinking water wells based on on-base and off-base groundwater results
- Partnering with multi-agency team in activities that include:
 - Evaluating site data and information
 - Planning additional investigation to fill any data gaps
 - Identifying potential removal actions
 - Developing path forward and continuing public outreach

Example Conceptual Site Model



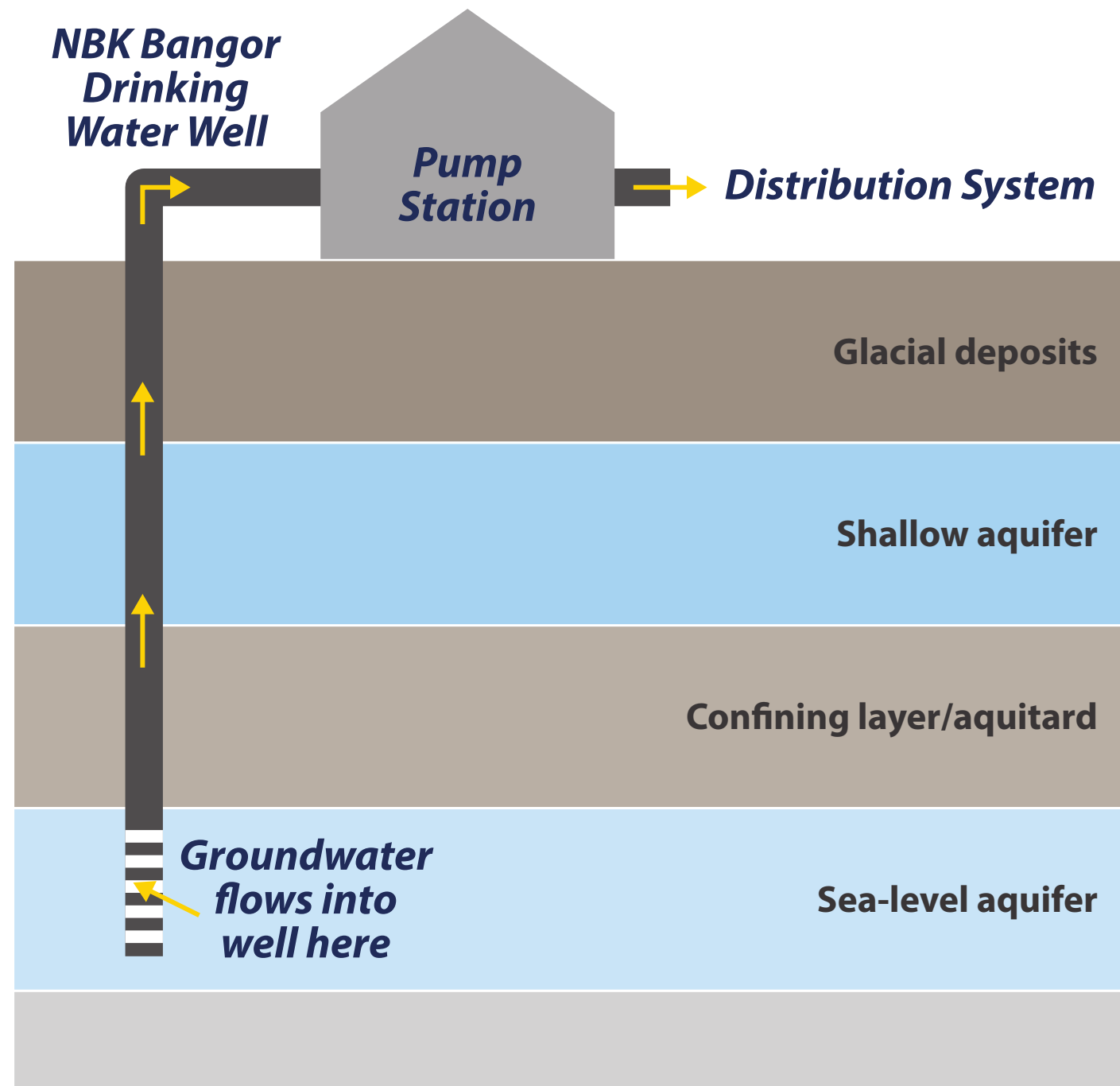
ACRONYMS & ABBREVIATIONS

NBK Naval Base Kitsap PFAS per- and polyfluoroalkyl substances PFOA perfluorooctanoic acid PFOS perfluorooctane sulfonate



NBK Bangor Drinking Water

To request sampling, click the sampling icon below the poster station or call 844-NBKBNGR (844-625-2647).



NBK Bangor's drinking water meets all safe drinking water standards.

- On-base drinking water wells are upgradient from potential PFAS release areas and collect groundwater from a deeper aquifer.
- On-base drinking water wells were tested for PFAS in 2014 and will be resampled in the fall of 2020.
- Results of all water quality sampling can be found in annual Consumer Confidence Reports at: https://www.cnic.navy.mil/regions/cnrnw/om/environmental_support/water_quality_information.html

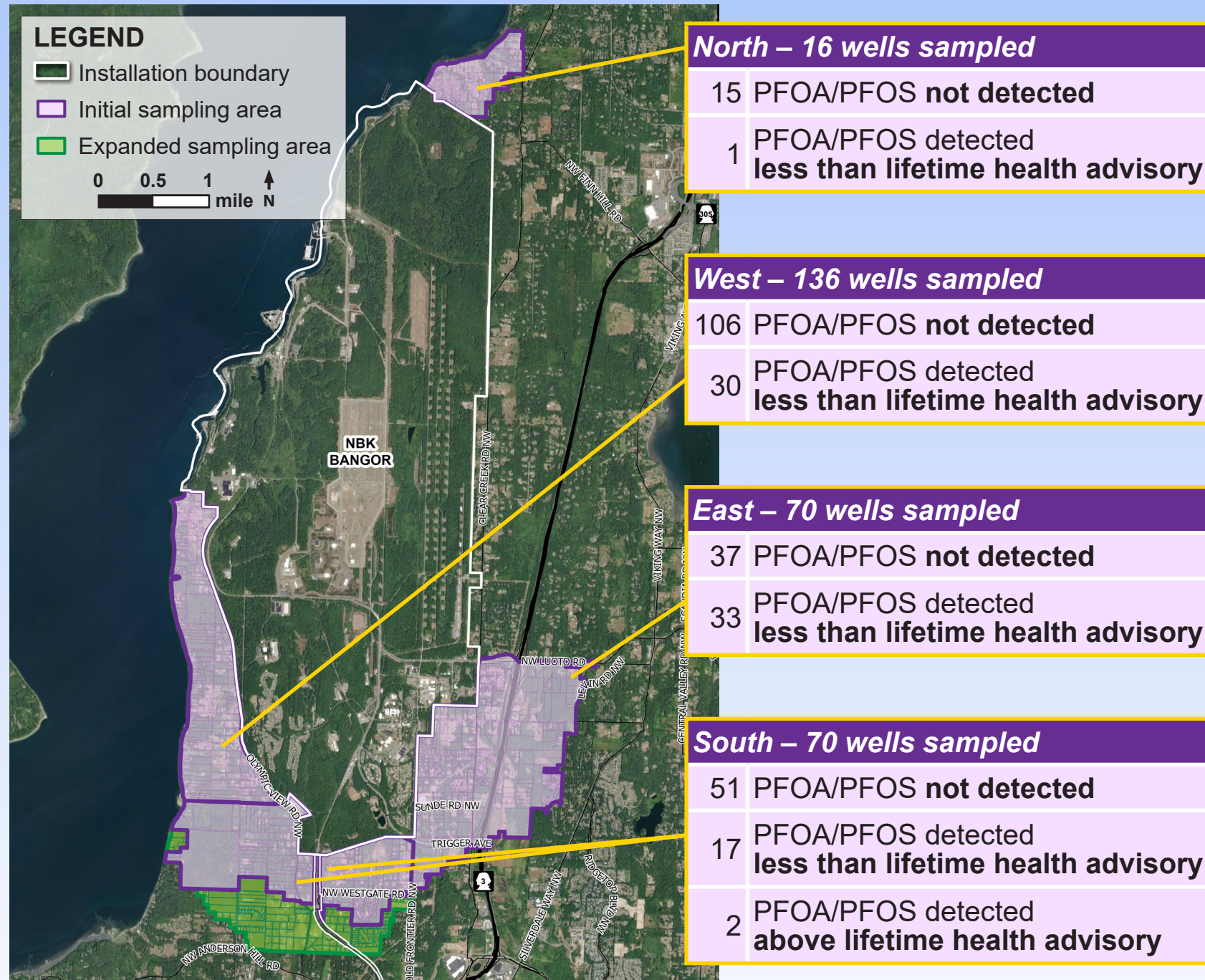
ACRONYMS & ABBREVIATIONS

NBK Naval Base Kitsap PFAS per- and polyfluoroalkyl substances



PFAS Drinking Water Results near NBK Bangor

To request sampling, click the sampling icon below the poster station or call 844-NBKBNGR (844-625-2647).



- **292** drinking water samples were collected in the sampling area during initial sampling.
- **209** samples had non-detect values for PFOS and PFOA.
- **83** samples had detections for PFOS and/or PFOA.
 - **2** out of these 83 samples had values above the EPA lifetime health advisory.

ACRONYMS & ABBREVIATIONS

EPA U.S. Environmental Protection Agency
NBK Naval Base Kitsap

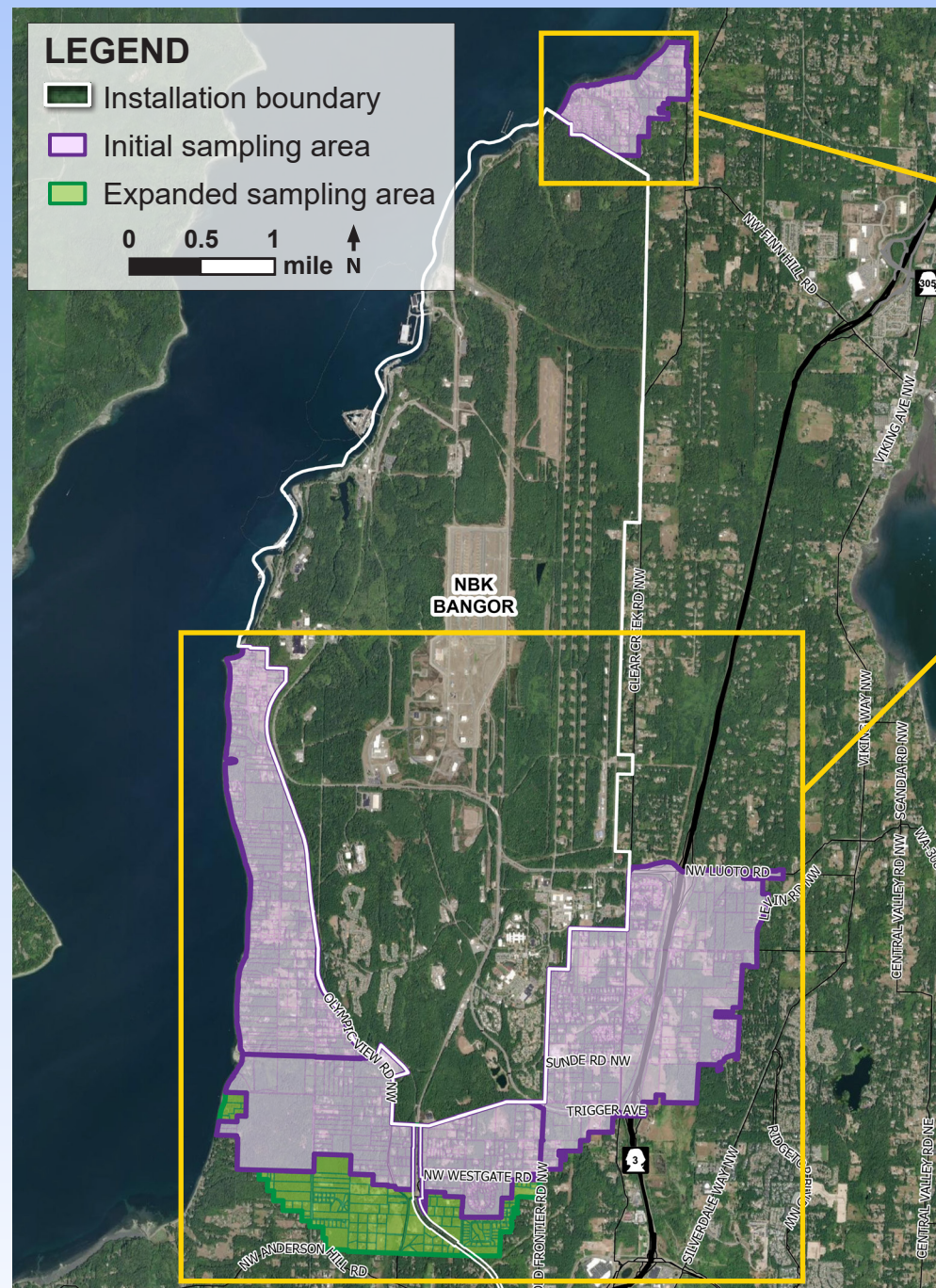
PFAS per- and polyfluoroalkyl substances
PFOA perfluorooctanoic acid

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Off-Base Drinking Water Well Sampling

To request sampling, click the sampling icon below the poster station or call 844-NBKBNGR (844-625-2647).



Off-Base Drinking Water Well Sampling – **North**

Off-Base Drinking Water Well Sampling – **West, East, South**

The Navy needs your permission to sample your drinking water well.

- Based on the initial sampling results, the Navy is expanding the off-base sampling area.
- The new sampling area is downgradient of the south initial sampling area.
- If you are in the initial sampling area and your drinking water well was not previously sampled, the Navy would like to sample it for PFAS.

ACRONYMS & ABBREVIATIONS

PFAS per- and polyfluoroalkyl substances

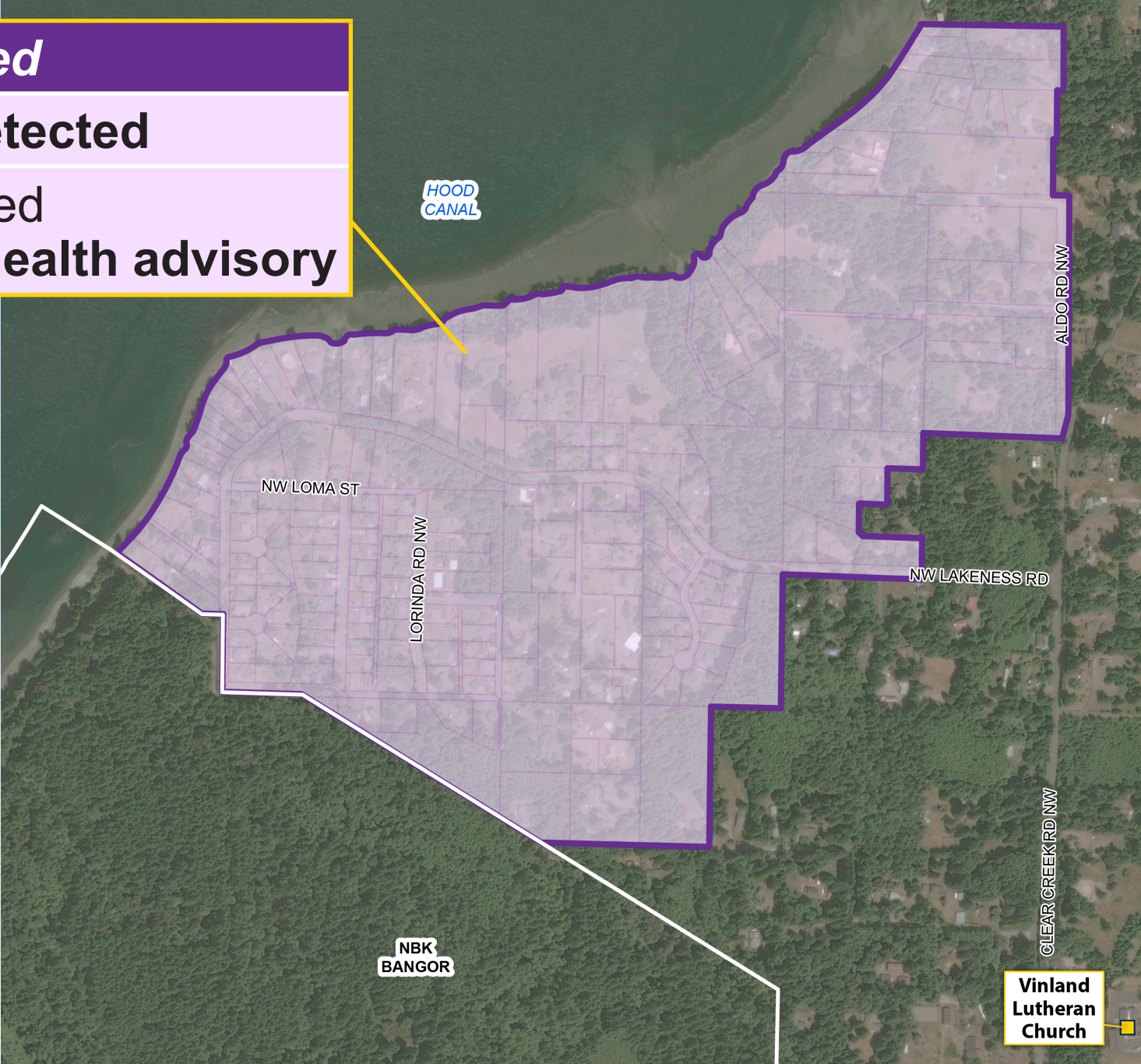


Initial Off-Base Drinking Water Well Sampling – North

To request sampling, click the sampling icon below the poster station or call 844-NBKBNGR (844-625-2647).

North – 16 wells sampled

15	PFOA/PFOS not detected
1	PFOA/PFOS detected less than lifetime health advisory



LEGEND

- Installation boundary
- Initial sampling area

0 0.125 0.25 mile N

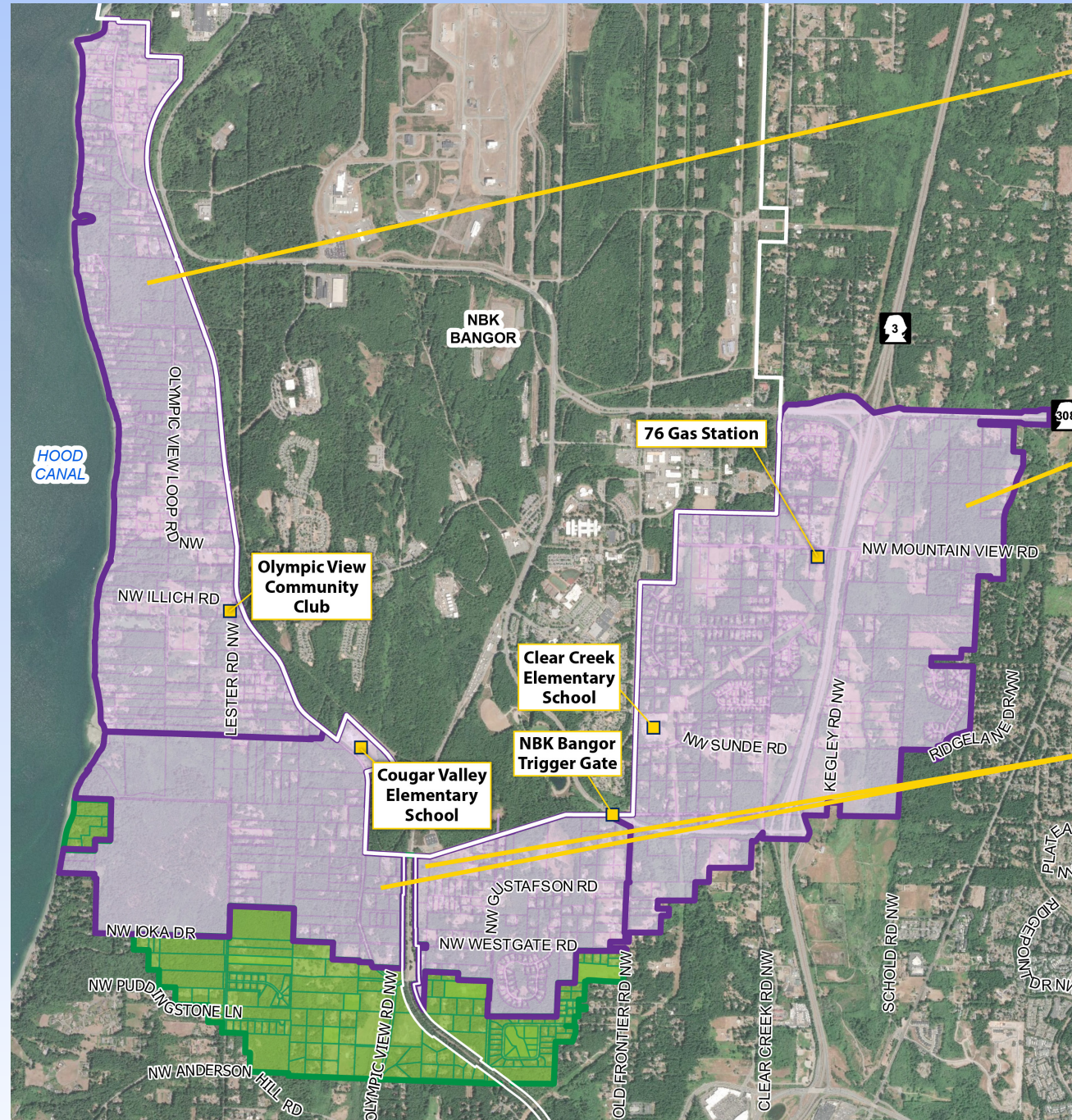
ACRONYMS & ABBREVIATIONS

PFOA perfluorooctanoic acid PFOS perfluorooctane sulfonate



Initial Off-Base Drinking Water Well Sampling – West, East, South

To request sampling, click the sampling icon below the poster station or call 844-NBKBNGR (844-625-2647).



West – 136 wells sampled

106	PFOA/PFOS not detected
30	PFOA/PFOS detected less than lifetime health advisory

East – 70 wells sampled

37	PFOA/PFOS not detected
33	PFOA/PFOS detected less than lifetime health advisory

South – 70 wells sampled

51	PFOA/PFOS not detected
17	PFOA/PFOS detected less than lifetime health advisory
2	PFOA/PFOS detected above lifetime health advisory

LEGEND

- Installation boundary
- Initial sampling area
- Expanded sampling area

0 0.5 1 mile N

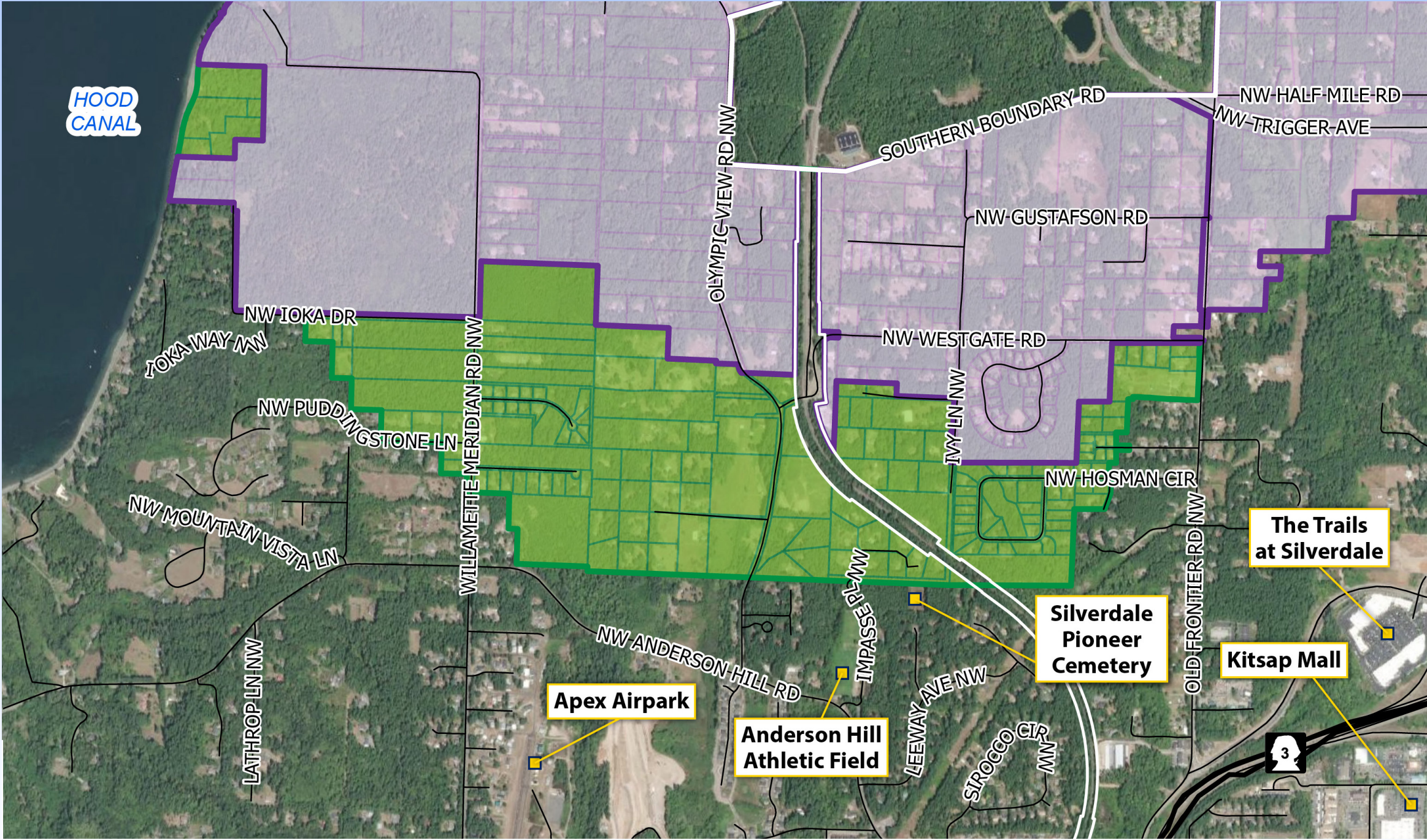
ACRONYMS & ABBREVIATIONS

PFOA perfluorooctanoic acid PFOS perfluorooctane sulfonate



Expanded Off-Base Drinking Water Well Sampling

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PFAS Drinking Water Results near NBK Bangor

To request sampling, click the sampling icon below the poster station or call 844-NBKBNGR (844-625-2647).

Combined PFOS and PFOA

Of 292 results, PFOS and/or PFOA were:

- **detected in 83 samples**
 - 2 samples above the EPA lifetime health advisory
 - 81 samples below the EPA lifetime health advisory
- **not detected in 209 samples**

DETECTED BELOW
EPA LIFETIME
HEALTH ADVISORY
81 samples

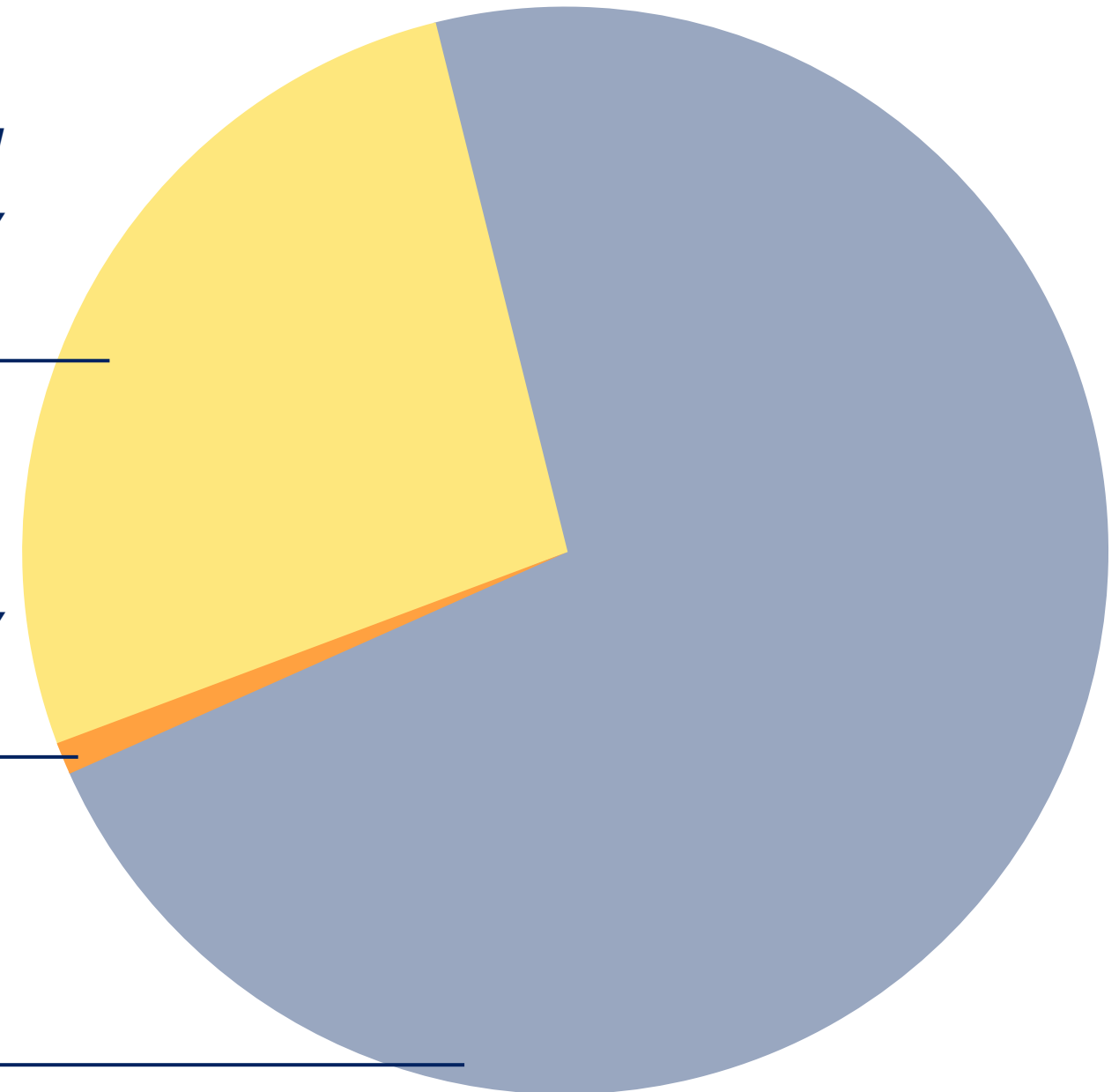
27%

DETECTED ABOVE
EPA LIFETIME
HEALTH ADVISORY
2 samples

<1%

NOT DETECTED
209 samples

72%



ACRONYMS & ABBREVIATIONS

EPA U.S. Environmental Protection Agency
NBK Naval Base Kitsap

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PFOS perfluorooctane sulfonate



PFAS Drinking Water Results near NBK Bangor

To request sampling, click the sampling icon below the poster station or call **844-NBKBNGR (844-625-2647)**.

The Navy is taking action on the EPA lifetime health advisory.

Total – 292 wells sampled

PFAS	Standard	Limit	Above	Below	Not Detected
PFOA + PFOS	EPA lifetime health advisory	70 ppt	2	81	209
PFOA*	Draft Washington State Action Level	10 ppt	5	47	240
PFOS*	Draft Washington State Action Level	15 ppt	1	62	229
PFBS	Draft Washington State Action Level	860 ppt	0	91	201
PFNA	Draft Washington State Action Level	14 ppt	0	10	282
PFHxS	Draft Washington State Action Level	70 ppt	0	74	218

* These detection counts include the PFOA + PFOS results above.

North – 16 wells sampled

PFAS	Standard	Limit	Above	Below	Not Detected
PFOA + PFOS	EPA lifetime health advisory	70 ppt	0	1	15
PFOA*	Draft Washington State Action Level	10 ppt	0	1	15
PFOS*	Draft Washington State Action Level	15 ppt	0	1	15
PFBS	Draft Washington State Action Level	860 ppt	0	4	12
PFNA	Draft Washington State Action Level	14 ppt	0	0	16
PFHxS	Draft Washington State Action Level	70 ppt	0	3	13

South – 70 wells sampled

PFAS	Standard	Limit	Above	Below	Not Detected
PFOA + PFOS	EPA lifetime health advisory	70 ppt	2	17	51
PFOA*	Draft Washington State Action Level	10 ppt	3	12	55
PFOS*	Draft Washington State Action Level	15 ppt	1	10	59
PFBS	Draft Washington State Action Level	860 ppt	0	25	45
PFNA	Draft Washington State Action Level	14 ppt	0	3	67
PFHxS	Draft Washington State Action Level	70 ppt	0	21	49

West – 136 wells sampled

PFAS	Standard	Limit	Above	Below	Not Detected
PFOA + PFOS	EPA lifetime health advisory	70 ppt	0	30	106
PFOA*	Draft Washington State Action Level	10 ppt	1	11	124
PFOS*	Draft Washington State Action Level	15 ppt	0	27	109
PFBS	Draft Washington State Action Level	860 ppt	0	27	109
PFNA	Draft Washington State Action Level	14 ppt	0	2	134
PFHxS	Draft Washington State Action Level	70 ppt	0	23	113

East – 70 wells sampled

PFAS	Standard	Limit	Above	Below	Not Detected
PFOA + PFOS	EPA lifetime health advisory	70 ppt	0	33	37
PFOA*	Draft Washington State Action Level	10 ppt	1	23	46
PFOS*	Draft Washington State Action Level	15 ppt	0	24	46
PFBS	Draft Washington State Action Level	860 ppt	0	35	35
PFNA	Draft Washington State Action Level	14 ppt	0	5	65
PFHxS	Draft Washington State Action Level	70 ppt	0	27	43

ACRONYMS & ABBREVIATIONS

EPA	U.S. Environmental Protection Agency	PFBS	perfluorobutane sulfonic acid	PFOA	perfluorooctanoic acid
NBK	Naval Base Kitsap	PFHxS	perfluorohexane sulfonic acid	PFOS	perfluorooctane sulfonate
PFAS	per- and polyfluoroalkyl substances	PFNA	perfluorononanoic acid	ppt	part(s) per trillion



Understanding Data Packages

To request sampling, click the sampling icon below the poster station or call **844-NBKBNGR (844-625-2647)**.

The result for PFOA:
PFOA was detected in the sample at 0.29 ng/L (0.29 ppt).
The “J” qualifier means that the result detected is an estimated level.

The result for PFOS:
PFOA was detected in the sample at 2.34 ng/L (2.34 ppt).

All other results:
All other PFAS were not detected (ND) in the sample.



Project Client:
Project Name:
Project No.:

Client ID

Battelle ID
Sample Type SA
Collection Date 02/21/2020
Extraction Date 02/25/2020
Analysis Date 02/27/2020
Analytical Instrument Sciex 5500 LC/MS/MS
% Moisture NA
Matrix DW
Sample Size 0.275
Size Unit-Basis L

Analyte	CAS No.	Result (ng/L)	DL	LOD	LOQ
PFHxA	307-24-4	ND	0.21	0.45	2.27
PFHpA	375-85-9	ND	0.21	0.45	2.27
PFOA	335-67-1	0.29 J	0.18	0.45	2.27
PFNA	375-95-1	ND	0.11	0.36	2.27
PFDA	335-76-2	ND	0.10	0.36	2.27
PFUnA	2058-94-8	ND	0.09	0.36	2.27
PFDoA	307-55-1	ND	0.13	0.45	2.27
PFTTrDA	72629-94-8	ND	0.09	0.36	2.27
PFTeDA	376-06-7	ND	0.20	0.45	2.27
NMeFOSAA	2355-31-9	ND	0.18	0.45	2.27
NEtFOSAA	2991-50-6	ND	0.15	0.45	2.27
PFBS	375-73-5	ND	0.11	0.36	2.27
PFHxS	355-46-4	ND	0.11	0.36	2.27
PFOS	1763-23-1	2.34	0.14	0.45	2.27
HFPO-DA	13252-13-6	ND	0.08	0.36	2.27
Adona	919005-14-4	ND	0.11	0.36	2.27
11CI-PF3OUdS	763051-92-9	ND	0.09	0.36	2.27
9CI-PF3ONS	756426-58-1	ND	0.11	0.36	2.27

Surrogate Recoveries (%)	Recovery
13C2-PFHxA	107
13C2-PFDA	90
d5-EtFOSAA	88
13C3-HFPO-DA	97

1 nanogram per liter (ng/L) = 1 part per trillion (ppt)

This column includes the data qualifiers that apply to a given result.

The detection limit (**DL**) is the lowest level at which the laboratory can reliably “see” that this compound is present.

The limit of detection (**LOD**) is the lowest level at which the laboratory can reliably “see” this compound is **not** present.

The limit of quantitation (**LOQ**) is the lowest level at which the laboratory can reliably measure this compound with a known degree of confidence and accuracy.

ACRONYMS & ABBREVIATIONS

ND not detected
ng/L nanogram(s) per liter

PFAS per- and polyfluoroalkyl substances
PFOA perfluorooctanoic acid

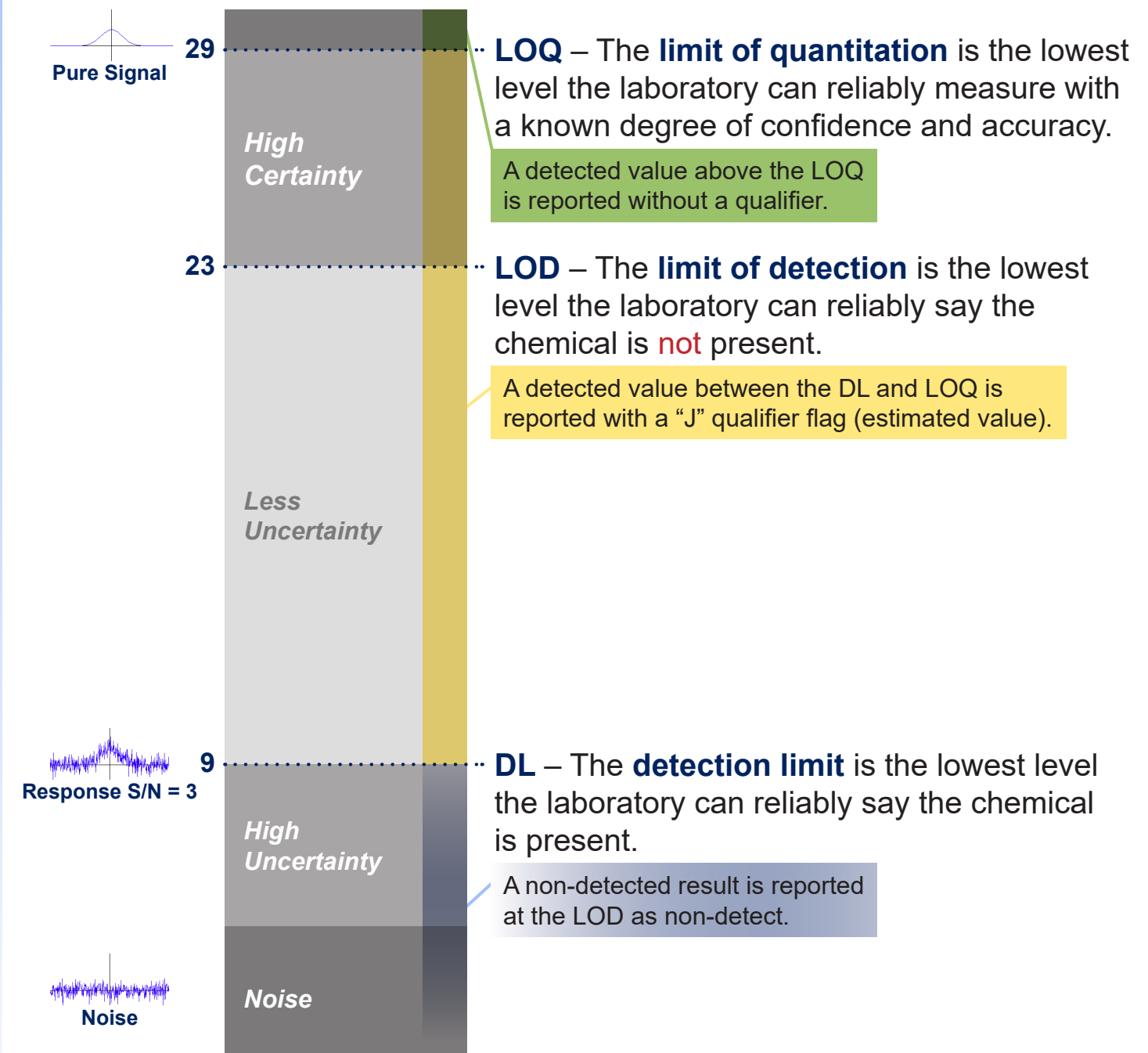
PFOS perfluorooctane sulfonate
ppt part(s) per trillion



Understanding Data Packages

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Instrument Measurements and Analytical Reporting



How Are Amounts of Chemicals in Samples Reported?

This table is an example of how PFOA results might be reported by the laboratory given the DL, LOD, and LOQ shown on the figure to the left.

Sample	Instrument Result	Reported Result
1	non-detect	ND
2	10	10 J
3	25	25 J
4	30	30
5	40	40

J = Estimated

What Is a Surrogate?

- A substance similar to the analytes of interest
- Not found naturally in the substance
- Intentionally added to the sample at a known amount to monitor the performance of the sample's preparation and analysis

ACRONYMS & ABBREVIATIONS

PFOA perfluorooctanoic acid

Per- and Polyfluoroalkyl Substances (PFAS) and Exposure

To request sampling, click the sampling icon below the poster station or call 844-NBKBNGR (844-625-2647).

Where Do PFAS Come From?

- Manufactured compounds; no natural occurrence.
- Used since 1950s in products and industry.
- Last a long time in the environment.



firefighting foam



stain-resistant carpet and fabrics



nonstick cookware



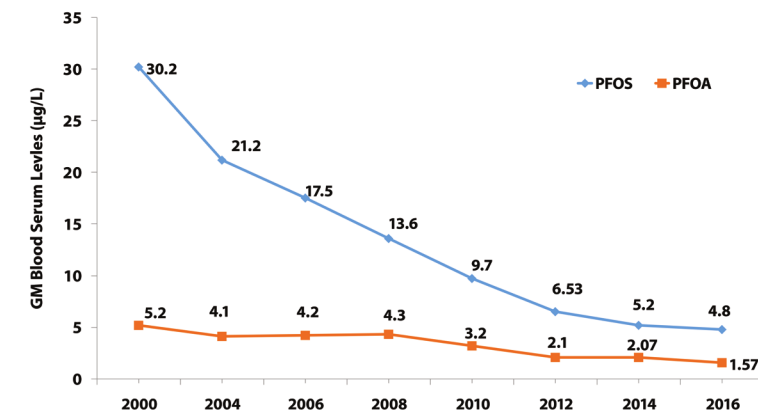
food packaging

Exposures to PFAS

- Occurs primarily from swallowing:
 - Impacted water
 - Fish, meat, or crops grown in impacted areas
 - Food wrapped in PFAS-coated paper or containers
- Breathing or accidentally swallowing PFAS that escapes from products in the home.
- Can reach babies in the womb through placenta and nursing infants through breast milk of exposed mothers.
- Skin contact while bathing or showering is unlikely to be significant exposure.

PFAS in People

- CDC monitoring estimates that most people in the U.S. have PFAS in their bodies.
- Levels of PFOS and PFOA are decreasing in blood serum of the U.S. population following their phase-out from use.
- Some PFAS stay in the body a long time.
- There is no recommended medical treatment to reduce PFAS in the body.



Source: CDC National Health and Nutrition Examination Survey

ACRONYMS & ABBREVIATIONS

CDC Centers for Disease Control and Prevention
PFAS per- and polyfluoroalkyl substances

PFOA perfluorooctanoic acid
PFOS perfluorooctane sulfonate

Health Concerns and Advisory Levels

To request sampling, click the sampling icon below the poster station or call 844-NBKBNGR (844-625-2647).

How Might PFAS Exposure Affect People’s Health?

- We are still learning about health effects of PFAS in people, but the most studied PFAS indicate some health risks in people.
- Based on limited evidence from studies with people, potential health effects found to be associated with exposure include:
 - Increased cholesterol levels
 - Decreased immune response to vaccines
 - Increased risk of thyroid disease
 - Increased liver enzymes in serum
 - Increased risks of some cancers
- Animal testing with some PFAS shows damage to liver, thyroid, and immune system; PFOS and PFOA exposures resulted in reduced growth, altered development, and some cancers.
- The levels of PFOS or PFOA cannot be linked to an individual's current or future health effects.

What Is the EPA Lifetime Health Advisory?

- Sets a concentration of 70 ppt PFOS and PFOA in drinking water.
- Protects against harmful health effects to sensitive populations and the general public.
- Assumes exposure over a lifetime.
- Provides information to state agencies and public health officials on health effects and water treatment so they can take steps to reduce exposures.
- Is only an advisory and is therefore non-enforceable.

How Was the EPA Health Advisory Calculated?

- Is based on studies of health effects with PFOS and PFOA in laboratory animals.
- Considers information regarding health effects of people exposed to PFOS and PFOA.
- Protects sensitive populations, including babies in the womb of mothers who are exposed.
- Assumes 20 percent of overall exposure is from drinking water, 80 percent of overall exposure is from other sources.

ACRONYMS & ABBREVIATIONS

EPA	U.S. Environmental Protection Agency	PFOA	perfluorooctanoic acid	ppt	part(s) per trillion
PFAS	per- and polyfluoroalkyl substances	PFOS	perfluorooctane sulfonate		

Washington is Developing State Action Levels

State Board of Health—Rulemaking

- Washington is in the process of setting State Action Levels for five PFAS.
 - Action Levels are public health goals for long-term water consumption.
 - A draft rule is available. A final rule is expected in mid-2021.

Draft Rule would:

- Require public drinking water systems to test for PFAS.
- Help us understand occurrence of PFAS in Washington State drinking water.
- Ensure that consumers are informed and have information to protect themselves when PFAS are detected.



Acronyms

DOH	Washington State Department of Health	PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid	PFHxS	perfluorohexane sulfonic acid
PFOS	perfluorooctane sulfonic acid	PFBS	perfluorobutane sulfonic acid

Draft State Action Levels for per- and polyfluoroalkyl substances (PFAS)

Individual PFAS	Level in Drinking Water
PFOA	10 ppt
PFOS	15 ppt
PFNA	14 ppt
PFHxS	70 ppt
PFBS	860 ppt

ppt = parts per trillion

Action Levels are Protective

- Protect health over a lifetime of exposure in daily drinking water.

Based on...

- 2019 DOH review of best available science and more recent health assessments.
- Higher exposures in breastfeeding infants.
- Assumption that 20-50 percent of PFAS exposure comes from drinking water sources. 50-80 percent can come from other sources such as diet.
- Long-term exposure (> 10 years) in daily drinking water.
- Minnesota Department of Health, infant exposure model.



Sign Up for Your Sampling Appointment

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Off-Base Drinking Water Well Sampling

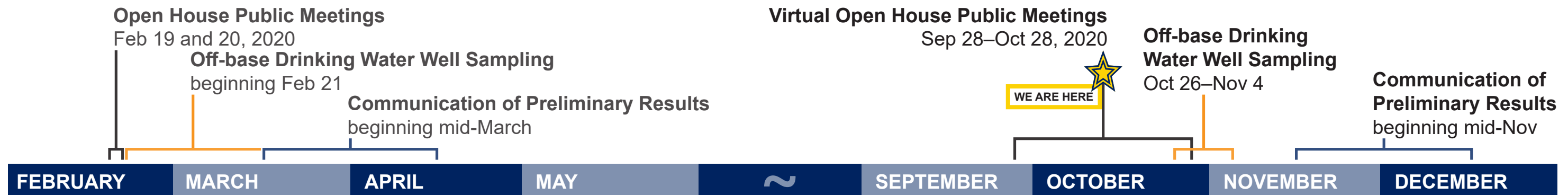
- The Navy will be sampling drinking water wells in the designated sampling area.
- Sampling is at no cost to you.
- Drinking water samples will be collected **Monday, October 26–Wednesday, November 4, 2020**.
- General sampling appointments are available **9 a.m.–6 p.m. Monday–Friday | 9 a.m.–1 p.m. Saturday | 1 p.m.–5 p.m. Sunday**

Additional times available upon request

- The property owner must give permission for sampling and complete the questionnaire.
- Sampling takes less than an hour.
- An adult (18 years or older) must be present during sampling.

The Navy will provide bottled water if your sampling results are above the EPA lifetime health advisory (70 ppt).

Off-Base Drinking Water Sampling Activity Timeline



ACRONYMS & ABBREVIATIONS

EPA U.S. Environmental Protection Agency ppt part(s) per trillion



Sampling and Results Timeline

To request sampling, click the sampling icon below the poster station or call 844-NBKBNGR (844-625-2647).

Sequence of Events	Approximate Timeframe
1. Sign up for drinking water well sampling.	■ September 28–October 28, 2020
2. Navy contractor samples well.	■ Beginning October 26, 2020
3. Navy receives preliminary results.	■ Approximately 1 month after sample collected
4. Navy calls property owner with results.	■ Within 24 hours of results received ■ Bottled water distributed if results are above the EPA lifetime health advisory (70 ppt)
5. Lab data is verified and Navy mails final lab data to property owner.	■ Approximately 3 months from sampling

ACRONYMS & ABBREVIATIONS

EPA U.S. Environmental Protection Agency ppt part(s) per trillion



Drinking Water Sampling Process

To request sampling, click the sampling icon below the poster station or call 844-NBKBNGR (844-625-2647).

Drinking water well sampling is voluntary.

Sampling Process

- We need your help to:
 - Make your appointment.
 - Fill out the questionnaire prior to sampling appointment.
- Samples will be collected by a team of qualified professionals:
 - Team will consist of two members.
 - The water sample will be collected as close to well as possible.
 - Water will run for 5 minutes prior to collection.
- Samples will be collected and analyzed according to EPA guidelines.

COVID-19 Precautions

- The sampling team will take the necessary precautions to minimize exposure. In preparation, please unlock any areas requiring access prior to sampling team arrival.
 - A sampling team member will call you upon arrival; you do not need to meet the team in person.
 - Sampling team members may arrive in separate cars.
 - Sampling team members will be wearing masks and gloves.
 - One team member will collect the sample; the second team member will remain in the car to assist with documentation.
 - Upon completion of sampling, a team member will call you to let you know that sampling is complete.

ACRONYMS & ABBREVIATIONS

COVID-19 coronavirus disease 2019 EPA U.S. Environmental Protection Agency