2022 Federal Facility Agreement Meeting

CERCLA & CD Sites

October 27, 2022

Meseret Ghebresllassie

DPW Compliance Branch Chief

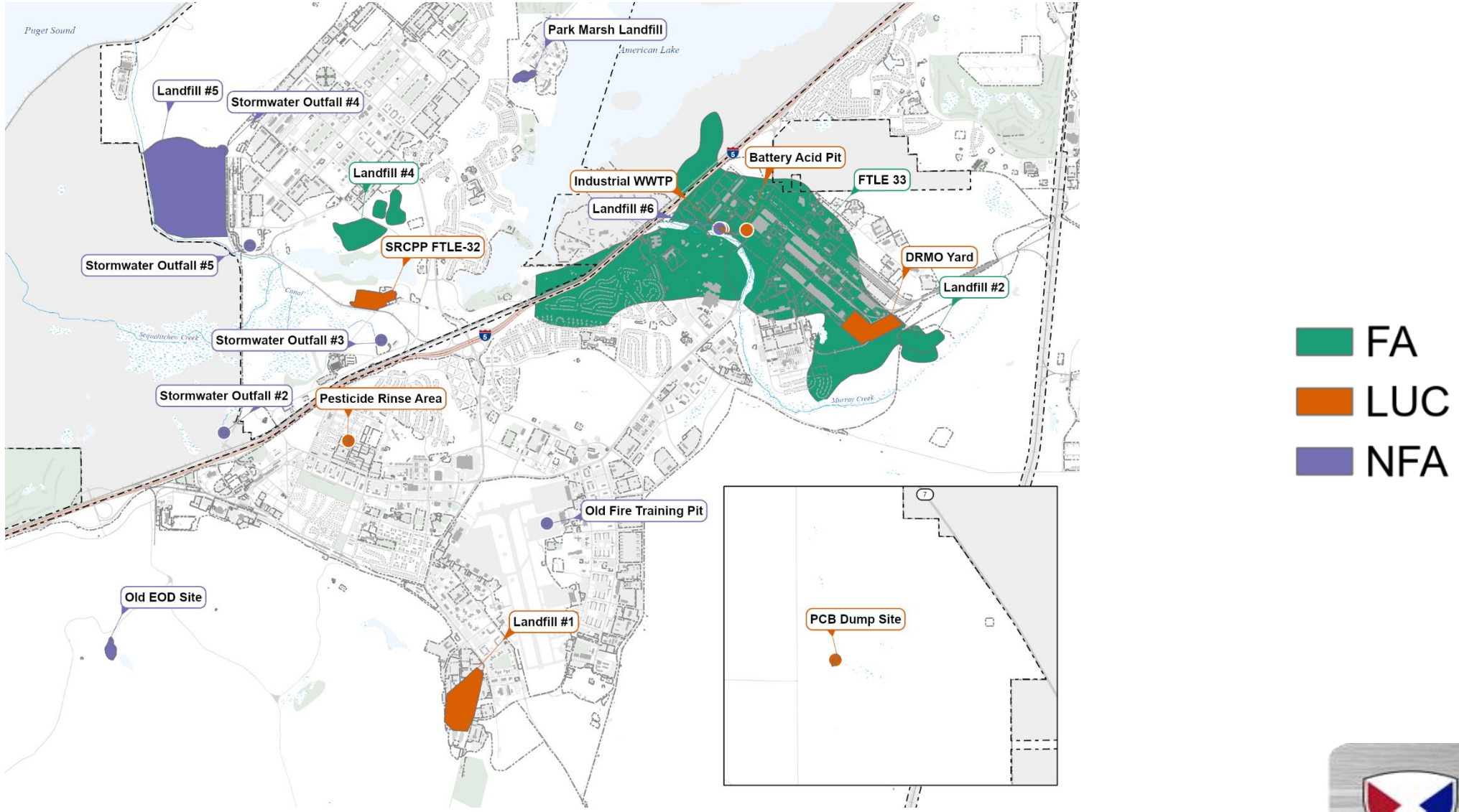
JBLM CERCLA Sites List

January 1990 FFA – Fort Lewis

- Landfill 5: FTLE-58 – Delisted NPL in 1992
- Landfill 1: FTLE-54 (LTM) LUC
- Landfill 2/Logistics Center: FTLE 33 (RA-O) P&T, GWM & LUC
- Landfill 4: LF004 (RA-O) GWM/LUC
- Landfill 6: FTLE-59 (NFA)
- Fire Training Pit - FTLE17 (NFA)
- IWTP: FTLE-51 (LTM) LUC
- Battery Acid Pit: FTLE-16 (LTM) LUC
- Pesticide Rinse Area: FTLE-28 (LTM) LUC
- Illicit PCB Dump: FTLE-46 (LTM) LUC
- DPMO Yard: FTLE-31 (LTM) LUC
- EOD Site 62: FTLE-69 (MMRP) (NFA)
- Storm Water Outfalls 2, 3, 4, and 5 (NFA)
- SRCPP: FTLE-32 (LTM) LUC
- Park Marsh: FTLE-18 (NFA)

JBLM CERCLA Sites List

January 1990 FFA – Fort Lewis

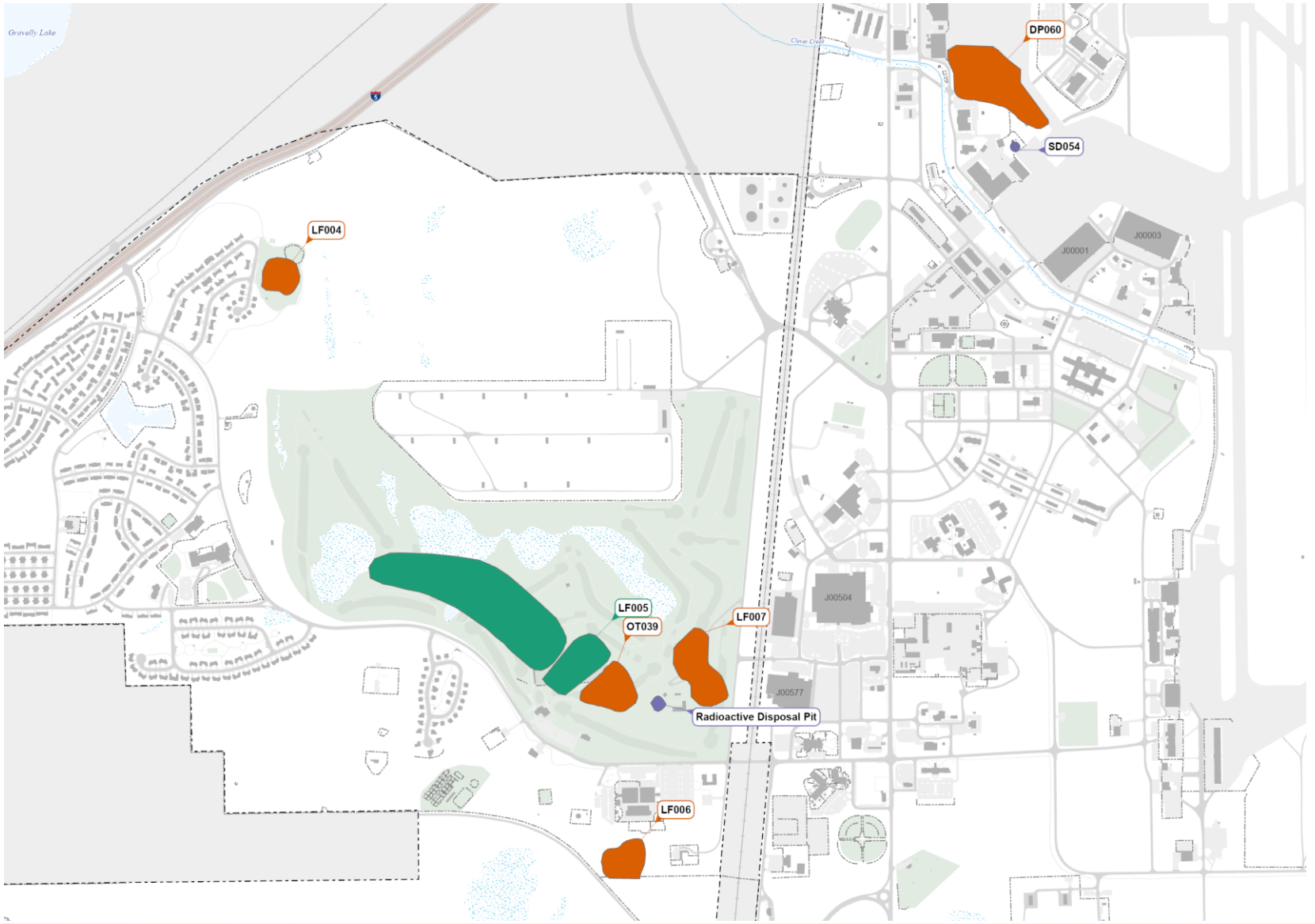


October 1989 FFA - McChord Field

- American Lake Garden Tract (ALGT) – NPL in 1984
  - Landfill 5: LF005/ALGT (RAO) GWM/LUC
  - Landfill 4: LF004 (LTM) LUC
  - Landfill 6: LF006 (LTM) LUC
  - Landfill 7: LF007 (LTM) LUC
  - Landfill 26: OT026 (MMRP) NFA
  - Landfill 35: RW-035 (NFA)
  - Landfill 39: OT039 (LTM) LUC
- Washrack/Treatment Area (WTA) Delisted NPL in 1997
  - Site SD054 (Delisted NPL in 1997)

JBLM CERCLA Sites List

October 1989 FFA - McChord Field

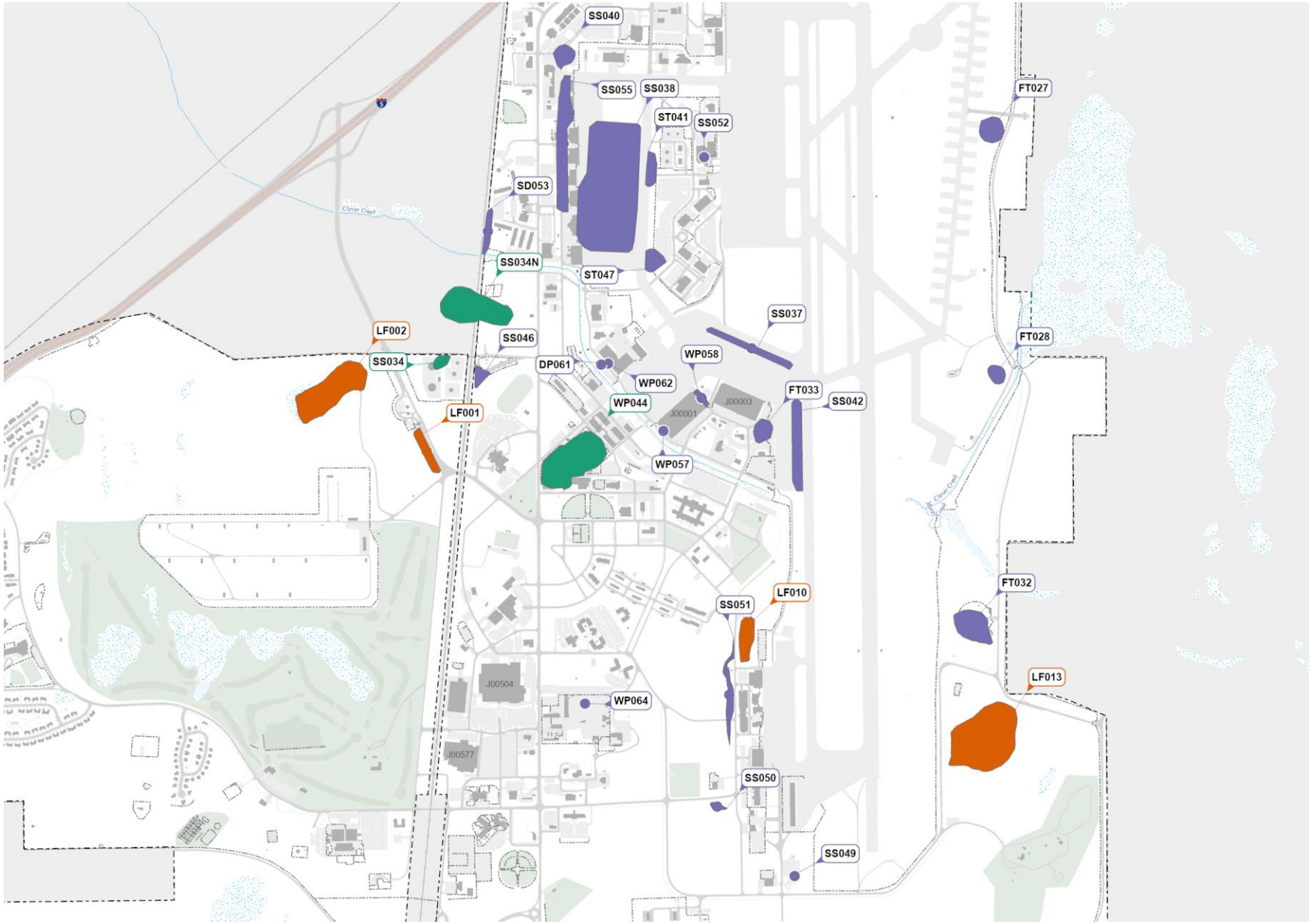


JBLM Consent Decree Sites List

- February 1992 McChord Consent Decree No. 922019677
- Total 29 sites:

- Area E (4 sites)
  - Site 10: LF010 (LTM) LUC
  - Site 49: SS049 (NFA)
  - Site 50: SS050 (NFA)
  - Site 51: SS051 (NFA)
- Area I (1 site)
  - Site 13: LF013 (LTM) LUC
- Area A (4 sites)
  - Site 1: LF001 (LTM) LUC
  - Site 2: LF002 (LTM) LUC
  - Site 34: SS-034 (RA-O) GWM/LUC
  - Site 46: SS046 (NFA)
- Motor Pool/Vehicle Maintenance (1 site)
  - WP-044 (RA-O) GWM/LUC
- Fire Training Areas (3 sites)
  - Site 27: FT027 (NFA)
  - Site 28: FT028 (NFA)
  - Site 32: FT032 (NFA)
- North Industrial Area (15 sites)
  - Site 12: LF012 (NFA)
  - Site 33: FT033 (NFA)
  - Site 37: SS037 (NFA)
  - Site 38: SS038 (NFA)
  - Site 40: SS040 (NFA)
  - Site 41: ST041 (NFA)
  - Site 42: SS042 (NFA)
  - Site 47: ST047 (NFA)
  - Site 52: SS052 (NFA)
  - Site 53: SD053 (NFA)
  - Site 55: SS055 (NFA)
  - Site 57: WP057 (NFA)
  - Site 58: WP058 (NFA)
  - Site 61: DP061 (NFA)
  - Site 62: WP062 (NFA)
- Entomology Shop Dry Well (1 site)
  - Site 64: WP064 (NFA)

JBLM Consent Decree Sites List



FA
LUC
NFA

JBLM CERCLA & CD Sites

- Active CERCLA Remediation or Monitoring sites
  - ALGT – Landfill 5 – (RA-O) GWM and LUC
  - Landfill 1 – (LTM) LUC
  - Landfill 2 – Log Center – (RA-O) P&T, GWM and LUC
  - Landfill 4 – (LTM) GWM and LUC

- Active CD Remediation or Monitoring sites
  - SS-034 (RA-o) GWM
  - WP-044 (RA-o) GWM

- DoD independent CERCLA cleanup Site
  - SS 34N TCE – (RA-o) GWM ISCO and GWM
  - Site DP060 (GWM) achieved cease monitoring in 2021

JBLM CERCLA & CD Sites COC Conc.

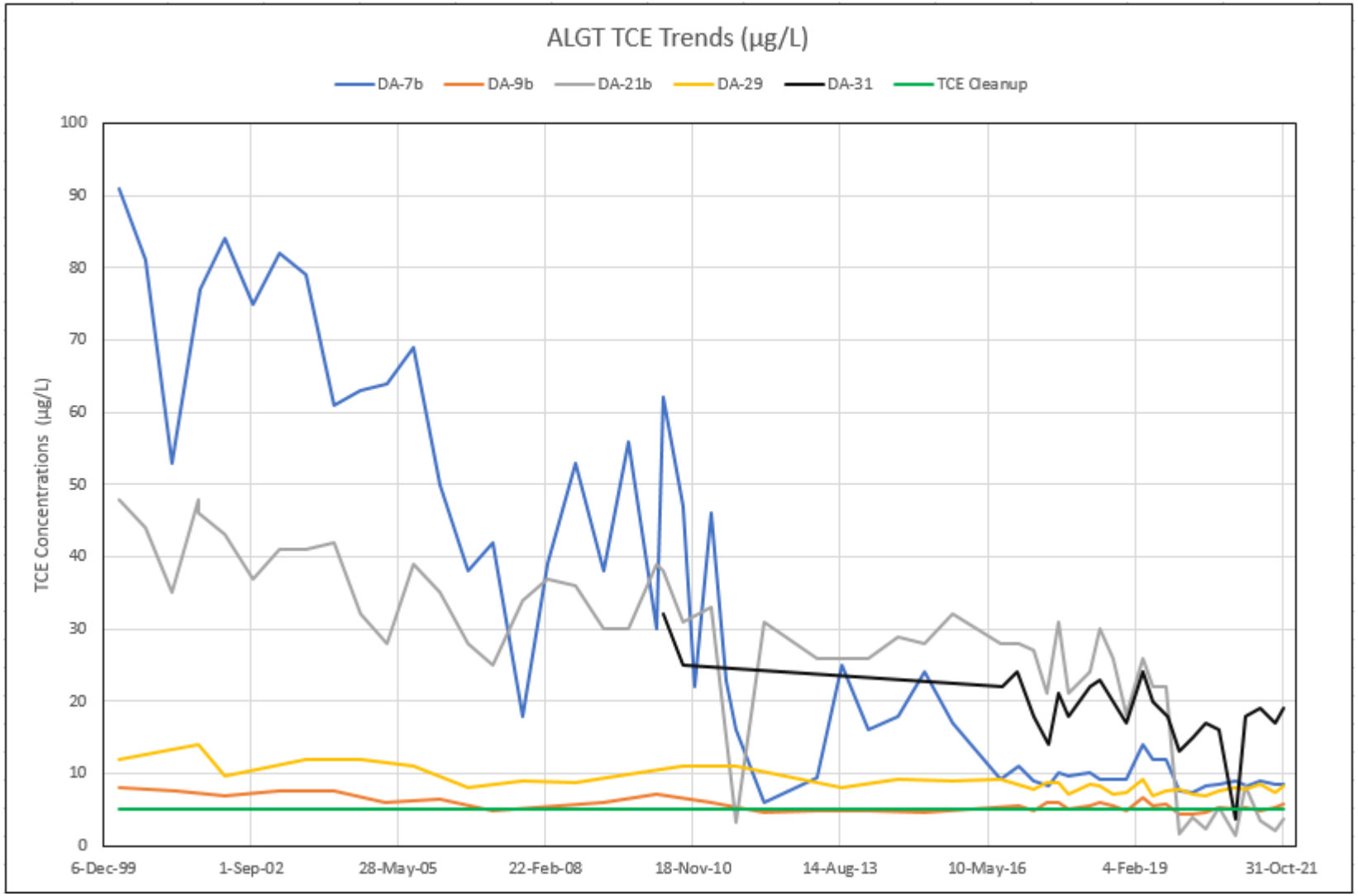
Site	COC	Max Conc. µg/L	Max Conc. µg/L 2022	Cleanup Level µg/L
Logistics Center LF2	TCE	16,000	**128**	5
Landfill 4	TCE	43	**5.69**	5
ALGT	TCE cis 1-2 DCE	91 220	**18.2** **35.8**	5 70
SS-34	TPH-D	160,000	**1,160**	500
WP-44	TPH-D TPH-O	6,800 1,500	**2,850** **1,100**	500 500
SS-34N	TCE	300	**80**	5
DP-60	TPH-D TPH-O	55,000 2,000	**---** **---**	500 500

CERCLA ALGT 2021 Activities

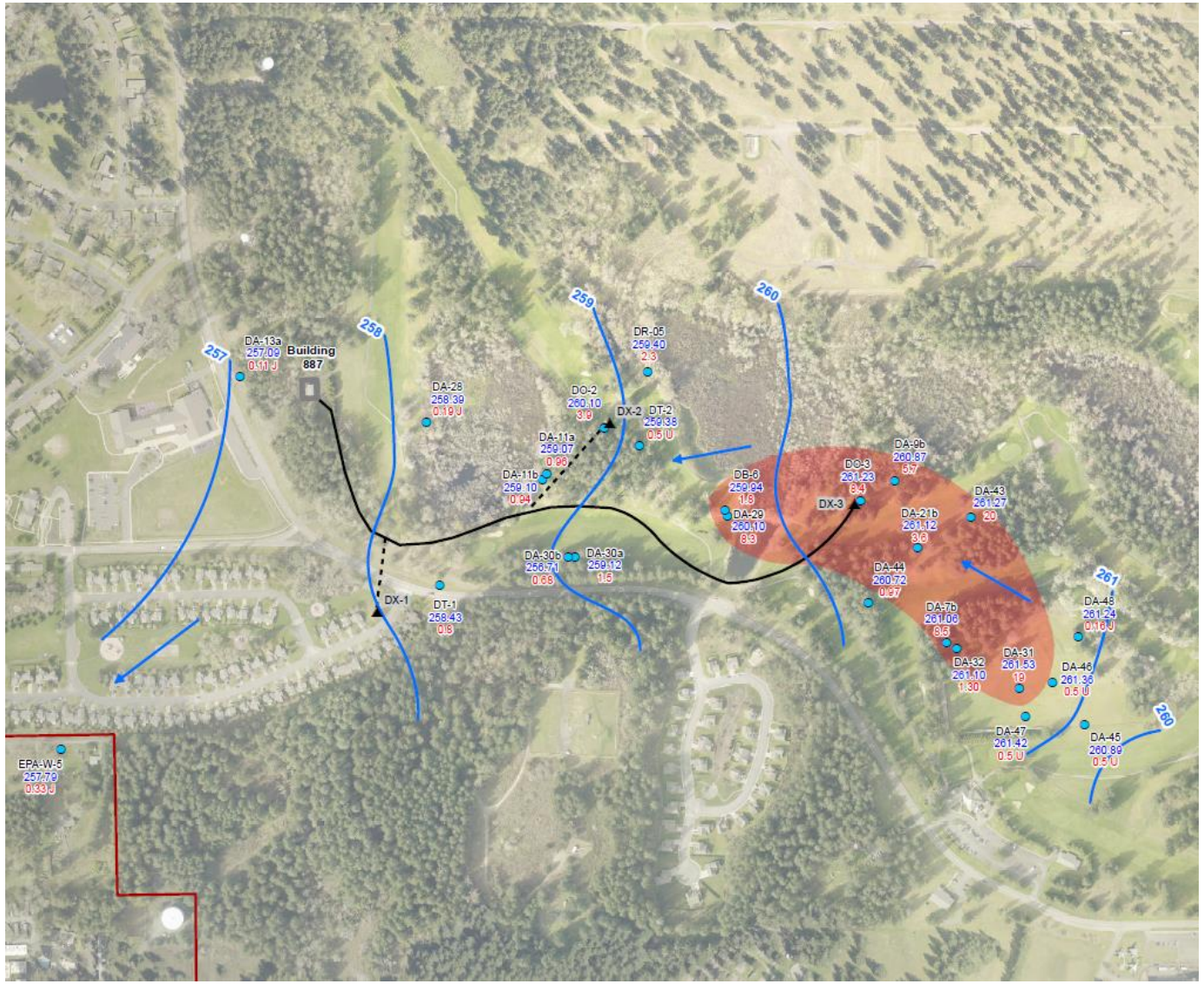
- P&T system permanent shutdown
- Collected quarterly VOC sampling and semi-annual MNA data from 23

Location	Well ID	Remedial Investigation (1989 - 1990)		GPT System Operation (1995 - August 2016)		MNA Sampling (September 2016 - November 2021)	
		# of GW Sample Events	Mean TCE Concentration (µg/L)	# of GW Sample Events	Mean TCE Concentration (µg/L)	# of GW Sample Events	Mean TCE Concentration (µg/L)
Source Area	DA-7b	4	**77**	46	**46**	22	**9.45**
	DA-21b	4	**61**	43	**32**	22	**15.83**
Mid-Plume	DA-9b	4	**13**	23	**6.7**	21	5.34
	DB-6	4	**12**	27	4.8	22	3.90
	DR-05	5	**6.3**	29	1.6	22	1.61
Downgradient	DT-1	--	--	57	2.5	22	1.28
Maximum Contaminant Level		--	5	--	5	--	5

ALGT Current and Future Activities



CERCLA ALGT 2021 TCE Plume



Legend

- Groundwater Monitoring Well
- Extraction Well
- GPT System 2" Pipe
- GPT System 6" Main Pipe
- Inferred Residual TCE Plume Above 5 µg/L
- Inferred Groundwater Elevation Contours
- JBLM Boundary
- Inferred Seasonal Groundwater Flow Direction
- 261.24 — November 2021 Groundwater Elevation (ft AMSL)
- 0.16 J — November 2021 TCE Concentration (µg/L)

ALGT Current and Future Activities

- EPA reviewing ROD Amendment, four alternatives presented
  - **Alternative #1 – No Further Action/Natural Attenuation**
  - **Alternative #2 – Monitored Natural Attenuation**
  - **Alternative #3 – In-Situ Reductive Dechlorination through Enhanced In-Situ Bioremediation**
  - **Alternative #4 – In-Situ Reductive Dechlorination through Electron Donor Injection**
- Continuing GW quarterly VOC sampling and semi-annual MNA sampling

ALGT Future Activities

Recommendation

- Alternative #2 – Monitored Natural Attenuation

Components:

- **No remedial action**
- **Continued groundwater monitoring at selected MW**
- **Continued implementation of institutional controls**

Rationale/Justification:

- **VOC plume boundary is contained within JBLM McChord Field**
- **Maximum TCE concentration 2019 was 26 µg/L**
- **Plume does not appear to be migrating; sampling program will continue monitoring contaminant concentrations**

Coming up

- ROD Amendment approval
- Implementation of New Remedy - MNA
- Decommissioning of the P&T System, upon amendment approval

Log Center - LF 2 2022 Activities

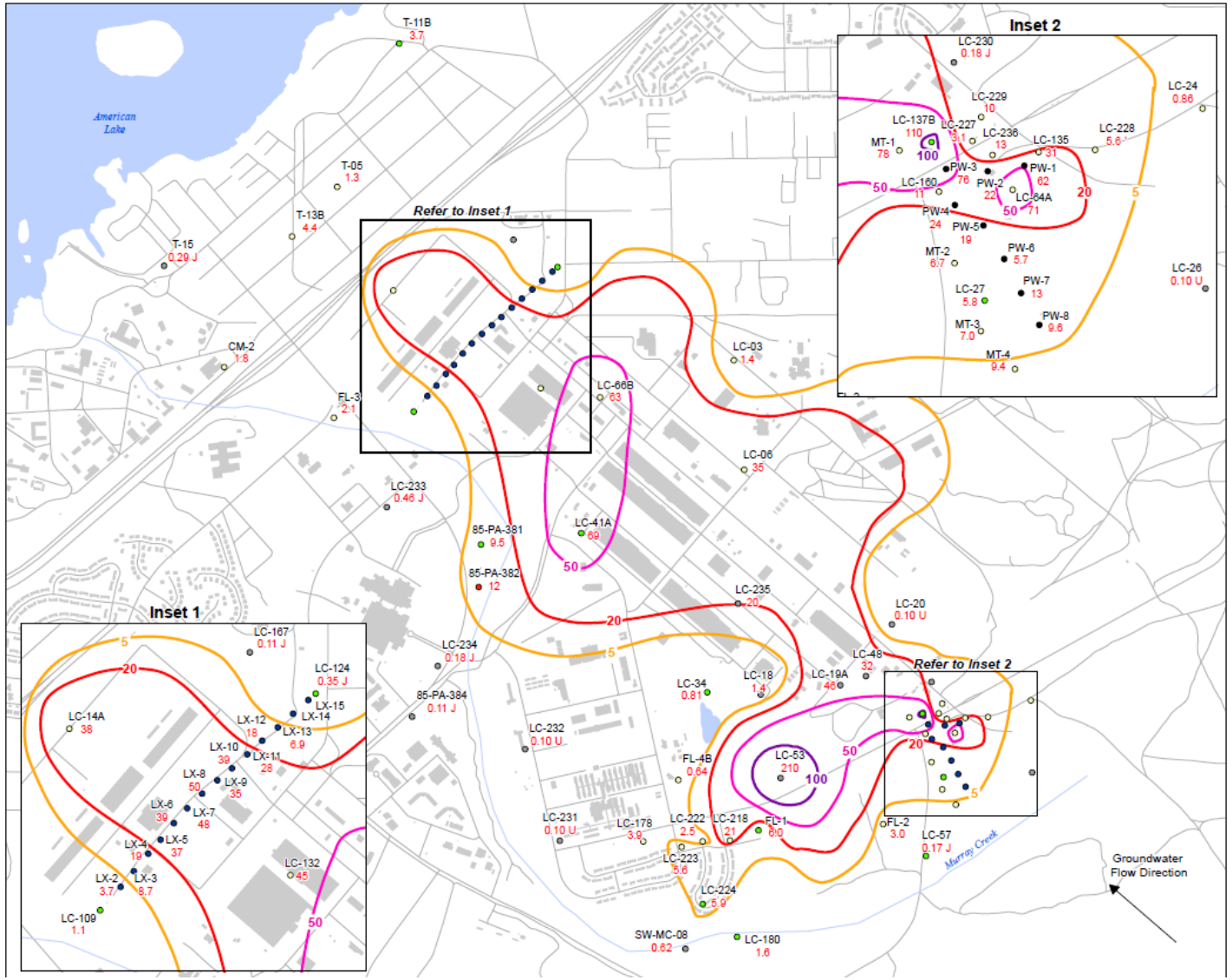
- P&T operation and GW monitoring
- Well Condition and Replacement Assesment
  - Installed replacement wells for LX-14 and LX-15 (LX-14R and LX-15R)
  - Inspected all pumps and motors
  - Video surveyed all wells
  - Evaluated conditions for replacement, rehabilitation, and no action

Log Center - LF 2 2021 Activities

- Source Area Investigation at LF2
  - Performed MIP/HPT drilling, sonic drilling with push-ahead sampling, monitoring well installation, and groundwater sampling
  - High TCE concentration area observed downgradient west of LF2
  - Installed 16 new groundwater monitoring wells in high TCE area
- Capture Zone Analysis at LF2 P&T system
  - Aquifer testing at PW-2 and PW-5
  - Simulation of pumping in high TCE area indicated a minimum of 3 new wells would be needed to capture downgradient TCE

Logistics Center LF 2

Spring 2021 Upper Vashon Aquifer TCE Plume



Legend

- Pump and Treat System Extraction Well
- Surface Water Course Centerline

Upper Vashon Aquifer Monitoring Well TCE Trend (2012-2021)

- Statistically Significant Upward Trend
- Statistically Significant Downward Trend
- No Trend
- Data Not Analyzed

Estimated TCE Concentration

- 100 µg/L
- 50 µg/L
- 20 µg/L
- 5 µg/L

17 Spring 2021 TCE Concentration (µg/L)

Notes:
ROD Remediation Goal for TCE = 5 µg/l
J = The report is an estimated value.
U = Analyte not detected above practical quantification limit.

N

0 1,000 2,000

Feet
1 inch = 1,250 feet

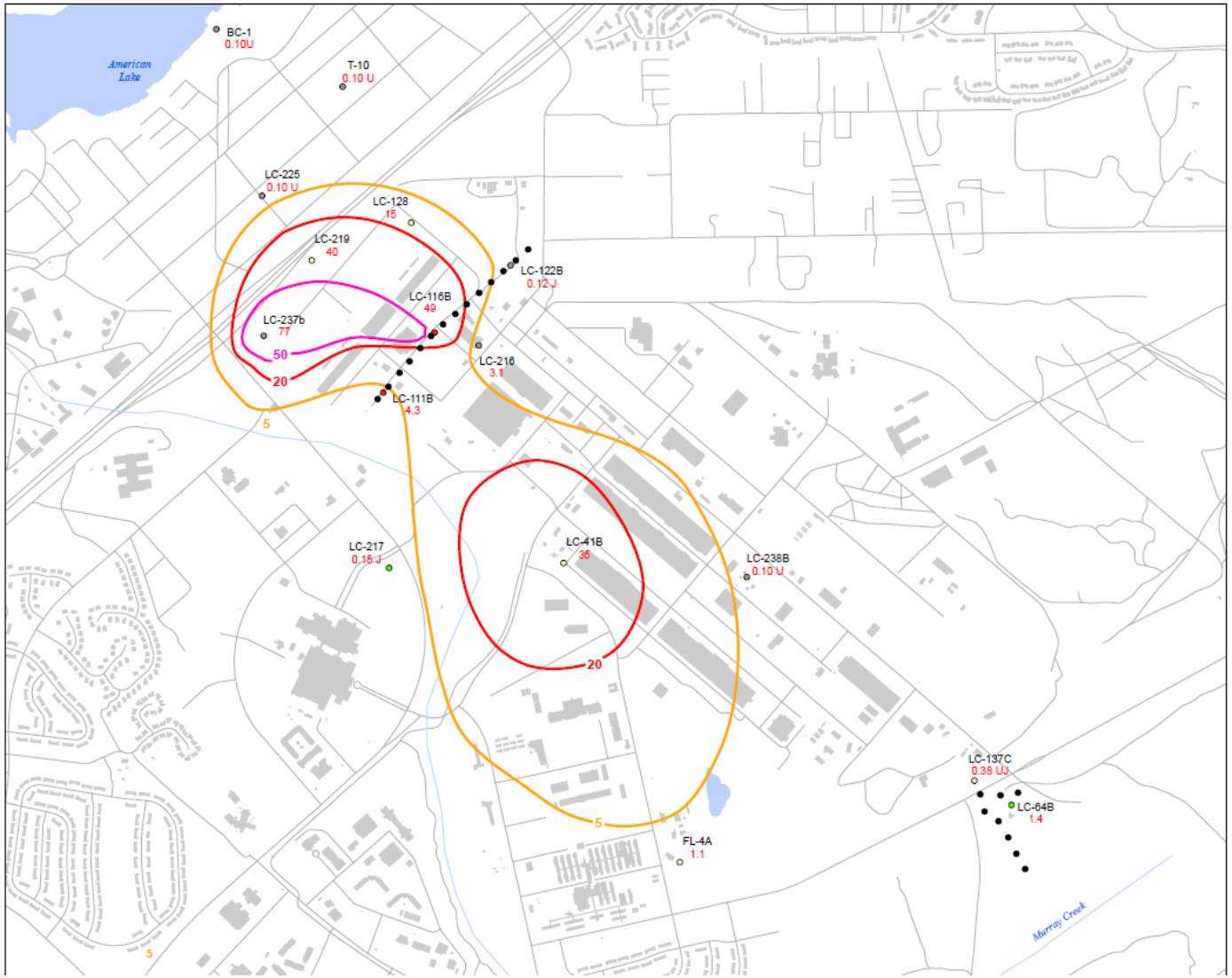
Map Date: 12/21/2021
Coordinate System: UTM Zone 10
Horizontal Datum: WGS 84

FIGURE 9
UPPER VASHON AQUIFER TCE CONCENTRATIONS (SPRING 2021) AND TCE CONCENTRATION TRENDS (2012-2021)

2021 ANNUAL GROUNDWATER MONITORING AND REPORTING

Logistics Center LF 2

Spring 2021 Lower Vashon Aquifer TCE Plume



Legend

- Pump and Treat System Extraction Well
- Surface Water Course Centerline

Lower Vashon Aquifer Monitoring Well TCE Trend (2012-2021)

- Statistically Significant Upward Trend
- Statistically Significant Downward Trend
- No Trend
- Data Not Analyzed

Estimated TCE Concentration

- 50 µg/L
- 20 µg/L
- 5 µg/L

42 Spring 2021 TCE Concentration (µg/L)

Notes:
ROD Remediation Goal for TCE = 5 µg/l
J = The report is an estimated value.
U = Analyte not detected above practical quantification limit.

N

0 800 1,600
Feet
1 inch = 1,039 feet

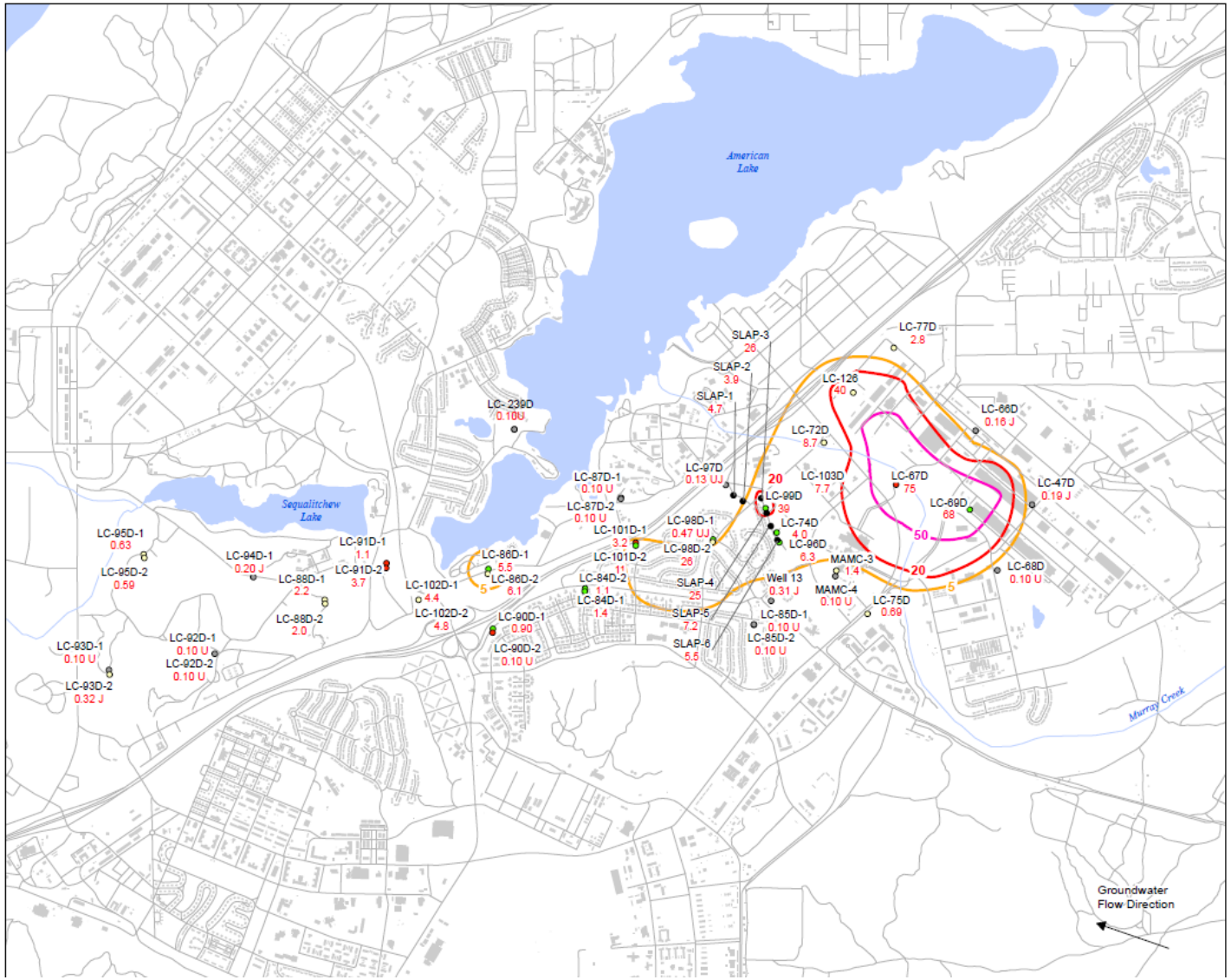
Map Date: 12/21/2021
Coordinate System: UTM Zone 10
Horizontal Datum: WGS 84

FIGURE 16
LOWER VASHON AQUIFER TCE CONCENTRATIONS (SPRING 2021) AND TCE CONCENTRATION TRENDS (2012-2021)

2021 ANNUAL GROUNDWATER MONITORING AND REPORTING

Logistics Center LF 2

Spring 2021 Sea Level Aquifer TCE Plume



Legend

- Pump and Treat System Extraction Well
- Surface Water Course Centerline

Sea Level Aquifer Monitoring Well TCE Trend (2012-2021)

- Statistically Significant Upward Trend
- Statistically Significant Downward Trend
- No Trend
- Data Not Analyzed

Estimated TCE Concentration

- 50 µg/L
- 20 µg/L
- 5 µg/L
- 11 Spring 2021 TCE Concentration (µg/L)

Notes:
ROD Remediation Goal for TCE = 5 µg/l
J = The report is an estimated value.
U = Analyte not detected above practical quantification limit.

N

0 1,750 3,500

Feet

1 inch = 2,195 feet

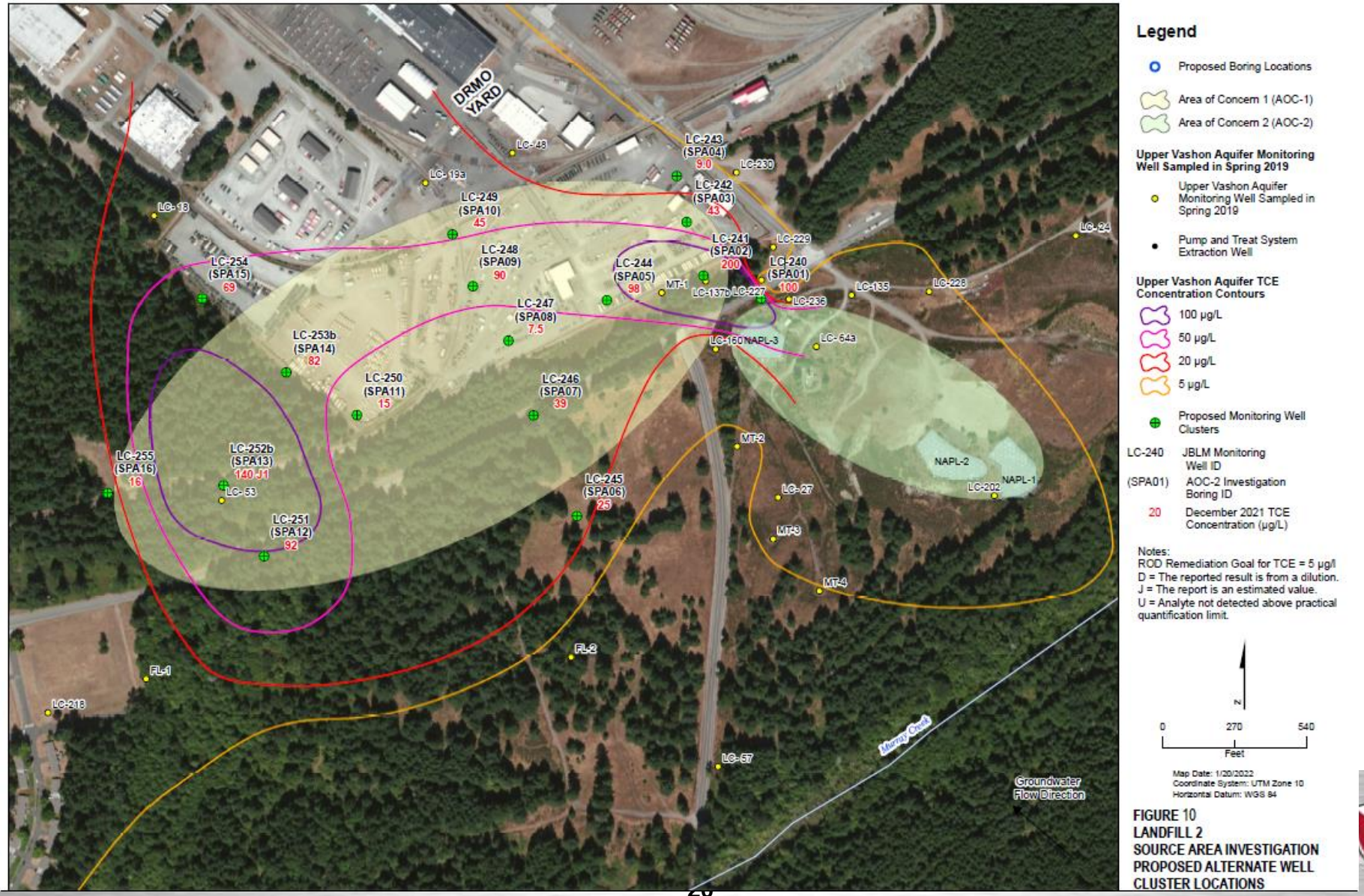
Map Date: 12/21/2021
Coordinate System: UTM Zone 10
Horizontal Datum: WGS 84

FIGURE 19
SEA LEVEL AQUIFER
TCE CONCENTRATIONS (SPRING 2021) AND TCE CONCENTRATION TRENDS (2012-2021)

2021 ANNUAL GROUNDWATER MONITORING AND REPORTING

Log Center - LF 2

Source Area Investigation



Legend

- Proposed Boring Locations
- Area of Concern 1 (AOC-1)
- Area of Concern 2 (AOC-2)

Upper Vashon Aquifer Monitoring Well Sampled in Spring 2019

- Upper Vashon Aquifer Monitoring Well Sampled in Spring 2019
- Pump and Treat System Extraction Well

Upper Vashon Aquifer TCE Concentration Contours

- 100 µg/L
- 50 µg/L
- 20 µg/L
- 5 µg/L

- Proposed Monitoring Well Clusters

LC-240 JBLM Monitoring Well ID

(SPA01) AOC-2 Investigation Boring ID

20 December 2021 TCE Concentration (µg/L)

Notes:
ROD Remediation Goal for TCE = 5 µg/l
D = The reported result is from a dilution.
J = The report is an estimated value.
U = Analyte not detected above practical quantification limit.

N

0 270 540

Feet

Map Date: 1/20/2022
Coordinate System: UTM Zone 10
Horizontal Datum: WGS 84

FIGURE 10
LANDFILL 2
SOURCE AREA INVESTIGATION
PROPOSED ALTERNATE WELL CLUSTER LOCATIONS

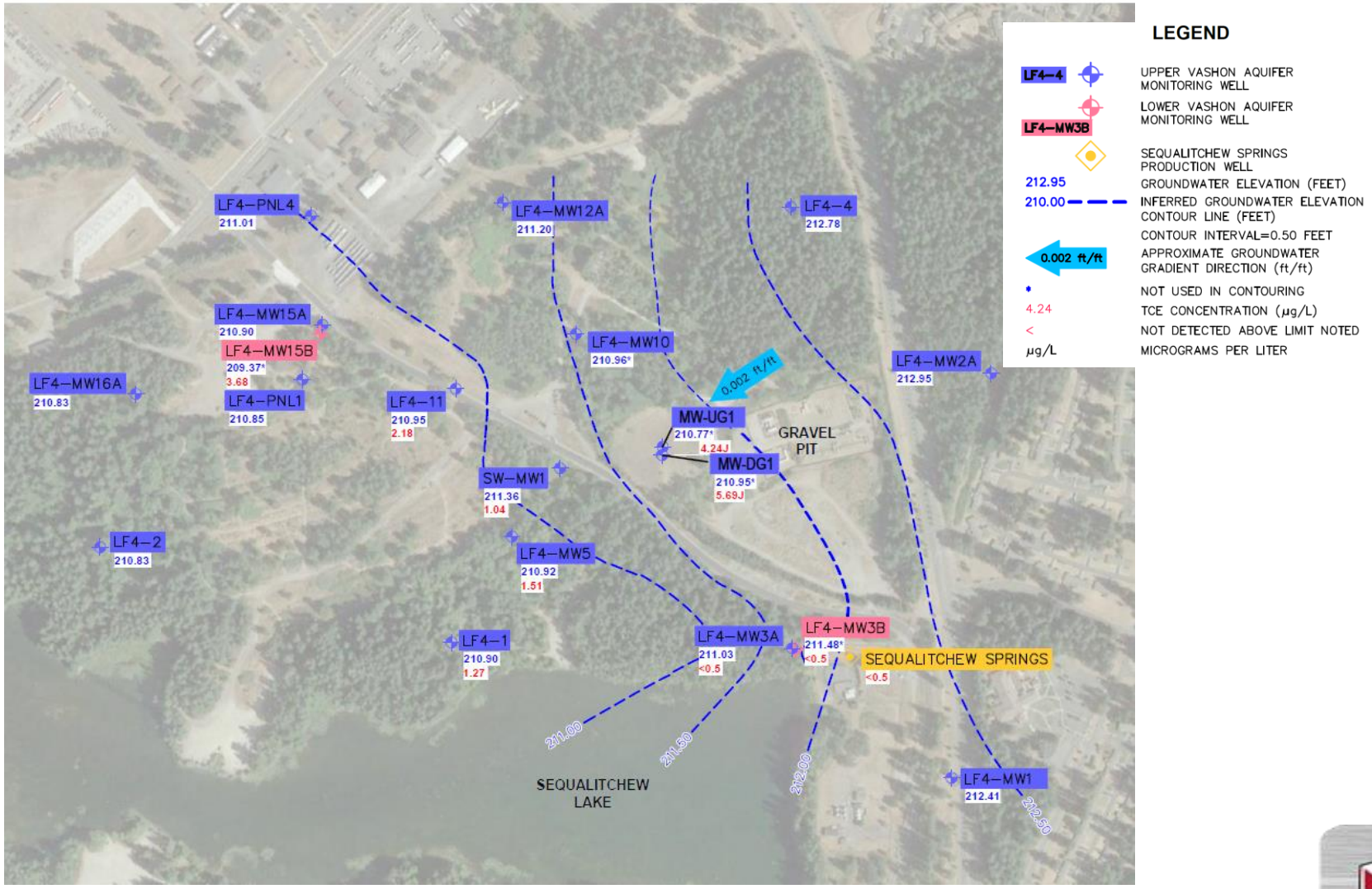
Log Center - LF 2

Current and Future Activities

- Offline line extraction wells returned to operation in 2022 after well rehab and pump/motor replacement (LX-4, LX-6, PW-2, PW-6, PW-7)
- Further assessment of high TCE area downgradient west of LF2 (TBD)
- Coming up
  - Electrical components upgrades to SCADA system
  - Quarterly sampling of 16 LF2 Source Area Investigation wells
  - Continue the semi-annual groundwater monitoring
  - Continue P&T of the three extraction systems.

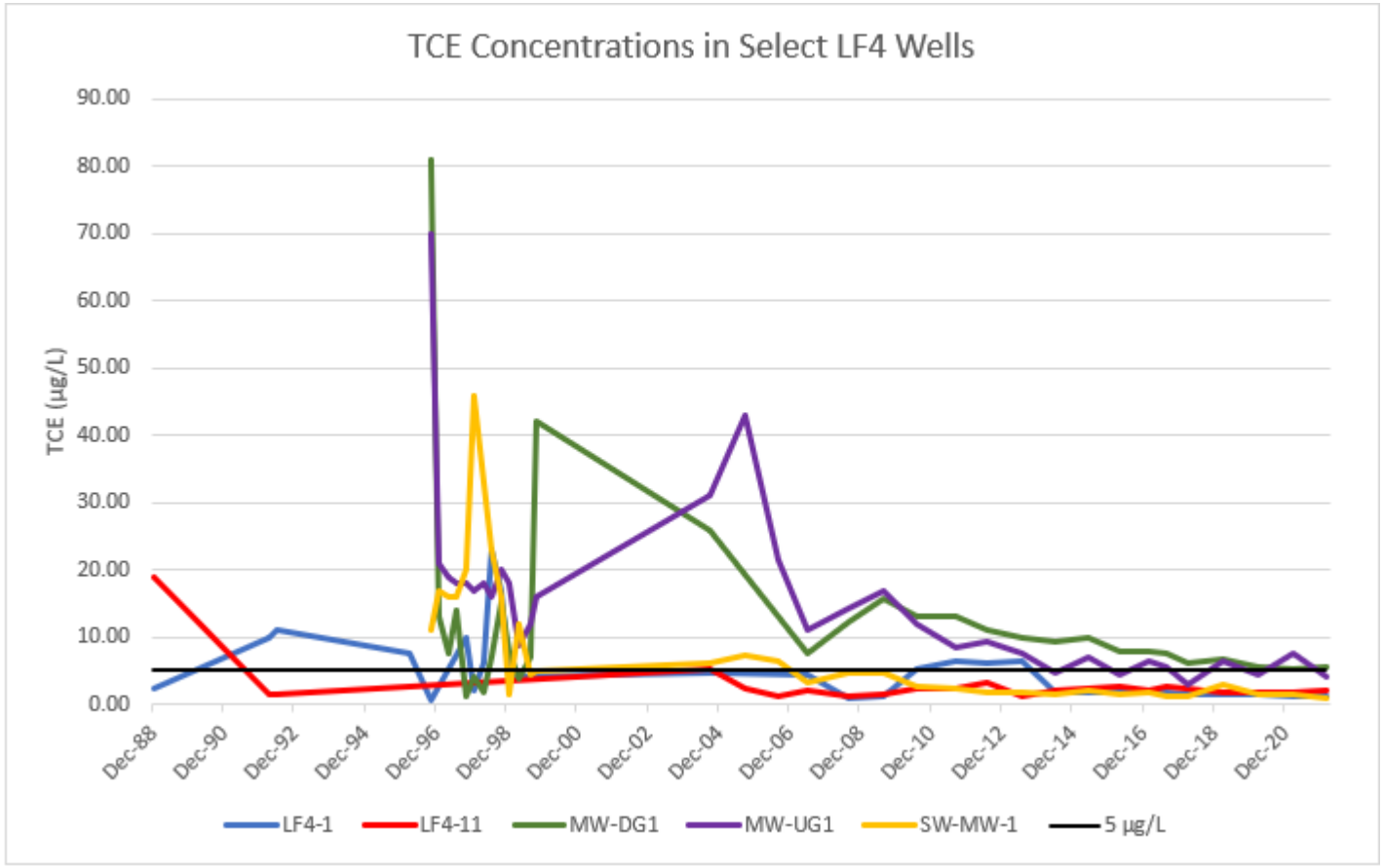
Landfill 4

Spring 2022 TCE Concentrations



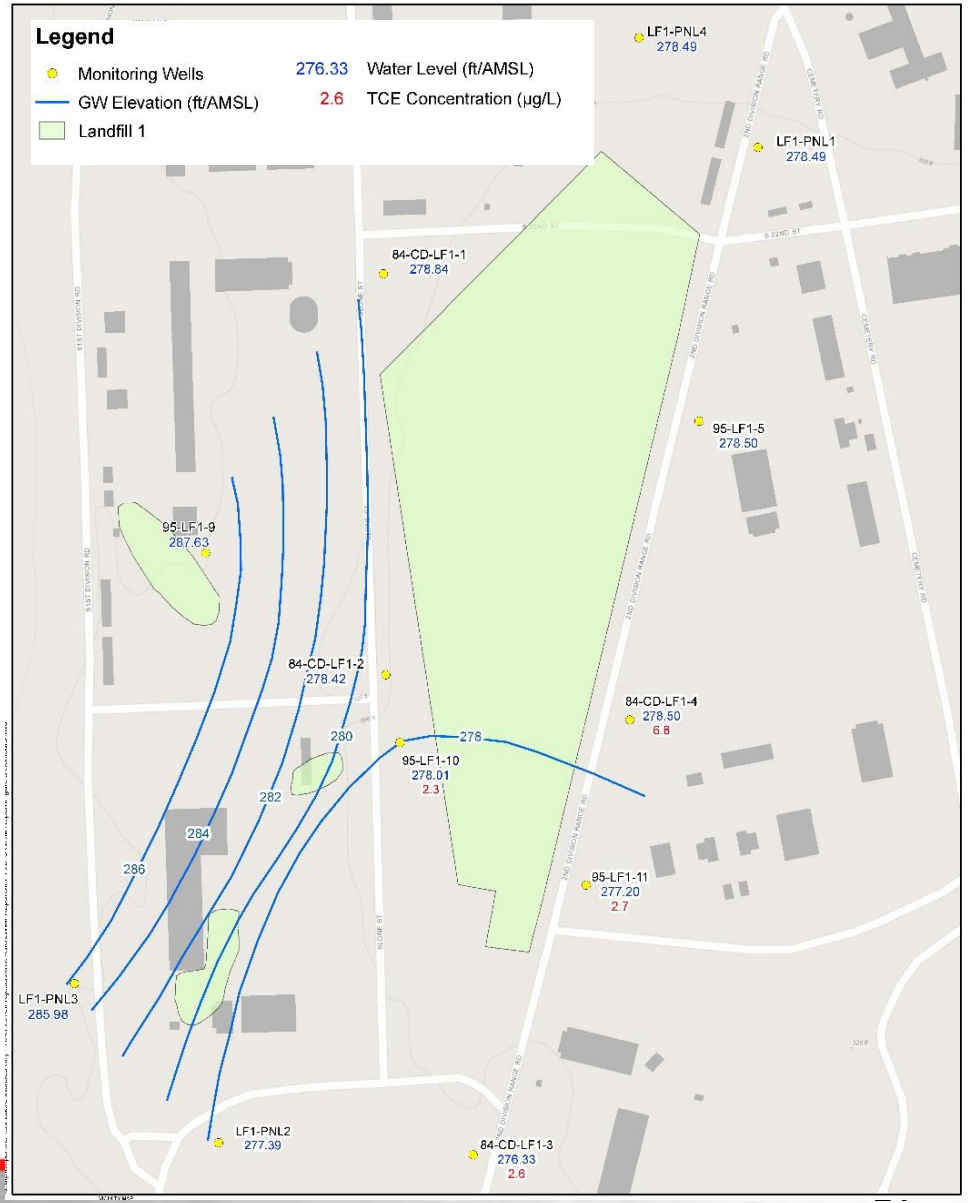
Landfill 4
Current and Future Activities

- Coming up
  - Site Closure



Landfill 1 - TCE

Current and Future Activities



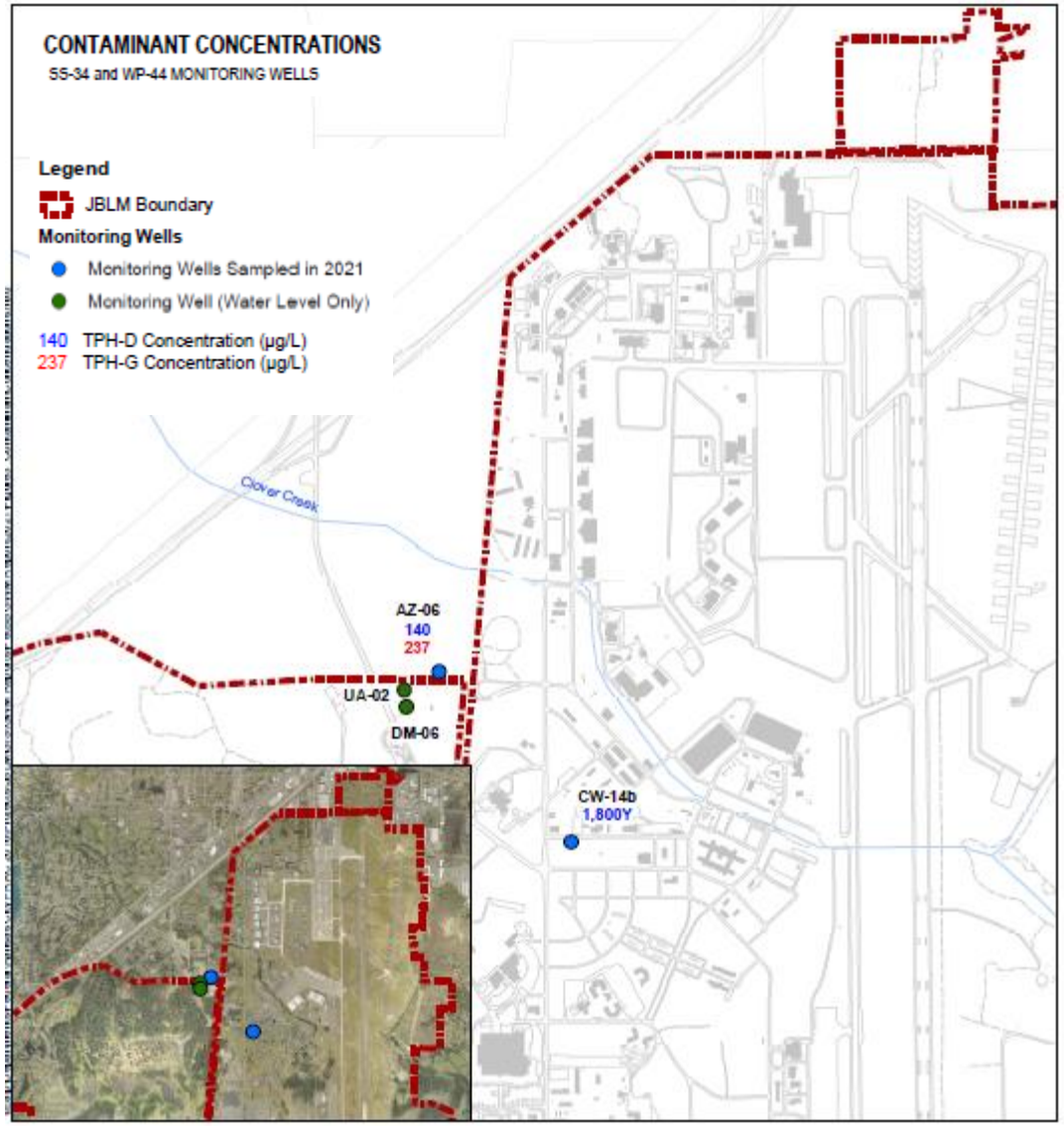
- Annual Land-Use Control Inspections

JBLM Consent Decree & DoD

Sites 2021 Activities

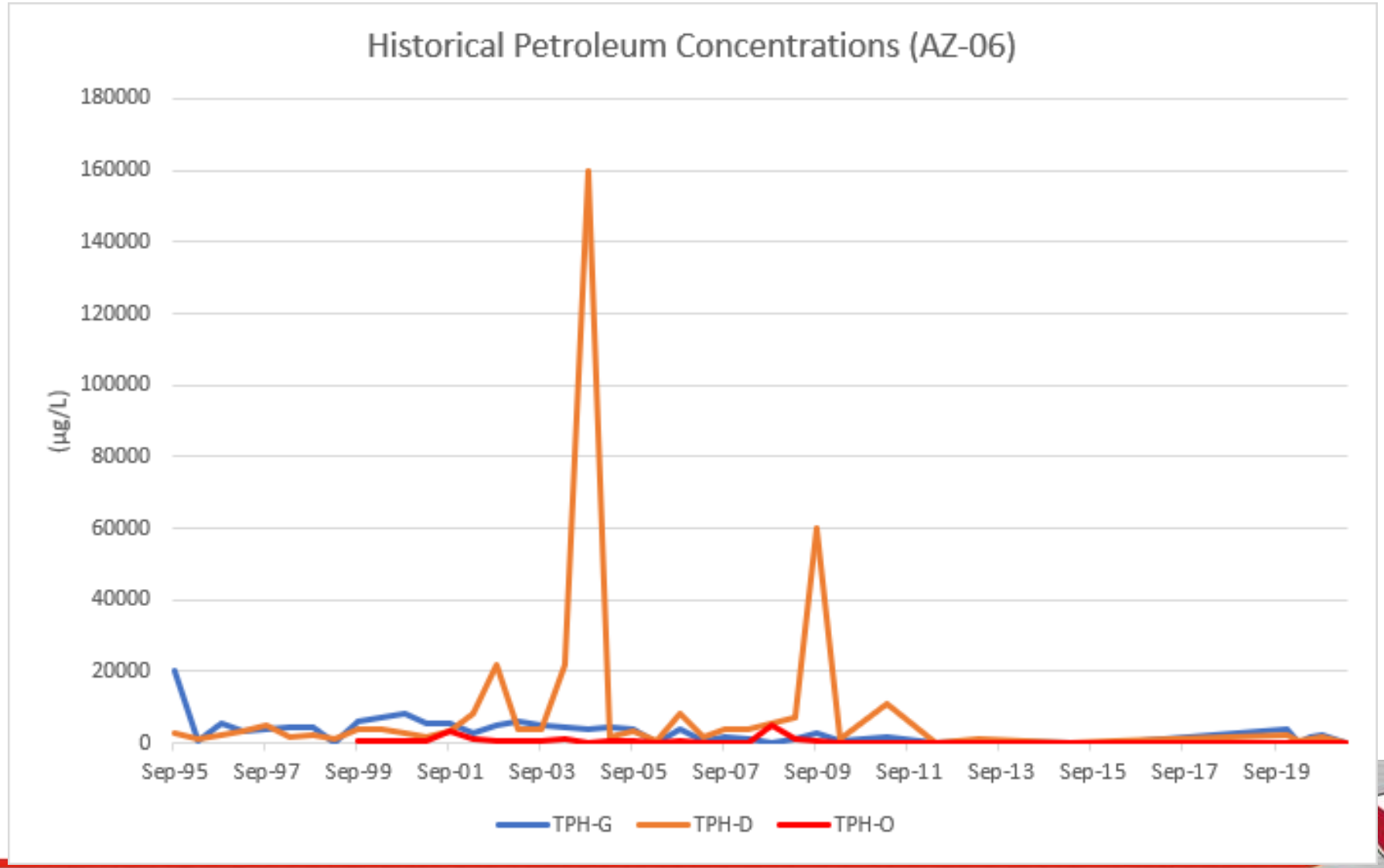
- WP-044 – Continue GWM
- SS-034 – Continue GWM
- SS-34N – Continue GWM

SS-34/WP-44TPH-D and TPH-O Concentrations - Spring 2021



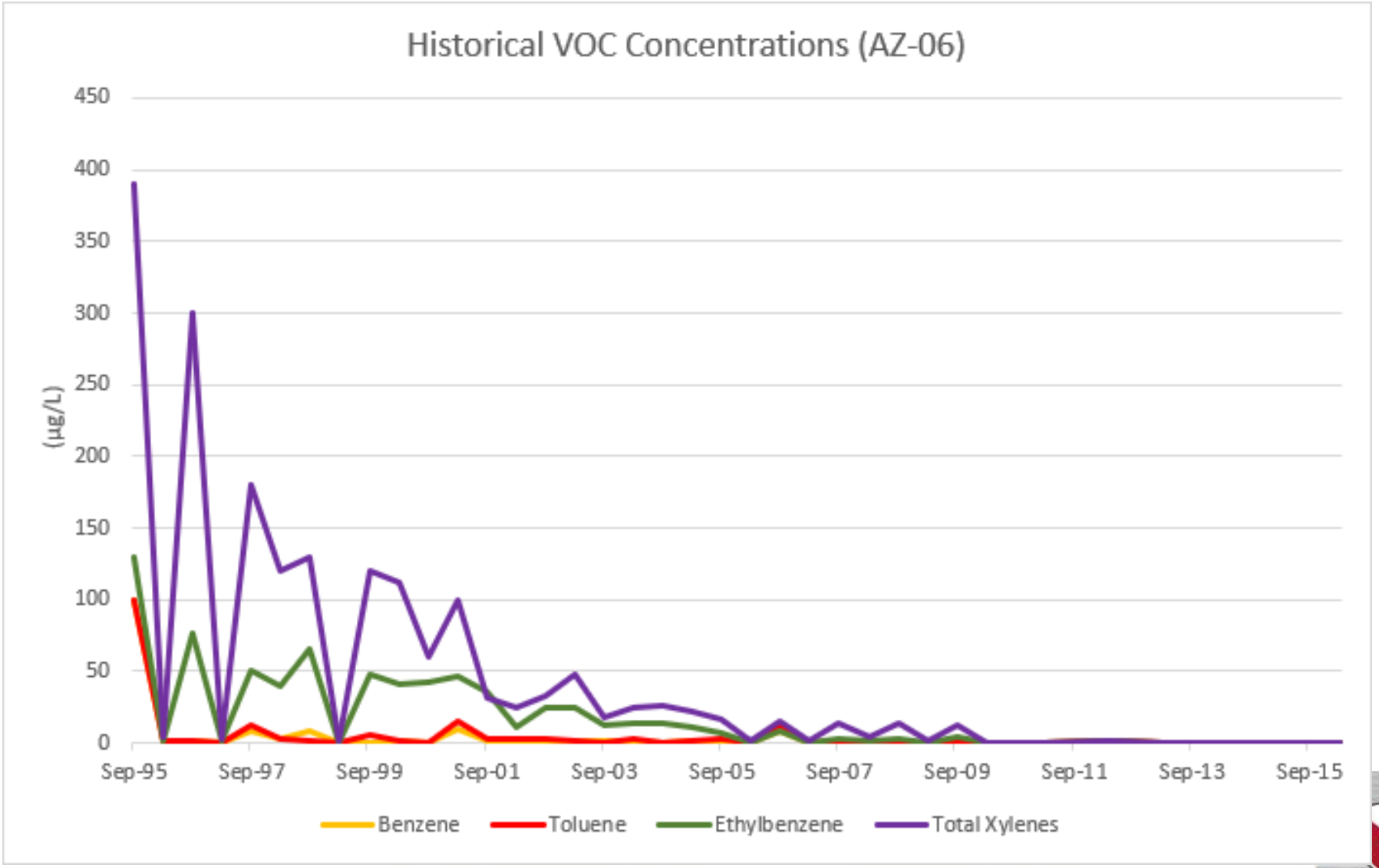
JBLM Agreed Order Sites

SS-34



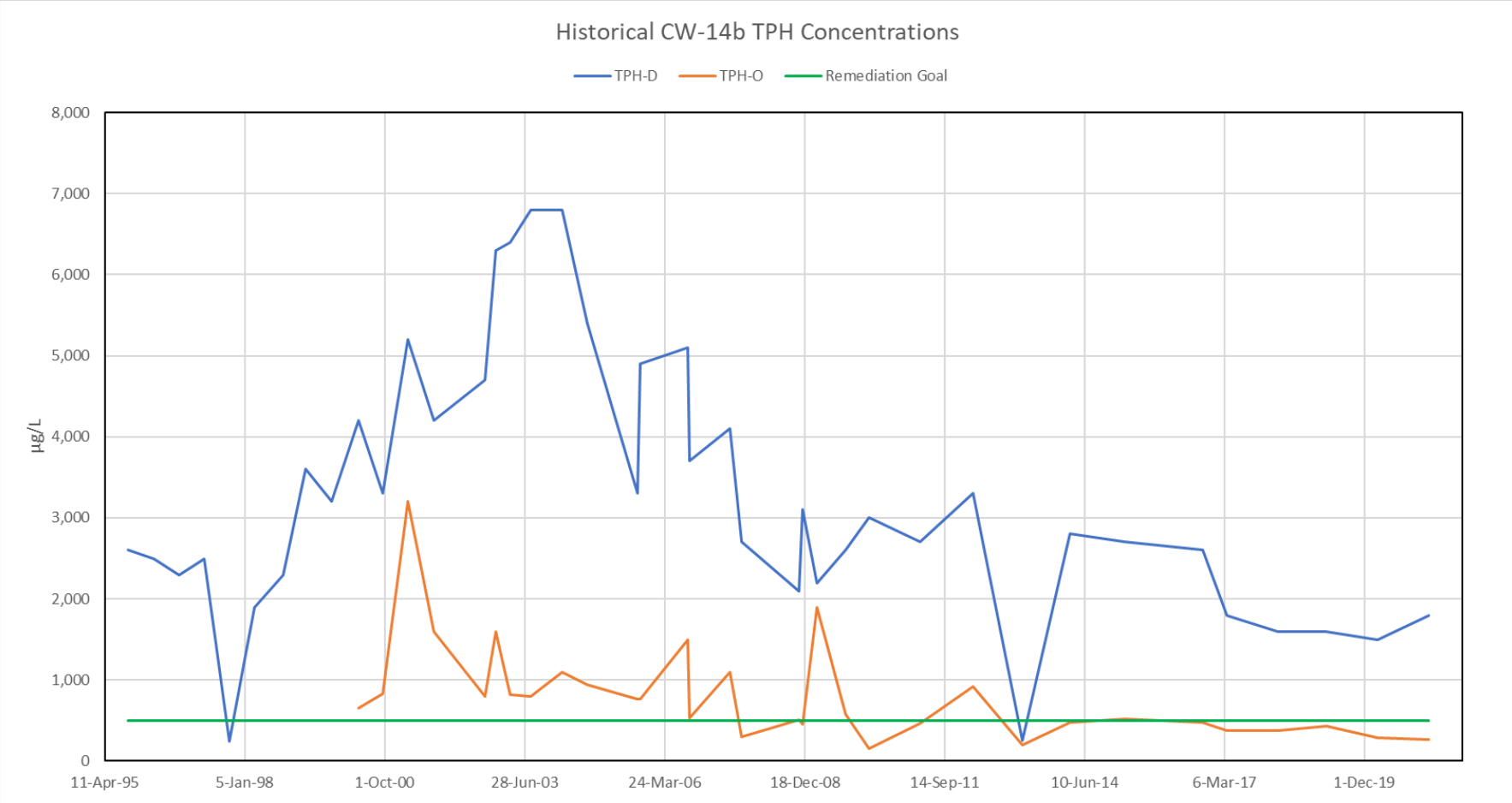
JBLM Agreed Order Sites

SS-34



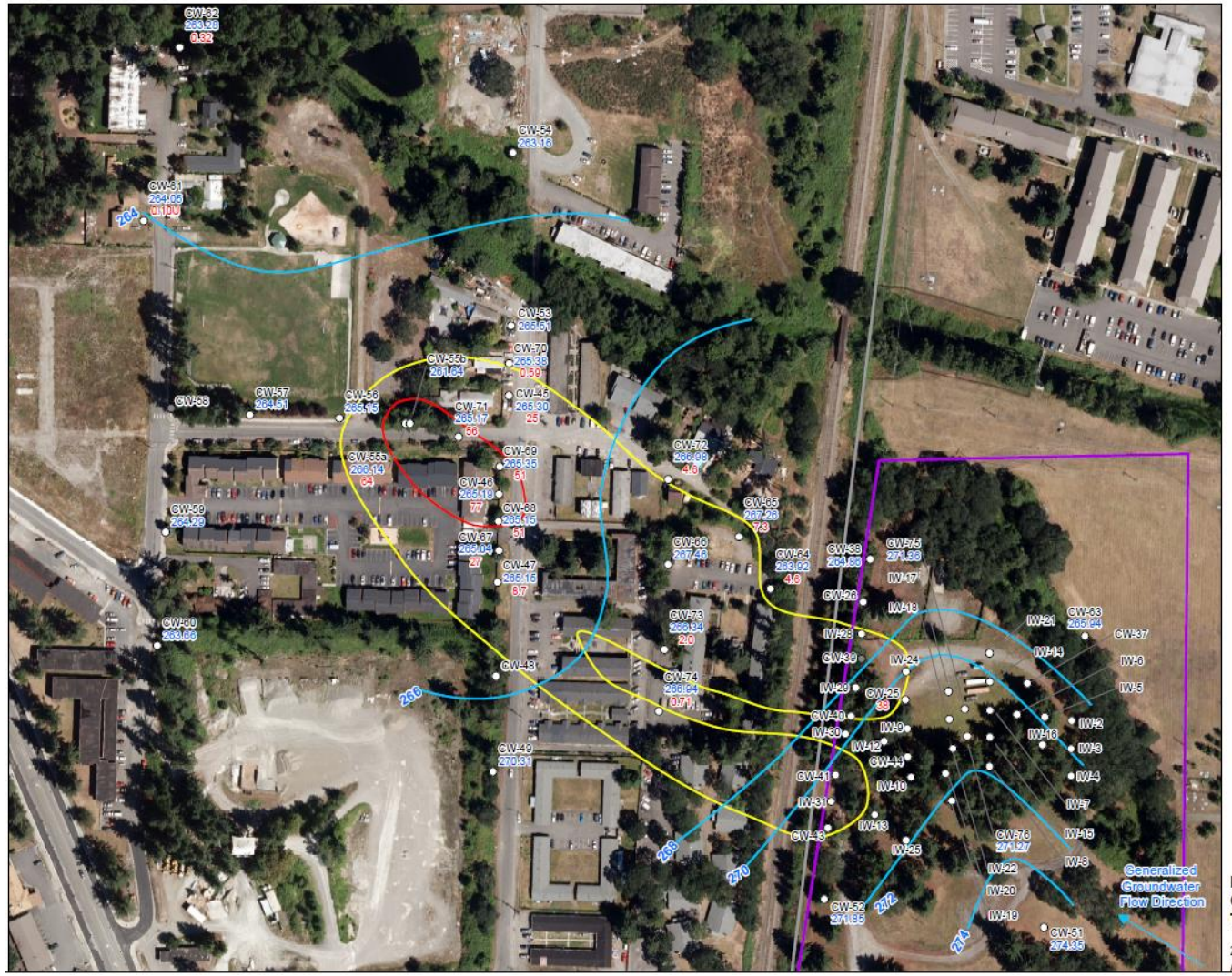
JBLM Agreed Order Sites

WP-44



SS-34N TCE Plume

Maximum Concentrations November 2021



Legend

- Monitoring Well
- Monitoring Well (Destroyed/Inaccessible)
- JBLM Boundary
- SS-34N (on-Base) Boundary
- Groundwater Elevation Contours* (ft AMSL)

Inferred TCE Concentration**

- 5 µg/L
- 50 µg/L

266.98 November 2021 Groundwater Elevation (ft AMSL)

4.6 November 2021 TCE Concentration (µg/L)

Notes:
*Groundwater elevation contour intervals are 2 ft AMSL.
**TCE contours are inferred using data presented on this figure and data from historical sampling events.
TCE MTCA Cleanup Level = 5 µg/L
µg/L = micrograms per liter
J = The result is an estimated value.
ft AMSL= feet above mean sea level
MTCA = Model Toxics Control Act
TCE = trichloroethene
U = Analyte not detected above practical quantification limit. Value listed is reporting limit.

N

0 140 280
Feet

Map Date: 1/11/2022
Coordinate System: UTM Zone 10
Horizontal Datum: WGS 84

FIGURE 6
GROUNDWATER ELEVATIONS AND TCE CONCENTRATIONS (NOVEMBER 2021)

2021 ANNUAL GROUNDWATER MONITORING AND REPORTING

SS-34N TCE

Future Activities

- Continue GW Monitoring
- Vapor Intrusion Study, two additional sampling events, anticipated in winter 2023 pending rights of entry (ROEs)

SS-34N VI Investigation

Rights of Entry

Legend

- Monitoring Well
- Monitoring Well (Destroyed/Inaccessible)
- JBLM Boundary
- SS-34N (on-Base) Boundary
- Groundwater Elevation Contours* (ft AMSL)

Inferred TCE Concentration**

- 5 µg/L
- 50 µg/L

266.98 November 2021 Groundwater Elevation (ft AMSL)

4.6 November 2021 TCE Concentration (µg/L)

Notes:
*Groundwater elevation contour intervals are 2 ft AMSL.
**TCE contours are inferred using data presented on this figure and data from historical sampling events.
TCE MTCA Cleanup Level = 5 µg/L
µg/L = micrograms per liter
J = The result is an estimated value.
ft AMSL= feet above mean sea level
MTCA = Model Toxics Control Act
TCE = trichloroethene
U = Analyte not detected above practical quantification limit. Value listed is reporting limit.

N

0 140 280
Feet

Map Date: 1/11/2022
Coordinate System: UTM Zone 10
Horizontal Datum: WGS 84

FIGURE 6
GROUNDWATER ELEVATIONS AND TCE CONCENTRATIONS (NOVEMBER 2021)

2021 ANNUAL GROUNDWATER MONITORING AND REPORTING

JBLM PFAS RI Update

- JBLM PFAS Preliminary Assessment/Site Inspection (PA/SI) completed in 2020
- PA/SI Report identified 12 AOPIs largely associated with historical use of Aqueous Film-Forming Foam (AFFF)
- PFAS was detected in the shallow unconfined Vashon aquifer and the deeper confined Sea Level aquifer
- Remedial Investigation/Feasibility Study (RI/FS) started in late 2020 on selected 12 AOPI only
  - 1st *Technical Project Planning (TPP)* held on March 2021
  - May – June 2021: Initial GW sampling at a subset of existing monitoring wells
  - Draft ISWP send to Regulators on July 30, 2021
  - EPA approved RI Work plan January 27, 2022
  - January – June 2022: OPSEC Review
  - March – July 2022: RI soil and grab groundwater sampling
  - August 2022: RI surface water and sediment sampling
  - *December 14, 2022: TPP # 2 Meeting*

RI Soil Data Evaluation

RI soil results:

- Soil data > HQ=1
- Soil data > HQ = 0.1 < HQ = 1
- Soil < HQ = 0.1

McChord Area

Soil data > HQ=1

Source Feature	AOI
Landfill #12	AOI 1
FT027	AOI 2
Hangars 5, 6 & Sump 1	AOI 3
Hangars 1 & 2	AOI 5
Taxiway D	AOI 5
FT032	AOI 6
Landfill #13	AOI 6

Soil data > HQ=0.1 < HQ = 1

Source Feature	AOI
Building 301	AOI 1
Hangar 13 & Sump 3	AOI 3
Hangars 3 & 4	AOI 5
Landfill #22	AOI 6

Soil < HQ = 0.1

Source Feature	AOI
Hangars 7, 9, 10 & Sump 2	AOI 3
Infield Aviation Fuel Tanks	AOI 3
FT028	AOI 4
FT030	AOI 4
FT033	AOI 5
Historic Wash Rack	AOI 5

Gray Army Airfield

Soil data > HQ=1

Source Feature	AOI
Hangar 3106	AOI 16
Hangar 3146 & Storm Drainage Area 1	AOI 16
Building 3081 (Fire Station)	AOI 19

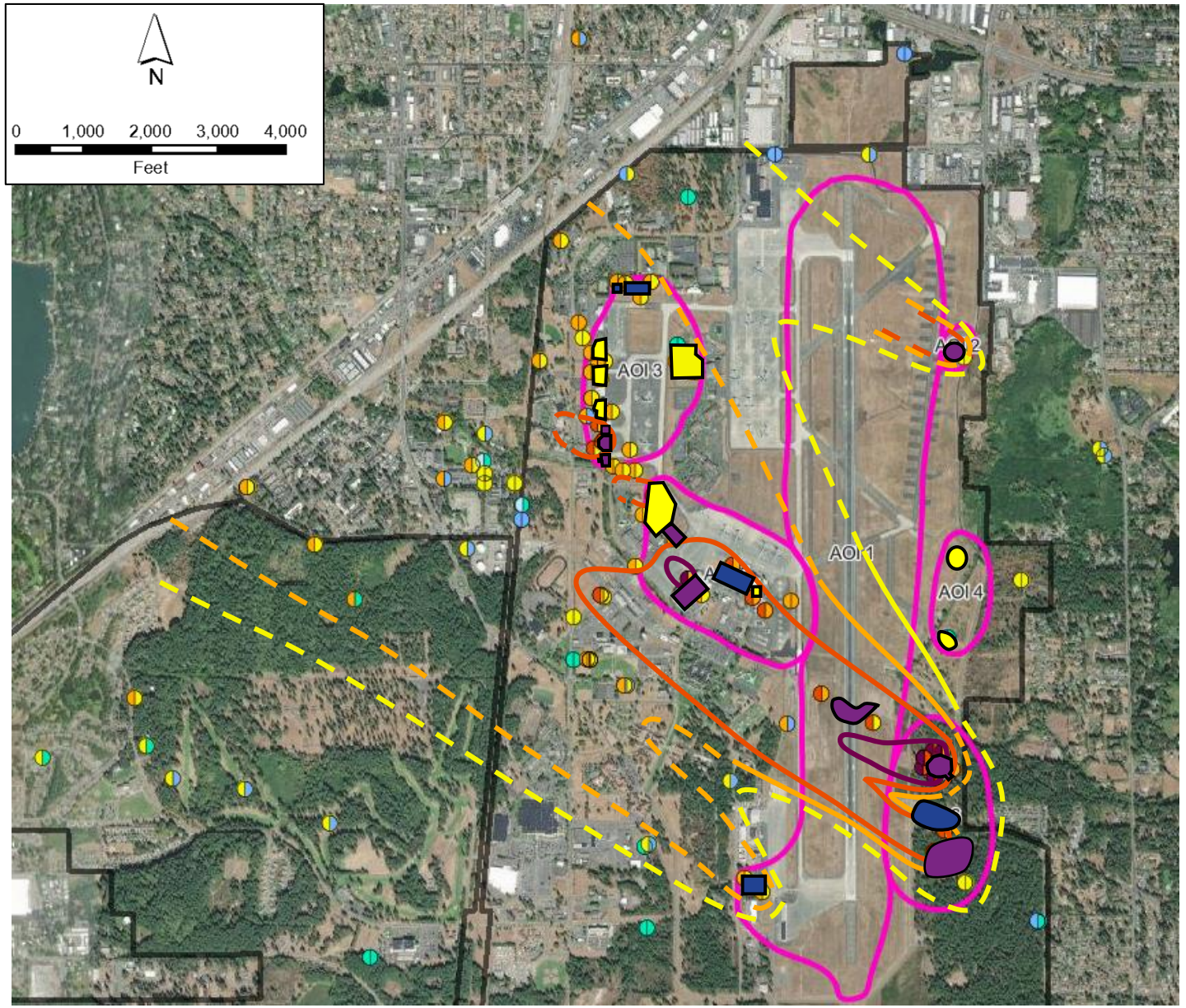
Soil data > HQ=0.1 < HQ = 1

Source Feature	AOI
H3273 & Storm Drainage Area 2	AOI 17
Hangar 3098	AOI 20

Soil < HQ = 0.1

Source Feature	AOI
FTLE17	AOI 16
Hangar 3063	AOI 19
Building 3095 & 3099	AOI 20
Building 2014	AOI 22
B4100, B4074, B4076, B1206, B1210	AOI 23

Source Features with Vashon Aquifer PFOS Isocontours

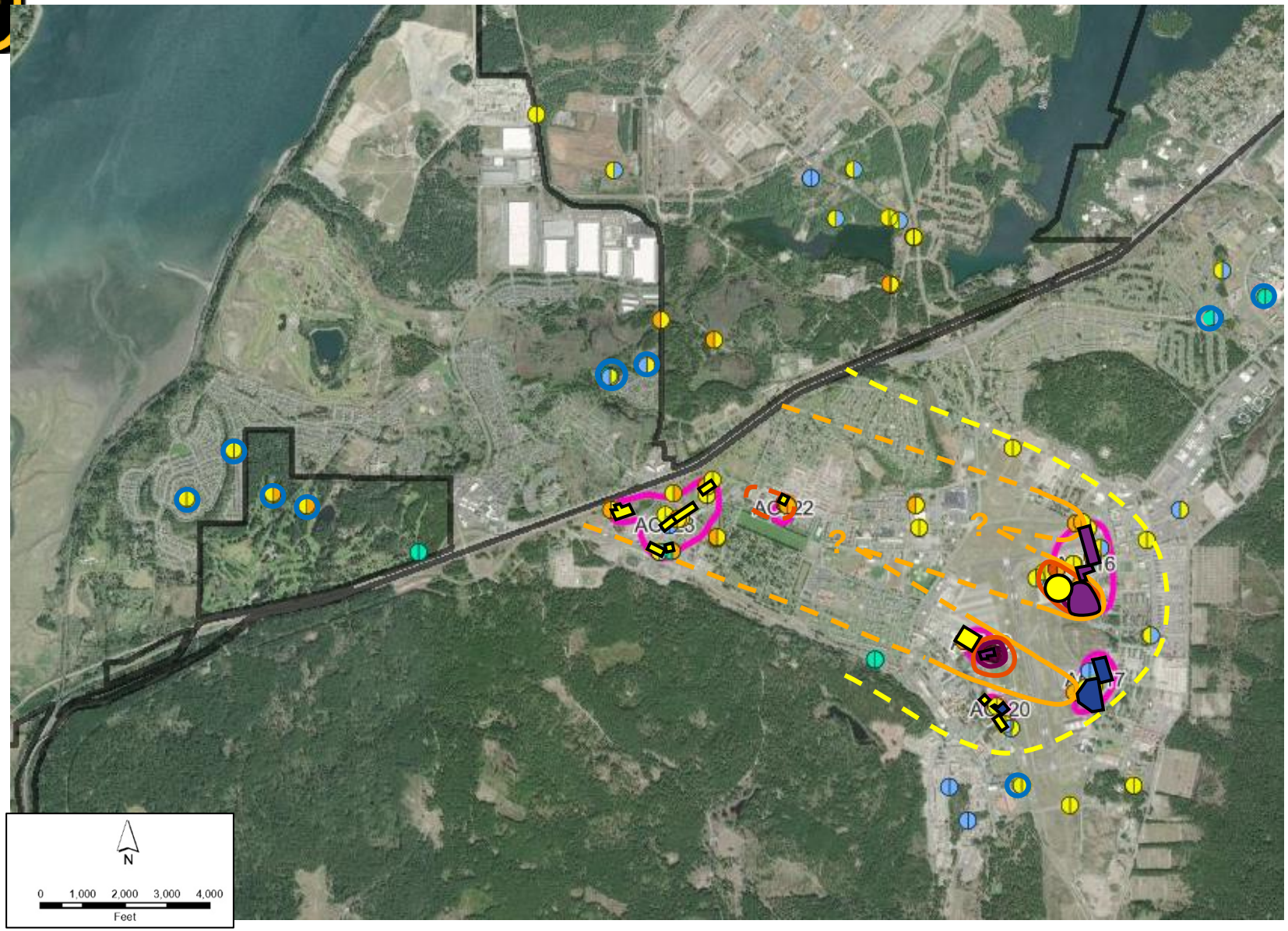


McChord

Concentration (ng/L)	PFOS Groundwater Results
> 4,000	Greater than 1000x SL
400-4,000	Between 100x SL and 1000x SL
40-400	Between 10x SL and 100x SL
4.0-40	Between SL and 10x SL
< 4.0	Detection less than SL
	Non-detect (RL > SL)
	Non-detect (RL <= SL)
	Results Pending

Concentration (ng/L)	PFOA Groundwater Results
> 6,000	Greater than 1000x SL
600-6,000	Between 100x SL and 1000x SL
60-600	Between 10x SL and 100x SL
6.0-60	Between SL and 10x SL
< 6.0	Detection less than SL
	Non-detect (RL > SL)
	Non-detect (RL <= SL)
	Results Pending

Source Features with Vashon Aquifer PFOS Isocontours



GAAF

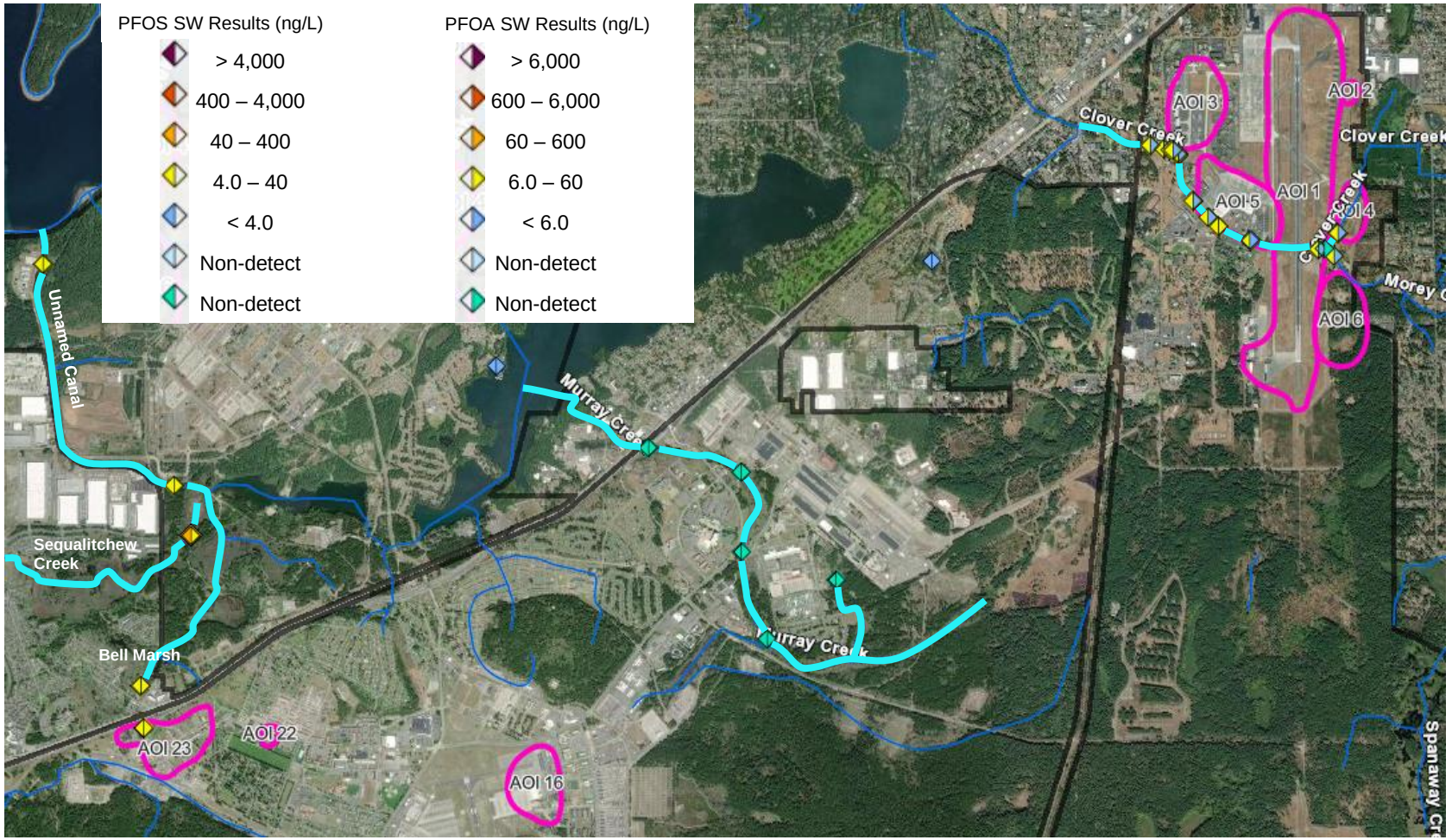
Concentration (ng/L)	PFOS Groundwater Results
> 4,000	Greater than 1000x SL
400-4,000	Between 100x SL and 1000x SL
40-400	Between 10x SL and 100x SL
4.0-40	Between SL and 10x SL
< 4.0	Detection less than SL
	Non-detect (RL > SL)
	Non-detect (RL <= SL)
	Results Pending

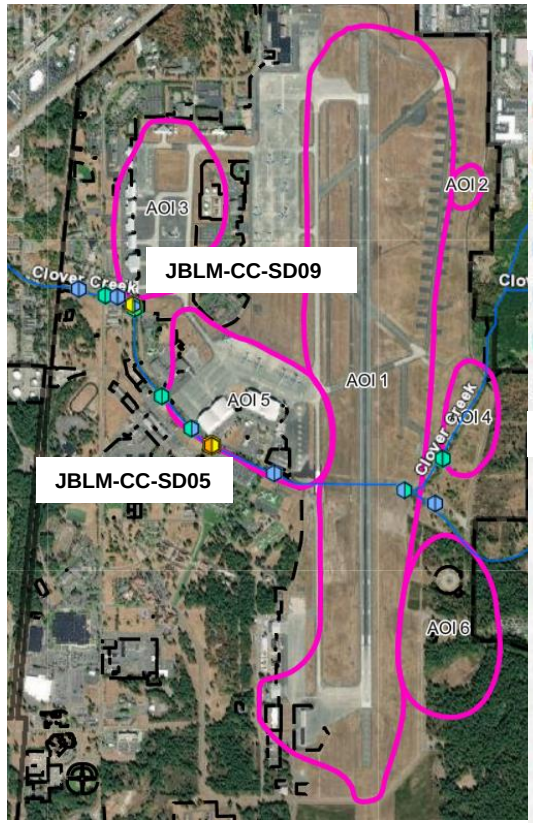
Concentration (ng/L)	PFOA Groundwater Results
> 6,000	Greater than 1000x SL
600-6,000	Between 100x SL and 1000x SL
60-600	Between 10x SL and 100x SL
6.0-60	Between SL and 10x SL
< 6.0	Detection less than SL
	Non-detect (RL > SL)
	Non-detect (RL <= SL)
	Results Pending

Concentration from well not screened in Vashon aquifer and not used for contouring

Surface Water and Sediment PFAS Results

- ✓ **Highest detected concentrations of PFOS and PFOA were in surface water samples associated with Clover Creek, Unnamed Canal, Sequalitchew Creek, and Bell Marsh.**
- ✓ **PFOA and PFOS were not detected in any samples from Murray Creek.**
- ✓ **Sediment samples generally non-detect or low PFAS detections.**
- ✓ **The greatest detections of PFOS in sediment were detected near Hangars 5 (AOI 3) and 1 (AOI 5)**





PFOS Sediment Results (mg/kg)
- > 13
- 1.3 – 13
- 0.13 – 1.3
- 0.013 – 0.13
- < 0.013
- Non-Detect
- Non-Detect
- Results Pending

PFOA Sediment Results (mg/kg)
- > 19
- 1.9 – 19
- 0.19 – 1.9
- 0.019 – 0.19
- < 0.019
- Non-Detect
- Non-Detect
- Results Pending

Questions and Discussion

Place Holder