

RI/IRA BCT Scoping Meeting Summary

Date of Call: 08/20/2020

Time of Call: 1400 EST

Meeting Leader: Paula Bond, Aerostar SES LLC (ASL)

Attendees:

| Name | Organization |
|------------------|--------------------------------|
| Dave Gibson | AFCEC BEC |
| Val de la Fuente | AFCEC |
| Dan Medina | AFCEC |
| Paula Bond | ASL, Project Manager |
| Jim Romer | ASL, Project Engineer |
| Cheryl Brewer | ASL, Project Technical Support |
| Lee Major | CN-AFCEC Support Contractor |
| Mark Weegar | CN-AFCEC Support Contractor |
| Julie Spencer | GSI Environmental |
| Janet Anderson | GSI Environmental |
| Philip Goodrum | GSI Environmental |
| Dave Kline | EGLE Section Manager |
| John Bradley | EGLE Supervisor |
| Beth Place | EGLE Project Manager |
| Matt Baltusis | EGLE Geologist |
| Eric Wildfang | EGLE Toxicologist Supervisor |
| Divinia Ries | EGLE Toxicologist |
| Jeremiah Morse | AECOM for EGLE |
| Puneet Vij | MDHHS Toxicologist |
| Brad Ermisch | EGLE Compliance (ARARs) |

Introductions

These scoping meetings support the BCT; they allow more time to go over information. This kick off meeting began with introduction of AFCEC/Aerostar's remedial investigation (RI)/interim remedial action (IRA) Team (Team). These minutes summarize the Team's proposed approach and additional details will be discussed at upcoming meetings between the agencies. An RI work plan in Uniform Federal Policy Quality Assurance Program Plan (UFP QAPP) format will be developed.

Remedial Investigation Approach

Inform EGLE of the Team's preliminary approach and start a dialogue on the RI and the IRAs. There will be additional meetings to discuss data quality objectives (DQOs), methods, and other topics.

ARARs

The Air Force requested a list of potential ARARs from EGLE on August 6, 2020. EGLE's goal is to provide the list by September 18, 2020 and will have future discussions.

Proposed Background Data Approach

There was discussion about representative background data and how that will be determined and applied. The Team plans to use available existing data that meet DoD DQOs, and collect new data, including representative background. The DoD DQOs used to make these decisions will be provided to EGLE. RI data will be compared to background and that background data will be used in the risk assessment. EGLE Part 201 only considers the natural background, additional background discussion will take place on future scoping calls.

Remedial Investigation Delineation

Groundwater plumes will be delineated to determine surface water discharges and/or to comply with ARARs once they are determined. The soil will be delineated to defensibly discriminate background concentrations from contaminated areas. The remedial investigation will determine nature and extent of the contamination for all affected media. Further discussion will be needed on the details.

Proposed Groundwater Investigation

Where appropriate the Team proposes to sample existing wells to fill data gaps. Data gaps will be discussed at a later meeting. The groundwater investigation will utilize vertical aquifer grab samples from multiple depths. An on-site laboratory will be used to expedite sample analysis and allow in-field decisions for plume delineation. The on-site laboratory is DoD Environmental Laboratory Accreditation Program (ELAP)-certified and that quality control samples will be submitted to a fixed laboratory. The details of the sampling approach and mobile laboratory will be included in the RI UFP-QAPP work plan.

General plume areas maps were presented showing the extent of the plume in the shallow, intermediate, and deep portions of the affected aquifer based on current data.

Proposed Soil Investigation

Identify potential source areas, determine background concentrations, and the nature and extent of PFAS impacts via vertical profile sampling. An on-site mobile laboratory will be used to expedite sample analysis. Lysimeter studies will be conducted in source areas to evaluate potential mass transfer from soil to groundwater and evaluate the need for possible source removal.

EGLE mentioned the potential for using multi-increment sampling to collect representative soil samples. EGLE geologist informed about work on MPART PFAS background and statewide PFAS sampling to determine soil concentrations at areas with various land uses; however, the work will not be complete prior to the WAFB RI.

Proposed Surface Water and Sediment Investigation

Many surface water and sediment samples have been collected from the area. Will be collecting additional surface water, sediment, and pore water samples.

Proposed Sentinel Wells

The Team is currently evaluating existing monitoring wells to identify those wells which would be appropriate for inclusion in a sentinel well network to monitor plume migration toward drinking water receptors. Additional wells will be installed if necessary. Criteria for sentinel wells include PFOS/PFOA concentrations, distance, and depth in determining wells for the program. EGLE and AFCEC discussed sentinel well evaluation parameters at a previous BCT; however, no decisions were made.

Proposed Hydrogeologic Investigation

Confirm aquifer properties by conducting pump and/or slug tests and potentially collect high-resolution site characterization data using a hydraulic profiling tool in select lower conductivity areas such as near Clarks Marsh. Generally, the surficial sediments are sand and gravel underlain by a clay layer. Seasonal comprehensive water level data will also be collected, and the groundwater model will be updated.

Proposed Risk Assessment Approach

Utilize available data from previous investigations, including investigations conducted by EGGLE. The overall approach will follow the Tiered Approach for Risk Assessment. Standard USEPA methods and guidance will be followed for the exposure assessment and risk characterization. Risk assessment DQOs will be presented in the UFP-QAPP work plan, but the methodology will be outlined in a stand-alone risk assessment work plan. Additional scoping meetings for the risk assessment are anticipated.

Overview of the tiered approach for the risk assessment. The risk assessment will start with a deterministic screen to identify contaminants of potential concern (COPCs). There was significant discussion regarding the application of probabilistic methods and follow up discussions will occur.

Methods used to identify the human health COPCs and discussed the methodology for creating the human health conceptual site model (CSM) and significant exposure pathways and follow up discussions will occur.

The Team has proposed the following for the ecological risk assessment and human health risk of ingestion of fish and game, Ecological risk assessment will follow standard EPA guidance and state-of-the-science for PFAS. Since the EPA has not established specific ecological risk methods for PFAS, the most relevant sources identified through literature reviews will be used to develop risk screening levels for surface water, sediment, and soil developed from cross-agencies included the DoD Strategic Environmental Research Development Program (SERDP) and data from states like California and Florida. Ecological conceptual site model receptors and pathways will be developed. The ecological risk assessment will look at the aquatic and terrestrial plant and invertebrate communities as a food source for fish and wildlife; local forage fish populations; local piscivorous/omnivorous fish populations; waterfowl; piscivorous/semi-piscivorous birds, and mammals; herbivorous and invertivorous mammals; insectivorous birds and mammals; and omnivorous birds and mammals. Collect fish tissue and other biological samples as necessary to support the risk assessment. The risk assessment would include evaluating human health effects from the ingestion of fish and game.

It is anticipated that additional risk assessment scoping meetings will be scheduled to discuss the details of the risk assessment process.

Proposed Interim Remedial Action Goals

Summary of the IRA approach. The Team's proposed goals of the IRA are to reduce concentrations of PFOS, PFOA, and PFBS entering Van Etten Lake and Clarks Marsh by installing pump and treat systems. The Team is currently reviewing existing data and identifying target capture zones for both focus areas.

Proposed Interim Remedial Action Approach

Reviewing existing data, conducting groundwater modeling, evaluating re-injection and infiltration options, sampling existing wells for groundwater quality parameters, and reviewing lessons learned from operating other pump and treat systems at the former base.

Proposed IRA Approach AFFF Areas 1 and 15

The initial design is to install approximately 10 (11 as of the date of the Summary) extraction wells with approximately 250 foot spacing. Using an adaptive pumping approach, wells would be pumped at 35 to 45 gallons per minute. Existing monitoring wells will be used as available as downgradient performance monitoring points.

Proposed IRA Approach Fire Training Area FT002

There is an existing extraction well and pump and treat system at the site that has resulted in significant decreases in PFOS/PFOA concentrations downgradient of the extraction system. Currently reviewing data and evaluating the target capture zones. Groundwater modeling runs are being performed to evaluate possible pumping rates using the MODFLOW model dated October 4, 2019 (WAFBModel_VerificationToDec2018Gauging_UpdateBotElev) previously provided to EGLE. EGLE will check their files to determine if they have the most recent version of the model.

Schedule

Overview of the schedule highlighting the access agreements as a critical path item. Preview to determine when EGLE may receive documents.

Other Topics

Discussed the B-B' cross section and goal for the interim remedial action. The team is looking at flow rates and spacing and what flow we can accommodate at the Central Treatment System (CTS). The Team will also be looking at that while we are on-site (25 Aug 20) to check logistics.

Interaction with US Forest Service (USFS). Air Force has met with the USFS to see what could be done to expedite access. A work plan is needed to re-engage with them; describe the well locations, routes to the locations, schedule, and any USFS requirements for protection of the forest. The portion of the RI work plan for performing work on USFS property may be submitted before the full RI work plan due to time required for access. If so, it will contain the same information.

Impact on Substantive Requirements Documents (SRDs). None expected. The Van Etten Lake extracted groundwater would go to the CTS and be included in the CTS discharge. The extracted groundwater at FT002 will go to the treatment system and included in the discharge.

Difference in the sentinel well program and the sampling in the RI. The sentinel well program may begin before the RI if appropriate existing monitoring locations are present.

Selection of sentinel wells. The team is evaluating drinking water well locations and nearby existing monitoring wells. The Team has proposed that the considerations for the program will be PFOS and PFOA concentration, location, screened interval, and depth.

RI data is not required to move forward with the IRAs. There is sufficient data at this time to move forward with the design of the IRAs.

Communication with EGLE regarding details of the IRAs. IRA implementation work plans will be developed for the IRAs. Additional scoping calls on the IRAs will take place.

Follow on Topics

Discuss EPA's risk assessment approach versus EGLE Part 201 risk assessment approach.

Discuss the PFAS analytes/compounds used to make site decisions.

Additional scoping meetings identified:

Aerostar proposed the following additional scoping meetings after the call as an action item from the call.

- Data Quality Objectives (September 22-24)
- Potential ARARs (to be scheduled after receipt of ARARs anticipated from EGLE Friday, September 18)
- IRAs (October 5 – 7)
- Risk Assessment (Oct 20-22)
 - Data quality requirements
 - Part 201 requirements
 - Background data discussion, including background for soil

EGLE requested a CSM meeting prior to the DQO meeting to identify/discuss data gaps. EGLE additionally requested that the DQOs are of sufficient detail by area and media, and meetings are of sufficient length preferably with materials a week in advance to thoroughly discuss the topics to avoid impacts to schedule in the work plan review. The Team will make every effort to provide the necessary information for the follow-on scoping meetings in a timely manner.

Attachments: Slides and figures provided for the Aug 20, 2020 meeting

RI/IRA Scoping

Former Wurtsmith Air Force Base

08/20/2020



The Wurtsmith RI/IRA Team

- Air Force Civil Engineer Center
 - Dave Gibson, AFCEC BEC
 - Lee Major, AFCEC Support
 - Mark Weegar, PG - AFCEC Support
- Aerostar Environmental LLC
 - Paula Bond, PG - Project Manager
 - Jim Romer, PE, PG - Project Engineer
 - Janet Anderson, PhD, DABT - Toxicologist (GSI)
 - Phil Goodrum, PhD, DABT - Toxicologist (GSI)
- Michigan Department of Environment, Great Lakes and Energy (EGLE)
 - Beth Place, Project Manager



Agenda

- Remedial Investigation Scoping Discussion
 - Goals
 - Process
 - Approach
 - Preliminary Applicable or Relevant and Appropriate Requirements (ARARs)
 - Media investigations
 - Sentinel Wells
 - Risk Assessment
- Interim Remedial Actions Scoping Discussion
 - Goals
 - General Approach
- Schedule



RI Goals

- Determine nature and extent of PFOS, PFOA, and PFBS in groundwater, soil, surface water, and sediment (includes tissue sampling)
- Determine source strength or mass transfer of PFAS into the groundwater via lysimeter studies
- Collect sufficient data to support human health and ecological risk assessments
- Collect sufficient data to support the development of a future feasibility study



Generalized RI Process

- Evaluation of existing data
- Develop preliminary conceptual site model (CSM)
- Development RI Work Plan (Uniform Federal Policy Quality Assurance Project Plan [UFP-QAPP] format)
- RI field work/data collection
- Evaluate new data
- Prepare RI Report
 - Baseline human health and ecological risk assessments
 - Updated CSM



RI Approach

- Will use available existing data that meet quality standards
- Collect new data including representative background
- Nature and extent of PFOS, PFOA, and PFBS
 - Samples will be analyzed for DoD QSM Table B-15 analytes
 - Only PFOS, PFOA, and PFBS will be discussed in the RI, however, all data will be included as an appendix
- Includes each AFFF Area (Site-wide)



RI Delineation

- Groundwater
 - Groundwater plume(s) will be delineated to determine surface water discharges and/or to comply with ARARs once they are determined
- Soil
 - Soil will be delineated to defensibly discriminate background from contaminated areas



Preliminary ARARs

- Preliminary ARARs Include
 - Chemical Specific (during RI)
 - Action-specific (during FS)
 - Location Specific
 - To Be Considered
- AFCEC formal request submitted to EGLE on August 6, 2020

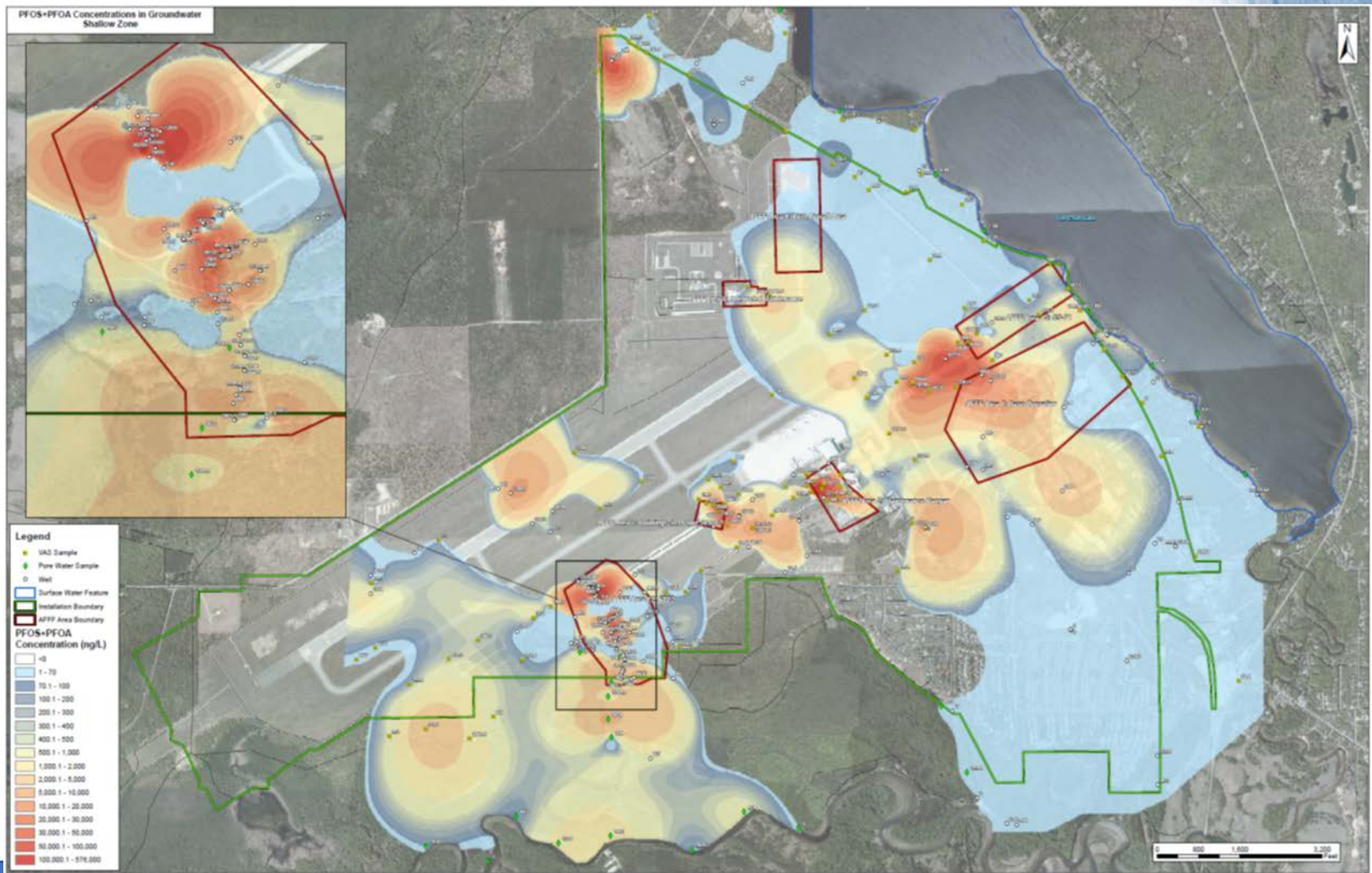


Groundwater Investigation

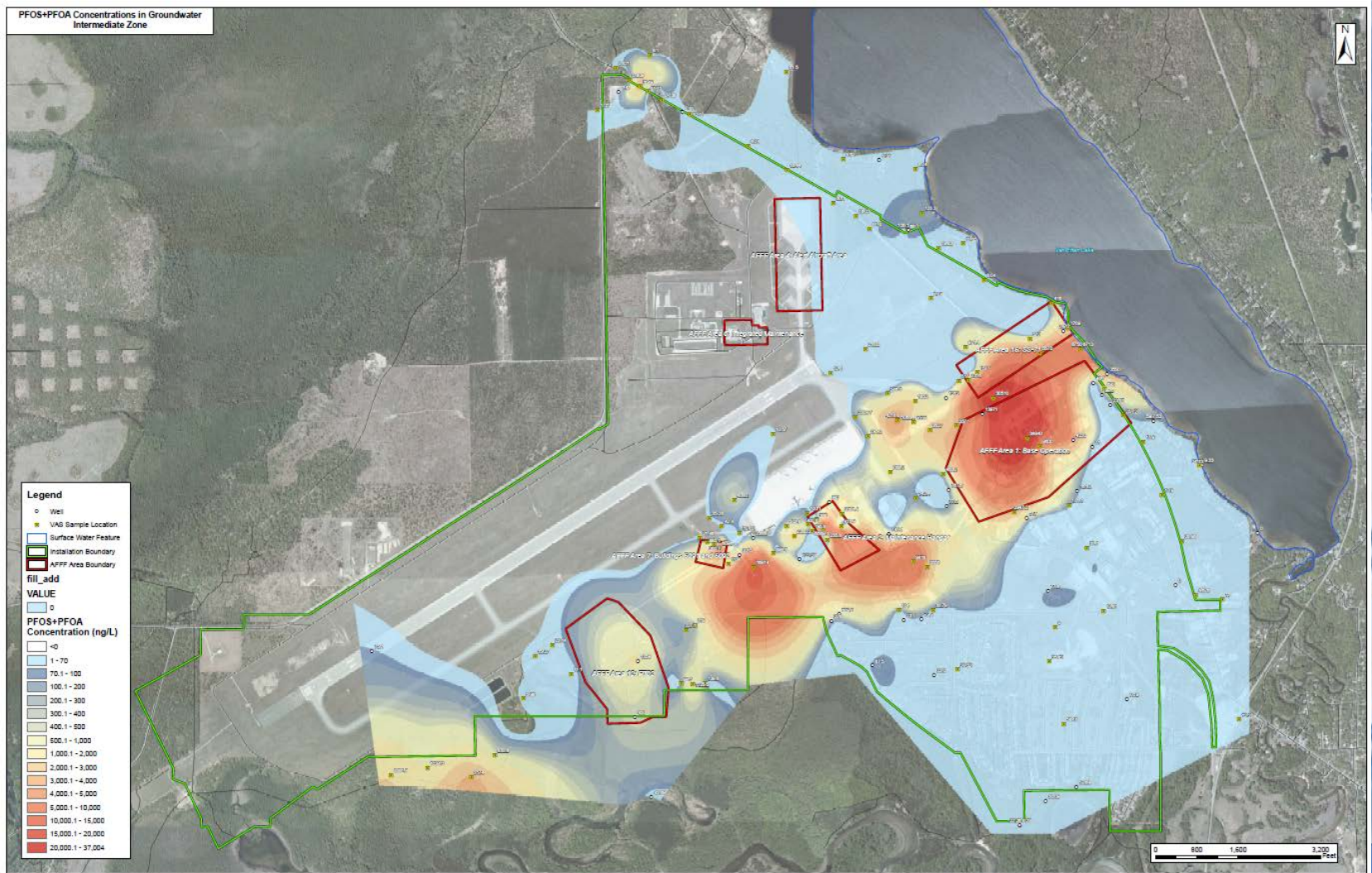
- Evaluate existing monitoring wells to fill data gaps
- Nature and extent via direct push or sonic vertical profile sampling
 - Grab groundwater samples from multiple depths
- On-site mobile laboratory
- Step-outs as needed
- Install permanent monitoring wells for monitoring plume changes
- Fate and transport modeling



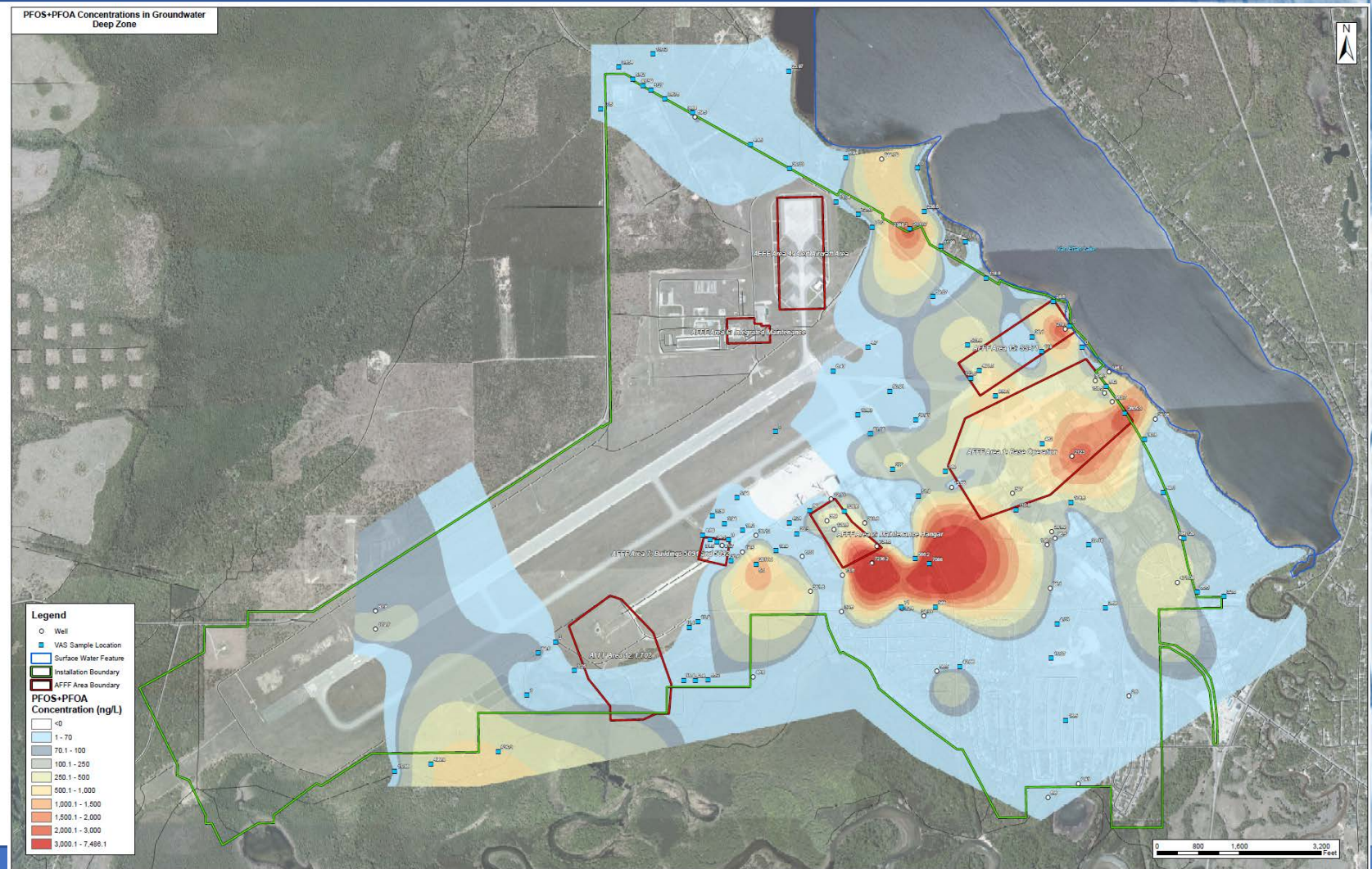
Shallow Zone 0-25 ft bgs PFOS + PFOA



Intermediate Zone 25-40 ft bgs PFOS + PFOA



Deep Zone >40 ft bgs PFOS + PFOA

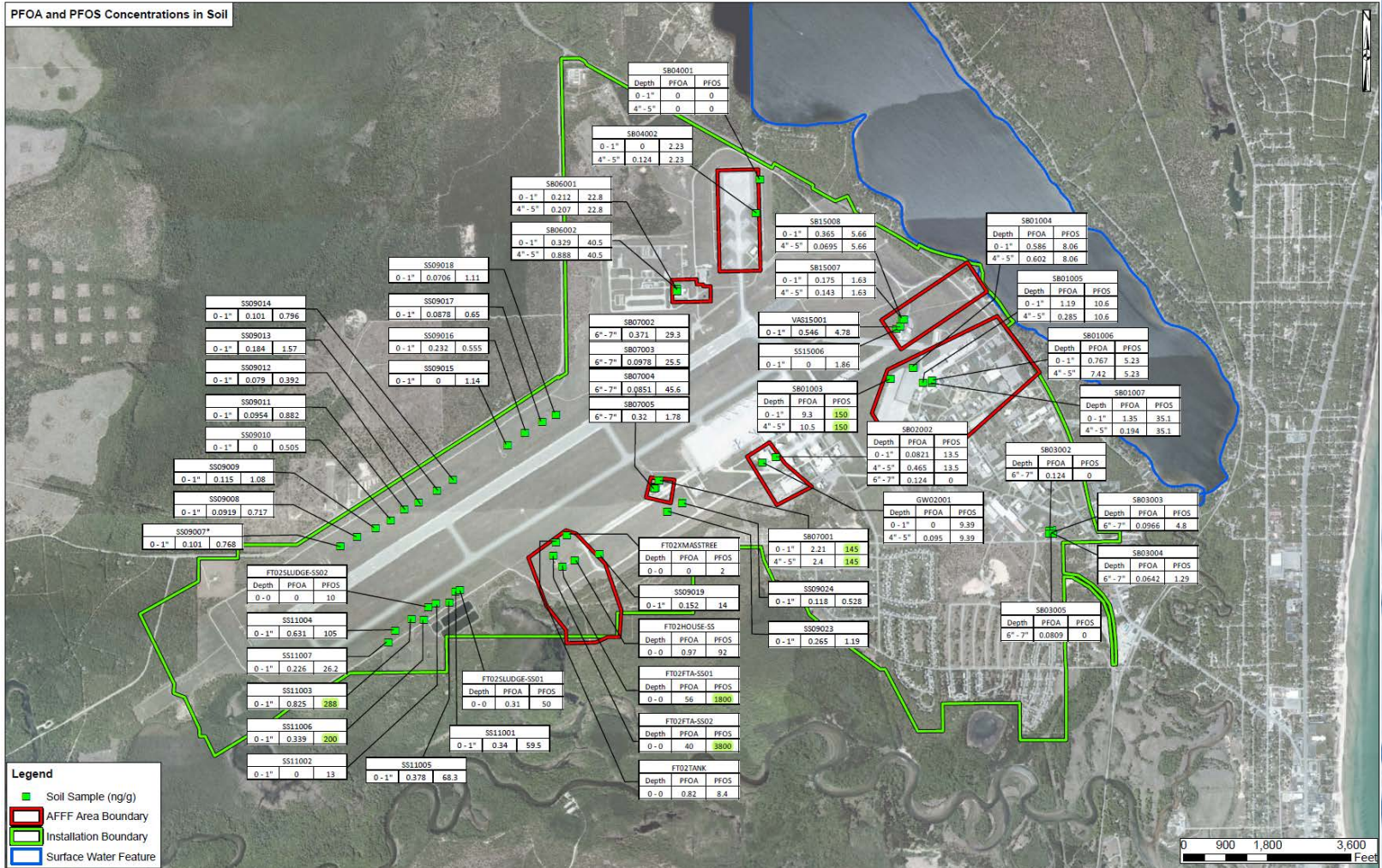


Soil Investigation

- Identify potential source areas
- Determine background concentrations
- Determine nature and extent via direct push or sonic vertical profile sampling
 - Grab soil samples from multiple depths
- On-site mobile laboratory
- Step-outs as needed
- Conduct lysimeter studies in identified source areas to evaluate potential mass transfer from soil to groundwater and evaluate the need for potential source removals



Soil Concentrations PFOS and PFOA

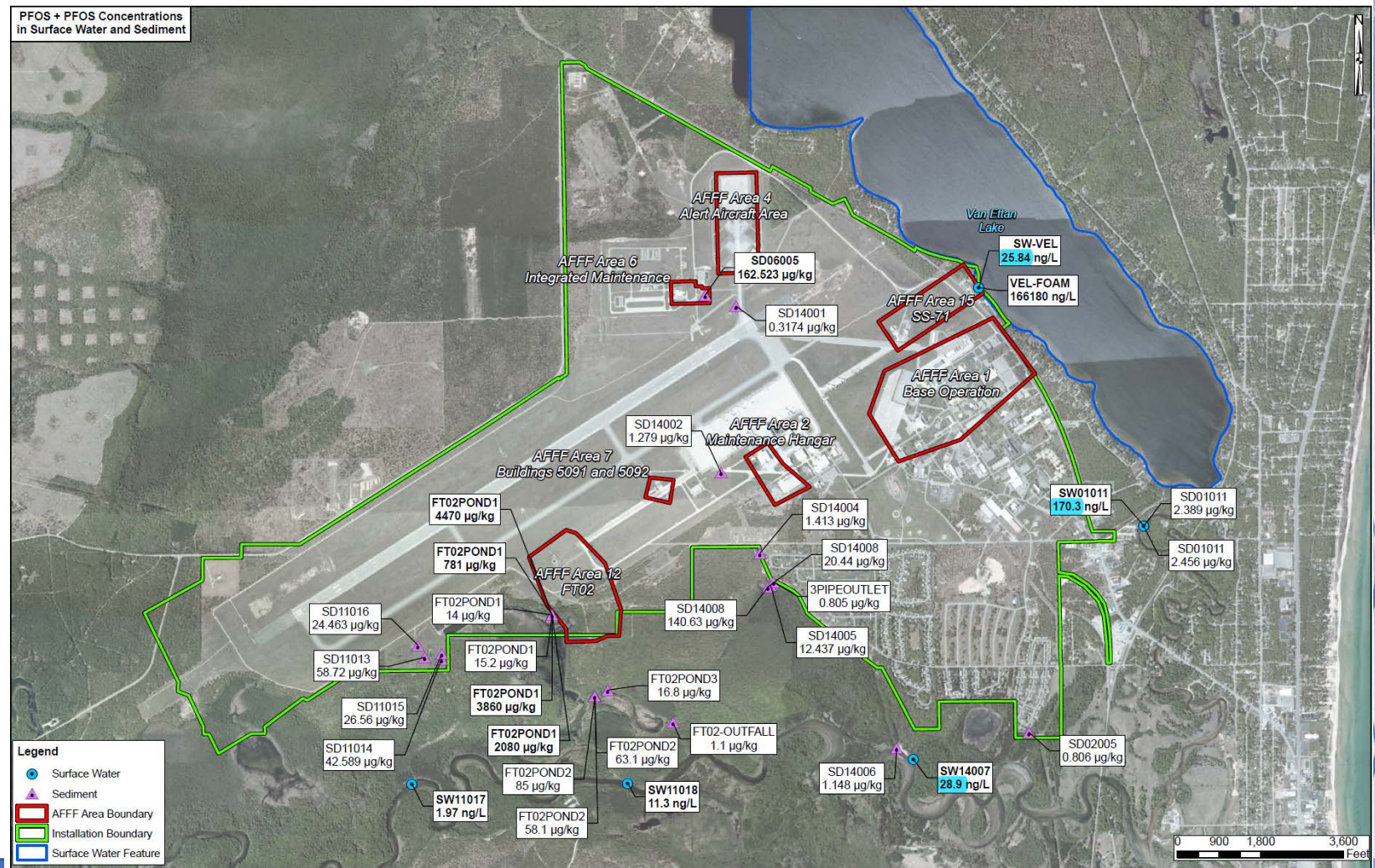


Surface Water and Sediment Investigation

- Evaluate surface water and sediment grab samples
- Collect pore water samples to estimate PFAS flux into surface water (ex. Clark's Marsh, Van Etten Lake)
- Collect data to support the human health and ecological risk assessments
 - Fish tissue
 - Other



Surface Water and Sediment



Sentinel Wells

- Preliminary sentinel wells will be identified to monitor known plume migration
 - Will be included in the UFP-QAPP
- As RI data are collected additional monitoring wells may be installed/added/ or removed from the program

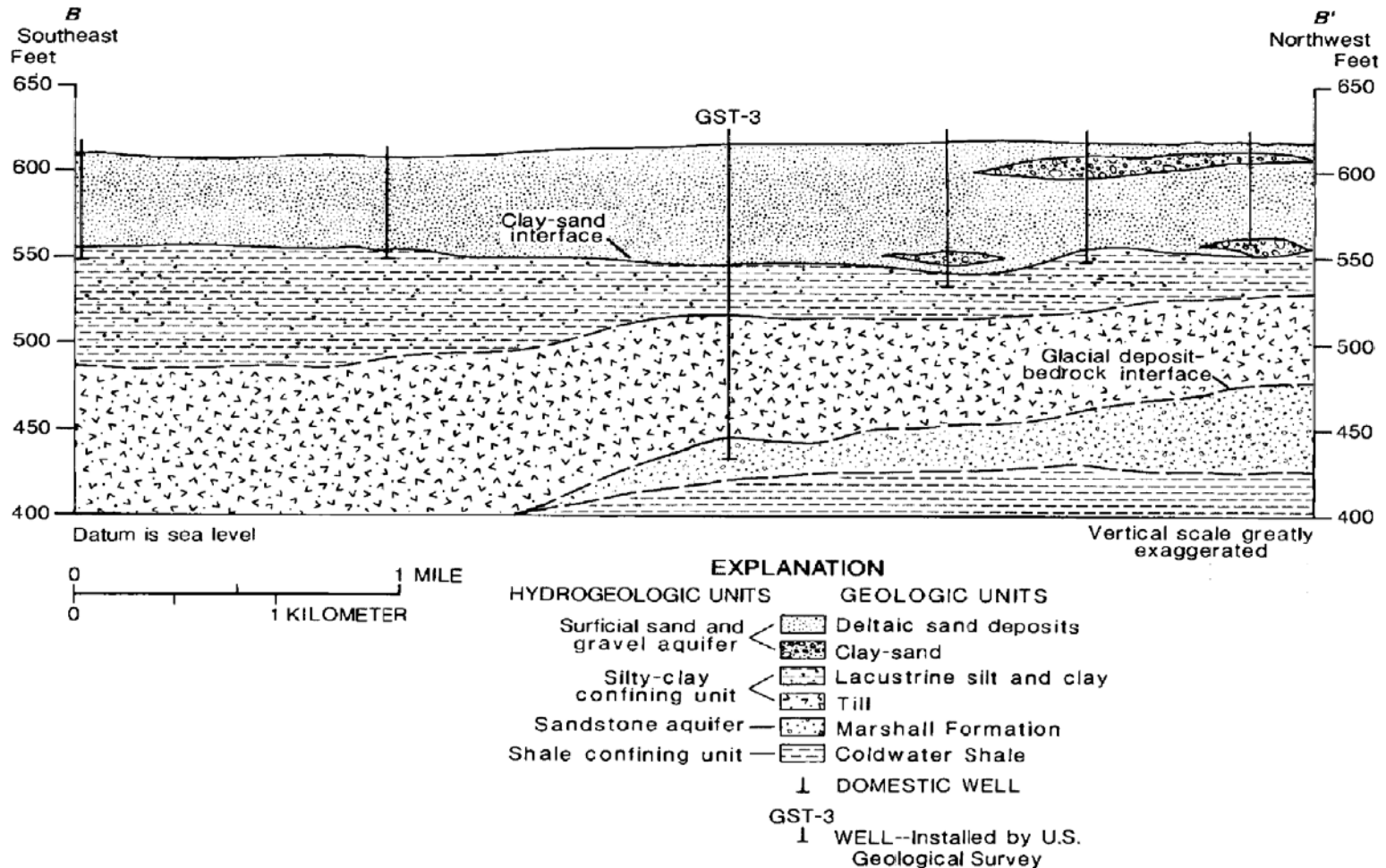


Hydrogeologic Investigation

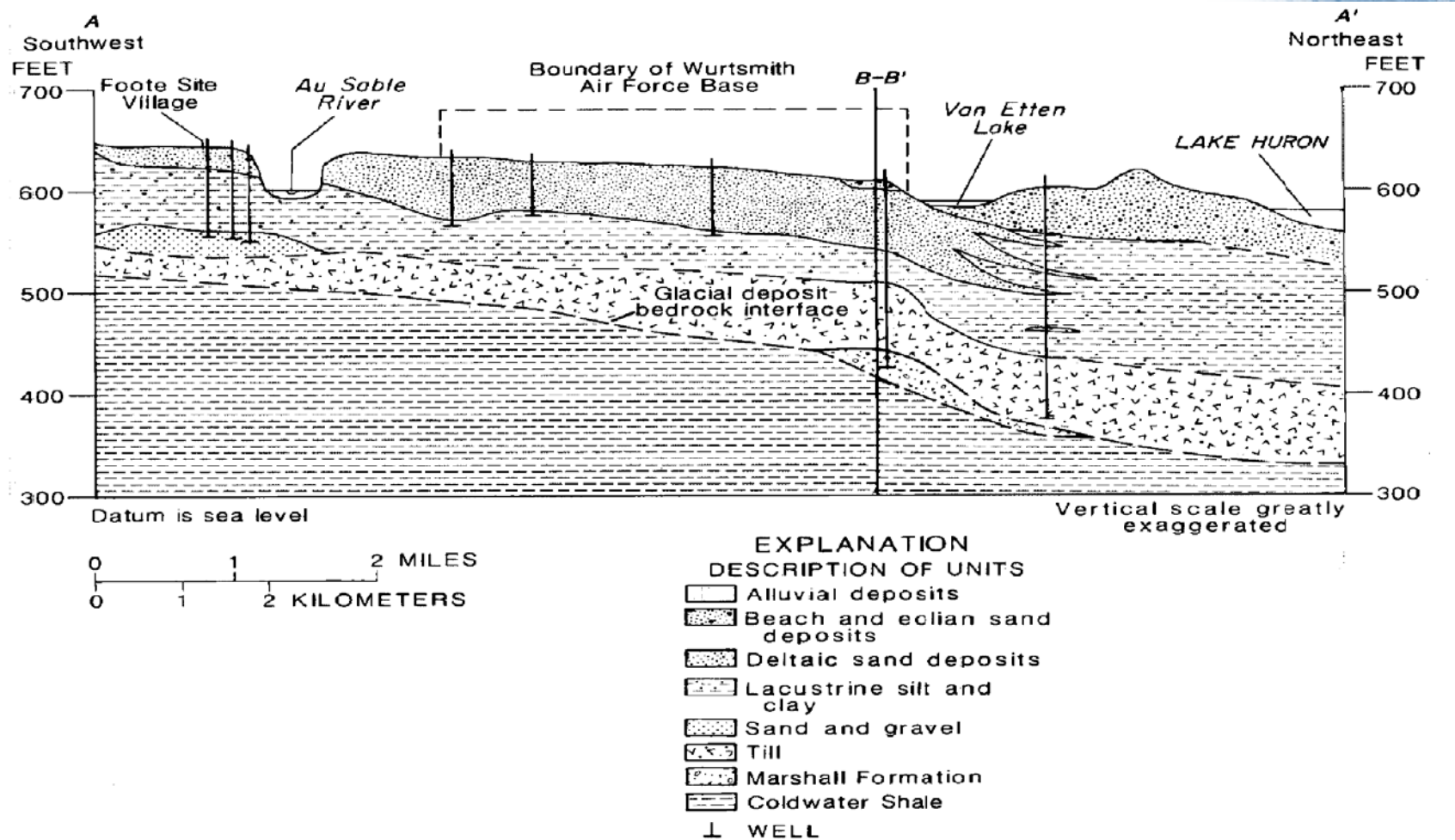
- Confirm aquifer properties through pump testing or slug testing
- Collect high resolution site characterization data using a hydraulic profiling tool (HPT) in select areas where appropriate
- Dial-in conductivity, transmissivity, and flow data
- Collect seasonal comprehensive water level data
- Update groundwater model



Representative Cross-Section



Representative Cross-Section



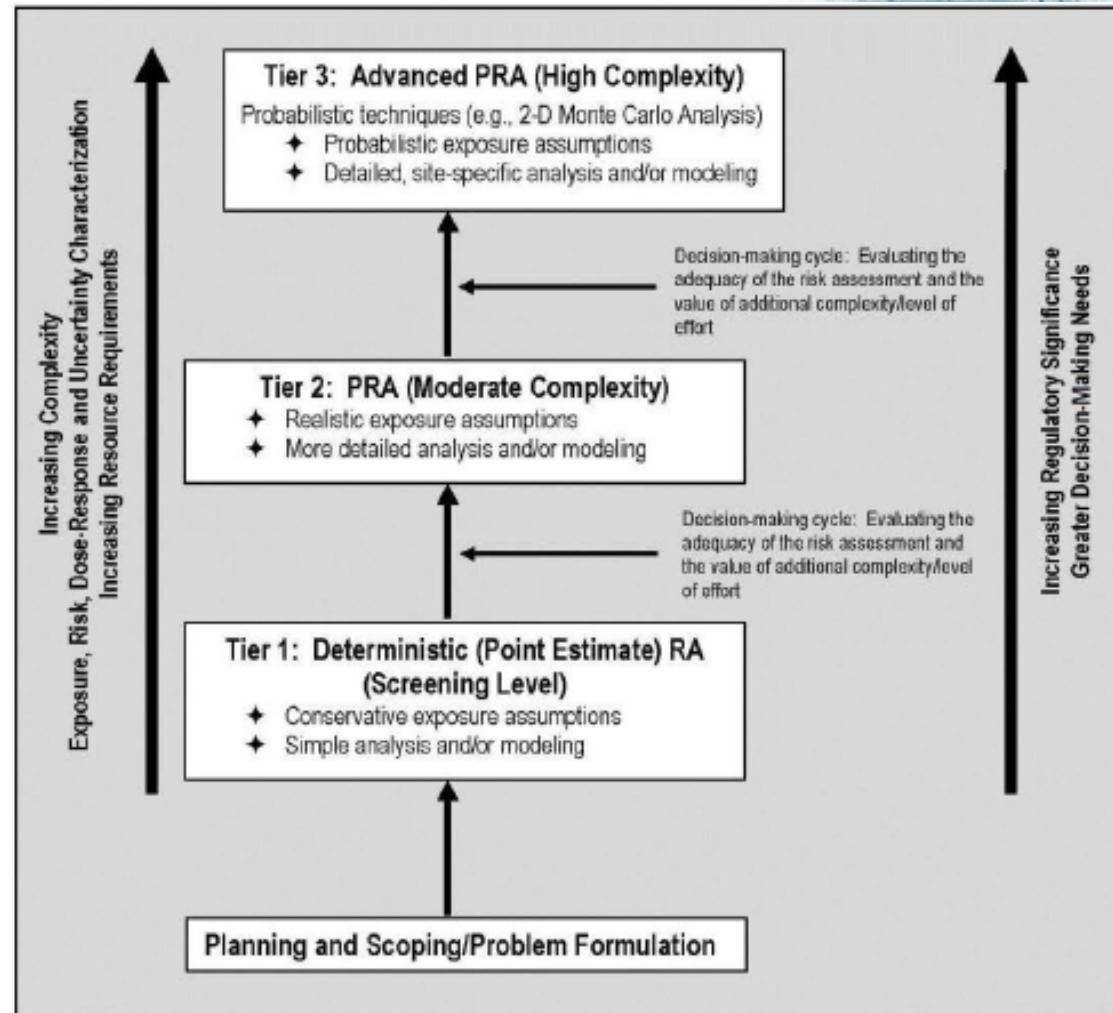
Risk Assessment

- Human Health and Ecological
 - Will utilize available data (SI, ESI, RI, EGLE data, data in peer-reviewed literature)
- Overall approach will follow the Tiered Approach for Risk Assessment. (USEPA. 2014. Risk Assessment Forum White Paper: Probabilistic Risk Assessment Methods and Case Studies. Office of the Science Advisor, Risk Assessment Forum. EPA/100/R-14/004. July.)
- All guidance for exposure assessment and risk characterization will be the standard EPA methods and guidance
- Risk assessment methods will be presented in the UFP-QAPP



Tiered Approach for Risk Assessment

- Assessments that are high in complexity and regulatory significance benefit from the application of probabilistic techniques



SOURCE: Adapted from: USEPA 2004. *An Examination of EPA Risk Assessment Principles and Practices*. EPA/100/B-04/001, Washington, D.C.: Office of the Science Advisor, Office of Research and Development and World Health Organization, 4004. *International Programme on Chemical Safety Risk Assessment Terminology*. Geneva.



Risk Assessment

- Human Health Contaminants of Potential Concern (COPCs) Identification Methods
 - THQ of 0.1
 - PFOA and PFOS – EPA 2016 toxicity values (USEPA 2019)
 - For other PFAS, use toxicity value that meets EPA and DoD criteria including finalized, peer-reviewed and use of well-established methods from EPA
- Human Health CSM Receptors and Pathways
 - Current and future residential risk, tap water and soil
 - Current recreator risk, surface water, sediment and soil
 - Fish consumption
 - Hunter scenario (consumption of wild game)



Risk Assessment

- Ecological COPCs Identification Methods
 - Use the most recent, comprehensive, transparent values that follow standard EPA guidance and state-of-the-science for PFAS
 - Most relevant sources include: DoD SERDP, California, Florida
- Ecological CSM Receptors and Pathways
 - Aquatic and terrestrial plant and invertebrate community as a food source for fish and wildlife
 - Survival, growth, and reproduction of local forage fish population
 - Survival, growth, and reproduction of local piscivorous/omnivorous fish populations



Risk Assessment

- Ecological CSM cont'd
 - Protection (i.e. survival and reproduction) of waterfowl
 - Protection of piscivorous/semi-piscivorous birds and mammals
 - Protection of herbivorous and invertivorous mammals
 - Protection of insectivorous birds and mammals
 - Protection of omnivorous birds and mammals



IRA Goals

- Reduce concentrations of PFOS and PFOA entering Van Etten Lake
 - Pump and treat system
- Reduce concentrations of PFOS and PFOA entering Clarks Marsh
 - Pump and treat system
- Currently reviewing existing data
- Determine Target Capture Zone(s)
- Refine Objectives



IRA Approach

- Review existing data – Identify Target Distribution
- Perform modeling scenarios for extraction well placement
- Consider utility corridors back to treatment plants
- Evaluate possible re-injection\ infiltration options
- Sample existing wells for parameters other than COCs which may effect treatment pretreatment requirements (e.g Fe, Mn, TOC, etc.)
- Establish Treatment systems requirements
- Review lessons learned from operation of both the CTS and the FT-02 Treatment System

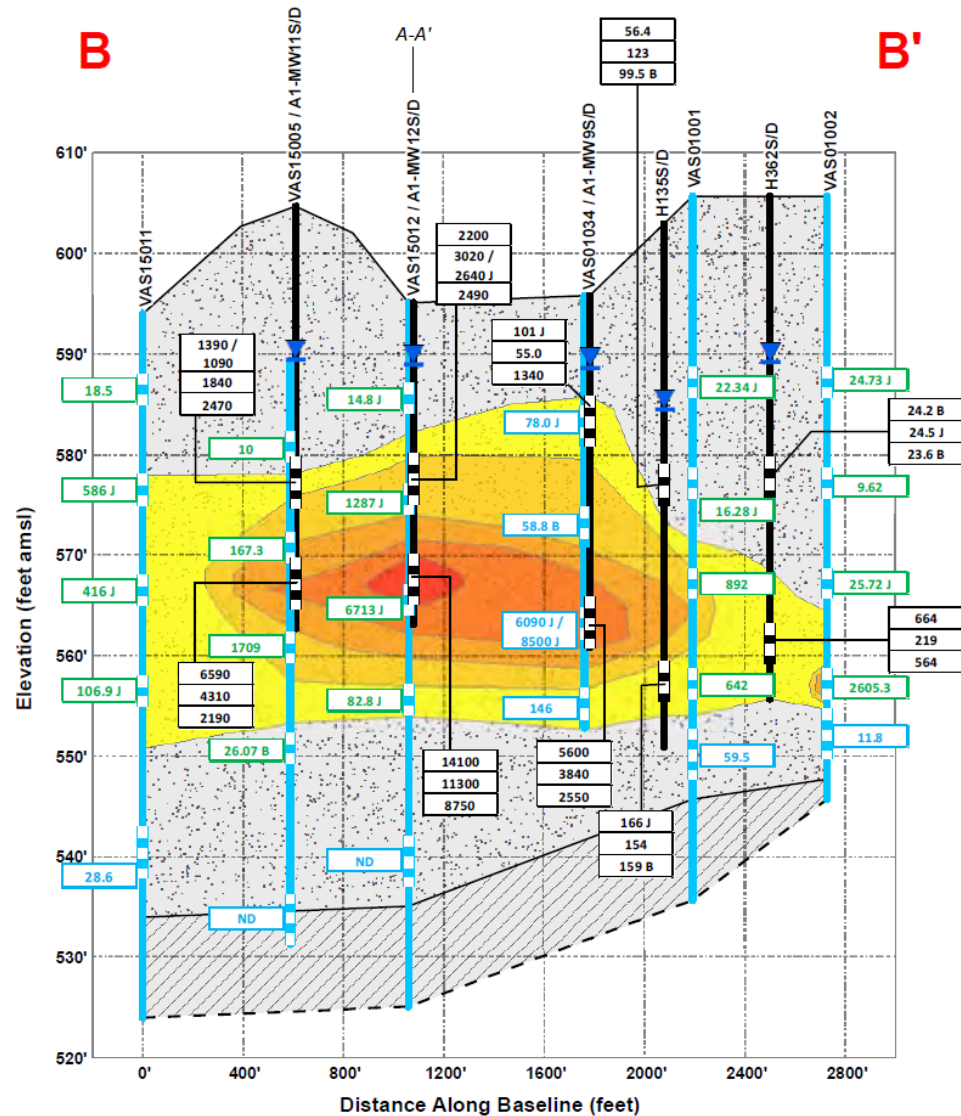


IRA Approach AFFF Areas 1 and 15

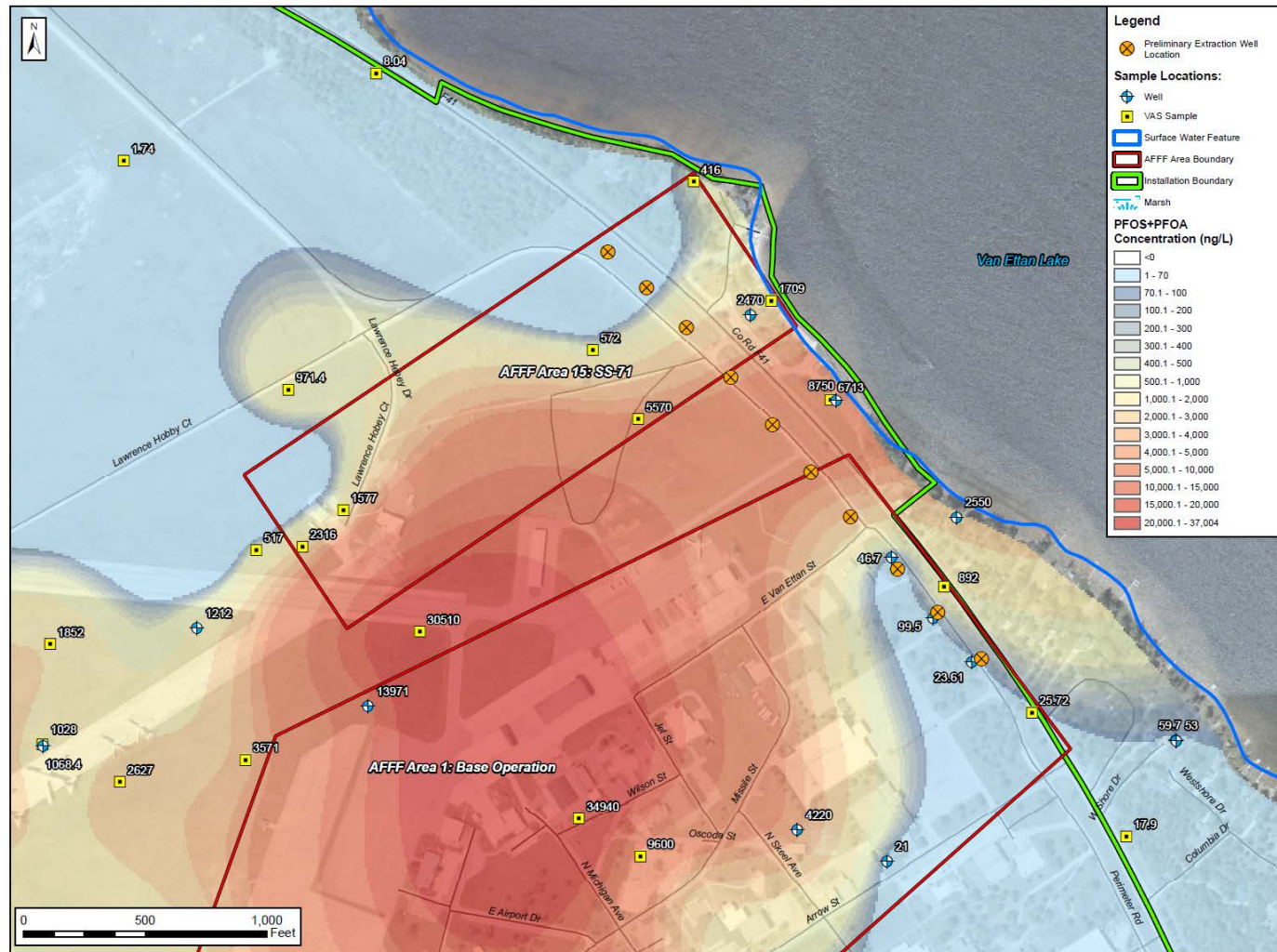
- Conducting modeling
 - Use existing wells (ex. mw 9 S\D, 11 S\D, and 12 S\D) as performance monitoring points. Extraction wells installed at least 100 ft upgradient of performance monitoring wells.
 - Initial extraction well placement on a 250 ft spacing (10 extraction wells)
 - Bottom of screened interval will be 550 ft amsl
 - Keep an eye on projected drawdowns compared to saturated thickness (which only appears to be around 40 ft)
 - Model runs will be steady state however, particle tracks will include tic marks per 100 days travel time so we can see a more realistic operational capture zone



Cross-Section at Lake Van Etten

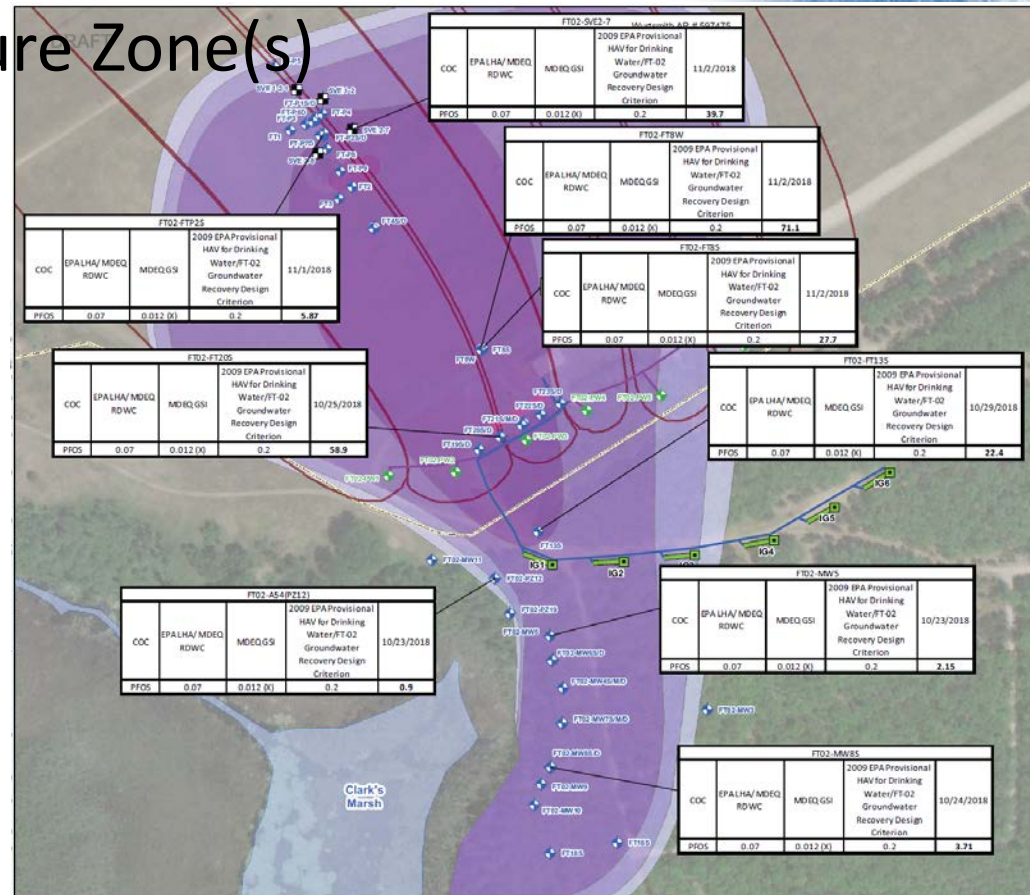
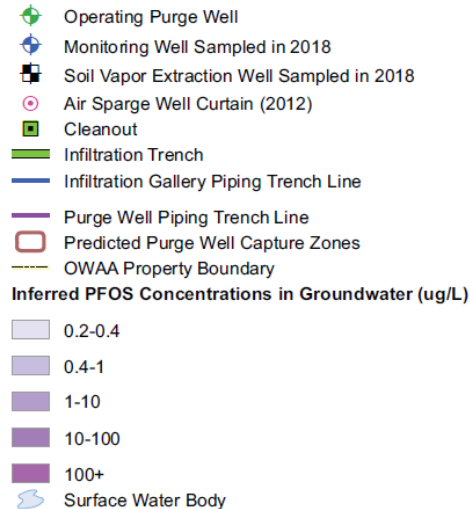


Conceptual Extraction Well Locations



IRA Approach Fire Training Area

- Currently reviewing data
- Determine Target Capture Zone(s)
- Refining IRA Objectives



Schedule

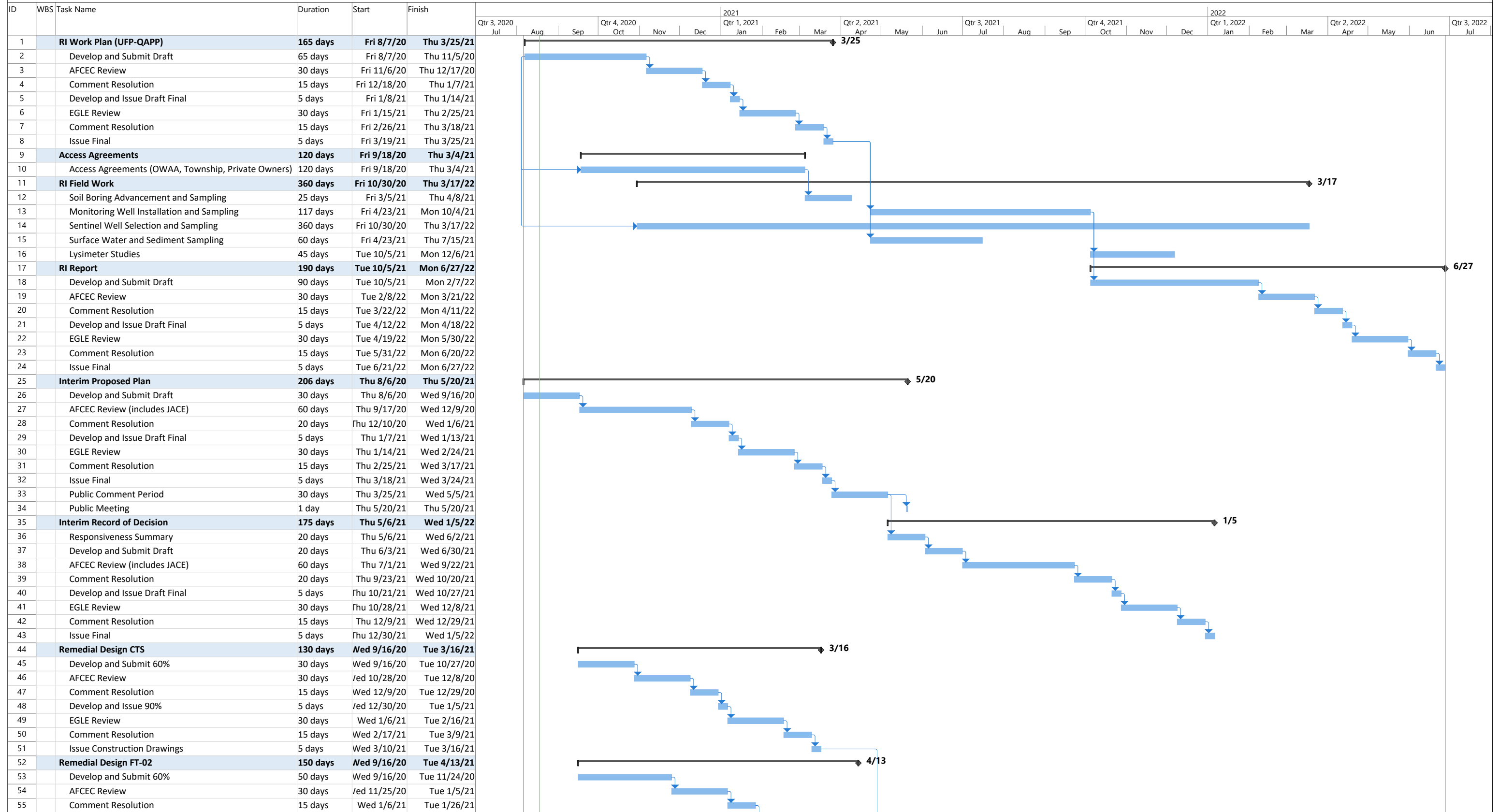
- Project schedule shows details for
 - Document deliverables
 - RI Field work
 - IRA design
 - IRA construction



Questions

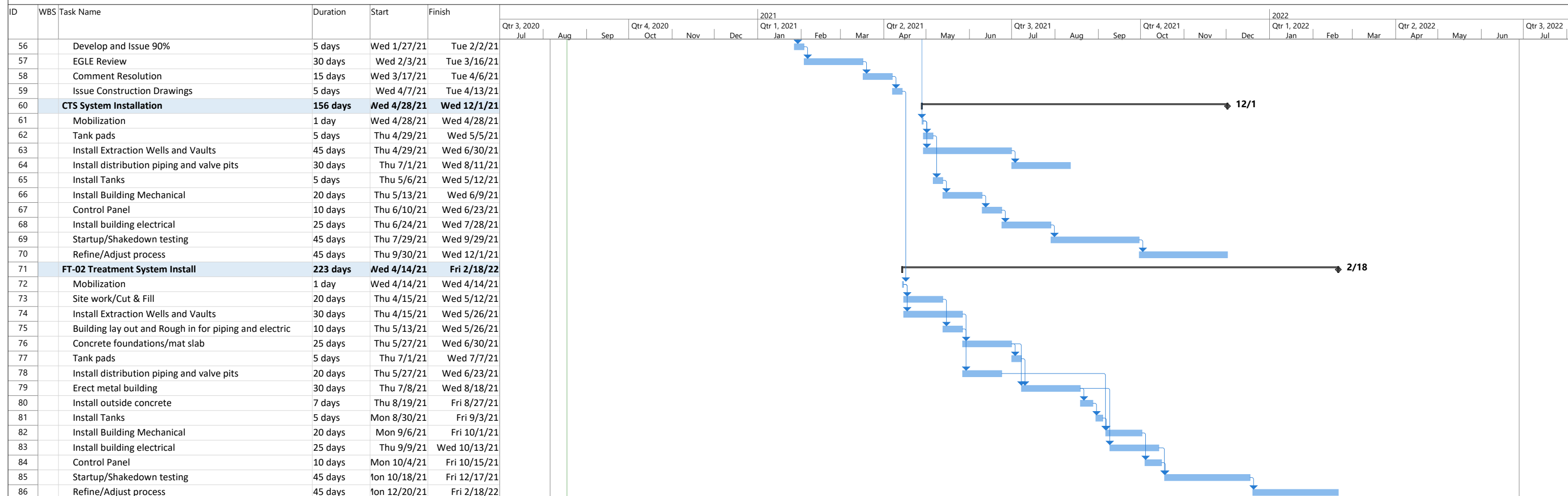


Remedial Investigation/Interim Remedial Actions
Former Wurtsmith Air Force Base



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|------------------------------|-----------|-----------------|--------------------|-----------------------|----------------|--------------------|-----------------|
| Wurtsmith AFB Tue 8/18/20 | Task | Summary | Inactive Milestone | Duration-only | Start-only | External Milestone | Manual Progress |
| | Split | Project Summary | Inactive Summary | Manual Summary Rollup | Finish-only | Deadline | |
| | Milestone | Inactive Task | Manual Task | Manual Summary | External Tasks | Progress | |

Remedial Investigation/Interim Remedial Actions Former Wurtsmith Air Force Base



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| | Milestone | | Inactive Task | | Manual Task | | Manual Summary | | External Tasks | | Progress | | | |