



Scoping Summary for the D-Area Groundwater Operable Unit (U) (Post-Characterization Scoping Phase)

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1.0 PROJECT PHASE/STATUS OF SCOPING SUMMARY

Groundwater in D Area has been monitored under the approved *Monitoring Work Plan for the DAG OU (WSRC-RP-2003-4150, Revision 1, June 2004)* since 2004. The U.S. Department of Energy (USDOE) has submitted groundwater monitoring reports or data summary letters annually to the U.S. Environmental Protection Agency (USEPA) and the South Carolina Department of Environmental Services (SCDES) ¹ documenting the monitoring results.

In April 2021, a Resource Conservation and Recovery Act Facility Investigation/Remedial Investigation (RFI/RI) Work Plan scoping meeting was held. The Core Team agreed with the adequacy of current groundwater data for defining problem[s] warranting action and identified two additional data needs as follows: additional sampling and/or installation of one (1) monitoring well in the Gordon Aquifer (GA) for volatile organic compounds (VOCs) and per- and poly-fluorinated alkyl substances (PFAS); and surface water and sediment sampling for potential PFAS contaminated groundwater discharge. The *RFI/RI Work Plan for the D-Area Groundwater Operable Unit (D-Area Upgradient Sources)* (SRNS-RP-2019-00394, Revision 0, June 2021) including a Sampling and Analysis Plan (SAP) to address the additional data needs was submitted in June 2021. The Revision 1 report was approved by the USEPA and SCDES in May 2022. Twenty-four (24) additional monitoring wells were installed, and additional sampling to complete characterization of DAG OU in support of the RFI/RI/Baseline Risk Assessment (BRA) was completed.

At the June 16, 2022 DAG OU Annual Reports Microsoft Teams meeting, the Core Team agreed to replace the DAG OU data summary letter (2021 data) and the groundwater monitoring report (2022 data) with a single DAG OU Monitoring Report (2021 and 2022 data). This report was submitted April 1, 2023.

During the DAG OU Post-Characterization scoping meeting on November 30, 2023, the Core Team discussed uncertainties associated with contaminant migration (CM) risk to groundwater from PFAS contamination. The Core Team agreed further sampling was warranted in suspected PFAS source area locations in D Area to manage these uncertainties. A webcast meeting was held on February 20, 2024, where Savannah River Site (SRS) proposed concrete and soil sampling for PFAS constituents in two suspected PFAS source areas, the 411-1D Fire-Fighting Training Area (FFTA), and the former 715-D Gasoline Station. In the webcast meeting, SRS also proposed volatile organic compound (VOC) soil sampling at the D-Area Bubble Tower Soil Vapor Extraction units. The DAG OU RCRA RFI/RI Work Plan Addendum Revision 1 (SRNS-RP-2024-0031) was submitted on August 20, 2024, which documented the additional samples and analyses. The DAG Work Plan Addendum also presented the characterization investigation designed to

¹ South Carolina Department of Environmental Services (SCDES) was previously known as South Carolina Department of Health of Environmental Control (SCDHEC) prior to July 1, 2024.

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determine the nature and vertical extent of PFAS and VOCs contamination in concrete and/or vadose zone and Upper Three Runs Aquifer (UTRA) soils. All of the proposed soil and concrete samples were collected in August 2024, and the data will be presented as part of this scoping summary. The Core Team agreed at the November 2023 DAG OU Post-Characterization Scoping Meeting that groundwater and surface water monitoring at DAG OU would continue annually and semiannually, and the 2024 data was included in the DAG OU Annual Data Summary Report (SRNS-RP-2025-01191) submitted in October 2025. The DAG OU Annual Data Summary Report concluded that tritium groundwater plume concentrations were decreasing, and overall, the VOC groundwater plume concentrations have also been decreasing since 2001 to present. The DAG OU PFAS groundwater plumes appear to be stable though additional monitoring stations have mapped the extents of the plumes.

The Core Team agreed that monitoring results associated with the DAG OU treatability study and the 488-4D Ash Landfill would continue to be provided in separate annual reports, submitted May 22, 2025 and July 17, 2025, respectively. The treatability study report concluded on further reevaluation of the hydrological properties and data collected to date that it would take at least 10 to 110 years of injection to substantially change the aquifer conditions. The 488-D Ash Landfill report concluded the groundwater has elevated metals and sulfate concentrations (Al, Be, Co, Fe, Mn and SO₄), but the concentrations have been steady or decreasing for the last seven years. Additionally, upgradient DAG OU wells display higher groundwater concentrations of metals indicating contamination originates from upgradient sources (i.e., the 484-17D Coal Storage Area [DCSA] and 489-D Coal Pile Runoff Basin [CPRB]).

This scoping summary supports Core Team discussion regarding the development of the RFI/RI/BRA for the DAG OU, currently scheduled for submittal on or before December 10, 2026. This scoping summary meeting will present the following five topics to support the OU strategy for the DAG OU:

- 1) Present all the new groundwater, surface water, and soils data;
- 2) Present an overview of results of the DAG OU Groundwater Model update;
- 3) Propose an EE/CA removal action for the highest portion of the PFAS groundwater plume;
- 4) Present an outline of a revised DAG OU SAP Addendum for additional PFAS characterization; and
- 5) Propose a revised DAG OU schedule to support the EE/CA and complete vadose zone PFAS characterization.

2.0 D AREA HISTORY AND BACKGROUND

SRS encompasses approximately 803 square kilometers (km²) (310 square miles [mi²]) of South Carolina coastal plain uplands along the Savannah River in Aiken, Barnwell, and Allendale counties. SRS is owned by the USDOE. SRS produced special nuclear materials for the U.S. Department of Defense between 1952 and 1988. The reactors that were used to produce the nuclear materials required heavy water as a moderator to control the speed of neutrons in the reactor. The heavy water was produced in D Area at the SRS. D

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Area also contained the heavy water rework facility to purify the SRS inventory of used reactor moderator. Other D Area operations included the 484-D Powerhouse that provided electricity and steam for the D-Area facilities and other areas at SRS. After shutdown of the D-Area Bubble Towers, a portion of the area was used for the 411-1D/411-3D FFTA to support the SRS Fire Department.

D Area is located in the southwest quadrant of the SRS, approximately (~) 914-meters (m) (3,000-feet [ft]) east of the nearest site boundary, the Savannah River. The DAG OU, which is located in the Savannah River Floodplain and Swamp watershed, encompasses groundwater beneath D Area, west and southwest to the Savannah River (Figure 1). Groundwater flow is to the southwest in both the Upper Three Runs Aquifer (UTRA) (Figure 2) and GA (Figure 3).

The groundwater in D-Area has been contaminated with trichloroethylene (TCE), tetrachloroethylene (PCE), tritium, beryllium, and other metals from surface or facility sources associated with the D-Area OU (DAOU). More recently, PFAS contaminants have been identified in D-Area groundwater, which resulted from SRS Fire Department training activities. The DAOU is composed of multiple waste units and facilities associated with the former operation of the 484-D Powerhouse and the production and rework of heavy water moderator for reactor operations. Most sources of the groundwater contamination associated with the DAOU have been addressed under remedial and/or removal actions, with the exception of the PFAS groundwater plumes.

2.1 Completed Source Remediation

The DAOU consists of the following three main facility areas: the 484-D Powerhouse (Powerhouse Subunit), the D-Area Heavy Water Facility (Bubble Tower Subunit), and the Moderator Processing Facility (Moderator Processing Subunit) (Figure 4). Non-time critical removal (NTRC) actions were completed for the facilities associated with the Bubble Tower Subunit and the Moderator Processing Subunit, and these facilities are no longer a source of tritium or TCE contamination to groundwater. The *Early Action Record of Decision Remedial Alternative Selection for the D-Area Operable Unit (SRNS-RP-2010-00162, Rev. 1.2, July 2011)* integrated the results of the completed removal actions and selected land use controls (LUCs) as the final action for the Bubble Tower Subunit, Moderator Processing Subunit, the northern 25% section of the 489-D CPRB (part of the Powerhouse Subunit), and miscellaneous units (i.e., D-Area Asbestos Pit, and the D-Area Process Sewer Lines as Abandoned inside the area fence).

The Powerhouse Subunit consists of the 484-D Powerhouse building, the DCSA, and the 489-D Coal Pile Runoff Basin (CPRB) and associated ancillary facilities for coal and ash storage, runoff, and disposal. The 488-D D-Area Ash Basin (488-DAB) and the D-Area Rubble Pit (DRP) are no longer operational and remedial actions for these surface units were completed under the D-Area Expanded Operable Unit project. The *Record of Decision Remedial Alternative Selection for the D-Area Expanded Operable Unit (WSRC-RP-2004-4007, Revision 1, August 2004)* documents the selection of a low permeability geosynthetic cover system installed over the 488-DAB, and LUCs and groundwater monitoring for the 488-DAB and the DRP.

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A coal pile located at the 484-17D DCSA south of the 484-D Powerhouse created acidic leachate that infiltrated into the vadose zone and collected in the 489-D CPRB. The coal pile was removed following shutdown of the 484-D Powerhouse. The 2020 NTCR action at the 484-17D DCSA proposed to amend the acidic soils by the addition of lime (calcium carbonate) to a depth of 1.2 m (4 ft) below ground surface (bgs) to raise the pH of the soils to more natural levels (approximately a pH of 5.5 or higher) within the majority (approximately 4.9 hectares [12 acres]) of the 484-17D DCSA (*Removal Site Evaluation Report / Engineering Evaluation / Cost Analysis (RSER/EE/CA) for the D-Area Coal Storage Area (484-17D) (U)* SRNS-RP-2018-00813, Revision 1). The removal action was completed in December of 2020. Post-action pH soil sampling was conducted in June 2022 and confirmed the soil pH had been raised sufficiently. Improvements in the slightly deeper groundwater conditions (i.e. increased pH, lower metal concentration) are not expected to be evident on the order of a decade or more. The 484-17D DCSA is currently listed on FFA Appendix K.1: D&D Facilities to be Decommissioned. The final action for the 484-17D DCSA will be addressed by the DAOU ROD scheduled for issuance in January 2046.

The 489-D CPRB previously received runoff from the 484-17D DCSA. A NTCR action was completed for the 489-D CPRB northern 25% section in 2011. The southern 75% section of the 489-D CPRB was addressed under a NTCR action in 2017 to remove coal fines and contaminated sediments from the basin and will remain open as a storm water retention structure.

In 2013, the 488-1D Ash Basin, 488-2D Ash Basin, and the 488-4D Ash Landfill were included as subunits of the DAOU.

- A NTCR action was conducted for the 488-1D Ash Basin to consolidate ash in the eastern portion of the basin and install a geosynthetic cover and vegetative layer compliant with the SCDES Class Three Solid Waste Landfill Cover requirements. The western portion of the 488-1D Ash Basin was graded for stormwater runoff.
- A time critical removal action was conducted for the 488-2D Ash Basin to dewater and remove bulk ash from the basin and consolidate in the 488-4D Ash Landfill. Fill material was placed in the 488-2D Ash Basin and the basin was regarded, sloped appropriately, and converted to a storm water detention structure.
- A NTCR action was conducted for the 488-4D Ash Landfill to consolidate excavated ash from the 488-2D Ash Basin and install a geosynthetic cover and vegetative layer compliant with the SCDES Class Three Solid Waste Landfill Cover requirements over the landfill.

A second Early Action ROD for the DAOU including the 488-1D Ash Basin, 488-2D Ash Basin, 488-4D Ash Landfill and southern 75% section of the 489-D CPRB was issued in July 2020. The final ROD for the DAOU to include the remaining Powerhouse Subunit waste units and D&D facilities is currently scheduled for issuance in January 2046.

2.2 Additional Activities

Treatability Study for Groundwater Injection and Effluent Discharge Canal Treatment

The presence of a low-pH plume in the groundwater is expected to last for decades under natural groundwater conditions. The low-pH groundwater is currently discharging into the D-Area Effluent Discharge Canal which later converges with Beaver Dam Creek and flows through the Savannah River floodplain to the Savannah River (Figure 6). If the pH of the aquifer can be raised to more normal, less acidic conditions, the groundwater and surface water conditions in the D-Area Effluent Discharge Canal would improve.

An ongoing treatability study is injecting potable water into the Upper Three Runs Aquifer (UTRA) upgradient of the low-pH, metals, and sulfate plume to create a hydraulic head and displace the low-pH groundwater in the aquifer (*Treatability Study Work Plan for Groundwater Injection and Discharge Canal Treatment at the D-Area Groundwater Operable Unit [SRNS-TR-2018-00128, Revision 1, January 2019]*). Field start occurred in December 2019 with the installation of five of the injection wells. Due to the abundance of potentially less accepting sediments encountered (clays and fine sediments), injection testing on the wells was conducted before moving forward with the installation of the remaining injection well field. Once results showed there was enough flow into the wells with short tests, five additional injection wells were installed in 2021. Since March 2022, a total of over 164 million gallons of water have been injected. Two calcium carbonate marble chip reactive structures were installed in 2020 downgradient within the D-Area Effluent Discharge Canal. Surface water samples are currently being monitored for pH and metals upgradient, in-between, and downgradient of the reactive structures. Water flow through the reactive structures has been reduced due to sediment and detritus buildup. A maintenance action was conducted in the first half of March 2024, both reactive structures were redesigned, and one was relocated to improve performance and limit detritus buildup. The new reactive structures were constructed by installing limestone riprap on the upstream side to help break up and block detritus from clogging up the larger marble aggregate. It is expected that use of larger marble aggregate instead of small chips will allow more water flow over time. A small amount of limestone riprap was also added at the downstream side of the reactive structures to help minimize displacement of the aggregate during higher flow events. The recent treatability study status and data have been submitted in the fifth annual data report in May 2025 (*Treatability Study Data Report for Groundwater Injection and Discharge Canal Neutralization at the D-Area Groundwater Operable Unit (OU) (U)*, SRNS-TR-2025-00218). The treatability study results will be used to support the development of the DAG OU DAG OU RFI/RI/BRA and the Corrective Measures Study/Feasibility Study (CMS/FS).

Between March and November 2020, a removal action was conducted at the 484-17D DCSA to reduce the acidity in the surface and subsurface soils. A lime calcium carbonate neutralization amendment (i.e., Hi-Cal AgLime) was mixed with the soils to a depth of 4 ft bgs and a limestone gravel cover was placed over all disturbed areas (Figure 31). Subsequent soil sampling in May 2022 indicated the removal action was a success as the soil pH levels were raised to more natural levels (pH of 5.5 or higher).

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The combined (or synergistic) effects of the 484-17 DCSA removal action and the DAG OU treatability study will be evaluated using the data collected for the treatability study, the 484-17D DCSA RSER/EE/CA, and the DAG OU groundwater and surface water monitoring over time.

DAG OU Continued Modeling Efforts

Groundwater modeling efforts for the DAG OU were initially reported in Brewer and Schor (2002) to assist in formulating a sampling and monitoring plan. A separate groundwater model was developed for the DOSB in 2004 since the 2002 model for the DAG OU did not include the DOSB. These previous groundwater modeling studies have been revisited, and an updated groundwater model was constructed in 2024 and 2025 for DAG OU combining a regional model with a localized model as shown in Figure 7. As presented in Figure 7, the updated model was designed to reduce reliance on artificial boundary conditions by using three natural surface water boundaries for the most part, namely: 1) Upper Three Runs Creek, 2) Savannah River, and 3) Fourmile Branch. The two regional models are simulated simultaneously using capabilities available in the latest MODFLOW 6. MODFLOW 6 also allows for an unstructured grid that helps in modeling contaminant transport at a finer resolution in the area of interest. The regional and local model grids were discretized using 250 feet and 50 feet spacing in the horizontal direction, respectively. The updated numerical model consists of five layers that simulate the relevant hydrogeological units as follows:

- Layers 1-3: Upper Three Runs Aquifer
- Layer 2: local clay unit (where present)
- Layer 4: Gordon confining unit
- Layer 5: Gordon Aquifer

Top elevation of the updated groundwater model was developed using a Light Detection and Ranging (also known as “LiDAR”) dataset recently acquired by SRNS. The top elevations of the other hydrogeological units were estimated using hydrostratigraphic “picks” available in the geotechnical database maintained by SRNS. The groundwater flow model was then calibrated by using water level data obtained between 2016 and 2021. The observed water level data were further used to develop three sets of calibration data: 1) direct calibration to water level, 2) calibration to horizontal head difference (HHD) between a pair water levels, and 3) calibration to vertical head difference (VHD) between a pair of water level. Calibration to each of the head difference(s) improves model performance in simulating groundwater flow direction and migration velocities. In addition to groundwater level data, a baseflow estimate was also used as a “soft” target for model calibration. The baseflow yield was estimated using the watershed modeling code, SWAT. The

groundwater model was then calibrated by employing the most-widely used parameter estimation code (PEST). The calibration effort yielded an overall root mean square error (RMSE) value of less than 1 feet, with an RMSE of 1.06 ft for HHD, and 1.16 feet for VHD targets. The baseflow estimate was also in the qualitative range of values as simulated by SWAT.

The calibrated model was used to conduct predictive contaminant transport simulations using the particle-tracking methodology. Particle-tracking simulations assume that the contaminant behaves like a non-reactive tracer and provides a conservative (least-time taken to discharge boundary) estimate of contaminant migration. A forward particle-tracking simulation was conducted by releasing three particles at different vertical placements in each of the local model cells. Placing the particles at three different vertical locations within each model cell helped improve the estimates of migration pathways by reducing vertical discretization bias in the results. The results were then parsed for simulated migration paths for the different layers and travel times for particles within a given footprint of the simulated contaminant plume. For example, the migration pathway of the injected water through the various layers is presented in Figure 8 and the travel times associated with those particles are presented in Figure 9. The travel time information is provided through a statistical visualization in the form of a cumulative distribution function (CDF) in Figure 10. The estimated CDF shows that 50% of the water injected is anticipated to reach a discharge boundary in 82.5 years. Similar CDFs were also developed for particles originating in the various contaminant plumes and the results are summarized in Table 4. As mentioned earlier, it should be noted that particle-tracking provides a conservative (least-time taken to discharge) estimate of migration times since it does not account for several factors impacting contaminant transport such as dispersion, degradation, and adsorption. A contaminant transport model can account for these factors more effectively, and it is planned to be tasked in the future when the contaminant characterization has been finalized.

2.3 Land Use

The DAG OU is located in a future industrial land use zone of SRS as defined by the Land Use Control Assurance Plan. No current or future development of the DAG OU is planned. There is no current or projected future use of the groundwater within the DAG OU as a drinking water source.

3.0 D-AREA GROUNDWATER OPERABLE UNIT

Commingled plumes of TCE, tritium, beryllium, and other metals are present in the groundwater at D Area above maximum contaminant levels (MCLs). Groundwater flow in the UTRA and the underlying GA are both to the west to southwest towards the Savannah River. A schematic of the DAG OU conceptual site model is provided in Figure 11.

A flow and transport groundwater model was developed in 2002 to support the DEXOU, provide a baseline for D-Area groundwater understanding, and to show nature and extent of existing groundwater contamination. The model supported the development of the *Monitoring Work Plan for the DAG OU (WSRC-RP-2003-4150, Revision 1, June 2004)* which prescribed annual or semi-annual monitoring of wells and surface water stations. The groundwater flow model was updated in 2024 (as described above in section 2.2) to include updated information before the DAG OU RFI/RI report. Annual or semi-annual monitoring of wells and surface water stations have provided long-term trend data of the tritium, TCE, and metals plumes that have been reported in groundwater monitoring reports or data summary letters annually since 2004. Twenty-four (24) additional monitoring wells were installed throughout D Area in the UTRA and GA between 2020 and 2023 to further supplement the DAG OU monitoring network and fill identified data needs. Seven additional surface water stations were also installed to support the DAG OU treatability study and/or further supplement the DAG OU monitoring network. The current monitoring network includes 109 monitoring wells and 12 surface water stations over an area of approximately 600 acres (Figure 2 & Figure 3). This network supports the monitoring of the highest concentrations of the various plumes and relative geometry of each plume as described below.

VOC Plume: The VOC Plume (mainly TCE [Figure 15]) extends from the Bubble Towers Subunit southwest under the 484-17D DCSA, 488-4D Ash Landfill and portions of the Ash Basins, and westward into the D-Area wetlands and comprises an area of approximately 152.6 hectares (377 acres). The maximum TCE concentration in 2024 was 110 micrograms per liter ($\mu\text{g/L}$) at monitoring well DCB 62, exceeding the 5 $\mu\text{g/L}$ MCL. Concentrations downgradient of DCB 62 are less than 100 $\mu\text{g/L}$. The plume area estimated at or above 100 $\mu\text{g/L}$ is approximately 0.6 hectares (1.6 acres). Concentrations farther downgradient into the D-Area wetlands drop to levels ranging from non-detect to above the MCL, with a maximum 2024 concentration of 35.0 $\mu\text{g/L}$ at well DCB 54. The now expanded GA well network has displayed that the vast majority of the TCE plume is restricted to the UTRA as only two GA monitoring wells exhibit concentrations above the MCL (DRW001D & DCB089D) (Figure 16). A cross-sectional view of the 2024 TCE plume is provided in Figure 17. Surface water concentrations within the DAOU footprint are generally non-detect with occasional detections less than the MCL.

Overall, VOC (TCE and PCE) concentrations are decreasing slightly, with plume attenuation believed to be primarily based on advection and dispersion. PCE concentrations are much lower than TCE with a 2024 maximum concentration of 4.3 $\mu\text{g/L}$ at well DCB 45C. VOC degradation products are minimal to non-existent, and detected concentrations remain below respective MCLs. Most concentrations of TCE in the UTRA source area are decreasing, indicating depletion of the source and attenuation of the TCE plume. Increases displayed at DCB 26AR are most likely due to plume migration from the higher concentrations upgradient. Increases in DRW001D indicate some limited downward vertical migration to the GA. Intermediate wells (i.e., DCB 27C and DCB 28) show decreasing concentrations and indicate that the plume is not growing in extent. In addition, downgradient wells also display steady or decreasing trends which also supports that the plume is not growing in extent and does not pose an immediate threat to surface water or the D-Area wetlands.

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Metals Plume: The low-pH and metals plumes extend to the southwest from the DRP, 484-17D DCSA, and 489-D CPRB. Exposure of coal to rainwater for up to 59 years has caused the dissolution of iron sulfide (pyrite; a mineral commonly found in coal), leading to the creation of sulfuric acid. As a result, the soils underneath the 484-17D DCSA, associated storm water runoff in the 489-D CPRB, and groundwater underlying the area have been acidified. The groundwater downgradient of the DRP, 484-17D DCSA, and 489-D CPRB has a pH less than 4.5 with some areas as low as 3 to 3.5 (Figure 5), which is considerably lower than the background groundwater in D Area (pH ~ 5.1). This acidification has resulted in the leaching of metals from both the coal and the natural minerals in the underlying soils, leading to a sulfate and metals groundwater plume in the UTRA. Acidic groundwater (pH < 4) is currently discharging downgradient into the surface water of the D-Area Effluent Discharge Canal and the Beaver Dam Creek.

Metals including aluminum, antimony, arsenic, beryllium, cadmium, chromium, cobalt, iron, lead, manganese, mercury, nickel, selenium, and thallium generally exceed their respective MCLs or USEPA Regional Screening Levels (RSLs). The beryllium plume correlates with the low-pH plume (Figure 5). The maximum beryllium concentration during 2024 was 78 µg/L at well DCB 23C, above the 4 µg/L MCL. The 2024 beryllium plume covers an area of approximately 91.1 hectares (225 acres). In general, the highest beryllium concentrations, as well as other metal concentrations, are located directly downgradient of the source areas. The beryllium plume, displaying concentrations above the MCL, is in the UTRA (Figure 18) and GA concentrations are below the MCL (Figure 19). Figure 20 shows a cross-sectional view of the 2024 beryllium plume. Current 2024 sampling of GA wells shows that the GA is not impacted by low-pH groundwater and metal concentrations are below MCLs/RSLs. Metal trends show lingering contaminant concentrations that are likely due to ongoing acidic pH levels in the vadose zone and in groundwater. Some wells show increasing concentrations due to some plume migration vertically or horizontally, although overall plume footprints have minimally changed. Surface water downgradient of the 484-17D DCSA in the D-Area Effluent Discharge Canal and Beaver Dam Creek displays low-pH levels (pH < 4.0) and elevated metal concentrations. In 2024, the maximum surface water concentrations were the following:

- Aluminum 4,380 µg/L at DSWM-4B;
- Beryllium 5.2 µg/L at DSWM-4C;
- Cobalt 17.1 µg/L at DSWM-4C;
- Iron 30,600 µg/L at DSWM-5; and
- Manganese 696 µg/L at DSWM-4B.

Tritium Plume: The tritium plume extends from the Moderator Processing Facility to the southwest towards the 488-D Ash Basin and 488-4D Ash Landfill and towards the west into the wetlands and comprises an area of approximately 31.8 hectares (78.7 acres) (Figure 21). The maximum concentration in 2024 was 91.6 picocuries per milliliter (pCi/mL) at well DCB 26AR, exceeding the 20 pCi/mL MCL. The tritium plume comprises an area of approximately 31.8 hectares (78.7 acres) near the recognized source area and

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downgradient towards the 488-D Ash Basin. Concentrations downgradient towards the D-Area wetlands drop to levels ranging from non-detect to slightly below the MCL, with a maximum 2024 concentration of 19.6 pCi/mL at well DCB080. The GA has not been impacted by the tritium plume (Figure 22). A cross-sectional view of the 2024 tritium plume is provided in Figure 23.

Tritium contamination originated from the Moderator Processing Facility. Historical monitoring well data shows tritium maximum levels were above 1,400 pCi/mL during 2001. In 2011, the tritium source in the vadose zone was remediated by detritiation of concrete and soil under a removal action; therefore, declining tritium concentrations in groundwater near the source are expected to continue. Tritium contamination above MCLs is only present in the UTRA as concentrations at GA wells are either non-detect or are less than the MCL. Overall tritium concentrations are decreasing. Surface water samples remain either non-detect or at levels far below the MCL.

PFAS Plume: PFAS constituents are an emerging contaminant and can be sourced from historical use of PFAS containing aqueous film-forming foam (AFFF). AFFF was historically used in D Area to extinguish fires for training purposes at the 411-1D/411-3D FFTA in the DAOU Bubble Tower subunit. In addition, it is suspected that a one-time fuel fire was extinguished using AFFF at the 715-D Former Gas Station. The presence of PFAS contamination in the groundwater at the 411-1D/411-3D FFTA in the DAOU Bubble Tower subunit and at the 715-D Former Gas Station was initially confirmed during groundwater sampling in 2020. More recently four additional potential PFAS source areas were identified in D Area: 1) A concrete structure (402-D Tank Farm remnants) used for fire-fighting training; 2) A grass fire area; 3) A phytoremediation area; and 4) A stormwater discharge to the D-Area Effluent Discharge Canal tributary (Figure 24).

During November 2022, an expanded groundwater and surface water sampling across D Area at 65 monitoring wells and 10 surface water stations was performed to determine the full extent of PFAS contamination in D Area. The results of this sampling event were presented in the 2023 DAG OU Groundwater Monitoring Report. Multiple PFAS constituents were detected, the chemical signature indicating association with legacy AFFF. The PFAS constituents detected above MCLs included perfluorononanoic acid (PFNA), perfluorooctane sulfonic acid (PFOS), perfluorooctanoic acid (PFOA), and perfluorohexane sulfonic acid (PFHxS).

During 4Q2024, a subset of the currently monitored stations and additional monitoring stations (75 monitoring wells and 21 surface water stations) were sampled for PFAS constituents. These stations include three additional D-Area wetland surface water samples (DSWM-Wet-01, DSWM-Wet-02, and DSWM-Wet-03) (Figure 25) and six Savannah River/near discharge surface water samples (Figure 26) which are discussed below. In 2024, the maximum PFNA groundwater concentration was 2,600 ng/L at well DCB 62 located adjacent to the 715-D Gasoline Station, which exceeds the MCL of 10 ng/L. Figure 25 displays the PFNA results for the UTRA and surface water stations and depicts the PFNA plume greater than 10 ng/L. Figure 27 displays the PFNA plume for the GA. PFNA exceeded the MCL in three GA wells (DCB026D, DCB 33D, and DRW001D) with a maximum concentration of 44 ng/L at DRW001D,

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and a cross-sectional view of the 2024 PFNA plume is provided in Figure 28. The aerial extent of all PFAS plumes in D Area is approximately 245.6 hectares (607 acres).

Four other PFAS constituents exceeded MCLs or RSLs in 2024. These include perfluorodecanoic acid (PFDA), PFHxS, PFOA, and PFOS, which had the second highest PFAS concentrations in groundwater (Figure 28 and Figure 29). Also, the Hazard Index² was also exceeded (>1) for multiple samples. The Hazard Index is calculated as detailed below.

Equation

$$\text{Hazard Index} = \left(\frac{[\text{GenX}_{\text{water}}]}{[10 \text{ ppt}]} \right) + \left(\frac{[\text{PFBS}_{\text{water}}]}{[2000 \text{ ppt}]} \right) + \left(\frac{[\text{PFNA}_{\text{water}}]}{[10 \text{ ppt}]} \right) + \left(\frac{[\text{PFHxS}_{\text{water}}]}{[9.0 \text{ ppt}]} \right)$$

As USEPA recently proposed to remove the Hazard Index MCL, and only PFBS does not have an individual MCL, emphasis is placed on individual constituents that exceed MCLs or RSLs. The maximum concentrations and associated groundwater wells are listed below:

- PFNA – 2,600 ng/L at DCB 62 above the MCL of 10 ng/L;
- PFOA – 150 ng/L at DCB078 above the MCL of 4 ng/L;
- PFOS – 310 ng/L at DRW 1 and DCB 62 above the MCL of 4 ng/L /L;
- PFHxS – 120 ng/L at DRW 1 above the MCL of 10 ng/L; and
- PFDA – 51 ng/L at DCB 62 above the RSL of 0.04 ng/L;

Maximum groundwater concentrations of PFNA slightly increased in 2024, while the PFOA, PFOS, PFHxS, and PFDA concentrations were slightly lower than previous results.

Soil sampling occurred in 2022 and 4Q2024 at the 411-1D/411-3D FFTA in the DAOU Bubble Tower subunit and at the 715-D Former Gas Station. PFAS soil concentrations at the FFTA point to it being a substantial source of PFAS contamination (see Figure 12); however, lower concentrations of PFAS are found near the 715-D Former Gas Station. Due to deep contamination in the groundwater around 715-D, such as that in well DCB 62, an upgradient source was suspected, which was further corroborated by firsthand accounts of prior D Area workers who stated that the concrete structure (402-D Tank Farm remnants) upgradient of the 715-D Former Gas Station was used for AFFF foam training. Three additional potential sources were identified as well: 1) The site of a previous phytoremediation study that used water sourced from a contaminated D Area groundwater well; 2) An area where a grass fire may have been extinguished

²The total chronic hazard attributed to exposure to multiple constituents through a single exposure pathway is known as the Hazard Index. A hazard index in excess of 1 indicates that exposure to receptors may not be protective.

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using AFFF; and 3) A stormwater discharge to the D-Area Effluent Discharge Canal tributary. A total of thirty 0-1 foot samples were collected at the suspected source areas in 2025 (Figure 24) to aid in identifying where to focus future source area characterization activities. Results from the 0-1 foot samples indicate that AFFF was likely applied to the concrete structure. The remaining potential source areas are also impacted, with many of the highest levels in the outfall area.

In 1Q2025, groundwater sampling and geologic characterization were conducted using ISOFlow and cone penetrometer testing (CPT) southwest of the FFTA and on the border of the hotspot area of the PFAS plume (Figure 13). Seven CPT borings were conducted (numbered DCPT-01 through DCPT-07) generally from northwest to southeast. The CPT logs provided a detailed geologic description of the subsurface before conducting the ISOFlow groundwater sampling. At each of the DISO ISOFlow locations, five sampling intervals were estimated using the CPT logs, and the final selected sample intervals were determined by the lithology seen during drilling. The concentrations were highest at DISO-1 and decreased moving toward DISO-7. Maximum concentrations for PFOA (80.2 ng/L), PFOS (440 ng/L), PFNA (1,670 ng/L), PFHxS (150 ng/L), and PFBS (15.9 ng/L) were observed at DISO-1. The highest PFAS concentration varied in depth from roughly 6.1-15.2 m (20-50 ft) bgs at northwestern locations, to 12.2-19.8 m (40-65 ft) bgs at locations further southwest (Figure 14).

Based on these results, and the trend data from monitoring wells, SRS recommends implementing a removal action to address the higher concentration portion of the PFAS plume. A Rev 0 RSER/EE/CA will be submitted that includes three alternatives to limit downgradient migration of PFAS from the high concentration portion of the groundwater plume: 1) No Action; 2a) In-situ Permeable Adsorptive Barrier (PAB) (Colloidal Activated Carbon [CAC] Injections); 2b) In-situ PAB (Granulated Activated Carbon [GAC] Trench); and 3) Pump and Treat. A draft comparative analysis of the removal action alternatives is summarized in Table 3.

Surface water and sediment downgradient of the source areas also contain PFAS constituents. In 2022, the D006 ditch, the D-Area Effluent Discharge Canal, and the Beaver Dam Creek contained detectable concentrations of PFAS constituents; The D006 ditch had the highest concentrations with a maximum of 126 ng/L PFNA. In 2022, PFNA, PFHxS, PFOS, and PFOA were detected above their current MCLs. In 2024, the same PFAS constituents were detected above MCLs in surface water. The D006 ditch still contained the highest concentrations with 4Q2024 results showing a maximum surface water PFNA concentration of 44 ng/L at station DSWM-1A. Locations upgradient in D-Area or further upgradient towards the D-Area Oil and Seepage Basin were non-detect for PFAS constituents in groundwater and surface water. Sediment concentrations are far below USEPA RSL soil limits. The maximum sediment PFNA concentration was 13.5 ng/g at station DSWM-4.

Surface water samples collected in the wetland during 4Q2024 (DSWM-Wet-01, DSWM-Wet-02, and DSWM-Wet-03) show that contaminated groundwater is potentially discharging into the wetland (Figure 25). Concentrations exceeded MCLs for both PFOA and PFOS at each of these three locations. Samples collected from the Savannah River adjacent to the upgradient end of the SRS property

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(RM 116) and downgradient of any D-Area discharge (including the most downgradient location SR-DownBDCMouth) show little variability in PFAS concentrations, suggesting that the D-Area PFAS groundwater contamination is not significantly contributing to the Savannah River PFAS contamination from the SRS (Figure 26). The source of elevated concentrations of PFOS and PFOA in the BDC-Mouth station is unclear but may be attributed to desorption of PFAS from sediments previously contaminated by releases down Beaver Dam Creek.

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D-Area Groundwater Operable Unit			
Problem(s) Warranting Action	Remedial Action Objectives	Scope of Problem(s)	Likely Response Actions
<ul style="list-style-type: none"> • Groundwater contains levels of TCE above the 5 µg/L MCL. • Groundwater contains levels of metals (aluminum, antimony, arsenic, beryllium, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, nickel, selenium, and thallium) that exceed their respective MCLs or RSLs. • Surface water contains levels of metals (aluminum, beryllium, cobalt, iron, and manganese) that exceed their respective MCLs or RSLs. • Groundwater contains levels of tritium above the 20 pCi/mL MCL. • Groundwater and surface water contains levels of PFAS constituents above the current USEPA MCLs and/or RSLs. • Vadose Zone soils contain PFAS concentrations that exceed EPA SSLs for contaminant migration to the groundwater. 	<ul style="list-style-type: none"> • Prevent human exposure to groundwater contaminated with TCE, metals, tritium, and PFAS constituents above their respective MCLs or RSLs. • Reduce the concentrations of TCE, metals, tritium, and PFAS constituents to below MCLs or RSLs and attenuate the contaminant plumes to the extent practicable. • Limit outcropping of contaminated groundwater above MCLs or RSLs to surface water. • Prevent PFAS soil contamination from leaching into the groundwater at levels above their respective MCLs or RSLs. 	<ul style="list-style-type: none"> • The TCE plume occupies an area of about 152.6 hectares (377 acres) within the UTRA and GA. • The commingled metals plumes (aluminum, antimony, arsenic, beryllium, cadmium, chromium, cobalt, iron, lead, manganese, mercury, nickel, selenium, and thallium) occupy an area of about 91.1 hectares (225 acres) within the UTRA. • The tritium plume occupies an area of about 31.8 hectares (78.7 acres) within the UTRA. • The PFAS plume occupies an area of about 111.2 hectares (607 acres) within the UTRA. • PFAS vadose zone soil contamination areas are at least 10,000 square meters (2.5 acres) and about 3.05 meters deep, but the areal extent is not fully known. 	<p><u>Comprehensive Response</u></p> <ul style="list-style-type: none"> • No Action; • Monitored Natural Attenuation with LUCs (TCE and tritium); • Groundwater Monitoring and LUCs (Metals). <p><u>Contaminant Specific Response³</u></p> <ul style="list-style-type: none"> • Targeted bioremediation (VOCs only); • pH Adjustment (Metals only); • Phytoremediation (Tritium only); • PFAS pump and treat reduction by carbon treatment, or exchange resin capsulation; Activated Carbon PRB; or other emerging remediation technologies; • Low permeability cap for PFAS vadose zone soils; • Excavation and disposal or thermal treatment of PFAS vadose zone soils.

³ A combination of contaminant specific responses and/or MNA with LUCs would be required to address all problems warranting action. Because contaminants will be left in place, LUCs will be a component of the final remedial action.

Uncertainties

- It is uncertain about the extent of the VOC plume vertically in the Gordon Aquifer, and laterally in the UTRA. This uncertainty impacts the scope of the problem, and this uncertainty will be managed by using groundwater modeling to extend the plume vertically and laterally.
- The effectiveness of the ongoing treatability study (i.e., displacement of low-pH groundwater in the UTRA by injection of potable water) and the 484-17D DCSA NTCR action (i.e., reduction of acidic leachate) in improving groundwater conditions is unknown at this early stage of implementation. These uncertainties may impact the final remedial selection and will be managed by considering the results of the treatability study and NTCR action in the CMS/FS.
- It is unknown how the Savannah River PFAS contamination, D Area groundwater contamination, and Savannah River Floodplain soil and vegetation PFAS contamination cycle within the Savannah River Floodplain IOU. These uncertainties will be managed by expanding the Savannah River Floodplain IOU characterization effort to determine PFAS sources and cycling in these wetlands.
- It is unknown the extent of PFAS contamination in the vadose zone soils and the extent of the contaminant migration risk to groundwater. These uncertainties will be managed by submitting a revised Work Plan Addendum for characterization of the new suspected PFAS source areas.

4.0 OPERABLE UNIT STRATEGY

The Rev 0 RFI/RI/BRA for the DAG OU is currently scheduled for submittal on December 10, 2026. Due primarily to ongoing uncertainties associated with the PFAS sources and also ongoing operation and evaluation of the effectiveness of the DAG OU treatability study, the project team recommends deferring the submittal of the Rev 0 RFI/RI/BRA until additional characterization for the extent of PFAS contamination in the vadose zone can be completed. This characterization scope will be documented in a revised Second Work Plan Addendum, to be submitted in fiscal year 2026. The project team also recommends a Rev 0 RSER/EE/CA submittal in the first half of fiscal year 2026 focusing on the high concentration portion of the PFAS plume. This will lead to a removal action being executed in fiscal year 2027. Further discussion of the administrative path for PFAS surface soil contamination is needed. SRS recommends that PFAS contamination in the wetland and Beaver Dam Creek surface water be further evaluated as part of the SRFPS IOU.

The Core Team agreed at the November 13, 2025 scoping meeting to the following:

- Development of an RSER/EE/CA in fiscal year 26 to conduct a non-time critical removal action to address the higher concentration portion of the PFAS groundwater plume in the UTRA.
- Development of a Second Work Plan Addendum to conduct additional PFAS soil and groundwater sampling at additional potential source areas and add the additional PFAS groundwater sampling to the DAG OU network.
- Deferment of the submittal of the RFI/RI/BRA from December 2026 to December 2029.

A record of these key agreements is documented in Table 1.

SRNS will submit a formal request and revised implementation schedule (similar to Figure 32) to EPA and SCDES for approval to extend the DAG OU schedule as agreed to by the Core Team at the November 13, 2025 scoping meeting.

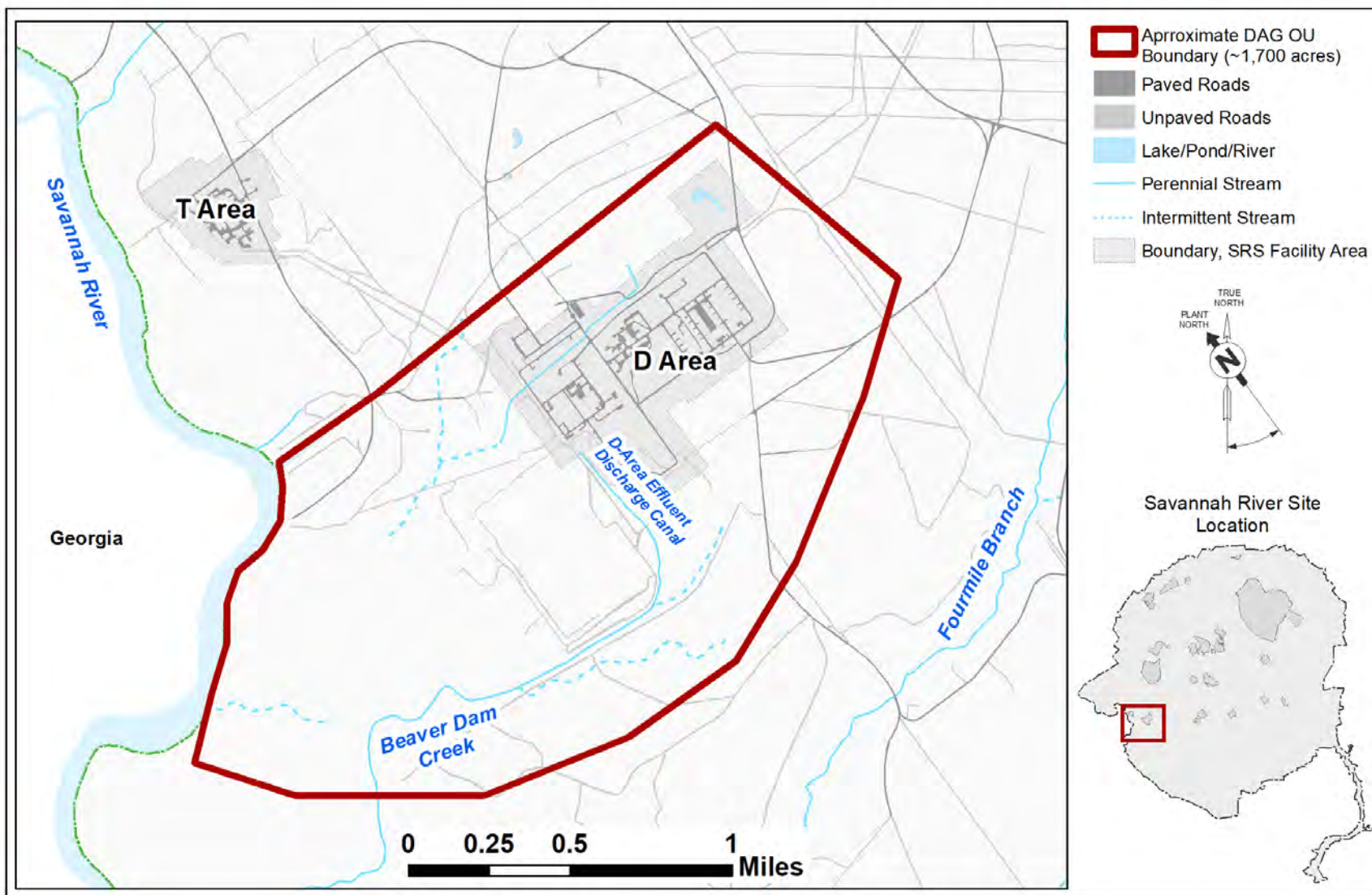


Figure 1. DAG OU Location

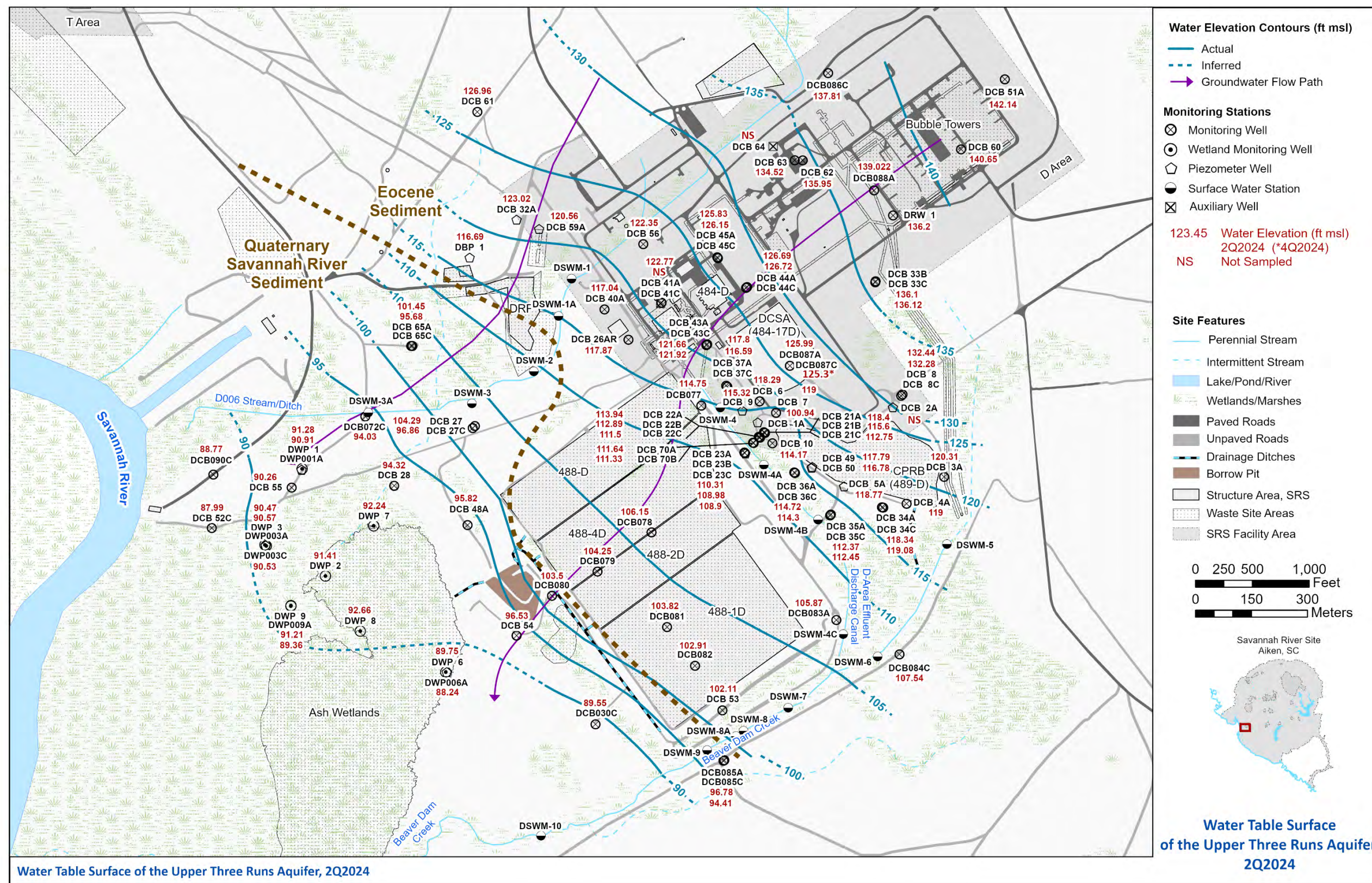


Figure 2. DAG OU Upper Three Runs Aquifer Stations and Groundwater Flow Direction (2Q2024)

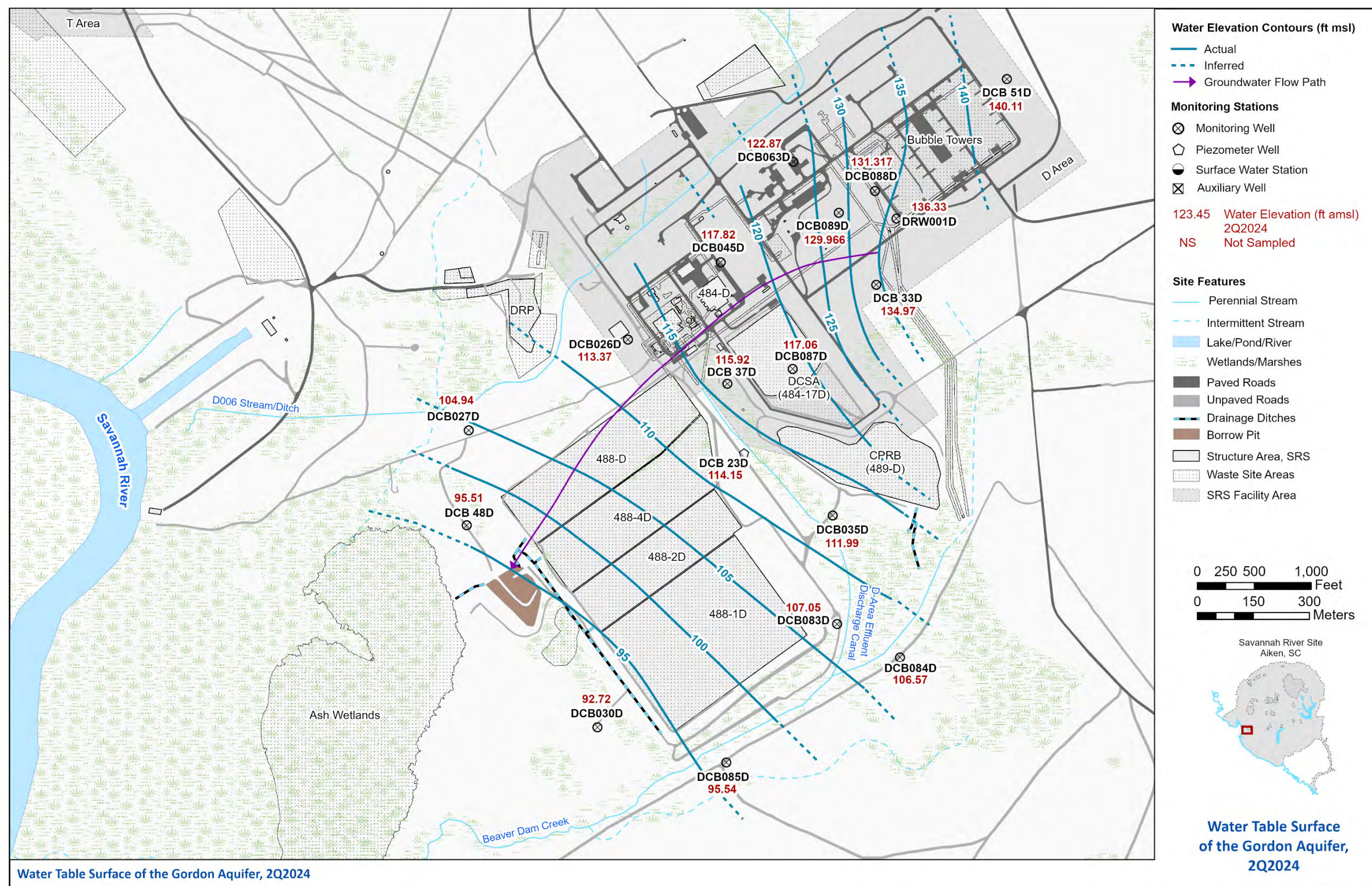


Figure 3. DAG OU Gordon Aquifer Stations and Groundwater Flow Direction (2Q2024)

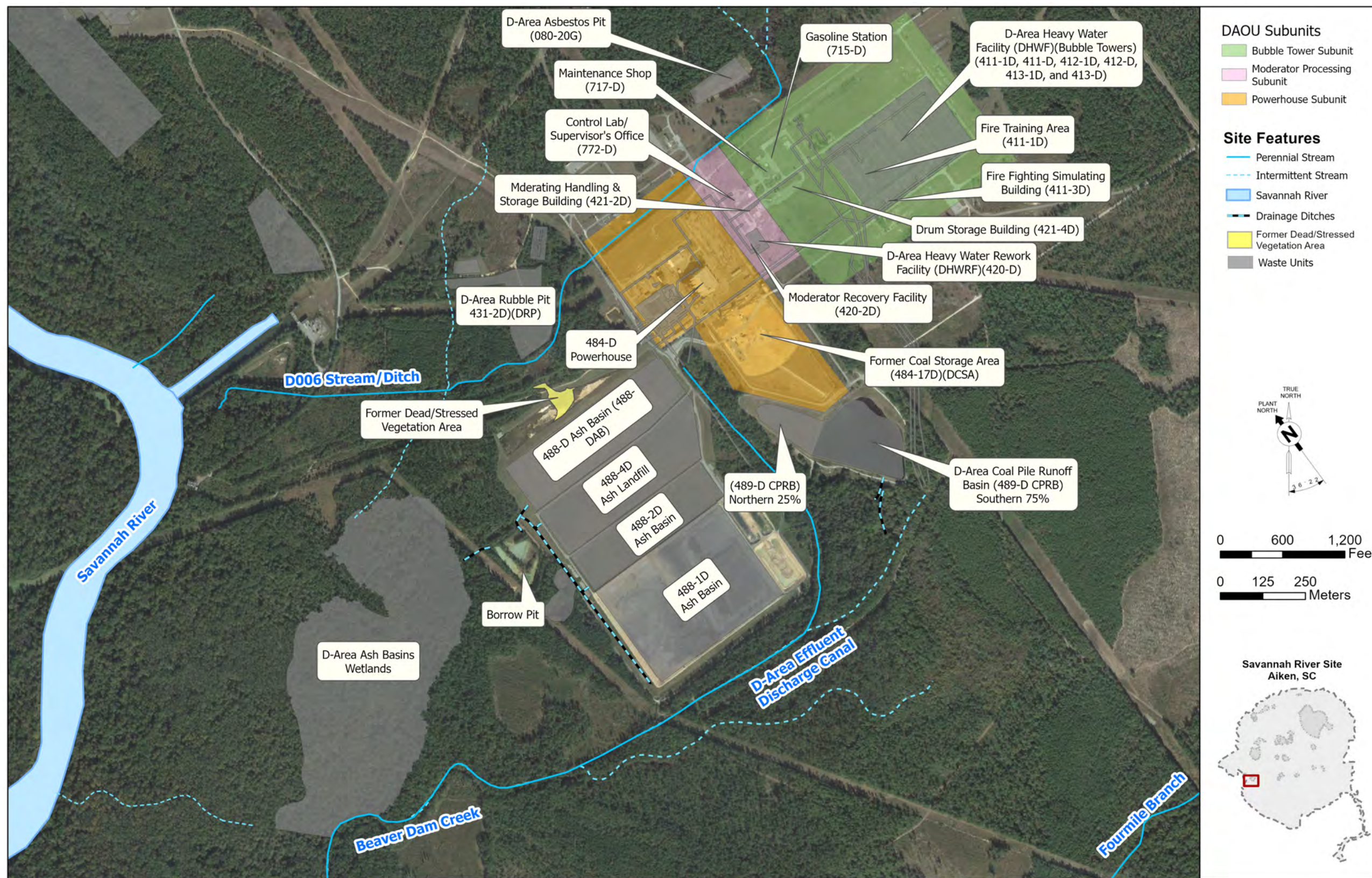


Figure 4. DAOU Subunits and Facilities

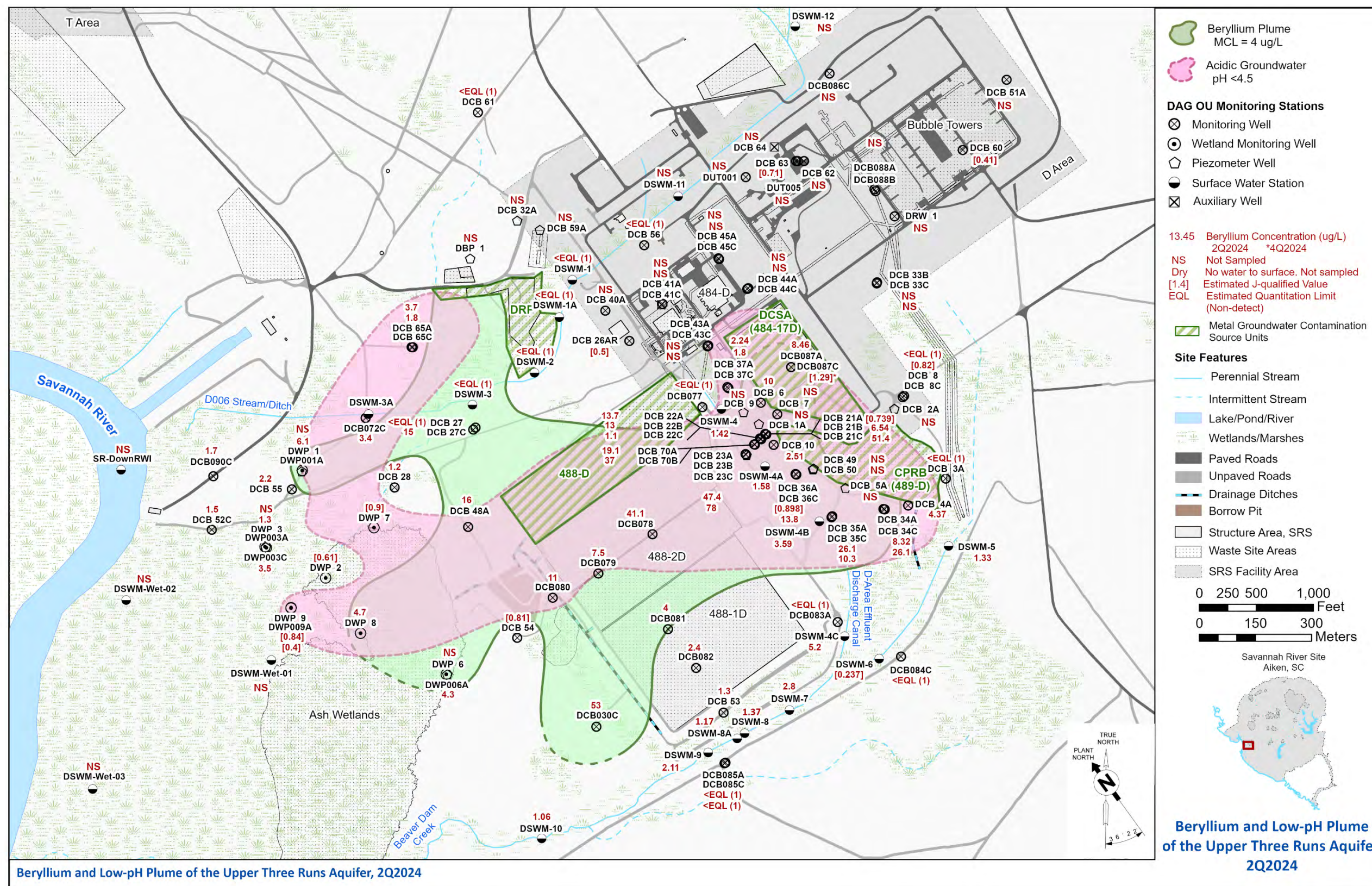


Figure 5. DAG OU Low-pH and Beryllium Plume (2Q2024)

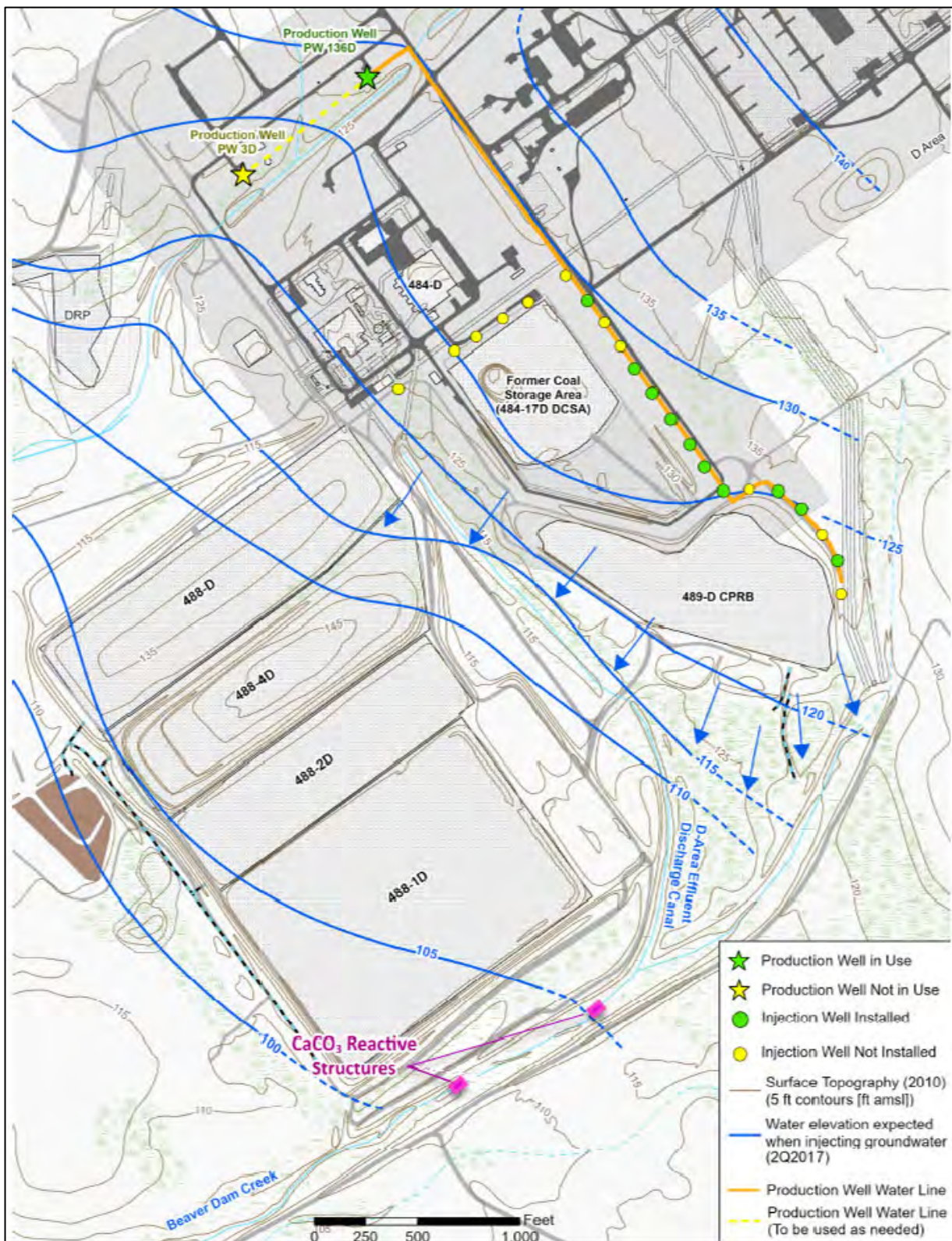


Figure 6. DAG OU Treatability Study and CaCO₃ Reactive Structures

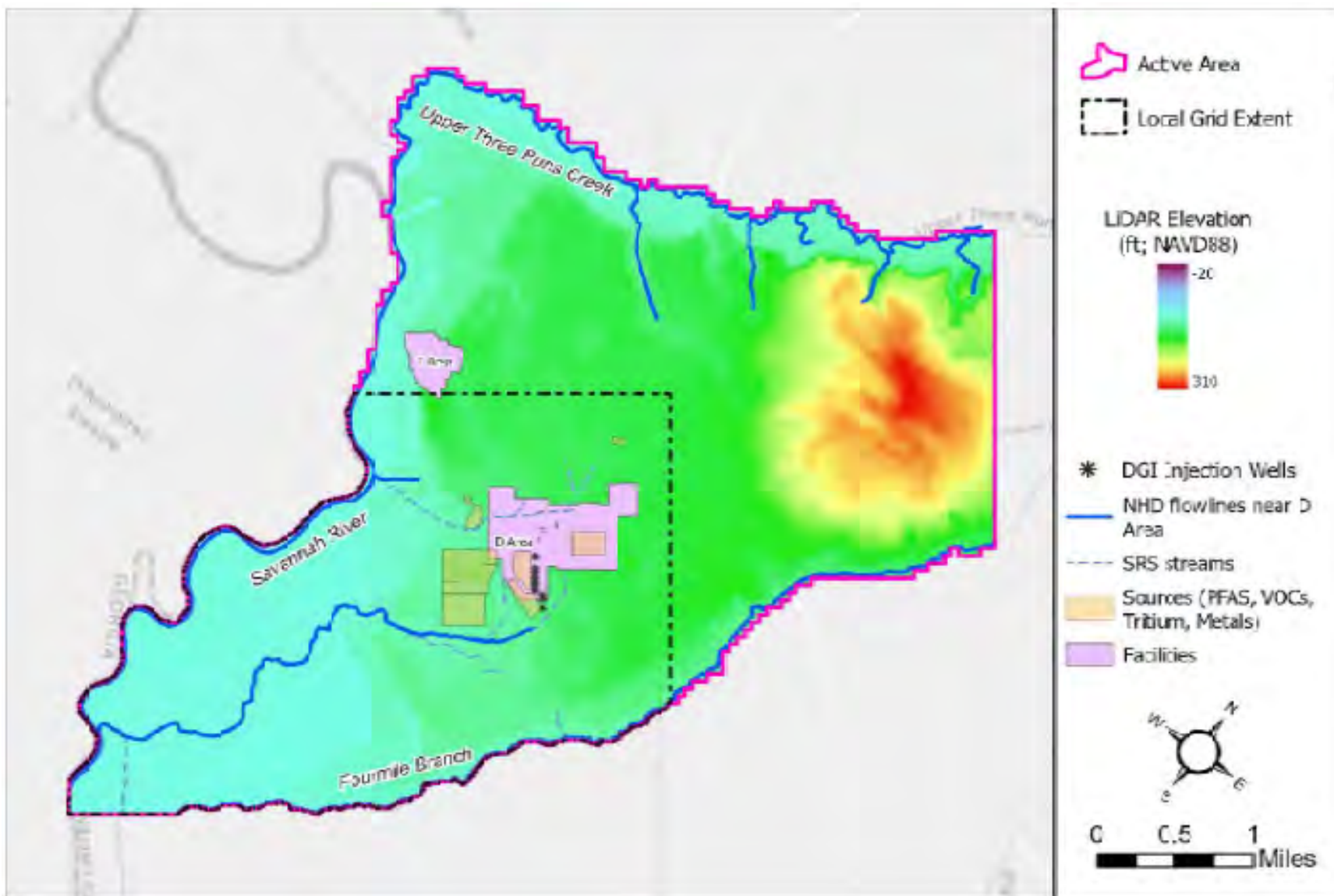


Figure 7. Study Area for the updated groundwater model for DAG OU

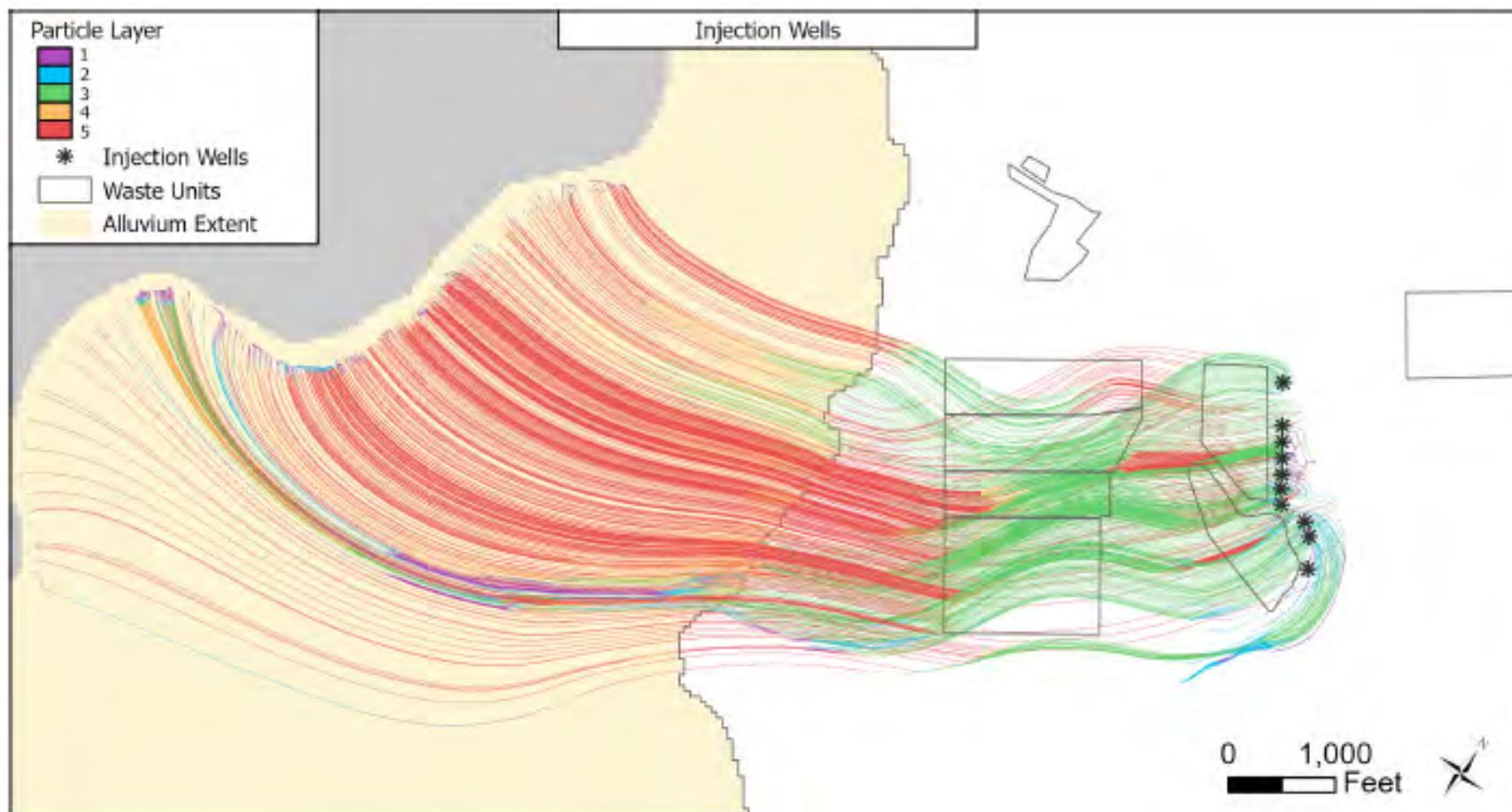


Figure 8. Particle Paths for Particles Originating near the Ten Injection Wells Categorized by Model Layer

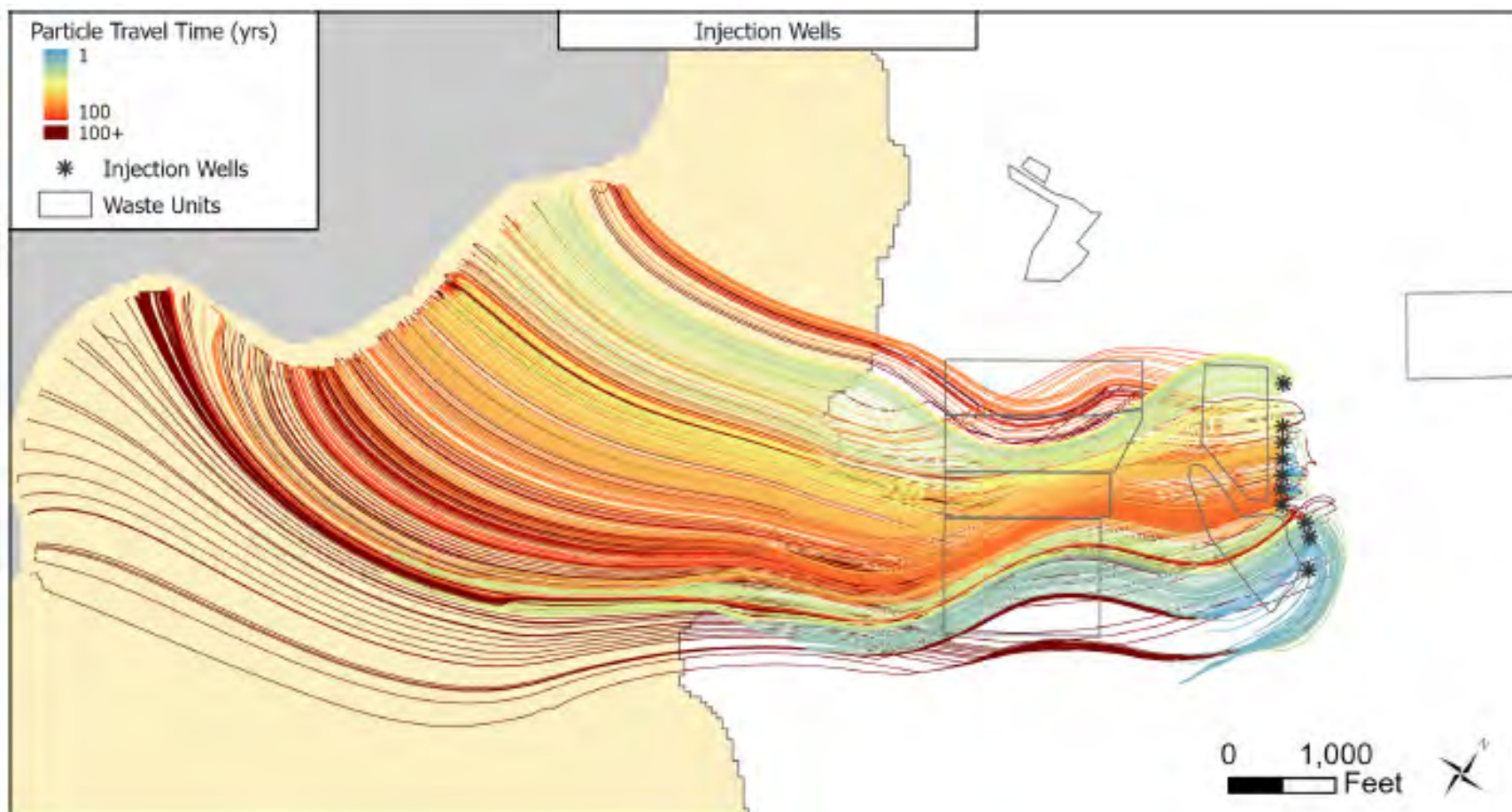


Figure 9. Particle Paths for Particles Originating near the Ten Injection Wells, Categorized by Travel Time

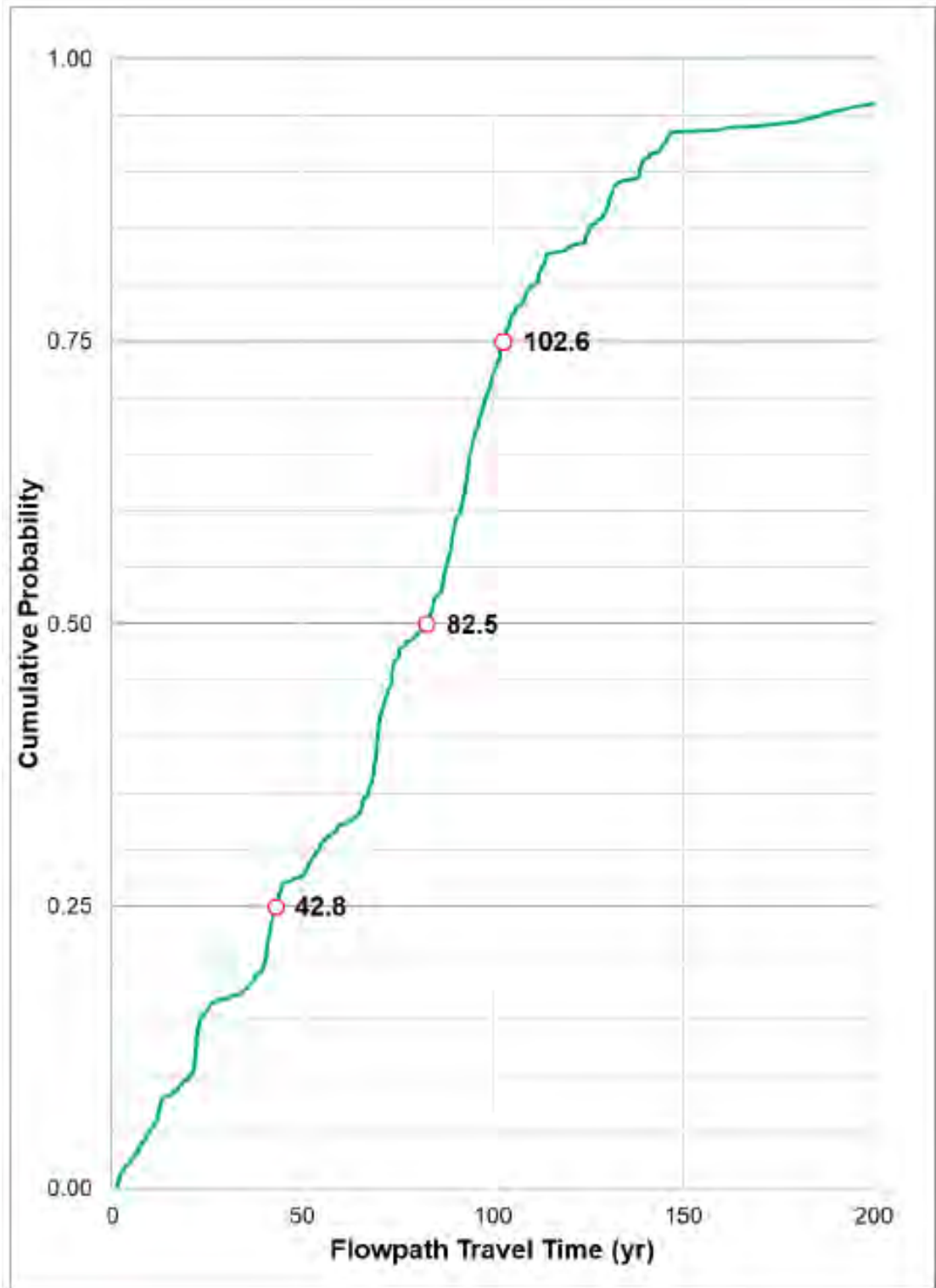
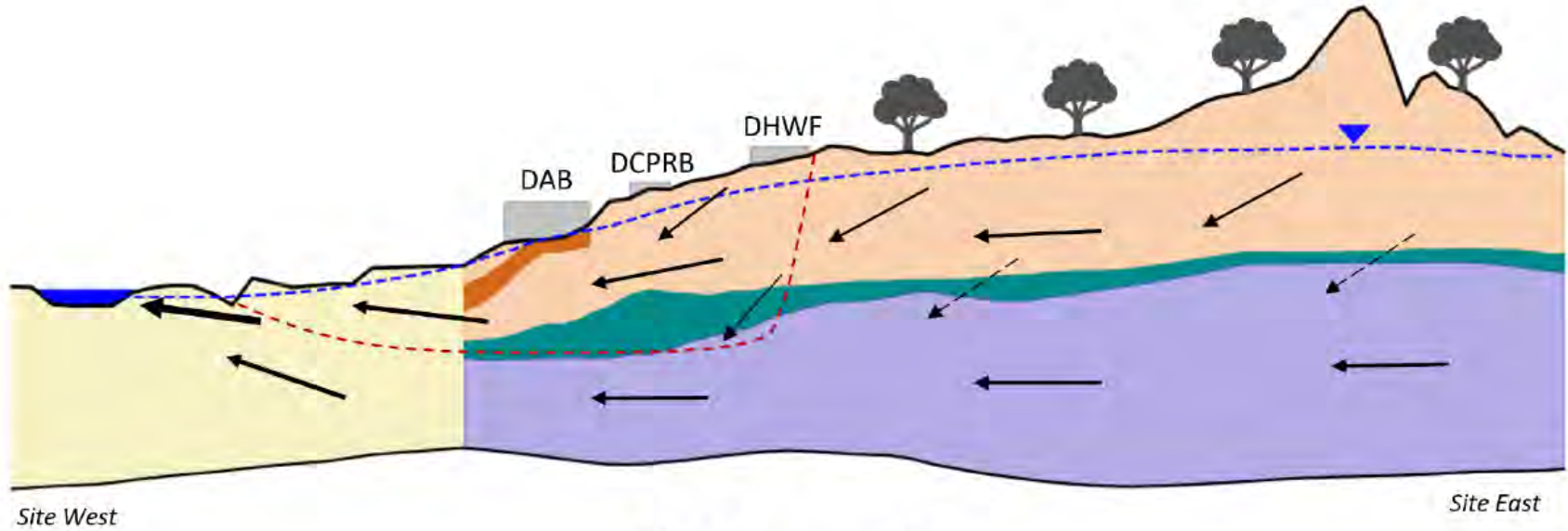


Figure 10. Cumulative Distribution Function of Groundwater Travel Time for the Injected Water



Not to scale

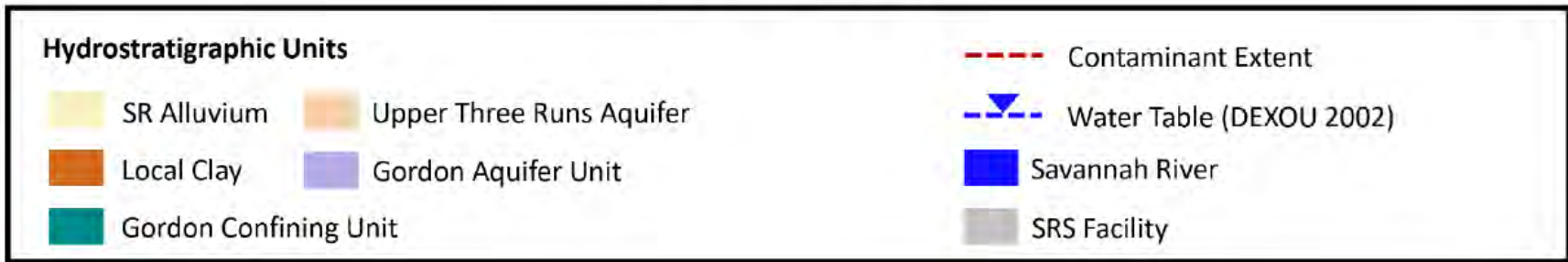


Figure 11. DAG OU Conceptual Site Model

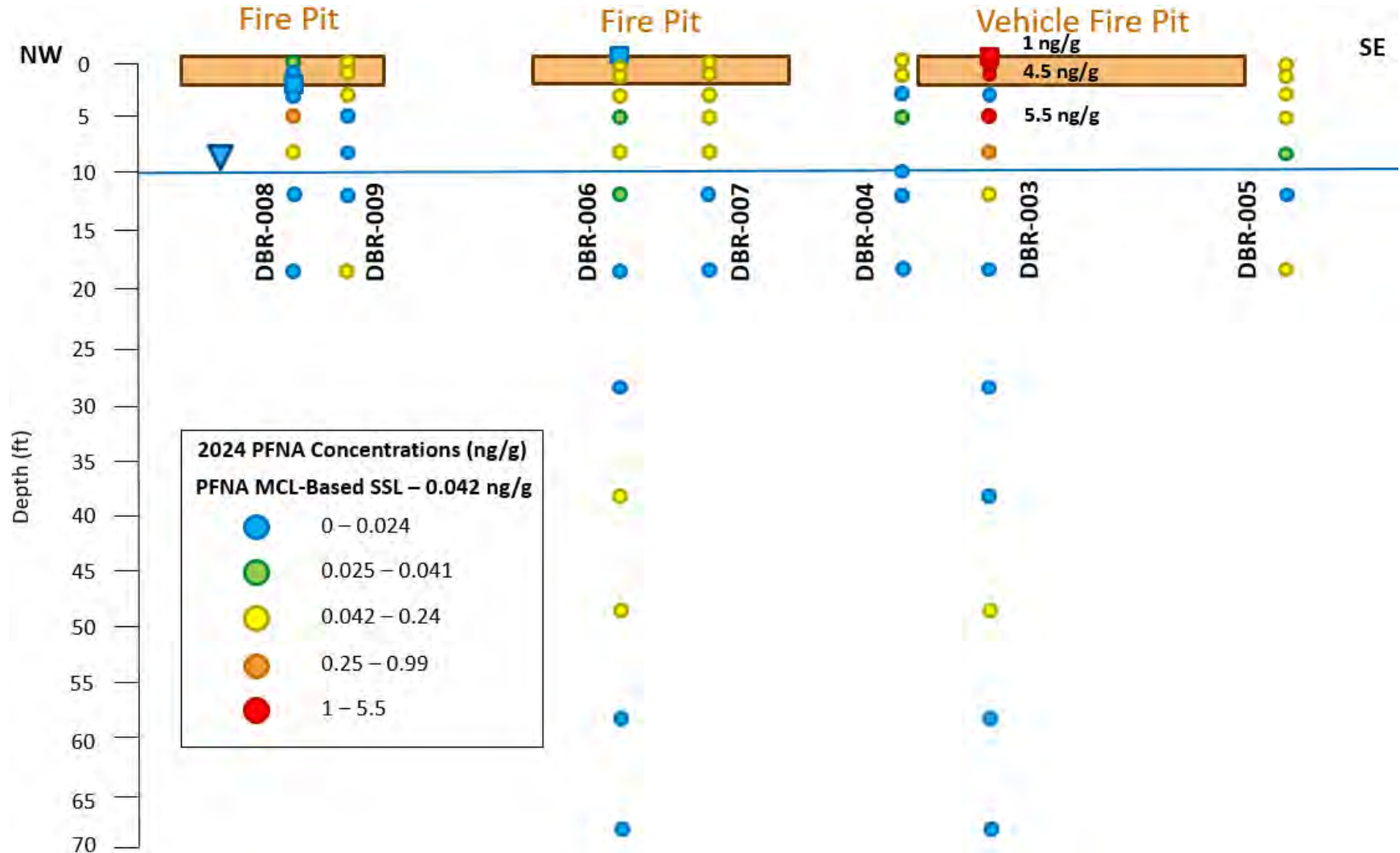


Figure 12. Cross Section of PFNA Concentrations at the FFTA

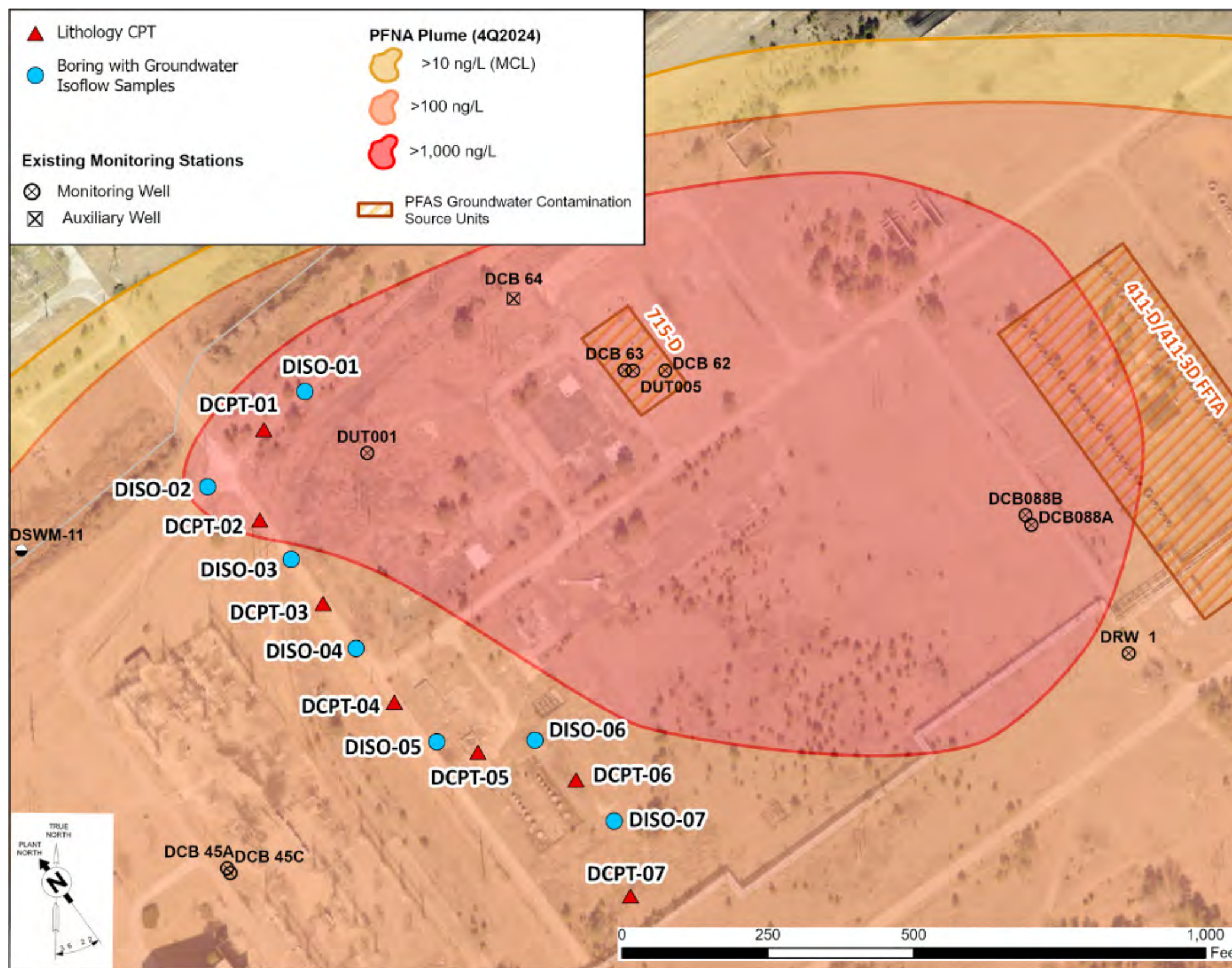


Figure 13. Investigative Sampling Locations

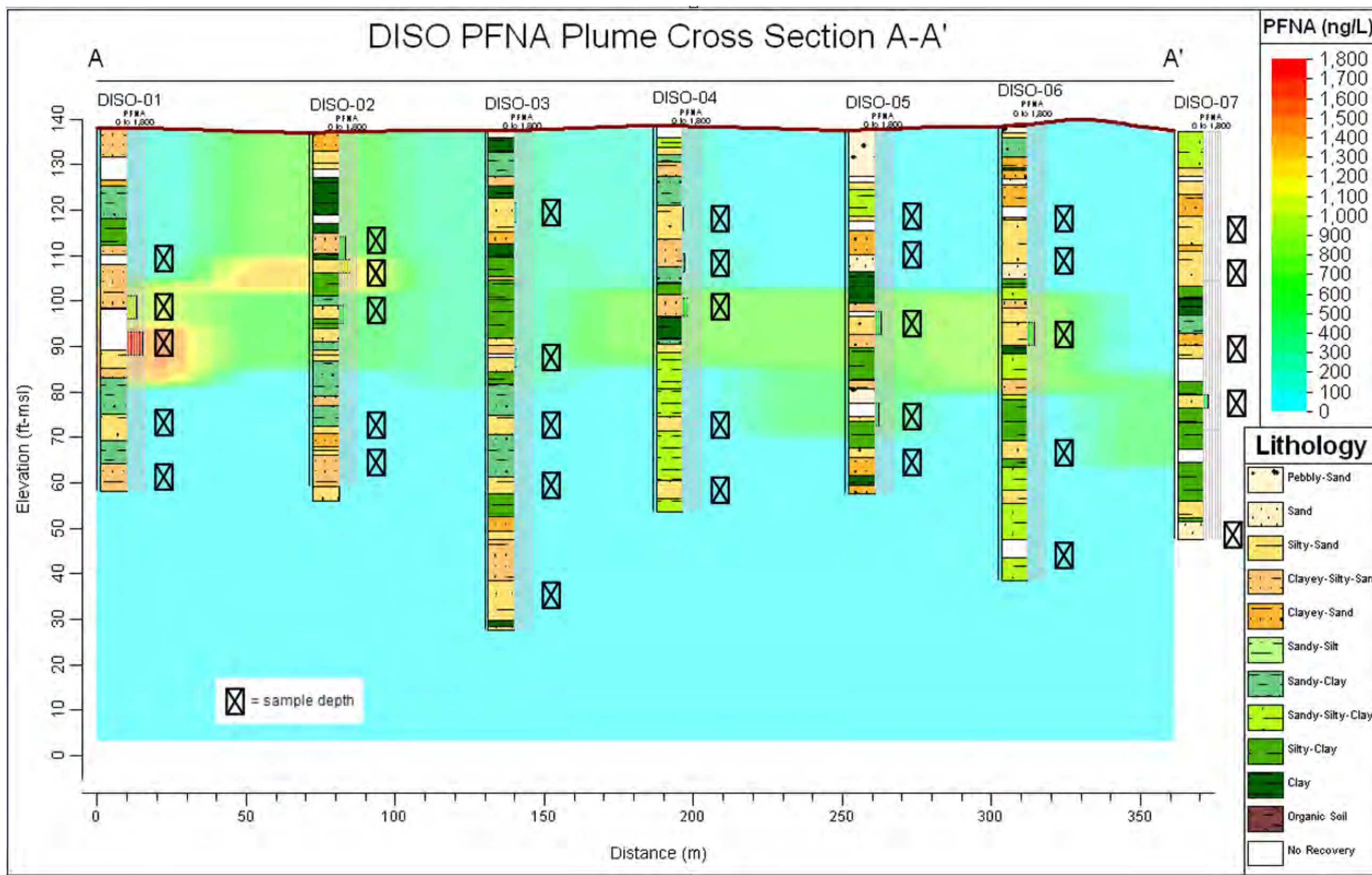


Figure 14. Investigative Sampling PFNA Plume and Lithology Cross Section

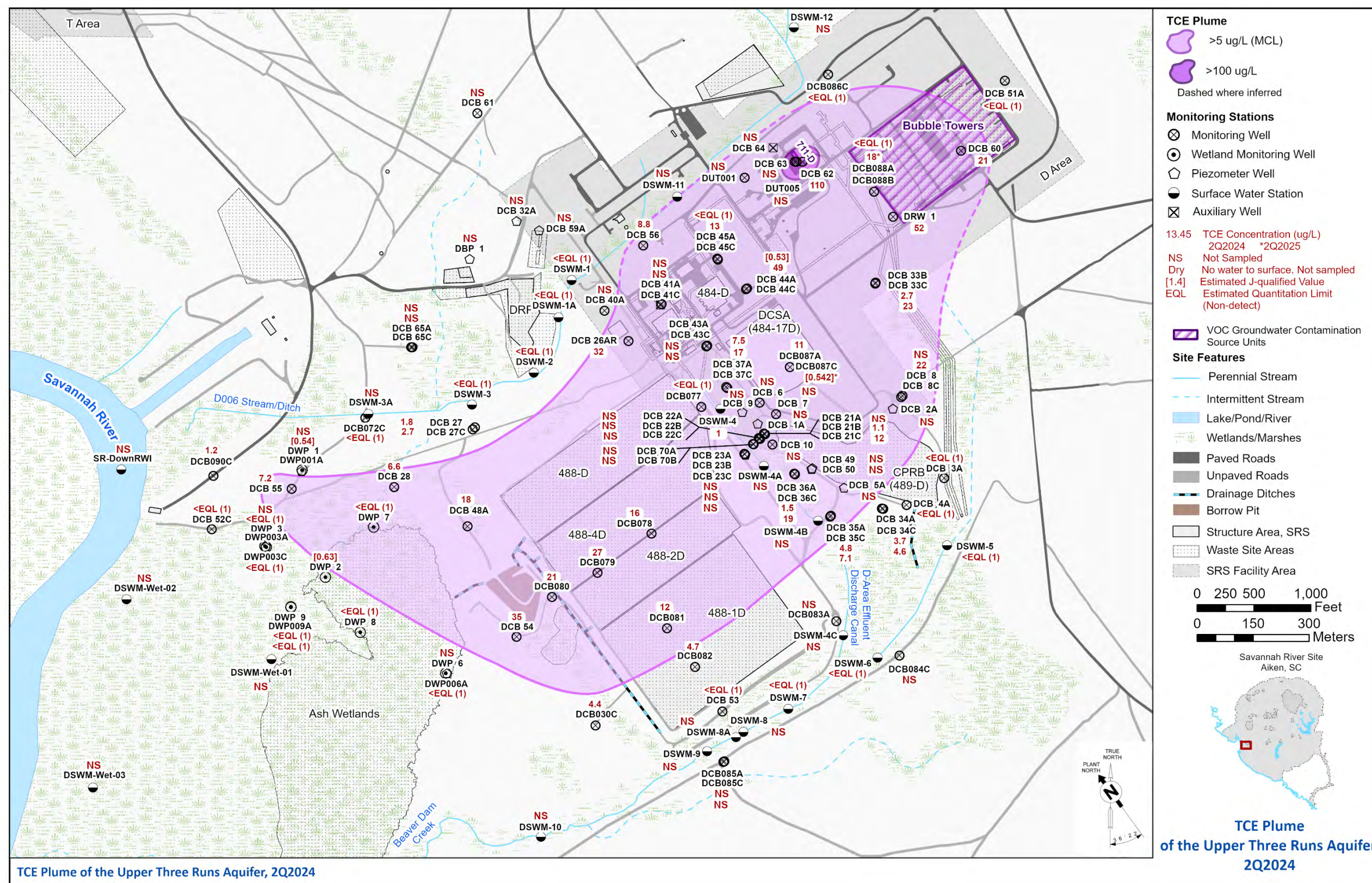


Figure 15. DAG OU Upper Three Runs Aquifer TCE Plume (2Q2024)

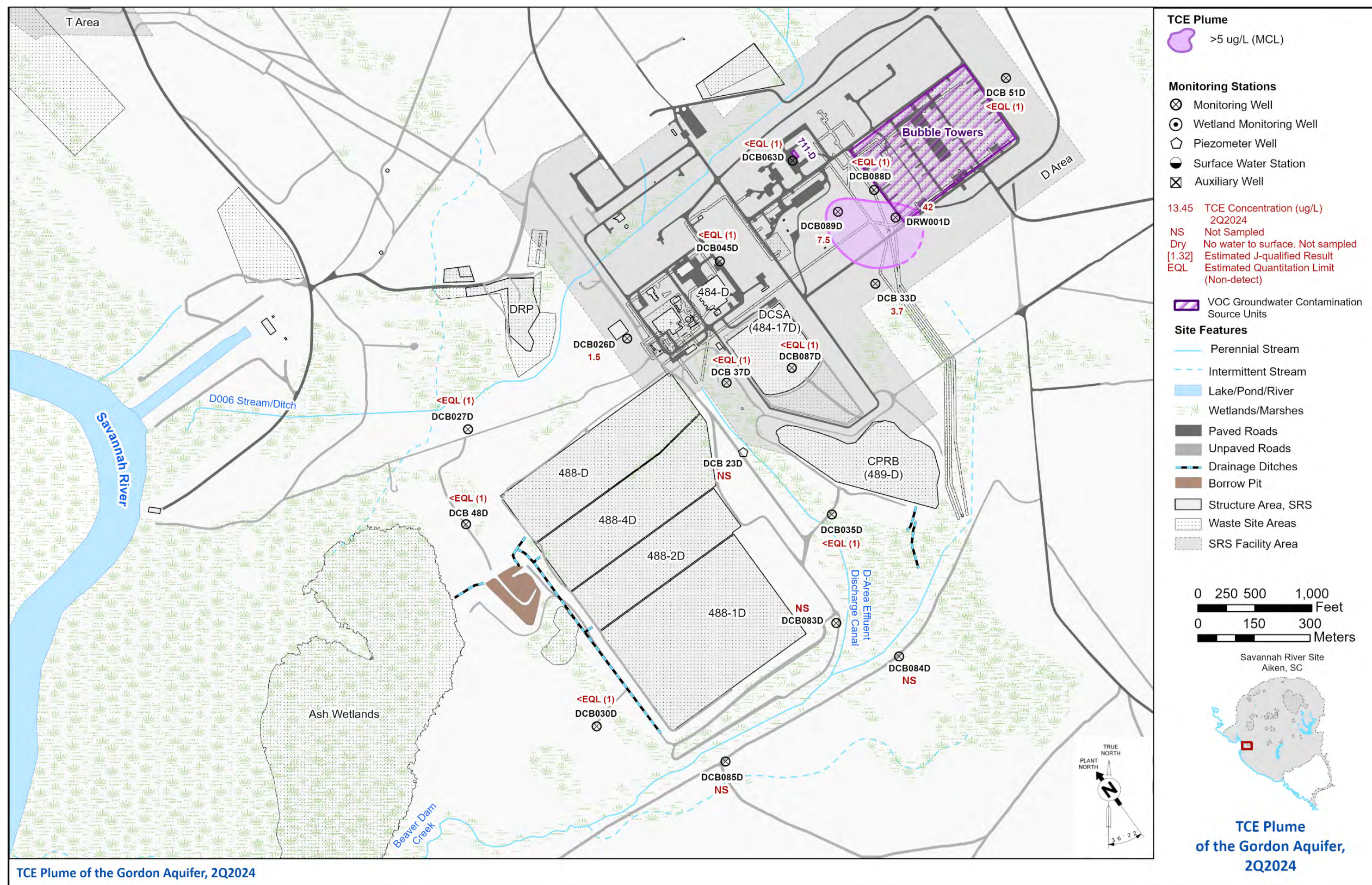


Figure 16. DAG OU Gordon Aquifer TCE Plume (2Q2024)

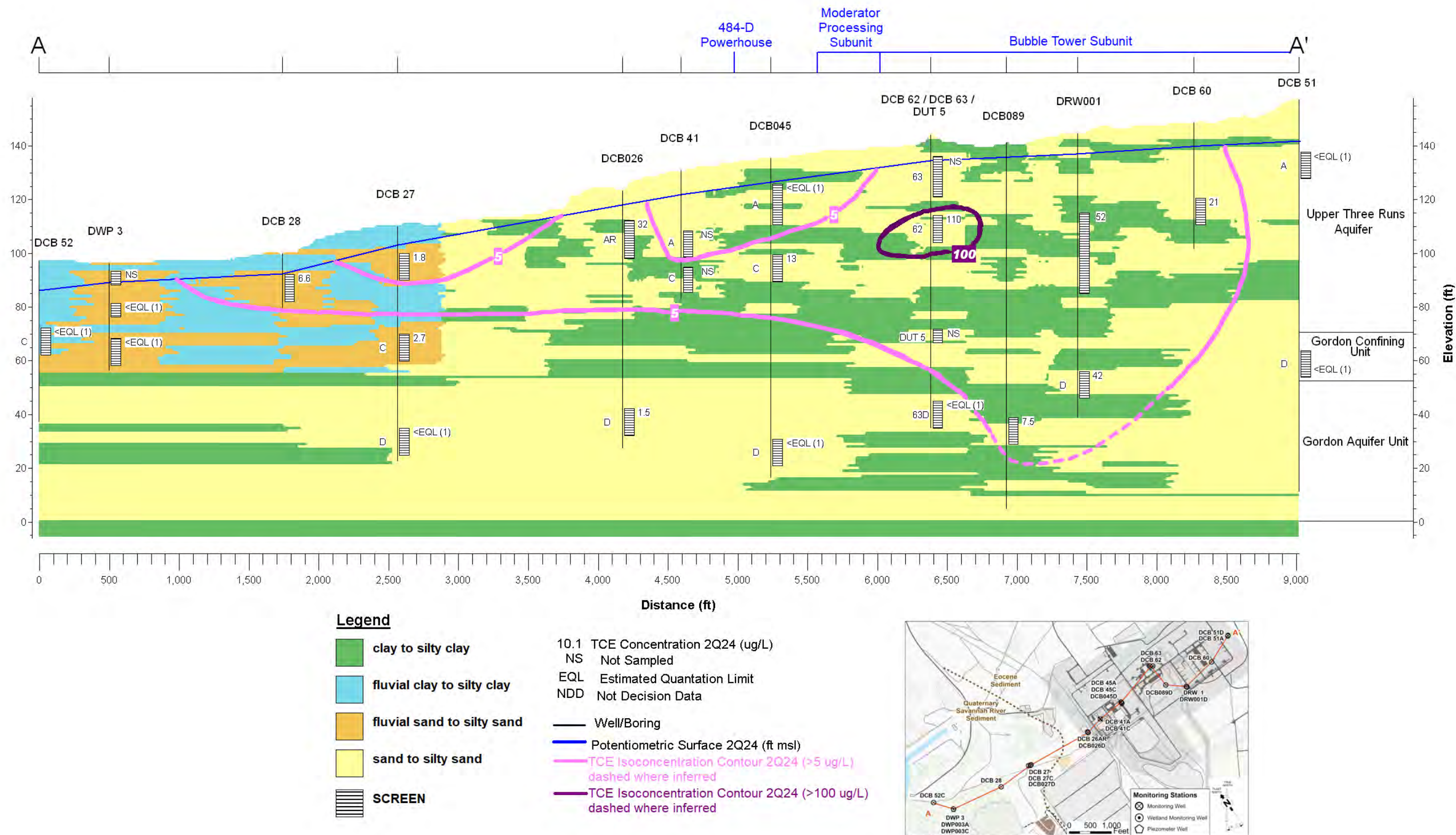


Figure 17. Cross-Section A-A' of the DAG OU TCE Plume (2Q2024)



Figure 19. DAG OU Gordon Aquifer Beryllium Plume (2Q2024)

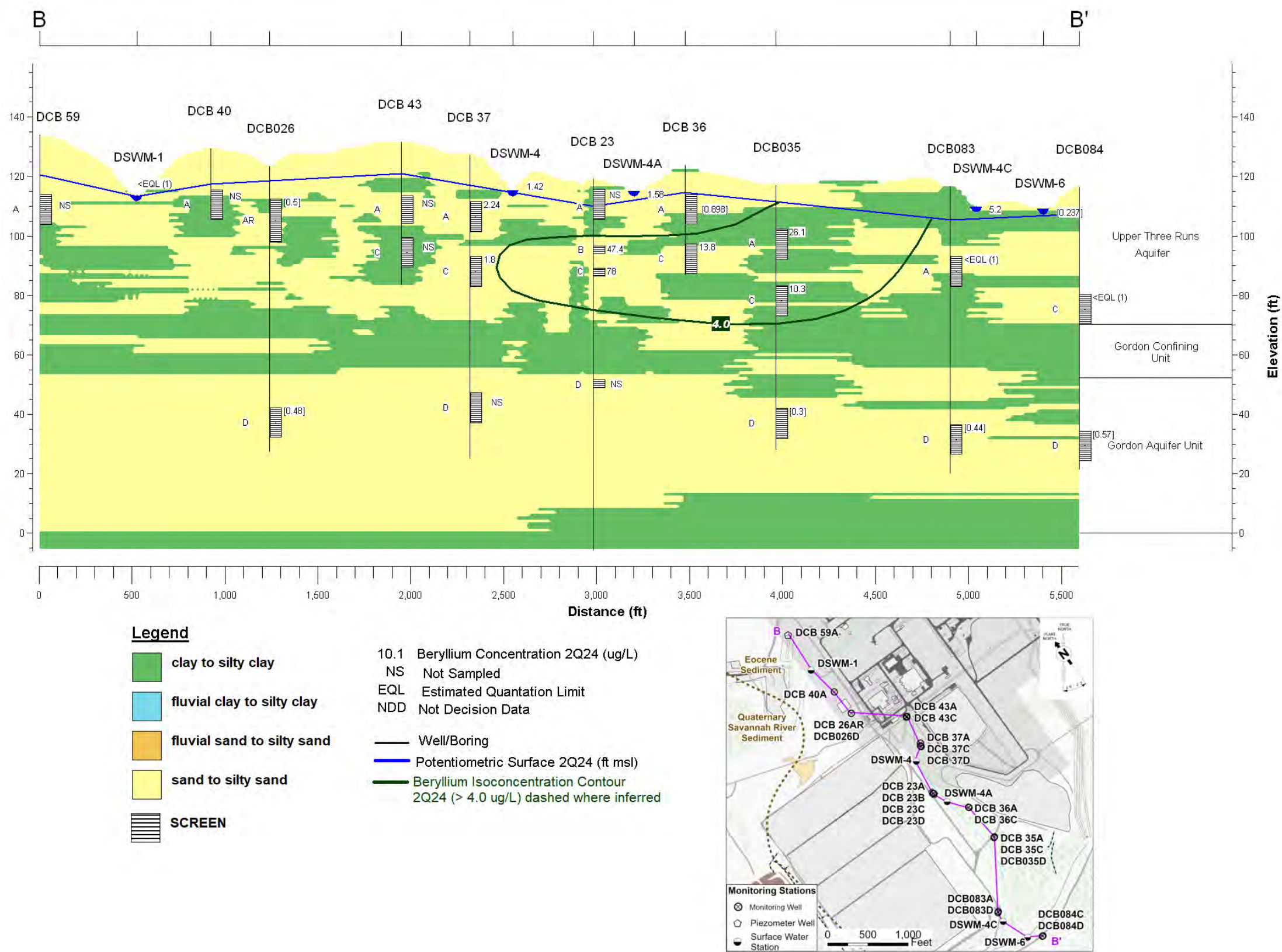


Figure 20. Cross-Section B-B' of the DAG OU Beryllium Plume (2Q2024)

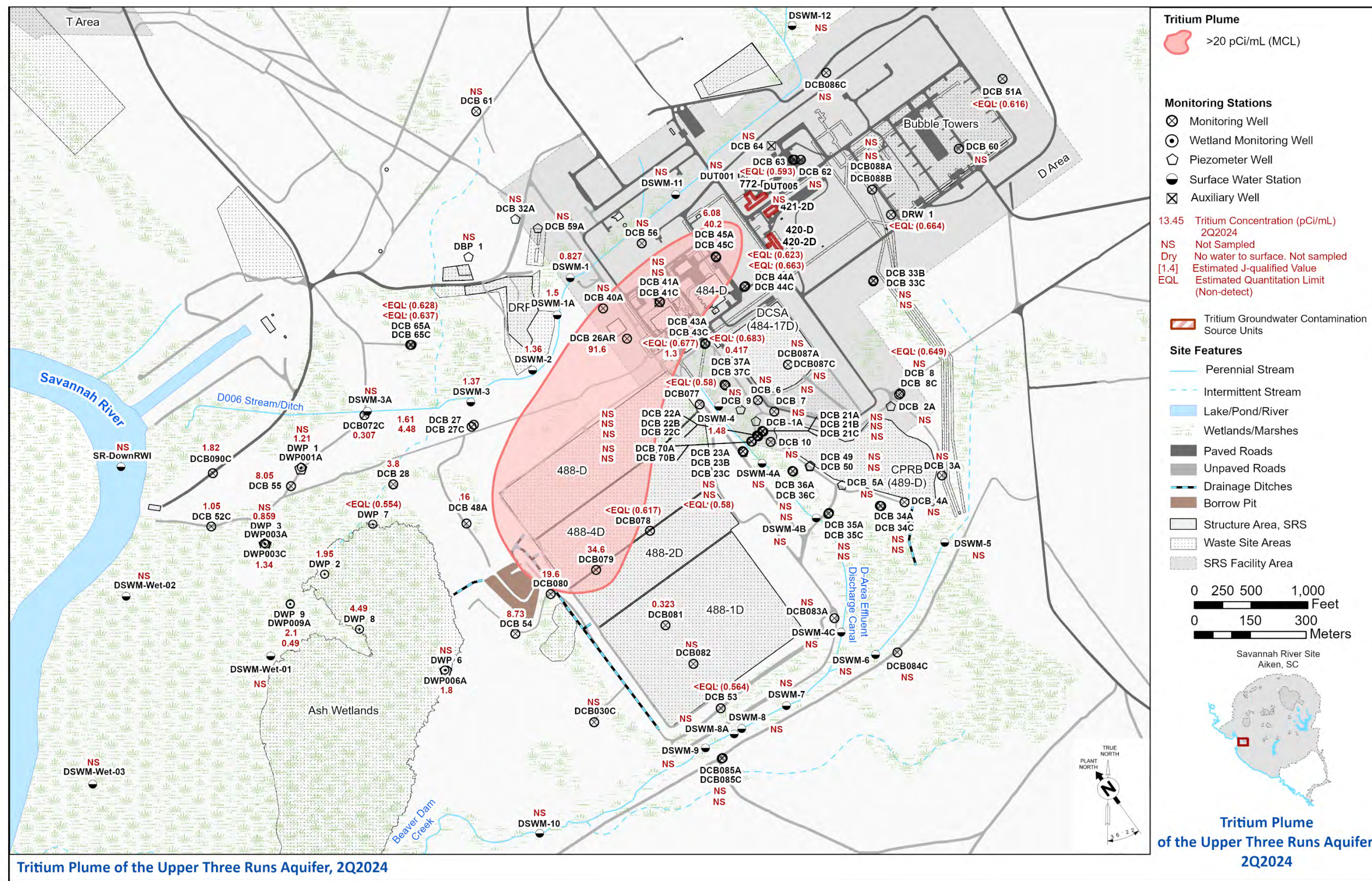


Figure 21. DAG OU Upper Three Runs Aquifer Tritium Plume (2Q2024)

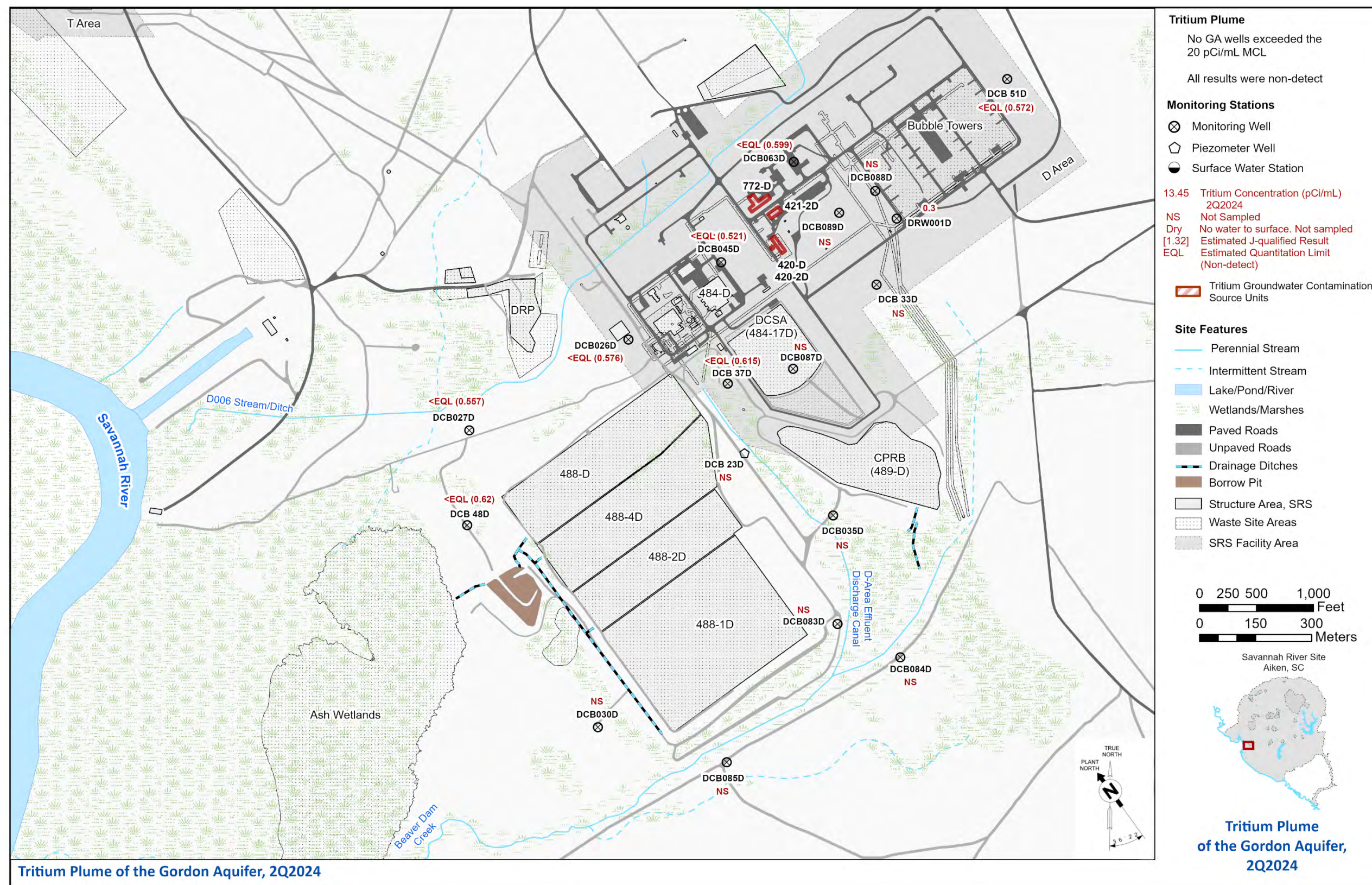


Figure 22. DAG OU Gordon Aquifer Tritium Plume (2Q2024)

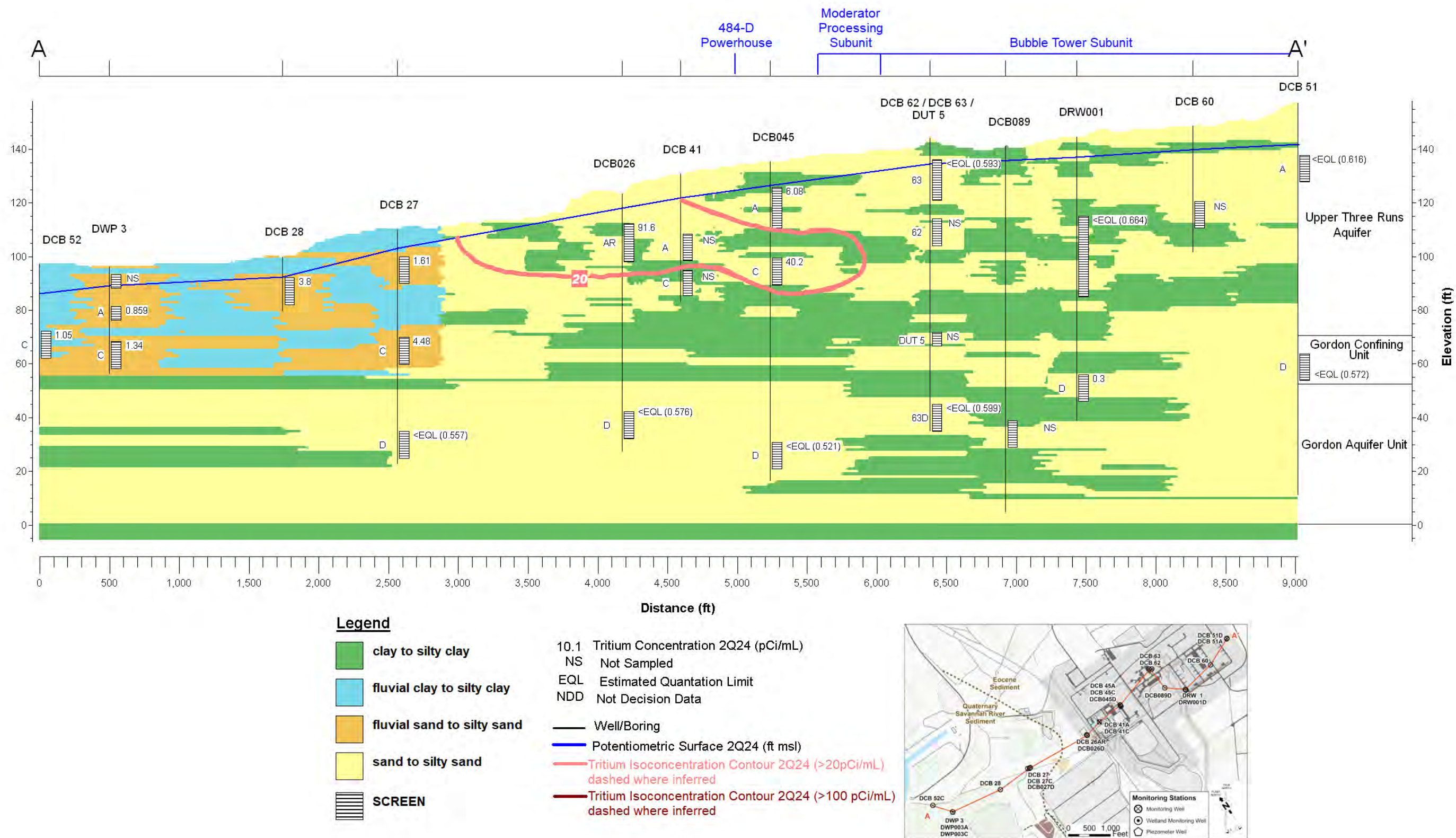


Figure 23. Cross-Section A-A' of the DAG OU Tritium Plume (2Q2024)

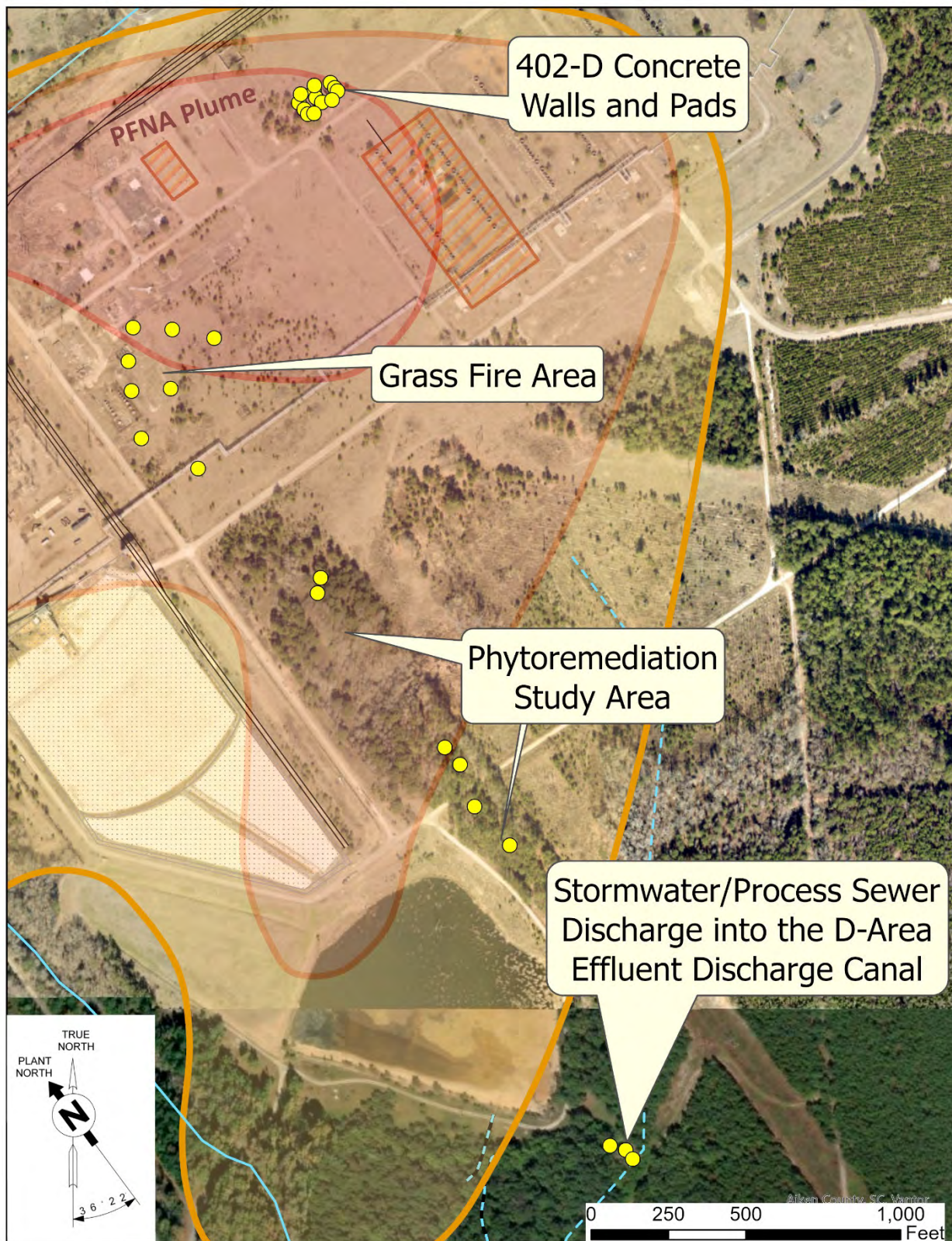


Figure 24. Additional D-Area Potential PFAS Source Area

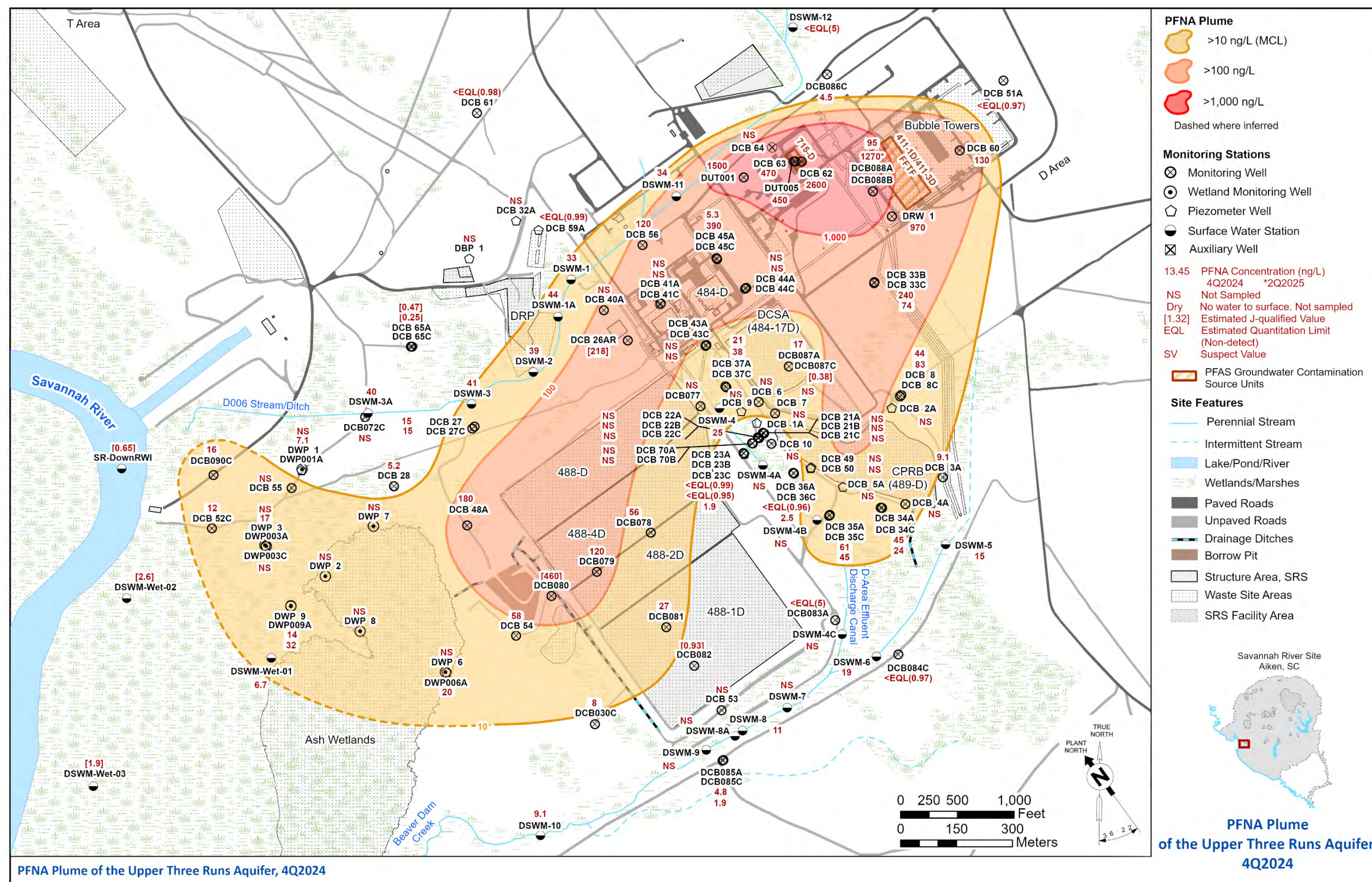


Figure 25. DAG OU PFAS Sources and Upper Three Runs Aquifer PFNA Plume (4Q2024)

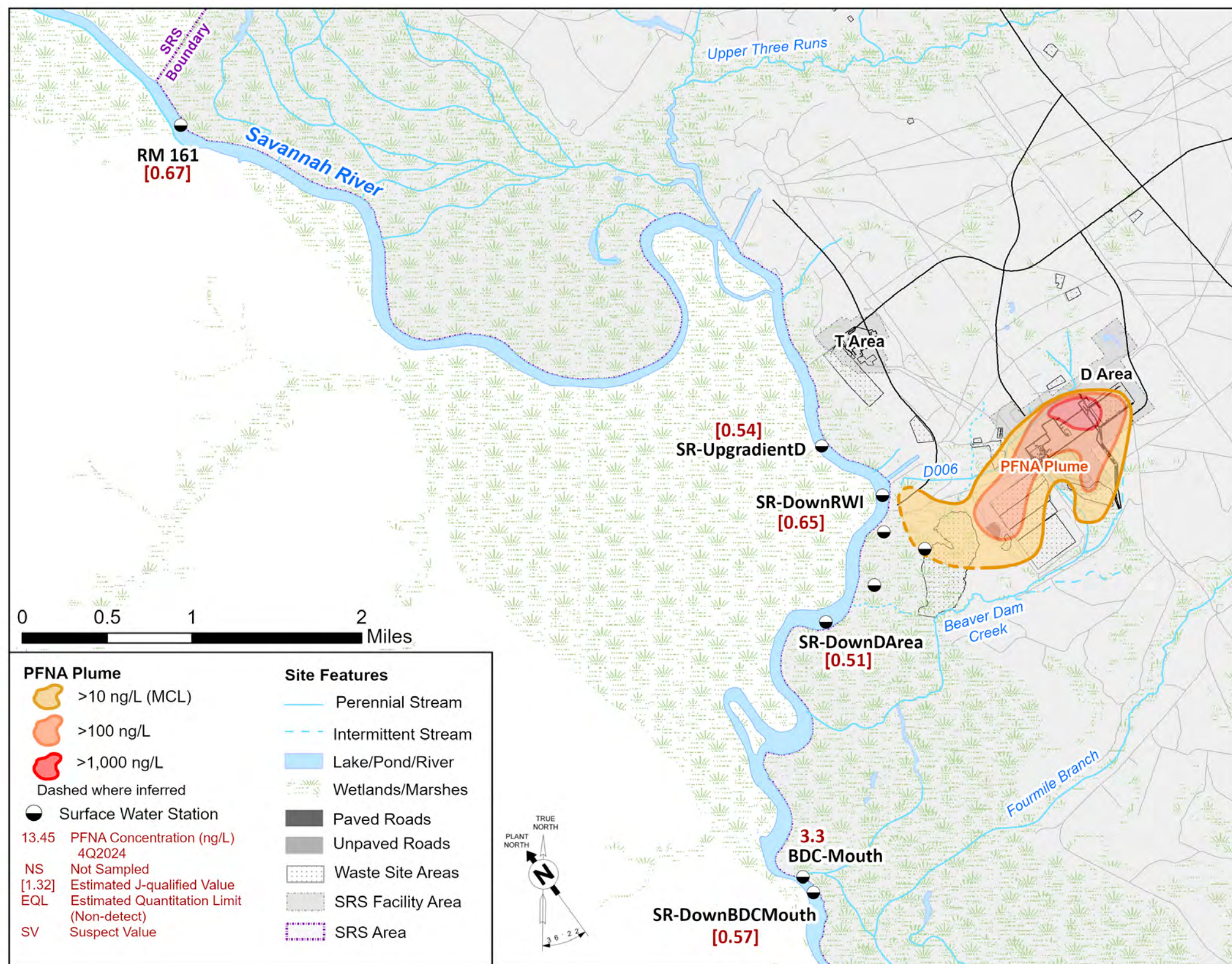


Figure 26. Savannah River and Beaver Dam Creek Mouth Sample Locations with PFNA Plume and Concentrations

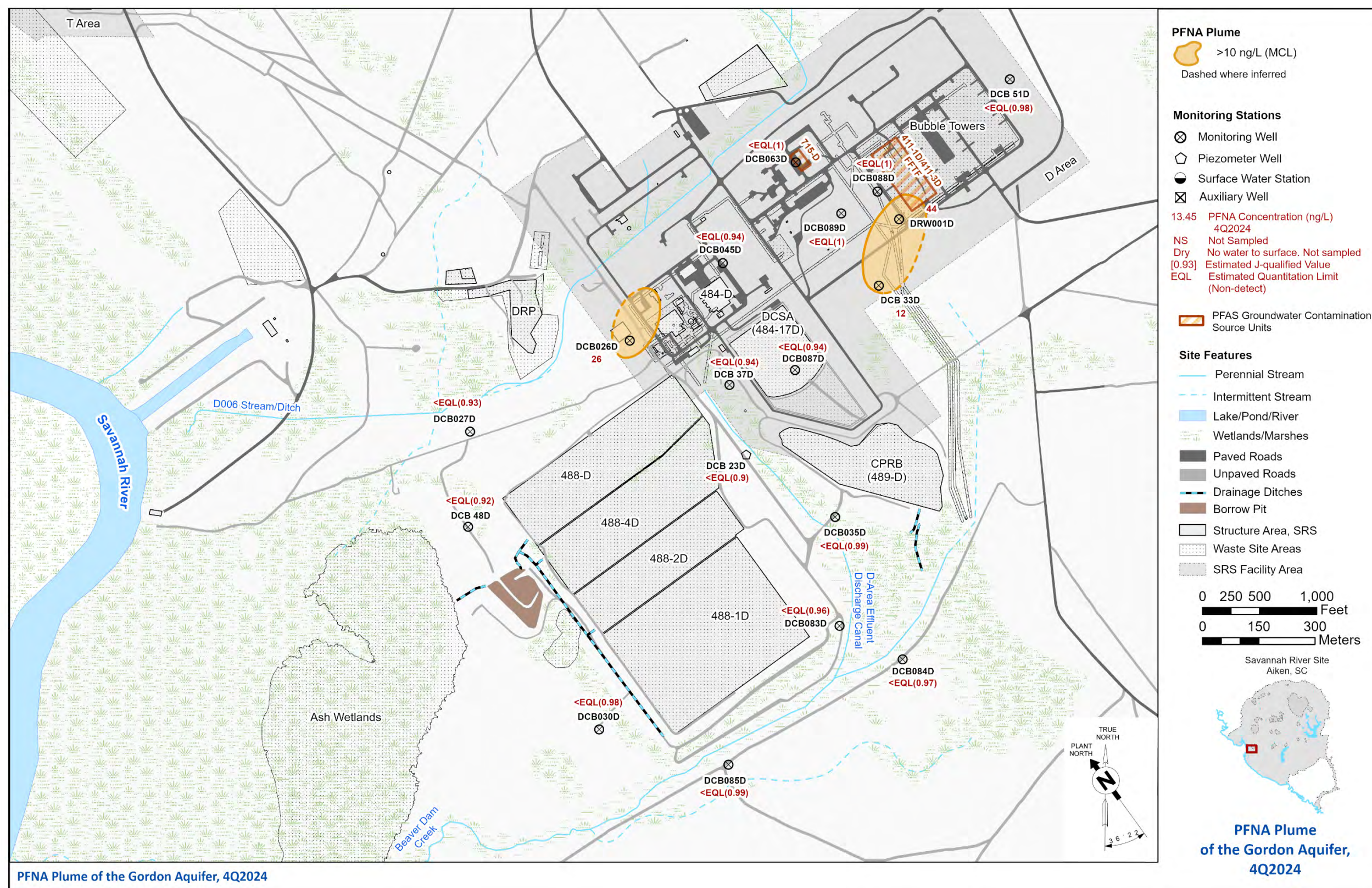


Figure 27. DAG OU Gordon Aquifer PFNA Plume (4Q2024)

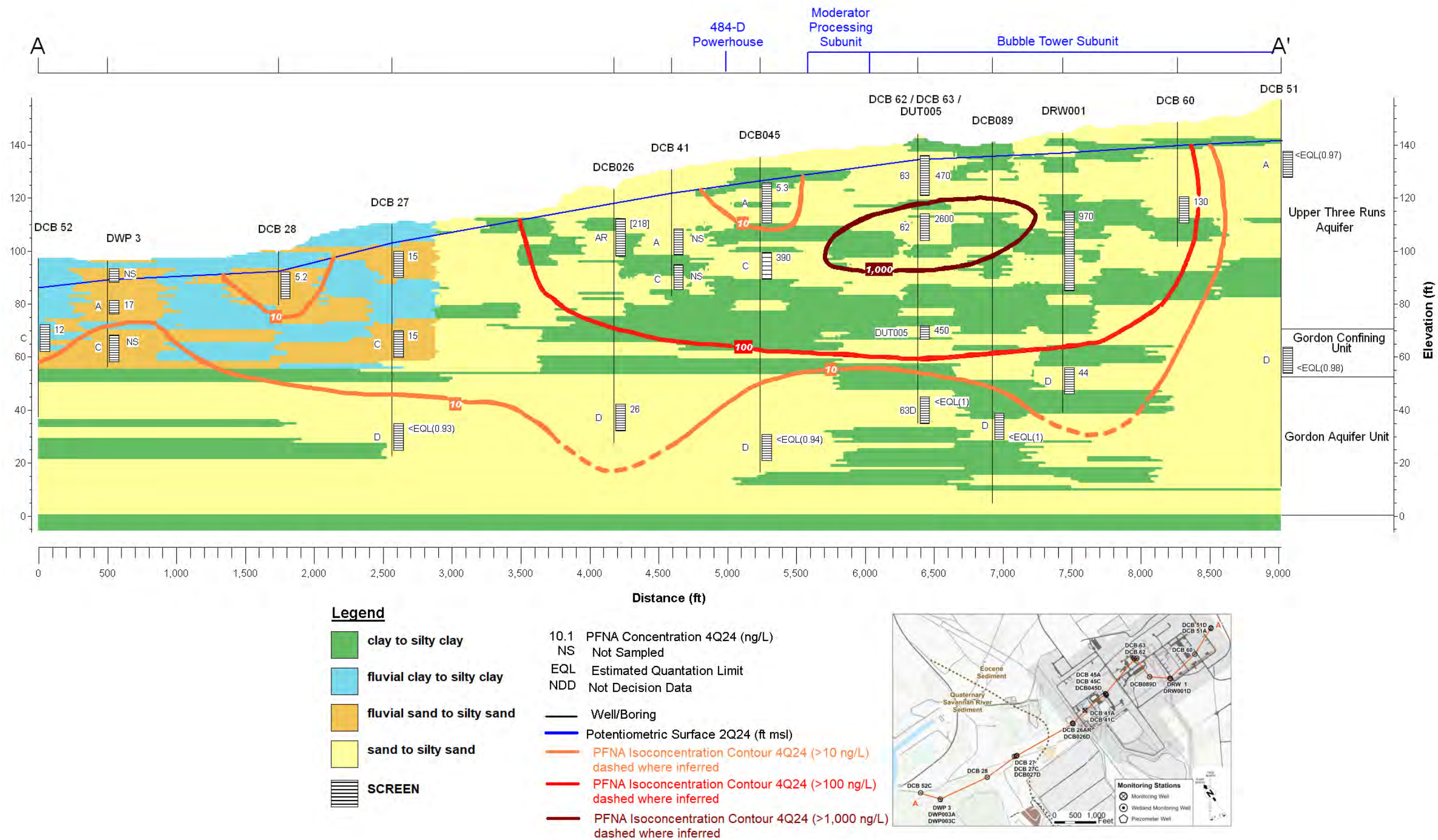


Figure 28. Cross-Section A-A' of the DAG OU PFNA Plume (4Q2024)

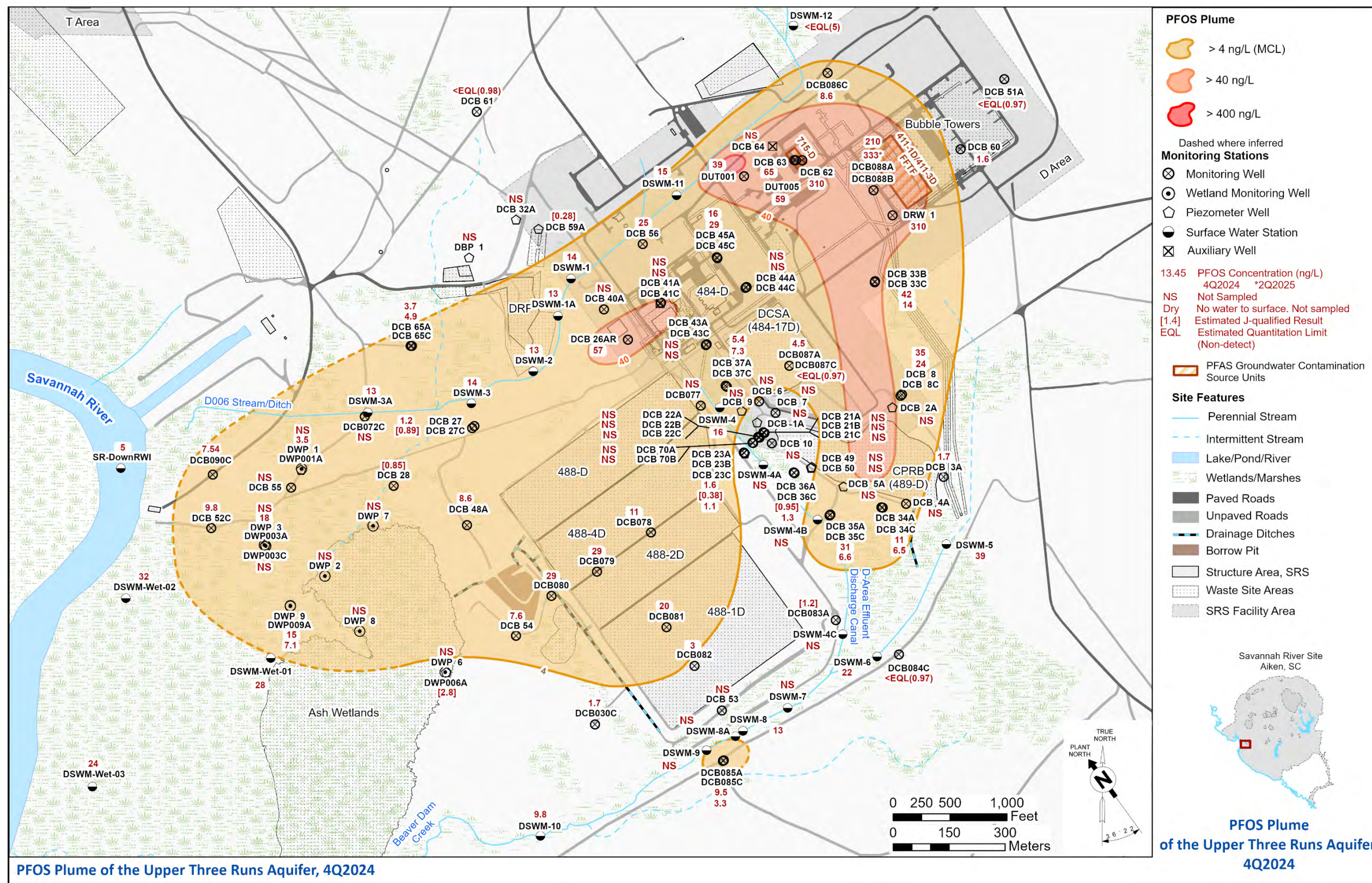


Figure 29. Upper Three Runs Aquifer PFOS Plume (4Q2024)

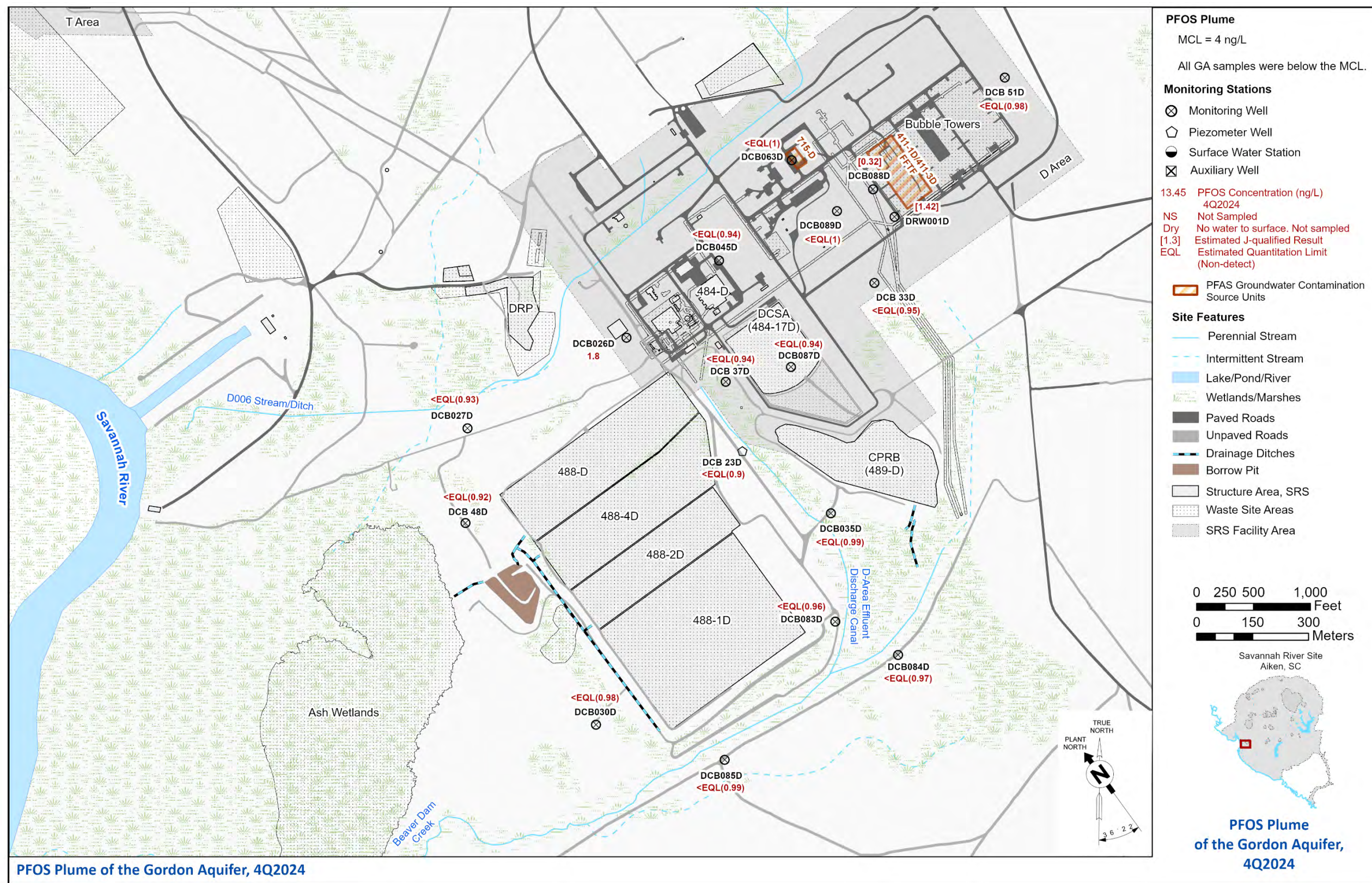


Figure 30. Gordon Aquifer PFOS Plume (4Q2024)



Figure 31. Photograph After Completion of the Soil Neutralization at the 484-17D DCSA

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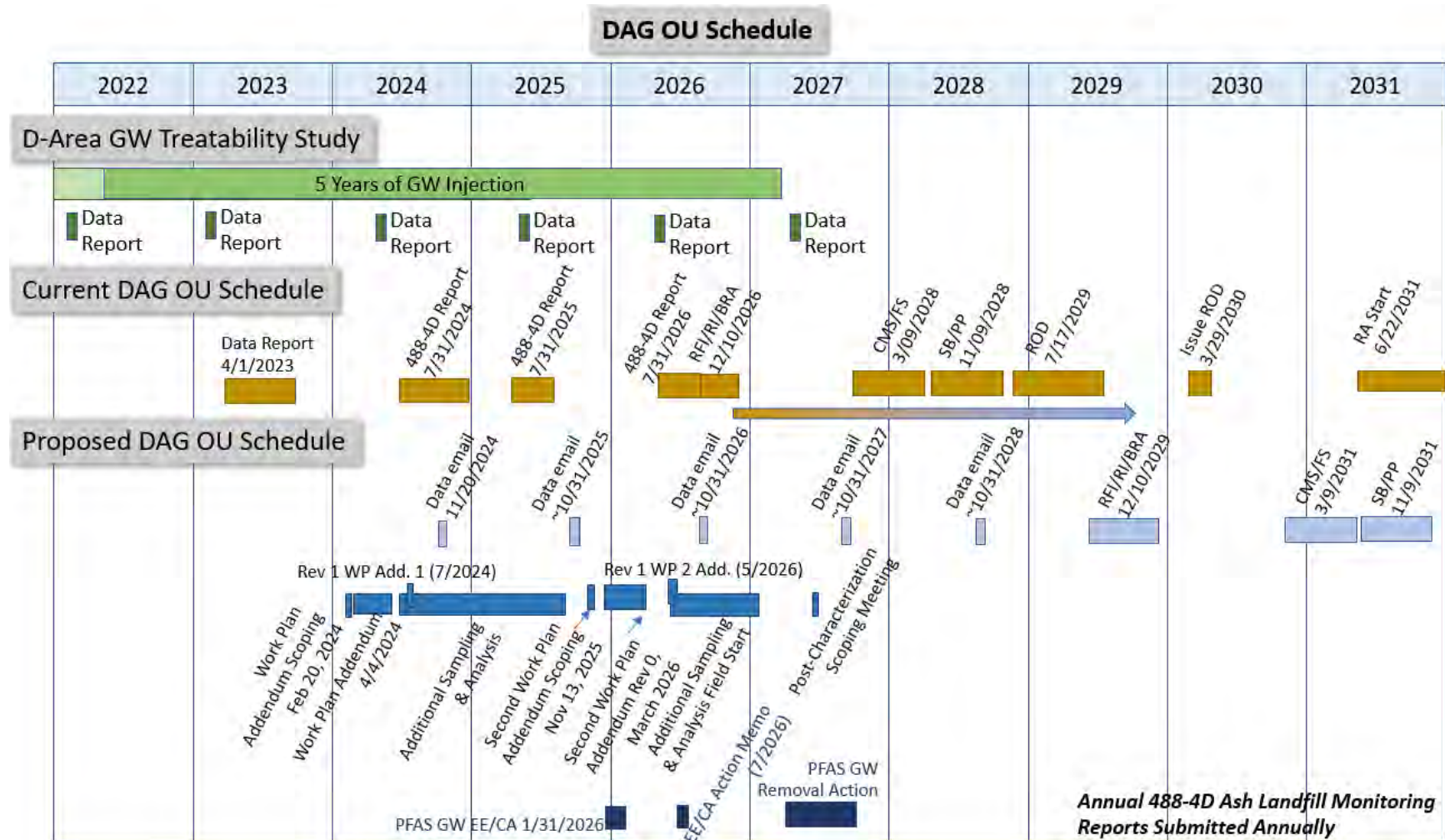


Figure 32. DAG OU Schedule

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Table 1. Record of Key Agreements⁴

Date	Description of Agreement
4/14/2021	<p>The Core Team agreed with the adequacy of current groundwater data for defining problem[s] warranting action with the addition of the following in the RFI/RI Work Plan to address uncertainties:</p> <ul style="list-style-type: none"> • additional sampling and/or installation of a monitoring well in the Gordon Aquifer for VOCs and PFAS. • Sampling surface water and sediment in co-located points upstream and downstream of potential PFAS contaminated groundwater discharge(s). <p>The Core Team agreed to submittal of the RFI/RI Work Plan and SAP in June 2021.</p>
6/16/2022	<p>The Core Team agreed at the 6/16/2022 DAG OU Annual Reports Microsoft Teams meeting that there is no longer a need for a long-term monitoring strategy for DAG OU as SRS prepares for submittal of the RFI/RI/BRA on or before 12/10/2024. The Core Team agreed to replace the DAG OU Letter report (2021 data) due on 7/31/2022 and the groundwater report (2022 data) due on 7/31/2023 with a single DAG OU Monitoring Report (2021 and 2022 data) due on 1/31/2023. Annual DAG OU data reporting will be suspended after submittal of the 2023 DAG OU Monitoring Report, but groundwater monitoring will continue until submittal of the CMS/FS.</p>
11/30/2023	<p>The Core Team agreed to perform depth discrete sampling for VOCs and tritium at well DRW 1 due to the 30-ft screen zone, which will be documented in the RFI/RI report.</p>
11/30/2023	<p>The Core Team agreed to evaluate phytoremediation for tritium as a remedial action but recognized it will be screened out early due to the presence of the PFAS plume.</p>
11/30/2023	<p>The Core Team agreed to extend the DAG OU schedule for submittal of the RFI/RI to 2026 in order to conduct PFAS source area characterization and continuation of the DAG OU Treatability Study. SRNS will continue sampling of the DAGW network according to the monitoring plan for reporting as follows:</p> <ol style="list-style-type: none"> 1. PFAS Data – PFAS soil and latest PFAS groundwater data shared in a data report, and discuss optimization of the PFAS groundwater monitoring to include as part of the workplan addendum. 2. Discrete well DRW001 sampling and annual groundwater sampling data shared via email annually until submittal of the RFI/RI (i.e., emails in 2024 and 2025). 3. Continue to submit 488-4D Report annually. 4. Continue to submit Treatability Study results annually.

⁴ Core Team agreements are documented at each phase and retained for each successive phase in order to maintain a comprehensive list for the life of the project.

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Table 1. Record of Key Agreements (*continued/end*)

Date	Description of Agreement
11/13/2025	The Core Team agreed to proceed with development of an RSER/EE/CA to conduct a NTC removal action to address the higher concentration portion of the PFAS groundwater plume in the UTRA. The RSER/EE/CA will evaluate the following alternatives: 1) No action, 2a) In-situ PAB (CAC Injections), 2b) In-situ PAB (GAC Trench), and 3) Pump and treat. The project team will ensure that alternative 2a will include a second CAC injection in the evaluation.
11/13/2025	The Core Team agreed to proceed with development of a second work plan addendum, as proposed, to conduct additional PFAS soil and groundwater sampling at the additional potential PFAS source areas.
11/13/2025	The Core Team agreed to add the proposed PFAS sampling to the DAG OU monitoring network with the addition of wells DWP006A, DCB085A, DCB085C, and DCB090C. Samples will be analyzed with method EPA 533 with 10% additionally analyzed as splits with method EPA 1633. This monitoring will be included in second work plan addendum.
11/13/2025	<p>The Core Team agreed to extend the DAG OU schedule for submittal of the RFI/RI/BRA from December 2026 to December 2029 in order to conduct additional PFAS source area characterization and implement the PFAS groundwater removal action. SRNS will submit a formal request and revised implementation schedule to EPA and SCDES. SRNS will continue sampling of the DAG OU network according to the monitoring plan for reporting as follows:</p> <ol style="list-style-type: none"> 1. Continue groundwater sampling data shared via email annually until submittal of the RFI/RI/BRA. 2. Continue to submit 488-4D Report annually. 3. Continue to submit the Treatability Study results annually (submitted by May 31).

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Table 2. Key Changes to Scoping Summary⁵

Date	Section	Description of Change	Rationale for Change
11/13/2025	All	Updated previous November 2023 scoping summary to reflect current scoping phase.	Support Second Post-Characterization Scoping Meeting held on 11/13/2023.
11/13/2025	2.3	Previous Land Use Section 3.0 was shifted into Section 2 as Subsection 2.3. Subsequent sections shifted numbering.	Streamlined scoping summary.
11/13/2025	4.0	Updated to reflect Core Team agreements on the OU strategy from the 11/13/2025 Scoping Meeting.	Core Team agreement to extend the submittal of the RFI/RI/BRA from December 2026 to December 2029 to allow for PFAS source characterization, development of a Second Work Plan Addendum with SAP to support PFAS source characterization, and development and implementation of an RSER/EE/CA to conduct a non-time critical removal action for high concentration PFAS groundwater.
11/13/2025	4.0 (page 12)	Split the RSER/EE/CA alternative 2 into two subsections, 2a) In-situ PAB (CAC Injections) and 2b) In-situ PAB (GAC Trench).	Provide clear comparison between the two types of in-situ alternatives.
11/13/2025	Table 1	Record of Core Team Agreements	Updated table with Core Team agreements from the 11/13/2025 Scoping Meeting.
11/13/2025	Table 3	Split the RSER/EE/CA alternative 2 into two subsections, 2a) In-situ PAB (CAC Injections) and 2b) In-situ PAB (GAC Trench).	Provide clear comparison between the two types of in-situ alternatives.

⁵ Significant changes from the previous version of the scoping summary. Changes may include addition, deletion or alteration of problem statements; refined scope of the problems; selection or refinement of response actions; substantial changes in unit strategy; or the addition of supporting materials. The Key Changes table is not a continuous list, but rather, is updated each time the scoping summary is revised.

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Table 3. Comparative Analysis of Removal Action Alternatives Presented in the Draft RSER/EE/CA

	Effectiveness	Implementability	Cost*	Acceptance
Alternative 1 No Action	Low	High	\$0	Low
Alternative 2a In-situ PAB (CAC Injections)	Medium	High	\$15.59M	High
Alternative 2b In-situ PAB (GAC Trench)	Medium	Medium	\$40.17M	High
Alternative 3 Pump and Treat	High	Medium	\$24.27M	High

Note: Range is Low to High, where Low = worst and High = best.

PAB – permeable adsorptive barrier; CAC – colloidal activated carbon; GAC – granular activated carbon

*Million (M)

Table 4. Statistical Summary of Groundwater Travel Times as Estimated by Particle-tracking Simulation

Plume	Aquifer	Concentration Range	Percentiles of Groundwater Flowpath Travel Times (yr)						
			5	10	25	50	75	90	95
Low pH	UTRA	-	0	0	7	19	38	71	96
Be	UTRA	Low	3	5	10	19	37	71	101
PFNA	UTRA	Low	1	3	10	19	34	67	101
		Med	7	14	22	38	63	99	120
		High	18	26	54	83	95	104	108
	GA	Low	53	55	61	109	114	116	118
PFOS	UTRA	Low	2	4	10	25	49	85	107
		High	4	8	35	56	92	110	123
TCE	UTRA	Low	0	3	17	33	63	101	126
	GA	Low	105	107	110	113	116	118	119
Tritium	UTRA	Low	24	26	30	36	44	56	89
		High	5	10	17	25	38	62	84