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AIR NATIONAL GUARD
JOINT BASE ANDREWS MD 20762**

05 October 2026

ACTION MEMORANDUM

FROM: Headquarters Air National Guard, Civil Engineering Directorate, Operations Division, Restoration Branch (NGB/A4V)

SUBJECT: Non-Time-Critical Removal Action for Per- and Polyfluoroalkyl Substances (PFAS) in Groundwater and Stormwater Infrastructure at Sites SS006P, SS007P, SS008P, SS009P, and SS010P, Stewart Air National Guard (ANG) Base, Newburgh, New York

REFERENCES:

Air Force Civil Engineer Center (AFCEC) Environmental Restoration Technical Support Branch (CZTE), 2024. *Final Critical Process Analysis After Action Report - Stewart Air National Guard Base Stormwater Infrastructure Phase 1*. 28 May.

Air Force Center for Environmental Excellence (AFCEE), 2002. *Environmental Baseline Survey, 105th Airlift Wing, New York Air National Guard, Stewart International Airport, Newburgh, New York*. November.

Aneptek, 1997. *Remedial Investigation Report, Site 2 – Pesticide Pit Burial Area, Stewart Air National Guard Base, Newburgh, New York*. September.

BB&E, Inc. (BB&E), 2016. *Final Perfluorinated Compounds Preliminary Assessment Site Visit Report, New York Air National Guard, Stewart Air National Guard Base, Newburgh, New York*. March.

Department of Defense Manual (DoDM) 4715.20, 2012. *Incorporating Change 1, Aug 31, 2018, Defense Environmental Restoration Program (DERP) Management*. 9 March.

NGB/A4VR, 2025. *Final Engineering Evaluation/Cost Analysis for Non-Time-Critical Removal Action of Per- and Polyfluoroalkyl Substances in Groundwater and Stormwater Infrastructure, Stewart Air National Guard Base, Newburgh, Orange County, New York*. July.

Noblis, 2024. *Final Critical Process Analysis After Action Report Stewart Air National Guard Base – Stormwater Infrastructure Phase 1 Report*. 28 May.

Wood, 2018. *Revised Final FY16 Phase I Regional Site Inspection Report for Per- and Polyfluoroalkyl Substances, 105th Airlift Wing, New York Air National Guard, Stewart Air National Guard Base, Newburgh, NY*. 31 October.

Wood, 2019. *Final Site Inspection Report Addendum, FY 16 Phase I Regional Site Inspections, Per- and Polyfluoroalkyl Substances, 105th Airlift Wing, New York Air National Guard Base, Stewart Air National Guard Base, Newburgh, NY*. 1 March.

Wood, 2020a. *Revised Final Report, FY 16 Phase I Regional Site Inspections, Per- and Polyfluoroalkyl Substances; 105th Airlift Wing, New York Air National Guard, Stewart Air National Guard Base, Newburgh, New York*. June.

Wood, 2020b. *Final Expanded Site Inspection Report for Per- and Polyfluoroalkyl Substances,*

105th Airlift Wing, New York Air National Guard, Stewart Air National Guard Base, Newburgh, NY. September.

United States Environmental Protection Agency (USEPA), 2009. *Superfund Removal Guidance for Preparing Action Memorandum*, Wash. D.C. September.

USEPA. 2024. *PFAS National Primary Drinking Water Regulation*, EPA-HQ-OW-2022-0114; FRL 8543-02-OW. 25 June.

1.0 PURPOSE

The purpose of this Action Memorandum is to document the decision and approval by NGB/A4V to select and conduct a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Non-Time-Critical Removal Action (NTCRA) at Stewart ANG Base located in Newburgh, New York (NY) (**Figure 1**). The NTCRA is in response to release(s) of per- and polyfluoroalkyl substances (PFAS); likely from operations associated with Sites SS006P, SS007P, SS008P, SS009P, and SS010P; that have impacted groundwater and groundwater infiltrating into stormwater infrastructure that conveys water to Outfall A, Outfall 002, and Outfall 003 stormwater systems where it discharges into Recreation Pond. This Action Memorandum has been prepared subsequent to the NGB/A4V engineering evaluation and cost analysis (EE/CA) (NGB/A4VR 2025). The EE/CA was prepared to identify the objectives of the removal action; evaluate the effectiveness, implementability, and cost of various alternatives that may satisfy these objectives; and identify the recommended action. The overall objective of the proposed NTCRA is to prevent human exposure to impacted groundwater and surface water in areas along the southern installation boundary and the adjacent stormwater infrastructure where PFAS concentrations have been identified above applicable screening levels.

The response action described in this Action Memorandum is necessary to achieve the remedial action objectives (RAOs) and reduce the current mass of PFAS in groundwater and stormwater infrastructure in the vicinity of Sites SS006P, SS007P, SS008P, SS009P, and SS010P, where PFAS releases have been confirmed above USEPA Maximum Contaminant Levels (MCLs). The response action meets the requirements specified in the DERP Manual (DoDM 2012), and this memorandum is prepared in accordance with USEPA guidance (USEPA 2009). There are no known nationally significant or precedent-setting issues associated with the response.

2.0 SITE CONDITIONS AND BACKGROUND

The NTCRA activities outlined in this Action Memorandum are not associated with a specific site at Stewart ANG Base but are actions in response to Base-wide impacts that have negatively impacted groundwater that is migrating to the southern Base boundary and stormwater through the infiltration of impacted groundwater into the stormwater infrastructure system. The following sections summarize site history, current characteristics, nature of contamination, and rationale for the proposed NTCRA.

2.1 Physical Location

Stewart ANG Base encompasses 280 acres of land located within the Town of Newburgh and the Town of New Windsor, Orange County, New York; approximately 2.5 miles west of the City of Newburgh (**Figure 1**). The Base is situated along the eastern portion of Stewart International Airport. Base facilities in the Town of Newburgh are zoned for industrial usage and are bound on

the west and northwest by defined Industrial Zones, and on the north and east by defined Interchange Business Zones. In the Town of New Windsor, Base facilities are zoned for airport usage and are bound by Airport Zones to the south and southwest, Planned Industrial Zones to the southeast, and Office and Light Industrial Zones to the east (Wood 2020b). Lake Washington is located to the southeast of the Base and forms part of the reservoir system used by the City of Newburgh Water Department. Brown's Pond, located to the south-southwest of the Base, has been and is used as a backup water supply source, when needed.

In 1930, Samuel L. Stewart donated 1,552 acres of mostly agricultural land to the City of Newburgh to develop the Stewart Municipal Airport. In 1941, a pilot training facility was constructed for cadets of West Point U.S. Military Academy, and construction began on runway extensions and barracks. In 1942, the facility was activated as the U.S. Army Air Force Basic-Advance flying school for West Point pilots. In 1947, Stewart Municipal Airport was turned over to the Air Force, which operated the facility as Stewart Air Force Base until 1969.

In 1970, Stewart Air Force Base was deactivated, and the aviation facilities were transferred to the State of New York and operated by the New York Metropolitan Transit Authority. The State of New York added an additional 8,600 acres and a 4.7-mile-long buffer zone to the original 1,552-acre facility to create Stewart International Airport.

In 1983, operation of the airport was transferred from the New York Metropolitan Transit Authority to the New York State Department of Transportation. At that time, the 105th Tactical Air Support Group relocated from Westchester County Airport and occupied the 267-acre facility at Stewart International Airport. After various aircraft and mission changes (including conversion to the C-5 Galaxy), the unit assumed its current name of the 105th Airlift Wing in 1995.

The primary mission of the 105th Airlift Wing is to provide peacetime and wartime inter-theater airlift operations using the Boeing C-17 Globemaster III, which replaced the C-5 Galaxy that was phased out in 2011. Operations related to aircraft maintenance include corrosion control, nondestructive inspection, minor painting, fuel cell maintenance, engine maintenance, avionics, repair, hydraulics, washing, and wheel and tire maintenance. Ground vehicle maintenance operations include fluid changes (e.g., oil, transmission, antifreeze); filter changes (fuel, oil, transmission, air); brake repair; lube, grease and repair of axle and drive trains; body repair; welding; and minor painting and washing (Wood 2020a).

2.2 Removal Site Evaluation

Because aqueous film-forming foam (AFFF) contains PFAS, locations where AFFF was stored and/or used represent potential PFAS release locations that may have impacted environmental media. At Stewart ANG Base, AFFF was stored at the hangars and fire department for use during firefighting operations and training activities, including annual spray nozzle testing. Non-fire training area sites where AFFF may have been released include crash sites, hangars, fuel spill areas, hazardous waste storage facilities, and firefighting equipment testing areas. According to Base records, there have been nine releases of AFFF between 1987 and 1999. The Base has converted from AFFF to the use of a new high expansion foam. Through PFAS investigations, several PFAS source areas have been confirmed, and include: the current fire station; a former nozzle testing area; the aircraft apron; Hangar 100, 101, and 102; and the retention basins located along the southern Base boundary. PFAS have also been detected in groundwater off- base and

in Lake Washington (**Figure 1**) which is considered, but has not been recently used for, the primary municipal drinking water supply for the City of Newburgh.

In 2015, a preliminary assessment (PA) was conducted to identify and research Fire Training Areas (FTAs) in operation since 1970 or any other use or release of AFFF that may have resulted in a release of PFAS into the environment. The goal of the PA was to determine if a potential release location posed a threat to human health and the environment and required additional inspection. The PA identified 15 documented potential release locations that were suspected or known to have had fire training or other potential to release of AFFF at the Base. Of those 15 locations evaluated in the PA, sufficient evidence of a potential release warranting additional investigation to monitor and characterize PFAS was found at 13 of the potential release locations. Additionally, the PA advised verification of the structural integrity of the Base sanitary sewer (BB&E 2016).

A site inspection (SI) was completed in 2017 (dry season) and 2018 (wet season) to evaluate the presence or absence of PFAS at the 13 potential release locations identified in the PA as well as off-Base sampling locations (Wood 2018 and Wood 2019). Results from the SI indicated that PFAS are present within groundwater at concentrations exceeding drinking water criteria and USEPA Lifetime Health Advisory levels for drinking water. These groundwater impacts were primarily present in three distinct areas of the Base: the west/southwest portions of the Base (including the stormwater outfalls and the Recreation Pond), the east/southeast portion at Site 3 (the former Base landfill), and the northwest portion of the Base at the current fire station (Building 104).

An expanded site inspection (ESI) was conducted in 2019 and 2020 to further assess the presence of PFAS at concentrations exceeding screening criteria, to evaluate pathways for PFAS to Recreation Pond and Lake Washington (**Figure 1**), and to evaluate PFAS contributions to the stormwater drainage system (Wood 2020b). There were observed exceedances of PFAS screening levels in the groundwater samples (in the southeastern/downgradient vicinity of the Base and in 4 off-Base wells located to the south of the Base) and stormwater runoff samples (in PRLs 1, 3, 4, 6, 7, 8, 10, and 11, and particularly in Outfall A, Outfall 002, and Outfall 003 stormwater systems). Soil and sediment samples did not exhibit PFAS exceedances of the screening levels used at the time of the ESI.

On 26 and 27 June 2019, monitoring stations were installed at each of the four outfalls that discharge into Recreation Pond (Outfalls 002, 003, A, and 17K), and at the outlet from Recreation Pond (Outfall 010). Each monitoring station was equipped with a Teledyne ISCO® area velocity sensor with redundant ultrasonic sensors, data logger, and telemetry system. A rain gauge was installed at the monitoring station for Outfall 010. The flow monitoring stations were inspected monthly to perform routine maintenance, calibration, and downloading of data for quality review. The flow monitoring station at Outfall 010 was removed on 17 October 2019 to allow for construction and operation of an interim storm water treatment system (ISWTS) using granular activated carbon (GAC) and ion exchange resin to treat PFAS in water in Recreation Pond. The ISWTS was installed in accordance with the Clean Water Act and is not a CERCLA action. The ISWTS was brought online on 5 December 2019. The remaining flow monitoring stations and rain gauge were removed on 31 December 2019. Due to system inefficiencies and an accumulation of solids and biofouling within the treatment system, the system was shut down on 6 January

2020. A Phase I Pilot Study was conducted from 14 February 2020 through 20 March 2020 to determine if the addition of sand filtration to the influent line of the treatment system would reduce the presence of solids. Based on the results of the pilot study, the ISWTS was modified and began operation again on 13 July 2020. Although the ISWTS is currently operating as designed, it has some limitations (e.g., risk of system bypass following high snow melt conditions, significant rainfall events, etc.) where the volume of influent to the Recreation Pond exceeds the treatment systems design specifications and a large portion of stormwater bypasses the system.

Closed-circuit television (CCTV) video surveys of Outfall 17K and non-17K (Outfalls 002, 003, and A) areas were completed in 2019 by P.E. Grosser Consulting, Inc. on behalf of the New York State Department of Transportation to evaluate the condition of the storm sewer infrastructure. This survey work identified stormwater line damage, confirmed groundwater infiltration, and identified other sources of inflow or cross-connection. A PFAS remedial investigation (RI) is currently being conducted at the Base based on the results of the SI, ESI, and CCTV video surveys.

As identified in the 2024 Critical Process Analysis Phase I After Action Report, groundwater migrating toward the southern installation boundary upgradient of the Recreation Pond has consistently contained PFAS concentrations above 10 parts per trillion (ppt) with some locations ranging between 1,000 to 10,000 ppt (Air Force Civil Engineer Center [AFCEC] Environmental Restoration Technical Support Branch [CZTE] 2024). Groundwater in this area migrates slowly off-Base, impacting Recreation Pond and the downstream drinking water supply (Lake Washington). The current PFAS Phase I Remedial Investigation (RI) is investigating groundwater migration and pathways, and the results of the RI will be documented in a PFAS RI report. Note that additional data may be needed to fully assess all groundwater migration pathways and may be part of future investigation activities. The Base has proactively implemented treatment of surface water; however, the extent of PFAS at the Base and the continued release of PFAS from the industrial ponds and Recreation Pond have emphasized the need for additional removal actions to ensure the Base complies with applicable criteria.

2.3 Site Characteristics

The topography of the Base is relatively flat with downward slopes to the south and east. Surface elevations range from 440 to 450 feet (ft) above mean sea level (amsl) throughout most of the installation to a low of 340 ft amsl along the eastern property line and 400 ft amsl along the southern installation boundary (Air Force Center for Environmental Excellence [AFCEE] 2002). Surface water runoff flows in an east and southeast direction. Runoff is moderately high due to the large area of impermeable surfaces (e.g., aircraft parking aprons, paved roads, etc.) and predominantly glacial till soil types. Stormwater to surface water flow is the primary PFAS migration mechanism throughout the Silver Stream network, from Recreation Pond to Lake Washington. The majority of surface water runoff from the Base ultimately discharges through three outfalls into Recreation Pond, located south of the Base boundary. Recreation Pond discharges through a tributary into Silver Stream further to the south. Silver Stream flows east and ultimately south to discharge into Moodna Creek, which flows into the Hudson River. To the east of the Base and Site 3, which is the former Base landfill, additional runoff flows eastward to wetlands that discharge to the northeast into Patton Brook, which flows into Quassaick Creek and the Hudson River. In 2016, the portion of Silver Stream flow historically channeled toward

Washington Lake was diverted away from Washington Lake and conveyed to Moodna Creek. The diversion gates on both Murphy's Ditch and Silver Stream were closed in 2016 and presently remain closed to prevent surface water flow from entering Washington Lake. Washington Lake was the City of Newburgh's historical drinking water source, located southeast of the Base across State Route 300 (Union Avenue). Due to the impacted runoff being diverted into Lake Washington, it is unable to be used as a drinking water source unless treated. In 2016, the flow of Silver Stream (southeast of the Base, across State Route 207/300) was diverted, via activation of a diverter valve, from Lake Washington and now entirely flows towards Moodna Creek. This diverter redirects the flow of impacted surface water to Lake Washington. The northern Patton Brook diversion is referred to as Murphy's Ditch or Gulch and is located to the south (Wood 2020a).

Groundwater at the Base generally flows from the northwest to the south-southeast and historically has been encountered in site monitoring wells at depths ranging between 15 to 40 ft below ground surface (bgs) in upland areas of the Base and between depths of approximately 5 to 10 ft bgs at the Base boundary (Wood 2020a).

Based on hydraulic conductivity tests performed at the pesticide burial pit for the 1997 RI, the overburden was estimated to have a geometric mean hydraulic conductivity of 0.35 feet per day (ft/d) while the weathered bedrock hydraulic conductivity was estimated to have a geometric mean hydraulic conductivity of 0.22 ft/d (Aneptek 1997). A synoptic groundwater event performed in 2021 as part of the annual long-term monitoring for Site 3 (Former Base Landfill) estimated the local hydraulic gradient as 0.14 feet per foot (ft/ft) in the glacial till in the southern portion of the Base, northeast of the industrial ponds (Noblis 2024). Hydraulic conductivity testing has not yet been performed on wells installed during the SI, ESI, or ongoing RI; however, tests are expected to be performed as the RI efforts move forward and will provide an improved understanding of groundwater pathways and flow velocities in this area (Noblis 2024).

The relatively dense uniform glacial till deposit underlying the site exhibits low permeability. Hydraulic conductivity, hydraulic gradient, and formation porosity are used to estimate groundwater seepage (flow) velocity. Assuming a porosity of 0.25 for the alluvium and 0.3 for the weathered bedrock for the Base, this yields groundwater velocities of approximately 0.19 ft/day in the glacial till. Based on these subsurface conditions, groundwater has not been identified as a primary transport route for significant groundwater plume migration from the Base (Wood 2020b). However, PFAS-impacted groundwater has been identified at concentrations up to or exceeding 10,000 nanograms per liter (ng/L) at source areas across the installation during previous investigations and groundwater does likely interact with surface water features as it migrates towards the southern/southeastern Base boundary. Shallow groundwater infiltrates into the aged stormwater piping inverts in multiple locations throughout the Base.

2.4 Release or threatened release of a hazardous substance, pollutant, or contaminant into the environment.

Previous investigations have identified PFAS at concentrations exceeding project screening levels at various locations throughout the Base. This Action Memorandum addresses PFAS-impacted groundwater that is migrating to the southern Base boundary and stormwater impacts from the intrusion of PFAS-impacted groundwater into stormwater infrastructure.

2.5 National Priority List (NPL) Status

This installation is not included on the NPL.

2.6 Maps

Figure 1 presents a location map for Stewart ANG Base. Figure 2 illustrates Alternative A4, Groundwater Interception with Foam Fractionation Technology and GAC Treatment. Figure 3 illustrates Alternative B3, CIPP Lining Method – Identified Stormwater Infrastructure Sections for Rehabilitation.

2.7 Actions and Responses

2.7.1 Previous Actions

Previous investigations have been conducted at Stewart ANG Base to determine the presence or absence of PFAS. A summary of previous actions is outlined in the following Table 1.

Table 1. Summary of Previous Actions

Previous Action	Date	Primary Results
Preliminary Assessment	2015	Identified 15 potential release locations of AFFF at the Base.
Site Inspection	2017	Identified the presence of PFAS within groundwater at concentrations exceeding drinking water criteria and USEPA Lifetime Health Advisory levels for drinking water.
Expanded Site Inspection	2019-2020	Identified exceedances of PFAS screening levels in groundwater and stormwater runoff samples.
CCTV video surveying	2019	Identified stormwater line damage, confirmed groundwater infiltration, and identified other sources of inflow or cross-connection.
Critical Process Analysis Phase I After Action Report	2024	Identified the need for additional removal actions to mitigate PFAS-impacted groundwater migrating along the southern Base boundary and prevent PFAS-impacted groundwater from infiltrating into the stormwater system.

2.7.2 Current Actions

A Remedial Investigation is currently being conducted at Stewart ANG Base to assess the nature and extent of PFAS in environmental media. In addition, an ISWTS was constructed in 2019 that

uses GAC and ion exchange resin to remove PFAS from stormwater that reaches Recreation Pond. The ISWTS is currently operating as designed.

2.8 State and Local Authorities' Roles

2.8.1 Federal Actions to Date

The proposed NTCRA will be conducted in accordance with: 1) the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 Code of Federal Regulations [CFR] Part 300); 2) the Comprehensive Environmental Response Compensation, and Liability Act (CERCLA) of 1980 as amended by the Superfund Amendments and Reauthorization Act; 3) RCRA (40 CFR 260-266); and, 4) provisions set forth by the USEPA.

2.8.2 State and Local Actions to Date

The New York State Department of Environmental Conservation (NYSDEC) has regulatory authority over the NTCRA and has provided technical guidance regarding previous investigations. In addition, Restoration Advisory Board (RAB) members and the public were provided with an opportunity to review and provide comments on the EE/CA for this NTCRA.

2.8.3 Potential for Continued State/Local Response

The ANG will lead the proposed NTCRA effort and fully anticipates that NYSDEC, RAB members, and the public will continue to be involved in and/or informed about future response actions.

3.0 THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT AND STATUTORY AND REGULATORY AUTHORITIES

Section 300.415(b)(2) of the NCP provides factors for determining the appropriateness of a removal action. Factors that the USEPA considers when determining whether a removal action is appropriate are:

- i. Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants;
- ii. Actual or potential contamination of drinking water supplies or sensitive ecosystems;
- iii. Hazardous substances or pollutants or contaminants in drums, barrels, tanks or other bulk storage contaminated that may pose a threat of release;
- iv. High levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface that may migrate;
- v. Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released;
- vi. Threat of fire or explosion;
- vii. The availability of other appropriate federal or state response mechanisms to respond to the release; and
- viii. Other situations that may pose threats to public health or welfare or the environment.

The factors most applicable to the current conditions at Stewart ANG Base are factors (i) and (ii) as detailed below.

- i. Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants.

Concentrations of PFAS above USEPA Health Advisory Levels and MCLs have been detected in groundwater and stormwater at Stewart ANG Base. If the NTRCA is not implemented, the PFAS plume will continue to migrate, and the mass of PFAS in groundwater and the stormwater infrastructure will remain elevated. As an interim measure, the goal of the NTRCA is to reduce the impact of PFAS in groundwater.

ii. Actual or potential contamination of drinking water supplies or sensitive ecosystems.

PFAS are present at Stewart ANG Base in groundwater that may migrate. PFAS was detected at concentrations above screening and regulatory levels in groundwater and stormwater. The NGB identified unacceptable risk to human health from a release to the environment resulting in elevated concentrations of PFAS. This incident meets the requirement of a threat to public health or welfare or a threat to the environment for initiating a removal action (see the National Contingency Plan [NCP] at 40 Code of Federal Regulations (CFR) 300.415(b)(2)(iv)).

4.0 ENDANGERMENT DETERMINATION

There exists an unacceptable risk to human health from elevated concentrations of PFAS in stormwater and groundwater at the site. Thus, actual or threatened releases of pollutants and contaminants from this site may present an imminent and substantial endangerment to public health or welfare or the environment.

5.0 PROPOSED ACTIONS AND ESTIMATED COSTS

Based on the EE/CA and additional review by ANG legal counsel, the removal action objectives (RAOs) for groundwater and stormwater infrastructure at Stewart ANG Base include:

Groundwater:

- Reduce human health risks associated with groundwater impacted by PFOS and PFOA.
- Reduce off-Base migration of PFAS-impacted groundwater by intercepting and hydraulically controlling PFAS in groundwater.

Stormwater Infrastructure:

- Prevent infiltration of PFAS-impacted groundwater into stormwater infrastructure by rehabilitating stormwater lines where damage has been identified via CCTV.
- Reduce the overall volume of PFAS-impacted water that enters Recreation Pond and Lake Washington.

5.1 Proposed Actions

The NTCRA's scope is to construct a groundwater interception trench and treatment system to intercept, extract, and treat (to levels generally consistent with the discharge from the ISWTS) up to 50 gallons per minute (gpm) of PFAS-impacted groundwater at the southern installation boundary and to complete stormwater rehabilitation to improve the structural integrity of the existing infrastructure. Progress toward achieving the RAOs will be continually assessed throughout the NTCRA through groundwater performance monitoring, including groundwater level gauging to evaluate groundwater drawdown and analytical sampling to evaluate PFAS concentration trends.

5.1.1 Proposed Action Description

The selected action is installation of a groundwater interception trench and treatment system with foam fractionation technology and GAC, combined with CIPP Lining Rehabilitation of stormwater infrastructure. The groundwater component of the selected action will be achieved utilizing an excavation trench and two 12-inch diameter stainless-steel sumps/pumps with wire-wrapped screens. The interception trench will be backfilled with a mixture of PFAS-free gravel and clay to facilitate water extraction. The recommended components of the treatment system include programmable, automated controls with adjustable flow rate monitoring for each sump/pump. The treatment components will be housed in a weather-protected facility with ease of access to treatment vessels for maintenance and changeouts.

Foam fractionation has emerged as a viable method for removing and concentrating PFAS from aqueous matrices. The method exploits the surface-active nature of the PFAS to adsorb at the air-liquid interfaces of rising air bubbles, resulting in foam formation at the top of a foam fractionator. The removal of PFAS is then achieved through foam harvesting and offsite destruction/disposal. Advantages of foam fractionation include simplicity, low operational costs, and the ability to efficiently remove higher concentrations of PFAS without significant impacts on operational cost. The foam fractionation technology would be combined with GAC polish treatment as a safety factor to ensure discharge limits are attained, as shown in **Figure 2**. The GAC will also assist with residual volatile organic compound (VOC) concentrations that may remain in groundwater, if any.

This selected action would reduce the volume of PFAS in extracted groundwater using foam formation and harvesting, and the PFAS concentrations in treated water would meet treatment goals. Used or spent GAC will be handled, stored, treated, and/or disposed of in accordance with guidance and regulations in effect at the time of generation and spent foam/sludge from the foam fractionation technology would be destroyed via hydrothermal alkaline treatment in compliance with current DoD PFAS disposal policy.

The stormwater infrastructure rehabilitation component of the selected action will be achieved utilizing the CIPP trenchless storm sewer technique to effectively prevent groundwater infiltration into the stormwater infrastructure. The identified stormwater infrastructure sections to be rehabilitated are shown on **Figure 3**. This technique is completed by inserting a flexible epoxy or equivalent resin-impregnated tube/liner into the damaged pipe and curing (i.e., hardening) it in place to create a new pipe inside of the old one. The resin-impregnated tube/liner can be coated with polyurethane or polypropylene to provide additional strength and chemical resistance, if required. The CIPP liner will be cured using steam or hot water. No excavation work is required.

5.1.2 Contribution to Remedial Performance

The NTCRA will, to the extent practicable, contribute to the efficient performance of long-term remedial action with respect to PFAS remaining following the removal action. The groundwater treatment system will extract groundwater, which will then be treated so that the effluent PFOS and PFOA concentrations are below the USEPA's former Health Advisory Level and current ISWTS discharge target of 70 ng/L before discharge to Recreation Pond. Other PFAS discharge levels will be monitored. The concentrations of PFAS within the groundwater will be reduced. Still, they may not be reduced to concentrations less than the USEPA MCLs as a result of the NTCRA,

and subsequent remedial actions may be necessary.

5.1.3 Engineering Evaluation/Cost Analysis

Based upon the three (3) NCP criteria of effectiveness, implementability, and cost; the EE/CA evaluated the following removal action alternatives:

Groundwater:

- Alternative A1: No-Action
- Alternative A2: Groundwater Interception with GAC Treatment
- Alternative A3.1: Groundwater Interception with GAC and Single-Use IX Resin Treatment
- Alternative A3.2: Groundwater Interception with GAC and Regenerable IX Resin Treatment
- Alternative A4: Groundwater Interception with foam fractionation technology and GAC Treatment

Stormwater Infrastructure:

- Alternative B1: No-Action
- Alternative B2: Slip-Lining Rehabilitation
- Alternative B3: CIPP Lining Rehabilitation

Based on the comparative analysis conducted during the EE/CA, the recommended removal actions include Alternative A4, Groundwater Interception with Foam Fractionation and GAC Treatment, and Alternative B3, CIPP Lining Rehabilitation.

Alternative A4 is recommended as it is the most technically feasible alternative that meets the groundwater RAOs following the pilot study completion. This alternative hydraulically controls PFAS migration in groundwater and effectively treats PFAS in the extracted groundwater to reduce the current mass of PFAS in groundwater. Alternative A4 is cost-effective due to lower O&M costs and treatment train dependability and expandability. Alternative A4 is administratively feasible with stakeholder backing and could be part of a permanent remedy for groundwater.

Alternative B3 is recommended, as it is the most technically feasible alternative that meets the stormwater infrastructure RAOs. This alternative effectively prevents groundwater infiltration into the stormwater infrastructure. Alternative B3 is cost-effective and is administratively feasible.

The EE/CA was made available for public comment from 8 August to 8 September 2025. The public comment period and location to access the EE/CA were advertised in the *Mid-Hudson Times* and *Times Herald-Record* newspapers. Comments received during the public comment period and the NGB/A4V response is included in **Attachment 2**.

5.1.4 Applicable or relevant and appropriate requirements (ARARs)

The NCP at 40 CFR 300.415(j) provides for removal actions and indicates they “shall, to the extent practicable considering the exigencies of the situation, attain ARARs...In determining whether compliance with ARARs is practicable, the lead agency [NGB] may consider appropriate factors, including: (1) the urgency of the situation; and (2) the scope of the removal action to be considered.”

In accordance with the Assistant Secretary of Defense for Energy, Installations, and Environment

(ASD EI&E) stated policy, the NGB, as a DoD component, applies the CERCLA process to guide cleanup actions at Stewart ANGB and to respond to PFAS groundwater impacts resulting from ANG mission-related activities. CERCLA specifically requires remedial actions (cleanups) to attain federal or more stringent state standards determined to be legally applicable or relevant and appropriate under the circumstances presented by the contaminants at the site unless a waiver is granted. Put another way, an ARAR is a promulgated federal or more stringent state law or regulation aimed at protecting human health and the environment during the cleanup at a site and that has been evaluated and found to be legally applicable or relevant and appropriate for the site.

The ARARs rule is different for CERCLA removal actions. The NCP at Section 300.415(j) of Title 40 CFR identifies that USEPA Superfund-financed removal actions shall attain ARARs, to the extent practicable, considering the exigencies of the situation. "Practicability" is based on the urgency of the situation and the scope of the removal. Thus, DoD is not legally required to attain ARARs as part of a removal action.

On June 25, 2024, a federal Safe Drinking Water Action (SDWA) rule became effective on drinking water standards for certain PFAS (USEPA 2024). That rule applies to all regulated drinking water suppliers, including the DoD. The rule set federal applicable MCLs for the Base water supply. Federal MCLs may be "relevant and appropriate" ARARs for CERCLA remedial and non-emergency removal actions at private residences' drinking water wells. The PFAS constituents and their potential MCLs are listed below. The SDWA rule:

- Establishes MCLs for several PFAS in drinking water;
- Applies to SDWA regulated water purveyors, including DoD;
- Includes enforceable levels for five PFAS and a Hazard Index (HI) MCL, calculated as a mixture of four PFAS; and,
- Federal MCLs in ppt:
 - PFOS = 4;
 - PFOA = 4;
 - Hexafluoropropylene oxide dimer acid (HFPO-DA; commonly known as GenX) = 10;
 - PFNA = 10;
 - PFHxS = 10; and,
 - HI MCL for PFHxS, PFNA, perfluorobutane sulfonate (PFBS), and GenX = 1 (unitless).

State drinking water standards may qualify as ARARs for remedial action in accordance with CERCLA if the state environmental rule is more stringent than a federal rule upon completion of the remedial action. In this case, the New York State Department of Health PFAS drinking water standards (New York Codes, Rules and Regulations, Title 10, Part 5, Subpart 5-1, Section 5-1.52; i.e., PFOA: 10 ppt; PFOS: 10 ppt) are not more stringent than the federal rule and thus are not potential ARARs.

As noted above, DoD is not legally required to attain ARARs as part of a removal action and may consider the ARARs to the extent practicable, considering the exigencies of the situation.

Reliable information can be derived from other to-be-considered (TBC) criteria, advisories, or guidance (40 CFR § 300.400(g)(3)). These advisories, criteria, or guidance are developed by the USEPA, other federal agencies, or states and may be useful in developing the removal action. TBCs complement ARARs but do not override them.

5.1.5 Project schedule

Per CERCLA Section 104(c), there is no time restriction for implementing the removal action at the Base since NGB is funding the removal activity. Since this removal action has been designated non-time-critical, the start date is dependent on Action Memorandum approval, several items, including, but not limited to, the availability of adequate funding and contracting capacity, and the development and approval of the Remedial Action Work Plan (RAWP). During the design process, regulatory permits are required for groundwater interception and discharge of treated groundwater. Once the planning and approval process is complete, the removal action can be implemented. The proposed pilot study can be conducted concurrently with the timeline for Action Memorandum approval and incorporated into the design and implementation process.

5.2 Estimated Costs

The NTCRA's estimated total cost is \$42,400,000, including capital and operations and maintenance (O&M) costs for 30 years. The Alternatives' anticipated costs are provided below and are based on either an estimate provided by contractors, standard cost estimating data, previous experience with similar projects, or current costs. More detailed information on the estimated costs can be found in the EE/CA (NGB/A4VR 2025).

Summary of NTCRA Project Costs (estimated in USD)

Action/Task	Capital Costs	Operations and Maintenance Costs
Groundwater interception with foam fractionation technology and GAC treatment	\$5,600,000 ¹	\$33,900,000 ²
CIPP lining rehabilitation	\$2,900,000 ³	⁴
Total	\$42,400,000	

Notes:

¹ = Estimated capital costs are based on construction of one 50-gpm groundwater treatment system. Estimated costs include multimedia filtration system, GAC system, foam fractionation system, treatment system mechanical costs (interception trench installation, groundwater collection sumps, electrical distribution, extraction wells and monitoring well installation, etc.), treatment system facility costs (including SCADA material and installation), and system startup.

² = Annual O&M costs of one 50-gpm groundwater treatment system are estimated to be approximately \$1.0M. This cost estimate incorporates periodic costs such as site visits, spent media replacement (e.g., change-outs), media disposal, and performance monitoring. Over a 30-year period, the net present-worth cost of the system is approximately \$33.9M based on the OMB discount rate of 0.5 percent.

³ = Estimated capital costs are based on the approximate 6,600 ft of pipe that require rehabilitation. Estimated costs include GAC system installation, stormwater sewer cleaning, pre-lining rinsing and CCTV inspection, liner installation, post-lining CCTV inspection and flow testing, and site restoration.

⁴ = O&M is anticipated to include periodic site visits, inspections, and general monitoring. The O&M costs for the CIPP lining rehabilitation are incorporated into its capital cost estimate.

6.0 EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

If removal action is delayed or not taken, PFAS may continue to migrate in groundwater, infiltration of PFAS-impacted groundwater into stormwater infrastructure may continue, and concentrations will likely remain elevated.

7.0 OUTSTANDING POLICY ISSUES

No outstanding policy issues were identified for this action.

8.0 ENFORCEMENT

No enforcement actions have been taken to date, and none are anticipated.

9.0 RECOMMENDATION

This Action Memorandum documents the decision and approval of the NGB for an NTCRA to address a PFAS release to the environment in groundwater and stormwater infrastructure attributable to Stewart ANG Base. The NTCRA consists of groundwater interception with foam fractionation technology and GAC Treatment, along with CIPP lining rehabilitation. This decision is in accordance with CERCLA as amended, Office of the Secretary of Defense (OSD) DERP guidance, and is consistent with the NCP. This decision is based on the administrative record file for the site. Conditions at the site meet the NCP requirements.

Approved by:

William K. Strickland, GS-15, DAF
Chief, Environmental Division NGB/A4V
Air National Guard Readiness Center

5 Attachments

1. Attachment 1. List of Acronyms
2. Attachment 2. Responsiveness Summary, Comments, and Responses to Comments
3. Figure 1. Stewart ANG Base and Area Features
4. Figure 2. Alternative A4 Groundwater Interception with Foam Fractionation and GAC Treatment
5. Figure 3. Alternative B3 CIPP Lining Method – Identified Stormwater Infrastructure Sections for Rehabilitation

ATTACHMENT 1. LIST OF ACRONYMS

AFCEC	Air Force Civil Engineer Center
AFCEE	Air Force Center for Environmental Excellence
AFFF	aqueous film-forming foam
AM	Action Memorandum
ANG	Air National Guard
ARAR	applicable or relevant and appropriate requirement
ASD EI&E	Assistant Secretary of Defense for Energy, Installations, and Environment
Base	Stewart Air National Guard Base
BB&E	BB&E, Inc.
CCTV	closed-circuit television
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CIPP	cured-in-place-pipe
CPeO	Center for Public Environmental Oversight
CZTE	Environmental Restoration Technical Support Branch
DERP	Defense Environmental Restoration Program
DoD	Department of Defense
EE/CA	Engineering Evaluation/Cost Analysis
ERP	Environmental Restoration Program
ESI	expanded site inspection
ft	foot or feet
FTA	Fire Training Area
GAC	granular activated carbon
gpm	gallons per minute

HI	Hazard Index
ISWTS	interim storm water treatment system
IX	ion exchange
M	million
MCL	Maximum Contaminant Level
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NGB	National Guard Bureau
NTCRA	Non-Time-Critical Removal Action
NYSDEC	New York State Department of Environmental Conservation
O&M	operation and maintenance
OMB	Office of Management and Budget
PA	preliminary assessment
PFAS	per- and polyfluoroalkyl substances
PFAS6	perfluoroalkyl substances-6
PFBS	perfluorobutane sulfonate
PFC	perfluorinated compound
PFDA	perfluorodecanoic acid
PFHpA	perfluoroheptanoic acid
PFHxS	perfluorohexane sulfonate
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctane sulfonate
ppt	parts per trillion
RAB	Restoration Advisory Board
RAO	removal action objective

RAWP	removal action work plan
RI	remedial investigation
SDWA	Safe Drinking Water Act
SI	site inspection
U.S.	United States
USEPA	United States Environmental Protection Agency

ATTACHMENT 2. RESPONSIVENESS SUMMARY, COMMENTS, AND RESPONSES TO
COMMENTS

Final Responsiveness Summary
Comment Period: 8 August 2025 through 8 September 2025
Non-Time-Critical Removal Action for PFAS in Groundwater and Stormwater
Infrastructure at Sites SS006P, SS007P, SS008P, SS009P, and SS010P
Stewart Air National Guard Base
Newburgh, New York

This Responsiveness Summary has been prepared by the Air National Guard (ANG) as part of the process for making a recommendation of the selected actions of groundwater interception with foam fractionation technology and GAC treatment and stormwater infrastructure CIPP lining rehabilitation for PFAS in groundwater and stormwater infrastructure at Sites SS006P, SS007P, SS008P, SS009P, and SS010P at Stewart Air National Guard Base, Newburgh, New York. The actions are summarized in this Action Memorandum. This Responsiveness Summary documents public comments and issues raised during the public comment period on the Proposed Plan and presents responses to those comments.

The engineering evaluation/cost analysis document was made available to the public during this public comment period at the following website:
<https://www.105aw.ang.af.mil/About/Programs/Environmental>.

As published on 7 August 2025 and 14 August 2025 in the Mid-Hudson Times and on 7 August 2025 and 8 August 2025 in the Times Herald-Record, the public comment period began on 8 August 2025 and ran through 8 September 2025. During this public comment period, the public was encouraged to provide comments on the Proposed Plan to the Base Environmental Manager or Restoration Program Manager for the ANG.

During the public comment period, comments received from the public included those from the Center for Public Environmental Oversight (CPeO). Comments were also received from Restoration Advisory Board members, the City of Newburgh, and the Port Authority of New York and New Jersey (Port Authority). Comments received and responses to comments are included on the following pages.



NATIONAL GUARD BUREAU
3501 FETCHET AVENUE
JOINT BASE ANDREWS MD 20762-5157

05 October 2026

MEMORANDUM FOR

Center for Public Environmental Oversight (CPEO)
Attention: Lenny Siegel
Mountain View, CA

FROM: NGB/A4VR

SUBJECT: Response to the Center for Public Environmental Oversight (CPEO) Comments on the Final Engineering Evaluation/Cost Analysis for the Non-Time-Critical Removal Action of Per- and Polyfluoroalkyl Substances (PFAS), Stewart Air National Guard Base, Newburgh, Orange County, New York, July 2025.

1. ANG provides the following responses to CPeO comments on the Final Engineering Evaluation/Cost Analysis for the Non-Time-Critical Removal Action of Per- and Polyfluoroalkyl Substances (PFAS), Stewart Air National Guard Base, Newburgh, Orange County, New York, July 2025:

Comment 1. Thank you for the opportunity to comment on the July 2025 “Engineering Evaluation/Cost Analysis [EE/CA] Non-Time Critical Removal [NTCRA] of Per- and Polyfluoroalkyl Substance [PFAS] in Groundwater and Stormwater Infrastructure, Stewart Air National Guard [ANG] Base, Newburgh, Orange County, New York.” I have been asked by a member of the RAB to review the document, and I have agreed, not just because the Removal Action is necessary to protect the local community, but because each PFAS Remedy or Removal Action implemented by a Defense Component sets a national precedent.

My comments will focus on the groundwater response. In summary, I support the selected alternative for removing and destroying PFAS in groundwater released from the base. However, more should be specified to protect the local drinking water supply and public health.

On the positive side, I support the selected alternative, primarily the Foam Fractionation and Hydrothermal Alkaline Treatment. For several years, the Defense Department has been supporting the development of safe, thorough PFAS destruction technologies. However, installations and activities appear reluctant to implement innovative approaches. I am pleased to see these two technologies selected for the high-profile Stewart Base.

However, the description of the use of Granular Activated Carbon (GAC) to “polish off” the treated groundwater is incomplete. It states (page 3-10), “Spent GAC will be removed and disposed of at a hazardous waste disposal facility.” What “disposal” method will be used? How can the neighbors of the hazardous waste disposal facility be assured that they are going to be protected from additional PFAS exposure? Is the EE/CA deliberately vague because the Air National Guard hopes that Congress or the Trump Administration will overturn the ban on incineration?.

NGB/A4VR Response I: “Disposal” in this context refers to the practice of placing materials (i.e., spent GAC) in a permitted hazardous waste landfill. These landfills operate under state authorized permits. Protection of surrounding communities is assured through the operational guidelines contained within the authorized permits and oversight by the state regulatory authority.

Comment 2. Page 2-2 of the EE/CA refers to the Assistant Secretary of Defense [ASD] Memorandum dated September 3, 2024 to justify setting Removal Action Objectives (RAOs) at three times the applicable drinking water standards. I and other environmental leaders have objected to that policy in general, but it is particularly unacceptable at Stewart. As noted on page 2-2 of the EE/CA, the

purpose of that weakening factor was to set priorities among impacted private wells. However, adopting the less protective RAOs at Stewart could impact the response. If indeed there are locations where the groundwater concentrations of target PFAS are between the drinking water standards and three times those standards, the EE/CA should identify those locations and explain how the use of the less protective RAOs to guide cleanup decisions might impact the response. This is particularly important because PFAS pollution from the Stewart ANG Base has indeed impacted public water supplies, as well as private wells, so drinking water standards should apply. Furthermore, using the drinking water standards directly as objectives may be efficient in the long run because, as the EE/CA suggests on page 5-1, the selected alternative could be part of a permanent remedy.

NGB/A4VR Response 2: The EE/CA was prepared to follow applicable guidance from the 3 September 2024 ASD Memorandum. The reference to the ASD (3x MCL) policy provides justification for the NTCRA. Drinking water sources are likely impacted due to the migration of PFAS in groundwater at the Site. The NTCRA will supplement the actions taken to mitigate drinking water exposure by reducing PFAS mass contributing to groundwater migration to drinking water sources and reducing the duration of necessary mitigation of drinking water exposure. The RAOs and discharge requirements will be formalized in the NTCRA Action Memorandum.

Comment 3. I was pleased to read in the EE/CA (pages 3-8 & 3-9), “Performance and compliance monitoring are necessary to assess whether additional response actions are needed to mitigate potential health risks in the future.” That’s good, but there is no description of the monitoring strategy, which is essential to evaluating the success of the Removal Action. What PFAS analytes will be targeted? What analytical method will be used? Will total organic fluorine be measured? Data from past sampling at the Stewart Base show locations where the concentrations of other PFAS significantly exceeded measured values of PFOS and PFOA. Roger Brewer’s work shows that exposure risk is a function of all PFAS, not just the two well-known compounds for which there are drinking water standards.

NGB/A4VR Response 3: See Appendix A and B of the Final EE/CA. Costs were developed to include 30 years of quarterly performance groundwater monitoring at 14 monitoring wells. Costs were prepared assuming that laboratory analysis would include the following: PFAS, VOCs, SVOCs, metals, total organic carbon, total suspended solids, total dissolved solids, pH, cations, and anions. Monitoring requirements will be provided in detail during the Response Action Plan / Design Documents.

2. NGB/A4VR has documented the comments received during the public comment period in a responsiveness summary included in the NTCRA Action Memorandum. If you have any questions on the responses, please contact me at william.myer.2@us.af.mil or 774-994-7265.

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William Myer, GS-13
Environmental Restoration Program Manager



NATIONAL GUARD BUREAU
3501 FETCHET AVENUE
JOINT BASE ANDREWS MD 20762-5157

05 October 2026

MEMORANDUM FOR

City of Newburgh (City)
Attention: Frederick Shoyer, Principal Scientist
Montrose Engineering & Geology, D.P.C.

FROM: NGB/A4VR

SUBJECT: Response to the City of Newburgh (City) Comments on the Final Engineering Evaluation/Cost Analysis for the Non-Time-Critical Removal Action of Per- and Polyfluoroalkyl Substances (PFAS), Stewart Air National Guard Base, Newburgh, Orange County, New York, July 2025. Comments provided by Montrose Engineering & Geology, D.P.C.

1. ANG provides the following responses to the City's comments on the Final Engineering Evaluation/Cost Analysis for the Non-Time-Critical Removal Action of Per- and Polyfluoroalkyl Substances (PFAS), Stewart Air National Guard Base, Newburgh, Orange County, New York, July 2025:

Pilot Study/Test (PS/T) Comments

Comment PS/T 1. Section 3.0 of the EE/CA references a proposed pilot groundwater interception and treatment system for the Southern Boundary Groundwater Pilot System response action, as outlined in the Phase I and Phase II Critical Process Analysis (CPA) reports (Noblis 2024a and Noblis 2024b). The EE/CA indicates that implementation of the EE/CA work will follow completion of the pilot test. Subsequent investigations—including pilot system optimization, bench-scale treatability testing for influent pre-treatment and effluent polishing, and a data gap analysis—will be guided by the pilot test findings.

The City notes that the interim treatment system at REC Pond has faced persistent challenges, primarily due to inadequate design for managing biofouling, suspended solids and dissolved metals. This concern is supported by the Phase I Pilot Study conducted from February 14 to March 20, 2020, which evaluated the effectiveness of adding sand filtration to the influent line to reduce solids. Despite modifications to the interim system, fouling issues remained unresolved.

Given these findings, the City strongly recommends that the ANG incorporate a comprehensive pilot and bench-scale study focused on both the treatment of extracted groundwater and the posttreatment stream from the foam fractionation system. This is particularly important as foam fractionation alters the composition of non-PFAS contaminants in the waste stream, and a robust evaluation is necessary to ensure effective treatment and regulatory compliance.

NGB/A4VR Response PS/T 1: As the commentor references, a pilot test is being conducted as part of the interim removal action. The proposed treatment system will be evaluated during the pilot test and adjustments may be made to the full-scale treatment system design based on the results of the pilot test.

Comment PS/T 2. The description of Alternative A4, along with Figure 5, suggests that granular activated carbon (GAC) will serve as the sole polishing treatment following foam fractionation. However, GAC alone is unlikely to provide sufficient post-treatment, and the system will experience fouling issues similar to those observed in the interim treatment system.

NGB/A4VR Response PS/T 2: Relative to GAC not providing sufficient treatment. This comment is not supported by technical data. There are numerous full-scale PFAS treatment systems across the U.S. Air Force enterprise that solely rely on GAC to successfully treat PFAS. In addition, a pilot

study was recently completed at a separate ANG installation and foam fractionation with GAC polishing treatment was proven to be a successful treatment alternative.

Relative to biofouling. A pilot test will be conducted as part of the interim removal action. The proposed treatment system will be evaluated during the pilot test and adjustments may be made to the full-scale treatment system design based on the results of the pilot test. In addition, it should be noted that the stormwater treatment system is treating water from a different environment compared to water that will be treated from the groundwater aquifer with likely significantly different geochemical makeup. It cannot be inferred that the groundwater treatment system will encounter the same biofouling issues.

Comment PS/T 3. Additionally, Alternative A4 references the destruction of “spent foam/sludge from the SAFF®40 system via hydrothermal alkaline treatment.” It remains unclear whether this process is intended to occur on-site or be managed off-site. If on-site treatment is proposed, it is strongly recommended that the pilot study incorporates this technology to evaluate its feasibility, performance, and compatibility with the overall treatment system.

NGB/A4VR Response PS/T 3: The spent foam/sludge will not be destroyed on-site. This is outlined in the cost estimate, Appendix B of the Final EE/CA.

Technology (T) Comments

Comment T1. Use of Proprietary Branding: The report references SAFF® as the foam fractionation technology, which implies exclusivity to that specific brand. To promote fair competition and ensure cost-effective solutions for taxpayers, it is recommended that the report refer more broadly to “foam fractionation technology.” This would allow other qualified vendors to propose alternative systems during procurement.

NGB/A4VR Response T1: Acknowledged. The Action Memorandum will reflect this revision from “SAFF” to “foam fractionation technology”.

Comment T2. Clarification on Treatment Feasibility (Section 3.5.1): The statement, “Treatment of higher PFAS levels with SAFF®40 is a function of increased time in the treatment train versus an increase in treatment media,” may be technically accurate but is potentially misleading. Extended treatment time necessitates larger or additional foam fractionation units, increased energy consumption, and higher overall operational and maintenance costs. These factors should be clearly acknowledged in the feasibility assessment. In addition, higher concentrations of PFAS loading onto IX resins inherently makes regenerable IX resins more competitive than GAC and single-use regenerative IX resins.

NGB/A4VR Response T2: The referenced statement was intended to indicate that foam fractionation provides the capability to treat higher concentrations of PFAS without the addition of a higher volume of treatment media.

Comment T3. Operational Challenges and System Design Considerations: The interim remediation system at REC Pond has consistently faced fouling issues in filters and carbon or resin vessels due to naturally occurring, non-PFAS contaminants. These fouling problems have led to unplanned shutdowns and compromised the system’s ability to prevent untreated water from discharging off-site. The aeration process inherent to foam fractionation may further exacerbate downstream fouling in polishing filters and GAC vessels.

- Figure 5 (Alternative A4 – Groundwater Interception with SAFF® and GAC Treatment) appears to rely solely on GAC for post-treatment, which may be insufficient. In contrast, other alternatives depicted in the report include additional filtration components:
- Figure 3: Alternative A2 – Groundwater Interception with GAC Treatment
- Figure 4A: Alternative A3.1 – Groundwater Interception with GAC Treatment and Single-Use Ion Exchange Resin
- Figure 4B: Alternative A3.2 – Groundwater Interception with GAC Treatment and Regenerable Ion Exchange Resin

To ensure robust system performance and minimize operational disruptions, similar filtration components should be considered for Alternative A4.

NGB/A4VR Response T3: A pilot test will be conducted as part of the interim removal action. The proposed treatment system will be evaluated during the pilot test and adjustments may be made to the full-scale treatment system design based on the results of the pilot test. In addition, it should be noted that the stormwater treatment system is treating water from a different environment compared to water that will be treated from the groundwater aquifer with likely significantly different geochemical makeup. It cannot be inferred that the groundwater treatment system will encounter the same biofouling issues.

The GAC treatment following foam fractionation technology is intended to be a polishing step to treat residual PFAS and treat other constituents that may be present in groundwater (e.g., volatile organic compounds). GAC as a treatment medium is being successfully implemented without the use of ion exchange resin media at numerous USAF and ANG installations.

Comment T4. Figure 4A – Alternative Groundwater Interception with GAC Treatment and Single-Use Ion Exchange (IX) Resin: Figure 4A illustrates a treatment configuration in which a granular activated carbon (GAC) polishing vessel is positioned downstream of the single-use IX resin. Since the IX resin is designed to effectively capture residual PFAS compounds, the subsequent GAC unit will primarily accumulate non-PFAS contaminants. As a result, the GAC vessel will provide minimal additional PFAS removal and may not serve a meaningful role in PFAS treatment within this configuration.

NGB/A4VR Response T4: Correct. In this configuration, the GAC would treat non-PFAS constituents (e.g., VOCs) that may be present in groundwater.

Comment T5. The proposed discharge location appears to be the outfall of REC Pond. This discharge would likely require a separate permit issued by the New York State Department of Environmental Conservation (NYSDEC) to ensure regulatory compliance.

NGB/A4VR Response T5: Discharge permits are currently being addressed separately by the Base.

Capital Cost (CC) Comments

Comment CC1. The EE/CA indicates that the regenerable ion exchange (IX) resin system would be operated on-site. However, the capital cost difference between Alternative A3.1 (Groundwater Interception with GAC and single-use IX resin) and Alternative A3.2 (Groundwater Interception with GAC and regenerable IX resin) is only approximately \$60,000. This cost differential appears understated, as an on-site regenerable IX resin system would typically require a significantly higher capital investment.

NGB/A4VR Response CC1: The regenerable carbon will not be regenerated on-site, please see Cost Summary tables.

Comment CC2. All treatment alternatives include a line item for discharge to POTW, yet the narrative text proposes discharge to the REC Pond outfall. This discrepancy should be clarified to ensure consistency between the cost assumptions and the proposed discharge strategy.

NGB/A4VR Response CC2: These costs were applied to account for any effort or costs associated with treated water discharge. No change necessary as this cost was applied to each alternative.

Comment CC3. Alternative A2 (Groundwater Interception with GAC Treatment) omits several key cost components that are included in other alternatives, such as:

- Extraction well installation (\$91,681)
- Monitoring well installation (\$232,933)
- Utility clearance (\$3,662)
- Hydraulic pump testing (\$83,009)

Although Alternative A2 was not selected, the omission of these costs raises questions about the consistency and completeness of the capital cost estimates.

NGB/A4VR Response CC3: Acknowledge the omission of these costs for Alternative A2; however, this omission should not raise concerns related to the completeness of the overall cost estimates. The costs are transparently included in each cost summary tab for review. The inclusion of these costs within Alternative 2 would only escalate the costs and make this alternative less cost competitive.

Comment CC4. Alternative A4 (Groundwater Interception with Foam Fractionation and GAC Polish) does not include capital costs for the hydrothermal alkaline treatment system, assuming it is to be implemented on-site. This omission should be addressed to accurately reflect the full scope of the treatment system.

NGB/A4VR Response CC4: Destruction of foam and sludge from the foam fractionation treatment system will not be implemented on-site. See Cost Summary.

Comment CC5. Alternatives A1, A3.2, and A4 each list identical capital costs (\$67,230) for bench-scale testing. Given the complexity of systems involving multiple media (e.g., GAC and IX resin) and advanced technologies such as foam fractionation and hydrothermal alkaline treatment, it is reasonable to expect higher bench-scale testing costs for these alternatives. The uniform cost allocation does not appear to reflect the varying technical demands of each system.

NGB/A4VR Response CC5: The costs included in the EE/CA are preliminary cost estimates developed to compare remedial alternatives. The bench-scale treatability test cost was developed in RACER and is intended to conform with the -30 to +50 percent accuracy range as outlined by USEPA guidance.

Operation & Maintenance Cost (OMC) Observations

Comment OMC1. Alternative A4 appropriately includes costs associated with media filter bags.

NGB/A4VR Response OMC1: Comment acknowledged.

Comment OMC2. Treatment and disposal volumes for tertiary fractionate storage have not been provided, preventing a complete evaluation of O&M costs for this component.

NGB/A4VR Response OMC2: A precise storage volume will be determined during pilot test and remedial design.

Comment OMC3. The O&M cost difference between Alternative A3.2 (\$34.6M) and Alternative A4 (\$33.9M) is approximately 2%. Given the close cost margin, both alternatives warrant further evaluation through pilot-scale and bench-scale testing to validate performance and cost assumptions.

NGB/A4VR Response OMC3: Acknowledged; however, due to the anticipated lower cost, ability to successfully treat other non-PFAS constituents, and proven success treating PFAS at other USAF and ANG installations, Alternative 4 has been recommended as the preferred alternative.

Comment OMC4. Alternatives that incorporate more complex or extensive treatment equipment would typically be expected to incur higher operation and maintenance (O&M) costs. However, this does not appear to be reflected in the cost estimate for Alternative A4, raising questions about the accuracy or completeness of its O&M cost assumptions.

NGB/A4VR Response OMC4: The costs included in the EE/CA are preliminary cost estimates developed to compare remedial alternatives. The costs were developed to conform with the -30 to +50 percent accuracy range as outlined by USEPA guidance. Cost estimates may be revised during the planning and design phase of the project.

Stormwater (SW) Infrastructure Rehabilitation Considerations

Comment SW1. 1. The Cured-in-Place Pipe (CIPP) hot water lining method generates a waste effluent stream that requires appropriate treatment and disposal. If this method is selected, additional costs for effluent management should be incorporated into the overall cost estimate.

NGB/A4VR Response SW1: Wastewater generated during CIPP curing could either be contained and disposed of off-site along with wastewater generated during pre-installation sewer line cleaning or containerized and discharged into the groundwater treatment system. The amount of wastewater generated can be significantly reduced by conducting steam curing.

2. NGB/A4VR has documented the comments received during the public comment period in a responsiveness summary included in the NTCRA Action Memorandum. If you have any questions on the responses, please contact me at william.myer.2@us.af.mil or 774-994-7265.

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William Myer, GS-13
Environmental Restoration Program Manager



NATIONAL GUARD BUREAU
3501 FETCHET AVENUE
JOINT BASE ANDREWS MD 20762-5157

05 October 2026

MEMORANDUM FOR

Port Authority of New York and New Jersey (Port Authority)
Attention: Omar Astacio, General Manager

FROM: NGB/A4VR

SUBJECT: Response to the Port Authority of New York and New Jersey (Port Authority) Comments on the Final Engineering Evaluation/Cost Analysis for the Non-Time-Critical Removal Action of Per- and Polyfluoroalkyl Substances (PFAS), Stewart Air National Guard Base, Newburgh, Orange County, New York, July 2025.

1. ANG provides the following responses to Port Authority comments on the Final Engineering Evaluation/Cost Analysis for the Non-Time-Critical Removal Action of Per- and Polyfluoroalkyl Substances (PFAS), Stewart Air National Guard Base, Newburgh, Orange County, New York, July 2025:

Comment 1. Siting and Access. The proposed interception trench associated with the groundwater recovery system is located near the ANG Base's wastewater lagoons and along steep terrain. Given the estimated size of the trench and site conditions, a portion of the trench, as well as the construction storage/laydown areas, may be located on and would require access to Port Authority's leasehold. In addition, the proposed location of the selected groundwater treatment system (Option 2) appears to be within Port Authority's leasehold near Recreation Pond. At present, the ANG does not have the access rights necessary to perform this work within Port Authority's leasehold. Any work on Port Authority leasehold would be subject to Port Authority's Tenant Construction Authorization Procedure ("TCAP") requirements. Because of these factors, early coordination is essential to avoid delays in implementing the NTCRA, and we believe a focused discussion is the appropriate next step.

Accordingly, we request a meeting to review the precise nature and location of the work and the scope and terms of any required access agreements. In addition, NYSDOT should be included in these conversations, as New York State is the fee owner of the property and its permission may also be required.

NGB/A4VR Response 1: Comment acknowledged. ANG will engage the Port Authority, NYSDOT, and others, at appropriate times and in appropriate manners, during the NTCRA. The ANG will work with the Port Authority to obtain access, as necessary, during the design process prior to work commencing.

Comment 2. Need for Subsurface Controls to Prevent Cross-Contamination. Construction activities related to the groundwater recovery and treatment program will require excavation and/or borings. Without appropriate controls, such activities may result in the cross-contamination of highly impacted, shallow groundwater to the deep, bedrock aquifer. The documents provided did not include standard operating procedures that ANG proposes to observe to prevent vertical migration and cross-contamination. These procedures should be addressed in the final design and implementation plans, and Port Authority must have an opportunity to provide input.

NGB/A4VR Response 2: Comment acknowledged. The design and work planning phase of the project will include detailed procedures necessary to complete the work properly.

Comment 3. Information Requests. The EE/CA references a pilot groundwater interception and treatment system proposed in the 2024 Phase I and Phase II Critical Process Analysis reports. If implementation of the pilot system has been completed, Port Authority has not received a report from

that implementation, nor are any such report or the Phase I and II reports available in the Administrative Record. Port Authority did receive the Phase II report as part of a bulk transmission of documents, but its significance was not identified at the time. Please provide the 2024 Phase I Critical Process Analysis report, as well as any report related to the pilot, at your earliest convenience so that Port Authority's technical team can review the EE/CA as informed by the underlying data. Port Authority may submit further comments on the EE/CA following review of those reports.

NGB/A4VR Response 3: Comment acknowledged. The Phase I Critical Process Analysis (CPA) report will be provided to the Port Authority under separate cover. The pilot study discussed in the CPA has not been implemented yet. The pilot study will be conducted after the EE/CA is completed.

2. NGB/A4VR has documented the comments received during the public comment period in a responsiveness summary included in the NTCRA Action Memorandum. If you have any questions on the responses, please contact me at william.myer.2@us.af.mil or 774-994-7265.

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William Myer, GS-13
Environmental Restoration Program Manager



NATIONAL GUARD BUREAU
3501 FETCHET AVENUE
JOINT BASE ANDREWS MD 20762-5157

05 October 2026

MEMORANDUM FOR

Members of the Stewart ANGB Restoration Advisory Board (RAB)
Attention: Ed Lawson, Dan Shapley, Bill Fetter, Mike Schade, Jennifer
Rawlison, Chuck Thomas, Jen Benson

FROM: NGB/A4VR

SUBJECT: Response to the Stewart ANGB Restoration Advisory Board (RAB) Member Comments on the Final Engineering Evaluation/Cost Analysis for the Non-Time-Critical Removal Action of Per- and Polyfluoroalkyl Substances (PFAS), Stewart Air National Guard Base, Newburgh, Orange County, New York, July 2025.

1. ANG provides the following responses to the RAB Member comments on the Final Engineering Evaluation/Cost Analysis for the Non-Time-Critical Removal Action of Per- and Polyfluoroalkyl Substances (PFAS), Stewart Air National Guard Base, Newburgh, Orange County, New York, July 2025:

Comment 1. We support the alternatives proposed in the EE/CA, and urge full funding and expeditious implementation. The EE/CA recommends two actions that we support:

- Alternative A4: Groundwater Interception with Surface-Activated Foam Fractionation® (“SAFF”) and GAC Treatment, which is intended to prevent PFAS-contaminated groundwater in and around the wastewater lagoons from reaching Rec Pond.
- Alternative B3: Cured-in-Place-Pipe (CIPP) Lining Rehabilitation, which is intended to prevent PFAS-contaminated groundwater from infiltrating certain stormwater pipes that discharge to Rec Pond.

Both alternatives will reduce the load of PFAS and volume of stormwater reaching Rec Pond, which will make the ISTWS more effective in more conditions. They are examples of the type of project we have called for as part of the “Speed up the Cleanup” petition campaign that generated 1,050 signatures. For these reasons, we support these recommended alternatives.

Further, we strongly support the full funding of these alternatives and implementation in 2026. The estimated cost is \$8.5 million, plus an annual operation and maintenance cost of \$1 million, though these costs may increase if the EE/CA is modified based on our comments.

NGB/A4VR Response 1: Comment Acknowledged.

Comment 2. The 17K stormwater project, and expanded ISTWS and other projects to further reduce PFAS load and stormwater volume, should be pursued.

The proposed projects will substantially reduce PFAS contamination leaving the base, but they won’t completely stop the flow of PFAS. For these reasons, we urge expeditious analysis of additional alternatives, including but not limited to:

- The Route 17K stormwater project. The Route 17K pipe that gathers stormwater from off base and channels it via a pipe under the base, delivers a relatively large volume, estimated at up to 40%, of stormwater to Rec Pond. Because the large volume of stormwater results in bypass of the ISTWS, and because PFAS-contaminated groundwater at the base infiltrates this stormwater pipe, addressing it is a high priority that must be pursued expeditiously. We reiterate our request, made routinely over the course of years, for the New York State

Department of Transportation to present alternatives to the RAB and the public, so that we can comment on the proposals before commitments are made.

- Expanded ISWTS. The interim treatment system in operation at Rec Pond is unable to operate during or after rain or snowmelt, due to increased water volumes that exceed the system's capacity. A new engineering solution, such as a system with greater capacity and expanded stormwater storage, must be devised and implemented to ensure filtration of all water in all weather conditions. It is unacceptable that nearly every time it rains, PFAS-contaminated water flows off site, contaminating waterbodies, potentially resulting in exposures to the aquatic ecosystem and to people through drinking water or consumption of fish.
- Outfall treatments. End-of-pipe or in-pipe treatments such as "fluoro-sorb" technology being used at other PFAS remediation sites, including Westchester Airport, should be analyzed as potential solutions to remove PFAS from stormwater discharges, including those discharging from parts of the base that do not discharge to Rec Pond.

NGB/A4VR Response 2: Comment acknowledged. Additional alternatives may be pursued by parties in the future, as deemed appropriate.

Comment 3. The applicable or relevant and appropriate requirements (ARARs) should reflect the most stringent state or federal standard for each contaminant.

We are aware that the Assistant Secretary of Defense Memorandum dated September 3, 2024 directs the DoD to prioritize "removal actions to address private drinking water wells impacted by PFAS from DoD activities where concentrations are known to be at or above three times the MCL values," and that removal actions, per this memorandum, are not required to meet ARARs. However, we urge the DoD to strive to meet ARAR-levels through this removal action.

Under CERCLA, "Only those state standards that are promulgated, are identified by the state in a timely manner, and are more stringent than federal requirements may be applicable or relevant and appropriate." 40 C.F.R. § 300.400(g)(4). Accordingly, we strongly support the use of the more stringent Maximum Contaminant Levels (MCLs) established by the United States Environmental Protection Agency in the 2024 final rule for the National Primary Drinking Water Regulation (NPDWR) on drinking water standards for all relevant contaminants other than perfluorooctane sulfonate (PFOS), including: PFOA, HFPO-DA, PFNA, and PFHxS. Additionally, we support the use of the Hazard Index Maximum Contaminant Level for any combination of PFBS, PFHxS, HFPO-DA and PFNA. Ensuring adequate removal of PFBS is particularly important because PFBS is considered an indicator of whether treatment is adequately removing short-chain PFAS.

We agree with the comments made in New York State's June 16, 2025 letter¹ that the ARARs should reflect New York Department of Environmental Conservation's (NYDEC) Final Ambient Water Quality Guidance Values (guidance levels) for PFOS and PFOA². More specifically, the ARAR for PFOS should reflect the more stringent standard of 2.7 ppt.

NYDEC's guidance level for PFOS is applicable because it is more stringent than the federal MCL of 4.0 ppt, and because the guidance levels are both "of general applicability and are legally enforceable." The guidance levels are incorporated in NYDEC State Pollutant Discharge Elimination System (SPDES) permits for industrial dischargers, thereby establishing generally applicable legally enforceable standards. Alternatively, we urge the consideration of NYDEC guidance levels pursuant to the "to be considered" category provided for in 40 C.F.R. § 300.400(g)(3), which allows "lead and support agencies" to "identify other advisories, criteria, or guidance to be considered for a particular release" as appropriate.

NGB/A4VR Response 3: The NTCRA will, to the extent practicable, contribute to the efficient performance of long-term remedial action with respect to PFAS remaining following the removal action. The groundwater treatment system will extract groundwater, which will then be treated so that the effluent PFOS and PFOA concentrations are below the USEPA's former Health Advisory Level and current interim storm water treatment system (ISWTS) discharge target of 70 ng/L before discharge to Recreation Pond. Other PFAS discharge levels will be monitored. The concentrations of PFAS within the groundwater will be reduced. Still, they may not be reduced to concentrations less than the USEPA MCLs as a result of the NTCRA, and subsequent remedial actions may be necessary.

Comment 4. Treated discharges should meet NYDEC's Final Ambient Water Quality Guidance Values.

As noted in the EE/CA, "regulatory permits are required [the] discharge of treated groundwater." ES-4. The standards set in the SPDES permit for this discharge should reflect the guidance values established by NYDEC for PFOS: 2.7 ppt. (Because PFOA has a more stringent drinking water MCL of 4 ppt, discharges should be filtered to that level.) Accordingly, all discharges must meet the applicable human health guidance levels..

NGB/A4VR Response 4: The NTCRA will, to the extent practicable, contribute to the efficient performance of long-term remedial action with respect to PFAS remaining following the removal action. The groundwater treatment system will extract groundwater, which will then be treated so that the effluent PFOS and PFOA concentrations are below the USEPA's former Health Advisory Level and current interim storm water treatment system (ISWTS) discharge target of 70 ng/L before discharge to Recreation Pond. Other PFAS discharge levels will be monitored. The concentrations of PFAS within the groundwater will be reduced. Still, they may not be reduced to concentrations less than the USEPA MCLs as a result of the NTCRA, and subsequent remedial actions may be necessary.

Comment 5. The Foam Fractionation (SAFF) and GAC Treatment System should target short-chain PFAS with additional treatment techniques and strategies to ensure removal of PFBS and other short-chain PFAS.

Foam fractionation, and SAFF in particular, has been shown to be effective in the removal of numerous PFAS compounds. However, SAFF has been shown to be much more effective for removing long-chain PFAS, such as PFOA and PFOS, and less effective in removing short-chain PFAS, such as PFBS. Short-chain PFAS, including PFBS, have been found in samples collected and analyzed as part of the mobilizations completed during the Remedial Investigation at SANGB. PFBS is part of a federal drinking water MCL, and it was likely included as a representative short-chain PFAS, with the assumption that if drinking water is treated to remove PFBS, it will also likely remove other short-chain PFAS. Therefore, it is important that an ARAR consistent with PFBS's Hazard Index MCL be established, and essential that the treatment system can effectively remove PFBS and other short-chain PFAS.

Evidence for SAFF's difficulty in removing short-chain PFAS is presented both on the website of the company that produces SAFF and in multiple peer-reviewed academic journal articles.^{3,4,5} However, as noted on the company website and in the peer-reviewed literature, there are several techniques and strategies that can be utilized to increase the removal of short-chain PFAS. These techniques and strategies include: the addition of a surfactant or other metal-based compound that can increase adherence of PFAS, using ozonated air, adjusting vessel geometry, and sequencing adjustments. Therefore, we strongly request that SANGB implement enhancements to the SAFF system to ensure that not only long-chain PFAS but also short-chain PFAS are also removed. We also strongly request

SANB to monitor effluent water quality closely for both short- and long-chain PFAS to assess the efficacy of different enhancement strategies. Additionally, if a surfactant is used during SAFF, measurement of the surfactant in the treated water after GAC must be performed to ensure no residual surfactant is left in the treated water or its concentration does not exceed relevant regulatory standards. Strategies and techniques should be tested during the pilot phase to ensure the final treatment design is adequately removing both long- and short-chain PFAS.

NGB/A4VR Response 5: The foam fractionation technology treatment system will undergo pilot study and bench scale testing prior to implementation. The treatment system will be designed to efficiently treat to the appropriate discharge limits. Treatment will reduce the mass of short-chain and long-chain PFAS migrating from the SANGB boundary.

Comment 6. Discharges from the CIPP Lining Rehabilitation process should be controlled and treated to prevent any downstream impacts to aquatic life, or risks to human health.

Certain “hot water cure” CIPP methods used to rehabilitate pipes can produce toxic discharges that flow downstream and can harm aquatic life and pose health hazards to workers.⁶ The CIPP process should be chosen and implemented to ensure that any potentially harmful chemicals produced or mobilized during the process are captured and treated to avoid downstream impacts or adverse impacts to workers.

NGB/A4VR Response 6: Wastewater generated during CIPP curing could either be contained and disposed of off-site along with wastewater generated during pre-installation sewer line cleaning or containerized and discharged into the groundwater treatment system. The amount of wastewater generated can be significantly reduced by conducting steam curing.

Comment 7. PFAS-contaminated filter media should be disposed of without posing risks to other communities.

Spent filter media, foam, and other PFAS-contaminated media generated by filtering PFAS-contaminated water should be disposed of in ways that do not result in contamination via air emissions from incineration, water contamination from landfill leachate, or other impacts to communities that host disposal facilities, especially other environmental justice communities. We request that the disposal methods and locations for all filter media and other PFAS-contaminated substances be publicly disclosed to the RAB.

NGB/A4VR Response 7: “Disposal” in this context refers to the practice of placing materials (i.e., spent GAC) in a permitted hazardous waste landfill. These landfills operate under state authorized permits. Protection of surrounding communities is assured through the operational guidelines contained within the authorized permits and oversight by the state regulatory authority. Manifests and disposal records will be provided in documentation of treatment implementation and operation activities. Potential planned disposal facilities will be identified in design and/or work plan documents.

Comment 8. Additional technical questions and comments about Alternative A4: Groundwater Interception. We have the following comments and questions about Alternative A4:

Comment 8a. We wish to verify that adequate storage and pump capacity are included to ensure that all water pumped from the trench will be treated, and that PFAS-contaminated groundwater is not allowed to pool up and flow through the trench. The trench should be continually drained to avoid any flow-through of PFAS-contaminated groundwater.

NGB/A4VR Response 8a: Pilot study and hydraulic conductivity testing will be completed as part of the design phase of the project. The system will be designed to capture and treat groundwater moving through the trench footprint.

Comment 8b. We urge the implementation of hydraulic conductivity testing as soon as possible, so final treatment of the system can be informed by the most current information about groundwater pathways and flow.

NGB/A4VR Response 8b: Pilot study and hydraulic conductivity testing will be completed as part of the design phase of the project..

Comment 8c. What is the proposed footprint of the pilot trench system? Please provide a cross-sectional detail of the proposed trench construction.

NGB/A4VR Response 8c: As stated in the EE/CA: " The groundwater recovery system interception trench will be approximately 30 ft deep and 900 ft long and run approximately parallel with the southern installation boundary at a perpendicular placement to the known groundwater flow direction." A cross-section of the proposed trench has not yet been produced but is planned to be included in the design phase of the project.

Comment 9. Additional technical questions and comments about Alternative B3: CIPP Lining Rehabilitation. We have the following questions about CIPP process:

Comment 9a. Once cured, does the CIPP liner bond to the interior wall of the original pipe to assure no annular migration of groundwater infiltration?

NGB/A4VR Response 9a: Yes, that is the intent of the CIPP liner technology.

Comment 9b. Will the inherent turbid characteristics of the regional runoff result in any excessive abrasion, thus reducing the expected +/- 50-year life of the liner?

NGB/A4VR Response 9b: Stormwater turbidity is not unique to the SANGB region. The life expectancy of the liner accounts for the factors contributing to material breakdown.

Comment 9c. Is there any dependence of low groundwater head for the installation of the CIPP? Will a sustained period of low precipitation be necessary? Will sustained precipitation further delay the installation of the CIPP?

NGB/A4VR Response 9c: The lack of groundwater infiltration during CIPP liner installation is ideal. However, there are multiple industry-accepted procedures to mitigate this occurrence that will be incorporated into the design phase of the project, as necessary.

Comment 10. Deficiencies in public communications about the EE/CA limited public engagement beyond RAB members. The public engagement process we observed for the EE/CA had several deficiencies that we urge you to address before other public comment periods for remedial activities. These include:

Comment 10a. Public notice of the comment period was limited to legal notices. A press release would gain wider attention from the press, as evidenced by the press reports RAB members generated by sending a press release.

NGB/A4VR Response 10a: Comment acknowledged. The public notice was published in accordance with CERCLA guidance. ANG supports the RAB press release efforts.

Comment 10b. The SANGB website did not provide the public with information about how to comment. The email addresses included in the legal notice were not published on the website, leaving any interested member of the public without the necessary information to deliver comments

NGB/A4VR Response 10b: Comment acknowledged. The public notice was published in accordance with CERCLA guidance.

Comment 10c. The EE/CA cover page is labeled “Final” when it should be labeled “Draft” to signal to the public that comments on a draft will be considered before publishing a final plan.

NGB/A4VR Response 10c: The EE/CA is Final. Public comments on the EE/CA are being responded to and will be documented in the Action Memorandum as a responsiveness summary in accordance with CERCLA guidance.

Comment 11. Other Comments.

Comment 11a. The Executive Summary states that Lake Washington “forms part of the reservoir system”. It would be more accurate to say that Lake Washington is/was the primary drinking water supply for the City of Newburgh. Additionally, New Windsor’s public water supply (Butterhill well field) and private wells have been polluted, and these should be referenced.

NGB/A4VR Response 11a: The referenced statement is accurate. The text also states in the next paragraph: "Groundwater in this area is migrating slowly off-Base; impacting the Recreation Pond and downstream drinking water supply (Lake Washington)".

Comment 11b. In section 3.4.5, it is stated that time is to be evaluated as one of the weighted factors in the decision process. However, there does not seem to be any time comparisons among the various options.

NGB/A4VR Response 11b: The time to achieve the RAO is not different among the included alternatives, except for the obvious No Action alternative.

Comment 11c. In section 3.5.2 it is stated earlier in this text that this is a non-time critical process. However, it has been over a year since the implementation of this concept was introduced. Now we are anticipating an additional 1.5 years before any recovery begins. Given the existing implementation of these processes at other installations across the country, benchtop and pilot studies should be able to be minimized.

NGB/A4VR Response 11c: The NTCRA project, including pilot studies and bench-scale studies, will be conducted in as efficient a manner as possible, within funding and regulatory and community oversight constraints.

¹ Department of Environmental Conservation, "Draft Engineering Evaluation/Cost Analysis Non-Time-Critical Removal Action of Per- and Polyfluoroalkyl Substances in Groundwater and Stormwater Infrastructure. Stewart Air National Guard Base. NYSDEC Site No. 336089" (June 16, 2025).

² Department of Environmental Conservation, "Division of Water Technical and Operational Guidance Series (TOGS) No. 1.1.1. Final Ambient Water Quality Guidance Values for PFOA, PFOS, and 1,4-Dioxane" (May 15, 2023)
https://extapps.dec.ny.gov/docs/water_pdf/togs111addendum2023.pdf.

³ Burns, David J., Paul Stevenson, and Peter JC Murphy. "PFAS removal from groundwaters using surface-active foam fractionation." Remediation Journal 31.4 (2021): 19-33.

⁴ Burns, David J., et al. "Commercial-scale remediation of per-and polyfluoroalkyl substances from a landfill leachate catchment using Surface-Active Foam Fractionation (SAFF®)." Remediation Journal 32.3 (2022): 139-150.

⁵ We, Angel Chyi En, et al. "A review of foam fractionation for the removal of per-and polyfluoroalkyl substances (PFAS) from aqueous matrices." Journal of hazardous materials 465 (2024): 133182.

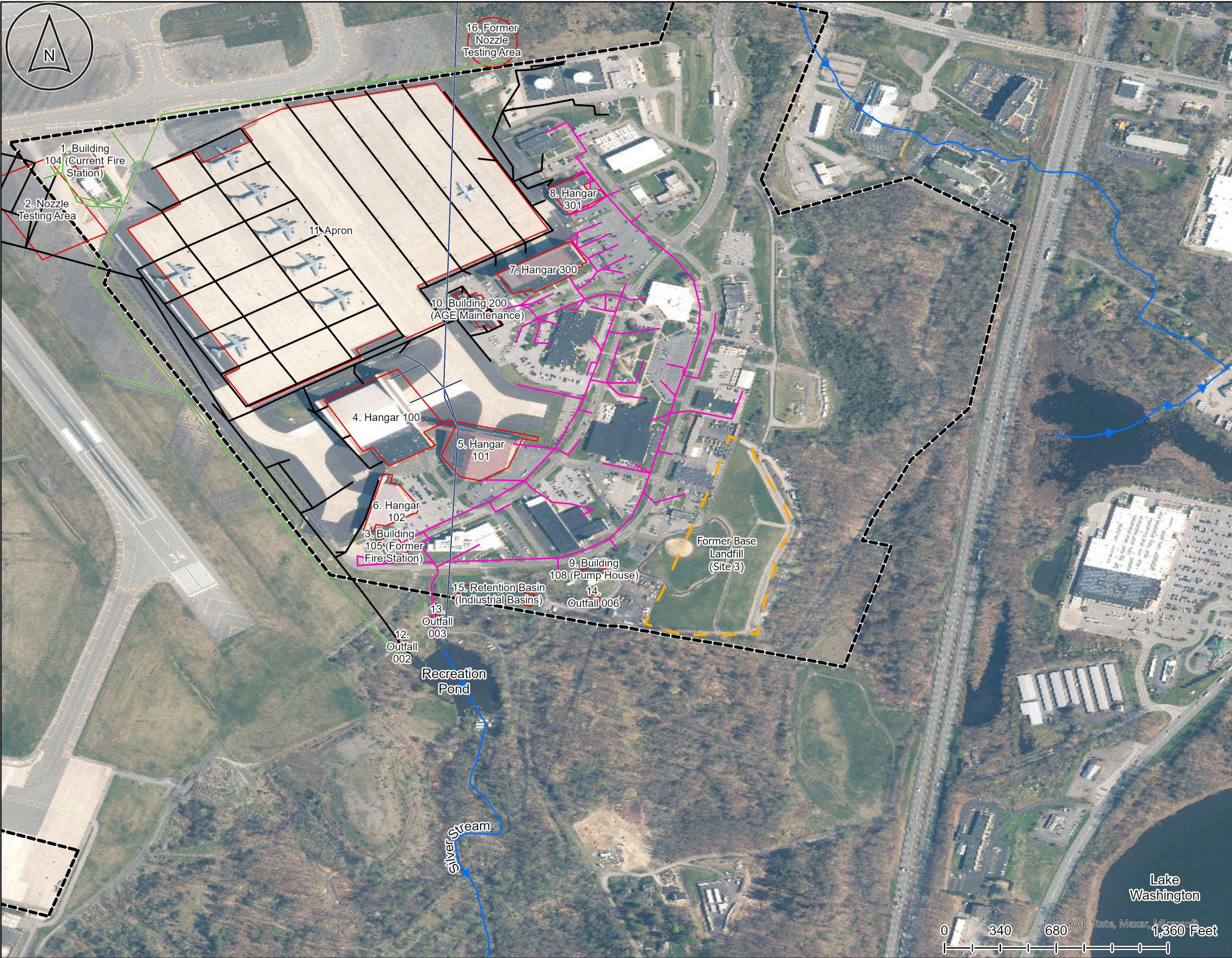
⁶ Whelton, Andrew; Purdue University Lyles School of Civil Engineering Environmental & Ecological Engineering, "Where we are Today: Cured in Place Pipe Lining (CIPP) Chemical Emissions and Safety", September 2019,
<https://engineering.purdue.edu/CIPPSafety/resources/ACEC-2019-09-26.pdf>

2. NGB/A4VR has documented the comments received during the public comment period in a responsiveness summary included in the NTCRA Action Memorandum. If you have any questions on the responses, please contact me at william.myer.2@us.af.mil or 774-994-7265.

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William Myer, GS-13
 Environmental Restoration Program Manager



Legend

Stormwater Line

- Outfall 002
- Outfall 003
- Outfall 17K
- Outfall A
- ➔ Surface Water Flow
- Former Base Landfill
- Potential AFFF Area of Concern
- Installation Boundary

Notes:
AFFF: aqueous film forming foam
ANGB: Air National Guard Base

This figure has been pulled from the Final Critical Process Analysis (CPA) Phase 1 Report (Wood 2024a).

Stewart ANGB
Newburgh, Orange County, NY

Stewart ANG Base and Area Features



Air Force Civil Engineer Center
2261 Hughes Avenue
Building 171, Suite 155
JBSA Lackland, Texas 78236

Figure 1

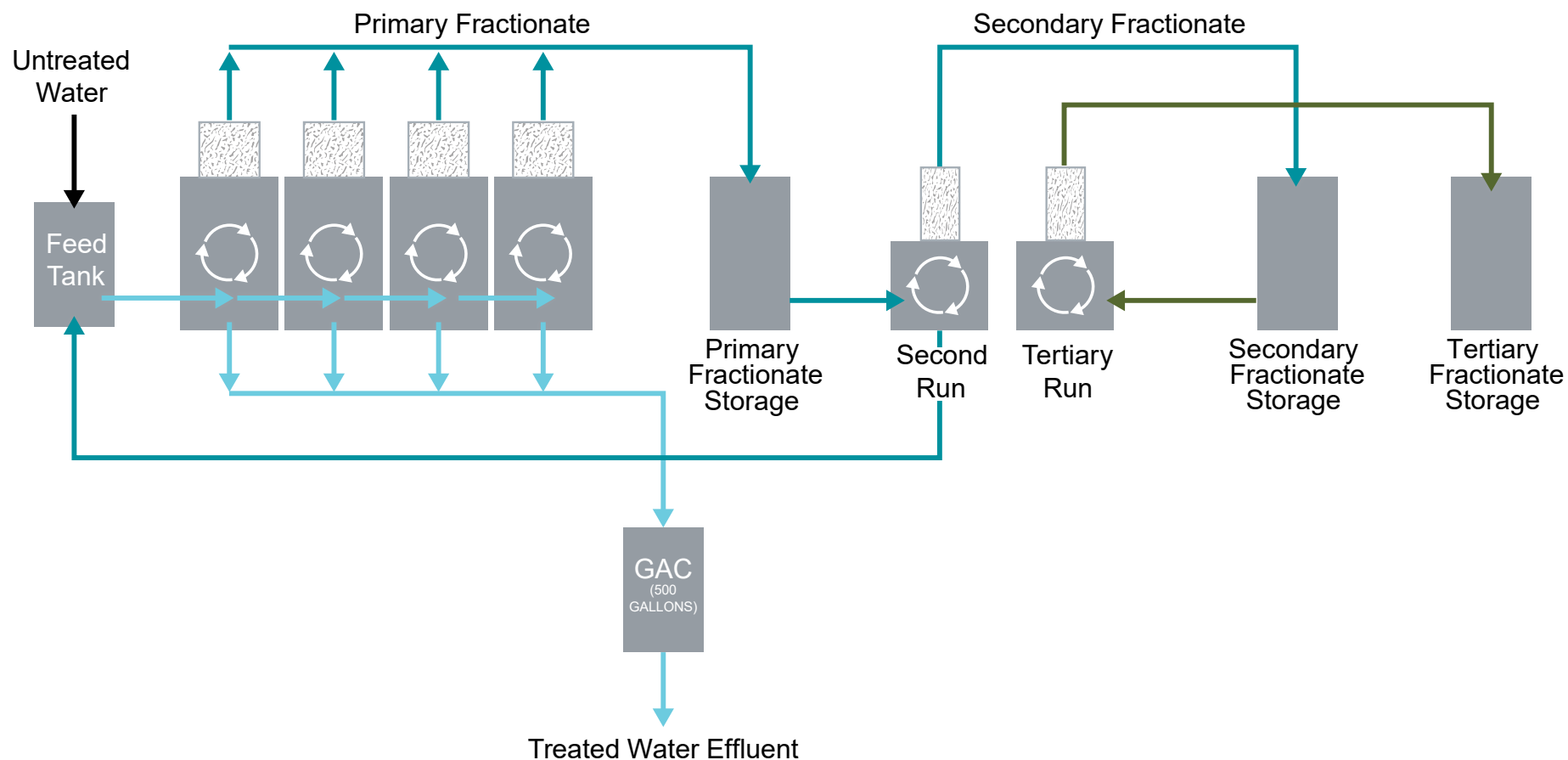
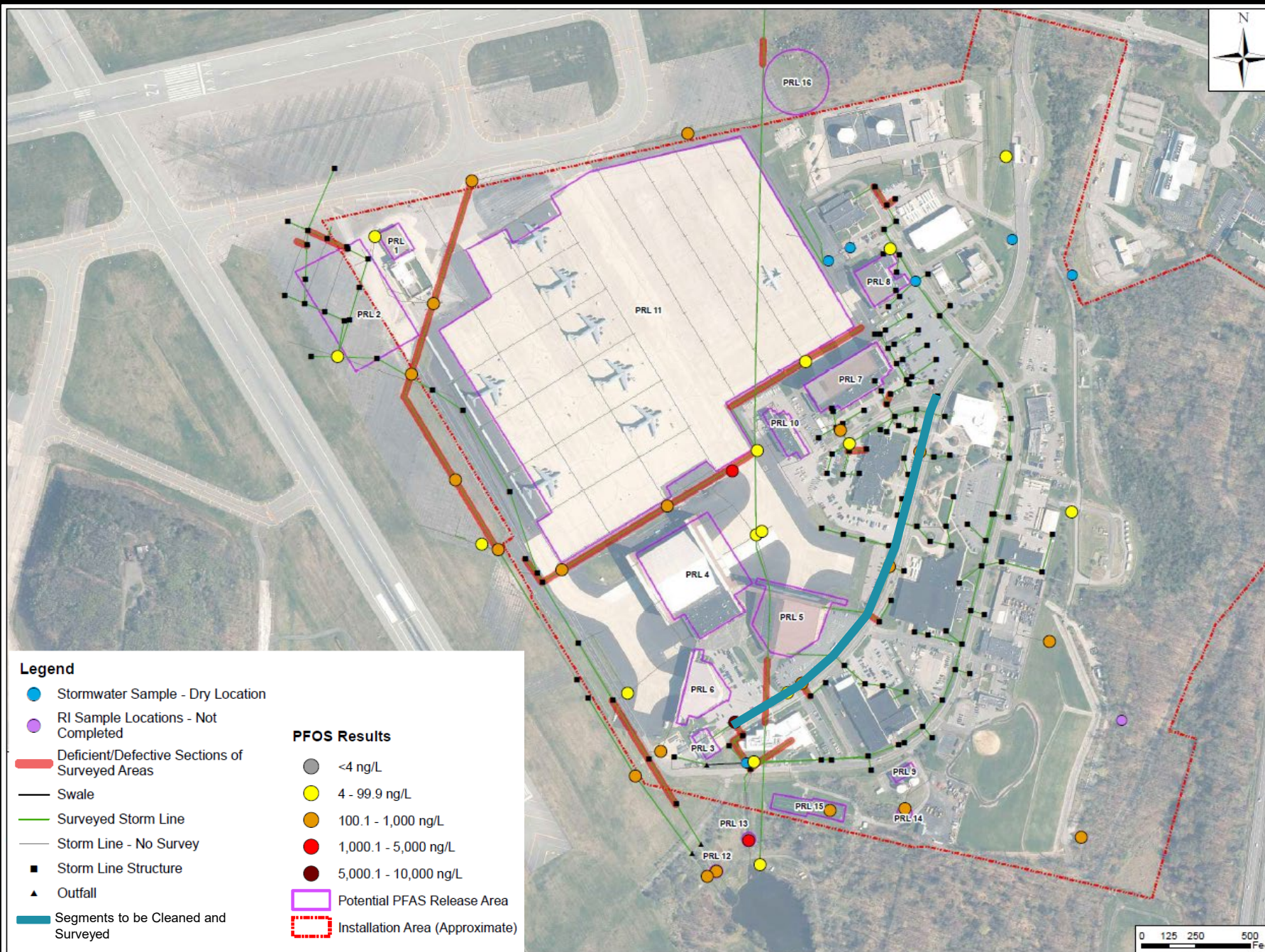


FIGURE 2
Alternative A4
Groundwater Interception
with Foam Fractionation
and GAC Treatment
 Stewart ANGB
 Newburgh, Orange County, NY

NOTE:
 GAC = Granular Activated Carbon





Notes:

1. PFOS Screening Level = 4 nanograms per liter (ng/L)
2. No storm water results for PFOS were non-detect.
3. Storm line defects included water infiltration, fractures, cracks, and holes.
4. The orange highlighted sections of stormwater lines represent those sections that are initially planned for rehabilitation.
5. The blue highlighted sections of stormwater lines will be cleaned and surveyed. Should damaged be observed in these sections, then additional planning and rehabilitation may be conducted.

This figure has been pulled and modified from the Restoration Advisory Board (RAB) Meeting No. 17 presentation hosted on January 31, 2024.

Stewart ANGB
Newburgh, Orange County, NY

**Alternative B3 CIPP Lining Method -
Identified Stormwater Infrastructure
Sections for Rehabilitation**



Figure 3