

Integrated PFAS Remediation Paves the Way for Airport Development

Cost-Efficient, Colloidal Carbon-Based
Approach Enables Construction Progress While
Effectively Mitigating Environmental Risk



Highlights

Site Type

Airport cargo facility redevelopment

Location

Alaska

Site Conditions

Peat bog wetland requiring land surcharging and structural fill placement

Contaminants

Per- and polyfluoroalkyl substances (PFAS) associated with historical aqueous film-forming foam (AFFF) releases

Project Driver

Regulatory compliance – Soil and groundwater concentrations exceeded Alaska Department of Environmental Conservation (ADEC) cleanup levels under 18 AAC 75

Remedial Approach

Construction-integrated PFAS plume control using SourceStop colloidal activated carbon (CAC) and powdered activated carbon (PAC) blended with non-frost susceptible (NFS) structural fill

Summary

Development of a large cargo facility at an international cargo airport in Alaska required construction across a peat bog wetland where PFAS contamination associated with historical AFFF use had been identified in soil and groundwater. Because construction involved surcharging and structural fill placement, a strategy was needed to prevent migration of PFAS-impacted water during earthwork activities. To address this risk, the project team implemented a phased, construction-integrated PFAS migration control system using SourceStop®-amended fill and permeable sorptive barriers across multiple areas of the site. The innovative in situ approach reduces the potential for downstream groundwater impacts while avoiding pumping, waste generation, and schedule disruptions.

Background

The project involved redevelopment of a large cargo facility at an international airport in Alaska, where site investigations identified PFAS impacts in soil and groundwater associated with historical use of AFFF.

The site is underlain by saturated peat deposits over a confining layer, resulting in perched groundwater conditions. Construction activities required surcharging of the peat and placement of structural fill to improve load-bearing capacity. This process compresses the peat, displacing pore water and creating the potential for PFAS-impacted water to migrate beyond the site if not controlled.

To mitigate PFAS risk, a phased mitigation strategy was implemented across multiple areas of the site, integrating sorptive treatment directly into construction activities.





Remedial Strategy

The remediation approach focused on creating passive sorptive treatment zones within engineered fill and trench systems to intercept PFAS-impacted water generated during surcharging and shallow groundwater flow. The system was implemented across multiple phases and treatment areas:

Northeast Area – Permeable Trench Barrier A permeable trench barrier approximately 879 ft in length was installed along the northeastern portion of the site. The trench was excavated through peat deposits and backfilled with NFS material amended with SourceStop and PAC, forming a sorptive barrier to intercept shallow groundwater migration.

Fill Integration – Northeast and Southern Areas Carbon-amended NFS fill was incorporated into structural fill placement areas, including a ~700-ft long southern boundary zone (10 ft wide × 2 ft deep). These treatment zones were designed to intercept water displaced during peat compression and provide lateral PFAS migration control.

Utility Corridor Treatment A localized treatment zone (~50 ft in length) was constructed along a utility corridor using the same amendment approach to address potential PFAS migration pathways associated with utility installation.

Across all phases, SourceStop CAC and PAC were blended with NFS fill to create permeable sorptive media capable of immobilizing PFAS within the subsurface.



Construction Benefits of SourceStop-Amended Fill



The use of SourceStop and PAC-amended fill provided several practical advantages during construction:

- Dust-minimized application compared to dry carbon handling
- Compatible with standard excavation and fill placement workflows
- Flexible implementation across trench, fill, and utility corridor applications
- Efficient mixing and placement using conventional earthmoving equipment

These advantages supported efficient installation across multiple phases and helped maintain construction productivity while implementing PFAS treatment.

Construction and Application

Application Details

Site Conditions:

- Peat bog wetland with perched groundwater
- Peat thickness approximately 3–13 ft
- Groundwater movement influenced by surcharging and site grading

Treatment System Geometry:

- Trench barrier: ~879 ft long × ~4 ft wide
- Southern boundary fill integration: ~700 ft × 10 ft × 2 ft
- Utility corridor: ~50 ft treatment zone

Amendment Quantities:

~231,500 lbs SourceStop and PAC amendment blend (total project) (mixed into NFS Fill material)

PFAS treatment was integrated directly into ongoing construction activities using standard earthmoving equipment and workflows. For the trench installation, excavators operated in tandem to remove peat soils and place amended NFS fill, minimizing groundwater accumulation and maintaining trench stability.

For the fill integration areas, NFS material was staged in controlled batches and amended with SourceStop and PAC prior to placement. PAC was applied directly to staged fill material, while SourceStop was introduced and distributed across the material. The amended fill was mechanically mixed using excavators or wheel loaders until a homogeneous blend was achieved. In certain areas, geotextile fabric was placed prior to fill placement to support treatment zone integrity.

The treated material was then transported, placed, and graded to design specifications using standard construction equipment. This phased approach allowed treatment zones to be installed concurrently with site development activities and ensuring the construction timeline was not impacted.



Excavation prior to installation of permeable trench barrier

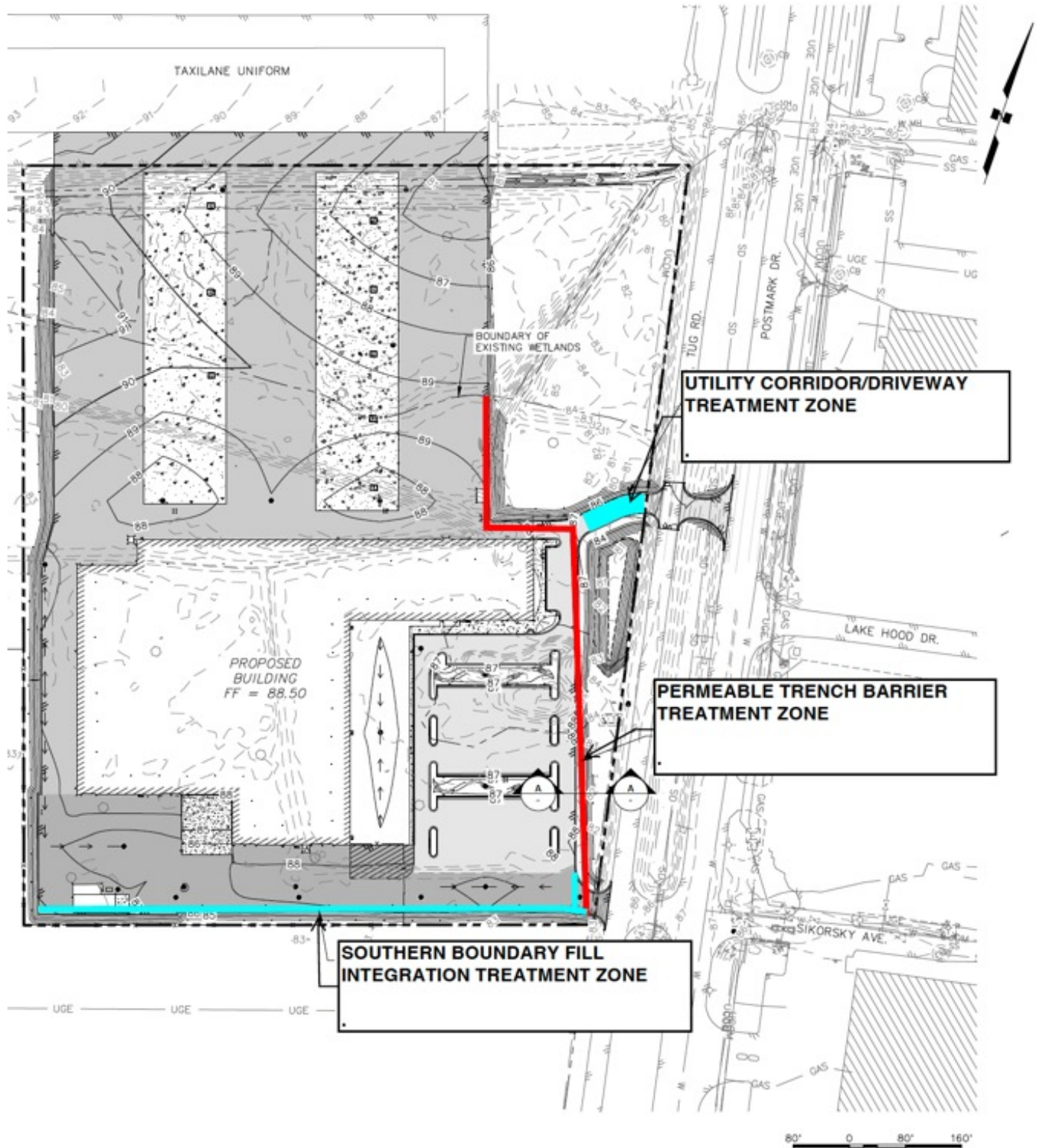


SourceStop spray-applied to NFS fill material



Placement of SourceStop-amended fill to create a permeable sorptive barrier

Figure 1 **Treatment Zone Map**



Results

The phased implementation of the colloidal activated carbon-amended fill and permeable trench barriers provided an effective, construction-integrated solution to manage PFAS migration during development of the cargo facility.

As peat soils were compressed during surcharging, displaced water was directed through engineered treatment zones where PFAS compounds were adsorbed onto activated carbon, reducing the potential for migration beyond the project boundary. The system also intercepts shallow groundwater flow, limiting PFAS transport and reducing potential exposure to downgradient receptors.

Because the remediation relies entirely on passive sorption processes, the system requires:

- no pumps
- no electrical power
- no ongoing operational maintenance
- no ongoing PFAS waste management

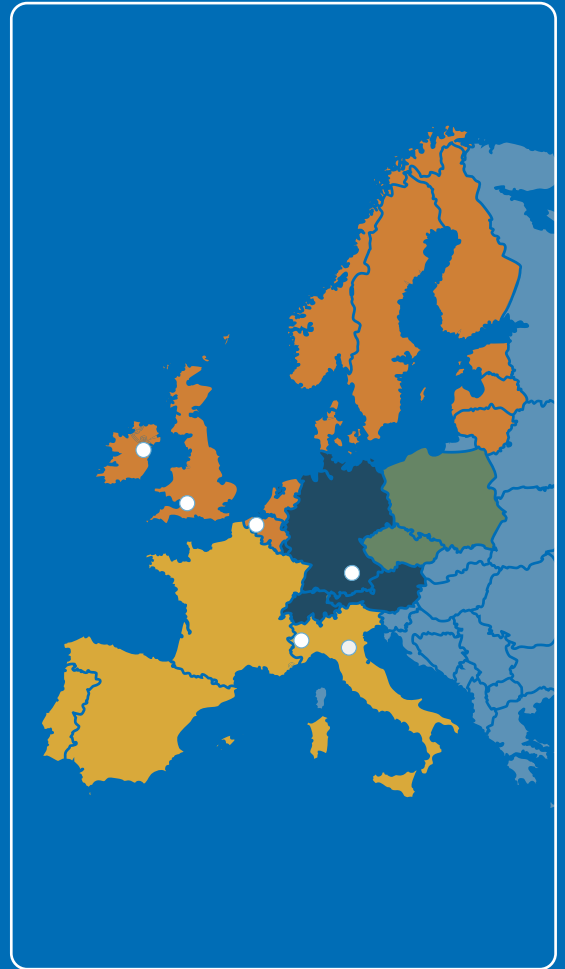
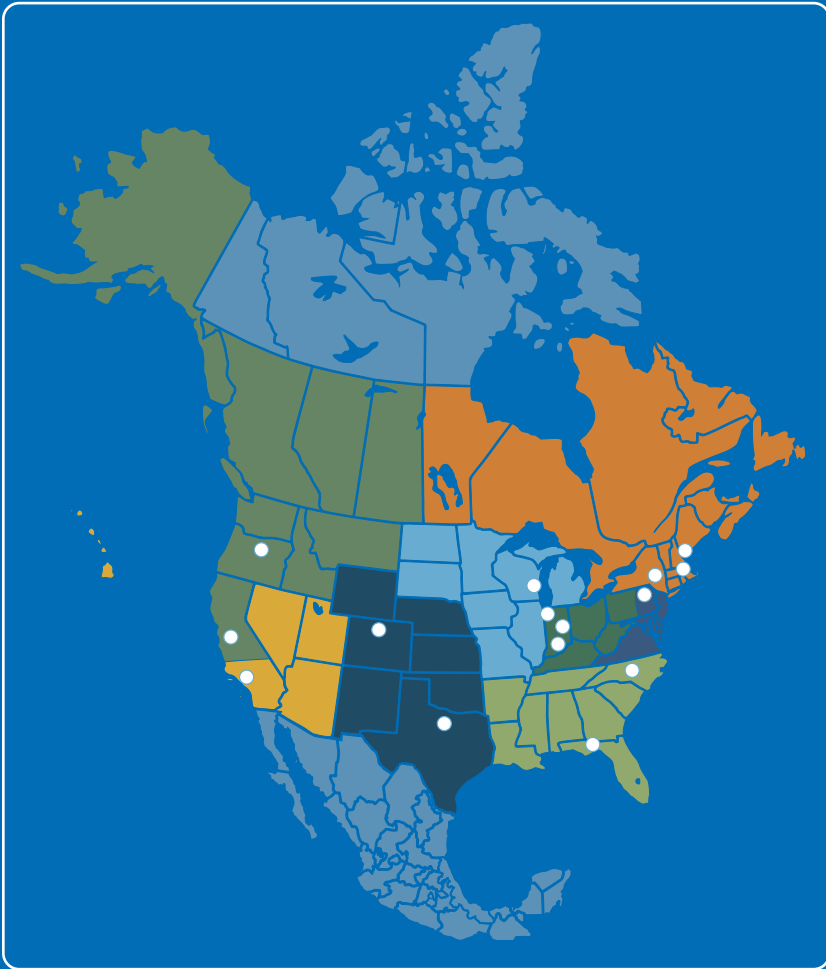
The PFAS treatment system was implemented seamlessly across multiple construction phases, allowing PFAS control measures to be installed concurrently with earthwork and fill placement. This approach eliminated the need for separate treatment infrastructure or schedule disruptions, helping maintain project timelines while proactively managing PFAS migration risk.

By integrating SourceStop with phased construction activities across multiple treatment zones, this project demonstrates how passive PFAS migration control strategies can be leveraged during site development to achieve remediation objectives and reduce downstream exposure risk.



Have a challenge? Let's solve it together.

Contact us today to discuss your specific needs.



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