

Fact Sheet: Performance-Based Remediation at the Former Galena Forward Operating Location, Alaska

The Air Force has awarded a contract for Performance-Based Remediation (PBR) for 31 sites at the Former Galena Forward Operating Location (FOL), Alaska. Parsons is the prime contractor and is teamed with CH2M HILL and Ahtna Engineering Services, LLC. The objective of the contract is to maximize the number of "Site Closeouts" (SC) (i.e., complete all cleanup actions and meet cleanup goals) at the Former Galena FOL, or advance sites as close to SC as practicable during the 6-year period of performance in a cost effective manner. Parsons and their teaming partners will provide a full range of construction and environmental restoration activities to achieve the performance objectives and support cleanup for the 31 sites.

Purpose

This fact sheet is provided for Public Review and Comment of the proposed remedies at the Former Galena FOL in accordance with Alaska Department of Environmental Conservation (ADEC) guidance. Contaminated sites at the Former Galena FOL are regulated under two different programs as described below. Both programs require public notification and review of the proposed remedies. This fact sheet provides a summary of the potential cleanup techniques, along with tables and figures summarizing the proposed remedy at each site.

Site Characterization Sites

ADEC regulates sites contaminated with petroleum hydrocarbons under the State of Alaska Contaminated Sites Program. ADEC regulations require public review of the proposed remedy before approval of a Cleanup Plan for each site. The locations of the Site Characterization sites are shown on Figure 1. The proposed remedies for sites under the Contaminated Sites Program will be presented for public review during a Restoration Advisory Board (RAB) meeting to be held on August 19, 2014 at 7:00 pm at the Larsen Charlie Hall in Galena, Alaska.

CERCLA Sites

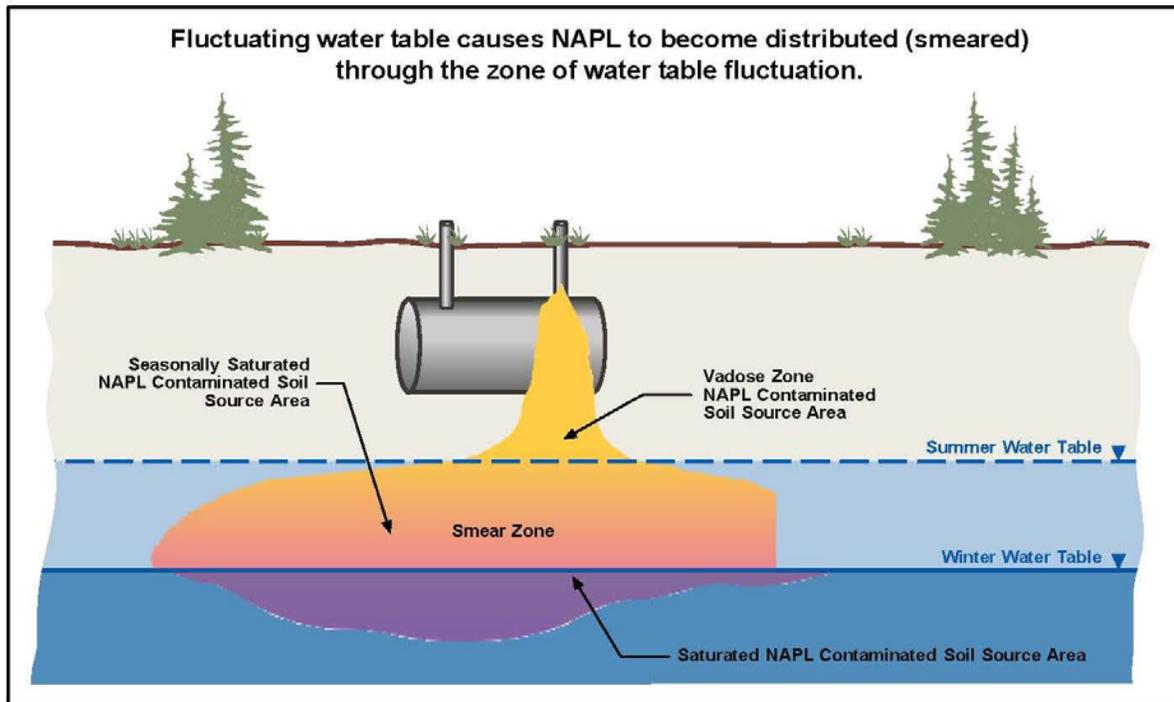
Sites that contain contaminants other than petroleum hydrocarbons (such as chlorinated solvents) or in addition to petroleum hydrocarbons are regulated by the US Environmental Protection Agency (US EPA) using guidelines specified in the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). For Galena, ADEC provides oversight of CERCLA sites on behalf of and in coordination with US EPA. The locations of the CERCLA sites are shown on Figure 2. The proposed remedies for CERCLA sites are presented for public review in a document called the Proposed Plan. Formal review periods for Proposed Plans will occur at a later date after Feasibility Studies have been completed. The proposed remedies for CERCLA sites will be summarized at the August RAB meeting to familiarize the public with the remedies and the review process.

Generalized Conceptual Site Model

Sources of contamination at the Former Galena FOL may include leaks or spills from underground or above ground storage tanks, pipelines fill stands, oil water separators, or dry wells. Once released, contaminants migrate downward through soil until reaching the water table. The water table at Galena fluctuates each year by up to 20 feet or more due to the rise and fall of the Yukon River. The zone between the high and low water tables is referred to as the "variably saturated zone" or VSZ. Because fuels are lighter than water, the rise and fall of the water table causes petroleum hydrocarbons to be "smeared" across the VSZ. The distribution of contaminants between the vadose zone (above the high water table elevation),

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the VSZ, and the permanently saturated zone (below the low water table elevation) influences the cleanup techniques that can be used. For example, a technology that extracts contaminant in soil vapor can only be used for the VSZ during the winter when the water table is low.



Nature and Extent of Contamination

Areas of soil contamination at the Former Galena FOL are shown on Figure 3 for contaminants exceeding human health criteria and Figure 4 for soil exceeding migration to groundwater criteria. Areas of groundwater contamination that exceed ADEC groundwater cleanup levels for diesel-range organics (DRO), benzene, and trichloroethene (TCE) are shown on Figure 5. The areas of contamination are associated with the 31 Site Characterization or CERCLA sites being addressed under the PBR effort.

The attached figures are based on the information presented in the Site Characterization, Remedial Investigation, and Groundwater Reports for the Galena sites. These documents are listed in Table 4 and can be downloaded from the Air Force's Administrative Record website at <http://afcec.publicadmin-record.us.af.mil/Search.aspx>. The Air Force is in the process of updating these reports to include the most recent information collected in 2013; however, the overall understanding of contamination has not changed significantly.

Applicable Technologies

A number of proven technologies were considered for the PBR effort. These technologies are listed in Table 1. When considering cleanup technologies for the Former Galena FOL, consideration was given to site-specific conditions such as the large seasonal variation in groundwater, as well as the expense and practicality of shipping materials and chemicals to Galena or having to handle hazardous materials or wastes.

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Several types of treatment technologies have been selected for the Former Galena FOL:

- **Excavation of Contaminated Soil:** Where practical, soil contaminated with petroleum hydrocarbons will be removed and treated at the Galena Landfarm located near Campion. If excavated soil contains hazardous chemicals, it will be disposed of in a licensed facility off-site. Clean fill material will be placed back in the excavation and the site will be restored to its initial condition.
- **Subsurface Aeration or Venting:** Several technologies associated with aeration or venting of contaminated soil may be used. Soil vapor extraction (SVE) removes contamination from the subsurface soil by creating a vacuum and extracting the soil vapor and volatile contaminants. Bioventing injects air into subsurface soil to stimulate aerobic biodegradation of petroleum hydrocarbons. Air can also be injected below the water table to volatilize and biodegrade contaminants in groundwater through processes referred to as air sparging or biosparging. These methods require the installation of vent wells and blowers installed in sheds. These systems may require operation over several years.
- **Injection of Remedial Agents:** Injection of remedial agents can be used to treat contaminated soil and groundwater. For example, injection of sulfate into groundwater can stimulate biodegradation of petroleum hydrocarbons through the process of sulfate reduction. Injection usually occurs in one-time or infrequent events using direct-push drilling methods that do not leave wells or equipment behind.
- **Monitored Natural Attenuation (MNA):** MNA relies on natural processes to degrade or attenuate contaminants in the subsurface. MNA may be used as a component of the remedy at sites with petroleum hydrocarbons or chlorinated solvents in groundwater. While more aggressive cleanup techniques are used to address contaminant source areas, MNA is often used to address lesser contamination at the fringes or downgradient areas of groundwater plumes.
- **Land Use Controls (LUCs):** Land use or institutional controls are implemented when residual contamination remains in place that may pose a potential risk. For example, the drilling of water wells may be restricted while a site is undergoing long-term monitoring for MNA.

Technology Selection and Schedule:

Petroleum Hydrocarbon Sites

The proposed technical approach for each site regulated under the ADEC Contaminated Sites Program is listed on Table 2. Table 2 summarizes the different cleanup techniques that are proposed for each site, and a schedule of when the technologies will be implemented. The locations of the sites under the Contaminated Sites Program are shown on Figure 1. Table 2 also lists potential property owners that may be affected by cleanup operations. Because groundwater plumes can extend past site boundaries, property owners that may be impacted by the installation and monitoring of groundwater wells are not listed in Table 2.

CERCLA Sites

The proposed technical approach for each site regulated under the CERCLA program is listed on Table 3, and the location of the CERCLA sites are shown on Figure 2. A Proposed Plan will be prepared for public review and comment at a later date that describes the cleanup

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techniques for CERCLA sites.

Public Review and Comment:

The public is invited to comment on the proposed remedies during a RAB meeting to be held on August 19, 2014 at 7:00 pm at the Larsen Charlie Hall in Galena, Alaska. Representatives from Parsons, CH2M HILL, and the Air Force will be available to field questions from the public. Alternately, the public may provide comments in writing to either of the following:

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Comments will be accepted until August 29, 2014.

Table 1
Cleanup Technologies for the Former Galena FOL

Technology	Type of Application	Advantages	Limitations
Excavation and Disposal	<ul style="list-style-type: none"> Contaminated surface soil Soil contaminated with metals, PAHs, pesticides, and PCBs Debris/drum burial sites Petroleum-contaminated soil unobstructed by utilities and within 15 feet of surface 	<ul style="list-style-type: none"> Rapid achievement of CULs in soil Only practical alternative for certain classes of contaminants (PAHs, metals, PCBs, pesticides) Petroleum-contaminated soil can be treated economically at the landfarm 	<ul style="list-style-type: none"> Expensive for larger sites and when excavated material must be disposed off-site Limited by utilities, infrastructure, and by the water table with depth (practical limit ~15 feet deep without sheet piling and dewatering). Excavation restricted within 400 feet of runway
Bioventing	<ul style="list-style-type: none"> Petroleum contaminants in unsaturated soil 	<ul style="list-style-type: none"> Relatively low cost in situ treatment Proven technology at Galena Works in and around utilities and infrastructure 	<ul style="list-style-type: none"> Deeper portions of VSZ are only unsaturated for a few months each year May exacerbate vapor intrusion problems if implemented near buildings
Soil Vapor Extraction (SVE)	<ul style="list-style-type: none"> VOCs in unsaturated soil, including TCE and benzene 	<ul style="list-style-type: none"> Relatively low cost in situ treatment Proven technology at Galena Works in and around utilities and infrastructure and provides vapor intrusion mitigation 	<ul style="list-style-type: none"> Deeper portions of VSZ are only unsaturated for a few months each year
Biosparging or Airsparging	<ul style="list-style-type: none"> Petroleum contaminants in lower VSZ and groundwater 	<ul style="list-style-type: none"> Airsparging removes contaminants by volatilization and mass transfer to the vadose zone Biosparging enhances aerobic bioremediation of petroleum contaminant and is proven at Galena Both sparging configurations deliver oxygen to saturated soil and groundwater Horizontal sparge wells can deliver oxygen beneath structures and large above ground storage tanks 	<ul style="list-style-type: none"> Requires higher energy blowers Requires specialized screen designs to provide uniform oxygen distribution Airsparging is suitable for volatile contaminants like benzene, but less volatile, long-chain compounds such as DRO are removed by biodegradation (biosparging)
In-situ Chemical Oxidation (ISCO)	<ul style="list-style-type: none"> Organic contaminants 	<ul style="list-style-type: none"> Effective for most organic contaminants Treatment may be completed quickly (days) Can treat beneath buildings and other structures 	<ul style="list-style-type: none"> Chemical oxidation amendments are expensive, some are hazardous chemicals Excavation and bioventing are more cost effective than ISCO when concentrations in soil exceed 500 milligrams per kilogram. Can require multiple injections Difficult to distribute in heterogeneous formations

**Table 1
Cleanup Technologies for the Former Galena FOL**

Technology	Type of Application	Advantages	Limitations
Permeable Reactive Barriers (PRBs)	<ul style="list-style-type: none"> • PRBs are a remediation configuration used to intercept dissolved contaminant plumes • Requires a primary treatment technology such as air sparging or adding an electron acceptor such as sulfate 	<ul style="list-style-type: none"> • Useful to prevent migration of contaminants to potential receptors • May be designed as a passive system requiring little operations and maintenance 	<ul style="list-style-type: none"> • May be difficult to install if relying on deep trenching in loose soil • May need to be operating indefinitely if contaminant source is not adequately removed
Sulfate-Enhanced Bioremediation	<ul style="list-style-type: none"> • Petroleum contaminants in saturated soil and groundwater 	<ul style="list-style-type: none"> • Relatively low cost, low energy, passive • Can deliver electron acceptor at higher loading rate than dissolved air 	<ul style="list-style-type: none"> • Sulfate source (gypsum) must be transported to Galena and injected into the subsurface • May require reinjection of additional sulfate
Enhanced Anaerobic Bioremediation	<ul style="list-style-type: none"> • Chlorinated solvents in groundwater that are degraded under anaerobic conditions 	<ul style="list-style-type: none"> • Relatively low cost, low energy, passive • Involves injection of non-hazardous materials such as sugars, whey or emulsified vegetable oil 	<ul style="list-style-type: none"> • Materials must be transported to Galena and injected into the subsurface • May require more than one injection
Monitored Natural Attenuation (MNA)	<ul style="list-style-type: none"> • Petroleum contaminants • Chlorinated VOC contaminants under specific conditions 	<ul style="list-style-type: none"> • Low energy, low cost, rely on natural processes • Most groundwater plumes at Galena show evidence of MNA processes including limited migration and presence of degradation products 	<ul style="list-style-type: none"> • Long time to meet CULs; practical only as supplement to more active remedies • Large source mass will strain capacity of attenuation processes / result in longer plumes

Notes:

CULs – Cleanup Levels

DRO – diesel range organics

ISCO – In Situ Chemical Oxidation

MNA – monitored natural attenuation

PAHs - polycyclic aromatic hydrocarbons

PCBs – polychlorinated biphenyls

PRBs – permeable reactive barriers

SVE – soil vapor extraction

TCE - trichloroethene

VOCs – volatile organic compounds

VSZ – variably saturated zone

**TABLE 2
TECHNICAL APPROACH AND SCHEDULE SUMMARY FOR PETROLEUM CONTAMINATED SITES**

Site ID and Description	Affected Property Owners*	Technical Approach	Schedule
CG001/CG002 - Million Gallon Hill/ Missile Storage Area	City of Galena	<ul style="list-style-type: none"> • Replace existing bioventing system with expanded biosparge/bioventing system to treat petroleum contamination in the deeper variably saturated zone (VSZ) soil and groundwater using horizontal wells. 	<ul style="list-style-type: none"> • 2014 – 2016 – Complete planning documents • 2017 – Install biosparge/bioventing system • 2039 – Anticipated date to achieve Cleanup Complete (Site Closeout)
SS005 - Wilderness Hall (Bldg 1872)	City of Galena (School)	<ul style="list-style-type: none"> • Biosparge/bioventing to treat petroleum contamination in deeper VSZ soil and groundwater. 	<ul style="list-style-type: none"> • 2014 – 2015 Complete planning documents • 2016 – Install biosparge/bioventing system • 2021 – Anticipated date to achieve Cleanup Complete (Site Closeout)
ST005 / CB001 POL Tank Farm / Galena Aviation Vocation Technical Center	ADOT / City of Galena (School)	<ul style="list-style-type: none"> • Expand the existing bioventing and Soil Vapor Extraction (SVE) systems with a more aggressive biosparge/bioventing to treat petroleum contamination in deeper VSZ soil and groundwater. 	<ul style="list-style-type: none"> • 2014 – 2015 Complete planning documents • 2016 – Install vertical wells for biosparging/SVE • 2017 – Install horizontal biosparge wells • 2032 - Anticipated date to achieve Cleanup Complete (Site Closeout)
ST009 - West Unit JP-4 Fuel Stands	ADOT	<ul style="list-style-type: none"> • Excavate non-petroleum contaminants in surface soil. • SVE to rapidly reduce benzene concentrations in vadose zone and VSZ soil. • Transition SVE to bioventing to treat petroleum contaminants after benzene concentrations decrease. • Inject sulfate to enhance biodegradation of petroleum contaminants in groundwater. 	<ul style="list-style-type: none"> • 2014-2015 – Complete planning documents • 2015 – Complete excavation • 2016 – Install SVE system • 2018 – Complete sulfate injections • 2042 - Anticipated date to achieve Cleanup Complete (Site Closeout)
ST010 - Southeast Runway Fuel Spill	ADOT	<ul style="list-style-type: none"> • Bioventing for petroleum contamination in vadose zone and VSZ soil. • Monitored Natural Attenuation (MNA) for contamination in groundwater. 	<ul style="list-style-type: none"> • 2014 – 2015 – Complete planning documents • 2016 – Install bioventing system and start MNA sampling for groundwater • 2039 - Anticipated date to achieve Cleanup Complete (Site Closeout)
SS014/SS017 – Birchwood Hangar/ Former Truck Fillstands	US Fish and Wildlife Service/ City of Galena/ ADOT	<ul style="list-style-type: none"> • Bioventing for petroleum contamination in vadose zone and VSZ. • Inject sulfate to enhance biodegradation of petroleum contaminants in groundwater. • Excavate arsenic in surface soil if it is attributed to a source-related release. 	<ul style="list-style-type: none"> • 2014-2015 – Complete planning documents • 2016 – Install bioventing system • 2018 Complete sulfate injections • 2038 - Anticipated date to achieve Cleanup Complete (Site Closeout)

**TABLE 2
TECHNICAL APPROACH AND SCHEDULE SUMMARY FOR PETROLEUM CONTAMINATED SITES**

Site ID and Description	Affected Property Owners*	Technical Approach	Schedule
SS016 - Building 2541 – Former POL Fuel Lab	ADOT (BLM)	<ul style="list-style-type: none"> • Bioventing for petroleum contamination in vadose zone and VSZ soil. • MNA for groundwater contaminants. 	<ul style="list-style-type: none"> • 2014-2015 – Complete planning documents • 2016 – Install bioventing system and start MNA sampling for groundwater • 2036 – Anticipated date to achieve Cleanup Complete (Site Closeout)
ST020 - Building 1837 – Former UST	City of Galena	<ul style="list-style-type: none"> • Excavate and landfarm petroleum-contaminated soil. 	<ul style="list-style-type: none"> • 2014-2015 Complete planning documents • 2015 – Complete excavation • 2016 – Achieve Cleanup Complete (Site Closeout)
SS021 - Building 1549 Old Fire Station	ADOT	<ul style="list-style-type: none"> • Site Characterization has not detected any contaminant releases sourced from SS021. • Administratively close site and address contamination beneath the site as part of the SS017 cleanup. 	<ul style="list-style-type: none"> • 2014-2015 – Complete Site Characterization Addendum report • 2015 - Achieve Cleanup Complete (Site Closeout)
TU001 - Power Plant Tank 49	City of Galena	<ul style="list-style-type: none"> • Excavate and landfarm contaminated surface soil. • Biosparge/bioventing for petroleum contamination in VSZ soil and groundwater. 	<ul style="list-style-type: none"> • 2014-2015 - Complete planning documents • 2015 –Complete excavation • 2015 – Install biosparge system • 2028 - Anticipated date to achieve Cleanup Complete (Site Closeout)
CSS001 (AST1569) - Electric Power Station AST	ADOT (City of Galena)	<ul style="list-style-type: none"> • Excavate and landfarm petroleum-contaminated soil. 	<ul style="list-style-type: none"> • 2014-2015 Complete planning documents • 2015 – Complete excavation • 2016 – Achieve Cleanup Complete (Site Closeout)
CSS002 (B1812) - Building 1812 Former Hazardous Waste Satellite Accumulation Point	City of Galena	<ul style="list-style-type: none"> • Excavate and landfarm petroleum-contaminated soil to 15 feet bgs. • Excavate surface soil contaminated with PAHs/ lead. • Bioventing for remaining petroleum contaminants in vadose zone and VSZ soil. • MNA for groundwater contaminants 	<ul style="list-style-type: none"> • 2014-2015 – Complete planning documents • 2015 – Complete excavation • 2016 – Install bioventing system and start MNA sampling for groundwater • 2020 – Achieve Cleanup Complete with Land Use Controls (LUCs) (Response Complete) • 2050 –Anticipated date to Achieve Cleanup Complete (Site Closeout)
CSS005 (PADS) - Refueling Pads	US Fish and Wildlife Service (ADOT)	<ul style="list-style-type: none"> • Excavate and landfarm petroleum-contaminated soil. 	<ul style="list-style-type: none"> • 2014-2015 Complete planning documents • 2015 – Complete excavation • 2016 – Achieve Cleanup Complete (Site Closeout)

**TABLE 2
TECHNICAL APPROACH AND SCHEDULE SUMMARY FOR PETROLEUM CONTAMINATED SITES**

Site ID and Description	Affected Property Owners*	Technical Approach	Schedule
CPL006 (OAP) -Old Abandoned Pipeline	City of Galena/ ADOT (School)	<ul style="list-style-type: none"> Bioventing for petroleum-contaminated soil in vadose zone and VSZ west of Wilderness Hall and in airfield area. MNA for groundwater contaminants. 	<ul style="list-style-type: none"> 2014-2015 – Complete planning documents 2016 – Install bioventing system, start MNA sampling for groundwater 2040 – Anticipated date to achieve Cleanup Complete (Site Closeout)
CST011 (UST1428) - Combat Alert Cell USTs	US Fish and Wildlife Service (ADOT)	<ul style="list-style-type: none"> Remove existing USTs abandoned in place and excavate/ landfarm petroleum-contaminated soil. In Situ Chemical Oxidation (ISCO) to treat contaminants in soil below the bottom of the excavation and under the building. 	<ul style="list-style-type: none"> 2014-2015 – Complete planning documents 2015 – Complete excavation and ISCO injections 2020 – Achieve Cleanup Complete with LUCs (Response Complete) 2025 – Anticipated date to Achieve Cleanup Complete (Site Closeout)
CST013 (UST1770) - Former Incinerator USTs	City of Galena	<ul style="list-style-type: none"> Excavate and landfarm petroleum-contaminated soil. 	<ul style="list-style-type: none"> 2014-2015 – Complete planning documents 2015 – Complete excavation 2016 – Achieve Cleanup Complete (Site Closeout)
CST014 (UST1859) - Dining Facility UST	City of Galena (School)	<ul style="list-style-type: none"> Biosparge/bioventing to treat petroleum contamination in deeper VSZ soil and groundwater. 	<ul style="list-style-type: none"> 2014-2015 – Complete planning documents 2016 – Install biosparge system 2020 – Achieve Cleanup Complete with LUCs (Response Complete) 2028 – Anticipated date to Achieve Cleanup Complete (Site Closeout)
CST009 (UST1400) - Building 1400 Former Ammunition Storage UST	BLM (ADOT)	<ul style="list-style-type: none"> Excavate and landfarm petroleum-contaminated soil. 	<ul style="list-style-type: none"> 2014-2015 – Complete planning documents 2015 – Complete excavation 2016 – Achieve Cleanup Complete (Site Closeout)

- Property owners that may be impacted by cleanup activities. Entities in parenthesis may be indirectly affected (for example, monitoring wells may be installed on downgradient properties or activities may occur in the general vicinity of buildings used by the Galena Interior Learning Academy).

**TABLE 3
TECHNICAL APPROACH AND SCHEDULE SUMMARY FOR CERCLA SITES**

Site ID and Description	Affected Property Owners*	Technical Approach	Schedule
FT001 - Fire Protection Training Area	ADOT	<ul style="list-style-type: none"> • Soil vapor extraction (SVE) for trichloroethene (TCE) in vadose zone and VSZ soil. • Transition the SVE system to bioventing for residual petroleum contamination. • Monitored natural attenuation (MNA) for groundwater contaminants. 	<ul style="list-style-type: none"> • 2014-2015 – Complete Feasibility Study (FS), Proposed Plan (PP), Record of Decision (ROD), and Remedial Action Work Plan (RAWP) • 2016 – Install SVE/bioventing system and start MNA sampling for groundwater • 2037 – Anticipated date to achieve Cleanup Complete (Site Closeout)
SS006 - TCE Area (Bldg 1845)	City of Galena	<ul style="list-style-type: none"> • SVE for chlorinated volatile organic compounds (VOCs) in vadose zone and VSZ soil. • Enhanced anaerobic bioremediation for chlorinated VOCs in groundwater. • Excavate/off-site disposal (if necessary) for non-volatile contaminants in surface soil. 	<ul style="list-style-type: none"> • 2014-2015 – Complete FS, PP, and ROD • 2015-2016 – Complete RAWP • 2016 – Install SVE system • 2017 – Complete bioremediation injections • 2027 – Anticipated date to achieve Cleanup Complete (Site Closeout)
SS013 - Control Tower Drum Storage Area, South	ADOT / BLM	<ul style="list-style-type: none"> • Land Use Controls (LUCs) for low level contaminants. 	<ul style="list-style-type: none"> • 2015 – Complete Remedial Investigation Report • 2016-2017 – Complete FS, PP, and ROD • 2017 Achieve Cleanup Complete with LUCs (Response Complete)
SS015 - South Apron Maintenance Area	ADOT	<ul style="list-style-type: none"> • SVE for chlorinated VOCs in vadose zone and VSZ soil. • Transition the SVE system to bioventing for residual petroleum contamination. • Enhanced anaerobic bioremediation for high concentrations of chlorinated VOCs in groundwater. • MNA for downgradient plume. 	<ul style="list-style-type: none"> • 2014-2015 – Complete FS, PP, and ROD • 2016 – Complete RAWP and install SVE System • 2017 – Complete bioremediation injections and start MNA sampling for groundwater • 2044 – Anticipated date to achieve Cleanup Complete (Site Closeout)

**TABLE 3
TECHNICAL APPROACH AND SCHEDULE SUMMARY FOR CERCLA SITES**

Site ID and Description	Affected Property Owners*	Technical Approach	Schedule
SS019 - Building 1700 – Refueler Maintenance Shop	City of Galena	<ul style="list-style-type: none"> • Excavate and landfarm petroleum-contaminated soil near former UST and dry well. • SVE for remaining contaminants in vadose zone and VSZ soil (under building, beyond excavation limits). • Address chlorinated VOC contamination east of Bldg 1700 as part of SS006. • LUCs to manage soil remaining above cleanup levels. 	<ul style="list-style-type: none"> • 2014 – Complete Pilot Test Work Plan and FS • 2015 – Install SVE System; complete PP and ROD • 2016 – Complete RAWP; excavate petroleum contaminated soil • 2020 – Achieve Cleanup Complete with LUCs (Response Complete)
SS018 (AOC023) - Waste Accumulation Area - South of Bldg 1499	City of Galena	<ul style="list-style-type: none"> • Excavate and landfarm petroleum-contaminated soil where feasible. • Bioventing for petroleum-contaminated soil beneath pipeline that cannot be safely excavated. • Excavate pesticide-contaminated soil if it exceeds acceptable risk levels. • Address chlorinated VOCs in groundwater as part of SS006. • LUCs to manage soil remaining above cleanup levels. 	<ul style="list-style-type: none"> • 2014 – Complete Bioventing Pilot Test Work Plan and FS • 2015 – Install bioventing system; complete PP and ROD • 2016 – Complete RAWP; excavate petroleum contaminated soil • 2020 – Achieve Cleanup Complete with LUCs (Response Complete)
SS022 (B400) - Building 400 Former CAA- Air Force Weather Station	ADOT / FAA	<ul style="list-style-type: none"> • Excavate and landfarm petroleum-contaminated soil. • SVE for chlorinated VOCs in vadose zone and VSZ soil. • MNA for contaminants in groundwater. 	<ul style="list-style-type: none"> • 2014 – Complete Pilot Test Work Plan and FS • 2015 – Install SVE system; complete PP and ROD • 2016 – Complete RAWP; excavate petroleum contaminated soil • 2020 – Achieve Cleanup Complete (Site Closeout)

**TABLE 3
TECHNICAL APPROACH AND SCHEDULE SUMMARY FOR CERCLA SITES**

Site ID and Description	Affected Property Owners*	Technical Approach	Schedule
DP023 (DSWD) - Former Disposal Site West of Dike	ADOT	<ul style="list-style-type: none"> Conduct a Time Critical Removal Action (TCRA) to excavate / remove / dispose of buried drums, debris, and contaminated soil up to 15 feet below ground surface. LUCs to manage soil remaining above cleanup levels after excavation. 	<ul style="list-style-type: none"> 2014 (September) – Conduct test pit investigation 2014-2015 – Complete TCRA Work Plan 2015 – Complete TCRA (excavation of contaminated soil) 2017 – Complete FS, PP, and ROD 2018 – Complete Additional RAWP, if necessary 2020 – Achieve Cleanup Complete with LUCs (Response Complete)
OW024 (OWS1833) - MWR Storage OWS	City of Galena	<ul style="list-style-type: none"> SVE for VOC contamination in vadose zone and VSZ soil. Excavate / remove arsenic contaminated surface soil if it is attributed to a source-related release. 	<ul style="list-style-type: none"> 2014 – Complete SVE Pilot Test Work Plan and FS 2015 – Install SVE system, complete PP, ROD, and RAWP 2016 – Complete excavation of surface soil (if necessary) 2020 – Achieve Cleanup Complete (Site Closeout)
SS025 - West Perimeter Road TCE Spill	City of Galena/ ADOT	<ul style="list-style-type: none"> Collect additional soil and groundwater samples for delineation. SVE for chlorinated VOCs in vadose zone and VSZ soil. LUCs to manage soil remaining above cleanup levels. 	<ul style="list-style-type: none"> 2014 – Complete SVE Pilot Test Work Plan and FS 2015 – Install SVE System 2016 – Complete PP, ROD, and RAWP 2020 – Achieve Cleanup Complete with LUCs (Response Complete)

- Property owners that may be impacted by cleanup activities. Entities in parenthesis may be indirectly affected (for example, monitoring wells may be installed on downgradient properties or activities may occur in the general vicinity of buildings used by the Galena Interior Learning Academy).

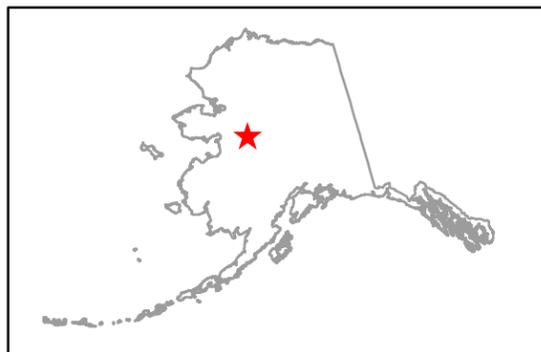
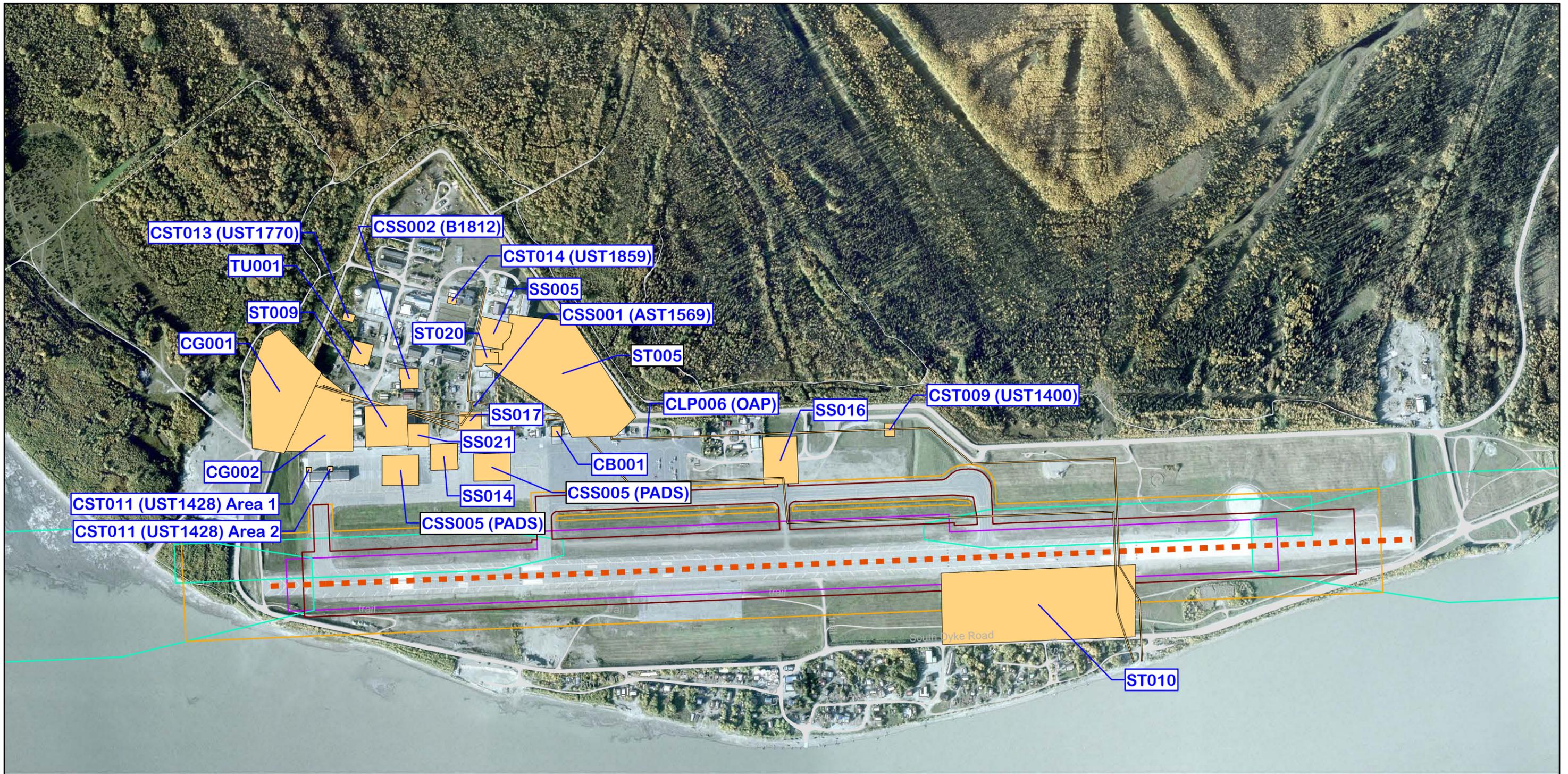
Table 4. Key Reference Documents

Administrative Record (AR): Copies of reference documents with AR-assigned numbers can be downloaded from <http://afcec.publicadmin-record.us.af.mil/Search.aspx>

Entry No.	Document Title	AR Number	Date Issued
1	Final Site Characterization Results Report – Site CG001/CG002	AR 706	September 2013
2	Final Remedial Investigation Results Report – Site FT001	AR 649	June 2013
3	Final Site Characterization Results Report – Site SS005	AR 715	September 2013
4	Final Site Characterization Results Report – Site CB001/ST005	AR 716	September 2013
5	Final Remedial Investigation Results Report – Site SS006/SS019	AR 714	September 2013
6	Final Site Characterization Results Report – Site ST009	AR 691	July 2013
7	Final Site Characterization Results Report – Site ST010	AR 656	April 2013
8	Final Site Characterization Results Report – Site SS014/SS017/SS021	AR 709	September 2013
9	Final Remedial Investigation Results Report – Site SS015	AR 692	July 2013
10	Final Site Characterization Results Report – Site SS016	AR 655	April 2013
11	Final Site Characterization Results Report – Site ST020	AR 704	July 2013
12	Final Site Characterization Results Report – Site TU001	AR 690	July 2013
13	Final Remedial Investigation Results Report – Site AOC023 (SS018)	AR 694	June 2013
14	Final Site Characterization Results Report – Site AST1569 (CSS001)	AR 652	January 2013
15	Final Site Characterization Results Report – Site UST15783 (+B1812 [CSS002])	AR 708	September 2013
16	Final Remedial Investigation Results Report – Site B400 (SS022)	AR 647	May 2013
17	Final Remedial Investigation Results Report – Site DSWD (DP023)	AR 648	May 2013
18	Final Site Characterization Results Report – Site PADS (CSS005)	AR 654	June 2013
19	Final Site Characterization Results Report – Site OAP (CPL006)	AR 653	June 2013
20	Final Remedial Investigation Results Report - Site OWS 1833 (OW024)	AR 650	June 2013

Table 4. Key Reference Documents

Entry No.	Document Title	AR Number	Date Issued
21	Final Site Characterization Results Report – Site UST1770 (CST013)	AR 658	May 2013
22	Final Site Characterization Results Report – Site UST1428 (CST011)	AR 657	April 2013
23	Final Site Characterization Results Report – Site UST1859 (CST014)	AR 693	July 2013
24	Final Remedial Investigation Results Report – Site S1850	AR 651	May 2013
25	Final Hydrogeologic Report	AR 695	July 2013
26	Final Groundwater Contaminant Characterization Report for 2010 and 2011	AR 713	September 2013
27	Technical Memorandum – Summary of April/May 2012 Semi-annual Groundwater Sampling Event	AR 685	June 2012
28	Final 2013 Supplemental Site Characterization Sampling Plan	AR 679	July 2013
29	Final 2013 Supplemental Remedial Investigation and Site Characterization Sampling Plan	AR 703	July 2013
30	Final Addendum Work Plan for 2013 Interim Removal Action at Site SS016	AR 677	2013



- Legend**
- ADOT Runway Control Areas**
- Approach (TERPS)
 - OFA
 - OFZ
 - Safety Area
 - - - Runway Centerline
- Site Characterization Areas
 - Building

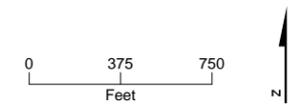


Figure 1
Investigation Areas
for Site Characterization

Former Galena Forward Operating Location, Alaska





Legend

- | | |
|---|---|
|  Approach (TERPS) |  Remedial Investigation Areas |
|  OFA |  Building |
|  OFZ | |
|  Safety Area | |
|  Runway Centerline | |

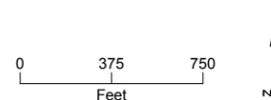


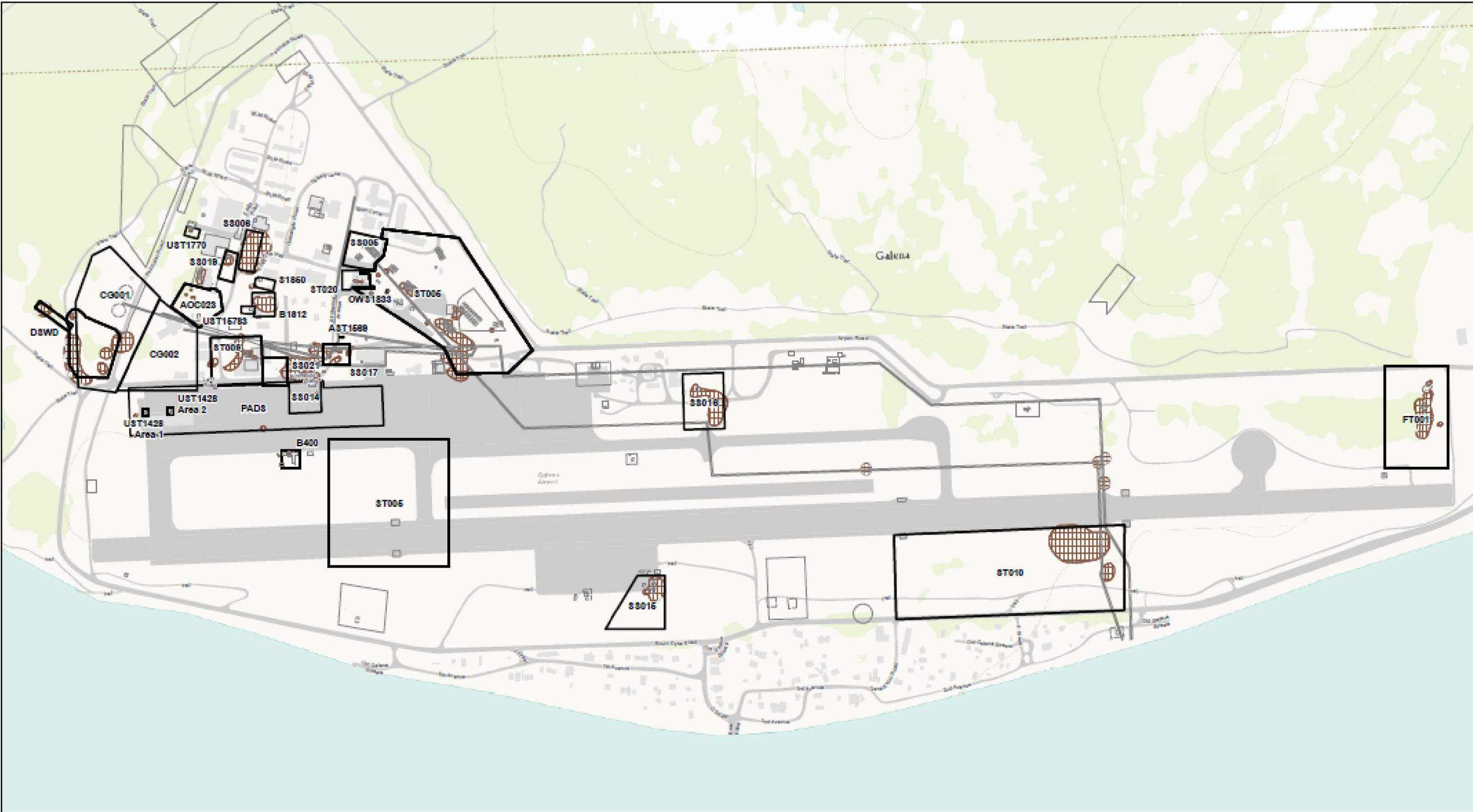
Figure 2

**Investigation Areas
for Remedial Investigation**

Former Galena Forward Operating Location, Alaska

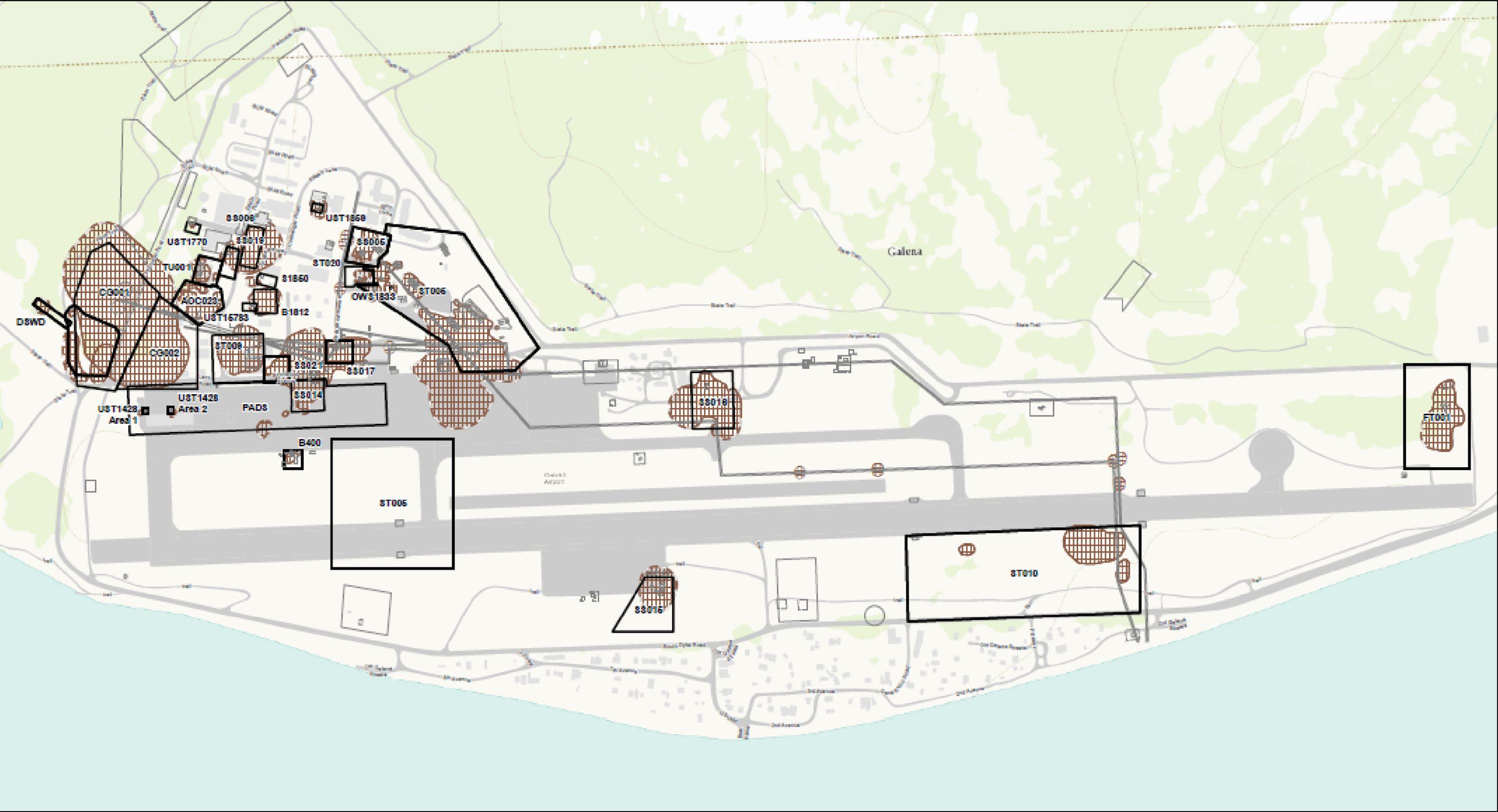


Figure 3: Soil (0-15 feet bgs) exceeding Method 2 Human Health Cleanup Levels



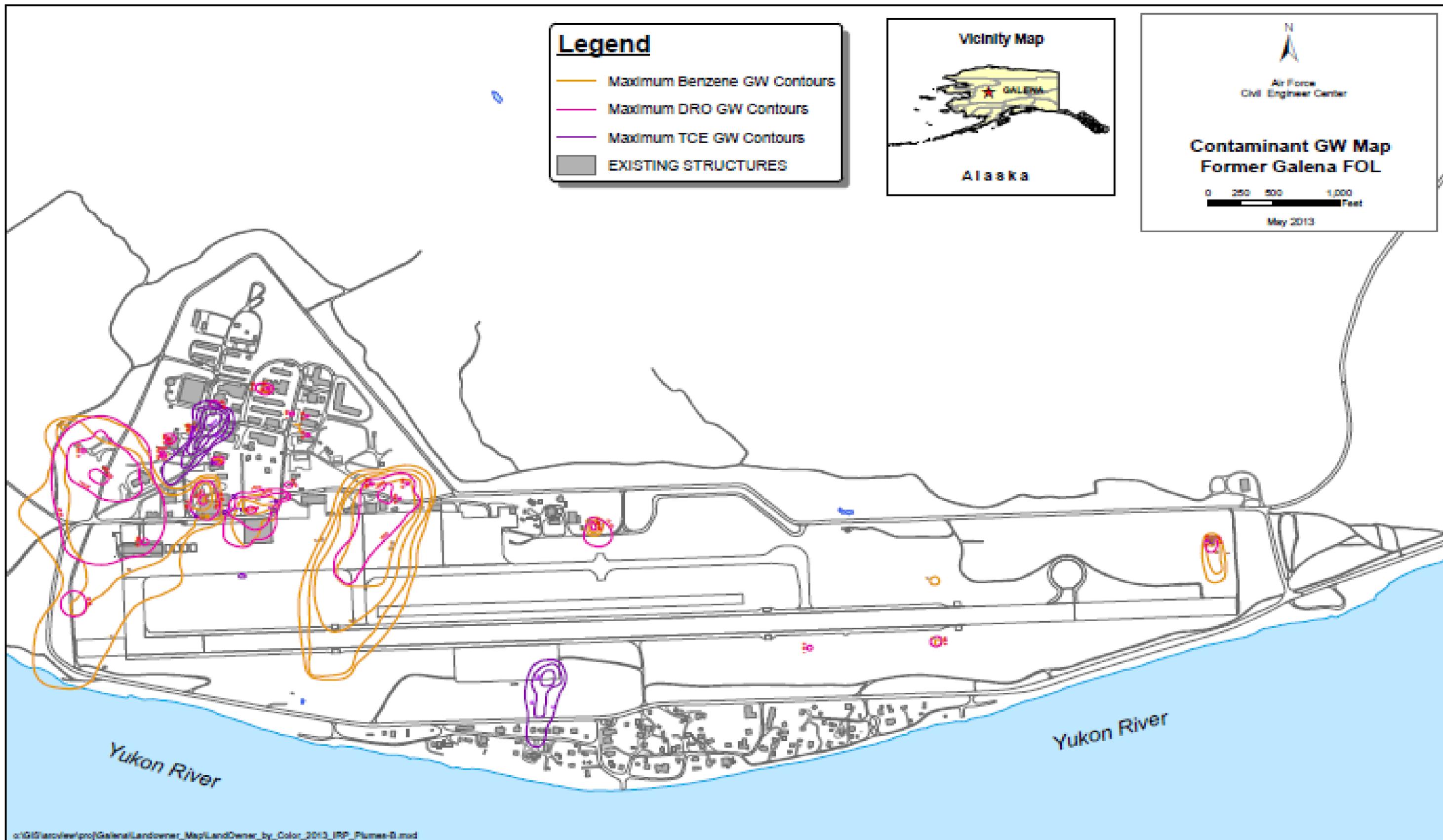
Note: Based on data from SC and RI Reports – does not include data from 2013

Figure 4: Soil (all depths) exceeding Method 2 Migration to Groundwater Cleanup Levels



Note: Based on data from SC and RI Reports – does not include data from 2013

Figure 5: Groundwater exceeding ADEC Cleanup Levels



Note: Based on data from 2007 to 2011