Minor Change to the Off-Post Record of Decision for the Off-Post Groundwater Intercept and Treatment System Modification of the First Creek System

Fact Sheet
June 7, 2021

Purpose of the Fact Sheet

The Record of Decision (ROD) provides the framework, purpose and overall rationale for the environmental cleanup actions to be accomplished at Rocky Mountain Arsenal (RMA). The purpose of this fact sheet is to document minor changes to the requirements of the ROD for the RMA Off-Post Operable Unit (OU) (HLA 1995) related to modifications of the First Creek System (FCS). Flow from the FCS extraction system and the Northern Pathway System extraction system have been treated at the Off-Post Groundwater Intercept and Treatment System (OGITS) in accordance with the ROD. Changes discussed in this Fact Sheet apply only to the FCS portion of the OGITS system.

This fact sheet documents a change in the location of groundwater treatment of the FCS flow from the OGITS to the newly constructed First Creek Treatment System (FCTS). This change is being made to provide operational efficiency for groundwater treatment in the off-post OU. There are no changes in the treatment process, which is designed to ensure that groundwater is treated to ROD remediation goals.

Remediation Framework

The Off-Post ROD was signed by the U.S. Army (Army), the U.S. Environmental Protection Agency (EPA) and the Colorado Department of Public Health and Environment (CDPHE) on December 19, 1995. The On-Post ROD was signed by the Army, EPA and CDPHE on June 10, 1996, with concurrence from the U.S. Fish and Wildlife Service and Shell Oil Company (Shell). The Army, serving as lead agency, and Shell are implementing the on-post and off-post remedies, which include treatment of contaminated groundwater at multiple systems, including the North Boundary Containment System, Northwest Boundary Containment System and OGITS. The locations of the existing treatment systems are shown on Figure 1.

Summary of Site History and Contamination Issues

The RMA is a federally owned facility located in Commerce City, Colorado, approximately 10 miles northeast of downtown Denver. Following the attack on Pearl Harbor, the Army established RMA in 1942 to produce chemical warfare agents and incendiary munitions during World War II. Following the war and through the early 1980s, the Army continued to use these facilities for military production and munitions storage and demilitarization. Beginning in 1946, the Army leased some RMA facilities to private companies to manufacture industrial and agricultural chemicals. Shell Oil Company purchased Julius Hyman and Co., the principal lessee, and continued to manufacture primarily pesticides at RMA from 1950 to 1982. Although the Army and Shell used accepted manufacturing and disposal practices of the time, contamination of soil, sediments, structures and groundwater occurred. The principal contaminants include organochlorine pesticides, heavy metals, chemical agent-degradation products and manufacturing by-products, and chlorinated and aromatic solvents.

In 1984, the Army began a systematic investigation of site contamination in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), and the site was placed on the National Priorities List in 1987. The National Priorities List includes the nation's most contaminated sites, also known as Superfund sites. The RMA was divided into the On-Post OU and Off-Post OU. The On-Post OU addresses contamination within the boundaries of RMA, and the Off-Post OU addresses contamination north and northwest of RMA.

As required by CERCLA, a Remedial Investigation was conducted to determine the nature and extent of contamination in the off-post area (ESE and HLA 1988). The Remedial Investigation identified groundwater as the primary pathway for migration of contamination into the off-post area. An Endangerment Assessment/Feasibility Study (HLA 1992) was conducted for the Off-Post OU leading to the actions required by the Off-Post ROD (HLA 1995). A separate Remedial Investigation/Feasibility Study (Ebasco 1992, FWENC 1995) was conducted for the On-Post OU leading to the actions required by the On-Post ROD (FWENC 1996). Sites that posed potential immediate risks to human health and the environment were addressed through Interim Response Actions.

The remedy selected in the Off-Post ROD consisted primarily of groundwater treatment and exposure control to prevent use of contaminated groundwater. The groundwater remedy, which is ongoing, includes extraction of contaminated groundwater that migrated off post prior to completion of the boundary containment systems, treatment at the OGITS, and reinjection of treated groundwater. Continued operation of the North Boundary Containment System and Northwest Boundary Containment System were identified as part of the off-post remedy, consistent with the remedy selected in the On-Post ROD. Groundwater monitoring continues as part of long-term operations and maintenance. The selected off-post remedy also includes institutional controls to prevent the use of groundwater in which contaminants exceed remediation goals and mapping of groundwater contaminants that exceed containment system remediation goals. The Army also paid to connect residents to treated municipal water supplies. There are no changes to these controls.

Chemicals present in groundwater and treated at the North Boundary Containment System, Northwest Boundary Containment System and OGITS include; volatile halogenated organics, volatile hydrocarbon compounds, volatile aromatic organics, organochlorine pesticides, diisopropylmethyl phosphonate (DIMP), phosphorous and sulfur-containing organic chemicals, semivolatile halogenated organics and arsenic.

Summary of OGITS and FCS

The OGITS was originally constructed in 1993 as an Interim Response Action to extract and treat contaminated alluvial groundwater plumes that had migrated north of RMA prior to construction of the North Boundary Containment System (HLA 1991). The OGITS has treated contaminated groundwater extracted from two systems, the First Creek System and the Northern Pathway System. Both extraction systems are located along Highway 2 north of RMA and the OGITS is located on Peoria Street between 96th Avenue and 104th Avenue, as shown on Figure 1.

The Off-Post ROD describes the operation of the OGITS as follow:

- Removal of contaminated alluvial groundwater north of the RMA boundary in the First Creek and northern paleochannels, using groundwater extraction wells.
- Treatment of the extracted groundwater, using carbon adsorption.
- Recharge the treated groundwater to the alluvial aquifer using recharge wells and trenches.

The FCS began operating in 1993 to intercept contaminated alluvial groundwater flowing along the First Creek paleochannel northwest of the northern boundary of RMA. The extraction and recharge system is located east of Highway 2 between 96th Avenue and 104th Avenue.

The original system consisted of 5 extraction wells, 7 recharge trenches, and pipelines to convey extracted groundwater to the OGITS and treated water back to the recharge trenches. In September 2003, two of the original FCS extraction wells were turned off for hydraulic control purposes (PMRMA 2005). Also, recharge trenches 1 and 2, located along the northeast boundary of the system, were shut down in 2012 and 2009, respectively, to enhance plume capture. The current system configuration is shown on Figure 2.

In 2019, the Army proposed to redesign and replace of most of the system piping in the extraction and recharge area due to failure of the existing rigid piping system caused by fluctuating water tables. As part of this project, a new meter building was constructed near the well field to consolidate flow for piping to the OGITS plant. The project was approved by the regulatory agencies in Design Change Notice DCN-FCS-001 Revision 1, dated June 24, 2020 (Navarro 2020).

In 2021, the Northern Pathway System was modified due to land development in the area. The modifications included adding a separate treatment plant located near the Northern Pathway System extraction wells and eliminated the pipeline from the Northern Pathway System to OGITS, which traversed through an area being developed for residential housing (Navarro 2021a).

Without the Northern Pathway System flow at OGITS, the remaining FCS flow is too low to be effectively treated using the large diameter carbon adsorbers in the OGITS plant. As such, the Army proposed installing new smaller carbon vessels in the OGITS plant. However, after carefully considering all options, the Army determined that installing the smaller vessels in the new metering building would allow contaminated water to be treated at First Creek, rather than piping from First Creek to OGITS. This approach will also enable the OGITS to be shut down and removed. The design for the new meter building was revised to include all necessary elements for treatment, including influent filters, carbon adsorbers, floor drain sump pump, additional piping, and leak detection for the new plant (Navarro 2021b). The new design was approved by the regulatory agencies in Design Change Notice DCN-FCS-001, Revision 2, dated March 12, 2021.

Explanation of Minor Changes to ROD Requirements

Changes to the Off-Post ROD include relocation of groundwater treatment from the OGITS to the new FCTS plant. There are no changes to the existing extraction wells or recharge trenches. The FCTS will use carbon adsorption to treat the contaminated groundwater, consistent with the requirements in the Off-Post ROD. Treated groundwater is returned to the FCS recharge trenches for reinjection into the alluvial aquifer. The new FCTS is located closer to the FCS well field, which will minimize the piping required to transport groundwater to and from the plant. Relocating treatment to the FCTS provides efficiency by using properly sized adsorbers and minimizing transport of groundwater. Implementation of this modification will also allow decommissioning of the OGITS, facilitating land development in that area.

Construction of the treatment building is complete, and installation of treatment equipment and new piping is scheduled to be completed in May 2021. The FCTS will be operated to meet the groundwater containment system remediation goals specified in the ROD for the OGITS. Influent and effluent testing will be conducted during plant start-up to ensure that the containment system remediation goals are being met. Long-term influent and effluent monitoring will be conducted on the same schedule as specified for OGITS, and results will continue to be reported in quarterly effluent reports.

Following start-up of the new system, the pipelines between the FCS and OGITS will either be removed or plugged and abandoned. Demolition of the OGITS treatment building will be evaluated after start-up of the FCTS and the new Northern Pathway Treatment System.

System performance monitoring will continue as detailed in the *Long-Term Monitoring Plan for Groundwater and Surface Water* (TtEC and URS 2010). No changes are required for the FCS monitoring network.

These changes to the off-post remedy entail revisions to the FCS portion of the remedy. However, the overall remediation goals and operational requirements remain unchanged.

Cost

Total project cost for the FCTS is estimated at $717,900. Project cost includes plugging the existing abandoned pipeline for removal at a later date. Operational costs for the new FCTS are likely to be slightly less than the FCS portion of the OGITS operational cost due to the proximity

of the treatment building to the extraction and recharge system, and efficiency of the updated system.

Long-term monitoring costs are not anticipated to increase, as there are no changes needed for the current FCS monitoring. Compliance and performance monitoring will continue as required by the Long-Term Monitoring Plan. The Army is responsible for implementation and operation of the modified FCTS and for the associated costs.

Public Participation

The documents that support the change described here are part of the Administrative Record and are available at the Joint Administrative Record and Document Facility. (Please call 303-289-0300 to schedule an appointment to visit.) Primary documents include the *First Creek Groundwater Intercept System Modification, Design Change Notice DCN-FCS-001, Revision 2* (Navarro 2021b) and the *Final Implementation Document for the Ground-Water Intercept and Treatment System North of Rocky Mountain Arsenal Interim Response Action* (HLA 1991). Site information is also available at the EPA Superfund Record Center located at 1595 Wynkoop Street, Denver, CO 80202, by appointment. To request copies of the administrative record, call 800-227-8917 ext. 312-7273 (toll free).

Information Contact

- U.S. Army Public Relations Office
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- U.S. Environmental Protection Agency
  Sai Appaji
  Remedial Project Manager
  (303) 312-6313

- Colorado Department of Public Health & Environment
  Susan Newton
  State Project Officer
  (303) 692-3321

Document Locations

- Joint Administrative Record and Document Facility
  Rocky Mountain Arsenal
  6550 Gateway Rd., Building 129
  Commerce City, Colorado 80022
  To schedule an appointment to visit, call (303) 289-0300

- EPA Superfund Records Center
  1595 Wynkoop Street
  Denver, CO 80202
  (800) 227-8917 ext 312-7273
  Monday – Friday 8 a.m. – 4 p.m.

References

ESE and HLA (Environmental Science and Engineering, Inc. and Harding Lawson Associates)

1988 (Dec.) *Offpost Operable Unit Remedial Investigation and Chemical Specific Applicable or Relevant and Appropriate Requirements, Final Report*. Version 3.1.

Foster Wheeler (Foster Wheeler Environmental Corporation)

1996 (June) *Record of Decision for the On-Post Operable Unit*. Version 3.1.

HLA (Harding Lawson Associates)

1995 (Dec.) *Rocky Mountain Arsenal Offpost Operable Unit Final Record of Decision, Rocky Mountain Arsenal, Commerce City, Colorado*.

1992 (Nov. 24) *Offpost Operable Unit Endangerment Assessment/Feasibility Study*.

1991 (Jan.) *Final Implementation Document for the Ground-Water Intercept and Treatment System North of Rocky Mountain Arsenal Interim Response Action*.

Navarro (Navarro Research and Engineering, Inc.)

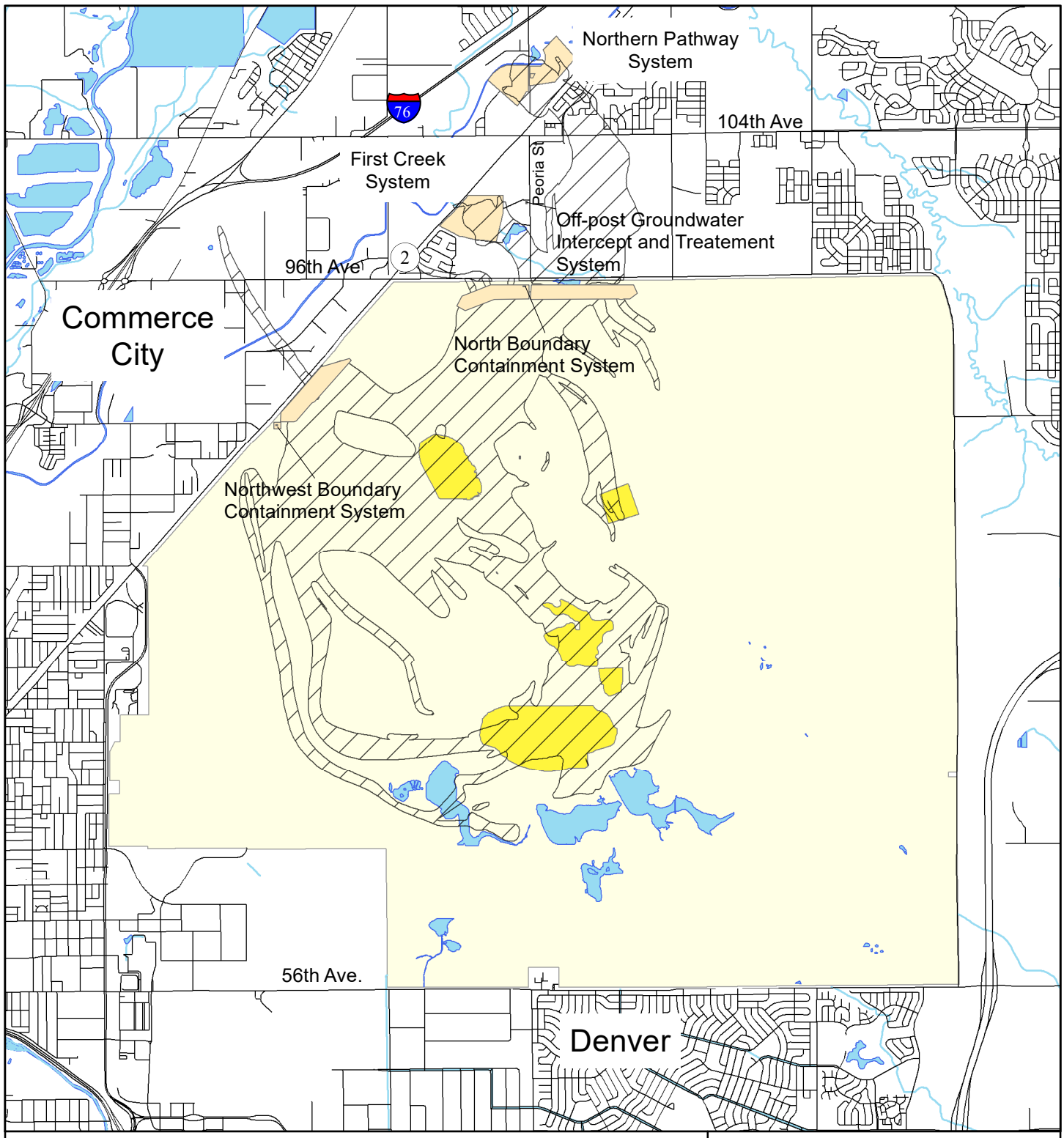
2021a (Feb. 17) *Minor Change to the Off-Post Record of Decision for the Off-Post Groundwater Intercept and Treatment System Modification of the Northern Pathway System.* Fact Sheet.

2021b (Mar. 12) *Design Change Notice First Creek Groundwater Intercept System Modification*. DCN-FCS-001, Revision 2.

2020 (Jun. 24) *Design Change Notice First Creek Groundwater Intercept System Modification*. DCN-FCS-001, Revision 1.

TtEC and URS (Tetra Tech EC, Inc. and URS Corporation)

2010 (Mar.) *Long-Term Monitoring Plan for Groundwater and Surface Water*.



Legend

- Groundwater Contaminant Plume Extent
- Roads
- Bodies of Water
- Former Manufacturing or Waste Disposal Areas
- Treatment System Extraction and Recharge Area
- Rocky Mountain Arsenal / RMA National Wildlife Refuge

N

NAD27-NGVD29 Datum, US Survey Feet, Colorado North Zone

Sources: U.S. Army, RMA GIS, OMC, Shell/AECOM

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Rocky Mountain Arsenal

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Figure 1

Groundwater Treatment System Locations

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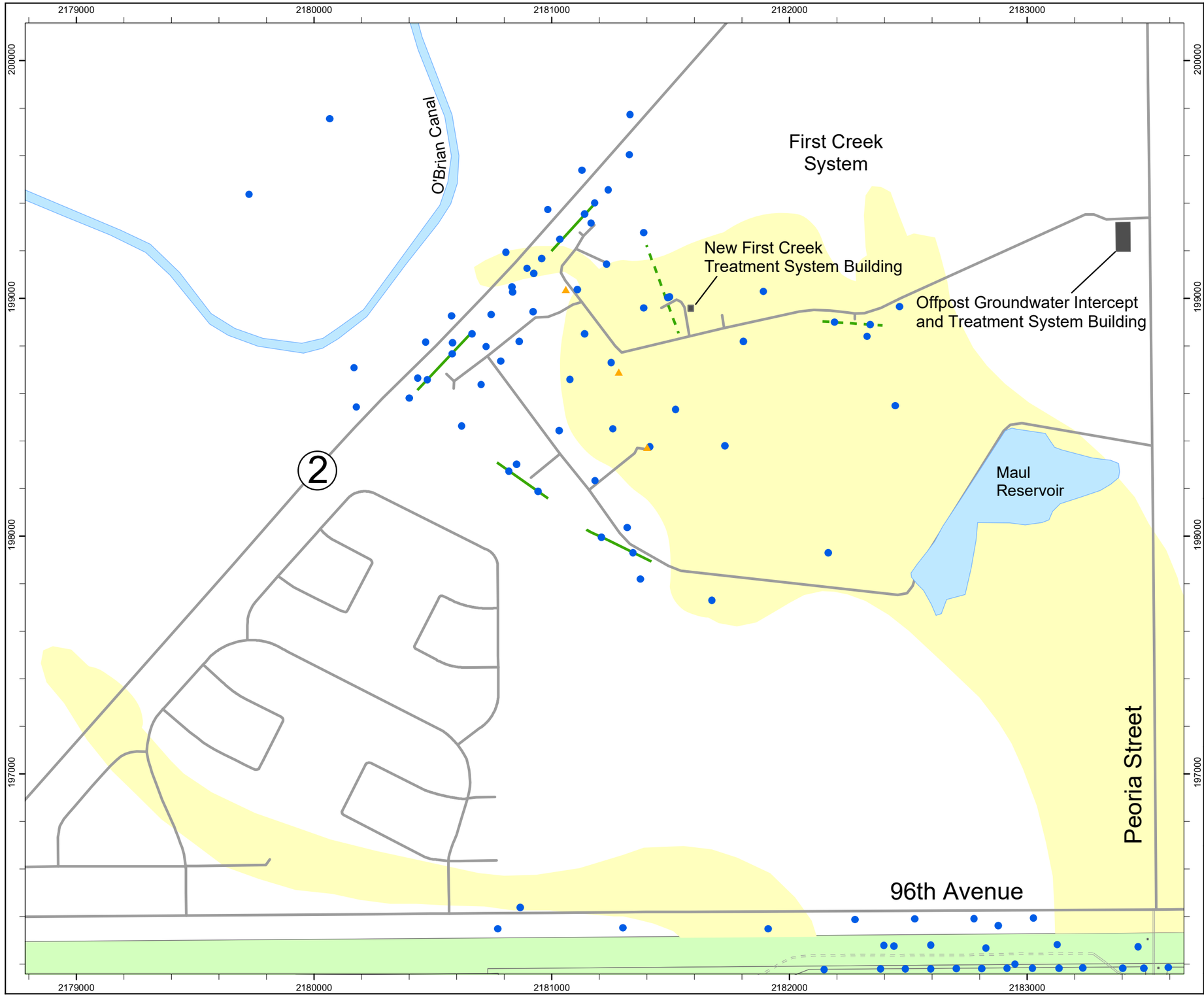

Legend

- Rocky Mountain Arsenal
- 2019 Groundwater Contaminant Plume
- Roads
- Ditches
- Recharge Trench
- Inactive Recharge Trench
- Goundwater Monitoring Well
- Extraction Well

N

0 237.5 475 950

Feet

Sources: U.S. Army, RMA GIS, OMC, Shell/AECOM

State Plane, Colorado North Zone,
NAD27, US Survey Feet

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Figure 2

First Creek System

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