Status of Cleanup at Twin Cities Army Ammunition Plant (TCAAP)

14 January 2021

US Army Environmental Command (USAEC)

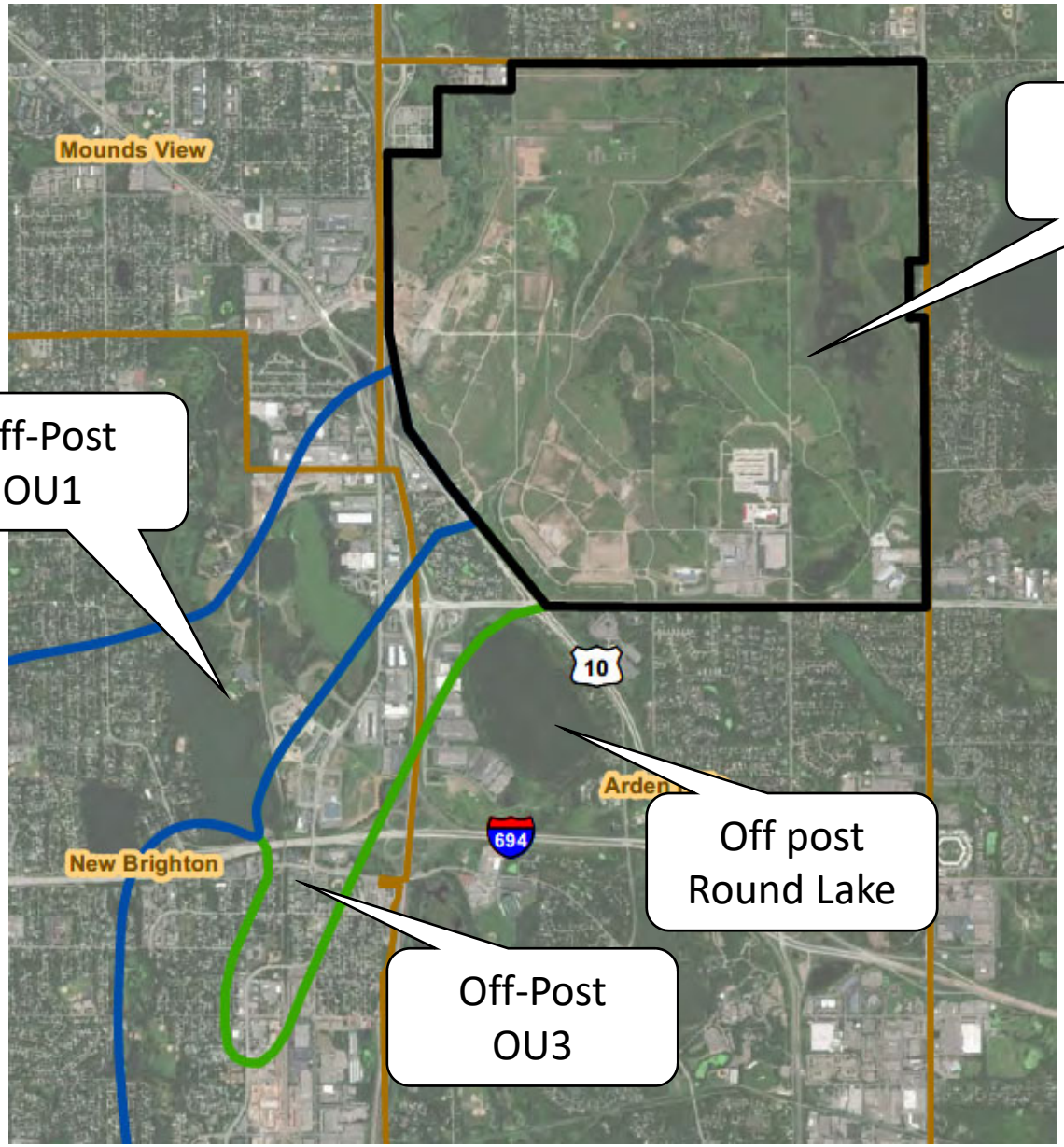
TCAAP History

- The construction of the Twin Cities Army Ammunition Plant began on Aug. 28, 1941, on a site that was primarily farmland. Field construction was completed in January 1943. The principal functions of the facility were the manufacture of small caliber ammunition and related materials and 105 millimeter (mm) and 155mm projectile metal parts, the proof testing of small caliber ammunition, and the storage and handling of strategic and critical raw materials for other government agencies.
- The majority of ammunition manufacturing occurred during World War II (WWII), the Korean Conflict, and the Southeast Asia Conflict. Most of the many tenants performed nonmilitary, industrial-based activities. The TCAAP preliminary assessment (PA) details activities of the various tenants.
- The facility had more than 300 structures, including five major production buildings, numerous auxiliary buildings, and supporting utilities. Between the late 1950s and 2005, when operations were terminated, Alliant Techsystems, Inc. (ATK) (formerly part of Honeywell, Inc., which is potentially responsible for the site) manufactured fuses and selected ammunition at the facility. ATK and their parent company Northrup Grumman are cooperating with the Army in the cleanup of past contamination.
- In 1982 the 25-square-mile New Brighton/Arden Hills superfund site (which includes the entire four-square-mile TCAAP facility) was proposed for addition to the NPL. In September 1983 the superfund site made the final NPL with a hazard ranking index score of 59.6.
- In December 1987 a three-party federal facilities agreement (FFA) between the Army, the USEPA, and the MPCA was implemented. A two-party Defense and State Memorandum of Agreement/Cooperative Agreement between the Army and the MPCA became effective in June 1991. The regulatory driver for TCAAP is the interagency agreement/FFA associated with the NPL site.
- Records of Decision (RODs), ROD Amendments and Explanation of Significant Differences (ESDs) for OU1, OU2 and OU3 are available at https://tcaaprab.org/resources-2/

On-post vs Off-post

- When TCAAP was placed on the National Priorities List (NPL) in 1983, it occupied approximately 2,370 acres in northwest Ramsey County, Minnesota, within the Minneapolis/St. Paul metropolitan area.
- Since 1983, much of the property has been transferred outside of federal ownership to Ramsey County, the city of Arden Hills, National Guard Bureau and Army Reserves.
- For the purposes of cleanup, references to TCAAP include all of the Army-owned installation property in 1983, which is also referred to as operable unit (OU) 2 and considered on-post.

Twin Cities Army Ammunition Plant Cleanup



What has the Army done?

- Many actions have been performed to clean up affected soil and groundwater at the former TCAAP aka New Brighton/Arden Hills Superfund Site, including source removal, groundwater treatment, monitored natural attenuation, capping, soil treatment with an in-situ volatilization system, and soil incineration.
- >94,000 cubic yards of affected soil have been treated
- >More than 200,000 pounds of VOCs have been removed from deep soils
- Successfully extracted VOCs from soils using soil vapor extraction systems
- ~1,500 cubic yards of PCB-impacted soil have been incinerated

What has the Army done (continued)

- OU2 soil and surface water cleanup goals have been met by the Army
- Soil and surface water cleanup actions required by the OU2 ROD & amendments completed
- Risks mitigated and no further Minnesota Environmental Response and Liability Act (MERLA) response actions for OU2 soil and surface water
- EPA delisted OU2 soil and surface water from the NPL September 23, 2019
- Land use control (LUC) for this area now allows access by the general public
- Cleanup work at Round Lake and OU1, OU2, and OU3 groundwater continues

Emerging Chemicals

1,4 Dioxane

- New Brighton discovered 1,4 Dioxane in their wells in early 2015.
- Water was pumped from deeper non-impacted aquifer and then purchased from Minneapolis while treatment train was designed and installed.
- November 2018 an Ultraviolet/Peroxide Advanced Oxidation Process became operational and treatment resumed.
- Periodic sampling continues.

• Per- and polyfluoroalkyl substances (PFAS)

- The Army is investigating potential releases of certain PFAS on all its installations.
- Army's priority is to quickly address PFOS and PFOA in drinking water above EPA safe levels.
- Preliminary Assessment anticipated in 2021.

Where can I find more information?

- The Army's cleanup activities are documented in an Annual Performance Report available at: https://tcaaprab.org/resources-2/
  - The website includes APRs from 1988-2019
- The Installation Action Plan is also updated annually and available on the same page
- Five Year Review Reports document the Army verifying that the remedies put in place are still protective of human health and the environment
  - The website includes 5YR reports from 1999, 2004, 2009, 2014, and 2019
- Land Use Controls documentation is also available for review

Questions

Most Recent Cleanup Activities

- Comprehensive Well Inventory
  - Monitoring Wells (installed to monitor water quality)
  - Extraction Wells (used with pump & treat system)
  - Private Wells (in homes and businesses)
- Optimization of OU1
- Optimization of OU2
- OU2 updates and other activities
- Land Use Control updated based on delisting
- Website Updated
- Remedial Investigation/Feasibility Study for Round Lake
- Admin Record/Information Repository Review and Index Record Update

Twin Cities Army Ammunition Plant Cleanup

LEGEND:

- Operable Unit 1 (North Plume)
- Operable Unit 2 of the New Brighton/ Arden Hills Superfund Site (the same area occupied by the Twin Cities Army Ammunition Plant in 1983, when the Site was placed on the NPL.)
- Operable Unit 3 (South Plume)
- Municipal Boundaries

OU1

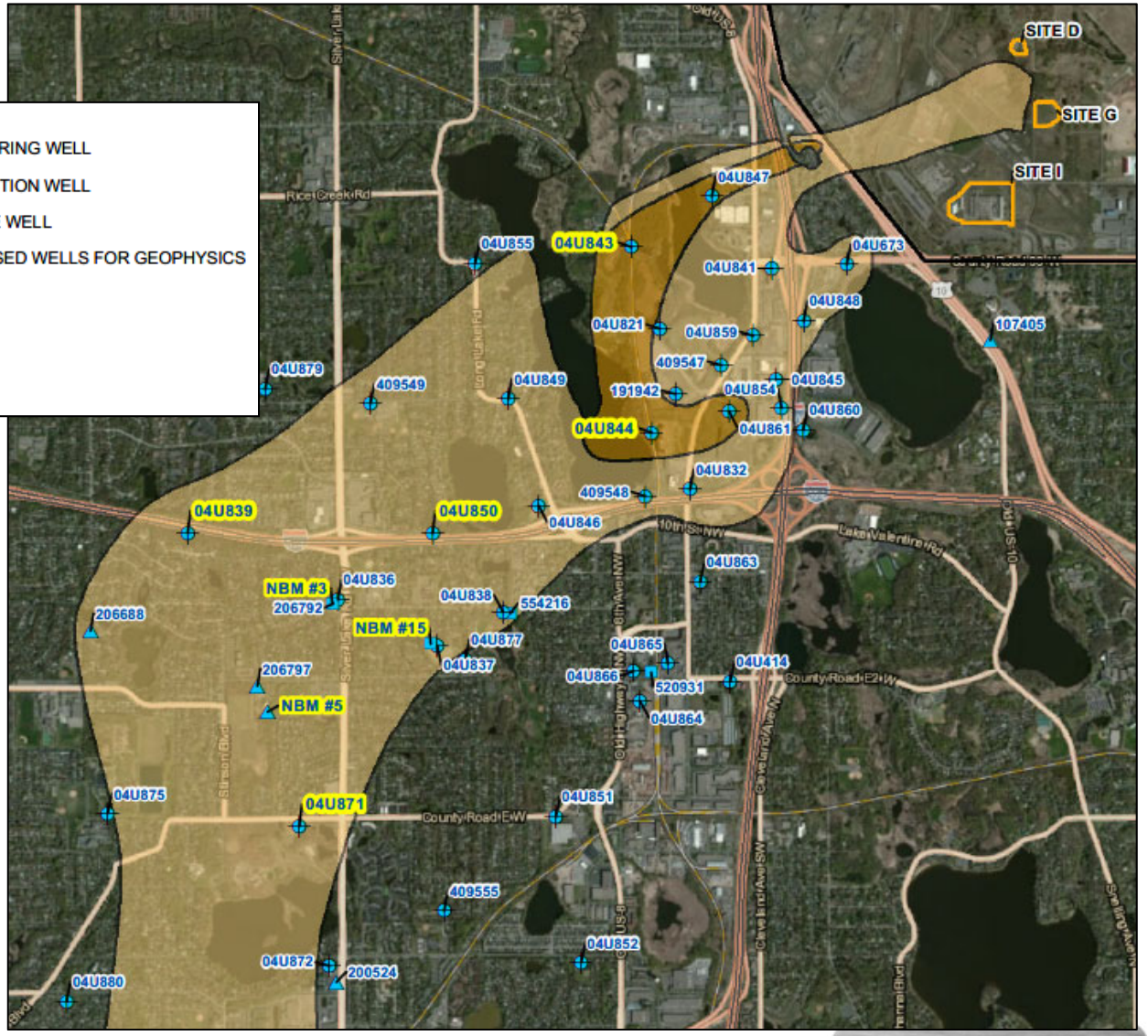
LEGEND:

2019 Trichloroethene Concentrations (µg/L)

Upper Unit 4 (Dashed Where Inferred)

- 5-100
- 100-1,000
- 1,000+
- SITE BOUNDARIES
- OPERABLE UNIT 2
- INTERSTATE

- MONITORING WELL
- EXTRACTION WELL
- PRIVATE WELL
- 04U838 PROPOSED WELLS FOR GEOPHYSICS

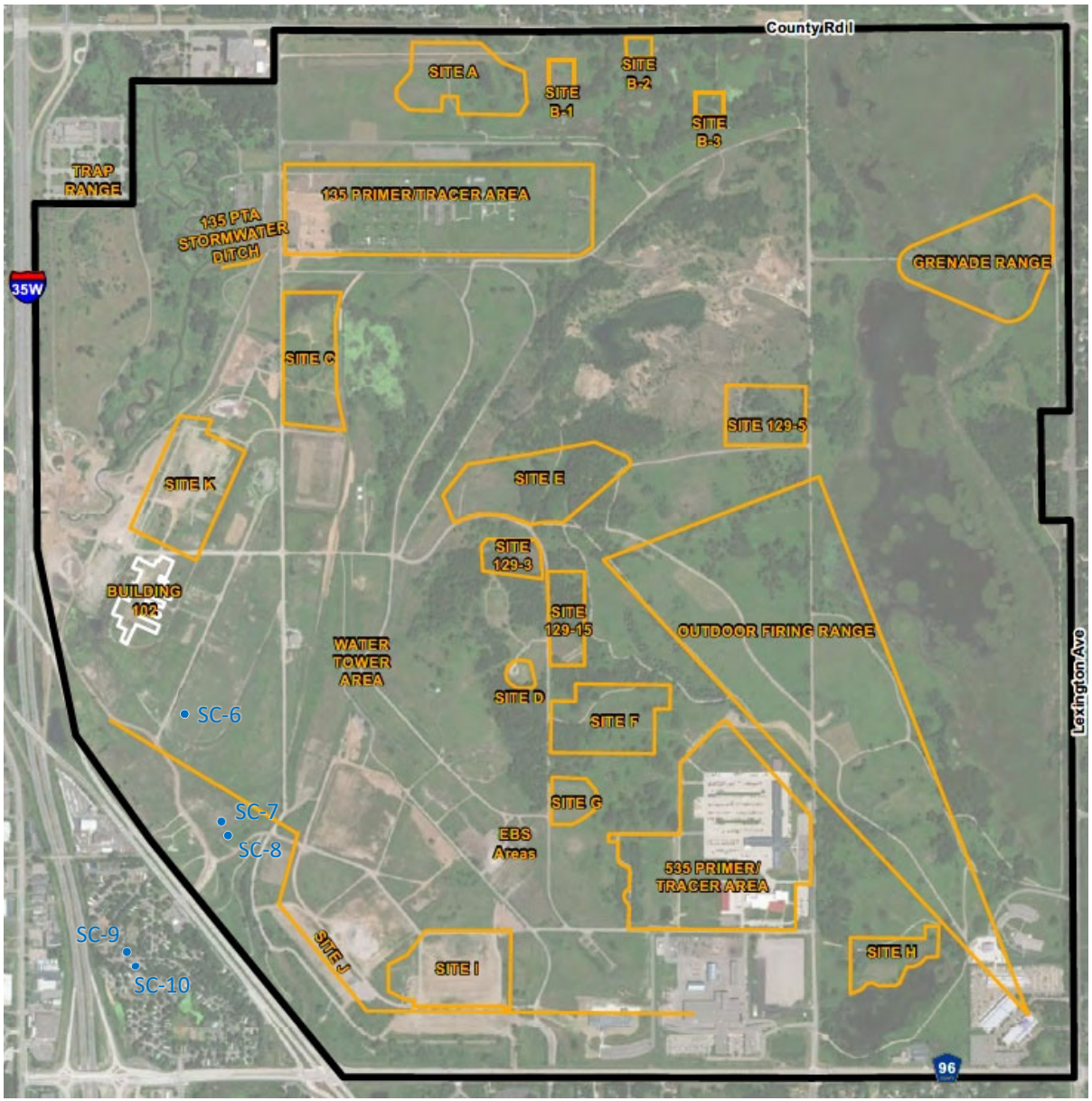


OU1 Optimization

- Collect Geophysics data
  - 3 New Brighton wells
  - 5 bedrock monitoring wells
- Identify best locations for new extraction wells to improve effectiveness of contaminant removal
- Army will present results of optimization study to EPA, MPCA and New Brighton ~Feb 2021
- Drilling to refine location is anticipated Spring 2021
- Expect to increase amount of contaminant removed by relocating well more central to plume
- Army is working with New Brighton to ensure drinking water treatment operations are not affected

Twin Cities Army Ammunition Plant Cleanup

OU2

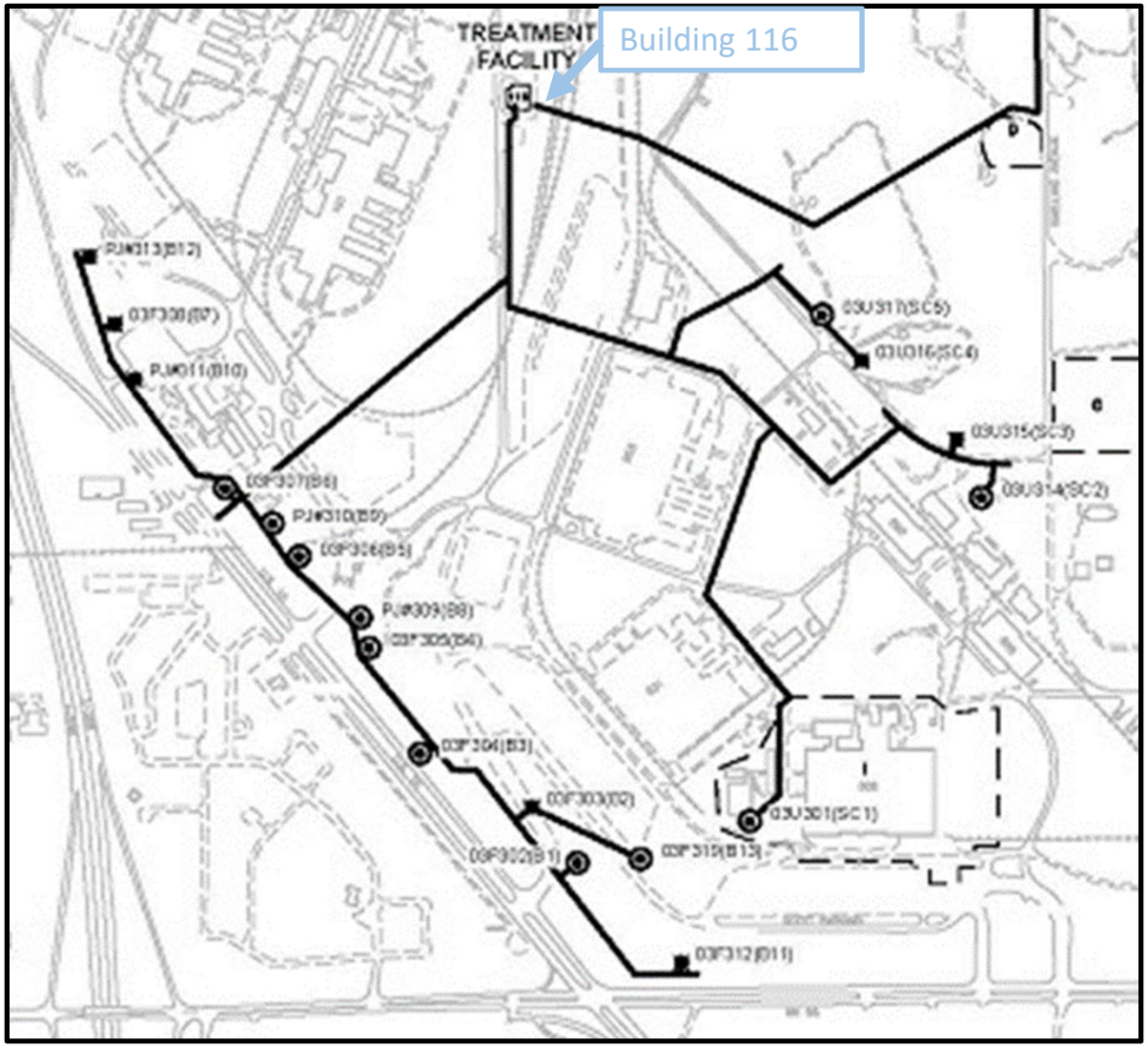

County Rd I
SITE A
SITE B-1
SITE B-2
SITE B-3
TRAP RANGE
135 PRIMER/TRACER AREA
135 PTA STORMWATER DITCH
GRENADE RANGE
35W
SITE C
SITE 129-5
SITE K
SITE E
SITE 129-3
BUILDING 102
SITE 129-15
OUTDOOR FIRING RANGE
WATER TOWER AREA
Lexington Ave
SITE D
SITE F
SC-6
SITE G
SC-7
SC-8
EBS Areas
535 PRIMER/ TRACER AREA
SC-9
SITE J
SITE I
SITE H
SC-10
96

OU2 Optimization

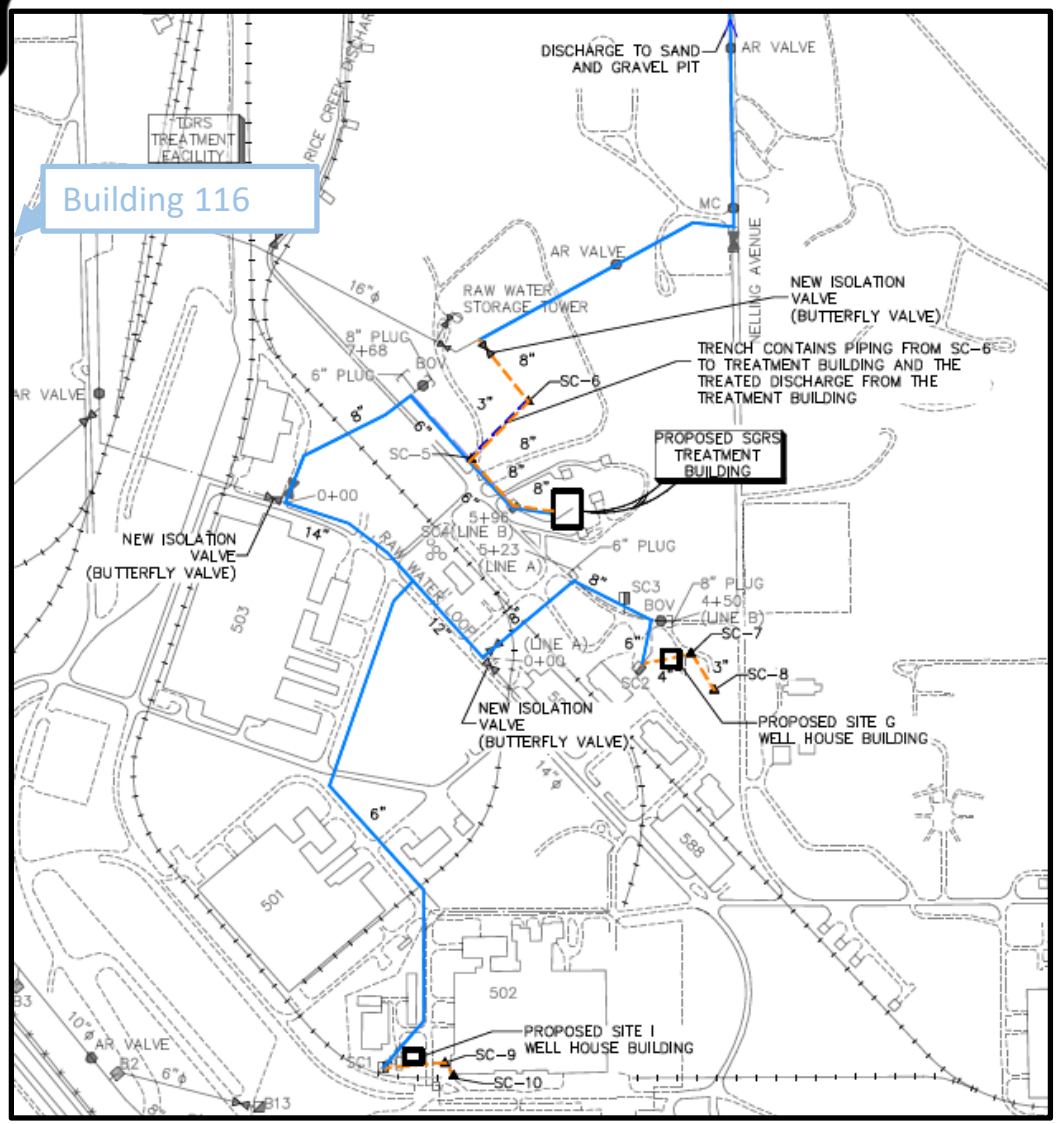
- TCAAP Groundwater Recovery System (TGRS) installed in 1987
- Install TGRS extraction wells nearer to the source areas
- Increases capture effectiveness and treatment of the plume
- Install secondary treatment called Source Groundwater Recovery System (SGRS)
- Anticipate SGRS construction 2021
- Anticipate SGRS operational 2022

Information on OU2 available at
https://tcaaprab.org/map-of-ou2/

Existing Extraction System (TGRS)



Future SGRS – Pumping Plan



Site G and Site I

- One wellhouse serving two extraction wells

Site D

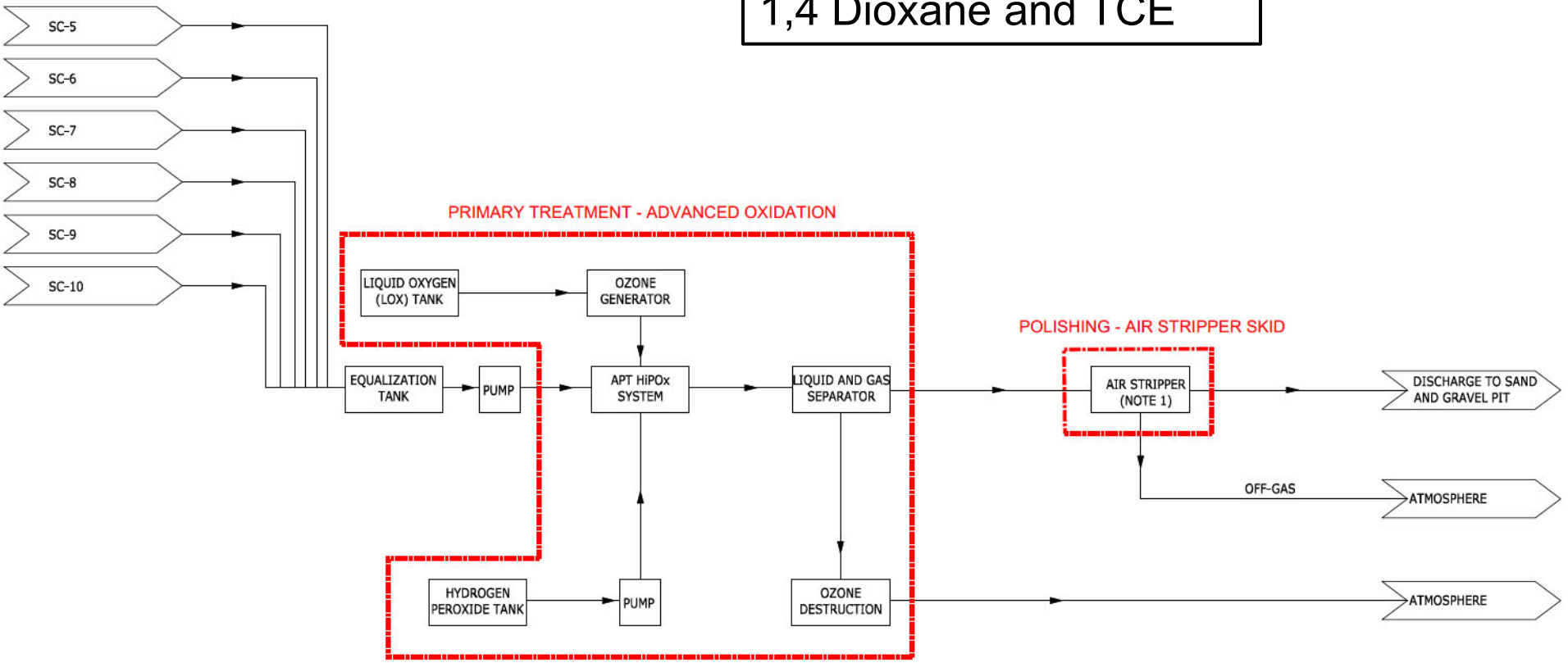
- Revised location of SGRS Building for road and electrical access
- SC-5 uses existing wellhouse; SC-6 manifold inside SGR building
- Discharge to Sand and Gravel Pit

Pipe Routing

- New piping in **orange**
- Existing piping in **blue**

SGRS – Process Flow

SGRS will treat for both 1,4 Dioxane and TCE

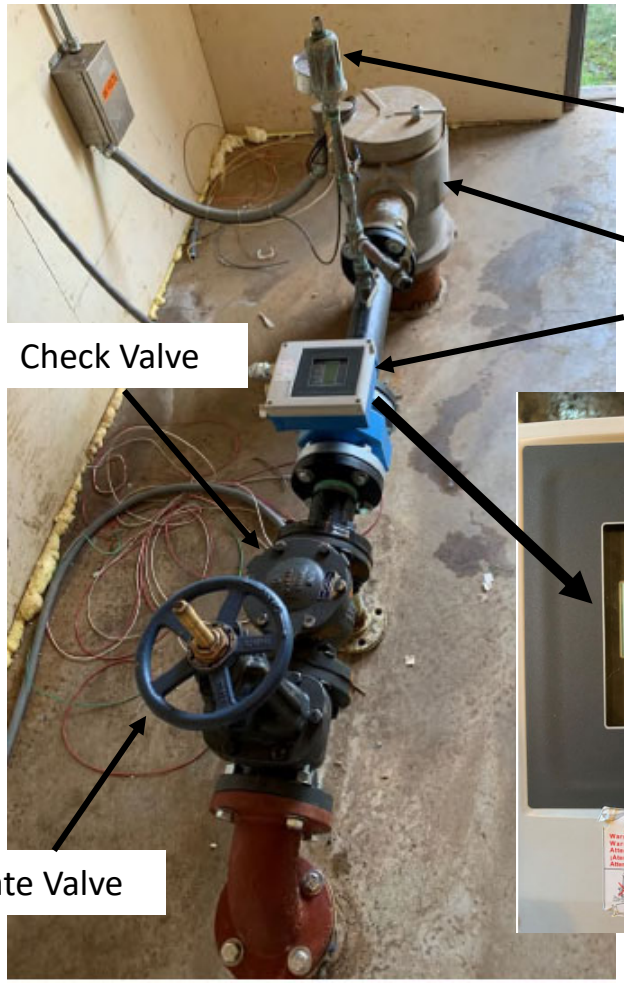


NOTE 1
Transfer pumps on Air Stripper Skid sized to discharge to Sand and Gravel Pit

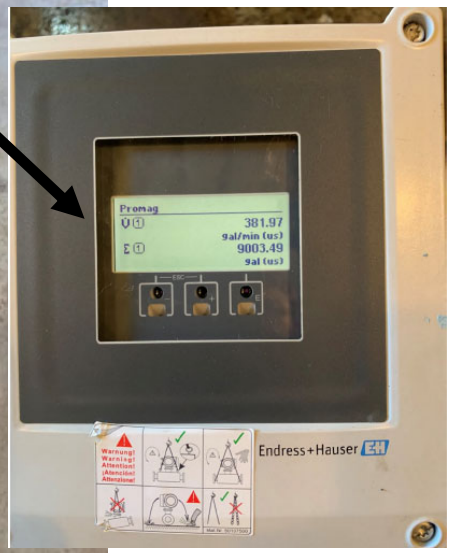
Other OU2 Recent Activities

- TGRS upgrades
  - Electrical Upgrades
    - Upsize electrical feed to Well B4
    - Large pump at B4
  - Well House Upgrades
    - Replaced piping manifold
    - Removed old control panel and communication infrastructure
    - Installed new control and communication panels with variable frequency drive for flow or level control
    - Installed wireless communication from wells to TGRS for automated data collection and remote viewing
- Land Use Controls (LUC) Inspection
- LUC implementation (shallow soil sites; deep soil sites)

TGRS Well Upgrade



Revised Well Manifold (B6)



Flow Meter Display

Antenna at Well B4 –

Facilitate Wireless Communication to TGRS

TGRS Building Upgrade

TGRS Control Upgrades

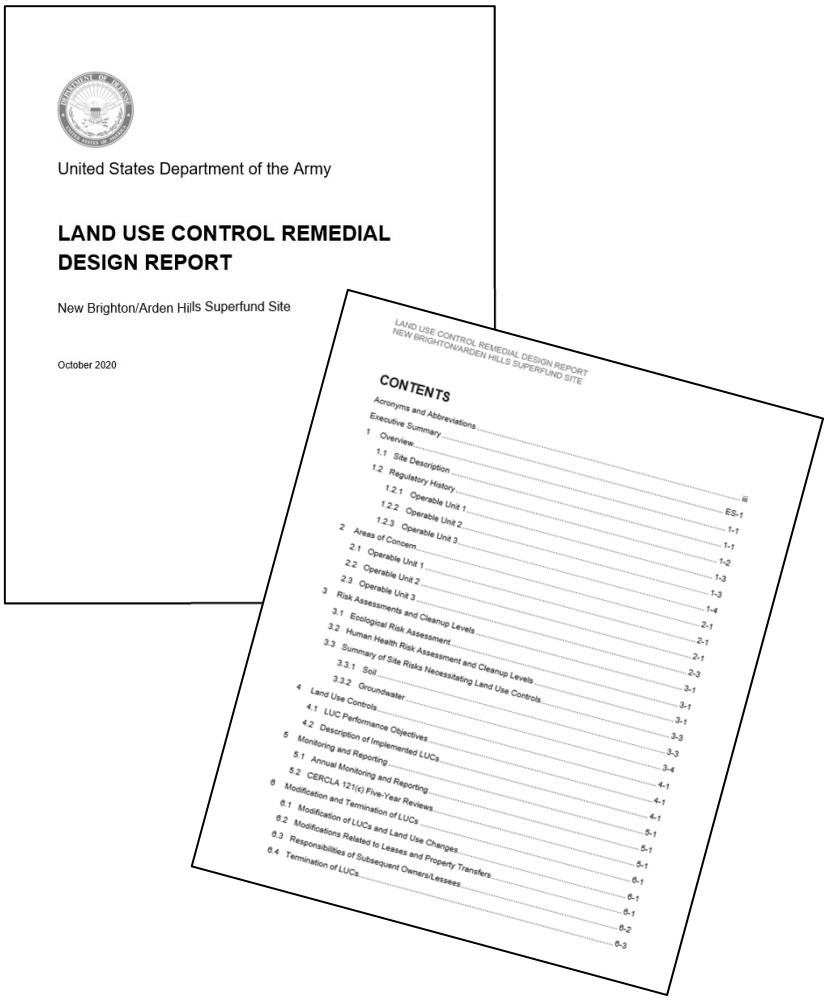
- Decommissioned old main control panel and communication infrastructure
- Installed new main control panel
- Installed wireless communication hardware (antenna) for automated data collection and remote viewing

Decommissioning of Control Infrastructure

Main Control Panel

Land Use Controls (LUCs)

- Revision 6 completed to document partial delisting of soils in OU2 and update LUCs based on delisting
- Additional updates made to include OU1 and OU3 (previous revisions discussed LUCs in OU2 only)
- Document reorganized to streamline and add clarity
- Available for download at: https://tcaaprab.org/wp-content/uploads/2020/10/2020-Land-Use-Control-Remedial-Design-LUCRD-Revision-6.pdf
- On Resources Page, under Reports: Institutional Controls at TCAAP https://tcaaprab.org/resources-2/


United States Department of the Army

LAND USE CONTROL REMEDIAL DESIGN REPORT

New Brighton/Arden Hills Superfund Site

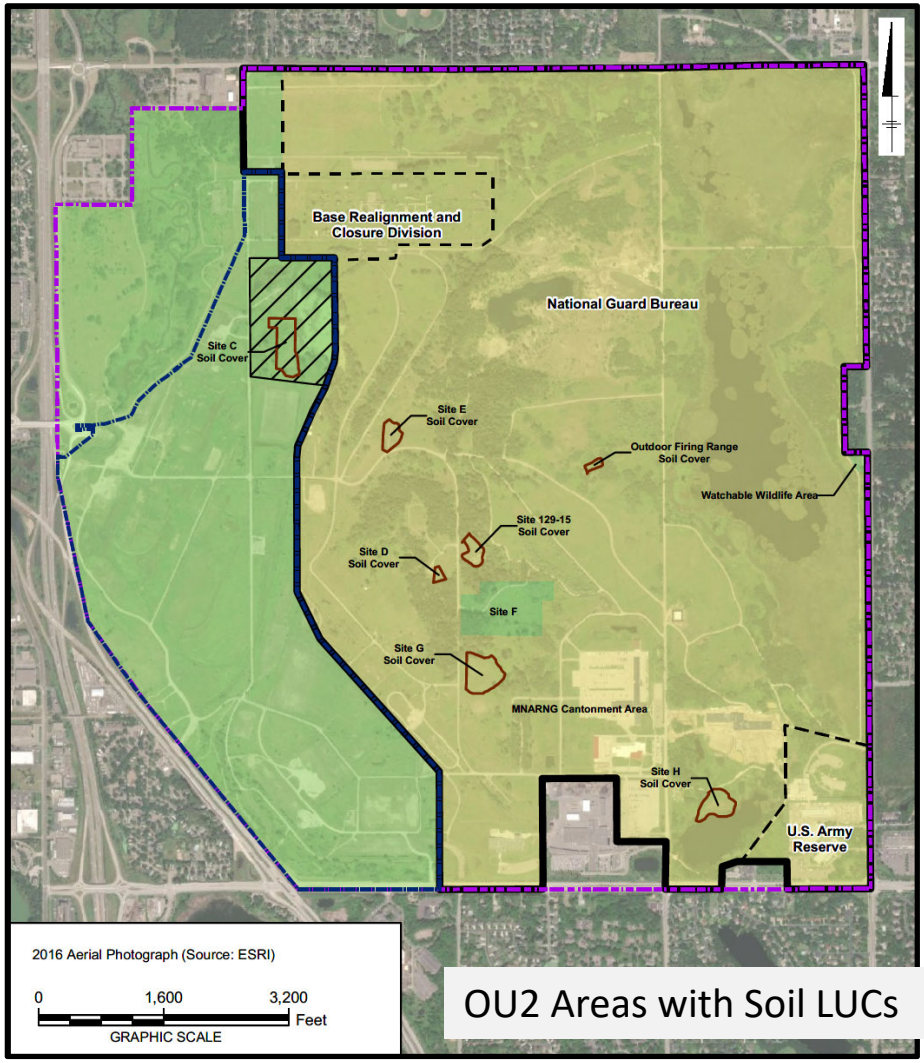
October 2020

CONTENTS

LUC Summary

LUCs are in place to:

- Prevent uses of contaminated groundwater (OU1, OU2, OU3)
- Prevent activities that would reduce the effectiveness of groundwater remedial actions (OU1, OU2, OU3)
- Prevent exposure to contaminated soil at levels that pose an unacceptable risk to human health (OU2)
- Prevent disturbance of soil covers (OU2)

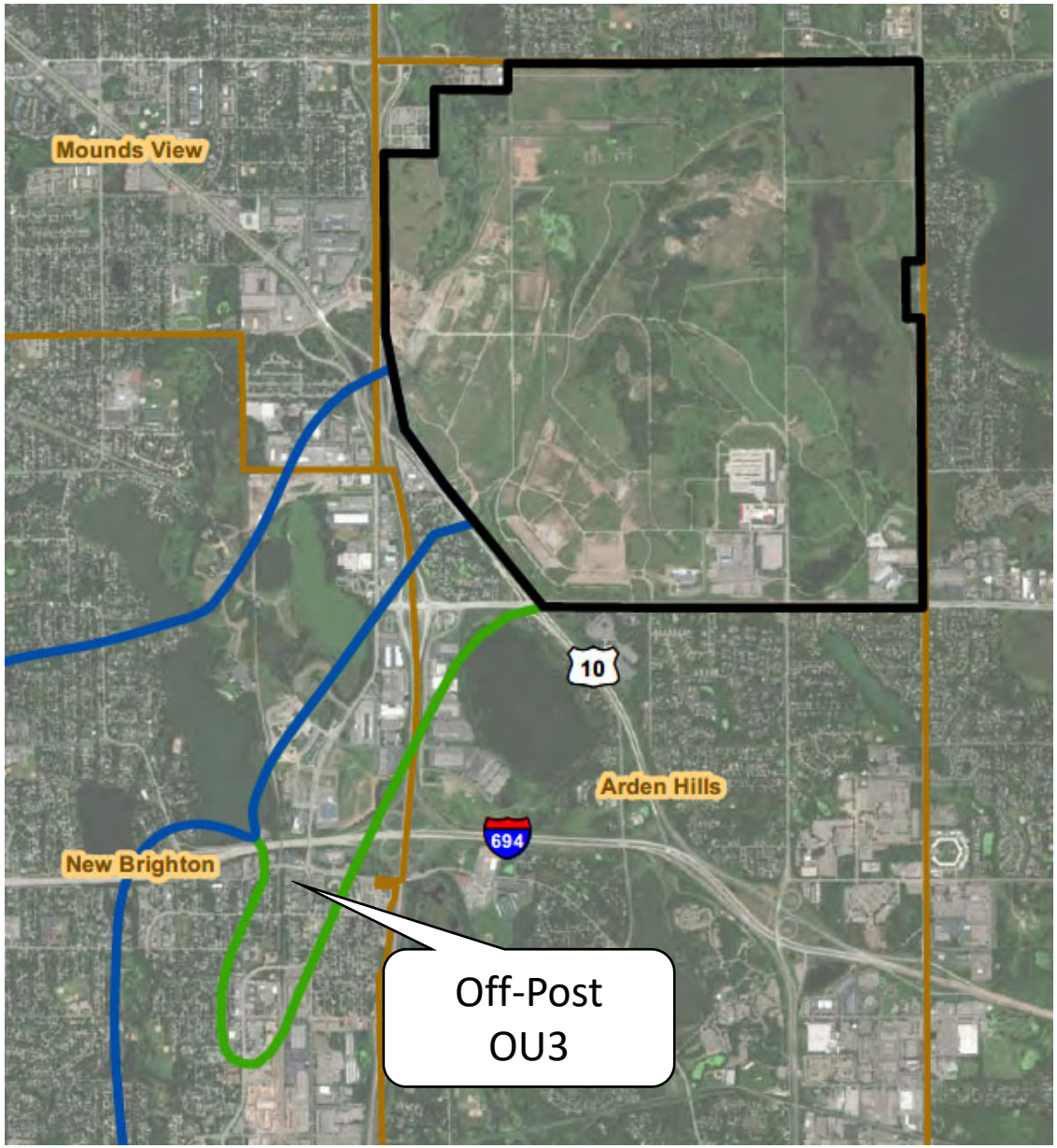


OU2 Areas with Soil LUCs

LEGEND:

- Operable Unit 2
- Ramsey County-Owned Property
- Federally - owned property controlled by the U.S. Army
- Separation of Control Under the U.S. Army
- Location of Soil Cover
- No soil LUC Required
- Industrial LUC
- 4-Foot Soil Disturbance Restriction

Twin Cities Army Ammunition Plant Cleanup



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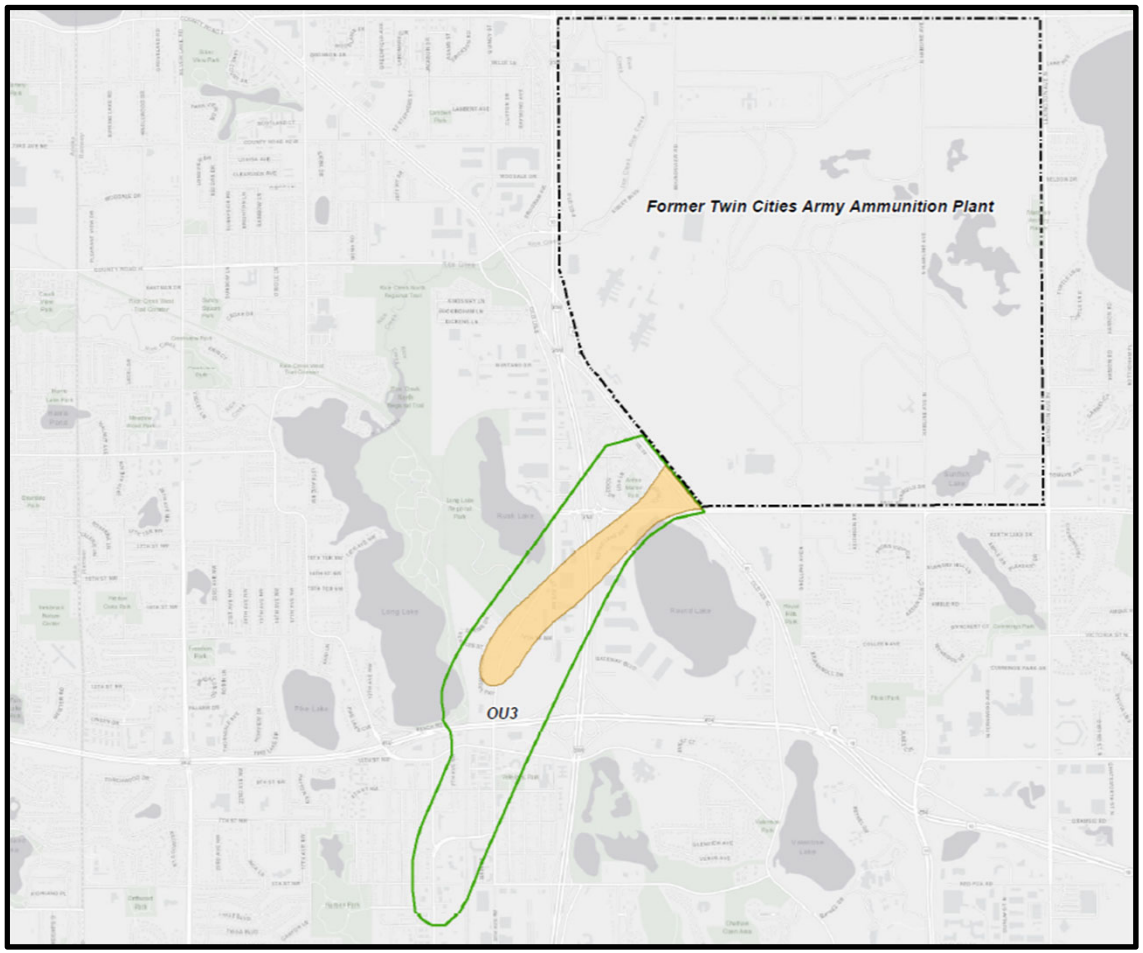
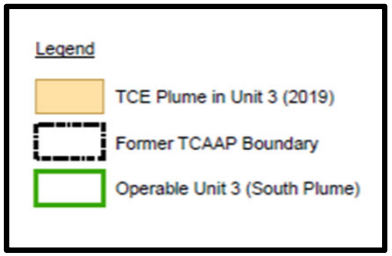
OU3 Plume



- Continued monitored natural attenuation
- Annual groundwater sampling each summer
- Results from sampling are available in the Annual Performance Report



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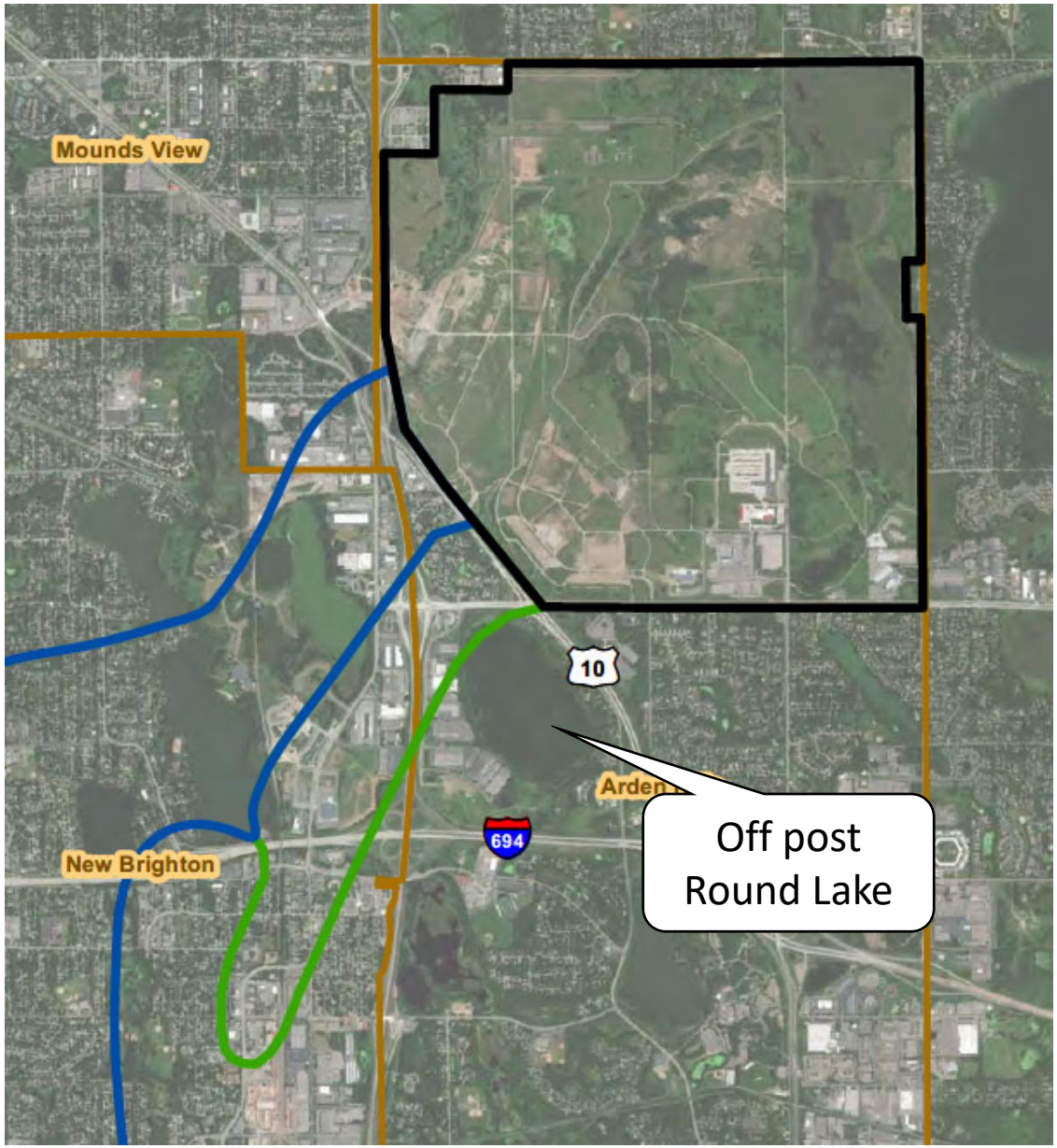

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Round Lake

Legend
Parcel Boundaries [Source: Ramsey County]
Former Twin Cities
Army Ammunition Plant
Round Lake
14th St NE
13th St
Parkshore Dr
2010 Aerial Photograph (Source: Mn GEO)
700 350 0 700
Feet
N

Round Lake History

- Round Lake was formerly part of TCAAP but was transferred to the U.S. Fish & Wildlife Service National Wildlife Refuge System in 1974.
- Historical releases of hazardous substances from TCAAP to Round Lake were associated with the discharge of industrial processing wastewater, sanitary sewer, and storm sewer discharges.
- Contaminants of concern for Round Lake sediments include seven metals (cadmium, chromium, copper, lead, silver, vanadium, and zinc) and PCBs.
- Contamination is largely confined to the upper 1 foot of sediment in the lake.

Round Lake History (continued)

Army is currently finalizing a Supplemental Remedial Investigation (RI) and Feasibility Study (FS).

- Because there is a mixture of contaminants, and to provide a general depiction of metals concentrations in sediments at various sediment depths, a mean probable effect concentration quotient (mPEC-Q) is used to measure success.
- The original RI was conducted between 1987 and 2004. Human Health Risk Assessment identified no risk to humans and Ecological Risk Assessment concluded ecological risks were low.
- USEPA requested Feasibility Study.

Round Lake History (continued)

- First version of the RI/FS was published in 2005 and after discussions with EPA and MPCA, Army submitted multiple revisions between 2005-2010.
- In 2010 Army conducted additional investigation work documented in a 2012 FS that was rejected by EPA and MPCA.
- Three parties could not reach consensus on risk. Army contracted with Oak Ridge National Laboratory for a Supplemental Ecological Risk Assessment completed in 2013.
- Three parties still could not reach consensus and went into informal dispute process from 2014-2016.

Round Lake History (continued)

- Army acknowledged potential for ecological risk. Technical Working Group was convened to establish remedial action objectives.
- In 2015 Army conducted further evaluations and analysis of data to refine risk parameters.
- Army has prepared multiple revisions of the Supplemental RI/FS between 2016-2020 (based on input from EPA, MPCA, MDNR and USFWS).
- Army anticipates finalizing Supplemental RI/FS very soon which will be available to the community for review once EPA and MPCA accept the document.
- It will be published on the website and available in the Information Repository.

What's Next

- OU1
  - Finalize location and install well(s)
- OU2
  - Vapor Intrusion investigation at Site A
  - USGS Treatability study at Site K to improve shallow groundwater remediation
  - Continue work on SGRS
- OU3
  - Continue groundwater monitoring
- Round Lake
  - Finalize Supplemental RI/FS
  - Develop Proposed Plan identifying Army's preferred alternative
  - Conduct Public Comment Period and Public Meeting
  - Develop Record of Decision documenting selected remedy based on stakeholder input

Website – Updated Pages and Content

- Same URL address – **tcaaprab.org**
- Six new main pages:
  - Home
  - Background
  - Operable Units
    - OU2
  - Resources
  - Restoration Advisory Board (RAB)
  - Information
- Information on the Operable Units and Operable Unit 2 sites
- Links to many files in the Public Repository
  - Decision Documents
  - Reports
  - Other resources
- RAB status and how to get involved

Welcome to the website for the former Twin Cities Army Ammunition Plant (TCAAP). The former TCAAP is located in the city of Arden Hills in the northern portion of the Minneapolis – St. Paul metropolitan area in Ramsey County. It is surrounded by the cities of New Brighton, Arden Hills, Mounds View, and Shoreview, Minnesota. TCAAP formerly occupied a four-square mile area east of U.S. Interstate Highway 35W and north of Ramsey County Highway 96.

Previous manufacturing operations from 1942 to 1981 impacted soil, groundwater, sediment, and surface water, and the former TCAAP was placed on the National Priority List (NPL) in September 1983 and designated as the New Brighton/Arden Hills (NB/AH) Superfund Site. Cleanup at the former TCAAP is taking place under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) with the United States Army as the lead agency in coordination with the United States Environmental Protection Agency (U.S. EPA) Region 5 and the Minnesota Pollution Control Agency (MPCA).

The size of the former TCAAP has shrunk over time because of property ownership transfers and reassignment of control to the National Guard Bureau, Army Reserve, Ramsey County, and the City of Arden Hills. The remaining land (approximately 160 acres) is in the process of being transferred out of federal ownership.

Map showing Former Twin Cities Army Ammunition Plant in Minnesota

Photograph of former manufacturing facility at the TCAAP

Questions

You can ask questions now or at anytime using the email listed on the website.