U.S. DEPARTMENT OF ENERGY | OFFICE OF ENVIRONMENTAL MANAGEMENT



DOE Environmental Management
Los Alamos Field Office (EM-LA)
LANL Legacy Cleanup Update to Los Alamos County Council

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EM-LA Manager

ENVIRONMENTAL MANAGEMENT
SAFETY ❖ PERFORMANCE ❖ CLEANUP ❖ CLOSURE

June 20, 2023

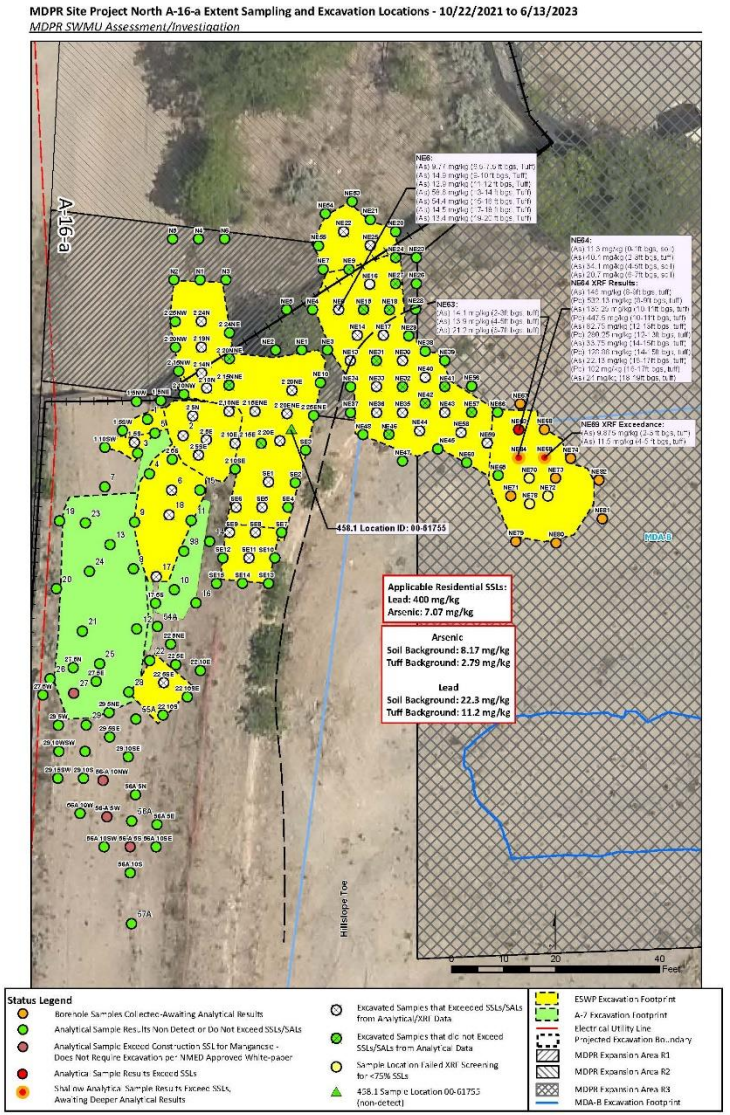
ATTACHMENT A

Today's Agenda

- Middle DP Road (MDPR) Site
- Material Disposal Area T (MDA T)
- Technical Area 21 (TA-21)
- Chromium Interim Measures

MDPR Site: Work Completed

- 822 samples at 171 borehole locations
- Expanded area of investigation 3 times from 1.3 acres initially identified as area of investigation in 2020 to current 1.8 acres investigation
- Disposed of 826 cubic yards of waste; collected and analyzed 255 waste management samples
- Excavated approximately 4,510 cubic yards of contaminated soil and debris to date
- Investigation and cleanup in land parcel A-8-a is complete
- Additional investigation work in northern part of land parcel A-16-a is on-going and almost complete with the exception of one small area
- Despite challenges, EM-LA/N3B remain dedicated to successful completion while maintaining accountability and high fiduciary standards



MDA T at TA-21

Inactive 2.2-acre landfill

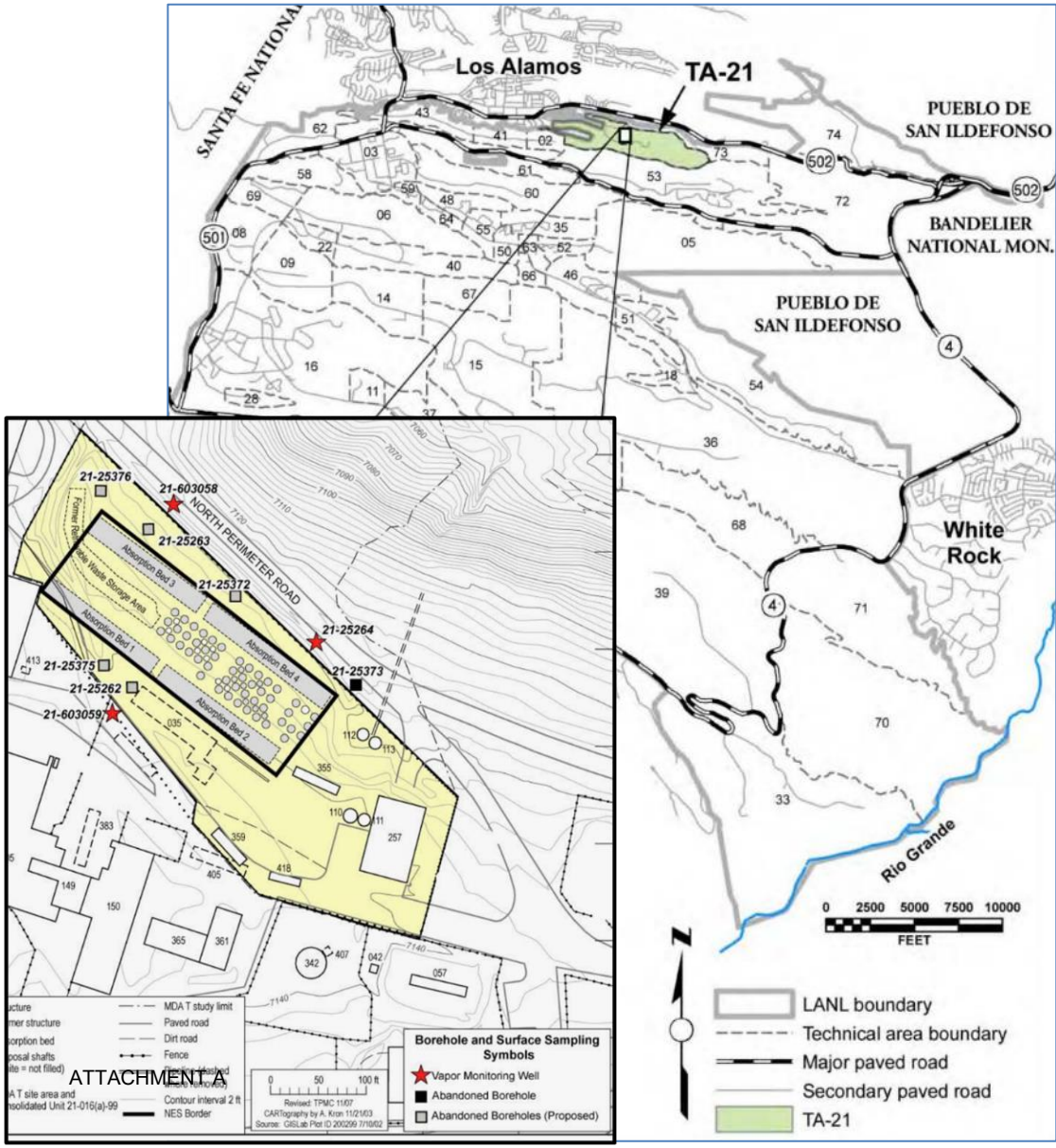
4 absorption beds used to dispose of liquid wastes from 1945 to 1952
- 120’ x 20’ x 6’ deep

- ~18 million gallons of wastewater from uranium and plutonium processing buildings released into beds

64 shafts
- 6-8 ft in diameter; 15 – 69 ft deep

- Liquid americium-241 and other wastes mixed with cement

- Minor vapor-phase volatile organic compounds contamination at depth



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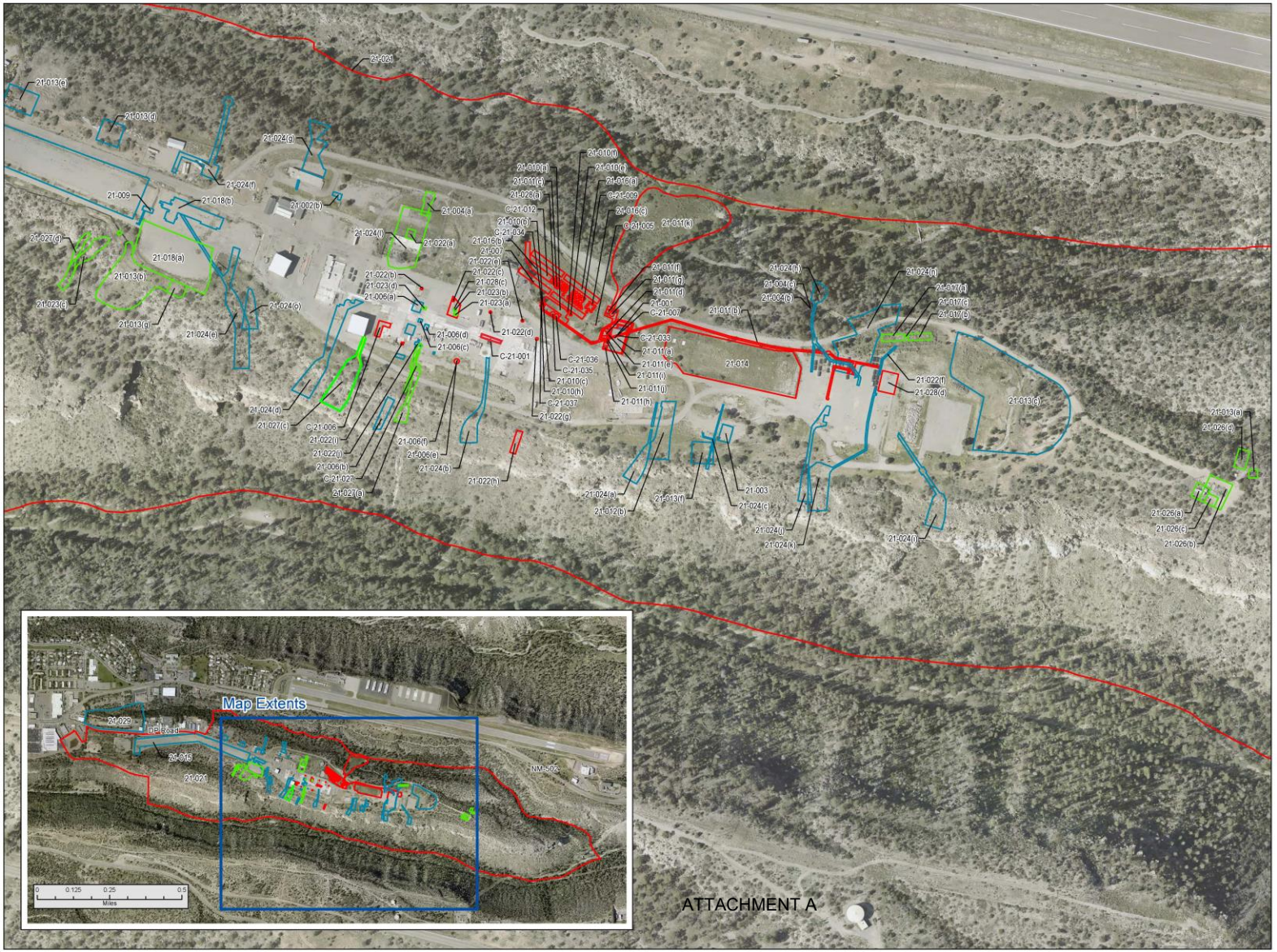
TA-21 Solid Waste Management Units & Areas of Concern



ATTACHMENT A

TA-21 SWMU/AOC Certificate of Completion (CoC) Status

Legend

- Certificate of Completion - Investigation Underway
- Certificate of Completion - Under Preparation
- Certificate of Completion - Awaiting NMED Approval
- Certificate of Completion - Approved CoC wout Controls
- Certificate of Completion - Approved CoC with Controls

New Mexico StatePlane Coordinate System
Central Zone (3002)
North American Datum, 1983 (NAD 83)
US Survey Ft

DISCLAIMER: This map was created for work processes associated with the TA-21 Closure Project. All other uses for this map should be confirmed with N3B TA-21 Program Manager.

MAP: TA_21_PRS_Map3_COC_NMED
TYPE: REGULAR

GIS: Jeffrey Lyon
EDITED: Joshua Sammons
DATE: 2/7/2019
REVISION NUMBER: 2.0

N
0 125 250 500 Feet

Interim Measures for Hexavalent Chromium Plume Control

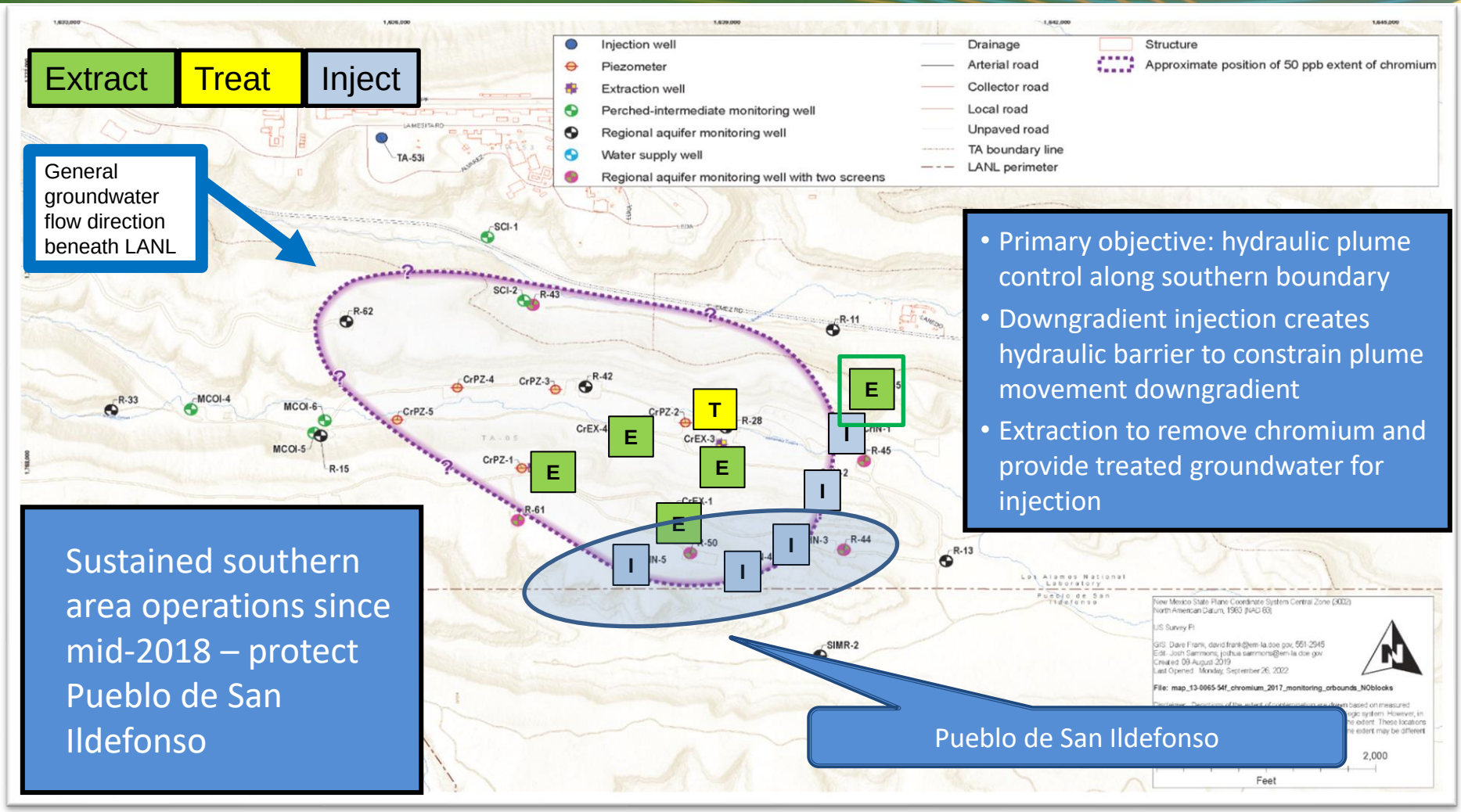
Process:

1. Extract contaminated groundwater
2. Treat contaminated groundwater near point of extraction
3. Inject treated (clean) groundwater along downgradient side of plume

Purpose:

1. Create hydraulic barrier to prevent further migration of plume
2. Inject treated (clean) water to avoid unnecessary consumption of limited resource and adhere to New Mexico Office of the State Engineer (OSE) authorization

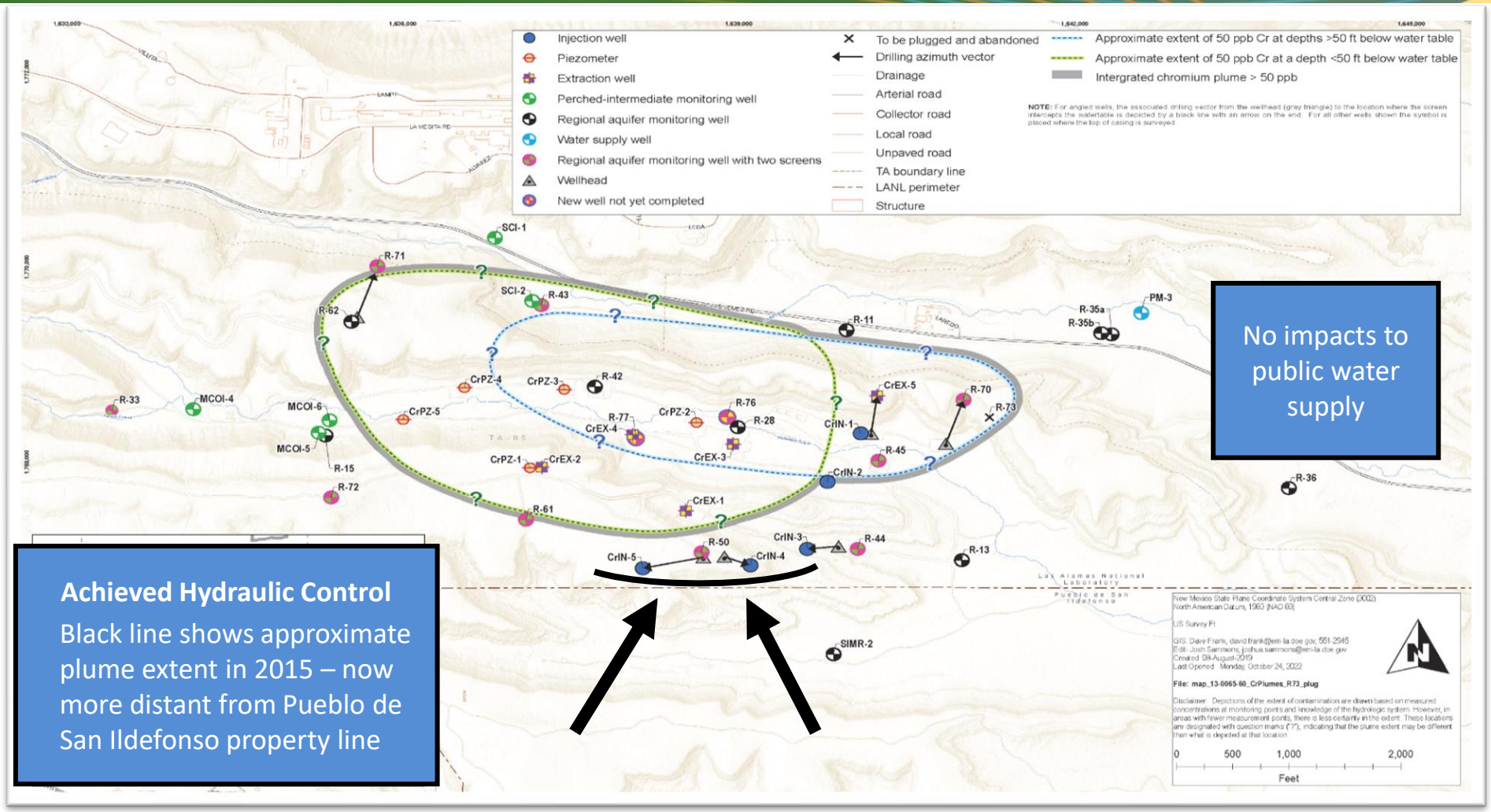
2018: Hydraulic Control Along Southern Boundary



- Primary objective: hydraulic plume control along southern boundary
- Downgradient injection creates hydraulic barrier to constrain plume movement downgradient
- Extraction to remove chromium and provide treated groundwater for injection

Sustained southern area operations since mid-2018 – protect Pueblo de San Ildefonso

2022: Hydraulic Control Along Southern Boundary



No impacts to public water supply

Achieved Hydraulic Control

Black line shows approximate plume extent in 2015 – now more distant from Pueblo de San Ildefonso property line

Direction from NM Regulator

NMED Hazardous Waste Bureau (HWB)

- On September 30, 2022, EM-LA/N3B submitted Chromium Interim Measures and Characterization Work Plan to NMED HWB—an FY22 Appendix B Milestone
- On November 21, 2022, NMED HWB directed EM-LA to leave certain injection and extraction wells associated with the Interim Measures, “off-line until further notice”
- EM-LA received NMED response on Work Plan on May 31, 2023

NMED Ground Water Quality Bureau (GWQB)

- On June 6, 2022, EM-LA received Notice of Violation, Los Alamos National Laboratory Underground Injection Control Wells, DP-1835
- On September 30, 2022, EM-LA/N3B submitted Regional Aquifer Monitoring Well Action Plan to NMED GWQB
- On December 12, 2022, NMED GWQB directed EM-LA to cease injection operations for the Interim Measures

Impact of NMED Directive

Alternative to injection is land application -- Presents numerous challenges

1. Loss of hydraulic control
2. EM-LA would need to store water above ground because land application of treated groundwater during freezing temperatures is not authorized under Discharge Permit
3. If land application is pursued, most water does not return to regional aquifer due to evapotranspiration
4. This approach would also require action with Los Alamos County, NMED and OSE to revisit water rights/how EM-LA is using the water

Result: Interim Measures extraction and treatment would be reduced to approximately 10% of current capacity, allowing the plume to advance downgradient

EM-LA Approach

- Injection wells turned off March 31, 2023, and as a result, Interim Measures was shut down
- EM-LA continues regular communication with NMED and is evaluating all options

1. Continue three-party technical meetings with NMED HWB and GWQB and Pueblo de San Ildefonso
2. Encourage Los Alamos County to request three-party meeting with NMED and EM-LA
3. Perform additional qualitative and quantitative analyses
4. Evaluate different extraction and injection operational scenarios
5. Install additional wells
6. Continue monitoring to evaluate plume movement
7. Move toward proposing a final remedy

BACKUP SLIDES

NMED Directive: Cease Injection for Interim Measures

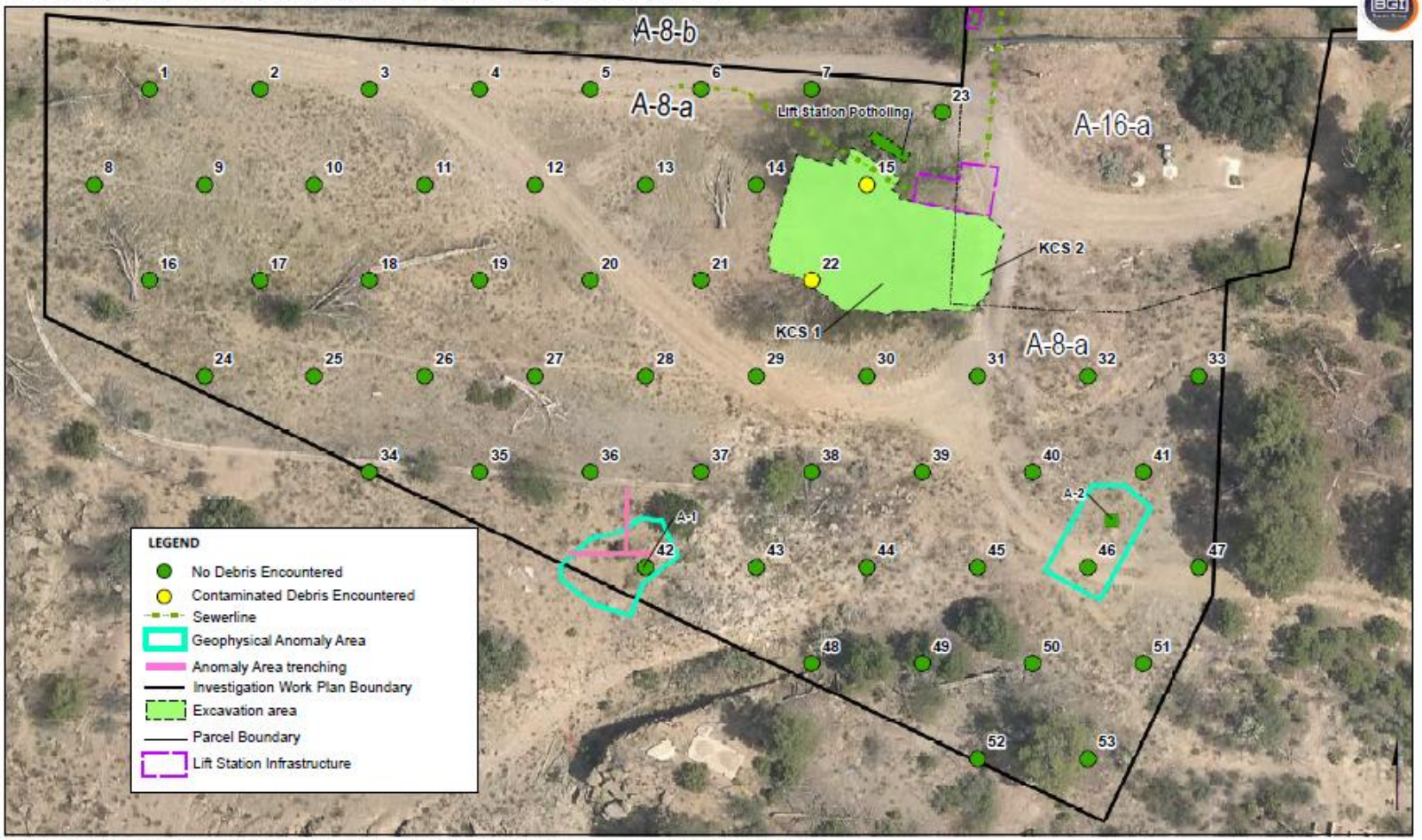
NMED letter to EM-LA, dated December 12, 2022

"**By April 1, 2023, the Permittees shall cease all injections authorized under DP-1835 to prevent any potential further migration of chromium contamination**. Cessation shall include all injection activities until the Permittees complete the proposed corrective actions and can definitively prove through qualitative and quantitative analyses, simulations, monitoring well installation, and continued monitoring that further migration is not occurring. Cessation of all injection activities does not inhibit the Permittee from the continued operation of the ion exchange treatment system by utilizing a different treated groundwater disposal option. **The Permittee shall not resume injections until NMED agrees that the Permittee has proven that further migration of the contamination plume will not occur. When the Permittee has provided sufficient evidence NMED will provide written agreement and approval to the Permittees to resume injections**."

NMED Concern: Believes injection is forcing contamination deeper into regional aquifer and resulting in plume migration

MDPR A-8-a Investigation Status Map

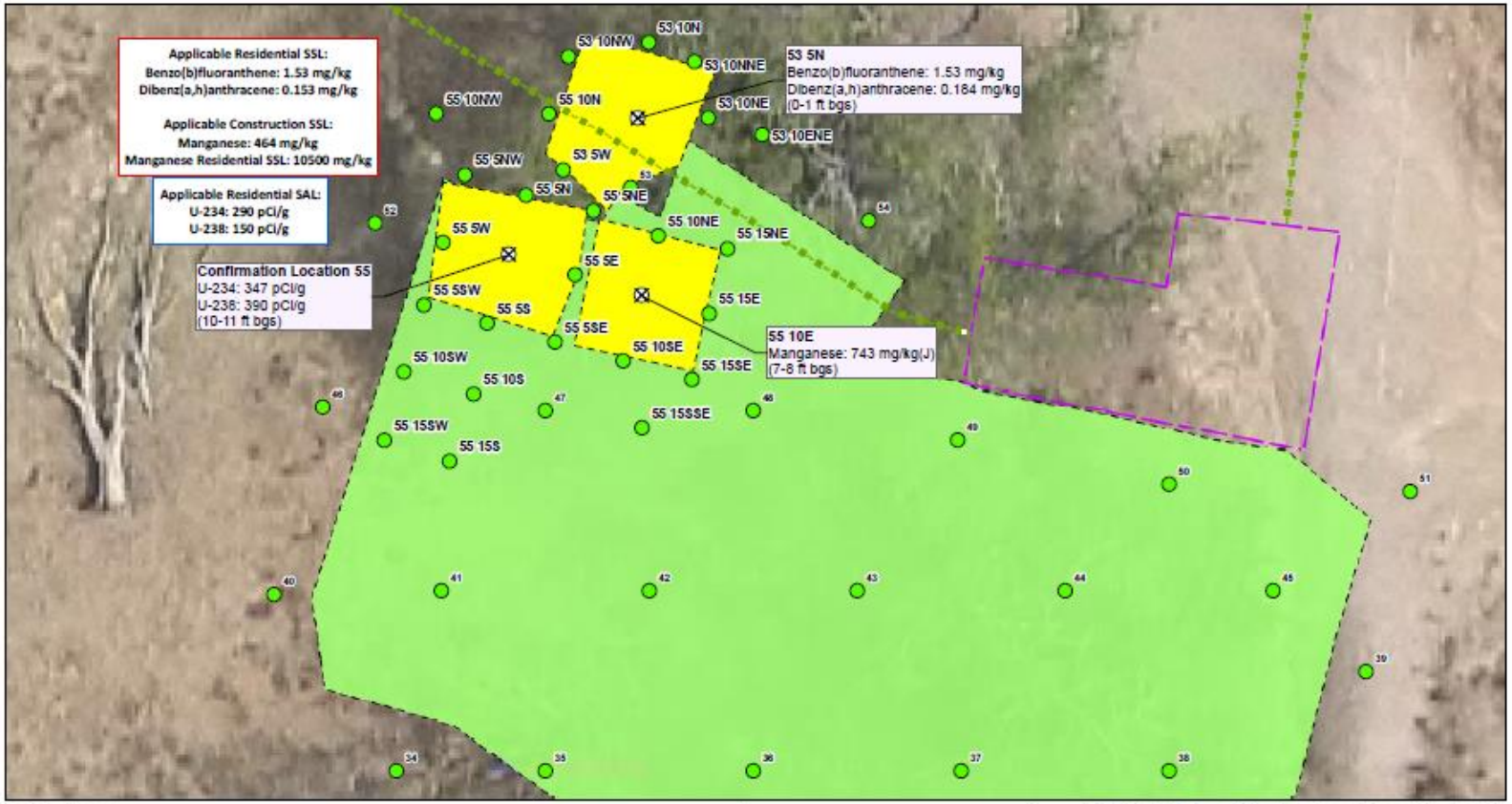
MDPR Site Project A-8-a - Work Completed 4/14/2021 to 10/21/2021 *Potholing and Excavation Locations*



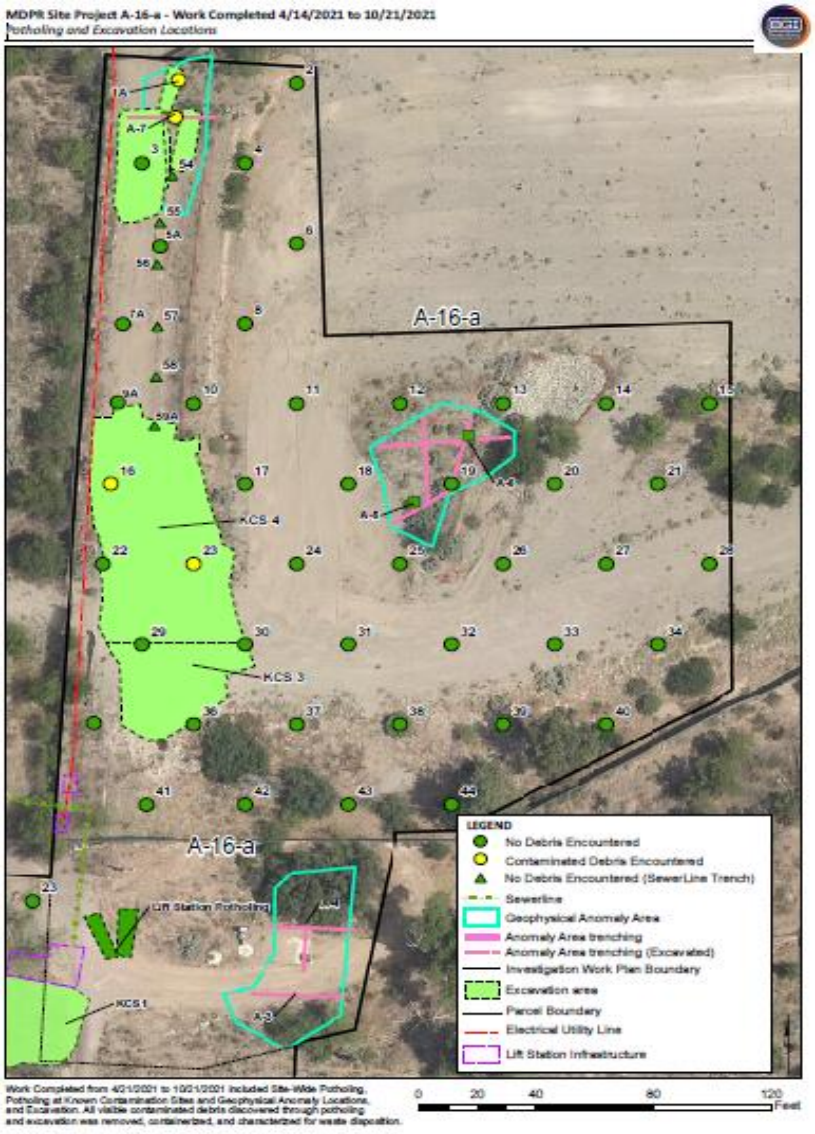
Work Completed from 4/21/2021 to 10/21/2021 included Site-Wide Potholing, Potholing at Known Contamination Sites and Geophysical Anomaly Locations, and Excavation. All visible contaminated debris discovered through potholing and excavation was removed, containerized, and characterized for waste disposition.

0 20 40 80 120 Feet

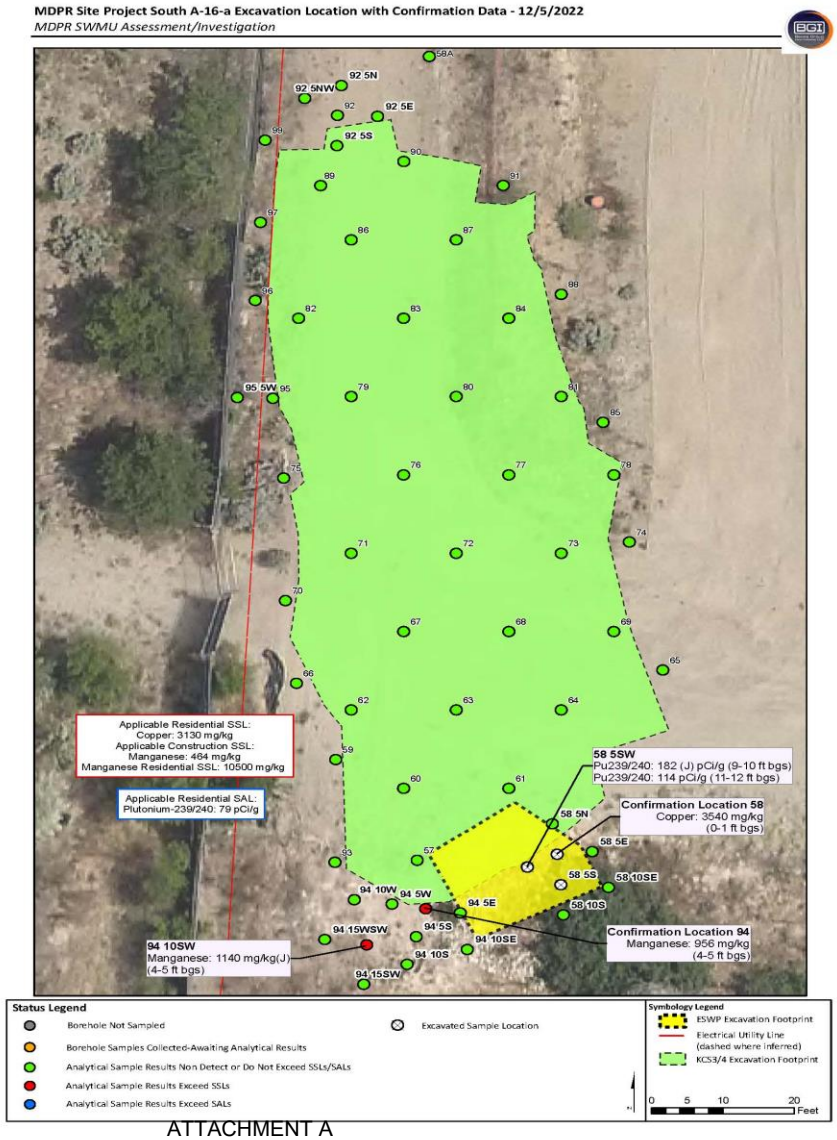
MDPR A-8-a Investigation Status Map



MDPR A-16-a Investigation Status Map



MDPR A-16-a South Investigation Status Map



MDPR A-16-a North Investigation Status Map