

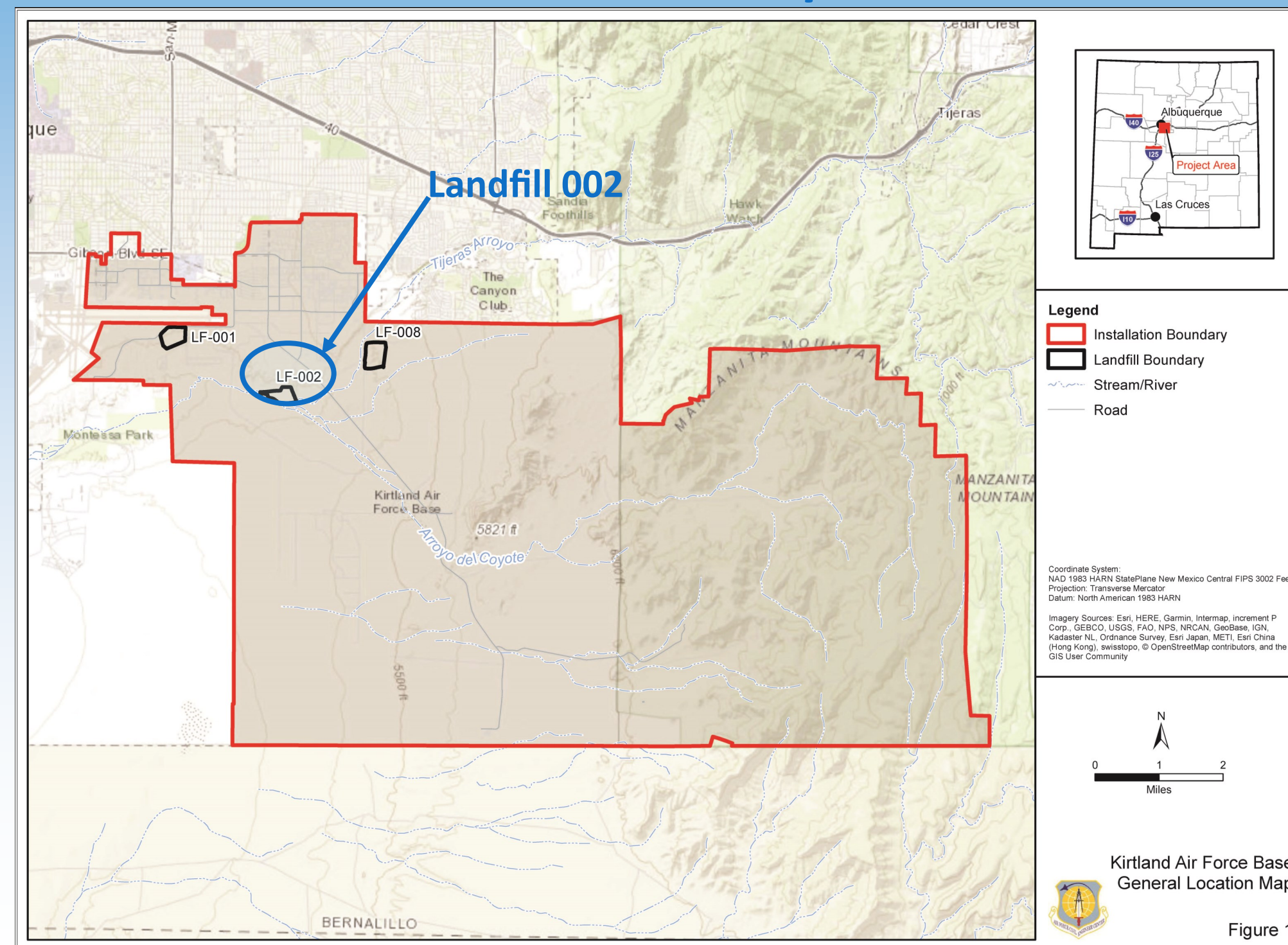


Kirtland Air Force Base—Landfill 002 (SWMU 6-2)

Monitoring and Inspections



Location Map



Site Background

- Operated between 1942 and 1965
- Waste was disposed in 'trench-and-fill' fashion
- Estimated 1,321,700 cubic yards (CY) of general refuse, construction and demolition debris
- Depth to groundwater ranges from 370 to 415 feet
- The Water Authority's 21-inch Tijeras Interceptor sanitary sewer line crosses the site
- Currently six regional aquifer groundwater monitoring wells
- Long-Term Monitoring (LTM) program initiated in 1996
- Tijeras arroyo was modified in 1999 to reduce flooding potential at LF-002 under the 100-yr runoff event

ET Cover System

- Selected as preferred alternative in Corrective Measures Study
- ET cover is 32 acres in area
- ET cover system includes 36" ET cover overlaying a 6" compacted subgrade layer
- Soils for ET cover specified as silty sand, silty-clayey sand, or silty clay, with 99% passing a 1 inch sieve
- Design objective of ET cover was to achieve target percolation rate of 2.5 millimeters per year or less

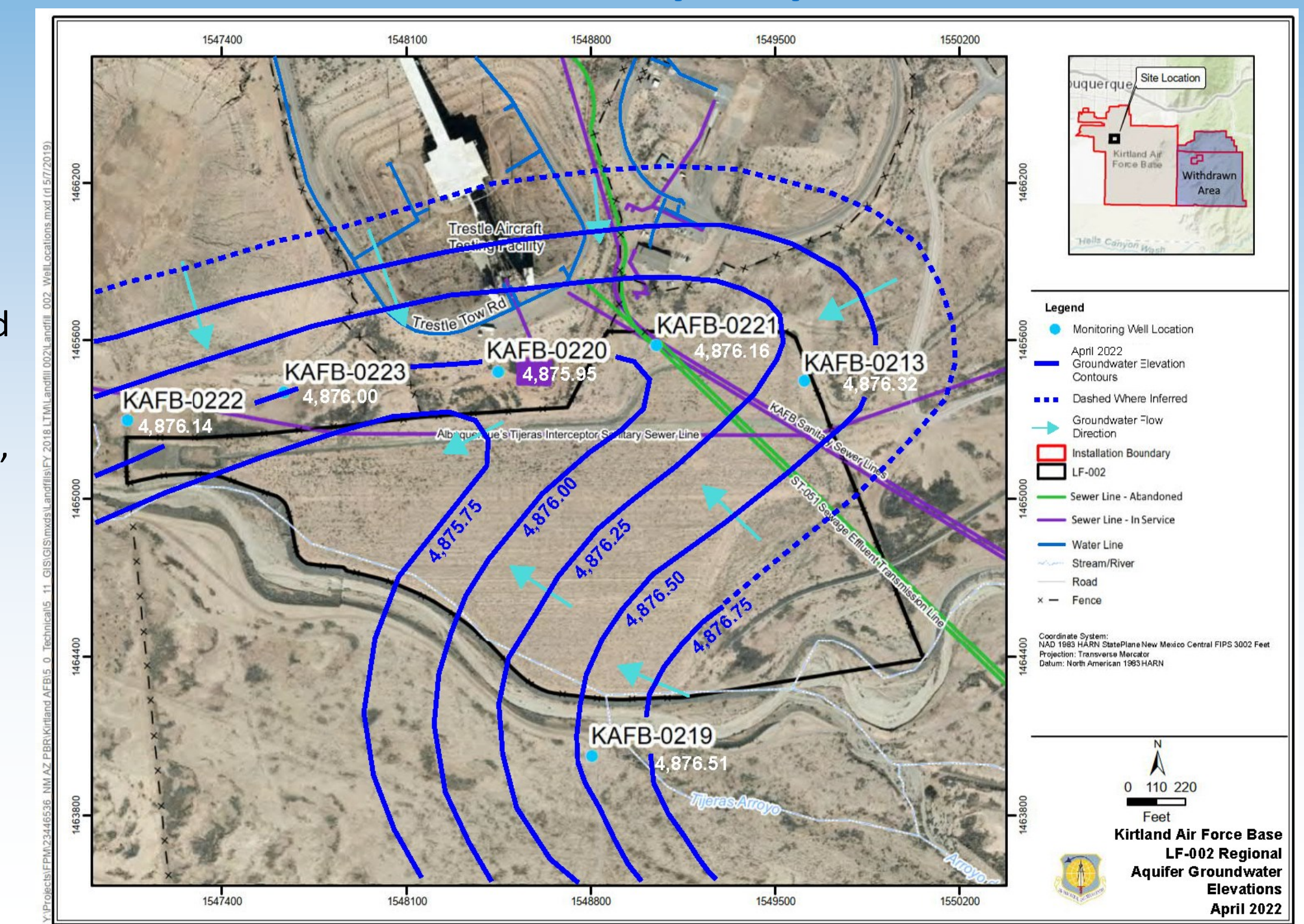
Regulatory Framework

- LF-002 (SWMU 6-2) is listed on Table I-3 of the Kirtland AFB RCRA Permit as a SWMU or AOC Requiring Corrective Action
- The landfill is regulated under NMAC 4.1.500, which addresses RCRA landfill requirements under CFR Parts 264.111 and 264.310
- The regulations prescribe closure requirements and post-closure care and monitoring requirements
- The ET cover was designed as an equivalent system as a RCRA landfill cap, as permitted under 40 CFR part 264.310(a)(7)
- The ET cover and drainage/erosion control system were constructed between 2004 and 2006 and the landfill is now in the post closure period

Evapotranspiration (ET) Cover



Groundwater Map—April 2022



Current Inspections and Monitoring Program

- Through 2017, annual groundwater sampling of six monitoring wells with quarterly groundwater depth measurements, and monthly landfill inspections or following large rain events
- Currently, annual groundwater sampling of sanitary sewer indicator parameters (nitrate, anions and TDS) to account for the Water Authority sewer line underneath LF002, biennial groundwater sampling for expanded analyte list with semi-annual groundwater depth measurements and landfill inspections, and inspections following large rain events, when they occur
- **Groundwater Sampling**
 - Anions (nitrate, chloride, fluoride, sulfates) and Total Dissolved Solids - annual
 - Dissolved metals (21 target analyte list metals) - biennial
 - VOCs, Radium-226, Radium-228, Gross alpha, Gross beta (ceased all in 2018)
- **Landfill Inspections**
 - Inspector walks inspection route across landfill area and documents conditions with notes and photographs
 - Evaluates for fencing/signage condition, cover settling, tumbleweed/debris accumulation in drainages and pipes, rill erosion, piping erosion, desiccation cracking, animal burrows, drainage system conditions, inlets, outlets, sedimentation
 - Inspection reports used to plan maintenance and mitigation measures
- **Landfill Repairs**
 - Significant repairs of LF-002 conducted in 2015 included: Removal of fiber rolls, backfilling of fissures, backfill of rilling and erosional gullies with topsoil, removal of debris from intake #1, and revegetation of disturbed areas

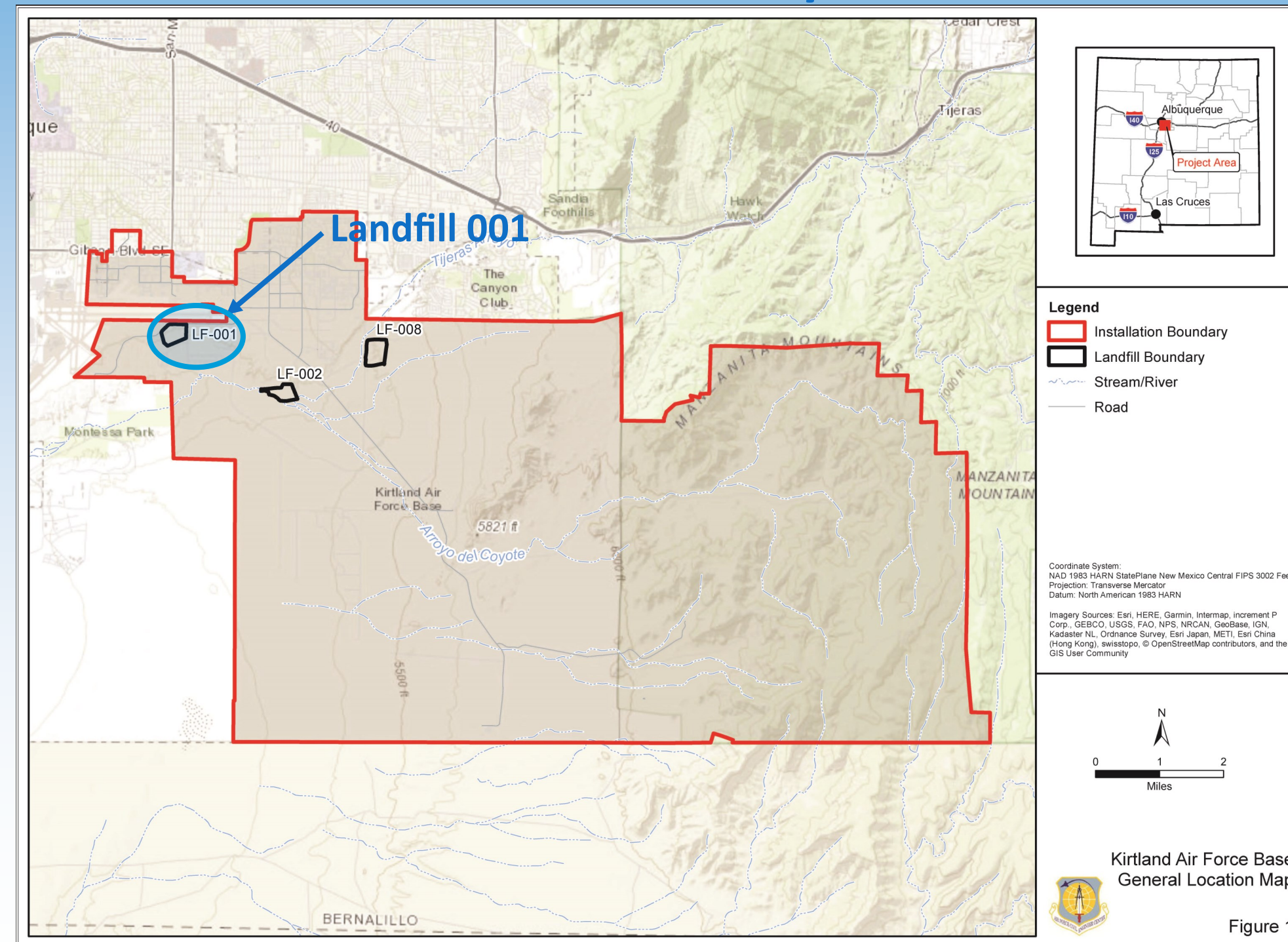


Kirtland Air Force Base—Landfill 001 (SMWU 6-1)

Monitoring and Inspections



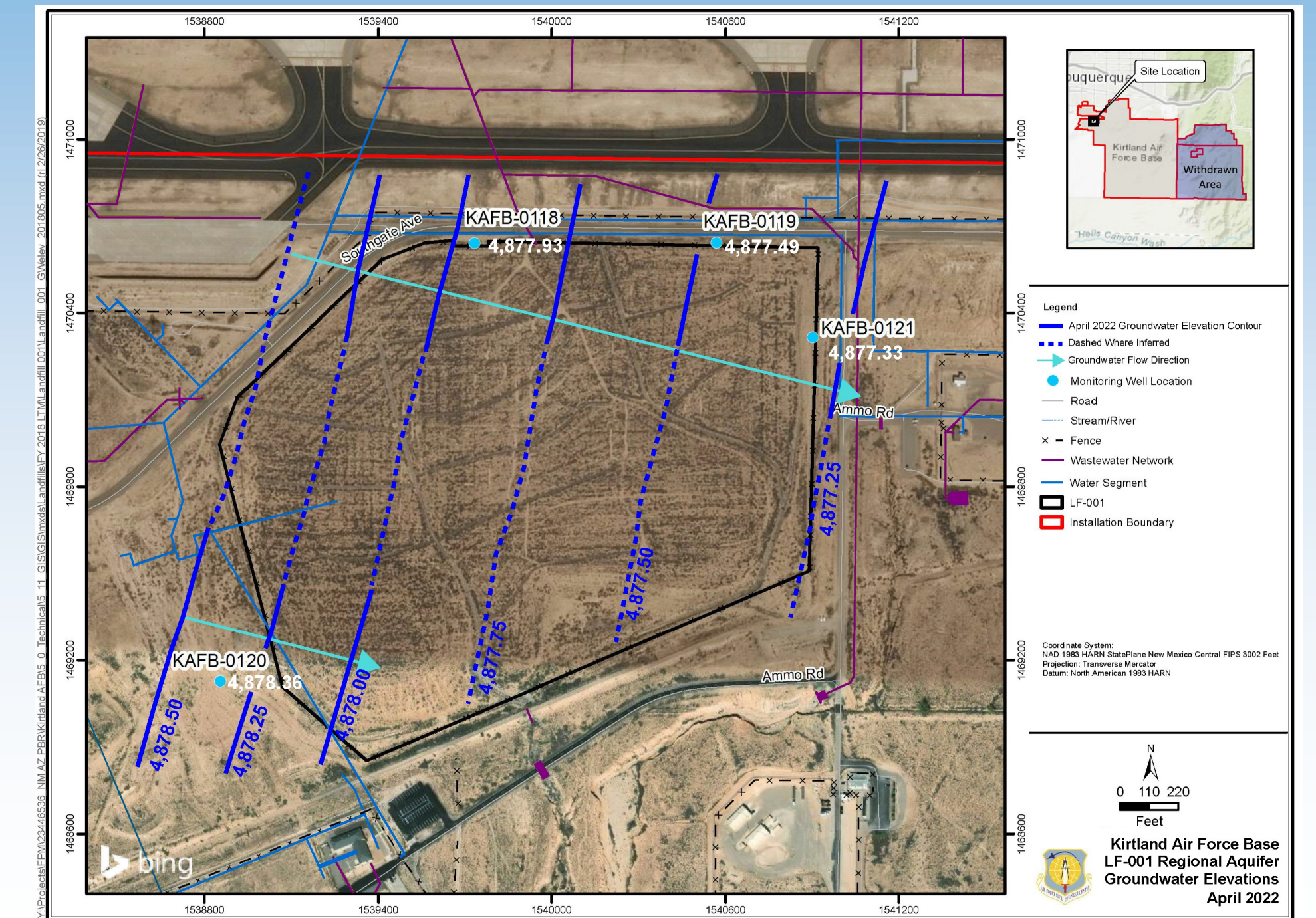
Location Map



Regulatory Framework

- LF-001 (SWMU 6-1) is listed on Table I-3 of the Kirtland AFB RCRA Permit as a SWMU or AOC Requiring Corrective Action
- LF-001 primarily contains municipal waste and construction waste and debris
- The landfill is regulated under NMAC 4.1.500, which addresses RCRA landfill requirements under CFR Parts 264.111 and 264.310
- The regulations prescribe closure requirements and post-closure care and monitoring requirements
- The ET cover was designed as an equivalent system as a RCRA landfill cap, as permitted under 40 CFR part 264.310(a)(7)
- The ET cover was installed in 2006 and the landfill is now in the post closure period

Groundwater Map—April 2022



Site Background

- Operated as early as 1951 but primarily between 1960 and 1975
- Waste was disposed in 'trench-and-fill' fashion
- Estimated 425,000 cubic yards (CY) of municipal waste and 175,000 CY of construction waste and demolition debris
- Depth to groundwater ranges from 420 to 450 feet
- Currently four regional aquifer groundwater monitoring wells
- Long-Term Monitoring (LTM) program initiated in 1996
- Evapotranspiration (ET) cover installation completed in 2006

ET Cover System

- Selected as preferred alternative in Corrective Measures Study
- ET cover is 49 acres in area
- ET cover system includes 36" ET cover overlaying a 6" compacted subgrade layer
- Soils for ET cover specified as silty sand, silty-clayey sand, or silty clay, with 99% passing a 1 inch sieve
- Design objective of ET cover was to achieve target percolation rate of 2.5 millimeters per year or less

Evapotranspiration (ET) Cover



Current Inspections and Monitoring Program

- Through 2017, annual groundwater sampling of four monitoring wells with quarterly groundwater depth measurements, and monthly landfill inspections or following large rain events
- Current monitoring: biennial groundwater sampling of four monitoring wells with semi-annual groundwater depth measurements, and landfill inspections are conducted semi-annually and again following large rain events, when they occur
- **Groundwater Sampling**
 - Dissolved metals (21 target analyte list metals) - biennial
 - Anions (nitrate, chloride, fluoride, sulfates) and Total Dissolved Solids - biennial
 - VOCs, Radium-226, Radium-228, Gross alpha, Gross beta (ceased sampling in 2018)
- **Landfill Inspections**
 - Inspector walks inspection route across landfill area and documents conditions with notes and photographs
 - Evaluates for fencing/signage condition, cover settling, tumbleweed/debris accumulation in drainages and pipes, rill erosion, piping erosion, desiccation cracking, animal burrows, drainage system conditions, inlets, outlets, sedimentation
 - Inspection reports used to plan maintenance and mitigation measures
- **Landfill Repairs**
 - Significant repairs of LF-001 conducted in 2015 included: Removal of fiber rolls, backfilling of fissures, backfill of rilling and erosional gullies with topsoil, repair of rock berms

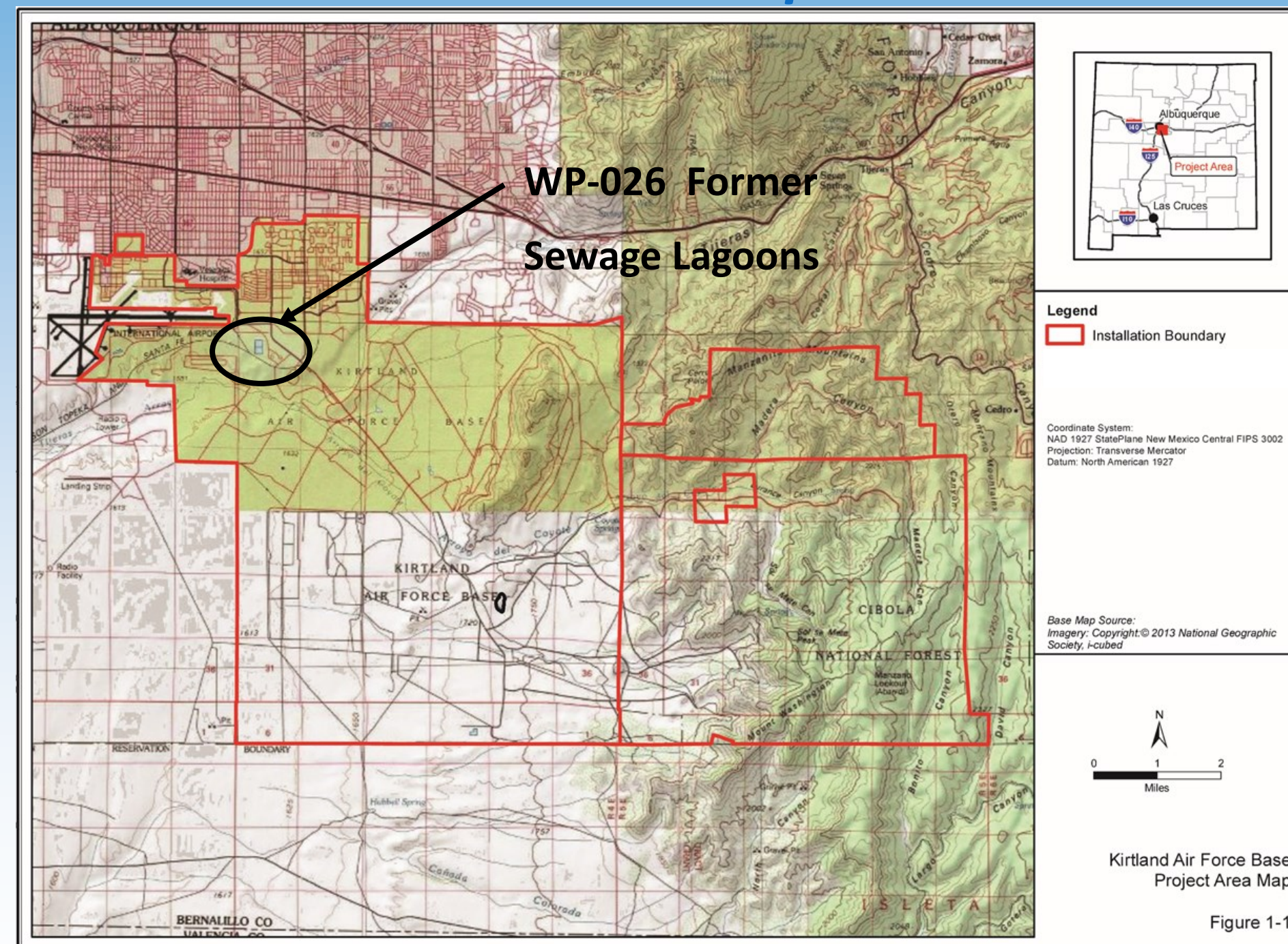


Kirtland Air Force Base—Site WP-026 (SWMU WP-026)

Former Sewage Lagoons



Location Map



Site Background

- Site WP-026 includes two distinct areas – Former Base Sewage Lagoons and Golf Course Main Pond (GCMP)
- Sites linked because GCMP historically received effluent from the Sewage Lagoons thus they shared the same waste stream
- Both the perched groundwater unit and the regional aquifer are present at the former Sewage Lagoons and at the GCMP
- Three groundwater monitoring wells are screened in the perched unit at the GCMP, and nitrate is the only constituent that exceeds regulatory levels
- Nitrate in groundwater at the GCMP is regulated under Kirtland AFB Site ST-105, through NMED Ground Water Quality Bureau (GWQB)

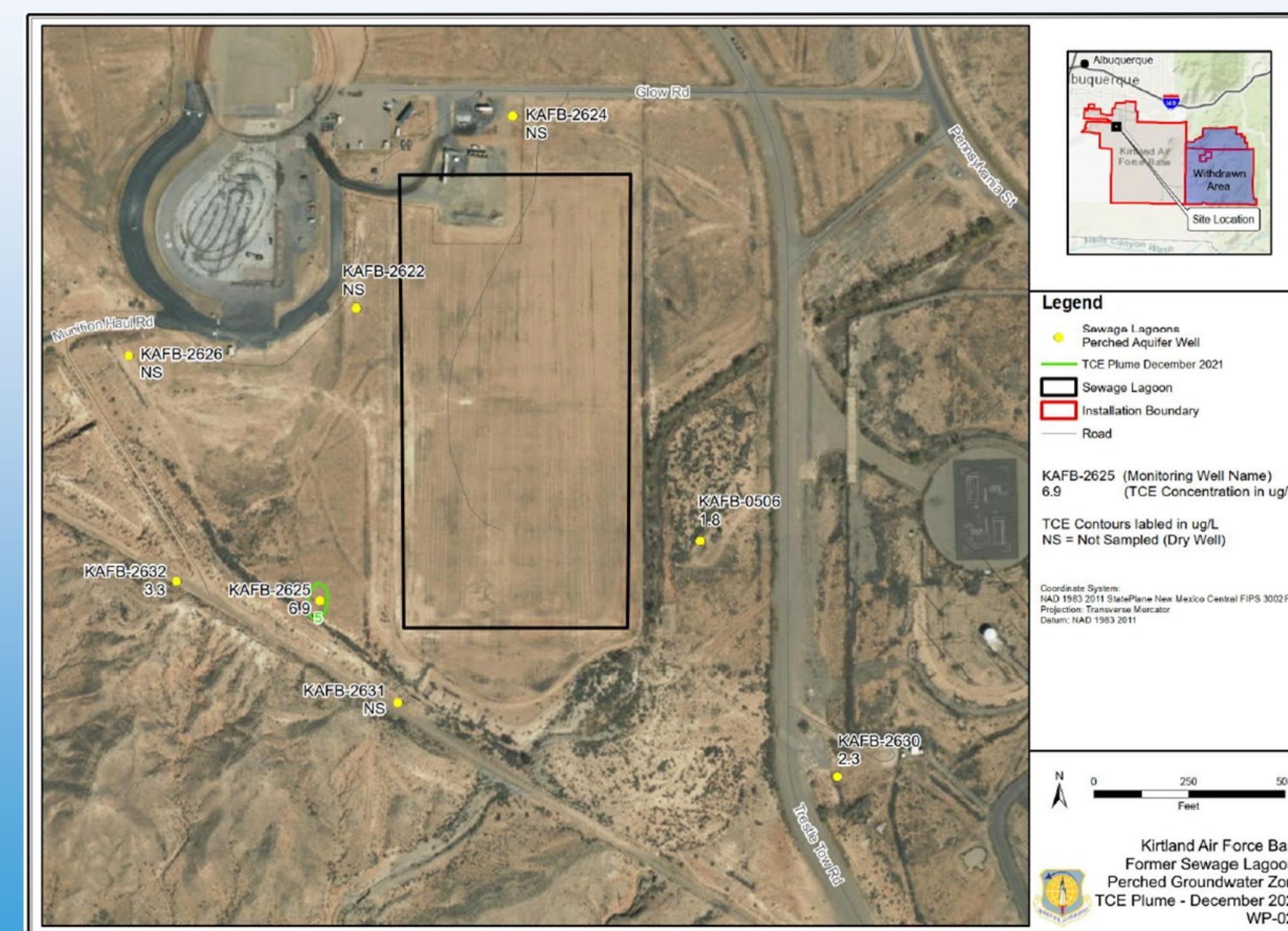
Former Sewage Lagoons Background

- Constructed in 1962 – operated through 1987
- Unlined north and south cells
- Approximately 14 acres filled up to 6 ft depth of sewage water
- Approximately 330 million gallons raw sewage handled from April through October each year
- November to March KAFB sewage was diverted into City of Albuquerque sewer system

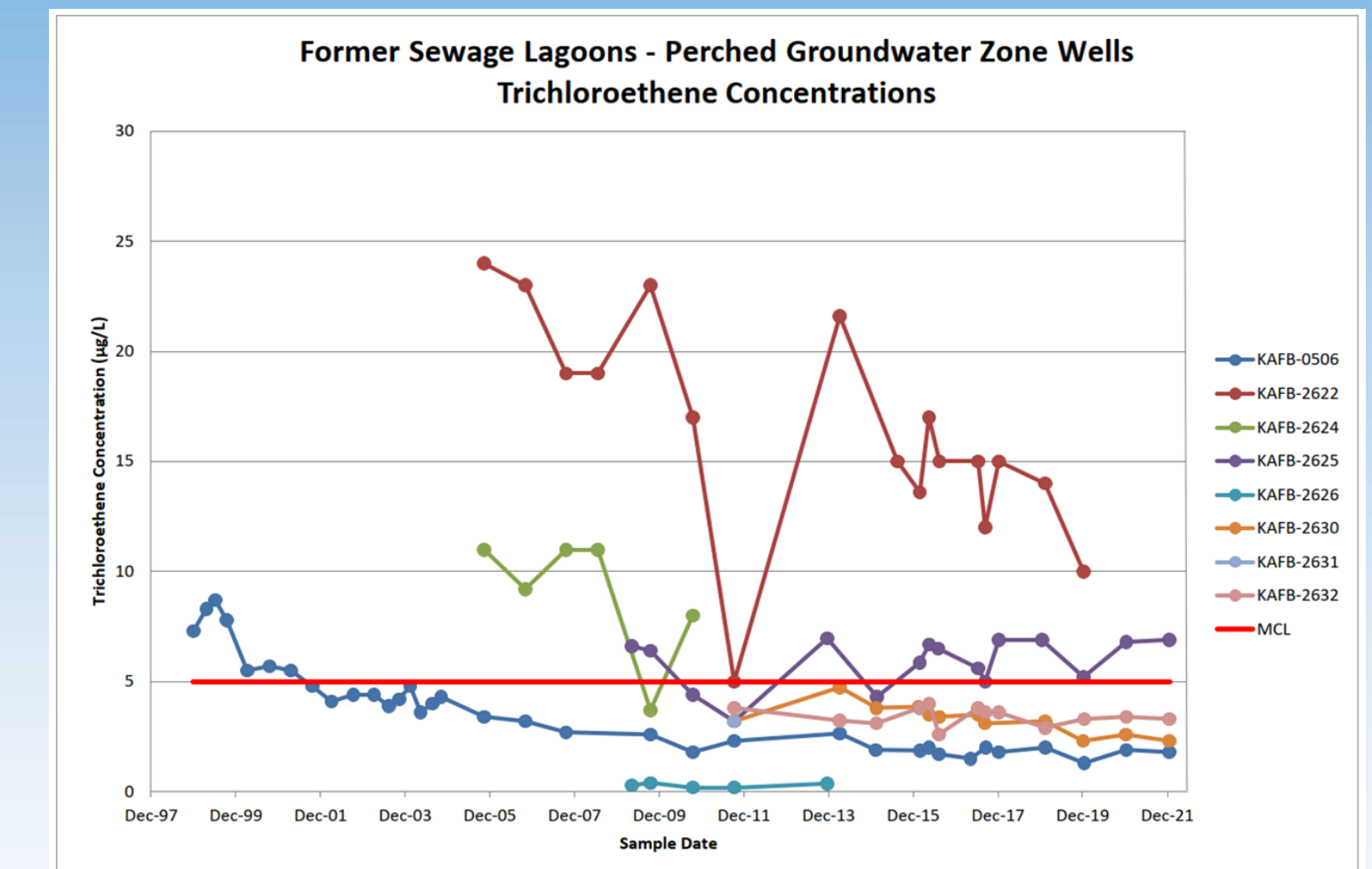
Regulatory Framework/History

- WP026 (SWMU WP-026) is listed on Table I-3 of the Kirtland AFB RCRA Permit as a SWMU or AOC Requiring Corrective Action
- USGS study and Stage 2 RFI – 1988 through 1992
- Post closure groundwater monitoring 1994 through 1996
- Focus was chromium
- Several exceedances of nitrate in perched groundwater (max concentration 14.3 mg/L, but no nitrate exceedances since 1997 in the perched groundwater zone)
- Annual monitoring initiated in 1996 (on-going)
- Supplemental Soil Investigations 1998 through 2000
- Soils excavation and removal (dry sludge near surface) – 2010 Accelerated Corrective Measure
- Contaminants of Concern at Former Sewage Lagoons - TCE in perched groundwater zone and nitrate in regional aquifer
- Nitrate in groundwater is also regulated under Site ST-105 through GWQB

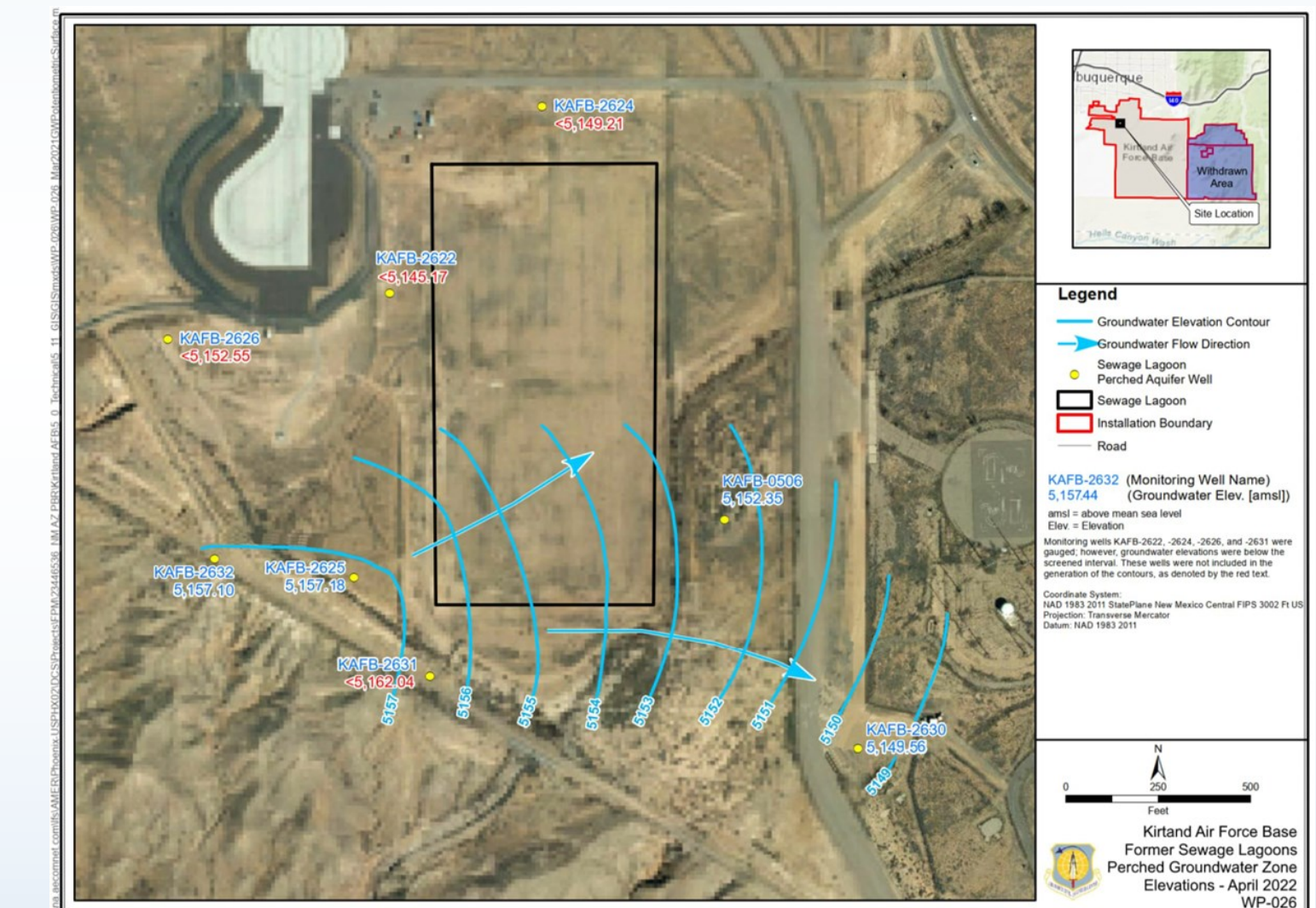
TCE Distribution - Perched Groundwater Zone - December 2021



Perched Groundwater Zone TCE Trends - Dec 2021



Perched Unit Groundwater Map—April 2022



Current Conditions and Site Management

- Remaining perched groundwater zone wells water level declining at average of 0.35 ft per year
- One remaining perched groundwater unit well has TCE in exceedance of 5 µg/L (NMWQCC) standard
- At request of NMED an aquifer test was conducted in 2022 in perched groundwater zone well KAFB-2630
- Aquifer Test Report under NMED review
- Groundwater Sampling**
- Four perched groundwater zone wells and four regional aquifer wells sampled annually and gauged quarterly under current LTM program
- Samples analyzed for nitrate, ammonia, anions, TDS (both perched and regional) and VOCs and metals (perched unit only)
- Annual Monitoring Reports submitted to NMED

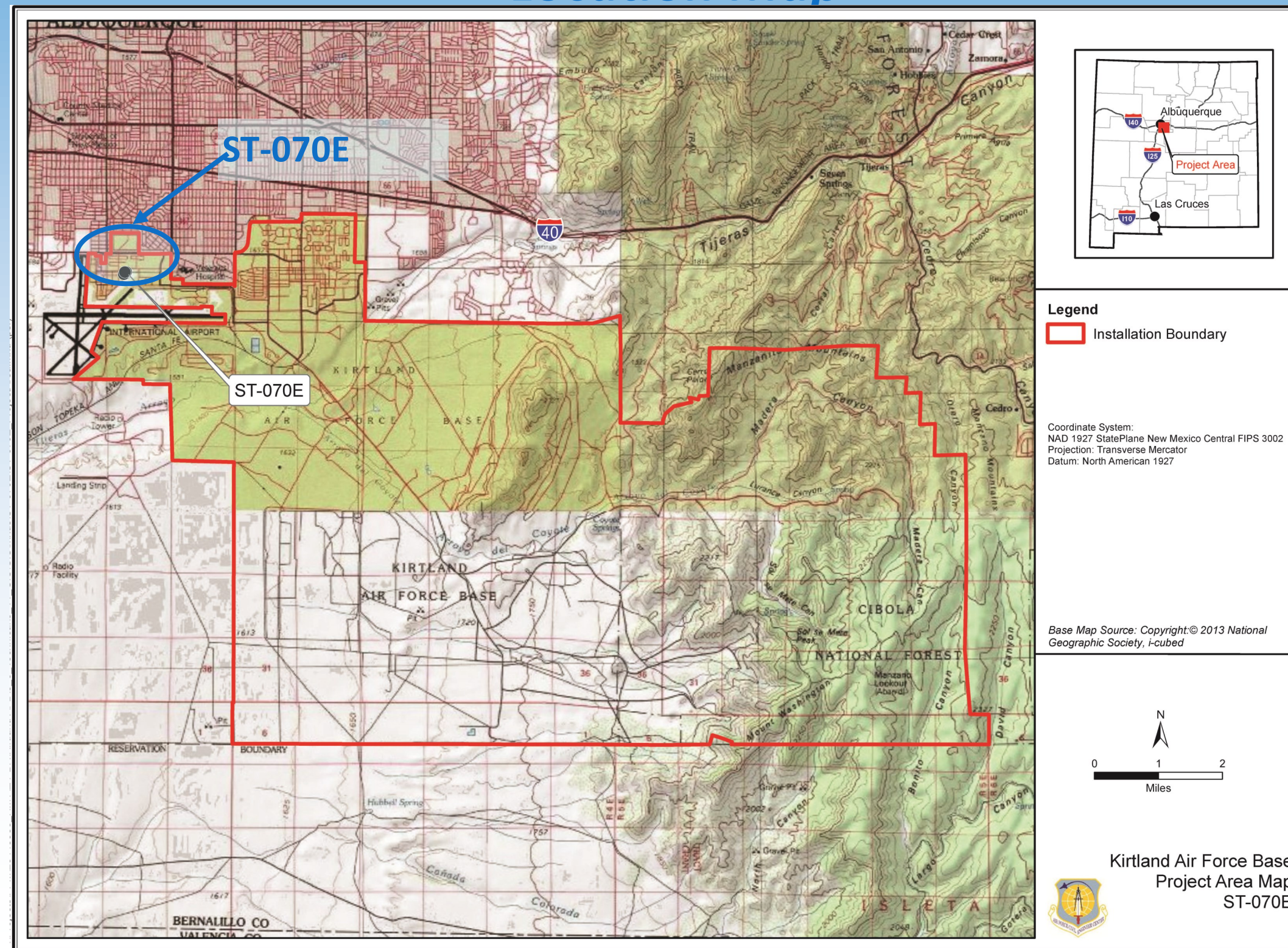


Kirtland Air Force Base—Site ST-070E, Oil Water Separator

ST-219



Location Map



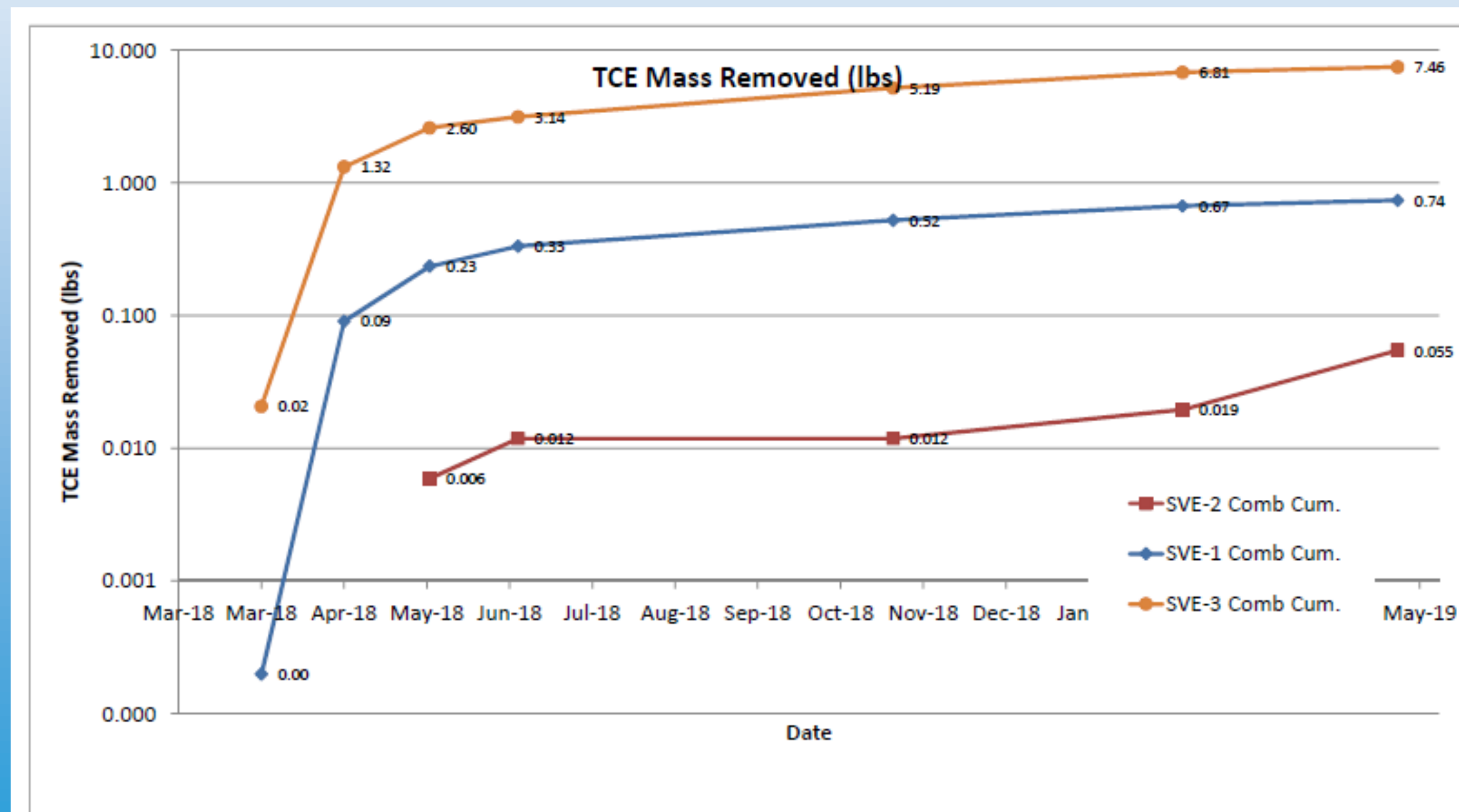
Site Background

- Area used for aircraft movement and parking around hangar buildings 481 & 482
- Potential historic releases of fuels, lubricants and degreasers
- Former Oil Water Separator (OWS) identified as a contaminant release site based on inspections and sampling in 1990 & 1992
- Several RCRA Facility Investigation (RFI) phases conducted between 1993 & 1999
- 39 soil borings were advanced and sampled up to 150 feet depth below surface
- 7 soil vapor monitoring wells were installed
- Investigations determined that petroleum hydrocarbon contamination (Avgas, jet fuel, diesel and gasoline and limited mineral spirits and chlorinated solvents) impacted soils below the former OWS and drainage sump
- Groundwater characterization began in 2001 with installation of monitoring well KAFB-7001, a 480 ft deep well screened in the regional aquifer
- To date, no site-related contaminants have exceeded regulatory standards in well KAFB-7001, although trichloroethylene (TCE) has been detected at trace levels

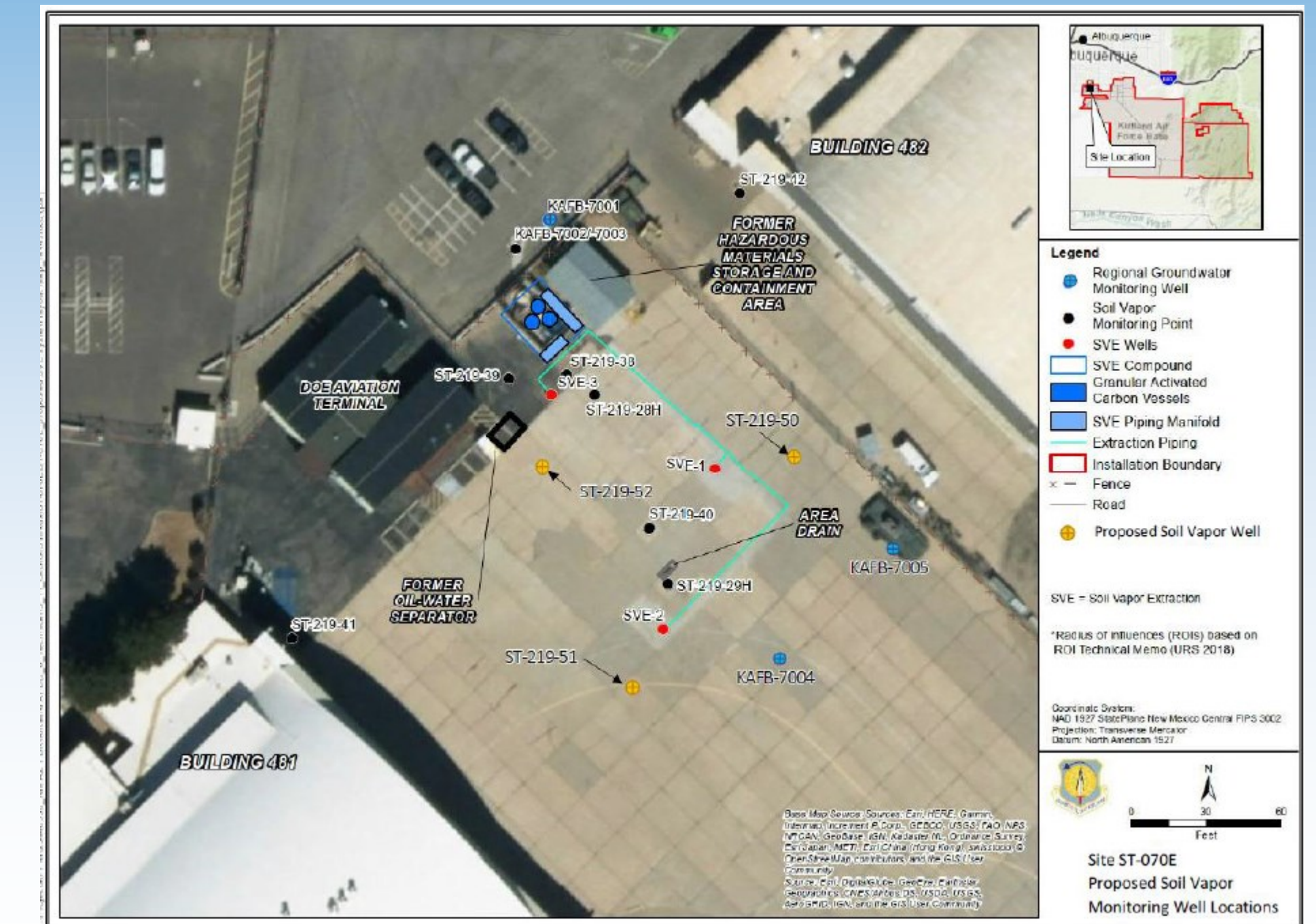
Remediation History

- Bioventing was conducted between 1999 and 2001
 - Active subsurface ventilation with humidified air through a vapor well and extraction well
 - Soil samples collected to confirm presence of TPH degrading bacteria
 - Lower than anticipated degradation rates were achieved
- SVE Pilot Tests conducted in 2003
 - Results of pilot testing indicated SVE would be an effective alternative for remediation of TPH and chlorinated solvents
 - Between 2007 and 2008 the SVE pilot scale system was expanded to full scale system by converting two monitoring wells to SVE wells
- SVE full scale system operation 2008—2016
 - The effluent treatment system was upgraded in 2008
 - Rebound study conducted in 2011 indicated that three month shutdowns would help operational efficiency
 - Full operation under current contract between June 2014 and June 2016, primarily from a single nested well
 - System operated at an air extraction rate of 80 to 85 standard cubic feet per minute (scfm)
- Mass Removal Since SVE Upgrade Restart (March 2018 through May 2019)
 - TPH (gasoline range) - 12,918 lbs
 - Tetrachloroethylene (TCE) - 8.3 lbs
 - Trichloroethylene (PCE) - 4.2 lbs

ST-070E TCE Mass Removed Since 2018 Restart



ST-070E Proposed SVE Monitoring Wells



Upgraded SVE System (2016-2017)

- Three New SVE Extraction wells:
 - SVE-1 (nested well screens at 7-12 ft; 16-26 ft; and 31-36 ft)
 - SVE-2 (single well screen at 32-42 ft)
 - SVE-3 (nested well screens at 35-50 ft; 94-104 ft; 132-142 ft)
- Screen placements determined during construction based on field screening and observations during drilling
- New SVE Treatment System:
 - 20 HP SVE blower up to 250 scfm operating at vacuum of 90 inches of water column
 - Automated shutdown logic for influent temperatures, discharge high-levels, etc.
 - Two 3,000 lb vapor phase granular activated carbon (GAC) treatment vessels with a third alternate on site for change-outs

Current Operations & Monitoring

- SVE system operations terminated in May 2019
- In 2020 NMED requested three additional vapor monitoring wells (adjacent to 2016 SVE wells)
- The work plan was submitted to NMED in February 2022 (No response to date)
- In 2021 two new groundwater wells installed
- Quarterly groundwater monitoring of three wells (laboratory sample analysis)
- An updated Long-Term Monitoring Plan was submitted to NMED in April 2022 (No response to date)
- Updated plan will include annual vapor monitoring and quarterly groundwater monitoring

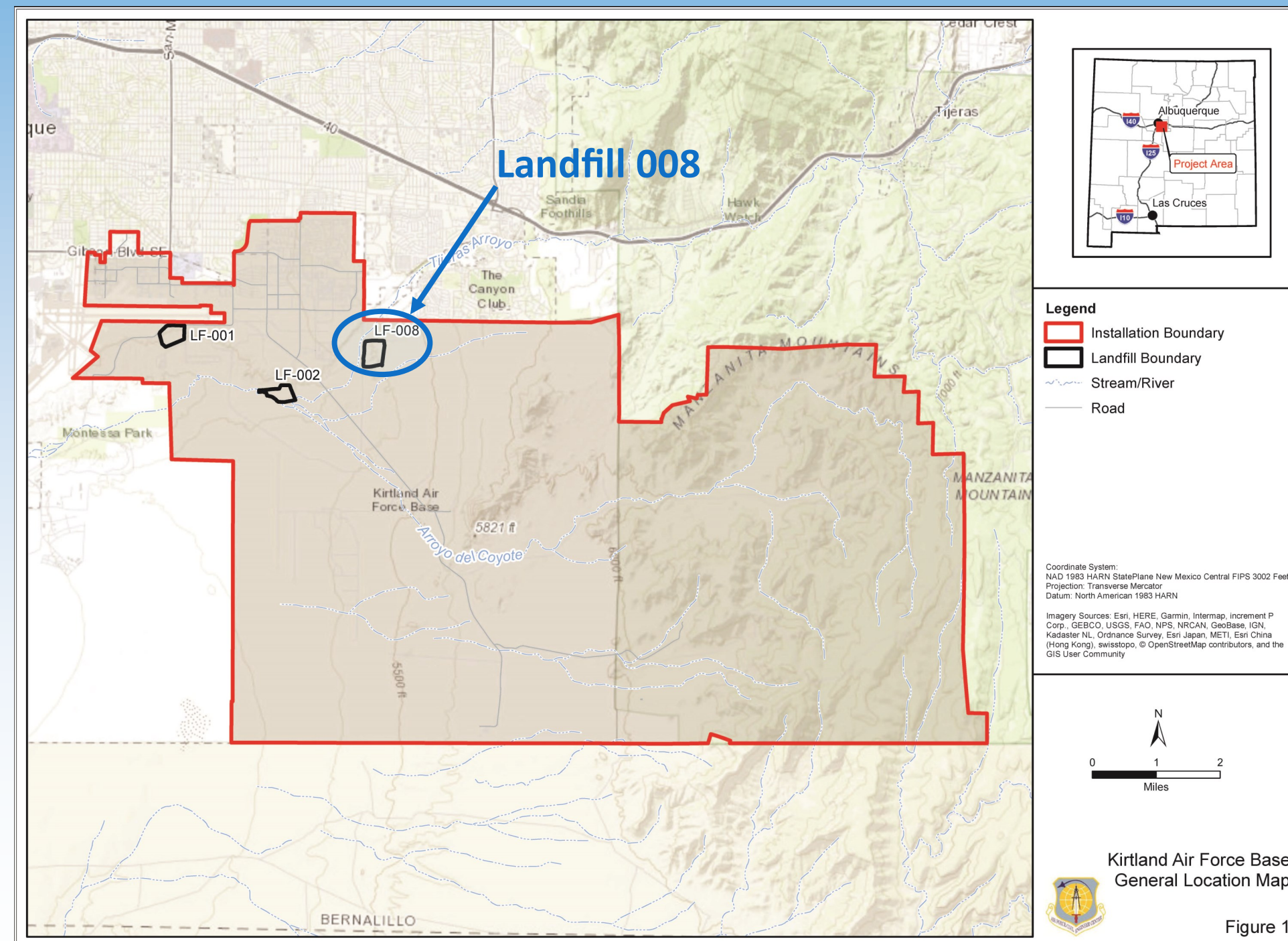


Kirtland Air Force Base—Landfill 008 (SWMU 6-4)

Monitoring and Inspections



Location Map



Site Background

- LF-008 comprises 3 former landfills: Landfill 004, 005 & 006, located adjacent to the currently operational construction/demolition debris landfill (LF-268, since 1989)
- Landfill 4 operated by City of Albuquerque and KAFB from 1964 to 1969, where approximately 600,000 cubic yards (CY) of general refuse was placed over a 25 acre area
- Landfills 5 and 6 operated from 1960 through 1989
- Landfill 5 was used for construction/demolition debris and Landfill 6 was general refuse
- Landfills 5 and 6 comprise approximately 1,746,000 CY of waste disposed over an area of approximately 40 acres
- Long-Term Monitoring (LTM) program initiated in 1995
- Monitoring at the site also covers the active portion of LF-268 under requirements of the New Mexico Solid Waste Bureau

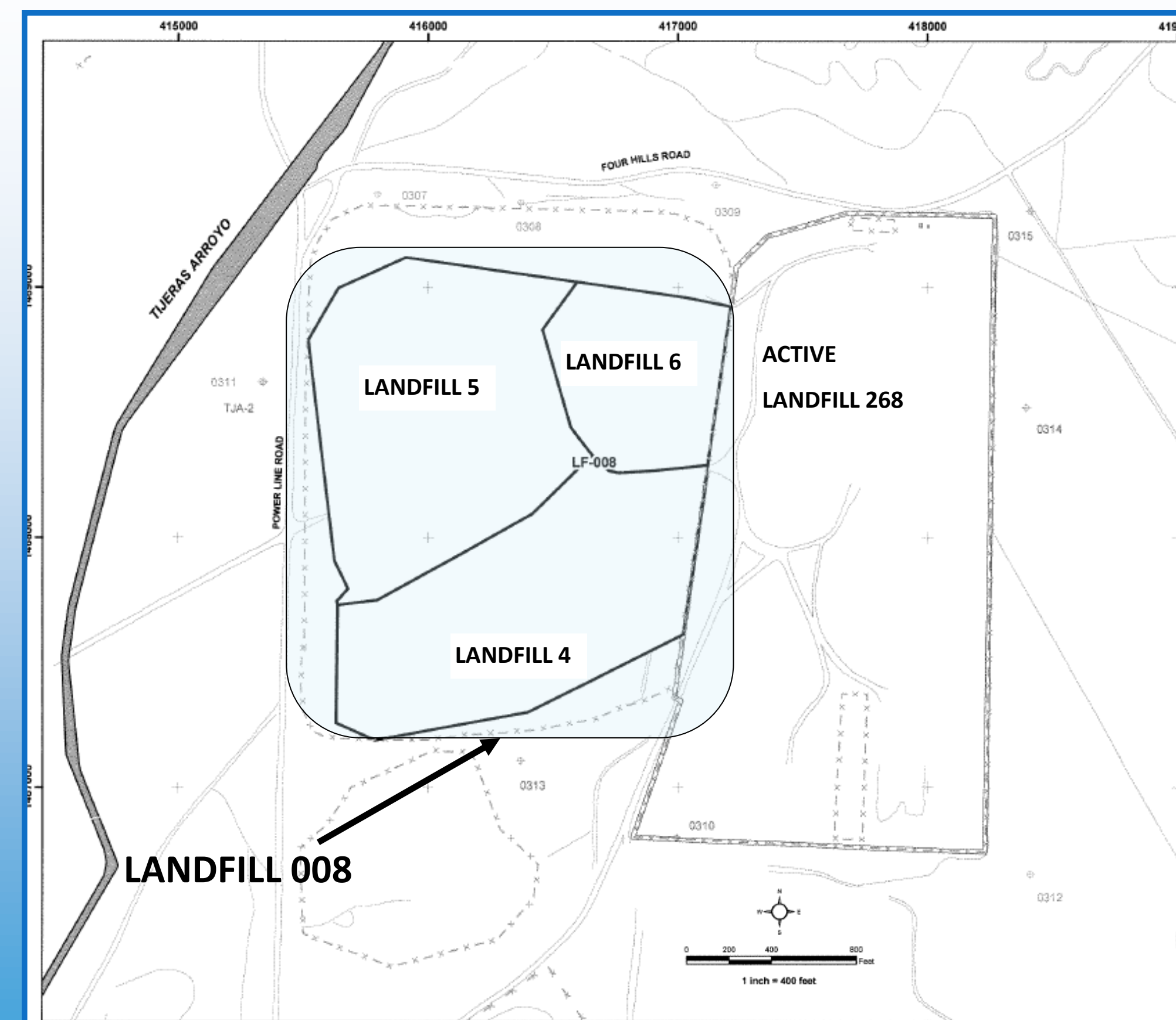
ET Cover System

- Selected as preferred alternative in Corrective Measures Study
- 36" RCRA landfill cover of native soil was installed in 1992
- ET cover is 65 acres in area
- ET cover system includes 36" ET cover overlaying a 6" compacted subgrade layer
- Design objective of ET cover was to achieve target percolation rate of 2.5 millimeters per year or less

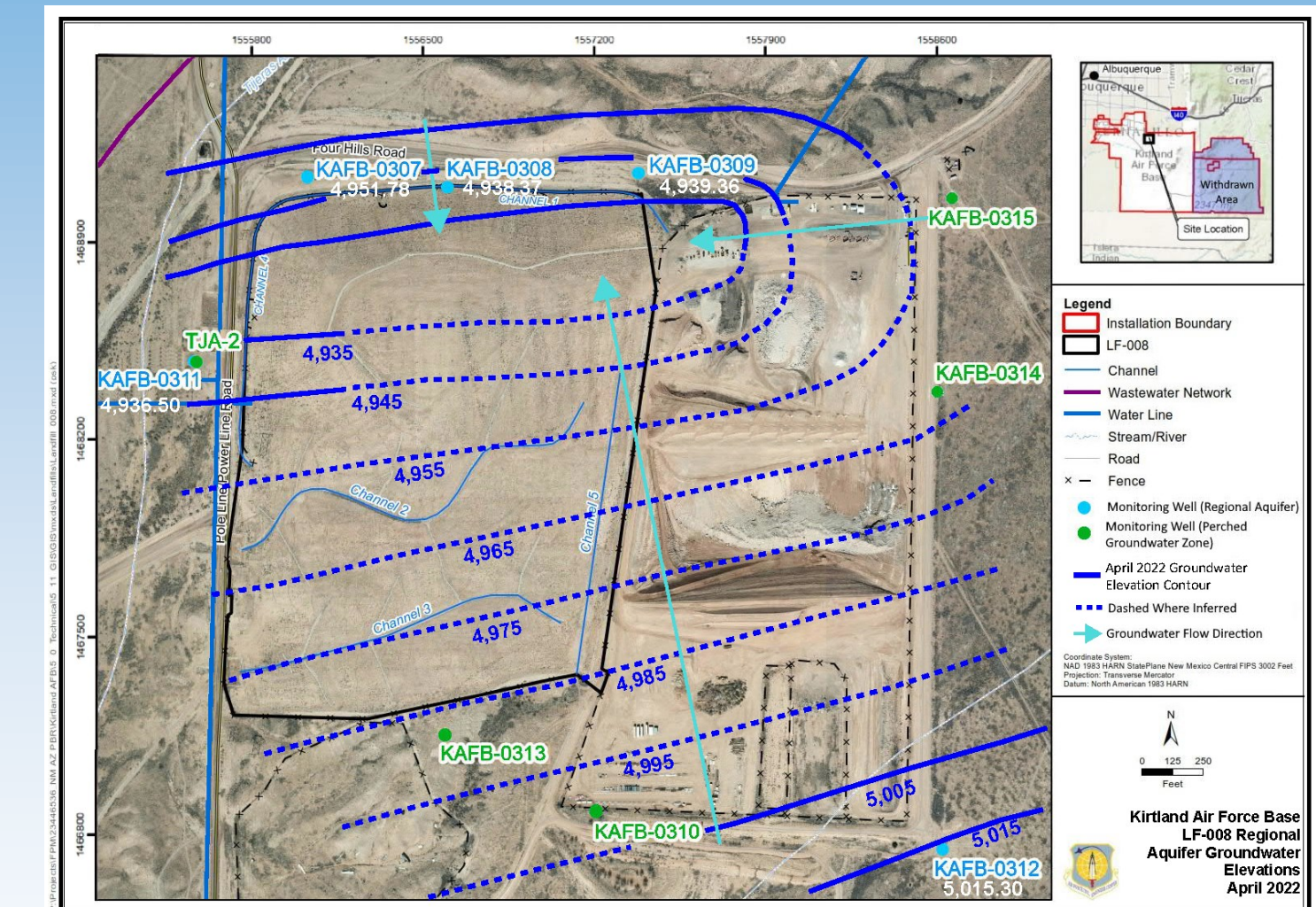
Regulatory Framework

- LF-008 (SWMU 6-4) is listed on Table I-3 of the Kirtland AFB RCRA Permit as a SWMU or AOC Requiring Corrective Action
- The landfill is regulated under NMAC 4.1.500, which addresses RCRA landfill requirements under CFR Parts 264.111 and 264.310
- The regulations prescribe closure requirements and post-closure care and monitoring requirements
- The ET cover was designed as an equivalent system as a RCRA landfill cap, as permitted under 40 CFR part 264.310(a)(7)
- The ET cover and drainage/erosion control system were constructed between 2001 and 2005 and the landfill is now in the post closure period
- Numerous modifications were made to facilitate future use of the construction and demolition landfill (LF-268), including construction of a new Waste Transfer Facility and re-alignment of the access haul road.

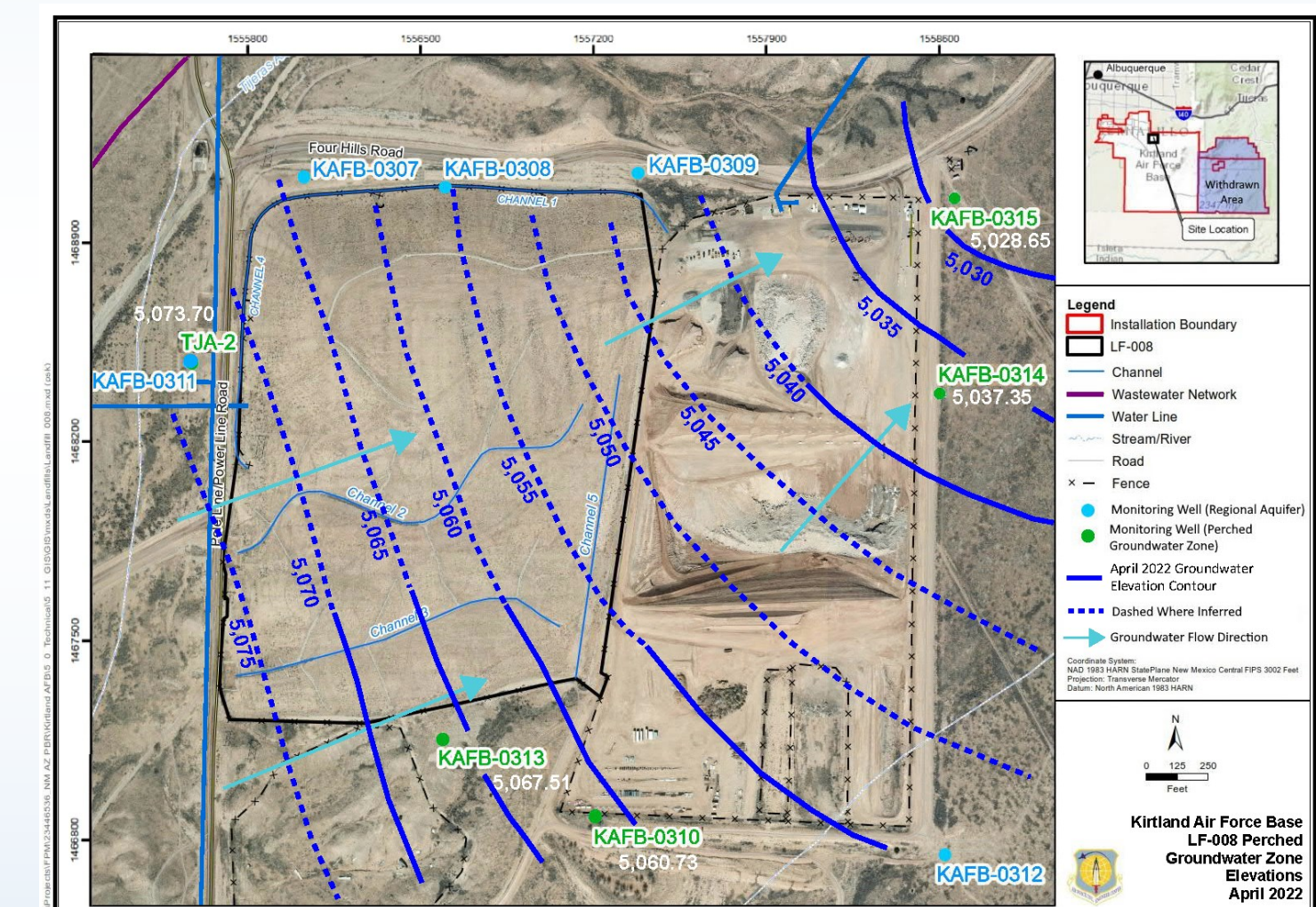
Site Map



Regional Aquifer Groundwater Map—April 2022



Perched Unit Groundwater Map—April 2022



Current Inspections and Monitoring Program

- Through 2017, annual groundwater sampling of 5 regional aquifer and 5 perched unit monitoring wells with quarterly groundwater depth measurements, and monthly landfill inspections or following large rain events
- Currently, sampling changed for removal of radiological analytes from the sampling list, and landfill inspections are conducted semi-annually and again following large rain events, when they occur
- Erosion repairs conducted August 2018 with additional maintenance and repairs conducted in November 2018. Most recent erosion and sedimentation maintenance conducted in spring 2022.
- **Groundwater Sampling**
 - Volatile Organic Compounds (VOCs) - annual sampling
 - Dissolved metals (21 target analyte list metals) - annual sampling
 - Radium-226, Radium-228, Gross alpha, Gross beta (ceased sampling in 2018)
 - Nitrate plus Nitrite (as Nitrogen) - annual sampling