



**N3B-Los Alamos**  
1200 Trinity Drive, Suite 150  
Los Alamos, New Mexico 87544  
(505) 661-5918



**Environmental Management**  
P.O. Box 1663, MS M984  
Los Alamos, New Mexico 87545  
(505) 665-5658/FAX (505) 606-2132

## GROUND WATER

OCT 29 2019

BUREAU

Date: OCT 29 2019  
Refer To: N3B-19-0330

Mr. Steve Pullen  
Ground Water Quality Bureau  
New Mexico Environment Department  
1190 S. St. Francis Drive  
Santa Fe, NM 87505

**Subject: Submittal of the Sampling and Analysis Plan for Characterization of Soils in the Land Application Zones Used at the Chromium and RDX Project Areas Under Discharge Permit 1793**

Dear Mr. Pullen:

Enclosed is the sampling and analysis plan (SAP) for the characterization of specific constituents (i.e., chromium, Royal Demolition Explosive [RDX], and perchlorate) in soil within designated land application zones under Discharge Permit 1793 (DP-1793). This SAP addresses a condition of the June 15, 2017, New Mexico Environment Department (NMED) approval of Work Plans #4 and #5 under DP-1793 that requires samples to be collected 6 months before the end of the term of the discharge permit (July 27, 2020). NMED requires samples to be collected from representative locations in each land application zone in Mortandad Canyon and the RDX project area, and analyzed for total chromium and RDX in the applicable areas. NMED did not require that perchlorate be sampled for in approval of Work Plan #5; however, soil sampling for perchlorate will be performed in Mortandad Canyon for completeness.

If you have questions, please contact Christian Maupin at (505) 695-4281 (christian.maupin@em-la.doe.gov) or Cheryl Rodriguez at (505) 257-7941 (cheryl.rodriguez@em.doe.gov).

Sincerely,

Elizabeth Lowes  
Program Manager  
Environment, Safety and Health  
N3B-Los Alamos

Sincerely,

Arturo Q. Duran  
Compliance and Permitting Manager  
Environmental Management  
Los Alamos Field Office

Enclosure(s): Sampling and Analysis Plan for Characterization of Soils in the Land Application Zones Used at the Chromium and Royal Demolition Explosive Project Areas Under Discharge Permit 1793 (EM2019-0370)

cc (letter and enclosure[s] emailed):

Steve Pullen, NMED-GWQB

Andrew Romero, NMED-GWQB

David Nickless, EM-LA

Cheryl Rodriguez, EM-LA

Hai Shen, EM-LA

Ben Underwood, EM-LA

Emily Day, N3B

Erich Evered, N3B

Jeannette Hyatt, N3B

Danny Katzman, N3B

Joseph Legare, N3B

Frazer Lockhart, N3B

Christian Maupin, N3B

Glenn Morgan, N3B

Bruce Robinson, N3B

Steve White, N3B

[emla.docs@em.doe.gov](mailto:emla.docs@em.doe.gov)

N3B Records

# **SAMPLING AND ANALYSIS PLAN FOR CHARACTERIZATION OF SOILS IN THE LAND APPLICATION ZONES USED AT THE CHROMIUM AND ROYAL DEMOLITION EXPLOSIVE PROJECT AREAS UNDER DISCHARGE PERMIT 1793**

## **1.0 OBJECTIVE**

The purpose of this sampling and analysis plan (SAP) is to characterize concentrations of key constituents in soil within designated land-application zones following land application of treated effluent used for the chromium and Royal Demolition Explosive (RDX) project areas under Discharge Permit 1793 (DP-1793). This SAP addresses a condition of the June 15, 2017, New Mexico Environment Department (NMED) approval of Work Plans #4 and #5 under DP-1793 that requires soil samples to be collected 6 mo before the end of the term of the discharge permit (July 27, 2020). The samples are required to be collected from representative locations in each land application zone in Mortandad Canyon and the RDX project area, and analyzed for total chromium and RDX in the applicable area at a National Environmental Laboratory Accreditation Program-accredited analytical laboratory. NMED did not require that perchlorate be sampled for in the approval of Work Plan #5; however, soil sampling for perchlorate will be performed in Mortandad Canyon for completeness.

## **2.0 APPROACH**

### **2.1 Chromium Project Area**

Four zones are designated for land application of treated groundwater in the chromium project area (Figure 2.1-1). Baseline samples were collected in July 2016 from two depths (0–6 in. and 6–12 in.) at each of ten total locations within Zones 1, 3, and 4. Zone 2 was not sampled in 2016 because that zone constitutes the road, which is subject to periodic grading. Figure 2.1-1 shows the locations of samples analyzed for chromium and perchlorate collected in 2016. The same locations will be resampled and analyzed for chromium and perchlorate. Zone 2 will also be sampled in accordance with NMED's requirement in the Work Plan #5 approval letter to sample all land application zones (NMED 2017). Table 2.1-1 provides additional information on the sampling conducted for baseline purposes in 2016.

### **2.2 RDX Project Area**

Nine zones are designated for land application of treated groundwater in the RDX project area (Figure 2.2-1). Baseline samples were collected in late June and early July 2016 from two depths (0–6 in. and 6–12 in.) at nine locations and one depth (0–6 in.) at one additional location, all within land application Zones 1, 3, 4, and 9. Figure 2.2-1 shows the locations of samples analyzed for RDX collected in 2016. The same locations will be resampled and analyzed for RDX. Zones 2 and 5 through 8 will also be sampled in order to sample all land application zones. Table 2.2-1 provides additional information on the sampling conducted for baseline purposes in 2016.

## **3.0 REPORTING**

The results of the sampling presented in this SAP will be presented in a report to NMED. The report will also include comparisons to the baseline sample results and to applicable soil-screening action levels for soils as presented in NMED's 2019 "Risk Assessment Guidance for Site Investigations and Remediation," Table A-1 (NMED 2019).

#### **4.0 REFERENCES**

NMED (New Mexico Environment Department), June 15, 2017. "Approval with Modification of Work Plan #5 for Treatment and Land Application of Groundwater at TA-05, Los Alamos National Laboratory, Discharge Permit 1793," New Mexico Environment Department letter to J. Bretzke (LANL) and C. Rodriguez (EM-LA) from M. Hunter (NMED-GWQB), Santa Fe, New Mexico.

NMED (New Mexico Environment Department), June 19, 2019. "Risk Assessment Guidance for Site Investigations and Remediation," February 2019 (Revision 2, 6/19/19), Hazardous Waste Bureau and Ground Water Quality Bureau, Santa Fe, New Mexico.

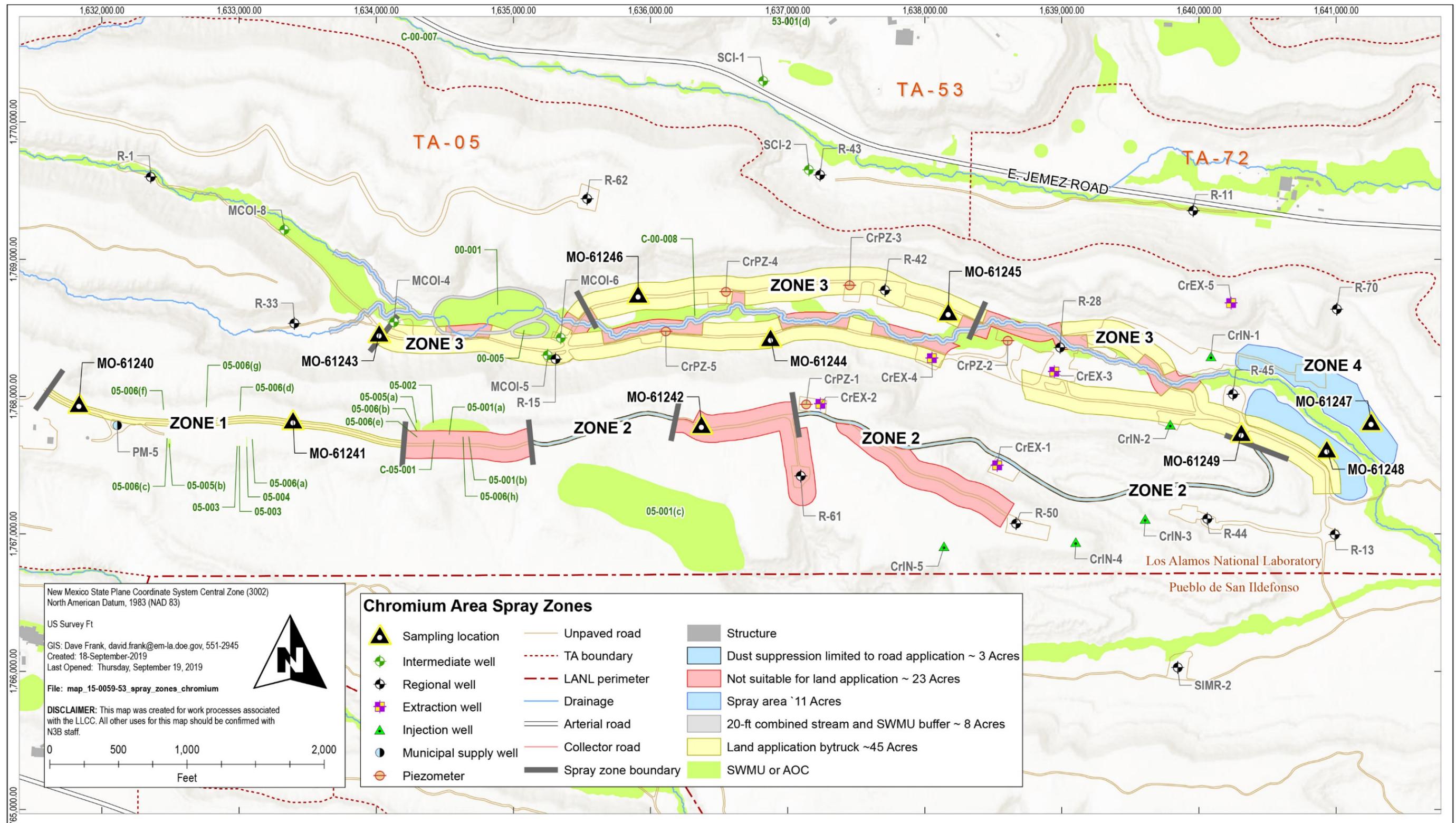


Figure 2.1-1 Chromium project area land-application zones and locations of baseline and post land-application soil samples

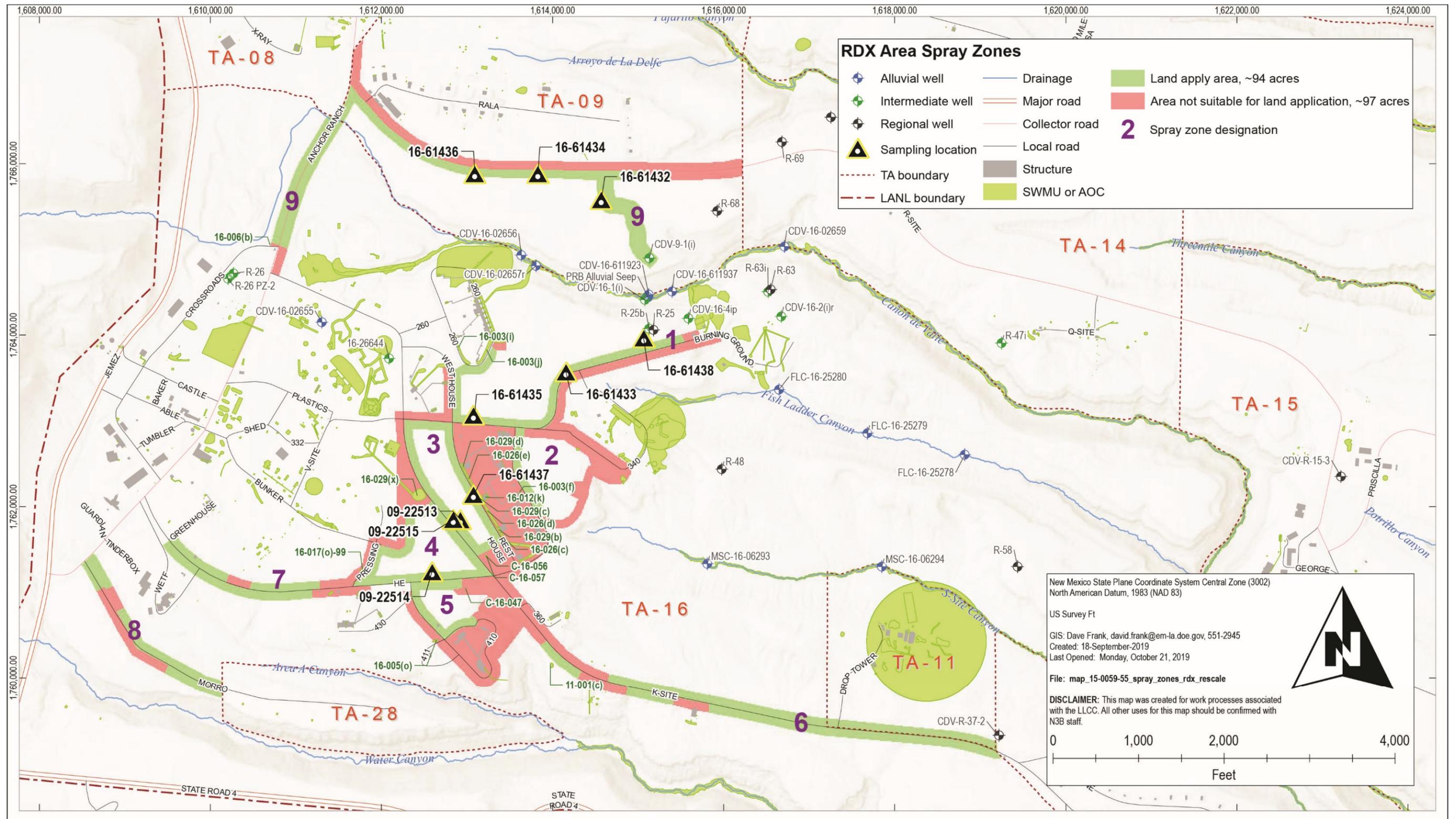


Figure 2.2-1 RDX project area land-application zones and locations baseline and post land-application soil samples

**Table 2.1-1  
Chromium Project Area 2016 Baseline Soil Sampling**

Land Application Zone	Sample Location ID	Sample Depth (in.)	Number of Samples Taken	Notes
1	MO-61240	0–6	1	
1	MO-61240	6–12	1	
1	MO-61241	0–6	1	
1	MO-61241	6–12	1	
1	MO-61242	0–6	1	
1	MO-61242	6–12	1	
2	None	NA*	NA	No sample was taken in 2016. Samples will be taken for the DP-1793 end-term requirements in 2019. Samples will be taken at two depths between 0–6 in. and 6–12 in.
3	MO-61243	0–6	1	
3	MO-61243	6–12	1	
3	MO-61244	0–6	1	
3	MO-61244	6–12	1	
3	MO-61245	0–6	1	
3	MO-61245	6–12	1	
3	MO-61246	0–6	1	
3	MO-61246	6–12	1	
3	MO-61249	0–6	1	
3	MO-61249	6–12	1	
4	MO-61247	0–6	1	
4	MO-61247	6–12	1	
4	MO-61248	0–6	1	
4	MO-61248	6–12	1	

\*NA = Not analyzed.

**Table 2.2-1  
RDX Project Area 2016 Baseline Soil Sampling**

Land Application Zone	Sample Location ID	Sample Depth (in.)	Number of Samples Taken	Notes
1	16-61433	0–6	1	
1	16-61433	6–12	1	
1	16-61435	0–6	1	
1	16-61435	6–12	1	
1	16-61438	0–6	1	
1	16-61438	6–12	1	
2	None	NA*	NA	No sample was taken in 2016. Samples will be taken for the DP-1793 end-term requirements in 2019. Samples will be taken at two depths between 0–6 in. and 6–12 in.
3	16-61437	0–6	1	Single depth was sampled because of bedrock
3	09-22513	0–6	1	
3	09-22513	6–12	1	
4	09-22514	0–6	1	
4	09-22514	6–12	1	
4	09-22515	0–6	1	
4	09-22515	6–12	1	
5	None	NA	NA	No sample was taken in 2016. Samples will be taken for the DP-1793 end-term requirements in 2019. Samples will be taken at two depths between 0–6 in. and 6–12 in.
6	None	NA	NA	No sample was taken in 2016. Samples will be taken for the DP-1793 end-term requirements in 2019. Samples will be taken at two depths between 0-6 in. and 6–12 in.
7	None	NA	NA	No sample was taken in 2016. Samples will be taken for the DP-1793 end-term requirements in 2019. Samples will be taken at two depths between 0–6 in. and 6–12 in.
8	None	NA	NA	No sample was taken in 2016. Samples will be taken for the DP-1793 end-term requirements in 2019. Samples will be taken at two depths between 0–6 in. and 6–12 in.
9	16-61432	0–6	1	
9	16-61432	6–12	1	
9	16-61434	0–6	1	
9	16-61434	6–12	1	
9	16-61436	0–6	1	
9	16-61436	6–12	1	

\*NA = Not analyzed.