



PROPOSED PLAN
Amendment to the September 2001 Record of
Decision, revised as per the September 2006
Explanation of Significant Differences
Fruit Avenue Plume Superfund Site
Albuquerque, New Mexico
July 17, 2017



The purpose of this Proposed Plan is to:

- **Identify the proposed alternate remedy that would amend the 2006 remedy;**
 - **Summarize the information that prompted and supports fundamentally changing the 2006 remedy;**
 - **Solicit public review and comment on the alternate cleanup strategy as well as information contained in the Administrative Record file; and,**
 - **Provide information on how the public can be involved in the remedy selection process for the Fruit Avenue Plume Site.**
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Dates to Remember:

- **Public Comment Period:**
July 31, 2017 to August 31, 2017
The EPA and NMED will accept written comments on the Proposed Plan during the public comment period.
- **Public Meeting: August 15, 2017**
The EPA will hold a public meeting to explain the Proposed Plan and all of the alternatives presented in the Feasibility Study addendum. Oral and written comments will also be accepted at the meeting. The meeting will be held at Wells Park Community Center, 500 Mountain Road, NW, Albuquerque, NM 87101 at 6:00 PM.

- **Administrative Record file is available for viewing at:**

EPA Region 6
7th Floor Reception Area
1445 Ross Avenue, Suite 12D13
Dallas, TX 75202-2733
Toll Free (800) 533-3508 or (214) 665-6597
Monday – Friday 7:30 – 11:00 am/1:00 – 4:00 pm

NMED
Harold Runnels Bldg., Suite 2262 N
1190 St. Francis Drive
Santa Fe, NM 87505
(505) 827-0387 or
toll-free 1-800-219-6157

Albuquerque Public Library
423 Central Ave., NE
Albuquerque, NM 87102
(505) 848-1376

Special Collections Library
ATTN: Eileen O’Connell

Hours – 10:00 am – 6:00 pm Tuesday, Wednesday, Friday
11:00 am – 7:00 pm Thursday

The Administrative Record file is also available for viewing on the web at:

<https://semspub.epa.gov/src/home/search.jsf>, Collection ID 65102.

<https://www.epa.gov/superfund/fruit-avenue-plume>

1. INTRODUCTION AND STATEMENT OF PURPOSE

1.1 Site Name, Location

The Fruit Avenue Plume (FAP) Superfund site (Site) is listed on the National Priorities List (NPL). The Site includes a ground water plume that is contaminated with chlorinated solvents. The Site is located in the downtown area of Albuquerque, New Mexico (Figure 1). At the time the Site was listed on the NPL, it consisted of a contaminated ground water plume spanning multiple aquifer zones up to 544 feet deep; it was approximately 3,500 feet long, and ranged in width from 550 to 1,300 feet.

The geographic coordinates for the center of the Site are latitude 35°5'21" North, and longitude 106°38'40" West. The Site is located in Township 10N, Range 3E, Bernalillo County. Figure 2 depicts the overall area of the Site. Figure 3 presents the Conceptual Site Model. Figure 4 illustrates the location of the Albuquerque Bernalillo County Water Utility Authority (Water Authority), and the University of New Mexico (UNM) production wells that are closest to the contaminated ground water plume.

The Site is identified on EPA's National Priorities List (NPL)¹ as a ground water plume contaminated with chlorinated solvents, and is located beneath the downtown area of Albuquerque, New Mexico (see Figure 1).

1.2 Lead and support agencies

This document is issued by EPA, the lead agency for site activities, and the New Mexico Environment Department (NMED), the support agency. EPA, in consultation with the NMED, will select a final remedy for the Site after reviewing and considering all information submitted during the 30-day public comment period, which follows the issuance of this Proposed Plan. EPA, in consultation with the NMED, may modify the Preferred Alternative or select another response action presented in this Plan, based on new information or public comments. Therefore, the public is encouraged to review and comment on all the alternatives presented in this Proposed Plan. Once EPA has evaluated all the comments and consulted with the NMED, it will issue a ROD Amendment that documents the selection of the new remedy for the Site. The ROD Amendment will include EPA's response to comments submitted during the public comment period.

1.3 Regulatory framework

The EPA has conducted its activities in connection with the Site in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund), 42 U.S.C. §§ 9601 et seq., and the National Oil and Hazardous Substance Contingency Plan (NCP), 40 C.F.R. Part 300. The EPA is issuing this Proposed Plan in accordance with and as part of its public participation responsibilities under CERCLA § 117(a),

¹ The NPL is the list, compiled by the EPA pursuant to Section 105 of CERCLA, 42 U.S.C. § 9605, of uncontrolled hazardous substance releases in the United States that are priorities for long-term remedial evaluation and responses.

42 U.S.C. § 9617(a)² and 40 C.F.R. § 300.430(f)(2). The summary information and recommendations set forth in this Proposed Plan are based on information and documents contained in the Administrative Record file for the Site. EPA and the NMED encourage the public to review these documents to gain a more comprehensive understanding of the Site and Superfund activities that have been conducted at the Site.

This Proposed Plan considers additional information developed since the 2001 ROD, and the 2006 ESD, were issued. Based on this new information, this Proposed Plan describes EPA's Preferred Alternative for remediation of Site ground water. This Preferred Alternative was developed in consultation with the NMED.

This proposal and selection of a remedy as an amendment to the 2001 ROD for the Site is in accordance with the NCP at 40 CFR § 300.435(c)(2)(ii)(A) through (H). This Proposed Plan, the public notice of the Plan, EPA's public meeting about the Plan, the opportunity for the public to make written and oral comments satisfy certain requirements of CERCLA Section 117(a), 42 U.S.C. § 9617(a), and the NCP at 40 CFR § 300.825(a)(2).

The NCP, at 40 CFR § 300.5, defines an operable unit (OU) as a discrete action that comprises an incremental step toward comprehensively addressing site problems. The investigation and remediation of this Site has been conducted as a single operable unit to address soil and ground water contamination.

1.4 Original Record of Decision (ROD)

In 2001, the U.S. Environmental Protection Agency (EPA) issued a Record of Decision (ROD) for the Fruit Avenue Plume Site located in Albuquerque, New Mexico. The ROD documents the remedy that EPA selected to address the contamination at the Site. EPA proposes to amend the 2001 ROD. The ROD was also revised in 2006 as described in an Explanation of Significant Differences (ESD).

At the Site, the ground water is contaminated with various hazardous substances, primarily trichloroethene (TCE), with lesser amounts of perchloroethene (PCE), cis 1,2-dichloroethene (cis-1,2-DCE), and trans 1,2-dichloroethene (trans-1,2-DCE). In EPA's 2001 ROD, EPA selected a remedy that called for extraction of the contaminated ground water, treatment of the extracted water, and reinjection of the treated water into the subsurface (hereinafter this remedy is referred to as "pump and treat" or "P&T"). As further explained below, the P&T system was constructed in 2003 and 2004, and began operation in 2005. Other elements of the selected remedy included Soil Vapor Extraction (SVE), remediation of hot spots and placement of restrictive covenants on the source property.

1.5 2006 Remedy as revised by the ESD – Current remedy

In 2006, EPA reevaluated certain parts of the Site remedy and issued the ESD. EPA made some significant changes to the remedy, but did not fundamentally change the remedy. The ESD

² "U.S.C." means United States Code and "§" means section. The 42 refers to the United States Code title referred to. So "42 U.S.C. § 9617(a)" means "title 42 of the United States Code, section 9617(a)."

documented EPA's decision not to implement the following elements of the original remedy that were called for in the ROD:

- SVE of contaminants from soil located at the former location of the Elite Cleaners and Sunshine Laundry dry cleaning operations (hereinafter the EC/SL) that were identified as a potential source of contamination at the Site;
- Remediation of contaminant hot spots in the shallow and intermediate ground water of the former EC/SL;
- Placement of restrictive covenants on the source property.

EPA's investigations, on which the ESD was based, found there was no longer a basis for implementation of these elements. In addition, at that time, EPA's investigations found that the existing Air Stripper Treatment Plant (ASTP) system (the ASTP system is part of the P&T system) should effectively treat contamination that may originate from the contamination source areas originally identified.

1.6 Circumstances that led to the need for a ROD Amendment

Now, EPA has found that, while P&T remedy may remove contaminants as expected, the P&T remedy may also hinder the natural attenuation processes that degrade the contaminants of concern at the Site. Since natural attenuation is more efficient at neutralizing contamination, EPA has decided to eliminate the P&T, and continue the remedy using Monitored Natural Attenuation (MNA). This Proposed Plan identifies EPA's Preferred Alternative of using MNA site-wide for cleaning up the contaminated ground water at the Site, in lieu of P&T. This Proposed Plan provides EPA's rationale for this preference. In addition, this Proposed Plan includes summaries of other cleanup alternatives evaluated as part of the development of this Proposed Plan.

2. PUBLIC PARTICIPATION

This Proposed Plan discusses information developed since EPA issued the 2001 ROD and the 2006 ESD, including the results of the 2005, 2013, and 2016 MNA studies, and the results of the semi-annual ground water sampling events. EPA encourages the public to review these documents in order to gain a more comprehensive understanding of the Site, as well as an understanding of EPA's evaluation of the Preferred Alternative (*i.e.*, the proposed alternate remedy). EPA also encourages the public to participate in the decision-making process for the Site by providing comments on the documents included in the Administrative Record file, which support the Preferred Alternative and the other decisions proposed in this Proposed Plan.

The Administrative Record file, which contains the documents on which this Proposed Plan is based, will be available for public review starting on July 31, 2017, at the following information repositories:

**Albuquerque Public Library
Special Collections Library
ATTN: Eileen O'Connell, Mgr.
423 Central Ave., NE**

Albuquerque, NM 87102
(505) 848-1376

New Mexico Environment Department
Harold Runnels Idg., Suite - 2262 N.
1190 St. Francis Drive
Santa Fe, NM 87505
(505) 827-0387 or
toll-free 1-800-219-6157

EPA Region 6
1445 Ross Avenue, Suite
Room 12D13
7th Floor Reception Area
Dallas, TX 75202
(214) 665-6424

On the Web

Information about the Fruit Avenue Plume Site is available on EPA's web page at:

Superfund Site: Fruit Avenue Plume, Albuquerque, NM

<https://www.epa.gov/superfund/fruit-avenue-plume>

A public meeting to receive comments on this Proposed Plan will be held at the Wells Park Community Center, located at 500 Mountain Road, NW, Albuquerque, New Mexico, 87101, on Tuesday August 15, from 6:00 PM to time 7:30 PM. The public is invited to comment on this Proposed Plan to amend the 2001 Record of Decision for the Fruit Avenue Plume Superfund Site. Final decisions regarding remediation of the Site will only be made after public comments are considered.

The official public comment period begins on July 31, 2017, and ends on August 31, 2017. During the public comment period, written comments may be submitted to:

Bartolome J Canellas
Remedial Project Manager
EPA, Region 6 (6SF-RL)
1445 Ross Ave.; Suite 1200
Dallas, Texas 75202-2733
(214) 665-6662 or toll free (800) 533-3508

Written comments must be postmarked no later than August 31, 2017.

For specific information about the NMED's participation in the Superfund process, please contact:

Sabino Rivera
New Mexico Environment Department
Superfund Oversight Section
Harold Runnels Building
1190 South Francis
Santa Fe, NM 87505
(505) 827-0387
Sabino.Rivera@state.nm.us

EPA, in consultation with the State of New Mexico, will select a final remedy for the Site after the public comment period has ended and information submitted during this time has been reviewed and considered. EPA will respond to comments received during the public comment period in the Responsiveness Summary, which will be attached to the amended Record of Decision. Once EPA finalizes the ROD Amendment, both the Responsiveness Summary and the ROD Amendment will be available to the public at the repository locations noted above. Note that the final Site remedy may be different from the proposed remedy identified in this Proposed Plan, due to changes made by EPA based on comments received, new issues identified, or new information gathered during the public comment period. Such changes or alterations of this Proposed Plan will be explained and described in the ROD Amendment. Any ROD Amendment will be signed by the Superfund Division Director for EPA Region 6 and will become part of the Administrative Record file (40 C.F.R. § 300.825(a)(2)).

3. SITE BACKGROUND

3.1 Background

The suspected sources of the chlorinated solvent contamination in the ground water plume are historical releases from several facilities (including Sunshine Laundry, Elite Cleaners, and American Linen Corporation) that operated laundry and/or dry-cleaning facilities near the corner of 3rd Street and Roma Avenue from 1924 to 1973. In 1973, the buildings were demolished and replaced by a paved parking area, as part of an urban development plan. The City of Albuquerque first discovered chlorinated solvent contamination in ground water near the Site, in April 1989, during a routine inspection of the Coca-Cola bottling plant water supply well, located at 205 Marquette Avenue NE. Due to the contamination, this well was plugged and abandoned in 1989. In addition, contaminated soils and two underground storage tanks (UST), a 300-gallon UST and a 1,500-gallon UST, were removed from the former Elite Cleaners/Sunshine Laundry property by the City of Albuquerque in November 1989.

3.2 Geology and Hydrogeology

Geologically, the Site is located in the south-central portion of the Albuquerque Basin. The Albuquerque Basin is filled with up to 10,000 feet of sediments. The Santa Fe Formation sediments fill the majority of the basin and contain the primary ground water drinking source for

the City of Albuquerque. The Santa Fe Group aquifer system is composed of unconsolidated to loosely consolidated gravels, sands, silts and clays. It is overlain by Quaternary fluvial sediments with facies distribution generally similar to those of the Santa Fe Group. Within the coarse-grained, water-producing facies are numerous discontinuous silt and clay interbeds, producing multiple aquifer zones, see Figure 3.

The depth to ground water beneath the source area is approximately 40 feet below ground surface (bgs). Depths beneath the Site range from approximately 20 feet bgs to the west and up to 225 feet bgs to the east. The wide range of depths to ground water is affected by the topography of the Site and the different aquifer zones. The State has defined aquifer zones, based on depth below ground surface, as the Shallow, Intermediate, and Deep aquifers. Ground water at the Site generally flows eastward from the Site, toward the main regional ground water extraction centers related to the City of Albuquerque well fields.

Ground water is an important source of drinking water for the City of Albuquerque. Currently, the Water Authority and the UNM operate an array of water supply wells located east (downgradient) of the Site. These wells are screened in the same alluvial aquifer that is being remediated under the FAP Superfund Site ROD. Protection of water quality at the Water Authority and UNM well locations from impacts associated with the FAP Superfund Site is consistent with the requirements established in the ROD.

3.3 Contaminants of Concern

Contaminants of concern are chlorinated solvents in ground water, containing concentrations of PCE, TCE and the natural degradation products of DCE. Figure 2 shows the extent of contamination, and Figure 3 shows the conceptual Site Model. Currently only TCE exceeds remedial action objective of 5 µg/L.

The TCE-contaminant plume at the Site is described as having the following two portions:

- The primary, or western, portion of the VOC plume lies west of the BNSF railroad tracks and upgradient of the P&T system, with COCs generally occurring in ground water of the intermediate aquifer zones (I1 and I2). Ground water in the shallow aquifer zone is generally not contaminated with COCs at concentrations above remediation goals.
- The eastern portion of the VOC plume lies east of the BNSF railroad tracks and downgradient of the P&T system, with COCs generally occurring in the deep aquifer zones (D1, D2, and D3).

The western and eastern plumes were initially part of one large continuous plume. Operation of the P&T system has remediated the central portion of the plume, dividing it into two smaller portions.

An off-site chlorinated solvent (TCE) plume, with an unknown source located west of the Site, has been detected in the I2 and D1 aquifer zones and is called the West Central Avenue Plume (WCAP). This upgradient plume has merged with the Fruit Avenue TCE plume in the downtown area. Although this upgradient plume is not related to the Site, EPA and NMED are continuing to monitor its migration. NMED has conducted a preliminary assessment and a site inspection to develop additional information on the source, distribution, and contaminant concentrations

present in the off-site plume. Additionally, the NMED is in the process of conducting a Site Reassessment that will be completed in late September 2017.

3.4 Distribution of Contamination

TCE concentrations from February 2002 through August 2016 appear to have decreased or remained relatively stable at most monitored well locations, consistent with the conclusion of the MNA reports. The TCE plume has experienced changes in the following areas:

- **Near the Presumed Source Area (Western Portion of the Plume)**

The western portion of the TCE plume, in the vicinity of the historical source area, is characterized by monitor wells screened in the S, I1, I2, and D1 aquifer zones. The maximum detected TCE concentration observed in this portion of the plume, prior to the start of remedial action, was 99 µg/L detected in a 2005 sample collected from monitor well HSM-I2-5. Seven other locations also had TCE concentrations above 50 µg/L, which were detected prior to the August 2010 sampling event.

In 2012, TCE concentrations at monitor wells in this area ranged from 39 µg/L to 2.4 µg /L; in 2016, they ranged from 23.5 µg/L to 0.7 µg /L.

These results indicate that 75 percent of monitor wells have decreasing or stable TCE concentrations. They also indicate that in the western portion of the FAP, TCE concentrations continue to attenuate, as reported in the 2013 MNA evaluation.

- **Vicinity of P&T System (Central Portion of the Plume)**

The central portion of the TCE plume was largely remediated by the P&T system between 2006 and 2013, as evidenced by rapid TCE concentration declines observed at the extraction well. The highest reported concentration was 12 µg/L, in April 2008, and the most current reading was 2.45 µg/L, in November 2016.

The highest observed TCE concentration measured in ground water near the P&T system was 42 µg/L in a sample collected in 1999, from SFMW-23 (D2), and the most current reading was 12.5 µg/L, in August 2016.

These results indicate that 83 percent of monitor wells in the vicinity of the P&T System (Central Portion of the Plume) have decreasing or stable TCE concentrations, which means that the TCE plume continues to attenuate in this area.

- **Downgradient of P&T (Eastern Portion of the Plume)**

The downgradient or eastern TCE plume is characterized by monitor wells screened in the D1, D2, and D3 aquifer zones. The Mann-Kendall (MK) evaluation was not performed for the D4 aquifer zone monitor wells, because ground water samples from this zone were non-detect for TCE.

The highest observed TCE concentrations measured in ground water samples collected in this portion of the TCE plume were: D1 = 19 µg/L in 2008; D2 = 22 µg/L in 2004; and D3 = 27 µg/L in 2011. As of February 2012, TCE concentrations at these locations had declined to less than 19 µg/L.

TCE concentrations increased slightly at the eastern portion of the plume between 2012 and 2015, with the maximum TCE concentration detected in MNW-5 (D3) at 18.7 µg/L in 2016, although this location has a stable concentration trend.

These results indicate that 67 percent of monitor wells have decreasing or stable TCE concentrations.

3.5 Remedial Action Objective and Cleanup Goals

The remedial action objectives (RAO) for the Site presented in the ROD are unchanged. These RAOs are as follows:

- **Ground water:** Prevent human ingestion of, inhalation of, or dermal contact with ground water that contains concentrations of PCE above 5 µg/L, TCE above 5 µg/L, cis-1,2-DCE above 70 µg/L, and trans-1,2-DCE above 100 µg/L (these concentrations are the maximum contaminant level goals (MCLGs)) set by the Safe Drinking Water Act (or are MCLs where MCLGs are set at zero)). Vinyl chloride (VC), another chemical compound, which may form as TCE naturally breaks down in the environment, has not been routinely detected.
- **Ground water:** Restoration of ground water to its beneficial use as a drinking water source.
- **Soil:** Prevent human ingestion of, inhalation of, or dermal contact with concentrations of PCE and TCE in ground water, the source of which is contaminated soil with concentrations of PCE and TCE that exceed 0.027 mg/kg and 0.024 mg/kg respectively. That is, while the exposure route involves ground water as the medium of concern, the source of the PCE and TCE contamination in question is contaminated soil, even though that soil poses no direct risk to human health.

Based on the baseline risk assessment performed during the RI/FS, the primary medium of concern at the Site is the ground water. Table 1 lists the remediation goals for the Site as presented in the ROD, plus a remediation goal for Vinyl Chloride (VC), which EPA proposes, as part of this Proposed Plan, to add to the selected remedy. A remediation goal of 1 µg/L was selected for VC since it is a NMED ground water standard.

Table 1. Site-specific Remediation Goals for ground water as established in the ROD, plus a proposed remediation goal for vinyl chloride.:

Contaminant of Concern	Remediation Goal	Basis
PCE	5 µg/L	MCL
TCE	5 µg/L	MCL
cis-1,2-DCE	70 µg/L	MCLG
trans-1,1-DCE	100 µg/L	MCLG
VC	1 µg/L	NMED Regulations

µg/L = microgram/Liter

The remediation goals for soil, established in the ROD, are not affected by the Proposed Plan.

Remediation Goals are concentrations of contaminants for each exposure route that are protective of human health and the environment. Except for vinyl chloride, EPA's remediation goals for the ground water at the Site are contaminant concentration levels that are Maximum Contaminant Level Goals (MCLGs) established under the Safe Drinking Water Act and codified at 40 CFR § 141.50, or they are Maximum Contaminant Levels where MCLGs are set at zero. MCLs are codified at 40 CFR § 141.61. The proposed 1 µg/L remediation goal listed for vinyl chloride (VC) is the NMED standard for ground water (of 10,000 mg/L Total Dissolved Solids concentration or less) codified at 20.6.2.3103(A)(31). Currently, TCE is the only COC at the Site that exceeds its remediation goal in monitoring well ground water samples.

3.6 Selected Remedy in the 2001 Record of Decision

The Site remedy selected in EPA's 2001 ROD included the following remedy elements. Following each remedy element is a brief description of any studies that EPA made regarding that element, along with any follow-up actions.

1. **Soil Vapor Extraction:** The ROD required Soil Vapor Extraction (SVE) of chlorinated solvents from soil located on the source area property. EPA and NMED conducted additional studies in 2001, 2002, and 2003. Those studies supported a determination that the Soil Vapor Extraction remedy element was not required, because a source requiring remediation was not present. The decision to forgo the Soil Vapor Extraction remedy component was documented in the 2006 Explanation of Significant Differences (ESD).
2. **Hot Spot Treatment:** Remediation of contamination hot spots in the shallow and intermediate ground water that underlies the contaminant source area property by injecting either a bioremediation additive or a chemical oxidant into the subsurface to degrade the COCs in place.

EPA conducted an evaluation of hot spot treatment in 2004, during the development of the Remedial Design for the remedy selected in the 2001 ROD. EPA's 2004 evaluation concluded that hot spot treatment in the shallow and intermediate ground water was unnecessary, because no hot spots were identified upon further investigations. This was documented in the 2006 ESD.

3. **Pump and Treat:** Extraction of contaminated ground water, from the shallow, intermediate, and deep zones, treating the extracted water with air stripping and granulated activated carbon and reinjection of the treated water back into the subsurface. EPA completed construction of the air stripping treatment plant (ASTP) (the ASTP is part of the P&T system) on the Site in 2005. Refinements to the system were completed in October 2005, including the addition of an acid pretreatment system. The P&T system pumps ground water from a single extraction well at about 80 gallons per minute, treats the water in the ASTP, and then injects the treated water to the subsurface via two injection wells. The P&T system was operated during the time between November 2005 and May 2013. The P&T system was shut off in May 2013, because of low influent concentrations, as well as the results of natural attenuation studies conducted.

The single extraction well was installed as part of the initial P&T system to capture the majority of the ground water plume. Further studies in 2005 supported a finding that natural

attenuation would address contamination down gradient from the capture zone and no further expansion of the P&T was warranted.

Under the Preferred Alternative proposed by EPA in this Proposed Plan, monitored natural attenuation (MNA) would be the principal approach taken to address the contaminated ground water plume across the entire Site. EPA believes that it now has enough data to support MNA. Natural attenuation was one of the preliminary remedial technologies evaluated in the Feasibility Study ³ for the 2001 Record of Decision. MNA was not recommended, at the time, as a stand-alone remedial alternative because of the lack of sufficient site-specific data to demonstrate that COC concentrations would be reduced by MNA within a reasonable timeframe. Data to support evaluation of MNA as a ground water remedy have now been collected under the Long Term Monitoring Program (LTMP). Consequently, EPA's Preferred Alternative is centered on MNA.

4. **Restrictive Covenants:** Placement of a restrictive covenant on the contaminant source property requiring that the asphalt cap remains on the source property until remediation goals for the soil are met.

EPA has determined that a covenant on the property is not needed since no hot spots or unacceptable levels of soil vapors have been found. EPA documented this significant change to the remedy in its 2006 ESD.

5. **Ground Water Use Restriction Boundary:** Implementation of ground water use restrictions in the area of the contaminated ground water plume until remediation goals for ground water are met. The New Mexico Office of the State Engineer (OSE) implemented a ground water use restriction boundary (19 NMAC 25.9), prohibiting drilling of new wells, prohibiting appropriation of new surface water or ground water, and prohibiting transfer of either surface water or ground water to existing wells within the boundaries of the Site.

The OSE restrictions on ground water use are currently in place and will continue until remediation goals are met in the ground water. EPA's Preferred Alternative does not contemplate changing this ROD element.

6. **Long-Term Ground Water Monitoring:** Ground water monitoring to assess the extent of contamination and risks to human health. In reference to remedy element 6, ground water monitoring to assess the extent of contamination and risks to human health, EPA has conducted quarterly ground water monitoring since 2004. Presently, ground water monitoring continues as required in the 2001 ROD. EPA's Preferred Alternative does not change the ground water monitoring required in the ROD. Based on data evaluations presented in recent monitoring, and natural attenuation evaluation reports, individual wells are currently

³ When EPA develops a selected remedy for an NPL Superfund site, it undertakes a Remedial Investigation and a Feasibility Study (RI/FS). The Remedial Investigation (RI) is a process undertaken by EPA to determine the nature and extent of the problem presented by the release at a Superfund site listed on the National Priorities List. The RI emphasizes data collection and site characterization, and is generally performed concurrently and in an interactive fashion with the Feasibility Study. The RI includes sampling and monitoring, as necessary, and includes the gathering of sufficient information to determine the necessity for remedial action and to support the evaluation of remedial alternatives. The Feasibility Study (FS) is undertaken by EPA to develop and evaluate options for remedial action. The FS emphasizes data analysis and is generally performed concurrently and in an interactive fashion with the RI, using data gathered during the RI. The RI data are used to define the objectives of the response action, to develop remedial action alternatives, and to undertake an initial screening and detailed analysis of the alternatives. See 40 C.F.R. § 300.5.

scheduled for the collection of semi-annual, annual, or biennial samples.

For the reasons provided in EPA's 2006 ESD, EPA made a final decision not to implement three of the remedy elements listed above:

Note that EPA's 2006 Explanation of Significant Differences (ESD), documents EPA's final decision not to implement the following elements of the original remedy that were called for in the ROD:

- SVE of contaminants from soil located at the former location of Elite Cleaners and the former location of Sunshine Laundry.
- Remediation of contaminant hot spots in the shallow and intermediate ground water of the former EC/SL
- Placement of restrictive covenants on the source property.

3.7 Summary of Selected Post ROD investigations conducted

3.7.1 The 2006 Explanation of Significant Differences (September 2006)

EPA conducted an MNA evaluation in 2005 to determine whether the ASTP/P&T well system required expansion. Modeling results indicated that without further well system expansion, contamination located downgradient of the ASTP/P&T well system, that was not captured by the existing system, would naturally diminish to concentration levels below Remediation Goals. The model showed that the concentration levels would drop below Remediation Goals at a point that is at least two thousand feet upgradient of the nearest receptor well. That is, if an MNA approach is followed, chlorinated solvents would not reach any drinking water well at concentrations that exceed Remediation Goals.

MNA, based on ground water monitoring, has been shown as an effective remedy for the treatment of the portion of the eastern plume (see Figure 2) that is downgradient of the capture zone of the ASTP system. The capture zone created by the extraction well when it was operational, was approximately six hundred feet wide, and centered along Roma Street at Arno Street NE.

3.7.2 The 2009 Remedial System Evaluation (September 2009)

In September 2009, the EPA conducted a Remedial System Evaluation (RSE) and found that full-time operation of the Site's P&T system was no longer necessary. Specifically, EPA found the RA goals specified in the ROD could be achieved more cost-effectively by shifting to pulsed pumping operations. Pulsed operations refer to the operation of the P&T system followed by periods of non-operation, allowing the contaminated ground water to flow back in to the areas where the extraction well is screened. As part of pulsed operations, after a certain time period, the P&T system was turned back on to remove the contaminated ground water that had collected. The pulsed pumping operation mode occurred between 2010 and 2013 and enabled the P&T system to operate more efficiently. Limited rebound of contamination in the extraction well led to a decision by EPA to shut down the P&T system in 2013. During the shutdown, EPA evaluated, potential contaminant rebound effects. Also during the shutdown, EPA evaluated the,

effectiveness of MNA to address contamination in upgradient portions of the ground water plume.

3.7.3 The 2013 MNA Evaluation (August 2013)

Assessment of the MNA remedy element was completed in 2013. As documented by EPA in its 2006 ESD, MNA through semi-annual ground water monitoring had been shown an effective remedy for treatment of the plume perimeter that is not included in the capture zone of the ASTP system. The 2006 ESD explained why MNA is a viable and effective remedy for the eastern portion of the FAP, which lies downgradient of the P&T system capture zone. The 2013 MNA evaluation report found that further operation of the P&T remedy has a negative impact on the MNA response action, exacerbating the aquifer conditions needed for more effective natural reductive dechlorination. In particular, operation of the ASTP adds oxygen to the treated ground water that is reinjected into the subsurface. The resulting oxygen-rich or “oxic” conditions are less favorable for the natural degradation of TCE, which instead favors anoxic or oxygen-poor conditions.

Based on these findings, in July 2013, the P&T system was switched from pulsed operations to a standby mode, as recommended in the draft 2013 MNA Evaluation Report. Effective April 2014, the EPA extended the standby operation mode until completion of an additional assessment of MNA in 2016 and until the completion of the 2nd Five-Year Review.

The MNA Evaluation Report, finalized in August 2013, recommended expanding the use of MNA, in lieu of P&T, to complete remedial actions of the central and western portion of the plume. This recommendation was based on multiple lines of evidence supporting MNA, which included, among others:

- Direct and indirect evidence of Biodegradation.
- Compound Specific Isotope Analysis (CSIA).
- Monitoring and Remediation Optimization System (MAROS) Evaluation.
- Trend analyses using the MK test.
- Evaluation of natural attenuation parameters.
- Evaluation of geochemical conditions.
- Evaluation of plume degradation patterns and magnetic susceptibility.

3.7.4 The 2016 MNA Update Report (September 2016)

In September 2016, an updated evaluation of MNA was performed to review the conclusions reached in the 2013 MNA report. Primary lines of evidence were re-analyzed and the site conditions were investigated to identify changes that might affect long-term predictions of ground water plume behavior. This updated 2016 evaluation confirmed the conclusions of the 2013 MNA evaluation. The 2016 MNA evaluation also provided additional information to document chlorinated solvent degradation processes. In addition, this 2016 MNA evaluation concluded that the selected remedy should be modified following completion of the second Five-Year Review to allow for decommissioning the P&T system and to rely on MNA to address the chlorinated solvent ground water contamination in the central and upgradient (western) portions of the FAP as well as in the eastern plume.

3.7.5 Evaluation of Alternatives: Focused Feasibility Study addendum (January 2017)

A focused Feasibility Study (FS) addendum has been prepared as a companion document to the 2001 FS report, prepared by Duke Engineering & Services and the NMED. The FS addendum was intended to build upon previous documents that support a remedy modification, prior to transfer of the Site to the State.

The focused Feasibility Study addendum identified the following remedial action alternatives for addressing ground water contaminated with chlorinated solvents at the Site:

- Retain the remedy selected in the 2001 ROD as modified by the 2006 Explanation of Significant Differences. (Hereinafter this remedy is referred to as the Current Remedy.)
- Use Site-wide Monitored Natural Attenuation (MNA) to degrade the chlorinated solvents. EPA is proposing MNA as its preferred alternative for addressing chlorinated solvent contaminated ground water on the Site. (Hereinafter, this remedy is referred to as EPA's 2017 Preferred Alternative).
- Extend the P&T System to capture downgradient parts of the TCE plume. (Hereinafter this remedy is referred to as Capture Downgradient Portions of the TCE Plume.)

The Capture Downgradient Portions of the TCE Plume alternative was suggested by project stakeholders, and was assessed in the FS addendum. This alternative would have included the construction of a new extraction well near the MNW-5 location, and the alternative would use a combination of existing and newly installed infrastructure to transport extracted ground water to the existing ASTP for treatment and reinjection. This alternative was evaluated against the CERCLA criteria of cost, implementability, and effectiveness in the FS addendum. It was not retained for further consideration because the estimated net present value of this alternative is significantly higher than MNA and because this alternative is not expected to substantially shorten the remedial timeframe. Also, elements of this remedy alternative are likely not feasible. In particular, the required construction of underground piping through Acequia Madre Park (on Roma between Edith and Arno) would not be feasible due to the extensive disruption that it would cause to park facilities.

4. BASIS FOR THE EPA'S 2017 PREFERRED ALTERNATIVE

An MNA remedy element was not part of the remedy EPA selected in the 2001 ROD for the Site. EPA has now identified MNA of chlorinated solvents in contaminated ground water as its preferred remedy to address chlorinated solvent contamination in Site ground water. EPA bases its preference for MNA on the numerous investigations performed since 2001. After reviewing the reports from these investigations, EPA believes that MNA is an efficient remedy for mass removal of chlorinated solvent contamination in ground water across the entire Site.

EPA completed an MNA evaluation in 2005 (EPA, 2006), with reassessments of MNA in 2013 (EPA 2013) and in 2016 (EPA 2016). In the 2006 ESD, EPA said that the 2005 MNA evaluation had shown that TCE concentrations in the eastern part of the plume should naturally attenuate to

contaminant levels that are below the MCL for TCE before they can migrate to the nearest downgradient receptor well. See Explanation of Significant Differences Fruit Avenue Plume Superfund Site Albuquerque, New Mexico (EPA September 2006) p. 8. The 2006 ESD selected MNA as a viable and effective remedy for the eastern portion of the Site, which lies downgradient of the P&T system capture zone.

The 2013 and 2016 reassessments of MNA confirmed that MNA is effectively addressing the eastern portion of the TCE plume (see Figure 2). The findings of the 2016 MNA evaluation are consistent with the conclusions of the 2013 MNA evaluation. Collectively, these evaluations provide definitive data that MNA is a viable and effective remedy for the entire Site, including the central and western portions of the contaminated ground water plume (see Figure 2).

The reassessments of MNA and the remedial systems evaluation (2009) also found that P&T system operations are no longer efficient for removing TCE mass from the aquifer. The conclusion of these efforts is that the remedial action has now reached a point where natural attenuation processes are more effective than P&T at achieving remediation goals in the central and western portions of the Site. Based on this determination, the second Five-Year and based on the conclusions of the focused feasibility study, EPA is proposing to terminate P&T system operations, and expand the MNA remedy element to address the chlorinated solvent plume in the central and western portions of the Site, in addition to the eastern portion of the Site.

4.1 Evaluation of Alternatives

As part of the remedy selection process for a Superfund site, a detailed analysis shall be conducted on the limited number of alternatives that represent viable approaches to remedial action after evaluation in the screening stage, which EPA undertook as part of the focused feasibility study. In this case, the three alternatives that remained after the screening stage are as follows:

- Alternative 1 – 2006 Remedy Revised per the Explanation of Significant Differences. (Current remedy).
- Alternative 2 – Site-wide Monitored Natural Attenuation (MNA). (This is EPA’s 2017 Preferred Alternative for remediation of the Site).
- Alternative 3 – No-Further Action Alternative – Under the NCP at 40 CFR § 300.430 (e)(6), the no-further-action alternative shall be developed and considered.

4.2 Nine Criteria

EPA uses nine NCP criteria to evaluate alternatives for the cleanup of a release. These nine criteria are categorized into three groups: threshold, balancing, and modifying. The threshold criteria must be met in order for an alternative to be eligible for selection. The threshold criteria are the overall protection of human health and the environment and compliance with Applicable or Relevant and Appropriate Requirements (ARARs). The balancing criteria are used to weigh major tradeoffs among alternatives. The five balancing criteria are long-term effectiveness and permanence; reduction of toxicity, mobility or volume through treatment; short-term effectiveness; implementability; and cost. The modifying criteria are state and community acceptance. Table 2 below lists the evaluation criteria:

Table 2. CERCLA Remedial Action Alternative Evaluation Criteria

Threshold Criteria

Criterion No. 1	Overall Protection of Human Health and the Environment
Criterion No. 2	Compliance with ARARs

Balancing Criteria

Criterion No. 3	Long-term Effectiveness and Permanence
Criterion No. 4	Reduction of Toxicity Mobility or Volume (TMV) through Treatment
Criterion No. 5	Short-term Effectiveness
Criterion No. 6	Implementability
Criterion No. 7	Cost

Modifying Criteria (evaluated during proposed plan public comment period)

Criterion No. 8	State Acceptance
Criterion No. 9	Community Acceptance

CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act

TMV = toxicity, mobility, and volume

Table 3. Comparison of the Differences Between Alternatives

Remedy Element	Alternative 1 – <u>Current Remedy</u> (2006 Remedy Revised as per ESD)	Alternative 2 – <u>EPA’s 2017 Preferred Alternative</u> (Site-wide MNA)	Alternative 3 - No-Further-Action
Pump and Treat	Extraction and treatment of contaminated deep zone ground water by using a P&T system and re-injecting the treated water	Terminate and decommission	No Pump and Treat
Ground water Use Restriction Boundary	Implementation of ground water use restrictions until remediation goals for ground water are met	No change	No ground water use restrictions
Long-Term Ground Water Monitoring	Semi-annual ground water monitoring to assess the extent of contamination, risks to human health, and the effectiveness of natural attenuation processes	Semi-annual or annual	No ground water monitoring
Monitored Natural Attenuation	MNA found to be effective for contaminated ground water downgradient (east) of the P&T system.” (see 2006 ESD at p.8)	MNA remedy element expanded to include contaminated ground water in central and western portions of the plume	No monitoring of natural attenuation

4.3 Comparison of the Current Remedy and the Proposed Remedy Alternatives

In the following analysis, the 2006 Remedy, as modified by the ESD, is compared with the ROD Amendment Alternatives in relation to each of the nine criteria. This new remedy will have to meet the same ARARs required for the original ROD.

Table 4. Nine Criteria Comparative Analysis of 2001 Remedy and the 2017 Remedy

Evaluation Criteria	Alternative 1 2006 Remedy revised as per ESD (Current Remedy)	Alternative 2 - <u>EPA’s 2017 Preferred Alternative</u> (Site-wide MNA)	Alternative 3 No-Further-Action Alternative
Criterion No. 1 Overall Protection of Human Health and the Environment	Yes Achieves overall protection. As explained in the 2006 ESD (and in the column to the left in this table), EPA discontinued some of the remedy elements selected in the 2001 ROD (see 2006 ESD at pp. 4-8). In addition, as explained on page 8 of the ESD, EPA found that MNA was effective at addressing the contamination	Yes Achieves overall protection. EPA’s preferred alternative (Alternative 2) provides protection of human health and the environment, because it will control the risk from exposure to the COC-contaminated ground water through ICs. Alternative 2 remediates contaminated ground water	NO Does not achieve overall protection. Without ground water use restrictions, the No-Further-Action alternative allows a complete exposure pathway whereby those who drink water drawn from wells

Table 4. Nine Criteria Comparative Analysis of 2001 Remedy and the 2017 Remedy

Evaluation Criteria	Alternative 1 2006 Remedy revised as per ESD (Current Remedy)	Alternative 2 - <u>EPA's</u> <u>2017 Preferred</u> <u>Alternative</u> (Site-wide MNA)	Alternative 3 No-Further-Action Alternative
	<p>in the eastern part of the contaminated ground water plume at the Site. Otherwise, the Site remedy, after the 2006 ESD remains essentially the same as the remedy described in the 2001 ROD. However, now EPA has determined that another remedy element— P&T-- that was part of the 2001 ROD should be discontinued because it is inefficient and will no longer contribute substantially to the remedy.</p>	<p>by monitored natural attenuation. The amended remedy will be effective and permanent in the long term, provided a LTMP and maintenance are conducted, 5- year reviews are performed, and ICs are implemented and enforced. In addition, the preferred remedy does not waste resources on remedy elements like P&T, which no longer contribute substantially to the remedy.</p>	<p>completed in the contaminated ground water plume may be exposed to concentrations of TCE that exceed MCLs. In addition, without ground water monitoring (included with MNA) it will not be clear when natural attenuation is complete, and whether unpredicted ground water movement threatens other areas.</p>

Table 4. Nine Criteria Comparative Analysis of 2001 Remedy and the 2017 Remedy

Evaluation Criteria	Alternative 1 2006 Remedy revised as per ESD (Current Remedy)	Alternative 2 - EPA's 2017 Preferred Alternative (Site-wide MNA)	Alternative 3 No-Further-Action Alternative
Criterion No. 2 Compliance with ARARs	<p>Yes Will meet ARARs</p> <p>As explained above in Table 4 (<i>see supra</i> Table 4 at “Overall Protection of Human Health and the Environment), after the 2006 ESD, the remedy remained essentially the same, except for the removal of three unnecessary remedy elements. This post-ESD remedy would meet ARARs eventually, but wasted resources on P&T, which did not contribute to the remedy.</p>	<p>Yes Will meet ARARs</p> <p>EPA’s preferred remedy (Alternative 2) will meet all ARARs for the Site and it will attain RAOs. Moreover, it has none of the unnecessary or inefficient remedy elements that are part of the 2001 ROD or the post-ESD remedy.</p>	<p>No Will not meet ARARs</p> <p>The No-Further-Action alternative will have no monitoring, so ARAR compliance will be unknown.</p>
Criterion No. 3 Long-term Effectiveness and Permanence	<p>The remedy in the 2001 ROD, and the 2001 ROD remedy as modified by the 2006 ESD, provide similar long-term effectiveness through prevention of direct contact exposure. Periodic monitoring and maintenance will also provide EPA with data so that EPA can determine whether long-term effectiveness and permanence are being attained.</p>	<p>The Site-wide MNA alternative, the remedy in the 2001 ROD, and the 2001 ROD remedy as modified by the 2006 ESD, all provide similar long-term effectiveness through prevention of direct contact exposure. Periodic monitoring and maintenance will also provide EPA with data so that EPA can determine whether long-term effectiveness and permanence are being attained.</p>	<p>The no-further-action alternative is not effective or permanent, because it has no provisions to prevent exposure to contaminated ground water, and because it does not provide monitoring necessary to ensure that no unpredicted migration of the plume is occurring.</p>

Table 4. Nine Criteria Comparative Analysis of 2001 Remedy and the 2017 Remedy

Evaluation Criteria	Alternative 1 2006 Remedy revised as per ESD (Current remedy)	Alternative 2 - EPA's <u>2017 Preferred</u> <u>Alternative</u> (Site-wide MNA)	Alternative 3 No-Further-Action Alternative
Criterion No. 4 Reduction of Toxicity, Mobility, or Volume of Contaminants Through Treatment	<p>Treatment Used: As part of the remedy elements selected in the 2001 ROD, biotic reductive dechlorination.</p> <p>Materials Treated: Dissolved-phase COCs</p>	<p>There is no active treatment under the Site-wide MNA alternative, so there is no reduction in TMV through active treatment under this Alternative. [Note: Although there is no treatment under the 2017 Remedy Alternative, the remedy reduces toxicity through the natural transformation of TCE to cis-1,2-DCE, trans-1,2-DCE, VC, and also naturally reduces the volume of contaminated ground water throughout the plume. COC mobility is not reduced.] [Note also: The plume is stable, daughter products DCE continue to be generated and to degrade through the natural attenuation process. Vinyl chloride is not accumulating.]</p>	<p>The No-Further-Action Alternative does not include treatment. [Moreover, it does not provide monitoring necessary to ensure that no unpredicted migration of the plume is occurring.]</p>

Table 4. Nine Criteria Comparative Analysis of 2001 Remedy and the 2017 Remedy

Evaluation Criteria	Alternative 1 2006 Remedy revised as per ESD (Current remedy)	Alternative 2 - EPA's <u>2017 Preferred</u> <u>Alternative</u> (Site-wide MNA)	Alternative 3 No-Further-Action Alternative
Criterion No. 5 Short-Term Effectiveness Remediation timeframe	<p>Remediation timeframe 2031</p> <p>There are normal safety risks associated with the operation of the remedy. Health and safety risks can be minimized by adherence to safe work practices.</p> <p>The remedy was projected to have an impact on subsurface geochemistry because it involves the extraction of ground water, which was projected to temporarily draw down the aquifer in the vicinity of the extraction wells. This draw down has been minimal due to the inefficiency of the P&T system.</p> <p>Under Alternative 1, RAOs would be met by approximately the year 2031 (based on 2013 MNA sensitivity analysis).</p>	<p>Remediation timeframe 2030</p> <p>There are normal safety risks associated with ground water sampling. Health and safety risks can be minimized by adherence to safe work practices.</p> <p>This alternative does not cause additional environmental impacts beyond those already expected from the presence of the COC plume.</p> <p>Under Alternative 2, RAOs should be met by approximately the year 2030 (based on 2013 MNA sensitivity analysis).</p>	<p>Remediation timeframe 2046</p> <p>No further action is not effective in the short term because it does nothing to prevent exposure to contaminated ground water.</p>

Table 4. Nine Criteria Comparative Analysis of 2001 Remedy and the 2017 Remedy

Evaluation Criteria	Alternative 1 2006 Remedy revised as per ESD (Current remedy)	Alternative 2 - EPA's 2017 <u>Preferred</u> <u>Alternative</u> (Site-wide MNA)	Alternative 3 No-Further-Action Alternative
Criterion No. 6 Implementability	<p>The technology described in the 2001 ROD had been demonstrated at numerous superfund sites, and was considered to be implementable. P&T have been demonstrated separately at numerous sites. The use of this technology was considered to be technically feasible. There were no administrative barriers that prevent the implementation of the technology. Services, equipment, and materials for the construction of the P&T system were readily available. P&T was continued for a time as part of the post-ESD remedy, but eventually it was found to be inefficient and EPA proposes to discontinue P&T.</p> <p>Under Alternative 1, RAOs would be met by approximately the year 2031 (based on 2013 MNA sensitivity analysis).</p>	<p>Site-wide MNA, is technically and administratively feasible. Alternative 2 consists of implemented portions of the 2001 remedy that will continue to be implemented. These currently implemented portions of the post ESD remedy are: 1) The LTMP which will continue with semi-annual or annual sampling and periodic evaluations of MNA, and 2) Site-wide MNA will be easier to implement than the 2001 ROD remedy, because O&M of the ASTP is not required.</p> <p>Under Alternative 2, RAOs should be met by approximately the year 2030 (based on 2013 MNA sensitivity analysis).</p>	<p>There is no implementability concerns associated with the no-further-action alternative.</p>

Table 4. Nine Criteria Comparative Analysis of 2001 Remedy and the 2017 Remedy

Evaluation Criteria	Alternative 1 2006 Remedy revised as per ESD (Current remedy)	Alternative 2 - EPA's 2017 <u>Preferred Alternative</u> (Site-wide MNA	Alternative 3 No-Further-Action Alternative
Criterion No. 7 Cost	Capital \$0 Annual O&M Cost \$455,000 Present Worth Cost (based 7%) \$6,200,000 This remedy alternative is not cost effective, because the remedy's costs are not proportional to its overall effectiveness (see 40 CFR §300.430(f)(1)(ii)(D)). In particular, the additional cost for P&T, which is part of this remedy, does not add any additional protection.	Capital \$0 Annual O&M Cost \$155,000 Present Worth Cost (based 7%) \$3,310,000 This remedy alternative is cost effective because, the remedy's costs are proportional to its overall effectiveness (see 40 CFR §300.430(f)(1)(ii)(D)). This remedy attains the same levels of protection that the 2001 ROD remedy attains and that the 2006 post-ESD remedy (Alternative 1) attain, at about half the cost.	Capital \$0 Annual O&M Cost \$0 Almost no cost is associated with the no-further-action alternative.
Criterion No. 8 State/Support Agency Acceptance	The State of New Mexico, acting through the NMED and the City of Albuquerque Environmental Health Department was consulted and they provided letters indicating their concurrence. These letters are included in the ESD.	Comments will be reviewed and addressed in the Amended ROD to be completed after the Proposed Plan public comment period.	
Criterion No. 9 Community Acceptance	The post-ESD remedy was accepted by the community.	Comments will be reviewed and addressed in the Amended ROD to be completed after the Proposed Plan public comment period.	

4.4 Summary of the Proposed Remedy

EPA's 2017 Preferred Alternative (Site-wide MNA), which is Alternative 2 in Table 4, contains the following elements:

- P&T operations would cease. The extraction and injection wells would be plugged and abandoned and the ASTP would be decommissioned.

- MNA would be expanded to include the central and western portions of the Site plume. At this time, it includes only the eastern part of the Site plume.
- The ground water monitoring and reporting, and ground water use restriction boundary remedy elements would be unchanged. They will provide important information to assess the protectiveness of MNA as a Site-wide remedy.

The overall remedy effectiveness was evaluated by assessing the five balancing criteria: long-term effectiveness and permanence; reduction in TMV through treatment; short-term effectiveness; implementability; and cost. The overall effectiveness was compared to the alternative's costs to determine cost effectiveness. There is no active treatment involved in EPA's 2017 Preferred Alternative (Site-wide MNA), which is Alternative 2, so there is no reduction in TMV through treatment; nonetheless, the ground water contamination will be reduced through natural attenuation under Alternative 2.

The State will conduct long term monitoring to ensure that ground water contaminant attenuation is taking place and to ensure that there is no unforeseen migration of the plume. Relatively low concentrations of PCE, TCE, and DCE in ground water are present within the ground water use restriction boundary. Since the OSE has implemented ground water use restrictions within the boundary, there is no current exposure pathway. Concentrations of these contaminants are expected to naturally attenuate below their respective Remediation Goals before reaching the ground water use restriction boundary. EPA's preferred remedy alternative (Alternative 2) is cost effective, because the remedy's costs are proportional to its overall effectiveness (see 40 CFR §300.430(f)(1)(ii)(D)).

EPA's 2017 Preferred Alternative (Site-wide MNA), which is Alternative 2, attains the same levels of protection that the 2001 ROD remedy attains and that the 2006 post-ESD remedy (Alternative 1) attains, at about half the cost. In short, the relationship of the overall effectiveness of Alternative 2 was determined to be proportional to the costs and, therefore, represents a reasonable value for the money to be spent.

There is a fundamental difference between the remedy selected in the 2001 ROD and Alternative 2 - EPA's preferred remedy for the Site.

The 2001 remedy included costs for three remedy elements that were eliminated after the 2006 ESD. Specifically, EPA discontinued: 1) soil vapor extraction due to lack of free phase contamination in soil and ground water; 2) hot spot treatment in shallow and intermediate ground water for the same reason; and 3) the restricted covenant on the source property, because it was not necessary, since there were no hot spots or unacceptable soil vapors found (*see* 2006 ESD at pp. 4-8). Even though the three remedy elements were discontinued after the 2006 ESD, the remaining cost of O&M for the P&T system, which stayed part of the remedy after the 2006 ESD, in conjunction with LTMP costs, would be higher than the cost of O&M for EPA's 2017 Preferred Alternative (Alternative 2).

Modification of the remedy to include Site-wide MNA, as recommended in the 2013 and 2016 MNA evaluations, will provide a more cost-effective remedy. In addition, EPA projects that

Remediation Goals will be reached within a reasonable timeframe—approximately the year 2030. If EPA’s 2017 Preferred Alternative (Site-wide MNA), which is Alternative 2, is selected, it will also relieve the State of New Mexico from running an active P&T system at the conclusion of the 10-year long-term response action (LTRA) period. Alternative 2 will also allow the return of the property occupied by the extraction and treatment system to the City of Albuquerque for reuse and redevelopment.

4.5 EPA’s 2017 Preferred Alternative (Site-wide MNA), which is Alternative 2

Alternative 2 – Site-wide Monitored Natural Attenuation (MNA) Under Alternative 2, which is EPA’s preferred alternative, will be used site-wide to address the western, central and eastern portions of the ground water plume.

EPA’s Preferred Alternative would call for no future use of the P&T system, but, instead would require expanding the use of MNA to the western and central portions of the Site. If EPA’s Preferred Alternative remedy is adopted, it will do the following:

- Contain and remediate the contaminant plume through the natural processes of MNA;
- Will allow (but not require) the deconstruction of the existing P&T plant; and
- Return the use of the plant property to the City of Albuquerque.

In addition, EPA’s Preferred Alternative would continue long-term monitoring to ensure that the chlorinated solvent plume is not expanding, and to verify that contaminant concentrations continue to decrease.

5. DESCRIPTION OF DIFFERENCES, EXPECTED OUTCOMES

5.1 Common Elements Between the Current and the Preferred Alternative

5.1.1 Ground Water Monitoring

The requirement for ground water monitoring and reporting, and the ground water use restriction boundary remedy elements, are unchanged under the preferred alternative. They will provide important information to assess the effectiveness of MNA as a Site-wide remedy. Based on data evaluations presented in recent monitoring, and natural attenuation evaluation reports, individual wells are currently scheduled for the collection of semi-annual, annual or biennial samples. Annual ground water sampling may be sufficient for future events.

5.1.2 Institutional Controls

The institutional controls implemented by the New Mexico OSE (i.e., the ground water use restriction boundary, which prohibits ground water use in the area impacted by the contaminated ground water plume,) are necessary to assure the continued effectiveness of the response action, whether Alternative 1 or Alternative 2 is selected.

5.1.3 Five-Year Reviews

The NCP, at 40 CFR § 300.430(f)(4)(ii), requires that periodic reviews be conducted if a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the Site above levels that allow for unlimited use and unrestricted exposure. These reviews are conducted no less often than every five years after the selected remedial action is initiated. Two Five-Year reviews have been performed at the Site to date, with the last one completed in March 2017. Five-Year reviews will continue until the ground water use restrictions can be lifted. This is the same requirement that existed under the 2001 FAP ROD.

5.2 Differences

The current remedy under Alternative 1 uses active P&T treatment, while Alternative 2 requires passive treatment through the implementation of MNA Site-wide. Alternative 2 is EPA's preferred alternative.

5.3 Expected Outcome

5.3.1 Transfer of Long-Term Response Action (LTRA) Projects to States

The CERCLA, Section 104(c)(6), 42 U.S.C. § 9604(c)(6), provides the statutory basis for the transfer of ground water and surface water restoration projects from the EPA to State O&M. The NCP, 40 CFR§300.435(f)(3), states, "for fund-financed remedial actions involving treatment or other measures to restore ground water or surface water quality to a level that assures protection of human health and the environment, the operation of such treatment or other measures for a period up to ten years after the remedy becomes operational and functional (O&F) will be considered part of the remedial action. Activities required to maintain the effectiveness of such treatment or measures following the ten-year period, or after the remedial action is complete, whichever is earlier, shall be considered O&M."

The EPA defines the ten-year period following the O&F determination as LTRA. If Remediation Goals have not been achieved upon completion of the ten years, the remedy transitions into O&M to be conducted by the State.

For the groundwater restoration remedy, the O&F period was completed on August 26, 2007 with the concurrence of the state.

5.3.2 Decommissioning of ASTP facilities

The Preferred Alternative, Site-wide MNA, will allow for the decommissioning of the existing ASTP facilities and the return of the property to the City of Albuquerque. This will facilitate the reuse of the property and promote further redevelopment in the area.

6. SUPPORT AGENCY COMMENTS

This section will be completed after the Proposed Plan public comment period.

7. STATUTORY DETERMINATIONS

Based on information currently available, the EPA believes the Preferred Alternative (Alternative 2) meets the NCP threshold criteria, and provides the best balance of tradeoffs among the other alternatives, with respect to the balancing and modifying criteria. EPA expects

the Preferred Alternative to satisfy the following statutory requirements of CERCLA §121 (b): (1) be protective of human health and the environment; (2) comply with ARARs; (3) be cost-effective; and (4) utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Though Alternative 2 does not meet the statutory preference for treatment, this Proposed Plan explains why that preference will not be met; and, furthermore, EPA's evaluation has shown that TCE concentrations within the FAP should naturally attenuate to concentrations levels that are below the MCL, before they can migrate to the nearest downgradient receptor well.

Acronyms and Abbreviations

ARAR	Applicable or Relevant and Appropriate Requirement
ASTP	Air Stripper Treatment Plant
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
COC	Contaminant of Concern
CSIA	Compound Specific Isotope Analysis
DCE	Dichloroethene
EPA	U.S. Environmental Protection Agency
ESD	Explanation of Significant Differences
FAP	Fruit Avenue Plume
ICs	Institutional Controls
LTMP	Long -Term Monitoring Program
LTRA	Long-Term Response Action
MAROS	Monitoring and Remediation Optimization System
MCLGs	Maximum Contaminant Level Goals
MCLs	Maximum Contaminant Levels
MK	Mann-Kendall
MNA	Monitored Natural Attenuation
NCP	National Contingency Plan
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
NPL	National Priorities List
O&F	Operational and Functional
O&M	Operation and Maintenance
OSE	Office of the State Engineer
P&T	Pump-and-Treat

PCE	Perchloroethene
RAOs	Remedial Action Objectives
ROD	Record of Decision
RSE	Remedial System Evaluation
Site	Fruit Avenue Plume Superfund site
TCE	Trichloroethene
TMV	Toxicity, Mobility, and Volume
UNM	University of New Mexico
UST	Underground Storage Tank
VC	Vinyl Chloride

GLOSSARY

Administrative Record File– The administrative record is the body of documents and information that forms the basis for the selection of a particular response action at a Superfund site. Typically, EPA refers to the administrative record as the —administrative record file until EPA has selected a particular response action, to avoid creating the impression that the record is complete at any time prior to the final selection decision. See 55 FR. 8666, 8804-5 (March 6, 1990) (National Oil and Hazardous Substances Pollution Contingency Plan Preamble).

The Administrative Record File is available for public review and copy. It is located at the main Albuquerque Public Library near the Site, NMED and at the EPA Regional Office. It is also Available online (see URL address above at page 1).

Carcinogen – A cancer-causing substance or agent.

Chemical of Concern (COC) – A contaminant at a Superfund site that is considered among the most abundant and/or the most toxic chemicals. When a COC is targeted for cleanup, other chemicals that may be present will also be removed.

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) – Also known as Superfund. CERCLA is a Federal law passed in 1980 and modified in 1986 by the Superfund Amendments and Reauthorization Act.

Ground water – Water found beneath the ground surface that fills the pores between soil, sand, and gravel particles to the point of saturation. When it occurs in a sufficient quantity and quality, ground water can be used as a water supply.

Institutional Controls (ICs) – Non-engineered instruments, such as administrative and/or legal

controls, that help to minimize the potential for human exposure to contamination and/or protect the integrity of the remedy. ICs work by limiting land or ground water use and/or providing information that helps modify or guide a person's action at a site. Some common examples include restrictive covenants, deed notices, or local ordinances.

Maximum Contaminant Level (MCL) – The maximum permissible level of a contaminant in water to any user of a public water system. MCLs are established under the Federal Safe Drinking Water Act, 42 U.S.C. 300(f) et seq.

Monitoring – Monitoring is the ongoing collection of information about the environment that helps gauge the effectiveness of a cleanup action. Monitoring wells and probes installed at different locations/depths/levels at a site would be used to detect the presence of COCs in ground water and soil.

National Oil and Hazardous Substances Pollution Contingency Plan (NCP) – 40 Code of Federal Regulations (CFR) Part 300. Regulations promulgated by EPA to respond to releases or threatened release of hazardous substances, pollutants, or contaminants.

National Priorities List (NPL) – EPA's list of the most serious uncontrolled or abandoned hazardous waste sites identified for possible remedial action under Superfund. A site must be on the NPL to receive money from the Trust Fund for Remedial Action.

Natural Attenuation – Natural attenuation refers to the natural degradation processes that achieve site-specific remedial objectives. The natural attenuation processes that are at work in such a remedial approach includes a variety of physical, chemical, and/or biological processes that, under favorable conditions, act without human intervention to reduce the mass, toxicity, mobility, volume, or concentration of contaminants in soil and ground water. These in situ processes include biodegradation, dispersion, dilution, sorption, volatilization, and chemical or

biological stabilization, transformation, or destruction of contaminants. Under the proper conditions, natural attenuation can contribute significantly to remediation of COCs.

Off-site – Away from the Site.

Record of Decision (ROD) – A ROD is a public document prepared by EPA that provides the justification for the remedial action (cleanup) chosen at a National Priority Listed (Superfund) site. It also contains site history, site description, site characteristics, community participation, enforcement activities, past and present activities, contaminated media, the contaminants present, and the scope and role of the response action.

Remedial Action (RA) – The actual construction or implementation phase of a Superfund site cleanup that follows remedial design.

Remedial Action Objective (RAO) – Remedial action objectives specify contaminants and media of concern, potential exposure pathways, and remediation goals. Remediation goals establish acceptable exposure levels that are protective of human health and the environment. Remedial action objectives are established for each remedial action under CERCLA.

Proposed Plan

Figures

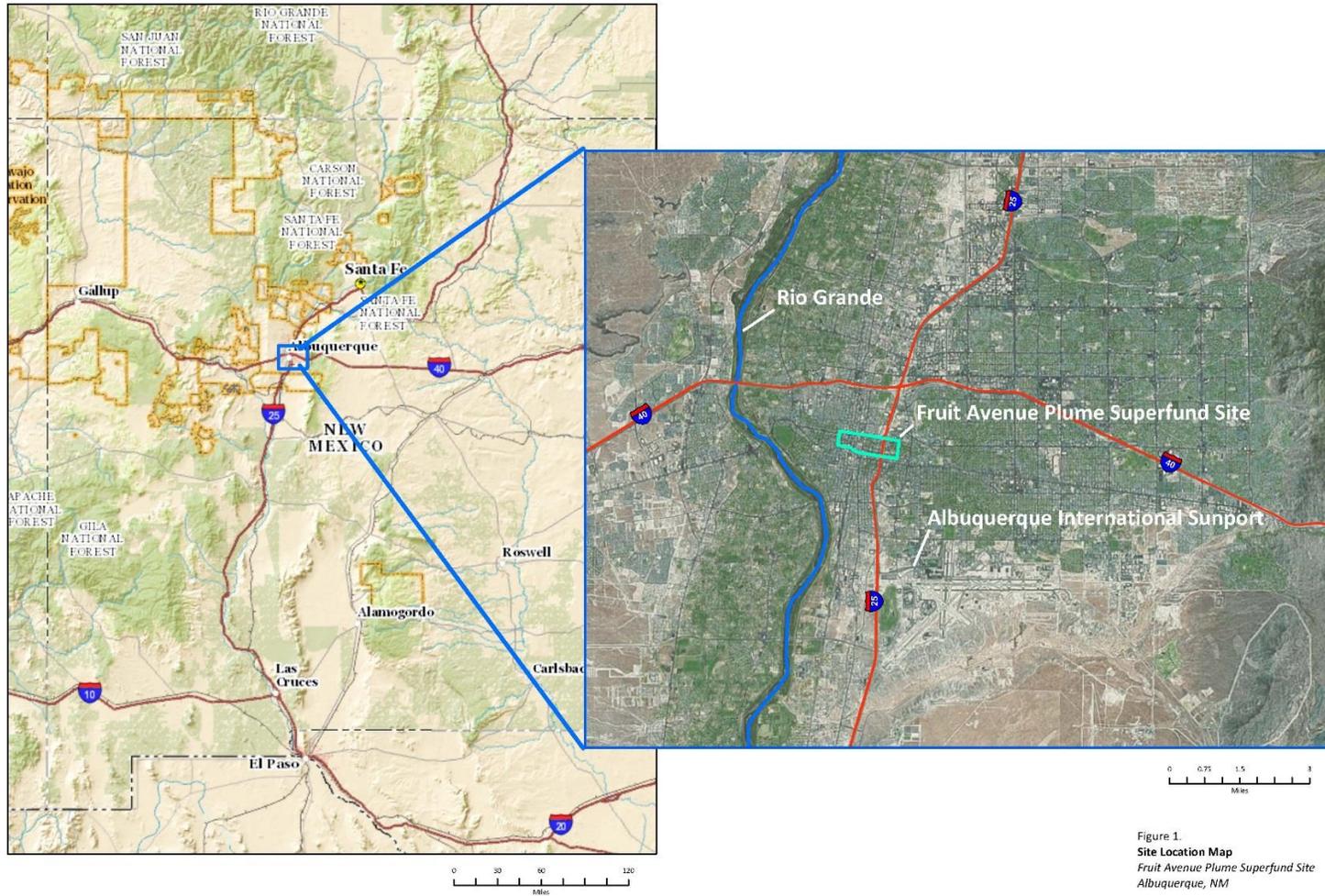


Figure 1
 Site Location Map
 Fruit Avenue Plume Superfund Site
 Albuquerque, NM



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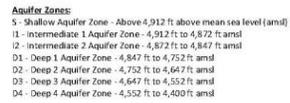
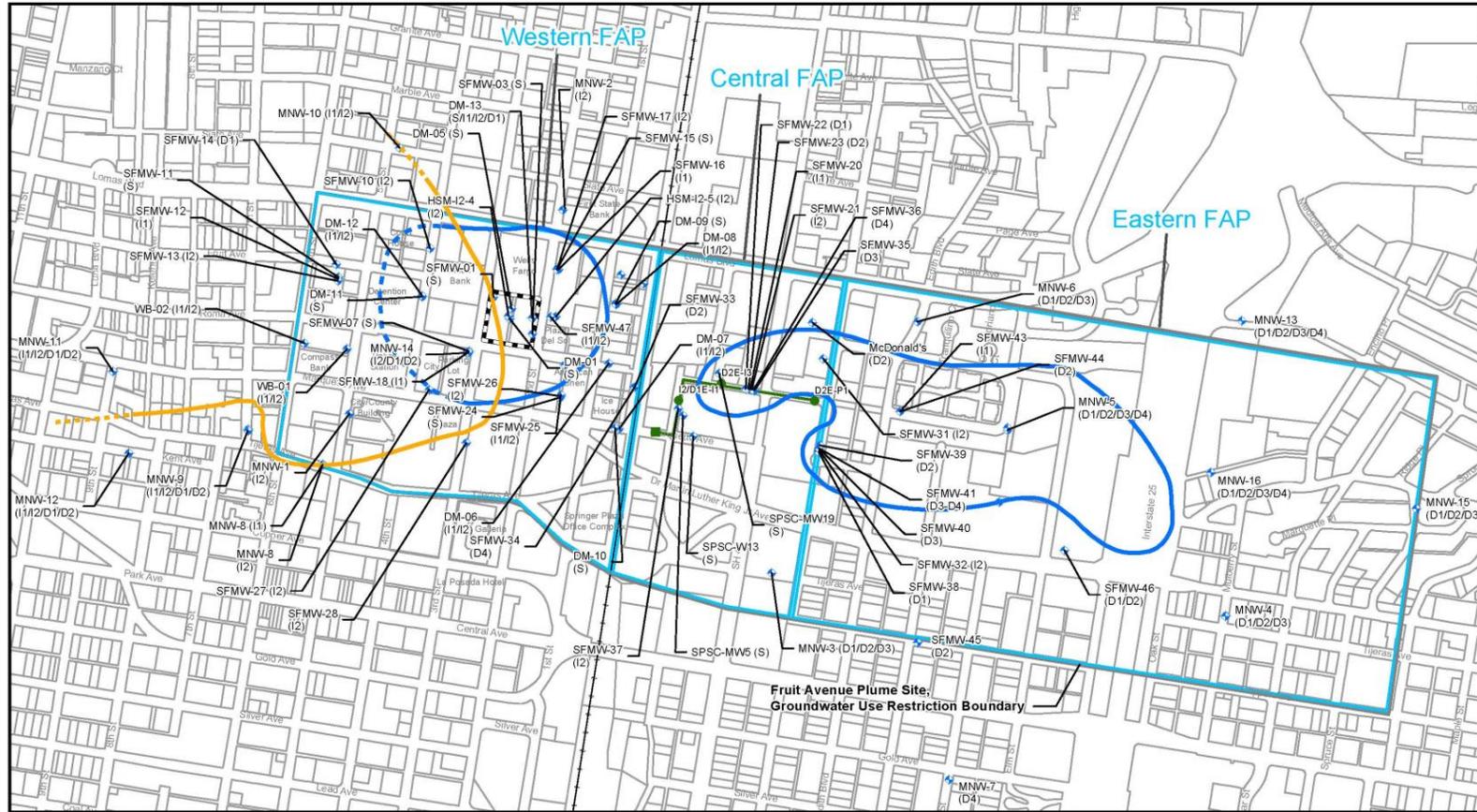
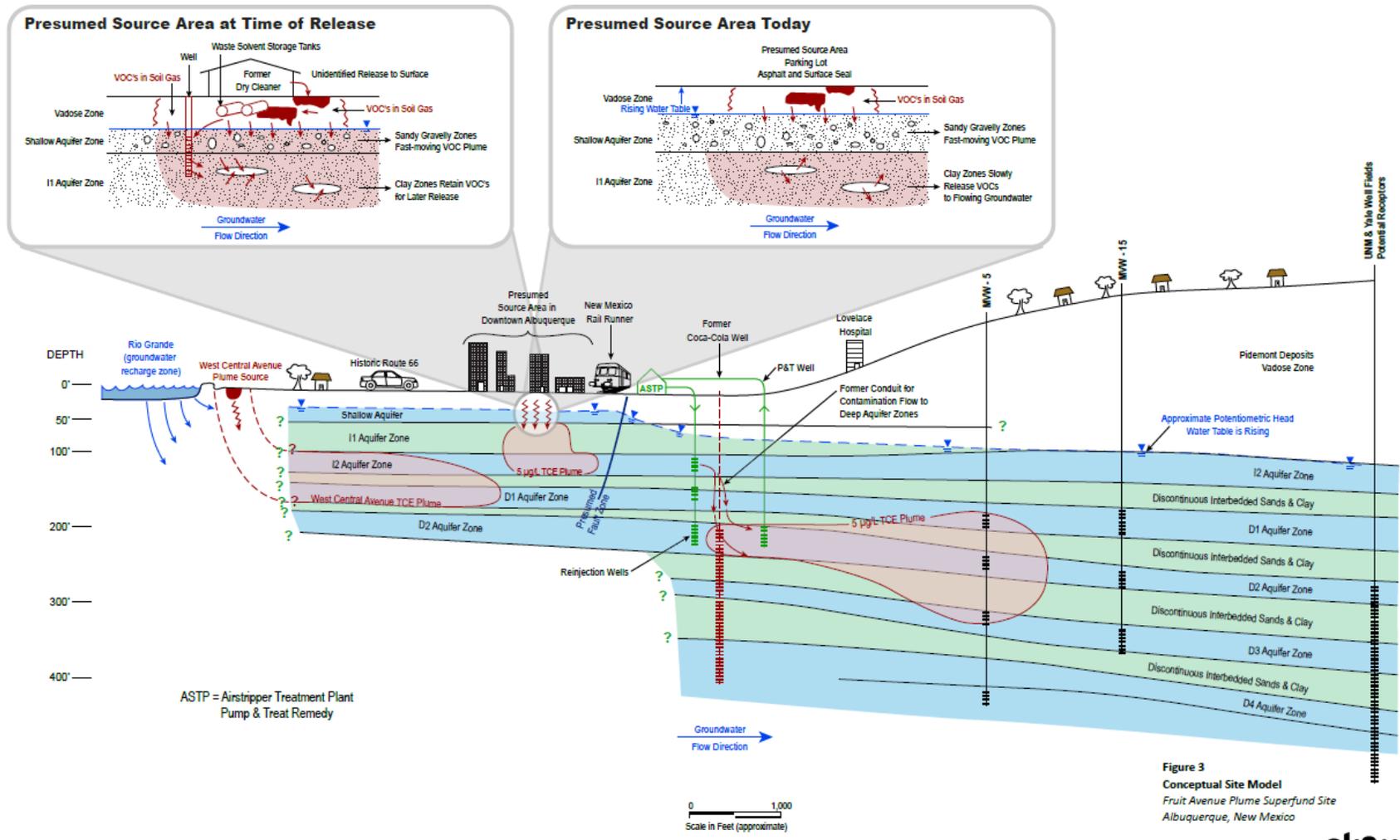


Figure 2.
LTM Program Monitor Site Map
Fruit Avenue Plume Superfund Site
Albuquerque, NM



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CONCURRENCES

PROPOSED PLAN
AMENDMENT TO THE SEPTEMBER 2001 RECORD OF DECISION
REVISED AS PER THE SEPTEMBER 2006 EXPLANATION OF SIGNIFICANT
DIFFERENCES
FRUIT AVENUE PLUME SUPERFUND SITE
ALBUQUERQUE, NEW MEXICO



Bart Canellas
Remedial Project Manager

7/6/17

Date



Blake Atkins
Chief, ~~Arkansas~~ ^{CA/TX/OK} Texas Section

7/10/17

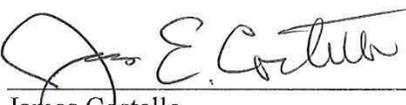
Date



John C. Meyer
Chief, Superfund Remedial Branch

7/6/17

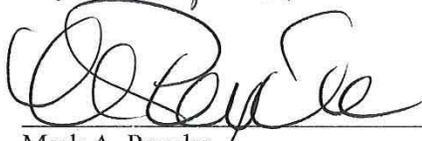
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James Costello
~~Attorney~~, Office of Regional Counsel
Practice Group Leader

7/11/17

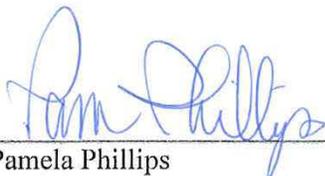
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Mark A. Peycke
Chief, Superfund Branch, Office of Regional Counsel

07/12/17

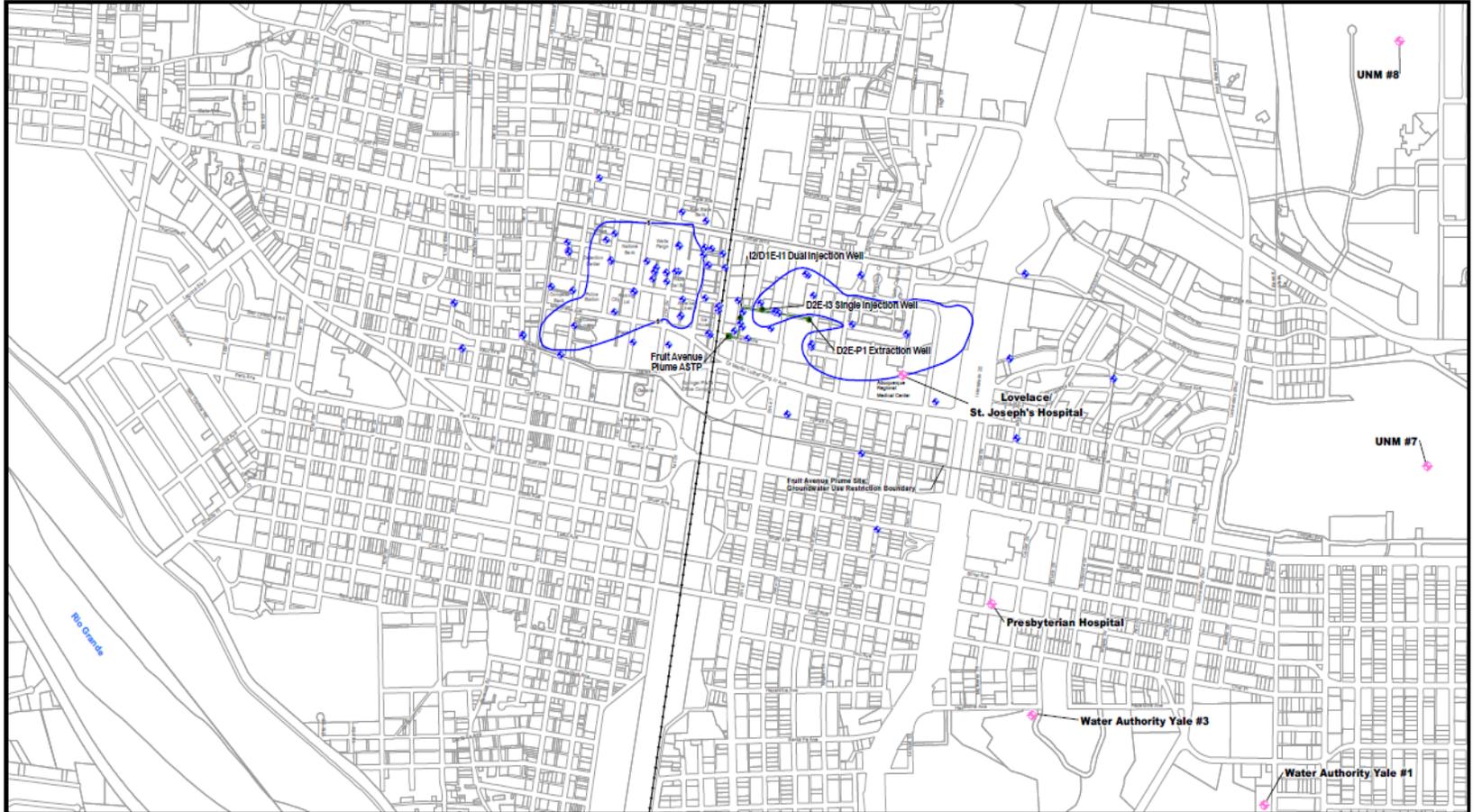
Date



Pamela Phillips
Deputy Director, Superfund Division

7/17/17

Date



- Legend**
- + Monitor Well
 - + Existing and Potential Receptor Well
 - Injection Well
 - Air Stripper Treatment Plant
 - Railroad
 - 2015 TCE Composite Plume Boundary at 5 µg/L
 - Pipeline

Notes:
 ASTP = Air Stripper Treatment Plant
 TCE = trichloroethene
 µg/L = micrograms per liter
 UNM = University of New Mexico
 Water Authority = Albuquerque Bernalillo County Water Utility Authority

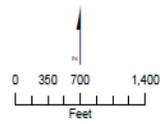


Figure 4
 Site Map
 Fruit Avenue Plume Superfund Site
 Albuquerque, New Mexico

ch2m

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