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**GW
WORKPLAN**

08 / 26 / 2013



ENTERPRISE PRODUCTS PARTNERS L.P.
ENTERPRISE PRODUCTS HOLDINGS LLC
(General Partner)

ENTERPRISE PRODUCTS OPERATING LLC

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August 26, 2013

Return Receipt Requested
7012 1010 0003 7361 4642

Mr. Glenn von Gonten
New Mexico Energy, Minerals & Natural Resources
Department - Oil Conservation Division
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

Attn: Jim Griswold

**Re: Groundwater Investigation Workplan
Enterprise Field Services, LLC
Lateral K-7 September 2012 Pipeline Release
NE $\frac{1}{4}$ NW $\frac{1}{4}$ Section 27, T26N, R7W
Rio Arriba County, New Mexico**

Dear Mr. Von Gonten:

Enterprise Field Services, LLC (Enterprise) is submitting the enclosed workplan entitled: *Groundwater Investigation Workplan*, dated July 23, 2013. This workplan details proposed groundwater investigation activities in order to delineate the extent of the dissolved phase hydrocarbon contaminants associated with the Lateral K-7 pipeline September 2012 release.

Animas Environmental Services, LLC (AES) completed an initial site assessment and continued site assessment, details of which were previously submitted in AES' *Pipeline Release Letter Report* dated September 26, 2012, and *Continued Site Assessment Report* dated February 25, 2013. Based on field screening and laboratory analytical results from the continued site assessment, soils have been impacted above NMOCD action levels and groundwater has been impacted above WQCC standards in the vicinity of the September 2012 release.

AES recommends the installation of five 1-inch diameter groundwater monitor wells as detailed in the enclosed workplan. If you have any questions concerning the enclosed workplan, please do not hesitate to contact me at (713) 381-2286, or via email at: drsmith@eprod.com.

Sincerely,

David R. Smith, P.G.
Sr. Environmental Scientist

Rodney M. Sartor, REM
Sr. Manager, Environmental

/dep

Enclosure – Groundwater Investigation Workplan

cc: Jonathan Kelly, New Mexico Oil Conservation Division, 1000 Rio Brazos Road, Aztec, NM

ec: Sherrie Landon - Bureau of Land Management, Farmington, NM
Ross Kennemer – Animas Environmental Services, Farmington, NM

Lateral K-7 / 2012



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Groundwater Investigation Workplan

Enterprise Field Services, LLC
Lateral K-7 September 2012
Pipeline Release
NE¼ NW¼ Section 27, T26N, R7W
Rio Arriba County, New Mexico

July 23, 2013

Prepared by:

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- Figure 3. Proposed Soil Borings/Monitor Well Locations and Well Schematic

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1.0 Introduction

Animas Environmental Services, LLC (AES), on behalf of Enterprise Field Services, LLC (Enterprise), has prepared a workplan to complete a groundwater investigation for the Lateral K-7 pipeline release that was discovered in September 2012. The release was the result of two small corrosion holes. Details of the initial site assessment and continued site assessment were previously submitted in AES' *Pipeline Release Letter Report* dated September 26, 2012, and *Continued Site Assessment Report* dated February 25, 2013.

1.1 Site Location and NMOCD Ranking

The release area is located on Federal land under jurisdiction of the Bureau of Land Management (BLM) within the NE¼ NW¼, Section 27, T26N, R7W, Rio Arriba County, New Mexico. Latitude and longitude of the release were recorded as N36.46422 and W107.56505, respectively. A topographic site location map is included as Figure 1, and an aerial map showing the release location is included as Figure 2.

In accordance with NMOCD release protocols, action levels were established per NMOCD *Guidelines for Remediation of Leaks, Spills, and Releases* (August 1993) prior to the initial assessment. The release was given a ranking score of 30 based on the following factors:

- **Depth to Groundwater:** Based on measurements from the continued assessment, groundwater ranges from approximately 24 to 28 feet below ground surface (bgs). (20 points)
- **Wellhead Protection Area:** The release location is not within a wellhead protection area. (0 points)
- **Distance to Surface Water Body:** The release location is within the floodplain of Palluche Canyon, which is approximately 370 feet to the west. The wash in Palluche Canyon flows north and ultimately discharges into Largo Canyon. (10 points)

1.2 Release Information

On September 4, 2012, a release was discovered at the location during an annual pipeline survey. On the same day, Enterprise personnel responded to isolate the suspected pipeline, which was identified as the 8-inch diameter Lateral K-7 pipeline. The release was found to have resulted from two corrosion holes in the pipeline approximately 7.5 feet apart.

1.3 Initial and Continued Release Assessment

1.3.1 Initial Release Assessment

On September 4, 2012, Enterprise contractors completed the pipeline repairs. During the excavation work, AES collected five discrete soil samples from the walls and base of the

excavation for field screening of volatile organic compounds (VOCs). The final excavation dimensions measured approximately 10 feet by 8 feet by 4.5 feet in depth. Additionally, eight discrete samples were collected for field screening of VOCs from a total of four test holes advanced outside of the excavation area to aid in the delineation of petroleum hydrocarbon soils.

Soil field screening results showed that VOC concentrations exceeded the NMOCD action level of 100 parts per million (ppm) in all of the samples collected and ranged from 103 parts per million (ppm) in TH-3 at 7.5 feet bgs up to 8,304 ppm in S-4 (the western wall of the excavation).

Based on the field screening readings and the shallow depth of groundwater, AES and Enterprise determined that a continued site assessment to determine the vertical and horizontal extents of the release would be appropriate prior to implementing further mitigation measures.

1.3.2 Continued Release Assessment

On November 6, 2012, AES completed a continued site assessment with the purpose of delineating the full extent of petroleum hydrocarbon impact on subsurface soils and groundwater resulting from the release. The investigation included the installation of eight soil borings (SB-1 through SB-8) and the collection of soil and groundwater samples.

Soil borings were advanced to depths ranging from 20 to 36 feet bgs. Groundwater was encountered in seven of the soil borings (SB-1 through SB-6 and SB-8) at depths ranging from approximately 24 to 28 feet bgs. Groundwater was not observed in SB-7 at the time of drilling.

Soil field screening results showed VOC concentrations exceeding the NMOCD action level of 100 ppm in all of the soil boring (SB-1 through SB-8) except for in SB-7. Soil samples collected for laboratory analysis indicated that residual total benzene, toluene, ethylbenzene, and xylenes (BTEX) and total petroleum hydrocarbons (TPH) concentrations exceed NMOCD action levels in SB-3 and SB-8. Laboratory analyzed soil samples from the remaining borings did not exceed NMOCD action levels for benzene, total BTEX, or TPH. The highest soil concentrations were reported in SB-3 at 8 to 12 feet bgs with 110 mg/kg benzene, 4,690 mg/kg total BTEX and 23,400 mg/kg TPH as gasoline range organics (GRO) and diesel range organics (DRO).

Groundwater was encountered in seven of the soil borings (SB-1 through SB-6 and SB-8); however, SB-8 did not yield enough to collect a groundwater sample. A Geoprobe equipped with a stainless steel hydropunch tool was used to collect grab groundwater samples. The hydropunch sampler was driven below the static water level and the groundwater was

allowed to flow into the sampler from an exposed stainless steel screen under ambient hydrostatic pressure. Groundwater was collected from the sampler using new disposable bailers. Once sampling was completed, the sampler was removed, decontaminated, and each boring was abandoned in accordance with local regulations.

Initial screening samples were collected, and laboratory analytical results confirmed dissolved phase benzene concentrations above the WQCC standard of 10 µg/L in each groundwater sample, with the highest benzene concentration reported in SB-3W with 260 µg/L. Dissolved phase toluene concentrations also exceeded the WQCC standard of 750 µg/L in SB-3W (790 µg/L). Dissolved phase ethylbenzene and xylenes concentrations were below WQCC standards in each sample.

2.0 Proposed Groundwater Investigation

Based on the analytical results described in the previous section, a groundwater investigation is proposed in order to delineate the extent of the dissolved phase hydrocarbon contaminants associated with the Lateral K-7 September 2012 pipeline release. The investigation procedures are designed to be protective of both surface water and groundwater and are based upon protocols outlined in AES' Standard Operating Procedures (SOPs). AES' SOPs follow applicable NMOCD guidelines, BLM guidelines, ASTM standards and applicable U.S. Environmental Protection Agency (USEPA) methods and guidelines for soil and groundwater sampling.

2.1 *Pre-Field Permits and Coordination*

2.1.1 Access Agreements

Prior to initiating the field work, Enterprise will coordinate with BLM for a Temporary Use Area (TUA) permit, if required.

2.1.2 Archaeological Clearances

In the event that any evidence of artifacts and/or human remains are encountered, all work will be stopped immediately. The BLM Archaeologist and the State Historic Preservation Office (SHPO) will be contacted, and appropriate mitigation measures will be implemented.

2.1.3 Office of State Engineer Permits

Prior to initiating the groundwater investigation, AES will consult with the New Mexico Office of the State Engineer (NMOSE) to determine if groundwater monitor well permits are required.

2.1.4 Utilities Notification

AES will utilize the New Mexico One-Call system to identify and mark all underground utilities at the site before the start of any proposed field activities which could impact buried utilities. Any local utilities not participating in the New Mexico One-Call system will be contacted separately by the drilling contractor for utility locations.

2.1.5 Health and Safety Plan

AES has a company health and safety plan in place, and all on-site personnel are 40-hour HAZWOPER trained in accordance with OSHA regulations outlined in 29 CFR 1910.120(e). Prior to the start of the site investigation, AES will prepare a comprehensive site-specific Job Safety Analysis (JSA) addressing the site investigation activities and associated soil and groundwater sampling. All employees and subcontractors are required to read and sign the JSA to acknowledge their understanding of the information contained within the JSA. The JSA will be implemented and enforced on site by the assigned Site Safety and Health Officer.

2.2 *Installation of Monitor Wells*

AES proposes to install five soil borings which will be completed as 1-inch diameter groundwater monitor wells to delineate the extent of dissolved phase petroleum hydrocarbon impacts. Soil borings will be advanced to a total depth of approximately 34 to 36 feet bgs with a DT 6620 track-mounted direct push rig, manufactured by Geoprobe®, and equipped with a 2-inch outer diameter (OD) core barrel. Direct push drilling will be provided by Earth Worx, Los Lunas, New Mexico. The locations of the proposed monitor wells are shown on Figure 3.

2.3 *Soil Sampling and Analyses*

2.3.1 Sample Collection

Each soil boring will be continuously sampled using a core-barrel sampler. Soil samples collected will be field screened for VOCs with a photo-ionization detector (PID) organic vapor meter (OVM). In the event that field screening results exceed 100 parts per million, soil samples will be collected from that boring for laboratory analysis. Generally, these samples will be collected from the vadose zone where the highest OVM-PID reading is observed and from the capillary fringe just above groundwater.

For each soil boring, a Soil Boring Log will be completed. These logs will record sample identification, depth collected, and method of collection, as well as observations of soil moisture, color, density, grain size, plasticity, contaminant presence, and overall stratigraphy.

2.3.2 Field Screening

Samples will be field screened for VOC vapors utilizing a PID-OVM calibrated with isobutylene gas to obtain preliminary data regarding potential hydrocarbon impacted soil. Field screening will follow AES SOPs, applicable ASTM standards and USEPA guidelines. The highest (peak) PID-OVM readings will be recorded onto the soil boring logs.

2.3.3 Laboratory Analyses

Discrete samples collected for laboratory analysis will be placed into new, clean, laboratory-supplied containers, which will then be labeled, placed on ice, and logged onto a sample chain of custody record. Samples will be maintained on ice until delivery to the analytical laboratory, Hall Environmental Analysis Laboratory (Hall) in Albuquerque, New Mexico. Soil samples will be laboratory analyzed for:

- Benzene, toluene, ethylbenzene, and xylene (BTEX) per U.S. Environmental Protection Agency (USEPA) Method 8021B; and
- TPH as GRO/DRO per USEPA Method 8015B.

2.4 Groundwater Monitor Well Installation and Sampling

2.4.1 Groundwater Monitor Well Installation and Construction

Each soil boring will be completed as a groundwater monitor well (MW-1 through MW-5). Monitoring well construction will consist of 1.4-inch outside diameter (OD) [0.75-inch inside diameter (ID)] Schedule 40 PVC screen and 1.0-inch blank riser casing. The screened interval will extend 15 feet across the water table. The wells will be constructed of a 1.4-inch OD (0.75-inch ID) pre-packed screen (0.010-inch slot). The screen is factory packed with 20/40 Colorado silica sand. A bentonite seal will be placed above the sand pack, and concrete grout with approximately 5 percent bentonite will be poured from the top of the bentonite plug up to within 0.5 feet of ground surface. An above grade locking steel protective casing, enclosed with a shroud of concrete, will be installed on the well to prevent unauthorized access and damage. A monitor well construction schematic is presented on Figure 3.

2.4.2 Professional Survey

The location and elevation of the top of each well casing will be surveyed to the nearest 0.01 foot with reference to mean sea level by a licensed surveyor in order to accurately determine the local groundwater depth and flow direction beneath the site. Each well will be tied to an existing USGS benchmark. AES will arrange with a New Mexico Licensed Professional Surveyor to complete the survey upon completion of the monitor well installation.

2.4.3 Monitor Well Development

Following monitor well installation and completion, each well will be developed by a combination of surging and bailing techniques. Groundwater purged from the wells will be

contained in a labeled and sealed 55-gallon drum and transported to Envirotech Landfarm for proper disposal.

2.4.4 Groundwater Sampling

Upon completion and development, the monitor wells will be allowed to sit undisturbed for a minimum of 48 hours. The monitor wells will then be gauged to determine water table elevation and direction of groundwater flow. The wells will then be purged of a minimum of three well volumes, and a groundwater sample will be collected from each well.

Groundwater samples will be collected from each well with a new disposable bailer equipped with a low-flow release valve. Purging data, including pH, temperature, conductivity, oxidation-reduction potential (ORP), and dissolved oxygen (DO), will be measured with a YSI water quality meter and documented on a Water Sample Collection Form along with purged water volume and sample depth. All sampling equipment will be thoroughly decontaminated between uses. Purged water will be contained in a labeled and sealed 55-gallon drum and transported to the Envirotech Landfarm for proper disposal.

2.4.5 Laboratory Analyses

All groundwater analytical samples collected from the monitor wells will be submitted to Hall for analysis of the following parameters:

- BTEX per USEPA Method 8021B;
- TPH (as GRO/DRO) per USEPA Method 8015B.

Once collected, sample containers will be packed per standard protocol with ice in insulated coolers and shipped to the analytical laboratory.

2.5 Equipment Decontamination

In order to prevent cross-contamination between sampling locations, strict decontamination procedures will be employed during the continued site investigation. All drilling equipment will be decontaminated after completing each well, and sampling equipment (i.e. hand auger, spoon sampler and other hand tools) will be decontaminated following each use at an individual depth or location.

All decontamination of equipment will be completed within clean 5-gallon plastic buckets, which will contain the effluent. At least two tubs will be used, one designated for push rods and the other for small sampling equipment. On an as-needed basis, effluent from the tubs will be transferred by small pump or bucket into 55-gallon New Mexico Department of Transportation (DOT) approved drums, which will then be marked with identification labels and sealed. Decontamination procedures to be utilized are outlined below.

For small equipment such as hand augers, hand tools and spoon samplers:

1. Physical removal of gross contamination and all debris with brushes;
2. Hand wash with non-phosphate detergent;
3. Hand wash with non-phosphate detergent and water using brush;
4. Rinse with water;
5. Second rinse with water; and
6. Air dry.

All decontamination procedures will be completed in strict accordance with AES SOPs and applicable USEPA guidelines.

3.0 Deliverables

Following completion of the site investigation activities, a Groundwater Investigation Report summarizing the investigation activities will be submitted to Enterprise. The report will include the following:

1. A summary of all work conducted in the implementation of the investigation;
2. Maps of all sampling locations, including groundwater contaminant concentrations and contours;
3. Soil boring logs and geologic cross-sections;
4. All laboratory data and quality assurance and quality control information;
5. Site photographs;
6. Professional survey data; and
7. Recommendations for further action, if applicable.

4.0 Implementation Schedule

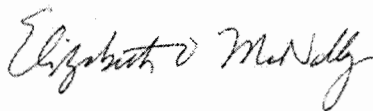
AES proposes the following timeline to implement the investigation. Note, this schedule assumes that no inclement weather occurs, which could result in a delay in implementing the field work.

<i>Task</i>	<i>Days from NMOCD Work Plan Concurrency</i>
Complete pre-field coordination, applicable permitting, work scheduling and notifications	7
Utilities Clearances	7
Complete installation of soil borings and groundwater monitor wells; collect and submit soil and groundwater samples for laboratory analysis. Schedule professional survey of wells.	21
Receive laboratory analytical reports for soil and groundwater samples. Receive professional survey data.	35
Prepare and submit Groundwater Investigation Report.	60

Respectfully submitted,



Heather M. Woods, P.G.
Project Manager



Elizabeth McNally, P.E.
Principal

5.0 References

Animas Environmental Services, LLC (AES). Enterprise Lateral K-7 September 2012 Release
Release Report, September 26, 2012

AES. *Enterprise Lateral K-7 September 2012 Pipeline Release Continued Site Assessment
Report*, February 25, 2013.

ASTM International. ASTM D5092 - 04(2010)e1. *Standard Practice for Design and
Installation of Groundwater Monitoring Wells*, 2010.

New Mexico Oil Conservation Division. 1993. *Environmental Handbook: Miscellaneous
Guidelines: Guidelines for Remediation of Spills, Leaks, and Releases*. August 13, 1993.
<http://www.emnrd.state.nm.us/ocd/EnvironmentalHandbook.htm>

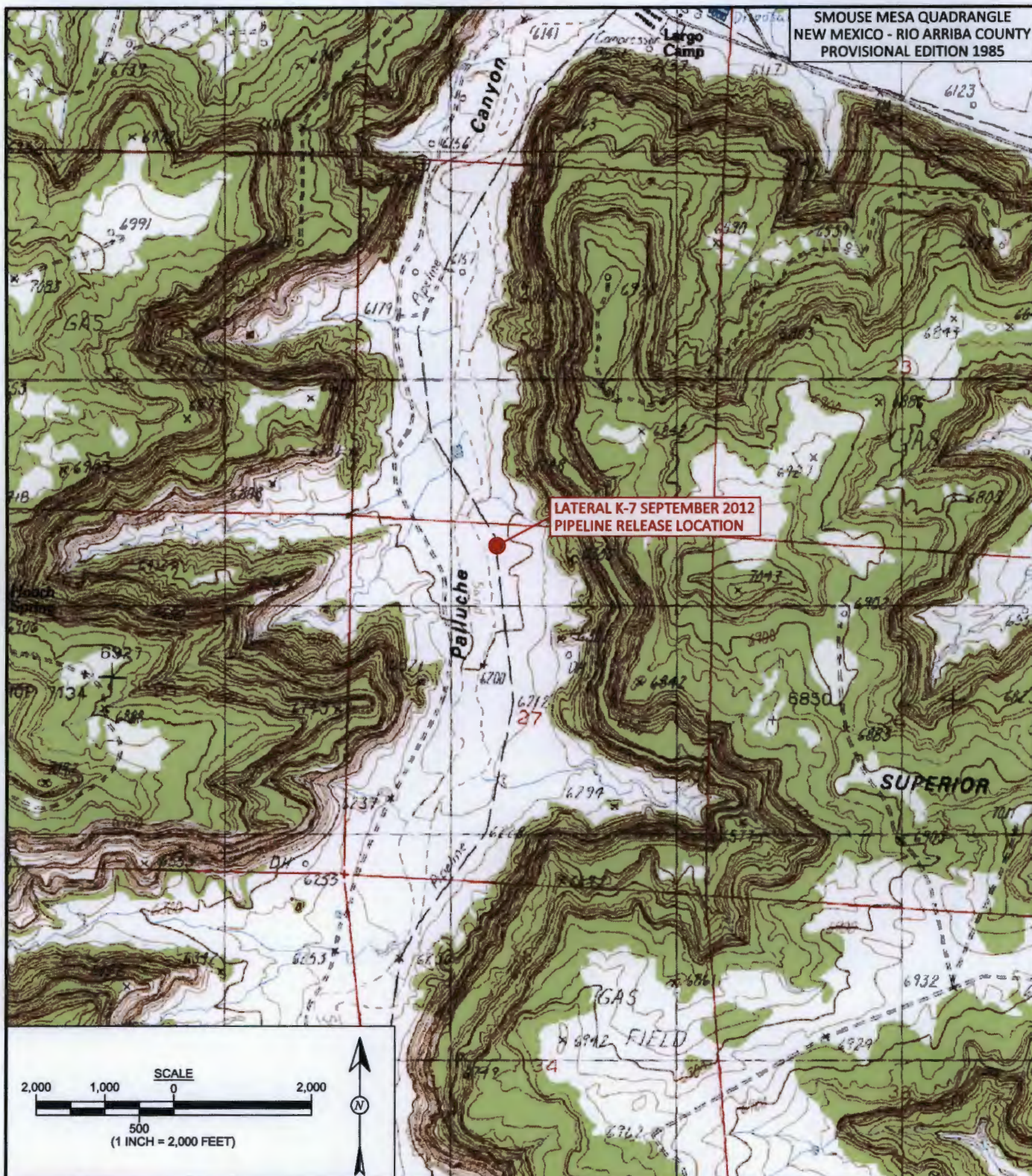
U.S. Department of Interior (USDI) Bureau of Land Management. 2008. *Natural Resource
Damage Assessment and Restoration Handbook*. Release 1-1712. May, 2008.

U.S. Environmental Protection Agency (USEPA). 1982. *Methods for Chemical Analysis for
Water and Wastes*. Document EPA-600, July, 1982.

USEPA. 1992. SW-846, 3rd Edition, *Test Methods for Evaluating Solid Waste: Physical
Chemical Methods*, dated November, 1986, and as amended by Update One, July,
1992.

USEPA. 2001. Contract Laboratory Program (CLP) Guidance for Field Samplers. OSWER
9240.0-35, EPA 540-R-00-003. June, 2001.

SMOUSE MESA QUADRANGLE
NEW MEXICO - RIO ARriba COUNTY
PROVISIONAL EDITION 1985



Animas Environmental Services, LLC

DRAWN BY:
C. Lameman

DATE DRAWN:
June 7, 2013

REVISIONS BY:

C. Lameman

DATE REVISED:
June 7, 2013

CHECKED BY:

H. Woods

DATE CHECKED:

June 7, 2013

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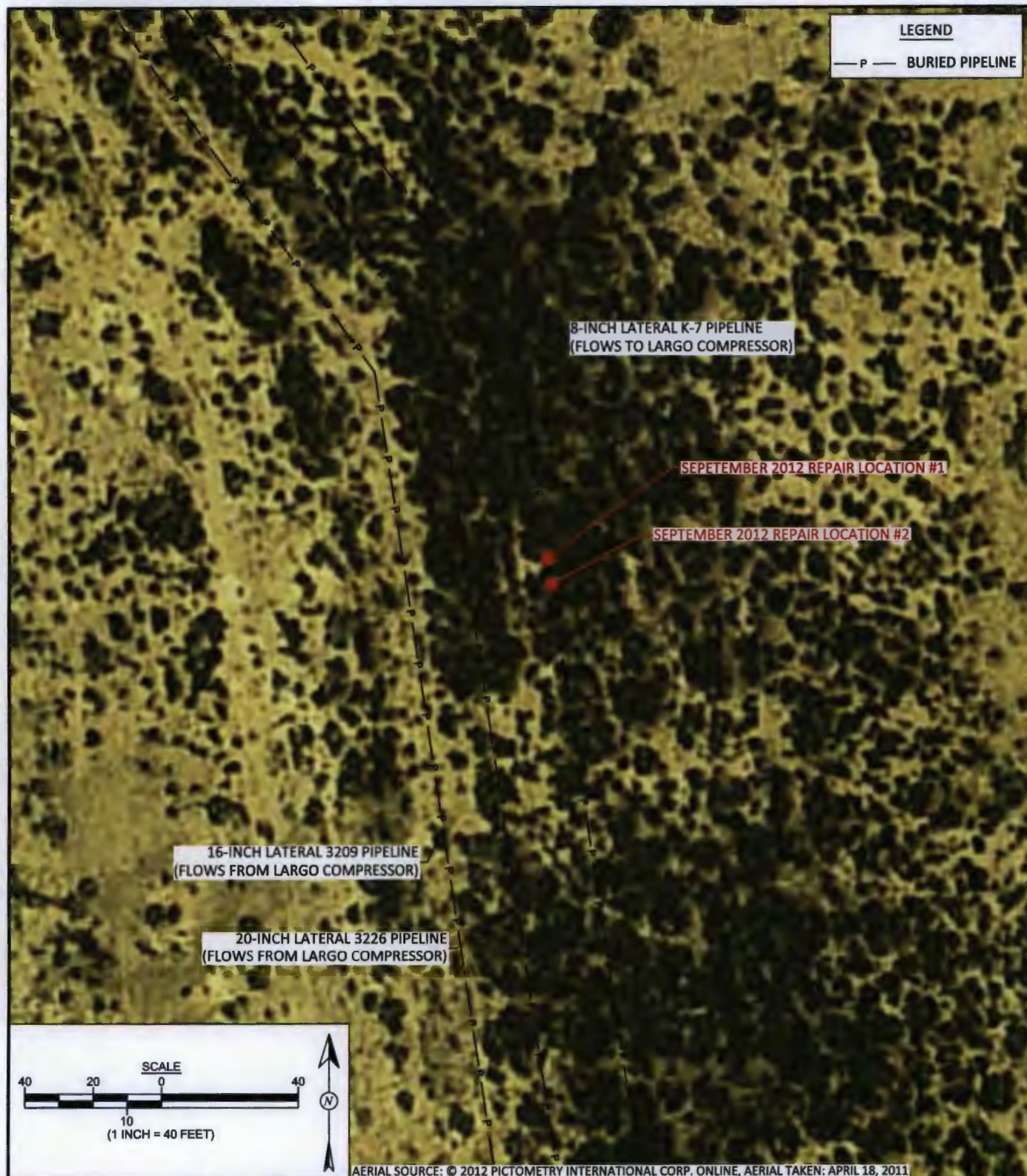
E. McNally

DATE APPROVED:

June 7, 2013

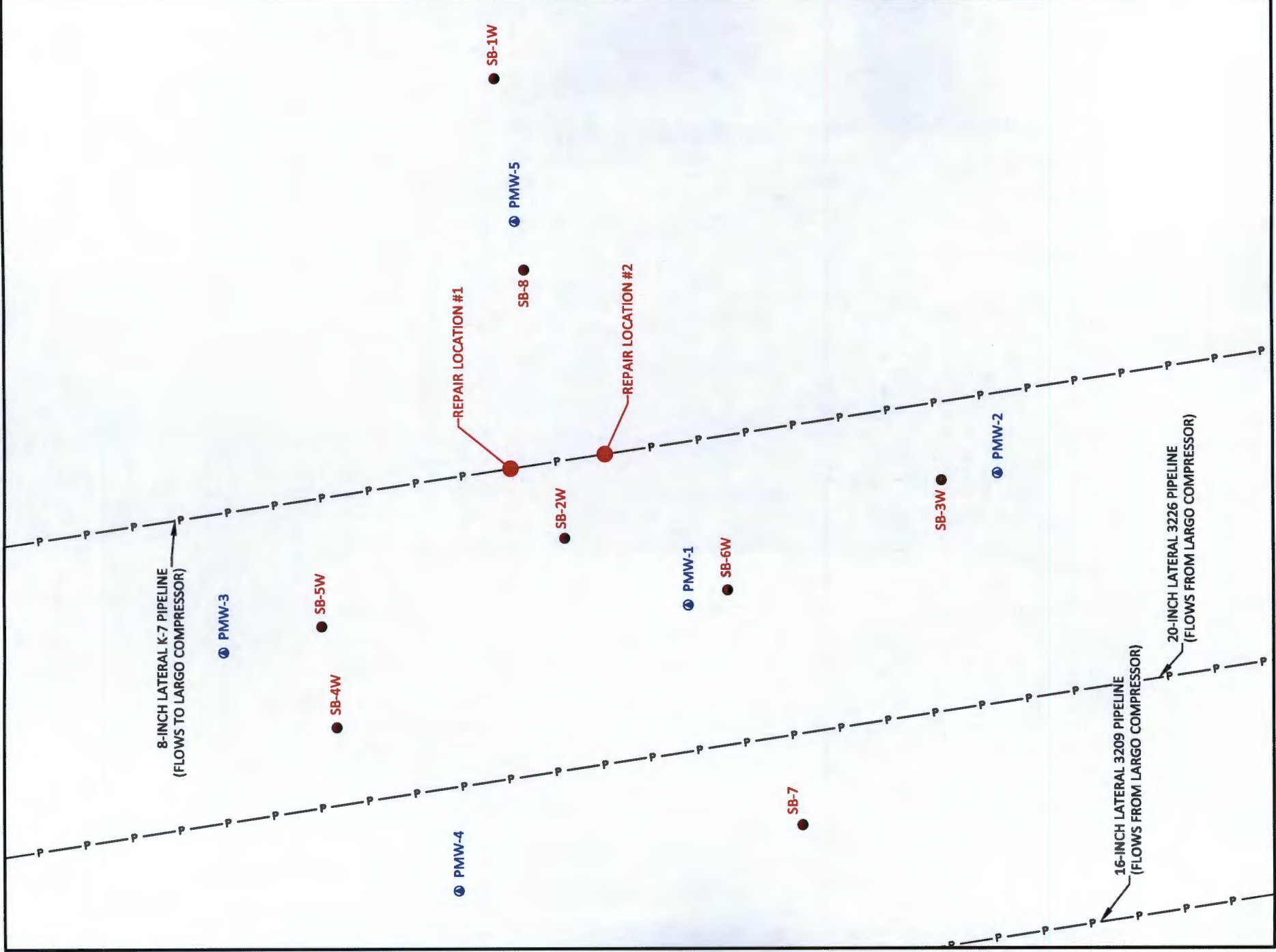
FIGURE 1

TOPOGRAPHIC SITE LOCATION MAP
ENTERPRISE FIELD SERVICES, LLC
LATERAL K-7 SEPTEMBER 2012 PIPELINE RELEASE
NE¼ NW¼, SECTION 27, T26N, R7W
RIO ARriba COUNTY, NEW MEXICO
N36.46422, W107.56505



Animas Environmental Services, LLC

DRAWN BY: C. Lameman	DATE DRAWN: June 7, 2013	FIGURE 2 AERIAL SITE MAP ENTERPRISE FIELD SERVICES, LLC LATERAL K-7 SEPTEMBER 2012 PIPELINE RELEASE NE¼ NW¼, SECTION 27, T26N, R7W RIO ARriba COUNTY, NEW MEXICO N36.46422, W107.56505
REVISIONS BY: C. Lameman	DATE REVISED: June 7, 2013	
CHECKED BY: T. Ross	DATE CHECKED: June 7, 2013	
APPROVED BY: E. McNally	DATE APPROVED: June 7, 2013	



NOT TO SCALE

PROPOSED GROUNDWATER MONITOR WELL SCHEMATIC

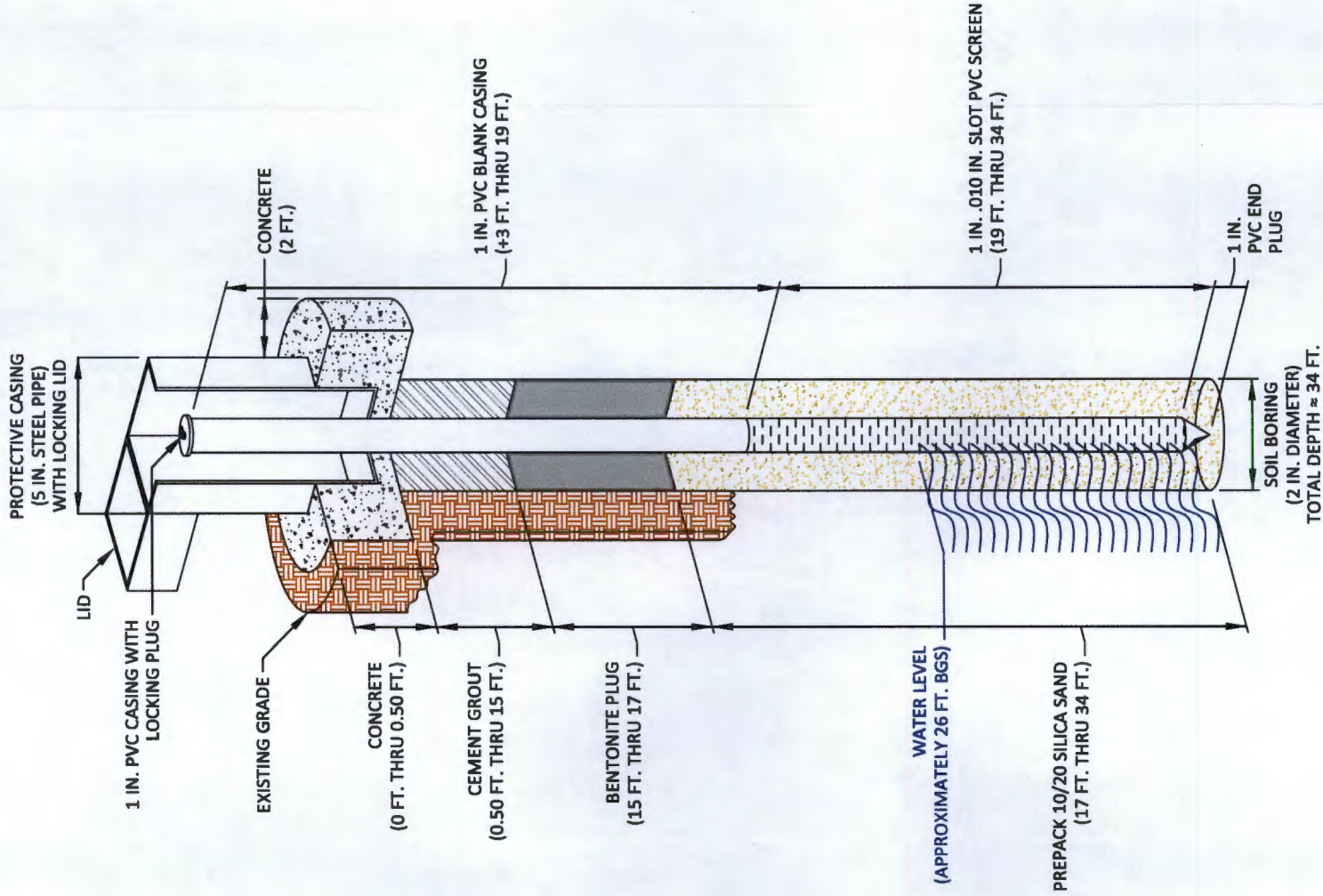


FIGURE 3

**PROPOSED MONITOR WELL LOCATIONS
AND WELL SCHEMATIC**
ENTERPRISE FIELD SERVICES, LLC
LATERAL K-7 SECTION 27, T26N, R7W
NE¼ NW¼, SECTION 27, T26N, R7W
RIO ARriba COUNTY, NEW MEXICO
N36.46422, W107.56505



DRAWN BY: C. Lameman	DATE DRAWN: June 7, 2013
REVISIONS BY: C. Lameman	DATE REVISED: June 7, 2013
CHECKED BY: T. Ross	DATE CHECKED: June 7, 2013
APPROVED BY: E. McNally	DATE APPROVED: June 7, 2013

LEGEND	
●	SOIL BORING LOCATIONS (NOVEMBER 2012)
④	PROPOSED SOIL BORING AND MONITOR WELL LOCATIONS
— P —	BURIED PIPELINE (APPROXIMATE)

