APPROVED

Report approved by NMOCD-Santa Fe on 14 December 2017. See email documentation.

December 12, 2017 Reference No. 11135241

Ms. Olivia Yu
New Mexico Oil Conservation Division
Energy, Minerals and Natural Resources Department
1625 N. French Dr.
Hobbs, NM 88240

Ms. Amber Groves
New Mexico State Land Office
2827 N. Dal Paso, Ste. 117
Hobbs, NM 88260

Dear Ms. Yu and Ms. Groves:

Re: 0-6-1 Four Inch Line Release
1RP-4643
Work Plan to Perform Additional Site Assessment Activities
S20, T20S, R 37E
Lea County, New Mexico

GHD Services Inc. (GHD) appreciates the opportunity to submit this work plan to ETC Field Services LLC (ETC) for the 0-6-1 Four Inch Pipeline release. The release location (Site) is located approximately 4.6 miles south of Monument, New Mexico in Section 20, Township 20 south, Range 37 east in Lea County, New Mexico (Figure 1). The site is regulated by the New Mexico Oil Conservation Division (NMOCD). The surface is owned by the New Mexico State Land Office (NMSLO).

Assessment activities that included the drilling of six soil borings and the installation of one groundwater monitoring well were performed at the Site on August 29 and 30, 2017 by GHD. Vertical and horizontal assessment was performed by collecting soil samples from the six soil borings (BE-1, BE-2, BS, BW, BN-1, BN-2) that were advanced in the four cardinal directions of the release point and one (MW-1) that was advanced near the release point (Figure 2). Either two or three soil samples per soil boring were submitted to Hall Environmental Analysis Laboratory (HEAL) located in Albuquerque, New Mexico. The samples were analyzed for benzene, toluene, ethylbenzene, xylenes (BTEX) by EPA Method 8021B, total petroleum hydrocarbons (TPH) by EPA Method 8015B, and chloride by EPA Method 300.0.

The soil sample collected from MW-1 from 15 to 17 ft. bgs contained a benzene concentration of 0.032 milligrams per kilogram (mg/kg). None of the rest of the submitted samples contained BTEX or total TPH constituents above the laboratory reporting limits. Chloride concentrations ranged from 54 to 1,100 mg/kg. The highest chloride concentration, and the only one exceeding the Recommended Remedial Action Limit (RRAL), was contained in the sample collected from MW-1 at 15 to 17 ft. bgs.

GHD
6121 Indian School Road NE Suite 200 Albuquerque New Mexico 87110 USA
T 505 884 0672 F 505 884 4932 W www.ghd.com

A groundwater sample was collected from MW-1 on September 20, 2017 and submitted to HEAL for BTEX analysis by EPA Method 8021B, TPH by EPA Method 8015D, chloride by EPA Method 300.0, and total dissolved solids (TDS) by EPA Method SM2540C Mod analysis. Benzene was detected at a concentration of 200 micrograms per liter (ug/L) that exceeds the New Mexico Water Quality Control Commission (NMWQCC) standard of 10 ug/L. Chloride was detected above the NMWQCC standard of 250 milligrams per liter (mg/L) at a concentration of 580 mg/L. The sample also exceeded the NMWQCC standard for TDS (1,000 mg/L), with a concentration of 2,010 mg/L.

A second groundwater sample was collected from MW-1 on October 17, 2017 to confirm the original sample results. The sample was submitted to HEAL for BTEX analysis by EPA Method 8021B, chloride by EPA Method 300.0, and total dissolved solids (TDS) by EPA Method SM2540C Mod analysis. Benzene was detected at a concentration of 150 ug/L, chloride at a concentration of 560 mg/L, and TDS at a concentration of 1,620 mg/L.

The assessment activities and results are further detailed in the Assessment Summary Report dated October 23, 2017 that was prepared by GHD.

1. Proposed Scope of Work

Based on the results of the initial assessment performed by GHD, the impact to groundwater from petroleum hydrocarbons and chloride contamination needs to be further assessed. GHD proposes to advance soil borings and install additional groundwater monitoring / air sparge wells at the site to further delineate the horizontal extent of contamination in the groundwater.

1.1 Project Preparation

This task includes preparing this work plan and other project preparation activities that occur after approval, but before fieldwork mobilization.

- Submission of this work plan (without the costs) to the NMOCD and NMSLO for their approval.
- Preparation of a project health and safety plan.
- Coordinate with ETC to have underground utilities marked.
- Obtain required permits from the New Mexico Office of the State Engineer (NMOSE) to install monitoring wells.
- Update the NMSLO Water Monitoring Easement.

1.2 Proposed Soil Boring and Monitoring Well Drilling Program

GHD proposes to advance up to six investigational soil borings and install four 2-inch diameter groundwater monitoring wells and two 2-inch diameter air sparge wells. The locations of the proposed

borings/wells are shown on Figure 2. Monitoring air/sparge well locations will be determined in the field based on site conditions. Prior to mobilizing any drilling equipment, a New Mexico 811 utility locate will be completed.

Drilling will be performed by Enviro-Drill, Inc. (EDI) of Albuquerque, New Mexico. Proposed soil borings will be advanced to an approximate depth of 35 ft. bgs. Drilling will be performed using a hollow stem auger equipped drill rig. During drilling, discrete soil samples will be collected in 5-foot intervals using a clean 18-in. long split spoon. Soil samples will be field screened using the Petroflag TPH Analyzer System, heated headspace using a calibrated photoionization detector, and for chlorides using HACH Titration Strips.

Two soil samples, the sample exhibiting the highest hydrocarbon concentrations and the sample above the water table will be submitted for the following laboratory analyses:

- Benzene, toluene, ethylbenzene and xylene (BTEX) by EPA Method 8021.
- Gasoline, diesel, and motor oil range (GRO/DRO/MRO) total petroleum hydrocarbons (TPH) by EPA Method 8015.

All of the soil samples will be analyzed for chlorides by EPA Method 300.0. Soil samples will be placed in appropriate laboratory supplied containers and preserved on ice in insulated coolers. Soil samples will be submitted to HEAL with chain of custody documentation.

Soil cuttings generated during the drilling activities will be placed in the on-site stockpile or on plastic for future disposal based on the laboratory results.

1.2.1 Monitoring Well Construction

The monitoring/air sparge wells will be drilled and installed by a New Mexico-licensed water well driller. Prior to the installation of the groundwater monitoring/air sparge wells, appropriate permits will be obtained from the NMOSE.

Groundwater monitoring wells will be constructed of 2-in. diameter, flush-threaded, Schedule 40 PVC casing. Each well will be constructed with 0.020-in. machine slot well screen. The well screen will be placed from the bottom of boring, extending to approximately 10 ft. below ground surface. The total depth of the monitoring wells is estimated at approximately 35 ft. bgs. The borehole annulus will be backfilled with a 10/20 sand filter pack to approximately 2-ft above the top of the screen interval. An approximate 2-ft thick bentonite seal will be placed on top of the sand. The remainder of the well annulus will be grouted to ground surface with a 95 percent Portland cement and 5 percent bentonite powder grout.

Air sparge wells will be constructed of 2-in. diameter, flush-threaded, Schedule 40 PVC casing. Each well will be constructed with 0.020-in. machine slot well screen. The well screens will be five feet long and placed from the bottom of boring, extending to approximately 20 ft. below ground surface. The total depth of the air sparge wells is estimated at approximately 45 ft. bgs. The borehole annulus will be backfilled

with a 10/20 sand filter pack to approximately the top of the screen interval. An approximate 3-ft thick bentonite seal consisting of coated pellets will be placed on top of the sand. The remainder of the well annulus will be grouted to ground surface with a 95 percent Portland cement and 5 percent bentonite powder grout.

Each well will be completed with a stick-up lockable well vault. The well vaults will be placed within a minimum 24-in. by 24-in. by 4-in. thick concrete pad and the vault locked.

A State of New Mexico licensed surveyor will be retained to prepare a site map and determine horizontal and vertical control for each monitoring well. Monitoring well construction information will be documented in well record forms submitted to the NMOSE by the drilling subcontractor.

1.2.2 Monitoring Well Development

Monitoring wells will be developed by removal of sufficient volumes of water to clear the well casing and annulus of sediment. Wells will be developed until geochemical field parameters of pH, temperature, and conductivity stabilize to within 10 percent. Following well development, static water levels will be measured with an oil/water interface probe to assess the presence of any light, non-aqueous phase liquids (LNAPL).

1.3 Subsurface Assessment Report Preparation

Upon receipt of the soil and groundwater laboratory analytical data, GHD will prepare an assessment report. The report will include a summary of the fieldwork performed, site drawing showing sampling locations, photographs, and the laboratory analysis reports. The report will also include recommendations for any future field efforts.

1.4 Groundwater Monitoring

An initial round, first quarter, of groundwater samples will be collected from the monitoring wells following installation (during the same mobilization as the well installation). Sampling of the wells will then be performed on a quarterly basis for three quarters. Prior to sampling, the monitoring wells will be gauged using a decontaminated interface probe.

Monitoring wells will be purged by hand bailing using dedicated, disposable polyethylene bailers. Wells will be purged until field parameters including groundwater temperature, pH, TDS, conductivity, and oxidation/reduction potential (ORP) stabilize to within 10 percent or until three well volumes have been removed. Field parameters will be collected using an appropriate multi-parameter sonde. Purge water generated during the monitoring events will be containerized on Site for disposal following analysis.

Following collection, groundwater samples will be labeled, placed on ice, and submitted to HEAL for analyses of chloride by EPA Method 300.0, BTEX by EPA Method 8260, and TDS by EPA Method 2540C.

1.5 Annual Groundwater Monitoring Report Preparation

GHD will prepare an annual report summarizing the quarterly groundwater monitoring and assessment data collected during the 2018 calendar year. The annual report will include tabulated analytical and gauging data, groundwater gradient and isopleth maps for contaminants of concern from the semiannual events, details of monitoring well installation activities, and recommendations for future activities at the site.

1.6 SVE/Ozone/Air Sparge Pilot Study

GHD proposes to perform a pilot study to assess the effectiveness of soil vapor extraction (SVE) and air/ozone in the vicinity of MW-1. GHD proposes to utilize MW-1 and select newly installed wells as monitoring wells. The SVE pilot study would consist of the following:

- The SVE system would consist of a trailer or skid-mounted vacuum blower and moisture separator. Vapor abatement would be performed using granulated activated carbon canisters.
- The newly installed monitoring wells would be used to monitor vadose zone vacuums.
- The pilot study would be operated for 12 to 24 hours.
- Data consisting of system flow and vacuum, monitor well vacuums, depth to water, and extraction concentrations would be monitored and recorded during the pilot study. The data would be used to assess the radius of influence, blower sizing, and vapor abatement requirements, if necessary.

The air sparge pilot study will be performed in the vicinity of MW-1 utilizing the newly installed air sparge wells at the same time as the SVE pilot study. The air sparge pilot study will consist of the following:

- Groundwater samples will be collected from the site monitor wells prior to performing the pilot study to obtain baseline groundwater concentrations. The monitor wells will be sampled for BTEX by EPA Method 8021B and total and dissolved iron.
- Air/ozone would be applied to the air sparge wells using an electric air compressor or blower connected to an ozone generator. The air pressure to be applied would be sufficient to overcome head and pore pressures, but not enough to cause fracturing.
- Pressure from the air sparge wells and MW-1 will be observed to assess the pressure radius of influence. Dissolved oxygen and ORP will be recorded from the surrounding monitoring wells.
- The test will be operated for a period of 48 hours.
- Following completion of the air/ozone sparge pilot test, the site wells will be sampled for BTEX by EPA Method 8021B and total and dissolved iron.

The performance of the air sparge pilot study may be modified as data is obtained. Following completion of the pilot study, the data will be reduced and the efficiency of using air sparge will be assessed. If the

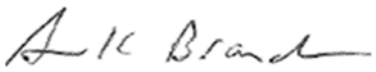
data indicates that air sparge is an effective remedial method, a full-scale system design may be recommended.

Following completion of the pilot study, a report documenting the procedures and data collected would be provided. The report would include maps showing the pilot study layout and graphs showing the radius of influence that was observed during the study. Recommendations for the design and operation of the full-scale remediation system would be provided.

GHD appreciates the opportunity to submit this work plan to ETC. Please feel free to contact either of us at 505-884-0672 if you have questions or comments.

Sincerely,

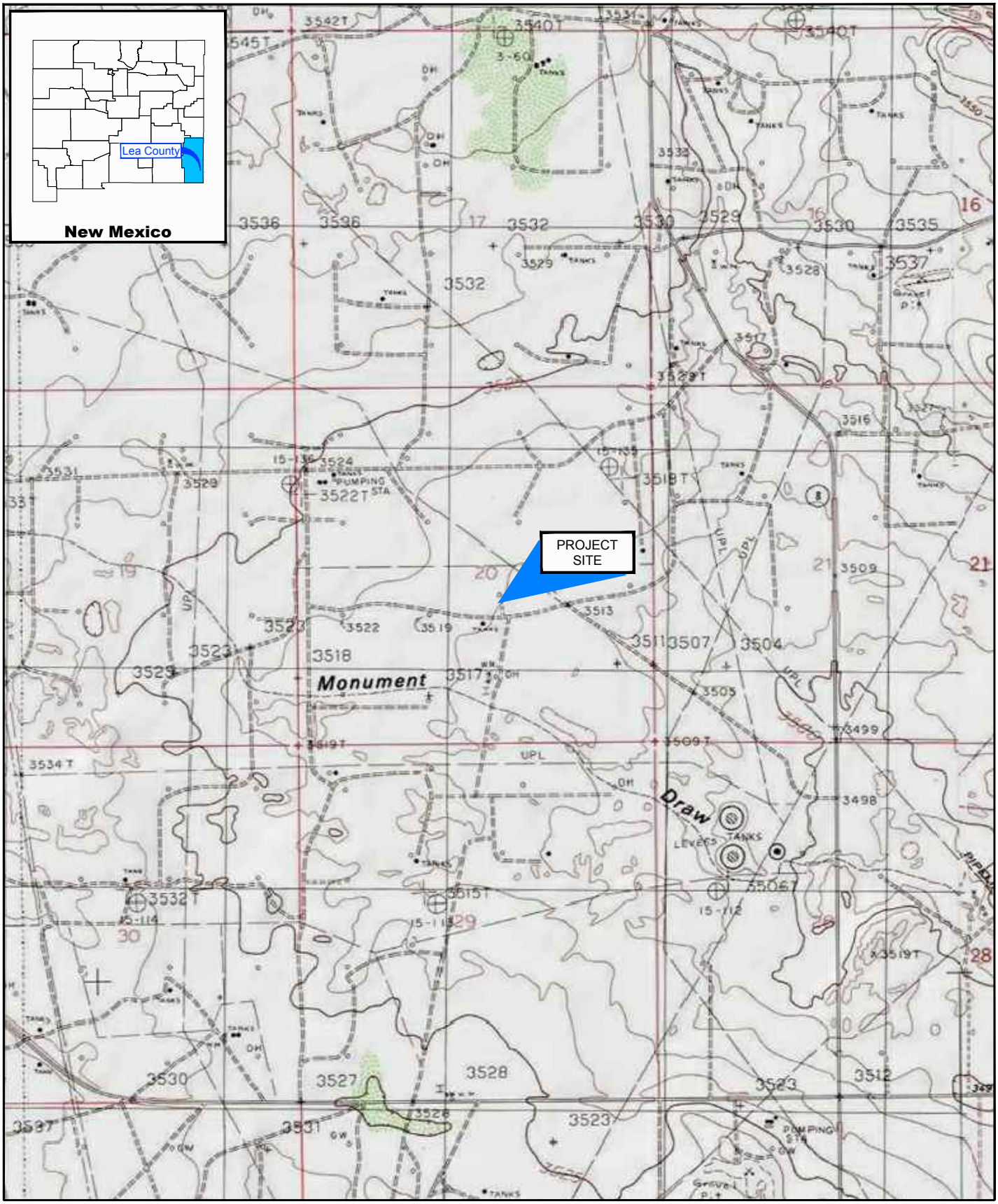
GHD



Alan Brandon
Senior Project Manager

Bernard Bockisch
New Mexico Operations Manager

AB/jm/1



Source: USGS 7.5 Minute Quad "Monument South and Hobbs SW, New Mexico"

Lat/Long: 32.557054° North, 103.27255° West

0 1000 2000ft

Coordinate System:
NAD 1983 (2011) StatePlane-
New Mexico East (US Feet)

ETC FIELD SERVICES LLC
LEA COUNTY, NEW MEXICO
0-6-1 4" LINE RELEASE

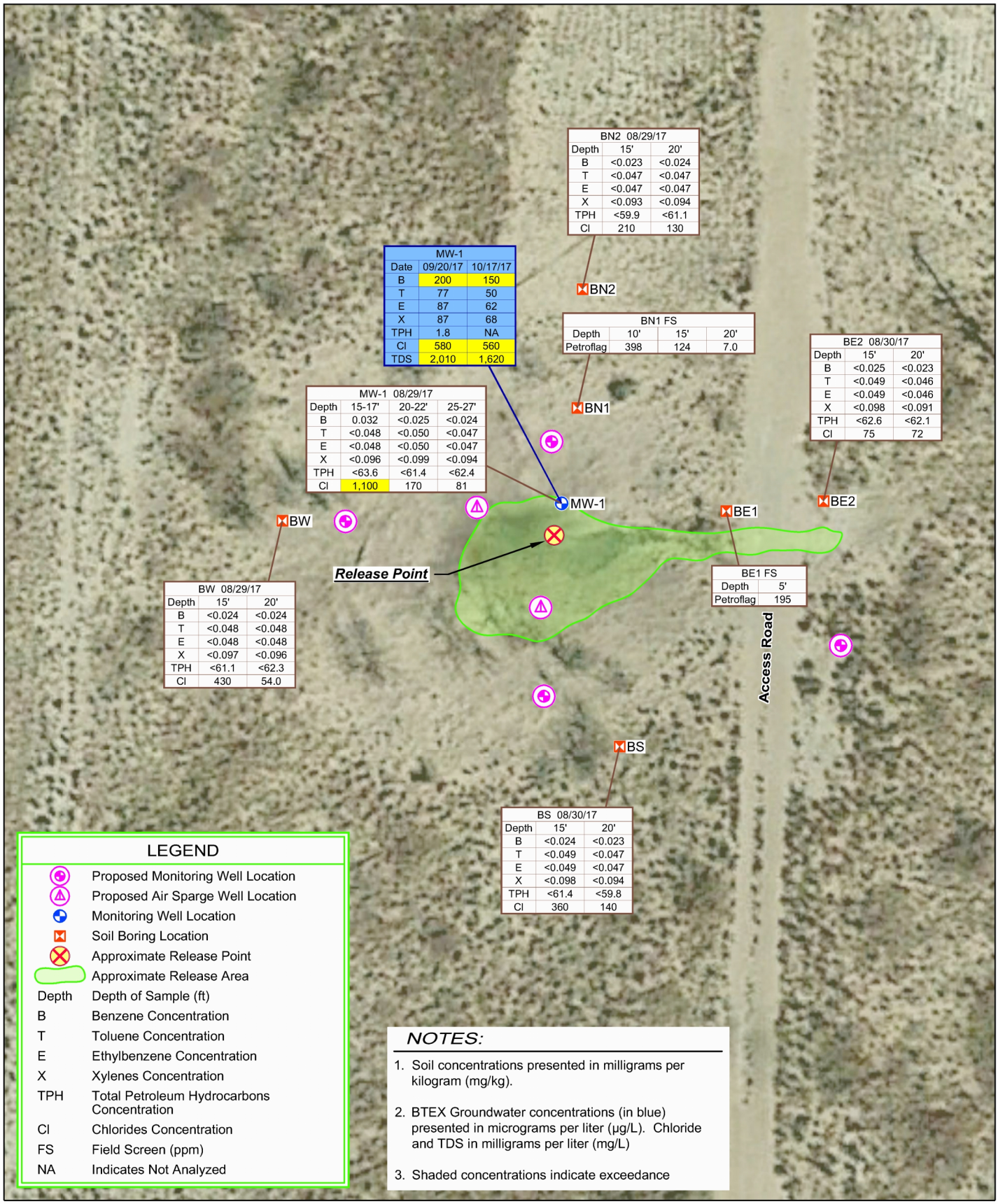
11135241-00

Oct 5, 2017

SITE LOCATION MAP

FIGURE 1

CAD File: I:\CAD\Files\Eight Digit Job Numbers\1113----\11135241-ETC-S-U-6 Six Inch Line Release\11135241-00\11135241-00(000)GN-DL001.dwg



Source: Image © 2016 Google - Imagery Date: February 1, 2017

Lat/Long: 32.557054° North, 103.27255° West

0 10 30ft

Coordinate System:
NAD 1983 (2011) StatePlane-
New Mexico East (US Feet)

ETC FIELD SERVICES LLC
LEA COUNTY, NEW MEXICO
0-6-1 4" LINE RELEASE

11135241-00

Nov 9, 2017

PROPOSED MONITORING WELL AND AIR SPARGE WELL LOCATIONS

FIGURE 2

CAD File: I:\CAD\Files\Eight Digit Job Numbers\1113----\11135241-ETC-S-U-6 Six Inch Line Release\Proposal\11135241-00(Proposal)GN-DL001.dwg

www.ghd.com