



**A & M Engineering and
Environmental Services, Inc.**
Consulting - Design - Construction - Remediation

PHASE II ENVIRONMENTAL SITE ASSESSMENT (ESA)

542-Acre Robson Ranch

21701 East 31st Street
Tulsa, Wagoner County, Oklahoma 74014

A & M Project Number 2320-0013

Field Activities Dates: May 4, 8, and 24, 2023
Report Date: June 26, 2023

Prepared For:



The City of Tulsa

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June 26, 2023

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REF: Phase II Environmental Site Assessment (Phase II ESA) for the 542-Acre Robson Ranch located at 21701 East 31st Street, Tulsa, Wagoner County, Oklahoma 74014.

Dear Ms. Barnett:

A & M Engineering and Environmental Services, Inc. (A & M) has completed the enclosed Phase II ESA for the above referenced site.

Thank you for choosing A & M. If you have any questions or require further assistance, please contact us at (918) 665-6575 or via email.

Respectfully,
A & M Engineering and Environmental Services, Inc.

A handwritten signature in blue ink, appearing to read 'JE Elbert', is written over a white rectangular background.

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Enclosures

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1.0 INTRODUCTION

A & M Engineering and Environmental Services, Inc. (A & M) has prepared this Phase II Environmental Site Assessment (Phase II ESA) to summarize the field sampling activities and present the laboratory analyses results, findings, and recommendations for the property/facility of interest, as described in the following sections.

1.1 PROJECT LOCATION AND DESCRIPTION

The **542-Acre Robson Ranch**, henceforth referred to as the “Site”, is located at 21701 East 31st Street, Tulsa, Wagoner County, Oklahoma 74014. The Site is currently developed with a residence and associated outbuildings and is used as a horse ranch.

Appendix A (Figures) provides a Site Vicinity Map (Figure 1), Topographic Map (Figure 2), and Site Layout Map (Figure 3) for reference.

1.2 USER/CLIENT

The party seeking to use this Phase II ESA may include, without limitation, a potential purchaser of property, a potential tenant of property, an owner of property, a lender, an insurer, or a property manager.

As designated by A & M’s proposal (dated February 22, 2023) and the approval received on March 7, 2023, this Phase II ESA will be used by the City of Tulsa and/or PartnerTulsa as represented/authorized by Ms. Michelle Barnett, P.E. (Senior Vice President of Economic and Workforce Development), henceforth referred to as the “User/Client”.

1.3 UNDERGROUND UTILITIES

Prior to subsurface investigation activities onsite, OKIE811 was notified by Justin Scott (Environmental Specialist) of A & M. This notification was provided on April 10, 2023. OKIE811 marked public underground utilities within the adjacent easements per Ticket No. 23041016015255. In addition, Ground Penetrating Radar (GPR) was used to locate public and private underground utilities within the Site boundaries. The User/Client was unable to provide any Site drawings that identified the location of underground utilities onsite.

1.4 ADJOINING PROPERTIES

The adjacent properties are presently being used as follows:

- **North** - The Site is bounded to the north by undeveloped land.
- **South** - The Site is bounded to the south by East 31st Street with single-family residences beyond.
- **East** - The Site is bounded to the east by the Creek Nation Turnpike with undeveloped land beyond.
- **West** - The Site is bounded to the west undeveloped land.

Appendix A (Figures) provides a Site Vicinity Map (Figure 1), Topographic Map (Figure 2), and Site Layout Map (Figure 3) for reference.

1.5 SITE GEOLOGY AND HYDROGEOLOGY

According to the United States Geological Services (USGS), the geologic units found in the vicinity of the Site are broadly characterized by Paleozoic stratified sequences. According to the United States Department of Agriculture (USDA) Soil Survey Geographic Database, soils in the vicinity of the Site are mapped as the Dennis series, which is described as a very deep, somewhat poorly drained silty loam on interfluvial and hillslopes. The nearest body of surface water is an unnamed tributary of Spunky Creek that flows across the Site, approximately 850 feet north of the area of concern.

1.6 BACKGROUND

Prior to conducting/completing this Phase II ESA; A & M performed a Phase I Environmental Site Assessment (ESA) onsite for the City of Tulsa during February 2023. The Phase I ESA (dated February 14, 2023) identified the following Recognized Environmental Conditions (RECs) onsite:

- A gasoline or diesel fuel pump was identified southwest of the detached garage located in the residential portion of the Site. This fuel pump was observed to be connected to a buried fuel delivery line, suggesting the presence or former presence of an Underground Storage Tank (UST) at the Site. Interviews with the landowner indicated that the suspected UST may still be present at the Site, as the landowner was unaware of any remediation activities or the removal of this suspected UST. A & M reviewed information available at the Oklahoma Conservation Commission (OCC) Petroleum Storage Tank Portal; however, no UST records were on file for the Site. Based upon a lack of records and information regarding the status of this suspected UST and knowledge of the potential for contamination to soil and groundwater as a result of storing petroleum, the undetermined status of this suspected UST was considered a REC.

Based upon the presence of this REC identified onsite; A & M recommended a Phase II ESA be conducted for further evaluation of potential associated environmental impacts onsite.

1.7 STATEMENT OF OBJECTIVES AND SCOPE OF WORK

The objectives of this Phase II ESA and scope of work may be associated with landowner liability protection, landowner continuing obligations, threshold knowledge for Brownfields remediation grants, evaluating target analytes, establishing business environmental risk, and/or liabilities disclosure, as appropriate.

The objectives of this Phase II ESA and scope of work are consistent with A & M's proposal dated February 22, 2023 and approved by the User/Client on March 7, 2023. The primary driver for this Phase II ESA is landowner liability protection and threshold knowledge for Brownfields remediation grants.

1.8 PROJECT PLANS AND SAFETY

This Phase II ESA was completed in accordance with the following project plans that functioned as companion/support documents and established procedures for Quality Assurance/Quality Control (QA/QC), health and safety, and field sampling activities:

- **Quality Assurance Project Plan (QAPP)** - Established quality assurance and quality control procedures implemented during completion of the project.
- **Project Health and Safety Plan (PHASP)** - Established the health and safety precautions, procedures, and personal protective measures/methods imposed to ensure the project was completed in a safe and effective manner.
- **Project Field Sampling Plan (PFSP)** - Outlined the planned work activities and implementation.

1.9 STANDARD PRACTICES

The American Society for Testing and Materials (ASTM), Standard Practice for Environmental Site Assessments: Phase II Environmental Site Assessment Process, E1903-19 (ASTM E1903-19) can be used in the preparation of Phase II ESAs on a voluntary basis. Although this Phase II ESA may not have been prepared in strict accordance with ASTM E1903-19, A & M has used ASTM E1903-19 as a practical reference to ensure the use of a scientifically sound approach for investigating the Site to evaluate the presence or likely presence of substances of concern. This standard practice establishes the process for conducting Phase II ESAs of a parcel of property with respect to the presence or the likely presence of substances including but not limited to those within the scope of the CERCLA. Those substances within the scope of CERCLA include hazardous substances, pollutants, contaminants, petroleum/petroleum products, controlled substances, and constituents thereof.

The objectives and transparency in communicating and interpreting Phase II ESA results, including specific adherence to requirements for documenting the scope of assessment and constraints on the conduct of the assessment process, are defined by ASTM E1903-19. The objectives of this standard are to establish practices to ensure that sound and scientifically valid data concerning actual property conditions are provided to the user. Terminology used in this Phase II ESA are consistent with and defined by ASTM E1903-19, Part 3.1. This standard does not address the evaluation of business environmental risk in light of data collected through the Phase II ESA process. Such evaluation is a function of Site and transaction-specific variables and the user's objectives and risk tolerance.

1.10 LIMITATIONS

This Phase II ESA is intended to serve as an evaluation effort and is not a substitute for sampling and laboratory analyses performed to delineate the extent of potential contamination. Our findings and recommendations are based upon conditions observed on the date of field activities and regulations in effect at the time. We have made no representation of future compliance considerations. Areas onsite and offsite that were not sampled during this effort are not part of this evaluation and we make no judgement or guarantee regarding the environmental conditions within those areas. We have relied fully upon any/all readily available information that may have been provided by User/Client representatives and/or regulatory agencies in our evaluation. We have assumed the information provided is true, accurate, current, and correct in representation. If that is not the case, then our Phase II ESA may be affected. The User/Client has contractually agreed by signing the associated proposal that

the degree of investigatory sampling and chemical testing is appropriate to achieve the degree of confidence needed or desired. It is not A & M's role or intent as part of this Phase II ESA to provide legal or business advice.

A single round of sampling and chemical testing may not always provide data sufficient to meet the chosen objectives. No Phase II ESA can eliminate all uncertainty and any sample, either surface or subsurface, taken for chemical testing may or may not be representative of a larger population. Phase II ESAs do not generally require an exhaustive assessment of environmental conditions at a property. The services described in this Phase II ESA were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with the User/Client. This Phase II ESA is solely for the use and information of this User/Client unless otherwise noted. Any reliance on this Phase II ESA by a third party is at such party's sole risk.

The purpose of this Phase II ESA is to reasonably characterize existing Site conditions based on the geology/hydrogeology of the area. It is understood that a balance has been sought between a reasonable inquiry into the Site conditions and an exhaustive analysis of each conceivable environmental characteristic. No investigation is thorough enough to describe all geologic/hydrogeologic conditions of interest onsite. If conditions have not been identified during the Phase II ESA, such a finding should not therefore be construed as a guarantee of the absence of such conditions at the Site, but rather as the result of the services performed within the scope, limitations, and cost of the work performed. We are unable to report on or accurately predict events that may change the Site conditions after the described services are performed, whether occurring naturally or caused by external forces. A & M assumes no responsibility for conditions we were not authorized to evaluate, or conditions not generally recognized as predictable when services were performed. Geologic/hydrogeologic conditions may exist at the Site that cannot be identified solely by visual observation. Where subsurface exploratory work was performed, our professional opinions are based in part on interpretation of data from discrete sampling locations that may not represent actual conditions at unsampled locations.

1.11 REPORTING OBLIGATIONS

A requirement to report observations from a Phase II ESA to a governmental entity or third party may be imposed by various authorities, including statutes, regulations, common law, and/or professional standards. A & M accepts no responsibility or liability for such reporting. The User, Client, and/or property owner accept all and full responsibility for reporting observations from this Phase II ESA to governmental entities and/or third parties, as required and appropriate.

1.12 DATA USEABILITY

Investigation data generally only represent the Site conditions at the time the data was generated since Site conditions can be dynamic. Therefore, the usability of data collected as part of this Phase II ESA may have a finite lifetime depending on the application and use being made of the data. To the extent that investigation data falls within the scope of data used in a Phase I ESA conducted pursuant to ASTM E1527 or ASTM E2247, the lifetime limits defined by those standards apply.

A & M has evaluated whether previously generated data were appropriate for subsequent use beyond the original purpose for which they were collected or are otherwise subject to lifetime limits imposed by other laws, regulations, or regulatory policies, prior to using or otherwise referencing such data in this Phase II ESA.

2.0 CONCEPTUAL MODEL AND AREAS OF CONCERN

Areas of concern were identified prior to sampling activities based upon a Conceptual Model developed using readily available background information provided by the User/Client and/or regulatory agencies, as applicable. Information compiled during our Conceptual Model is identified in the following sections.

2.1 TARGET ANALYTES

Target analytes associated with the particular substances that have been, or may have been released or may be present onsite, and those associated with past and current operations onsite, include the following:

- Total Petroleum Hydrocarbons – Oil Range, Diesel Range, and Gasoline Range (TPH - all ranges (ORO, DRO, GRO)).
- Benzene, Toluene, Ethylbenzene, Xylene (BTEX).
- Lead.

2.2 PHYSICAL STATE OF TARGET ANALYTES

The most likely physical states of the target analytes were determined, as follows:

- Liquid petroleum fuels.
- Solid and dissolved lead in fuels.

2.3 POTENTIAL TARGET ANALYTE TRANSFORMATIONS

Potential primary target analyte transformations into secondary target analytes were not considered a concern for the target analytes.

2.4 ROUTES OF ENTRY

Potential routes of entry for the target analytes into the environment may have included:

- Spills and leaks onsite.
- Underground Storage Tanks (USTs) onsite.
- Operations onsite.

2.5 ENVIRONMENTAL MEDIA POTENTIALLY IMPACTED

Environmental media potentially impacted onsite included:

- Surface soil.
- Subsoil.
- Uppermost groundwater.

2.6 TARGET ANALYTES BEHAVIOR, FATE, AND TRANSPORT

Based upon the extent of exposure, target analyte characteristics, and soil/geology characteristics onsite the target analytes were expected on the surface, within fifteen (15) feet of the surface, and potentially within the uppermost groundwater.

2.7 TARGET ANALYTES MIGRATION

Based upon the target analyte characteristics, soil/geology characteristics onsite, regional topography, and surface water within close proximity, migration via the uppermost groundwater was expected to be generally toward the northeast.

2.8 AREAS OF CONCERN

Based upon the Conceptual Model the primary areas of concern that warranted investigation to meet the objectives of this Phase II ESA included the following:

- Existing disconnected fuel dispenser.
- Suspect UST pit.

2.9 VALIDATION OF CONCEPTUAL MODEL

The results of the field sampling activities performed onsite on May 4, 8, and 24, 2023 were consistent with the Conceptual Model. Therefore, the Conceptual Model was validated.

2.10 VALIDATION OF ASSUMPTIONS

The results of the field sampling activities performed onsite on May 4, 8, and 24, 2023 were consistent with the assumptions made during preparation of the Conceptual Model. Therefore, the assumptions have been validated.

3.0 SAMPLING PLAN AND FIELD SAMPLING ACTIVITIES

All sampling activities were performed consistent with generally accepted professional consulting principles/practices and the signed proposal outlining the project scope of work. If applicable, the Project Field Sampling Plan (PFSP) was also followed. Pre-packaged disposable gloves (latex, nitrile, or similar) were used during all sampling activities. Gloves were replaced between samples to limit the potential for cross contamination. All sample locations, depths, and intervals were selected during field sampling based upon historical and readily available information, historic and current operations onsite and adjacent, visual observations, olfactory indicators, Photoionization Detector (PID) readings, and/or the areas with the highest potential for environmental contaminants.

3.1 GROUND-PENETRATING RADAR SURVEY

Prior to the start of the field sampling activities, A & M contracted with GPRS Inc. to perform a GPR survey of the area of concern. This survey was conducted to identify subsurface anomalies that may potentially indicate past or present UST locations and/or fuel supply lines. The survey identified a suspect fuel supply line extending south from the existing onsite fuel pump as well an anomaly suspected to be the former location of an historical UST.

Final sampling locations were selected based on information provided by GPRS. During the installation of soil borings, no evidence of an existing UST was encountered, and it is presumed that the historical UST was previously removed from the ground. Disposable gloves were changed between sample locations to prevent cross contamination.

The GPR Survey Report is provided in Appendix B (GPR Survey Report).

3.2 SURFACE SOIL SAMPLING

A total of three (3) surface soil samples were collected on May 8, 2023 from the area around the fuel dispenser by Justin Scott (Environmental Specialist) of A & M. Surface conditions within the area consist of mown grass, limestone gravel, and topsoil. Testholes were hand (gloved) dug or probed using manual methods to depths between six (6) and one (1) foot Below Ground Surface (BGS). Turf was removed using manual tools and samples were collected by hand (gloved) from the exposed soil.

General identification, locations, and observations information pertaining to the surface soils sampling is provided on Table 1 (Surface Soil Samples General Information) provided on the next page.

Table 1
Surface Soil Samples General Information

Sample IDs	Sample Types	Latitudes	Longitudes	Depths Sampled	Observations
RR-5	Surface soil	36.120954	-95.735616	0.5'-1'	Brown loam
RR-6	Surface soil	36.120942	-95.735640	0.5'-1'	Brown loam/gravel
RR-7	Surface soil	36.120929	-95.735616	0.5'-1'	Brown loam/gravel

Appendix A (Figures) provides a Sample Locations Map (Figure 4) depicting the approximate locations from which samples were collected onsite. Appendix C (Photographic Record) provides photos of field sampling activities. Appendix D (Field Sampling Data Sheets) provides field data documenting sampling activities performed onsite.

3.3 BORINGS SOIL AND GROUNDWATER SAMPLING

A total of three (3) borings were completed onsite using a truck-mounted augur rig on May 4, 2023 by Able Drilling, Inc. (Able). Boring completion was conducted under the direction of Justin Scott (Environmental Specialist) of A & M. Borings were completed to refusal, first uppermost groundwater, or twenty (20) feet, whichever was encountered first. Temporary groundwater wells were installed in all three (3) borings (RR-1, RR-2, and RR-3) on the same day of completion and allowed to recharge for approximately seventy-two (72) hours prior to groundwater sampling attempts.

Two (2) soil samples were collected from each of the borings during completion on May 4, 2023 by Justin Scott (Environmental Specialist) of A & M. Samples were collected by hand (gloved) from the boring cuttings. Disposable gloves were changed between sample locations to prevent cross contamination. Groundwater samples were collected from the borings on May 8, 2023 by Justin Scott (Environmental Specialist) of A & M. Groundwater samples were collected using single-use, pre-packaged disposable bailers to reduce the possibility of cross contamination. Groundwater samples for metals analyses were filtered (laboratory) using single use prepackaged filters to remove sediment.

Upon completion of sampling activities, the borings were plugged with soil cuttings and bentonite chips. Soil cuttings were drummed, confirmed to be non-hazardous by laboratory analysis, and removed for disposal in a permitted, offsite landfill.

Appendix E (Boring Logs) provides logs illustrating soil lithology observed in the borings completed onsite. Appendix F (IDW Disposal Information) provides a copy of Investigative Derived Waste (IDW) disposal information, as applicable.

General identification, locations, and depths information pertaining to the borings soil and groundwater sampling is provided on Table 2 (Borings and Groundwater General Information) provided on the following page.

Table 2
Borings and Groundwater General Information

Sample IDs	Latitudes	Longitudes	Total Depths (BGS)	Depths to Groundwater (BGS)
RR-1	36.120853	-95.735589	13.00'	6.21 ft.
RR-2	36.120857	-95.735667	13.00'	7.25 ft.
RR-3	36.120962	-95.735625	14.00'	5.77 ft.

Notes: BGS = Below Ground Surface, NM = Not Measured

Subsurface soils encountered consisted generally of the following:

- Limestone gravel and brown loam from surface to approximately one (1) foot.
- Reddish-brown clay from approximately one (1) foot to five (5) feet.
- Black coal and red clay from approximately five (5) feet to six (6) feet.
- Tan sandstone from approximately six (6) feet to twelve (12) feet.
- Gray limestone and dark gray shale from approximately twelve (12) feet to thirteen (13) feet.

Appendix A (Figures) provides a Sample Locations Map (Figure 4) depicting the approximate locations from which samples were collected onsite. Appendix C (Photographic Record) provides photos of field sampling activities. Appendix D (Field Sampling Data Sheets) provides field data documenting sampling activities performed onsite.

4.0 LABORATORY ANALYSES RESULTS

Surface soil samples, boring soil samples, and uppermost groundwater samples were collected for laboratory analyses during the field sampling activities. All samples were transported and delivered directly (by hand) to the laboratory under strict Chain of Custody (COC). All laboratory analyses were performed by Green Country Testing using United States Environmental Protection Agency (USEPA) approved analytical methods. Laboratory analyses results are discussed in the following sections.

4.1 SURFACE SOIL AND BORING SOIL LABORATORY ANALYSES RESULTS

Total Lead concentrations in all soil samples (both surface soil and boring soil) were below the United States Environmental Protection Agency (USEPA) Hazard Standard of 400 milligrams per kilogram (mg/Kg) in bare soil at residential or child-occupied play areas (40 CFR 745 II(F)(3)). Lead concentrations in soil ranged from 14.3 mg/Kg (RR-2-B) to 58.3 mg/Kg (RR-7).

To provide a comparison for naturally occurring Total Lead background levels onsite, one (1) surface soil sample (RR-10) was collected onsite from an area presumed to be unaffected by historical fueling operations. This sample returned a Total Lead result of 24.0 mg/Kg. Total Lead concentrations in boring soil samples appear to be consistent with background levels; however, laboratory analysis of surface soil samples RR-5 and RR-7 returned Total Lead concentrations markedly higher than the background level, of 48.7 mg/Kg and 58.3 mg/Kg, respectively.

Detectable concentrations of TPH-ORO were identified in all boring and surface soil samples except for RR-1-A and RR-3-B in a range from 3.74 mg/Kg (RR-3-A) to 32.2 mg/Kg (RR-7). Detectable concentrations of TPH-DRO were identified in all soil samples except for RR-1-A and RR-3-B in a range from 3.29 mg/Kg (RR-3-A) to 16.8 mg/Kg (RR-7). Detectable concentrations of TPH-GRO were identified only in boring soil samples RR-1-B (6.47 mg/Kg) and RR-3-B (5.93 mg/Kg).

Both the ODEQ Tier I Screening Level and Oklahoma Corporation Commission (OCC) UST Release Action Level are 50 mg/Kg for all three (3) TPH ranges (ORO, DRO, and GRO) combined. The concentration of TPH (all ranges combined) in sample RR-7 totaled 49.0 mg/Kg; however, a duplicate sample (RR-8) collected from the same location as sample RR-7 returned a result of 84.8 mg/Kg for all three (3) ranges combined. All other detectable TPH concentrations in both surface soil and boring soil samples were below the ODEQ Tier 1 Screening Levels and OCC Action Levels. In addition, all TPH sample results were below ODEQ Tier 2 Screening Levels for Industrial Soils (GRO – 2,500 mg/Kg, DRO – 2,610 mg/Kg, and ORO – 23,000 mg/Kg).

Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX) concentrations were below laboratory detection levels in all surface soil and boring soil samples.

OCC regulations state that if BTEX concentrations are below Action Levels, a TPH concentration of 500 mg/Kg in soil may be required to confirm a case at the discretion of PSTD.

[Appendix G \(Laboratory Analyses Results Summaries\)](#) provides tabulated summaries of all laboratory analyses results. [Appendix H \(Laboratory Analyses Reports\)](#) provides copies of all laboratory analyses results provided by the laboratory.

4.2 GROUNDWATER LABORATORY ANALYSES RESULTS

Laboratory analysis found that concentrations of all analytes (TPH-all ranges, Dissolved Lead, and BTEX) were below detection limits.

[Appendix G \(Laboratory Analyses Results Summaries\)](#) provides tabulated summaries of all laboratory analyses results. [Appendix H \(Laboratory Analyses Reports\)](#) provides copies of all laboratory analyses results provided by the laboratory.

4.3 VALIDATION OF CHEMICAL TESTING DATA (QA/QC)

A duplicate soil sample (RR-8) collected from the same location as sample RR-7 returned a combined concentration of TPH of 84.8 mg/Kg. This concentration was higher than RR-7 (49.0 mg/Kg). Total Lead in RR-7 (58.3 mg/Kg) was higher than in duplicate RR-8 (30.7 mg/Kg). Although variation was encountered, both RR-7 and RR-8 were consistent in returning the highest concentrations of TPH and Total Lead encountered onsite. All other analytes were below detection limits in both RR-7 and RR-8.

The duplicate groundwater sample (RR-4) consisted of groundwater collected from temporary monitor well RR-3. All laboratory results for both samples were below detection limits.

All sampling equipment used was single-use and disposable; as a result, no equipment rinsate sample was collected. QA/QC sample results were consistent for the duplicate surface soil sample.

[Appendix G \(Laboratory Analyses Results Summaries\)](#) provides tabulated summaries of all laboratory analyses results. [Appendix H \(Laboratory Analyses Reports\)](#) provides copies of all laboratory analyses results provided by the laboratory.

5.0 FINDINGS AND CONCLUSIONS

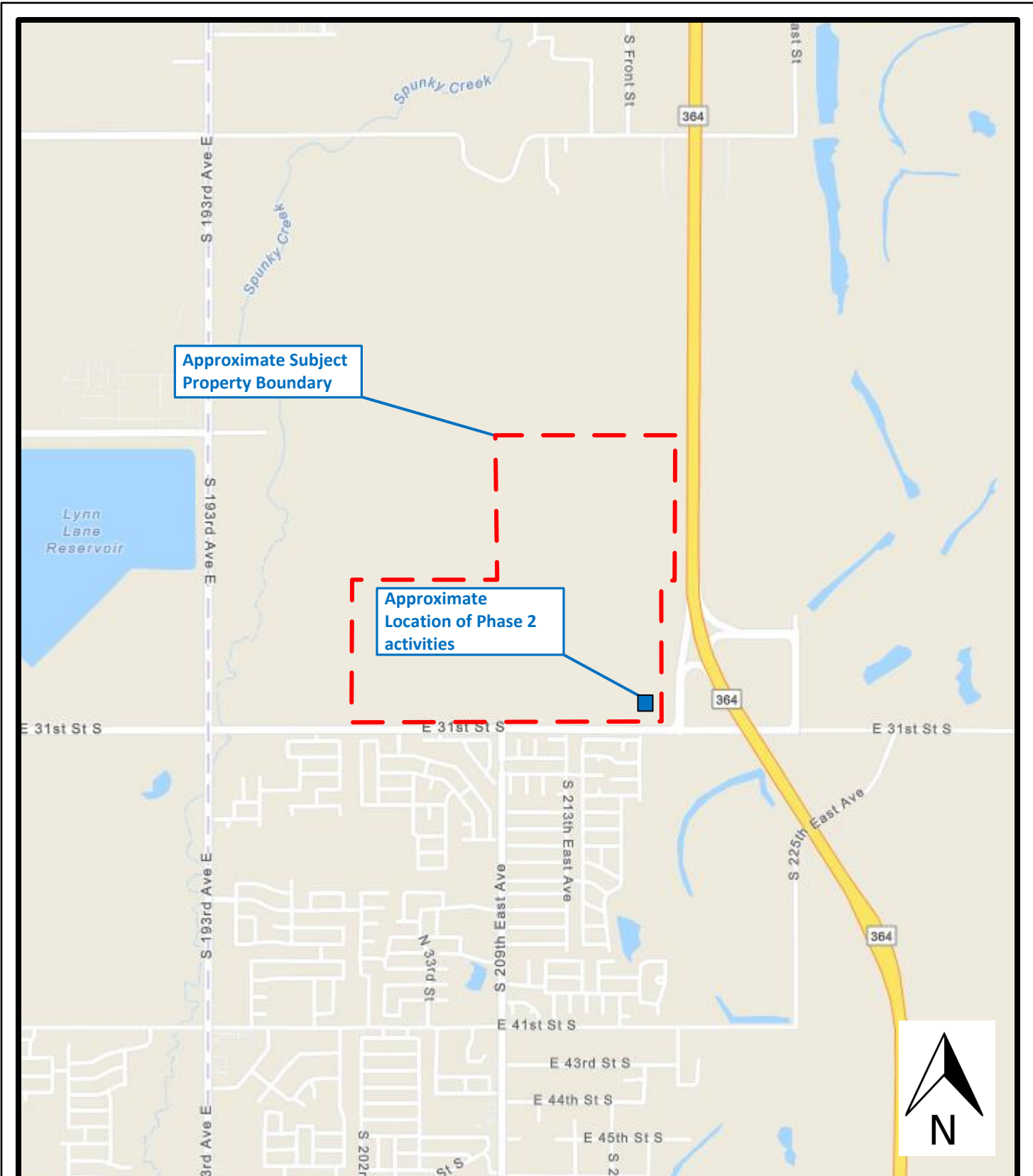
Based upon the referenced field sampling activities and associated laboratory analyses results; the following findings and conclusions have been discovered:

- No potential sources for surface and/or subsurface impacts other than the fuel dispenser and suspect historical UST identified as an REC by the Phase I ESA (February 14, 2023) were identified during Phase II ESA activities onsite. No evidence of an existing UST was identified during subsurface sampling activities.
- Total Lead concentrations in surface soil samples RR-5 (46.7 mg/Kg) and RR-7 (58.3 mg/Kg) were above the naturally-occurring onsite background level (24.0 mg/Kg); however, Total Lead concentrations in all surface soil and boring soil samples were below the United States Environmental Protection Agency (USEPA) Hazard Standard of 400 milligrams per kilogram (mg/Kg) in bare soil at residential or child-occupied play areas (40 CFR 745 II(F)(3)).
- BTEX concentrations were below detection limits in all surface and boring soil samples.
- Concentrations of all analytes were below detection limits in all groundwater samples.
- The total TPH concentration in surface soil sample RR-7 (49.0 mg/Kg, all ranges combined) was below the ODEQ Tier 1 Residential Cleanup Level of 50 mg/Kg; however, a duplicate soil sample (RR-8) collected from the same location returned a TPH concentration (all ranges combined) of 84.8 mg/Kg. This concentration is above the ODEQ Tier 1 Residential Screening Level and the OCC Action Level (both 50 mg/Kg), but below the ODEQ Tier 2 Screening Levels for Industrial Soils (GRO – 2,500 mg/Kg, DRO – 2,610 mg/Kg, and ORO – 23,000 mg/Kg). Use of any level beyond Tier 1 Residential is considered a risk-based remediation. For ODEQ approval of a risk-based remediation, groundwater investigation and monitoring and a deed notice may be required. In addition, OCC regulations state that if BTEX concentrations are below action levels, a TPH concentration of 500 mg/Kg in soil may be required to confirm a case at the discretion of the OCC Petroleum Storage Tank Division.

6.0 RECOMMENDATIONS

A combined TPH concentration exceeding the ODEQ Tier 1 Screening Level for Residential Soils and the OCC Action Level was identified in one (1) surface soil sample location. This combined TPH concentration is presumed to be related to historical onsite fueling activities. Should remediation of this impacted soil be desired, additional assessment would be necessary to delineate the vertical and horizontal extent of TPH impacts.

Appendix A
(Figures)



Site Vicinity Map

542-Acre Robson Ranch

21701 East 31st Street
Tulsa, Wagoner County, Oklahoma 74014

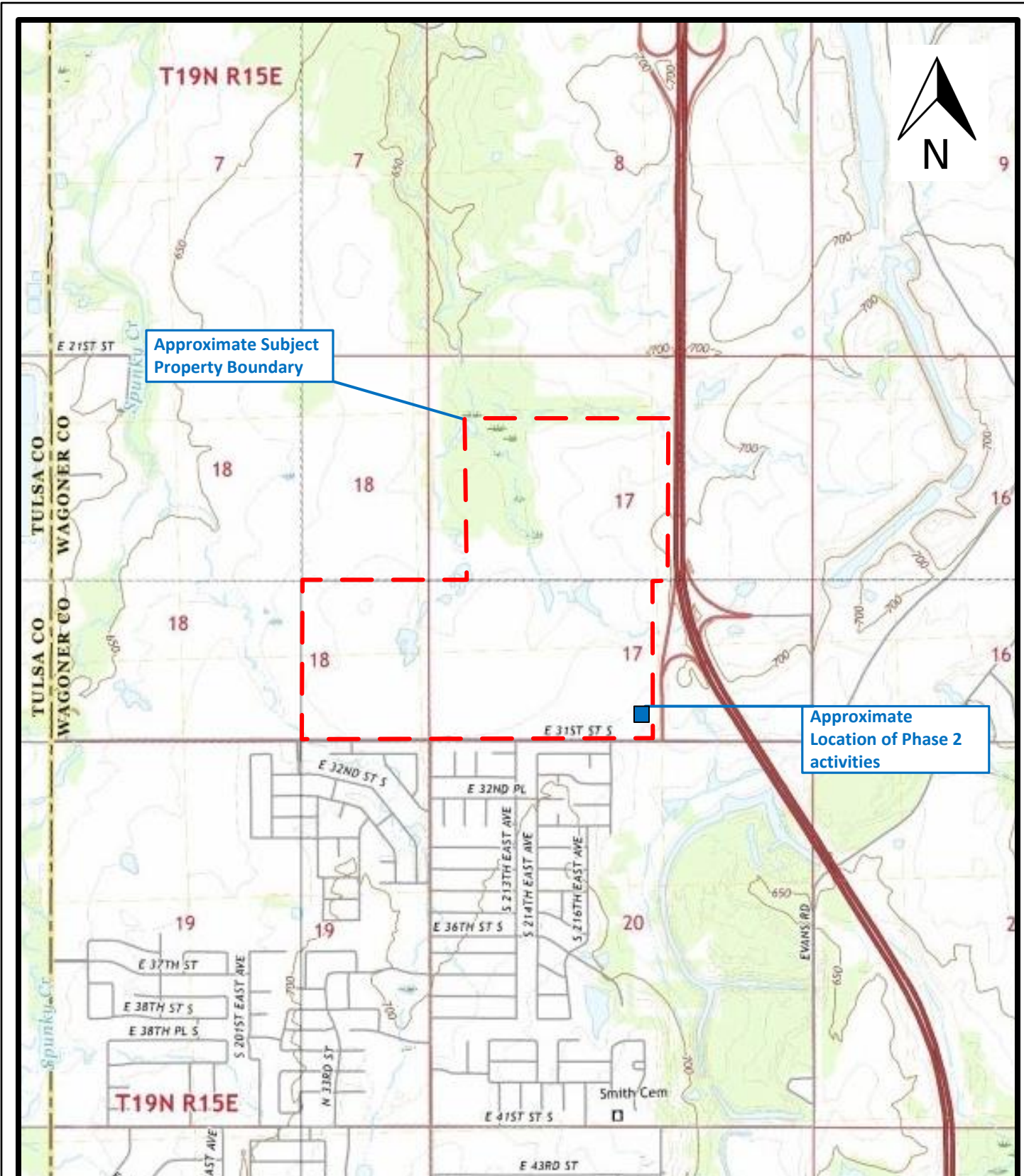
Not To Scale

June 26, 2023

Figure 1



A & M Engineering and Environmental Services, Inc.
Consulting - Design - Construction - Remediation



Topographic Map

542-Acre Robson Ranch

21701 East 31st Street
Tulsa, Wagoner County, Oklahoma 74014

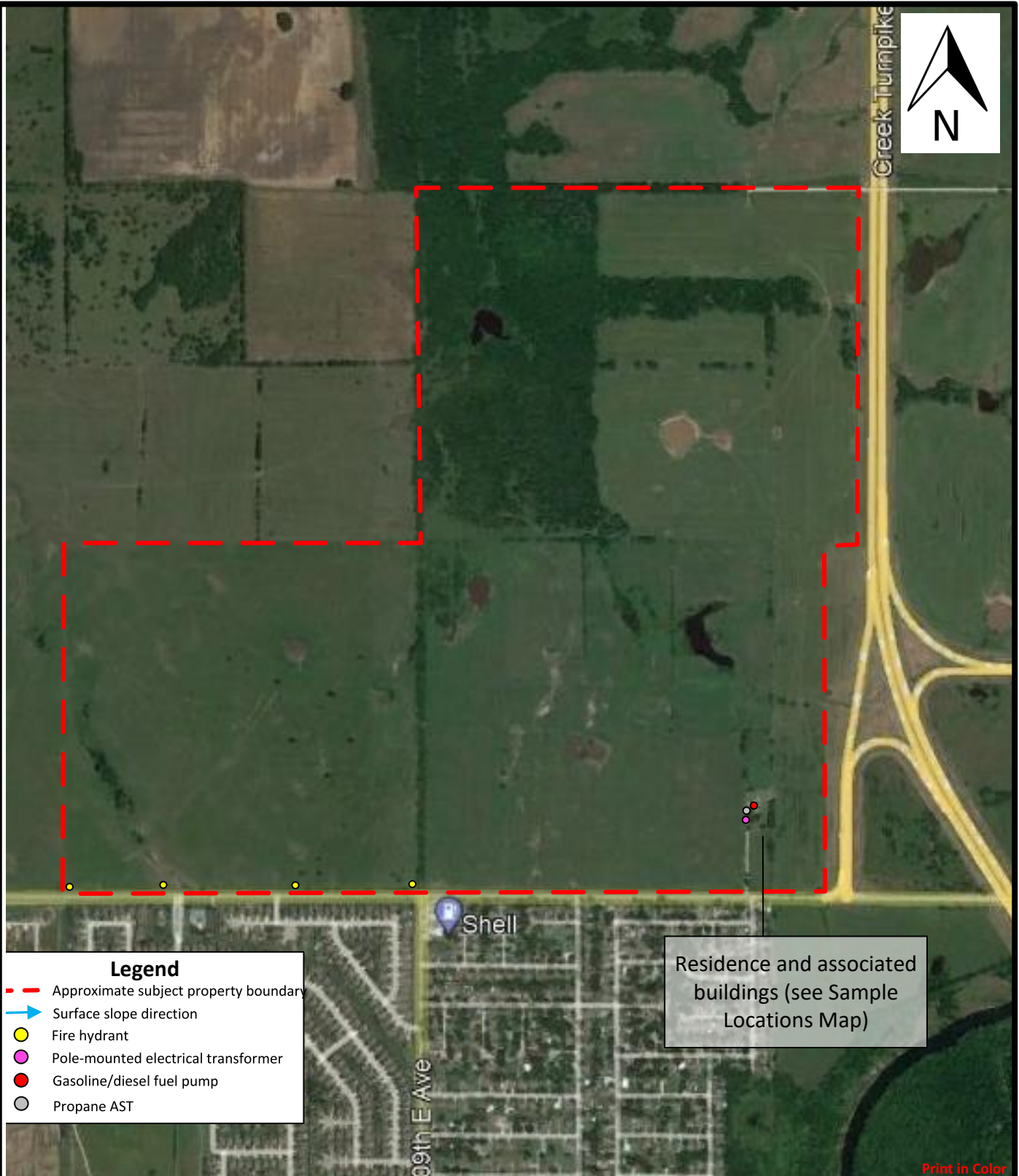
Not To Scale

June 26, 2023

Figure 2



**A & M Engineering and
Environmental Services, Inc.**
Consulting - Design - Construction - Remediation



Legend

- - - Approximate subject property boundary
- Surface slope direction
- Fire hydrant
- Pole-mounted electrical transformer
- Gasoline/diesel fuel pump
- Propane AST

Residence and associated buildings (see Sample Locations Map)

Print in Color



A & M Engineering and Environmental Services, Inc.
Consulting - Design - Construction - Remediation

Site Layout Map

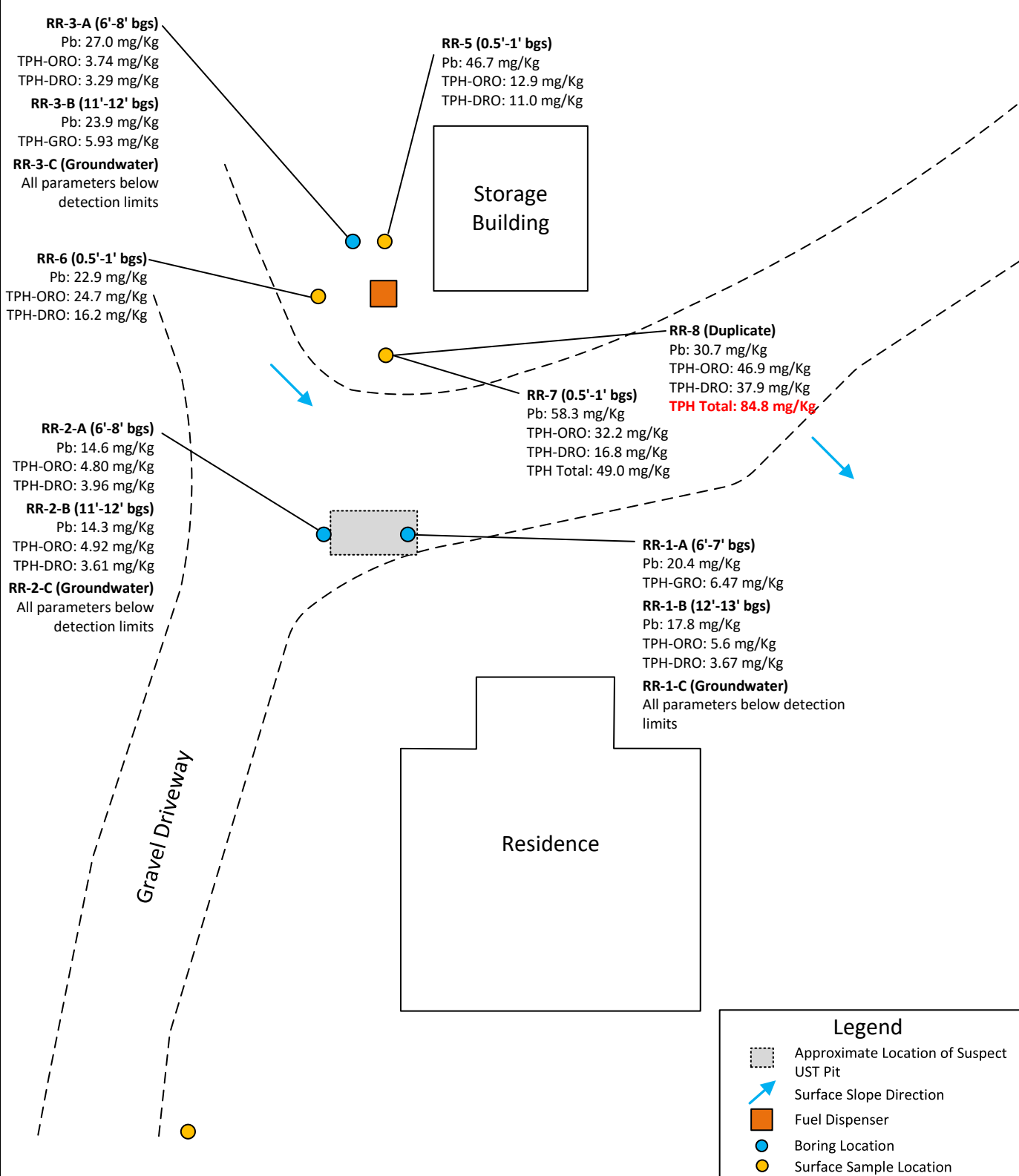
542-Acre Robson Ranch

21701 East 31st Street
Tulsa, Wagoner County, Oklahoma 74014

Not To Scale

June 26, 2023

Figure 3



Print in Color

Legend

- Approximate Location of Suspect UST Pit
- Surface Slope Direction
- Fuel Dispenser
- Boring Location
- Surface Sample Location

A & M Engineering and Environmental Services, Inc.
Consulting - Design - Construction - Remediation

Sample Locations Map	
542-Acre Robson Ranch	
21701 East 31st Street Tulsa, Wagoner County, Oklahoma 74014	
Not To Scale	June 26, 2023
Figure 4	

Appendix B
(GPR Survey Report)



Summary of Scanning for Underground Storage Tanks (UST's)

Prepared For: A&M Engineering

Prepared By:
Albert Meyer
Albert.Meyer@gprsinc.com
Project Manager -Oklahoma
918.288.8442
April 24, 2023

April 24, 2023

A&M Engineering

Attn: Justin Scott

Site: 21701 E 31ST. Street Tulsa, Ok

We appreciate the opportunity to provide this report for our work completed on April 19, 2023.

PURPOSE

The purpose of this project was to search for any suspected underground storage tanks (USTs) or suspected UST-related piping/anomalies remaining on the property. The scope of work consisted of 1 location measuring approximately 200-300 square feet. The client was on site and determined scan area, markings were then placed onto the surface using paint.

EQUIPMENT

- **Underground Scanning GPR Antenna.** The antenna with frequencies ranging from 250 MHz-450 MHz is mounted in a 4 wheeled cart which rolls over the surface. The surface needs to be reasonably smooth and unobstructed in order to obtain readable scans. Obstructions such as curbs, landscaping, and vegetation will limit the feasibility of GPR. The data is displayed on a screen and marked in the field in real time. The total depth achieved can be as much as 8' or more with this antenna but can vary widely depending on the types of materials being scanned through. Some soil types such as clay may limit maximum depths to 3' or less. As depth increases, targets must be larger in order to be detected and non-metallic targets can be especially difficult to locate. Depths provided should always be treated as estimates as their accuracy can be affected by multiple factors. For more information, please visit: [Link](#)
- **Electromagnetic Pipe Locator.** The EM locator can passively detect the electromagnetic fields from live AC power or from radio signals travelling along some conductive utilities. It can also be used in conjunction with a transmitter to connect directly to accessible, metallic pipes or tracer wires. A current is sent through the pipe or tracer wire at a specific frequency and the resulting EM field can then be detected by the receiver. A utility's ability to be located depends on a variety of factors including access to the utility, conductivity, grounding, interference from other fields, and many others. Depths provided should always be treated as estimates as their accuracy can be affected by multiple factors. For more information, please visit: [Link](#)

PROCESS

The EM pipe locator was used to connect to accessible, traceable pipes that may be tank-related such as vent pipes or product lines. A current is induced onto the pipe which creates an electromagnetic field that can be traced using the receiver. We can then attempt to trace these pipes to their origin or end point and paint or flag their locations.

Initial GPR scans were collected in order to evaluate the data and calibrate the equipment. Based on these findings, a scanning strategy is formed, consisting of scanning the entire area in a grid with 3' scan spacing in order to locate any potential UST's that may remain at the site. The GPR data is viewed in real time and anomalies in the data were located and marked on the surface along with their depths using paint. Relevant scan examples were saved and will be provided in this report.

LIMITATIONS

Please keep in mind that there are limitations to any subsurface investigation. The equipment may not achieve maximum effectiveness due to soil conditions, above ground obstructions, reinforced concrete, and a variety of other factors. No subsurface investigation or equipment can provide a complete image of what lies below. Our results should always be used in conjunction with as many methods as possible including consulting existing plans and drawings, exploratory excavation or potholing, visual inspection of above-ground features, and utilization of services such as One Call/811. Depths are dependent on many factors so depth accuracy can vary throughout a site and should be treated as estimates only. Relevant scan examples were saved and will be provided in this report.

FINDINGS

The subsurface conditions at the time of the scanning allowed for maximum GPR depth penetration of 1-3 feet in most areas. Multiple utilities were observed during the scanning; however, utility locating was not part of the scope of this project. The equipment and methods used did not detect reactions from potential UST's but did find potential fuel line leading to suspected tank pit. The following pages will provide further explanation of the findings.



Scan area Outlined in white

Prepared for: A&M Engineering
 Prepared By: Albert Meyer
 Date of Scanning: 4/19/2023

Terms and Conditions

GPRS does not provide land survey or civil engineering data collection or documentation. This is provided as a reference map of the field markings and is not survey-grade.

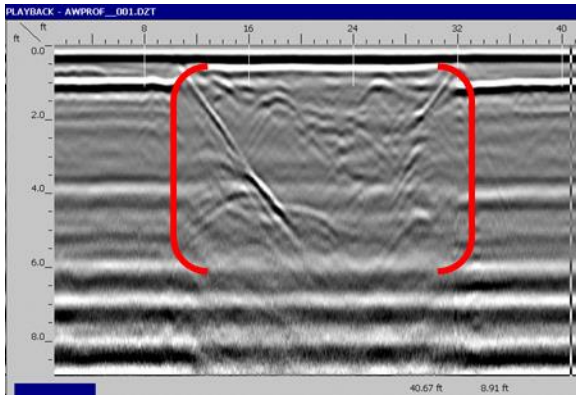
LEGEND

	ELECTRIC		SANITARY
	WATER		STORM
	COMM		UNKNOWN
	GAS		

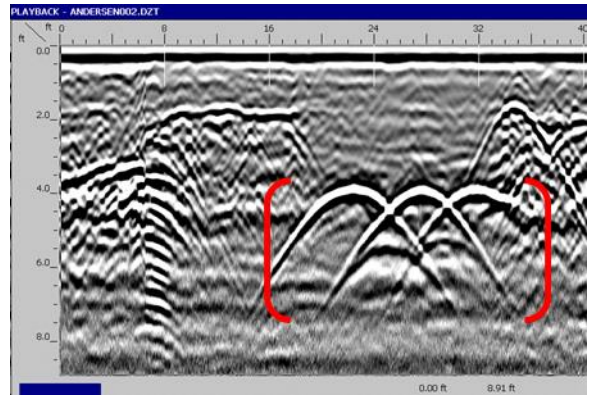
21701 E 31ST. Street

Prepared by:

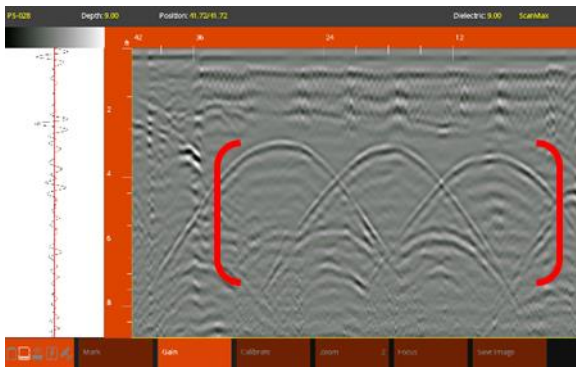




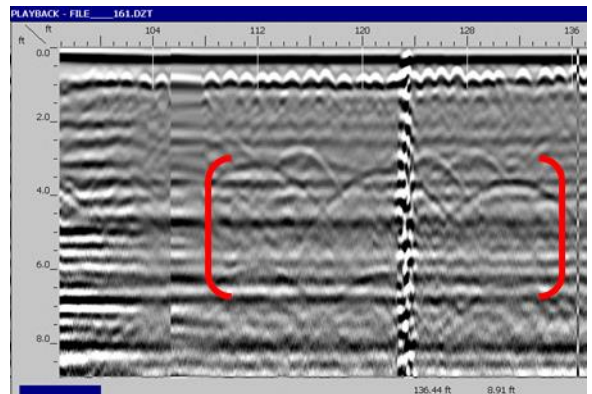
Sample GPR data screenshot showing a possible former tank pit or excavation. The change in the data from the excavation is apparent but GPR cannot determine whether this is due to a tank removal or whether tanks may still exist beyond the maximum depth of penetration of the GPR signal.



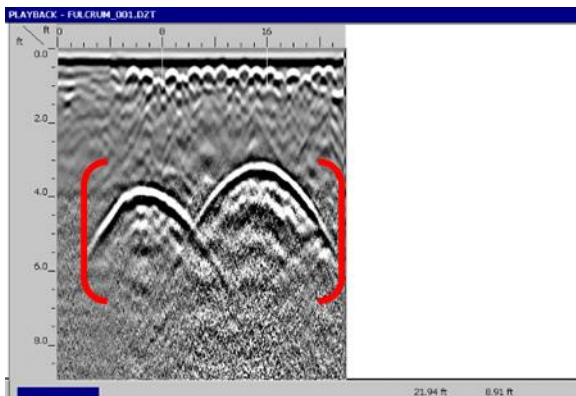
Sample GPR data screenshot showing three reactions from probable USTs. The diameters cannot be determined from these hyperbolas but they can be seen to be larger than a reaction from a typical utility.



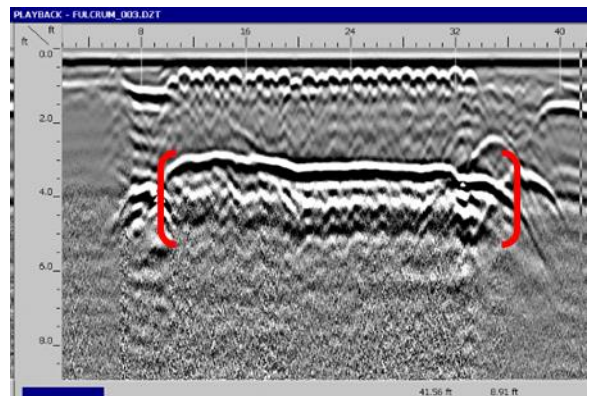
Sample GPR data screenshot showing three reactions from known USTs at an active fueling station. The concrete above the USTs is reinforced with wire mesh.



Sample GPR data screenshot showing three reactions from known USTs at an active fueling station. These USTs are non-metallic and therefore have a weaker reflection that is more difficult and sometimes impossible to identify in the GPR data.



Sample GPR data screenshot showing two potential USTs. These reactions are larger than a typical utility but large utilities can look identical to a UST.



Sample GPR data screenshot showing a scan collected parallel along the top one of the suspected USTs shown in the data to the left. A parallel scan is used to determine a clear beginning and end to the reaction to the reaction which is an indicator of a UST and to determine an approximate length.

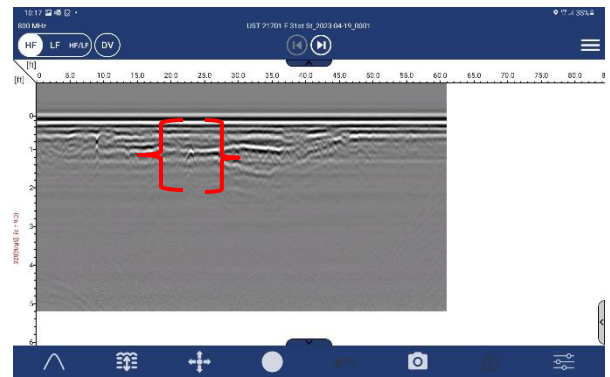
Sample Data Screenshots.
(Not taken from this project)

Location:
previously collected from various sites





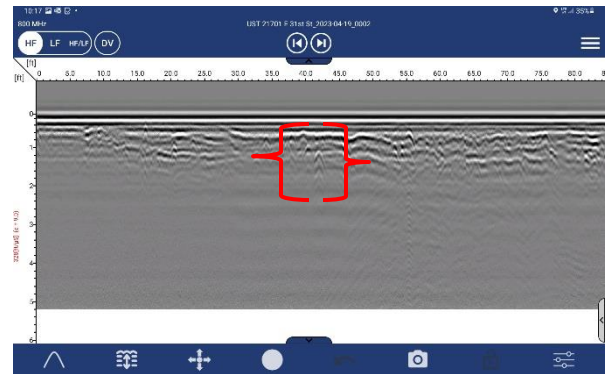
Picture 1: 31ST ST. 001 – Scan one taken from east to west across the north side of scan area



Picture 2: 31ST ST. scan 001, Data reaction across scan area showing possible product line leading to potential tank Pit (red brackets).



Picture 3: 31ST ST. 002 – scan taken from west to east across scan area



Picture 4: 31ST ST. scan 002 – Data reaction across scan area showing possible product line leading to potential tank pit (red brackets).

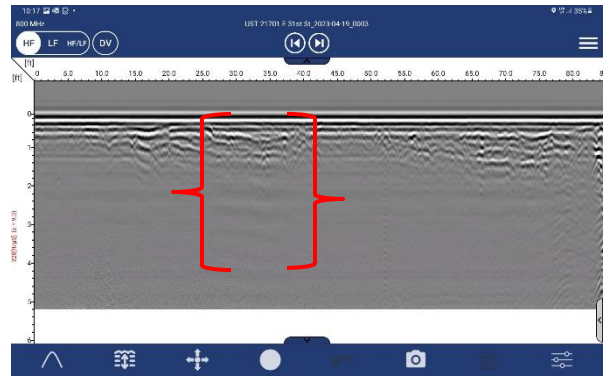
GPR Data Screenshots and Photos

21701 E 31ST. Street





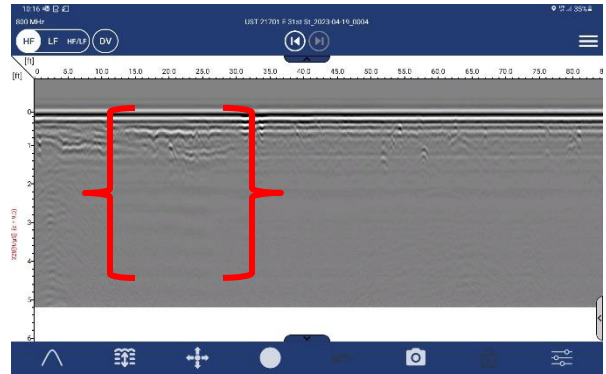
Picture 5: 31ST ST. 003 – Scan 3 taken from west to east across south side of area #1



Picture 6: 31ST ST. scan 003, Data shows reaction across scan area showing potential tank pit or excavation (red brackets)



Picture 7: 31ST ST. 004 – scan taken from north to south across scan area



Picture 8: 31ST ST. scan 004 – Data shows reaction across scan area showing potential tank pit or excavation. (red brackets)

GPR Data Screenshots and Photos

21701 E 31ST. Street



CLOSING

GPRS, Inc. has been in business since 2001, specializing in underground storage tank location, concrete scanning, utility locating, and shallow void detection for projects throughout the United States. I encourage you to visit our website (www.gprsinc.com) and contact any of the numerous references listed.

Scanned 1 Area for possible UST. Area was approximately 200-300 square feet. Area was scanned in a 3' grid pattern with GPR. Data did not provide conclusive evidence of tanks being present but did show potential fuel line leading to a potential tank pit. Was able to connect EM pipe locator to exposed fuel line at pump, which produced a tone leading to the suspected pit area.

GPRS appreciates the opportunity to offer our services, and we look forward to continuing to work with you on future projects. Please feel free to contact us for additional information or with any questions you may have regarding this report.

Signed,

Reviewed,

Albert Meyer
Project Manager —Oklahoma

Mike Kuebbeler
Area Manager —Oklahoma



Direct: 918.288.8442

Direct: 405.439.6787

Albert.Meyer@gprsinc.com

Mike.Kuebbeler@gprsinc.com

www.gprsinc.com

www.gprsinc.com

Appendix C
(Photographic Record)

PHOTO 1



A typical view of the auger rig, with the fuel dispenser visible in the foreground.

PHOTO 2



Typical drilling activities and the fuel dispenser.

PHOTO 3



A typical view of a coal seam encountered at 6'-7' below ground surface.

PHOTO 4



Saturated limestone and shales encountered at 12'-13' below ground surface.

PHOTO 5



A typical temporary monitor well.

PHOTO 6



Groundwater sampling with a disposable bailer.



A & M Engineering and Environmental Services, Inc.
Consulting - Design - Construction - Remediation

Photographic Record

542-Acre Robson Ranch Property

21701 East 31st Street
Tulsa, Wagoner County, Oklahoma 74014

Appendix D
(Field Sampling Data Sheets)

Appendix E
(Boring Logs)

Appendix F
(IDW Disposal Information)

Appendix G
(Laboratory Analyses Results Summaries)

Laboratory Analyses Summary - Boring Soils and Surface Soils

542-Acre Robson Ranch

21701 East 31st Street, Tulsa, Wagoner County, Oklahoma 74014

Samples		RR-1-A Boring Soil (6'-7')	RR-1-B Boring Soil (11'-12')	RR-2-A Boring Soil (6'-7')	RR-2-B Boring Soil (11'-12')	R-3-A Boring Soil (6'- 7')	RR-3-B Boring Soil (11'-12')	RR-5 Surface Soil (0.5'-1')	RR-6 Surface Soil (0.5'-1')	RR-7 Surface Soil (0.5'-1')
Parameters	Limits (mg/kg)	Laboratory Analyses Results (mg/kg) unless otherwise noted								
Lead	400/24.0 ¹	20.4	17.8	14.6	14.3	27.0	23.9	46.7	22.9	58.3
TPH (Oil)	50/23,000 ²	5.6	<2.87	4.8	4.92	3.74	<2.94	12.9	24.7	32.2
TPH (Diesel)	50/2,610 ²	3.67	<2.87	3.96	3.61	3.29	<2.94	11.0	16.2	16.8
TPH (Gasoline)	50/2,500 ²	<4.40	6.47	< 4.40	<4.28	<4.28	5.93	< 4.36	< 4.32	< 4.40
TPH (all ranges combined)	50*	9.27	6.47	8.76	8.53	7.03	5.93	23.9	40.9	49
Benzene	1	< 0.220	< 0.220	< 0.220	<2.14	<2.14	< 0.220	< 0.218	< 0.216	< 0.220
Ethylbenzene	6	< 0.550	< 0.550	< 0.550	<0.535	<0.535	< 0.550	< 0.545	< 0.540	< 0.550
Toluene	4900	< 0.550	< 0.550	< 0.550	<0.535	<0.535	< 0.550	< 0.545	< 0.540	< 0.550
Xylenes, Total	580	< 1.65	< 1.65	< 1.65	<1.60	<1.60	< 1.65	< 1.64	< 1.62	< 1.65

TPH = Total Petroleum Hydrocarbons; GRO = Gasoline Range Organics; DRO = Diesel Range Organics; ORO = Oil Range Organics; ¹Total Lead compared to the USEPA Hazard Standard in bare soil at residential or child-occupied play areas and the onsite naturally occurring background level (24.0 mg/Kg);*TPH concentrations compared to the ODEQ Tier 1 Residential Generic Cleanup Level and OCC Action Level (50 mg/kg) for the total of all three (3) ranges and the ODEQ Tier 2 Screening Levels for Industrial Soils; All other concentrations compared to the USEPA Regional Screening Levels (RSLs) for Residential Soil (November 2019), if applicable. Laboratory analyses results depicted with gray highlighted table cells represent concentrations detected above laboratory detection limits but at concentrations below the regulatory/screening limits. Laboratory analyses results depicted with yellow highlighted table cells represent concentrations above the applicable regulatory/screening limits.

Laboratory Analyses Results Summary - Groundwater
542-Acre Robson Ranch
21701 East 31st Street, Tulsa, Wagoner County, Oklahoma 4014

Groundwater Samples		RR-1-C	RR-2-C	RR-3-C
Parameters	Limits (mg/L)	Laboratory Analyses Results (mg/L)	Laboratory Analyses Results (mg/L)	Laboratory Analyses Results (mg/L)
TPH-ORO	1.0/2.0	<2.0	<2.0	<2.0
TPH-DRO	1.0/2.0	<2.0	<2.0	<2.0
TPH-GRO	1.0/2.0	< 0.0500	< 0.0500	< 0.0500
Lead (dissolved)	0.015	< 0.00500	< 0.00500	< 0.00500
Benzene	5.00E-03	< 0.00500	< 0.00500	< 0.00500
Ethylbenzene	0.70	< 0.00500	< 0.00500	< 0.00500
Toluene	1.0	< 0.00500	< 0.00500	< 0.00500
Xylenes, Total	10.0	< 0.01500	< 0.01500	< 0.01500

TPH concentrations are compared to the ODEQ screening levels for TPH in groundwater (1.0 mg/L) and the OCC Action Level for TPH in groundwater (2.0 mg/L). All other concentrations are compared to USEPA Maximum Contaminant Levels (MCLs).

Laboratory Analyses Results Summary - QA/QC Samples

542-Acre Robson Ranch

21701 East 31st Street, Tulsa, Wagoner County, Oklahoma 74014

	RR-8 (soil duplicate)	RR-4-C (groundwater duplicate)	RR-10 (background soil)
Parameters	Laboratory Analyses Results (mg/Kg)	Laboratory Analyses Results (mg/L)	Laboratory Analyses Results (mg/Kg)
TPH-ORO	46.9	<2.0	NA
TPH-DRO	37.9	<2.0	NA
TPH-GRO	< 4.32	< 0.0500	NA
TPH (all ranges combined)	84.4*	<2.0	NA
Lead	30.7	< 0.00500	24.0
Benzene	< 0.00485	< 0.00500	NA
Ethylbenzene	< 0.00485	< 0.00500	NA
Toluene	< 0.00485	< 0.00500	NA
Xylenes, Total	< 0.00485	< 0.01500	NA

*The combined total of duplicate sample RR-8 (collected from surface soil sample location RR-7) is in excess of the ODEQ Tier 1 Screening Level for TPH in Residential Soils (50 mg/Kg) and the OCC Action Level (50 mg/Kg).

Appendix H
(Laboratory Analyses Reports)

Green Country Testing, Inc.
6825 E 38th Street
Tulsa, OK 74145
TEL: 918-828-9977 FAX: 918-828-7756
Website: www.greencountrytesting.com



May 22, 2023

Justin Scott
A & M Engineering
10010 E. 16th St.
Tulsa, OK 74128-4813
TEL: (918) 665-6575
FAX: (918) 665-6576

RE: Robson Ranch

Order No.: 2305158

Dear Justin Scott:

Green Country Testing, Inc. received 15 sample(s) on 5/9/2023 for the analyses presented in the following report.

In accordance with your instructions, Green Country Testing conducted the analysis shown on the following pages on samples submitted by your company. The results relate only to the items tested. Unless otherwise noted, all analysis were conducted using EPA approved methodologies. Test reports meet all the NELAC requirements. All relevant sampling information is on the attached chain-of-custody form. The initials SUB as the analyst designate any testing sub-contracted by Green Country Testing.

Certifications/Accreditation: OK - 7604 - AR - ADEQ - KS - E-10232

A scope of Certified/Accredited parameters is available upon request. If you have any questions regarding these tests results, please feel free to call.

Sincerely,

A handwritten signature in black ink, appearing to read "Brian Duzan", with a stylized flourish at the end.

Brian Duzan
Laboratory Director

CC:
Accounts Payable
Jeff Elbert
Monty Bruner

Green Country Testing, Inc.
6825 E 38th Street
Tulsa, OK 74145
TEL: 918-828-9977 FAX: 918-828-7756
Website: www.greencountrytesting.com



Case Narrative

WO#: 2305158
Date: 5/22/2023

CLIENT: A & M Engineering

Project: Robson Ranch

2305158

OK CORROS has been Sub Contracted.

2305158

OK CORROS has been Sub Contracted.

Prep Comments for 1311 Metals, Sample 2305158-015B: Limited Sample

Green Country Testing, Inc.
 6825 E 38th Street
 Tulsa, OK 74145
 TEL: 918-828-9977 FAX: 918-828-7756
 Website: www.greencountrytesting.com



Analytical Report

(continuous)

WO#: 2305158

Date Reported: 5/22/2023

CLIENT: A & M Engineering

Lab Order: 2305158

Project: Robson Ranch

Lab ID: 2305158-001

Collection Date: 5/5/2023 10:28:00 AM

Client Sample ID: RR-1-A

Matrix: SLUDGE

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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METALS IN SOIL BY ICP

SW6010B 3050B Analyst: KR

Lead	20.4	1.23		mg/Kg	10	5/11/2023 9:42:58 PM
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BTEX/GRO/DRO IN SOIL OR SEDIMENT

SW8021B Analyst: JR

BTEX IN SOIL

Benzene	< 0.220	0.220		mg/Kg	0.11	5/10/2023 12:39:00 PM
Ethylbenzene	< 0.550	0.550		mg/Kg	0.11	5/10/2023 12:39:00 PM
Toluene	< 0.550	0.550		mg/Kg	0.11	5/10/2023 12:39:00 PM
Xylenes, Total	< 1.65	1.65		mg/Kg	0.11	5/10/2023 12:39:00 PM
Surr: 4-Bromofluorobenzene	118	55.4 - 146		%Rec	0.11	5/10/2023 12:39:00 PM
Surr: Trifluorotoluene	88.6	47.6 - 144		%Rec	0.11	5/10/2023 12:39:00 PM

OIL RANGE ORGANICS IN SOIL

OKDRO MODIFIED OKDRO_S_ Analyst: JR

TPH (Oil) C10-C35	5.60	2.97		mg/Kg	1	5/11/2023 3:13:00 PM
Surr: p-Terphenyl	59.3	19.6 - 175		%Rec	1	5/11/2023 3:13:00 PM

BTEX/GRO/DRO IN SOIL OR SEDIMENT

OKDRO OKDRO_S_ Analyst: JR

DIESEL RANGE ORGANICS IN SOIL

TPH (Diesel)	3.67	2.97		mg/Kg	1	5/11/2023 3:13:00 PM
Surr: p-Terphenyl	59.3	41.4 - 143		%Rec	1	5/11/2023 3:13:00 PM

BTEX/GRO/DRO IN SOIL OR SEDIMENT

OKGRO Analyst: JR

GASOLINE RANGE ORGANICS IN SOIL

TPH (Gasoline)	< 4.40	4.40		mg/Kg	0.11	5/10/2023 12:39:00 PM
Surr: 4-Bromofluorobenzene	86.2	51.7 - 154		%Rec	0.11	5/10/2023 12:39:00 PM
Surr: Trifluorotoluene	82.4	47.5 - 154		%Rec	0.11	5/10/2023 12:39:00 PM

Qualifiers:

H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits
W	Sample container temperature is out of limit as specified at testcode

M	Manual Integration used to determine area response
PL	Permit Limit
RL	Reporting Detection Limit

Green Country Testing, Inc.
 6825 E 38th Street
 Tulsa, OK 74145
 TEL: 918-828-9977 FAX: 918-828-7756
 Website: www.greencountrytesting.com



Analytical Report

(continuous)

WO#: 2305158

Date Reported: 5/22/2023

CLIENT: A & M Engineering

Lab Order: 2305158

Project: Robson Ranch

Lab ID: 2305158-002

Collection Date: 5/5/2023 10:31:00 AM

Client Sample ID: RR-1-B

Matrix: SLUDGE

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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METALS IN SOIL BY ICP

SW6010B 3050B Analyst: KR

Lead	17.8	1.23		mg/Kg	10	5/11/2023 9:53:21 PM
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BTEX/GRO/DRO IN SOIL OR SEDIMENT

SW8021B Analyst: JR

BTEX IN SOIL

Benzene	< 0.220	0.220		mg/Kg	0.11	5/10/2023 12:39:00 PM
Ethylbenzene	< 0.550	0.550		mg/Kg	0.11	5/10/2023 12:39:00 PM
Toluene	< 0.550	0.550		mg/Kg	0.11	5/10/2023 12:39:00 PM
Xylenes, Total	< 1.65	1.65		mg/Kg	0.11	5/10/2023 12:39:00 PM
Surr: 4-Bromofluorobenzene	122	55.4 - 146		%Rec	0.11	5/10/2023 12:39:00 PM
Surr: Trifluorotoluene	90.2	47.6 - 144		%Rec	0.11	5/10/2023 12:39:00 PM

OIL RANGE ORGANICS IN SOIL

OKDRO MODIFIEI OKDRO_S_ Analyst: JR

TPH (Oil) C10-C35	< 2.87	2.87		mg/Kg	1	5/11/2023 3:13:00 PM
Surr: p-Terphenyl	69.1	19.6 - 175		%Rec	1	5/11/2023 3:13:00 PM

BTEX/GRO/DRO IN SOIL OR SEDIMENT

OKDRO OKDRO_S_ Analyst: JR

DIESEL RANGE ORGANICS IN SOIL

TPH (Diesel)	< 2.87	2.87		mg/Kg	1	5/11/2023 3:13:00 PM
Surr: p-Terphenyl	69.1	41.4 - 143		%Rec	1	5/11/2023 3:13:00 PM

BTEX/GRO/DRO IN SOIL OR SEDIMENT

OKGRO Analyst: JR

GASOLINE RANGE ORGANICS IN SOIL

TPH (Gasoline)	6.47	4.40		mg/Kg	0.11	5/10/2023 12:39:00 PM
Surr: 4-Bromofluorobenzene	89.8	51.7 - 154		%Rec	0.11	5/10/2023 12:39:00 PM
Surr: Trifluorotoluene	84.4	47.5 - 154		%Rec	0.11	5/10/2023 12:39:00 PM

Qualifiers:

H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits
W	Sample container temperature is out of limit as specified at testcode

M	Manual Integration used to determine area response
PL	Permit Limit
RL	Reporting Detection Limit

Green Country Testing, Inc.
 6825 E 38th Street
 Tulsa, OK 74145
 TEL: 918-828-9977 FAX: 918-828-7756
 Website: www.greencountrytesting.com



Analytical Report

(continuous)

WO#: 2305158

Date Reported: 5/22/2023

CLIENT: A & M Engineering

Lab Order: 2305158

Project: Robson Ranch

Lab ID: 2305158-003

Collection Date: 5/5/2023 11:10:00 AM

Client Sample ID: RR-2-A

Matrix: SLUDGE

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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METALS IN SOIL BY ICP

SW6010B 3050B Analyst: KR

Lead	14.6	1.23		mg/Kg	10	5/11/2023 10:04:19 PM
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BTEX/GRO/DRO IN SOIL OR SEDIMENT

SW8021B Analyst: JR

BTEX IN SOIL

Benzene	< 0.220	0.220		mg/Kg	0.11	5/10/2023 12:39:00 PM
Ethylbenzene	< 0.550	0.550		mg/Kg	0.11	5/10/2023 12:39:00 PM
Toluene	< 0.550	0.550		mg/Kg	0.11	5/10/2023 12:39:00 PM
Xylenes, Total	< 1.65	1.65		mg/Kg	0.11	5/10/2023 12:39:00 PM
Surr: 4-Bromofluorobenzene	117	55.4 - 146		%Rec	0.11	5/10/2023 12:39:00 PM
Surr: Trifluorotoluene	87.1	47.6 - 144		%Rec	0.11	5/10/2023 12:39:00 PM

OIL RANGE ORGANICS IN SOIL

OKDRO MODIFIED OKDRO_S_ Analyst: JR

TPH (Oil) C10-C35	4.80	2.98		mg/Kg	1	5/11/2023 3:13:00 PM
Surr: p-Terphenyl	56.6	19.6 - 175		%Rec	1	5/11/2023 3:13:00 PM

BTEX/GRO/DRO IN SOIL OR SEDIMENT

OKDRO OKDRO_S_ Analyst: JR

DIESEL RANGE ORGANICS IN SOIL

TPH (Diesel)	3.96	2.98		mg/Kg	1	5/11/2023 3:13:00 PM
Surr: p-Terphenyl	56.6	41.4 - 143		%Rec	1	5/11/2023 3:13:00 PM

BTEX/GRO/DRO IN SOIL OR SEDIMENT

OKGRO Analyst: JR

GASOLINE RANGE ORGANICS IN SOIL

TPH (Gasoline)	< 4.40	4.40		mg/Kg	0.11	5/10/2023 12:39:00 PM
Surr: 4-Bromofluorobenzene	85.4	51.7 - 154		%Rec	0.11	5/10/2023 12:39:00 PM
Surr: Trifluorotoluene	80.8	47.5 - 154		%Rec	0.11	5/10/2023 12:39:00 PM

Qualifiers:	H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
	ND	Not Detected at the Reporting Limit	PL	Permit Limit
	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
	W	Sample container temperature is out of limit as specified at testcode		

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 Website: www.greencountrytesting.com



Analytical Report

(continuous)

WO#: 2305158

Date Reported: 5/22/2023

CLIENT: A & M Engineering

Lab Order: 2305158

Project: Robson Ranch

Lab ID: 2305158-004

Collection Date: 5/5/2023 11:12:00 AM

Client Sample ID: RR-2-B

Matrix: SLUDGE

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
METALS IN SOIL BY ICP					SW6010B 3050B	Analyst: KR
Lead	14.3	1.23		mg/Kg	10	5/11/2023 10:15:02 PM
BTEX/GRO/DRO IN SOIL OR SEDIMENT					SW8021B	Analyst: JR
BTEX IN SOIL						
Benzene	< 0.214	0.214		mg/Kg	0.107	5/10/2023 12:39:00 PM
Ethylbenzene	< 0.535	0.535		mg/Kg	0.107	5/10/2023 12:39:00 PM
Toluene	< 0.535	0.535		mg/Kg	0.107	5/10/2023 12:39:00 PM
Xylenes, Total	< 1.60	1.60		mg/Kg	0.107	5/10/2023 12:39:00 PM
Surr: 4-Bromofluorobenzene	119	55.4 - 146		%Rec	0.107	5/10/2023 12:39:00 PM
Surr: Trifluorotoluene	89.1	47.6 - 144		%Rec	0.107	5/10/2023 12:39:00 PM
OIL RANGE ORGANICS IN SOIL					OKDRO OKDRO_S_	Analyst: JR
TPH (Oil) C10-C35	4.92	2.90		mg/Kg	1	5/11/2023 3:13:00 PM
Surr: p-Terphenyl	39.0	19.6 - 175		%Rec	1	5/11/2023 3:13:00 PM
BTEX/GRO/DRO IN SOIL OR SEDIMENT					OKDRO OKDRO_S_	Analyst: JR
DIESEL RANGE ORGANICS IN SOIL						
TPH (Diesel)	3.61	2.90		mg/Kg	1	5/11/2023 3:13:00 PM
Surr: p-Terphenyl	39.0	41.4 - 143	S	%Rec	1	5/11/2023 3:13:00 PM
BTEX/GRO/DRO IN SOIL OR SEDIMENT					OKGRO	Analyst: JR
GASOLINE RANGE ORGANICS IN SOIL						
TPH (Gasoline)	< 4.28	4.28		mg/Kg	0.107	5/10/2023 12:39:00 PM
Surr: 4-Bromofluorobenzene	85.9	51.7 - 154		%Rec	0.107	5/10/2023 12:39:00 PM
Surr: Trifluorotoluene	83.0	47.5 - 154		%Rec	0.107	5/10/2023 12:39:00 PM

Qualifiers:
 H Holding times for preparation or analysis exceeded
 ND Not Detected at the Reporting Limit
 R RPD outside accepted recovery limits
 W Sample container temperature is out of limit as specified at testcode

M Manual Integration used to determine area response
 PL Permit Limit
 RL Reporting Detection Limit

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 Website: www.greencountrytesting.com



Analytical Report

(continuous)

WO#: 2305158

Date Reported: 5/22/2023

CLIENT: A & M Engineering

Lab Order: 2305158

Project: Robson Ranch

Lab ID: 2305158-005

Collection Date: 5/5/2023 11:50:00 AM

Client Sample ID: RR-3-A

Matrix: SLUDGE

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
METALS IN SOIL BY ICP				SW6010B	3050B	Analyst: KR
Lead	27.0	1.24		mg/Kg	10	5/11/2023 10:26:05 PM
BTEX/GRO/DRO IN SOIL OR SEDIMENT				SW8021B		Analyst: JR
BTEX IN SOIL						
Benzene	< 0.214	0.214		mg/Kg	0.107	5/10/2023 12:39:00 PM
Ethylbenzene	< 0.535	0.535		mg/Kg	0.107	5/10/2023 12:39:00 PM
Toluene	< 0.535	0.535		mg/Kg	0.107	5/10/2023 12:39:00 PM
Xylenes, Total	< 1.60	1.60		mg/Kg	0.107	5/10/2023 12:39:00 PM
Surr: 4-Bromofluorobenzene	118	55.4 - 146		%Rec	0.107	5/10/2023 12:39:00 PM
Surr: Trifluorotoluene	89.0	47.6 - 144		%Rec	0.107	5/10/2023 12:39:00 PM
OIL RANGE ORGANICS IN SOIL				OKDRO MODIFIEI	OKDRO_S_	Analyst: JR
TPH (Oil) C10-C35	3.74	2.91		mg/Kg	1	5/11/2023 3:13:00 PM
Surr: p-Terphenyl	57.3	19.6 - 175		%Rec	1	5/11/2023 3:13:00 PM
BTEX/GRO/DRO IN SOIL OR SEDIMENT				OKDRO	OKDRO_S_	Analyst: JR
DIESEL RANGE ORGANICS IN SOIL						
TPH (Diesel)	3.29	2.91		mg/Kg	1	5/11/2023 3:13:00 PM
Surr: p-Terphenyl	57.3	41.4 - 143		%Rec	1	5/11/2023 3:13:00 PM
BTEX/GRO/DRO IN SOIL OR SEDIMENT				OKGRO		Analyst: JR
GASOLINE RANGE ORGANICS IN SOIL						
TPH (Gasoline)	< 4.28	4.28		mg/Kg	0.107	5/10/2023 12:39:00 PM
Surr: 4-Bromofluorobenzene	86.0	51.7 - 154		%Rec	0.107	5/10/2023 12:39:00 PM
Surr: Trifluorotoluene	82.3	47.5 - 154		%Rec	0.107	5/10/2023 12:39:00 PM

Qualifiers:	H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
	ND	Not Detected at the Reporting Limit	PL	Permit Limit
	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
	W	Sample container temperature is out of limit as specified at testcode		

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Analytical Report

(continuous)

WO#: 2305158

Date Reported: 5/22/2023

CLIENT: A & M Engineering

Lab Order: 2305158

Project: Robson Ranch

Lab ID: 2305158-006

Collection Date: 5/5/2023 11:53:00 AM

Client Sample ID: RR-3-B

Matrix: SLUDGE

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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METALS IN SOIL BY ICP

SW6010B 3050B Analyst: KR

Lead	23.9	1.23		mg/Kg	10	5/11/2023 10:52:49 PM
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BTEX/GRO/DRO IN SOIL OR SEDIMENT

SW8021B Analyst: JR

BTEX IN SOIL

Benzene	< 0.220	0.220		mg/Kg	0.11	5/10/2023 12:39:00 PM
Ethylbenzene	< 0.550	0.550		mg/Kg	0.11	5/10/2023 12:39:00 PM
Toluene	< 0.550	0.550		mg/Kg	0.11	5/10/2023 12:39:00 PM
Xylenes, Total	< 1.65	1.65		mg/Kg	0.11	5/10/2023 12:39:00 PM
Surr: 4-Bromofluorobenzene	119	55.4 - 146		%Rec	0.11	5/10/2023 12:39:00 PM
Surr: Trifluorotoluene	88.9	47.6 - 144		%Rec	0.11	5/10/2023 12:39:00 PM

OIL RANGE ORGANICS IN SOIL

OKDRO MODIFIED OKDRO_S_ Analyst: JR

TPH (Oil) C10-C35	< 2.94	2.94		mg/Kg	1	5/11/2023 3:13:00 PM
Surr: p-Terphenyl	53.8	19.6 - 175		%Rec	1	5/11/2023 3:13:00 PM

BTEX/GRO/DRO IN SOIL OR SEDIMENT

OKDRO OKDRO_S_ Analyst: JR

DIESEL RANGE ORGANICS IN SOIL

TPH (Diesel)	< 2.94	2.94		mg/Kg	1	5/11/2023 3:13:00 PM
Surr: p-Terphenyl	53.8	41.4 - 143		%Rec	1	5/11/2023 3:13:00 PM

BTEX/GRO/DRO IN SOIL OR SEDIMENT

OKGRO Analyst: JR

GASOLINE RANGE ORGANICS IN SOIL

TPH (Gasoline)	5.93	4.40		mg/Kg	0.11	5/10/2023 12:39:00 PM
Surr: 4-Bromofluorobenzene	87.8	51.7 - 154		%Rec	0.11	5/10/2023 12:39:00 PM
Surr: Trifluorotoluene	82.3	47.5 - 154		%Rec	0.11	5/10/2023 12:39:00 PM

Qualifiers:	H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
	ND	Not Detected at the Reporting Limit	PL	Permit Limit
	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
	W	Sample container temperature is out of limit as specified at testcode		

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Analytical Report

(continuous)

WO#: 2305158

Date Reported: 5/22/2023

CLIENT: A & M Engineering

Lab Order: 2305158

Project: Robson Ranch

Lab ID: 2305158-007

Collection Date: 5/8/2023 3:12:00 PM

Client Sample ID: RR-1-C

Matrix: GROUNDWATER

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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METALS IN WATER BY ICP, DISSOLVED

SW6010B SW3005A Analyst: KR

Lead	< 0.00500	0.00500		mg/L	1	5/11/2023 7:13:21 PM
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BTEX/GRO IN WATER

SW8021B Analyst: JR

BTEX IN WATER

Benzene	< 0.00500	0.00500		mg/L	1	5/9/2023 1:24:00 PM
Ethylbenzene	< 0.00500	0.00500		mg/L	1	5/9/2023 1:24:00 PM
Toluene	< 0.00500	0.00500		mg/L	1	5/9/2023 1:24:00 PM
Xylenes, Total	< 0.0150	0.0150		mg/L	1	5/9/2023 1:24:00 PM
Surr: 4-Bromofluorobenzene	116	48.9 - 178		%Rec	1	5/9/2023 1:24:00 PM
Surr: Trifluorotoluene	88.6	41.1 - 178		%Rec	1	5/9/2023 1:24:00 PM

OIL RANGE ORGANICS IN WATER

OKDRO MODIFIED OKDRO_W_ Analyst: JR

TPH (Oil) C10-C35	< 2.00	2.00		mg/L	1	5/15/2023 3:38:00 PM
Surr: p-Terphenyl	53.4	11.2 - 159		%Rec	1	5/15/2023 3:38:00 PM

DIESEL RANGE ORGANICS IN WATER

OKDRO OKDRO_W_ Analyst: JR

TPH (Diesel)	< 2.00	2.00		mg/L	1	5/15/2023 3:38:00 PM
Surr: p-Terphenyl	53.4	25.1 - 159		%Rec	1	5/15/2023 3:38:00 PM

BTEX/GRO IN WATER

OKGRO Analyst: JR

GASOLINE RANGE ORGANICS IN WATER

TPH (Gasoline)	< 0.0500	0.0500		mg/L	1	5/9/2023 1:24:00 PM
Surr: 4-Bromofluorobenzene	77.5	63.1 - 145		%Rec	1	5/9/2023 1:24:00 PM
Surr: Trifluorotoluene	82.5	50.9 - 156		%Rec	1	5/9/2023 1:24:00 PM

Qualifiers:	H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
	ND	Not Detected at the Reporting Limit	PL	Permit Limit
	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
	W	Sample container temperature is out of limit as specified at testcode		

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Analytical Report

(continuous)

WO#: 2305158

Date Reported: 5/22/2023

CLIENT: A & M Engineering

Lab Order: 2305158

Project: Robson Ranch

Lab ID: 2305158-008

Collection Date: 5/8/2023 3:18:00 PM

Client Sample ID: RR-2-C

Matrix: GROUNDWATER

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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METALS IN WATER BY ICP, DISSOLVED

SW6010B SW3005A Analyst: KR

Lead	< 0.00500	0.00500		mg/L	1	5/11/2023 7:44:37 PM
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BTEX/GRO IN WATER

SW8021B Analyst: JR

BTEX IN WATER

Benzene	< 0.00500	0.00500		mg/L	1	5/9/2023 1:24:00 PM
Ethylbenzene	< 0.00500	0.00500		mg/L	1	5/9/2023 1:24:00 PM
Toluene	< 0.00500	0.00500		mg/L	1	5/9/2023 1:24:00 PM
Xylenes, Total	< 0.0150	0.0150		mg/L	1	5/9/2023 1:24:00 PM
Surr: 4-Bromofluorobenzene	113	48.9 - 178		%Rec	1	5/9/2023 1:24:00 PM
Surr: Trifluorotoluene	85.2	41.1 - 178		%Rec	1	5/9/2023 1:24:00 PM

OIL RANGE ORGANICS IN WATER

OKDRO MODIFIED OKDRO_W_ Analyst: JR

TPH (Oil) C10-C35	< 2.00	2.00		mg/L	1	5/15/2023 3:38:00 PM
Surr: p-Terphenyl	60.8	11.2 - 159		%Rec	1	5/15/2023 3:38:00 PM

DIESEL RANGE ORGANICS IN WATER

OKDRO OKDRO_W_ Analyst: JR

TPH (Diesel)	< 2.00	2.00		mg/L	1	5/15/2023 3:38:00 PM
Surr: p-Terphenyl	60.8	25.1 - 159		%Rec	1	5/15/2023 3:38:00 PM

BTEX/GRO IN WATER

OKGRO Analyst: JR

GASOLINE RANGE ORGANICS IN WATER

TPH (Gasoline)	< 0.0500	0.0500		mg/L	1	5/9/2023 1:24:00 PM
Surr: 4-Bromofluorobenzene	75.1	63.1 - 145		%Rec	1	5/9/2023 1:24:00 PM
Surr: Trifluorotoluene	79.6	50.9 - 156		%Rec	1	5/9/2023 1:24:00 PM

Qualifiers:	H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
	ND	Not Detected at the Reporting Limit	PL	Permit Limit
	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
	W	Sample container temperature is out of limit as specified at testcode		

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Analytical Report

(continuous)

WO#: 2305158

Date Reported: 5/22/2023

CLIENT: A & M Engineering

Lab Order: 2305158

Project: Robson Ranch

Lab ID: 2305158-009

Collection Date: 5/8/2023 3:23:00 PM

Client Sample ID: RR-3-C

Matrix: GROUNDWATER

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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METALS IN WATER BY ICP, DISSOLVED

SW6010B SW3005A Analyst: KR

Lead	< 0.00500	0.00500		mg/L	1	5/11/2023 7:49:58 PM
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BTEX/GRO IN WATER

SW8021B Analyst: JR

BTEX IN WATER

Benzene	< 0.00500	0.00500		mg/L	1	5/9/2023 1:24:00 PM
Ethylbenzene	< 0.00500	0.00500		mg/L	1	5/9/2023 1:24:00 PM
Toluene	< 0.00500	0.00500		mg/L	1	5/9/2023 1:24:00 PM
Xylenes, Total	< 0.0150	0.0150		mg/L	1	5/9/2023 1:24:00 PM
Surr: 4-Bromofluorobenzene	113	48.9 - 178		%Rec	1	5/9/2023 1:24:00 PM
Surr: Trifluorotoluene	87.5	41.1 - 178		%Rec	1	5/9/2023 1:24:00 PM

OIL RANGE ORGANICS IN WATER

OKDRO MODIFIED OKDRO_W_ Analyst: JR

TPH (Oil) C10-C35	< 2.00	2.00		mg/L	1	5/15/2023 3:38:00 PM
Surr: p-Terphenyl	65.7	11.2 - 159		%Rec	1	5/15/2023 3:38:00 PM

DIESEL RANGE ORGANICS IN WATER

OKDRO OKDRO_W_ Analyst: JR

TPH (Diesel)	< 2.00	2.00		mg/L	1	5/15/2023 3:38:00 PM
Surr: p-Terphenyl	65.7	25.1 - 159		%Rec	1	5/15/2023 3:38:00 PM

BTEX/GRO IN WATER

OKGRO Analyst: JR

GASOLINE RANGE ORGANICS IN WATER

TPH (Gasoline)	< 0.0500	0.0500		mg/L	1	5/9/2023 1:24:00 PM
Surr: 4-Bromofluorobenzene	75.4	63.1 - 145		%Rec	1	5/9/2023 1:24:00 PM
Surr: Trifluorotoluene	81.3	50.9 - 156		%Rec	1	5/9/2023 1:24:00 PM

Qualifiers:	H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
	ND	Not Detected at the Reporting Limit	PL	Permit Limit
	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
	W	Sample container temperature is out of limit as specified at testcode		

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Analytical Report

(continuous)

WO#: 2305158

Date Reported: 5/22/2023

CLIENT: A & M Engineering

Lab Order: 2305158

Project: Robson Ranch

Lab ID: 2305158-010

Collection Date: 5/8/2023 3:29:00 PM

Client Sample ID: RR-4-C

Matrix: GROUNDWATER

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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METALS IN WATER BY ICP, DISSOLVED

SW6010B SW3005A Analyst: KR

Lead	< 0.00500	0.00500		mg/L	1	5/11/2023 7:55:21 PM
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BTEX/GRO IN WATER

SW8021B Analyst: JR

BTEX IN WATER

Benzene	< 0.00500	0.00500		mg/L	1	5/9/2023 1:24:00 PM
Ethylbenzene	< 0.00500	0.00500		mg/L	1	5/9/2023 1:24:00 PM
Toluene	< 0.00500	0.00500		mg/L	1	5/9/2023 1:24:00 PM
Xylenes, Total	< 0.0150	0.0150		mg/L	1	5/9/2023 1:24:00 PM
Surr: 4-Bromofluorobenzene	116	48.9 - 178		%Rec	1	5/9/2023 1:24:00 PM
Surr: Trifluorotoluene	88.9	41.1 - 178		%Rec	1	5/9/2023 1:24:00 PM

OIL RANGE ORGANICS IN WATER

OKDRO MODIFIEI OKDRO_W_ Analyst: JR

TPH (Oil) C10-C35	< 2.00	2.00		mg/L	1	5/15/2023 3:38:00 PM
Surr: p-Terphenyl	59.7	11.2 - 159		%Rec	1	5/15/2023 3:38:00 PM

DIESEL RANGE ORGANICS IN WATER

OKDRO OKDRO_W_ Analyst: JR

TPH (Diesel)	< 2.00	2.00		mg/L	1	5/15/2023 3:38:00 PM
Surr: p-Terphenyl	59.7	25.1 - 159		%Rec	1	5/15/2023 3:38:00 PM

BTEX/GRO IN WATER

OKGRO Analyst: JR

GASOLINE RANGE ORGANICS IN WATER

TPH (Gasoline)	< 0.0500	0.0500		mg/L	1	5/9/2023 1:24:00 PM
Surr: 4-Bromofluorobenzene	76.9	63.1 - 145		%Rec	1	5/9/2023 1:24:00 PM
Surr: Trifluorotoluene	82.6	50.9 - 156		%Rec	1	5/9/2023 1:24:00 PM

Qualifiers:	H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
	ND	Not Detected at the Reporting Limit	PL	Permit Limit
	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
	W	Sample container temperature is out of limit as specified at testcode		

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Analytical Report

(continuous)

WO#: 2305158

Date Reported: 5/22/2023

CLIENT: A & M Engineering

Lab Order: 2305158

Project: Robson Ranch

Lab ID: 2305158-011

Collection Date: 5/5/2023 3:35:00 PM

Client Sample ID: RR-5

Matrix: SLUDGE

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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METALS IN SOIL BY ICP

SW6010B 3050B Analyst: KR

Lead	46.7	1.23		mg/Kg	10	5/11/2023 11:03:58 PM
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BTEX/GRO/DRO IN SOIL OR SEDIMENT

SW8021B Analyst: JR

BTEX IN SOIL

Benzene	< 0.218	0.218		mg/Kg	0.109	5/10/2023 12:39:00 PM
Ethylbenzene	< 0.545	0.545		mg/Kg	0.109	5/10/2023 12:39:00 PM
Toluene	< 0.545	0.545		mg/Kg	0.109	5/10/2023 12:39:00 PM
Xylenes, Total	< 1.64	1.64		mg/Kg	0.109	5/10/2023 12:39:00 PM
Surr: 4-Bromofluorobenzene	116	55.4 - 146		%Rec	0.109	5/10/2023 12:39:00 PM
Surr: Trifluorotoluene	86.3	47.6 - 144		%Rec	0.109	5/10/2023 12:39:00 PM

OIL RANGE ORGANICS IN SOIL

OKDRO MODIFIED OKDRO_S_ Analyst: JR

TPH (Oil) C10-C35	12.9	2.96		mg/Kg	1	5/11/2023 3:13:00 PM
Surr: p-Terphenyl	44.5	19.6 - 175		%Rec	1	5/11/2023 3:13:00 PM

BTEX/GRO/DRO IN SOIL OR SEDIMENT

OKDRO OKDRO_S_ Analyst: JR

DIESEL RANGE ORGANICS IN SOIL

TPH (Diesel)	11.0	2.96		mg/Kg	1	5/11/2023 3:13:00 PM
Surr: p-Terphenyl	44.5	41.4 - 143		%Rec	1	5/11/2023 3:13:00 PM

BTEX/GRO/DRO IN SOIL OR SEDIMENT

OKGRO Analyst: JR

GASOLINE RANGE ORGANICS IN SOIL

TPH (Gasoline)	< 4.36	4.36		mg/Kg	0.109	5/10/2023 12:39:00 PM
Surr: 4-Bromofluorobenzene	84.0	51.7 - 154		%Rec	0.109	5/10/2023 12:39:00 PM
Surr: Trifluorotoluene	80.0	47.5 - 154		%Rec	0.109	5/10/2023 12:39:00 PM

Qualifiers:

H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits
W	Sample container temperature is out of limit as specified at testcode

M	Manual Integration used to determine area response
PL	Permit Limit
RL	Reporting Detection Limit

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 Website: www.greencountrytesting.com



Analytical Report

(continuous)

WO#: 2305158

Date Reported: 5/22/2023

CLIENT: A & M Engineering

Lab Order: 2305158

Project: Robson Ranch

Lab ID: 2305158-012

Collection Date: 5/5/2023 3:39:00 PM

Client Sample ID: RR-6

Matrix: SLUDGE

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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METALS IN SOIL BY ICP

SW6010B 3050B Analyst: KR

Lead	22.9	1.24		mg/Kg	10	5/11/2023 11:14:23 PM
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BTEX/GRO/DRO IN SOIL OR SEDIMENT

SW8021B Analyst: JR

BTEX IN SOIL

Benzene	< 0.216	0.216		mg/Kg	0.108	5/10/2023 12:39:00 PM
Ethylbenzene	< 0.540	0.540		mg/Kg	0.108	5/10/2023 12:39:00 PM
Toluene	< 0.540	0.540		mg/Kg	0.108	5/10/2023 12:39:00 PM
Xylenes, Total	< 1.62	1.62		mg/Kg	0.108	5/10/2023 12:39:00 PM
Surr: 4-Bromofluorobenzene	118	55.4 - 146		%Rec	0.108	5/10/2023 12:39:00 PM
Surr: Trifluorotoluene	88.8	47.6 - 144		%Rec	0.108	5/10/2023 12:39:00 PM

OIL RANGE ORGANICS IN SOIL

OKDRO MODIFIEI OKDRO_S_ Analyst: JR

TPH (Oil) C10-C35	24.7	2.98		mg/Kg	1	5/17/2023 12:24:00 PM
Surr: p-Terphenyl	46.9	19.6 - 175		%Rec	1	5/17/2023 12:24:00 PM

BTEX/GRO/DRO IN SOIL OR SEDIMENT

OKDRO OKDRO_S_ Analyst: JR

DIESEL RANGE ORGANICS IN SOIL

TPH (Diesel)	16.2	2.98		mg/Kg	1	5/17/2023 12:24:00 PM
Surr: p-Terphenyl	46.9	41.4 - 143		%Rec	1	5/17/2023 12:24:00 PM

BTEX/GRO/DRO IN SOIL OR SEDIMENT

OKGRO Analyst: JR

GASOLINE RANGE ORGANICS IN SOIL

TPH (Gasoline)	< 4.32	4.32		mg/Kg	0.108	5/10/2023 12:39:00 PM
Surr: 4-Bromofluorobenzene	85.8	51.7 - 154		%Rec	0.108	5/10/2023 12:39:00 PM
Surr: Trifluorotoluene	82.5	47.5 - 154		%Rec	0.108	5/10/2023 12:39:00 PM

Qualifiers:

H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits
W	Sample container temperature is out of limit as specified at testcode

M	Manual Integration used to determine area response
PL	Permit Limit
RL	Reporting Detection Limit

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Analytical Report

(continuous)

WO#: 2305158

Date Reported: 5/22/2023

CLIENT: A & M Engineering

Lab Order: 2305158

Project: Robson Ranch

Lab ID: 2305158-013

Collection Date: 5/5/2023 3:44:00 PM

Client Sample ID: RR-7

Matrix: SLUDGE

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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METALS IN SOIL BY ICP

SW6010B 3050B Analyst: KR

Lead	58.3	1.23		mg/Kg	10	5/11/2023 8:43:01 PM
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BTEX/GRO/DRO IN SOIL OR SEDIMENT

SW8021B Analyst: JR

BTEX IN SOIL

Benzene	< 0.220	0.220		mg/Kg	0.11	5/10/2023 12:39:00 PM
Ethylbenzene	< 0.550	0.550		mg/Kg	0.11	5/10/2023 12:39:00 PM
Toluene	< 0.550	0.550		mg/Kg	0.11	5/10/2023 12:39:00 PM
Xylenes, Total	< 1.65	1.65		mg/Kg	0.11	5/10/2023 12:39:00 PM
Surr: 4-Bromofluorobenzene	116	55.4 - 146		%Rec	0.11	5/10/2023 12:39:00 PM
Surr: Trifluorotoluene	85.7	47.6 - 144		%Rec	0.11	5/10/2023 12:39:00 PM

OIL RANGE ORGANICS IN SOIL

OKDRO MODIFIED OKDRO_S_ Analyst: JR

TPH (Oil) C10-C35	32.2	2.98		mg/Kg	1	5/17/2023 12:24:00 PM
Surr: p-Terphenyl	40.0	19.6 - 175		%Rec	1	5/17/2023 12:24:00 PM

BTEX/GRO/DRO IN SOIL OR SEDIMENT

OKDRO OKDRO_S_ Analyst: JR

DIESEL RANGE ORGANICS IN SOIL

TPH (Diesel)	16.8	2.98		mg/Kg	1	5/17/2023 12:24:00 PM
Surr: p-Terphenyl	40.0	41.4 - 143	S	%Rec	1	5/17/2023 12:24:00 PM

BTEX/GRO/DRO IN SOIL OR SEDIMENT

OKGRO Analyst: JR

GASOLINE RANGE ORGANICS IN SOIL

TPH (Gasoline)	< 4.40	4.40		mg/Kg	0.11	5/10/2023 12:39:00 PM
Surr: 4-Bromofluorobenzene	84.5	51.7 - 154		%Rec	0.11	5/10/2023 12:39:00 PM
Surr: Trifluorotoluene	79.8	47.5 - 154		%Rec	0.11	5/10/2023 12:39:00 PM

Qualifiers:	H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
	ND	Not Detected at the Reporting Limit	PL	Permit Limit
	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
	W	Sample container temperature is out of limit as specified at testcode		

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Analytical Report

(continuous)

WO#: 2305158

Date Reported: 5/22/2023

CLIENT: A & M Engineering

Lab Order: 2305158

Project: Robson Ranch

Lab ID: 2305158-014

Collection Date: 5/5/2023 3:49:00 PM

Client Sample ID: RR-8

Matrix: SLUDGE

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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METALS IN SOIL BY ICP

SW6010B 3050B Analyst: KR

Lead	30.7	1.22		mg/Kg	10	5/11/2023 11:25:12 PM
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BTEX/GRO/DRO IN SOIL OR SEDIMENT

SW8021B Analyst: JR

BTEX IN SOIL

Benzene	< 0.216	0.216		mg/Kg	0.108	5/10/2023 12:39:00 PM
Ethylbenzene	< 0.540	0.540		mg/Kg	0.108	5/10/2023 12:39:00 PM
Toluene	< 0.540	0.540		mg/Kg	0.108	5/10/2023 12:39:00 PM
Xylenes, Total	< 1.62	1.62		mg/Kg	0.108	5/10/2023 12:39:00 PM
Surr: 4-Bromofluorobenzene	116	55.4 - 146		%Rec	0.108	5/10/2023 12:39:00 PM
Surr: Trifluorotoluene	88.1	47.6 - 144		%Rec	0.108	5/10/2023 12:39:00 PM

OIL RANGE ORGANICS IN SOIL

OKDRO MODIFIED OKDRO_S_ Analyst: JR

TPH (Oil) C10-C35	46.9	2.98		mg/Kg	1	5/17/2023 12:24:00 PM
Surr: p-Terphenyl	47.7	19.6 - 175		%Rec	1	5/17/2023 12:24:00 PM

BTEX/GRO/DRO IN SOIL OR SEDIMENT

OKDRO OKDRO_S_ Analyst: JR

DIESEL RANGE ORGANICS IN SOIL

TPH (Diesel)	37.9	2.98		mg/Kg	1	5/17/2023 12:24:00 PM
Surr: p-Terphenyl	47.7	41.4 - 143		%Rec	1	5/17/2023 12:24:00 PM

BTEX/GRO/DRO IN SOIL OR SEDIMENT

OKGRO Analyst: JR

GASOLINE RANGE ORGANICS IN SOIL

TPH (Gasoline)	< 4.32	4.32		mg/Kg	0.108	5/10/2023 12:39:00 PM
Surr: 4-Bromofluorobenzene	85.4	51.7 - 154		%Rec	0.108	5/10/2023 12:39:00 PM
Surr: Trifluorotoluene	82.2	47.5 - 154		%Rec	0.108	5/10/2023 12:39:00 PM

Qualifiers:

H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits
W	Sample container temperature is out of limit as specified at testcode

M	Manual Integration used to determine area response
PL	Permit Limit
RL	Reporting Detection Limit

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Analytical Report

(continuous)

WO#: 2305158

Date Reported: 5/22/2023

CLIENT: A & M Engineering

Lab Order: 2305158

Project: Robson Ranch

Lab ID: 2305158-015

Collection Date: 5/8/2023 3:55:00 PM

Client Sample ID: RR-9

Matrix: SLUDGE

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
RCI IN SOIL						
REACTIVE CYANIDE						
Cyanide, Reactive	< 4.51	4.51		ppm	1	5/16/2023 2:20:00 PM
RCI IN SOIL						
REACTIVE SULFIDE						
Sulfide, Reactive	13.3	5.64		ppm	1	5/22/2023 11:46:00 AM
TCLP LEAD						
METALS IN TCLP EXTRACT						
Lead	< 0.0500	0.0500		mg/L	10	5/11/2023 6:36:33 PM
TCLP BENZENE						
VOLATILE ORGANICS IN WATER						
Benzene	< 0.100	0.100		mg/L	20	5/17/2023 8:40:00 AM
Surr: 4-Bromofluorobenzene	93.6	65.4 - 142		%Rec	20	5/17/2023 8:40:00 AM
Surr: Dibromofluoromethane	127	67.5 - 144		%Rec	20	5/17/2023 8:40:00 AM
Surr: Toluene-d8	83.5	79.7 - 127		%Rec	20	5/17/2023 8:40:00 AM
RCI IN SOIL						
IGNITABILITY IN SOIL OR SEDIMENT						
Ignitability	>200	80.0		°F	1	5/9/2023 3:45:00 PM
CORROSIVITY BY PH						
Hydrogen Ion (pH)	7.62	0.100	H	pH Units	1	5/11/2023 2:28:00 PM

Qualifiers:	H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
	ND	Not Detected at the Reporting Limit	PL	Permit Limit
	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
	W	Sample container temperature is out of limit as specified at testcode		



QC SUMMARY REPORT

WO#: 2305158

22-May-23

Client: A & M Engineering
Project: Robson Ranch

TestNo: OKDRO

Sample ID: MB-18600	SampType: MBLK	TestCode: tphdro_w	Units: mg/L	Prep Date: 5/12/2023	RunNo: 62759						
Client ID: PBW	Batch ID: 18600	TestNo: OKDRO	OKDRO_W_P	Analysis Date: 5/15/2023	SeqNo: 705130						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

TPH (Diesel)	< 2.00	2.00									
Surr: p-Terphenyl	292		400.0		73.1	25.1	159				

Sample ID: LCS-18600	SampType: LCS	TestCode: tphdro_w	Units: mg/L	Prep Date: 5/12/2023	RunNo: 62759						
Client ID: LCSW	Batch ID: 18600	TestNo: OKDRO	OKDRO_W_P	Analysis Date: 5/15/2023	SeqNo: 705131						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

TPH (Diesel)	3.62	2.00	4.00	0	90.5	80	120				
Surr: p-Terphenyl	168		400.0		42.1	25.1	159				

Sample ID: 2305158-007BMS	SampType: MS	TestCode: TPHDRO_W	Units: mg/L	Prep Date: 5/12/2023	RunNo: 62759						
Client ID: RR-1-C	Batch ID: 18600	TestNo: OKDRO	OKDRO_W_P	Analysis Date: 5/15/2023	SeqNo: 705135						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

TPH (Diesel)	3.62	2.00	4.00	0	90.4	80	120				
Surr: p-Terphenyl	167		400.0		41.8	25.1	159				

Sample ID: 2305158-007BMSD	SampType: MSD	TestCode: TPHDRO_W	Units: mg/L	Prep Date: 5/12/2023	RunNo: 62759						
Client ID: RR-1-C	Batch ID: 18600	TestNo: OKDRO	OKDRO_W_P	Analysis Date: 5/15/2023	SeqNo: 705137						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

TPH (Diesel)	3.28	2.00	4.00	0	82.0	80	120	3.62	9.85	20	
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Qualifiers:

H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response	ND	Not Detected at the Reporting Limit
PL	Permit Limit	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits	W	Sample container temperature is out of limit as specified at testcode		



QC SUMMARY REPORT

WO#: 2305158
 22-May-23

Client: A & M Engineering
Project: Robson Ranch

TestNo: OKDRO

Sample ID: 2305158-007BMSD	SampType: MSD	TestCode: TPHDRO_W	Units: mg/L	Prep Date: 5/12/2023	RunNo: 62759						
Client ID: RR-1-C	Batch ID: 18600	TestNo: OKDRO	OKDRO_W_P	Analysis Date: 5/15/2023	SeqNo: 705137						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: p-Terphenyl	144		400.0		36.1	25.1	159		0	0	

Qualifiers:

H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response	ND	Not Detected at the Reporting Limit
PL	Permit Limit	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits	W	Sample container temperature is out of limit as specified at testcode		



QC SUMMARY REPORT

WO#: 2305158

22-May-23

Client: A & M Engineering
Project: Robson Ranch

TestNo: OKDRO

Sample ID: MB-18566	SampType: MBLK	TestCode: tphdro_s	Units: mg/Kg	Prep Date: 5/9/2023	RunNo: 62718						
Client ID: PBS	Batch ID: 18566	TestNo: OKDRO	OKDRO_S_P	Analysis Date: 5/11/2023	SeqNo: 704410						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

TPH (Diesel)	< 2.99	2.99									
Surr: p-Terphenyl	3.19		4.985		64.1	41.4	143				

Sample ID: LCS-18566	SampType: LCS	TestCode: tphdro_s	Units: mg/Kg	Prep Date: 5/9/2023	RunNo: 62718						
Client ID: LCSS	Batch ID: 18566	TestNo: OKDRO	OKDRO_S_P	Analysis Date: 5/11/2023	SeqNo: 704411						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

TPH (Diesel)	44.4	2.99	49.90	0	89.0	60	140				
Surr: p-Terphenyl	2.74		4.990		54.8	41.4	143				

Sample ID: 2305099-002BMS	SampType: MS	TestCode: TPHDRO_S	Units: mg/Kg	Prep Date: 5/9/2023	RunNo: 62718						
Client ID: BatchQC	Batch ID: 18566	TestNo: OKDRO	OKDRO_S_P	Analysis Date: 5/11/2023	SeqNo: 704413						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

TPH (Diesel)	48.0	2.97	49.48	7.490	81.9	60	140				
Surr: p-Terphenyl	2.93		4.948		59.3	41.4	143				

Sample ID: 2305099-002BMSD	SampType: MSD	TestCode: TPHDRO_S	Units: mg/Kg	Prep Date: 5/9/2023	RunNo: 62718						
Client ID: BatchQC	Batch ID: 18566	TestNo: OKDRO	OKDRO_S_P	Analysis Date: 5/11/2023	SeqNo: 704414						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

TPH (Diesel)	49.5	2.95	49.14	7.490	85.6	60	140	48.02	3.11	40	
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Qualifiers:

H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response	ND	Not Detected at the Reporting Limit
PL	Permit Limit	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits	W	Sample container temperature is out of limit as specified at testcode		



QC SUMMARY REPORT

WO#: 2305158

22-May-23

Client: A & M Engineering
Project: Robson Ranch

TestNo: OKDRO

Sample ID: 2305099-002BMSD	SampType: MSD	TestCode: TPHDRO_S	Units: mg/Kg	Prep Date: 5/9/2023	RunNo: 62718						
Client ID: BatchQC	Batch ID: 18566	TestNo: OKDRO	OKDRO_S_P	Analysis Date: 5/11/2023	SeqNo: 704414						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Surr: p-Terphenyl 2.88 4.914 58.7 41.4 143 0 0

Sample ID: MB-18601	SampType: MBLK	TestCode: tphdro_s	Units: mg/Kg	Prep Date: 5/12/2023	RunNo: 62783						
Client ID: PBS	Batch ID: 18601	TestNo: OKDRO	OKDRO_S_P	Analysis Date: 5/17/2023	SeqNo: 705470						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

TPH (Diesel) < 2.99 2.99
 Surr: p-Terphenyl 3.10 4.978 62.4 41.4 143

Sample ID: LCS-18601	SampType: LCS	TestCode: tphdro_s	Units: mg/Kg	Prep Date: 5/12/2023	RunNo: 62783						
Client ID: LCSS	Batch ID: 18601	TestNo: OKDRO	OKDRO_S_P	Analysis Date: 5/17/2023	SeqNo: 705471						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

TPH (Diesel) 41.2 2.99 49.90 0 82.6 60 140
 Surr: p-Terphenyl 1.64 4.990 32.8 41.4 143 S

Sample ID: 2305158-012AMS	SampType: MS	TestCode: TPHDRO_S	Units: mg/Kg	Prep Date: 5/12/2023	RunNo: 62783						
Client ID: RR-6	Batch ID: 18601	TestNo: OKDRO	OKDRO_S_P	Analysis Date: 5/17/2023	SeqNo: 705475						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

TPH (Diesel) 52.7 2.97 49.46 16.21 73.8 60 140
 Surr: p-Terphenyl 2.54 4.946 51.4 41.4 143

Qualifiers: H Holding times for preparation or analysis exceeded M Manual Integration used to determine area response ND Not Detected at the Reporting Limit
 PL Permit Limit R RPD outside accepted recovery limits RL Reporting Detection Limit
 S Spike Recovery outside accepted recovery limits W Sample container temperature is out of limit as specified at testcode



QC SUMMARY REPORT

WO#: 2305158

22-May-23

Client: A & M Engineering
Project: Robson Ranch

TestNo: OKDRO

Sample ID: 2305158-012AMS	SampType: MS	TestCode: TPHDRO_S	Units: mg/Kg	Prep Date: 5/12/2023	RunNo: 62783						
Client ID: RR-6	Batch ID: 18601	TestNo: OKDRO	OKDRO_S_P	Analysis Date: 5/17/2023	SeqNo: 705475						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Sample ID: 2305158-012AMSD	SampType: MSD	TestCode: TPHDRO_S	Units: mg/Kg	Prep Date: 5/12/2023	RunNo: 62783						
Client ID: RR-6	Batch ID: 18601	TestNo: OKDRO	OKDRO_S_P	Analysis Date: 5/17/2023	SeqNo: 705477						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
TPH (Diesel)	54.5	2.97	49.55	16.21	77.2	60	140	52.71	3.25	40	
Surr: p-Terphenyl	2.10		4.955		42.4	41.4	143		0	0	

Qualifiers:	H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response	ND	Not Detected at the Reporting Limit
	PL	Permit Limit	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
	S	Spike Recovery outside accepted recovery limits	W	Sample container temperature is out of limit as specified at testcode		



QC SUMMARY REPORT

WO#: 2305158

22-May-23

Client: A & M Engineering
Project: Robson Ranch

TestNo: OKDRO Modified

Sample ID: 2305158-012AMS	SampType: MS	TestCode: TPH_ORO_S	Units: mg/Kg	Prep Date: 5/12/2023	RunNo: 62783						
Client ID: RR-6	Batch ID: 18601	TestNo: OKDRO Modi OKDRO_S_P	Analysis Date: 5/17/2023	SeqNo: 705474							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

TPH (Oil) C10-C35	67.3	2.97	49.46	24.74	86.1	60	140				
Surr: p-Terphenyl	2.54		4.946		51.4	19.6	175				

Sample ID: 2305158-012AMSD	SampType: MSD	TestCode: TPH_ORO_S	Units: mg/Kg	Prep Date: 5/12/2023	RunNo: 62783						
Client ID: RR-6	Batch ID: 18601	TestNo: OKDRO Modi OKDRO_S_P	Analysis Date: 5/17/2023	SeqNo: 705476							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

TPH (Oil) C10-C35	62.8	2.97	49.55	24.74	76.8	60	140	67.32	6.92	27.8	
Surr: p-Terphenyl	2.10		4.955		42.4	19.6	175		0	0	

Qualifiers:	H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response	ND	Not Detected at the Reporting Limit
	PL	Permit Limit	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
	S	Spike Recovery outside accepted recovery limits	W	Sample container temperature is out of limit as specified at testcode		



QC SUMMARY REPORT

WO#: 2305158

22-May-23

Client: A & M Engineering
Project: Robson Ranch

TestNo: OKDRO Modified

Sample ID: 2305158-007BMS	SampType: MS	TestCode: TPH_ORO_W	Units: mg/L	Prep Date: 5/12/2023	RunNo: 62759						
Client ID: RR-1-C	Batch ID: 18600	TestNo: OKDRO Modi OKDRO_W_P	Analysis Date: 5/15/2023	SeqNo: 705134							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

TPH (Oil) C10-C35	3.51	2.00	4.00	0	87.6	80	120				
Surr: p-Terphenyl	167		400.0		41.8	11.2	159				

Sample ID: 2305158-007BMSD	SampType: MSD	TestCode: TPH_ORO_W	Units: mg/L	Prep Date: 5/12/2023	RunNo: 62759						
Client ID: RR-1-C	Batch ID: 18600	TestNo: OKDRO Modi OKDRO_W_P	Analysis Date: 5/15/2023	SeqNo: 705136							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

TPH (Oil) C10-C35	3.15	2.00	4.00	0	78.7	80	120	3.51	10.8	20	S
Surr: p-Terphenyl	144		400.0		36.1	11.2	159		0	0	

Qualifiers:	H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response	ND	Not Detected at the Reporting Limit
	PL	Permit Limit	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
	S	Spike Recovery outside accepted recovery limits	W	Sample container temperature is out of limit as specified at testcode		



QC SUMMARY REPORT

WO#: 2305158

22-May-23

Client: A & M Engineering
Project: Robson Ranch

TestNo: OKGRO

Sample ID: MB-R62698	SampType: MBLK	TestCode: TPHGRO_S	Units: mg/Kg	Prep Date:	RunNo: 62698						
Client ID: PBS	Batch ID: R62698	TestNo: OKGRO		Analysis Date: 5/10/2023	SeqNo: 704177						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

TPH (Gasoline)	< 40.0	40.0									
Surr: 4-Bromofluorobenzene	40.2		50.00		80.4	51.7	154				
Surr: Trifluorotoluene	41.9		50.00		83.8	47.5	154				

Sample ID: LCS-R62698	SampType: LCS	TestCode: TPHGRO_S	Units: mg/Kg	Prep Date:	RunNo: 62698						
Client ID: LCSS	Batch ID: R62698	TestNo: OKGRO		Analysis Date: 5/10/2023	SeqNo: 704178						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

TPH (Gasoline)	911	40.0	1,000	0	91.1	60	140				
Surr: 4-Bromofluorobenzene	93.5		100.0		93.5	51.7	154				
Surr: Trifluorotoluene	93.4		100.0		93.4	47.5	154				

Sample ID: 2305158-001AMS	SampType: MS	TestCode: TPHGRO_S	Units: mg/Kg	Prep Date:	RunNo: 62698						
Client ID: RR-1-A	Batch ID: R62698	TestNo: OKGRO		Analysis Date: 5/10/2023	SeqNo: 704180						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

TPH (Gasoline)	102	4.40	110.0	0	93.2	60.9	115				
Surr: 4-Bromofluorobenzene	9.65		11.00		87.7	51.7	154				
Surr: Trifluorotoluene	9.49		11.00		86.3	47.5	154				

Qualifiers:	H Holding times for preparation or analysis exceeded	M Manual Integration used to determine area response	ND Not Detected at the Reporting Limit
	PL Permit Limit	R RPD outside accepted recovery limits	RL Reporting Detection Limit
	S Spike Recovery outside accepted recovery limits	W Sample container temperature is out of limit as specified at testcode	



QC SUMMARY REPORT

WO#: 2305158
 22-May-23

Client: A & M Engineering
Project: Robson Ranch

TestNo: OKGRO

Sample ID: 2305158-001AMSD	SampType: MSD	TestCode: TPHGRO_S	Units: mg/Kg	Prep Date:	RunNo: 62698						
Client ID: RR-1-A	Batch ID: R62698	TestNo: OKGRO		Analysis Date: 5/10/2023	SeqNo: 704181						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

TPH (Gasoline)	103	4.40	110.0	0	93.5	60.9	115	102.5	0.301	13.7	
Surr: 4-Bromofluorobenzene	9.69		11.00		88.0	51.7	154		0	0	
Surr: Trifluorotoluene	9.49		11.00		86.3	47.5	154		0	0	

Qualifiers:	H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response	ND	Not Detected at the Reporting Limit
	PL	Permit Limit	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
	S	Spike Recovery outside accepted recovery limits	W	Sample container temperature is out of limit as specified at testcode		



QC SUMMARY REPORT

WO#: 2305158

22-May-23

Client: A & M Engineering
Project: Robson Ranch

TestNo: OKGRO

Sample ID: MB-R62696	SampType: MBLK	TestCode: TPHGRO_W	Units: mg/L	Prep Date:	RunNo: 62696						
Client ID: PBW	Batch ID: R62696	TestNo: OKGRO		Analysis Date: 5/9/2023	SeqNo: 704155						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

TPH (Gasoline)	< 0.0500	0.0500									
Surr: 4-Bromofluorobenzene	41.7		50.00		83.5	63.1	145				
Surr: Trifluorotoluene	42.3		50.00		84.6	50.9	156				

Sample ID: LCS-R62696	SampType: LCS	TestCode: TPHGRO_W	Units: mg/L	Prep Date:	RunNo: 62696						
Client ID: LCSW	Batch ID: R62696	TestNo: OKGRO		Analysis Date: 5/9/2023	SeqNo: 704155						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

TPH (Gasoline)	0.930	0.0500	1.00	0	93.0	80	120				
Surr: 4-Bromofluorobenzene	96.0		100.0		96.0	63.1	145				
Surr: Trifluorotoluene	94.6		100.0		94.6	50.9	156				

Sample ID: 2305158-007AMS	SampType: MS	TestCode: TPHGRO_W	Units: mg/L	Prep Date:	RunNo: 62696						
Client ID: RR-1-C	Batch ID: R62696	TestNo: OKGRO		Analysis Date: 5/9/2023	SeqNo: 704155						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

TPH (Gasoline)	0.828	0.0500	1.00	0	82.8	70.1	107				
Surr: 4-Bromofluorobenzene	85.5		100.0		85.5	63.1	145				
Surr: Trifluorotoluene	87.5		100.0		87.5	50.9	156				

Qualifiers:	H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response	ND	Not Detected at the Reporting Limit
	PL	Permit Limit	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
	S	Spike Recovery outside accepted recovery limits	W	Sample container temperature is out of limit as specified at testcode		



QC SUMMARY REPORT

WO#: 2305158
 22-May-23

Client: A & M Engineering

Project: Robson Ranch

TestNo: OKGRO

Sample ID: 2305158-007AMSD	SampType: MSD	TestCode: TPHGRO_W	Units: mg/L	Prep Date:	RunNo: 62696						
Client ID: RR-1-C	Batch ID: R62696	TestNo: OKGRO	Analysis Date: 5/9/2023	SeqNo: 704159							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
TPH (Gasoline)	0.844	0.0500	1.00	0	84.4	70.1	107	0.828	1.80	11.9	
Surr: 4-Bromofluorobenzene	86.3		100.0		86.3	63.1	145		0	0	
Surr: Trifluorotoluene	88.7		100.0		88.7	50.9	156		0	0	

Qualifiers:	H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response	ND	Not Detected at the Reporting Limit
	PL	Permit Limit	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
	S	Spike Recovery outside accepted recovery limits	W	Sample container temperature is out of limit as specified at testcode		



QC SUMMARY REPORT

WO#: 2305158
 22-May-23

Client: A & M Engineering
Project: Robson Ranch

TestNo: SW1010A

Sample ID: 2305158-015ADUP	SampType: DUP	TestCode: IGN_S	Units: °F	Prep Date:	RunNo: 62655						
Client ID: RR-9	Batch ID: R62655	TestNo: SW1010A		Analysis Date: 5/9/2023	SeqNo: 703608						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ignitability	>200	80.0						0	0	20	

Qualifiers:

H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response	ND	Not Detected at the Reporting Limit
PL	Permit Limit	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits	W	Sample container temperature is out of limit as specified at testcode		



QC SUMMARY REPORT

WO#: 2305158

22-May-23

Client: A & M Engineering
Project: Robson Ranch

TestNo: SW1010A

Sample ID: MB-R62655	SampType: MBLK	TestCode: IGN	Units: °F	Prep Date:	RunNo: 62655						
Client ID: PBW	Batch ID: R62655	TestNo: SW1010A		Analysis Date: 5/9/2023	SeqNo: 703596						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ignitability	>200	80.0									

Sample ID: LCS-R62655	SampType: LCS	TestCode: IGN	Units: °F	Prep Date:	RunNo: 62655						
Client ID: LCSW	Batch ID: R62655	TestNo: SW1010A		Analysis Date: 5/9/2023	SeqNo: 703597						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ignitability	80.0	80.0	79.80	0	100	96.74	103.26				

Qualifiers:

H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response	ND	Not Detected at the Reporting Limit
PL	Permit Limit	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits	W	Sample container temperature is out of limit as specified at testcode		



QC SUMMARY REPORT

WO#: 2305158

22-May-23

Client: A & M Engineering
Project: Robson Ranch

TestNo: SW6010B

Sample ID: MB-18577	SampType: MBLK	TestCode: MET_S_ICP	Units: mg/Kg	Prep Date: 5/10/2023	RunNo: 62703						
Client ID: PBS	Batch ID: 18577	TestNo: SW6010B	3050B	Analysis Date: 5/11/2023	SeqNo: 704230						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	< 0.120	0.120									

Sample ID: LCS-18577	SampType: LCS	TestCode: MET_S_ICP	Units: mg/Kg	Prep Date: 5/10/2023	RunNo: 62703						
Client ID: LCSS	Batch ID: 18577	TestNo: SW6010B	3050B	Analysis Date: 5/11/2023	SeqNo: 704231						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	53.3	0.124	49.53	0	108	80	120				

Sample ID: 2305158-013BMS	SampType: MS	TestCode: MET_S_ICP	Units: mg/Kg	Prep Date: 5/10/2023	RunNo: 62703						
Client ID: RR-7	Batch ID: 18577	TestNo: SW6010B	3050B	Analysis Date: 5/11/2023	SeqNo: 704234						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	79.9	0.123	49.29	58.29	43.9	21.4	120				

Sample ID: 2305158-013BMDS	SampType: MSD	TestCode: MET_S_ICP	Units: mg/Kg	Prep Date: 5/10/2023	RunNo: 62703						
Client ID: RR-7	Batch ID: 18577	TestNo: SW6010B	3050B	Analysis Date: 5/11/2023	SeqNo: 704235						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	81.4	0.123	49.29	58.29	46.9	21.4	120	79.92	1.86	13.4	

Qualifiers: H Holding times for preparation or analysis exceeded M Manual Integration used to determine area response ND Not Detected at the Reporting Limit
 PL Permit Limit R RPD outside accepted recovery limits RL Reporting Detection Limit
 S Spike Recovery outside accepted recovery limits W Sample container temperature is out of limit as specified at testcode



QC SUMMARY REPORT

WO#: 2305158

22-May-23

Client: A & M Engineering
Project: Robson Ranch

TestNo: SW6010B

Sample ID: MB-18574	SampType: MBLK	TestCode: MET_WW_T	Units: mg/L	Prep Date: 5/10/2023	RunNo: 62701						
Client ID: PBW	Batch ID: 18574	TestNo: SW6010B	SW3010A	Analysis Date: 5/11/2023	SeqNo: 704197						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	< 0.00500	0.00500									

Sample ID: LCS-18574	SampType: LCS	TestCode: MET_WW_T	Units: mg/L	Prep Date: 5/10/2023	RunNo: 62701						
Client ID: LCSW	Batch ID: 18574	TestNo: SW6010B	SW3010A	Analysis Date: 5/11/2023	SeqNo: 704198						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	2.08	0.00500	2.000	0	104	85	115				

Sample ID: 2305131-001BMS	SampType: MS	TestCode: MET_WW_T	Units: mg/L	Prep Date: 5/10/2023	RunNo: 62701						
Client ID: BatchQC	Batch ID: 18574	TestNo: SW6010B	SW3010A	Analysis Date: 5/11/2023	SeqNo: 704200						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	2.04	0.00500	2.000	0.007006	102	90.3	107				

Sample ID: 2305131-001BMSD	SampType: MSD	TestCode: MET_WW_T	Units: mg/L	Prep Date: 5/10/2023	RunNo: 62701						
Client ID: BatchQC	Batch ID: 18574	TestNo: SW6010B	SW3010A	Analysis Date: 5/11/2023	SeqNo: 704201						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	2.05	0.00500	2.000	0.007006	102	90.3	107	2.042	0.489	2.07	

Qualifiers: H Holding times for preparation or analysis exceeded M Manual Integration used to determine area response ND Not Detected at the Reporting Limit
 PL Permit Limit R RPD outside accepted recovery limits RL Reporting Detection Limit
 S Spike Recovery outside accepted recovery limits W Sample container temperature is out of limit as specified at testcode



QC SUMMARY REPORT

WO#: 2305158

22-May-23

Client: A & M Engineering
Project: Robson Ranch

TestNo: SW6010B

Sample ID: MB-18578	SampType: MBLK	TestCode: MET_GW_D	Units: mg/L	Prep Date: 5/10/2023	RunNo: 62702
Client ID: PBW	Batch ID: 18578	TestNo: SW6010B	SW3005A	Analysis Date: 5/11/2023	SeqNo: 704221
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qual
Lead	< 0.00500	0.00500			

Sample ID: LCS-18578	SampType: LCS	TestCode: MET_GW_D	Units: mg/L	Prep Date: 5/10/2023	RunNo: 62702
Client ID: LCSW	Batch ID: 18578	TestNo: SW6010B	SW3005A	Analysis Date: 5/11/2023	SeqNo: 704222
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qual
Lead	2.02	0.00500	2.000	0	101 80 120

Sample ID: 2305158-007CMS	SampType: MS	TestCode: MET_GW_D	Units: mg/L	Prep Date: 5/10/2023	RunNo: 62702
Client ID: RR-1-C	Batch ID: 18578	TestNo: SW6010B	SW3005A	Analysis Date: 5/11/2023	SeqNo: 704225
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qual
Lead	1.96	0.00500	2.000	0	98.0 92.5 107

Sample ID: 2305158-007CMSD	SampType: MSD	TestCode: MET_GW_D	Units: mg/L	Prep Date: 5/10/2023	RunNo: 62702
Client ID: RR-1-C	Batch ID: 18578	TestNo: SW6010B	SW3005A	Analysis Date: 5/11/2023	SeqNo: 704226
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qual
Lead	1.96	0.00500	2.000	0	97.8 92.5 107 1.960 0.204 21.4

Qualifiers: H Holding times for preparation or analysis exceeded M Manual Integration used to determine area response ND Not Detected at the Reporting Limit
 PL Permit Limit R RPD outside accepted recovery limits RL Reporting Detection Limit
 S Spike Recovery outside accepted recovery limits W Sample container temperature is out of limit as specified at testcode



QC SUMMARY REPORT

WO#: 2305158

22-May-23

Client: A & M Engineering
Project: Robson Ranch

TestNo: SW7.3.3.2

Sample ID: MB-R62742	SampType: MBLK	TestCode: REACTCN	Units: ppm	Prep Date:	RunNo: 62745
Client ID: PBW	Batch ID: R62745	TestNo: SW7.3.3.2		Analysis Date: 5/16/2023	SeqNo: 704902
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qual
Cyanide, Reactive	< 0.0417	0.0417			

Sample ID: LCS-R62742	SampType: LCS	TestCode: REACTCN	Units: ppm	Prep Date:	RunNo: 62745
Client ID: LCSW	Batch ID: R62745	TestNo: SW7.3.3.2		Analysis Date: 5/16/2023	SeqNo: 704903
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qual
Cyanide, Reactive	0.263	0.0417	0.9620	0	27.3 0 120

Qualifiers: H Holding times for preparation or analysis exceeded M Manual Integration used to determine area response ND Not Detected at the Reporting Limit
 PL Permit Limit R RPD outside accepted recovery limits RL Reporting Detection Limit
 S Spike Recovery outside accepted recovery limits W Sample container temperature is out of limit as specified at testcode



QC SUMMARY REPORT

WO#: 2305158

22-May-23

Client: A & M Engineering
Project: Robson Ranch

TestNo: SW7.3.4.2

Sample ID: MB-R62824	SampType: MBLK	TestCode: REACTS	Units: ppm	Prep Date:	RunNo: 62826
Client ID: PBW	Batch ID: R62826	TestNo: SW7.3.4.2		Analysis Date: 5/22/2023	SeqNo: 706147
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qual

Sulfide, Reactive < 0.104 0.104

Sample ID: LCS-R62824	SampType: LCS	TestCode: REACTS	Units: ppm	Prep Date:	RunNo: 62826
Client ID: LCSW	Batch ID: R62826	TestNo: SW7.3.4.2		Analysis Date: 5/22/2023	SeqNo: 706148
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qual

Sulfide, Reactive 0.225 0.104 1.670 0 13.5 0 120

Qualifiers: H Holding times for preparation or analysis exceeded M Manual Integration used to determine area response ND Not Detected at the Reporting Limit
 PL Permit Limit R RPD outside accepted recovery limits RL Reporting Detection Limit
 S Spike Recovery outside accepted recovery limits W Sample container temperature is out of limit as specified at testcode



QC SUMMARY REPORT

WO#: 2305158

22-May-23

Client: A & M Engineering
Project: Robson Ranch

TestNo: SW8021B

Sample ID: MB-R62698	SampType: MBLK	TestCode: BTEX_S	Units: mg/Kg	Prep Date:	RunNo: 62698						
Client ID: PBS	Batch ID: R62698	TestNo: SW8021B		Analysis Date: 5/10/2023	SeqNo: 704163						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	< 2.00	2.00									
Ethylbenzene	< 5.00	5.00									
Toluene	< 5.00	5.00									
Xylenes, Total	< 15.0	15.0									
Surr: 4-Bromofluorobenzene	60.6		50.00		121	55.4	146				
Surr: Trifluorotoluene	45.1		50.00		90.3	47.6	144				

Sample ID: LCS-R62698	SampType: LCS	TestCode: BTEX_S	Units: mg/Kg	Prep Date:	RunNo: 62698						
Client ID: LCSS	Batch ID: R62698	TestNo: SW8021B		Analysis Date: 5/10/2023	SeqNo: 704164						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	100	2.00	100.0	0	100	80	120				
Ethylbenzene	110	5.00	100.0	0	110	80	120				
Toluene	104	5.00	100.0	0	104	80	120				
Xylenes, Total	348	15.0	300.0	0	116	80	120				
Surr: 4-Bromofluorobenzene	137		100.0		137	55.4	146				
Surr: Trifluorotoluene	103		100.0		103	47.6	144				

Sample ID: 2305158-001AMS	SampType: MS	TestCode: BTEX_S	Units: mg/Kg	Prep Date:	RunNo: 62698						
Client ID: RR-1-A	Batch ID: R62698	TestNo: SW8021B		Analysis Date: 5/10/2023	SeqNo: 704166						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	10.1	0.220	11.00	0	92.1	64.8	127				

Qualifiers:

H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response	ND	Not Detected at the Reporting Limit
PL	Permit Limit	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits	W	Sample container temperature is out of limit as specified at testcode		



QC SUMMARY REPORT

WO#: 2305158

22-May-23

Client: A & M Engineering
Project: Robson Ranch

TestNo: SW8021B

Sample ID: 2305158-001AMS	SampType: MS	TestCode: BTEX_S	Units: mg/Kg	Prep Date:	RunNo: 62698						
Client ID: RR-1-A	Batch ID: R62698	TestNo: SW8021B		Analysis Date: 5/10/2023	SeqNo: 704166						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ethylbenzene	11.0	0.550	11.00	0	100	70.8	139				
Toluene	10.6	0.550	11.00	0	96.4	69.8	132				
Xylenes, Total	34.8	1.65	33.00	0	105	71.9	140				
Surr: 4-Bromofluorobenzene	13.5		11.00		123	55.4	146				
Surr: Trifluorotoluene	10.3		11.00		94.0	47.6	144				

Sample ID: 2305158-001AMSD	SampType: MSD	TestCode: BTEX_S	Units: mg/Kg	Prep Date:	RunNo: 62698						
Client ID: RR-1-A	Batch ID: R62698	TestNo: SW8021B		Analysis Date: 5/10/2023	SeqNo: 704167						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	10.2	0.220	11.00	0	92.8	64.8	127	10.13	0.757	37	
Ethylbenzene	11.0	0.550	11.00	0	100	70.8	139	11.00	0.219	31.4	
Toluene	10.6	0.550	11.00	0	96.8	69.8	132	10.61	0.327	38.7	
Xylenes, Total	34.9	1.65	33.00	0	106	71.9	140	34.75	0.371	32.2	
Surr: 4-Bromofluorobenzene	13.5		11.00		123	55.4	146		0	0	
Surr: Trifluorotoluene	10.7		11.00		96.9	47.6	144		0	0	

Qualifiers: H Holding times for preparation or analysis exceeded
 PL Permit Limit
 S Spike Recovery outside accepted recovery limits
 M Manual Integration used to determine area response
 R RPD outside accepted recovery limits
 W Sample container temperature is out of limit as specified at testcode

ND Not Detected at the Reporting Limit
 RL Reporting Detection Limit



QC SUMMARY REPORT

WO#: 2305158

22-May-23

Client: A & M Engineering
Project: Robson Ranch

TestNo: SW8021B

Sample ID: MB-R62696	SampType: MBLK	TestCode: BTEX_W	Units: mg/L	Prep Date:	RunNo: 62696						
Client ID: PBW	Batch ID: R62696	TestNo: SW8021B		Analysis Date: 5/9/2023	SeqNo: 704147						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	< 0.00500	0.00500									
Ethylbenzene	< 0.00500	0.00500									
Toluene	< 0.00500	0.00500									
Xylenes, Total	< 0.00500	0.00500									
Surr: 4-Bromofluorobenzene	61.6		50.00		123	48.9	178				
Surr: Trifluorotoluene	45.4		50.00		90.8	41.1	178				

Sample ID: LCS-R62696	SampType: LCS	TestCode: BTEX_W	Units: mg/L	Prep Date:	RunNo: 62696						
Client ID: LCSW	Batch ID: R62696	TestNo: SW8021B		Analysis Date: 5/9/2023	SeqNo: 704148						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	0.102	0.00500	0.100	0	102	80	120				
Ethylbenzene	0.111	0.00500	0.100	0	111	80	120				
Toluene	0.106	0.00500	0.100	0	106	80	120				
Xylenes, Total	0.345	0.00500	0.300	0	115	80	120				
Surr: 4-Bromofluorobenzene	139		100.0		139	48.9	178				
Surr: Trifluorotoluene	105		100.0		105	41.1	178				

Sample ID: 2305158-007AMS	SampType: MS	TestCode: BTEX_W	Units: mg/L	Prep Date:	RunNo: 62696						
Client ID: RR-1-C	Batch ID: R62696	TestNo: SW8021B		Analysis Date: 5/9/2023	SeqNo: 704150						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	0.0934	0.00500	0.100	0	93.4	72.2	125				

Qualifiers:

H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response	ND	Not Detected at the Reporting Limit
PL	Permit Limit	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits	W	Sample container temperature is out of limit as specified at testcode		



QC SUMMARY REPORT

WO#: 2305158

22-May-23

Client: A & M Engineering
Project: Robson Ranch

TestNo: SW8021B

Sample ID: 2305158-007AMS	SampType: MS	TestCode: BTEX_W	Units: mg/L	Prep Date:	RunNo: 62696						
Client ID: RR-1-C	Batch ID: R62696	TestNo: SW8021B		Analysis Date: 5/9/2023	SeqNo: 704150						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ethylbenzene	0.101	0.00500	0.100	0	101	89.1	124				
Toluene	0.0965	0.00500	0.100	0	96.5	83.8	125				
Xylenes, Total	0.319	0.00500	0.300	0	106	82.7	133				
Surr: 4-Bromofluorobenzene	125		100.0		125	48.9	178				
Surr: Trifluorotoluene	96.0		100.0		96.0	41.1	178				

Sample ID: 2305158-007AMSD	SampType: MSD	TestCode: BTEX_W	Units: mg/L	Prep Date:	RunNo: 62696						
Client ID: RR-1-C	Batch ID: R62696	TestNo: SW8021B		Analysis Date: 5/9/2023	SeqNo: 704151						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	0.0950	0.00500	0.100	0	95.0	72.2	125	0.0934	1.73	10.5	
Ethylbenzene	0.102	0.00500	0.100	0	102	89.1	124	0.101	1.16	11.6	
Toluene	0.0980	0.00500	0.100	0	98.0	83.8	125	0.0965	1.58	13.1	
Xylenes, Total	0.322	0.00500	0.300	0	107	82.7	133	0.319	0.957	11.8	
Surr: 4-Bromofluorobenzene	125		100.0		125	48.9	178		0	0	
Surr: Trifluorotoluene	97.2		100.0		97.2	41.1	178		0	0	

Qualifiers:	H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response	ND	Not Detected at the Reporting Limit
	PL	Permit Limit	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
	S	Spike Recovery outside accepted recovery limits	W	Sample container temperature is out of limit as specified at testcode		



QC SUMMARY REPORT

WO#: 2305158

22-May-23

Client: A & M Engineering
Project: Robson Ranch

TestNo: SW8260C

Sample ID: MB-R62774	SampType: MBLK	TestCode: 8260_W	Units: mg/L	Prep Date:	RunNo: 62774						
Client ID: PBW	Batch ID: R62774	TestNo: SW8260C		Analysis Date: 5/17/2023	SeqNo: 705325						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	< 0.00500	0.00500									
Surr: 4-Bromofluorobenzene	40.5		50.00		81.1	65.4	142				
Surr: Dibromofluoromethane	64.7		50.00		129	67.5	144				
Surr: Toluene-d8	40.2		50.00		80.3	79.7	127				

Sample ID: LCS-R62774	SampType: LCS	TestCode: 8260_W	Units: mg/L	Prep Date:	RunNo: 62774						
Client ID: LCSW	Batch ID: R62774	TestNo: SW8260C		Analysis Date: 5/17/2023	SeqNo: 705326						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	0.0945	0.00500	0.100	0	94.5	80	120				
Surr: 4-Bromofluorobenzene	49.2		50.00		98.5	65.4	142				
Surr: Dibromofluoromethane	58.3		50.00		117	67.5	144				
Surr: Toluene-d8	49.2		50.00		98.5	79.7	127				

Sample ID: 2305185-002AMS	SampType: MS	TestCode: 8260_W	Units: mg/L	Prep Date:	RunNo: 62774						
Client ID: BatchQC	Batch ID: R62774	TestNo: SW8260C		Analysis Date: 5/17/2023	SeqNo: 705328						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	1.66	0.100	2.00	0	82.9	69.2	124				
Surr: 4-Bromofluorobenzene	981		1,000		98.1	65.4	142				
Surr: Dibromofluoromethane	1,210		1,000		121	67.5	144				
Surr: Toluene-d8	950		1,000		95.0	79.7	127				

Qualifiers:	H Holding times for preparation or analysis exceeded	M Manual Integration used to determine area response	ND Not Detected at the Reporting Limit
	PL Permit Limit	R RPD outside accepted recovery limits	RL Reporting Detection Limit
	S Spike Recovery outside accepted recovery limits	W Sample container temperature is out of limit as specified at testcode	



QC SUMMARY REPORT

WO#: 2305158
 22-May-23

Client: A & M Engineering
Project: Robson Ranch

TestNo: SW8260C

Sample ID: 2305185-002AMSD	SampType: MSD	TestCode: 8260_W	Units: mg/L	Prep Date:	RunNo: 62774						
Client ID: BatchQC	Batch ID: R62774	TestNo: SW8260C		Analysis Date: 5/17/2023	SeqNo: 705329						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	1.83	0.100	2.00	0	91.4	69.2	124	1.66	9.72	11.8	
Surr: 4-Bromofluorobenzene	995		1,000		99.5	65.4	142		0	0	
Surr: Dibromofluoromethane	1,320		1,000		132	67.5	144		0	0	
Surr: Toluene-d8	1,010		1,000		101	79.7	127		0	0	

Qualifiers:

H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response	ND	Not Detected at the Reporting Limit
PL	Permit Limit	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits	W	Sample container temperature is out of limit as specified at testcode		



QC SUMMARY REPORT

WO#: 2305158

22-May-23

Client: A & M Engineering
Project: Robson Ranch

TestNo: SW9045D

Sample ID: LCS-R62695	SampType: LCS	TestCode: OK CORROS	Units: pH Units	Prep Date:	RunNo: 62695						
Client ID: LCSS	Batch ID: R62695	TestNo: SW9045D	Analysis Date: 5/11/2023	SeqNo: 704117							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Hydrogen Ion (pH) 7.03 0.100 7.000 0 100 80 120

Sample ID: 2305185-001BDUP	SampType: DUP	TestCode: OK CORROS	Units: pH Units	Prep Date:	RunNo: 62695						
Client ID: BatchQC	Batch ID: R62695	TestNo: SW9045D	Analysis Date: 5/11/2023	SeqNo: 704120							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Hydrogen Ion (pH) 6.57 0.100 6.650 1.21 0.631 RH

Qualifiers: H Holding times for preparation or analysis exceeded M Manual Integration used to determine area response ND Not Detected at the Reporting Limit
 PL Permit Limit R RPD outside accepted recovery limits RL Reporting Detection Limit
 S Spike Recovery outside accepted recovery limits W Sample container temperature is out of limit as specified at testcode

2305158

CHAIN OF CUSTODY RECORD

A & M Engineering and Environmental Services, Inc.
 Consulting - Design - Construction - Remediation

Report To:		Invoice To:	
Company:	A & M Engineering	Same as Report To:	<input type="checkbox"/> Yes <input type="checkbox"/> No
Contact:	Justin Scott	Copy of Invoice with Report:	<input type="checkbox"/> Yes <input type="checkbox"/> No
Address:	40010 E. 16th St.	Company:	
E-Mail:	j.scott@amengineering.com	Contact:	
Phone:		Email:	

Project Name/#:	Robson Ranch	Compliance Project?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Site/Facility ID:		Sampler Name:	Justin Scott
PO #:		Sampler Name:	(Signature)

Immediately Packed on Ice: Yes No
 *Matrix Codes: Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (A), Bioassay (B), Vapor (V), Other (O)

No.	Sample ID/Description	Date	Time	Comp / Grab	Matrix*	# Containers	REMARKS
1	RR-1-A	5/5/23	10:28am	G	SL	3	NET
2	RR-1-B	5/5/23	10:31am	G	"	2	NET
3	RR-2-A	5/5/23	11:10am	G	"	2	DISPOSED
4	RR-2-B	5/5/23	11:12am	G	"	2	PER
5	RR-3-A	5/5/23	11:50am	G	"	2	Justin
6	RR-3-B	5/5/23	11:53am	G	"	2	
7	RR-1-C	5/8/23	15:12pm	G	GW	4	
8	RR-2-C	5/8/23	15:18pm	G	GW	4	
9	RR-3-C	5/8/23	15:23pm	G	GW	4	
10	RR-4-C	5/8/23	15:29pm	G	GW	4	
11	RR-5	5/8/23	15:35	G	SL	2	
12	RR-6	5/8/23	15:39	G	SL	2	
13	RR-7	5/8/23	15:44	G	SL	2	
14	RR-8	5/8/23	15:49	G	SL	2	

Deliverable Requested: I, II, III, IV, Other (specify):
 Shipping Method:
 Special Instructions/QC Requirements:

1. Relinquished by (signature):	Date:	2. Received by (signature):	Date:
<i>[Signature]</i>	5/8/23 8:18	<i>[Signature]</i>	5/9/23 8:19
Company:	Time:	Company:	Time:

REMARKS:	Standard or RUSH Turn	Other
Rec'd on ice @ 0.6°C	<input checked="" type="checkbox"/> Standard	Received on Ice? <input checked="" type="checkbox"/> N
	<input type="checkbox"/> Rush	Temp:



A & M Engineering and Environmental Services, Inc.
Consulting - Design - Construction - Remediation

CHAIN OF CUSTODY RECORD

Report To:		Invoice To:		Analyses / Preservatives			
Company:	Same as Report To: <input type="checkbox"/> Yes <input type="checkbox"/> No	Container Preservative Type**					
Contact:	Copy of Invoice with Report: <input type="checkbox"/> Yes <input type="checkbox"/> No	** Preservative Type: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (U) unpreserved, (O) Other					
Address:	Company:						
E-Mail:	Contact:						
Phone:	Email:						
Project Name/#:	Compliance Project? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No						
Site/Facility ID:	Sampler Name: <u>JUSTIN SCOTT</u>						
PO #:	Sampler Name: (Print)						
	Sampler Name: (Signature)						
	* Matrix Codes: Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (A), Bioassay (B), Vapor (V), Other (O)						
No.	Sample ID/Description	Date	Time	Comp /Grab	Matrix*	# Containers	REMARKS
1	RR-9 Jb	5/5/18	15:55	5	SL	5	TPH-ORO/BNO/GRO GTEX TOTAL Pb
2	RR-9	5/8/23	15:55	6	SL	6	
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							

GREEN COUNTRY TESTING
CHAIN OF CUSTODY
ATTACHMENT
OF 2 PAGES

Deliverable Requested: I, II, III, IV, Other (specify): _____

Shipping Method: _____

Special Instructions/QC Requirements: _____

1. Relinquished by (signature): <u>[Signature]</u>	Date: <u>5-9-23</u>	8:18	2. Relinquished by (signature): _____	Date: _____	Time: _____
Company: _____	Time: _____	Company: _____	2. Received by (signature): _____	Date: _____	Time: _____

REMARKS: Rec'd on ice @ OBC

Standard or RUSH Turn: Standard Rush Other

Received on Ice? Y N

Temp: _____

Green Country Testing, Inc.
6825 E 38th Street
Tulsa, OK 74145
TEL: 918-828-9977 FAX: 918-828-7756
Website: www.greencountrytesting.com



May 26, 2023

Justin Scott
A & M Engineering
10010 E. 16th St.
Tulsa, OK 74128-4813
TEL: (918) 665-6575
FAX: (918) 665-6576

RE: 2320-0013

Order No.: 2305472

Dear Justin Scott:

Green Country Testing, Inc. received 1 sample(s) on 5/24/2023 for the analyses presented in the following report.

In accordance with your instructions, Green Country Testing conducted the analysis shown on the following pages on samples submitted by your company. The results relate only to the items tested. Unless otherwise noted, all analysis were conducted using EPA approved methodologies. Test reports meet all the NELAC requirements. All relevant sampling information is on the attached chain-of-custody form. The initials SUB as the analyst designate any testing sub-contracted by Green Country Testing.

Certifications/Accreditation: OK - 7604 - AR - ADEQ - KS - E-10232

A scope of Certified/Accredited parameters is available upon request. If you have any questions regarding these tests results, please feel free to call.

Sincerely,

A handwritten signature in black ink, appearing to read "Brian Duzan", with a stylized flourish at the end.

Brian Duzan
Laboratory Director

CC:
Accounts Payable
Jeff Elbert
Monty Bruner

Green Country Testing, Inc.
 6825 E 38th Street
 Tulsa, OK 74145
 TEL: 918-828-9977 FAX: 918-828-7756
 Website: www.greencountrytesting.com



Analytical Report

(continuous)

WO#: 2305472

Date Reported: 5/26/2023

CLIENT: A & M Engineering

Lab Order: 2305472

Project: 2320-0013

Lab ID: 2305472-001

Collection Date: 5/24/2023 8:30:00 AM

Client Sample ID: RR-10

Matrix: SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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METALS IN SOIL BY ICP

SW6010B

3050B

Analyst: **KR**

Lead	24.0	1.24		mg/Kg	10	5/26/2023 12:54:13 AM
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Qualifiers:

H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits
W	Sample container temperature is out of limit as specified at testcode

M	Manual Integration used to determine area response
PL	Permit Limit
RL	Reporting Detection Limit



QC SUMMARY REPORT

WO#: 2305472

26-May-23

Client: A & M Engineering
Project: 2320-0013

TestNo: SW6010B

Sample ID: 2305472-001AMS	SampType: MS	TestCode: MET_S_ICP	Units: mg/Kg	Prep Date: 5/25/2023	RunNo: 62909						
Client ID: RR-10	Batch ID: 18687	TestNo: SW6010B	3050B	Analysis Date: 5/26/2023	SeqNo: 707376						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	50.3	0.123	49.36	23.98	53.3	21.4	120				

Sample ID: 2305472-001AMSD	SampType: MSD	TestCode: MET_S_ICP	Units: mg/Kg	Prep Date: 5/25/2023	RunNo: 62909						
Client ID: RR-10	Batch ID: 18687	TestNo: SW6010B	3050B	Analysis Date: 5/26/2023	SeqNo: 707377						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	50.6	0.123	49.36	23.98	53.9	21.4	120	50.30	0.587	13.4	

Sample ID: MB-18687	SampType: MBLK	TestCode: MET_S_ICP	Units: mg/Kg	Prep Date: 5/25/2023	RunNo: 62909						
Client ID: PBS	Batch ID: 18687	TestNo: SW6010B	3050B	Analysis Date: 5/26/2023	SeqNo: 707385						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	< 0.119	0.119									

Sample ID: LCS-18687	SampType: LCS	TestCode: MET_S_ICP	Units: mg/Kg	Prep Date: 5/25/2023	RunNo: 62909						
Client ID: LCSS	Batch ID: 18687	TestNo: SW6010B	3050B	Analysis Date: 5/26/2023	SeqNo: 707386						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	49.8	0.123	49.36	0	101	80	120				

Qualifiers: H Holding times for preparation or analysis exceeded M Manual Integration used to determine area response ND Not Detected at the Reporting Limit
 PL Permit Limit R RPD outside accepted recovery limits RL Reporting Detection Limit
 S Spike Recovery outside accepted recovery limits W Sample container temperature is out of limit as specified at testcode

