



October 16, 2017

Reference No. 088210-35

Mr. Zane Kurtz
Sr. Safety and Environmental Representative
5509 Champions Dr.
Midland, TX 79706
VIA E-Mail: zane_kurtz@eogresources.com

Dear Mr. Kurtz:

**Re: Assessment Summary Report
Livingston Ridge SWD Water Line
2RP-2044
EOG Resources, Inc.
Site Location: Sec. 1, T 22-S, R 31-E
(Lat 32.41751°, Long -103.73427°)
Eddy County, New Mexico**

GHD Services, Inc. (GHD) is pleased to present this report for the above referenced site. Assessment activities were performed at the Livingston Ridge SWD Water Line (hereafter referred to as the "Site"), from June 9 to August 18, 2017 by GHD. The Site is located within Section 1, Township 22 South, Range 31 East, in Eddy County, New Mexico (Figure 1). The property is owned by the U.S. Bureau of Land Management (BLM).

The Site is an active pipeline located approximately 30 miles east-northeast of Carlsbad, New Mexico. According to EOG Resources, Inc. (EOG) supplied Site information, a release of approximately 50 barrels (bbls) of crude oil and 3,200 bbls of produced water occurred when a flowline ruptured. Approximately 30 bbls of crude oil and 480 bbls of produced water were recovered after the release utilizing vacuum trucks. The release was discovered on October 27, 2013. A C-141 Form was submitted to the New Mexico Oil Conservation Division (NMOCD) and the BLM on November 5, 2013 and remediation permit (RP) number 2RP-2044 was assigned.

Initial delineation samples were collected on November 4, 2013 in five areas within the release area (green outlined area on Figure 2) by Yates Petroleum Corporation (Yates). Thirty-nine samples were collected from depths ranging from 2 to 16 feet below ground surface (ft. bgs) and submitted for laboratory analyses. The samples were submitted to Cardinal Laboratories (Cardinal) in Hobbs, New Mexico for benzene, toluene, ethylbenzene, and xylenes (BTEX) by EPA Method 8021B, total petroleum hydrocarbons (TPH) gasoline and diesel range organics by EPA Method 8015M, and chlorides by Method SM4500CL-B analysis.

None of the samples contained BTEX or TPH constituents above the laboratory reporting limits. Chloride concentrations ranged from 6,280 to 29,600 milligrams per kilogram (mg/kg).



Additional vertical delineation samples were collected on January 16, 2014 by Yates utilizing a core drill rig. Twenty-four samples were collected from depths ranging from 20 to 55 ft. bgs within three areas of the release area. The samples were submitted to Cardinal for chloride analysis by Method SM4500CL-B. Chloride concentrations ranged from 128 to 14,800 mg/kg. A sample collected from one boring centrally located in the release area contained a chloride concentration of 752 mg/kg at a depth 55 ft. bgs. This sample represented the deepest chloride concentration greater than the NMOCD Recommended Remedial Action Level (RRAL) of 600 mg/kg established for this Site (see below).

1. Recommended Remediation Action Limits

There are relatively few groundwater wells in the area of the Site with which to obtain a depth to groundwater. Based on information available from the New Mexico Office of the State Engineer, New Mexico Water Rights Reporting System website, the closest well with a reported depth to water is approximately 3.5 miles from the site. The depth to groundwater measured in this well was 448 feet below ground surface (ft. bgs).

Based on information available from the United States Geological Survey (USGS) website, the closest USGS gauging site, approximately 2.7 miles southeast of the site, indicates groundwater at a depth of approximately 125 feet below ground surface (ft. bgs) in 1988. The well information is included in Appendix A.

Groundwater was not encountered in soil boring SB-5 that was advanced to a depth of 130 ft. bgs during GHD's assessment activities.

There do not appear to be any wellhead protection areas and no surface water bodies within 200 ft. to 1000 ft. of the Site. Therefore, the preliminary total ranking score for the Site is 0 (see table below).

Based on this score, the applicable NMOCD Site-specific RRALs are 10 mg/kg for benzene, 50 mg/kg for total BTEX, 5,000 mg/kg for total TPH, and 600 mg/kg for chlorides.

In an August 28, 2017 telephone conversation between Bernard Bockisch of GHD and Jim Griswold, NMOCD Environmental Bureau Chief, GHD was informed that the NMOCD is accepting chloride concentrations of 600 mg/kg for assessment clean up levels.

New Mexico Oil Conservation Division Site Assessment	
Ranking Criteria	Score
Depth to Ground Water (> 100 ft. bgs)	0
Wellhead Protection Area (> 1000 ft. from water source, > 200 ft. from domestic source)	0
Distance to Surface Body Water (200-1000 ft.)	0
Ranking Criteria Total Score	0*



New Mexico Oil Conservation Division Site Assessment

*Because the ranking criteria total score is 0, NMOCD established RRALs are 10 mg/kg for benzene, 50 mg/kg for total BTEX, 5,000 mg/kg for TPH¹, and 600 mg/kg for chlorides.

1. NMOCD Guidelines for Remediation of Leaks, Spills and Releases, August 13, 1993.

2. Assessment Activities

GHD and SDR Enterprises, LLC (SDR) performed additional delineation from June 9 to August 18, 2017 that included the collection of 36 soil samples from 18 test pits and 18 samples from 6 soil borings. Soil samples were collected from 2 ft. bgs and 10 ft. bgs in each test pit and submitted to Hall Environmental Analysis Laboratory (HEAL) located in Albuquerque, New Mexico. Two samples (TP-5 and TP-7) were submitted for TPH (gasoline, diesel, and motor oil range) by EPA Method 8015 BTEX by EPA Method 8021B. All of the samples were submitted for chloride analysis by EPA 300.

BTEX and TPH constituents were not detected above the laboratory reporting limits and chlorides ranged from below the laboratory reporting limit to 17,000 mg/kg. Chloride was detected above the NMOCD RRAL in five of the test pit samples (TP-2, TP-4, TP-5, TP-6, and TP-7) all at depths of 10 ft. bgs. These test pits were located in the southern area of the release. The analytical data is summarized on Table 1 and the laboratory reports are included in Appendix A.

The horizontal and vertical extent of the chloride concentrations within the northern portion of the spill area had been delineated to below the RRAL for chloride. However, the horizontal and vertical extent of chloride concentrations in the southern portion of the impacted area was not fully assessed.

Further soil sampling and soil boring activities were performed by GHD and Enviro-Drill, Inc. of Albuquerque, New Mexico from July 17 through 19, 2017 to assess the vertical extent of chloride concentrations in the soil in the southern portion of the impacted area. Thirteen additional soil samples were collected from four soil borings (SB-1 to SB-4) at depths ranging from 40 ft. bgs to 90 ft. bgs. The samples were submitted to HEAL for analysis of chloride by EPA Method 300.0.

Chloride concentrations in these samples ranged from 62 to 13,000 mg/kg. A summary of the soil boring laboratory results is presented in the following table.

Soil Boring ID	Depth	Chloride Concentration in mg/kg
SB-1	50	8,300
SB-1	60	8,300
SB-1	70	13,000
SB-1	80	11,000
SB-1	90	3,400



Soil Boring ID	Depth	Chloride Concentration in mg/kg
SB-2	50	7,600
SB-2	60	7,700
SB-2	70	6,200
SB-2	75	980
SB-3	50	62
SB-3	60	88
SB-4	40	870
SB-4	50	79
SB-5 (near SB-1)	100	48
SB-5 (near SB-1)	110	760
SB-5 (near SB-1)	120	82
SB-6 (near SB-2)	85	<30
SB-6 (near SB-2)	95	<30

The analytical data is summarized on Table 1 and the laboratory reports are included in Appendix A.

Two additional soil borings, SB-5 and SB-6 were advanced in close proximity to SB-1 and SB-2, respectively between August 16 and 18, 2017. Borings SB-1 and SB-2 experienced drilling refusal at depths of 90 and 75 ft. bgs. The two additional soil borings (SB-5 and SB-6) were advanced to collect additional samples from below these depths.

Three soil samples were collected from SB-5 (near SB-1) from 100, 110, and 120 ft. bgs and two samples were collected from SB-6 (near SB-2) at depths of 85 and 95 ft. bgs. The samples were submitted to HEAL for analysis of chloride by EPA Method 300.0.

Soils at the Site consisted primarily of clayey sands and silty sands with the sands being either very fine or fine grained. A clay with sand unit was encountered at varying depths in all of the soil borings. The soil boring logs are included as Appendix C.

Based on the collected assessment data, it appears that the vertical and horizontal extent of chloride-impacted soil has been fully assessed as shown on Figure 2.

3. Summary and Recommendations

Based on the assessment of the chloride concentrations, GHD recommends the following:

- Excavating the spill area to a depth of 4 ft. bgs and stockpiling the soil to be used for future backfill at the Site. Soil samples will be collected and submitted for chloride analysis to determine if the excavated soil can be used as backfill.
- Placement of a 20-mil polyethylene liner in the bottom of the excavation (see Figure 2 for the excavation area) at a depth of 4 ft. bgs.



- Backfilling of the excavation with clean fill material and wheel compacting to grade.
- Fertilizing and reseeded of the disturbed area with a BLM-approved seed mix.

Following completion of the backfilling, revegetation of the site will be performed. Disturbed areas associated with the remediation efforts will be re-seeded. If after one growing season the vegetation has not taken hold, seeding may need to be repeated until revegetation is successful. The seed mix will be determined by the BLM.

Should you have any questions, or require additional information regarding this submittal please feel free to contact myself, or Bernie Bockisch at (505) 884-0672 or Bernard.Bockisch@ghd.com.

Sincerely,

GHD

A handwritten signature in black ink that reads "Alan Brandon". The signature is written in a cursive, flowing style.

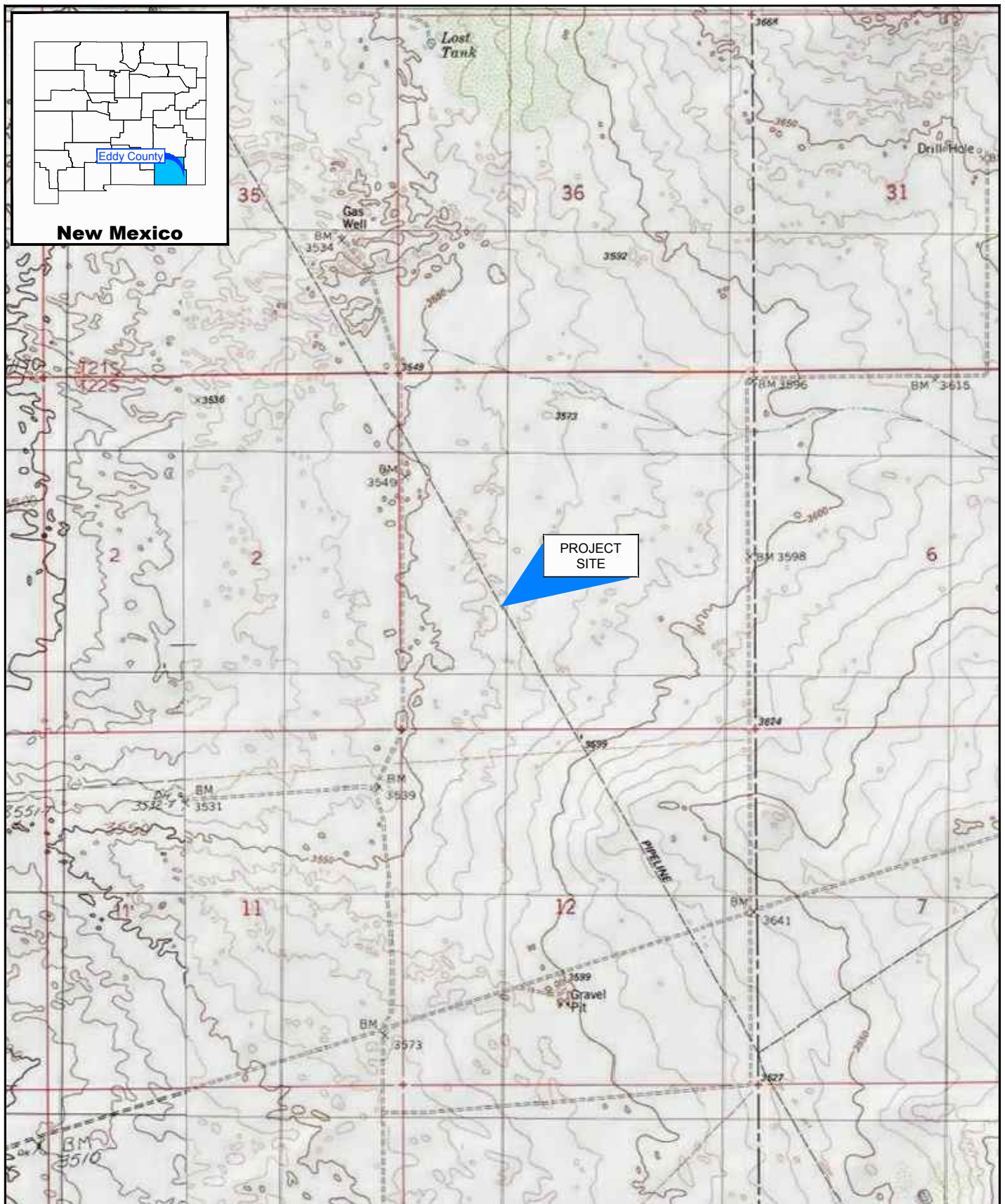
Alan Brandon
Senior Project Manager

BB/mc/30

A handwritten signature in blue ink that reads "Bernard Bockisch". The signature is written in a cursive, flowing style.

Bernard Bockisch
Albuquerque Operations Manager

Figures



Source: USGS 7.5 Minute Quad "The Divide and Livingston Ridge, New Mexico"

Lat/Long: 32.41827° North, 103.73503° West

0 1000 2000ft

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

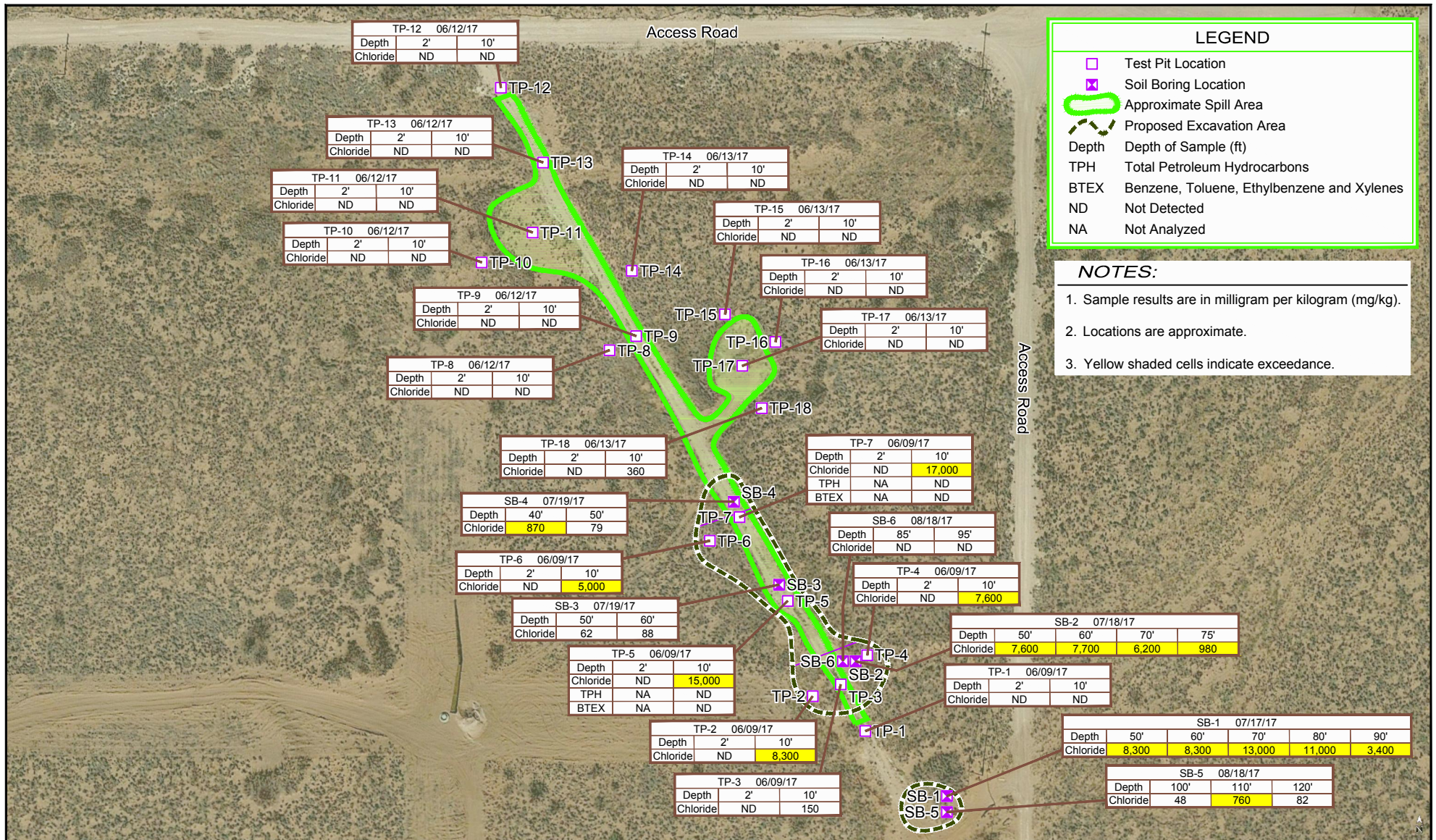


EOG RESOURCES
EDDY COUNTY, NEW MEXICO
LIVINGSTON RIDGE SWD No.2

SITE LOCATION MAP

088210-35
Jun 21, 2017

FIGURE 1



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

Lat/Long: 32.41827° North, 103.73503° West

0 60 120ft

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



EOG RESOURCES
EDDY COUNTY, NEW MEXICO
LIVINGSTON RIDGE SWD No.2

SAMPLE LOCATION MAP

088210-35
Oct 11, 2017

FIGURE 2

Tables

Table 1

Livingston Ridge SWD #2 Water Line - Summary of Soil Analytical Data

Sample ID	Depth (feet)	Date	Benzene	Toluene	Ethylbenzene	Xylenes	BTEX	TPH (GRO)	TPH (DRO)	TPH (MRO)	Total TPH	Chloride
088210-35-060917-MG-TP-1-2	2	06/09/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	<30
088210-33-060917-MG-TP-1-10	10	06/09/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	<30
088210-35-060917-MG-TP-2-2	2	06/09/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	<30
088210-33-060917-MG-TP-2-10	10	06/09/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	8300
088210-35-060917-MG-TP-3-2	2	06/09/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	<30
088210-33-060917-MG-TP-3-10	10	06/09/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	150
088210-35-060917-MG-TP-4-2	2	06/09/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	<30
088210-33-060917-MG-TP-4-10	10	06/09/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	7600
088210-35-060917-MG-TP-5-2	2	06/09/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	<30
088210-33-060917-MG-TP-5-10	10	06/09/2017	<0.024	<0.048	<0.048	<0.097	<0.217	<4.8	<9.6	<48	<62.4	15000
088210-35-060917-MG-TP-6-2	2	06/09/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	<30
088210-33-060917-MG-TP-6-10	10	06/09/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	5000
088210-35-060917-MG-TP-7-2	2	06/09/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	<30
088210-33-060917-MG-TP-7-10	10	06/09/2017	<0.024	<0.049	<0.049	<0.097	<0.219	<4.9	<10	<50	<64.9	17000
088210-35-061217-MG-TP-8-2	2	06/12/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	<30
088210-33-061217-MG-TP-8-10	10	06/12/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	<30
088210-35-061217-MG-TP-9-2	2	06/12/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	<30
088210-33-061217-MG-TP-9-10	10	06/12/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	<30
088210-35-061217-MG-TP-10-2	2	06/12/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	<30
088210-33-061217-MG-TP-10-10	10	06/12/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	<30
088210-35-061217-MG-TP-11-2	2	06/12/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	<30
088210-33-061217-MG-TP-11-10	10	06/12/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	<30
088210-35-061217-MG-TP-12-2	2	06/12/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	<30
088210-33-061217-MG-TP-12-10	10	06/12/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	<30
088210-35-061217-MG-TP-13-2	2	06/12/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	<30
088210-33-061217-MG-TP-13-10	10	06/12/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	<30
088210-35-061317-MG-TP-14-2	2	06/13/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	<30
088210-33-061317-MG-TP-14-10	10	06/13/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	<30
088210-35-061317-MG-TP-15-2	2	06/13/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	<30
088210-33-061317-MG-TP-15-10	10	06/13/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	<30
088210-35-061317-MG-TP-16-2	2	06/13/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	<30
088210-33-061317-MG-TP-16-10	10	06/13/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	<30
088210-35-061317-MG-TP-17-2	2	06/13/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	<30
088210-33-061317-MG-TP-17-10	10	06/13/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	<30
088210-35-061317-MG-TP-18-2	2	06/13/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	<30
088210-33-061317-MG-TP-18-10	10	06/13/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	360

Table 1

Livingston Ridge SWD #2 Water Line - Summary of Soil Analytical Data

Sample ID	Depth (feet)	Date	Benzene	Toluene	Ethylbenzene	Xylenes	BTEX	TPH (GRO)	TPH (DRO)	TPH (MRO)	Total TPH	Chloride
088210-35-071717-MG-SB-1-50	50	07/17/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	8300
088210-35-071717-MG-SB-1-60	60	07/17/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	8300
088210-35-071717-MG-SB-1-70	70	07/17/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	13000
088210-35-071817-MG-SB-1-80	80	07/18/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	11000
088210-35-071817-MG-SB-1-90	90	07/18/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	3400
088210-35-071817-MG-SB-2-50	50	07/18/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	7600
088210-35-071817-MG-SB-2-60	60	07/18/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	7700
088210-35-071817-MG-SB-2-70	70	07/18/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	6200
088210-35-071817-MG-SB-2-75	75	07/18/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	980
088210-35-071817-MG-SB-3-50	50	07/19/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	62
088210-35-071817-MG-SB-3-60	60	07/19/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	88
088210-35-071817-MG-SB-4-40	40	07/19/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	870
088210-35-071817-MG-SB-4-50	50	07/19/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	79
088210-35-081817-SP-SB-5-100	100	08/18/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	48
088210-35-081817-SP-SB-5-110	110	08/18/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	760
088210-35-081817-SP-SB-5-120	120	08/18/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	82
088210-35-081617-SP-SB-6-85	85	08/16/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	<30
088210-35-081617-SP-SB-6-95	95	08/16/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	<30
NMOCD RRALs (Total Ranking Score = 0)			10	50				Total TPH: 5,000				600

Notes:

All sample results are in milligrams per kilogram

NA = Not Analyzed

NMOCD = New Mexico Oil Conservation Division

RRALs = Recommended Remediation Action Limits

Highlighted = Exceeds NMOCD RRAL

Appendices

Appendix A

Water Well Report

Livingston Ridge SWD #2



New Mexico Office of the State Engineer Water Column/Average Depth to Water

(A CLW##### in the POD suffix indicates the POD has been replaced & no longer serves a water right file.)

(R=POD has been replaced,
O=orphaned,

C=the file is closed)

(quarters are 1=NW 2=NE 3=SW 4=SE)

(quarters are smallest to largest)

(NAD83 UTM in meters)

(In feet)

POD Number	POD Sub-Code	basin	County	Q 64	Q 16	Q 4	Sec	Tws	Rng	X	Y	Distance	DepthWell	DepthWater	Water Column
C 02744		ED		3	2	1	11	22S	31E	617374	3586631*	1839	4911		
C 02745		ED		4	2	2	15	22S	31E	616789	3585013*	3300	925		
C 02746		ED		4	2	2	15	22S	31E	616789	3585013*	3300	930		
C 02747		ED		4	2	2	15	22S	31E	616789	3585013*	3300	1076		
C 02949 EXPL		ED		1	1	4	34	21S	31E	616140	3589231*	3397	970		
C 03150		ED		2	4	4	14	22S	31E	618412	3584025*	3469	981		
C 02939	C	LE		3	3	1	19	22S	32E	620234	3583042*	4560	280		
C 03717 POD1	C	LE		4	4	1	09	22S	32E	624094	3586365	5179	650		
C 03112 EXPLORE		ED		3	1	1	09	22S	31E	613753	3586590*	5341	3567		
C 02415		ED		3	3	4	16	22S	31E	614592	3583785*	5746	880	448	432
C 02727		ED		3	1	1	33	21S	31E	613716	3589809*	5815	913		
C 02682		ED		4	4	4	08	22S	31E	613566	3585379*	5836	4400		

Average Depth to Water: 448 feet

Minimum Depth: 448 feet

Maximum Depth: 448 feet

Record Count: 12

UTMNAD83 Radius Search (in meters):

Easting (X): 619026.33

Northing (Y): 3587439.34

Radius: 6000

*UTM location was derived from PLSS - see Help

The data is furnished by the NMOSE/ISC and is accepted by the recipient with the expressed understanding that the OSE/ISC make no warranties, expressed or implied, concerning the accuracy, completeness, reliability, usability, or suitability for any particular purpose of the data.

8/24/17 8:17 AM

WATER COLUMN/ AVERAGE DEPTH TO WATER



[USGS Home](#)
[Contact USGS](#)
[Search USGS](#)

National Water Information System: Web Interface

[USGS Water Resources](#)

Data Category:

Groundwater ▼

Geographic Area:

United States ▼

GO

Click to hide News Bulletins

- [Please see news on new formats](#)
- [Full News](#) 

Groundwater levels for the Nation

Search Results -- 1 sites found

site_no list =

- 322333103461401

Minimum number of levels = 1

[Save file of selected sites](#) to local disk for future upload

USGS 322333103461401 22S.31E.15.13214

Available data for this site

Groundwater: Field measurements ▼

GO

Eddy County, New Mexico

Hydrologic Unit Code --

Latitude 32°23'40", Longitude 103°46'16" NAD27

Land-surface elevation 3,455 feet above NAVD88

This well is completed in the Santa Rosa Sandstone (231SNRS) local aquifer.

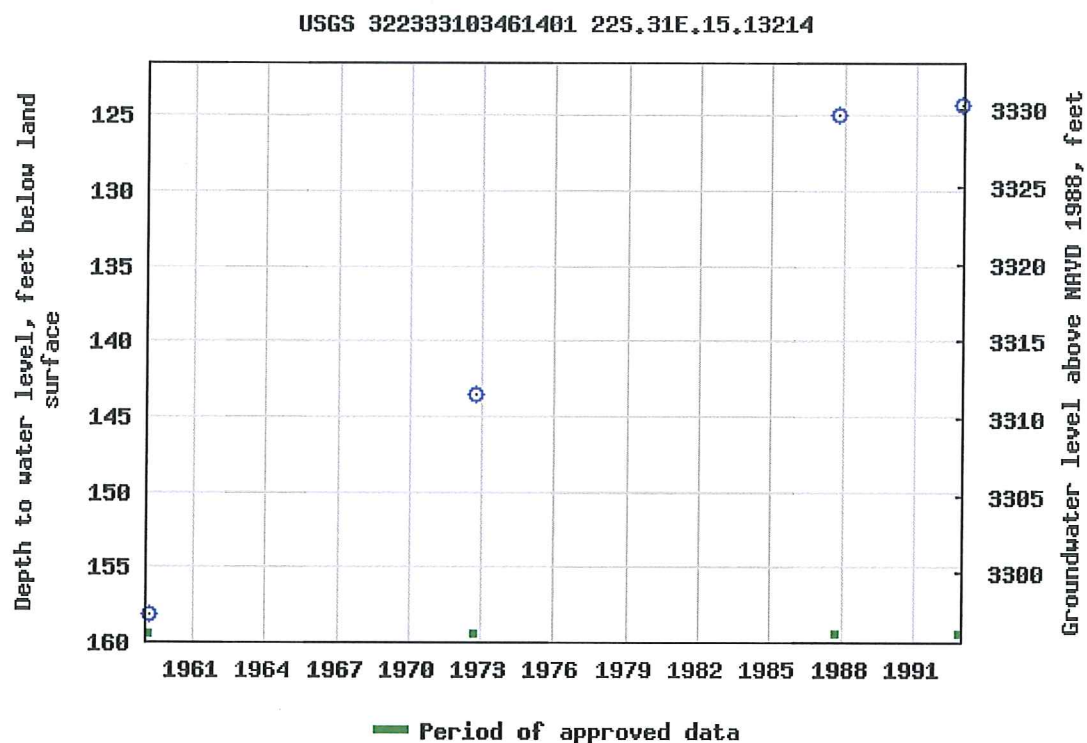
Output formats

[Table of data](#)

[Tab-separated data](#)

[Graph of data](#)

[Reselect period](#)



Breaks in the plot represent a gap of at least one year between field measurements.

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[U.S. Department of the Interior](#) | [U.S. Geological Survey](#)

Title: Groundwater for USA: Water Levels

URL: <https://nwis.waterdata.usgs.gov/nwis/gwlevels?>



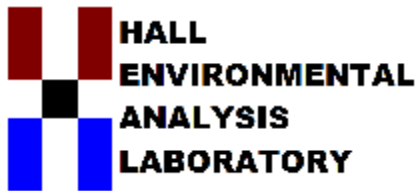
Page Contact Information: [USGS Water Data Support Team](#)

Page Last Modified: 2017-10-04 09:30:06 EDT

0.97 0.88 nadww02

Appendix B

Laboratory Analytical Reports



Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

June 19, 2017

Bernie Bockish

GHD

6121 Indian School Road, NE #200

Albuquerque, NM 87110

TEL: (505) 884-0672

FAX

RE: Livingston 2

OrderNo.: 1706844

Dear Bernie Bockish:

Hall Environmental Analysis Laboratory received 36 sample(s) on 6/15/2017 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0190

Sincerely,

A handwritten signature in black ink, appearing to read 'Andy Freeman', is written over a horizontal line.

Andy Freeman

Laboratory Manager

4901 Hawkins NE

Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1706844**

Date Reported: **6/19/2017**

CLIENT: GHD

Client Sample ID: 088210-35-060917-MG-TP-1-2'

Project: Livingston 2

Collection Date: 6/9/2017 9:55:00 AM

Lab ID: 1706844-001

Matrix: SOIL

Received Date: 6/15/2017 9:30:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	ND	30		mg/Kg	20	6/17/2017 1:56:39 AM	32339

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	R	RPD outside accepted recovery limits
	RL	Reporting Detection Limit	S	% Recovery outside of range due to dilution or matrix

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1706844**

Date Reported: **6/19/2017**

CLIENT: GHD

Client Sample ID: 088210-35-060917-MG-TP-1-10

Project: Livingston 2

Collection Date: 6/9/2017 10:05:00 AM

Lab ID: 1706844-002

Matrix: SOIL

Received Date: 6/15/2017 9:30:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	ND	30		mg/Kg	20	6/17/2017 2:58:41 AM	32339

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	R	RPD outside accepted recovery limits
	RL	Reporting Detection Limit	S	% Recovery outside of range due to dilution or matrix

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1706844**

Date Reported: **6/19/2017**

CLIENT: GHD

Client Sample ID: 088210-35-060917-MG-TP-2-10

Project: Livingston 2

Collection Date: 6/9/2017 10:55:00 AM

Lab ID: 1706844-003

Matrix: SOIL

Received Date: 6/15/2017 9:30:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	8300	300		mg/Kg	200	6/18/2017 10:18:05 PM	32339

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	R	RPD outside accepted recovery limits
	RL	Reporting Detection Limit	S	% Recovery outside of range due to dilution or matrix

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1706844**

Date Reported: **6/19/2017**

CLIENT: GHD

Client Sample ID: 088210-35-060917-MG-TP-3-2'

Project: Livingston 2

Collection Date: 6/9/2017 11:10:00 AM

Lab ID: 1706844-004

Matrix: SOIL

Received Date: 6/15/2017 9:30:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	ND	30		mg/Kg	20	6/17/2017 3:23:31 AM	32339

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	R	RPD outside accepted recovery limits
	RL	Reporting Detection Limit	S	% Recovery outside of range due to dilution or matrix

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1706844**

Date Reported: **6/19/2017**

CLIENT: GHD

Client Sample ID: 088210-35-060917-MG-TP-3-10

Project: Livingston 2

Collection Date: 6/9/2017 11:25:00 AM

Lab ID: 1706844-005

Matrix: SOIL

Received Date: 6/15/2017 9:30:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	150		30	mg/Kg	20	6/17/2017 3:35:56 AM	32339

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	R	RPD outside accepted recovery limits
	RL	Reporting Detection Limit	S	% Recovery outside of range due to dilution or matrix

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1706844**

Date Reported: **6/19/2017**

CLIENT: GHD

Client Sample ID: 088210-35-060917-MG-TP-4-2'

Project: Livingston 2

Collection Date: 6/9/2017 11:35:00 AM

Lab ID: 1706844-006

Matrix: SOIL

Received Date: 6/15/2017 9:30:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	ND	30		mg/Kg	20	6/17/2017 3:48:20 AM	32339

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	R	RPD outside accepted recovery limits
	RL	Reporting Detection Limit	S	% Recovery outside of range due to dilution or matrix

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1706844**

Date Reported: **6/19/2017**

CLIENT: GHD

Client Sample ID: 088210-35-060917-MG-TP-4-10

Project: Livingston 2

Collection Date: 6/9/2017 11:50:00 AM

Lab ID: 1706844-007

Matrix: SOIL

Received Date: 6/15/2017 9:30:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	7600	300		mg/Kg	200	6/18/2017 10:30:30 PM	32339

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	R	RPD outside accepted recovery limits
	RL	Reporting Detection Limit	S	% Recovery outside of range due to dilution or matrix

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1706844**

Date Reported: **6/19/2017**

CLIENT: GHD

Client Sample ID: 088210-35-060917-MG-TP-5-2'

Project: Livingston 2

Collection Date: 6/9/2017 1:05:00 PM

Lab ID: 1706844-008

Matrix: SOIL

Received Date: 6/15/2017 9:30:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	ND	30		mg/Kg	20	6/17/2017 4:13:09 AM	32339

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	R	RPD outside accepted recovery limits
	RL	Reporting Detection Limit	S	% Recovery outside of range due to dilution or matrix

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1706844**

Date Reported: **6/19/2017**

CLIENT: GHD

Client Sample ID: 088210-35-060917-MG-TP-5-10

Project: Livingston 2

Collection Date: 6/9/2017 1:20:00 PM

Lab ID: 1706844-009

Matrix: SOIL

Received Date: 6/15/2017 9:30:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	15000	750		mg/Kg	500	6/18/2017 10:42:55 PM	32340
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: TOM
Diesel Range Organics (DRO)	ND	9.6		mg/Kg	1	6/16/2017 4:23:31 PM	32315
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	6/16/2017 4:23:31 PM	32315
Surr: DNOP	102	70-130		%Rec	1	6/16/2017 4:23:31 PM	32315
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	6/16/2017 6:45:47 PM	32311
Surr: BFB	102	54-150		%Rec	1	6/16/2017 6:45:47 PM	32311
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.024		mg/Kg	1	6/16/2017 6:45:47 PM	32311
Toluene	ND	0.048		mg/Kg	1	6/16/2017 6:45:47 PM	32311
Ethylbenzene	ND	0.048		mg/Kg	1	6/16/2017 6:45:47 PM	32311
Xylenes, Total	ND	0.097		mg/Kg	1	6/16/2017 6:45:47 PM	32311
Surr: 4-Bromofluorobenzene	129	66.6-132		%Rec	1	6/16/2017 6:45:47 PM	32311

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	R	RPD outside accepted recovery limits
	RL	Reporting Detection Limit	S	% Recovery outside of range due to dilution or matrix

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1706844**

Date Reported: **6/19/2017**

CLIENT: GHD

Client Sample ID: 088210-35-060917-MG-TP-6-2'

Project: Livingston 2

Collection Date: 6/9/2017 1:40:00 PM

Lab ID: 1706844-010

Matrix: SOIL

Received Date: 6/15/2017 9:30:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	ND	30		mg/Kg	20	6/17/2017 10:48:00 AM	32340

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	R	RPD outside accepted recovery limits
	RL	Reporting Detection Limit	S	% Recovery outside of range due to dilution or matrix

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1706844**

Date Reported: **6/19/2017**

CLIENT: GHD

Client Sample ID: 088210-35-060917-MG-TP-6-10

Project: Livingston 2

Collection Date: 6/9/2017 1:55:00 PM

Lab ID: 1706844-011

Matrix: SOIL

Received Date: 6/15/2017 9:30:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	5000	150		mg/Kg	100	6/18/2017 10:55:19 PM	32340

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	R	RPD outside accepted recovery limits
	RL	Reporting Detection Limit	S	% Recovery outside of range due to dilution or matrix

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1706844**

Date Reported: **6/19/2017**

CLIENT: GHD

Client Sample ID: 088210-35-060917-MG-TP-2-2'

Project: Livingston 2

Collection Date: 6/9/2017 10:40:00 AM

Lab ID: 1706844-012

Matrix: SOIL

Received Date: 6/15/2017 9:30:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	ND	30		mg/Kg	20	6/17/2017 11:37:38 AM	32340

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	R	RPD outside accepted recovery limits
	RL	Reporting Detection Limit	S	% Recovery outside of range due to dilution or matrix

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1706844**

Date Reported: **6/19/2017**

CLIENT: GHD

Client Sample ID: 088210-35-060917-MG-TP-7-2'

Project: Livingston 2

Collection Date: 6/9/2017 2:05:00 PM

Lab ID: 1706844-013

Matrix: SOIL

Received Date: 6/15/2017 9:30:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	ND	30		mg/Kg	20	6/17/2017 12:14:51 PM	32340

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	R	RPD outside accepted recovery limits
	RL	Reporting Detection Limit	S	% Recovery outside of range due to dilution or matrix

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1706844**

Date Reported: **6/19/2017**

CLIENT: GHD

Client Sample ID: 088210-35-060917-MG-TP-7-10

Project: Livingston 2

Collection Date: 6/9/2017 2:40:00 PM

Lab ID: 1706844-014

Matrix: SOIL

Received Date: 6/15/2017 9:30:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	17000	750		mg/Kg	500	6/18/2017 11:07:43 PM	32340
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: TOM
Diesel Range Organics (DRO)	ND	10		mg/Kg	1	6/16/2017 4:45:37 PM	32315
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	6/16/2017 4:45:37 PM	32315
Surr: DNOP	102	70-130		%Rec	1	6/16/2017 4:45:37 PM	32315
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	6/16/2017 7:10:02 PM	32311
Surr: BFB	96.5	54-150		%Rec	1	6/16/2017 7:10:02 PM	32311
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.024		mg/Kg	1	6/16/2017 7:10:02 PM	32311
Toluene	ND	0.049		mg/Kg	1	6/16/2017 7:10:02 PM	32311
Ethylbenzene	ND	0.049		mg/Kg	1	6/16/2017 7:10:02 PM	32311
Xylenes, Total	ND	0.097		mg/Kg	1	6/16/2017 7:10:02 PM	32311
Surr: 4-Bromofluorobenzene	122	66.6-132		%Rec	1	6/16/2017 7:10:02 PM	32311

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	R	RPD outside accepted recovery limits
	RL	Reporting Detection Limit	S	% Recovery outside of range due to dilution or matrix

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1706844**

Date Reported: **6/19/2017**

CLIENT: GHD

Client Sample ID: 088210-35-061217-MG-TP-8-2'

Project: Livingston 2

Collection Date: 6/12/2017 10:50:00 AM

Lab ID: 1706844-015

Matrix: SOIL

Received Date: 6/15/2017 9:30:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	ND	30		mg/Kg	20	6/17/2017 12:39:40 PM	32340

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	R	RPD outside accepted recovery limits
	RL	Reporting Detection Limit	S	% Recovery outside of range due to dilution or matrix

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1706844**

Date Reported: **6/19/2017**

CLIENT: GHD

Client Sample ID: 088210-35-061217-MG-TP-8-10

Project: Livingston 2

Collection Date: 6/12/2017 11:10:00 AM

Lab ID: 1706844-016

Matrix: SOIL

Received Date: 6/15/2017 9:30:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	ND	30		mg/Kg	20	6/17/2017 12:52:04 PM	32340

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	R	RPD outside accepted recovery limits
	RL	Reporting Detection Limit	S	% Recovery outside of range due to dilution or matrix

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1706844**

Date Reported: **6/19/2017**

CLIENT: GHD

Client Sample ID: 088210-35-061217-MG-TP-9-2'

Project: Livingston 2

Collection Date: 6/12/2017 11:20:00 AM

Lab ID: 1706844-017

Matrix: SOIL

Received Date: 6/15/2017 9:30:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	ND	30		mg/Kg	20	6/17/2017 1:04:29 PM	32340

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	R	RPD outside accepted recovery limits
	RL	Reporting Detection Limit	S	% Recovery outside of range due to dilution or matrix

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1706844**

Date Reported: **6/19/2017**

CLIENT: GHD

Client Sample ID: 088210-35-061217-MG-TP-9-10

Project: Livingston 2

Collection Date: 6/12/2017 11:35:00 AM

Lab ID: 1706844-018

Matrix: SOIL

Received Date: 6/15/2017 9:30:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	ND	30		mg/Kg	20	6/17/2017 1:16:53 PM	32340

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	R	RPD outside accepted recovery limits
	RL	Reporting Detection Limit	S	% Recovery outside of range due to dilution or matrix

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1706844**

Date Reported: **6/19/2017**

CLIENT: GHD

Client Sample ID: 088210-35-061217-MG-TP-10-2

Project: Livingston 2

Collection Date: 6/12/2017 11:55:00 AM

Lab ID: 1706844-019

Matrix: SOIL

Received Date: 6/15/2017 9:30:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	ND	30		mg/Kg	20	6/17/2017 1:29:17 PM	32340

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	R	RPD outside accepted recovery limits
	RL	Reporting Detection Limit	S	% Recovery outside of range due to dilution or matrix

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1706844**

Date Reported: **6/19/2017**

CLIENT: GHD

Client Sample ID: 088210-35-061217-MG-TP-10-1

Project: Livingston 2

Collection Date: 6/12/2017 1:05:00 PM

Lab ID: 1706844-020

Matrix: SOIL

Received Date: 6/15/2017 9:30:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	ND	30		mg/Kg	20	6/17/2017 1:41:41 PM	32340

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	R	RPD outside accepted recovery limits
	RL	Reporting Detection Limit	S	% Recovery outside of range due to dilution or matrix

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1706844**

Date Reported: **6/19/2017**

CLIENT: GHD

Client Sample ID: 088210-35-061217-MG-TP-11-2

Project: Livingston 2

Collection Date: 6/12/2017 1:15:00 PM

Lab ID: 1706844-021

Matrix: SOIL

Received Date: 6/15/2017 9:30:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	ND	30		mg/Kg	20	6/17/2017 1:54:06 PM	32340

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	R	RPD outside accepted recovery limits
	RL	Reporting Detection Limit	S	% Recovery outside of range due to dilution or matrix

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1706844**

Date Reported: **6/19/2017**

CLIENT: GHD

Client Sample ID: 088210-35-061217-MG-TP-11-1

Project: Livingston 2

Collection Date: 6/12/2017 1:30:00 PM

Lab ID: 1706844-022

Matrix: SOIL

Received Date: 6/15/2017 9:30:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	ND	30		mg/Kg	20	6/17/2017 2:06:30 PM	32340

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	R	RPD outside accepted recovery limits
	RL	Reporting Detection Limit	S	% Recovery outside of range due to dilution or matrix

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1706844**

Date Reported: **6/19/2017**

CLIENT: GHD

Client Sample ID: 088210-35-061217-MG-TP-12-2

Project: Livingston 2

Collection Date: 6/12/2017 1:45:00 PM

Lab ID: 1706844-023

Matrix: SOIL

Received Date: 6/15/2017 9:30:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	ND	30		mg/Kg	20	6/17/2017 2:43:43 PM	32340

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	R	RPD outside accepted recovery limits
	RL	Reporting Detection Limit	S	% Recovery outside of range due to dilution or matrix

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1706844**

Date Reported: **6/19/2017**

CLIENT: GHD

Client Sample ID: 088210-35-061217-MG-TP-12-1

Project: Livingston 2

Collection Date: 6/12/2017 2:00:00 PM

Lab ID: 1706844-024

Matrix: SOIL

Received Date: 6/15/2017 9:30:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	ND	30		mg/Kg	20	6/17/2017 2:56:08 PM	32340

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	R	RPD outside accepted recovery limits
	RL	Reporting Detection Limit	S	% Recovery outside of range due to dilution or matrix

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1706844**

Date Reported: **6/19/2017**

CLIENT: GHD

Client Sample ID: 088210-35-061217-MG-TP-13-2

Project: Livingston 2

Collection Date: 6/12/2017 2:10:00 PM

Lab ID: 1706844-025

Matrix: SOIL

Received Date: 6/15/2017 9:30:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	ND	30		mg/Kg	20	6/17/2017 3:08:34 PM	32340

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	R	RPD outside accepted recovery limits
	RL	Reporting Detection Limit	S	% Recovery outside of range due to dilution or matrix

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1706844**

Date Reported: **6/19/2017**

CLIENT: GHD

Client Sample ID: 088210-35-061217-MG-TP-13-1

Project: Livingston 2

Collection Date: 6/12/2017 2:30:00 PM

Lab ID: 1706844-026

Matrix: SOIL

Received Date: 6/15/2017 9:30:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	ND	30		mg/Kg	20	6/17/2017 3:20:58 PM	32340

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	R	RPD outside accepted recovery limits
	RL	Reporting Detection Limit	S	% Recovery outside of range due to dilution or matrix

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1706844**

Date Reported: **6/19/2017**

CLIENT: GHD

Client Sample ID: 088210-35-061317-MG-TP-14-2

Project: Livingston 2

Collection Date: 6/13/2017 8:15:00 AM

Lab ID: 1706844-027

Matrix: SOIL

Received Date: 6/15/2017 9:30:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	ND	30		mg/Kg	20	6/17/2017 3:33:23 PM	32340

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	R	RPD outside accepted recovery limits
	RL	Reporting Detection Limit	S	% Recovery outside of range due to dilution or matrix

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1706844**

Date Reported: **6/19/2017**

CLIENT: GHD

Client Sample ID: 088210-35-061317-MG-TP-14-1

Project: Livingston 2

Collection Date: 6/13/2017 8:40:00 AM

Lab ID: 1706844-028

Matrix: SOIL

Received Date: 6/15/2017 9:30:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	ND	30		mg/Kg	20	6/17/2017 3:45:47 PM	32340

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	R	RPD outside accepted recovery limits
	RL	Reporting Detection Limit	S	% Recovery outside of range due to dilution or matrix

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1706844**

Date Reported: **6/19/2017**

CLIENT: GHD

Client Sample ID: 088210-35-061317-MG-TP-15-2

Project: Livingston 2

Collection Date: 6/13/2017 9:00:00 AM

Lab ID: 1706844-029

Matrix: SOIL

Received Date: 6/15/2017 9:30:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	ND	30		mg/Kg	20	6/17/2017 4:23:00 PM	32341

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	R	RPD outside accepted recovery limits
	RL	Reporting Detection Limit	S	% Recovery outside of range due to dilution or matrix

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1706844**

Date Reported: **6/19/2017**

CLIENT: GHD

Client Sample ID: 088210-35-061317-MG-TP-15-1

Project: Livingston 2

Collection Date: 6/13/2017 9:15:00 AM

Lab ID: 1706844-030

Matrix: SOIL

Received Date: 6/15/2017 9:30:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	ND	30		mg/Kg	20	6/17/2017 5:25:03 PM	32341

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	R	RPD outside accepted recovery limits
	RL	Reporting Detection Limit	S	% Recovery outside of range due to dilution or matrix

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1706844**

Date Reported: **6/19/2017**

CLIENT: GHD

Client Sample ID: 088210-35-061317-MG-TP-16-2

Project: Livingston 2

Collection Date: 6/13/2017 9:25:00 AM

Lab ID: 1706844-031

Matrix: SOIL

Received Date: 6/15/2017 9:30:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	ND	30		mg/Kg	20	6/17/2017 5:37:27 PM	32341

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	R	RPD outside accepted recovery limits
	RL	Reporting Detection Limit	S	% Recovery outside of range due to dilution or matrix

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1706844**

Date Reported: **6/19/2017**

CLIENT: GHD

Client Sample ID: 088210-35-061317-MG-TP-16-1

Project: Livingston 2

Collection Date: 6/13/2017 9:40:00 AM

Lab ID: 1706844-032

Matrix: SOIL

Received Date: 6/15/2017 9:30:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	ND	30		mg/Kg	20	6/17/2017 5:49:52 PM	32341

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	R	RPD outside accepted recovery limits
	RL	Reporting Detection Limit	S	% Recovery outside of range due to dilution or matrix

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1706844**

Date Reported: **6/19/2017**

CLIENT: GHD

Client Sample ID: 088210-35-061317-MG-TP-17-2

Project: Livingston 2

Collection Date: 6/13/2017 9:50:00 AM

Lab ID: 1706844-033

Matrix: SOIL

Received Date: 6/15/2017 9:30:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	ND	30		mg/Kg	20	6/17/2017 6:02:17 PM	32341

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	R	RPD outside accepted recovery limits
	RL	Reporting Detection Limit	S	% Recovery outside of range due to dilution or matrix

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1706844**

Date Reported: **6/19/2017**

CLIENT: GHD

Client Sample ID: 088210-35-061317-MG-TP-17-1

Project: Livingston 2

Collection Date: 6/13/2017 10:00:00 AM

Lab ID: 1706844-034

Matrix: SOIL

Received Date: 6/15/2017 9:30:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	ND	30		mg/Kg	20	6/17/2017 6:14:42 PM	32341

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	R	RPD outside accepted recovery limits
	RL	Reporting Detection Limit	S	% Recovery outside of range due to dilution or matrix

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1706844**

Date Reported: **6/19/2017**

CLIENT: GHD

Client Sample ID: 088210-35-061317-MG-TP-18-2

Project: Livingston 2

Collection Date: 6/13/2017 10:25:00 AM

Lab ID: 1706844-035

Matrix: SOIL

Received Date: 6/15/2017 9:30:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	ND	30		mg/Kg	20	6/17/2017 6:27:07 PM	32341

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	R	RPD outside accepted recovery limits
	RL	Reporting Detection Limit	S	% Recovery outside of range due to dilution or matrix

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1706844**

Date Reported: **6/19/2017**

CLIENT: GHD

Client Sample ID: 088210-35-061317-MG-TP-18-1

Project: Livingston 2

Collection Date: 6/13/2017 11:00:00 AM

Lab ID: 1706844-036

Matrix: SOIL

Received Date: 6/15/2017 9:30:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	360	30		mg/Kg	20	6/17/2017 6:39:31 PM	32341

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	R	RPD outside accepted recovery limits
	RL	Reporting Detection Limit	S	% Recovery outside of range due to dilution or matrix

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1706844

19-Jun-17

Client: GHD
Project: Livingston 2

Sample ID	MB-32339		SampType: mblk		TestCode: EPA Method 300.0: Anions					
Client ID:	PBS		Batch ID: 32339		RunNo: 43583					
Prep Date:	6/16/2017		Analysis Date: 6/16/2017		SeqNo: 1372810		Units: mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID	LCS-32339		SampType: lcs		TestCode: EPA Method 300.0: Anions					
Client ID:	LCSS		Batch ID: 32339		RunNo: 43583					
Prep Date:	6/16/2017		Analysis Date: 6/16/2017		SeqNo: 1372811		Units: mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	94.9	90	110			

Sample ID	MB-32340		SampType:	mblk		TestCode:	EPA Method 300.0: Anions				
Client ID:	PBS		Batch ID:	32340		RunNo:	43585				
Prep Date:	6/17/2017		Analysis Date:	6/17/2017		SeqNo:	1372868		Units: mg/Kg		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Chloride	ND	1.5									

Sample ID	LCS-32340		SampType: lcs		TestCode: EPA Method 300.0: Anions					
Client ID:	LCSS		Batch ID: 32340		RunNo: 43585					
Prep Date:	6/17/2017		Analysis Date: 6/17/2017		SeqNo: 1372869		Units: mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	94.4	90	110			

Sample ID	MB-32341		SampType: mblk		TestCode: EPA Method 300.0: Anions					
Client ID:	PBS		Batch ID: 32341		RunNo: 43585					
Prep Date:	6/17/2017		Analysis Date: 6/17/2017		SeqNo: 1372898		Units: mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID	LCS-32341		SampType: lcs		TestCode: EPA Method 300.0: Anions					
Client ID:	LCSS		Batch ID: 32341		RunNo: 43585					
Prep Date:	6/17/2017		Analysis Date: 6/17/2017		SeqNo: 1372899		Units: mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	93.5	90	110			

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
RL Reporting Detection Limit

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
R RPD outside accepted recovery limits
S % Recovery outside of range due to dilution or matrix

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1706844

19-Jun-17

Client: GHD
Project: Livingston 2

Sample ID	MB-32315	SampType:	MBLK	TestCode:	EPA Method 8015M/D: Diesel Range Organics					
Client ID:	PBS	Batch ID:	32315	RunNo:	43560					
Prep Date:	6/15/2017	Analysis Date:	6/16/2017	SeqNo:	1372149	Units:	mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	9.6		10.00		96.0	70	130			

Sample ID	LCS-32315	SampType:	LCS	TestCode:	EPA Method 8015M/D: Diesel Range Organics					
Client ID:	LCSS	Batch ID:	32315	RunNo:	43560					
Prep Date:	6/15/2017	Analysis Date:	6/16/2017	SeqNo:	1372317	Units:	mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	50	10	50.00	0	99.8	73.2	114			
Surr: DNOP	4.8		5.000		95.6	70	130			

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
RL Reporting Detection Limit

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
R RPD outside accepted recovery limits
S % Recovery outside of range due to dilution or matrix

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1706844

19-Jun-17

Client: GHD
Project: Livingston 2

Sample ID	MB-32311		SampType: MBLK		TestCode: EPA Method 8015D: Gasoline Range					
Client ID:	PBS		Batch ID: 32311		RunNo: 43568					
Prep Date:	6/15/2017		Analysis Date: 6/16/2017		SeqNo: 1373048		Units: mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	970		1000		96.9	54	150			

Sample ID	LCS-32311		SampType: LCS		TestCode: EPA Method 8015D: Gasoline Range					
Client ID:	LCSS		Batch ID: 32311		RunNo: 43568					
Prep Date:	6/15/2017		Analysis Date: 6/16/2017		SeqNo: 1373049		Units: mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	25	5.0	25.00	0	102	76.4	125			
Surr: BFB	1100		1000		108	54	150			

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
RL Reporting Detection Limit

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
R RPD outside accepted recovery limits
S % Recovery outside of range due to dilution or matrix

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1706844

19-Jun-17

Client: GHD
Project: Livingston 2

Sample ID	MB-32311		SampType: MBLK		TestCode: EPA Method 8021B: Volatiles					
Client ID:	PBS		Batch ID: 32311		RunNo: 43568					
Prep Date:	6/15/2017		Analysis Date: 6/16/2017		SeqNo: 1373066		Units: mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 4-Bromofluorobenzene	1.2		1.000		124	66.6	132			

Sample ID	LCS-32311		SampType: LCS		TestCode: EPA Method 8021B: Volatiles					
Client ID:	LCSS		Batch ID: 32311		RunNo: 43568					
Prep Date:	6/15/2017		Analysis Date: 6/16/2017		SeqNo: 1373067		Units: mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.1	0.025	1.000	0	107	80	120			
Toluene	1.1	0.050	1.000	0	108	80	120			
Ethylbenzene	1.1	0.050	1.000	0	109	80	120			
Xylenes, Total	3.3	0.10	3.000	0	110	80	120			
Surr: 4-Bromofluorobenzene	1.3		1.000		126	66.6	132			

Qualifiers:

* Value exceeds Maximum Contaminant Level.	B Analyte detected in the associated Method Blank
D Sample Diluted Due to Matrix	E Value above quantitation range
H Holding times for preparation or analysis exceeded	J Analyte detected below quantitation limits
ND Not Detected at the Reporting Limit	P Sample pH Not In Range
PQL Practical Quantitative Limit	R RPD outside accepted recovery limits
RL Reporting Detection Limit	S % Recovery outside of range due to dilution or matrix

Sample Log-In Check List

Client Name: GHD

Work Order Number: 1706844

RcptNo: 1

Received By: Erin Melendrez

6/15/2017 9:30:00 AM

Completed By: Ashley Gallegos

6/15/2017 10:29:02 AM

Reviewed By:

AG

06/15/17

uug
AG

Chain of Custody

1. Custody seals intact on sample bottles? Yes ☐ No ☐ Not Present ☒
2. Is Chain of Custody complete? Yes ☒ No ☐ Not Present ☐
3. How was the sample delivered? Courier

Log In

4. Was an attempt made to cool the samples? Yes ☒ No ☐ NA ☐
5. Were all samples received at a temperature of >0° C to 6.0°C Yes ☒ No ☐ NA ☐
6. Sample(s) in proper container(s)? Yes ☒ No ☐
7. Sufficient sample volume for indicated test(s)? Yes ☒ No ☐
8. Are samples (except VOA and ONG) properly preserved? Yes ☒ No ☐
9. Was preservative added to bottles? Yes ☐ No ☒ NA ☐
10. VOA vials have zero headspace? Yes ☐ No ☐ No VOA Vials ☒
11. Were any sample containers received broken? Yes ☐ No ☒
12. Does paperwork match bottle labels?
(Note discrepancies on chain of custody) Yes ☒ No ☐
13. Are matrices correctly identified on Chain of Custody? Yes ☒ No ☐
14. Is it clear what analyses were requested? Yes ☒ No ☐
15. Were all holding times able to be met?
(If no, notify customer for authorization.) Yes ☒ No ☐

of preserved
bottles checked
for pH: _____
(<2 or >12 unless noted)
Adjusted? _____
Checked by: _____

Special Handling (if applicable)

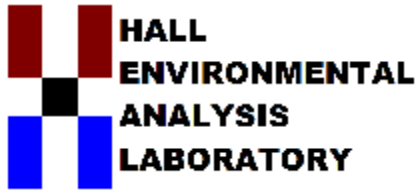
16. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☒

Person Notified:		Date:	
By Whom:		Via:	<input type="checkbox"/> eMail <input type="checkbox"/> Phone <input type="checkbox"/> Fax <input type="checkbox"/> In Person
Regarding:			
Client Instructions:			

17. Additional remarks:

18. Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	5.1	Good	Yes			



Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

August 01, 2017

Bernie Bockish

GHD

6121 Indian School Road, NE #200

Albuquerque, NM 87110

TEL: (505) 884-0672

FAX

RE: Livingston 2

OrderNo.: 1707B18

Dear Bernie Bockish:

Hall Environmental Analysis Laboratory received 13 sample(s) on 7/21/2017 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0190

Sincerely,

A handwritten signature in black ink, appearing to read 'Andy Freeman', is written over a horizontal line.

Andy Freeman

Laboratory Manager

4901 Hawkins NE

Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order: 1707B18

Date Reported: 8/1/2017

CLIENT: GHD
Project: Livingston 2

Lab Order: 1707B18

Lab ID: 1707B18-001 **Collection Date:** 7/17/2017 4:20:00 PM

Client Sample ID: S088210-35-071717MG-SB-1-50' **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS							Analyst: SRM
Chloride	8300	300		mg/Kg	200	7/27/2017 5:15:27 PM	33021

Lab ID: 1707B18-002 **Collection Date:** 7/17/2017 5:05:00 PM

Client Sample ID: S088210-35-071717MG-SB-1-60' **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS							Analyst: SRM
Chloride	8300	300		mg/Kg	200	7/27/2017 5:27:52 PM	33021

Lab ID: 1707B18-003 **Collection Date:** 7/17/2017 5:50:00 PM

Client Sample ID: S088210-35-071717MG-SB-1-70' **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS							Analyst: SRM
Chloride	13000	750		mg/Kg	500	7/27/2017 5:40:17 PM	33021

Lab ID: 1707B18-004 **Collection Date:** 7/18/2017 9:10:00 AM

Client Sample ID: S088210-35-071817MG-SB-1-80' **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS							Analyst: SRM
Chloride	11000	750		mg/Kg	500	7/27/2017 5:52:42 PM	33021

Lab ID: 1707B18-005 **Collection Date:** 7/18/2017 10:05:00 AM

Client Sample ID: S088210-35-071817MG-SB-1-90' **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS							Analyst: SRM
Chloride	3400	150		mg/Kg	100	7/27/2017 6:29:56 PM	33021

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank	Page 1 of 4
	D	Sample Diluted Due to Matrix	E	Value above quantitation range	
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits	
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range	
	PQL	Practical Quantitative Limit	RL	Reporting Detection Limit	
	S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified	

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order: 1707B18

Date Reported: 8/1/2017

CLIENT: GHD
Project: Livingston 2

Lab Order: 1707B18

Lab ID: 1707B18-006 **Collection Date:** 7/18/2017 2:10:00 PM

Client Sample ID: S088210-35-071817MG-SB-2-50' **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS							Analyst: SRM
Chloride	7600	750		mg/Kg	500	7/27/2017 6:42:20 PM	33021

Lab ID: 1707B18-007 **Collection Date:** 7/18/2017 2:55:00 PM

Client Sample ID: S088210-35-071817MG-SB-2-60' **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS							Analyst: SRM
Chloride	7700	300		mg/Kg	200	7/27/2017 6:54:45 PM	33021

Lab ID: 1707B18-008 **Collection Date:** 7/18/2017 3:30:00 PM

Client Sample ID: S088210-35-071817MG-SB-2-70' **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS							Analyst: SRM
Chloride	6200	300		mg/Kg	200	7/27/2017 7:07:10 PM	33021

Lab ID: 1707B18-009 **Collection Date:** 7/18/2017 4:15:00 PM

Client Sample ID: S088210-35-071817MG-SB-2-75' **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	980	30		mg/Kg	20	7/26/2017 4:12:52 PM	33021

Lab ID: 1707B18-010 **Collection Date:** 7/19/2017 11:15:00 AM

Client Sample ID: S088210-35-071917MG-SB-3-50' **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	62	30		mg/Kg	20	7/26/2017 4:25:17 PM	33021

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank	Page 2 of 4
	D	Sample Diluted Due to Matrix	E	Value above quantitation range	
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits	
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range	
	PQL	Practical Quantitative Limit	RL	Reporting Detection Limit	
	S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified	

Analytical Report

Lab Order: 1707B18

Date Reported: 8/1/2017

Hall Environmental Analysis Laboratory, Inc.**CLIENT:** GHD
Project: Livingston 2**Lab Order:** 1707B18**Lab ID:** 1707B18-011 **Collection Date:** 7/19/2017 11:45:00 AM
Client Sample ID: S088210-35-071917MG-SB-3-60' **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS Analyst: MRA							
Chloride	88	30		mg/Kg	20	7/26/2017 4:37:42 PM	33021

Lab ID: 1707B18-012 **Collection Date:** 7/19/2017 3:05:00 PM
Client Sample ID: S088210-35-071917MG-SB-4-40' **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS Analyst: MRA							
Chloride	870	30		mg/Kg	20	7/26/2017 4:50:07 PM	33021

Lab ID: 1707B18-013 **Collection Date:** 7/19/2017 3:35:00 PM
Client Sample ID: S088210-35-071917MG-SB-4-50' **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS Analyst: MRA							
Chloride	79	30		mg/Kg	20	7/26/2017 5:02:32 PM	33021

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	RL	Reporting Detection Limit
	S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1707B18

01-Aug-17

Client: GHD
Project: Livingston 2

Sample ID	MB-33021		SampType: MBLK		TestCode: EPA Method 300.0: Anions					
Client ID:	PBS		Batch ID: 33021		RunNo: 44523					
Prep Date:	7/26/2017		Analysis Date: 7/26/2017		SeqNo: 1407865		Units: mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID	LCS-33021		SampType: LCS		TestCode: EPA Method 300.0: Anions					
Client ID:	LCSS		Batch ID: 33021		RunNo: 44523					
Prep Date:	7/26/2017		Analysis Date: 7/26/2017		SeqNo: 1407866		Units: mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	90.9	90	110			

Qualifiers:

* Value exceeds Maximum Contaminant Level.	B Analyte detected in the associated Method Blank
D Sample Diluted Due to Matrix	E Value above quantitation range
H Holding times for preparation or analysis exceeded	J Analyte detected below quantitation limits
ND Not Detected at the Reporting Limit	P Sample pH Not In Range
PQL Practical Quantitative Limit	RL Reporting Detection Limit
S % Recovery outside of range due to dilution or matrix	W Sample container temperature is out of limit as specified

Sample Log-In Check List

Client Name: GHD

Work Order Number: 1707B18

RcptNo: 1


Received By: Sophia Campuzano

7/21/2017 9:45:00 AM

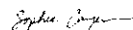
Completed By: Erin Melendrez

7/21/2017 10:32:15 AM

Reviewed By:



7/21/17




Chain of Custody

1. Custody seals intact on sample bottles? Yes ☐ No ☐ Not Present ☒
2. Is Chain of Custody complete? Yes ☒ No ☐ Not Present ☐
3. How was the sample delivered? Courier

Log In

4. Was an attempt made to cool the samples? Yes ☒ No ☐ NA ☐
5. Were all samples received at a temperature of >0° C to 6.0°C Yes ☒ No ☐ NA ☐
6. Sample(s) in proper container(s)? Yes ☒ No ☐
7. Sufficient sample volume for indicated test(s)? Yes ☒ No ☐
8. Are samples (except VOA and ONG) properly preserved? Yes ☒ No ☐
9. Was preservative added to bottles? Yes ☐ No ☒ NA ☐
10. VOA vials have zero headspace? Yes ☐ No ☐ No VOA Vials ☒
11. Were any sample containers received broken? Yes ☐ No ☒
12. Does paperwork match bottle labels?
(Note discrepancies on chain of custody) Yes ☒ No ☐
13. Are matrices correctly identified on Chain of Custody? Yes ☒ No ☐
14. Is it clear what analyses were requested? Yes ☒ No ☐
15. Were all holding times able to be met?
(If no, notify customer for authorization.) Yes ☒ No ☐

of preserved
bottles checked
for pH: _____
(<2 or >12 unless noted)
Adjusted? _____
Checked by: _____

Special Handling (if applicable)

16. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☒

Person Notified:	_____	Date:	_____
By Whom:	_____	Via:	<input type="checkbox"/> eMail <input type="checkbox"/> Phone <input type="checkbox"/> Fax <input type="checkbox"/> In Person
Regarding:	_____		
Client Instructions:	_____		

17. Additional remarks:

18. Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	2.4	Good	Yes			

Chain-of-Custody Record

Client: GHD Services, Inc.

Mailing Address: 6121 Indian School Rd Ste 200

NE Albuquerque, NM 87110

Phone #: 505 884 0672

email or Fax#: Bernard.Backisch@ghd.com

QA/QC Package:

☐ Standard ☐ Level 4 (Full Validation)

Accreditation

☐ NELAP ☐ Other

☐ EDD (Type)

Turn-Around Time:

☒ Standard ☐ Rush

Project Name:

Livingston 2

Project #:

088210-35

Project Manager:

Bernard Backisch

Sampler:

Michael Gant

On Ice: ☒ Yes ☐ No

Sample Temperature: 2.4

Container Type and #

4 for Soil Sor

Preservative Type

ICE

HEAL No.

1707B18

-013

Sample Request ID

S-088210-35-01917-MG-SB-450

Date

7/19 1635

Time

S

Matrix

S

Relinquished by:

Michael Gant

Relinquished by:

Spk

Date:

7/20/08

Time:

1900

Relinquished by:

Spk

Date:

7/20/08

Time:

0850

Relinquished by:

Spk

Date:

7/21/07

Time:

0945

Remarks:

Spk

Date:

7/20/08

Time:

0850

Relinquished by:

Spk

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Spk

Date:

7/21/07

Time:

0945

Remarks:

Spk

Date:

7/20/08

Time:

0850

Relinquished by:



Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

September 01, 2017

Alan Brandon

GHD

6121 Indian School Road, NE #200

Albuquerque, NM 87110

TEL: (505) 884-0672

FAX

RE: Livingston Ridge SWD No 2

OrderNo.: 1708C84

Dear Alan Brandon:

Hall Environmental Analysis Laboratory received 3 sample(s) on 8/22/2017 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0190

Sincerely,

A handwritten signature in black ink, appearing to read 'Andy Freeman', is written over a horizontal line.

Andy Freeman

Laboratory Manager

4901 Hawkins NE

Albuquerque, NM 87109

Analytical Report

Lab Order: 1708C84

Date Reported: 9/1/2017

Hall Environmental Analysis Laboratory, Inc.**CLIENT:** GHD
Project: Livingston Ridge SWD No 2**Lab Order:** 1708C84**Lab ID:** 1708C84-001 **Collection Date:** 8/18/2017 10:53:00 AM
Client Sample ID: S-088210-35-081817-SP-SB-5-100 **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	48	30		mg/Kg	20	8/28/2017 6:01:52 PM	33585

Lab ID: 1708C84-002 **Collection Date:** 8/18/2017 11:40:00 AM
Client Sample ID: S-088210-35-081817-SP-SB-5-110 **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	760	30		mg/Kg	20	8/28/2017 6:14:16 PM	33585

Lab ID: 1708C84-003 **Collection Date:** 8/18/2017 12:22:00 PM
Client Sample ID: S-088210-35-081817-SP-SB-5-120 **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	82	30		mg/Kg	20	8/28/2017 6:26:40 PM	33585

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	RL	Reporting Detection Limit
	S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1708C84

01-Sep-17

Client: GHD

Project: Livingston Ridge SWD No 2

Sample ID	MB-33585	SampType:	mblk	TestCode:	EPA Method 300.0: Anions					
Client ID:	PBS	Batch ID:	33585	RunNo:	45254					
Prep Date:	8/28/2017	Analysis Date:	8/28/2017	SeqNo:	1434156	Units:	mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID	LCS-33585	SampType:	lcs	TestCode:	EPA Method 300.0: Anions					
Client ID:	LCSS	Batch ID:	33585	RunNo:	45254					
Prep Date:	8/28/2017	Analysis Date:	8/28/2017	SeqNo:	1434157	Units:	mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	90.3	90	110			

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Detection Limit
W Sample container temperature is out of limit as specified



Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: GHD

Work Order Number: 1708C84

RcptNo: 1

Received By: Isaiah Ortiz 8/22/2017 8:57:00 AM

Completed By: Michelle Garcia 8/22/2017 4:08:36 PM

Reviewed By: IMO 8/23/2017

I Ortiz

Michelle Garcia

Chain of Custody

1. Custody seals intact on sample bottles? Yes ☐ No ☐ Not Present ☒
2. Is Chain of Custody complete? Yes ☒ No ☐ Not Present ☐
3. How was the sample delivered? FedEx

Log In

4. Was an attempt made to cool the samples? Yes ☒ No ☐ NA ☐
5. Were all samples received at a temperature of $>0^{\circ}\text{C}$ to 6.0°C ? Yes ☒ No ☐ NA ☐
6. Sample(s) in proper container(s)? Yes ☒ No ☐
7. Sufficient sample volume for indicated test(s)? Yes ☒ No ☐
8. Are samples (except VOA and ONG) properly preserved? Yes ☒ No ☐
9. Was preservative added to bottles? Yes ☐ No ☒ NA ☐
10. VOA vials have zero headspace? Yes ☐ No ☐ No VOA Vials ☒
11. Were any sample containers received broken? Yes ☐ No ☒
12. Does paperwork match bottle labels?
(Note discrepancies on chain of custody) Yes ☒ No ☐
13. Are matrices correctly identified on Chain of Custody? Yes ☒ No ☐
14. Is it clear what analyses were requested? Yes ☒ No ☐
15. Were all holding times able to be met?
(If no, notify customer for authorization.) Yes ☒ No ☐
- # of preserved bottles checked for pH: _____
(<2 or >12 unless noted)
Adjusted? _____
Checked by: _____

Special Handling (if applicable)

16. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☒

Person Notified: _____ Date: _____
By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding: _____
Client Instructions: _____

17. Additional remarks:

18. Cooler Information

Cooler No	Temp $^{\circ}\text{C}$	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	0.1	Good	Not Present			



Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

August 28, 2017

Alan Brandon

GHD

6121 Indian School Road, NE #200

Albuquerque, NM 87110

TEL: (505) 884-0672

FAX

RE: Livingston Ridge SWD No 2

OrderNo.: 1708B40

Dear Alan Brandon:

Hall Environmental Analysis Laboratory received 2 sample(s) on 8/18/2017 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0190

Sincerely,

A handwritten signature in black ink, appearing to read 'Andy Freeman', is written over a horizontal line.

Andy Freeman

Laboratory Manager

4901 Hawkins NE

Albuquerque, NM 87109

Analytical ReportLab Order: **1708B40**Date Reported: **8/28/2017****Hall Environmental Analysis Laboratory, Inc.****CLIENT:** GHD
Project: Livingston Ridge SWD No 2**Lab Order:** 1708B40**Lab ID:** 1708B40-001 **Collection Date:** 8/16/2017 11:41:00 AM
Client Sample ID: S-088210-35-081617-SP-SB-6-85' **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	ND	30		mg/Kg	20	8/26/2017 12:09:13 AM	33563

Lab ID: 1708B40-002 **Collection Date:** 8/16/2017 11:44:00 AM
Client Sample ID: S-088210-35-081617-SP-SB-6-95' **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	ND	30		mg/Kg	20	8/26/2017 12:21:37 AM	33563

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	RL	Reporting Detection Limit
	S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1708B40

28-Aug-17

Client: GHD

Project: Livingston Ridge SWD No 2

Sample ID	MB-33563		SampType:	mblk		TestCode:	EPA Method 300.0: Anions				
Client ID:	PBS		Batch ID:	33563		RunNo:	45224				
Prep Date:	8/25/2017		Analysis Date:	8/25/2017		SeqNo:	1433002		Units:	mg/Kg	
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Chloride	ND	1.5									

Sample ID	LCS-33563		SampType: lcs		TestCode: EPA Method 300.0: Anions					
Client ID:	LCSS		Batch ID: 33563		RunNo: 45224					
Prep Date:	8/25/2017		Analysis Date: 8/25/2017		SeqNo: 1433003		Units: mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	96.3	90	110			

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Detection Limit
W Sample container temperature is out of limit as specified



Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: GHD

Work Order Number: 1708B40

RcptNo: 1

Received By: Sophia Campuzano 8/18/2017 9:15:00 AM

Completed By: Ashley Gallegos 8/18/2017 11:28:06 AM

Reviewed By: *grc 08/18/17*

Sophia Campuzano
AG

Chain of Custody

1. Custody seals intact on sample bottles? Yes ☐ No ☐ Not Present ☒
2. Is Chain of Custody complete? Yes ☒ No ☐ Not Present ☐
3. How was the sample delivered? Courier

Log In

4. Was an attempt made to cool the samples? Yes ☒ No ☐ NA ☐
5. Were all samples received at a temperature of $>0^{\circ}\text{C}$ to 6.0°C ? Yes ☒ No ☐ NA ☐
6. Sample(s) in proper container(s)? Yes ☒ No ☐
7. Sufficient sample volume for indicated test(s)? Yes ☒ No ☐
8. Are samples (except VOA and ONG) properly preserved? Yes ☒ No ☐
9. Was preservative added to bottles? Yes ☐ No ☒ NA ☐
10. VOA vials have zero headspace? Yes ☐ No ☐ No VOA Vials ☒
11. Were any sample containers received broken? Yes ☐ No ☒
12. Does paperwork match bottle labels?
(Note discrepancies on chain of custody) Yes ☒ No ☐
13. Are matrices correctly identified on Chain of Custody? Yes ☒ No ☐
14. Is it clear what analyses were requested? Yes ☒ No ☐
15. Were all holding times able to be met?
(If no, notify customer for authorization.) Yes ☒ No ☐

of preserved
bottles checked
for pH: _____
(<2 or >12 unless noted)
Adjusted? _____
Checked by: _____

Special Handling (if applicable)

16. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☒

Person Notified:	_____	Date:	_____
By Whom:	_____	Via:	<input type="checkbox"/> eMail <input type="checkbox"/> Phone <input type="checkbox"/> Fax <input type="checkbox"/> In Person
Regarding:	_____		
Client Instructions:	_____		

17. Additional remarks:

18. Cooler Information

Cooler No	Temp $^{\circ}\text{C}$	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	1.0	Good	Not Present			

Appendix C

Boring Logs



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 1 of 2

PROJECT NAME: LIVINGSTON RIDGE SWD NO. 2
PROJECT NUMBER: 088210-35
CLIENT: EOG RESOURCES
LOCATION: EDDY COUNTY, NEW MEXICO

HOLE DESIGNATION: SB-1
DATE COMPLETED: July 17, 2017
DRILLING METHOD: HSA
FIELD PERSONNEL: M. GANT

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	Chloride (mg/kg)
2	SC-CLAYEY SAND, fine grained, well sorted, reddish brown, dry							
4								
6								
8								
10	- light brown at 10.0ft BGS							
12								
14	- light reddish brown at 15.0ft BGS							
16								
18								
20	- very fine grained, brown at 20.0ft BGS			SB-1-20				
22								
24								
25.00		25.00						
26	SM-SILTY SAND, very fine grained, well sorted, brown, dry			SB-1-25				
28								
30	- reddish brown at 30.0ft BGS			SB-1-30				
32								
34				SB-1-35				
36								
38								
40				SB-1-40				
42								
44								
45	- fine grained, dark brown at 45.0ft BGS			SB-1-45				
46								

BACKFILLED
WITH
BENTONITE
CHIPS AND
SOIL

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 088210-WI.GPJ CRA_CORP.GDT 9/15/17



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 2 of 2

PROJECT NAME: LIVINGSTON RIDGE SWD NO. 2
PROJECT NUMBER: 088210-35
CLIENT: EOG RESOURCES
LOCATION: EDDY COUNTY, NEW MEXICO

HOLE DESIGNATION: SB-1
DATE COMPLETED: July 17, 2017
DRILLING METHOD: HSA
FIELD PERSONNEL: M. GANT

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	Chloride (mg/kg)
50	SC-CLAYEY SAND, very fine grained, light brown, well sorted, dry	50.00	CUTTINGS	SB-1-50				8300
52								
54								
56								
58								
60	- brown at 60.0ft BGS			SB-1-60				8300
62								
64								
66								
68								
70	CL-SANDY CLAY, very fine grained, well sorted, reddish brown, dry	70.00		SB-1-70				13000
72								
74								
76								
78								
80	SC-CLAYEY SAND, very fine grained, well sorted, brown, dry	80.00		SB-1-80				11000
82								
84	- reddish brown at 85.0ft BGS			SB-1-85				
86								
88								
90	END OF BOREHOLE @ 90.0ft BGS	90.00		SB-1-90				3400
92								
94								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 088210-WI.GPJ CRA_CORP.GDT 9/15/17



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 1 of 2

PROJECT NAME: LIVINGSTON RIDGE SWD NO. 2
PROJECT NUMBER: 088210-35
CLIENT: EOG RESOURCES
LOCATION: EDDY COUNTY, NEW MEXICO

HOLE DESIGNATION: SB-2
DATE COMPLETED: July 18, 2017
DRILLING METHOD: HSA
FIELD PERSONNEL: M. GANT

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	Chloride (mg/kg)
2	SC-CLAYEY SAND, fine grained, well sorted, reddish yellow, dry							
4								
6								
8								
10		10.00						
12	SM-SILTY SAND, very fine grained, well sorted, light brown, dry							
14								
16								
18								
20	- fine grained, reddish brown at 20.0ft BGS			SB-2-20				
22								
24								
26								
28								
30	- pink at 30.0ft BGS			SB-2-30				
32								
34								
36								
38								
40		40.00		SB-2-40				
42	SC-CLAYEY SAND, very fine grained, well sorted, reddish brown, dry							
44								
46								

BACKFILLED
WITH
BENTONITE
CHIPS AND
SOIL
CUTTINGS

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 088210-WI.GPJ CRA_CORP.CDT 9/15/17







STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 2 of 2

PROJECT NAME: LIVINGSTON RIDGE SWD NO. 2
PROJECT NUMBER: 088210-35
CLIENT: EOG RESOURCES
LOCATION: EDDY COUNTY, NEW MEXICO

HOLE DESIGNATION: SB-2
DATE COMPLETED: July 18, 2017
DRILLING METHOD: HSA
FIELD PERSONNEL: M. GANT

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	Chloride (mg/kg)
50	CL-SANDY CLAY, very fine grained, well sorted, slightly plastic, strong brown, dry	50.00		SB-2-50				7600
52								
54								
56								
58	- with sand at 60.0ft BGS							
60				SB-2-60				7700
62								
64								
66	SM-SILTY SAND, fine grained, well sorted, reddish yellow, dry							
68								
70		70.00		SB-2-70				6200
72								
74	END OF BOREHOLE @ 75.0ft BGS	75.00		SB-2-75				980
76								
78								
80								
82								
84								
86								
88								
90								
92								
94								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 088210-WI.GPJ CRA_CORP.GDT 9/15/17



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 1 of 2

PROJECT NAME: LIVINGSTON RIDGE SWD NO. 2
PROJECT NUMBER: 088210-35
CLIENT: EOG RESOURCES
LOCATION: EDDY COUNTY, NEW MEXICO

HOLE DESIGNATION: SB-3
DATE COMPLETED: July 19, 2017
DRILLING METHOD: HSA
FIELD PERSONNEL: M. GANT

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	Chloride (mg/kg)
2	SC-CLAYEY SAND, fine grained, well sorted, reddish yellow, dry							
4								
6								
8								
10	- very fine grained, light brown at 10.0ft BGS							
12								
14								
16	SM-SILTY SAND, very fine grained, well sorted, reddish yellow, dry	15.00						
18								
20				SB-3-20				
22								
24								
26	- strong brown at 25.0ft BGS			SB-3-25				
28								
30	SC-CLAYEY SAND, very fine grained, well sorted, reddish brown, dry	30.00						
32								
34								
36	CL-SANDY CLAY, very fine grained, well sorted, low plasticity, strong brown, dry	35.00		SB-3-35				
38								
40	SC-CLAYEY SAND, very fine grained, well sorted, reddish brown, dry	40.00		SB-3-40				
42								
44								
46				SB-3-45				

BACKFILLED
WITH
BENTONITE
CHIPS AND
SOIL
CUTTINGS

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 088210-WI.GPJ CRA_CORP.GDT 9/15/17




STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 2 of 2

PROJECT NAME: LIVINGSTON RIDGE SWD NO. 2
PROJECT NUMBER: 088210-35
CLIENT: EOG RESOURCES
LOCATION: EDDY COUNTY, NEW MEXICO

HOLE DESIGNATION: SB-3
DATE COMPLETED: July 19, 2017
DRILLING METHOD: HSA
FIELD PERSONNEL: M. GANT

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	Chloride (mg/kg)
50	CL-SANDY CLAY, very fine grained, well sorted, low plasticity, reddish brown, dry	50.00		SB-3-50				62
52								
54								
56								
58								
60	END OF BOREHOLE @ 60.0ft BGS	60.00		SB-3-60				88
62								
64								
66								
68								
70								
72								
74								
76								
78								
80								
82								
84								
86								
88								
90								
92								
94								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 088210-WI.GPJ CRA_CORP.CDT 9/15/17



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 1 of 2

PROJECT NAME: LIVINGSTON RIDGE SWD NO. 2
PROJECT NUMBER: 088210-35
CLIENT: EOG RESOURCES
LOCATION: EDDY COUNTY, NEW MEXICO

HOLE DESIGNATION: SB-4
DATE COMPLETED: July 19, 2017
DRILLING METHOD: HSA
FIELD PERSONNEL: M. GANT

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	Chloride (mg/kg)
2	SC-CLAYEY SAND, fine grained, well sorted, reddish yellow, dry							
4								
6								
8								
10	- very fine grained at 10.0ft BGS							
12								
14								
16	SM-SILTY SAND, very fine grained, well sorted, light brown, dry	15.00						
18								
20	SC-CLAYEY SAND, very fine grained, well sorted, light brown, dry	20.00		SB-4-20				
22								
24								
26	SM-SILTY SAND, very fine grained, well sorted, strong brown, dry	25.00		SB-4-25				
28								
30				SB-4-30				
32								
34								
36	CL-SANDY CLAY, very fine grained, well sorted, low plasticity, reddish brown, dry	35.00		SB-4-35				
38								
40	- strong brown at 40.0ft BGS			SB-4-40				870
42								
44								
46	SC-CLAYEY SAND, very fine grained, well sorted, reddish brown, dry	45.00		SB-4-45				

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 088210-WI.GPJ CRA_CORP.GDT 9/15/17



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 2 of 2

PROJECT NAME: LIVINGSTON RIDGE SWD NO. 2
PROJECT NUMBER: 088210-35
CLIENT: EOG RESOURCES
LOCATION: EDDY COUNTY, NEW MEXICO

HOLE DESIGNATION: SB-4
DATE COMPLETED: July 19, 2017
DRILLING METHOD: HSA
FIELD PERSONNEL: M. GANT

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	Chloride (mg/kg)
50	END OF BOREHOLE @ 50.0ft BGS	50.00		SB-4-50				79
52								
54								
56								
58								
60								
62								
64								
66								
68								
70								
72								
74								
76								
78								
80								
82								
84								
86								
88								
90								
92								
94								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 088210-WI.GPJ CRA_CORP.GDT 9/15/17



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 1 of 3

PROJECT NAME: LIVINGSTON RIDGE SWD NO. 2

HOLE DESIGNATION: SB-5

PROJECT NUMBER: 088210-35

DATE COMPLETED: August 18, 2017

CLIENT: EOG RESOURCES

DRILLING METHOD: HSA

LOCATION: EDDY COUNTY, NEW MEXICO

FIELD PERSONNEL: S. PEREZ

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	Chloride (mg/kg)
	SEE SB-1 FOR STRATIGRAPHIC DETAILS							
2								
4								
6								
8								
10								
12								
14								
16								
18								
20								
22								
24								
26								
28								
30								
32								
34								
36								
38								
40								
42								
44								
46								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 088210-WI.GPJ CRA_CORP.CDT 9/15/17



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 2 of 3

PROJECT NAME: LIVINGSTON RIDGE SWD NO. 2

HOLE DESIGNATION: SB-5

PROJECT NUMBER: 088210-35

DATE COMPLETED: August 18, 2017

CLIENT: EOG RESOURCES

DRILLING METHOD: HSA

LOCATION: EDDY COUNTY, NEW MEXICO

FIELD PERSONNEL: S. PEREZ

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	Chloride (mg/kg)
50								
52								
54								
56								
58								
60								
62								
64								
66								
68								
70								
72								
74								
76								
78								
80								
82								
84								
86								
88								
90		90.00						
92	SC-CLAYEY SAND, with silt, coarse grained, poorly graded, brown, dry							
94								

BACKFILLED
WITH
BENTONITE
CHIPS AND
SOIL
CUTTINGS

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 088210-WI.GPJ CRA_CORP.GDT 9/15/17



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 3 of 3

PROJECT NAME: LIVINGSTON RIDGE SWD NO. 2
PROJECT NUMBER: 088210-35
CLIENT: EOG RESOURCES
LOCATION: EDDY COUNTY, NEW MEXICO

HOLE DESIGNATION: SB-5
DATE COMPLETED: August 18, 2017
DRILLING METHOD: HSA
FIELD PERSONNEL: S. PEREZ

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	Chloride (mg/kg)
98								
100	SP-SAND, with silt, trace clay, coarse grained sandstone, poorly graded, brown, dry	100.00		SB-5-20				48
102								
104								
106								
108								
110				SB-5-25				760
112								
114								
116								
118								
120	- trace silt and clay at 120.0ft BGS			SB-5-30				82
122								
124								
126								
128								
130	END OF BOREHOLE @ 130.0ft BGS	130.00		SB-5-35				
132								
134								
136								
138								
140								
142								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 088210-WI.GPJ CRA_CORP.GDT 9/15/17



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 1 of 3

PROJECT NAME: LIVINGSTON RIDGE SWD NO. 2

HOLE DESIGNATION: SB-6

PROJECT NUMBER: 088210-35

DATE COMPLETED: August 16, 2017

CLIENT: EOG RESOURCES

DRILLING METHOD: HSA

LOCATION: EDDY COUNTY, NEW MEXICO

FIELD PERSONNEL: S. PEREZ

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	Chloride (mg/kg)
	SEE SB-1 FOR STRATIGRAPHIC DETAILS							
2								
4								
6								
8								
10								
12								
14								
16								
18								
20								
22								
24								
26								
28								
30								
32								
34								
36								
38								
40								
42								
44								
46								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 088210-WI.GPJ CRA_CORP.GDT 9/15/17



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 2 of 3

PROJECT NAME: LIVINGSTON RIDGE SWD NO. 2
PROJECT NUMBER: 088210-35
CLIENT: EOG RESOURCES
LOCATION: EDDY COUNTY, NEW MEXICO

HOLE DESIGNATION: SB-6
DATE COMPLETED: August 16, 2017
DRILLING METHOD: HSA
FIELD PERSONNEL: S. PEREZ

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	Chloride (mg/kg)
50			← BACKFILLED WITH BENTONITE CHIPS AND SOIL CUTTINGS					
52								
54								
56								
58								
60								
62								
64								
66								
68								
70								
72								
74								
76	CL-SILTY CLAY, few sand, fine grained, reddish brown, dry	75.00						
78								
80								
82								
84								
86				SB-6-85			45	<30
88	SW-SILTY SAND, trace fine gravel, coarse grained, well graded, reddish brown, dry	86.50						
90								
92								
94				SB-6-95			15	<30

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 088210-WI.GPJ CRA_CORP.CDT 9/15/17



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 3 of 3

PROJECT NAME: LIVINGSTON RIDGE SWD NO. 2
PROJECT NUMBER: 088210-35
CLIENT: EOG RESOURCES
LOCATION: EDDY COUNTY, NEW MEXICO

HOLE DESIGNATION: SB-6
DATE COMPLETED: August 16, 2017
DRILLING METHOD: HSA
FIELD PERSONNEL: S. PEREZ

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (%)	N' VALUE	Chloride (mg/kg)
	END OF BOREHOLE @ 96.5ft BGS	96.50	///		X			
98								
100								
102								
104								
106								
108								
110								
112								
114								
116								
118								
120								
122								
124								
126								
128								
130								
132								
134								
136								
138								
140								
142								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 088210-WI.GPJ CRA_CORP.CDT 9/15/17