

# **WESTERN ENVIRONMENT AND ECOLOGY, INC**

February 7<sup>th</sup>, 2017

Kent Carlson  
Carlson and Associates  
12460 1<sup>st</sup> Street  
P.O. Box 274  
Eastlake, Colorado 80614-0247

Subject: Limited Phase II Environmental Site Assessment for the Holly Hills Subdivision at 144<sup>th</sup> Avenue and Holly Street, Thornton, Colorado. Western Environment and Ecology, Inc. Project Number 82-052-01.

Dear Mr. Carlson:

Western Environment and Ecology, Inc. (Western Environment) is pleased to present the following Limited Phase II Environment Site Assessment of the above referenced property (Figure 1). This assessment was performed in accordance with the conclusions presented in a limited Phase II Environmental Site Assessment prepared by CTL Thompson Inc. dated January 9<sup>th</sup>, 2017 (Project # DN48,669.000-205), and following a January 16<sup>th</sup>, 2017 meeting between yourself and Scott Carlson of Carlson and Associates, Terry Hodge and Tony Dunning of Toll Brothers, Matthew Wardlow of CTL Thompson and Western Environment. The purpose of this investigation is to determine the extent and magnitude of soil and groundwater contamination encountered in the January 9<sup>th</sup> CTL assessment. It was the opinion Mr. Wardlow that the contamination was a result of petroleum production activities, likely a leaking valve connected to a produced water tank. The tank and all ancillary production equipment had been removed in 2015.

On January 23<sup>rd</sup>, 2017, Western Environment completed three groundwater monitoring wells adjacent to, and down gradient of, the CTL Thompson borings that encountered petroleum contamination. These wells were advanced using a Mobil 60 truck mounted drill with 8 inch hollow stem augers and a continuous sampler. The borings for wells TB-19, 20 and 21 were extended to a maximum depth of 35 feet below grade. The extracted soil samples were screened both visually and using a photo-ionization detector (PID) for indications of contamination. No soil samples exhibited elevated PID values or were visually contaminated, therefore no soil from the monitoring wells was selected for analysis. Lithologic logs and well completion diagrams were constructed using USCS soil classification system and are attached to this report.

Upon completion of the borings, screw-type 2" PVC casing was extended to the total depth of the hole. Ten or fifteen feet of 20 slot well screen was placed at the bottom of the wells with 10/20 silica sand set from the bottom to approximately 2 feet above the screened interval. Bentonite "crumbles" were then set to the surface and hydrated. Tamper resistant well covers were installed on all the wells. The top of casing datums were surveyed for each of the wells and was used to prepare the potentiometric surface map that indicated groundwater flow to the west (Figure 2).

**2217 WEST POWERS AVENUE \* LITTLETON, COLORADO 80120**  
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Subsequently, on January 24<sup>th</sup>, 2017 Western Environment advanced eleven soil borings bracketing the CTL Thompson borings that identified petroleum contamination. The borings were completed with a 7730 Track Mounted GeoProbe using 2 inch drive rods. Continuous soil samples were taken from each boring to a maximum depth of 19 feet or refusal. Lithologic logs, constructed using USCS soil classification system, are attached to this report.

The extracted soil samples were again screened with a PID and visually inspected for evidence of contamination. One soil sample from each boring that displayed the highest PID value was selected for analysis. If no elevated PID readings were detected and visually the sample did not appear contaminated, no sample was acquired for analysis. The samples selected for analysis were taken, using appropriate quality assurance and quality control methods and transported, under chain of custody controls, to Technology Laboratories in Fort Collins, Colorado. The samples were analyzed for benzene, toluene, ethyl-benzene and xylene (BTEX) and Total Volatile Petroleum Hydrocarbons (TVPH) utilizing EPA Method 8260B. The results are attached to the Appendix of the report. Additionally, the wells, completed the prior day, were developed in accordance with US EPA Guidance Document SW-846 in anticipation of sampling.

On January 25<sup>th</sup>, 2017, the static water level and water quality, consisting of pH, conductivity and dissolved oxygen, was measured in each well. Two 40.0 ml vials were collected from the wells for BTEX and TVPH analysis and also transported to Technology Laboratories in Fort Collins, the results are attached.

On February 2<sup>nd</sup>, 2017 Western Environment received the analytical results from the soil and water samples. These results and the Colorado Oil and Gas Conservation Commission (COGCC) Rule 900 soil and groundwater guideline concentrations are presented on the attached Table 1. Both water samples taken were below COGCC and US EPA Drinking Water Maximum Concentrations Levels (MCL's). Laboratory analysis of the soil samples reported that several of the samples exceeded the COGCC concentrations levels.

Therefor, based upon these results, and the opinions presented during the January 17<sup>th</sup> meeting, Western Environment recommends that the petroleum hydrocarbon contaminated soil identified, currently estimated to be approximately 550 cubic yards (Figure 3), be excavated, transported and disposed of at an approved facility. However, we currently do not recommend any groundwater remediation, however, we would recommend four quarters of monitoring and analysis for BTEX and TVPH to confirm groundwater concentrations below drinking water MCL's.

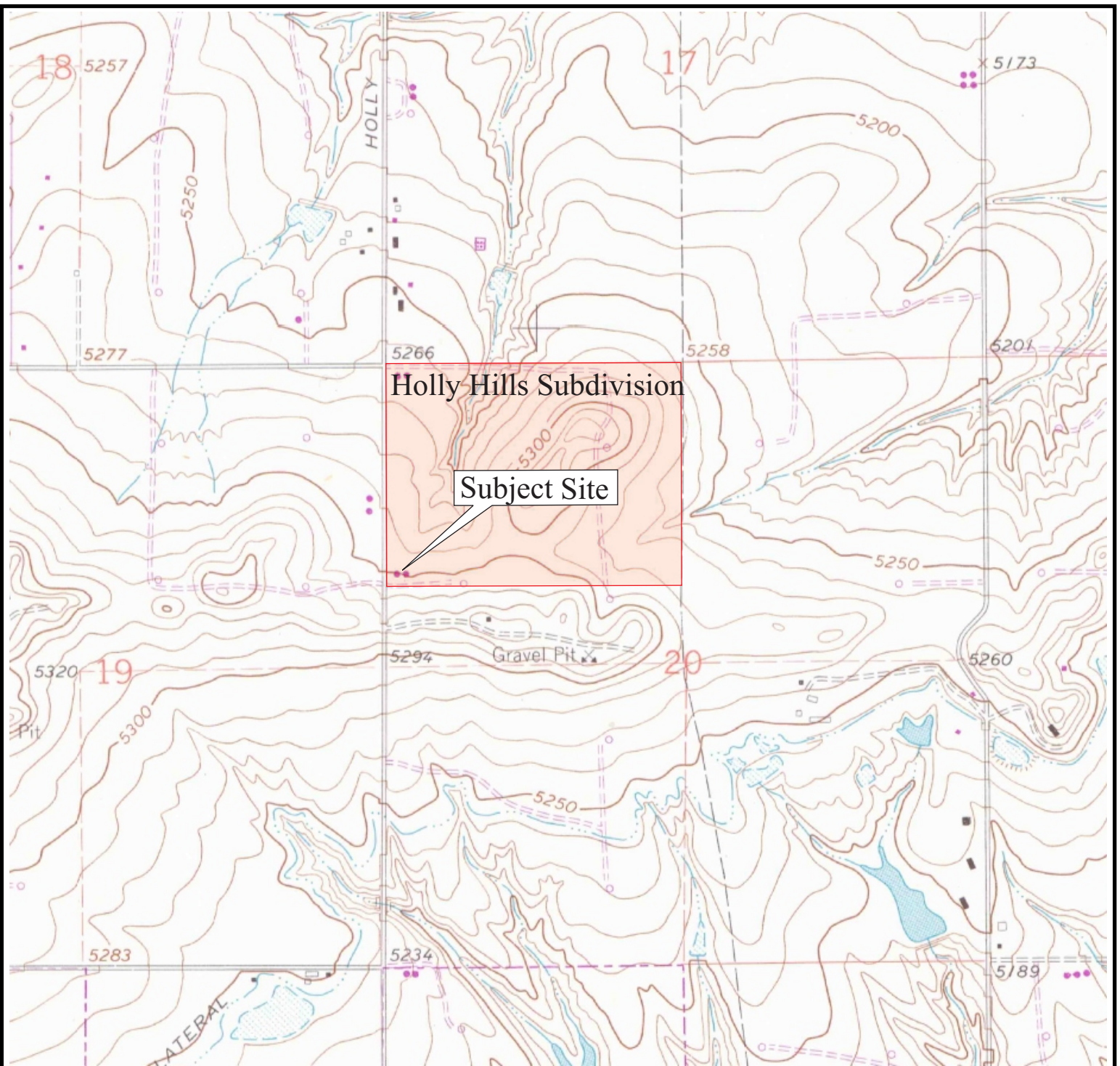
At our request Jack McCartney of McCartney Engineering, LLC, the approved signatory for the current facility operator Energy Search, filed a Form 19 Report of a Release with the COGCC. He also provided us a Form 27 Remediation Plan that we will complete and following your review, he will file.

We appreciate the opportunity to provide you with this assessment. Please feel free to contact us if you have any questions or comments.

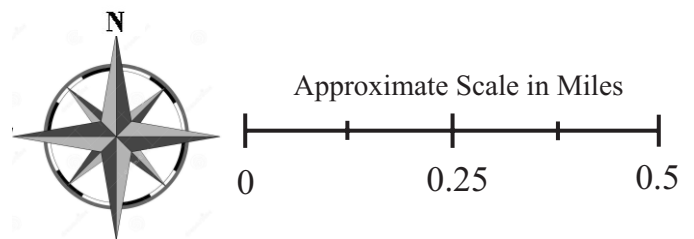
Sincerely,  
WESTERN ENVIRONMENT AND ECOLOGY, INC.

Greg D. Sherman P.G.  
President

att.



USGS Eastlake Qaudrangle, 7.5 Minutes Series, 1980



WESTERN ENVIRONMENT  
AND ECOLOGY, INC.  
2217 West Powers Avenue  
Littleton, Colorado 80120

Figure 1 - Site Location Map  
Holly Hills Subdivision  
144<sup>th</sup> Avenue and Holly Street  
Thornton, Colorado





● Temporary monitoring well

○ Soil Boring Location

○ Approximate Extent of Soil Contamination

69.80 Groundwater Elevation  
as of January 24th, 2017

TH-14,15,16 installed by CTL-Thompson, Inc.

TH-19,20,21 installed by Western Environment and Ecology, Inc.

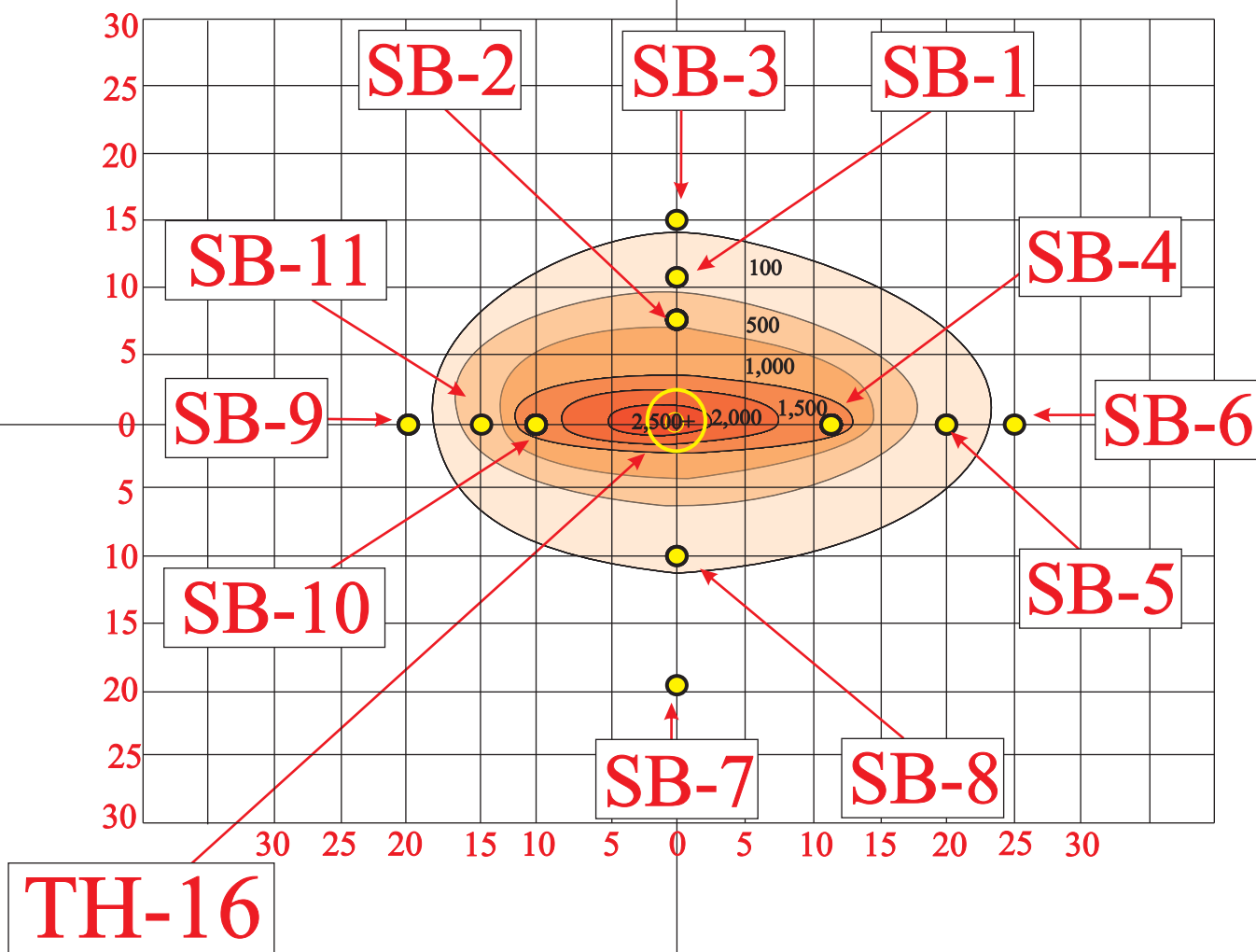





Approximate scale in feet

0 100 200

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Littleton, Colorado 80120

**Figure 2 - Groundwater Well Location Map**  
Holly Hills Subdivision  
144<sup>th</sup> Avenue and Holly Street  
Thornton, Colorado

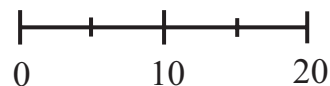


-  **TH-16** Groundwater Monitoring Well
-  **SB-7** Soil Borings
-  Approximate Extent of Soil Contamination of TPH -Total Petroleum Hydrocarbons (mg/Kg)

TH-16 installed by CTL-Thompson, Inc.  
 SB-1 through 11 completed by Western Environment and Ecology, Inc.

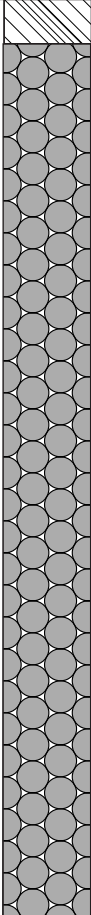



Approximate scale in feet






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Figure 3 - Soil Boring Location Map  
 Holly Hills Subdivision  
 144<sup>th</sup> Avenue and Holly Street  
 Thornton, Colorado

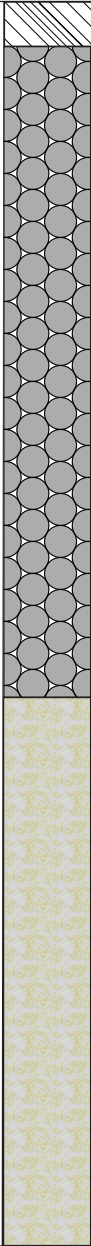

Client Carlson and Associates		Drilling Information					
Project Number 82-052-01		Date Started 1/23/2017		Date Completed 1/23/2017			
Project Location 144th and Holly		Method Mobile 60		Total Depth 39.0'			
Boring No. TH-19		Well Completion Information					
Logged by A. Curry, R. Corrales		Screen/Casing Diameter 2"		Screen Length 15'			
Approved by Greg Sherman		Slot Size 20		Casing Length 24'			
Drilled by Site Services		Top of Casing Datum 91.78'		Type PVC 1.5 foot riser			
Depth (ft)	Description	PID	Sample Interval/ Sample Type	Soil Classification	Blow Count	Well Completion	Water Level
—	Light brown clayey sand, dry.	0 ppm	CS	SC			
—							
—							
—							
5							
—							
—							
—							
10							
—							
—							
15	Light brown/white clayey sand, dry.	0 ppm		SC			
—							
—							
—							
10							
—							
—							
—							
15							
—							
—							
20	Light reddish yellow clayey sand, dry.	0 ppm					
—							
—							
—							
15							
—							
—							
—							
20							
—							
—							
25	Dark gray sandy clay with limonite staining and calcite streaks, dry.	0 ppm		CL			
—							
—							
—							
20							
—							
—							
—							
25							
—							
—							
30	Light gray claystone, with limonite staining, dry.	0 ppm					
—							
—							
—							
25							
—							
—							
—							
30							
—							
—							

Legend	
	Concrete
	Bentonite
	Sand

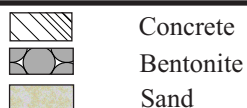
SS - Split Spoon Sample Type CS - Continuous Sampler  
ST - Pressed Shelby Tube CBS - California Barrel Sampler

Legend	
	Concrete
	Bentonite
	Sand

SS - Split Spoon	Sample Type	CS - Continuous Sampler
ST - Pressed Shelby Tube		CBS - California Barrel Sampler




Client Carlson and Associates		Drilling Information													
Project Number 82-052-01		Date Started 1/23/2017		Date Completed 1/23/2017											
Project Location 144th and Holly		Method Mobile 60		Total Depth 34.0'											
Boring No. TH-20		Well Completion Information													
Logged by A. Curry, R. Corrales		Screen/Casing Diameter 2"		Screen Length 10'											
Approved by Greg Sherman		Slot Size 20		Casing Length 19'											
Drilled by Site Services		Top of Casing Datum 91.78'		Type PVC with 1.5' riser											
Depth (ft)	Description	PID	Sample Interval/ Sample Type	Soil Classification	Blow Count	Well Completion	Water Level								
—	Light brown clayey sand, dry, calcite streaking from 3-4 feet.	0 ppm	CS ↓	SC											
—		0 ppm													
—		0 ppm													
5		0 ppm													
—		0 ppm													
—	Calcite streaking, dry.	0 ppm		CL											
10		0 ppm													
—		0 ppm													
—		Light gray clayey sand, dry.						0 ppm							
—								0 ppm							
—	0 ppm														
15	0 ppm														
—	0 ppm														
—	Dark gray sandy clay with reddish yellow limonite staining, dry.	0 ppm													
—		0 ppm													
—		0 ppm													
20		0 ppm													
—		0 ppm													
—	Light gray to light brown sandy clay, dry.	0 ppm													
—		0 ppm													
—		0 ppm													
25		0 ppm													
—		0 ppm													
—	Dark gray sandy clay, dry.	0 ppm													
—		0 ppm													
—		0 ppm													
30		0 ppm													
—		0 ppm													
—	Light gray claystone, dry, horizontal bedding.	0 ppm						↓							

Legend






SS - Split Spoon Sample Type  
ST - Pressed Shelby Tube  
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Legend	
	Concrete
	Bentonite
	Sand

SS - Split Spoon	Sample Type	CS - Continuous Sampler
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Legend	
	Concrete
	Bentonite
	Sand

Sample Type  
SS - Split Spoon      CS - Continuous Sampler  
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Legend	
	Concrete
	Bentonite
	Sand

SS - Split Spoon	Sample Type	CS - Continuous Sampler
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Client Carlson and Associates		Drilling Information						
Project Number 82-052-01		Date Started 1/24/2017			Date Completed 1/24/2017			
Project Location 144th and Holly		Method 7730 Track Mounted GeoProbe			Total Depth 19'			
Boring No. SB-1		Well Completion Information						
Logged by Austin Curry		Screen/Casing Diameter -			Screen Length -			
Approved by Greg Sherman		Slot Size -			Casing Length -			
Drilled by Site Services Drilling		Top of Casing Datum -			Type -			
Depth (ft)	Description	PID	Sample Interval/ Sample Type	Soil Classi- fication	Blow Count	Well Completion		Water Level
5	Light brown clayey sand dry.	0 ppm	CS <div>↓</div>	SC				
10	Light brown clayey sand. (Sample @ 10.0')	22.9 ppm						
		35.6 ppm						
15	Grayish brown, sandy clay	0 ppm			CL			
20	Reddish yellow, sandy clay							
	<b>Total depth 19.0'</b>	0ppm						
25								
30								

SS - Split Spoon      Sample Type      CS - Continuous Sampler  
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Client Carlson and Associates		Drilling Information					
Project Number 82-052-01		Date Started 1/24/2017			Date Completed 1/24/2017		
Project Location 144th and Holly		Method 7730 Track Mounted GeoProbe			Total Depth 12'		
Boring No. SB-2		Well Completion Information					
Logged by A. Curry		Screen/Casing Diameter -			Screen Length -		
Approved by Greg Sherman		Slot Size -			Casing Length -		
Drilled by Site Services Drilling		Top of Casing Datum -			Type -		

Depth (ft)	Description	PID	Sample Interval/ Sample Type	Soil Classification	Blow Count	Well Completion	Water Level
5	Light brown, clay sand, dry.	65.5 ppm	CS	SC			
	Dark gray, clayey sand, hydrocarbon staining.	10.0ppm					
		1.5 ppm					
		2.5 ppm					
10	Dark gray, clayey sand, hydrocarbon staining. (Sample @ 10.0')	258.0 ppm					
		335.0ppm					
		33.6ppm					
	Refusal at 12.0 ft						
15							
20							
25							
30							

SS - Split Spoon      Sample Type      CS - Continuous Sampler

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Client Carlson and Associates		Drilling Information					
Project Number 82-052-01		Date Started 1/24/2017		Date Completed 1/24/2017			
Project Location 144th and Holly		Method 7730 Track Mounted GeoProbe		Total Depth 17'			
Boring No. SB-3		Well Completion Information					
Logged by A. Curry		Screen/Casing Diameter -		Screen Length -			
Approved by Greg Sherman		Slot Size -		Casing Length -			
Drilled by Site Services Drilling		Top of Casing Datum -		Type -			

Depth (ft)	Description	PID	Sample Interval/ Sample Type	Soil Classification	Blow Count	Well Completion	Water Level
5	Light brown clayey sand, dry.	0ppm	CS	SC			
10	Light brown clayey sand, dry.	0ppm		SC			
15		0ppm					
20	Refusal at 17.0 ft						
25							
30							

SS - Split Spoon      Sample Type      CS - Continuous Sampler

ST - Pressed Shelby Tube      CBS - California Barrel Sampler

Client Carlson and Associates		Drilling Information					
Project Number 82-052-01		Date Started 1/24/2017			Date Completed 1/24/2017		
Project Location 144th and Holly		Method 7730 Track Mounted GeoProbe			Total Depth 15'		
Boring No. SB-4		Well Completion Information					
Logged by A. Curry		Screen/Casing Diameter -			Screen Length -		
Approved by Greg Sherman		Slot Size -			Casing Length -		
Drilled by Site Services Drilling		Top of Casing Datum -			Type -		

Depth (ft)	Description	PID	Sample Interval/ Sample Type	Soil Classification	Blow Count	Well Completion	Water Level
0	Light brown, sandy clay	0 ppm	CS ↓	SC			
5	Dark gray clayey sand, with hydrocarbon staining.	36.0 ppm 69.0 ppm					
10	Dark gray clayey sand with hydrocarbon staining.	125.0 ppm 225.0 ppm 257.0 ppm 275.0 ppm		SC			
15	(Sample @ 13.0')	409.0 ppm 450.0 ppm					
	Refusal at 15.0 ft						
20							
25							
30							

SS - Split Spoon      Sample Type      CS - Continuous Sampler  
 ST - Pressed Shelby Tube      CBS - California Barrel Sampler

Client Carlson and Associates		Drilling Information					
Project Number 82-052-01		Date Started 1/24/2017		Date Completed 1/24/2017			
Project Location 144th and Holly		Method 7730 Track Mounted GeoProbe		Total Depth 16'			
Boring No. SB-5		Well Completion Information					
Logged by A. Curry		Screen/Casing Diameter -		Screen Length -			
Approved by Greg Sherman		Slot Size -		Casing Length -			
Drilled by Site Services Drilling		Top of Casing Datum		Type -			
Depth (ft)	Description	PID	Sample Interval/ Sample Type	Soil Classification	Blow Count	Well Completion	Water Level
—	Light brown clayey sand, dry.	0ppm	CS	SC			
5	Light brown clayey sand, dry.	0ppm	↓				
10	Brownish yellow clayey sand, dry.	0ppm		SC			
15	Dark gray sand with hydrocarbon staining. (Sample @ 15.5')	70.5ppm	↓				
20	Refusal at 16.0 ft.						
25							
30							

SS - Split Spoon      Sample Type      CS - Continuous Sampler  
 ST - Pressed Shelby Tube      CBS - California Barrel Sampler



Client Carlson and Associates		Drilling Information						
Project Number 82-052-01		Date Started 1/24/2017			Date Completed 1/24/2017			
Project Location 144th and Holly		Method 7730 Track Mounted GeoProbe			Total Depth 17'			
Boring No. SB-6		Well Completion Information						
Logged by A. Curry		Screen/Casing Diameter -			Screen Length -			
Approved by Greg Sherman		Slot Size -			Casing Length -			
Drilled by Site Services Drilling		Top of Casing Datum -			Type -			
Depth (ft)	Description	PID	Sample Interval/ Sample Type	Soil Classification	Blow Count	Well Completion	Water Level	
0	Light brown clayey sand, dry.	0 ppm	CS	SC				
5	Light brown clayey sand, dry.	0 ppm						
10	Brownish yellow clayey sand, dry.	0 ppm		SC				
15		0 ppm						
20	Refusal at 17.0 ft							
25								
30								

SS - Split Spoon      Sample Type      CS - Continuous Sampler  
 ST - Pressed Shelby Tube      CBS - California Barrel Sampler

Client Carlson and Associates		Drilling Information					
Project Number 82-052-01		Date Started 1/24/2017		Date Completed 1/24/2017			
Project Location 144th and Holly		Method 7730 Track Mounted GeoProbe		Total Depth 16.5'			
Boring No. SB-7		Well Completion Information					
Logged by A. Curry		Screen/Casing Diameter -		Screen Length -			
Approved by Greg Sherman		Slot Size -		Casing Length -			
Drilled by Site Services Drilling		Top of Casing Datum -		Type -			
Depth (ft)	Description	PID	Sample Interval/ Sample Type	Soil Classification	Blow Count	Well Completion	Water Level
5	Light brown clayey sand, dry.	0 ppm	CS	SC			
10	Light brown clayey sand, dry.	0 ppm		SC			
15	Brownish yellow clayey sand, dry.	0 ppm					
20	Refusal at 17.0 ft						
25							
30							

SS - Split Spoon      Sample Type      CS - Continuous Sampler  
ST - Pressed Shelby Tube      CBS - California Barrel Sampler

Client Carlson and Associates		Drilling Information					
Project Number 82-052-01		Date Started 1/24/2017		Date Completed 1/24/2017			
Project Location 144th and Holly		Method 7730 Track Mounted GeoProbe		Total Depth 15'			
Boring No. SB-8		Well Completion Information					
Logged by A. Curry		Screen/Casing Diameter -		Screen Length -			
Approved by Greg Sherman		Slot Size -		Casing Length -			
Drilled by Site Services Drilling		Top of Casing Datum -		Type -			
Depth (ft)	Description	PID	Sample Interval/ Sample Type	Soil Classi- fication	Blow Count	Well Completion	Water Level
0	Light brown clayey sand, dry.	0 ppm	CS	SC			
5	Brownish yellow clayey sand, dry.	0 ppm					
10	Dark gray clayey sand with hydrocarbon staining.	4.0 ppm					
		2.0 ppm					
		4.0 ppm					
		40.0 ppm					
15	(Sample @ 14.0')	150.0 ppm					
	Refusal at 15.0 ft	15.0 ppm					
20							
25							
30							

SS - Split Spoon      Sample Type      CS - Continuous Sampler  
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Client Carlson and Associates		Drilling Information						
Project Number 82-052-01		Date Started 1/24/2017			Date Completed 1/24/2017			
Project Location 144th and Holly		Method 7730 Track Mounted GeoProbe			Total Depth 15'			
Boring No. SB-9		Well Completion Information						
Logged by A. Curry		Screen/Casing Diameter -			Screen Length -			
Approved by Greg Sherman		Slot Size -			Casing Length -			
Drilled by Site Services Drilling		Top of Casing Datum -			Type -			
Depth (ft)	Description	PID	Sample Interval/ Sample Type	Soil Classi- fication	Blow Count	Well Completion		Water Level
— — — — 5 — — — — 10 — — — — 15 — — — — 20 — — — — 25 — — — — 30	Light brown clayey sand, dry.	0 ppm	CS	SC				
	Light brown clayey sand, dry.	0 ppm						
	Brownish yellow clayey sand, dry.	3.0 ppm 5.0 ppm 17.0 ppm 2.0 ppm	↓	SC				
	<b>Refusal at 15.0 ft</b>							

SS - Split Spoon      Sample Type      CS - Continuous Sampler  
ST - Pressed Shelby Tube      CBS - California Barrel Sampler



Client Carlson and Associates		Drilling Information					
Project Number 82-052-01		Date Started 1/24/2017		Date Completed 1/24/2017			
Project Location 144th and Holly		Method 7730 Track Mounted GeoProbe		Total Depth 15'			
Boring No. SB-10		Well Completion Information					
Logged by A. Curry		Screen/Casing Diameter -		Screen Length -			
Approved by Greg Sherman		Slot Size -		Casing Length -			
Drilled by Site Services Drilling		Top of Casing Datum -		Type -			

Depth (ft)	Description	PID	Sample Interval/ Sample Type	Soil Classi- fication	Blow Count	Well Completion	Water Level
5	Dark gray clayey sand with hydrocarbon staining.		CS	SC			
		40.0 ppm					
		180.0 ppm					
	Dark gray clayey sand with hydrocarbon staining.	45.0 ppm					
		195.0 ppm					
		595.0 ppm					
10	(Sample @ 19.0')	705.0 ppm					
		135.0 ppm					
		105.0 ppm					
		225.0 ppm					
		225.0 ppm					
		250.0 ppm					
15		695.0 ppm					
	Refusal at 15.0 ft	697.0 ppm					
20							
25							
30							

SS - Split Spoon      Sample Type      CS - Continuous Sampler  
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Client Carlson and Associates		Drilling Information						
Project Number 82-052-01		Date Started 1/24/2017			Date Completed 1/24/2017			
Project Location 144th and Holly		Method 7730 Track Mounted GeoProbe			Total Depth 15'			
Boring No. SB-11		Well Completion Information						
Logged by A. Curry		Screen/Casing Diameter -			Screen Length -			
Approved by Greg Sherman		Slot Size -			Casing Length -			
Drilled by Site Services Drilling		Top of Casing Datum -			Type -			
Depth (ft)	Description	PID	Sample Interval/ Sample Type	Soil Classi- fication	Blow Count	Well Completion	Water Level	
5	Dark gray clayey sand with hydrocarbon staining.	65.0 ppm	CS	SC				
		225.0 ppm						
10	Dark gray clayey sand with hydrocarbon staining.	240.0 ppm						
		250.0 ppm						
		525.0 ppm						
15	Brownish yellow clayey sand.	499.0 ppm						
		50.0 ppm						
	<b>Refusal at 15.0 ft</b>							
20								
25								
30								

SS - Split Spoon      Sample Type      CS - Continuous Sampler  
ST - Pressed Shelby Tube      CBS - California Barrel Sampler



# TECHNOLOGY LABORATORY, INC.

## CENTRE PROFESSIONAL PARK

1012 Centre Avenue  
Fort Collins, Colorado 80526  
(970) 490-1414

### CERTIFICATE OF ANALYSIS

Western Environment & Ecology  
2217 W. Powers Ave  
Littleton, CO 80120

Sample ID: SB-1 @ 10.0'

Laboratory ID B5644-01

Sampled: 01/24/17

Received: 01/26/17

Project No.: 082-052-01

Matrix: Soil

<u>CAS Number</u>	<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>MDL</u>	<u>Method</u>	<u>Date Analyzed</u>
71-43-2	Benzene	< 0.01	mg/Kg	0.01	EPA-8260B	01/30/17
108-88-3	Toluene	< 0.01	mg/Kg	0.01	EPA-8260B	01/30/17
100-41-4	Ethylbenzene	< 0.01	mg/Kg	0.01	EPA-8260B	01/30/17
1330-20-7	Total Xylenes	0.02	mg/Kg	0.01	EPA-8260B	01/30/17
N/A	GRO (TVPH)	328	mg/Kg	0.5	EPA-8260B	01/30/17

### QA/QC SURROGATE RECOVERIES

<u>Compound</u>	<u>% Recovery</u>	<u>% Rec. Limits</u>
Dibromofluoromethane	117	68-120
Toluene-d8	90	81-128
Bromofluorobenzene	95	70-113

TECHNOLOGY LABORATORY, INC.

The results contained in this report  
relate only to those items tested.



# TECHNOLOGY LABORATORY, INC.

## CENTRE PROFESSIONAL PARK

1012 Centre Avenue  
Fort Collins, Colorado 80526  
(970) 490-1414

### CERTIFICATE OF ANALYSIS

Western Environment & Ecology  
2217 W. Powers Ave  
Littleton, CO 80120

Sample ID: SB-2 @ 10.0'

Laboratory ID B5644-02

Sampled: 01/24/17

Received: 01/26/17

Project No.: 082-052-01

Matrix: Soil

<u>CAS Number</u>	<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>MDL</u>	<u>Method</u>	<u>Date Analyzed</u>
71-43-2	Benzene	< 0.01	mg/Kg	0.01	EPA-8260B	01/27/17
108-88-3	Toluene	0.09	mg/Kg	0.01	EPA-8260B	01/27/17
100-41-4	Ethylbenzene	2.07	mg/Kg	0.01	EPA-8260B	01/27/17
1330-20-7	Total Xylenes	7.81	mg/Kg	0.01	EPA-8260B	01/27/17
N/A	GRO (TVPH)	709	mg/Kg	0.5	EPA-8260B	01/27/17

### QA/QC SURROGATE RECOVERIES

<u>Compound</u>	<u>% Recovery</u>	<u>% Rec. Limits</u>
Dibromofluoromethane	99	68-120
Toluene-d8	99	81-128
Bromofluorobenzene	90	70-113

TECHNOLOGY LABORATORY, INC.

The results contained in this report  
relate only to those items tested.





# TECHNOLOGY LABORATORY, INC.

## CENTRE PROFESSIONAL PARK

1012 Centre Avenue  
Fort Collins, Colorado 80526  
(970) 490-1414

### CERTIFICATE OF ANALYSIS

Western Environment & Ecology  
2217 W. Powers Ave  
Littleton, CO 80120

Sample ID: SB-4 @ 13.0'

Laboratory ID B5644-03

Sampled: 01/24/17

Received: 01/26/17

Project No.: 082-052-01

Matrix: Soil

<u>CAS Number</u>	<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>MDL</u>	<u>Method</u>	<u>Date Analyzed</u>
71-43-2	Benzene	0.13	mg/Kg	0.01	EPA-8260B	01/27/17
108-88-3	Toluene	0.06	mg/Kg	0.01	EPA-8260B	01/27/17
100-41-4	Ethylbenzene	7.98	mg/Kg	0.01	EPA-8260B	01/27/17
1330-20-7	Total Xylenes	44.5	mg/Kg	0.01	EPA-8260B	01/27/17
N/A	GRO (TVPH)	1725	mg/Kg	0.5	EPA-8260B	01/27/17

### QA/QC SURROGATE RECOVERIES

<u>Compound</u>	<u>% Recovery</u>	<u>% Rec. Limits</u>
Dibromofluoromethane	101	68-120
Toluene-d8	99	81-128
Bromofluorobenzene	93	70-113

TECHNOLOGY LABORATORY, INC.

The results contained in this report  
relate only to those items tested.



# TECHNOLOGY LABORATORY, INC.

## CENTRE PROFESSIONAL PARK

1012 Centre Avenue  
Fort Collins, Colorado 80526  
(970) 490-1414

### CERTIFICATE OF ANALYSIS

Western Environment & Ecology  
2217 W. Powers Ave  
Littleton, CO 80120

Sample ID: SB-5 @ 15.5'

Laboratory ID B5644-04

Sampled: 01/24/17

Received: 01/26/17

Project No.: 082-052-01

Matrix: Soil

<u>CAS Number</u>	<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>MDL</u>	<u>Method</u>	<u>Date Analyzed</u>
71-43-2	Benzene	< 0.01	mg/Kg	0.01	EPA-8260B	01/30/17
108-88-3	Toluene	< 0.01	mg/Kg	0.01	EPA-8260B	01/30/17
100-41-4	Ethylbenzene	0.01	mg/Kg	0.01	EPA-8260B	01/30/17
1330-20-7	Total Xylenes	0.04	mg/Kg	0.01	EPA-8260B	01/30/17
N/A	GRO (TVPH)	239	mg/Kg	0.5	EPA-8260B	01/30/17

### QA/QC SURROGATE RECOVERIES

<u>Compound</u>	<u>% Recovery</u>	<u>% Rec. Limits</u>
Dibromofluoromethane	110	68-120
Toluene-d8	93	81-128
Bromofluorobenzene	96	70-113

TECHNOLOGY LABORATORY, INC.

The results contained in this report  
relate only to those items tested.



# TECHNOLOGY LABORATORY, INC.

## CENTRE PROFESSIONAL PARK

1012 Centre Avenue  
Fort Collins, Colorado 80526  
(970) 490-1414

### CERTIFICATE OF ANALYSIS

Western Environment & Ecology  
2217 W. Powers Ave  
Littleton, CO 80120

Sample ID: SB-8 @ 14.0'

Laboratory ID B5644-05

Sampled: 01/24/17

Received: 01/26/17

Project No.: 082-052-01

Matrix: Soil

<u>CAS Number</u>	<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>MDL</u>	<u>Method</u>	<u>Date Analyzed</u>
71-43-2	Benzene	< 0.01	mg/Kg	0.01	EPA-8260B	01/27/17
108-88-3	Toluene	< 0.01	mg/Kg	0.01	EPA-8260B	01/27/17
100-41-4	Ethylbenzene	0.01	mg/Kg	0.01	EPA-8260B	01/27/17
1330-20-7	Total Xylenes	0.08	mg/Kg	0.01	EPA-8260B	01/27/17
N/A	GRO (TVPH)	114	mg/Kg	0.5	EPA-8260B	01/27/17

### QA/QC SURROGATE RECOVERIES

<u>Compound</u>	<u>% Recovery</u>	<u>% Rec. Limits</u>
Dibromofluoromethane	99	68-120
Toluene-d8	101	81-128
Bromofluorobenzene	87	70-113

TECHNOLOGY LABORATORY, INC.

The results contained in this report  
relate only to those items tested.



## TECHNOLOGY LABORATORY, INC.

### CENTRE PROFESSIONAL PARK

1012 Centre Avenue  
Fort Collins, Colorado 80526  
(970) 490-1414

### CERTIFICATE OF ANALYSIS

Western Environment & Ecology  
2217 W. Powers Ave  
Littleton, CO 80120

Sample ID: SB-10 @ 9.0'

Laboratory ID B5644-06

Sampled: 01/24/17

Received: 01/26/17

Project No.: 082-052-01

Matrix: Soil

<u>CAS Number</u>	<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>MDL</u>	<u>Method</u>	<u>Date Analyzed</u>
71-43-2	Benzene	1.04	mg/Kg	0.01	EPA-8260B	01/30/17
108-88-3	Toluene	9.04	mg/Kg	0.01	EPA-8260B	01/30/17
100-41-4	Ethylbenzene	7.19	mg/Kg	0.01	EPA-8260B	01/30/17
1330-20-7	Total Xylenes	42.4	mg/Kg	0.01	EPA-8260B	01/30/17
N/A	GRO (TVPH)	1938	mg/Kg	0.5	EPA-8260B	01/30/17

### QA/QC SURROGATE RECOVERIES

<u>Compound</u>	<u>% Recovery</u>	<u>% Rec. Limits</u>
Dibromofluoromethane	105	68-120
Toluene-d8	91	81-128
Bromofluorobenzene	97	70-113

TECHNOLOGY LABORATORY, INC.

The results contained in this report  
relate only to those items tested.



# TECHNOLOGY LABORATORY, INC.

## CENTRE PROFESSIONAL PARK

1012 Centre Avenue  
Fort Collins, Colorado 80526  
(970) 490-1414

### CERTIFICATE OF ANALYSIS

Western Environment & Ecology  
2217 W. Powers Ave  
Littleton, CO 80120

Sample ID: TH-16

Laboratory ID B5644-07

Sampled: 01/25/17

Received: 01/26/17

Project No.: 082-052-01

Matrix: Water

<u>CAS Number</u>	<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>MDL</u>	<u>Method</u>	<u>Date Analyzed</u>
71-43-2	Benzene	0.002	mg/L	0.001	EPA-8260B	01/27/17
108-88-3	Toluene	< 0.001	mg/L	0.001	EPA-8260B	01/27/17
100-41-4	Ethylbenzene	0.015	mg/L	0.001	EPA-8260B	01/27/17
1330-20-7	Total Xylenes	0.086	mg/L	0.001	EPA-8260B	01/27/17
N/A	GRO (TVPH)	0.71	mg/L	0.5	EPA-8260B	01/27/17

### QA/QC SURROGATE RECOVERIES

<u>Compound</u>	<u>% Recovery</u>	<u>% Rec. Limits</u>
Dibromofluoromethane	99	68-120
Toluene-d8	102	81-128
Bromofluorobenzene	92	70-113

TECHNOLOGY LABORATORY, INC.

The results contained in this report  
relate only to those items tested.





## TECHNOLOGY LABORATORY, INC.

### CENTRE PROFESSIONAL PARK

1012 Centre Avenue  
Fort Collins, Colorado 80526  
(970) 490-1414

### CERTIFICATE OF ANALYSIS

Western Environment & Ecology  
2217 W. Powers Ave  
Littleton, CO 80120

Sample ID: TH-21

Laboratory ID B5644-08

Sampled: 01/25/17

Received: 01/26/17

Project No.: 082-052-01

Matrix: Water

<u>CAS Number</u>	<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>MDL</u>	<u>Method</u>	<u>Date Analyzed</u>
71-43-2	Benzene	< 0.001	mg/L	0.001	EPA-8260B	01/27/17
108-88-3	Toluene	0.001	mg/L	0.001	EPA-8260B	01/27/17
100-41-4	Ethylbenzene	< 0.001	mg/L	0.001	EPA-8260B	01/27/17
1330-20-7	Total Xylenes	0.002	mg/L	0.001	EPA-8260B	01/27/17
N/A	GRO (TVPH)	< 0.5	mg/L	0.5	EPA-8260B	01/27/17

### QA/QC SURROGATE RECOVERIES

<u>Compound</u>	<u>% Recovery</u>	<u>% Rec. Limits</u>
Dibromofluoromethane	102	68-120
Toluene-d8	102	81-128
Bromofluorobenzene	92	70-113

TECHNOLOGY LABORATORY, INC.

The results contained in this report  
relate only to those items tested.



# TECHNOLOGY LABORATORY, INC.

1012 CENTRE AVENUE  
FORT COLLINS, CO 80526  
Phone: (970)490-1414 Fax: (970)472-5488  
www.techlabusa.com info@techlabusa.com

W.O. NUMBER 65644

## CHAIN-OF-CUSTODY REPORT

COMPANY NAME <u>WESTERN ENVIRONMENT &amp; Ecology</u>		ANALYSIS REQUESTED												OTHER							
PROJECT MANAGER <u>GREG SHERMAN</u>																					
PROJECT NUMBER <u>082-052-01</u>																					
PROJECT LOCATION OR NAME <u>144th &amp; Holly</u>																					
SAMPLER'S SIGNATURE <u>[Signature]</u>																					
SAMPLE ID	DATE/TIME SAMPLED	SAMPLE MATRIX: SOIL (S) AIR (A)	NUMBER OF CONTAINERS	BTEX / MTBE / (VPH) 8260 / 8015	TEPH (DRO)	OIL & GREASE	VOC 624 / 8260 (TOTAL / TCLP)	SVOC 625 / 8270 / PAH (TOTAL / TCLP)	pH / TSS / TDS	RCRA 8 METALS (TOTAL / TCLP / DISSOLVED)	React. / Ignite. / Corr. / Paint Filt.	BTEX / TVPH Emissions Vapor	BTEX Soil Vapor	TO-14 / TO-15 / TVPH Vapor	NITRATE / NITRITE / AMMONIA	BOD / COD	PCBs	HOLD AFTER ANALYSIS		HOLD, DON'T ANALYZE	
01	SB-120 10.0'	S	1	X																	
02	SB-220 10.0'	S	1	X																	
03	SB-420 13.0'	S	1	X																	
04	SB-520 15.5'	S	1	X																	
05	SB-820 14.0'	S	1	X																	
06	SB-1020 9.0'	S	1	X																	
07	TH-16	W	2	X																	
08	TH-21	W	2	X																	

PAGE 1 OF 1

☒ Normal (≤10 Working Days)  
☐ 3 Day (1.5 x Normal Rates)  
☐ Next Day (2 x Normal Rates)  
☐ Same Day (4 x Normal Rates)

TURNAROUND TIME

DISCHARGE PERMIT? YES NO

COMMENTS:

LOGGED IN BY: Robert Hansen  
Sample: ☒ ≤6° C ☐ None ☐ Other  
Preservative: ☐ Acid ☐ Filtered

RELINQUISHED BY: Austin Currey DATE: 1-26-17 TIME: 13:06  
COMPANY: WEE  
RELINQUISHED BY: Robert Hansen DATE: 1-26-17 TIME: 13:45  
COMPANY: INX 1847 EXPRES

January 9, 2017

Toll Brothers, Inc.  
10 Inverness Drive East, Suite 215  
Englewood, Colorado 80112

Attention: Mr. Terry Hodge  
Mr. Tony Dunning

Subject: Limited Phase II Environmental Site Assessment (ESA)  
Holly Hills Subdivision  
CTL Project No. DN48,669.000-205

## **INTRODUCTION**

This report presents the field and analytical results for soil and groundwater samples collected during the Limited Phase II Environmental Site Assessment (ESA) of the proposed Holly Hills Subdivision located southeast of East 144<sup>th</sup> Avenue and Holly Street in Thornton, Colorado.

## **BACKGROUND**

CTL | Thompson (CTL) conducted a Phase I ESA of the proposed Holly Hills Subdivision located southeast of East 144<sup>th</sup> Avenue and Holly Street under our Project No. DN48,669-200 (report dated November 29, 2016). The following Recognized Environmental Condition was identified:

- The current and historic presence of oil/gas wells at the Site.

The objective of this Phase II ESA was to assess soils and groundwater in the vicinity of seven oil/gas well features identified during the Phase I ESA. This scope of work is not intended to fully delineate the horizontal and vertical extent of contamination. Borings were installed in locations that would more likely indicate the presence of contamination. If contamination was identified, the limited number of borings and samples would not necessarily identify the extent or the source of contamination nor should the concentrations imply that these are the highest concentrations on the Site. For example, any one of these borings could be moved ten or more feet and higher concentrations of contamination could be identified. The presence of contamination during the Phase II is an indicator of contamination and additional investigation would be required to determine the source, extent, and highest concentration of contamination.



## FIELD ASSESSMENT AND SAMPLING

Prior to mobilization, CTL notified the public and private utility locating services to have utility locations marked in the field.

On December 13 and 14, 2016, Mr. Trevor Branch of CTL mobilized to the site with subcontractor Odell Drilling. At the time of drilling, all of the surface features had been removed/abandoned. Drilling locations were established from COGCC records, aerial photo imagery and field observations during our Phase I ESA. Mr. Branch returned to the site on December 20, 2016 to complete sampling of temporary monitoring wells. A truck-mounted auger drill rig was used to advance 18 soil borings in the approximate locations shown on Figure 1 surrounding the seven separate oil/gas well features. During advancement of each boring, soil samples were collected using a split-spoon sampler in 5-foot intervals to a maximum depth of 30 feet below grade.

Soils from split-spoon samples were observed in the field using disposable nitrile examination gloves changed after every sample. After the soils were visually inspected, the soil sample was divided. A portion of the sample was transferred into a plastic zip-loc bag and sealed; the other portion of the sample was promptly placed into a uniquely identified glass jar and packed tightly to minimize voids. Sample jars were then placed into a cooler chilled with ice for in-field storage and transit to the laboratory.

We used a MiniRAE 2000 photo ionization detector (PID) and our visual and olfactory observations to field-screen soils observed during drilling. The PID was calibrated to isobutylene. We screened soil samples from varying depths in the boreholes. During field-screening, samples were placed in resealable plastic bags for testing with the PID. The bagged samples were warmed and the vapor headspace inside the bags was then field-screened. The PID detects total vapor volatile organic compounds with the ionization potential of less than or equal to 10.6 eV. The PID does not provide a direct measure of compounds in the samples and it does not identify specific compounds, therefore, the results of field-screening are identified in units of parts per million volume (in air) (ppmv).

Following completion of soil sampling, 2-inch PVC casings with slotted screen were inserted into eight borings (TH-3, TH-5, TH-6, TH-10, TH-11, TH-15, TH-16, TH-18) as temporary wells to facilitate groundwater sampling. Groundwater samples were collected using disposable bailing devices.

Soil and groundwater samples collected for laboratory analysis were delivered under chain of custody protocol to Origins Laboratory in Denver, Colorado, an independent analytical laboratory.

## FIELD OBSERVATIONS

Figure 1 shows boring locations. Boring logs are presented as Attachment 1.



## **Soils**

Soils were generally sandy clays and clayey sands underlain by claystone and sandstone bedrock. No unusual staining or odors were observed in soils collected from the borings, and no elevated PID readings were recorded in the majority of the samples. Petroleum hydrocarbon odors were noted in two of the borings (TH-6 and TH-16). In TH-6 petroleum hydrocarbon odors and staining were noted at approximately the 15-foot depth and PID reading of 60 ppmv was recorded from that sample. In TH-16 petroleum hydrocarbon odors and staining were noted in the soils from approximately a 5-foot depth to 20-foot depth with the highest PID reading of 890 recorded at 15-foot depth. Saturated soils were only encountered at the 30-foot depth in borings TH-15 and TH-16.

## **Groundwater**

Groundwater was encountered and sampled in two of the eight temporary wells. The wells were not completed as permanent monitoring wells and were not surveyed. Groundwater was encountered at approximately 28 feet below ground surface in TH-15 and TH-16. Groundwater from each well was observed to be clear after moderately purging each well. No sheens, unusual odors or other obvious visual evidence of contamination was observed during sampling of groundwater.

## **LABORATORY ANALYTICAL RESULTS**

Figure 2 shows soil results and Figure 3 shows groundwater results.

## **Soils**

A total of eight samples were collected from varying depths, with at least one sample collected for each feature area. The soil samples were analyzed for the volatile organic compounds (VOCs) Benzene, Toluene, Ethylbenzene and Xylenes (BTEX) by EPA Method 8260 and Total Petroleum Hydrocarbons (TPH) by EPA Method 8015. Laboratory analytical results are presented in Attachment 2, and soil analytical results are summarized on Table 1 below.

The soil sample collected from the 15-foot depth in TH-16 was the only analyzed sample that had petroleum analytes encountered above laboratory detection limits. The laboratory results are summarized below in Table I:



Table I  
Summarized Soil Results

Analyte	TH-16 at 15'	COGCC Standard
TPH	<b>5,189</b>	500
Benzene	<b>0.194</b>	0.17
Toluene	0.234	85
Ethylbenzene	6.81	100
Xylenes (Total)	23.7	175

COGCC = Colorado Oil and Gas Conservation Commission

TPH = Total Petroleum Hydrocarbons

**BOLD** = Exceeds COGCC Standard

Note: All concentrations in milligrams per kilogram (mg/kg)

As seen in the table above, the soil sample from TH-16 exceeds the COGCC action level with regards to TPH and Benzene.

### **Groundwater**

Of the eight temporary monitoring wells that were installed, only two produced groundwater when checked seven days after drilling, in TH-15 and TH-16. The groundwater results are summarized in the table below:

Table II  
Summarized Groundwater Results

Analyte	TH-15	TH-16	CDPHE GW Standard
Benzene	ND	<b>55.4</b>	5.0
Toluene	ND	4.56	560
Ethylbenzene	ND	62.4	700
Xylenes (Total)	ND	295	1,400

CDPHE GW = Colorado Department of Public Health and Environment Groundwater

ND = Non-Detect

**BOLD** = Exceeds CDPHE GW Standard

Note: All concentrations in micrograms per liter (µg/L)

As seen in the table above, the four analyzed compounds were found above laboratory detection limits; however, only Benzene exceeded the groundwater standard in the sample collected from TH-16. BTEX was non-detect in the groundwater sample collected from TH-15.

### **CONCLUSIONS AND RECOMMENDATIONS**

Petroleum contamination was encountered in two of the eighteen borings that were installed as part of this investigation. The soil sample collected from boring TH-6 exhibited odors and staining in the field; however, the soil sample that was collected and analyzed in the laboratory did not have concentrations of BTEX or TPH above detection limits.





The soil in the area of boring TH-16 encountered noticeable contamination from the 5-foot depth to the 20-foot depth. The soil sample that was analyzed from the 15-foot depth (highest PID reading) exceeded standards for TPH and Benzene. The groundwater sample collected from this boring exceeded the state groundwater standard for Benzene.

As the purpose of this investigation was not to fully delineate the extent of contamination, it is recommended that additional investigation be conducted in the areas of TH-6 and TH-16 to determine extent of contamination if residences are planned to be constructed near these areas. CTL recommends that the operators/former operators of these wells be contacted to discuss the possibility of additional investigation and remediation. If this is not feasible than the COGCC should be contacted.

## LIMITATIONS

The subsurface investigation and chemical analyses were performed for specific parameters, as detailed in this letter. The accuracy and reliability of environmental studies are a reflection of the number and type of samples taken and extent of the analyses conducted, and are thus inherently limited and dependent upon the resources expended. An independent laboratory performed laboratory analysis. We are not responsible for the accuracy of data presented by others. The services performed should not be interpreted as providing any guarantee that the materials are free and clear of all hazardous materials.

We believe that our services were conducted in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing under similar conditions in the locality of the project. No warranty, express or implied, is made.

Thank you for choosing us to assist you with this project. If you have any questions or would like further clarification regarding this letter, please call.

Very truly yours,

CTL | THOMPSON, INC.

Trevor M. Branch, E.I.T.  
Environmental Staff Engineer

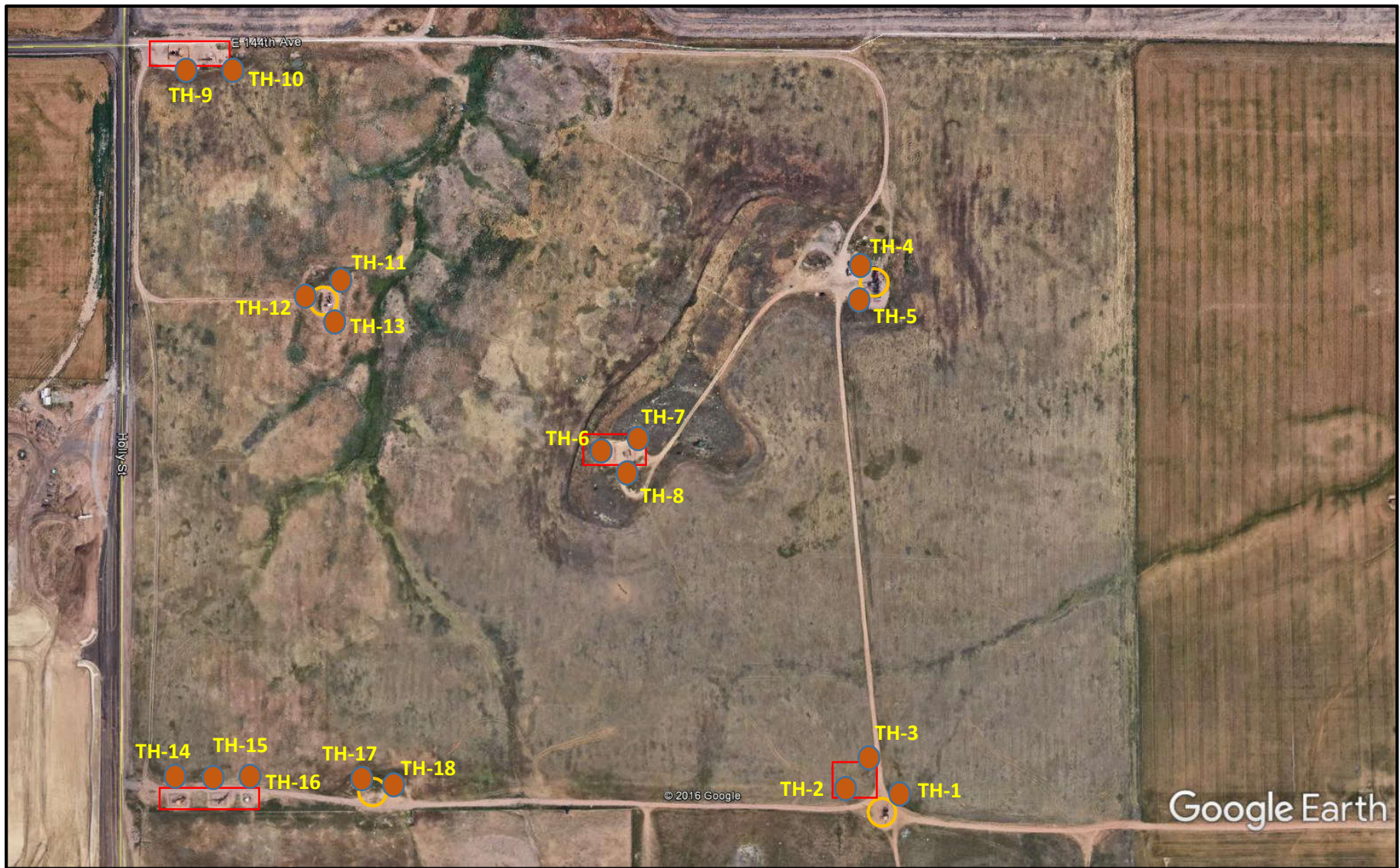
Reviewed by:

Matthew L. Wardlow, P.E.  
Environmental Department Manager

TMB:MLW/ot

Via E-mail: [thodge@tollbrothersinc.com](mailto:thodge@tollbrothersinc.com)  
[adunning@tollbrothersinc.com](mailto:adunning@tollbrothersinc.com)





● Environmental boring location

□ Oil/gas well feature location  
(i.e. tank battery/separator/water storage tank)

○ Abandoned oil/gas well location

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HOLLY HILLS SUBDIVISION  
DN48,669-205

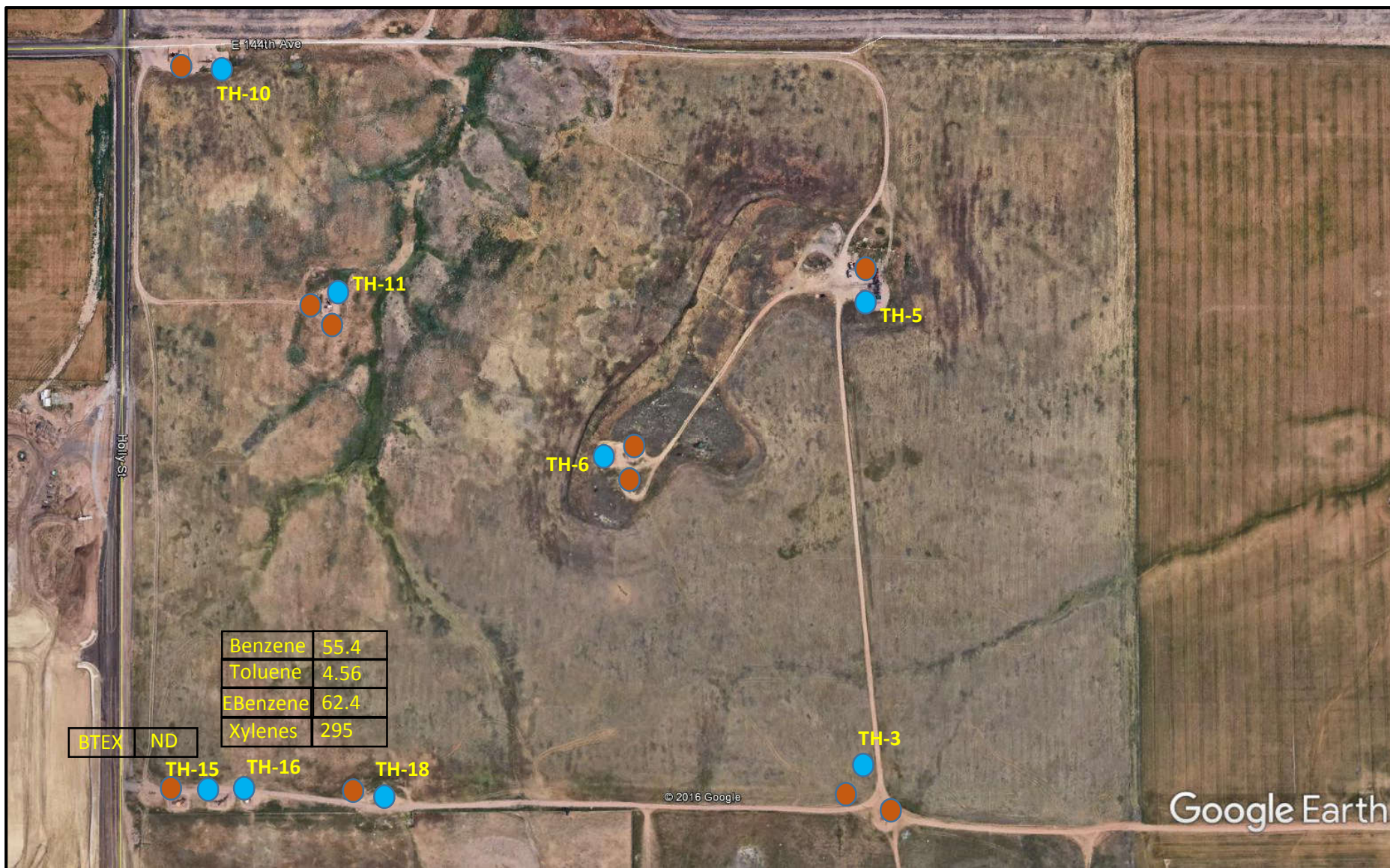
**Figure 1**  
**Boring Location Map**





● Environmental boring location



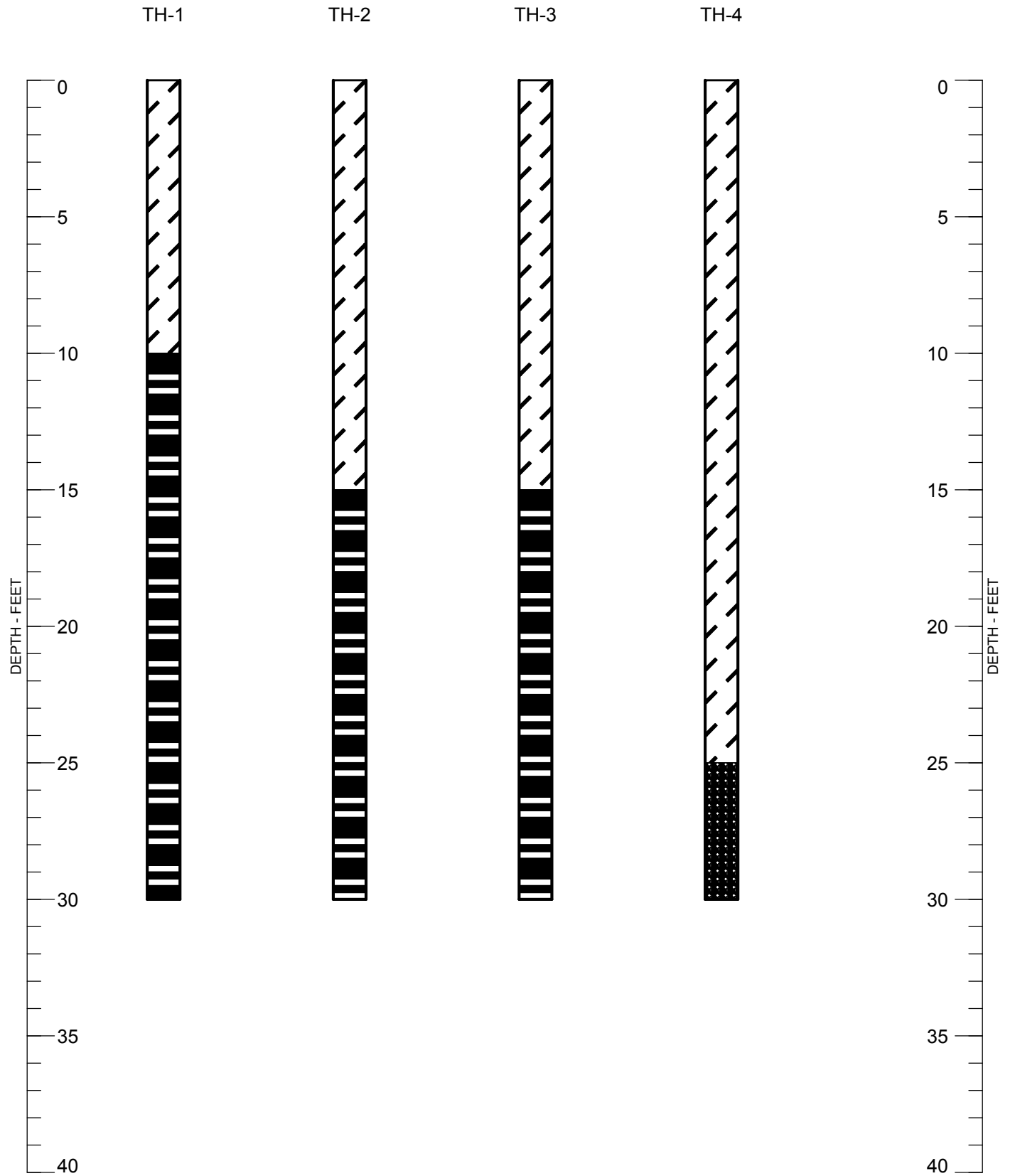
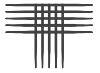


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 HOLLY HILLS SUBDIVISION  
 DN48,669-205

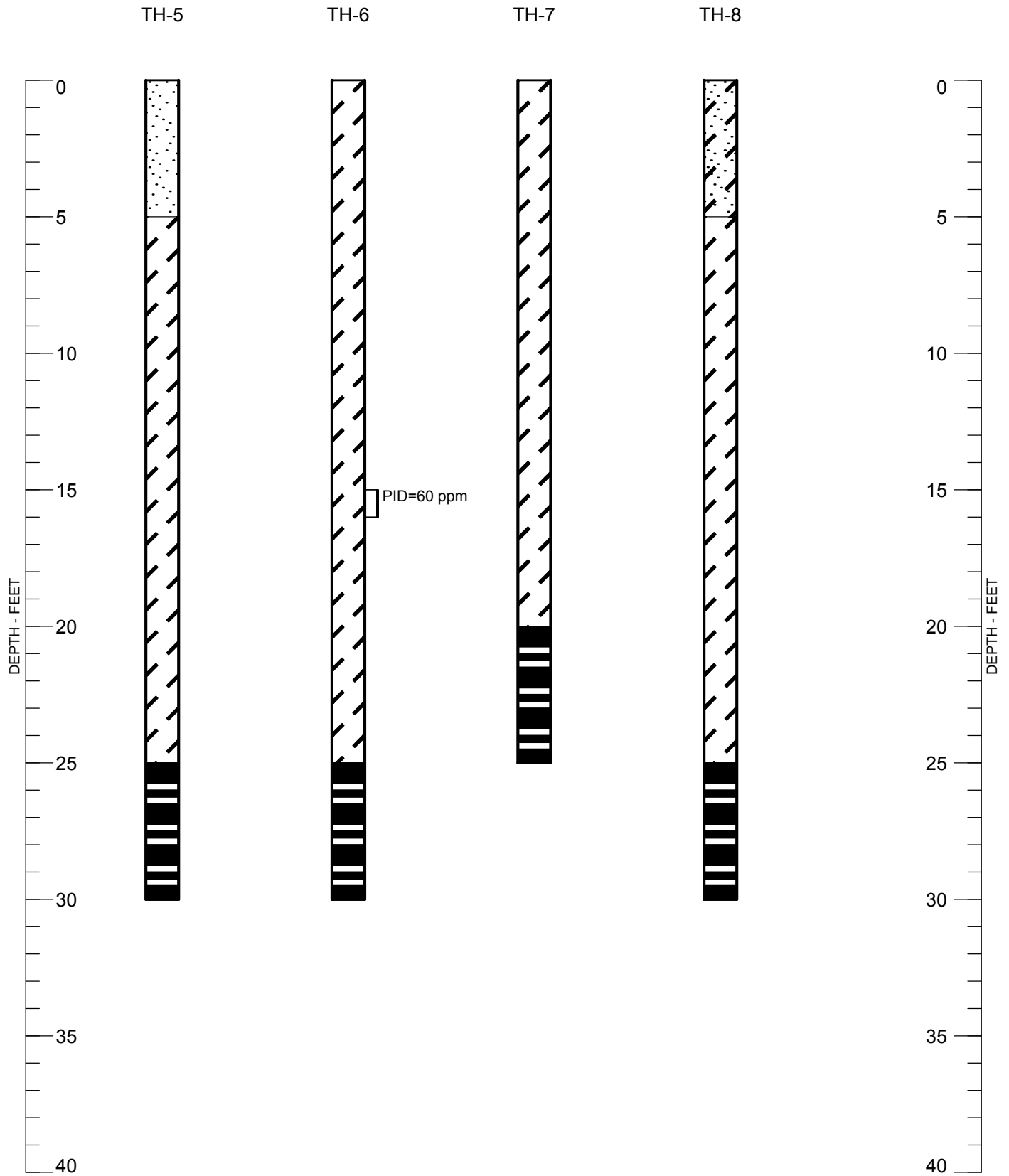
Figure 3  
 Groundwater Results Map



## ATTACHMENT 1 BORING LOGS

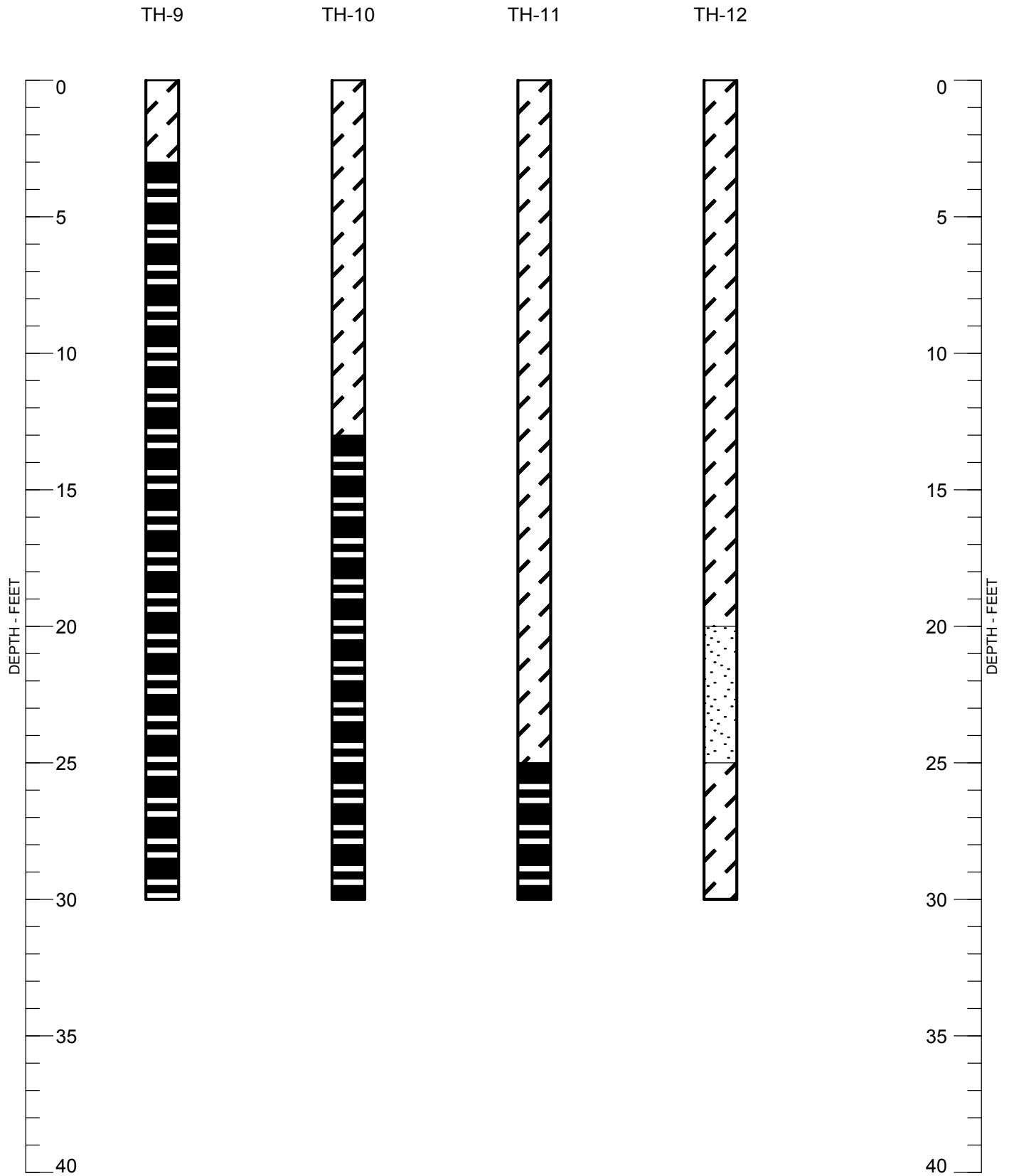


### SUMMARY LOGS OF EXPLORATORY BORINGS

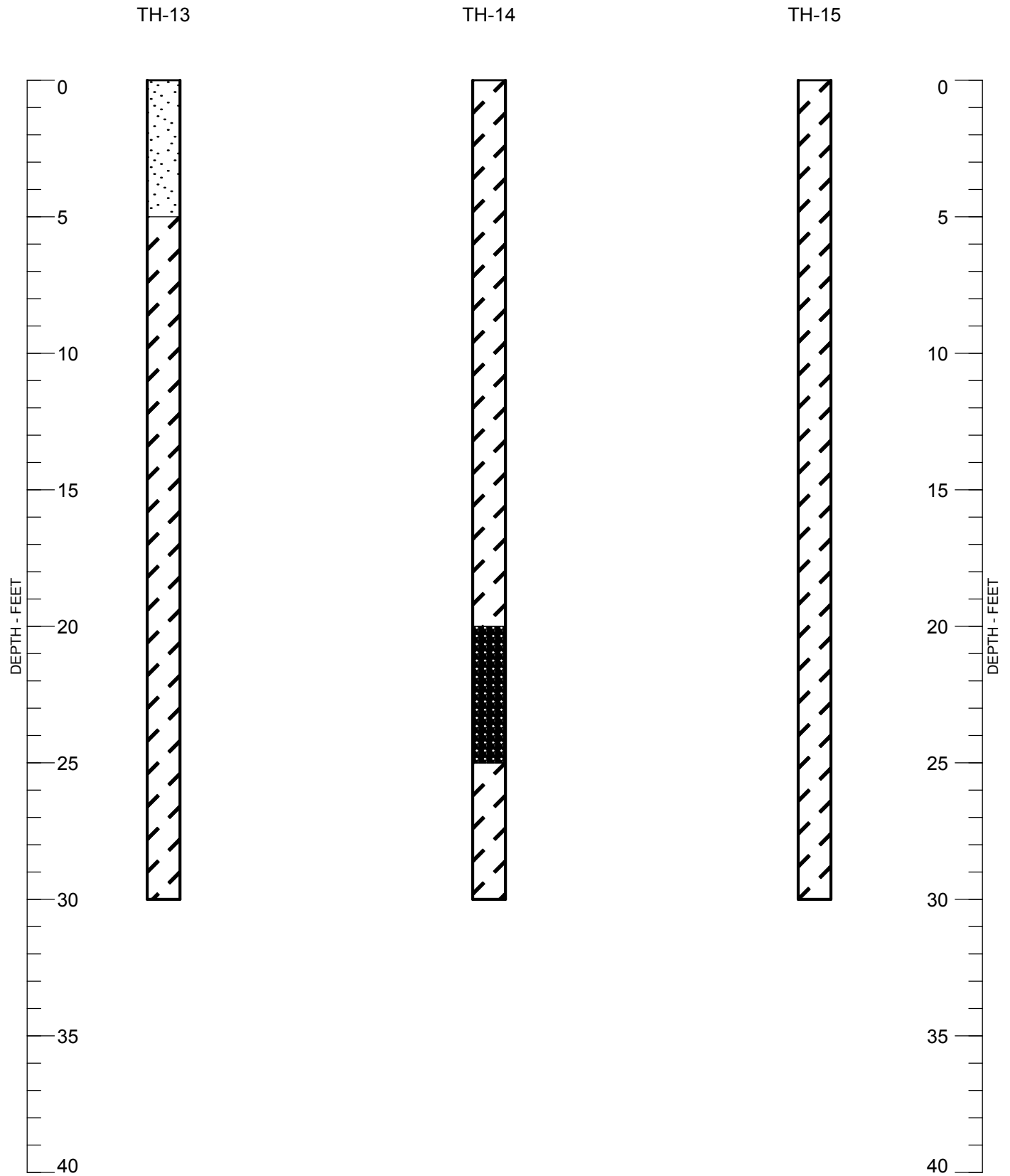
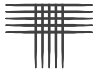


### SUMMARY LOGS OF EXPLORATORY BORINGS

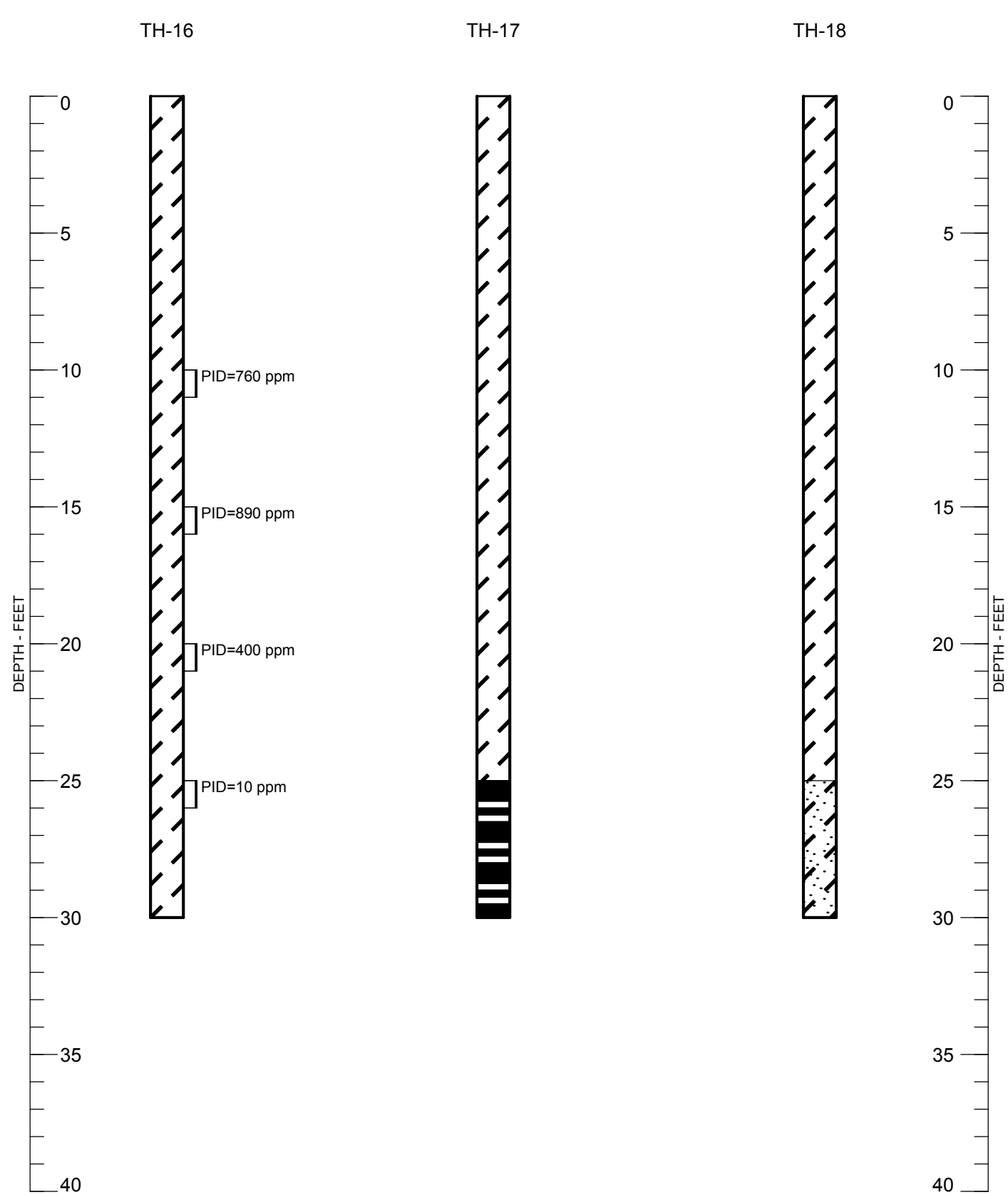




### SUMMARY LOGS OF EXPLORATORY BORINGS



### SUMMARY LOGS OF EXPLORATORY BORINGS



**LEGEND:**

- CLAY, SANDY, BROWN.
- SAND, CLAYEY, BROWN.
- SAND WITH GRAVEL.
- BEDRCOK, CLAYSTONE.

**NOTES:**

1. THE BORINGS WERE DRILLED ON DECEMBER 13, 2016 USING 4-INCH DIAMETER, CONTINUOUS-FLIGHT SOLID-STEM AUGER AND A TRUCK-MOUNTED CME-45 DRILL RIG.
2. GROUNDWATER WAS NOT ENCOUNTERED DURING THIS INVESTIGATION.
3. THESE LOGS ARE SUBJECT TO THE EXPLANATIONS, LIMITATIONS AND CONCLUSIONS CONTAINED IN THIS REPORT.

**SUMMARY LOGS OF EXPLORATORY BORINGS**



## ATTACHMENT 2 LABORATORY RESULTS



December 20, 2016

CTL Thompson, Inc.

Trevor Branch

1971 West 12th Avenue

Denver

CO 80204

**Project Name - Holly Hills**

**Project Number - DN48 669-205**

Attached are your analytical results for Holly Hills received by Origins Laboratory, Inc. December 16, 2016. This project is associated with Origins project number X612202-01.

The analytical results in the following report were analyzed under the guidelines of EPA Methods. These methods are identified as follows; "SW" are defined in SW-846, "EPA" are defined in 40CFR part 136 and "SM" are defined in the most current revision of Standard Methods For the Examination of Water and Wastewater.

The analytical results apply specifically to the samples and analyses specified per the attached Chain of Custody. As such, this report shall not be reproduced except in full, without the written approval of Origin's laboratory.

Unless otherwise noted, the analytical results for all soil samples are reported on a wet weight basis. All analytical analyses were performed under NELAP guidelines unless noted by a data qualifier.

Any holding time exceedances, deviations from the method specifications or deviations from Origins Laboratory's Standard Operating Procedures are outlined in the case narrative.

Thank you for selecting Origins for your analytical needs. Please contact us with any questions concerning this report, or if we can help with anything at all.

Origins Laboratory, Inc.  
303.433.1322  
o-squad@oelabinc.com



1725 Elk Place, Denver, CO 80211 | Phone: 303.433.1322 | Fax: 303.265.9645

CTL Thompson, Inc.  
1971 West 12th Avenue  
Denver CO 80204

Trevor Branch  
Project Number: DN48 669-205  
Project: Holly Hills

### CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
2 @ 20'	X612202-01	Soil	December 13, 2016 9:00	12/16/2016 10:16
5 @ 15'	X612202-02	Soil	December 13, 2016 11:00	12/16/2016 10:16
6 @ 14'	X612202-03	Soil	December 13, 2016 13:00	12/16/2016 10:16
9 @ 25'	X612202-04	Soil	December 13, 2016 14:00	12/16/2016 10:16
11 @ 20'	X612202-05	Soil	December 13, 2016 16:00	12/16/2016 10:16
16 @ 15'	X612202-06	Soil	December 14, 2016 11:30	12/16/2016 10:16
16 @ 25'	X612202-07	Soil	December 14, 2016 12:00	12/16/2016 10:16
17 @ 30'	X612202-08	Soil	December 14, 2016 13:00	12/16/2016 10:16

Origins Laboratory, Inc.



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Trevor Branch  
Project Number: DN48 669-205  
Project: Holly Hills

**ORIGINS**  
LABORATORY, INC

www.originslaboratory.com

page | of |

Client: CTL Thompson

Address: 1971 W 12<sup>th</sup> Avenue

Telephone Number: 303-805-0774

Email Address: hthompson@originslab.com

Project Manager: Tear Brach

Project Name: Holly Hills

Project Number: DRUG, 119-205

Samples Collected By: T Brach

Temp Received: 0°C

Date Results Needed: 12/16/16

Sample ID Description	Date Sampled	Time Sampled	# of Containers	Preservative				Matrix			Analysis			Sample Instructions
				Unpreserved	HCl	HNO <sub>3</sub>	Other	Groundwater	Soil	Air Surrogate	Other	ESTX	TFH	
2020'	12/15/16	9:00	1	X				X				X	TFH	1
5015'		11:00												2
6014'		13:00												3
9025'		14:00												4
11020'		16:00												5
16015'	12/14/16	11:30												6
16025'		12:00												7
17030'		13:00												8
														9
														10

Relinquished By: [Signature]

Relinquished By: [Signature]

Date: 12/16/2016

Date: 12/16/2016

Time: 11:16 am

Time: 10:16

Turnaround Time: ☐ Same Day ☐ 24 Hr ☒ 48 Hr ☐ Standard

Date: 12/16/16

Date: 12/16/16

Time: 10:16

Time: 10:16

Origins Laboratory, Inc.

Jeff Pellipini

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*



CTL Thompson, Inc.  
1971 West 12th Avenue  
Denver CO 80204

Trevor Branch  
Project Number: DN48 669-205  
Project: Holly Hills

Origins Laboratory

F-012207-01-R1  
Effective Date: 01/09/12

## Sample Receipt Checklist

Origins Work Order: X612202

Client: CTL Thompson

Client Project ID: Holly Hills

Checklist Completed by: Jeff Smith

Shipped Via: H&D  
(UPS, FedEx, Hand Delivered, Pick-up, etc.)

Date/time completed: 12-16-12

Airbill #: N/A

Matrix(s) Received: (Check all that apply): ☒ Soil/Solid ☒ Water ☐ Other: \_\_\_\_\_

Cooler Number/Temperature: 1 / 0.9 °C 1 / \_\_\_\_\_ °C 1 / \_\_\_\_\_ °C (Describe)

Thermometer ID: T003

Requirement Description	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature between 0°C to ≤ 6°C <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is there ice present (document if blue ice is used)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Are custody seals present on cooler? (if so, document in comments if they are signed and dated, broken or intact)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Are custody seals present on each sample container? (if so, document in comments if they are signed and dated, broken or intact)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Were all samples received intact <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was adequate sample volume provided <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Are short holding time analytes or samples with HTs due within 48 hours present <sup>(1)</sup> ?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Is a chain-of-custody (COC) present and filled out completely <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Does the COC agree with the number and type of sample bottles received <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Do the sample IDs on the bottle labels match the COC <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is the COC properly relinquished by the client with date and time recorded <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
For volatiles in water — is there headspace (> ¼ inch bubble) present? If yes, contact client and note in narrative.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Are samples preserved that require preservation and was it checked <sup>(1)</sup> ? (note ID of confirmation instrument used in comments) / (preservation is not confirmed for subcontracted analyses in order to insure sample integrity)/(pH < 2 for samples preserved with HNO <sub>3</sub> , HCL, H <sub>2</sub> SO <sub>4</sub> ) / (pH > 10 for samples preserved with NaAsO <sub>2</sub> +NaOH, ZnAc+NaOH)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Additional Comments (if any):				

<sup>(1)</sup>If NO, then contact the client before proceeding with analysis and note date/time and person contacted as well as the corrective action to in the additional comments (above) and the case narrative.

Reviewed by: [Signature] (Project Manager)

Date/Time Reviewed: 12/19/12

Origins Laboratory, Inc.

[Signature]

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

CTL Thompson, Inc.  
1971 West 12th Avenue  
Denver CO 80204

Trevor Branch  
Project Number: DN48 669-205  
Project: Holly Hills

2 @ 20'

12/13/2016 9:00:00AM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**X612202-01 (Soil)**

**BTEX by EPA 8260C**

Benzene	ND	0.002	mg/kg	1	B6L1902	12/19/2016	12/19/2016	U
Toluene	ND	0.002	"	"	"	"	"	U
Ethylbenzene	ND	0.002	"	"	"	"	"	U
Xylenes, total	ND	0.002	"	"	"	"	"	U

Surrogate: 1,2-Dichloroethane-d4	98.3 %	70-130			"	"	"	
Surrogate: Toluene-d8	95.5 %	70-130			"	"	"	
Surrogate: 4-Bromofluorobenzene	101 %	70-130			"	"	"	

**TPH-Carbon Chain by EPA Method 8015C**

Gasoline (C6-C10)	ND	50.0	mg/kg	1	B6L1903	12/19/2016	12/19/2016	U
Diesel (C10-C28)	ND	50.0	"	"	"	"	"	U
Residual Range Organics (C28-C40)	ND	200	"	"	"	"	"	U

Surrogate: o-Terphenyl	80.0 %	65-146			"	"	"	
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CTL Thompson, Inc.  
1971 West 12th Avenue  
Denver CO 80204

Trevor Branch  
Project Number: DN48 669-205  
Project: Holly Hills

5 @ 15'

12/13/2016 11:00:00AM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**X612202-02 (Soil)**

**BTEX by EPA 8260C**

Benzene	ND	0.002	mg/kg	1	B6L1902	12/19/2016	12/19/2016	U
Toluene	ND	0.002	"	"	"	"	"	U
Ethylbenzene	ND	0.002	"	"	"	"	"	U
Xylenes, total	ND	0.002	"	"	"	"	"	U

Surrogate: 1,2-Dichloroethane-d4	104 %	70-130			"	"	"	
Surrogate: Toluene-d8	94.7 %	70-130			"	"	"	
Surrogate: 4-Bromofluorobenzene	100 %	70-130			"	"	"	

**TPH-Carbon Chain by EPA Method 8015C**

Gasoline (C6-C10)	ND	50.0	mg/kg	1	B6L1903	12/19/2016	12/19/2016	U
Diesel (C10-C28)	ND	50.0	"	"	"	"	"	U
Residual Range Organics (C28-C40)	ND	200	"	"	"	"	"	U

Surrogate: o-Terphenyl	77.2 %	65-146			"	"	"	
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Denver CO 80204

Trevor Branch  
Project Number: DN48 669-205  
Project: Holly Hills

6 @ 14'

12/13/2016 1:00:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**X612202-03 (Soil)**

**BTEX by EPA 8260C**

Benzene	ND	0.050	mg/kg	25	B6L1902	12/19/2016	12/19/2016	U
Toluene	ND	0.050	"	"	"	"	"	U
Ethylbenzene	ND	0.050	"	"	"	"	"	U
Xylenes, total	ND	0.050	"	"	"	"	"	U

Surrogate: 1,2-Dichloroethane-d4	94.1 %	70-130			"	"	"	
Surrogate: Toluene-d8	95.4 %	70-130			"	"	"	
Surrogate: 4-Bromofluorobenzene	101 %	70-130			"	"	"	

**TPH-Carbon Chain by EPA Method 8015C**

Gasoline (C6-C10)	ND	50.0	mg/kg	1	B6L1903	12/19/2016	12/20/2016	U
Diesel (C10-C28)	ND	50.0	"	"	"	"	"	U
Residual Range Organics (C28-C40)	ND	200	"	"	"	"	"	U

Surrogate: o-Terphenyl	72.8 %	65-146			"	"	"	
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1971 West 12th Avenue  
Denver CO 80204

Trevor Branch  
Project Number: DN48 669-205  
Project: Holly Hills

9 @ 25'

12/13/2016 2:00:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**X612202-04 (Soil)**

**BTEX by EPA 8260C**

Benzene	ND	0.002	mg/kg	1	B6L1902	12/19/2016	12/19/2016	U
Toluene	ND	0.002	"	"	"	"	"	U
Ethylbenzene	ND	0.002	"	"	"	"	"	U
Xylenes, total	ND	0.002	"	"	"	"	"	U

Surrogate: 1,2-Dichloroethane-d4	120 %	70-130			"	"	"	
Surrogate: Toluene-d8	92.2 %	70-130			"	"	"	
Surrogate: 4-Bromofluorobenzene	99.7 %	70-130			"	"	"	

**TPH-Carbon Chain by EPA Method 8015C**

Gasoline (C6-C10)	ND	50.0	mg/kg	1	B6L1903	12/19/2016	12/20/2016	U
Diesel (C10-C28)	ND	50.0	"	"	"	"	"	U
Residual Range Organics (C28-C40)	ND	200	"	"	"	"	"	U

Surrogate: o-Terphenyl	67.2 %	65-146			"	"	"	
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CTL Thompson, Inc.  
1971 West 12th Avenue  
Denver CO 80204

Trevor Branch  
Project Number: DN48 669-205  
Project: Holly Hills

11 @ 20'

12/13/2016 4:00:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**X612202-05 (Soil)**

**BTEX by EPA 8260C**

Benzene	ND	0.002	mg/kg	1	B6L1902	12/19/2016	12/19/2016	U
Toluene	ND	0.002	"	"	"	"	"	U
Ethylbenzene	ND	0.002	"	"	"	"	"	U
Xylenes, total	ND	0.002	"	"	"	"	"	U

Surrogate: 1,2-Dichloroethane-d4	110 %	70-130			"	"	"	
Surrogate: Toluene-d8	92.9 %	70-130			"	"	"	
Surrogate: 4-Bromofluorobenzene	98.9 %	70-130			"	"	"	

**TPH-Carbon Chain by EPA Method 8015C**

Gasoline (C6-C10)	ND	50.0	mg/kg	1	B6L1903	12/19/2016	12/20/2016	U
Diesel (C10-C28)	ND	50.0	"	"	"	"	"	U
Residual Range Organics (C28-C40)	ND	200	"	"	"	"	"	U

Surrogate: o-Terphenyl	73.7 %	65-146			"	"	"	
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1971 West 12th Avenue  
Denver CO 80204

Trevor Branch  
Project Number: DN48 669-205  
Project: Holly Hills

16 @ 15'  
12/14/2016 11:30:00AM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
X612202-06 (Soil)

### BTEX by EPA 8260C

Benzene	0.194	0.050	mg/kg	25	B6L1902	12/19/2016	12/20/2016
Toluene	0.234	0.050	"	"	"	"	"
Ethylbenzene	6.81	0.050	"	"	"	"	"
Xylenes, total	23.7	0.498	"	250	"	"	12/20/2016

Surrogate: 1,2-Dichloroethane-d4	103 %	70-130			"	"	12/20/2016
Surrogate: Toluene-d8	166 %	70-130			"	"	" S-DUP
Surrogate: 4-Bromofluorobenzene	98.2 %	70-130			"	"	"

### TPH-Carbon Chain by EPA Method 8015C

Gasoline (C6-C10)	1720	50.0	mg/kg	1	B6L1903	12/19/2016	12/20/2016
Diesel (C10-C28)	2540	50.0	"	"	"	"	"
Residual Range Organics (C28-C40)	929	200	"	"	"	"	"

Surrogate: o-Terphenyl	87.4 %	65-146			"	"	"
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Origins Laboratory, Inc.



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CTL Thompson, Inc.  
1971 West 12th Avenue  
Denver CO 80204

Trevor Branch  
Project Number: DN48 669-205  
Project: Holly Hills

16 @ 25'  
12/14/2016 12:00:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**X612202-07 (Soil)**

**BTEX by EPA 8260C**

Benzene	ND	0.050	mg/kg	25	B6L1902	12/19/2016	12/19/2016	U
Toluene	ND	0.050	"	"	"	"	"	U
Ethylbenzene	ND	0.050	"	"	"	"	"	U
Xylenes, total	ND	0.050	"	"	"	"	"	U

Surrogate: 1,2-Dichloroethane-d4	96.9 %	70-130			"	"	"	
Surrogate: Toluene-d8	98.8 %	70-130			"	"	"	
Surrogate: 4-Bromofluorobenzene	101 %	70-130			"	"	"	

**TPH-Carbon Chain by EPA Method 8015C**

Gasoline (C6-C10)	ND	50.0	mg/kg	1	B6L1903	12/19/2016	12/20/2016	U
Diesel (C10-C28)	ND	50.0	"	"	"	"	"	U
Residual Range Organics (C28-C40)	ND	200	"	"	"	"	"	U

Surrogate: o-Terphenyl	70.0 %	65-146			"	"	"	
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CTL Thompson, Inc.  
1971 West 12th Avenue  
Denver CO 80204

Trevor Branch  
Project Number: DN48 669-205  
Project: Holly Hills

17 @ 30'

12/14/2016 1:00:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**X612202-08 (Soil)**

**BTEX by EPA 8260C**

Benzene	ND	0.002	mg/kg	1	B6L1902	12/19/2016	12/19/2016	U
Toluene	ND	0.002	"	"	"	"	"	U
Ethylbenzene	ND	0.002	"	"	"	"	"	U
Xylenes, total	ND	0.002	"	"	"	"	"	U

Surrogate: 1,2-Dichloroethane-d4	114 %	70-130			"	"	"	
Surrogate: Toluene-d8	94.1 %	70-130			"	"	"	
Surrogate: 4-Bromofluorobenzene	107 %	70-130			"	"	"	

**TPH-Carbon Chain by EPA Method 8015C**

Gasoline (C6-C10)	ND	50.0	mg/kg	1	B6L1903	12/19/2016	12/20/2016	U
Diesel (C10-C28)	ND	50.0	"	"	"	"	"	U
Residual Range Organics (C28-C40)	ND	200	"	"	"	"	"	U

Surrogate: o-Terphenyl	70.0 %	65-146			"	"	"	
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Origins Laboratory, Inc.



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CTL Thompson, Inc.  
1971 West 12th Avenue  
Denver CO 80204

Trevor Branch  
Project Number: DN48 669-205  
Project: Holly Hills

**Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control**  
**Origins Laboratory, Inc.**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch B6L1902 - EPA 5030 (soil)</b>										
<b>Blank (B6L1902-BLK1)</b>					Prepared: 12/19/2016 Analyzed: 12/19/2016					
Benzene	ND	0.002	mg/kg							U
Toluene	ND	0.002	"							U
Ethylbenzene	ND	0.002	"							U
Xylenes, total	ND	0.002	"							U
Surrogate: 1,2-Dichloroethane-d4	64		ug/kg	62.5		102	70-130			
Surrogate: Toluene-d8	60		"	62.5		95.6	70-130			
Surrogate: 4-Bromofluorobenzene	61		"	62.5		98.1	70-130			

Origins Laboratory, Inc.



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CTL Thompson, Inc.  
1971 West 12th Avenue  
Denver CO 80204

Trevor Branch  
Project Number: DN48 669-205  
Project: Holly Hills

**Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control**  
**Origins Laboratory, Inc.**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch B6L1902 - EPA 5030 (soil)</b>										
<b>LCS (B6L1902-BS1)</b>					Prepared: 12/19/2016 Analyzed: 12/19/2016					
Benzene	0.097	0.002	mg/kg	0.100		97.0	77.1-124			
Toluene	0.085	0.002	"	0.100		84.9	74.5-128			
Ethylbenzene	0.099	0.002	"	0.100		98.7	66.4-127			
m,p-Xylene	0.203	0.004	"	0.200		101	76.6-124			
o-Xylene	0.104	0.002	"	0.100		104	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	65		ug/kg	62.5		103	70-130			
Surrogate: Toluene-d8	61		"	62.5		98.0	70-130			
Surrogate: 4-Bromofluorobenzene	62		"	62.5		99.2	70-130			

Origins Laboratory, Inc.



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CTL Thompson, Inc.  
1971 West 12th Avenue  
Denver CO 80204

Trevor Branch  
Project Number: DN48 669-205  
Project: Holly Hills

**Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control**  
**Origins Laboratory, Inc.**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch B6L1902 - EPA 5030 (soil)**

Matrix Spike (B6L1902-MS1)		Source: X612202-01			Prepared: 12/19/2016 Analyzed: 12/19/2016					
Benzene	0.099	0.002	mg/kg	0.100	ND	98.8	71.8-126			
Toluene	0.085	0.002	"	0.100	ND	84.9	65.1-130			
Ethylbenzene	0.097	0.002	"	0.100	ND	96.5	62.2-130			
m,p-Xylene	0.198	0.004	"	0.200	ND	99.2	46.5-137			
o-Xylene	0.105	0.002	"	0.100	ND	105	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	67		ug/kg	62.5		108	70-130			
Surrogate: Toluene-d8	60		"	62.5		96.2	70-130			
Surrogate: 4-Bromofluorobenzene	61		"	62.5		97.8	70-130			

Origins Laboratory, Inc.



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CTL Thompson, Inc.  
1971 West 12th Avenue  
Denver CO 80204

Trevor Branch  
Project Number: DN48 669-205  
Project: Holly Hills

**Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control**  
**Origins Laboratory, Inc.**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch B6L1902 - EPA 5030 (soil)**

Matrix Spike Dup (B6L1902-MSD1)		Source: X612202-01			Prepared: 12/19/2016 Analyzed: 12/19/2016					
Benzene	0.100	0.002	mg/kg	0.100	ND	100	71.8-126	1.41	11.3	
Toluene	0.087	0.002	"	0.100	ND	86.9	65.1-130	2.28	15.4	
Ethylbenzene	0.100	0.002	"	0.100	ND	100	62.2-130	3.94	19.6	
m,p-Xylene	0.208	0.004	"	0.200	ND	104	46.5-137	4.85	19.2	
o-Xylene	0.107	0.002	"	0.100	ND	107	54.2-134	2.70	17.9	
Surrogate: 1,2-Dichloroethane-d4	67		ug/kg	62.5		108	70-130			
Surrogate: Toluene-d8	61		"	62.5		97.7	70-130			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		101	70-130			

Origins Laboratory, Inc.



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CTL Thompson, Inc.

1971 West 12th Avenue

Denver CO 80204

Trevor Branch

Project Number: DN48 669-205

Project: Holly Hills

## Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control

### Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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## Extractable Petroleum Hydrocarbons by 8015C - Quality Control

### Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch B6L1903 - EPA 3580

#### Blank (B6L1903-BLK1)

Prepared: 12/19/2016 Analyzed: 12/19/2016

Gasoline (C6-C10)	ND	50.0	mg/kg							U
Diesel (C10-C28)	ND	50.0	"							U
Residual Range Organics (C28-C40)	ND	200	"							U

Surrogate: o-Terphenyl

38.3

"

50.0

76.6

65-146

#### LCS (B6L1903-BS1)

Prepared: 12/19/2016 Analyzed: 12/19/2016

Gasoline (C6-C10)	933	50.0	mg/kg	1000		93.3	66.7-119			
Diesel (C10-C28)	912	50.0	"	1000		91.2	70.1-127			
Residual Range Organics (C28-C40)	850	200	"	1000		85.0	54.5-139			

Surrogate: o-Terphenyl

39.0

"

50.0

78.1

65-146

#### Matrix Spike (B6L1903-MS1)

Source: X612202-01

Prepared: 12/19/2016 Analyzed: 12/19/2016

Gasoline (C6-C10)	919	50.0	mg/kg	1000	ND	91.9	56.4-132			
Diesel (C10-C28)	889	50.0	"	1000	ND	88.9	57.4-138			
Residual Range Organics (C28-C40)	852	200	"	1000	ND	85.2	47.7-129			

Surrogate: o-Terphenyl

38.8

"

50.0

77.6

65-146

#### Matrix Spike Dup (B6L1903-MSD1)

Source: X612202-01

Prepared: 12/19/2016 Analyzed: 12/19/2016

Gasoline (C6-C10)	883	50.0	mg/kg	1000	ND	88.3	56.4-132	4.08	22	
Diesel (C10-C28)	884	50.0	"	1000	ND	88.4	57.4-138	0.593	18.3	
Residual Range Organics (C28-C40)	837	200	"	1000	ND	83.7	47.7-129	1.72	30.1	

Surrogate: o-Terphenyl

40.4

"

50.0

80.8

65-146

Origins Laboratory, Inc.



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CTL Thompson, Inc.  
1971 West 12th Avenue  
Denver CO 80204

Trevor Branch  
Project Number: DN48 669-205  
Project: Holly Hills

### Notes and Definitions

U Sample is Non-Detect.

S-DUP Duplicate analysis confirmed surrogate failure due to matrix effects.

ND Analyte NOT DETECTED at or above the reporting limit

RPD Relative Percent Difference

All soil results are reported at a wet weight basis.

Origins Laboratory, Inc.



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December 22, 2016

CTL Thompson, Inc.

Trevor Branch

1971 West 12th Avenue

Denver

CO 80204

**Project Name - Holly Hills**

**Project Number - DN48669-205**

Attached are your analytical results for Holly Hills received by Origins Laboratory, Inc. December 20, 2016. This project is associated with Origins project number X612234-01.

The analytical results in the following report were analyzed under the guidelines of EPA Methods. These methods are identified as follows; "SW" are defined in SW-846, "EPA" are defined in 40CFR part 136 and "SM" are defined in the most current revision of Standard Methods For the Examination of Water and Wastewater.

The analytical results apply specifically to the samples and analyses specified per the attached Chain of Custody. As such, this report shall not be reproduced except in full, without the written approval of Origin's laboratory.

Unless otherwise noted, the analytical results for all soil samples are reported on a wet weight basis. All analytical analyses were performed under NELAP guidelines unless noted by a data qualifier.

Any holding time exceedances, deviations from the method specifications or deviations from Origins Laboratory's Standard Operating Procedures are outlined in the case narrative.

Thank you for selecting Origins for your analytical needs. Please contact us with any questions concerning this report, or if we can help with anything at all.

Origins Laboratory, Inc.  
303.433.1322  
o-squad@oelabinc.com



1725 Elk Place, Denver, CO 80211 | Phone: 303.433.1322 | Fax: 303.265.9645

CTL Thompson, Inc.

1971 West 12th Avenue

Denver CO 80204

Trevor Branch

Project Number: DN48669-205

Project: Holly Hills

## CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
TH-15	X612234-01	Water	December 20, 2016 8:45	12/20/2016 09:35
TH-16	X612234-02	Water	December 20, 2016 9:00	12/20/2016 09:35

Origins Laboratory, Inc.



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Jen Pellegrini For Noelle Doyle Mathis, President

CTL Thompson, Inc.  
1971 West 12th Avenue  
Denver CO 80204

Trevor Branch  
Project Number: DN48669-205  
Project: Holly Hills

www.originslaboratory.com

page 1 of 1

**ORIGINS** LABORATORY, INC

Client: CTL Thompson  
Address: 1971 W 12th Ave  
Denver, CO  
Telephone Number: 303-825-0777  
Email Address: hannah@ctlthompson.com

Project Manager: Trevor Branch  
Project Name: Holly Hills  
Project Number: DN48669-205  
Samples Collected By: T Branch

Sample ID Description	Date Sampled	Time Sampled	# of Containers	Preservative				Matrix			Analysis	Sample Instructions	
				Unpreserved	HCl	HNO <sub>3</sub>	Other	Groundwater	Soil	As Summa Canister #			Other
TH-15	12/20/16	8:45	5	X				X					1
TH-16	12/20/16	9:00	5	X				X					2
													3
													4
													5
													6
													7
													8
													9
													10

Relinquished By: [Signature] Date: 12/20/16 Time: 9:30

Relinquished By: [Signature] Date: 12/20/16 Time: 9:35

Turnaround Time: Same Day ☐ 24 Hr ☐ 48 Hr ☒ 72 Hr ☐ Standard ☐

Temp Received: 3.9°C Date Results Needed: 12/20/16

Origins Laboratory, Inc.

*Jefe Pellegrini*

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

CTL Thompson, Inc.  
171 West 12th Avenue  
Denver CO 80204

Trevor Branch  
Project Number: DN48669-205  
Project: Holly Hills

Origins Laboratory

F-012207-01-R1  
Effective Date: 01/09/12

## Sample Receipt Checklist

Origins Work Order: X612234

Client: CTL

Client Project ID: Holly Hills

Checklist Completed by: Jose Smith

Shipped Via: H/D

Date/time completed: 12-20-16

(UPS, FedEx, Hand Delivered, Pick-up, etc.)

Airbill #: NA

Matrix(s) Received: (Check all that apply): Soil/Solid Water Other:

Cooler Number/Temperature: 1 13.9 °C 1 °C 1 °C (Describe)

Thermometer ID: T003

Requirement Description	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature between 0°C to ≤ 6°C <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Is there ice present (document if blue ice is used)	<input checked="" type="checkbox"/>			
Are custody seals present on cooler? (if so, document in comments if they are signed and dated, broken or intact)		<input checked="" type="checkbox"/>		
Are custody seals present on each sample container? (if so, document in comments if they are signed and dated, broken or intact)		<input checked="" type="checkbox"/>		
Were all samples received intact <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Was adequate sample volume provided <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Are short holding time analytes or samples with HTs due within 48 hours present <sup>(1)</sup> ?		<input checked="" type="checkbox"/>		
Is a chain-of-custody (COC) present and filled out completely <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Does the COC agree with the number and type of sample bottles received <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Do the sample IDs on the bottle labels match the COC <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Is the COC properly relinquished by the client with date and time recorded <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
For volatiles in water – is there headspace (> ¼ inch bubble) present? If yes, contact client and note in narrative.		<input checked="" type="checkbox"/>		
Are samples preserved that require preservation and was it checked <sup>(1)</sup> ? (note ID of confirmation instrument used in comments) / (preservation is not confirmed for subcontracted analyses in order to insure sample integrity) / (pH <2 for samples preserved with HNO <sub>3</sub> , HCL, H <sub>2</sub> SO <sub>4</sub> ) / (pH >10 for samples preserved with NaAsO <sub>2</sub> +NaOH, ZnAc+NaOH)	<input checked="" type="checkbox"/>			<u>HCL</u>
Additional Comments (if any):				

<sup>(1)</sup> If NO, then contact the client before proceeding with analysis and note date/time and person contacted as well as the corrective action to in the additional comments (above) and the case narrative.

Reviewed by: [Signature] (Project Manager)

Date/Time Reviewed: 12/20/16

Origins Laboratory, Inc.

[Signature]

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

CTL Thompson, Inc.  
1971 West 12th Avenue  
Denver CO 80204

Trevor Branch  
Project Number: DN48669-205  
Project: Holly Hills

TH-15

12/20/2016 8:45:00AM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**X612234-01 (Water)**

**BTEX by EPA 8260C**

Benzene	ND	1.00	ug/L	1	B6L2201	12/22/2016	12/22/2016	U
Toluene	ND	1.00	"	"	"	"	"	U
Ethylbenzene	ND	1.00	"	"	"	"	"	U
Xylenes, total	ND	1.00	"	"	"	"	"	U

Surrogate: 1,2-Dichloroethane-d4	99.0 %	84-121	"	"	"
Surrogate: Toluene-d8	101 %	85-115	"	"	"
Surrogate: 4-Bromofluorobenzene	99.8 %	84-114	"	"	"

Origins Laboratory, Inc.



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CTL Thompson, Inc.  
1971 West 12th Avenue  
Denver CO 80204

Trevor Branch  
Project Number: DN48669-205  
Project: Holly Hills

TH-16

12/20/2016 9:00:00AM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**X612234-02 (Water)**

**BTEX by EPA 8260C**

Benzene	55.4	1.00	ug/L	1	B6L2201	12/22/2016	12/22/2016
Toluene	4.56	1.00	"	"	"	"	"
Ethylbenzene	62.4	1.00	"	"	"	"	"
Xylenes, total	295	1.00	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	106 %	84-121			"	"	"
Surrogate: Toluene-d8	86.1 %	85-115			"	"	"
Surrogate: 4-Bromofluorobenzene	101 %	84-114			"	"	"

Origins Laboratory, Inc.



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CTL Thompson, Inc.  
1971 West 12th Avenue  
Denver CO 80204

Trevor Branch  
Project Number: DN48669-205  
Project: Holly Hills

**Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control**  
**Origins Laboratory, Inc.**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch B6L2201 - EPA 5030B (Water)**

**Blank (B6L2201-BLK1)**

Prepared: 12/22/2016 Analyzed: 12/22/2016

Benzene	ND	1.00	ug/L							U
Toluene	ND	1.00	"							U
Ethylbenzene	ND	1.00	"							U
Xylenes, total	ND	1.00	"							U
Surrogate: 1,2-Dichloroethane-d4	62		"	62.5	99.9		84-121			
Surrogate: Toluene-d8	63		"	62.5	101		85-115			
Surrogate: 4-Bromofluorobenzene	63		"	62.5	101		84-114			

Origins Laboratory, Inc.



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1971 West 12th Avenue  
Denver CO 80204

Trevor Branch  
Project Number: DN48669-205  
Project: Holly Hills

**Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control**  
**Origins Laboratory, Inc.**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch B6L2201 - EPA 5030B (Water)**

**LCS (B6L2201-BS1)**

Prepared: 12/22/2016 Analyzed: 12/22/2016

Benzene	47.8	1.00	ug/L	50.0		95.7	73.3-129			
Toluene	47.8	1.00	"	50.0		95.6	76.2-123			
Ethylbenzene	48.9	1.00	"	50.0		97.8	73.6-130			
m,p-Xylene	96.8	2.00	"	100		96.8	76.1-126			
o-Xylene	46.4	1.00	"	50.0		92.8	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	60		"	62.5		95.5	84-121			
Surrogate: Toluene-d8	61		"	62.5		97.9	85-115			
Surrogate: 4-Bromofluorobenzene	64		"	62.5		102	84-114			

Origins Laboratory, Inc.



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1971 West 12th Avenue  
Denver CO 80204

Trevor Branch  
Project Number: DN48669-205  
Project: Holly Hills

**Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control**  
**Origins Laboratory, Inc.**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch B6L2201 - EPA 5030B (Water)**

Matrix Spike (B6L2201-MS1)		Source: X612213-01			Prepared: 12/22/2016 Analyzed: 12/22/2016					
Benzene	54.4	1.00	ug/L	50.0	ND	109	74-130			
Toluene	55.1	1.00	"	50.0	ND	110	73-131			
Ethylbenzene	54.1	1.00	"	50.0	ND	108	76-132			
m,p-Xylene	107	2.00	"	100	ND	107	69-139			
o-Xylene	50.5	1.00	"	50.0	ND	101	74-131			
Surrogate: 1,2-Dichloroethane-d4	59		"	62.5		94.9	84-121			
Surrogate: Toluene-d8	61		"	62.5		97.7	85-115			
Surrogate: 4-Bromofluorobenzene	61		"	62.5		97.4	84-114			

Origins Laboratory, Inc.



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Denver CO 80204

Trevor Branch  
Project Number: DN48669-205  
Project: Holly Hills

**Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control**  
**Origins Laboratory, Inc.**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch B6L2201 - EPA 5030B (Water)**

Matrix Spike Dup (B6L2201-MSD1)		Source: X612213-01			Prepared: 12/22/2016 Analyzed: 12/22/2016					
Benzene	51.2	1.00	ug/L	50.0	ND	102	74-130	6.19	20	
Toluene	51.8	1.00	"	50.0	ND	104	73-131	6.23	20	
Ethylbenzene	49.9	1.00	"	50.0	ND	99.9	76-132	8.02	20	
m,p-Xylene	99.1	2.00	"	100	ND	99.1	69-139	7.26	20	
o-Xylene	47.7	1.00	"	50.0	ND	95.5	74-131	5.68	20	
Surrogate: 1,2-Dichloroethane-d4	60		"	62.5		96.7	84-121			
Surrogate: Toluene-d8	63		"	62.5		101	85-115			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		100	84-114			

Origins Laboratory, Inc.



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CTL Thompson, Inc.  
1971 West 12th Avenue  
Denver CO 80204

Trevor Branch  
Project Number: DN48669-205  
Project: Holly Hills

### Notes and Definitions

U Sample is Non-Detect.

ND Analyte NOT DETECTED at or above the reporting limit

RPD Relative Percent Difference

All soil results are reported at a wet weight basis.

Origins Laboratory, Inc.



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Jen Pellegrini For Noelle Doyle Mathis, President