Attachment F

WOOD RODGERS

July 21, 2020

Mr. Dwayne Smith
Director, Engineering and Capital Improvements
Washoe County Community Services Dept.
1001 E. Ninth Street
Reno, NV 89512

Re: Boneyard Flats Nitrate Testing

Dear Mr. Smith,

As requested, we have performed additional soils sampling at Boneyard to better understand the presence of nitrates in the existing soil at the proposed excavation project site at Boneyard Flats. Based upon the findings, we believe the proposed excavation can occur without a detrimental impact to ground water in the area. A summary of the findings follow.

After discussions with Chris Kropf at TMWA, my understanding is that nitrates are naturally occurring in desert soils throughout the west. If water, which is not normally present, is introduced over those soils the nitrates can be pulled through into the ground water increasing the nitrate concentrations. However, the nitrate concentrations will decline over time as they are flushed through the soils. In the case of Boneyard Flats, it is the natural low area in a closed basin. Meaning it is regularly inundated with stormwater. There are several questions to answer.

- What is the concentration of nitrates in the existing soil?
- What is the potential for nitrates to migrate due to the project?
- Is there a negative impact from the excavation project?

Three test pits we dug. Two were dug in the area of the proposed excavation, and one was dug north of the project area to potentially serve as a baseline for comparison. Are site map is attached. There has been some grading done in the area as part of the Phase I special use permit. One test pit was outside of the construction silt fence in undisturbed area and one was dug inside the silt fence. The test pit outside the silt fence was limited to a depth of 16' due to the limitation of the equipment reach. The other two test pits where dug to a depth of 20'. The soil profiles on the test pits are attached. The soils in the area of the proposed excavation consisted primarily of fat clays in the area of the proposed project (TP-2 and TP-3). Clayey sands were found in the test pit to the north (TP-1).

Samples were pulled at depths of 5', 10' 15' and 20' where possible. Those samples were sent to Silver State Analyticals for analysis. The results of the tests are attached. My understanding is that there is a reasonable correlation between nitrate concentration in soils measured in milligrams per kilogram (mg/kg) and groundwater concentrations in parts per million (ppm). That is a 1 mg/kg concentration in soil correlates to approximately 1 ppm in water. The EPA has set maximum contaminant level (MCL) desired for nitrate in groundwater is 10 ppm. Using this threshold and the correlation between soil concentrations and groundwater concentrations, the samples at Boneyard Flat can be evaluated.

Between the three test pits a total of eleven soil samples were taken. Only one sample test had a nitrate concentration above 10 mg/kg. This was in a 5' deep sample taken in TP-2 and the concentration was found to be 150 mg/kg. A highly elevated concentration. Based upon the 10 other samples tested this was an

anomaly. The next highest reading was 5.2 mg/kg, well below the MCL. It should be noted that the samples tested in TP-1, the potential baseline sample, was found to have nitrate concentrations in between the other two test pits. It was anticipated that sample is that area might reveal concentrations higher than those in the area regularly inundated.

After analyzing the results of the tests we offer the following answers to the question posed at the beginning.

What is the concentration of nitrates in the existing soil?

All but one of the soils samples tested have nitrate levels below the level anticipated to cause negative impacts to the ground water. The high nitrate soil sample was taken at a 5' depth. The excavation project is proposing to remove 10 feet of material in this area. The project will actually reduce the potential for ground water contamination by removing it from the area. The soil is proposed to be used for fill in a nearby housing development and will be covered by streets and homes. The impervious surfaces found in a development will reduce the potential for the contaminated soils to infiltrate into the groundwater at a different location when compared to being located in an aera known to be inundated by water.

What is the potential for nitrates to migrate due to the project?

The mechanism for moving naturally occurring nitrates into the groundwater is for surface waters to migrate through the soils and flush the nitrates with it to the ground water. In the case of Boneyard Flats, surface water is surely present, but the soils types that exist do not lend themselves to water migration. Previous geotechnical investigations had limited the test excavations to 15'. This time, soils were excavated to 20' deep, approximately 10' below the proposed bottom of excavation. Fat clay soils were present the entire depth of the test pit. Fat clays are typically used as liner material in ponds because once wet the soils particles swell and do not allow water or liquids to pass unimpeded. Therefore after the proposed excavation at Boneyard Flats, a fat clay liner with a thickness of at least 10 feet will remain. The potential for nitrate migrations is negligible.

Is there a negative impact from the excavation project?

The impacts due to the proposed project should be seen as positive based upon the information gained through the sample testing. The nitrate concentrations in the soil were found to be well below the threshold expected to produce concentrations in the ground water above the MCL ,with one exception. The soils that contain this high concentration of nitrates will be removed by the project thereby eliminating the possibility of the high nitrate concentration soils being a source of contamination. Outside of the discussion about nitrates it's worth noting here that the proposed project will reduce the flood elevations in the area by creating additional flood storage in the closed basin.

We believe this analysis adequately addresses and dispels concerns raised about the potential for nitrates to migrate into the ground water due to this project.

Please contact me if you have additional questions.

Sincerely,

Steve Strickland, P.E.
Vice President

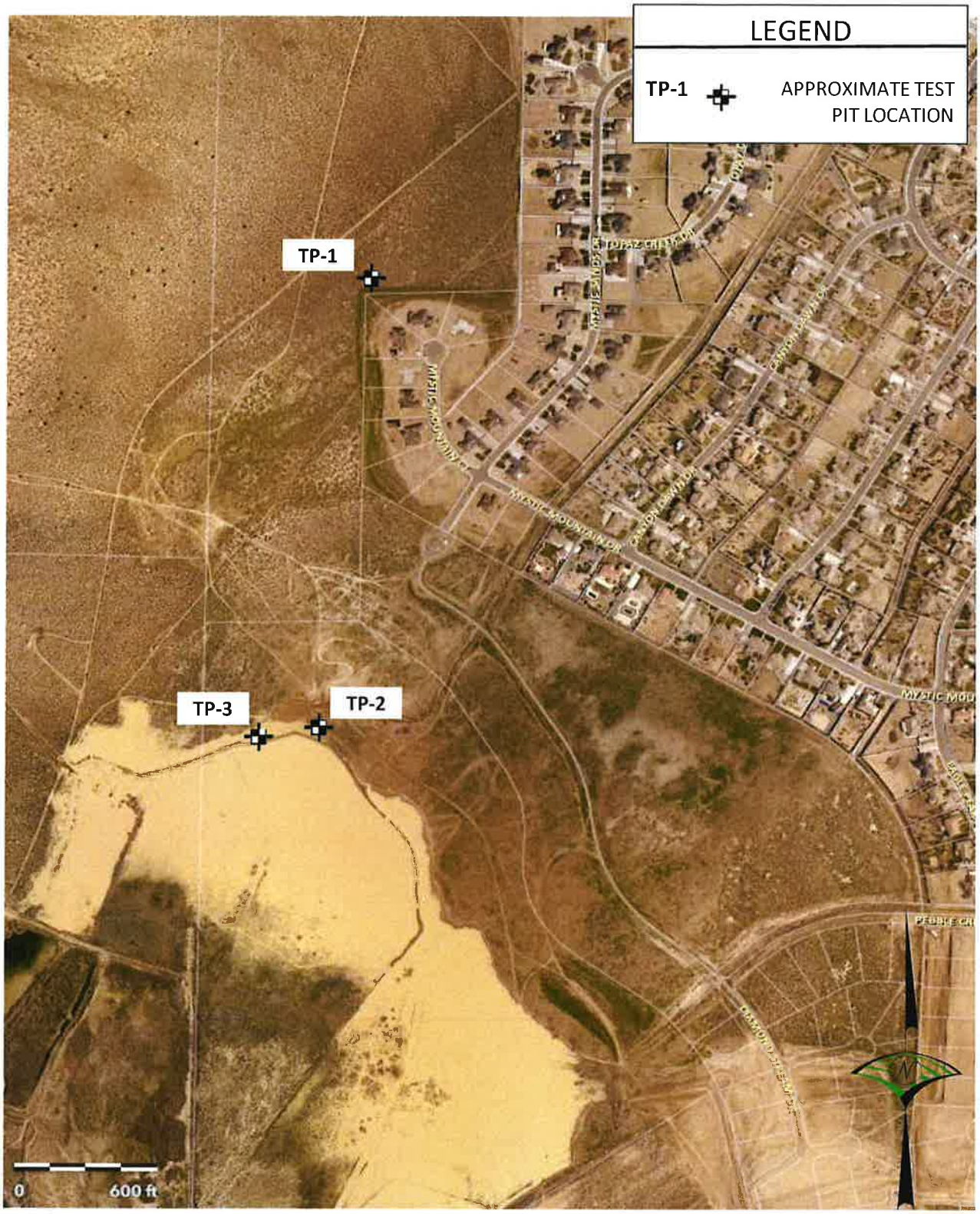

Image Reference: Washoe Regional Mapping System, Accessed 7/13/2020

WOOD RODGERS
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Phone 775.823.4068 Fax 775.823.4066

SITE MAP

Geotechnical Investigation
Boneyard
Stonebrook Sparks, LLC
Washoe County, Nevada

Project No.: 1407041
Date: 07/10/20

PLATE A-1

Wood Rodgers, Inc.
1361 Corporate Blvd
Reno, Nevada 89502
Telephone: 775-823-4068
Fax: 775-823-4066

TEST PIT NUMBER TP-1

PAGE 1 OF 1

CLIENT RRW Stonebrook, LLC
PROJECT NAME Boneyard
PROJECT NUMBER 1407041
PROJECT LOCATION Washoe County, Nevada
DATE STARTED 7/9/20 **COMPLETED** 7/9/20
GROUND ELEVATION 4519 ft **TEST PIT SIZE** 24 inches
EXCAVATION CONTRACTOR Joy Engineering
GROUND WATER LEVELS:
EXCAVATION METHOD Komatsu 360
AT TIME OF EXCAVATION --- NO FREE WATER ENCOUNTERED
LOGGED BY Seth Barton **CHECKED BY** Justin McDougal
AT END OF EXCAVATION --- NO FREE WATER ENCOUNTERED
NOTES:
AFTER EXCAVATION --- NO FREE WATER ENCOUNTERED

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	R-VALUE	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		CLAYEY SAND, (SC) medium dense, dry, tan, low to medium plasticity	GB AA									
		CLAYEY SAND, (SC) medium dense, dry, tan, medium plasticity										
5			GB AB					23.7				
10		SILTY CLAYEY SAND, (SC-SM) medium dense, dry, tan, slightly plastic	GB AC					5.4				
15			GB AD					8.4				
20		Decrease in fines	GB AE					10.5				

Practical Refusal at 20.0 Feet.

Bottom of Test Pit at 20.0 Feet.

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TEST PIT NUMBER TP-2

PAGE 1 OF 1

CLIENT RRW Stonebrook, LLC
PROJECT NAME Boneyard
PROJECT NUMBER 1407041
PROJECT LOCATION Washoe County, Nevada
DATE STARTED 7/9/20 **COMPLETED** 7/9/20
GROUND ELEVATION 4506.5 ft **TEST PIT SIZE** 24 inches
EXCAVATION CONTRACTOR Joy Engineering
GROUND WATER LEVELS:
EXCAVATION METHOD Komatsu 360
AT TIME OF EXCAVATION --- NO FREE WATER ENCOUNTERED
LOGGED BY Seth Barton **CHECKED BY** Justin McDougal
AT END OF EXCAVATION --- NO FREE WATER ENCOUNTERED
NOTES:
AFTER EXCAVATION --- NO FREE WATER ENCOUNTERED

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	R-VALUE	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		FAT CLAY, (CH) stiff, dry to slightly moist, brown, high plasticity	GB BA									
		FAT CLAY, (CH) very stiff, moist, brown, high plasticity										
5			GB BB					28.6				
10			GB BC					31.7				
15		Increase in moisture	GB BD					36.9				
20			GB BE					34.8				

Practical Refusal at 21.0 Feet.

Bottom of Test Pit at 21.0 Feet.

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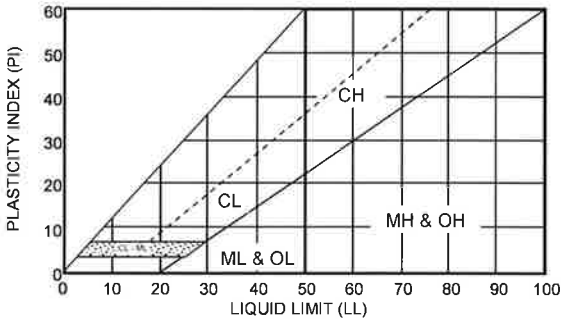
TEST PIT NUMBER TP-3

CLIENT RRW Stonebrook, LLC
PROJECT NAME Boneyard
PROJECT NUMBER 1407041
PROJECT LOCATION Washoe County, Nevada
DATE STARTED 7/9/20 **COMPLETED** 7/9/20
GROUND ELEVATION 4506 ft **TEST PIT SIZE** 24 inches
EXCAVATION CONTRACTOR Joy Engineering
GROUND WATER LEVELS:
EXCAVATION METHOD Komatsu 360
AT TIME OF EXCAVATION --- NO FREE WATER ENCOUNTERED
LOGGED BY Seth Barton **CHECKED BY** Justin McDougal
AT END OF EXCAVATION --- NO FREE WATER ENCOUNTERED
NOTES:
AFTER EXCAVATION --- NO FREE WATER ENCOUNTERED

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	R-VALUE	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		FAT CLAY, (CH) stiff, slightly moist, light brown, high plasticity Note: strongly cemented 0-2'	GB CA									
		FAT CLAY, (CH) very stiff, moist, brown, high plasticity Note: 0.25" diameter roots to 2.5' below ground surface										
5			GB CB					29.6				
10			GB CC					29.4				
15			GB CD					32.6				

Bottom of Test Pit at 16.0 Feet.

MAJOR DIVISION					TYPICAL NAMES
COARSED-GRAINED SOILS MORE THAN HALF IS COARSER THAN NO. 200 SIEVE	GRAVEL MORE THAN HALF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE	CLEAN SANDS WITH LITTLE OR NO FINES		GW	WELL GRADED GRAVELS WITH OR WITHOUT SAND, LITTLE OR NO FINES
				GP	POORLY GRADED GRAVELS WITH OR WITHOUT SAND, LITTLE OR NO FINES
		GRAVELS WITH OVER 12% FINES		GM	SILTY GRAVELS, SILTY GRAVELS WITH SAND
				GC	CLAYEY GRAVELS, CLAYEY GRAVELS WITH SAND
	SAND MORE THAN HALF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE	CLEAN SANDS WITH LITTLE OR NO FINES		SW	WELL GRADED SANDS WITH OR WITHOUT GRAVEL, LITTLE OR NO FINES
				SP	POORLY GRADED SAND WITH OR WITHOUT GRAVEL, LITTLE OR NO FINES
		SANDS WITH OVER 12% FINES		SM	SILTY SANDS WITH OR WITHOUT GRAVEL
				SC	CLAYEY SANDS WITH OR WITHOUT GRAVEL
FINE-GRAINED SOILS MORE THAN HALF IS FINER THAN NO. 200 SIEVE	SILT AND CLAY LIQUID LIMIT 50% OR LESS			ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTS WITH SANDS AND GRAVELS
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY CLAYS WITH SANDS AND GRAVELS, LEAN CLAYS
				OL	ORGANIC SILTS OR CLAYS OF LOW PLASTICITY
	SILT AND CLAY LIQUID LIMIT GREATER THAN 50%			MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOLID, ELASTIC SILTS
				CH	INORGANIC CLAYS OR HIGH PLASTICITY, FAT CLAYS
				OH	ORGANIC SILTS OR CLAYS MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS				Pt	PEAT AND OTHER HIGHLY ORGANIC SOILS



CONSISTENCY		RELATIVE DENSITY	
SILTS & CLAYS	SPT BLOW* COUNTS (N)	SANDS & GRAVELS	SPT BLOW* COUNTS (N)
VERY SOFT	0 - 2	VERY LOOSE	0 - 4
SOFT	3 - 4	LOOSE	5 - 10
MEDIUM STIFF	5 - 8	MEDIUM DENSE	11 - 30
STIFF	9 - 15	DENSE	31 - 50
VERY STIFF	16 - 30	VERY DENSE	50 +
HARD	30 +		

* The Standard Penetration Resistance (N) In blows per foot is obtained by the ASTM D1585 procedure using 2" O.D., 1 3/8" I.D. samplers.

DESCRIPTION OF ESTIMATED PERCENTAGES OF GRAVEL, SAND, AND FINES	
TRACE	Particles are present but est. < 5%
FEW	5% - 10%
LITTLE	15% - 20%
SOME	30% - 45%
MOSTLY	50% - 100%

NOTE: Percentages are presented within soil description for soil horizon with laboratory tested soil samples.

DEFINITIONS OF SOIL FRACTIONS	
SOIL COMPONENT	PARTICLE SIZE RANGE
COBBLES	ABOVE 3 INCHES
GRAVEL	3 IN. TO NO. 4 SIEVE
COARSE GRAVEL	3 IN. TO 3/4 IN.
FINE GRAVEL	3/4 IN. TO NO. 4 SIEVE
SAND	NO. 4 TO NO. 200
COARSE SAND	NO. 4 TO NO. 10
MEDIUM SAND	NO. 10 TO NO. 40
FINE SAND	NO. 40 TO NO. 200
FINES (SILT OR CLAY)	MINUS NO. 200 SIEVE

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UNIFIED SOIL CLASSIFICATION AND KEY TO SOIL DESCRIPTIONS

Geotechnical Investigation
Boneyard
Stonebrook Sparks, LLC
Washoe County, Nevada

Project No.: 1407041
Date: 07/14/20

PLATE A-3

SilverState Analytical Laboratories
Sierra Environmental Monitoring
Silver State Labs-Reno
1135 Financial Blvd
Reno, NV 89502
(775) 857-2400 FAX: (888) 398-7002
www.ssalabs.com

Analytical Report

Workorder#: 20070504
Date Reported: 7/14/2020

Client: Wood Rodgers
Project Name: 1407041/ Bone Yard Geotech/ TP-1 @ 5'-7'
PO #:
Sampled By: Client

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	Client Sample ID	Date/Time Sampled	Date Received
20070504-01	TP - 1 @ 5'-7'	07/10/2020 10:00	7/10/2020

Parameter	Method	Result	Units	PQL	Analyst	Date/Time Analyzed	Data Flag
Chloride	EPA 9056	220	mg/Kg	5	JF	07/13/2020 10:33	
Nitrate as N	EPA 9056	0.9	mg/Kg	0.5	JF	07/13/2020 10:33	

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	Client Sample ID	Date/Time Sampled	Date Received
20070504-02	TP - 1 @ 10'-10'	07/10/2020 10:00	7/10/2020

Parameter	Method	Result	Units	PQL	Analyst	Date/Time Analyzed	Data Flag
Chloride	EPA 9056	82	mg/Kg	5	JF	07/13/2020 10:54	
Nitrate as N	EPA 9056	0.8	mg/Kg	0.5	JF	07/13/2020 10:54	

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	Client Sample ID	Date/Time Sampled	Date Received
20070504-03	TP - 1 @ 15'-17'	07/10/2020 10:00	7/10/2020

Parameter	Method	Result	Units	PQL	Analyst	Date/Time Analyzed	Data Flag
Chloride	EPA 9056	68	mg/Kg	5	JF	07/13/2020 11:14	
Nitrate as N	EPA 9056	1.8	mg/Kg	0.5	JF	07/13/2020 11:14	

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	Client Sample ID	Date/Time Sampled	Date Received
20070504-04	TP - 1 @ 19-20'	07/10/2020 10:00	7/10/2020

Parameter	Method	Result	Units	PQL	Analyst	Date/Time Analyzed	Data Flag
Chloride	EPA 9056	41	mg/Kg	5	JF	07/13/2020 11:35	
Nitrate as N	EPA 9056	1.9	mg/Kg	0.5	JF	07/13/2020 11:35	

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Reno, NV 89502
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www.ssalabs.com

Analytical Report

Workorder#: 20070504
Date Reported: 7/14/2020

Client: Wood Rodgers
Project Name: 1407041/ Bone Yard Geotech/ TP-1 @ 5'-7'
PO #:
Sampled By: Client

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	Client Sample ID	Date/Time Sampled	Date Received
20070504-05	TP - 2 @ 5-7'	07/10/2020 10:00	7/10/2020

Parameter	Method	Result	Units	PQL	Analyst	Date/Time Analyzed	Data Flag
Chloride	EPA 9056	89	mg/Kg	5	JF	07/13/2020 11:56	
Nitrate as N	EPA 9056	150	mg/Kg	0.5	JF	07/13/2020 11:56	

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	Client Sample ID	Date/Time Sampled	Date Received
20070504-06	TP - 2 @ 10-12'	07/10/2020 10:00	7/10/2020

Parameter	Method	Result	Units	PQL	Analyst	Date/Time Analyzed	Data Flag
Chloride	EPA 9056	12	mg/Kg	5	JF	07/13/2020 12:16	
Nitrate as N	EPA 9056	5.2	mg/Kg	0.5	JF	07/13/2020 12:16	

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	Client Sample ID	Date/Time Sampled	Date Received
20070504-07	TP - 2 @ 15-17'	07/10/2020 10:00	7/10/2020

Parameter	Method	Result	Units	PQL	Analyst	Date/Time Analyzed	Data Flag
Chloride	EPA 9056	14	mg/Kg	5	JF	07/13/2020 12:37	
Nitrate as N	EPA 9056	2.4	mg/Kg	0.5	JF	07/13/2020 12:37	

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	Client Sample ID	Date/Time Sampled	Date Received
20070504-08	TP - 2 @ 20'-21'	07/10/2020 10:00	7/10/2020

Parameter	Method	Result	Units	PQL	Analyst	Date/Time Analyzed	Data Flag
Chloride	EPA 9056	11	mg/Kg	5	JF	07/13/2020 12:58	
Nitrate as N	EPA 9056	2.8	mg/Kg	0.5	JF	07/13/2020 12:58	

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www.ssalabs.com

Analytical Report

Workorder#: 20070504
Date Reported: 7/14/2020

Client: Wood Rodgers
Project Name: 1407041/ Bone Yard Geotech/ TP-1 @ 5'-7'
PO #:
Sampled By: Client

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	Client Sample ID	Date/Time Sampled	Date Received
20070504-09	TP - 3 @ 5-6'	07/10/2020 10:00	7/10/2020

Parameter	Method	Result	Units	PQL	Analyst	Date/Time Analyzed	Data Flag
Chloride	EPA 9056	7	mg/Kg	5	JF	07/13/2020 13:19	
Nitrate as N	EPA 9056	0.8	mg/Kg	0.5	JF	07/13/2020 13:19	

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	Client Sample ID	Date/Time Sampled	Date Received
20070504-10	TP - 3 @ 10-11'	07/10/2020 10:00	7/10/2020

Parameter	Method	Result	Units	PQL	Analyst	Date/Time Analyzed	Data Flag
Chloride	EPA 9056	9	mg/Kg	5	JF	07/13/2020 13:39	
Nitrate as N	EPA 9056	0.8	mg/Kg	0.5	JF	07/13/2020 13:39	

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	Client Sample ID	Date/Time Sampled	Date Received
20070504-11	TP - 3 @ 15-16'	07/10/2020 10:00	7/10/2020

Parameter	Method	Result	Units	PQL	Analyst	Date/Time Analyzed	Data Flag
Chloride	EPA 9056	8	mg/Kg	5	JF	07/13/2020 14:41	
Nitrate as N	EPA 9056	<0.5	mg/Kg	0.5	JF	07/13/2020 14:41	