

TECHNICAL MEMORANDUM

To: Nevada Environmental Response Trust

Cc: Nevada Division of Environmental Protection
United States Environmental Protection Agency

From: Arul Ayyaswami and Dan Pastor

Date: July 30, 2018

Subject: Unit 4 Source Area In-Situ Bioremediation Treatability Study Monthly Progress Report

At the direction of the Nevada Environmental Response Trust (NERT or Trust), Tetra Tech, Inc. (Tetra Tech) has prepared this memorandum that summarizes Tetra Tech's progress made during June 2018 toward successfully implementing the Unit 4 Source Area In-Situ Bioremediation Treatability Study. The location of the treatability study is depicted on Figure 1 and the location of the borings and wells are depicted on Figure 2.

Task Progress Update: May 2018

Task M21 – Unit 4 Source Area In-situ Bioremediation (ISB) Treatability Study

- Task Leader – Arul Ayyaswami
- Current Status
 - The University of Nevada – Las Vegas (UNLV) continues microcosm testing with a combination of carbon substrates, mixed microbial cultures, and soil and groundwater collected from boring locations in the vicinity of the Unit 4 Building. No additional sample results are currently available to report for these microcosms.
 - Treatability Study Modification No. 1 for the Unit 4 Source Area In-Situ Bioremediation Bench-Scale Work Plan was submitted to NDEP on June 29. This modification proposed additional bench-scale testing to:
 - Examine the impact of nano-scale zero-valent iron (ZVI) on the reduction of hexavalent chromium and other chemicals of potential concern (COPCs) as part of bench-scale testing, and evaluate the degradation kinetics of a selected organic carbon source with and without the addition of ZVI to determine if the addition of ZVI influences biological reduction of COPCs.
 - Determine if chloroform is degraded along with other COPCs, estimate chloroform degradation rates, evaluate potential chloroform toxicity to microorganisms, and identify intermediate and final degradation products associated with biodegradation of chloroform as part of bench-scale testing.

- Evaluate the effectiveness of citric acid as a carbon source for ISB in the source area relative to molasses or emulsified vegetable oil (EVO) as part of bench-scale testing.
- The following pre-implementation field activities were performed to collect critical data required to finalize the treatability study design:
 - The newly installed intermediate (I) and deep (D) injection/extraction wells and groundwater monitoring wells (Figure 2) were surveyed on June 21, developed from June 5 to June 15, and sampled from June 18 to June 20. Draft summary tables with well construction details, depth to groundwater, field parameters, and available chemical concentrations are attached as Tables 1 through 3. Draft boring logs are also attached.
 - Nuclear Magnetic Resonance (NMR) testing of the newly installed injection/extraction wells and groundwater monitoring wells along with monitoring wells M-252 and M-254 was conducted from June 18 to 21.
 - Slug testing was conducted from June 21 to June 28 on several of the newly installed injection/extraction wells and groundwater monitoring wells.
 - Baseline groundwater elevation monitoring was conducted throughout June by placing pressure transducers in the existing and newly installed wells to evaluate natural groundwater fluctuations. The results of the monitoring indicated that there is a daily fluctuation in groundwater from approximately 0.5 inches to 6 inches. The source of the fluctuation is not known. The largest groundwater fluctuation of 6 inches was present at groundwater monitoring well M-252, screened from 132 to 142 feet bgs.
 - Single-borehole dilution testing was performed on U4-E-01I from June 22 to June 25. The data obtained from the single-borehole dilution testing could not be properly analyzed due to the aforementioned fluctuations in groundwater. Therefore, no additional single-borehole dilution testing was conducted.
 - Preliminary analysis of the geotechnical results from the soil samples collected from the six geotechnical borings, G-1 through G-6, indicated that there are hydro-collapsible soils present (collapse % in test samples ranged from 1.1 to 8.1%) within the vadose zone beneath the Unit 4 basement. Creating saturated conditions in these collapsible vadose zone soils could cause significant settlement; therefore, the infiltration testing, vadose zone injection testing, and soil flushing perforation spacing tests were not performed.
- Schedule and Progress Updates
 - The following activities are scheduled to be conducted in July 2018:
 - Continued UNLV microcosm testing in accordance with the Unit 4 Source Area In-Situ Bioremediation Treatability Study Bench-Scale Work Plan.
 - Completion of slug testing in the newly installed wells.
 - Extraction well U4-E-02I will be re-sampled as the well has been re-developed and the pH level decreased to approximately 6.9 (from 11.2).
 - Additional baseline groundwater elevation monitoring will be performed to develop baseline groundwater fluctuations for each well. This data will be used in the analysis of the slug tests, step-drawdown, and constant rate tests.
 - Step-drawdown tests will be performed on two intermediate and two deep extractions wells.
 - Constant rate tests will be performed on one intermediate and one deep extraction well, following the step-drawdown tests.

- A technical memorandum discussing the groundwater fluctuations will be submitted to NDEP in July 2018.
- The Trust is planning to submit Treatability Study Modification No. 2 representing the first modification to the Unit 4 Source Area In-Situ Bioremediation Treatability Study Work. This modification will propose the following:
 - Perform a groundwater extraction test to determine if short-term groundwater extraction (up to 3 months) will reduce TDS and COPCs in groundwater to concentrations that have been successfully bioremediated in the bench-scale tests discussed above.
- Health and Safety
 - There were no health and safety incidents related to Task M21 during June 2018.

CERTIFICATION

Unit 4 Source Area Bioremediation Treatability Study Monthly Progress Report

**Nevada Environmental Response Trust Site
(Former Tronox LLC Site)
Henderson, Nevada**

Nevada Environmental Response Trust (NERT) Representative Certification

I certify that this document and all attachments submitted to the Division were prepared at the request of, or under the direction or supervision of NERT. Based on my own involvement and/or my inquiry of the person or persons who manage the systems(s) or those directly responsible for gathering the information or preparing the document, or the immediate supervisor of such person(s), the information submitted and provided herein is, to the best of my knowledge and belief, true, accurate, and complete in all material respects.

Office of the Nevada Environmental Response Trust

Le Petomane XXVII, not individually, but solely in its representative capacity as the Nevada Environmental Response Trust Trustee

Signature: Jay A. Steinberg, *not individually, but solely as Trustee*, not individually, but solely in his representative capacity as President of the Nevada Environmental Response Trust Trustee

Name: Jay A. Steinberg, not individually, but solely in his representative capacity as President of the Nevada Environmental Response Trust Trustee

Title: Solely as President and not individually

Company: Le Petomane XXVII, Inc., not individually, but solely in its representative capacity as the Nevada Environmental Response Trust Trustee

Date: 7/30/18

CERTIFICATION

I hereby certify that I am responsible for the services described in this document and for the preparation of this document. The services described in this document have been prepared in a manner consistent with the current standards of the profession, and to the best of my knowledge, comply with all applicable federal, state, and local statutes, regulations, and ordinances. I hereby certify that all laboratory analytical data was generated by a laboratory certified by the NDEP for each constituent and media presented herein.

Description of Services Provided: Prepared Unit 4 Source Area Bioremediation Treatability Study Monthly Progress Report, Nevada Environmental Response Trust Site, Henderson, Nevada.



July 30, 2018

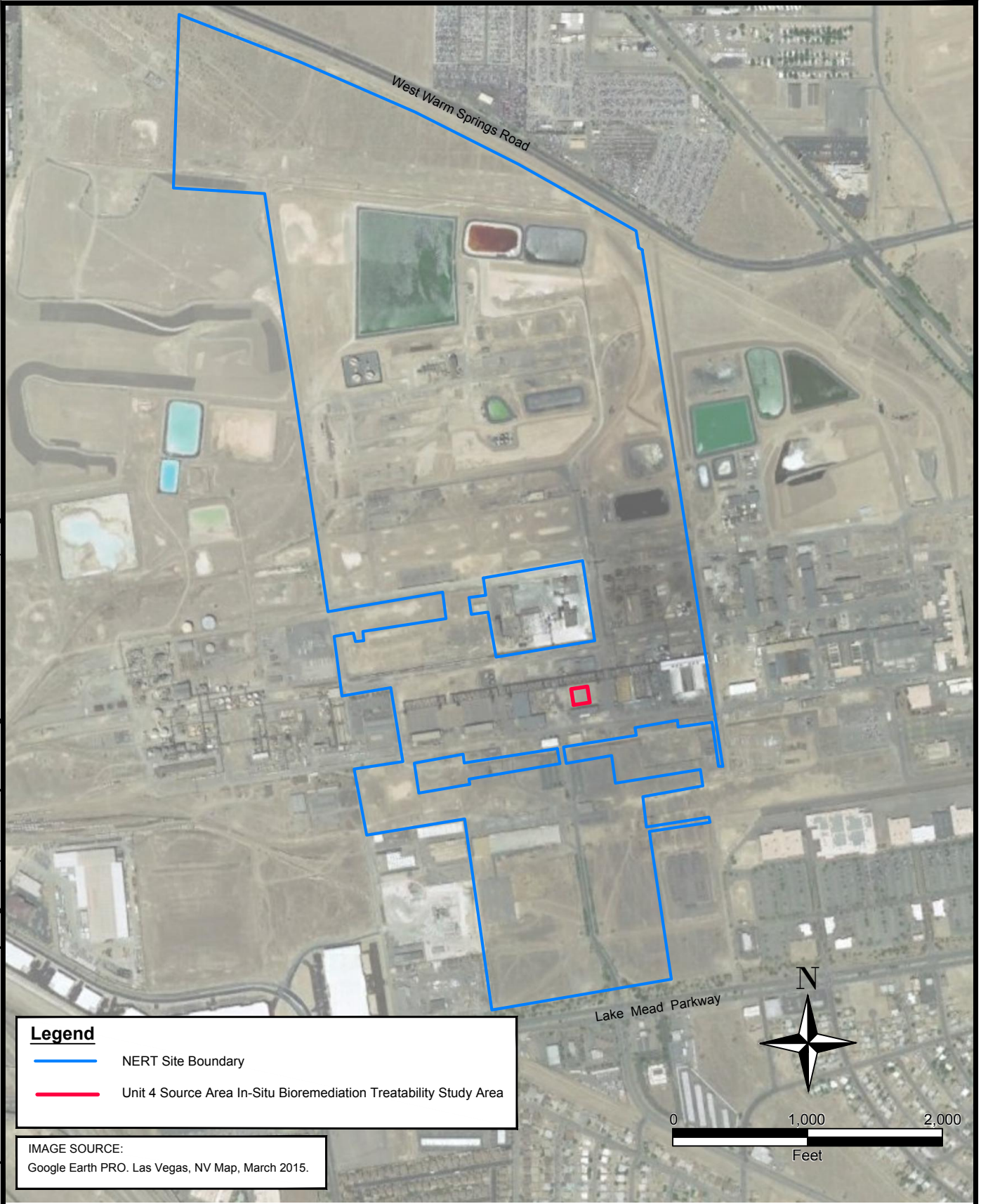
Kyle Hansen, CEM
Field Operations Manager/Geologist
Tetra Tech, Inc.

Date

Nevada CEM Certificate Number: 2167
Nevada CEM Expiration Date: September 18, 2018

Figures

tts318fs3:tt.local\CES\Projects\87600M2-1-18\CAD\Monthly Progress Updates\May 2018\Figure 1 - Site Location Map.dwg



Legend

- NERT Site Boundary
- Unit 4 Source Area In-Situ Bioremediation Treatability Study Area

IMAGE SOURCE:
Google Earth PRO. Las Vegas, NV Map, March 2015.



TETRA TECH

www.tetratech.com
150 S. 4th Street, Unit A
Henderson, Nevada 89015
PHONE: (702) 854-2293

NEVADA ENVIRONMENTAL RESPONSE TRUST SITE

UNIT 4 SOURCE AREA IN-SITU BIOREMEDIATION TREATABILITY STUDY

SITE LOCATION MAP

Project No: 117-7502018
Date: JUNE 13, 2018
Designed By: PK

Figure No.
1



Legend

- Geotechnical Soil Boring Location
- ⊕ Existing Third Mobilization Monitoring Well
- ⊕ Nested Monitoring Well (I - Intermediate; D - Deep)
- ⊕ UMCf Injection/Extraction Well Cluster (2 Screen Intervals; I - Intermediate; D - Deep)
- Unit 4 Treatability Study Area
- Department of Homeland Security Restricted Area
- Existing Unit 4 Building

Notes:

1. All locations are approximate.
2. Imagery Source: Aerotech Mapping, August 2016.
3. Well location source: Unit 4 Source Area In-Situ Bioremediation Treatability Study Work Plan, Tetra Tech, 2017.



TETRA TECH

www.tetrattech.com
 150 S. 4th Street, Unit A
 Henderson, Nevada 89015
 Phone: (702) 854-2293

NEVADA ENVIRONMENTAL RESPONSE TRUST SITE
 UNIT 4 SOURCE AREA IN-SITU BIOREMEDIATION TREATABILITY STUDY

BORING AND WELL LOCATIONS

Project No:	117-7502018
Date:	JULY 10, 2018
Designed By:	CL
Figure No.	2

Tables

Table 1
Well Construction Details
 Unit 4 Source Area In-Situ Bioremediation Treatability Study Part 1

Well ID	Date Installed	TOC Elevation (feet amsl)	Ground Surface Elevation (feet amsl)	Northing (feet)	Easting (feet)	Borehole Size (inches)	Total Depth of Borehole (feet bgs)	Well Diameter (inches)	Well Material (blank casing)	Filter Pack Material	Screen Material	Screen Interval (feet bgs)	Screen Top (feet bgs)	Screen Bottom (feet bgs)	Screen Interval (feet btoc)	Screen Top (feet btoc)	Screen Bottom (feet btoc)	Screen Length (feet)	Total Depth of Well (feet bgs)
U4-E-01I	5/9/2018	1,805.15	1,805.57	26717330.461	828212.169	8.63	92	4	Sch. 80 PVC	#2/16 Sand	4-in SS 0.010"	75-90	75	90	74.6 - 89.6	74.60	89.6	15	90.3
U4-E-01D	5/8/2018	1,805.11	1,805.41	26717332.564	828215.731	8.63	115	4	Sch. 80 PVC	#2/16 Sand	4-in SS 0.010"	95-110	95	110	94.7 - 109.7	94.7	109.7	15	110.3
U4-E-02I	5/10/2018	1,804.99	1,805.59	26717338.226	828254.235	8.63	92	4	Sch. 80 PVC	#2/16 Sand	4-in SS 0.010"	75-90	75	90	74.4 - 89.4	74.4	89.4	15	90.3
U4-E-02D	5/11/2018	1,804.99	1,805.63	26717338.568	828258.451	8.63	115	4	Sch. 80 PVC	#2/16 Sand	4-in SS 0.010"	95-110	95	110	94.4 - 109.4	94.4	109.4	15	110.3
U4-E-04I	5/15/2018	1,805.03	1,805.60	26717288.660	828217.900	8.63	92	4	Sch. 80 PVC	#2/16 Sand	4-in SS 0.010"	75-90	75	90	74.4 - 89.4	74.4	89.4	15	90.3
U4-E-04D	5/14/2018	1,804.95	1,805.49	26717288.998	828222.448	8.63	115	4	Sch. 80 PVC	#2/16 Sand	4-in SS 0.010"	95-110	95	110	94.5 - 109.5	94.5	109.5	15	110.3
U4-E-05I	5/16/2018	1,804.73	1,805.36	26717295.296	828260.766	8.63	92	4	Sch. 80 PVC	#2/16 Sand	4-in SS 0.010"	75-90	75	90	74.4 - 89.4	74.4	89.4	15	90.3
U4-E-05D	5/16/2018	1,804.95	1,805.49	26717295.676	828264.759	8.63	115	4	Sch. 80 PVC	#2/16 Sand	4-in SS 0.010"	95-110	95	110	94.5 - 109.5	94.5	109.5	15	110.3
U4IS-MW-02I	5/4/2018	1,805.07	1,805.47	26717319.449	828230.168	8.63	92	4	Sch. 80 PVC	#2/16 Sand	4-in SS 0.010"	75-90	75	90	74.6 - 89.6	74.6	89.6	15	90.3
U4IS-MW-02D	5/3/2018	1,805.07	1,805.50	26717315.326	828230.471	8.63	115	4	Sch. 80 PVC	#2/16 Sand	4-in SS 0.010"	95-110	95	110	94.6 - 109.6	94.6	109.6	15	110.3

Notes:

amsl	Above mean sea level
bgs	Below ground surface
btoc	Below top of casing
in	Inches
PVC	Polyvinyl Chloride
Sch.	Schedule
TOC	Top of Casing
SS	Stainless Steel

DRAFT

**Table 2
Groudwater Gauging Data**

Unit 4 Source Area In-Situ Bioremediation Treatability Study Part 1

Well ID	Screen Interval (feet bgs)	TOC Elevation (feet amsl)	Date Gauged	Depth to Water (feet btoc)	GW Elevation (feet amsl)
U4-E-01I	75-90	1,805.15	06/18/18	30.84	1,774.31
U4-E-01D	95-110	1,805.11	06/18/18	31.89	1,773.22
U4-E-02I	75-90	1,804.99	06/18/18	30.27	1,774.72
U4-E-02D	95-110	1,804.99	06/18/18	31.67	1,773.32
U4-E-04I	75-90	1,805.03	06/18/18	30.03	1,775.00
U4-E-04D	95-110	1,804.95	06/18/18	30.68	1,774.27
U4-E-05I	75-90	1,804.73	06/18/18	29.84	1,774.89
U4-E-05D	95-110	1,804.95	06/18/18	30.79	1,774.16
U4-IS-MW-02I	75-90	1,805.07	06/18/18	30.29	1,774.78
U4-IS-MW-02D	95-110	1,805.07	06/18/18	31.79	1,773.28

Notes:

amsl Above mean sea level
bgs Below ground surface
btoc Below top of casing

Table 3
Summary of Groundwater Analytical Results
 Unit 4 Bioremediation Treatability Study Part 1

Well ID	Sample ID	Sample Date	Perchlorate by USEPA Method 314.0 (µg/L)	Hexavalent Chromium by USEPA Method 7199 (µg/L)	USEPA Method 300.1B (µg/L)		Anions by USEPA Method 300.0 (mg/L)					General Chemistry (mg/L)				
					Chlorate	Chlorite	Nitrate as N	Chloride	Nitrite as N	Sulfate	Nitrate as NO3	Alkalinity as CaCO3	Bicarbonate ion as HCO3	Carbonate as CO3	Hydroxide as OH	Total Dissolved Solids
U4-E-01I	U4-E-01I-20180619	06/19/18	2,100,000	50,000	13,000,000	<1,000	37	3,000	<7.0	1,100	160	100	130	<1.4	<2.4	22,000
U4-E-01D	U4-E-01D-20180619	06/19/18	4,000,000	120,000	30,000,000	<1,000	75	5,800	<7.0	1,200	330	140	170	4.0	<1.4	58,000
U4-E-02I	U4-E-02I-20180619	06/19/18	330,000	6,100	1,900,000	<1,000	4.9	460	<0.70	1,000	22	98	<4.8	27	18	4,800
U4-E-02D	U4-E-02D-20180620	06/20/18	5,300,000	99,000	23,000,000	<1,000	58	5,100	<7.0	1,000	260	110	140	<2.4	<1.4	41,000
U4-E-04I	U4-E-04I-20180618	06/18/18	85,000	5,000	1,200,000	<1,000	4.4	340	<0.35	1,100	20	86	110	<2.4	<1.4	3,900
	U4-E-04I-20180618-FD	06/18/18	84,000	5,300	1,200,000	<1,000	4.7	360	<0.70	1,100	21	87	110	<2.4	<1.4	4,000
U4-E-04D	U4-E-04D-20180619	06/19/18	1,700,000	78,000	20,000,000	<1,000	59	4,400	<7.0	1,100	260	110	140	<2.4	<1.4	36,000
U4-E-05I	U4-E-05I-20180618	06/18/18	270,000	6,300	1,600,000	<1,000	5.4	460	<0.70	1,000	24	64	68	5.0	<1.4	4,900
U4-E-05D	U4-E-05D-20180618	06/18/18	4,000,000	87,000	20,000,000	<1,000	52	3,700	<7.0	1,100	230	130	140	11	<1.4	42,000
U4-IS-MW-02I	U4IS-MW-02I-20180620	06/20/18	410,000	16,000	3,300,000	<100	9.6	1,100	<0.70	1,100	42	110	130	<2.4	<1.4	7,000
U4-IS-MW-02D	U4IS-MW-02D-20180620	06/20/18	4,100,000	140,000	33,000,000	<1,000	87	7,900	<7.0	1,400	390	160	190	<2.4	<1.4	51,000

Notes:

- ID Identification
- °C Celsius
- DO Dissolved Oxygen
- µg/L Microgram per liter
- mg/L Milligram per liter
- mL Milliliter
- mL/min Milliliters per minute
- mV Millivolt
- mS/cm MilliSiemens per centimeter
- NTU Nephelometric Units
- USEPA United States Environmental Protection Agency
- VOC Volatile organic compound
- BMP Below Measuring Point
- NTU Nephelometric Units
- < Denotes concentration is less than the laboratory method detection limit indicated
- Not Analyzed

Table 3
Summary of Groundwater Analytical Results
 Unit 4 Bioremediation Treatability Study Part 1

Well ID	Sample ID	Sample Date	Detected VOCs by USEPA Method 8260B (µg/L)			General Water Quality Parameters										
			Benzene	Chloroethane	Chloroform	Temperature (°C)	pH	Specific Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mV)	Turbidity (NTU)	Purge Rate (mL/min)	Depth to Water (ft BMP)	Cum. Volume Purged (mL)	Ferrous Iron (mg/L)	Sulfide (mg/L)
U4-E-01I	U4-E-01I-20180619	06/19/18	<13	<20	2,800	27.21	7.61	27.9	1.95	136	2.8	200	31.09	4,000	0.02	0.08
U4-E-01D	U4-E-01D-20180619	06/19/18	<25	110	8,600	28.83	8.68	45.7	0.71	79	0.0	150	32.89	2,250	0.17	0.20
U4-E-02I	U4-E-02I-20180619	06/19/18	<1.3	5.2	450	30.44	11.19	6.16	3.08	-40	0.0	200	30.60	4,000	0.00	0.00
U4-E-02D	U4-E-02D-20180620	06/20/18	<13	<20	4,300	29.29	7.49	37.2	0.57	124	42.6	200	33.71	5,000	0.08	0.07
U4-E-04I	U4-E-04I-20180618	06/18/18	<2.5	<4.0	450	29.58	8.31	4.57	3.30	109	27.8	200	30.20	4,000	0.08	0.01
	U4-E-04I-20180618-FD	06/18/18	<2.5	<4.0	530	--	--	--	--	--	--	--	--	--	--	--
U4-E-04D	U4-E-04D-20180619	06/19/18	<25	<40	7,600	26.26	7.57	32.6	4.69	155	3.2	150	31.44	3,000	0.04	0.00
U4-E-05I	U4-E-05I-20180618	06/18/18	<2.5	<4.0	560	28.41	8.84	5.89	1.19	68	63.8	200	30.27	4,000	0.14	0.02
U4-E-05D	U4-E-05D-20180618	06/18/18	<25	<40	5,400	31.94	8.56	31.9	0.95	58	14.0	100	31.10	2,000	0.06	0.00
U4-IS-MW-02I	U4IS-MW-02I-20180620	06/20/18	32	<10	1,500	27.41	7.84	8.43	5.38	156	135	200	30.41	7,000	0.03	0.08
U4-IS-MW-02D	U4IS-MW-02D-20180620	06/20/18	<25	<40	11,000	27.42	7.50	48.4	0.66	148	28.0	200	33.11	6,000	0.10	0.03

Notes:

- ID Identification
- °C Celsius
- DO Dissolved Oxygen
- µg/L Microgram per liter
- mg/L Milligram per liter
- mL Milliliter
- mL/min Milliliters per minute
- mV Millivolt
- mS/cm MilliSiemens per centimeter
- NTU Nephelometric Units
- USEPA United States Environmental Protection Agency
- VOC Volatile organic compound
- BMP Below Measuring Point
- NTU Nephelometric Units
- < Denotes concentration is less than the laboratory method detection limit indicated
- Not Analyzed

Boring Logs



Tetra Tech
 17885 Von Karman Avenue, Suite 500
 Irvine, CA 92614
 Telephone: (949) 809-5000
 Fax: (949) 809-5010

CLIENT Nevada Environmental Response Trust (NERT) **PROJECT NAME** Unit 4 Source Area In-Situ Bioremediation Treatability S.

PROJECT NUMBER 117-7502018 - Task M21 **PROJECT LOCATION** Henderson, NV

DATE STARTED 5/8/18 **COMPLETED** 5/9/18 **GROUND ELEVATION** 1805.15 ft **HOLE SIZE** 8 in

DRILLING CONTRACTOR Cascade Drilling **GROUND WATER LEVELS:**

DRILLING METHOD Sonic **AT TIME OF DRILLING** 27.00 ft / Elev 1778.15 ft

LOGGED BY J. Richeson **CHECKED BY** J. Neuhaus **AT END OF DRILLING** ---

NOTES Well completed with 18" round flush-mounted vault. **AFTER DRILLING** 30.64 ft / Elev 1774.51 ft

ENVIRONMENTAL BH - GINT STD US.GDT - 7/6/18 14:44 - P:\87600M21-18\WORKING\FIELD IMPLEMENTATION\FIELD DOCUMENTATION - PART 1\BORING LOGS\GINT\NERT - M21 - PART 1\DRILLING & WELL INSTALLATIONS.GPJ

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
0					No Recovery. Hydro-vac for utility clearance to 12' bgs.	
5						
10						
12.0					1793.2	
15					(SW) SAND with Gravel, (15,80,5,0), (30,30,40), 10YR 5/3 brown, medium dense, moist, gravel <1.5" A/SA.	
15.0					1790.2	
20					(SM) Silty SAND, (10,55,35,0), (20,60,20), 10YR 5/4 yellowish brown, dense, moist, gravel <0.75" A/SA.	
19.0					1786.2	
20					(ML) Sandy SILT, (0,25,75,0), (95,5,0), 10YR 5/4 yellowish brown, stiff, moist, non-plastic, micaceous.	
21.0					1784.2	
25					(ML) SILT, (0,10,90,0), (100,0,0), 7.5YR 4/6 strong brown, firm, moist, non-plastic.	
25					(ML) SILT, (0,5,95,0), (100,0,0), 7.5YR 5/6 strong brown, moist, firm, low plasticity.	
25					(ML) SILT, (0,3,97,0), (30,30,40), 7.5YR 5/6 strong brown, stiff to very stiff, non-plastic to low plasticity, micaceous.	
30					▽ (ML) SILT, (0,7,93,0), (90,10,0), 7.5YR 4/4 brown, stiff, wet, low plasticity, micaceous, cemented nodules <3" SA/SR.	
30					▽ (ML) SILT, (0,10,90,0), (70,15,15), 7.5YR 5/6 strong brown, moist, low plasticity, cemented nodules <0.75" SA/SR.	
35					(ML) SILT with Sand, (0,15,85,0), (30,30,40), 7.5YR 5/6 strong brown, firm, moist, non-plastic, micaceous.	
35.0					1770.2	

4" Schedule 80 PVC



Tetra Tech
 17885 Von Karman Avenue, Suite 500
 Irvine, CA 92614
 Telephone: (949) 809-5000
 Fax: (949) 809-5010

CLIENT Nevada Environmental Response Trust (NERT)

PROJECT NAME Unit 4 Source Area In-Situ Bioremediation Treatability S.

PROJECT NUMBER 117-7502018 - Task M21

PROJECT LOCATION Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
35					(ML) Clayey Silt, (0,2,68,30), (100,0,0), 7.5YR 4/6 strong brown, very stiff, moist, medium plasticity, cemented nodules <0.75" SA/SR.	
40					(ML) Clayey SILT, (0,3,62,35), (33,33,34), 7.5YR 4/6 strong brown, very stiff, moist, medium plasticity, micaceous, cemented nodules <1" SA/SR and highly weathered nodules (white clay). (ML) Clayey SILT, (0,1,59,40), (100,0,0), 7.5YR 4/6 strong brown, very stiff, moist, medium to high plasticity, micaceous, highly weathered nodules (white clay).	
45					(ML) Clayey SILT, (0,1,59,40), (100,0,0), 7.5YR 4/6 strong brown, very stiff, moist, medium plasticity, micaceous, cemented nodules <2" SA/SR.	← 95% Cement / 5% Bentonite Grout
49.0					1756.2	
50.0					(CH) CLAY with Sand, (1,15,10,74), (33,34,33), 10YR 5/4 yellowish brown, stiff, wet, high plasticity, gravel <0.5" SA/A, cemented nodules <2" SA/SR.	
52.0					(ML) SILT with Clay, (0,10,70,20), (10,40,50), 10YR 5/4 yellowish brown, stiff, wet, non-plastic, cemented nodules <1.5" SA/SR.	
55.0					(ML) SILT, (0,10,90,0), (100,0,0), 10YR 4/4 dark yellowish brown, very stiff, moist, non-plastic.	
55.0					1750.2	
60.0					(ML) Clayey SILT, (0,5,65,30), (100,0,0), 7.5YR 4/4 brown, very stiff, moist, medium plasticity.	
60.0					(ML) Clayey SILT, (0,5,65,30), (100,0,0), 7.5YR 5/4 brown, very stiff, wet, medium plasticity, cemented nodules <1" SA/SR.	
60.0					1745.2	
65.0					(ML) SILT, (0,10,90,0), (100,0,0), 7.5YR 5/4 brown, stiff, moist, non-plastic, micaceous.	
65.0					1740.2	
66.0					(SM) Silty SAND, (0,70,30,0), (100,0,0), 7.5YR 5/4 brown, dense, wet.	
66.0					1739.2	
67.5					(ML) SILT, (0,10,90,0), (100,0,0), 7.5YR 5/4 brown, firm to stiff, wet, non-plastic.	
67.5					1737.7	
70.0					(ML) Clayey SILT, (0,3,57,40), (100,0,0), 7.5YR 5/6 strong brown, very stiff, moist, medium plasticity.	
71.0					1734.2	
72.0					(SW) Gravelly SAND, (25,65,10,0), (30,30,40), 10YR 3/2 very dark grayish brown, medium dense, wet, gravel <0.75" A/SA.	
72.0					1733.2	
75.0					(ML) SILT, (0,10,85,0), (25,25,50), 7.5YR 5/6 strong brown, very stiff, moist, non-plastic, micaceous.	← Hydrated 3/8" Bentonite Chips
75.0					1730.2	

(Continued Next Page)

ENVIRONMENTAL BH - GINT STD US.GDT - 7/6/18 14:44 - P:\87600M21-18\WORKINGFIELD IMPLEMENTATION\FIELD DOCUMENTATION - PART 1\BORING LOGS\GINT\NERT - M21 - PART 1\DRILLING & WELL INSTALLATIONS.GPJ



Tetra Tech
 17885 Von Karman Avenue, Suite 500
 Irvine, CA 92614
 Telephone: (949) 809-5000
 Fax: (949) 809-5010

CLIENT Nevada Environmental Response Trust (NERT)

PROJECT NAME Unit 4 Source Area In-Situ Bioremediation Treatability S.

PROJECT NUMBER 117-7502018 - Task M21

PROJECT LOCATION Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
75						
					(CH) CLAY, (0,1,9,90), (100,0,0), 7.5YR 5/4 brown, hard, moist, medium to high plasticity, few highly weathered nodules (white clay).	
				77.5	1727.7	
					(CL) Silty CLAY, (0,5,25,70), (100,0,0), 7.5YR 5/4 brown, very stiff, moist, low to medium plasticity, micaceous.	
80				79.5	1725.7	
					(CH) CLAY, (0,1,9,90), (100,0,0), 7.5YR 5/4 brown, hard, moist, medium to high plasticity, cemented nodules and highly weathered nodules (white clay).	
					(CH) CLAY, (0,1,9,90), (100,0,0), 7.5YR 5/4 brown, hard, moist, medium to high plasticity, micaceous, cemented nodules and highly weathered nodules (white clay).	
85				85.0	1720.2	
					(CH) Silty CLAY, (0,2,28,70), (100,0,0), 7.5YR 5/4 brown, hard, moist, medium to high plasticity, few large cemented nodules <4" SA/SR.	
					(CH) Silty CLAY, (0,2,33,65), (100,0,0), 7.5YR 5/4 brown, hard, moist, medium to high plasticity, micaceous.	
90				90.0	1715.2	
					(CH) CLAY, (0,1,9,90), (100,0,0), 7.5YR 5/4 brown, hard, moist, medium to high plasticity, cemented nodules and highly weathered nodules (white clay).	
				92.0	1713.2	

Bottom of borehole at 92.0 feet.

#2/16 Sand
 0.010" Slotted 4" Diameter Wire Wrapped Stainless Steel

ENVIRONMENTAL BH - GINT STD US.GDT - 7/6/18 14:44 - P:\87600M21-18\WORKING\FIELD IMPLEMENTATION\FIELD DOCUMENTATION - PART 1\BORING LOGS\GINT\NERT - M21 - PART 1 DRILLING & WELL INSTALLATIONS.GPJ



Tetra Tech
 17885 Von Karman Avenue, Suite 500
 Irvine, CA 92614
 Telephone: (949) 809-5000
 Fax: (949) 809-5010

CLIENT Nevada Environmental Response Trust (NERT) **PROJECT NAME** Unit 4 Source Area In-Situ Bioremediation Treatability S.

PROJECT NUMBER 117-7502018 - Task M21 **PROJECT LOCATION** Henderson, NV

DATE STARTED 5/7/18 **COMPLETED** 5/8/18 **GROUND ELEVATION** 1805.11 ft **HOLE SIZE** 8 in

DRILLING CONTRACTOR Cascade Drilling **GROUND WATER LEVELS:**

DRILLING METHOD Sonic **AT TIME OF DRILLING** 27.30 ft / Elev 1777.81 ft

LOGGED BY J. Richeson **CHECKED BY** J. Neuhaus **AT END OF DRILLING** ---

NOTES Well completed with 18" round flush-mounted vault. **AFTER DRILLING** 31.64 ft / Elev 1773.47 ft

ENVIRONMENTAL BH - GINT STD US.GDT - 7/6/18 14:44 - P:\87600M21-18\WORKING\FIELD IMPLEMENTATION\FIELD DOCUMENTATION - PART 1\BORING LOGS\GINT\NERT - M21 - PART 1\DRILLING & WELL INSTALLATIONS.GPJ

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
0					No recovery. Hydro-vac for utility clearance to 12' bgs.	
5						
10						
12.0					1793.1	
15					(SW) SAND with Gravel, (15,75,10,0), (30,30,40), 10YR 3/4 dark yellowish brown, medium dense, moist, gravel <2" A/SA.	
15.0					1790.1	
16.5					(SM) Silty SAND, (10,65,25,0), (35,50,15), 7.5YR 5/3 brown, medium dense, moist, gravel <1.5" SA/SR.	
16.5					1788.6	
19.0					(ML) Sandy SILT, (2,35,63,0), (25,65,10), 7.5YR 4/4 brown, firm, moist, non-plastic, weak cementation between 16.5 and 17' bgs.	
19.0					1786.1	
20					(ML) SILT, (0,5,95,0), (100,0,0), 7.5YR 5/4 brown, firm, moist, non-plastic.	
25					(ML) SILT, (0,5,95,0), (100,0,0), 7.5YR 5/4 brown, stiff, moist, non-plastic, trace cemented nodules <0.5" SA/SR.	
25					(ML) SILT, (0,3,97,0), (100,0,0), 7.5YR 5/4 brown, stiff, moist (wet between 25.5 and 26' bgs), non-plastic, cemented nodules <3" SA/SR.	
30					(ML) SILT, (0,3,92,5), (100,0,0), 7.5YR 5/4 brown, stiff, wet, low plasticity, cemented nodules <1" SA/SR.	
30					(ML) SILT, (0,2,95,3), (100,0,0), 7.5YR 5/4 brown, stiff, moist, non-plastic, cemented nodules <0.5" SA/SR.	
35					(ML) SILT, (0,7,93,0), (100,0,0), 7.5YR 5/4 brown, firm, wet, non-plastic.	
35.0					1770.1	

4" Schedule 80 PVC



Tetra Tech
 17885 Von Karman Avenue, Suite 500
 Irvine, CA 92614
 Telephone: (949) 809-5000
 Fax: (949) 809-5010

CLIENT Nevada Environmental Response Trust (NERT)

PROJECT NAME Unit 4 Source Area In-Situ Bioremediation Treatability S.

PROJECT NUMBER 117-7502018 - Task M21

PROJECT LOCATION Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
35					(ML) Clayey SILT, (0,3,72,25), (100,0,0), 7.5YR 4/6 strong brown, stiff, moist, medium plasticity, cemented nodules <1" SA/SR.	<p>← 95% Cement / 5% Bentonite Grout</p>
40					(ML) Clayey SILT, (0,3,72,25), (100,0,0), 7.5YR 4/6 strong brown, stiff, moist, medium plasticity.	
45					(ML) Clayey SILT, (0,2,78,20), (100,0,0), 7.5YR 4/6 strong brown, stiff, moist, medium plasticity, cemented nodules <1" SA/SR, some highly weathered nodules (white clay).	
47.5					(ML) Clayey SILT, (0,7,63,30), (90,10,0), 7.5YR 4/6 strong brown, very stiff, wet, medium plasticity, cemented nodules <0.75" SA/SR.	
49.5					(SC) Clayey SAND, (5,55,10,30), (20,30,50), 7.5YR 4/4 brown, dense, wet, gravel <0.25" A/SA.	
50					(ML) SILT, (0,10,85,5), (100,0,0), 7.5YR 4/4 brown, stiff, wet, non-plastic, cemented nodules <4" SA/SR.	
55					(ML) SILT, (0,5,85,10), (100,0,0), 7.5YR 4/4 brown, very stiff, moist, non-plastic to low plasticity, few cemented nodules <0.75" SA/SR.	
55.0					(ML) SILT with Clay, (0,2,83,15), (100,0,0), 10YR 5/6 yellowish brown, stiff, moist, low to medium plasticity.	
60.0					(ML) Clayey SILT, (0,5,70,25), (50,30,20), 10YR 5/6 yellowish brown, stiff, wet, medium plasticity, few cemented nodules <1" SA/SR.	
60.0					(ML) SILT with Sand, (0,15,83,2), (100,0,0), 10YR 5/4 yellowish brown, stiff, moist, non-plastic, micaceous.	
65.0					(ML) SILT with Sand, (0,15,83,2), (100,0,0), 10YR 4/3 brown, stiff, wet, non-plastic, micaceous.	
65.0					(SM) Silty SAND with Gravel, (15,60,25,0), (20,30,50), 10YR 3/2 very dark grayish brown, medium dense, wet, gravel <1" A/SA.	
66.0					(ML) SILT, (0,7,90,3), (100,0,0), 10YR 5/3 brown, stiff, moist, non-plastic, micaceous.	
67.5					(ML) Clayey SILT, (0,2,58,40), (100,0,0), 10YR 4/4 dark yellowish brown, very stiff, moist, low to medium plasticity, micaceous, trace cemented nodules <0.5" SA/SR.	
70	GB				(SM) Silty SAND with Gravel, (15,60,25,0), (20,30,50), 10YR 3/2 very dark grayish brown, medium dense, wet, gravel <1" A/SA.	
70.0					(CL) Silty CLAY, (0,2,48,50), (100,0,0), 10YR 5/4 yellowish brown, hard, moist, medium plasticity, micaceous, few cemented nodules <2" SA/SR.	
72.0						
75.0						

(Continued Next Page)

ENVIRONMENTAL BH - GINT STD US.GDT - 7/6/18 14:44 - P:\87600M21-18\WORKING\FIELD IMPLEMENTATION\FIELD DOCUMENTATION - PART 1\BORING LOGS\GINT\NERT - M21 - PART 1\DRILLING & WELL INSTALLATIONS.GPJ



Tetra Tech
 17885 Von Karman Avenue, Suite 500
 Irvine, CA 92614
 Telephone: (949) 809-5000
 Fax: (949) 809-5010

CLIENT Nevada Environmental Response Trust (NERT)

PROJECT NAME Unit 4 Source Area In-Situ Bioremediation Treatability S.

PROJECT NUMBER 117-7502018 - Task M21

PROJECT LOCATION Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
75	GB				(CL) CLAY, (0,1,10,90), (100,0,0), 10YR 5/4 yellowish brown, hard, moist, medium plasticity, few highly weathered nodules. (CH) CLAY, (0,1,10,90), (100,0,0), hard, moist, medium to high plasticity.	
80	GB				(CL) CLAY, (0,1,10,90), (100,0,0), hard, moist, medium plasticity, few highly weathered nodules. (CH) CLAY, (0,1,10,90), (100,0,0), hard, moist, medium to high plasticity.	
85	GB				(CH) CLAY, (0,0,5,95), 10YR 5/3 brown, hard, moist (wet from 85.5 to 85.75' bgs), high plasticity, highly weathered nodules.	
90	GB				(CL) Silty CLAY, (0,1,34,65), (100,0,0), 10YR 5/8 yellowish brown, hard, moist, medium plasticity, micaceous. (CL) Silty CLAY, (0,1,34,65), (100,0,0), 10YR 5/8 yellowish brown, hard, moist, medium plasticity, micaceous, cemented nodules <1" SA/SR, some highly weathered cemented nodules. (CL) Silty CLAY, (0,3,37,60), (20,30,50), 10YR 5/4 yellowish brown, hard, moist, medium plasticity, micaceous, cemented nodules <1" SA/SR.	Hydrated 3/8" Bentonite Chips
95	GB				(CH) CLAY, (0,1,29,70), (100,0,0), 10YR 5/3 brown, hard, moist, medium to high plasticity, micaceous, trace cemented nodules <1" SA/SR.	
100	GB				(ML) Clayey SILT, (0,5,65,30), (100,0,0), 10YR 5/4 yellowish brown, stiff, moist, low plasticity, micaceous, cemented nodules <2" SA/SR. (ML) Clayey SILT, (0,10,65,25), (100,0,0), 10YR 4/3 brown, stiff to very stiff, moist, non-plastic, cemented nodules <1" SA/SR.	#2/16 Sand 0.010" Slotted 4" Diameter Wire Wrapped Stainless Steel
105	GB				(CL) Silty CLAY, (0,2,43,55), (100,0,0), 10YR 5/3 brown, hard, moist, medium plasticity, highly weathered nodules (white clay).	
110	GB				(ML) Clayey SILT, (0,3,57,40), (100,0,0), 10YR 5/3 brown, moist, low plasticity, micaceous, cemented nodules <1" SA/SR, some highly weathered nodules.	
115	GB				(CL) Silty CLAY, (0,1,44,55), (100,0,0), 10YR 5/3 brown, moist, low to medium plasticity, cemented nodules <0.5" SA/SR, highly weathered nodules present.	

Bottom of borehole at 115.0 feet.

ENVIRONMENTAL BH - GINT STD US.GDT - 7/6/18 14:44 - P:\87600M21-18\WORKING\FIELD IMPLEMENTATION\FIELD DOCUMENTATION - PART 1BORING LOGS\GINT\NERT - M21 - PART 1 DRILLING & WELL INSTALLATIONS.GPJ



Tetra Tech
 17885 Von Karman Avenue, Suite 500
 Irvine, CA 92614
 Telephone: (949) 809-5000
 Fax: (949) 809-5010

CLIENT Nevada Environmental Response Trust (NERT) **PROJECT NAME** Unit 4 Source Area In-Situ Bioremediation Treatability S.

PROJECT NUMBER 117-7502018 - Task M21 **PROJECT LOCATION** Henderson, NV

DATE STARTED 5/9/18 **COMPLETED** 5/10/18 **GROUND ELEVATION** 1804.99 ft **HOLE SIZE** 8 in

DRILLING CONTRACTOR Cascade Drilling **GROUND WATER LEVELS:**

DRILLING METHOD Sonic **AT TIME OF DRILLING** 40.00 ft / Elev 1764.99 ft

LOGGED BY J. Richeson **CHECKED BY** J. Neuhaus **AT END OF DRILLING** ---

NOTES Well completed with 18" round flush-mounted vault. **AFTER DRILLING** 30.28 ft / Elev 1774.71 ft

ENVIRONMENTAL BH - GINT STD US.GDT - 7/6/18 14:44 - P:\87600M21-18\WORKING\FIELD IMPLEMENTATION\FIELD DOCUMENTATION - PART 1\BORING LOGS\GINT\NERT - M21 - PART 1\DRILLING & WELL INSTALLATIONS.GPJ

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
0					No recovery. Hydro-vac for utility clearance to 12' bgs.	
5						<p>4" Schedule 80 PVC</p>
10						
12.0					1793.0	
14.0					(SW-SM) Well-graded SAND with Silt and Gravel, (15,75,10,0), (30,50,20), 10YR 4/3 brown, medium dense, moist, gravel <1" A/SA. 1791.0	
15					(SM) Silty SAND, (2,68,30,0), (40,40,20), 10R 8/1 white, very dense, dry, cemented, white crystalline powder coating cementation.	
					(SM) Silty SAND, (5,70,25,0), (40,40,20), 7.5YR 7/1 light gray, dry, dense.	
					(SM) Silty SAND, (1,69,30,0), (30,60,10), 10YR 5/6 yellowish brown, medium dense, moist, some cementation, gravel <0.25" A/SA.	
20					(SM) Silty SAND, (0,60,40,0), (70,20,10), 10YR 5/4 yellowish brown, medium dense, moist, some cementation, gravel <0.25" A/SA. 1785.0	
					(ML) Sandy SILT, (0,15,85,0), (90,10,0), 10YR 5/8 yellowish brown, firm, moist, non-plastic to low plasticity.	
25					(ML) SILT, (0,5,90,5), (75,25,0), 7.5YR 5/4 brown, stiff, moist, low plasticity. 1780.0	
					(ML) SILT, (0,5,90,5), (75,25,0), 7.5YR 5/4 brown, stiff, moist, low plasticity, micaceous, cemented nodules <0.5" SA/SR.	
					▽ (ML) SILT, (0,5,95,0), (100,0,0), 7.5YR 5/4 brown, stiff, moist, non-plastic, micaceous, few cemented nodules <3" SA/SR.	
					(ML) SILT, (0,5,90,5), (100,0,0), 7.5YR 5/4 brown, stiff, moist, low plasticity, micaceous.	
35					1770.0	

(Continued Next Page)



Tetra Tech
 17885 Von Karman Avenue, Suite 500
 Irvine, CA 92614
 Telephone: (949) 809-5000
 Fax: (949) 809-5010

CLIENT Nevada Environmental Response Trust (NERT)

PROJECT NAME Unit 4 Source Area In-Situ Bioremediation Treatability S.

PROJECT NUMBER 117-7502018 - Task M21

PROJECT LOCATION Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
35					(MH) Clayey SILT, (0,2,73,25), (100,0,0), 7.5YR 4/6 strong brown, very stiff, moist, medium plasticity, cemented nodules <1.5" SA/SR, weathered nodules.	
40					(CL-ML) Silty CLAY, (0,1,59,40), (100,0,0), 7.5YR 5/4 brown, very stiff, wet, high plasticity, micaceous, cemented nodules <2" SA/SR, weathered nodules. (CL-ML) Silty CLAY, (0,1,59,40), (100,0,0), 7.5YR 5/4 brown, very stiff, wet, high plasticity, micaceous, cemented nodules <0.75" SA/SR, less weathered nodules than above.	
45					(CL-ML) Silty CLAY, (1,7,52,40), (10,40,50), 7.5YR 5/4 brown, very stiff, wet, high plasticity, micaceous, cemented nodules <0.75" SA/SR, less weathered nodules than above, gravel <0.25" A/SA.	95% Cement / 5% Bentonite Grout
47.5					(CL) Sandy CLAY, (0,25,35,40), (75,25,0), 7.5YR 4/6 strong brown, firm, wet, low to medium plasticity.	
48.0					(SM) Silty SAND with Gravel, (25,60,15,0), (20,35,45), 10YR 4/3 brown, medium dense, wet, gravel <0.5" SA.	
49.0					(ML) Sandy SILT, (0,30,70,0), (100,0,0), 10YR 5/4 yellowish brown, firm, moist, non-plastic.	
50.0					(ML) SILT, (0,7,90,3), (100,0,0), 10YR 5/6 yellowish brown, stiff, moist, non-plastic to low plasticity, cemented nodules <1" SA/SR.	
52.0					(ML) Clayey SILT, (0,3,72,25), (100,0,0), 10YR 5/6 yellowish brown, stiff, wet, low to medium plasticity, cemented nodules <1" SA/SR.	
53.0					(ML) SILT, (0,1,89,10), (100,0,0), 10YR 5/6 yellowish brown, stiff, moist, non-plastic, few cemented nodules <0.5" SA/SR.	
55.0					(MH) Clayey SILT, (0,5,70,25), (100,0,0), 7.5YR 5/4 brown, stiff, wet, medium to high plasticity, high concentration of cemented nodules <3" SA/SR.	
60					(ML) Clayey SILT, (0,2,88,10), (100,0,0), 7.5YR 5/4 brown, hard, wet, low plasticity.	
61.0					(ML) SILT, (0,10,85,5), (100,0,0), 7.5YR 5/4 brown, stiff, moist, non-plastic, micaceous, cemented nodules <0.5" SA/SR.	
63.0					(SW-SM) Well-graded SAND with Silt and Gravel, (15,75,10,0), (40,40,20), 7.5YR 3/4 dark brown, medium dense, wet, gravel <1" SA/SR.	
64.0					(ML) Clayey SILT, (0,10,65,25), (80,20,0), 7.5YR 4/6 strong brown, firm, moist, non-plastic to low plasticity, micaceous.	
65					(MH) Clayey SILT, (0,5,60,35), (100,0,0), 7.5YR 4/6 strong brown, wet, medium plasticity, micaceous, few cemented nodules <2" SA/SR.	
68.0					(CL-ML) Silty CLAY, (1,14,30,55), (33,33,34), 7.5YR 4/6 strong brown, very stiff, moist, medium to high plasticity, micaceous, cemented nodules <1" SA/SR, gravel <0.25" SA/SR.	Hydrated 3/8" Bentonite Chips
71.0					(SW-SM) Well-graded SAND with Gravel, (20,70,10,0), (10,40,50), 10YR 3/2 very dark grayish brown, medium dense, wet, gravel <0.5" SA/SR.	
73.0					(ML) SILT, (0,10,85,5), (100,0,0), 7.5YR 4/6 strong brown, stiff, moist, non-plastic, micaceous, cemented nodules <1"	
75.0						

(Continued Next Page)

ENVIRONMENTAL BH - GINT STD US.GDT - 7/6/18 14:44 - P:\87600M21-18\WORKING\FIELD IMPLEMENTATION\FIELD DOCUMENTATION - PART 1\BORING LOGS\GINT\NERT - M21 - PART 1\DRILLING & WELL INSTALLATIONS.GPJ



Tetra Tech
 17885 Von Karman Avenue, Suite 500
 Irvine, CA 92614
 Telephone: (949) 809-5000
 Fax: (949) 809-5010

CLIENT Nevada Environmental Response Trust (NERT)

PROJECT NAME Unit 4 Source Area In-Situ Bioremediation Treatability S.

PROJECT NUMBER 117-7502018 - Task M21

PROJECT LOCATION Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
75						
80					SA/SR. (CH) CLAY, (0,0,10,90), 7.5YR 5/6 strong brown, hard, moist, high plasticity, highly weathered nodules. (CH) CLAY, (0,0,10,90), 7.5YR 5/6 strong brown, very stiff, moist, medium plasticity, highly weathered nodules. (CH) CLAY, (0,0,10,90), 7.5YR 5/6 strong brown, hard, moist, high plasticity, highly weathered nodules.	
85			86.0		#2/16 Sand 0.010" Slotted 4" Diameter Wire Wrapped Stainless Steel	
90			88.0			
92			92.0	(CH) CLAY, (0,2,13,85), (100,0,0), 7.5YR 5/6 strong brown, hard, moist, high plasticity, cemented nodules <1" SA/SR, weathered nodules.	1713.0	

Bottom of borehole at 92.0 feet.

ENVIRONMENTAL BH - GINT STD US.GDT - 7/6/18 14:44 - P:\87600M21-18\WORKING\FIELD IMPLEMENTATION\FIELD DOCUMENTATION - PART 1\BORING LOGS\GINT\NERT - M21 - PART 1\DRILLING & WELL INSTALLATIONS.GPJ



Tetra Tech
 17885 Von Karman Avenue, Suite 500
 Irvine, CA 92614
 Telephone: (949) 809-5000
 Fax: (949) 809-5010

CLIENT Nevada Environmental Response Trust (NERT) **PROJECT NAME** Unit 4 Source Area In-Situ Bioremediation Treatability S.

PROJECT NUMBER 117-7502018 - Task M21 **PROJECT LOCATION** Henderson, NV

DATE STARTED 5/10/18 **COMPLETED** 5/11/18 **GROUND ELEVATION** 1804.99 ft **HOLE SIZE** 8 in

DRILLING CONTRACTOR Cascade Drilling **GROUND WATER LEVELS:**

DRILLING METHOD Sonic **AT TIME OF DRILLING** 28.00 ft / Elev 1776.99 ft

LOGGED BY J. Richeson **CHECKED BY** J. Neuhaus **AT END OF DRILLING** ---

NOTES Well completed with 18" round flush-mounted vault. **AFTER DRILLING** 31.12 ft / Elev 1773.87 ft

ENVIRONMENTAL BH - GINT STD US.GDT - 7/6/18 14:44 - P:\87600M21-18\WORKING\FIELD IMPLEMENTATION\FIELD DOCUMENTATION - PART 1\BORING LOGS\GINT\NERT - M21 - PART 1\DRILLING & WELL INSTALLATIONS.GPJ

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
0					No recovery. Hydro-vac for utility clearance to 12' bgs.	
5						
10						
12.0					1793.0	
14.0					(SM) Silty SAND, (5,65,30,0), (33,34,33), 2.5YR 8/1 white, dry, micaceous, strong cementation, gravel <0.25" A/SA. 1791.0	
15.0					(SW-SM) Well-graded SAND with Silt, (10,80,10,0), (33,34,33), 7.5YR 4/4 brown, medium dense, moist, micaceous, gravel <0.75" A/SA. 1790.0	
18.0					(SM) Silty SAND, (0,70,30,0), (40,40,20), 10YR 5/4 yellowish brown, dense, moist. 1787.0	
20.0					(SM) Silty SAND, (0,55,45,0), (80,20,0), 10YR 5/8 yellowish brown, dense, moist, few cemented nodules. 1785.0	
22.0					(ML) Sandy SILT, (0,35,65,0), (100,0,0), 10YR 5/8 yellowish brown, soft to firm, moist, non-plastic, micaceous. 1783.0	
25.0					(ML) SILT with Sand, (0,15,85,0), (100,0,0), 10YR 6/6 brownish yellow, firm, moist, non-plastic. 1780.0	
30					(ML) SILT, (0,10,90,0), (100,0,0), 10YR 4/4 dark yellowish brown, firm, moist, non-plastic, micaceous.	
35.0					(ML) Clayey SILT, (0,5,65,30), (33,34,33), 7.5YR 5/4 brown, firm, moist, low plasticity, few weakly cemented nodules <0.75" SA/SR. 1770.0	

4" Schedule 80 PVC



Tetra Tech
17885 Von Karman Avenue, Suite 500
Irvine, CA 92614
Telephone: (949) 809-5000
Fax: (949) 809-5010

CLIENT Nevada Environmental Response Trust (NERT)

PROJECT NAME Unit 4 Source Area In-Situ Bioremediation Treatability S.

PROJECT NUMBER 117-7502018 - Task M21

PROJECT LOCATION Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
35						
38.0					(CL) Silty CLAY, (0,3,37,60), (100,0,0), 10YR 5/8 yellowish brown, firm, wet, medium to high plasticity, cemented nodules <1" SA/SR, highly weathered cemented nodules.	
40.0					(CH) CLAY, 7.5YR 5/4 brown, stiff, moist, medium to high plasticity, micaceous.	
45.0					(CL) Silty CLAY, (0,3,37,60), (100,0,0), 7.5YR 4/6 strong brown, stiff, moist, medium to high plasticity, micaceous, cemented nodules <1" SA/SR, highly weathered cemented nodules.	
48.0					(MH) Clayey SILT, (0,3,57,40), (100,0,0), 7.5YR 4/6 strong brown, hard, moist, medium to high plasticity, cemented nodules <1" SA/SR, weathered cemented nodules.	
49.0					(SM) Silty SAND, (5,55,40,0), (33,27,40), 7.5YR 4/6 strong brown, medium dense, wet, gravel <0.25" A/SA.	
52.0					(ML) SILT with Sand, (0,15,80,5), (33,33,34), 7.5YR 4/6 strong brown, firm, wet, non-plastic.	
53.0					(CL) Silty CLAY, (0,5,40,55), (100,0,0), 7.5YR 4/6 strong brown, stiff, wet, high plasticity, cemented nodules <2" SA/SR.	
55.0					(MH) Clayey SILT, (0,3,57,40), (100,0,0), 10YR 3/6 dark yellowish brown, stiff, wet, medium plasticity, cemented nodules <1" SA/SR, highly weathered nodules (white clay).	
58.0					(CL) Silty CLAY, (0,1,49,50), (100,0,0), 7.5YR 6/3 light brown, wet, medium to high plasticity, high concentration of cemented nodules <3" SA/SR, highly weathered cemented nodules.	
60.0					(ML) Clayey SILT, (0,3,67,30), (100,0,0), 7.5YR 5/4 brown, stiff, moist, low plasticity, micaceous.	
62.0					(ML) Sandy SILT, (0,40,50,10), (70,30,0), 7.5YR 5/4 brown, wet, non-plastic, trace gravel <0.25" A/SA.	
63.0					(ML) SILT with Sand, (0,15,80,5), (33,33,34), 7.5YR 4/6 strong brown, firm, wet, non-plastic.	
64.5					(SW-SM) Well-graded SAND with Silt and Gravel, (20,70,10,0), (33,33,34), 10YR 3/3 dark brown, medium dense, wet, gravel <0.5" A/SA.	
68.0					(ML) SILT, (0,10,90,0), (100,0,0), 7.5YR 5/4 brown, firm, moist, non-plastic.	
71.0					(ML) SILT, (0,10,90,0), (100,0,0), 7.5YR 5/4 brown, firm, wet, non-plastic, cemented nodules <1" SA/SR.	
71.5	GB				(CL) Silty CLAY, (0,5,45,50), (100,0,0), 7.5YR 5/4 brown, very stiff, moist, low to medium plasticity, highly weathered nodules (wet) at 69' bgs.	
72.5					(CL) Silty CLAY, (1,20,45,34), (33,34,33), 7.5YR 5/4 brown, very stiff, moist, low to medium plasticity, gravel <0.25" A/SA.	
75					(SM) Silty SAND, (5,70,25,0), (33,30,37), 7.5YR 5/4 brown, medium dense, wet, gravel <0.25" SA/SR.	
					(CL) Silty CLAY, (1,20,45,34), (33,34,33), 7.5YR 5/4 brown, very stiff, moist, low to medium plasticity, gravel	

← 95% Cement / 5% Bentonite Grout

ENVIRONMENTAL BH - GINT STD US.GDT - 7/6/18 14:44 - P:\87600M21-18\WORKING\FIELD IMPLEMENTATION\FIELD DOCUMENTATION - PART 1\BORING LOGS\GINT\NERT - PART 1\DRILLING & WELL INSTALLATIONS.GPJ



Tetra Tech
 17885 Von Karman Avenue, Suite 500
 Irvine, CA 92614
 Telephone: (949) 809-5000
 Fax: (949) 809-5010

CLIENT Nevada Environmental Response Trust (NERT)

PROJECT NAME Unit 4 Source Area In-Situ Bioremediation Treatability S.

PROJECT NUMBER 117-7502018 - Task M21

PROJECT LOCATION Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
75	GB				<0.25" A/SA.	
					(CH) CLAY, (0.5,10,85), (100,0,0), 7.5YR 5/4 brown, hard, moist, medium to high plasticity, trace highly weathered nodules (white clay).	
					(CH) CLAY, (0,0,10,90), 7.5YR 4/6 strong brown, hard, moist, medium to high plasticity.	
80	GB				(CH) CLAY, (0,0,30,70), 7.5YR 4/6 strong brown, very stiff, moist, low to medium plasticity.	
				81.0	(CH) CLAY, (0,0,10,90), 7.5YR 4/6 strong brown, stiff, wet, high plasticity, cemented nodules <2" SA/SR, highly weathered nodules (white clay).	1724.0
					(CL) Silty CLAY, (0,5,25,70), (0,30,70), 10YR 4/3 brown, hard, moist, medium to high plasticity, micaceous.	
85	GB				(CL) Silty CLAY, (0,5,25,70), (0,30,70), 10YR 4/3 brown, stiff, wet, medium to high plasticity, micaceous, cemented nodules, weathered nodules.	1720.0
				85.0	(CL) Silty CLAY, (0,5,25,70), (0,30,70), 10YR 4/3 brown, hard, moist, medium to high plasticity, micaceous.	
				87.5	(CH) CLAY, (0,0,10,90), 10YR 4/3 brown, hard, moist, medium to high plasticity, some highly weathered nodules (white clay).	1717.5
90	GB				(CL) Silty CLAY, (0,0,35,65), 10YR 4/3 brown, hard, moist, low to medium plasticity, micaceous.	
				91.0	(CH) CLAY, (0,0,10,90), 10YR 4/3 brown, hard, moist, high plasticity, cemented nodules <1.5" SA/SR, highly weathered nodules (white clay, wet).	1714.0
				93.0	(CL) Silty CLAY, (0,0,35,65), 7.5YR 5/6 strong brown, very stiff, moist, low to medium plasticity.	1712.0
95	GB				(CL) Silty CLAY, (0,0,25,75), 7.5YR 5/3 brown, very stiff to hard, moist, medium to high plasticity, cemented nodules <0.75" SA/SR, highly weathered nodules (white clay).	1708.0
				97.0	(CH) CLAY, (0,0,10,90), 7.5YR 6/3 light brown, hard, moist, high plasticity, cemented nodules <3" SA/SR, some highly weathered nodules (white clay, stiff, moist, high plasticity).	
100	GB				(CH) CLAY, (0,0,10,90), 7.5YR 6/3 light brown, hard, moist, high plasticity, cemented nodules <3" SA/SR, high concentration of highly weathered nodules (white clay, 10YR 8/2 very pale brown, very stiff, wet, high plasticity).	
				105.0	(CH) CLAY, (0,0,10,90), 7.5YR 5/3 brown, hard, moist, low to medium plasticity, micaceous, cemented nodules <1" SA/SR.	1700.0
105	GB				(CH) CLAY, (0,0,10,90), 7.5YR 5/3 brown, hard, moist, low to medium plasticity, micaceous, trace cemented nodules <0.5" SA/SR.	1697.5
				107.5	(CL) Silty CLAY, 7.5YR 5/3 brown, very stiff, moist, low to medium plasticity, micaceous, few cemented nodules <1" SA/SR, weathered nodules (white clay).	
110	GB				(ML) Clayey SILT, (0,0,55,45), 7.5YR 5/3 brown, hard, moist, low plasticity, few cemented nodules <0.75" SA/SR, some weathered nodules (white clay).	
					(ML) Clayey SILT, (0,0,65,35), 7.5YR 5/3 brown, hard, moist, low to medium plasticity, micaceous, trace weathered nodules (white clay).	
115	GB				(ML) Clayey SILT, (0,0,75,25), 7.5YR 5/4 brown, very stiff.	1690.0

Hydrated 3/8" Bentonite Chips

#2/16 Sand
 0.010" Slotted 4" Diameter Wire Wrapped Stainless Steel

ENVIRONMENTAL BH - GINT STD US.GDT - 7/6/18 14:44 - P:\87600M21-18\WORKING\FIELD IMPLEMENTATION\FIELD DOCUMENTATION - PART 1 BORING LOGS\GINT\NERT - M21 - PART 1 DRILLING & WELL INSTALLATIONS.GPJ



Tetra Tech
17885 Von Karman Avenue, Suite 500
Irvine, CA 92614
Telephone: (949) 809-5000
Fax: (949) 809-5010

CLIENT Nevada Environmental Response Trust (NERT)

PROJECT NAME Unit 4 Source Area In-Situ Bioremediation Treatability S.

PROJECT NUMBER 117-7502018 - Task M21

PROJECT LOCATION Henderson, NV

ENVIRONMENTAL BH - GINT STD US.GDT - 7/6/18 14:44 - P:\87600M21-18\WORKING\FIELD IMPLEMENTATION\FIELD DOCUMENTATION - PART 1\BORING LOGS\GINT\NERT - M21 - PART 1\DRILLING & WELL INSTALLATIONS.GPJ

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
---------------	-----------------------	-----------------------------	-----------------------	----------------	----------------------	--------------

moist, low plasticity, micaceous, trace weathered nodules
(white clay).
Bottom of borehole at 115.0 feet.



Tetra Tech
 17885 Von Karman Avenue, Suite 500
 Irvine, CA 92614
 Telephone: (949) 809-5000
 Fax: (949) 809-5010

CLIENT Nevada Environmental Response Trust (NERT) **PROJECT NAME** Unit 4 Source Area In-Situ Bioremediation Treatability S.

PROJECT NUMBER 117-7502018 - Task M21 **PROJECT LOCATION** Henderson, NV

DATE STARTED 5/15/18 **COMPLETED** 5/15/18 **GROUND ELEVATION** 1805.03 ft **HOLE SIZE** 8 in

DRILLING CONTRACTOR Cascade Drilling **GROUND WATER LEVELS:**

DRILLING METHOD Sonic **AT TIME OF DRILLING** 40.50 ft / Elev 1764.53 ft

LOGGED BY J. Richeson **CHECKED BY** J. Neuhaus **AT END OF DRILLING** ---

NOTES Well completed with 18" round flush-mounted vault. **AFTER DRILLING** 30.02 ft / Elev 1775.01 ft

ENVIRONMENTAL BH - GINT STD US.GDT - 7/6/18 14:44 - P:\87600M21-18\WORKING\FIELD IMPLEMENTATION\FIELD DOCUMENTATION - PART 1\BORING LOGS\GINT\NERT - M21 - PART 1.DRILLING & WELL INSTALLATIONS.GPJ

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
0					No recovery. Hydro-vac for utility clearance to 12' bgs.	
5						
10						
12.0					1793.0	
14.0					(SW-SM) Well-graded SAND with Silt and Gravel, (15,75,10,0), (35,35,30), 7.5YR 4/4 brown, medium dense, moist, gravel <2" A/SA. 1791.0	
15					(SM) Silty SAND, (5,70,25,0), (30,50,20), 7.5YR 8/1 white, very dense, dry, micaceous, strong cementation.	
17.0					(SM) Silty SAND, (2,68,30,0), (50,40,10), 10YR 5/4 yellowish brown, dense, moist, micaceous, gravel <0.5" A/SA. 1788.0	
20					(ML) Sandy SILT, (0,45,55,0), (80,20,0), 10YR 6/6 brownish yellow, firm, moist, non-plastic, few cemented nodules.	
22.5					(ML) Sandy SILT, (0,40,60,0), (75,25,0), 10YR 5/6 yellowish brown, firm, moist, non-plastic, micaceous. 1782.5	
25					(MH) Clayey SILT, (0,5,70,25), (100,0,0), 10YR 5/6 yellowish brown, stiff, moist, low to medium plasticity. 1780.0	
27.0					(ML) SILT, (0,2,93,5), (100,0,0), 10YR 5/6 yellowish brown, stiff, moist, non-plastic, micaceous, few cemented nodules <1" A/SR. 1778.0	
30					(MH) SILT with Clay, (0,1,84,15), (100,0,0), 10YR 5/6 yellowish brown, stiff, moist (wet at 29' bgs), low to medium plasticity, micaceous, 10% of sample comprised of cemented nodules <3" SA/SR.	
32.0					(MH) SILT with Clay, (0,1,84,15), (100,0,0), 10YR 5/6 yellowish brown, stiff, moist, low to medium plasticity, micaceous, 10% of sample comprised of cemented nodules <3" SA/SR, 50% of sample comprised of weathered nodules <2" SA/SR to sand grain size. 1773.0	
35.0					(MH) SILT with Clay, (0,1,84,15), (100,0,0), 10YR 5/6 yellowish brown, stiff, moist, low to medium plasticity, micaceous, trace cemented nodules <0.75" SA/SR. 1770.0	

4" Schedule 80 PVC



Tetra Tech
 17885 Von Karman Avenue, Suite 500
 Irvine, CA 92614
 Telephone: (949) 809-5000
 Fax: (949) 809-5010

CLIENT Nevada Environmental Response Trust (NERT)

PROJECT NAME Unit 4 Source Area In-Situ Bioremediation Treatability S.

PROJECT NUMBER 117-7502018 - Task M21

PROJECT LOCATION Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
35					(ML) SILT, (0,5,90,5), (100,0,0), 7.5YR 5/4 brown, firm, moist, non-plastic, micaceous.	
					(CL) Silty CLAY, (0,1,29,70), (100,0,0), 7.5YR 5/4 brown, very stiff, moist, high plasticity, micaceous, cemented nodules <1" SA/SR.	
40					(CL) Silty CLAY, (0,1,29,70), (100,0,0), 7.5YR 5/4 brown, very stiff, moist, high plasticity, micaceous, 15% of sample interval comprised of cemented nodules <1" SA/SR.	
				41.5	(CL) Silty CLAY, (0,1,29,70), (100,0,0), 7.5YR 5/4 brown, very stiff, wet, high plasticity, micaceous, 15% of sample interval comprised of cemented nodules <1" SA/SR.	1763.5
				44.0	(CL) Silty CLAY, (0,1,29,70), (100,0,0), 7.5YR 5/4 brown, very stiff, moist, high plasticity, micaceous, cemented nodules <1" SA/SR.	1761.0
45					(CH) CLAY, (0,1,9,90), (100,0,0), 7.5YR 5/4 brown, stiff, moist, high plasticity, high concentration of weathered cemented nodules <1" to sand grain size, high concentration of highly weathered nodules (white clay).	
				48.5	(CL) Silty CLAY, (0,1,39,60), (100,0,0), 7.5YR 5/4 brown, very stiff, wet, high plasticity, micaceous, weathered nodules <0.5" to sand grain size.	1756.5
50					(CL) Silty CLAY, (0,1,39,60), (100,0,0), 7.5YR 5/4 brown, very stiff to hard, wet, high plasticity, micaceous, weathered nodules <0.5" to sand grain size.	
				50.0	(CL) Silty CLAY, (0,1,39,60), (100,0,0), 7.5YR 5/4 brown, very stiff to hard, wet, high plasticity, micaceous, weathered nodules <0.5" to sand grain size.	1755.0
				51.0	(CL) Sandy CLAY, (5,40,5,50), (20,40,40), 7.5YR 5/4 brown, firm, wet, low plasticity, gravel <0.5" A/SA.	1754.0
					(ML) Sandy SILT, (1,29,70,0), (50,50,0), 7.5YR 5/4 brown, firm, wet, non-plastic, trace gravel <0.25" A/SA.	
55					(ML) Clayey SILT, (0,5,65,30), (100,0,0), 7.5YR 5/4 brown, firm to stiff, wet, low plasticity, cemented nodules <1.5" SA/SR.	
				57.0	(MH) Clayey SILT, (0,2,58,40), (100,0,0), 7.5YR 5/4 brown, stiff, moist, low to medium plasticity, high concentration of weathered nodules (20% of sample), some highly weathered nodules (white clay).	1748.0
60					(MH) Clayey SILT, (0,2,58,40), (100,0,0), 7.5YR 5/4 brown, stiff, moist, low to medium plasticity, high concentration of weathered nodules (50% of sample, <1.5" to sand grain size, wet), some highly weathered nodules (white clay).	
				62.0	(ML) SILT, (0,10,90,0), (100,0,0), 7.5YR 5/4 brown, firm, wet, non-plastic, trace cemented nodules <0.25" SA/SR.	1743.0
				62.5	(SM) Silty SAND, (1,74,25,0), (25,55,20), 10YR 3/3 dark brown, dense, wet, trace gravel <0.25" SA/SR.	1742.5
				64.0	(ML) Sandy SILT, (0,30,70,0), (50,50,0), 10YR 5/4 yellowish brown, firm, wet, non-plastic, micaceous.	1741.0
65					(ML) SILT, (0,10,90,0), (100,0,0), 10YR 5/4 yellowish brown, stiff, wet, non-plastic, micaceous.	
				67.0	(ML) SILT, (0,10,90,0), (100,0,0), 10YR 5/4 yellowish brown, stiff, wet, non-plastic, micaceous, cemented nodules <1" SA/SR.	1738.0
70					(CL) Silty CLAY, (0,5,35,60), (0,20,80), 10YR 5/4 yellowish brown, very stiff, moist, medium to high plasticity, highly weathered nodules (white clay).	
				71.0	(CL) Silty CLAY, (0,5,35,60), (0,20,80), 10YR 5/4 yellowish brown, very stiff, moist, medium to high plasticity, highly weathered nodules (white clay).	1734.0
				73.0	(SW-SM) Well-graded SAND with Silt and Gravel, (20,70,10,0), (10,30,60), 10YR 3/2 very dark grayish brown, medium dense, wet, gravel <0.5" A/SA.	1732.0
				74.0	(ML) SILT with Sand, (0,25,60,15), (10,50,40), 10YR 5/4 yellowish brown, stiff, moist, low plasticity.	1731.0
75					(CL) Silty CLAY, (0,5,35,60), (15,45,40), 10YR 5/4	1730.0

← 95% Cement / 5% Bentonite Grout

← Hydrated 3/8" Bentonite Chips

(Continued Next Page)

ENVIRONMENTAL BH - GINT STD US.GDT - 7/6/18 14:44 - P:\87600M21-18\WORKING\FIELD IMPLEMENTATION\FIELD DOCUMENTATION - PART 1\BORING LOGS\GINT\NERT - M21 - PART 1\DRILLING & WELL INSTALLATIONS.GPJ



Tetra Tech
 17885 Von Karman Avenue, Suite 500
 Irvine, CA 92614
 Telephone: (949) 809-5000
 Fax: (949) 809-5010

CLIENT Nevada Environmental Response Trust (NERT)

PROJECT NAME Unit 4 Source Area In-Situ Bioremediation Treatability S.

PROJECT NUMBER 117-7502018 - Task M21

PROJECT LOCATION Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
75						
80					yellowish brown, very stiff, medium to high plasticity, micaceous, trace cemented nodules <1" SA/SR. (CH) CLAY, (0,0,10,90), 7.5YR 5/4 brown, hard, moist, high plasticity, cemented nodules <1" SA/SR, highly weathered nodules (white clay). (CH) CLAY, (0,0,5,95), 7.5YR 5/4 brown, hard, moist, high plasticity, trace highly weathered nodules (white clay).	<p>#2/16 Sand 0.010" Slotted 4" Diameter Wire Wrapped Stainless Steel</p>
81.0				1724.0	(CL) Silty CLAY, (0,0,40,60), very stiff, moist, low plasticity.	
83.0				1722.0	(CH) CLAY, (0,0,10,90), 7.5YR 5/4 brown, hard, moist, high plasticity.	
85.0				1720.0	(CH) CLAY, (0,2,13,85), (0,35,65), 7.5YR 5/4 brown, hard, moist, high plasticity.	
88.0				1717.0	(CL) Silty CLAY, (0,0,35,65), 7.5YR 5/4 brown, stiff, wet, low to medium plasticity, high concentration of cemented nodules <1" SA/SR, 25% of sample comprised of weathered nodules.	
90.0				1715.0	(MH) Clayey SILT, (0,0,55,45), 7.5YR 4/6 strong brown, very stiff, moist, low to medium plasticity, micaceous.	
92.5				1712.5	(CH) CLAY, (0,0,10,90), 7.5YR 4/6 strong brown, hard, moist, high plasticity, high concentration of cemented nodules <2" SA/SR, high concentration of highly weathered nodules (white clay).	

Bottom of borehole at 92.5 feet.

ENVIRONMENTAL BH - GINT STD US.GDT - 7/6/18 14:44 - P:\87600M21-18\WORKING\FIELD IMPLEMENTATION\FIELD DOCUMENTATION - PART 1\BORING LOGS\GINT\NERT - M21 - PART 1\DRILLING & WELL INSTALLATIONS.GPJ



Tetra Tech
 17885 Von Karman Avenue, Suite 500
 Irvine, CA 92614
 Telephone: (949) 809-5000
 Fax: (949) 809-5010

CLIENT Nevada Environmental Response Trust (NERT) **PROJECT NAME** Unit 4 Source Area In-Situ Bioremediation Treatability S.

PROJECT NUMBER 117-7502018 - Task M21 **PROJECT LOCATION** Henderson, NV

DATE STARTED 5/14/18 **COMPLETED** 5/14/18 **GROUND ELEVATION** 1804.95 ft **HOLE SIZE** 8 in

DRILLING CONTRACTOR Cascade Drilling **GROUND WATER LEVELS:**

DRILLING METHOD Sonic **AT TIME OF DRILLING** 38.50 ft / Elev 1766.45 ft

LOGGED BY J. Richeson **CHECKED BY** J. Neuhaus **AT END OF DRILLING** ---

NOTES Well completed with 18" round flush-mounted vault. **AFTER DRILLING** 30.35 ft / Elev 1774.60 ft

ENVIRONMENTAL BH - GINT STD US.GDT - 7/6/18 14:44 - P:\87600M21-18\WORKING\FIELD IMPLEMENTATION\FIELD DOCUMENTATION - PART 1\BORING LOGS\GINT\NERT - M21 - PART 1\DRILLING & WELL INSTALLATIONS.GPJ

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
0					No recovery. Hydro-vac for utility clearance to 12' bgs.	
5						
10						
12.0					1793.0	
15					(SM) Silty SAND with Gravel, (15,70,15,0), (30,50,20), 7.5YR 4/2 brown, medium dense to dense, moist, micaceous, gravel <2" A/SA.	
15.0					1790.0	
16.5					(SW-SM) Well-graded SAND with Silt, (5,85,10,0), (40,40,20), 10YR 4/3 brown, dense, moist, micaceous, gravel <1" SA/SR.	
16.5					1788.5	
19.0					(ML) SILT with Sand, (0,25,75,0), (70,30,0), 10YR 5/6 yellowish brown, firm, moist, non-plastic, micaceous.	
19.0					1786.0	
21.0					(ML) SILT, (0,5,95,0), (100,0,0), 7.5YR 5/3 brown, firm, moist, low plasticity, micaceous.	
21.0					1784.0	
25.0					(ML) Clayey SILT, (0,5,70,25), (100,0,0), 7.5YR 5/4 brown, firm, moist, low plasticity, micaceous.	
25.0					1780.0	
27.0					(ML) SILT, (0,3,92,5), (100,0,0), 7.5YR 5/4 brown, stiff, moist, low plasticity, micaceous.	
27.0					1778.0	
30					(ML) Clayey SILT, (0,3,72,25), (100,0,0), 7.5YR 5/4 brown, stiff, moist, low plasticity, micaceous.	
30					1778.0	
35					(ML) Clayey SILT, (0,3,72,25), (100,0,0), 7.5YR 5/4 brown, stiff, moist, low plasticity, micaceous, cemented and weathered nodules (white clay) <1" SA/SR (wet, medium plasticity). (MH) Clayey SILT, (0,5,65,30), (100,0,0), 7.5YR 5/4 brown, stiff, cemented nodules <2" SA/SR (wet, medium plasticity), some weathered nodules (white clay). (MH) Clayey SILT, (0,2,68,30), (100,0,0), 7.5YR 5/4 brown, very stiff, moist, medium plasticity, micaceous.	
35.0					1770.0	

4" Schedule 80 PVC



Tetra Tech
 17885 Von Karman Avenue, Suite 500
 Irvine, CA 92614
 Telephone: (949) 809-5000
 Fax: (949) 809-5010

CLIENT Nevada Environmental Response Trust (NERT)

PROJECT NAME Unit 4 Source Area In-Situ Bioremediation Treatability S.

PROJECT NUMBER 117-7502018 - Task M21

PROJECT LOCATION Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
35					(MH) Clayey SILT, (0,2,68,30), (100,0,0), 7.5YR 5/4 brown, firm, moist, medium to high plasticity, micaceous. (CL) Silty CLAY, (0,1,49,50), (100,0,0), 7.5YR 5/4 brown, very stiff, moist, high plasticity, cemented nodules <1" SA/SR, weathered nodules (white clay). (CL) Silty CLAY, (0,0,30,70), 7.5YR 5/4 brown, firm, moist to wet, high plasticity. (CL) Silty CLAY, (0,0,30,70), 7.5YR 5/4 brown, firm, moist to wet, high plasticity, cemented nodules <1" SA/SR (wet), weathered nodules (white clay).	
40						
43.0					1762.0	
45					(MH) Clayey SILT, (0,3,52,45), (80,20,0), 7.5YR 4/6 strong brown, stiff, moist, low to medium plasticity, cemented nodules <1" SA/SR. (MH) Clayey SILT, (0,1,74,25), (100,0,0), 7.5YR 4/6 strong brown, stiff, moist, low plasticity, cemented nodules <3" SA/SR, trace weathered nodules (white clay).	← 95% Cement / 5% Bentonite Grout
48.0					1757.0	
49.0					(SM) Silty SAND with Gravel, (15,60,25,0), (30,35,35), 10YR 4/2 dark grayish brown, medium dense, wet, gravel <0.75" A/SA.	
50.0					1756.0	
50.0					1755.0	
55					(ML) Sandy SILT, (2,43,55,0), (60,35,5) 10YR 4/4 dark yellowish brown, stiff, wet, non-plastic, trace gravel <0.25" A/SA. (MH) Clayey SILT, (0,5,65,30), (90,10,0), 10YR 4/4 dark yellowish brown, wet, medium plasticity, 30% of sample comprised of cemented nodules <3" SA/SR. (MH) Clayey SILT, (0,0,60,40), 7.5YR 4/3 brown, stiff, moist, high plasticity, micaceous, few cemented nodules <1" SA/SR.	
57.0					(MH) Clayey SILT, (0,0,60,40), 7.5YR 4/4 brown, stiff, moist, medium to high plasticity, micaceous, few cemented nodules <1" SA/SR, highly weathered cemented nodules (white clay).	
60					(MH) Clayey SILT, (0,5,50,45), (30,40,30), 7.5YR 4/3 brown, stiff, wet, medium to high plasticity, cemented nodules <1.5" SA/SR.	
60.0					1748.0	
60.0					1745.0	
63.0					(CL) Silty CLAY, (0,0,45,55), 7.5YR 5/4 yellowish brown, stiff, wet, 25% of sample comprised of cemented nodules <1" SA/SR and weathered nodules (white clay).	
64.0					(ML) Sandy SILT, (0,40,60,0), (50,50,0), 7.5YR 5/4 yellowish brown, firm, wet, non-plastic.	
64.0					1742.0	
65					(MH) Clayey SILT, (0,5,70,25), (50,40,10), 10YR 4/3 brown, stiff, wet, low to medium plasticity, 20% of sample comprised of cemented nodules <2" SA/SR.	
65.5					1741.0	
65.5					1739.5	
67.0					(SM) Silty SAND, (0,85,15,0), (30,30,40), 10YR 3/2 very dark grayish brown, medium dense, wet, trace gravel <0.25" SA/SR.	
67.0					1738.0	
68.0					(ML) Sandy SILT, (0,25,75,0), (40,50,10), 10YR 4/4 dark yellowish brown, stiff, wet, non-plastic.	
68.0					1737.0	
70	GB				(MH) Clayey SILT, (0,2,58,40), (100,0,0), 10YR 4/4 dark yellowish brown, stiff, wet, low to medium plasticity.	
71.0					(CL) Silty CLAY, (0,0,35,65), 7.5YR 6/4 light brown, stiff, moist, high plasticity, cemented nodules <0.75" SA/SR, some highly weathered nodules (white clay).	
71.0					1734.0	
72.0					1733.0	
73.0					(SW-SM) Well-graded SAND with Silt and Gravel, (15,75,10,0), (30,40,30), 10YR 4/2 dark grayish brown, medium dense, wet, gravel <0.5" SA/SR.	
73.0					1732.0	
74.0					1731.0	
74.5					1730.5	
75					(ML) SILT, (0,10,85,5), (100,0,0), 10YR 5/4 yellowish	
75.0					1730.0	

(Continued Next Page)

ENVIRONMENTAL BH - GINT STD US.GDT - 7/6/18 14:44 - P:\87600M21-18\WORKING\FIELD IMPLEMENTATION\FIELD DOCUMENTATION - PART 1\BORING LOGS\GINT\NERT - M21 - PART 1 DRILLING & WELL INSTALLATIONS.GPJ



Tetra Tech
 17885 Von Karman Avenue, Suite 500
 Irvine, CA 92614
 Telephone: (949) 809-5000
 Fax: (949) 809-5010

CLIENT Nevada Environmental Response Trust (NERT)

PROJECT NAME Unit 4 Source Area In-Situ Bioremediation Treatability S.

PROJECT NUMBER 117-7502018 - Task M21

PROJECT LOCATION Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
75	GB				brown, stiff, moist, non-plastic to low plasticity. (CL) Silty CLAY, (0,0,30,70), 10YR 5/4 yellowish brown, hard, moist, medium to high plasticity, trace cemented nodules <1" SA/SR.	
					(SC) Clayey SAND, (0,60,5,35), (20,40,40), 10YR 4/2 dark grayish brown, dense, wet.	1726.0
80	GB				(CL) Silty CLAY, (0,0,30,70), 10YR 5/4 yellowish brown, hard, moist, medium to high plasticity, trace cemented nodules <1" SA/SR.	
					(CH) CLAY, (0,0,10,90), 7.5YR 5/4 brown, hard, moist, high plasticity.	1723.0
					(CH) CLAY, (0,0,10,90), 7.5YR 5/4 brown, hard, moist, high plasticity, cemented nodules <1" SA/SR, highly weathered nodules (white clay).	1722.0
85	GB				(ML) Clayey SILT, (0,2,58,40), (90,10,0), 7.5YR 5/4 brown, very stiff, moist, low to medium plasticity.	
					(CH) CLAY, (0,0,10,90), 7.5YR 5/4 brown, hard, moist, high plasticity.	
					(CL) Silty CLAY, (0,1,39,60), (100,0,0), 7.5YR 5/4 brown, stiff, moist, low to medium plasticity, micaceous, some highly weathered nodules (white clay).	1717.5
90	GB				(CL) Silty CLAY, (0,0,45,55), 7.5YR 5/4 brown, stiff, wet, medium plasticity, micaceous, 30% of sample comprised of cemented nodules <0.75" SA/SR.	
					(CH) CLAY, (0,0,10,90), 7.5YR 5/4 brown, hard, moist, high plasticity.	1715.0
					(CL) Silty CLAY, (0,0,30,70), 7.5YR 4/6 strong brown, hard, moist, medium to high plasticity, micaceous.	1713.0
					(CH) CLAY, (0,0,10,90), 7.5YR 5/4 brown, hard, moist, high plasticity, cemented nodules <1" SA/SR, highly weathered nodules (white clay).	1711.5
95	GB				(MH) Clayey SILT, (0,1,59,40), (100,0,0), 7.5YR 6/4 light brown, stiff, moist, low plasticity, trace highly weathered nodules (white clay).	
					(CH) CLAY, (0,0,10,90), 10YR 5/6 yellowish brown, very stiff, wet, high plasticity, 35% of sample comprised of nodules <1" SA/SR, highly weathered nodules (white clay).	1710.0
					(CL) Silty CLAY, (0,1,39,60), 10YR 5/4 yellowish brown, very stiff, moist, medium plasticity, trace highly weathered nodules (white clay).	1708.0
					(CH) CLAY, (0,0,10,90), 10YR 5/4 yellowish brown, hard, moist, medium to high plasticity, cemented nodules <1.5" SA/SR.	1707.0
100	GB				(CL) Silty CLAY, (0,0,30,70), 10YR 5/6 yellowish brown, very stiff, wet, medium to high plasticity, 40% of sample cemented nodules <0.75" SA/SR and weathered nodules.	
					(SM) Silty SAND, (5,70,25,0), (20,40,40), 10YR 4/2 dark grayish brown, dense, wet, gravel <0.25" SA/SR.	1705.0
					(CL) Silty CLAY, (0,0,30,70), 10YR 5/6 yellowish brown, very stiff, wet, medium to high plasticity, 40% of sample cemented nodules <0.75" SA/SR and weathered nodules.	1702.0
					(ML) Clayey SILT with Sand, (0,15,45,40), (80,20,0), 10YR 4/6 dark yellowish brown, stiff, moist, low plasticity, trace cemented nodules <1" SA/SR.	1701.5
105	GB				(CH) CLAY, (0,0,10,90), 10YR 5/4 yellowish brown, hard, moist, high plasticity, cemented nodules <0.75" SA/SR, highly weathered nodules (white clay).	
					(CL) Silty CLAY, (0,0,25,75), 10YR 6/4 light yellowish brown, stiff, moist, medium to high plasticity, high concentration of weathered nodules <0.5" SA/SR, trace	1700.0
					(CL) Silty CLAY, (0,0,30,70), 10YR 5/6 yellowish brown, very stiff, wet, medium to high plasticity, 40% of sample cemented nodules <0.75" SA/SR and weathered nodules.	1698.0
					(ML) Clayey SILT with Sand, (0,15,45,40), (80,20,0), 10YR 4/6 dark yellowish brown, stiff, moist, low plasticity, trace cemented nodules <1" SA/SR.	1692.5
110	GB				(CH) CLAY, (0,0,10,90), 10YR 5/4 yellowish brown, hard, moist, high plasticity, cemented nodules <0.75" SA/SR, highly weathered nodules (white clay).	
					(CL) Silty CLAY, (0,0,25,75), 10YR 6/4 light yellowish brown, stiff, moist, medium to high plasticity, high concentration of weathered nodules <0.5" SA/SR, trace	1692.5
115	GB				(CL) Silty CLAY, (0,0,25,75), 10YR 6/4 light yellowish brown, stiff, moist, medium to high plasticity, high concentration of weathered nodules <0.5" SA/SR, trace	1690.0

← Hydrated 3/8" Bentonite Chips

← #2/16 Sand
 0.010" Slotted 4" Diameter Wire Wrapped Stainless Steel

ENVIRONMENTAL BH - GINT STD US.GDT - 7/6/18 14:44 - P:\87600M21-18\WORKING\FIELD IMPLEMENTATION\FIELD DOCUMENTATION - PART 1\BORING LOGS\GINT\NERT - M21 - PART 1\DRILLING & WELL INSTALLATIONS.GPJ



Tetra Tech
17885 Von Karman Avenue, Suite 500
Irvine, CA 92614
Telephone: (949) 809-5000
Fax: (949) 809-5010

CLIENT Nevada Environmental Response Trust (NERT)

PROJECT NAME Unit 4 Source Area In-Situ Bioremediation Treatability S.

PROJECT NUMBER 117-7502018 - Task M21

PROJECT LOCATION Henderson, NV

ENVIRONMENTAL BH - GINT STD US.GDT - 7/6/18 14:44 - P:\87600M21-18\WORKING\FIELD IMPLEMENTATION\FIELD DOCUMENTATION - PART 1\BORING LOGS\GINT\NERT - M21 - PART 1\DRILLING & WELL INSTALLATIONS.GPJ

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
---------------	-----------------------	-----------------------------	-----------------------	----------------	----------------------	--------------

<p>gravel <0.5" A/SA, some greenish yellow staining at 112' bgs. (CH) CLAY, (0,0,10,90), 10YR 5/4 yellowish brown, very stiff, moist, low to medium plasticity, micaceous, trace highly weathered nodules (white clay).</p> <p>Bottom of borehole at 115.0 feet.</p>



Tetra Tech
 17885 Von Karman Avenue, Suite 500
 Irvine, CA 92614
 Telephone: (949) 809-5000
 Fax: (949) 809-5010

CLIENT Nevada Environmental Response Trust (NERT) **PROJECT NAME** Unit 4 Source Area In-Situ Bioremediation Treatability S.

PROJECT NUMBER 117-7502018 - Task M21 **PROJECT LOCATION** Henderson, NV

DATE STARTED 5/15/18 **COMPLETED** 5/16/18 **GROUND ELEVATION** 1804.73 ft **HOLE SIZE** 8 in

DRILLING CONTRACTOR Cascade Drilling **GROUND WATER LEVELS:**

DRILLING METHOD Sonic **AT TIME OF DRILLING** 29.00 ft / Elev 1775.73 ft

LOGGED BY J. Richeson **CHECKED BY** J. Neuhaus **AT END OF DRILLING** ---

NOTES Well completed with 18" round flush-mounted vault. **AFTER DRILLING** 29.82 ft / Elev 1774.91 ft

ENVIRONMENTAL BH - GINT STD US.GDT - 7/6/18 14:44 - P:\87600M21-18\WORKING\FIELD IMPLEMENTATION\FIELD DOCUMENTATION - PART 1\BORING LOGS\GINT\NERT - M21 - PART 1\DRILLING & WELL INSTALLATIONS.GPJ

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
0					No recovery. Hydro-vac for utility clearance to 12' bgs.	
5						<p>4" Schedule 80 PVC</p>
10						
12.0					1792.7	
15					(SM) Silty SAND, (5,70,25,0), (30,50,20), 7.5YR 8/1 white, very dense, dry, micaceous, strong cementation.	
17.0					1787.7	
17.0					(SM) Silty SAND, (2,58,40,0), (30,40,30), 10YR 4/4 dark yellowish brown, dense, moist, micaceous.	
19.0					1785.7	
19.0					(ML) Sandy SILT, (0,30,70,0), (80,20,0), 10YR 4/4 dark yellowish brown, firm, moist, non-plastic.	
20					1785.7	
20					(ML) SILT, (0,10,90,0), (100,0,0), 10YR 5/6 yellowish brown, firm, moist, non-plastic.	
24.0					1780.7	
24.0					(ML) SILT, (0,10,90,0), (100,0,0), 10YR 4/6 dark yellowish brown, firm, moist, non-plastic.	
25					1779.7	
25.0					(ML) Clayey SILT, (0,5,70,25), (100,0,0), 10YR 5/6 yellowish brown, stiff, moist, low plasticity.	
25.0					(ML) SILT, (0,3,92,5), (100,0,0), 10YR 5/6 yellowish brown, stiff, moist, non-plastic, micaceous.	
29.0					1775.7	
29.0					(ML) Clayey SILT, (0,1,70,29), (100,0,0), 10YR 5/6 yellowish brown, stiff, moist (wet at 29' bgs), low plasticity, micaceous, cemented nodules <2" SA/SR.	
32.0					1772.7	
32.0					(ML) Clayey SILT, (0,1,70,29), (100,0,0), 10YR 5/6 yellowish brown, stiff, moist (wet at 29' bgs), low plasticity, micaceous, 10% of sample comprised of cemented nodules <1" SA/SR (wet).	
35					1769.7	
35.0					(ML) Clayey SILT, (0,1,70,29), (100,0,0), 10YR 5/6 yellowish brown, stiff, moist, low plasticity, micaceous.	

(Continued Next Page)



Tetra Tech
 17885 Von Karman Avenue, Suite 500
 Irvine, CA 92614
 Telephone: (949) 809-5000
 Fax: (949) 809-5010

CLIENT Nevada Environmental Response Trust (NERT)

PROJECT NAME Unit 4 Source Area In-Situ Bioremediation Treatability S.

PROJECT NUMBER 117-7502018 - Task M21

PROJECT LOCATION Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
35						
40				40.0	cemented nodules <2" SA/SR. (ML) SILT, (0,5,85,10), (100,0,0), 7.5YR 5/4 brown, firm, moist, non-plastic, micaceous. (CL) Silty CLAY, (0,1,39,60), (100,0,0), 7.5YR 5/4 brown, very stiff, moist, high plasticity, micaceous, cemented nodules <1" SA/SR. (CL) Silty CLAY, (0,1,39,60), (100,0,0), 7.5YR 5/4 brown, very stiff, wet, high plasticity, micaceous, 15% of sample comprised of cemented nodules <1.5" SA/SR. (CL) Silty CLAY, (0,1,39,60), (100,0,0), 7.5YR 5/4 brown, very stiff, moist, high plasticity, micaceous, cemented nodules <1" SA/SR.	1764.7
45				43.0	(CH) CLAY, (0,1,9,90), (100,0,0), 7.5YR 5/4 brown, stiff, moist, high plasticity, cemented nodules <1.5" SA/SR, highly weathered nodules (white clay). (CL) Silty CLAY, (0,1,39,60), (100,0,0), 7.5YR 5/4 brown, very stiff, wet, high plasticity, micaceous, cemented nodules <0.5" SA/SR.	1761.7
50				51.0	(CL) Silty CLAY, (0,1,29,70), (50,50,0), 7.5YR 5/4 brown, firm, wet, non-plastic, trace cemented nodules <0.5" SA/SR.	1753.7
55				55.0	(ML) Clayey SILT, (0,5,65,30), (100,0,0), 7.5YR 5/4 brown, stiff, wet, low plasticity, cemented nodules <1" SA/SR. (ML) Clayey SILT, (0,2,58,40), (100,0,0), 7.5YR 5/4 brown, stiff, moist, low to medium plasticity, cemented nodules <1.5" SA/SR, some highly weathered nodules (white clay).	1749.7
60				61.5	(CL) Silty CLAY, (0,0,30,70), 7.5YR 5/4 brown, hard, moist, high plasticity.	
				62.0	(SM) Silty SAND, (1,54,45,0), (90,10,0), 10YR 3/3 dark brown, dense, wet.	1743.2
				64.0	(ML) Sandy SILT, (0,30,70,0), (50,50,0), 10YR 5/4 yellowish brown, firm, wet, non-plastic, micaceous.	1742.7
65				67.0	(ML) SILT, (0,10,90,0), (100,0,0), 10YR 5/4 yellowish brown, stiff, wet, non-plastic, micaceous.	1740.7
70				71.0	(CL) Silty CLAY, (0,5,40,55), (50,50,0), 10YR 5/4 yellowish brown, stiff, moist, medium plasticity, trace cemented nodules <0.75" SA/SR, highly weathered nodules (white clay).	1737.7
				72.0	(SM) Silty SAND, (2,68,30,0), (25,50,25), 10YR 3/2 very dark grayish brown, medium dense to dense, wet, gravel <0.75" A/SA.	1733.7
				73.0	(ML) SILT with Sand and Clay, (0,25,65,10), (50,50,0), 10YR 5/4 yellowish brown, stiff, moist, low plasticity.	1732.7
75				75.0	(CL) Silty CLAY, (0,2,28,70), (100,0,0), 10YR 5/4	1731.7
						1729.7

← 95% Cement / 5% Bentonite Grout

← Hydrated 3/8" Bentonite Chips

ENVIRONMENTAL BH - GINT STD US.GDT - 7/6/18 14:44 - P:\87600M21-18\WORKING\FIELD IMPLEMENTATION\FIELD DOCUMENTATION - PART 1\BORING LOGS\GINT\NERT - M21 - PART 1\DRILLING & WELL INSTALLATIONS.GPJ



Tetra Tech
 17885 Von Karman Avenue, Suite 500
 Irvine, CA 92614
 Telephone: (949) 809-5000
 Fax: (949) 809-5010

CLIENT Nevada Environmental Response Trust (NERT)

PROJECT NAME Unit 4 Source Area In-Situ Bioremediation Treatability S.

PROJECT NUMBER 117-7502018 - Task M21

PROJECT LOCATION Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
75						
80					yellowish brown, very stiff, high plasticity, micaceous, some cemented nodules <1" SA/SR. (CH) CLAY, (0,0,10,90), 7.5YR 5/4 brown, hard, moist, high plasticity, cemented nodules <0.75" SA/SR, highly weathered nodules (white clay).	<p>#2/16 Sand 0.010" Slotted 4" Diameter Wire Wrapped Stainless Steel</p>
				80.0	1724.7	
				82.0	1722.7	
				84.0	1720.7	
85					(CL) Silty CLAY, (0,0,25,75), 7.5YR 5/4 brown, hard, moist, high plasticity, high concentration of highly weathered nodules (white clay).	
				89.5	1715.2	
90					(CH) CLAY, (0,0,10,90), 7.5YR 4/6 strong brown, hard, moist, high plasticity, some cemented nodules <0.75" SA/SR, highly weathered nodules (white clay).	
				92.5	1712.2	

Bottom of borehole at 92.5 feet.

ENVIRONMENTAL BH - GINT STD US.GDT - 7/6/18 14:44 - P:\87600M21-18\WORKING\FIELD IMPLEMENTATION\FIELD DOCUMENTATION - PART 1\BORING LOGS\GINT\NERT - M21 - PART 1\DRILLING & WELL INSTALLATIONS.GPJ



Tetra Tech
 17885 Von Karman Avenue, Suite 500
 Irvine, CA 92614
 Telephone: (949) 809-5000
 Fax: (949) 809-5010

CLIENT Nevada Environmental Response Trust (NERT) **PROJECT NAME** Unit 4 Source Area In-Situ Bioremediation Treatability S.

PROJECT NUMBER 117-7502018 - Task M21 **PROJECT LOCATION** Henderson, NV

DATE STARTED 5/16/18 **COMPLETED** 5/16/18 **GROUND ELEVATION** 1804.95 ft **HOLE SIZE** 8 in

DRILLING CONTRACTOR Cascade Drilling **GROUND WATER LEVELS:**

DRILLING METHOD Sonic **AT TIME OF DRILLING** 28.50 ft / Elev 1776.45 ft

LOGGED BY J. Richeson **CHECKED BY** J. Neuhaus **AT END OF DRILLING** ---

NOTES Well completed with 18" round flush-mounted vault. **AFTER DRILLING** 30.89 ft / Elev 1774.06 ft

ENVIRONMENTAL BH - GINT STD US.GDT - 7/6/18 14:44 - P:\87600M21-18\WORKING\FIELD IMPLEMENTATION\FIELD DOCUMENTATION - PART 1\BORING LOGS\GINT\NERT - M21 - PART 1\DRILLING & WELL INSTALLATIONS.GPJ

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
0					No recovery. Hydro-vac for utility clearance to 12' bgs.	
5						
10						
12.0					1793.0	
14.0					(SM) Silty SAND, (0,75,25,0), (25,50,25), 7.5YR 8/1 white, very dense, dry, micaceous, strong cementation. 1791.0	
15.0					(SW-SM) Well-graded SAND with Silt and Gravel, (15,75,10,0), (30,50,20), 10YR 4/6 dark yellowish brown, medium dense, moist, micaceous, gravel <0.75" A/SA. 1790.0	
17.0					(SM) Silty SAND, (1,69,30,0), (30,40,30), 10YR 5/4 yellowish brown, medium dense, moist, micaceous, trace gravel <0.5" A/SA. 1788.0	
19.0					(ML) Sandy SILT, (0,30,70,0), (40,60,0), 10YR 4/4 dark yellowish brown, moist, non-plastic, micaceous. 1786.0	
22.0					(ML) SILT, (0,10,90,0), (100,0,0), 10YR 5/6 yellowish brown, firm, moist, non-plastic, micaceous. 1783.0	
30					▽ (ML) Clayey SILT, (0,1,69,30), (100,0,0), stiff, wet, low plasticity, cemented nodules <1" SA/SR.	
35					▽ (ML) Clayey SILT, (0,1,69,30), (100,0,0), stiff, wet, low plasticity, 25% of sample comprised of cemented nodules <1" SA/SR.	
					(ML) Clayey SILT, (0,0,70,30), 7.5YR 4/4 brown, stiff, moist, low plasticity.	
					(MH) Clayey SILT, (0,0,60,40), 7.5YR 4/4 brown, very stiff, moist, medium plasticity. 1770.0	

(Continued Next Page)



Tetra Tech
 17885 Von Karman Avenue, Suite 500
 Irvine, CA 92614
 Telephone: (949) 809-5000
 Fax: (949) 809-5010

CLIENT Nevada Environmental Response Trust (NERT)

PROJECT NAME Unit 4 Source Area In-Situ Bioremediation Treatability S.

PROJECT NUMBER 117-7502018 - Task M21

PROJECT LOCATION Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
35						
37.0					(ML) Clayey SILT, (0,0,70,30), 7.5YR 4/4 brown, stiff, moist, low plasticity.	
37.0					(CL) Silty CLAY, (0,2,38,60), (100,0,0), 7.5YR 5/4 brown, very stiff, moist, high plasticity, cemented nodules <1" SA/SR, highly weathered nodules (white clay).	1768.0
40.0					(CL) CLAY with Silt, (0,1,15,84), (100,0,0), 7.5YR 5/4 brown, stiff, moist, few cemented nodules <1.5" SA/SR, few highly weathered nodules (white clay).	1765.0
42.0					(CL) CLAY with Silt, (0,1,15,84), (100,0,0), 7.5YR 5/4 brown, stiff, moist.	1763.0
42.0					(CL) Silty CLAY, (0,2,28,70), (100,0,0), 7.5YR 4/6 strong brown, very stiff, moist, high plasticity, cemented nodules <1.5" SA/SR, highly weathered nodules (white clay).	1763.0
45.0					(CH) CLAY, (0,0,10,90), 7.5YR 5/4 brown, stiff, moist, high plasticity, few cemented nodules <1.5" SA/SR, highly weathered nodules (white clay).	1760.0
45.0					(ML) Clayey SILT, (0,2,58,40), (100,0,0), 7.5YR 4/4 brown, very stiff, moist, low plasticity, micaceous, few cemented nodules <2" SA/SR.	
50.0					(ML) Clayey SILT, (0,5,60,35), (100,0,0), 7.5YR 4/4 brown, stiff, wet, low plasticity, weathered nodules <0.75" to sand grain size.	1755.0
53.0					(CL) Silty CLAY, (0,0,35,65), 7.5YR 4/4 brown, stiff, wet, medium to high plasticity, high concentration of cemented nodules <1" SA/SR.	1752.0
55.0					(MH) Clayey SILT, (0,0,65,35), 7.5YR 4/6 strong brown, stiff, moist, low to medium plasticity, micaceous, some cemented nodules <0.75" SA/SR.	1750.0
57.0					(CL) Silty CLAY, (0,0,30,70), 7.5YR 4/6 strong brown, stiff, wet, medium to high plasticity, high concentration of cemented nodules <1.5" SA/SR and weathered nodules.	1748.0
60.0					(MH) Clayey SILT, (0,10,60,30), (30,50,20), 7.5YR 4/6 strong brown, firm to stiff, wet, low plasticity.	1745.0
62.0					(ML) Sandy SILT, (0,30,65,5), (30,45,25), 10YR 4/6 dark yellowish brown, firm, wet, non-plastic, micaceous.	1743.0
65.0					(ML) SILT with Sand, (0,15,80,5), (25,50,25), 10YR 4/4 dark yellowish brown, firm, wet, non-plastic, micaceous.	1740.0
66.0					(SM) Silty SAND, (5,55,40,0), (20,30,50), 10YR 3/3 dark brown, dense, wet, gravel <0.75" A/SA.	1739.0
67.5					(ML) SILT with Sand, (0,15,80,5), (90,10,0), 10YR 4/4 dark yellowish brown, firm to stiff, wet, non-plastic, micaceous.	1737.5
71.0					(CL) Silty CLAY, (0,2,48,50), (100,0,0), 10YR 5/6 yellowish brown, hard, moist, medium plasticity, high concentration of weathered nodules (mostly coarse sand size).	1734.0
71.5	GB				(CL) Silty CLAY, (0,0,30,70), 7.5YR 4/6 strong brown, firm, wet, high plasticity, cemented nodules <0.75" SA/SR, weathered nodules (sand grain size).	1733.5
75.0					(SM) Silty SAND, (0,70,30,0), (30,30,40), 10YR 3/3 dark brown, medium dense, wet.	
75.0					(CL) Silty CLAY, (0,0,30,70), 7.5YR 4/6 strong brown, firm,	1730.0

← 95% Cement / 5% Bentonite Grout

ENVIRONMENTAL BH - GINT STD US.GDT - 7/6/18 14:44 - P:\87600M21-18\WORKING\FIELD IMPLEMENTATION\FIELD DOCUMENTATION - PART 1BORING LOGS\GINTNERT - M21 - PART 1 DRILLING & WELL INSTALLATIONS.GPJ



Tetra Tech
 17885 Von Karman Avenue, Suite 500
 Irvine, CA 92614
 Telephone: (949) 809-5000
 Fax: (949) 809-5010

CLIENT Nevada Environmental Response Trust (NERT)

PROJECT NAME Unit 4 Source Area In-Situ Bioremediation Treatability S.

PROJECT NUMBER 117-7502018 - Task M21

PROJECT LOCATION Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
75	GB				wet, high plasticity, cemented nodules <0.75" SA/SR, weathered nodules (sand grain size). (CL) Silty CLAY, (0,2,28,70), (100,0,0), 7.5YR 4/6 strong brown, hard, moist, high plasticity, some cemented nodules <0.75" SA/SR and highly weathered nodules (white clay).	
78.5					1726.5	
80	GB				(CH) CLAY, (0,0,10,90), 7.5YR 5/4 brown, hard, moist, high plasticity, trace highly weathered nodules (white clay). (CL) Silty CLAY, (0,0,35,65), 7.5YR 5/4 brown, very stiff, moist, low to medium plasticity.	
80.0					1725.0	
82.0					(CH) CLAY, (0,0,10,90), 7.5YR 5/4 brown, hard, moist, high plasticity, trace highly weathered nodules (white clay). (CL) Silty CLAY, (0,0,30,70), 7.5YR 5/4 brown, very stiff, moist, low to medium plasticity, micaceous, cemented nodules <1.5" SA/SR.	
82.0					1723.0	
85	GB				(CL) Silty CLAY, (0,0,40,60), 10YR 5/6 yellowish brown, very stiff, moist, low to medium plasticity. (CH) CLAY, (0,0,10,90), 10YR 5/6 yellowish brown, hard, moist, high plasticity, micaceous.	
87.0					1718.0	
90	GB				(CL) CLAY with Silt, (0,0,15,85), 10YR 5/6 yellowish brown, hard, moist, high plasticity, 10% of sample comprised of cemented nodules <1.5" SA/SR and highly weathered nodules (white clay).	
90.0					1715.0	
92.0					1713.0	← Hydrated 3/8" Bentonite Chips
95	GB				(MH) Clayey SILT, (0,0,60,40), 7.5YR 5/6 strong brown, stiff, moist, low to medium plasticity, high concentration of cemented nodules <0.5" SA/SR and weathered nodules (mostly sand grain size). (CH) CLAY, (0,0,10,90), 10YR 5/4 yellowish brown, hard, moist, high plasticity, few cemented nodules <1" SA/SR.	
95.0					1710.0	
97.0					1708.0	
100	GB				(ML) Clayey SILT, (0,0,60,40), 7.5YR 5/4 brown, very stiff, moist, low plasticity, high concentration of cemented nodules <1.5" SA/SR and weathered nodules (sand grain size). (CL) Sandy CLAY, (0,40,0,60), (10,40,50), 10YR 3/3 dark brown, firm, moist, low to medium plasticity.	
100.0					1705.0	
100.5					1704.5	
101.5					1703.5	← #2/16 Sand ← 0.010" Slotted 4" Diameter Wire Wrapped Stainless Steel
105	GB				(CL) Silty CLAY, (0,5,35,60), (30,70,0), 7.5YR 5/4 brown, stiff, moist, high plasticity, micaceous, cemented nodules <0.75" SA/SR. (CL) Silty CLAY, (0,0,30,70), 7.5YR 5/6 strong brown, stiff to very stiff, moist, high plasticity, high concentration of cemented nodules <0.75" SA/SR and highly weathered nodules (white clay).	
106.0					1699.0	
108.0					1697.0	
110	GB				(CH) CLAY, (0,0,10,90), 10YR 4/6 dark yellowish brown, hard, moist, high plasticity. (CL) Silty CLAY, (0,0,35,65), 7.5YR 5/4 brown, hard, moist, high plasticity, high concentration of cemented nodules <1" SA/SR and highly weathered nodules (white clay). (CL) Silty CLAY, (0,0,30,70), 7.5YR 5/4 brown, very stiff, moist, low to medium plasticity, micaceous, cemented nodules <1" SA/SR, highly weathered nodules (white clay).	
115	GB				1690.0	

Bottom of borehole at 115.0 feet.

ENVIRONMENTAL BH - GINT STD US.GDT - 7/6/18 14:44 - P:\87600M21-18\WORKING\FIELD IMPLEMENTATION\FIELD DOCUMENTATION - PART 1\BORING LOGS\GINT\NERT - M21 - PART 1\DRILLING & WELL INSTALLATIONS.GPJ



Tetra Tech
 17885 Von Karman Avenue, Suite 500
 Irvine, CA 92614
 Telephone: (949) 809-5000
 Fax: (949) 809-5010

CLIENT Nevada Environmental Response Trust (NERT) **PROJECT NAME** Unit 4 Source Area In-Situ Bioremediation Treatability S.

PROJECT NUMBER 117-7502018 - Task M21 **PROJECT LOCATION** Henderson, NV

DATE STARTED 5/4/18 **COMPLETED** 5/4/18 **GROUND ELEVATION** 1805.07 ft **HOLE SIZE** 8 in

DRILLING CONTRACTOR Cascade Drilling **GROUND WATER LEVELS:**

DRILLING METHOD Sonic **AT TIME OF DRILLING** 25.00 ft / Elev 1780.07 ft

LOGGED BY J. Richeson **CHECKED BY** J. Neuhaus **AT END OF DRILLING** ---

NOTES Well completed with 18" round flush-mounted vault. **AFTER DRILLING** 30.79 ft / Elev 1774.28 ft

ENVIRONMENTAL BH - GINT STD US.GDT - 7/6/18 14:44 - P:\87600M21-18\WORKING\FIELD IMPLEMENTATION\FIELD DOCUMENTATION - PART 1\BORING LOGS\GINT\NERT - M21 - PART 1\DRILLING & WELL INSTALLATIONS.GPJ

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
0					No recovery. Hydro-vac for utility clearance to 12' bgs.	
5						
10						
12.0					1793.1	
15					(SM) Silty SAND with Gravel, (15,65,20,0), (40,45,15), 5YR 4/3 reddish brown, medium dense, moist, gravel <3" A/SA.	
15.0					1790.1	
19.0					(SM) Silty SAND, (10,65,25,0), (45,45,10), 7.5YR 5/6 strong brown, medium dense, moist, gravel <1.5" SA/SR.	
19.0					1786.1	
20					(ML) Sandy SILT, (1,29,70,0), (100,0,0), 7.5YR 5/6 strong brown, firm, moist, non-plastic to low plasticity, micaceous, trace gravel <0.5" SA/SR.	
22.0					1783.1	
22.0					(ML) SILT, (0,10,90,0), (100,0,0), 7.5YR 4/6 strong brown, firm, moist, low plasticity, micaceous.	
25					1780.1	
25.0					(ML) Sandy SILT, (0,35,65,0), (50,50,0), 10YR 4/4 dark yellowish brown, stiff, wet, non-plastic.	
27.5					1777.6	
27.5					(ML) SILT, (0,10,90,0), (100,0,0), 7.5YR 4/6 strong brown, stiff, moist, low plasticity, cemented nodules <2".	
30						
35						
35.0					1770.1	

4" Schedule 80 PVC



Tetra Tech
 17885 Von Karman Avenue, Suite 500
 Irvine, CA 92614
 Telephone: (949) 809-5000
 Fax: (949) 809-5010

CLIENT Nevada Environmental Response Trust (NERT)

PROJECT NAME Unit 4 Source Area In-Situ Bioremediation Treatability S.

PROJECT NUMBER 117-7502018 - Task M21

PROJECT LOCATION Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
35						
40					(MH) Clayey SILT, (0,0,70,30), 7.5YR 4/6 strong brown, stiff, moist, medium to high plasticity, micaceous, cemented nodules <1" SA.	
45						
47.5						
48.0					(SC) Clayey SAND with Gravel, (15,50,5,30), (0,20,80), 7.5YR 4/4 brown, medium dense, wet, gravel <1" SA/SR.	
50					(ML) Sandy SILT, (5,30,60,5), (0,50,50), 7.5YR 4/6 strong brown, stiff, moist, non-plastic. (ML) Sandy SILT, (0,20,65,15), (0,50,50), 7.5YR 4/6 strong brown, stiff, wet, non-plastic, cemented nodules.	
52.0					(ML) SILT with Clay, (0,10,75,15), (100,0,0), 7.5YR 4/6 strong brown, stiff, moist, low plasticity, cemented nodules <0.75" SA.	
55						
55.0					(MH) Clayey SILT, (0,10,50,40), (50,50,0), 7.5YR 5/4 brown, stiff, moist, medium plasticity, cemented nodules <1" SA/SR.	
58.0					(ML) SILT, (0,5,85,10), (100,0,0), 7.5YR 5/6 strong brown, stiff, moist, non-plastic to low plasticity, cemented nodules <0.5" SR.	
60						
64.0					(ML) SILT, (0,5,85,10), (100,0,0), 7.5YR 5/6 strong brown, stiff, moist, non-plastic to low plasticity, increased concentration of cemented nodules <2" A/SA.	
65					(SP-SC) Gravelly SAND with Clay, (25,60,0,15), (0,10,90), 10YR 3/2 very dark reddish brown, loose, wet, gravel <1.5" A/SA.	
67.5					(ML) SILT, (0,5,90,5), (0,10,90), 7.5YR 5/6 strong brown, stiff, moist, non-plastic, micaceous.	
70						
70.0					(SM) Silty SAND, (10,50,40,0), (0,50,50), 10YR 4/3 brown, medium dense, wet, gravel <1" SA/SR.	
71.0					(ML) SILT, (0,5,90,5), (100,0,0), 7.5YR 5/6 strong brown, stiff, moist, non-plastic, micaceous.	
74.0					(ML) SILT, (0,10,90,0), (100,0,0), 7.5YR 5/6 strong brown, stiff, moist, non-plastic, micaceous.	
75					(ML) Sandy SILT, (0,35,60,5), (0,50,50), 7.5YR 5/6 strong	

← 95% Cement / 5% Bentonite Grout

← Hydrated 3/8" Bentonite Chips



Tetra Tech
 17885 Von Karman Avenue, Suite 500
 Irvine, CA 92614
 Telephone: (949) 809-5000
 Fax: (949) 809-5010

CLIENT Nevada Environmental Response Trust (NERT)

PROJECT NAME Unit 4 Source Area In-Situ Bioremediation Treatability S.

PROJECT NUMBER 117-7502018 - Task M21

PROJECT LOCATION Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM	
75					brown, stiff, wet, non-plastic. (CL) Silty CLAY, (0,1,29,70), (100,0,0), 7.5YR 5/6 yellowish brown, hard, moist, medium plasticity. (CL) Silty CLAY, (0,1,29,70), (100,0,0), 7.5YR 5/6 yellowish brown, very hard, moist, medium plasticity, cemented nodules <1.5" SA/SR. (CL) Silty CLAY, (0,1,29,70), (100,0,0), 7.5YR 5/6 yellowish brown, hard, moist, medium plasticity. (CL) Silty CLAY, (0,5,40,55), (100,0,0), 7.5YR 5/6 yellowish brown, hard, moist, low to medium plasticity. (CL) Silty CLAY, (0,1,29,70), (100,0,0), 7.5YR 5/6 yellowish brown, very hard, moist, medium plasticity, cemented nodules <1.5" SA/SR. (CL) Silty CLAY, (1,10,34,55), (0,50,50), stiff to hard, moist, medium plasticity, gravel <1" SA. (CL) Silty CLAY, (0,1,29,70), (100,0,0), 7.5YR 5/6 yellowish brown, stiff, moist, medium plasticity, cemented nodules <1.5" SA/SR.		
80							
85							
90							
92.5					(CL) Silty CLAY, (0,1,29,70), (100,0,0), 7.5YR 5/6 yellowish brown, stiff, moist, medium plasticity, no cemented nodules.		1712.6
Bottom of borehole at 92.5 feet.							

ENVIRONMENTAL BH - GINT STD US.GDT - 7/6/18 14:44 - P:\87600M21-18\WORKING\FIELD IMPLEMENTATION\FIELD DOCUMENTATION - PART 1\BORING LOGS\GINT\NERT - M21 - PART 1\DRILLING & WELL INSTALLATIONS.GPJ



Tetra Tech
 17885 Von Karman Avenue, Suite 500
 Irvine, CA 92614
 Telephone: (949) 809-5000
 Fax: (949) 809-5010

CLIENT Nevada Environmental Response Trust (NERT) **PROJECT NAME** Unit 4 Source Area In-Situ Bioremediation Treatability S.

PROJECT NUMBER 117-7502018 - Task M21 **PROJECT LOCATION** Henderson, NV

DATE STARTED 5/3/18 **COMPLETED** 5/3/18 **GROUND ELEVATION** 1805.07 ft **HOLE SIZE** 8 in

DRILLING CONTRACTOR Cascade Drilling **GROUND WATER LEVELS:**

DRILLING METHOD Sonic **AT TIME OF DRILLING** 30.00 ft / Elev 1775.07 ft

LOGGED BY J. Richeson **CHECKED BY** J. Neuhaus **AT END OF DRILLING** ---

NOTES Well completed with 18" round flush-mounted vault. **AFTER DRILLING** 31.17 ft / Elev 1773.90 ft

ENVIRONMENTAL BH - GINT STD US.GDT - 7/6/18 14:44 - P:\87600M21-18\WORKING\FIELD IMPLEMENTATION\FIELD DOCUMENTATION - PART 1\BORING LOGS\GINT\NERT - M21 - PART 1\DRILLING & WELL INSTALLATIONS.GPJ

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
0					No recovery. Hydro-vac for utility clearance to 12' bgs.	
5						
10						
12.0					1793.1	
15					(SM) Silty SAND with Gravel, (15,65,20,0), (40,45,15), 5YR 4/3 reddish brown, medium dense, moist, gravel <3" A/SA.	
15.0					1790.1	
19.0					(SM) Silty SAND, (10,65,25,0) (45,45,10), 7.5YR 5/6 strong brown, medium dense, moist, gravel <1.5" SA/SR.	
19.0					1786.1	
20					(ML) Sandy SILT, (1,34,65,0), (100,0,0), 7.5YR 5/6 strong brown, firm, moist, non-plastic to low plasticity, micaceous, trace gravel <0.5" SA/SR.	
22.0					1783.1	
22.0					(ML) SILT with Sand, (0,15,85,0), (100,0,0), 7.5YR 4/6 strong brown, firm, moist, low plasticity, micaceous.	
25					1780.1	
25.0					(ML) SILT, (0,5,95,0), (70,30,0), 7.5YR 4/6 strong brown, firm, moist, low plasticity.	
					(ML) SILT, (0,5,90,5), (100,0,0), 7.5YR 4/6 strong brown, stiff, moist, low plasticity.	
30					▽ (ML) SILT, (0,5,95,0), (50,50,0), 7.5YR 4/6 strong brown, stiff, moist to wet, cemented white nodules present <1" SA/SR.	
					(ML) SILT, (0,5,95,0), (100,0,0), 7.5YR 4/6 strong brown, hard, moist, non-plastic.	
35						

4" Schedule 80 PVC



Tetra Tech
 17885 Von Karman Avenue, Suite 500
 Irvine, CA 92614
 Telephone: (949) 809-5000
 Fax: (949) 809-5010

CLIENT Nevada Environmental Response Trust (NERT)

PROJECT NAME Unit 4 Source Area In-Situ Bioremediation Treatability S.

PROJECT NUMBER 117-7502018 - Task M21

PROJECT LOCATION Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
35					(ML) SILT, (0,5,95,0), (100,0,0), 7.5YR 4/6 strong brown, hard, moist, non-plastic. (continued)	
					37.5 (ML) SILT with Clay, (0,5,80,15), (0,100,0), 7.5YR 4/6 strong brown, stiff, moist, low to medium plasticity, high concentration of cemented nodules (15% of sample comprised of cemented nodules <1" SA/SR). 1767.6	
40					39.5 (ML) SILT, (0,3,87,10), (100,0,0), 7.5YR 4/6 strong brown, hard, moist, non-plastic to low plasticity, trace cemented nodules. 1765.6	
					43.5 (ML) SILT, (0,3,87,10), (100,0,0), 7.5YR 4/6 strong brown, hard, moist, non-plastic to low plasticity, 20% of sample contains cemented nodules <1.5" SA/SR. 1761.6	
45					(ML) SILT with Clay, (0,5,80,15), (100,0,0), 7.5YR 4/6 strong brown, stiff, moist, low to medium plasticity, micaceous.	
					49.5 (CH) Sandy CLAY with Gravel, (15,40,5,40), (0,10,90), 5YR 4/3 reddish brown, soft, wet, high plasticity, black volcanic gravel <0.5" SA. 1755.6	
50					50.0 (ML) SILT with Sand, (1,20,78,1), (33,34,33), 7.5YR 4/3 brown, stiff, wet, low plasticity, micaceous, black volcanic gravel <0.25" SA. 1755.1	
					54.0 (ML) SILT, (0,5,85,10), (100,0,0), 7.5YR 4/6 strong brown, stiff, moist, low plasticity, cemented nodules <1" SA. 1751.1	
55					55.0 (CL) Silty CLAY with Sand, (1,15,34,50), (0,10,90), 7.5YR 5/4 brown, hard, moist, medium to high plasticity, micaceous, gravel <0.25" SA. 1750.1	
					55.5 (CL) Silty CLAY, (0,1,40,59), (0,10,90), 7.5YR 5/4 brown, very hard, moist, trace cemented nodules <0.5" SA/SR. 1749.6	
					(CL) Silty CLAY, (0,1,40,59), (0,10,90), 7.5YR 5/4 brown, firm, moist, 10% of sample contains cemented nodules <1" SA/SR.	
60					63.0 (ML) SILT, (0,2,96,2), (30,70,0), 7.5YR 4/4 brown, stiff, moist, non-plastic to low plasticity. 1742.1	
					65.0 (SC) Clayey SAND with Gravel, (25,60,0,15), (0,10,90), 10YR 3/2 very dark reddish brown, loose, wet, gravel <1.5" A/SA. 1740.1	
65					65.5 (ML) SILT, (0,2,96,2), (100,0,0), 7.5YR 4/4 brown, stiff, moist, non-plastic. 1739.6	
					67.5 (CL) CLAY with Sand, (0,15,5,80), (100,0,0), 7.5YR 4/4 brown, hard, moist, medium to high plasticity. 1737.6	
					69.5 (SC) Clayey SAND with Gravel, (25,60,0,15), (0,10,90), 10YR 3/2 very dark reddish brown, loose, wet, gravel <1.5" A/SA. 1735.6	
70					71.0 (ML) SILT with Clay, (0,5,80,15), (0,90,10), 7.5YR 4/4 brown, stiff, moist, low plasticity. 1734.1	
					75.0 1730.1	

← 95% Cement / 5% Bentonite Grout

(Continued Next Page)

ENVIRONMENTAL BH - GINT STD US.GDT - 7/6/18 14:44 - P:\87600M21-18\WORKING\FIELD IMPLEMENTATION\FIELD DOCUMENTATION - PART 1\BORING LOGS\GINT\NERT - M21 - PART 1 DRILLING & WELL INSTALLATIONS.GPJ



Tetra Tech
 17885 Von Karman Avenue, Suite 500
 Irvine, CA 92614
 Telephone: (949) 809-5000
 Fax: (949) 809-5010

CLIENT Nevada Environmental Response Trust (NERT)

PROJECT NAME Unit 4 Source Area In-Situ Bioremediation Treatability S.

PROJECT NUMBER 117-7502018 - Task M21

PROJECT LOCATION Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
75						
80					(ML) SILT with Clay, (0,5,80,15), (0,90,10), 7.5YR 4/4 brown, stiff, moist, low plasticity, highly weathered nodules <1" SA/SR. (CL) Silty CLAY, (0,1,44,55), (100,0,0), 10YR 4/4 dark yellowish brown, hard, moist, medium to high plasticity, trace cemented nodules <0.5" SA/SR. (CL) Silty CLAY, (0,1,44,55), (100,0,0), 10YR 4/4 dark yellowish brown, firm to stiff, moist, medium to high plasticity, trace cemented nodules <1.5" SA/SR.	
85				84.0	(ML) SILT, (0,1,89,10), (100,0,0), 10YR 4/4 dark yellowish brown, stiff, moist, non-plastic to low plasticity.	
				86.0	(CL) Silty CLAY, (0,1,44,55), (100,0,0), 10YR 4/4 dark yellowish brown, hard, moist, medium to high plasticity, trace cemented nodules <0.5" SA/SR.	
90				89.0	(ML) SILT, (0,1,89,10), (100,0,0), 10YR 4/4 dark yellowish brown, stiff, moist, non-plastic to low plasticity.	
				90.0	(CL) Silty CLAY, (0,1,44,55), (100,0,0), 10YR 4/4 dark yellowish brown, hard, moist, medium to high plasticity, trace cemented nodules <0.5" SA/SR.	
				92.5	(ML) SILT, (0,1,89,10), (100,0,0), 10YR 4/4 dark yellowish brown, stiff, moist, non-plastic to low plasticity, 10% of sample comprised of cemented nodules <1" SA/SR.	
95				95.0	(CL) Silty CLAY, (0,0,30,70), 7.5YR 5/3 brown, hard, moist, high plasticity.	
100					(CL) Silty CLAY, (0,0,30,70), 7.5YR 5/3 brown, stiff, wet, high plasticity, high concentration of cemented nodules and weathered nodules <1.5" SA/SR. (CL) Silty CLAY, (0,0,45,55), 7.5YR 5/3 brown, hard, moist, high plasticity, cemented nodules <1" SA/SR.	
				103.5	(ML) SILT, (0,1,94,5), (100,0,0), 10YR 4/6 dark yellowish brown, stiff, moist, non-plastic, fingers of dark organic staining, cemented nodules <1.5" SA/SR.	
105				105.0	(CL) Silty CLAY, (0,0,30,70), 10YR 4/6 strong brown, hard, moist, medium to high plasticity, cemented nodules.	
110				110.0	(CH) CLAY, (0,0,10,90), 10YR 4/6 strong brown, hard, moist, high plasticity.	
				113.0	(ML) Clayey SILT, (0,0,75,25), 10YR 4/6 strong brown, stiff, moist, non-plastic to low plasticity, cemented nodules.	
115				115.0		

Bottom of borehole at 115.0 feet.

ENVIRONMENTAL BH - GINT STD US.GDT - 7/6/18 14:44 - P:\87600M21-18\WORKING\FIELD IMPLEMENTATION\FIELD DOCUMENTATION - PART 1\BORING LOGS\GINT\NERT - M21 - PART 1 DRILLING & WELL INSTALLATIONS.GPJ

← Hydrated 3/8" Bentonite Chips

← #2/16 Sand
 ← 0.010" Slotted 4" Diameter Wire Wrapped Stainless Steel