

Data Gap Investigation – Phase II Groundwater Quality Assessment

NERT Remedial Investigation – Downgradient Study Area
Nevada Environmental Response Trust Site
Henderson, Nevada

Final

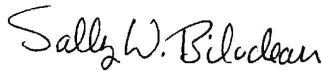


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Nevada Environmental Response Trust
Henderson, Nevada**

Responsible Certified Environmental Manager (CEM) for this Project

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 provided 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.



11-7-2019

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List of Abbreviations and Acronyms

±	plus or minus
°C	degrees Celsius
%	percent
α	well shape factor
$C_{(t)}$	concentration at time
n	porosity of the formation
t	time
V	volume
v	velocity
v^*	apparent velocity
v_d	Darcy velocity
°F	degrees Fahrenheit
A	cross sectional area
ARCH	air rotary casing hammer
bgs	below ground surface
cfs	cubic feet per second
C	relative concentration
C0	initial concentration
CSM	Conceptual Site Model
DGI	Data Gap Investigation
DGIP	Data Gap Investigation Plan
Endeavour	American Pacific Corporation /Endeavour LLC
EPA	United States Environmental Protection Agency
ft/d	feet per day
lb/d	pounds per day
K	hydraulic conductivity
LVW	Las Vegas Wash
mg/L	milligrams per liter
NDEP	Nevada Division of Environmental Protection
NERT	Nevada Environmental Response Trust
NERT On-Site Study Area	former Kerr McGee/Tronox site
NMR	Nuclear Magnetic Resonance
ppb	parts per billion
RI	Remedial Investigation
TDS	total dissolved solids
µg/L	microgram(s) per liter
UMCf	Upper Muddy Creek formation
USCS	Unified Soil Classification System
xMCf	Transitional Muddy Creek formation

1.0 Introduction

This Data Gap Investigation (DGI) Technical Memorandum describes the locations, procedures and methods for the Phase II groundwater quality assessment along the Las Vegas Wash (LVW) in support of the Nevada Environmental Response Trust (NERT) Remedial Investigation (RI) of the Downgradient Study Area in Henderson, Nevada (herein referred to as the Project) (**Figure 1**). This DGI was implemented at the direction of the Nevada Division of Environmental Protection (NDEP) and per the rationale, procedures and methods described in the *Data Gap Investigation Plan (DGIP) – Phase II Groundwater Quality Assessment* (AECOM 2019a) as modified by the May 13, 2019, *Proposed Borehole Dilution Testing as an Alternative to Pump Testing for Hydraulic Conductivity Determination Memorandum* (AECOM 2019b). Consistent with NDEP protocols, this DGI Technical Memorandum was provided to stakeholders for review. The responses to stakeholder comments are provided in **Appendix A**.

The overall objective of the RI of the Downgradient Study Area is to identify subsurface pathways through which perchlorate-impacted groundwater is entering the LVW. The Phase II DGI was conducted to aid in meeting that objective. The DGI consisted of the installation of 14 groundwater wells, 11 observation wells, slug testing, tracer testing, dilution testing, the collection of groundwater data from 40 wells, and installation and monitoring of transducers in the 14 new groundwater wells. The DGIP included procedures for pump testing; however, slug testing performed in the target wells indicated higher well yields than anticipated in the DGIP. Therefore, borehole dilution testing was proposed in lieu of pump testing to determine the hydraulic properties of the target zone, thus avoiding the logistical issues associated with storing and disposing the large quantities of water that would have been generated during pump testing.

Perchlorate concentrations in the Downgradient Study Area are generally defined where concentrations exceed 1,000 micrograms per liter ($\mu\text{g/L}$), but additional data are required to address data gaps identified by the Phase I well installation, the groundwater sampling results conducted in July 2018, the LVW surface water data collected in April and May of 2018, and the data developed through the ongoing *Las Vegas Wash Bioremediation Pilot Study Work Plan* (LVW Bioremediation Pilot Study)(Tetra Tech 2017). As stated in the DGIP, the following data gaps were identified in 2016 and have been assessed or partially addressed through prior investigations conducted in the Downgradient Study Area, including investigation data collected in preparation for the LVW Bioremediation Pilot Study. The Phase II DGI was focused to address specific elements of the data gaps as indicated below. The section in the report that addresses the data gap is provided in parentheses.

1. Where are the high concentration (1,000 $\mu\text{g/L}$ or higher) perchlorate-impacted groundwater plumes along the north and south sides of the LVW?

The 14 Phase II wells were installed to refine the understanding of the extent of the high concentration plumes on both the northern and southern sides of LVW (Refer to sections 3.8, 4.3, 4.4, and 5.1).

2. Why are there noticeable differences in perchlorate concentrations in groundwater over relatively short distances?

No Phase II wells were installed to address this issue because the LVW Bioremediation Pilot Study provided significant data to address this data gap; however, useful data were developed during the tracer test that support addressing this data gap. The dye tracer test was designed to look at dispersion, dilution, seepage velocity, and travel time. The data obtained from the test can provide additional useful information regarding why there are noticeable differences in perchlorate concentrations over short distances (Refer to sections 3.6 and 5.1).

3. How deep are the high concentration perchlorate-impacted groundwater plumes?

No Phase II wells were installed to address this issue because the LVW Bioremediation Pilot Study has developed significant data to address this data gap.

4. Do the high-concentration perchlorate plumes follow distinct water-bearing zones within the alluvium or bedrock formations?

The tracer tests and the NMR logging can be used to distinguish between low- and high-permeability zones (Refer to sections 3.5, 4.4, and 5.1).

5. Where does faulting affect the movement of high-concentration perchlorate-impacted groundwater?

The Phase II wells near Three Kids Weir and Calico Ridge Weir can be used to evaluate geology, faulting, and changes in perchlorate concentrations in these areas (Refer to sections 3.1, 4.4, and 5.1).

6. Along the LVW, does groundwater flow generally in the same direction as the surface water?

The potentiometric surface of the groundwater generally follows the surface water flow direction. The Phase II wells and transducers can provide useful data regarding groundwater potentiometric surface gradients and overall flow directions. The tracer test can provide detailed information in the tracer test areas regarding specific groundwater flow paths (Refer to sections 3.3, 3.6, and 5.1).

7. Where does impacted groundwater discharge to the LVW?

Previous surface water studies indicate that perchlorate-impacted groundwater discharges at the base of Calico Ridge Weir and at the base of Three Kids Weir. The dye tracer test can be used to confirm the groundwater connection at these locations. Although groundwater elevations are higher than surface water elevations at Homestead Weir, the surface water data from 2018 do not indicate groundwater is entering the LVW at that location. A Phase II groundwater monitoring well installed adjacent to Homestead Weir can provide geologic and perchlorate concentration data for this area (Refer to sections 3.8, 4.0, and 5.1).

8. Where is the groundwater/surface water interface and how far is it from the LVW?

Prior to the Phase II Groundwater Assessment, the groundwater/surface water interface was identified by temperatures exceeding 78 degrees Fahrenheit (°F) and lower than expected total dissolved solids (TDS) concentrations (less than 3,000 milligrams per liter [mg/L]). A more robust evaluation of temperature data and TDS concentrations from Phase II wells can provide additional data regarding groundwater/surface water interface (Refer to sections 3.8.5, 4.4, and 5.1).

9. Is there an area of known or suspected perchlorate flux of sufficient magnitude where an interim remedial action would be appropriate?

Given that perchlorate concentrations in Lake Mead are well below NDEP's interim action level and that NERT is completing the LVW Bioremediation Pilot Study between Bostick and Homestead Weirs (an area with elevated perchlorate mass flux from groundwater to surface water), AECOM does not recommend additional interim or emergency remedial actions at this time (Refer to section 5.1).

10. Is perchlorate-impacted groundwater bypassing the Seep Well Field on its eastern side near monitoring well COH2B1?

Perchlorate concentrations are over 1,000 µg/L in groundwater from well COH2B1. Additional sampling of this well can provide useful information; however, the source of perchlorate was not investigated within the scope of the Downgradient Study Area Investigation (Refer to sections 3.8 and 5.1).

11. Do high volumes of low-concentration, perchlorate-impacted groundwater provide more flux to the LVW than low volumes of high-concentration perchlorate-impacted groundwater?

The Phase II Groundwater Quality Assessment can provide additional information regarding high and low concentration sources of perchlorate (Refer to sections 3.6, 3.8, 4.0, and 5.1).

12. Do concentrations of perchlorate in groundwater fluctuate over time, seasonally, or after a rain event?

The Phase II Groundwater Quality Assessment in combination with previous sampling events provides information on changes in perchlorate concentrations in groundwater over time; however, it did not include evaluations of perchlorate concentrations seasonally or after rain events, which requires more frequent monitoring that is outside of the scope of the Downgradient Study Area investigation.

The data collected during this Phase II Groundwater Quality Assessment, in conjunction with previous groundwater quality assessments and several surface water sampling events, have been used to address the data gaps to the extent feasible based on the data collected as well as update the Conceptual Site Model (CSM), previously presented in the DGIP. As an interim deliverable, this document presents the sampling and analytical results of the samples collected per the DGIP. All data presented in this document, in addition to complementary data from adjacent areas within Operable Unit-3 (NERT RI Study Area north of Galleria Road), will be further evaluated by NERT during the preparation of the RI Report.

1.1 Rationale for Phase II Well Installation Locations

Perchlorate concentrations obtained from the July 2018 groundwater (AECOM 2019c) and May 2018 surface water analysis (AECOM 2019d) were used to identify key locations along the LVW where data gaps exist that could be addressed by the installation of groundwater monitoring wells completed in the shallow (0 to 90 feet below ground surface [bgs]) water-bearing zone. The data obtained along LVW indicate that there are significant perchlorate fluxes into the LVW near the toe of Calico Ridge Weir and near the toe of Three Kids Weir. There is also evidence that groundwater has the potential to discharge to the LVW below Homestead Weir but a corresponding increase in perchlorate flux is not evident at that location. The Phase II groundwater assessment was focused to obtain additional information at these key areas. **Table 1** presents the rationale for the installation of each well. **Figures 2, 3 and 4** show the 14 groundwater monitoring well locations in relation to the perchlorate concentrations in groundwater in July 2018 and in surface water and seeps in May 2018. Along with the perchlorate concentrations in groundwater and surface water, the figures show where warm temperature anomalies indicated discharge of groundwater to the LVW.

1.2 Site Background Information

1.2.1 Regional Geology

The Site is located within the Las Vegas Valley, which occupies a topographic and structural basin trending northwest-southeast and extending approximately 55 miles from near Indian Springs on the north to Railroad Pass on the south. The valley is bounded by the Las Vegas Range, Sheep Range, and Desert Range to the north; by Frenchman and Sunrise Mountains to the east; by the McCullough Range and River Mountains to the south and southeast; and the Spring Mountains to the west. The mountain ranges bounding the east, north, and west sides of the valley consist primarily of Paleozoic and Mesozoic sedimentary rocks (limestones, sandstones, siltstones, and fanglomerates), whereas the mountains on the south and southeast consist primarily of Tertiary volcanic rocks (basalts, rhyolites, andesites, and related rocks) that overlie Precambrian metamorphic and granitic rocks (ENSR 2007).

In the Las Vegas Valley, eroded Tertiary and Quaternary sedimentary and volcanic rocks comprise the unconsolidated basin deposits, which can be up to 13,000 feet thick (ENSR 2007). The valley floor consists of fluvial, paludal (swamp), playa, and lacustrine deposits surrounded by more steeply sloping alluvial fan aprons derived from erosion of the surrounding mountains. Generally, the deposits grade finer with increasing distance from their source and with decreasing elevation. The structure within the Quaternary and Tertiary-aged basin fill is characterized by a series of generally north-south trending fault scarps.

1.2.2 Local Geology

The local geology and hydrogeology are defined by data collected from soil borings and wells that have been installed in the LVW area. The Downgradient Study Area is composed of Quaternary alluvial deposits, the Muddy Creek formation, the Thumb formation, and the Horse Springs formation (**Figure 5**). These deposits are described in more detail below.

Alluvium. The alluvium consists of a reddish-brown heterogeneous mixture of fine- to coarse-grained angular sand and gravel with lesser amounts of silt, clay, and caliche. Boulders and cobbles are common. Due to the mode of deposition, no distinct beds or units are continuous over the LVW area. North of LVW the alluvium is primarily from the Frenchman Mountains and the clasts are generally composed of limestone, sandstone, siltstone, quartzite, with locally high concentrations of granite and gneiss (Bell and Smith 1980). South of LVW the alluvium is derived from the River Mountains and McCullough Range. The clasts present in the alluvium and derived from these mountains are dominantly composed of dacite, with basalt, tuff, and sedimentary rocks also present. Gypsum is also present in all of the alluvial deposits (Bell and Smith 1980).

South of the LVW a feature of the alluvial deposits is the stream-deposited sands and gravels that were laid down within paleochannels eroded into the surface of the Muddy Creek formation during infrequent flood runoff periods. These deposits vary in thickness and are narrow and generally linear. These are generally uniform sand and gravel deposits that exhibit higher permeability than the adjacent, well-graded deposits. Along the LVW the paleochannels are less distinct and have likely been reworked as the main channel of the LVW meandered and alternately cut downward and filled in with sediments through the course of seasonal storms, wastewater releases, and manmade channel alterations. The LVW has been and continues to be significantly modified through the installation and modification of erosion control features and improvements made to roads, bike paths, footpaths, and wildlife habitat within Clark County Wetlands Park.

The thickness of the alluvial deposits ranges from less than 1 foot to more than 90 feet in the Downgradient Study Area. Soil types identified in on-site soil borings include gravel, sandy gravel, silty gravel, clayey gravel, sand, silty sand, clayey sand, sandy clay, clay, sandy silt, and silt.

Transitional (or reworked) Muddy Creek formation. Where present, Transitional Muddy Creek formation (xMCf) is encountered at the base of the alluvium. The xMCf consists of reworked sediments derived from the Muddy Creek formation. The xMCf appears similar to the Muddy Creek formation, but it consists of reworked, less consolidated, and indurated sediments.

Muddy Creek formation. The Upper Muddy Creek formation (UMCf) of Pleistocene age occurs in the Las Vegas Valley as valley-fill deposits that are coarse grained near mountain fronts and become progressively finer grained toward the center of the valley. The Muddy Creek formation represents deposition in an alluvial apron environment from the Spring Mountains to the west, grading into fluvial, paludal (swamp), playa, and lacustrine environments further out into the valley center.

In Phase I and Phase II borings, the contact between the Quaternary alluvium and the UMCf (fine-grained member) is typically marked by gray-green to yellow-green gypsiferous clays and silts. The Muddy Creek formation can also be yellow brown or red brown. The UMCf is up to 325 feet thick (Bell and Smith 1980).

Horse Springs formation. As described in the geotechnical investigations conducted for the weir construction, the Horse Springs formation is composed of siliceous limestone interbedded with white to yellow silts and shales (GES 2007a). By Lower Narrows Weir it consists mostly of carbonate beds and is intruded by andesite sills with low-grade metamorphic contact aureoles. An aureole is the zone of altered rock that surrounds an intrusion. It consists of interbedded limestone, dolomite, and calcareous sandstone and claystone. Colors range from buff-white to pinkish gray to red brown. It is distinguished mainly by the fissile siltstone and claystone beds, variability of color over 6 inches to several feet, and an abundance of carbonate beds.

Thumb formation. As described in the geotechnical investigations conducted for the weir construction, the Thumb formation consists of red limestone, calcareous sandstone and siltstone (GES 2007b). Some parts of this formation are well bedded. The formation also contains volcanic flows and dikes. It is characterized by three sequences:

1. An upper sequence consisting of Precambrian gneiss, schist and granite clasts strongly cemented in a silica matrix. The clasts are typically angular. It becomes weakly cemented by the Frenchman fault zone.
2. A middle sequence consisting of thinly laminated pink to reddish yellow claystone and siltstone. This sequence is 20 to 30 feet thick, weakly cemented and friable. It contains gypsum veins and cross bedding.
3. A lower sequence that is composed of interbedded medium-grained sandstone, siltstone and claystone. It is predominantly red to reddish brown in color, weakly to moderately cemented and has some greenish gray units. Individual beds are 0.5 to 8 inches thick. Generally, the sandstone beds are more strongly cemented than the siltstone and claystone beds. The silt and clay beds have low permeability. This unit dips at 8 to 30 degrees and the Frenchman fault deforms it.

Extrusive Igneous Rocks. North of LVW, an andesitic and basaltic sequence follows the trend of the Frenchman fault. It consists of an upper greenish black flow of porphyritic basalt that has green olivine phenocrysts in a black groundmass. Below this flow is float composed of brownish black basaltic andesite. The trend of this sequence is North 32 degrees West and it exhibits dips up to 60 degrees to the southwest (GES 2007a and GES 2007b).

1.2.3 Local Groundwater Hydrology

The local groundwater hydrology is based on data collected from existing wells that have been installed in the LVW area. The depth to groundwater within the Downgradient Study Area along the LVW varies from less than 3 feet bgs to over 40 feet bgs. Generally, when a well is physically near LVW shallow depth to water is observed; conversely, when a well is far away from the LVW a deeper depth to water is observed, which is mainly due to topographic elevation differences. Actual groundwater elevations increase with distance from the LVW. The groundwater flow direction is generally to the east at a gradient of 0.0079 feet per foot. The shallow flow zone has been defined as groundwater from 0 to 90 feet bgs, and this zone was the focus of the Phase I and Phase II investigations.

The groundwater quality along the LVW was evaluated by the Southern Nevada Water Authority (Zhou 2012). The data was based on samples collected from wells on a monthly or quarterly basis from 2001 to 2010. The pH values in groundwater were typically between 6.5 and 7.5. Dissolved oxygen was generally less than 5 mg/L. Total dissolved solids ranged from 1,400 to 6,800 mg/L and groundwater exhibiting TDS concentrations lower than 3,000 mg/L were suspected of being mixed with surface water from LVW (Zhou 2012).

1.2.4 Local Surface Water Hydrology

The local surface water hydrology in the LVW is largely controlled by wastewater treatment plant discharges and engineered erosion control structures. The LVW has been modified over many years to accommodate the increase in population and development in the area. Currently discharges from four major wastewater treatment plants in the valley represent the vast majority of flow in the LVW (Clark County Water Reclamation District, City of Las Vegas Water Pollution and Control Facility, City of Henderson Water Reclamation Facilities, and City of North Las Vegas Water Reclamation Facility). A series of weirs have been constructed to control erosion. A wetlands park is present along most of the Downgradient Study Area.

The surface water quality along the LVW has been evaluated over many years. The reaches from Pabco Weir to Rainbow Gardens Weir were the focus of the 2018 surface water investigations as well as the Phase I and Phase II groundwater quality assessments. Through the Downgradient Study Area investigation, two major studies were conducted in 2016 and 2018 (AECOM 2016 and AECOM 2019c).

2.0 Well Installation and Data Collection

Well installation, sampling, and data collection for this DGI were conducted consistent with the *DGIP – Phase II Groundwater Quality Assessment* (AECOM 2019a). Fourteen 4-inch diameter groundwater monitoring wells were installed, developed, and sampled as part of this DGI. In addition, eleven 2-inch diameter wells were installed and developed with the intent to be used as observation wells during pump and tracer testing. The wells are located within the Downgradient Study Area along the north and south banks of the LVW. The 14 new and 26 existing groundwater monitoring wells were sampled (**Figure 6**).

2.1 Pre-Field Activities

Work was conducted under the site-specific Health and Safety Plan (AECOM 2018) and Quality Assurance Project Plan (AECOM 2017) developed for the Downgradient Study Area and the planned field work. The existing NERT RI Quality Assurance Project Plan was adapted to include the proposed Downgradient Study Area investigations.

Access to install the new groundwater monitoring and observation wells on Clark County property was obtained by NERT. AECOM obtained a Use Permit from Clark County Wetlands Park for the activities described in the Phase II Work Plan. A Chemical Use Request (UIC Form U240) was obtained for the tracer dye testing from the Bureau of Water Pollution Control, Underground Injection Control Program. Two tracer dyes were approved for use, Rhodamine WT and Fluorescein. Copies of the tracer dye permits are provided in **Appendix B**. Although no wells were installed on U.S. Bureau of Reclamation property, notification of proposed work and schedule was provided.

NERT, in conjunction with the drilling subcontractor, obtained the standard well drilling approvals from the Nevada Division of Water Resources. Notification was made to Nevada's Underground Service Alert to have utilities near the proposed wells located and marked. A utility geophysical clearance survey was conducted at each boring location. Notice of Intent and Underground Service Alert tickets are provided in **Appendix B**.

2.2 Field Activities

To maintain consistency in the methods applied in the field for this assessment, field activities adhered to the procedures described in relevant Field Guidance Documents in the Field Sampling Plan for the NERT RI/Feasibility Study (ENVIRON 2014a).

2.2.1 Well Installation and Development

Well installation activities were conducted March 25 through April 27, 2019. A total of 25 wells were installed, fourteen 4-inch diameter groundwater monitoring wells and eleven 2-inch diameter observation wells to be used during tracer testing. Twenty-three soil borings were advanced using the rotary sonic drilling method and two soil borings (NERT3.35S1 and NERT3.58N1) were advanced using air rotary casing hammer (ARCH) drilling methods. The ARCH drilling method was used in boreholes where the sonic drilling method was unable to advance through the subsurface material encountered. The 11 observation wells were installed from April 22 to 26, 2019, using the rotary sonic drilling method. Four observation wells were installed downgradient and cross gradient of NERT3.60S1 and around NERT4.46S1. Three observation wells were installed downgradient and cross gradient of NERT3.58S1 because no water was encountered at the proposed location of the fourth observation well.

The new groundwater monitoring wells were identified as NERT (owner) followed by the approximate river mile to the nearest hundredth of a mile, followed by the N or S for the north or south side of the LVW, followed by

sequentially numbered wells (1,2,3, etc.) within that hundredth of a river mile. For example, the westernmost Phase II monitoring well was identified as NERT4.71S2.

Equipment was decontaminated prior to drilling, between boreholes and at the end of each workday. The total depth of each boring was determined in the field based on the depth of the UMCf or bedrock (if present), such as the Horse Spring formation or the Thumb formation, or until refusal was encountered, whichever came first (**Table 1**). Maximum borehole depth of the monitoring wells was 90 feet bgs and boreholes were 8 inches in diameter. Boreholes for the observation wells were 6 inches in diameter. The lithology at each soil boring was logged by the field geologist using the Unified Soil Classification System (USCS). Soil boring logs are provided in **Appendix C**.

Each borehole was backfilled to the desired total depth of the well by pouring in bentonite chips. Monitoring wells were constructed of 4-inch diameter schedule 40 PVC with a screened interval of 20 feet. Observation wells were constructed of 2-inch diameter schedule 40 PVC with a screened interval of 20 feet. The well depth and screened interval were selected to match the surrounding wells and to intercept the same flow zone of interest. Well completion depths were between 35.5 and 62 feet bgs (**Table 2**). The filter pack and screen slot size were selected based on previous well installations in the area by AECOM and NERT contractors. Monterey #3 sand was used as the filter pack and extended at least 2 feet above the well screen. The screen slot size was 0.020 inches. A minimum 2-foot hydrated bentonite seal was placed above the filter pack and the annular space was backfilled with bentonite chips to the surface. Well completions were flush mounted traffic-rated well boxes with a vault and lockable well cap. Well construction diagrams are provided in **Appendix D**.

Well development activities were conducted between April 8 and May 3, 2019, exceeding the minimum 72-hours waiting period after well completion as specified in the DGIP (**Table 2**). During well development, pre-development groundwater was encountered between 10.43 and 39.41 feet bgs and after development between 18.31 and 39.65 feet bgs (**Table 2**). The wells were developed by bailing and surging to remove fine particles that may have gotten into the well or filter pack. Well development continued until the water was clear and field parameters stabilized. Stabilization of field parameters was over three readings as follows: pH plus or minus (\pm) 0.1, temperature \pm 1 degree Celsius ($^{\circ}$ C), and within \pm 10 percent (%) for specific conductivity, dissolved oxygen, oxidation-reduction potential and turbidity. Well development records are provided in **Appendix E**.

2.2.2 Soil Property Testing

Soil property samples were collected from 10 of the 14 boring locations during the drilling activities. The sample locations were selected by the field geologists. The soil property testing included:

- grain-size distribution (ASTM-D422),
- moisture content (ASTM-D2216),
- dry bulk density (ASTM-D2937)
- porosity (API RP40)
- total organic carbon and fractional organic carbon (Walkley-Black)
- Atterberg limits (ASTM D4318), and
- USCS description (ASTM-D2487).

Samples were collected and shipped by Ramboll under chain-of-custody protocols to Core Laboratories in Bakersfield, California. Results of the soil property testing are provided on **Tables 3 through 5** and soil property laboratory reports can be found in **Appendix F**.

2.2.3 Water Level Measurements

During well installation activities and the groundwater sampling event, groundwater monitoring wells were sounded for depth to water. An electronic sounder, accurate to the nearest \pm 0.01 feet, was used to measure

depth to water in each well. The electronic sounder was lowered down the casing to the top of the water column, and the graduated markings on the probe wire or tape were used to measure the depth to water from the surveyed point on the rim of the well casing and to the ground surface prior to the installation of the well casing.

2.2.4 Slug Testing

Slug tests were performed in three wells (NERT3.58S1, NERT3.60S1, and NERT4.64S1) to collect data for the estimation of hydraulic conductivity (K) values. Aquifer test analysis software, AQuifer TEst SOLVer© (AQTESOLV), and inferences made from other available site data were used to analyze falling head and rising head slug test data from each well.

A series of falling head and rising head slug tests were performed at wells NERT3.58S1, NERT3.60S1, and NERT4.64S1 between April 17 and April 19, 2019. Prior to commencement of slug testing at a given well, a pressure transducer was installed within the well at depths of 30 or 50 feet bgs. The transducers were programmed to record water elevations at a one-second interval. Water elevations were also measured periodically using a manual water level meter.

Initial tests conducted on April 17 and 18, 2019, used a solid slug of varying dimensions (2 and 3 feet long with a 2-inch diameter), which were quickly inserted into the water column to initiate the falling head slug test. After water levels stabilized to initial static groundwater level the slug was removed, thus initiating the rising head slug test. These slugs failed to produce enough displacement to allow for analysis in AQTESOLV because the displacement was too small, and the recovery was too rapid.

Each well was re-tested on April 19, 2019, using a 6-foot long slug with a 2-inch diameter; however, recovery was still near-instantaneous. The slug tests with the best results (i.e. highest initial displacement, least data “noise”) were chosen for AQTESOLV analysis. Water levels were converted to displacement from test initiation (in feet) by subtracting pre-test static water levels from each measurement.

Each dataset was individually analyzed in AQTESOLV. Based on the site hydrogeology consisting primarily of unconsolidated alluvium of variable thickness, the Bouwer-Rice (1976) solution for an unconfined aquifer with a partially penetrating well was chosen for curve-matching to estimate K. Aquifer parameters were estimated through visual matching of the data. In all cases, full recovery was near-instantaneous (within the first three seconds of initial displacement), which complicated data analysis. To the degree practicable, curves were matched to this early-time response. The near-instantaneous recovery of water levels is attributed to the aquifer’s high K relative to the amount of water displaced during slug testing. AQTESOLV analysis are provided in **Appendix G**.

2.2.5 Nuclear Magnetic Resonance Logging of Boreholes

Nuclear Magnetic Resonance (NMR) logging was conducted May 13 to 16, 2019, at each of the 14 new groundwater monitoring wells after the wells were constructed. Data collected through NMR logging was used to verify lithologic boundaries identified during field logging of the borehole. Based on the NMR logging, lithologic boundaries were not changed in the borehole logs. The NMR logging method uses the physics of nuclear magnetic resonance to directly measure hydrogen in the fluid state in groundwater. The NMR data are presented in **Appendix H**.

2.2.6 Groundwater Sampling

Groundwater sampling activities were conducted June 26 through July 9, 2019. Groundwater sampling was conducted using the low-flow method (in which low volumes of water were purged with little or no measurable drawdown) while allowing water quality field parameters to stabilize as specified in the field guidance document, if achievable, between three successive measurements. If field parameters did not stabilize by the time six volumes (about 6 liters) had been purged, then final water quality parameters were recorded, and a sample of groundwater was collected. The pump intake was positioned at the approximate midpoint of the well screen.

A flow-through cell equipped with a water quality meter was used during purging to track water quality field parameters and assess when stabilization of parameters had occurred. Samplers recorded measurements for depth to water, pH, electrical conductivity, dissolved oxygen, oxidation-reduction potential, turbidity and temperature of groundwater samples. Stabilization of field parameters was determined over three readings as follows: pH \pm 0.1, Temperature \pm 1°C, Specific Conductivity, Dissolved Oxygen, Oxidation-Reduction Potential and Turbidity within \pm 10 %. A water quality meter, calibrated as recommended by the manufacturer, was used to measure these parameters.

The identification system for the groundwater samples consisted of the well ID followed by the sample date in YYYYMMDD format. For example, a groundwater sample collected from monitoring well NERT3.35S1 on June 26, 2019, was identified as NERT3.65S1-20190626.

Groundwater samples from the 14 new groundwater monitoring wells were analyzed for the following constituents:

- Perchlorate (United States Environmental Protection Agency [EPA] Method 314.0);
- Chlorate (EPA Method 300.1);
- Chromium, Dissolved (EPA Method 200.8 [ICP-MS]);
- Hexavalent Chromium, Dissolved (Method 218.7); and
- TDS (Method SM 2540C).

Groundwater samples obtained from the 14 new wells for analyses of total dissolved chromium (i.e., combined trivalent and hexavalent chromium) and hexavalent chromium were filtered in the field using a 0.45-micron filter. Groundwater samples designated only for hexavalent chromium analysis were analyzed within 24 hours of sample collection or the sample was preserved by pH adjustment upon arrival at the laboratory (i.e., within 24 hours after sample collection) to allow for a longer holding time.

To obtain a more complete picture of the perchlorate and chlorate concentrations in groundwater along the LVW, the nine Phase I and 17 existing wells were also sampled during this timeframe. The 40 wells sampled are shown on **Figure 6**. The Phase I wells were analyzed for perchlorate, chlorate, and hexavalent chromium. The existing wells were only analyzed for perchlorate and chlorate. Groundwater sampling records are presented in **Appendix I**. Certified laboratory analytical reports are provided in **Appendix J**.

2.2.7 Transducer Installation

After Ramboll completed NMR logging, AECOM installed transducers in 11 wells. Transducer installation occurred between June 10 and July 9, 2019 (**Table 6**). Transducers were not installed in the three wells being used for dye injections (NERT3.58S1, NERT3.60S1, and NERT4.64S1) and one well (NERT4.71N1) that was not accessible during this timeframe due to a biological hazard (hornets). Transducers were installed in these four wells on August 13, 2019, when no dye remained in the injection wells and the hornets were gone. The transducers were set to automatically record groundwater level data every 15 minutes (96 times per day). Prior to the installation of each transducer and following installation of the transducer, a manual groundwater level measurement was collected using a water-level sounder. Static groundwater level readings were measured and recorded to the nearest 0.01 foot from the surveyed reference mark on the top north edge of the inner well casing.

The installation of each dedicated transducer typically consisted of placing the transducer at approximately 20 feet below the top of the water table and securing the transducer with a cable within the well head. As shown on **Table 6**, some wells have less than 20 feet of water column so for these wells the transducer was placed approximately 2 feet above the bottom of the well. These transducers recorded data for approximately two months before data were downloaded at the beginning of August 2019, currently with transducers in Phase I and

existing wells in the Downgradient Study Area. Automated readings from the transducers were corrected for barometric pressure fluctuations. Barometric data is available from the barometer in well WMW4.9S.

2.2.8 Surveying of New Groundwater Well Locations

New groundwater well locations and elevations (ground surface and top of casing) were surveyed by a licensed land surveyor. Locations were referenced to the State Plane Coordinate System and elevations were referenced to the North American Datum 83 Nevada East Zone (2701) with vertical datum based on NAVD 88 referenced to the City of Henderson Benchmark network. The survey data is presented on **Table 7** and the survey report is presented in **Appendix K**.

2.2.9 Preliminary Tracer Dye Sampling of LVW

To rule out background concentrations of tracer dye that may have already been present in the LVW, preliminary tracer dye sampling and analyses were conducted. Results were used to determine which tracer dye would be injected for the tracer testing and determine which sensor would be used in the tracer dye probes for monitoring the LVW.

Six surface water and charcoal sorbent samples were collected in the LVW in the vicinity of wells NERT4.64S1, NERT3.60S1, and NERT 3.58S1 (**Figures 2 and 4**). These locations were selected for background tracer dye analysis because these locations are where groundwater is considered most likely to enter the LVW from the selected injection wells (NERT4.64S1, NERT3.60S1, and NERT 3.58S1). Additionally, these locations are located close to observed surface water temperature 'anomalies' measured in February 2018 and, as discussed below, they are also the tracer test monitoring probe locations.

Samples were collected during daily low-water conditions to minimize the influence of upstream wastewater sources on surface water flow (and therefore dilution). Sampling consisted of collecting one grab water sample and deploying/collecting one charcoal sampler at each sampling location. A total of six groundwater samples and six charcoal samplers were collected.

Grab samples were collected in 50 milliliter glass vials. Charcoal samplers were anchored to the bottom of the LVW with a u-pin or stake and left in place for approximately 4 hours. Samplers were attached so that they extended outward from the anchor and did not lay flat on the bottom of the LVW. All samplers and equipment were removed from the LVW once sampling was complete.

Samples were collected on March 7, 2019, and analyzed for Fluorescein, Rhodamine WT, Eosine, and Sulforhodamine B by Ozark Underground Laboratory, in Protem, Missouri. Laboratory results are provided in **Appendix J**. Fluorescein dye was detected in charcoal samplers from five of the six locations in concentrations ranging from 0.186 parts per billion (ppb) to 0.851 ppb. Sulforhodamine B was detected in water samples from five of the six locations at concentrations ranging from 0.067 to 0.093 ppb. On this basis, Fluorescein and Sulforhodamine B were rejected as potential dyes for tracer testing. Since Rhodamine WT had been approved as an injection dye by the Nevada Underground Injection Control Program and was not detected in preliminary testing, it was selected for use in tracer dye testing.

2.2.10 Dye Tracer Testing

Dye tracer testing was proposed to establish positive proof of the connection between groundwater and surface water in the LVW, to provide additional lines of evidence regarding the velocity of groundwater towards the LVW in the test locations, and to provide additional information about the direction of the local groundwater gradient. This scope ultimately included three sets of dye measurements: 1) in the injection wells, 2) in the observation wells, and 3) in the LVW. The locations of the injection wells, observation wells and LVW probe locations are shown on **Figures 2, 4, 6, 9, 10, and 11**.

Wells NERT 3.58S1, NERT3.60S1, and NERT4.64S1 were selected for dye tracer testing (**Figures 2 and 4**). Slug test data was used to estimate the time required for the injected dye to travel from each injection well to the observation well and to the LVW. Based on the slug tests, average estimates of hydraulic conductivity in NERT 3.58S1, NERT3.60S1, and NERT4.64S1 were 452 feet per day (ft/d), 227 ft/d, and 136 ft/d, respectively.

Rhodamine WT for use in dye tracer testing was purchased from Ozark Underground Laboratory, Protem, Missouri. Each dye tracer test consisted of dye injection and monitoring declining dye concentrations in the test well and monitoring for dye detection in the LVW. Tests were conducted serially beginning with the furthest downstream well (NERT 3.58S1) to minimize the potential for interference. Three surface water locations were monitored using probes equipped with dye sensors (Eureka Water Probes, Austin, Texas) that allowed for continuous monitoring for dye concentration, temperature, and conductivity and reported those results via telemetry to a website for the duration of the testing (June 3, 2019, to August 8, 2019). Probe locations are shown in **Figures 2, 4, 9, 10, and 11**. Probe installation consisted of connecting the data cable to the probe, installing the probe in a PVC housing and securing the housing and probe in the LVW via a stake. The data cable was then connected to the telemetry box on the shore. Data collection from each probe was verified before dye was introduced in the injection wells. Surface water monitoring was centered on locations where groundwater could be expected to enter the LVW, and approximately 50 feet upstream and downstream from the primary location. The telemetry unit reported data at 5-minute intervals, 24 hours a day, 7 days a week.

Dye measurements in the LVW using the probes showed some variability related to fouling. Occasional fouling (accumulation of dirt, plant matter, or algae) of the probe surface near the optical windows used for fluorescence measurement was observed and appeared to correlate with intermittent spikes in fluorescence measurement. Although these spikes complicate data interpretation, consistent fluorescence measurements lasting for periods of hours that then declined to baseline without intervention (cleaning of the probe) could be readily discerned in the data and were concluded to be measurements of dye entering the LVW. Measured conductivity and dye concentrations in the LVW related to injections at NERT 3.58S1 and NERT 3.60S1 are presented in **Figures 7 and 8**. Dye was not detected in the LVW following injection at NERT4.64S1.

The time from dye injection in the well to first detection in the LVW was used to estimate the seepage velocity in that area. The arrival time of the peak concentration of dye observed from the injection was also used to calculate estimated seepage velocity. Results from these measurements and calculations are presented in Section 3.6.

2.2.11 Borehole Dilution Testing

Step-drawdown testing proposed in the DGIP for wells NERT4.64S1, NERT3.60S1, and NERT 3.58S1 was replaced with borehole dilution testing due to the anticipated large quantity of water a pumping test would produce. The modification to the proposed scope was presented in a memorandum dated May 13, 2019 and was accepted via email dated May 16, 2019 (**Appendix L**). A borehole -dilution test was performed concurrently with the dye tracer tests at each location and used to estimate groundwater velocity (v).

In accordance with the procedures described in the memorandum, injection well sampling consisted of collecting sets of up to five samples at uniform time intervals in the injection well on the day the dye was introduced. On subsequent days, multiple samples were collected at each injection well to evaluate the dilution of dye in the well caused by groundwater movement through the well. Sampling included homogenization (mixing within the water column of the well prior to sample collection) to ensure a uniform concentration within the well and to minimize any vertical stratification. Samples were also collected from each observation well using the same methods and approximately the same schedule discussed in the following section. All samples were collected with sampling equipment dedicated to each well to be sampled.

Dye concentration was quantified by visual comparison to prepared standards. These standards were most effective in the range from 1,000 to 1 mg/L. A simple absorbance photometer was also used to supplement the visual analysis. For the photometer, measured dye intensities over time in the injection well were fit to a quadratic calibration curve, from which concentration data over time could be determined.

The memorandum specified that the dilution trend (decline in dye concentration) observed in the initial sampling of the injection well would be used to determine the timing for the next sampling event; however, the declines in concentration were sufficiently rapid that daily sampling was chosen to characterize dilution. Photologs containing images of groundwater samples from the injection wells following dye introduction are provided as **Appendix M**.

Concentration trends with time were used to evaluate groundwater velocity at each injection well. The concentration data (as determined by the photometer and its calibration curve) collected over the course of the borehole dilution test was converted to relative concentration, C/C_0 , where C_0 is the initial concentration at the start of the test. Using these data, the following equation (1) from Lamontagne et al. 2002 can be solved:

Equation 1

$$C_{(t)} = e^{-\frac{v^*At}{V}}$$

$C_{(t)}$ is concentration at time t , v^* is apparent velocity, A is the cross-sectional area of the well normal to groundwater flow, and V is the volume of water in the well. Apparent velocity of the water in the well is the combination of the Darcy Velocity (v_d) and the well shape factor (α):

Equation 2

$$v^* = \alpha v_d$$

Dividing v^* by the porosity of the formation (n) and the well shape factor (α) yields groundwater velocity (Freeze and Cherry 1979).

Equation 3

$$v = \frac{v^*}{\alpha n}$$

In order to arrive at a unique solution, and to allow relative comparison among the dilution tests, the value for well shape factor was assumed to be 2. This value is commonly assumed for well shape factors in other studies (Lamontagne et al. 2002). Porosity was also assumed to be 0.33 in all wells. While effective porosity elsewhere on the Site is lower, during well installation a conductive gravel layer was observed. Because of this, a higher effective porosity value was chosen (Johnson 1967).

Dye was not observed in observation well samples from the injections at NERT 3.58S1 and NERT 3.60S1 (**Figures 9** and **10**). Dye was detected in one observation well (NERT4.64S1D) from injection well NERT4.64S1 (**Figure 11**). Data collected from the observation wells was analyzed similarly to that collected in the LVW, i.e. arrival times were used to bracket velocities. The time to the initial detection of dye and the time to the peak observed dye concentration were used as bounds of the time needed for the groundwater to travel from the injection well to the observation point. Depending on the position of the observation well and the predominant groundwater flow direction at the time of measurement, this may not necessarily coincide with the predominant flow velocity of the aquifer.

2.2.12 Deviations from DGIP – Phase II Groundwater Investigation

The procedures for well installation and sampling were detailed in the DGIP – Phase II Groundwater Investigation. The following deviations from the work plan occurred.

- 1) Well NERT3.70N1 was misnamed. Since this well is located downstream from NERT3.60N1 it was renamed NERT3.58N1.
- 2) The borings for eight wells (NERT3.35S1, NERT3.40S1, NERT3.58S1, NERT3.58N1, NERT3.63S1, NERT3.98S1, NERT4.64S1, and NERT4.70N1) were not drilled to their total planned depth of 90 feet due to drill rig refusal at shallower depths.
- 3) Observation well (NERT3.35S1D) was not installed due to refusal in the conglomerate unit of the Thumb formation at 36 feet bgs and because no water was encountered in the boring.
- 4) The three 12-hour pump tests were replaced with three borehole dilution tests. These modifications were presented in a technical memorandum titled *Proposed Borehole Dilution Testing as an Alternative to Pump Testing for Hydraulic Conductivity Determination* (AECOM 2019b) (**Appendix L**). These modifications were made due to the difficulty in storing and disposing the large quantities of water expected during the proposed pump test as estimated by slug testing performed in the target wells. The modifications were approved by NDEP (NDEP 2019).
- 5) Soil property samples were collected by Ramboll and testing was conducted on 14 samples from 10 boreholes instead of the 40 samples from 14 boreholes included in the work plan. Soil property testing was expanded to include porosity, dry bulk density, and organic carbon content. Based on comparing the soil laboratory test results to the field logging, the analysis of fewer samples has not compromised the study.

2.3 Data Validation

Data validation was conducted to assess the validity and usability of laboratory analytical data from the July 2019 groundwater sampling conducted in the Downgradient Study Area. Data generated from sampling activities were validated to Stage 2A per the Data Validation Guidance issued by NDEP on July 13, 2018 (NDEP 2018). All samples were analyzed as requested and all holding times were met. Due to low-level blank contamination in an associated equipment blank, the result for chromium for sample NERT4.71N1-20190709_20190709 was qualified as estimated (“J+”). No other data were qualified. Based upon the Stage 2A data validation, all other results are considered valid and usable for all purposes.

Overall, the data as qualified are useable for meeting DGI objectives. All results are valid; the analytical completeness defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for laboratory analysis for the DGI is 100%. Additionally, because all samples in each data set were collected and analyzed under similar prescribed conditions, the data are comparable. Details of the data validation are presented in the Data Validation Summary Report in **Appendix N**.

3.0 Phase II Groundwater Quality Assessment Results

3.1 Lithology

Sediments encountered in the Phase II boreholes drilled along the LVW included interbedded layers of poorly graded gravel, sandy gravel, poorly graded sand, silty sand, clayey sand, sandy silt, silt, and lean clay. These sediments were encountered from the surface to the maximum depth explored of 90 feet bgs. These sediments were observed at thicknesses of 15 feet to 90 feet and are typical of the fluvial depositional environment encountered in the Downgradient Study Area near the LVW.

Alluvium varied from unconsolidated to very well cemented. Within the alluvium, discontinuous beds of gravel, sand, silt and clay were observed. Caliche was encountered in one borehole (NERT3.58S1D). Bedrock formations were encountered in eight of the boreholes between 15 feet and 78 feet bgs (NERT3.35S1, NERT3.40S1, NERT3.58N1, NERT3.58S1, NERT3.58S1D, NERT3.60S1, NERT3.63S1, and NERT3.98S1). In the remaining borings bedrock was not encountered.

The UMCf was encountered in three of the eastern boreholes south of the LVW at 23, 64, and 70 feet bgs. In the Phase II boreholes, the contact between the Quaternary alluvium and the UMCf is typically marked by gray-green to yellow-green gypsiferous clays and silts.

The Thumb formation was also encountered in five of six of the eastern boreholes (NERT3.35S1, NERT3.40S1, NERT3.58S1D, NERT3.63S1, and NERT3.98S1) at depths ranging from 27 to 57.5 feet bgs. The Thumb formation was encountered in one of the eastern borings (NERT3.58N1) on the north side of the LVW at a depth of 15 feet bgs. The Horse Springs formation was also encountered in two of the eastern borings (NERT3.58S1 and NERT3.60S1) at depths of 66 and 78 feet bgs, respectively. A summary of depths to the UMCf and bedrock for each borehole, if encountered, is provided in **Table 8**.

A fault is suspected to run between NERT3.58S1 and NERT3.58S1D based on the occurrence of the contact of the UMCf and Horse Springs formations in NERT3.58S1 at depths of 64 and 66 feet bgs, respectively, and the shallow occurrence of the Thumb formation (36 feet bgs) in borehole NERT3.58S1D. Borehole NERT3.58S1D was drilled approximately 40 feet east of NERT3.58S1, but was not converted to an observation well due to refusal in the conglomerate unit of the Thumb formation and because no groundwater was encountered in the boring.

3.2 Soil Property Testing

Soil property testing was conducted on 14 samples from 10 borings (**Tables 3 through 5**). Testing included grain-size distribution, moisture content, dry bulk density, porosity, total organic carbon, fractional organic carbon, Atterberg limits, and USCS description. The USCS description from these analyses is shown on the boring logs at the depth that the sample was obtained. Moisture content ranged from 6.6 to 34.9 percent of dry weight. Dry bulk density ranged from 1.39 to 2.05 grams per cubic centimeter. Porosity as a percentage of bulk volume ranged from 23.7 to 48.6 percent. Total organic carbon ranged from 4,900 to 23,800 milligrams per kilogram (mg/kg).

3.3 Water Levels and Field Parameters

During groundwater sampling activities, groundwater elevations ranged from approximately 1,436 to 1,530 feet above mean sea level (**Table 7**). The depth to groundwater ranged from 2.96 to 43.58 feet bgs (**Table 7**). In general, groundwater elevations were highest at the western side of the Downgradient Study Area and lowest in the east side (**Figure 12**). In addition, when a well is physically near LVW, a shallow depth to water is observed; conversely, when a well is far away from LVW a deeper depth to water is observed, which is mainly due to topographic elevation differences. Actual groundwater elevations increase with distance from LVW. The 2018

groundwater elevations are shown in a schematic cross section along the LVW with weir profiles and surface elevations on **Figure 13**. The July 2019 groundwater elevations are shown in a schematic cross section along the LVW with the weir profiles and surface water elevations on **Figure 14**.

Based on the 2019 water level information and surface water investigations, there are five locations along the LVW, east of the Pabco Road Weir, where the groundwater elevation is equal to or higher than the elevation of the surface water in the LVW: Bostick Weir to Calico Ridge Weir, below Calico Ridge Weir, below Lower Narrows Weir, below Homestead Weir, and below Three Kids Weir (**Figure 14**).

Water quality field parameters were collected when each well was sampled. Field measurements for pH, electrical conductivity, dissolved oxygen, oxidation-reduction potential, turbidity and temperature were obtained and evaluated for stability (**Table 9**).

3.4 Slug Testing

Slug tests were performed on wells NERT4.64S1, NERT3.60S1, and NERT3.58S1 (**Figures 2 and 4**). Average estimates of K in NERT3.58S1, NERT3.60S1, and NERT4.64S1 were 452 ft/d, 227 ft/d, and 136 ft/d, respectively. Expected travel times were calculated for distances of 10, 30, 100, 200, and 400 feet. Uncertainty with these estimates is primarily attributed to insufficient initial displacement during slug testing. The K values determined through AQTESOLV analysis are generally consistent with previous K estimates from other site aquifer tests performed in gravelly alluvium (Fetter 2008).

Expected travel times were used to determine the approximate distances of the observation wells for the planned 12-hour constant rate pumping tests. Ultimate placement of the observation wells was influenced by site conditions including the presence of underground utilities and surficial physical barriers limiting borehole advancement. Note that a dye dilution test was conducted in place of the pump tests as discussed in Section 2.2.12. Results of the dye dilution test are presented in Section 3.6.

3.5 NMR Logging

NMR logging was performed on the 14 Phase II groundwater monitoring wells. Data from the NMR logs was used to identify zones where higher hydraulic conductivity was indicated. Potentially high conductivity zones (of 100 ft/d) were identified in the following borings:

Well ID	High Conductivity Zone Depth (in feet bgs)
NERT3.35S1	34.5 to 35.5
NERT3.58N1	50 to 52
NERT3.58S1	37 to 40
NERT3.60N1	40 to 41
NERT3.60S1	39 to 53
NERT 3.63S1	22 to 33
NERT4.64S1	40 to 44 and 47 to 53
NERT 4.65N1	36 to 41
NERT4.71N1	29 to 33 and 39 to 43

The NMR data are presented in **Appendix H**. Comparing these high permeability zones determined by the NMR to the lithology shown in the boring logs indicated that most of these zones were in sandy and/or gravelly material. In two instances (NERT3.58N1 and NERT4.65N1) the high permeability zone was within or at the contact with bedrock. In two instances (NERT3.60N1 and NERT4.64S1) the high permeability zone was within silt and/or sandy silt material. This further supports the value of NMR logging because lithologic logging does not accurately identify all high permeability zones.

3.6 Dye Tracer Surface Water Testing Results

Three locations in the LVW were sampled for the presence of several tracer dyes to determine which dye to use for the tracer dye investigation. Results of these tracer dye analyses are presented on **Table 10**. As discussed above (Section 2.2.9), Fluorescein was consistently detected in charcoal sorbent samples, although the detected concentrations were less than 1 ppb. Sulforhodamine B was consistently detected in surface water samples at concentrations less than 0.1 ppb. Eosine and Rhodamine WT were not detected in surface water or charcoal sorbent samples.

Rhodamine WT dye was selected for the tests based on low or non-detect background concentrations in surface water and the permit obtained previously for this dye. Rhodamine WT was injected into three groundwater monitoring wells (NERT3.58S1, NERT3.60S1, and NERT4.64S1) for this investigation.

Graphs showing the dye concentration and conductivity data for the probes that detected dye in the LVW following injections at NERT3.58S1 and NERT3.60S1 are provided as **Figures 7 and 8**. Dye was not detected in the LVW following injection at NERT4.64S1. Conductivity and temperature (not shown on graphs) measurements indicated significant daily variation in the LVW. Temperatures at all probe locations (not shown) oscillated in a range from approximately 22°C to 29°C over the course of each day with the increasing temperature roughly concurrent with daylight hours and decreasing temperature at night. Conductivity also followed a daily cycle with a range from approximately 2,500 to 3,000 micro-siemens per centimeter. There was some variability in this range among the probes. For example, Probe #0 (the furthest upstream for injections at NERT3.58S1 and NERT3.60S1) had a daily conductivity range from 3,250 to 4,200 micro siemens per centimeter. One hypothesis is that the periods when conductivity is highest represent periods when groundwater infiltration has the most influence on water quality in the LVW.

The initial observation of dye at a concentration above background represents the minimum time required for groundwater from the injection point to reach the observation point. For the injection at NERT3.58S1, dye was first detected in Probe #2 10,270 minutes (7.1 days) following injection (**Figure 7**). Since probe #2 was approximately 175 feet from NERT 3.58S1, the first detection of dye indicated a seepage velocity of 0.017 feet per minute or approximately 25 ft/d between the injection point and probe #2 (**Figure 9**). For the injection at NERT3.60S1, dye was first detected 6,125 minutes (4.2 days) following injection (**Figure 8**). Since probe #0 was approximately 183 feet from NERT3.60S1, the first detection of dye indicated a seepage velocity of 0.03 feet per minute or approximately 43 ft/d (**Figure 10**). Fluorescence observations coincided with daily peaks in conductivity at NERT3.58S1 and NERT3.60S1 which may further support the hypothesis that groundwater influence is periodic rather than continuous.

The peak concentration observed is also used to estimate groundwater velocity. For the injection at NERT3.58S1, the peak dye concentration was detected 16,075 minutes (11.2 days) following injection (**Figure 7**). Since Probe #2 was approximately 175 feet from NERT 3.58S1, the peak concentration of dye indicated a seepage velocity of 0.011 feet per minute or approximately 16 ft/d. For the injection at NERT3.60S1, the peak dye concentration was detected 6,660 minutes (4.6 days) following injection (**Figure 8**). Since probe #0 was approximately 183 feet from NERT3.60S1, the peak detection of dye indicated a seepage velocity of 0.028 feet per minute or approximately 40 ft/d.

Previous studies have estimated seepage velocities in the shallow (25 to 35 feet bgs) water-bearing zone are on the order of 5 ft/d (Tetra Tech 2018a). NMR and slug test data show that hydraulic conductivity is variable in this

area and with depth which may result in variability in groundwater velocity. For NERT3.58S1 and NERT3.60S1, the groundwater velocity ranges estimated by observations of dye in the LVW were within the same order of magnitude (tens of ft/d) and within the range of 16 to 43 ft/d.

3.7 Borehole Dilution Testing Results

For dye injection at NERT3.58S1, dye declined from its initial concentration to an estimated concentration of 2 mg/L within 24 hours. The dilution model indicated that the groundwater velocity at NERT3.58S1 was 23 ft/d. At location NERT3.60S1, the dilution model indicated a faster groundwater velocity of 55 ft/d. The model indicated velocities at these two locations agreed with the velocity ranges estimated by dye transport time from the injection points to the probes in the LVW. The third dye injection location, NERT4.64S1, had the slowest groundwater velocity estimated by the model at 10 ft/d; however, dye was not detected in the wash following this injection. Dye was detected in observation well NERT4.64S1D (approximately 40 feet east of NERT4.64S1) within an hour of its injection (**Figure 11**). The groundwater velocity in this case was not consistent with the model output. In NERT4.64S1, dilution-based velocity was 10 ft/d. Despite a slow decrease in dye at the well, dye was observed at nearby observation well soon after injection. This suggests a low volume, high velocity channel near the injection location. A photolog including these samples is included in **Appendix M**. Model outputs are provided in **Appendix O**.

The lithology of the screened interval of the test wells is predominantly gravelly sands and silts. These sediments typically have high K values, in the tens to hundreds of ft/d, and porosities ranging from 25 to 40%. The values above are consistent with the lithologies observed in the screened intervals.

The range in calculated velocities based on borehole dilution agree with rough order of magnitude estimates of velocity based on dye-arrival times in the LVW, except for NERT4.64S1. Combined, these lines of evidence suggest the aquifer exhibits high transmissivity in this area.

3.8 Groundwater Sampling Results

Groundwater samples were collected from 40 wells: 14 new Phase II groundwater monitoring wells, and 26 existing wells, which include 9 wells installed during the Phase I Groundwater Quality Assessment. The existing wells were previously sampled in April 2018 (AECOM 2019d). The 17 wells that were installed before the Downgradient Study Area investigation were also sampled in April 2016 (AECOM 2016). The 14 Phase II groundwater monitoring wells were sampled for the five constituents listed in Section 2.2.6. The nine Phase I wells were sampled for perchlorate, chlorate, and hexavalent chromium; the 17 remaining existing wells were only sampled for perchlorate and chlorate. Analytical laboratory results are provided in **Appendix J**.

Of interest and relevance to the groundwater quality assessment is the initiation of the LVW Bioremediation Pilot Study. The LVW Bioremediation Pilot Study includes the installation of injection and monitoring wells along Transect 1B south of LVW in the vicinity of Bostick Weir and Calico Ridge Weir. Injection of carbon donors is planned following assessment activities (**Table 12** and **Figure 15**).

3.8.1 Perchlorate

Concentrations of perchlorate detected in groundwater in the new Phase II wells ranged from 57 to 3,200 µg/L, and in the 26 existing wells from 12 to 4,000 µg/L (**Table 11**). **Figure 15** presents the July 2019 perchlorate concentrations and perchlorate contours.

Perchlorate concentrations in groundwater exceeded the Nevada Interim Action Screening Level of 18 µg/L at 34 of the 40 wells sampled in June and July 2019 (**Table 11**). Concentrations are highest in groundwater in well WMMW5.58S (4,000 µg/L) between Pabco Weir and Historic Lateral Expansion Weir. The area where the next highest concentrations are found is on the south side of Calico Ridge Weir. Downgradient of the Lower Narrows Weir, the perchlorate concentrations decrease.

Between Pabco Road Weir and Historic Lateral Weir Expansion, groundwater in two wells (WMW5.7N and NERT5.49S1) showed significantly lower concentrations (12 and 13 µg/L, respectively) than other wells in the general vicinity. Between Bostick Weir and in the vicinity of Calico Ridge Weir, concentrations of perchlorate below 1,000 µg/L (140 to 850 µg/L) were detected in six wells (NERT4.64N1, NERT4.65N1, NERT4.70N1, NERT4.71N1, WMW4.9N, and WMW4.9S). Additionally, significantly lower perchlorate concentrations in groundwater (57 and 13 µg/L) than surrounding wells were detected at two wells (MW-20 and MW-25, respectively) located on the northern boundary of the Henderson Landfill site. Groundwater from one well downgradient of Homestead Weir (NERT3.98S1) and at two wells upgradient of Rainbow Gardens Weir (NERT3.35S1 and NERT3.40S1) had non-detectable (<4.8 µg/L) perchlorate concentrations.

A comparison of perchlorate concentrations of groundwater in the 26 wells that were sampled in July 2018 and July 2019 showed that concentrations were lower in 19 wells and higher in seven wells in 2019 (**Table 12**). Groundwater from well WMW5.58S showed a significantly higher concentration in July 2019 (4,000 µg/L) exhibiting a 60% increase, from the July 2018 concentration (2,500 µg/L). Groundwater from wells NERT4.93S1 and NERT5.11S1 showed 54% to 62% lower perchlorate concentrations in July 2019 as compared to July 2018. The biggest percentage increase in concentration was in wells WMW5.7N and NERT5.49S1 at 208% and 155%; however, these wells had significantly lower concentrations than other wells in the general vicinity (**Table 12** and **Figure 15**).

3.8.2 Chlorate

Concentrations of chlorate detected in the new Phase II wells ranged from 13 to 14,000 µg/L, and in the 26 existing wells from 16 to 10,000 µg/L (**Figure 16** and **Table 11**). Chlorate concentrations in groundwater equaled or exceeded the basic comparison level of 1,000 µg/L in 22 of the 40 wells sampled in June and July 2019 (**Table 11**).

Chlorate concentration is relatively high in groundwater in well WMW5.58S (8,000 µg/L) between Pabco Weir and Historic Lateral Expansion Weir. Between Historical Lateral Weir and Calico Ridge Weir concentrations of chlorate are generally high (3,000 to 14,000 µg/L) with the highest concentrations detected in well NERT4.71S2.

Between Pabco Road Weir and Historic Lateral Weir Expansion, groundwater from four wells (COH2B1, NERT5.91S1, WMW5.7N and NERT5.49S1) showed significantly lower concentrations (<10 to 790 µg/L) than other nearby wells. In the vicinity of Calico Ridge Weir, lower concentrations (<10 to 28 µg/L) were also detected in groundwater from the north side of LVW (WMW4.9N, NERT4.71N1, NERT4.70N1, NERT4.65N1, and NERT4.64N1). Additionally, significantly lower concentrations (46 and 56 µg/L) were detected in groundwater from two wells (MW-20 and MW-25) located on the northern boundary of the Henderson Landfill site. Downgradient and north of Three Kids Weir, groundwater from two wells (NERT3.60N1 and NERT3.58N1) showed significantly lower concentrations (24 and 27 µg/L) than nearby wells. Groundwater from two wells upgradient of Rainbow Gardens Weir (NERT3.40S1 and NERT3.35S1) showed nondetectable concentrations (<10 µg/L).

A comparison of chlorate concentrations in groundwater from the 26 wells sampled in July 2018 and July 2019 showed that concentrations were lower in 18 wells, higher in five wells, and exhibited no change in three wells in 2019.

The 2019 data shows a general correlation between perchlorate and chlorate concentrations. High chlorate concentrations were typically detected in wells with high perchlorate concentrations, and vice versa, low chlorate concentrations were detected in wells with low perchlorate concentrations (**Table 11**).

3.8.3 Dissolved Chromium

Concentrations of dissolved chromium detected in the new Phase II wells ranged from 0.55J to 20 µg/L (**Figure 17** and **Table 11**). None of the dissolved chromium concentrations exceeded the maximum contaminant level for drinking water of 100 µg/L (**Table 11**). The highest concentration of dissolved chromium was detected at 20 µg/L

in NERT4.64S1 located south of the LVW near Calico Ridge Weir. Chromium concentrations decrease to the west and east from NERT4.64S1. In general, dissolved chromium concentrations were lower on the north side of LVW.

The 2019 dissolved chromium concentrations were within the same order of magnitude of concentrations detected in nearby wells that were sampled in 2016 and 2018.

3.8.4 Hexavalent Chromium

Concentrations of hexavalent chromium detected in the new Phase II wells ranged from 8.54 to 38.2 µg/L, and in the 10 Phase I wells from 14.2 to 37.4 µg/L (**Figure 18 and Table 11**). Hexavalent chromium was below detection limits in groundwater from 14 wells (**Table 11**). The highest concentration of 38.2 µg/L was in well NERT4.64S1 on the south side of LVW and downgradient of Calico Ridge Weir. None of the detected concentrations of hexavalent chromium exceeded the basic comparison level of 100 µg/L.

3.8.5 Total Dissolved Solids

TDS concentrations in the new Phase II wells ranged from 1,800 to 9,000 mg/L (**Figure 19 and Table 11**). There is not a basic comparison level established for TDS. The TDS concentrations exceeded the secondary maximum contaminant level for drinking water of 500 mg/L in all 14 wells tested. Concentrations are highest at and to the east of Three Kids Weir. The highest concentration of TDS was detected at 9,000 mg/L in NERT3.40S1 located southwest of Rainbow Gardens Weir. The lowest concentrations were detected at 1,800 mg/L at NERT4.70N1 and NERT4.71N1 located on the north side of LVW near Calico Ridge Weir. TDS concentrations below 3,000 mg/L may be a result of surface water mixing with groundwater adjacent to LVW.

The 2019 TDS concentrations were generally within 30% of concentrations detected in nearby wells that were sampled in 2016 and 2018.

3.8.6 Investigative Waste Disposal

Soil and rock generated during the DGI was transported to a secure staging area on the NERT site. NERT managed the waste profiling and disposal of the waste along with other investigative-derived waste generated for the RI. The liquid investigative-derived waste was placed into polyethylene tanks and transported to the groundwater extraction and treatment system at the NERT Site. The liquid waste was discharged into the GW-11 pond, which receives groundwater pumped from extraction wells. The liquid waste was treated and discharged through the on-site treatment systems. The remaining investigative-derived waste was double-bagged in plastic trash bags and was disposed as municipal trash.

4.0 Conceptual Site Model Update

A CSM of the LVW and potential inputs of perchlorate was presented in the DGI Technical Memorandum Phase I Groundwater Quality Assessment (AECOM 2019a). A diagram of the CSM is provided in **Figure 20**, which depicts estimated perchlorate load (in pounds per day [lb/d]) in the LVW from surface water sampling data collected during April and May of 2018. During that sampling event, construction of the Sunrise Mountain Weir and the Historic Lateral Weir Expansion was ongoing. A large volume of groundwater was being pumped from those construction areas to a temporary treatment facility where perchlorate was removed prior to discharge back to the LVW upstream of the Pabco Road Weir. As a result of that dewatering and treatment program, perchlorate concentrations in the LVW were lower than would otherwise be expected, particularly within the reach between Upper Narrows and Calico Ridge Weirs. This section updates relevant elements of the CSM by incorporating the findings of the 2019 Phase II Groundwater Assessment presented in Section 3 of this technical memorandum.

4.1 Anthropogenic Sources of Discharge to the LVW

Discharges from the four major wastewater treatment plants in the valley represent the vast majority of flow in the LVW (Clark County Water Reclamation District, City of Las Vegas Water Pollution and Control Facility, City of Henderson Water Reclamation Facilities, and City of North Las Vegas Water Reclamation Facility). Outfalls from groundwater treatment plants (NERT, American Pacific Corporation /Endeavour LLC [Endeavour], and TIMET) join the channel conveying treated wastewater from the City of Henderson, entering LVW above Pabco Road Weir (**Figure 20**). The remaining flow in the LVW comes from Duck Creek and the C-1 Channel, as well as non-point sources including urban and stormwater runoff and shallow groundwater discharge. Comparison of surface water and groundwater elevations show that portions of LVW are below the groundwater table and, therefore, receive groundwater discharge (AECOM 2019d). Other parts of LVW are above the groundwater, which cause infiltration (loss) of the surface water. This condition is dynamic and changes depending on a wide variety of variables including, but not limited to, increases in flow rates from the wastewater treatment plants due to increased land development, diurnal fluctuations in wastewater flows, and seasonal fluctuations of the groundwater table.

The treatment plants contribute a relatively steady daily supply of water to the LVW throughout the year. The outfalls discharge continuously but at a predictably cyclic rate. That cycling causes a diurnal flow pattern similar to a tidal pattern, with daily high and daily low flows. Unless disrupted by rain storm events, daily high flows are on the order of 100% higher than the daily low. However, the constant daily discharge represents the vast majority of flow in the LVW, and the natural, seasonal variability in streamflow has largely been eliminated. On average, streamflow tends to be somewhat higher from October through March (290 to 340 cubic feet per second [cfs]) and lower from April through September (260 to 310 cfs) (USGS 2018).

Along with the general increase in flow in the LVW through the years, there has also been an increase in the magnitude of stormwater runoff draining into the LVW. Fifty years ago, the annual peak flow at Pabco Road was on the order of 300 cfs (median value of 280 cfs from 1957 to 1967), or similar to the current average annual flow (298 cfs). More recently, annual peak flows are on the order of 4,500 cfs (median value of 4,350 cfs from 2005 to 2015) (USGS 2017).

In an effort to protect the channel from the erosive forces of higher flows, a series of erosion control structures (weirs) have been constructed to slow the water velocities in the LVW. Where erosional forces have been allowed to run their course, the stream channel within the Downgradient Study Area is generally 40 feet or less in width. Near some of the weirs, the width increases to 300 feet or more.

The channel materials consist of loose, unconsolidated sediments that have been shifted and sorted by the energy of the flowing water. Most of the underlying material is alluvium that consists of both fine-grained materials

(silts and clays) and courser materials (sands and gravels). As the water carries those deposits downstream, sand and gravel are deposited in areas with higher velocity, providing a more solid streambed. Where streamflow slows down in natural pools and behind some of the weir structures, silts and clays are deposited, creating a soft bottom. The Horse Springs formation is present in the southern streambank east of Calico Ridge Weir, and the Thumb formation is present on the northern and southern streambanks between the Lower Narrows and Three Kids Weirs.

4.2 Known Sources of Perchlorate

The former Kerr McGee/Tronox site (NERT On-Site Study Area) (**Figure 1**) has been the location of industrial operations since 1942 when it was developed by the U.S. government as a magnesium plant to support World War II operations. Following the war, this area continued to be used for industrial activities, including production of perchlorate, boron, and manganese compounds. Former industrial and waste management activities conducted at the NERT On-Site Study Area, as well as those conducted at adjacent properties, resulted in contamination of environmental media, including soil, groundwater, and surface water. The Endeavour (formerly PEPCON/AMPAC) site has also released perchlorate to groundwater and operates a treatment system to the west of the NERT site. Data indicate that between 16 to 19 pounds per day of perchlorate enter the Athens Drainage Channel downgradient of the Endeavour plume (Endeavour 2018).

Since 1979, the NERT On-Site Study Area has been the subject of numerous investigations and removal actions. Soil removal actions were conducted in 2010 and 2011 from the NERT On-Site Study Area to minimize potential health risks from impacted soil. Additional soil removal was performed in 2013 when the eastern end of the Beta Ditch was excavated. The soil removal activities and post-removal conditions are described in detail in the *Revised Interim Soil Removal Action Completion Report* (ENVIRON 2012, ENVIRON, 2014b). On-site and off-site groundwater removal actions include the installation of the groundwater extraction and treatment system, designed to capture and treat perchlorate and hexavalent chromium in shallow groundwater.

In Spring 1999, SNWA hydrologists discovered a seep (“the original seep”) discharging to the LVW at approximately 400 gallons per minute. Perchlorate concentrations in the seep exceeded 100,000 µg/L in 1999. The results of the seep samples indicated that a significant mass flux of perchlorate was entering the LVW. Kerr McGee subsequently implemented a capture system (consisting of a dam and sump structure) at the seep in November 1999 to reduce the migration of perchlorate to the LVW (ENSR 2005). The operation of the Seep Capture System and Seep Well Field has contained and treated a substantial mass of perchlorate that otherwise would have entered the LVW. To support the Downgradient Study Area investigation, surface water samples were collected from several locations in and near the LVW in May 2016. As part of that sampling program, a sample was collected from the sump immediately downgradient of the seep discovered by SNWA in 1999. The capture system that was subsequently implemented has significantly reduced both the perchlorate concentration and volume of groundwater discharging at the location. The 2016 sample had a perchlorate concentration of 85 µg/L, three orders of magnitude lower than samples collected in 1999. The seep was reported to be active only seasonally, with the small volume of flow terminating a short distance downstream in a topographic low where it seeps back into the ground and/or is evaporated into the air upgradient of its historic confluence with LVW. The seep was active during the May 2016 sampling, with discharge through the sump visible (AECOM 2016). In the fall of 2017 there was no longer visible evidence of the seep as it was completely filled in during activities associated with the construction of Sunrise Mountain Weir.

4.3 Perchlorate Patterns and Suspected Discharges with Phase II Updates

During the May 2016 sampling program (AECOM 2016) an attempt was made to locate the seeps that were sampled by Kerr McGee in 2000. Seeps that were successfully located, accessible, and flowing were subsequently sampled. It is surmised that weir construction, onshore riparian zone restoration, flooding and vegetative growth during intervening years, and the ongoing regional drought conditions may have affected the occurrence and, if present, the flow from the previously identified seeps. Because the installation of the weirs likely altered the seeps, attempts were made to relocate the seeps and, if possible, sample them. Of the 18 historic seep locations, only three (KM-45, KM-67 and KM-71) were located in May 2016. All other historic seeps

may have been buried by weir and bank construction, submerged by the expanded stream channel and associated sediments, temporarily dried up under the drought conditions of the time, or obscured by dense vegetation.

Two seeps (KM-67 and KM-71) were sampled in May 2016. The concentrations of perchlorate in the seeps were lower in 2016 than in 2000. At KM-71, the perchlorate concentration in 2016 (1.4 $\mu\text{g/L}$) was substantially lower than in 2000 (3,400 $\mu\text{g/L}$). In 2000, KM-71 was located downgradient of the current location of the Sunrise Mountain Weir. The seep was located in 2016 immediately upstream of the KM-71 location in a backwater channel. The seep that was sampled in May 2016 immediately upstream of the KM-71 location could be a different seep than the seep sampled in 2000. At KM-67, located near the Three Kids Weir, the perchlorate concentration (1,500 $\mu\text{g/L}$) in 2016 was slightly lower than in 2000 (2,100 $\mu\text{g/L}$). Construction of Three Kids Weir was completed in July 2015. A riprap weir referred to as "Demonstration Weir" was constructed near this location in 1999. The Demonstration Weir was relocated and rebuilt in 2007 and was eventually dismantled in 2013 and replaced by the Three Kids Weir (LVW Coordination Committee 2016). Although a weir was in place in this location during both the 2000 and 2016 sampling events, it is not clear to what extent, if any, each weir affected the stream flow and sample results during the 2000 and 2016 sampling events.

During the January and February 2017 surface water sampling events, sampling locations and methodology were designed to further refine the understanding of where perchlorate enters the LVW, and what impact the varying flow regime has on perchlorate concentrations in surface water samples. Known and suspected regions of perchlorate discharge were selected to help pinpoint loci of discharge and where, along transects, that discharge may be occurring. By characterizing the flow regime during sample collection, estimates of actual perchlorate flux were calculated to represent flow-weighted sampling results.

Following water-temperature studies in the LVW in early 2018, a number of new and previously sampled surface water locations were selected for sampling in May 2018 (**Figures 21 and 22**). Locations were selected to target new potential locations of groundwater inputs identified as temperature anomalies during thermal infrared and fiber optic distributed temperature sensing surveys, to refine the understanding of perchlorate contributions in areas where perchlorate flux into the LVW were suspected, and to resample previous locations to evaluate changes over time. The Phase I groundwater monitoring wells were installed in July 2018 to provide additional groundwater data along LVW.

The results of the surface water and seep sampling conducted by Kerr McGee in 2000 and by AECOM in May 2016, December 2016, January and February 2017, and May 2018 indicate that there may be perchlorate discharge to the LVW, in the areas between the Upper Narrows Weir and Sunrise Mountain Weir (under construction during the 2018 sampling event), between the Historic Lateral Weir Expansion (under construction in 2018) and the Calico Ridge Weir. The results of these sampling events indicate that there is evidence of perchlorate discharge to the LVW particularly downstream of the Calico Ridge Weir, between the Lower Narrows and Homestead Weirs, and downstream of the Three Kids Weir (**Figures 21 and 22**).

Surface water sampling results indicate the potential for small, cumulative gains of perchlorate from the region near the Historic Lateral Weir Expansion down to the Three Kids Weir. The slow, relatively minor seepage of groundwater may be contributing to a slow general increase in perchlorate load. Larger gains observed in surface water sample results are more likely to be attributed to more focused discharge of groundwater with higher concentrations of perchlorate. These higher concentration discharges were detected near the toe of the Upper Narrows Weir, near the toe of the Calico Ridge Weir, and near the toe of the Three Kids Weir.

Surface water data were collected outside of the Downgradient Study Area between Rainbow Gardens Weir and the Lake Las Vegas Outlet at LW0.9. These surface water data indicate that no significant additional sources of perchlorate were identified along this section of the LVW (AECOM 2019).

In July 2018, 26 wells along the LVW were sampled. These wells were sampled to provide additional data on groundwater impacts in the Downgradient Study Area. Surface water elevations were compared to groundwater

elevations to evaluate where groundwater was likely entering LVW. As shown on **Figure 13**, groundwater elevations appeared to be equal to or higher than surface water elevations between Bostick Weir and Calico Ridge Weir, below Calico Ridge Weir, below Homestead Weir, and below Three Kids Weir indicating potential groundwater discharge to the LVW in these areas. In July 2019, 40 wells along the LVW were sampled to further investigate groundwater impacts and the potential groundwater surface water interaction. At this time, as shown on **Figure 14**, groundwater elevations appeared to be equal to or higher than surface water elevations between Bostick Weir and Calico Ridge Weir, below Calico Ridge Weir, below Lower Narrows Weir, below Homestead Weir, and below Three Kids Weir indicating potential groundwater discharge to the LVW in these areas.

Perchlorate flux into LVW is the measurement of the amount of perchlorate discharging into LVW per unit of time, for example 5 lb/d. Total perchlorate load in LVW is the amount of perchlorate estimated that is carried by the surface water in LVW at a specific location, for example 29 lb/d at Lower Narrows Weir. Perchlorate load and flux at various reaches along the LVW are discussed in detail below and presented on **Figure 20**. NERT also collects surface water samples on a monthly basis as part of its ongoing RI surface water sampling program. Perchlorate load is reported from these sampling events in the Semi-Annual Remedial Performance Memorandum and Annual Remedial Performance Report. Given the variances in sample collection dates and sample locations, variances in reported perchlorate load in the LVW are to be expected. The following discussion focuses on 2018 data and the 2018 cross section (**Figure 13**) because both surface water and groundwater were sampled at that time.

Perchlorate load in the LVW was estimated from transect and discrete sampling during daily low flow periods. During January to June 2018 dewatering and treatment was conducted at Sunrise Mountain Weir and Historic Lateral Weir construction areas. For this reason, the perchlorate load identified may not be representative of conditions when dewatering is not occurring. In addition, groundwater levels within the area of dewatering would not be representative of conditions when dewatering is not occurring.

Upper Narrows to Pabco Road Weir: Based on 2018 surface water samples, the perchlorate load above Pabco Road Weir was between 1 and 2 lb/d (AECOM 2019d). In 2018, the groundwater concentrations in this area varied from not detected (WMW6.15S1) to 1,600 µg/L (COH2B1). Surface water data was not collected in 2019.

Pabco Road Weir to Bostick Weir: Based on 2018 surface water samples, the estimated perchlorate load in LVW begins to increase slowly near the Historic Lateral weir. In 2018 the groundwater concentrations in this area varied from 3.9 µg/L (WMW5.7N) to 6,000 µg/L (NERT5.11S1). In 2019, the groundwater concentrations in this area varied from 13 µg/L (NERT5.49S1) to 4,000 µg/L (NERTWMW5.58S).

Bostick Weir to Calico Ridge Weir: Based on 2018 surface water samples, the estimated perchlorate load in the LVW increased to 5.3 lb/d below the Bostick Weir, and 7.0 lb/d as the water entered the Calico Ridge Weir. In 2018, the groundwater concentrations in this area varied from 930 µg/L (WMW4.9S) to 3,900 µg/L (NERT4.93S1). In 2019, the groundwater concentrations in this area varied from 140 µg/L (NERT4.70N1) to 3,400 µg/L (NERT4.71S1).

Calico Ridge Weir to Lower Narrows Weir: Based on 2018 surface water samples, the estimated perchlorate load in LVW increased from 7 lb/d to 29 lb/d by the time it reaches Lower Narrows Weir. Most of the 22 lb/d perchlorate flux is suspected to come from groundwater discharge near the toe of the Calico Ridge Weir. In 2018, the groundwater concentration in this area was available from only one well (NERT4.51S1) and was 3,100 µg/L. In 2019, the groundwater concentrations in this area varied from 470 µg/L (NERT4.65N1) to 3,200 µg/L (NERT4.64S1).

Lower Narrows Weir to Homestead Weir: Based on 2018 surface water samples, the estimated perchlorate load in LVW increased slightly. In 2018, the groundwater concentrations in this area varied from 1,400 µg/L (NERT4.38N1) to 2,200 µg/L (NERT4.21N1). In 2019, the groundwater concentrations in this area varied from 1,400 µg/L (LNDMW1) to 1,800 µg/L (NERT4.38N1).

Homestead Weir to Three Kids Weirs: Based on 2018 surface water samples, the estimated perchlorate load in LVW was 32 to 33 lb/d. This represents a gain of 3 lb/d from the Lower Narrows Weir to the Three Kids Weir. In 2018, the groundwater concentrations in this area varied from 320 µg/L (WMW3.5N) to 1,100 µg/L (NERT3.80S1). In 2019, the groundwater concentrations in this area varied from not detected (<4.8 µg/L) (NERT3.98S1) to 1,200 µg/L (NERT3.63S1). Based on the 2019 perchlorate concentration in groundwater from well NERT3.98S1 (not detected or <4.8 µg/L), the groundwater adjacent to the south side of Homestead Weir is not impacted.

Three Kids Weir to Rainbow Gardens Weir: Based on 2018 surface water samples, the estimated perchlorate load in LVW was 40 to 56 lb/d. Downstream of the Three Kids Weir, discharge from the KM-67 seep enters on the south bank and begins to mix in with the waters of the LVW. In 2018, the groundwater concentrations in this area were available from only one well (WMW3.5S) and the perchlorate concentration was 1,500 µg/L. In 2019, the groundwater concentrations in this area varied from not detected (<4.8 µg/L) (NERT3.35S1 and NERT 3.40S1) to 1,600 µg/L (NERT3.60S1).

4.4 Additional Phase II DGI Refinements to CSM

The 2019 Phase II Groundwater Quality Assessment also provided information to refine the CSM with regard to faulting, groundwater elevation changes over time, perchlorate concentration changes over time, and groundwater flow velocity.

Faulting: Based on the different geology and water levels, a fault may be present between observation wells NERT3.58S1B and NERT3.58S1D. Similarly, based on different geology and significantly different water levels a fault may be present between monitoring wells NERT3.40S1 and NERT3.35S1. The LVW Bioremediation Pilot Test investigation along Transect 1b, along the south side of the LVW between Bostick Weir, and Calico Ridge Weir, has identified a fault zone in the vicinity of Lower Narrows Weir.

Perchlorate Concentration Changes Between 2016 and 2019: Review of the 2016 to 2019 perchlorate concentration data show that, in general, the groundwater concentrations are stable or declining in most wells (**Table 10**). Comparisons of perchlorate concentrations in groundwater from the 26 wells sampled in July 2018 and July 2019 indicate that nine wells had concentrations that were within 10% of each other, five wells had concentrations that were 21 to 80% of each other, and three wells had concentrations that decreased over 200% (**Table 12**).

Groundwater/Surface Water Interface: Temperature and TDS data were used to identify the groundwater/surface water interface. Temperature data was reviewed from transducers placed in wells along the LVW. In general, groundwater temperatures did not vary more than 3 °F. TDS concentrations in groundwater from wells along LVW, that are not suspected to be influenced by surface water mixing, average 4,700 mg/kg. Based on TDS concentrations below 3,000 mg/L and temperature changes in groundwater as recorded by transducers over 5 °F, the groundwater/surface water interface along LVW has been identified between 0 to 885 feet (at well WMW4.9N) from the banks of the channel (**Figure 23**).

Groundwater Seepage Velocities: Slug tests indicated average seepage velocities of 136 ft/d to 452 ft/d. Dilution tests indicated seepage velocities of 9.6 ft/d to 55.2 ft/d. The pathway from groundwater to the LVW was confirmed by tracer testing in two injection wells (NERT3.58S1 and NERT 3.60S1) at Three Kids Weir. Seepage velocities based on dye travel time from the injection wells to LVW ranged from 16 to 43 ft/d in this area. Of interest was that dye was not detected in the Three Kids Weir area in observation wells ranging from 5 to 30 feet from the injection wells indicating that dispersion of dye and, therefore, mixing of groundwater may be minimal (**Figures 9 and 10**). For the dye tracer test at Calico Ridge Weir (Well NERT4.64S1), dye was not detected in the LVW, but it was detected within one hour in an observation well 40 feet downgradient of the injection well (NERT4.64S1D) (**Figure 11**). Dye was not detected in observation well NERT4.64B located 15 feet from the injection well and between the injection well and NERT4.64S1D (**Figure 11**). These data suggest that dispersion

of dye and, therefore, mixing of groundwater are minimal, and that groundwater may flow in a relatively narrow circuitous path at a higher rate than the average velocity of groundwater in the Calico Ridge Weir area.

5.0 Conclusions and Recommendations

5.1 Conclusions

The following summarizes the conclusions of this Phase II DGI organized by the data gaps identified in Section 1.0. **Table 13** provides a summary of the investigation objectives, achievement of objectives and potential future work.

1. *Where are the high concentration (1,000 µg/L or higher) perchlorate-impacted groundwater plumes along the north and south sides of the LVW?*

Based on groundwater samples collected in July 2019, perchlorate concentrations of 1,000 µg/L or higher are present along the south side of the LVW except at monitoring wells NERT5.49S1 (13 µg/L) east of Historic Lateral Weir Expansion Weir, WMW4.9S (850 µg/L) between Bostick Weir and Calico Ridge Weir, and MW-20 (57 µg/L) and MW-25 (13 µg/L) at the Henderson Landfill site (**Figure 15**). The highest concentration of 4,000 µg/L was detected at WMW5.58S south of LVW between Pabco Weir and Historic Lateral Weir Expansion. As most monitoring wells are greater than 500 feet apart, additional monitoring wells would add refinement to understanding the high concentration (1,000 µg/L or higher) plumes.

There is limited data for the north bank of the LVW; however, based on the 12 locations sampled on the north, perchlorate concentrations of 1,000 µg/L or higher are present in three wells (NERT4.38N1, NERT4.21N1, LNDMW2) between Lower Narrows Weir and Homestead Weir (**Figure 15**). Along the north side of the LVW additional monitoring wells are needed to define perchlorate concentrations of 1,000 µg/L in groundwater in the areas between monitoring wells WMW5.7N and NERT4.71N1 (east of Historic Lateral Weir Expansion Weir to west of Bostick Weir) and between monitoring wells LNDMW2 and WMW3.5N (east of Homestead Weir to Three Kids Weir)

The eastern limits of perchlorate impacts in groundwater along the south side of the LVW are bounded by well NERT3.35S1 and NERT3.40S1 (**Figure 15**).

2. *Why are there noticeable differences in perchlorate concentrations in groundwater over relatively short distances?*

The groundwater monitoring data indicate that the perchlorate concentrations in groundwater are spatially highly variable. Since perchlorate is highly mobile in groundwater, this high variability in concentrations indicates that there are discrete flow zones within the alluvial sediments that are not in close communication. The lower perchlorate concentration of 850 µg/L at WMW4.9S is surrounded by impacted groundwater adjacent to nearby wells MW-13, NERT4.71S1, NERT4.71S2, and NERT4.93S1 with concentrations from 1,800 µg/L to 3,400 µg/L (**Figure 14**). Well WMW4.9S is screened over 30 feet while the surrounding wells are screened over 10-foot to 20-foot intervals. All of these wells are screened in gravelly sand to sand strata. One factor that may be contributing to the lower concentration may be related to the longer screened interval of well WMW4.9S. In addition, well WMW4.9S exhibits temperature variations as recorded by transducers greater than 5 °F which may indicate surface water mixing with groundwater that could also contribute to lower perchlorate concentrations.

Based on the fact that dye was injected at two wells (NERT3.58S1 and NERT3.60S1) but not detected in groundwater at observation wells located 5 to 30 feet away although it was detected in the LVW over 200 feet away from the injection point it is concluded that the dye followed a preferential pathway that bypassed the observation wells.

Based on the fact that dye from injection well NERT4.64S1 was detected in groundwater within 50 minutes at observation well NERT4.64S1D, which was located approximately 40 feet downgradient, and the dye concentration peaked within two hours of detection, it is concluded that the dye traveled about 0.8 feet per minute or 1,152 ft/d. Of interest is that no dye was detected from groundwater in well NERT4.64S1B, which is located 15 feet from the injection well and is located between the injection well and the observation well where the dye was detected. This further supports the conclusion that preferential pathways are present that do not necessarily conform to the generally observed groundwater gradient.

3. *How deep are the high concentration perchlorate-impacted groundwater plumes?*

No Phase II wells were installed to address this issue because the LVW Bioremediation Pilot Study has developed significant data to address this data gap.

4. *Do the high-concentration perchlorate plumes follow distinct water-bearing zones within the alluvium or bedrock formations?*

Distinct water-bearing zones were identified in the Phase II individual boring logs; however, distinct water-bearing zones were not identified as being continuous between nearby boreholes that had boring logs available for comparison. The NMR logs also identified discrete water-bearing zones varying in thickness from 1 to 9 feet. Cluster wells installed for the LVW Bioremediation Pilot Study have discrete screened intervals within the alluvial deposits and available data support the presence of discrete water-bearing zones. The cluster wells exhibit different water levels and different constituent concentrations indicating that the groundwater monitored in adjacent wells at depths of less than 90 feet bgs is from distinct and separate water-bearing zones.

5. *Where does faulting affect the movement of high-concentration perchlorate-impacted groundwater?*

Based on the data from the LVW Bioremediation Pilot Study, faulting affects the movement of groundwater between Calico Ridge Weir and Lower Narrows weir. Based on the geotechnical studies at Three Kids Weir, the observed seeps and the Phase I and II assessments faulting affects groundwater movement at Three Kids Weir and between Three Kids and Rainbow Gardens Weir.

6. *Along the LVW, does groundwater flow generally in the same direction as the surface water?*

The groundwater flow direction adjacent to LVW appears to flow generally to the east, similar to the surface water flow direction. However, as noted during the tracer test, local groundwater flow directions are not uniform and are much more variable than indicated by the overall flow directions determined from the potentiometric surface map.

7. *Where does perchlorate-impacted groundwater discharge to the LVW?*

As shown on **Figure 14** there are five locations along the LVW downstream of Pabco Road Weir (Bostick Weir, Calico Ridge Weir, Lower Narrows Weir, Homestead Weir and Three Kids Weir) where the groundwater elevation is equal to or higher than the elevation of the surface water in the LVW. These conditions allow for potential discharge of groundwater into the LVW because of the higher potentiometric surface of groundwater. Based on the potentiometric surface, surface water sampling, and dye tracer testing, perchlorate-impacted groundwater is discharging to the LVW downgradient of Calico Ridge Weir and Three Kids Weir. At three Kids Weir there are also a spring (K-67) that discharges perchlorate impacted water. Based on the perchlorate concentration in groundwater from NERT3.98S1 (<4.8 µg/L) near Homestead Weir there does not appear to be a significant source of perchlorate in this area (**Figure 15**). Based on the lack of warm water temperature anomalies, there also does not appear to be groundwater discharge to the LVW in this area. This is consistent with the surface

water perchlorate data that indicates that there is not significant discharge of perchlorate-impacted groundwater to the LVW near Homestead Weir.

8. *Where is the groundwater/surface water interface and how far is it from the LVW?*

The groundwater/surface water interface is dynamic. As indicated by 2016 to 2019 TDS concentrations and groundwater temperature changes (as recorded by transducers) of 5 °F or more, the groundwater/surface water interface is immediately adjacent to LVW in some areas and up to 885 feet away at well WMW4.9N (**Figure 23**). Low TDS concentrations (less than 3,000 parts per million) have been detected in groundwater from wells NERT4.64N1, NERT4.65N1, NERT4.70N1, NERT4.71N1, NERT5.49S1, WMW4.9N, WMW4.9S, WMW5.5S, WMW5.58S, and WMW5.7N from 2016 to 2019.

9. *Is there an area of known or suspected perchlorate flux of sufficient magnitude where an interim remedial action would be appropriate?*

Given that perchlorate concentrations in Lake Mead are well below NDEP's interim action level and that NERT is completing the LVW Bioremediation Pilot Study between Bostick and Homestead Weirs (an area with elevated perchlorate mass flux from groundwater to surface water), AECOM does not recommend implementation of additional interim or emergency remedial actions at this time.

10. *Is perchlorate-impacted groundwater bypassing the seep well field on its eastern side in the vicinity of monitoring well COH2B1?*

Concentrations of perchlorate in groundwater from well COH2B1 were 1,800 µg/L in July 2019. This indicates that groundwater that is significantly impacted by perchlorate is present in this area. The source of the perchlorate in this well may be from the Endeavour plume (Ramboll 2018 and Endeavour 2018); however, the source of perchlorate was not investigated in the Phase II Groundwater Quality Assessment. NERT's Annual Remedial Performance Report indicates that the capture zone efficiency of the Seep Well Field is 97.8% within the shallow water bearing zone.

11. *Do high volumes of low-concentration perchlorate-impacted groundwater provide more flux to the LVW than low volumes of high-concentration perchlorate-impacted groundwater?*

Based on the 2016 to 2019 groundwater assessments and dye tracer tests it appears that the fluxes adjacent to Calico Weir and Three Kids Weir are likely composed of groundwater with high-concentration perchlorate. The groundwater assessments, however, did not provide data to quantify the high-concentration contributions versus low-concentration contributions.

12. *Do concentrations of perchlorate in groundwater fluctuate over time, seasonally, or after a rain event?*

Review of the 2016 to 2019 perchlorate concentration data show that, in general, the groundwater concentrations are stable or declining in most wells (**Table 10**). The Phase I and Phase II groundwater sampling was not coordinated to specifically observe seasonal fluctuations or rain events.

5.2 Recommendations

The Phase II Groundwater Quality Assessment was focused on refining the understanding of groundwater impacts at Calico Ridge Weir, Homestead Weir and Three Kids Weir. Based on the results of the 2016, 2017, and 2018 surface water investigations, the 2016 groundwater sampling, the 2017 to 2019 transducer data, and the Phase I and Phase II groundwater assessments, the following specific areas along the LVW still need additional investigation (**Table 13**).

1. Additional groundwater assessment should be conducted north of the LVW if definition of the extent of perchlorate impacts down to the BCL is required in that area.
2. Nested groundwater monitoring wells on the south side of the LVW adjacent to the Three Kids Weir are needed to better understand the geology, hydrology, and contaminant transport in this area.
3. Continued transducer measurements of the 43 transducer wells and periodic groundwater quality monitoring of the 44 groundwater monitoring wells listed on **Table 11** in conjunction with other wells in Operable Unit 3 should be considered to gain a better understanding of the behavior of the perchlorate plume over various seasons.

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Tables

Table 1
Rationale and Well Completion Details for Phase II Groundwater Monitoring Wells
 NERT RI - Downgradient Study Area
 Henderson, Nevada

Phase II Well	Boring Depth in feet bgs ⁽¹⁾	Well Depth in feet bgs	Well Diameter ⁽²⁾	Depth to water	Well Screen in feet bgs ⁽³⁾	Sand Pack Interval in feet bgs ⁽⁴⁾	
Groundwater Monitoring Wells							Rationale Based on Perchlorate Concentrations Detected in Groundwater and Surface Water⁽⁵⁾
NERT3.35S1	57	57	4"	19.6	35 - 55	33 - 57	Determine concentrations about 280 feet east northeast of Phase II Well NERT3.40S1 on the south side of LVW to further characterize perchlorate impacts in groundwater between Three Kids weir and Rainbow Gardens Weir. This well may also provide additional information on faulting in the area. Surface water concentrations are 89 to 96 µg/L.
NERT3.40S1	65	57	4"	38.11	35 - 55	33 - 57	Determine concentrations south of the warm anomaly that was identified 180 feet east northeast of transect T3.5. Surface water concentrations are 90 µg/L in this area.
NERT3.58N1	62	62	4"	39.41	40 - 60	38 - 62	Determine concentrations about 200 feet northeast of Phase II Well NERT3.60N1 on the north side of LVW. Surface water concentrations are 200 µg/L.
NERT3.58S1	70	55.5	4"	34.95	35 - 55	33 - 56	Determine concentrations upgradient and on the south side of Three Kids Weir, west southwest of WMW3.5S (total well depth of 59.8 feet bgs at 1,500 µg/L) on the south side of LVW to further characterize perchlorate impacts in groundwater near the former K67 seep. To also evaluate groundwater/surface water interactions in this area. This well may also provide additional data regarding faulting in the area. Surface water concentrations are 53 and 980 µg/L. The concentration in the channel near the former seep is 1600 µg/L.
NERT3.60N1	90	52.5	4"	38.65	32 - 52	30 - 52.5	Determine concentrations on the south side of Homestead Weir to obtain additional data on perchlorate impacts between wells LVWPS-MW216 (total depth 20.6 feet bgs and 1,200 µg/L) and NERT3.80S1 (total well depth 20 feet bgs and 1,100 µg/L). Surface water concentrations are 44 µg/L.
NERT3.60S1	90	56	4"	38.65	35 - 55	33 - 56	Determine concentrations upgradient and on the south side of Three Kids Weir, south-southwest of WMW3.5S (total well depth of 59.8 feet bgs at 1,500 µg/L) on the south side of LVW to further characterize perchlorate impacts in groundwater. This well may also provide additional data regarding faulting in the area. Surface water concentrations are 32 and 36 µg/L.
NERT3.63S1	60	35.5	4'	18.58	15 - 35	13 - 36	Determine concentrations east-northeast of well WMW3.5N (56 feet bgs at 320 µg/L) on the north side of LVW adjacent to Three Kids weir. Surface water concentrations are 200 µg/L.
NERT3.98S1	55	37.5	4"	10.36	15 - 35	13 - 37	Determine concentrations on the north side of Calico Ridge Weir to obtain additional data on perchlorate impacts in the area. Surface water concentrations are 93 µg/L.
NERT4.64N1	90	47.5	4"	23.03	25 - 45	23 - 47.5	Determine concentrations on the north side of Calico Ridge Weir between WMW4.9N (total well depth of 53 feet bgs at 680 µg/L) and well NERT4.38.N1 (total well depth 40.9 bgs and 1,400 µg/L) to obtain additional data on perchlorate impacts in the area. Surface water concentrations are 31 µg/L.
NERT4.64S1	56	55.5	4"	27.10	35 - 55	33 - 56	Determine concentrations on the north side and upgradient of Calico Ridge Weir to obtain additional data on perchlorate impacts in the area.
NERT4.65N1	90	47	4"	24.21	25 - 45	23 - 47	Determine perchlorate concentrations north of LVW and about 450 feet west and upgradient of Calico Ridge weir and south of well WMW4.9N (total well depth of 53 feet bgs and 680 µg/L).

Table 1
Rationale and Well Completion Details for Phase II Groundwater Monitoring Wells
 NERT RI - Downgradient Study Area
 Henderson, Nevada

Phase II Well	Boring Depth in feet bgs ⁽¹⁾	Well Depth in feet bgs	Well Diameter ⁽²⁾	Depth to water	Well Screen in feet bgs ⁽³⁾	Sand Pack Interval in feet bgs ⁽⁴⁾	
NERT4.70N1	82	47	4"	27.87	25 - 45	23 - 47	Determine concentrations southeast of Phase II Well NERT3.60S1 on the south side of LVW to further characterize perchlorate impacts. This well may also provide additional information on faulting in the area. Surface water concentrations are 53 and 980 µg/L. The concentration in the channel by the former seep is 1600 µg/L.
NERT4.71N1	90	47	4"	27.87	25 - 45	23 - 47	Determine perchlorate concentrations between LVWPS-MW210A (total well depth of 55 feet bgs and 4,400 µg/L) and LVWPS-MM219 to further characterize this area of perchlorate impact south of Calico Ridge Weir. To evaluate surface water/groundwater interactions in this area. Surface water concentrations are 1,500 to 3,100 µg/L.
NERT4.71S2	55	55	4"	27.26	34.5 - 54.5	33 - 55	Determine perchlorate concentrations between LVWPS-205B (total well depth of 84 feet and 2,800 µg/L) and LVWPS-MW210A (total well depth of 55 feet bgs and 4,400 µg/L) to further characterize this area of perchlorate impact south and about 400 feet upstream of Calico Ridge Weir. To evaluate groundwater concentrations in this area.
Observation Wells							Rational Based on Expected Hydraulic Conductivity
3 wells around NERT3.58S1	50 - 55	45	2"	34.58 - 35.26	25-45 & 35-55	19 - 55	The observation wells were placed 5 to 13 feet cross gradient and down gradient from the injection well to potentially intercept dye as it dispersed from the injection well.
4 wells around NERT3.60S1	55	55	2"	38.71 - 43.74	35-55	33 - 55	The observation wells were placed 5 to 30 feet cross gradient and down gradient from the injection well to potentially intercept dye as it dispersed from the injection well.
4 wells around NERT4.64S1	55	55	2"	26.91 - 27.14	35 - 55	33 - 55	The observation wells were placed 7.5 to 40 feet cross gradient and down gradient from the injection well to potentially intercept dye as it dispersed from the injection well.
<p>Notes:</p> <p>⁽¹⁾ Borehole depth is similar to other NERT off site RI wells to provide stratigraphic information at comparable depths.</p> <p>⁽²⁾ The borehole is 8 inches in diameter and sealed with bentonite from the total depth to the planned well screen.</p> <p>⁽³⁾ Well casing is schedule 40 PVC and well screen slot size is 0.02 inches</p> <p>⁽⁴⁾ Sand Pack size is No. 3.</p> <p>⁽⁵⁾ Surface water concentrations are from May 2018 and groundwater concentrations are from July 2018</p> <p>µg/L: micrograms per liter bgs: below ground surface</p> <p>Red text shows where depths or well identifications were changed from the work plan</p>							

Table 2
Phase II Groundwater Monitoring Well Installation Details
 NERT RI - Downgradient Study Area
 Henderson, Nevada

Well ID	Drilling Completion Date	Well Installation					Well Development		
		Pilot Boring Depth ^{1.} (feet bgs)	Depth to Groundwater (feet bgs, TOC)	Well Completion Depth (feet bgs)	Well Screen ^{2.} (feet bgs)	Sand Pack Interval ^{4.} (feet bgs)	Date Developed	Depth to Groundwater (feet bgs)	Well Depth after Development (feet bgs)
NERT3.35S1	4/24/2019	57	19.6	55.5	35 - 55	33 - 57	4/29/2019	15.83	18.31
NERT3.40S1	4/16/2019	65	38.11	55.5	35 - 55	33 - 57	4/29/2019	38.11	38.80
NERT3.58N1	4/23/2019	62	39.41	62	40 - 60	38 - 62	5/3/2019	39.41	39.65
NERT3.58S1	3/28/2019	70	34.95	55.5	35 - 55	33 - 56	4/10/2019	34.86	34.97
NERT3.58S1A	4/24/2019	50	35.25	45	25 - 45 ^{3.}	23 - 45	4/30/2019	34.61	34.65
NERT3.58S1B	4/24/2019	50	34.56	45	25 - 45 ^{3.}	23 - 50	4/30/2019	33.80	33.85
NERT3.58S1C	4/24/2019	55	34.90	55	35 - 55 ^{3.}	33 - 55	4/30/2019	34.30	34.34
NERT3.58S1D	4/24/2019	Well not installed. Hit bedrock at 36 feet bgs and borehole was dry.							
NERT3.60N1	4/9/2019	90	38.02	52.5	32 - 52	30 - 52.5	5/3/2019	37.95	38.05
NERT3.60S1	3/27/2019	90	38.65	56	35 - 55	33 - 56	4/9/2019	38.62	38.60
NERT3.60S1A	4/23/2019	55	43.84	55	35 - 55 ^{3.}	33 - 55	4/30/2019	38.35	38.40
NERT3.60S1B	4/22/2019	55	38.73	55	35 - 55 ^{3.}	33 - 55	4/30/2019	38.15	38.16
NERT3.60S1C	4/23/2019	55	39.14	55	35 - 55 ^{3.}	33 - 55	5/1/2019	38.90	38.92
NERT3.60S1D	4/22/2019	55	38.71	55	35 - 55 ^{3.}	33 - 55	5/1/2019	38.54	38.60
NERT3.63S1	4/17/2019	60	18.58	35.5	15 - 35	13 - 36	5/1/2019	18.45	18.45
NERT3.98S1	4/2/2019	55	10.36	37.5	15 - 35	13 - 37	4/9/2019	10.43	19.01
NERT4.64N1	4/3/2019	90	23.03	47.5	25 - 45	23 - 47.5	4/10/2019	23.03	23.32
NERT4.64S1	3/25/2019	56	27.10	55.5	35 - 55	33 - 56	4/8/2019	27.01	27.09
NERT4.64S1A	4/26/2019	55	26.91	55	35 - 55 ^{3.}	33 - 55	5/2/2019	26.75	26.98
NERT4.64S1B	4/26/2019	55	26.78	55	35 - 55 ^{3.}	33 - 55	5/2/2019	26.61	26.75
NERT4.64S1C	4/26/2019	55	27.14	55	35 - 55 ^{3.}	33 - 55	5/2/2019	27.02	27.12
NERT4.64S1D	4/25/2019	55	26.91	55	35 - 55 ^{3.}	33 - 55	5/1/2019	26.68	27.00
NERT4.65N1	4/10/2019	90	24.21	45.5	25 - 45	23 - 47	5/3/2019	24.21	24.25
NERT4.70N1	4/11/2019	82	24.95	45.5	25 - 45	23 - 47	5/2/2019	24.85	25.07
NERT4.71N1	4/4/2019	90	27.89	45.5	25 - 45	22.5 - 47.5	4/10/2019	27.86	27.86
NERT4.71S2	4/1/2019	55	27.26	55	34.5 - 54.5	33 - 55	4/8/2019	27.30	27.51

Notes:

1. The borehole was 8 inches in diameter and sealed with bentonite from the total depth to the bottom of the well screen.
 2. Well casing is 4-inch schedule 40 PVC and well screen slot size is 0.02 inches unless noted otherwise
 3. Well casing is 2-inch schedule 40 PVC and well screen slot size is 0.02 inches.
 4. Sand pack is Monterey No. 3 sand.
- Red:** Encountered refusal at specified depth. Final depth is a deviation from the Data Gap Investigation Plan Phase II Groundwater Assessment.
 bgs - below ground surface

Table 3
Soil Physical Properties
 NERT RI - Downgradient Study Area
 Henderson, Nevada

Sample ID	Depth below ground in feet	Sample Orientation ¹	Moisture Content		Dry Bulk Density	Porosity		Total Organic Carbon	Fractional Organic Carbon
			ASTM D2216		ASTM D2937	API RP40		Walkley-Black	
			%	ml/ml		Total ²	Air Filled ³		
					g/cc	%Vb ⁴	%Vb ⁴	mg/kg	g/g
PT-NERT3.60S1-68.2-68.5	68.2-68.5	V	16.9	0.314	1.86	31.6	0.171	15200	1.52E-02
PT-NERT3.60S1-86.0-86.3	86.0-86.3	V	14.9	0.291	1.95	29.1	0.015	23800	2.38E-02
PT-NERT3.58S1-60.0-60.3	60.0-63.3	--	6.6	0.122	1.86	30.6	18.4	7000	7.00E-03
PT-NERT4.71S2-29.7-30.0	29.7-30.0	V	23.0	0.394	1.66	38.2	0.035	4900	4.90E-03
PT-NERT3.98S1-9.7-10.0	9.7-10.0	V	11.2	0.224	2.00	25.1	2.66	10700	1.07E-02
PT-NERT3.98S1-17.0-17.3	17.0-17.3	V	11.7	0.225	1.92	27.8	5.25	6200	6.20E-03
PT-NERT4.64N1-37.0-37.3	37.0-37.3	V	18.0	0.322	1.79	33.7	1.47	11100	1.11E-02
PT-NERT4.64N1-68.0-68.3	68.0-68.3	V	11.9	0.239	2.02	25.5	1.57	7600	7.60E-03
PT-NERT4.71N1-58.5-59.0	58.5-59.0	V	32.3	0.468	1.44	46.7	0.023	8400	8.40E-03
PT-NERT3.60N1-26.0-26.4	26.0-26.4	V	28.8	0.435	1.51	43.6	0.038	23400	2.34E-02
PT-NERT3.60N1-42.3-42.5	42.3-42.5	V	15.6	0.281	1.80	34.1	5.97	7100	7.10E-03
PT-NERT4.65N1-53.0-53.3	53.0-53.3	V	34.9	0.485	1.39	48.6	0.086	10200	1.02E-02
PT-NERT3.40S1-47.0-47.3	47.0-47.3	V	10.1	0.207	2.05	23.7	2.99	5000	5.00E-03
PT-NERT3.63S1-49.0-49.4	49.0-49.4	V	22.7	0.379	1.67	39.1	1.13	7100	7.10E-03

Notes:

- (1) Sample Orientation: H = horizontal; V = vertical; (--) = Sample received as loose grains in a bag.
 - (2) Total Porosity = no pore fluids in place; all interconnected pore channels.
 - (3) Air Filled Porosity= pore channels not occupied by pore fluids.
 - (4) Vb = Bulk Volume in cubic centimeters
- ml/ml = milliliter per milliliter
 g/cc = gram per cubic centimeter
 mg/kg = milligram per kilogram
 g/g = gram per gram

Table 4
Summary of Atterberg Limits
 NERT RI - Downgradient Study Area
 Henderson, Nevada

Sample ID	Depth below ground in feet	Atterberg Limits ¹			USCS / Plasticity Chart Symbol (Fines: <#40 Sieve)	USCS Classification Group Symbol Name	USDA/SCS ² Soil Texture Scheme
		Liquid Limit	Plastic Limit	Plasticity Index			
		ASTM D4318					
PT-NERT3.60S1-68.2-68.5	68.2-68.5	32	20	12	CL	Lean Clay	Silty Clay Loam
PT-NERT3.60S1-86.0-86.3	86.0-86.3	27	16	11	CL	Lean Clay	Silty Clay Loam
PT-NERT3.58S1-60.0-60.3	60.0-60.3	31	16	15	CL	Lean Clay with Sand	Silt Loam
PT-NERT4.71S2-29.7-30.0	29.7-30.0	24	15	9	CL	Sandy Lean Clay	Loam
PT-NERT3.98S1-9.7-10.0	9.7-10.0	17	14	3	ML	Sandy Silt	Loam
PT-NERT3.98S1-17.0-17.3	17.0-17.3	15	13	2	ML	SM: Silty Sand	Sandy Loam
PT-NERT4.64N1-37.0-37.3	37.0-37.3	30	18	12	CL	Lean Clay	Silty Clay Loam
PT-NERT4.64N1-68.0-68.3	68.0-68.3	36	17	19	CL	Sandy Lean Clay	Loam
PT-NERT4.71N1-58.5-59.0	58.5-59.0	43	22	21	CL	Lean Clay	Silty Clay
PT-NERT3.60N1-26.0-26.4	26.0-26.4	34	23	11	CL	Lean Clay with Sand	Silty Clay Loam
PT-NERT3.60N1-42.3-42.5	42.3-42.5	31	16	15	CL	Lean Clay	Silty Clay Loam
PT-NERT4.65N1-53.0-53.3	53.0-53.3	51	20	31	CH	Fat Clay with Sand	Silt Loam
PT-NERT3.40S1-47.0-47.3	47.0-47.3	16	14	2	ML	SM: Silty Sand	Loam
PT-NERT3.63S1-49.0-49.4	49.0-49.4	38	21	17	CL	Lean Clay	Silty Clay

Notes:

USCS: Unified Soil Classification System

USDA: US Department of Agriculture

SCS: Soil Conservation Service

(1) Silt assumed as fine fraction for NON-PLASTIC samples.

(2) Sand considered to be >No. 200 sieve for USDA SOIL TEXTURE SCHEME.

Table 5
Summary of Grain Size Analysis
 NERT RI - Downgradient Study Area
 Henderson, Nevada

Sample ID	Depth below ground in feet	Grain Size Description (Mean from Trask)	Median Grain Size (millimeter)	Component Percentages						
				Gravel	Sand Sized			Silt	Clay	Silt & Clay
					Coarse	Medium	Fine			
PT-NERT3.60S1-68.2-68.5	68.2-68.5	Silt	0.0103	0.00	0.00	0.03	7.18	57.14	35.65	92.79
PT-NERT3.60S1-86.0-86.3	86.0-86.3	Silt	0.0120	0.00	0.00	0.00	7.90	56.97	35.13	92.10
PT-NERT3.58S1-60.0-60.3	60.0-60.3	Silt	0.0237	0.00	0.00	0.16	23.93	50.72	25.19	75.91
PT-NERT4.71S2-29.7-30.0	29.7-30.0	Fine Grain Sand	0.0456	0.00	1.64	16.95	24.25	40.08	17.09	57.17
PT-NERT3.98S1-9.7-10.0	9.7-10.0	Silt	0.0366	0.00	0.00	2.62	31.67	45.87	19.84	65.71
PT-NERT3.98S1-17.0-17.3	17.0-17.3	Fine Grain Sand	0.0891	0.00	0.00	2.96	50.54	28.21	18.29	46.50
PT-NERT4.64N1-37.0-37.3	37.0-37.3	Silt	0.0125	0.00	0.00	0.82	6.18	65.20	27.80	93.00
PT-NERT4.64N1-68.0-68.3	68.0-68.3	Silt	0.0313	0.00	0.00	5.99	24.98	47.92	21.10	69.02
PT-NERT4.71N1-58.5-59.0	58.5-59.0	Silt	0.0075	0.00	0.00	0.00	1.95	56.83	41.22	98.05
PT-NERT3.60N1-26.0-26.4	26.0-26.4	Silt	0.0095	0.00	0.00	0.00	19.46	42.76	37.78	80.54
PT-NERT3.60N1-42.3-42.5	42.3-42.5	Silt	0.0093	0.00	0.00	0.00	6.20	55.22	38.58	93.80
PT-NERT4.65N1-53.0-53.3	53.0-53.3	Silt	0.0149	0.00	0.00	2.15	18.14	52.99	26.73	79.71
PT-NERT3.40S1-47.0-47.3	47.0-47.3	Fine Grain Sand	0.0747	0.00	2.48	14.14	33.47	28.28	21.63	49.91
PT-NERT3.63S1-49.0-49.4	49.0-49.4	Silt	0.0047	0.00	0.00	0.00	1.41	43.52	55.07	98.59

Table 6
Transducer Installation Details
 NERT RI - Downgradient Study Area
 Henderson, Nevada

Well ID	Transducer ID	Date & Time of Install	Pre-Installation Depth to Groundwater (feet btoc)	Measured Well Depth (feet btoc)	Water Column (feet)	Estimated Transducer Depth ⁽¹⁾ (feet btoc)	Transducer Depth Below Pre-Installation Depth to Groundwater ⁽²⁾ (feet)	Post-Installation Depth to Groundwater (feet btoc)
NERT3.35S1 ⁽³⁾	SN2103389	6/10/19 1230	16.81	55.18	38.37	36.50	19.69	16.16
		8/12/19 0750	15.60	55.18	39.58	36.50	20.90	15.60
NERT3.40S1 ⁽³⁾	SN2103397	6/10/19 1300	38.23	57.00	18.77	52.10	13.87	38.23
		8/12/19 0805	38.12	54.32	16.2	52.10	13.98	38.12
NERT3.58N1 ⁽³⁾	SN2099333	6/10/19 1435	39.60	60.44	20.84	49.75	10.15	39.6
		7/2/19 0850	39.51	60.46	20.95	55.00	15.49	39.51
NERT3.58S1	SN0042103374	8/12/19 0845	31.85	55.3	23.45	50	18.15	38.58
NERT3.60N1 ⁽³⁾	SN2103394	6/10/19 1400	38.10	51.31	13.21	48.62	10.52	38.09
		7/2/19 0950	38.09	51.37	13.28	45.00	6.91	38.58
NERT3.60S1	SN0042103390	8/12/19 0845	34.85	55.30	20.45	50.00	15.15	34.85
NERT3.63S1 ⁽³⁾	SN2103383	6/10/19 1320	18.71	34.72	16.01	33.62	14.91	18.71
		6/27/19 1050	18.68	34.83	16.15	30.00	11.32	18.68
NERT3.98S1 ⁽³⁾	SN2103375	6/10/19 1405	10.63	34.93	24.30	30.65	20.02	10.61
		6/29/19 1305	10.66	34.93	24.27	30.00	19.34	10.66

Table 6
Transducer Installation Details
 NERT RI - Downgradient Study Area
 Henderson, Nevada

Well ID	Transducer ID	Date & Time of Install	Pre-Installation Depth to Groundwater (feet btoc)	Measured Well Depth (feet btoc)	Water Column (feet)	Estimated Transducer Depth ⁽¹⁾ (feet btoc)	Transducer Depth Below Pre-Installation Depth to Groundwater ⁽²⁾ (feet)	Post-Installation Depth to Groundwater (feet btoc)
NERT4.64N1 ⁽³⁾	SN0042103377	6/10/19 1500	23.19	45.17	21.98	43.05	19.86	23.18
		7/2/19 1350	23.20	45.25	22.05	40.00	16.80	23.20
NERT4.64S1	SN2099355	8/12/19 1245	27.06	55.20	28.14	50.00	22.94	27.06
NERT4.65N1 ⁽³⁾	SN2103021	6/10/19 1530	24.18	45.51	21.33	44.13	19.95	24.17
		7/8/19 1240	24.19	45.5	21.31	40.00	15.81	24.19
NERT4.70N1 ⁽³⁾	SN2012672	6/10/19 1550	25.06	45.03	19.97	42.96	17.90	25.05
		7/9/19 1200	25.08	45.03	19.95	40.00	14.92	25.08
NERT4.71N1	SN2103382	8/13/19 1410	27.80	45.30	17.50	45.00	17.20	27.80
NERT4.71S2 ⁽³⁾	SN2102696	6/10/19 1340	27.31	54.35	27.04	47.46	20.15	27.31
		7/1/19 0930	27.30	54.40	27.10	50.00	22.70	27.30

Notes:

btoc: Below top of casing.

(1) Depth of the transducer is measured to the bottom of the transducer.

(2) Transducers were installed approximately 20 feet below the pre-installation groundwater surface, or approximately 2 feet above the measured total depth of the well if water column was less than 22 feet.

(3) Transducer initially installed with nylon rope. Second installation readings taken after nylon rope was replaced by Kevlar rope.

Table 7
Well Survey with Groundwater Elevations from June and July 2019
 NERT RI - Downgradient Study Area
 Henderson, Nevada

Well ID	Easting ⁽¹⁾	Northing ⁽¹⁾	Elevation ⁽¹⁾ (feet amsl, TOC)	Date Gaged	Depth to Water (feet, TOC)	Elevation (feet amsl)
AA-30	836125.80	26733691.92	1532.35	7/8/2019	19.08	1513.27
COH-2B1	832598.59	26733593.69	1546.95	7/3/2019	16.73	1530.22
LNDMW1	841145.67	26736145.45	1511.19	6/28/2019	36.81	1474.38
LNDMW2	840864.28	26737125.16	1501.98	7/5/2019	34.31	1467.67
MW-3	836835.36	26733434.90	1523.29	7/5/2019	6.12	1517.17
MW-4	836666.49	26733446.64	1526.35	7/5/2019	2.96	1523.39
MW-02	838994.12	26734478.11	1533.13	7/3/2019	39.62	1493.51
MW-13	838306.91	26734740.22	1529.84	6/28/2019	35.24	1494.60
MW-20	840590.41	26735460.67	1512.54	6/28/2019	32.64	1479.90
MW-25	839862.75	26734834.10	1531.65	7/3/2019	39.4	1492.25
NERT3.35S1	845391.59	26738372.78	1470.44	6/26/2019	16.05	1454.39
NERT3.40S1	845198.15	26738206.49	1474.58	6/26/2019	38.25	1436.33
NERT3.58N1	844188.45	26738048.58	1476.49	7/2/2019	34.49	1442.00
NERT3.58S1	844695.30	26737583.50	1474.30	6/27/2019	34.94	1439.36
NERT3.58S1A	844690.03	26737588.02	1474.53	6/18/2019	35.28	1439.25
NERT3.58S1B	844702.73	26737593.51	1473.94	6/18/2019	34.6	1439.34
NERT3.58S1C	844700.21	26737579.78	1474.27	6/18/2019	34.94	1439.33
NERT3.60N1	844016.02	26737827.79	1483.08	7/2/2019	38.09	1444.99
NERT3.60S1	844579.55	26737409.27	1478.23	7/1/2019	38.67	1439.56
NERT3.60S1A	844575.89	26737412.04	1478.50	7/1/2019	38.93	1439.57
NERT3.60S1B	844585.91	26737416.28	1478.24	7/1/2019	38.75	1439.49
NERT3.60S1C	844596.77	26737396.28	1478.74	7/1/2019	39.15	1439.59
NERT3.60S1D	844597.60	26737431.86	1478.31	7/1/2019	38.72	1439.59
NERT3.63S1	844152.61	26737071.55	1461.78	6/27/2019	18.68	1443.10
NERT3.80S1	843700.76	26736780.10	1460.54	6/27/2019	10.48	1450.06
NERT3.98S1	842522.48	26736678.95	1466.27	6/27/2019	10.67	1455.60
NERT4.21N1	841309.13	26736954.70	1502.07	7/2/2019	35.38	1478.87
NERT4.38N1	840337.59	26737140.64	1505.04	7/2/2019	32.61	1477.94
NERT4.51S1	840138.03	26735857.15	1506.24	6/27/2019	26.17	1480.07
NERT4.64N1	839271.62	26736269.47	1511.58	7/2/2019	23.20	1488.38
NERT4.64S1	839508.39	26735740.74	1513.00	7/1/2019	27.10	1485.90
NERT4.64S1A	839506.16	26735746.28	1512.73	7/9/2019	26.9	1485.83
NERT4.64S1B	839522.29	26735747.15	1512.55	7/9/2019	26.76	1485.79
NERT4.64S1C	839510.44	26735735.18	1512.98	7/9/2019	27.14	1485.84
NERT4.64S1D	839544.60	26735756.29	1512.63	7/9/2019	26.9	1485.73
NERT4.65N1	839107.82	26736244.72	1513.01	7/8/2019	24.19	1488.82
NERT4.70N1	838871.67	26736143.64	1514.91	7/9/2019	25.08	1489.83
NERT4.71N1	838600.29	26736123.87	1518.72	7/9/2019	27.91	1490.81
NERT4.71S1	838991.63	26735349.66	1519.29	7/1/2019	28.83	1490.46
NERT4.71S2	838770.32	26735408.27	1518.22	7/1/2019	27.3	1490.92
NERT4.93S1	837979.18	26734990.31	1523.33	7/1/2019	27.6	1495.73
NERT5.11S1	837144.38	26734881.04	1522.88	7/1/2019	20.81	1502.07
NERT5.49S1	835451.85	26734325.76	1543.37	7/8/2019	26.71	1516.66
NERT5.91S1	833571.59	26733845.83	1536.76	7/1/2019	13.32	1523.44
WMW3.5N	843836.97	26737791.35	1482.54	7/5/2019	35.31	1447.23
WMW3.5S	844697.76	26737275.90	1483.54	6/28/2019	43.58	1439.96
WMW4.9N	838408.40	26736756.98	1523.37	7/5/2019	31.8	1491.57
WMW4.9S	838411.85	26735290.15	1518.84	7/9/2019	26.45	1492.39
WMW5.58S ⁽²⁾	835070.11	26734647.03	1537.34	7/3/2019	16.87	1520.47
WMW5.5S	835768.11	26733971.74	1528.22	6/28/2019	13.89	1514.33
WMW5.7N	834471.76	26734425.52	1528.50	7/9/2019	8.42	1520.08

Notes:

(1) Well coordinates and elevations surveyed by licensed surveyor (Stanley). Coordinate system: State Plane Coordinate System; Elevations are referenced to the North American Datum (NAD) 83 Nevada East Zone (2701) with vertical datum based on NAVD 88 referenced to the City of Henderson Benchmark network.

(2) Well WMW5.58S is identified as WMW5.7S in the state of Nevada records however, the owner, Southern Nevada Water Authority, prefers to keep analytical data under the WMW5.58S well identification.

amsl = Above mean sea level

TOC = Top of casing

Table 8
Summary of Depth to Bedrock - Phase II Groundwater Well Installation
 NERT RI - Downgradient Study Area
 Henderson, Nevada

Well ID	Depth to Bedrock (feet bgs)	Bedrock	Comments
NERT3.35S1	32	Thumb(?)	Drilled to 57 feet bgs.
NERT3.40S1	50	Thumb	Weathered Bedrock
	57.5	Thumb	Bedrock
NERT3.58N1	15	Thumb	Drilled to 60 feet bgs.
NERT3.58S1	64	UMCf	Refusal at 70 feet bgs.
	66	Horse Springs	
NERT3.58S1A	No bedrock encountered	--	Drilled to 50 feet bgs.
NERT3.58S1B	No bedrock encountered	--	Drilled to 50 feet bgs.
NERT3.58S1C	No bedrock encountered	--	Drilled to 55 feet bgs.
NERT3.58S1D	36	Thumb	Drilled to 36.5 feet bgs.
NERT3.60N1	No bedrock encountered	--	Drilled to 90 feet bgs.
NERT3.60S1	70	UMCf	Drilled to 90 feet bgs.
	78	Horse Springs	
NERT3.60S1A	No bedrock encountered	--	Drilled to 55 feet bgs.
NERT3.60S1B	No bedrock encountered	--	Drilled to 55 feet bgs.
NERT3.60S1C	No bedrock encountered	--	Drilled to 55 feet bgs.
NERT3.60S1D	No bedrock encountered	--	Drilled to 55 feet bgs.
NERT3.63S1	56	Thumb	Refusal at 60 feet bgs.
NERT3.98S1	23	UMCf	
	27	Thumb	Drilled to 55 feet bgs.
NERT4.64N1	No bedrock encountered	--	Drilled to 90 feet bgs.
NERT4.64S1	No bedrock encountered	--	Drilled to 55 feet bgs.
NERT4.64S1A	No bedrock encountered	--	Drilled to 55 feet bgs.
NERT4.64S1B	No bedrock encountered	--	Drilled to 55 feet bgs.
NERT4.64S1C	No bedrock encountered	--	Drilled to 55 feet bgs.
NERT4.64S1D	No bedrock encountered	--	Drilled to 55 feet bgs.
NERT4.65N1	No bedrock encountered	--	Drilled to 90 feet bgs.
NERT4.70N1	No bedrock encountered	--	Drilled to 82 feet bgs.
NERT4.71N1	No bedrock encountered	--	Drilled to 90 feet bgs.
NERT4.71S2	No bedrock encountered	--	Drilled to 55 feet bgs.

Notes:

bgs: below ground surface

UMCf: Upper Muddy Creek formation

-- Bedrock not encountered to the depth explored

(?) indicates identification of formation is tentative

Table 9
Water Quality Parameters June and July 2019
 NERT RI - Downgradient Study Area
 Henderson, Nevada

Well ID	Sample Date	Screen Interval (feet, bgs)	Water-Bearing Zone	Lithology	Purge Volume Removed (Liters)	Temp (°C)	pH	EC (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Purge Flow Rate (mL/min)	Depth to Water (feet)	Color / Odor
AA-30	07/08/19	11.7 - 31.7	Shallow	Qal	8.2	24.75	7.06	6897	1.5	72.4	9.04	180	19.08	clear/ none
COH-2B1	07/03/19	--	Shallow	--	7.2	24.55	7.13	3205	1.45	49	9.82	180	16.73	clear/ none
LNDMW1	06/28/19	--	Shallow	--	6.4	24.83	6.97	5322	2.81	77.6	E	180	36.81	cloudy/ none
LNDMW2	07/05/19	--	Shallow	--	4.7	23.31	7.05	3145	1.53	60.1	487	200	34.31	tan/ none
MW-02	07/03/19	? - 45	Shallow	--	5.3	27.39	7.06	3435	6.27	69.1	14.2	180	39.62	clear/ none
MW-3	07/05/19	--	Shallow	--	collected grab sample from bailer	24.03	7.48	4081	7.35	55.2	8.22	NA	6.12	clear/ none
MW-4	07/05/19	--	Shallow	--	collected grab sample from bailer	23.01	7.68	5030	6.68	65.7	6.21	NA	2.96	clear/ none
MW-13	06/28/19	? - 48	Shallow	Qal	4.0	25.64	7.03	5941	4.75	74.5	14.6	200	35.24	clear/ none
MW-20	06/28/19	--	Shallow	--	4.8	26.21	7.43	6157	6.09	72.2	E	180	32.64	cloudy/ none
MW-25	07/03/19	--	Shallow	--	4.0	28.10	7.06	3979	5.15	69.9	69.8	180	39.40	cloudy/ none
NERT3.35S1	06/26/19	35 - 55	Shallow	Qal	4.3	27.36	7.43	9908	1.09	-51.6	1.08	140	16.05	clear/ none
NERT3.40S1	06/26/19	35 - 55	Shallow	Qal	4.5	27.56	7.29	13165	1.19	45.3	47.1	170	28.25	slightly cloudy/none
NERT3.58N1	07/02/19	40 - 60	Shallow	Qal	5.3	24.84	6.83	6956	1.93	62.5	19.8	180	39.49	clear/ none
NERT3.58S1	06/27/19	35 - 55	Shallow	Qal	4.7	24.39	6.89	4260	1.49	68.9	18.9	180	34.94	pink/ None
NERT3.60N1	07/02/19	32 - 52	Shallow	Qal	5.0	24.57	6.84	6835	1.11	57.3	27.7	180	38.09	clear/ none
NERT3.60S1	07/01/19	35 - 55	Shallow	Qal	5.5	25.28	7.01	4202	1.54	68.7	4.32	180	38.67	pink/ None
NERT3.63S1	06/27/19	15 - 35	Shallow	Qal	4.0	23.81	6.95	3978	1.14	72	7.05	200	18.68	clear/ none
NERT3.80S1	06/27/19	10 - 20	Shallow	Qal	4.3	24.34	6.69	3972	1.59	66.9	5.82	20	10.48	clear/ none
NERT3.98S1	06/27/19	15 - 35	Shallow	Qal	4.8	24.01	6.99	6100	0.75	-63.5	39.3	180	10.67	clear/ none
NERT4.21N1	07/02/19	45 - 55	Shallow	Qal	5.4	24.67	7.08	3933	4.21	72.7	2.23	200	35.38	clear/ none
NERT4.38N1	07/02/19	30 - 40	Shallow	Qal	4.0	25.51	6.91	3567	5.12	62.8	26.3	200	32.61	clear/ none
NERT4.51S1	06/27/19	40 - 50	Shallow	Qal	3.3	28.98	6.96	5508	4.05	66.4	1.22	200	26.17	clear/ none
NERT4.64N1	07/02/19	25 - 45	Shallow	Qal	2.5	25.18	7.12	2410	1.3	46.8	1.09	200	23.20	clear/ none
NERT4.64S1	07/01/19	35 - 55	Shallow	Qal	4.8	23.59	7.11	5648	4.06	83.7	1.9	180	22.10	clear/ none
NERT4.65N1	07/08/19	25 - 45	Shallow	Qal	4.0	25.20	7.13	2306	1.05	40.1	3.48	180	24.19	clear/ none
NERT4.70N1	07/09/19	25 - 45	Shallow	Qal	6.1	23.93	7.18	1908	1.14	161.1	7.34	200	25.08	clear/ none
NERT4.71N1	07/09/19	25 - 45	Shallow	Qal	5.0	23.67	7.16	1947	0.97	140.9	12.9	200	27.91	clear/ none
NERT4.71S1	07/01/19	40 - 50	Shallow	Qal	4.2	25.48	7.04	5874	3.26	71.2	20.1	180	28.83	clear/ none
NERT4.71S2	07/01/19	34.5 - 54.5	Shallow	Qal	5.9	24.09	7.01	4970	1.59	71.6	163	180	27.30	cloudy/ none
NERT4.93S1	07/01/19	45 - 55	Shallow	Qal	4.9	26.53	7.00	3988	1.85	70.7	13.1	180	27.60	clear/ none
NERT5.11S1	07/01/19	35 - 45	Shallow	Qal	6.25	25.11	7.01	4051	0.74	68.4	15.9	250	20.81	clear/ none
NERT5.49S1	07/08/19	30 - 40	Shallow	Qal	4.8	24.89	7.43	1648	0.99	39.8	6.73	200	26.74	clear/ none
NERT5.91S1	07/01/19	40 - 50	Shallow	Qal	3.8	26.38	7.02	4074	0.93	62.3	38.3	220	13.32	clear/ none
WMW3.5N	07/05/19	--	Shallow	--	5.4	24.62	6.97	6123	6.05	84.4	E	180	35.31	clear/ none
WMW3.5S	06/28/19	--	Shallow	--	4.8	23.48	6.98	4046	1.23	71.3	10.59	180	43.58	clear/ none
WMW4.9N	07/05/19	--	Shallow	--	5.5	24.72	7.03	2643	1.64	53.6	287	200	21.80	cloudy/ none
WMW4.9S	07/09/19	--	Shallow	--	5.9	24.29	7.04	2453	3.38	132.4	5.41	200	26.45	clear/ none
WMW5.58S ⁽¹⁾	07/03/19	--	Shallow	--	4.2	24.39	7.23	4426	1.09	-69.1	219	100	16.87	tan/ none
WMW5.5S	06/28/19	--	Shallow	--	4.7	23.62	7.17	3058	2.9	63	7.42	180	13.89	clear/ none
WMW5.7N	07/09/19	--	Shallow	--	4.5	29.69	7.21	1751	0.95	81.3	4.09	200	8.42	clear/ none

Notes:
 (1) Well WMW5.58S is identified as WMW5.7S in the state of Nevada records however, the owner, Southern Nevada Water Authority, prefers to keep analytical data under the WMW5.58S well identification.
 -- = No data available
 bgs = below ground surface
 °C = Degrees Celsius
 DO = Dissolved Oxygen
 EC = Electrical Conductivity
 ORP = Oxidation reduction potential
 mg/L = milligrams per liter
 mL/min = milliliters per minute
 mV = millivolts
 NA = Not applicable
 NTU = Nephelometric Turbidity Units
 Qal = Alluvium
 µS/cm = microSiemens per centimeter

Table 10
Preliminary Tracer Dye Analysis Results
 NERT RI - Downgradient Study Area
 Henderson, Nevada

Sample Name	Date/Time Placed	Date/Time Collected	Fluorescein		Eosine		RWT		SRB	
			Peak (nm)	Conc (ppb)	Peak (nm)	Conc (ppb)	Peak (nm)	Conc (ppb)	Peak (nm)	Conc (ppb)
T4.60C	3/7/19 0755	3/7/19 1210	516.8 *	0.186	ND	--	ND	--	ND	--
T4.61C	3/7/19 0800	3/7/19 1215	513.4 *	0.355	ND	--	ND	--	ND	--
T4.62C	3/7/19 0805	3/7/19 1220	ND	--	ND	--	ND	--	ND	--
T3.60C	3/7/19 0825	3/7/19 1240	516.0	0.585	ND	--	ND	--	ND	--
T3.58C	3/7/19 0830	3/7/19 1245	516.2	0.728	ND	--	ND	--	ND	--
T3.57C	3/7/19 0845	3/7/19 1250	516.4	0.851	ND	--	ND	--	ND	--
T4.60	NA	3/7/19 1210	ND	--	ND	--	ND	--	581.8	0.087
T4.61	NA	3/7/19 1215	ND	--	ND	--	ND	--	582.2	0.081
T3.60	NA	3/7/19 1240	ND	--	ND	--	ND	--	582.0	0.093
T3.58	NA	3/7/19 1245	ND	--	ND	--	ND	--	580.8	0.067
T3.57	NA	3/7/19 1250	ND	--	ND	--	ND	--	582.6	0.081

Notes:

Sample name incorporates the approximate river mile. C indicates that it was a sample collected via charcoal adsorption

-- = Data not reported

ND = No dye detected

NA = Not Applicable

RWT = Rhodamine WT

SRB = Sulforhodamine B

nm = nanometers

ppb = parts per billion

* = A fluorescence peak is present that does not meet all the criteria for a positive dye result.

Table 11
Analytical Results of Groundwater Well Sampling July 2019
NERT RI - Downgradient Study Area
Henderson, Nevada

Well ID	Sample Date	Sample ID	Perchlorate (µg/L)	Chlorate (µg/L)	Total Dissolved Chromium (µg/L)	Hexavalent Chromium (µg/L)	Total Dissolved Solids (mg/L)
		Method	314	300.1B	200.8	218.7	SM 2540C
		Screening Level	18 µg/L	1,000	100 µg/L	100 µg/L	500 mg/L
		Source	BCL	BCL	MCL	BCL	2nd MCL
AA-30	07/08/19	AA-30-20190708	3300	9500	--	--	--
COH-2B1	07/03/19	COH2B1-20190703	1800	790	--	--	--
LNDMW1	06/28/19	LNDMW1-20190628	1400	3700	--	--	--
LNDMW2	07/05/19	LNDMW2-20190705	1500	4600	--	--	--
MW-02	07/03/19	MW-02-20190703	1700	2400	--	--	--
MW-3	07/05/19	MW-3-20190705	2900	6000	--	--	--
MW-4	07/05/19	MW-4-20190705	2700	5900	--	--	--
MW-13	06/28/19	MW13-20190628	3100	9400	--	--	--
MW-20	06/28/19	MW20-20190628	57	46	--	--	--
MW-25	07/03/19	MW-25-20190703	13	56	--	--	--
NERT3.35S1	06/26/19	NERT3.35S1-20190626	< 4.8	< 10	0.57J	< 1.00	6900
NERT3.35S1	06/26/19	NERT3.35S1-20190626-FD	< 4.8	< 10	0.64J	< 1.00	6900
NERT3.40S1	06/26/19	NERT3.40S1-20190626	< 4.8	< 20	0.71J	< 1.00	9000
NERT3.58N1	07/02/19	NERT3.58N1-20190702	88	24	1.3J	< 1.00	6600
NERT3.58S1	06/27/19	NERT3.58S1-20190627	1000	2700	5.5	9.09	3400
NERT3.60N1	07/02/19	NERT3.60N1-20190702	57	27	< 0.50	< 1.00	6400
NERT3.60S1	07/01/19	NERT3.60S1-20190701	1600	4900	9.9	14.7	3300
NERT3.63S1	06/27/19	NERT3.63S1-20190627	1200	3900	8.6	8.54	3100
NERT3.80S1	06/27/19	NERT3.80S1-20190627	820	1400	--	< 1.00	--
NERT3.80S1	06/27/19	NERT3.80S1-20190627-FD	820	1400	--	< 1.00	--
NERT3.98S1	06/27/19	NERT3.98S1-20190627	< 4.8	< 20	0.79J	< 1.00	5100
NERT4.21N1	07/02/19	NERT4.21N1-20190702	1800	5500	--	27.1	--
NERT4.38N1	07/02/19	NERT4.38N1-20190702	1500	340	--	< 1.00	--
NERT4.51S1	06/27/19	NERT4.51S1-20190627	2400	8200	--	36.8	--
NERT4.64N1	07/02/19	NERT4.64N1-20190702	500	28	0.55J	< 1.00	2000
NERT4.64N1	07/02/19	NERT4.64N1-20190702-FD	500	28	0.72J	< 1.00	2000
NERT4.64S1	07/01/19	NERT4.64S1-20190701	3200	8900	20	38.2	4900
NERT4.65N1	07/08/19	NERT4.65N1-20190708	470	13	0.59J	< 1.00	2400
NERT4.70N1	07/09/19	NERT4.70N1-20190709	140	< 10	< 0.50	< 1.00	1800
NERT4.71N1	07/09/19	NERT4.71N1-20190709	160	< 10	0.69 J+	< 1.00	1800
NERT4.71S1	07/01/19	NERT4.71S1-20190701	3400	10000	--	37.4	--
NERT4.71S2	07/01/19	NERT4.71S2-20190701	2900	14000	19	26.6	4100
NERT4.93S1	07/01/19	NERT4.93S1-20190701	1800	8600	--	16.8	--
NERT5.11S1	07/01/19	NERT5.11S1-20190701	2300	10000	--	14.2	--

Table 11
Analytical Results of Groundwater Well Sampling July 2019
 NERT RI - Downgradient Study Area
 Henderson, Nevada

Well ID	Sample Date	Sample ID	Perchlorate (µg/L)	Chlorate (µg/L)	Total Dissolved Chromium (µg/L)	Hexavalent Chromium (µg/L)	Total Dissolved Solids (mg/L)
		Method	314	300.1B	200.8	218.7	SM 2540C
		Screening Level	18 µg/L	1,000	100 µg/L	100 µg/L	500 mg/L
		Source	BCL	BCL	MCL	BCL	2nd MCL
NERT5.49S1	07/08/19	NERT5.49S1-20190708	13	< 10	--	< 1.00	--
NERT5.91S1	07/01/19	NERT5.91S1-20190701	2800	450	--	< 1.00	--
WMW3.5N	07/05/19	WMW3.5N-20190705	260	300	--	--	--
WMW3.5S	06/28/19	WMW3.5S-20190628	1300	3500	--	--	--
WMW3.5S	06/28/19	WMW3.5S-20190628-FD	1300	3400	--	--	--
WMW4.9N	07/05/19	WMW4.9N-20190705	660	16	--	--	--
WMW4.9S	07/09/19	WMW4.9S-20190709	850	3000	--	--	--
WMW5.58S ⁽¹⁾	07/03/19	WMW5.58S-20190703	4000	8000	--	--	--
WMW5.5S	06/28/19	WMW5.5S-20190628	1000	3500	--	--	--
WMW5.7N	07/09/19	WMW5.7N-20190709	12	< 10	--	--	--

(1) Well WMW5.58S is identified as WMW5.7S in the state of Nevada records however, the owner, Southern Nevada Water Authority, prefers to keep analytical data under the WMW5.58S well identification.

BCL - Basic Comparison Level: Residential water basic comparison levels in NDEP July 2017 BCL spreadsheet (NDEP 2017). BCL for
 MCL - Maximum Contaminant Level: Primary United States Environmental Protections Agency Maximum Contaminant Level (USEPA 40
 2nd MCL - Secondary Maximum Contaminant Level: National Secondary Drinking Water Regulations (USEPA, 40 CFR Part 143).
 Gray Shading - Exceeds screening level.
 -- Not analyzed
 FD - field duplicate
 ND – not detected above the sample quantitation limit (SQL). The SQL is the method detection limit adjusted for dilutions etc.
 J - Result is less than the Practical Quantitation Limit but greater than or equal to the Sample Quantitation Limit and the concentration is an approximate value. The J flag may also indicate the result is estimated due to QC outliers.
 J+ The result is an estimated detection with a potential high bias.
 µg/L - Micrograms per liter
 mg/L - Milligrams per liter

Table 12
Analytical Results of Groundwater Well Sampling April and May 2016, July 2018, and July 2019

NERT RI - Downgradient Study Area
Henderson, Nevada

Well ID	Sample Date	Sample ID	Perchlorate (µg/L)	Chlorate (µg/L)	Chloride (mg/L)	Bromide (mg/L)	Chloride / Bromide Ratio	Dissolved Chromium (µg/L)	Hexavalent Chromium (µg/L) ⁽²⁾	Total Dissolved Solids (mg/L)
		Method	314	300.1B	300.0	300.0		200.8	218.7	SM 2540C
		Screening Level	18 µg/L	1,000	250 mg/L	11.3		100 µg/L	100 µg/L	500 mg/L
		Source	BCL	BCL	2nd MCL	BCL		MCL	BCL	2nd MCL
AA-30	4/22/2016	AA-30-20160422	4400	14000	1300	<5.0	>260	49	46	6900
AA-30	7/13/2018	AA-30-20180713	3900	9400	--	--	--	--	--	--
AA-30	7/8/2019	AA-30-20190708	3300	9500	--	--	--	--	--	--
COH-2B1	4/21/2016	COH2B1-20160421	5600	8900	1100	<2.5	>440	6.8	9.0	4800
COH-2B1	7/13/2018	COH2B1-20180713	1600	1000	--	--	--	--	--	--
COH-2B1	7/3/2019	COH2B1-20190703	1800	790	--	--	--	--	--	--
LNDMW1	4/22/2016	LNDMW1-20160422	1900	4800	680	<2.5	>272	14	21	4100
LNDMW1	7/11/2018	LNDMW1-20180711	1600	4700	--	--	--	--	--	--
LNDMW1	6/28/2019	LNDMW1-20190628	1400	3700	--	--	--	--	--	--
LNDMW2	4/27/2016	LNDMW2-20160427	1500	4300	470	3.5 J-	134	5.1 J	8.0	3000
LNDMW2	7/17/2018	LNDMW2-20180717	1700	6000	--	--	--	--	--	--
LNDMW2	7/5/2019	LNDMW2-20190705	1500	4600	--	--	--	--	--	--
MW-02	4/28/2016	MW-02-20160428	2100	2800	380 J-	<1.3	>292	8.6 J	12	3800
MW-02	7/12/2018	MW-02-20180712	1900	2600	--	--	--	--	--	--
MW-02	7/12/2018	MW-02-20180712-FD	1900	2600	--	--	--	--	--	--
MW-02	7/3/2019	MW-02-20190703	1700	2400	--	--	--	--	--	--
MW-13	4/21/2016	MW-13-20160421	3800	15000	860	<2.5	>344	48	39	5100
MW-13	7/12/2018	MW-13-20180712	3700	14000	--	--	--	--	--	--
MW-13	6/28/2019	MW13-20190628	3100	9400	--	--	--	--	--	--
MW-20	4/22/2016	MW-20-20160422	160	120	970	<2.5	>388	<1.0	< 1.00	4600
MW-20	7/12/2018	MW-20-20180712	48	78 J	--	--	--	--	--	--
MW-20	6/28/2019	MW20-20190628	57	46	--	--	--	--	--	--
MW-25	4/21/2016	MW-25-20160421	4.7	ND (<50)	490	<1.3	>377	15	20	3400
MW-25	7/12/2018	MW-25-20180712	4.3 F1	57	--	--	--	--	--	--
MW-25	7/3/2019	MW-25-20190703	13	56	--	--	--	--	--	--
MW-3	4/26/2016	MW-3-20160426	2300	4600	610	<2.5	>244	16 J	17	4600
MW-3	7/12/2018	MW-3-20180712	3300	6200	--	--	--	--	--	--
MW-3	7/5/2019	MW-3-20190705	2900	6000	--	--	--	--	--	--
MW-4	4/26/2016	MW-4-20160426	2600	5200	610	<2.5	>244	17 J	19	4500
MW-4	7/12/2018	MW-4-20180712	3000	5900	--	--	--	--	--	--
MW-4	7/5/2019	MW-4-20190705	2700	5900	--	--	--	--	--	--
NERT3.35S1	6/26/2019	NERT3.35S1-20190626	< 4.8	< 10	--	--	--	0.57	< 1.00	6900
NERT3.35S1	6/26/2019	NERT3.35S1-20190626-FD	< 4.8	< 10	--	--	--	0.64	< 1.00	6900
NERT3.40S1	6/26/2019	NERT3.40S1-20190626	< 4.8	< 20	--	--	--	0.71	< 1.00	9000
NERT3.58N1	7/2/2019	NERT3.58N1-20190702	88	24	--	--	--	1.3	< 1.00	6600
NERT3.58S1	6/27/2019	NERT3.58S1-20190627	1000	2700	--	--	--	5.5	9.09	3400
NERT3.60N1	7/2/2019	NERT3.60N1-20190702	57	27	--	--	--	< 0.50	< 1.00	6400
NERT3.60S1	01 Jul 2019	NERT3.60S1-20190701	1600	4900	--	--	--	9.9	14.7	3300
NERT3.63S1	6/27/2019	NERT3.63S1-20190627	1200	3900	--	--	--	8.6	8.54	3100
NERT3.80S1	7/9/2018	NERT3.80S1-20180709	1100	1700	480	<2.5	>192	1.8 J	--	3100
NERT3.80S1	6/27/2019	NERT3.80S1-20190627	820	1400	--	--	--	--	< 1.00	--
NERT3.80S1	6/27/2019	NERT3.80S1-20190627-FD	820	1400	--	--	--	--	< 1.00	--

Table 12
Analytical Results of Groundwater Well Sampling April and May 2016, July 2018, and July 2019

NERT RI - Downgradient Study Area
Henderson, Nevada

Well ID	Sample Date	Sample ID	Perchlorate (µg/L)	Chlorate (µg/L)	Chloride (mg/L)	Bromide (mg/L)	Chloride / Bromide Ratio	Dissolved Chromium (µg/L)	Hexavalent Chromium (µg/L) ⁽²⁾	Total Dissolved Solids (mg/L)
		Method	314	300.1B	300.0	300.0		200.8	218.7	SM 2540C
		Screening Level	18 µg/L	1,000	250 mg/L	11.3		100 µg/L	100 µg/L	500 mg/L
		Source	BCL	BCL	2nd MCL	BCL		MCL	BCL	2nd MCL
NERT3.98S1	6/27/2019	NERT3.98S1-20190627	< 4.8	< 20	--	--	--	0.79	< 1.00	5100
NERT4.21N1	7/16/2018	NERT4.21N1-20180716	2200	6800	570	<2.5	>228	15	--	4000
NERT4.21N1	7/2/2019	NERT4.21N1-20190702	1800	5500	--	--	--	--	27.1	--
NERT4.38N1	7/16/2018	NERT4.38N1-20180716	1400	300	510	<2.5	>204	2.5 B	--	3600
NERT4.38N1	7/2/2019	NERT4.38N1-20190702	1500	340	--	--	--	--	< 1.00	--
NERT4.51S1	7/10/2018	NERT4.51S1-20180710	3100	10000	710	<2.5	>284	19	--	4900
NERT4.51S1	6/27/2019	NERT4.51S1-20190627	2400	8200	--	--	--	--	36.8	--
NERT4.64N1	7/2/2019	NERT4.64N1-20190702	500	28	--	--	--	0.55	< 1.00	2000
NERT4.64N1	7/2/2019	NERT4.64N1-20190702-FD	500	28	--	--	--	0.72	< 1.00	2000
NERT4.64S1	7/1/2019	NERT4.64S1-20190701	3200	8900	--	--	--	20	38.2	4900
NERT4.65N1	7/8/2019	NERT4.65N1-20190708	470	13	--	--	--	0.59	< 1.00	2400
NERT4.70N1	7/9/2019	NERT4.70N1-20190709	140	< 10	--	--	--	< 0.50	< 1.00	1800
NERT4.71N1	7/9/2019	NERT4.71N1-20190709	160	< 10	--	--	--	0.69 J+	< 1.00	1800
NERT4.71S1	7/10/2018	NERT4.71S1-20180710	3800	14000	830	<5.0	>166	26	--	5200
NERT4.71S1	7/1/2019	NERT4.71S1-20190701	3400	10000	--	--	--	--	37.4	--
NERT4.71S2	7/1/2019	NERT4.71S2-20190701	2900	14000	--	--	--	19	26.6	4100
NERT4.93S1	7/10/2018	NERT4.93S1-20180710	3900	19000	770	<2.5	>308	15	--	4300
NERT4.93S1	7/10/2018	NERT4.93S1-20180710-FD	3900	18000	770	<2.5	>308	14	--	4300
NERT4.93S1	7/1/2019	NERT4.93S1-20190701	1800	8600	--	--	--	--	16.8	--
NERT5.11S1	7/10/2018	NERT5.11S1-20180710	6000	25000	910	<2.5	>364	13	--	4700
NERT5.11S1	7/1/2019	NERT5.11S1-20190701	2300	10000	--	--	--	--	14.2	--
NERT5.49S1	7/16/2018	NERT5.49S1-20180716	5.1	<100	250	0.27 J	>228	1.3 J B	--	1400
NERT5.49S1	7/8/2019	NERT5.49S1-20190708	13	< 10	--	--	--	--	< 1.00	--
NERT5.91S1	7/16/2018	NERT5.91S1-20180716	2900	660	570	<2.5	>228	1.5 J B	--	3100
NERT5.91S1	7/1/2019	NERT5.91S1-20190701	2800	450	--	--	--	--	< 1.00	--
WMW3.5N	4/27/2016	WMW3.5-N-20160427	340	480	1000	<2.5	>400	<5.0	<1.00	5200
WMW3.5N	4/27/2016	WMW3.5N-20160427-FD	360	480	1000	<2.5	>400	<5.0	<1.00	5100
WMW3.5N	7/17/2018	WMW3.5N-20180717	320	640	--	--	--	--	--	--
WMW3.5N	7/5/2019	WMW3.5N-20190705	260	300	--	--	--	--	--	--
WMW3.5S	4/29/2016	WMW3.5S-20160428	1400	3800	480	3.2	150	9.9 J	9.9	3100
WMW3.5S	7/16/2018	WMW3.5S-20180716	1500	3900	--	--	--	--	--	--
WMW3.5S	6/28/2019	WMW3.5S-20190628	1300	3500	--	--	--	--	--	--
WMW3.5S	6/28/2019	WMW3.5S-20190628-FD	1300	3400	--	--	--	--	--	--
WMW4.9N	4/27/2016	WMW4.9N-20160427	890	ND (<200)	400	<1.3	>103	<5.0	<1.00	2600
WMW4.9N	7/17/2018	WMW4.9N-20180717	680	13 J	--	--	--	--	--	--
WMW4.9N	7/5/2019	WMW4.9N-20190705	660	16	--	--	--	--	--	--
WMW4.9S	4/22/2016	WMW4.9S-20160422	270	580	290 J-	<0.50	>580	<1.0	2.0	1500
WMW4.9S	7/13/2018	WMW4.9S-20180713	930	2700	--	--	--	--	--	--
WMW4.9S	7/13/2018	WMW4.9S-20180713-FD	900	2700	--	--	--	--	--	--
WMW4.9S	7/3/2019	WMW4.9S-20190709	850	3000	--	--	--	--	--	--
WMW5.58S ⁽¹⁾	5/5/2016	WMW5.58S-20160505	510	<50	320	1.7	188	<0.50	<1.00	1800

Table 12
Analytical Results of Groundwater Well Sampling April and May 2016, July 2018, and July 2019

NERT RI - Downgradient Study Area
Henderson, Nevada

Well ID	Sample Date	Sample ID	Perchlorate (µg/L)	Chlorate (µg/L)	Chloride (mg/L)	Bromide (mg/L)	Chloride / Bromide Ratio	Dissolved Chromium (µg/L)	Hexavalent Chromium (µg/L) ⁽²⁾	Total Dissolved Solids (mg/L)
		Method	314	300.1B	300.0	300.0		200.8	218.7	SM 2540C
		Screening Level	18 µg/L	1,000	250 mg/L	11.3		100 µg/L	100 µg/L	500 mg/L
		Source	BCL	BCL	2nd MCL	BCL		MCL	BCL	2nd MCL
WMW5.58S ⁽¹⁾	7/13/2018	WMW5.58S-20180713	2500	3200	--	--	--	--	--	--
WMW5.58S ⁽¹⁾	7/3/2019	WMW5.58S-20190703	4000	8000	--	--	--	--	--	--
WMW5.5S	4/22/2016	WMW5.5S-20160422	3200	6400	570	2.2 J	259	<1.0	3.0	2800
WMW5.5S	7/13/2018	WMW5.5S-20180713	3100	11000	--	--	--	--	--	--
WMW5.5S	6/28/2019	WMW5.5S-20190628	1000	3500	--	--	--	--	--	--
WMW5.7N	4/28/2016	WMW5.7N-20160428	4.8	<50	280	1.6	175	<5.0	<1.00	1500
WMW5.7N	7/17/2018	WMW5.7N-20180717	3.9 J F1	<100	--	--	--	--	--	--
WMW5.7N	7/9/2019	WMW5.7N-20190709	12.0	< 10	--	--	--	--	--	--

Notes:

Gray Shading - Value equals or exceeds screening level

(1) Well WMW5.58S is identified as WMW5.7S in the state of Nevada records however, the owner, Southern Nevada Water Authority, prefers to keep analytical data under the WMW5.58S well identification.

(2) Based on discussion with Silver State Laboratory, the limit for some 2016 samples was changed from previous reports. The reporting limit (1.0 ug/L) more accurately reflects sample analysis than the historically reported detection limit (0.09 ug/L).

BCL - Basic Comparison Level: Residential water basic comparison levels in NDEP July 2017 BCL spreadsheet (NDEP 2017). BCL for perchlorate is identified as 18 µg/L to be consistent with the Nevada Interim Action Level.

MCL - Maximum Contaminant Level: Primary United States Environmental Protections Agency Maximum Contaminant Level (USEPA 40 CFR Part 141).

2nd MCL - Secondary Maximum Contaminant Level: National Secondary Drinking Water Regulations (USEPA, 40 CFR Part 143).

Bold Values - Constituent was detected at reportable concentration by the laboratory.

-- Not analyzed

< : Less than the method detection limit.

> : Greater than than the value shown.

B - Compound was found in the blank and sample

F1 - Matrix spike and/or matrix spike duplicate recovery is outside acceptable limits

FD - Field duplicate

J - Result is less than the Reporting Limit but greater than or equal to the Method Detection Limit and the concentration is an approximate value.

J- - Estimated - The associated numerical value is an estimated quantity with a negative bias. The analyte was detected but the reported value may not be accurate or precise.

J+ - Estimated - The associated numerical value is an estimated quantity with a positive bias. The analyte was detected but the reported value may not be accurate or precise.

µg/L - Micrograms per liter

mg/L - Milligrams per liter

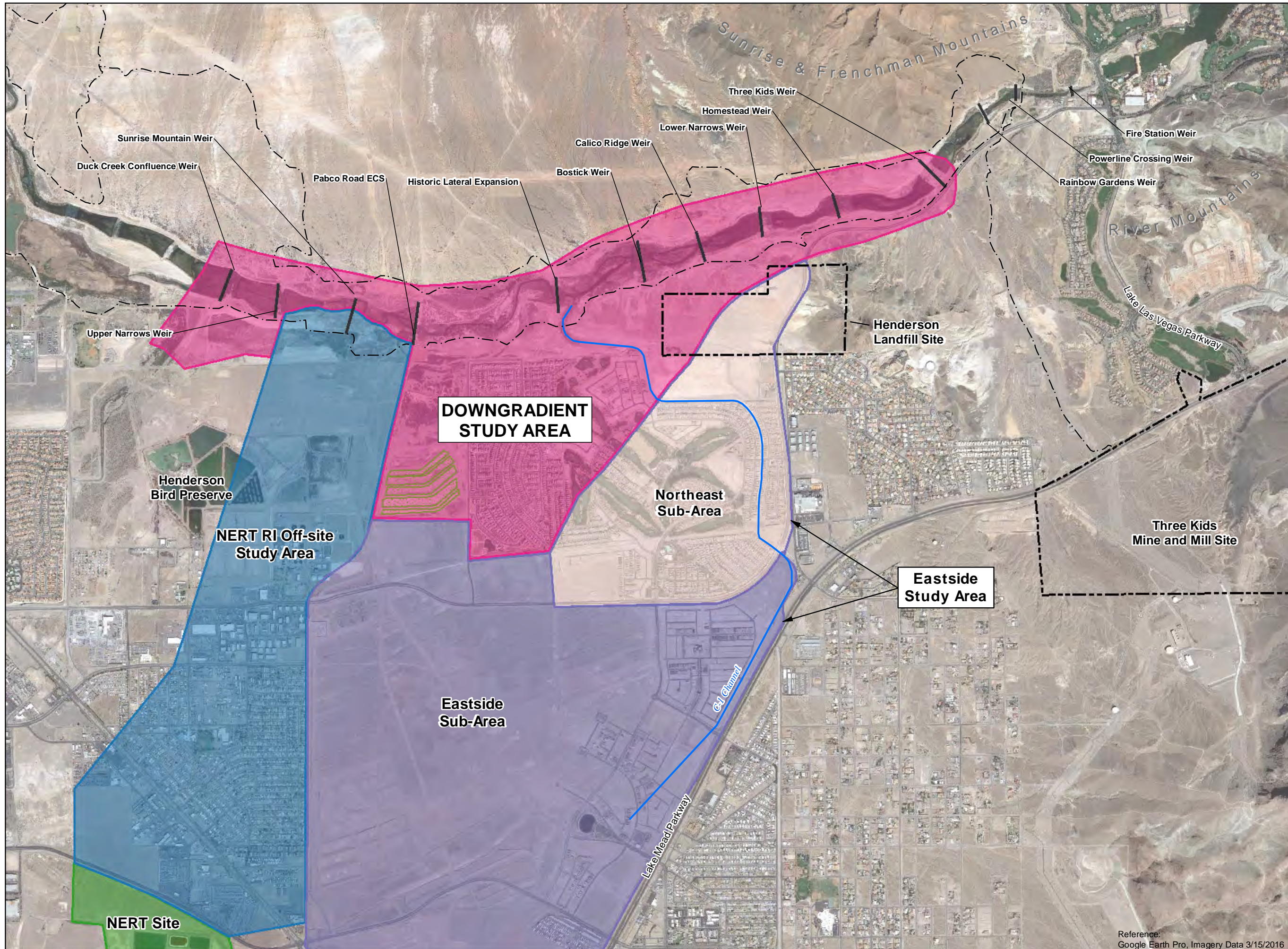
Table 13
Achievement of Investigation Objectives and Potential Future Work
 NERT RI - Downgradient Study Area
 Henderson, Nevada

Investigation Objective	Achievement of Objective	Potential Future Work
1) Where are the high concentration (1,000 µg/L or higher) perchlorate-impacted groundwater plumes?	<ul style="list-style-type: none"> • The Phase I and Phase II wells and the LVW Bioremediation Pilot Study wells provided further definition of the high concentration (>1,000 µg/L) perchlorate-impacted groundwater plumes on the north and south sides of LVW. • Data gaps remain the north side of LVW. 	Additional wells to define perchlorate impacts on the north side of LVW.
2) Why are there noticeable differences in perchlorate concentrations in groundwater over relatively short distances?	<ul style="list-style-type: none"> • High variability in perchlorate concentrations indicates separate discrete flow zones within the alluvium. • Surface water mixing with groundwater in some areas may dilute the perchlorate concentrations. 	None.
3) How deep are the high concentration perchlorate-impacted groundwater plumes?	<ul style="list-style-type: none"> • High perchlorate concentrations at depths <90 feet bgs are well defined • Data gaps remain for deeper groundwater specifically south of Calico Ridge Weir 	Additional deeper wells are needed to further define the extent of perchlorate impacts below 100 feet bgs.
4) Do the high-concentration perchlorate plumes follow distinct water-bearing zones within the alluvium or bedrock formations?	<ul style="list-style-type: none"> • Distinct water-bearing zones have been identified through NMR logging in individual wells but these zones were not identified as being continuous between wells. • Results of tracer tests indicate that specific flow zones do not conform to the generally observed groundwater gradient. 	None.
5) Where does faulting affect the movement of high-concentration perchlorate-impacted groundwater?	<ul style="list-style-type: none"> • The LVW Bioremediation Pilot Study indicates faulting affects the movement of groundwater between Calico Ridge Weir and Lower Narrows weir. • Prior geotechnical studies, the observed seeps and the Phase I and II assessments indicate faulting affects groundwater movement at Three Kids Weir and between Three Kids and Rainbow Gardens Weirs. 	Additional studies are needed to define the effect faulting has on perchlorate movement.
6) Along the LVW, does groundwater flow generally in the same direction as the surface water?	<ul style="list-style-type: none"> • The potentiometric surface of the groundwater generally follows the surface water direction. 	Continue to obtain and evaluate transducer data.

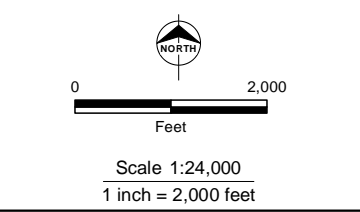
Table 13
Achievement of Investigation Objectives and Potential Future Work
 NERT RI - Downgradient Study Area
 Henderson, Nevada

Investigation Objective	Achievement of Objective	Potential Future Work
7) Where does impacted groundwater discharge to the LVW?	<ul style="list-style-type: none"> • The GW and SW studies show that the main impacted groundwater discharges to LVW occur below Calico Ridge Weir and below Three Kids Weir. • Some evidence of more diffuse discharges along other reaches of LVW. 	None.
8) Where is the groundwater/surface water interface and how far is it from the LVW?	<ul style="list-style-type: none"> • As indicated by total dissolved solids concentrations and temperature variations, the groundwater/surface water interface varies from 0 - 885 feet away from the LVW. 	None.
9) Is there an area of known or suspected perchlorate flux of sufficient magnitude where an interim remedial action would be appropriate?	<ul style="list-style-type: none"> • Perchlorate concentrations in Lake Mead are well below NDEP's interim action level, so interim/emergency actions are not needed. • NERT is completing a pilot study between Bostic and Homestead Weirs that may be considered an interim action. 	None.
10) Is perchlorate-impacted groundwater bypassing the Seep Well Field on its eastern side in the vicinity of monitoring well COH-2B1?	<ul style="list-style-type: none"> • NERT's Annual Remedial Performance Report indicates that the capture zone efficiency of the Seep Well Field is 97.8 percent. 	Continue sampling of COH-2B1 is planned. Consider a tracer test to determine the source of perchlorate in this area.
11) Do high volumes of low-concentration, perchlorate-impacted groundwater provide more flux to the LVW than low volumes of high-concentration perchlorate-impacted groundwater?	<ul style="list-style-type: none"> • Based on surface water data, nearly 45 lb/day (>70%) of perchlorate flux is contributed by two high concentration areas: ~22 lb/day at Calico Ridge Weir and ~23 lb/day at Three Kids Weir. 	Refine contribution estimates by 24-hour sampling and time composite load estimates in key locations.
12) Do concentrations of perchlorate in groundwater fluctuate over time, seasonally, or after a rain event?	<p>Comparison of perchlorate concentrations from 17 sampled wells in 2016 and 2018 indicated:</p> <ul style="list-style-type: none"> • 5 wells changed <10% • 9 wells changed 20-80% • 3 wells changed >200 %. 	Continue to evaluate seasonal changes and changes after rain events.

Figures



- Legend**
- Wetlands Trail
 - Channels
 - Northern Rapid Infiltration Basins
 - Downgradient Study Area
 - NERT Eastside Study Area
 - BRC Eastside Sub-Area
 - Northeast Sub-Area
 - Off-Site NERT RI Study Area
 - NERT Site

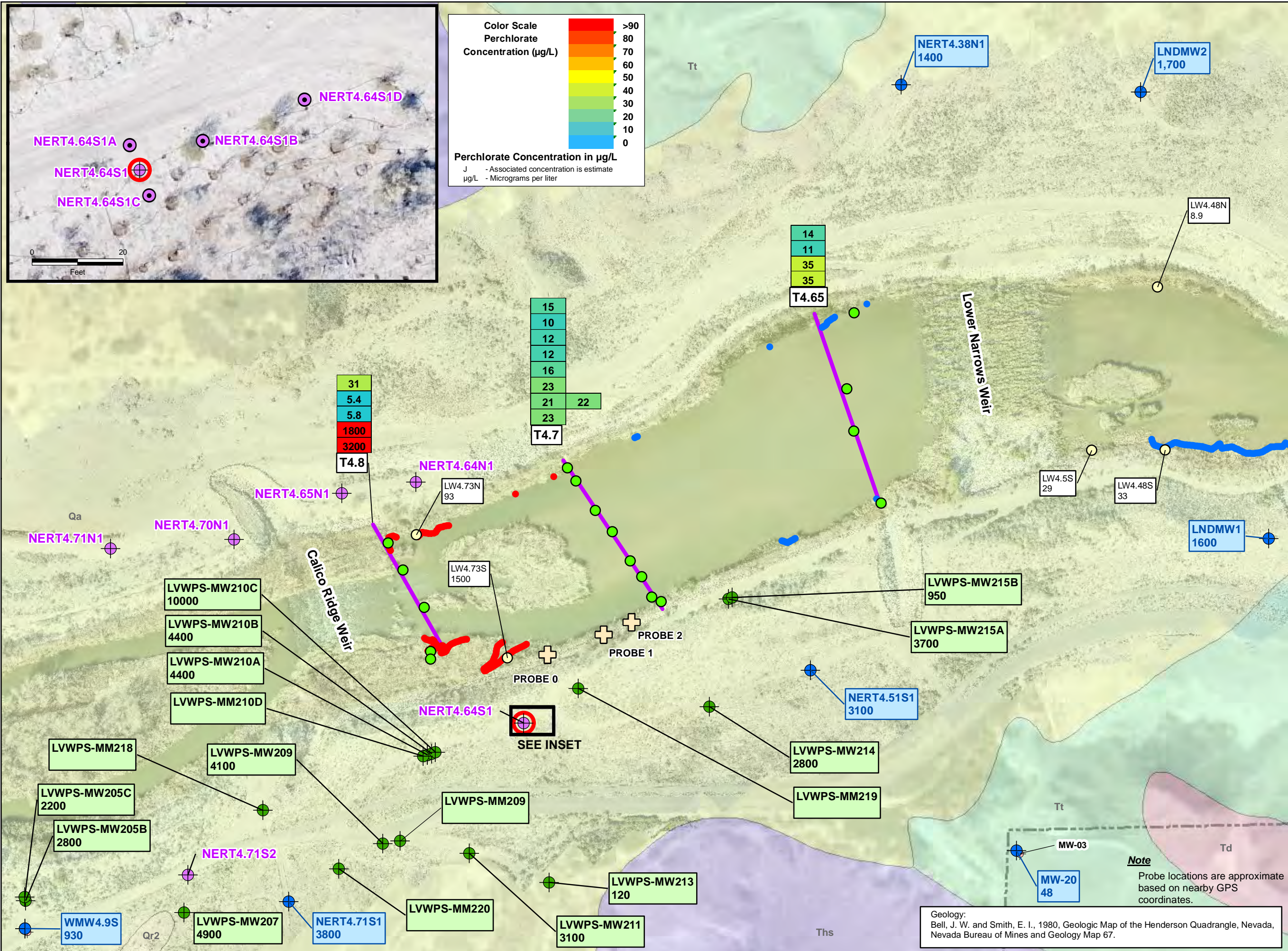
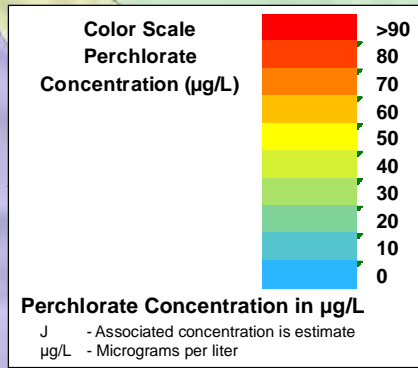
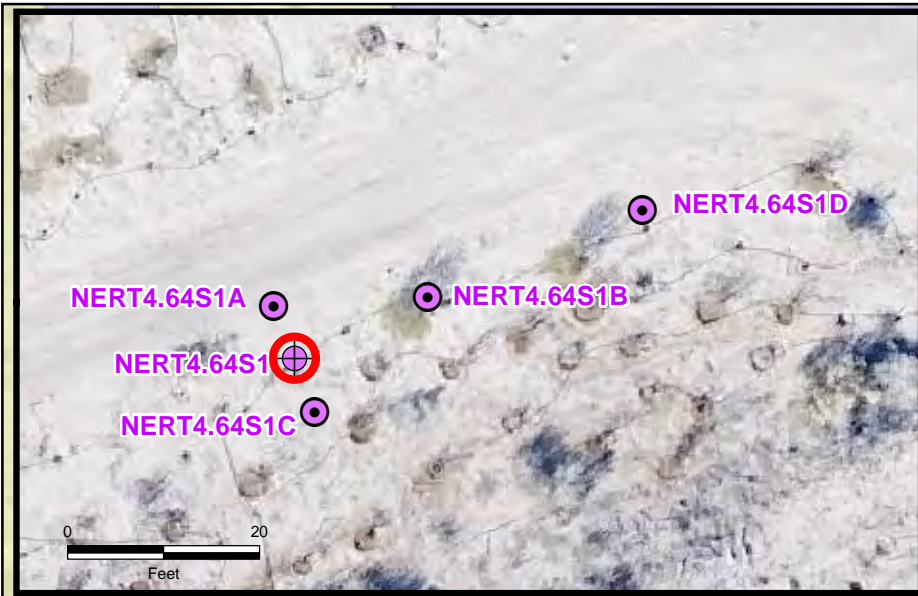


NERT
Downgradient Study Area

**DOWNGRADIENT
STUDY AREA
LOCATION MAP**

Date: 9/24/2019 Project: 60477365

AECOM Figure 1



- Legend**
- Warm DTS Anomaly
 - Cool DTS Anomaly
 - Transect
 - Surface Water Grab Sample Location
 - Surface Water Sample Along Transect
 - ⊕ Phase I Groundwater Well
 - ⊕ Bioremediation Pilot Test Wells
 - ⊕ Phase II Groundwater Well
 - ⊕ Dye Injection Well
 - ⊕ Observation Groundwater Well
 - ⊕ Preliminary Dye Sampling/Sensor Probe Location

- Perchlorate Concentration in µg/L**
 µg/L - Micrograms per liter
- Qa Modern Wash Deposits
 - Qpf Pediment and Fan Deposits of Frenchman Mountains
 - Td Volcanic Rocks North of Lake Mead Drive
 - Ths Horse Spring Formation
 - Tt Thumb Formation
- 0 200
 Feet
 Scale 1:2,400
 1 inch = 200 feet

NERT RI
 Downgradient Study Area

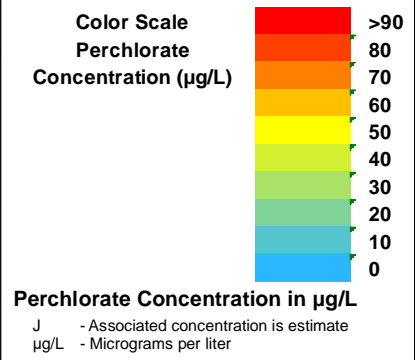
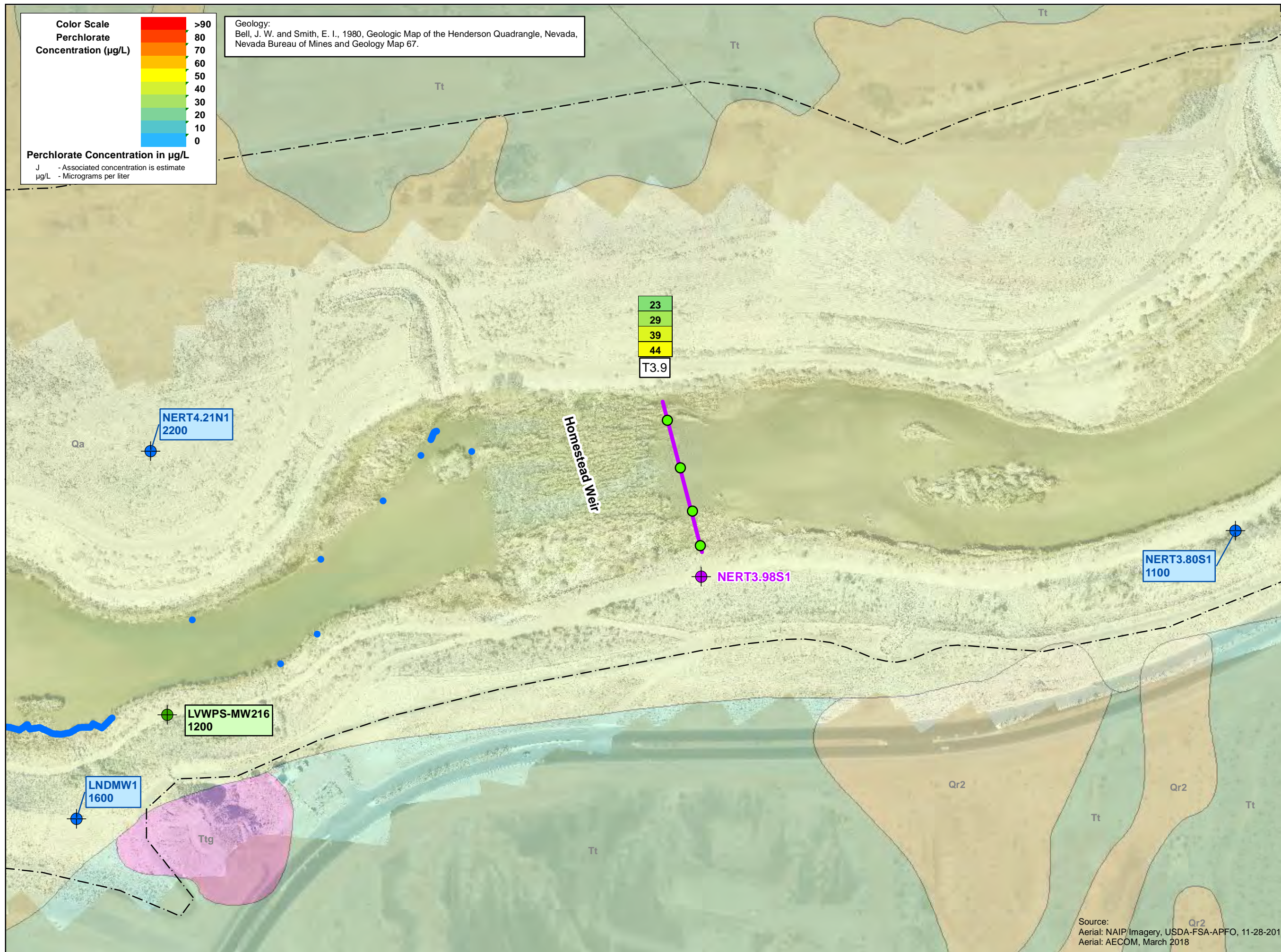
Calico Ridge Weir to Lower Narrows Weir 2018 Perchlorate Concentrations with Phase II Well Locations

Date: 9/27/2019 Project: 60477365

AECOM **Figure 2**

Note
 Probe locations are approximate based on nearby GPS coordinates.

Geology:
 Bell, J. W. and Smith, E. I., 1980, Geologic Map of the Henderson Quadrangle, Nevada, Nevada Bureau of Mines and Geology Map 67.



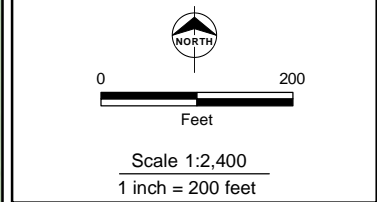
Geology:
 Bell, J. W. and Smith, E. I., 1980, Geologic Map of the Henderson Quadrangle, Nevada, Nevada Bureau of Mines and Geology Map 67.



- Legend**
- Cool DTS Anomaly
 - Transect
 - Surface Water Sample Along Transect
 - Phase I Groundwater Well
 - Bioremediation Pilot Test Wells
 - Phase II Groundwater Well

Perchlorate Concentration in µg/L
 µg/L - Micrograms per liter

Qa	Modern Wash Deposits
Qr2	Pediment and Fan Deposits of River Mountains
Tt	Thumb Formation
Ttg	Thumb Formation - Breccia

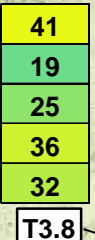
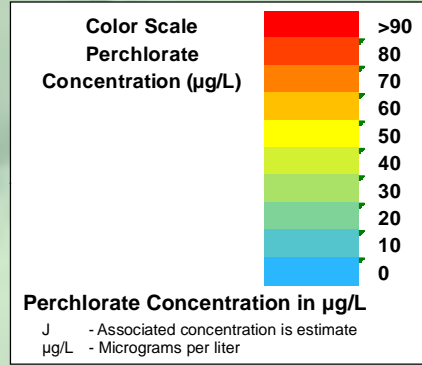


NERT RI
 Downgradient Study Area

**Homestead Weir
 2018 Perchlorate
 Concentrations with
 Phase II Well
 Locations**

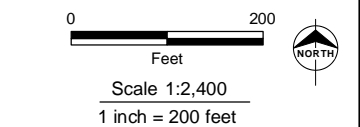
Date: 9/24/2019 Project: 60477365

AECOM **Figure 3**



- Legend**
- Warm DTS Anomaly
 - Cool DTS Anomaly
 - Transect
 - Surface Water Grab Sample Location
 - Surface Water Sample Along Transect
 - ⊕ Phase I Groundwater Well
 - ⊕ Phase II Groundwater Well
 - ⊕ Dye Injection Well
 - ⊕ Observation Groundwater Well
 - ⊕ Preliminary Dye Sampling/Sensor Probe Location

- Perchlorate Concentration in µg/L**
 µg/L - Micrograms per liter
- Qa Modern Wash Deposits
 - QTc Conglomerate of Las Vegas Wash
 - Qr1/Qr2 Pediment and Fan Deposits of River Mountains
 - Ths Horse Spring Formation
 - Tt Thumb Formation



Geology:
 Bell, J. W. and Smith, E. I., 1980, Geologic Map of the Henderson Quadrangle, Nevada, Nevada Bureau of Mines and Geology Map 67.

Three Kids Weir

Rainbow Gardens Weir

PROBE 0
 PROBE 1
 PROBE 2



NERT RI
 Downgradient Study Area

**Three Kids Weir to
 Rainbow Gardens Weir
 2018 Perchlorate
 Concentrations with
 Phase II Well
 Locations**

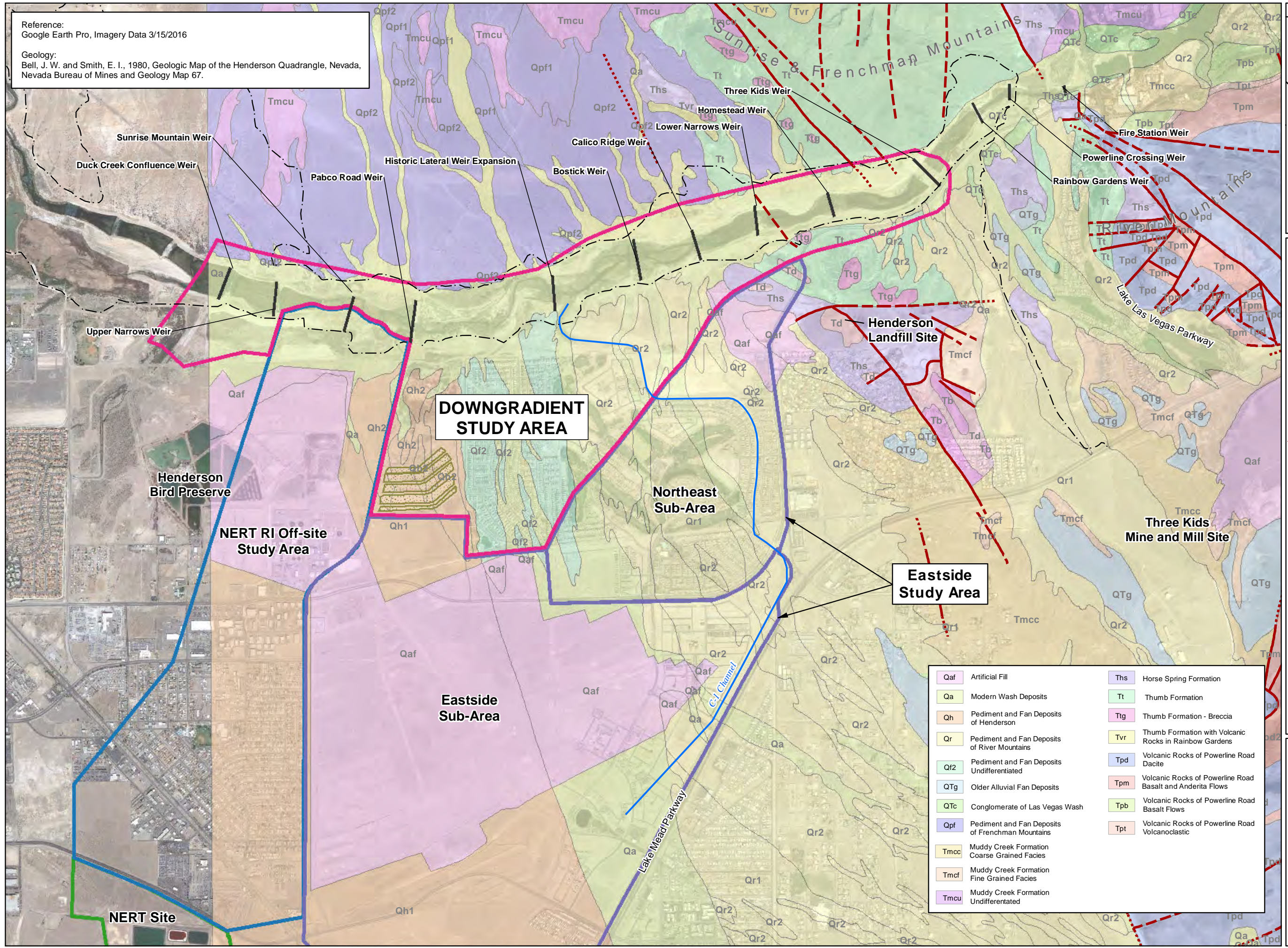
Date: 9/24/2019 Project: 60477365

AECOM Figure 4

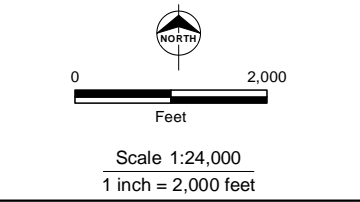


Reference:
Google Earth Pro, Imagery Data 3/15/2016

Geology:
Bell, J. W. and Smith, E. I., 1980, Geologic Map of the Henderson Quadrangle, Nevada, Nevada Bureau of Mines and Geology Map 67.



- Legend**
- Wetlands Trail
 - Channels
 - Northern Rapid Infiltration Basins
 - Downgradient Study Area
 - NERT Eastside Study Area
 - Off-Site NERT RI Study Area
 - NERT Site
 - Fault, dashed where inferred, dotted where concealed



Qaf	Artificial Fill	Ths	Horse Spring Formation
Qa	Modern Wash Deposits	Tt	Thumb Formation
Qh	Pediment and Fan Deposits of Henderson	Ttg	Thumb Formation - Breccia
Qr	Pediment and Fan Deposits of River Mountains	Tvr	Thumb Formation with Volcanic Rocks in Rainbow Gardens
Qr2	Pediment and Fan Deposits Undifferentiated	Tpd	Volcanic Rocks of Powerline Road Dacite
QTg	Older Alluvial Fan Deposits	Tpm	Volcanic Rocks of Powerline Road Basalt and Anderita Flows
QTc	Conglomerate of Las Vegas Wash	Tpb	Volcanic Rocks of Powerline Road Basalt Flows
Qpf	Pediment and Fan Deposits of Frenchman Mountains	Tpt	Volcanic Rocks of Powerline Road Volcanoclastic
Tmcc	Muddy Creek Formation Coarse Grained Facies		
Tmcf	Muddy Creek Formation Fine Grained Facies		
Tmcu	Muddy Creek Formation Undifferentiated		

NERT Downgradient Study Area

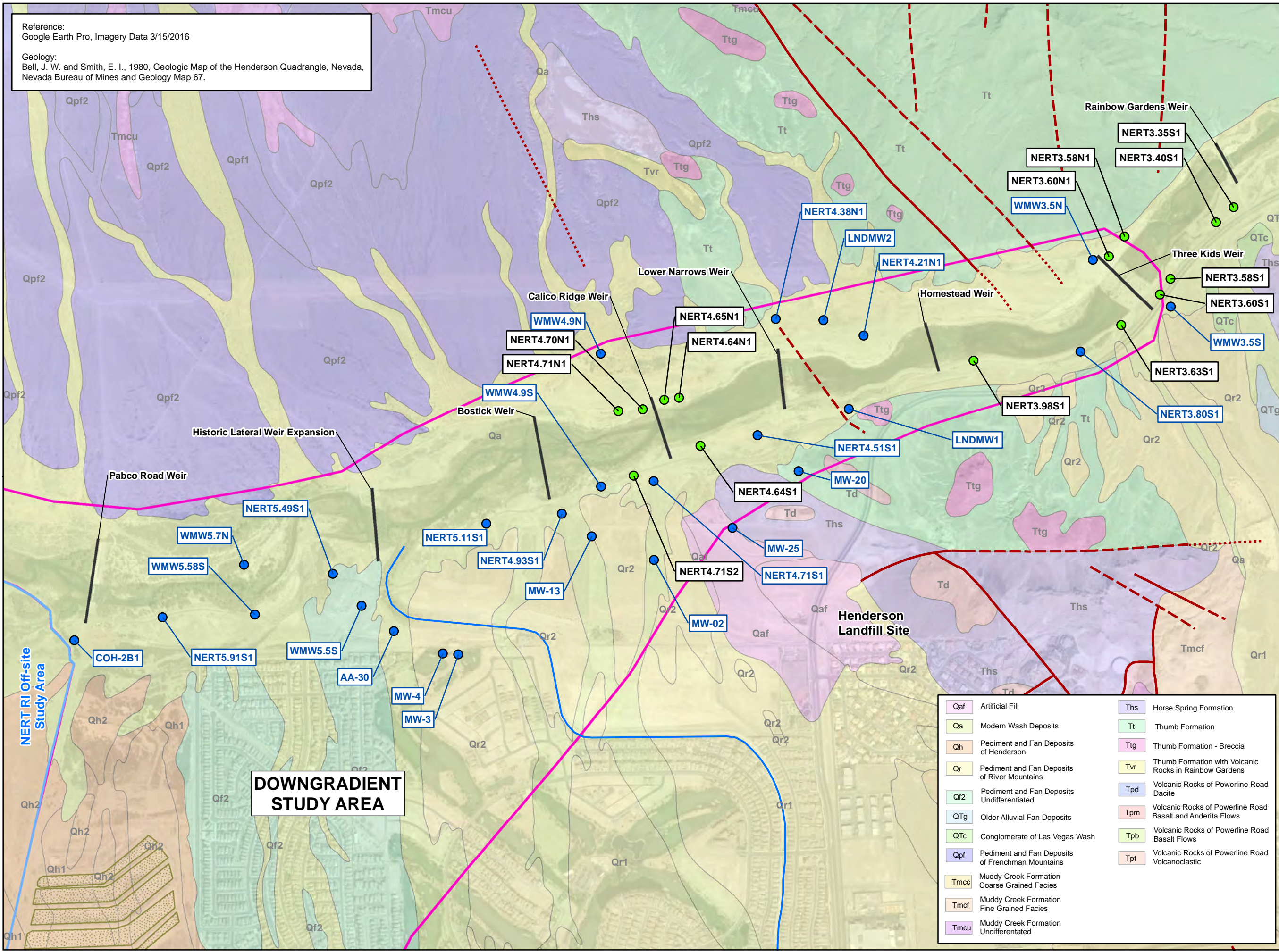
GEOLOGY OF THE DOWNGRADIENT STUDY AREA

Date: 9/24/2019 Project: 60477365

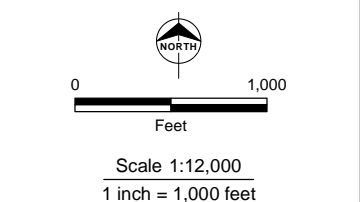
AECOM Figure 5

Reference:
Google Earth Pro, Imagery Data 3/15/2016

Geology:
Bell, J. W. and Smith, E. I., 1980, Geologic Map of the Henderson Quadrangle, Nevada, Nevada Bureau of Mines and Geology Map 67.



- Legend**
- Existing Groundwater Monitoring Well
 - Phase II Groundwater Monitoring Well
 - Weir
 - C-1 Channel
 - Northern Rapid Infiltration Basins
 - NERT RI Downgradient Study Area
 - NERT RI Off-site Study Area
 - Fault, dashed where inferred, dotted where concealed



Qaf	Artificial Fill	Ths	Horse Spring Formation
Qa	Modern Wash Deposits	Tt	Thumb Formation
Qh	Pediment and Fan Deposits of Henderson	Ttg	Thumb Formation - Breccia
Qr	Pediment and Fan Deposits of River Mountains	Tvr	Thumb Formation with Volcanic Rocks in Rainbow Gardens
Qf2	Pediment and Fan Deposits Undifferentiated	Tpd	Volcanic Rocks of Powerline Road Dacite
QTg	Older Alluvial Fan Deposits	Tpm	Volcanic Rocks of Powerline Road Basalt and Anderita Flows
QTc	Conglomerate of Las Vegas Wash	Tpb	Volcanic Rocks of Powerline Road Basalt Flows
Qpf	Pediment and Fan Deposits of Frenchman Mountains	Tpt	Volcanic Rocks of Powerline Road Volcanoclastic
Tmcc	Muddy Creek Formation Coarse Grained Facies		
Tmcf	Muddy Creek Formation Fine Grained Facies		
Tmcs	Muddy Creek Formation Undifferentiated		

DOWNGRADIENT STUDY AREA

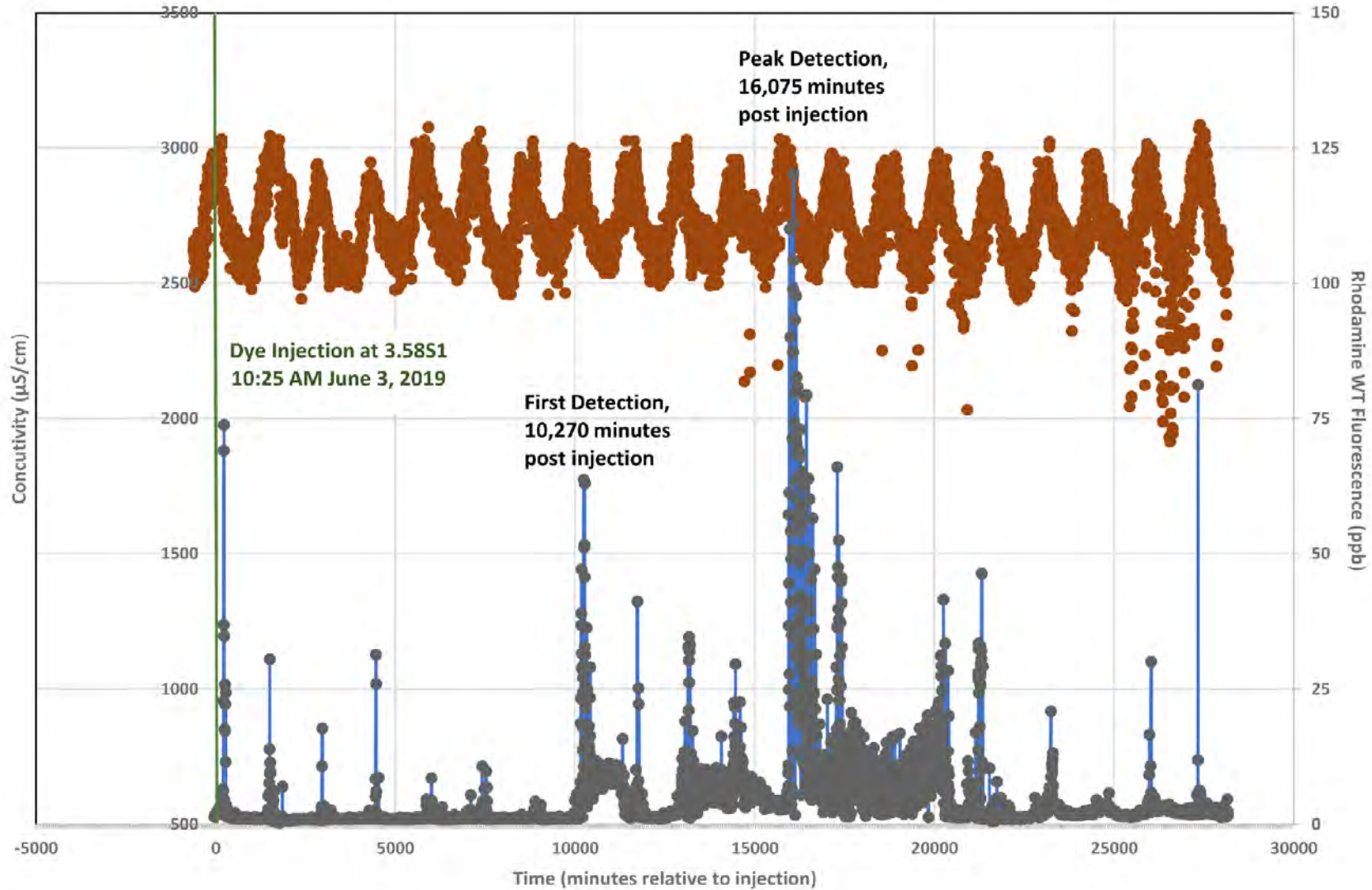
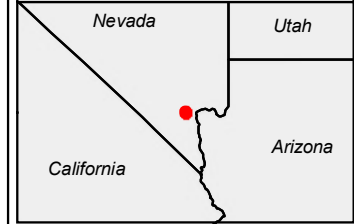
NERT RI Downgradient Study Area

EXISTING MONITORING WELLS AND PHASE II WELLS INCLUDED IN GROUNDWATER QUALITY ASSESSMENT

Date: 10/15/2019 Project: 60477365

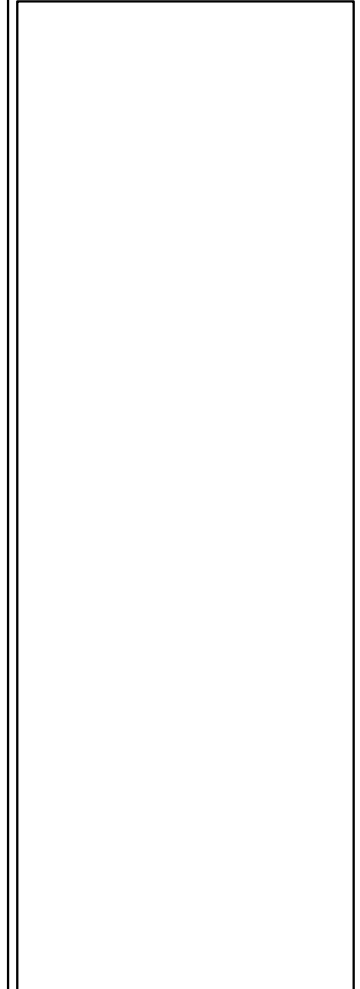
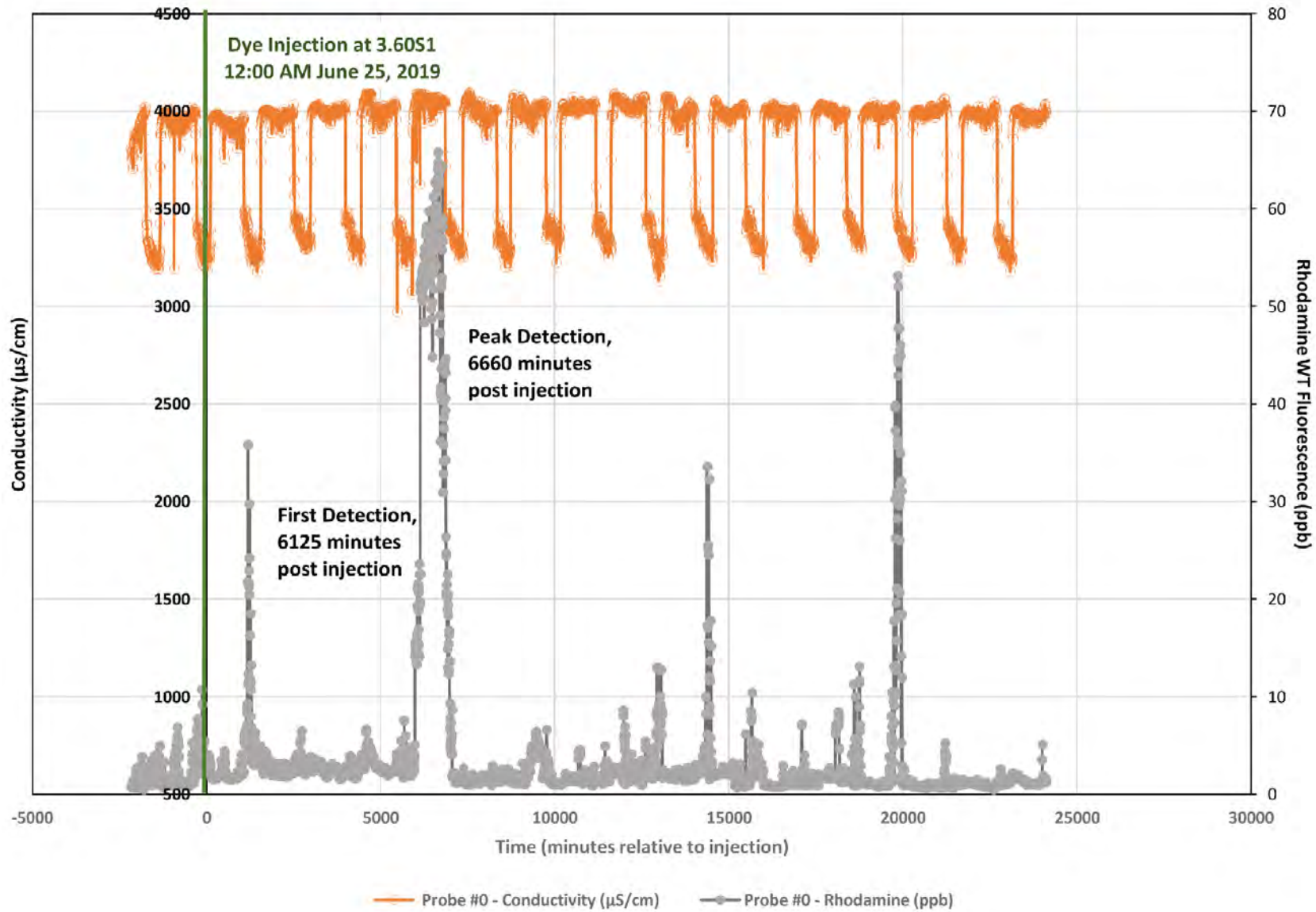
AECOM Figure 6

OVERVIEW MAP



● Probe #2 - Conductivity (µS/cm) ● Probe #2 - Rhodamine (ppb)

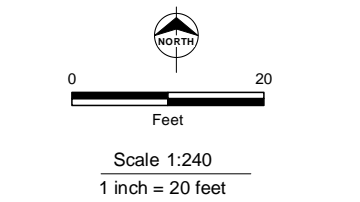
NERT RI
Downgradient Study Area
Probe #2
Fluorescence and
Conductivity Measurements
NERT3.58S1 Dye Injection
Date: 9/24/2019 Project: 60477365
AECOM **Figure 7**



NERT RI
Downgradient Study Area
Probe #0
Fluorescence and
Conductivity Measurements
NERT3.60S1 Dye Injection
Date: 9/24/2019 Project: 60477365
AECOM **Figure 8**



- Legend**
- Phase II Groundwater Well Dye Injected
 - Phase II Observation Well
 - Preliminary Dye Sampling/Sensor Probe Location



NERT RI
Downgradient Study Area

**Observation Wells
for NERT3.58S1**

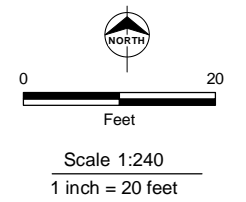
Date: 9/24/2019 Project: 60477365

AECOM Figure 9



- Legend**
- Phase II Groundwater Well Dye Injected
 - Phase II Observation Well
 - Preliminary Dye Sampling/Sensor Probe Location

Note
 Probe locations are approximate based on nearby GPS coordinates.



NERT RI
 Downgradient Study Area

**Observation Wells
 for NERT3.60S1**

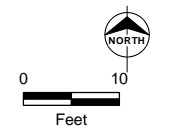
Date: 9/27/2019 Project: 60477365

AECOM Figure 10



- Legend**
- Phase II Groundwater Well Dye Injected
 - Phase II Observation Well
 - Preliminary Dye Sampling/Sensor Probe Location

Note
 Probe locations are approximate based on nearby GPS coordinates.



Scale 1:240
 1 inch = 20 feet

NERT RI
 Downgradient Study Area

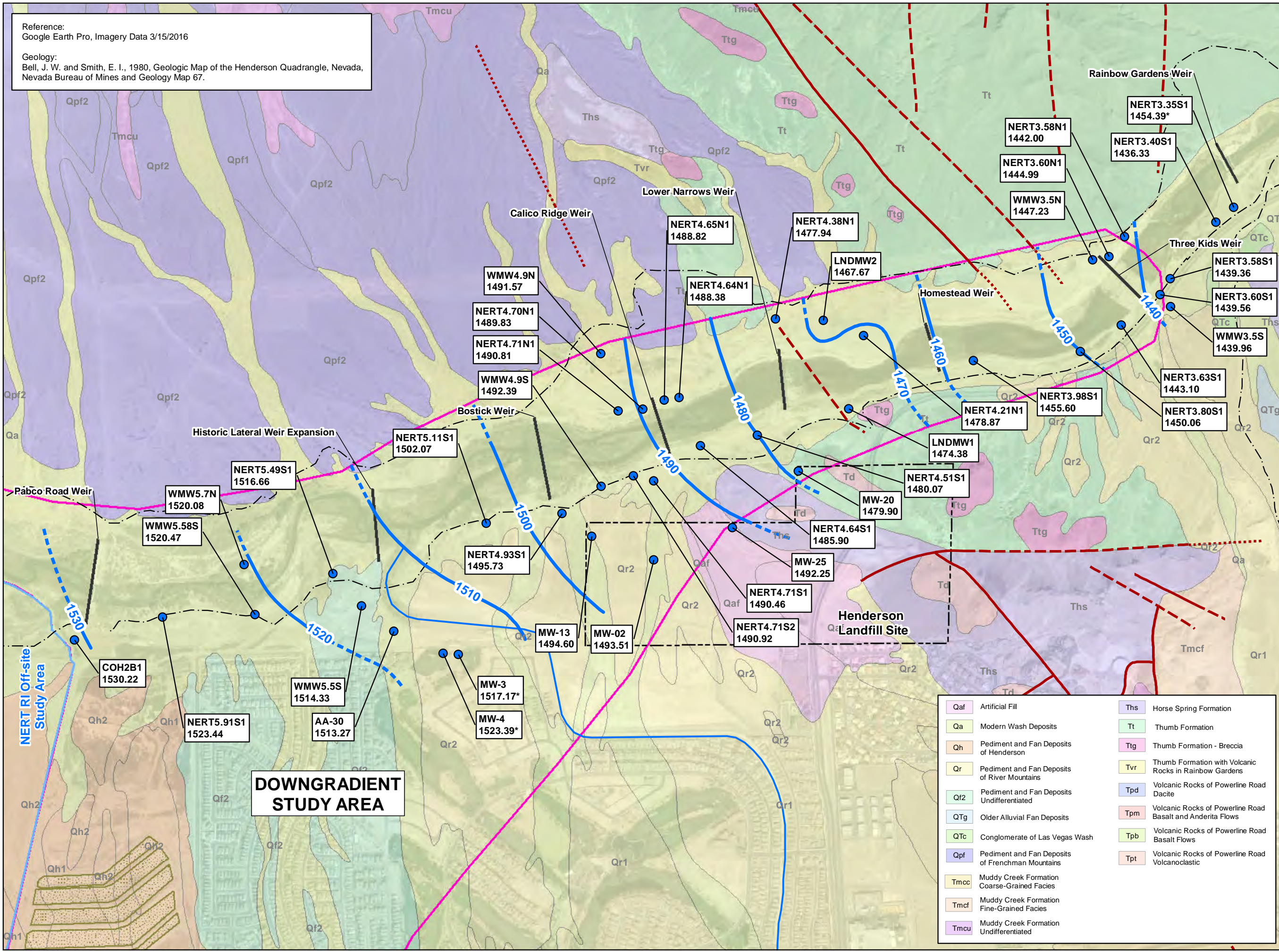
**Observation Wells
 for NERT4.64S1**

Date: 9/27/2019 Project: 60477365

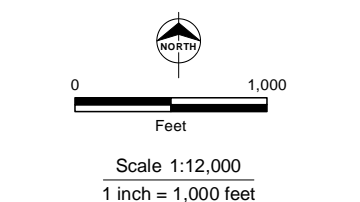
AECOM Figure 11

Reference:
Google Earth Pro, Imagery Data 3/15/2016

Geology:
Bell, J. W. and Smith, E. I., 1980, Geologic Map of the Henderson Quadrangle, Nevada, Nevada Bureau of Mines and Geology Map 67.



- Legend**
- Groundwater Monitoring Well
 - Weir
 - C-1 Channel
 - Northern Rapid Infiltration Basins
 - NERT RI Downgradient Study Area
 - NERT RI Off-site Study Area
 - Fault, dashed where inferred, dotted where concealed
 - 1450 Groundwater Elevation (feet above mean sea level)
 - Groundwater Elevation Contour, dashed where uncertain (feet above mean sea level)
 - * Perched Water Table Not Used for Contouring



Qaf	Artificial Fill	Ths	Horse Spring Formation
Qa	Modern Wash Deposits	Tt	Thumb Formation
Qh	Pediment and Fan Deposits of Henderson	Ttg	Thumb Formation - Breccia
Qr	Pediment and Fan Deposits of River Mountains	Tvr	Thumb Formation with Volcanic Rocks in Rainbow Gardens
Qf2	Pediment and Fan Deposits Undifferentiated	Tpd	Volcanic Rocks of Powerline Road Dacite
QTg	Older Alluvial Fan Deposits	Tpm	Volcanic Rocks of Powerline Road Basalt and Anderita Flows
QTc	Conglomerate of Las Vegas Wash	Tpb	Volcanic Rocks of Powerline Road Basalt Flows
Qpf	Pediment and Fan Deposits of Frenchman Mountains	Tpt	Volcanic Rocks of Powerline Road Volcanoclastic
Tmcc	Muddy Creek Formation Coarse-Grained Facies		
Tmcf	Muddy Creek Formation Fine-Grained Facies		
Tmcs	Muddy Creek Formation Undifferentiated		

DOWNGRADIENT STUDY AREA

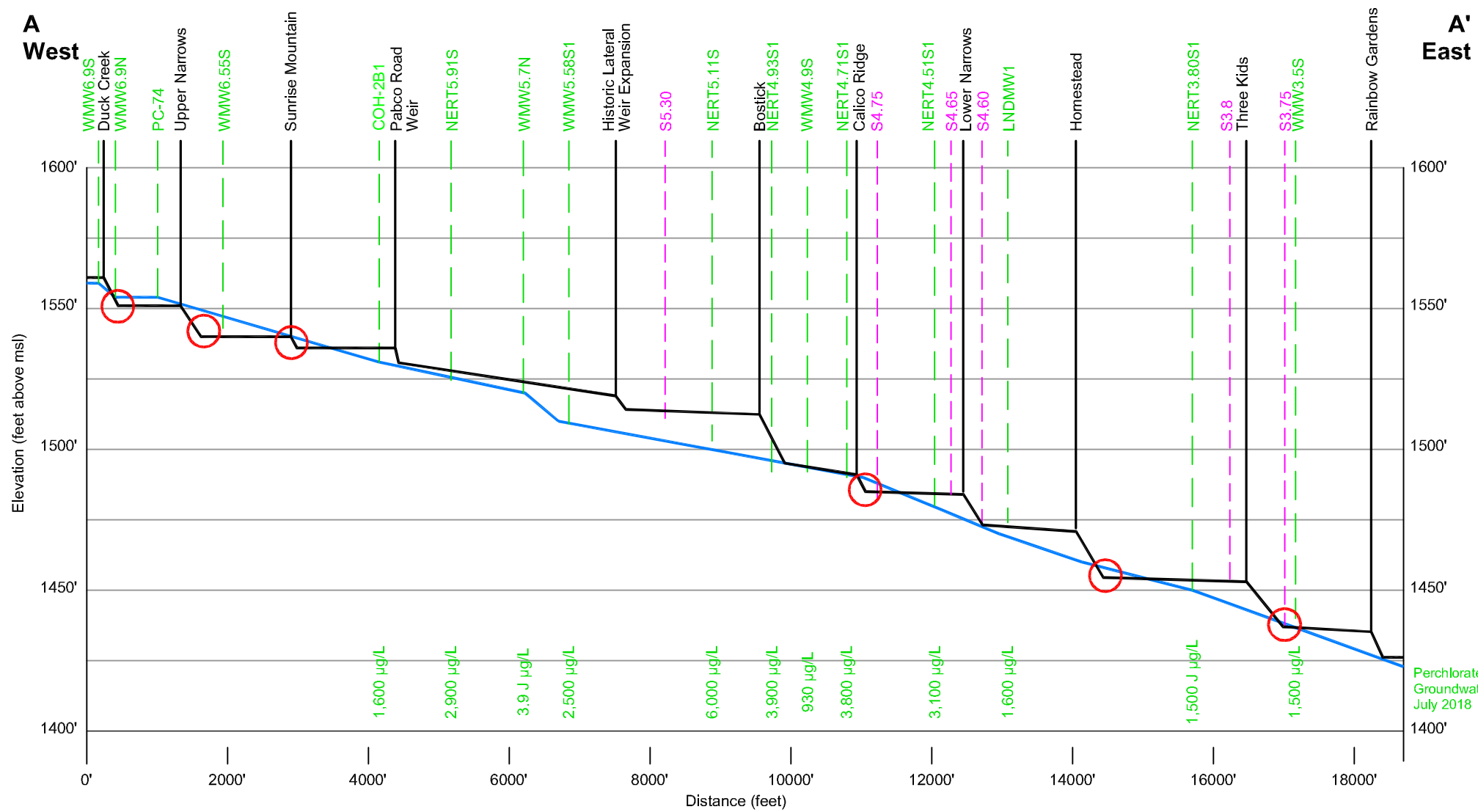
NERT RI
Downgradient Study Area

GROUNDWATER ELEVATIONS ALONG LAS VEGAS WASH JUNE - JULY 2019

Date: 9/24/2019 Project: 60477365

AECOM Figure 12

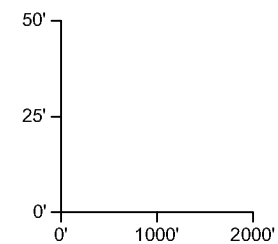
J:\Client-Projects\NDEP\NERT_GW_RA_900-CAD\00-GIS\WXDs\DCIP\Phase II_Tech Memo\Fig13_LW_CrossSection.dwg



Legend

- Surface Water Elevation: Based on AECOM survey of Pabco Road Weir, Las Vegas Wash grade control structures, general elevation information updated 3/22/2018, survey information 6/29/2018, and elevations from Staff Gage Transducers (July 9 to 17, 2018)
- Groundwater Elevation: Based on depth to water measurements on (July 9 to 17, 2018).
- Location of Surface Water Gage
- Location of Transducers in Monitoring Wells
- Location of Weir
- Area Where Groundwater Elevation is Higher Than Surfacewater Elevation

Note
Groundwater elevations in the vicinity of Historic Lateral Weir Expansion were affected by dewatering activities associated with construction.



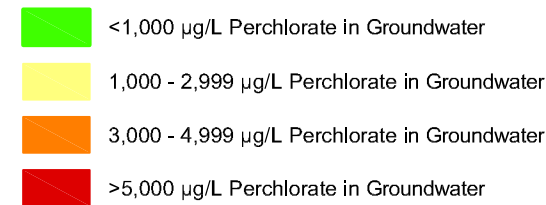
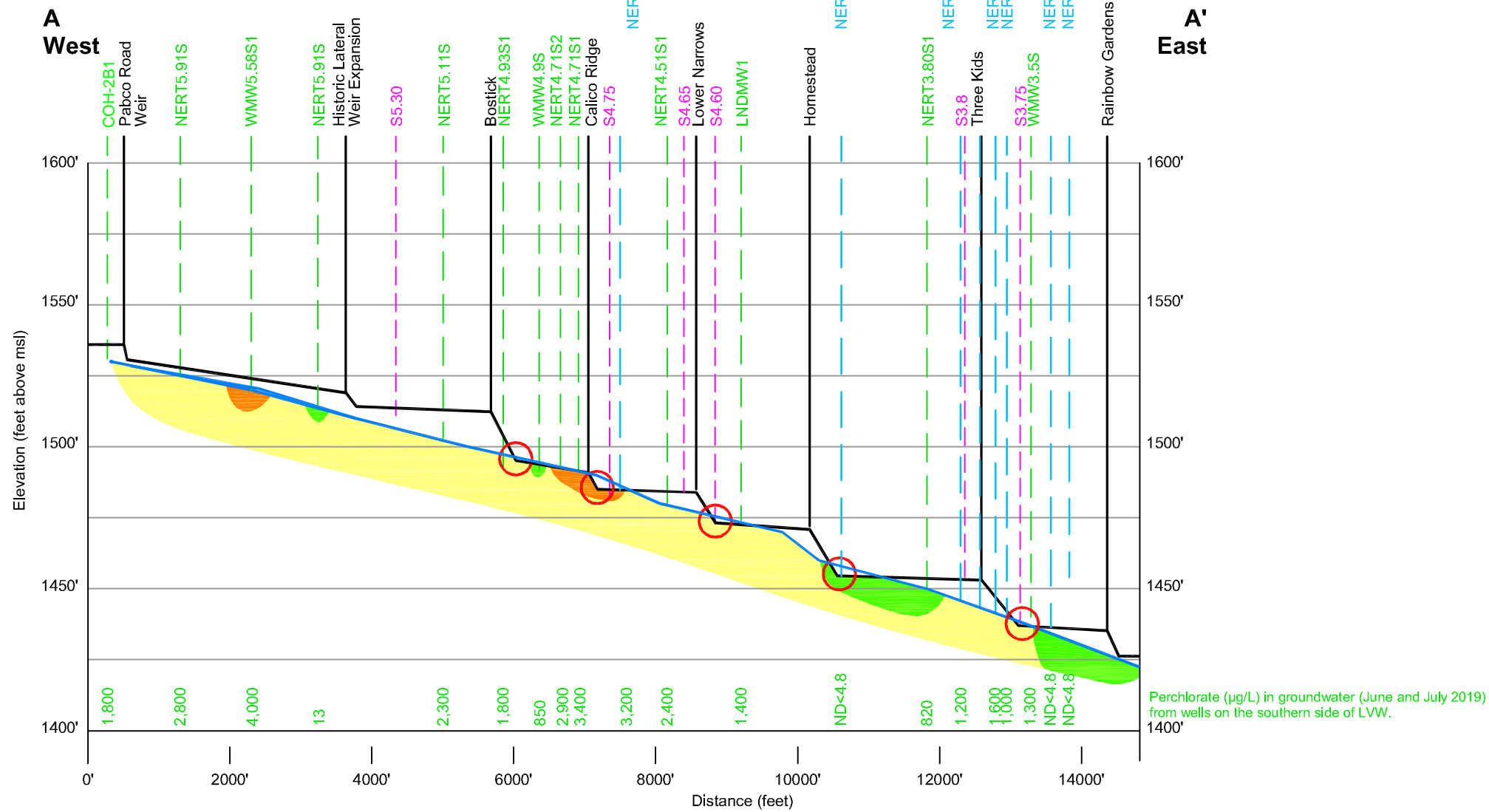
NERT
Downgradient Study Area

SCHEMATIC CROSS SECTION OF SURFACE WATER AND GROUNDWATER ELEVATIONS ALONG LAS VEGAS WASH 2018

Date: 9/24/2019 Project: 60477365

AECOM Figure 13

J:\Client-Projects\NDEP\NERT_GW_RA_900-CAD\00-GIS\WXDs\DCIP\Phase II_Tech Memo\Fig14_2019_LVW_CrossSection_south.dwg



- Legend**
- Surface Water Elevation: Based on AECOM survey of Pabco Road Weir, Las Vegas Wash grade control structures, general elevation information updated 3/22/2018, survey information 6/29/2018, and elevations from Staff Gage Transducers (July 9 to 17, 2018)
 - Groundwater Elevation: Based on depth to water measurements on (June 26 to July 9, 2019).
 - Location of Surface Water Gage
 - Location of Transducers in Monitoring Wells
 - Location of Transducers in Phase II Monitoring Wells
 - Location of Weir
 - Area Where Groundwater Elevation is Higher Than Surfacewater Elevation

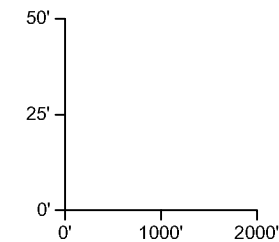
NERT
Downgradient Study Area

SCHEMATIC CROSS SECTION OF SURFACE WATER AND GROUNDWATER ELEVATIONS ALONG LAS VEGAS WASH 2019

Date: 9/24/2019 Project: 60477365

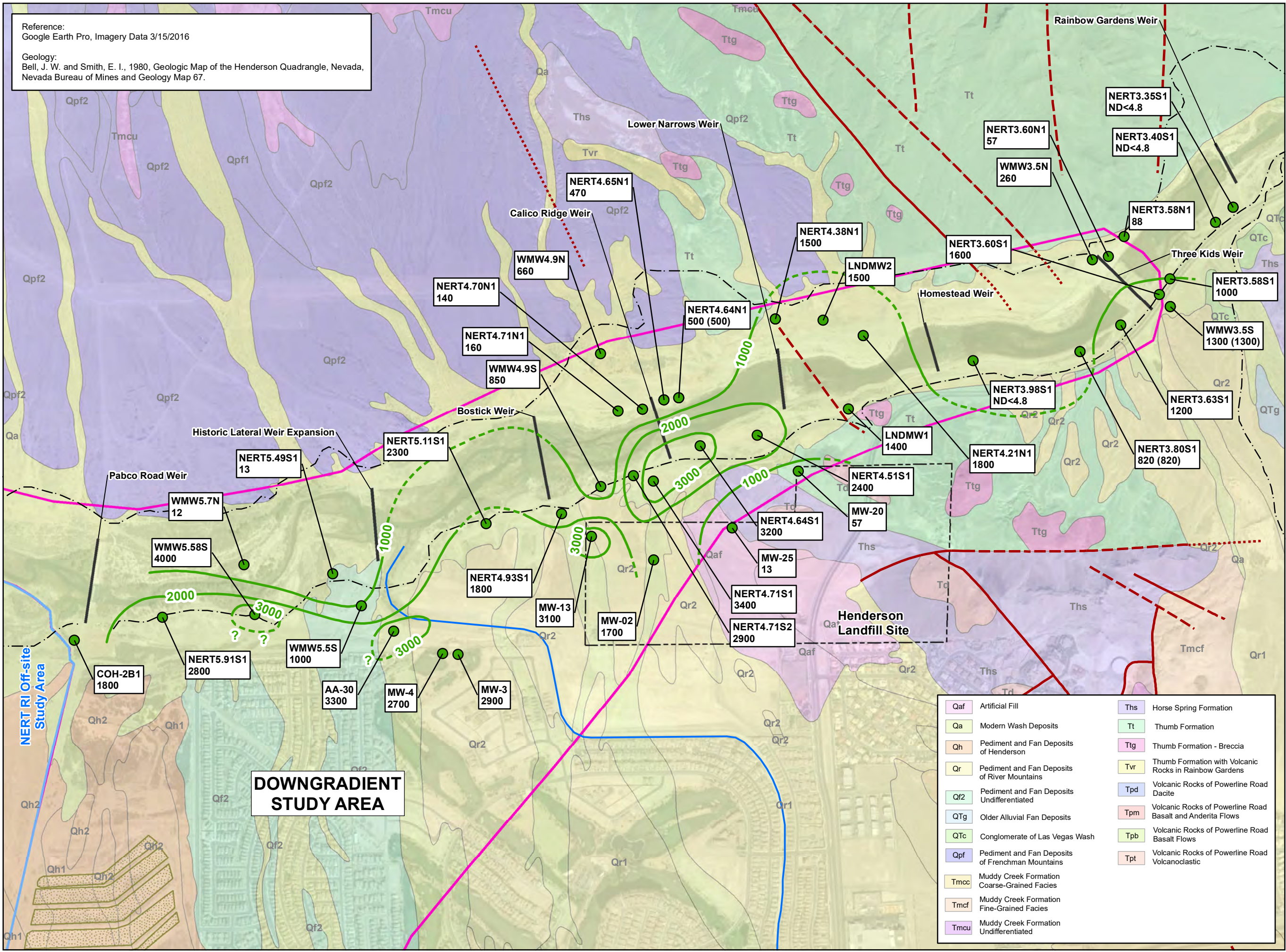


Figure 14



Reference:
Google Earth Pro, Imagery Data 3/15/2016

Geology:
Bell, J. W. and Smith, E. I., 1980, Geologic Map of the Henderson Quadrangle, Nevada, Nevada Bureau of Mines and Geology Map 67.



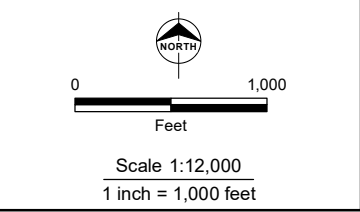
- Legend**
- Groundwater Monitoring Well
 - Weir
 - C-1 Channel
 - Northern Rapid Infiltration Basins
 - NERT RI Downgradient Study Area
 - NERT RI Off-site Study Area
 - Fault, dashed where inferred, dotted where concealed
 - Perchlorate Concentration Isocontour (dashed where inferred)

Perchlorate Concentration in µg/L

ND - Not detected above method detection limit

µg/L - Micrograms per liter

(###) - Duplicates in (prentices)



Qaf	Artificial Fill	Ths	Horse Spring Formation
Qa	Modern Wash Deposits	Tt	Thumb Formation
Qh	Pediment and Fan Deposits of Henderson	Ttg	Thumb Formation - Breccia
Qr	Pediment and Fan Deposits of River Mountains	Tvr	Thumb Formation with Volcanic Rocks in Rainbow Gardens
Qf2	Pediment and Fan Deposits Undifferentiated	Tpd	Volcanic Rocks of Powerline Road Dacite
QTg	Older Alluvial Fan Deposits	Tpm	Volcanic Rocks of Powerline Road Basalt and Anderita Flows
QTc	Conglomerate of Las Vegas Wash	Tpb	Volcanic Rocks of Powerline Road Basalt Flows
Qpf	Pediment and Fan Deposits of Frenchman Mountains	Tpt	Volcanic Rocks of Powerline Road Volcanoclastic
Tmcc	Muddy Creek Formation Coarse-Grained Facies		
Tmcf	Muddy Creek Formation Fine-Grained Facies		
Tmcu	Muddy Creek Formation Undifferentiated		

DOWNGRADIENT STUDY AREA

NERT RI Downgradient Study Area

PERCHLORATE CONCENTRATIONS IN GROUNDWATER JULY 2019

Date: 10/15/2019 Project: 60477365

AECOM Figure 15

Reference:
Google Earth Pro, Imagery Data 3/15/2016

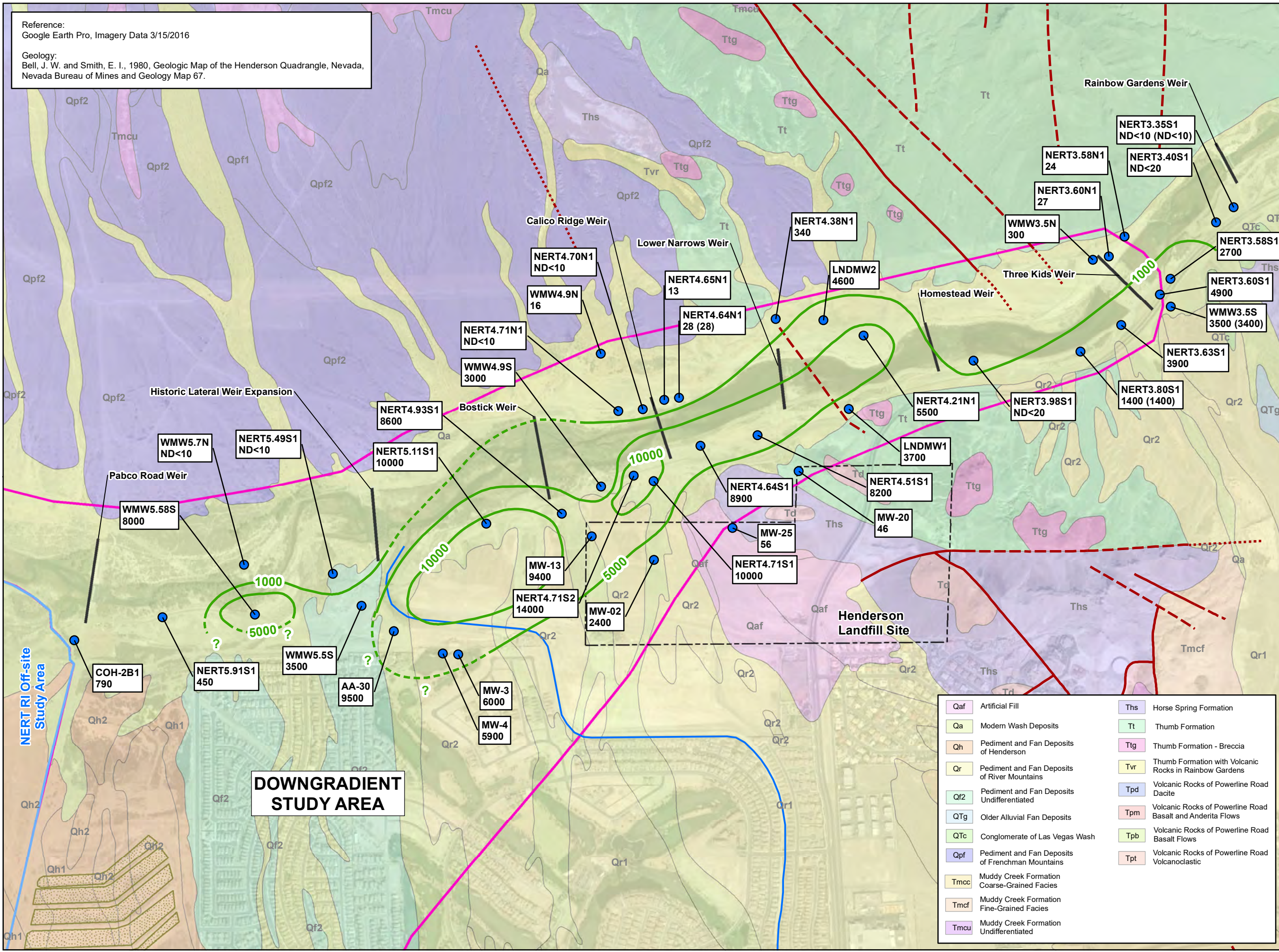
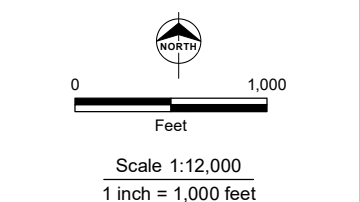
Geology:
Bell, J. W. and Smith, E. I., 1980, Geologic Map of the Henderson Quadrangle, Nevada, Nevada Bureau of Mines and Geology Map 67.



- Legend**
- Groundwater Monitoring Well Sampled in July 2019
 - Weir
 - C-1 Channel
 - Northern Rapid Infiltration Basins
 - NERT RI Downgradient Study Area
 - NERT RI Off-site Study Area
 - - - Fault, dashed where inferred, dotted where concealed
 - Chlorate Concentration Isocontour (dashed where inferred)

Chlorate Concentration in µg/L

ND - Not detected above method detection limit
 J - Result is less than the Reporting Limit but greater than or equal to the Method Detection Limit and the concentration is an approximate value
 µg/L - Micrograms per liter
 (###) - Duplicate Sample in (Parenthesis)



Qaf	Artificial Fill	Ths	Horse Spring Formation
Qa	Modern Wash Deposits	Tt	Thumb Formation
Qh	Pediment and Fan Deposits of Henderson	Ttg	Thumb Formation - Breccia
Qr	Pediment and Fan Deposits of River Mountains	Tvr	Thumb Formation with Volcanic Rocks in Rainbow Gardens
Qf2	Pediment and Fan Deposits Undifferentiated	Tpd	Volcanic Rocks of Powerline Road Dacite
QTg	Older Alluvial Fan Deposits	Tpm	Volcanic Rocks of Powerline Road Basalt and Anderita Flows
QTc	Conglomerate of Las Vegas Wash	Tpb	Volcanic Rocks of Powerline Road Basalt Flows
Qpf	Pediment and Fan Deposits of Frenchman Mountains	Tpt	Volcanic Rocks of Powerline Road Volcanoclastic
Tmcc	Muddy Creek Formation Coarse-Grained Facies		
Tmcf	Muddy Creek Formation Fine-Grained Facies		
Tmcu	Muddy Creek Formation Undifferentiated		

DOWNGRADIENT STUDY AREA

NERT RI Downgradient Study Area

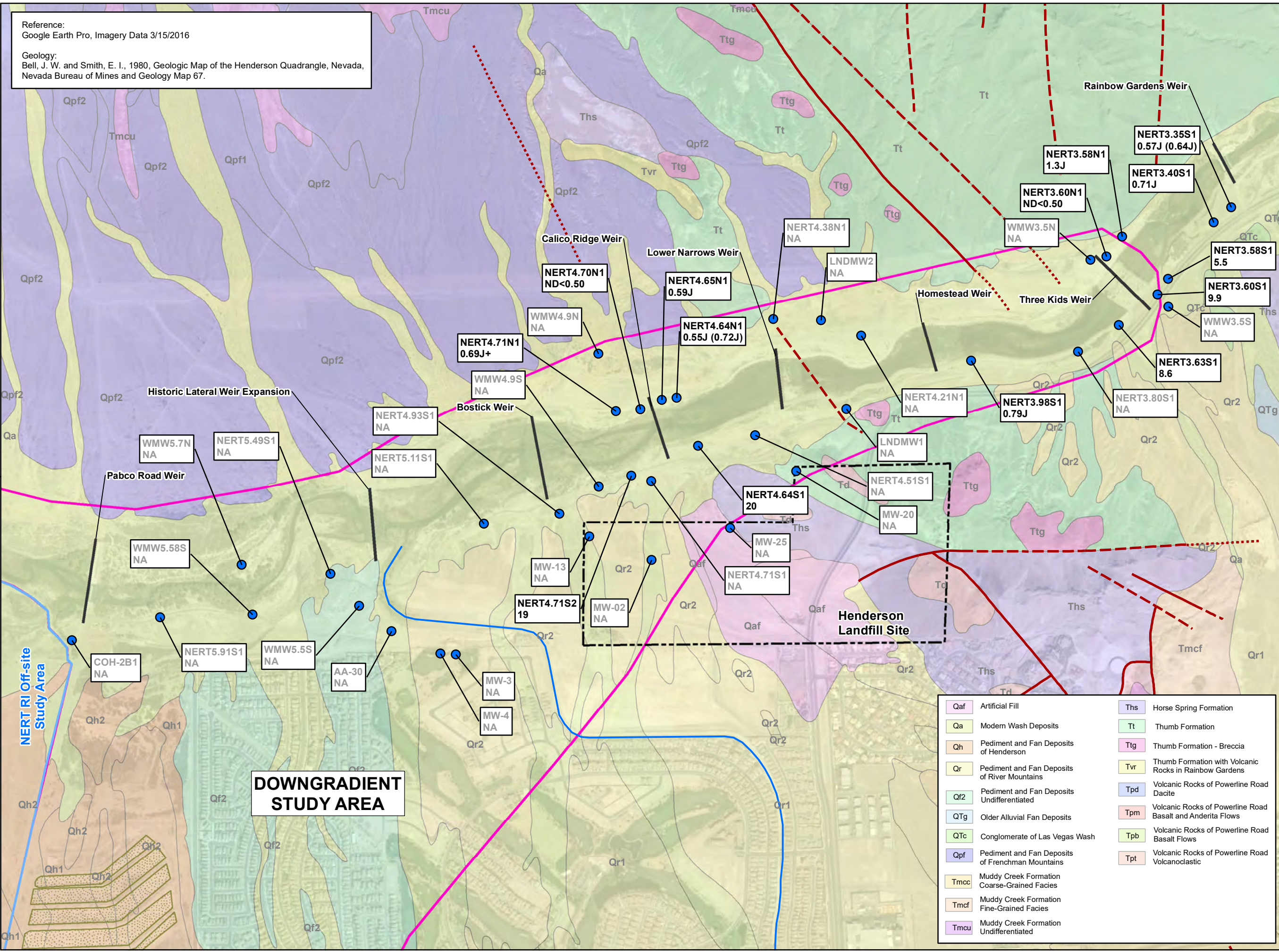
CHLORATE CONCENTRATIONS IN GROUNDWATER JULY 2019

Date: 10/15/2019 Project: 60477365

AECOM Figure 16

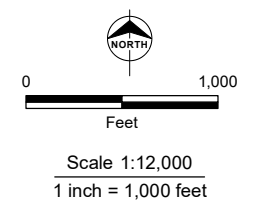
Reference:
Google Earth Pro, Imagery Data 3/15/2016

Geology:
Bell, J. W. and Smith, E. I., 1980, Geologic Map of the Henderson Quadrangle, Nevada,
Nevada Bureau of Mines and Geology Map 67.



- Legend**
- Groundwater Monitoring Well Sampled in July 2019
 - Weir
 - C-1 Channel
 - Northern Rapid Infiltration Basins
 - NERT RI Downgradient Study Area
 - NERT RI Off-site Study Area
 - Fault, dashed where inferred, dotted where concealed

- Dissolved Chromium Concentration in µg/L**
- ND - Not detected above method detection limit
 - NA - Sample taken but Not Analyzed for Dissolved Chromium
 - J - Result is less than the Reporting Limit but greater than or equal to the Method Detection Limit and the concentration is an approximate value
 - J+ - The result is an estimated detection with a potential high bias.
 - µg/L - Micrograms per liter
 - (###) - Duplicate Sample in (Parenthesis)



Qaf	Artificial Fill	Ths	Horse Spring Formation
Qa	Modern Wash Deposits	Tt	Thumb Formation
Qh	Pediment and Fan Deposits of Henderson	Ttg	Thumb Formation - Breccia
Qr	Pediment and Fan Deposits of River Mountains	Tvr	Thumb Formation with Volcanic Rocks in Rainbow Gardens
Qf2	Pediment and Fan Deposits Undifferentiated	Tpd	Volcanic Rocks of Powerline Road Dacite
QTg	Older Alluvial Fan Deposits	Tpm	Volcanic Rocks of Powerline Road Basalt and Anderita Flows
QTc	Conglomerate of Las Vegas Wash	Tpb	Volcanic Rocks of Powerline Road Basalt Flows
Qpf	Pediment and Fan Deposits of Frenchman Mountains	Tpt	Volcanic Rocks of Powerline Road Volcanoclastic
Tmcc	Muddy Creek Formation Coarse-Grained Facies		
Tmcf	Muddy Creek Formation Fine-Grained Facies		
Tmcs	Muddy Creek Formation Undifferentiated		

DOWNGRADIENT STUDY AREA

NERT RI
Downgradient Study Area

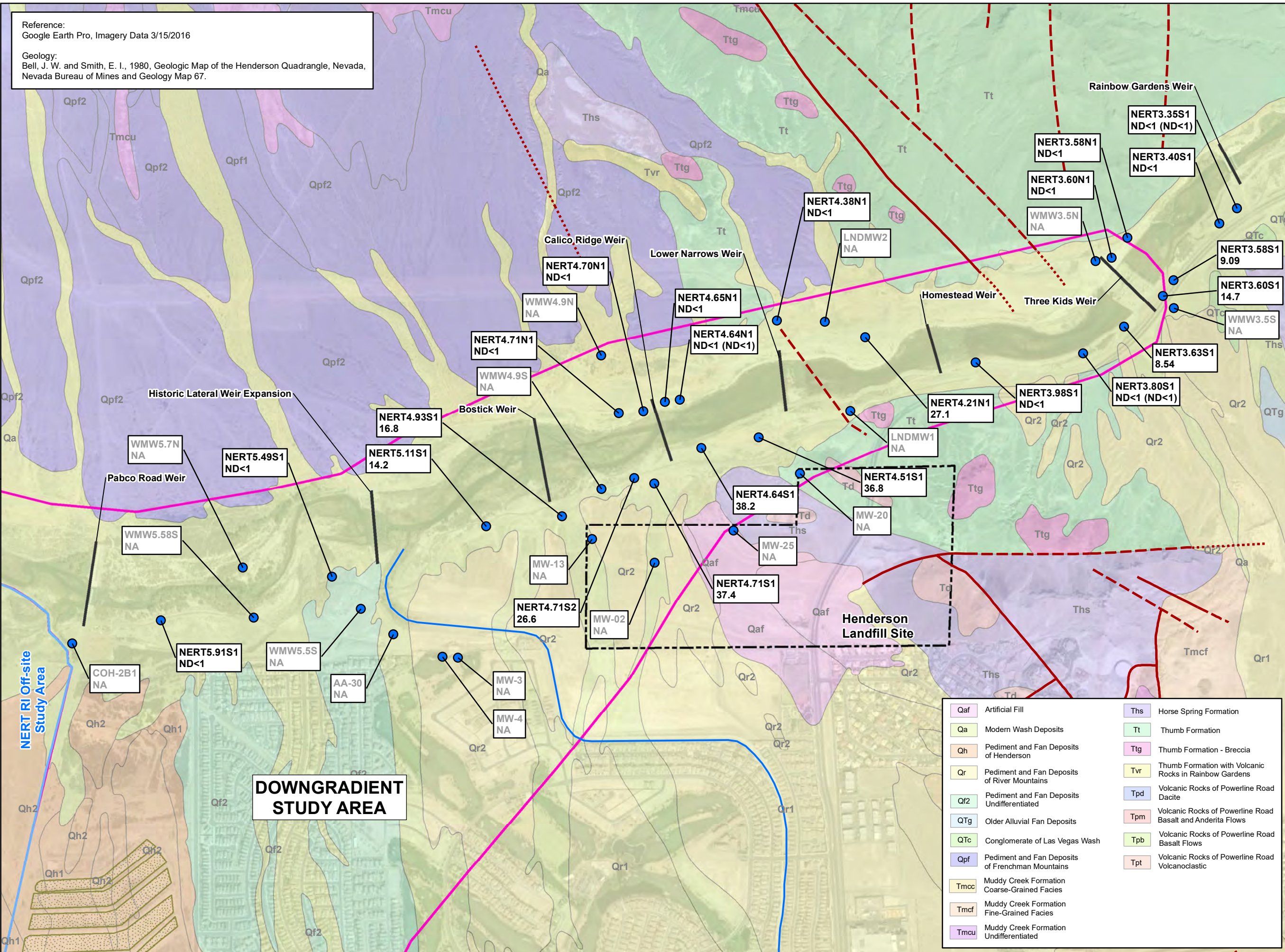
DISSOLVED CHROMIUM CONCENTRATIONS IN GROUNDWATER JULY 2019

Date: 10/15/2019 Project: 60477365

AECOM Figure 17

Reference:
Google Earth Pro, Imagery Data 3/15/2016

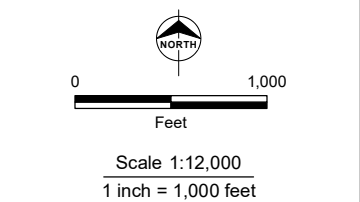
Geology:
Bell, J. W. and Smith, E. I., 1980, Geologic Map of the Henderson Quadrangle, Nevada,
Nevada Bureau of Mines and Geology Map 67.



- Legend**
- Groundwater Monitoring Well Sampled in July 2019
 - Weir
 - C-1 Channel
 - Northern Rapid Infiltration Basins
 - ▭ NERT RI Downgradient Study Area
 - ▭ NERT RI Off-site Study Area
 - - - Fault, dashed where inferred, dotted where concealed

Hexavalent Chromium Concentration in µg/L

- ND - Not detected above method detection limit
- NA - Sample taken but Not Analyzed for Hexavalent Chromium
- µg/L - Micrograms per liter
- (###) - Duplicate Sample in (Parenthesis)



Qaf	Artificial Fill	Ths	Horse Spring Formation
Qa	Modern Wash Deposits	Tt	Thumb Formation
Qh	Pediment and Fan Deposits of Henderson	Ttg	Thumb Formation - Breccia
Qr	Pediment and Fan Deposits of River Mountains	Tvr	Thumb Formation with Volcanic Rocks in Rainbow Gardens
Qf2	Pediment and Fan Deposits Undifferentiated	Tpd	Volcanic Rocks of Powerline Road Dacite
QTg	Older Alluvial Fan Deposits	Tpm	Volcanic Rocks of Powerline Road Basalt and Anderita Flows
QTc	Conglomerate of Las Vegas Wash	Tpb	Volcanic Rocks of Powerline Road Basalt Flows
Qpf	Pediment and Fan Deposits of Frenchman Mountains	Tpt	Volcanic Rocks of Powerline Road Volcanoclastic
Tmcc	Muddy Creek Formation Coarse-Grained Facies		
Tmcf	Muddy Creek Formation Fine-Grained Facies		
Tmcs	Muddy Creek Formation Undifferentiated		

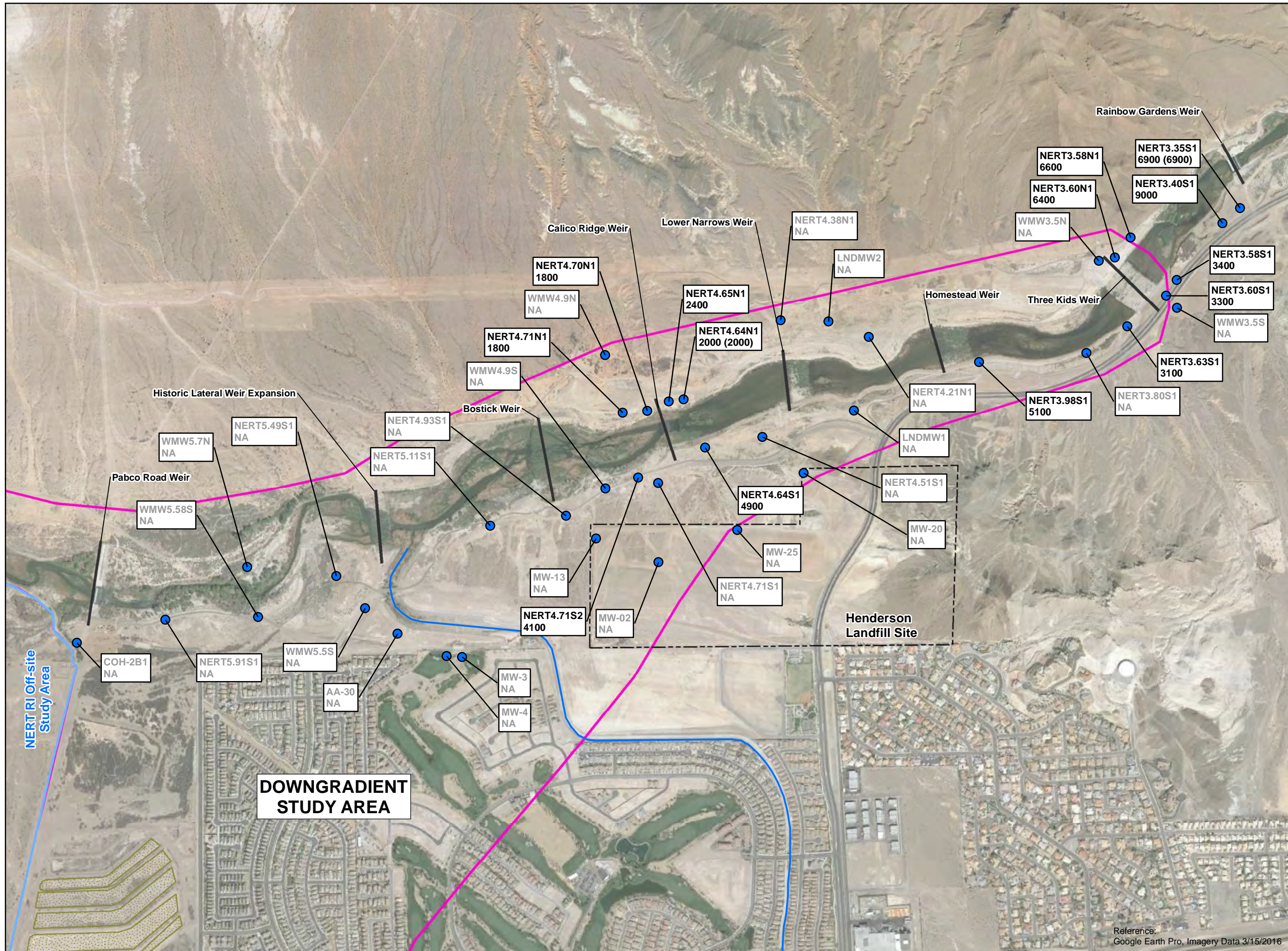
DOWNGRADIENT STUDY AREA

NERT RI Downgradient Study Area

HEXAVALENT CHROMIUM CONCENTRATIONS IN GROUNDWATER JULY 2019

Date: 10/15/2019 Project: 60477365

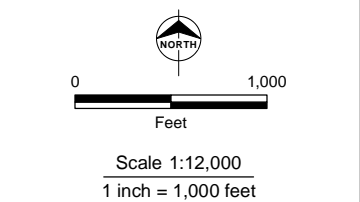
AECOM Figure 18



- Legend**
- Groundwater Monitoring Well Sampled in July 2019
 - Weir
 - C-1 Channel
 - Northern Rapid Infiltration Basins
 - ▭ NERT RI Downgradient Study Area
 - ▭ NERT RI Off-site Study Area
 - - - Fault, dashed where inferred, dotted where concealed

Total Dissolved Solids Concentration in mg/L

NA - Sample taken but Not Analyzed for total dissolved solids
 mg/L - Milligrams per liter
 (###) - Duplicate Sample in (Parenthesis)



DOWNGRADIENT STUDY AREA

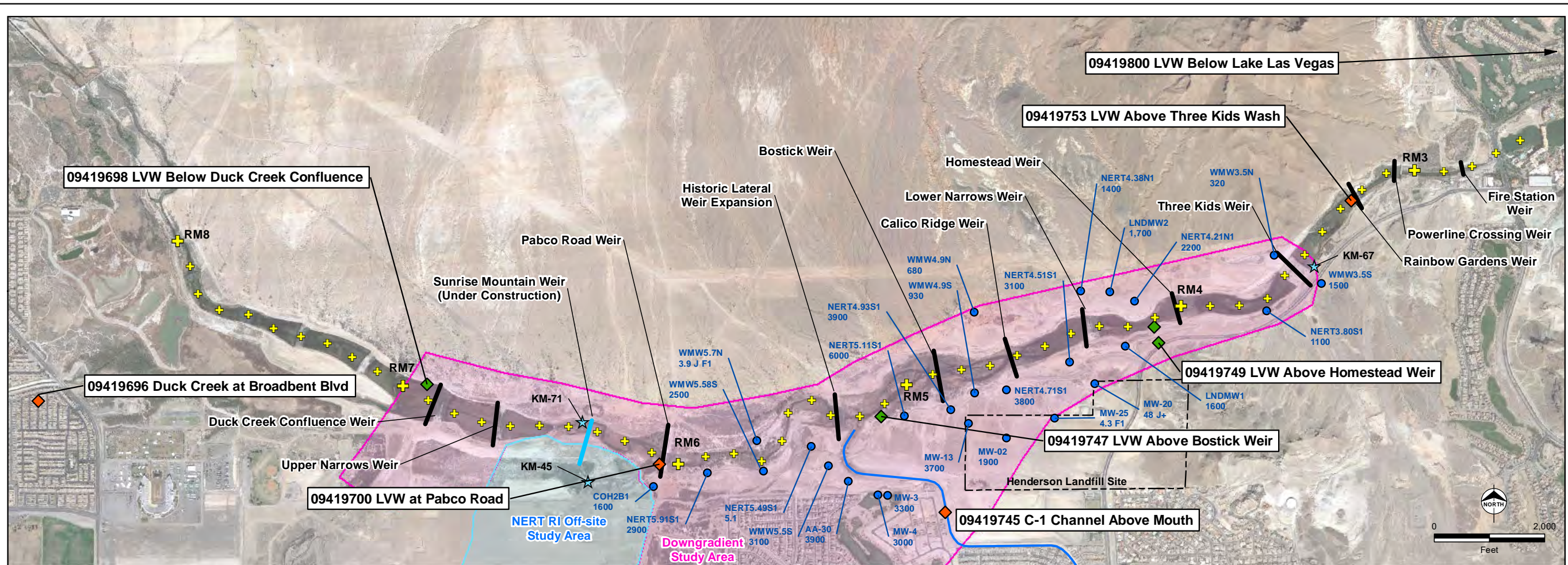
NERT RI Downgradient Study Area

TOTAL DISSOLVED SOLIDS CONCENTRATIONS IN GROUNDWATER JULY 2019

Date: 10/15/2019 Project: 60477365

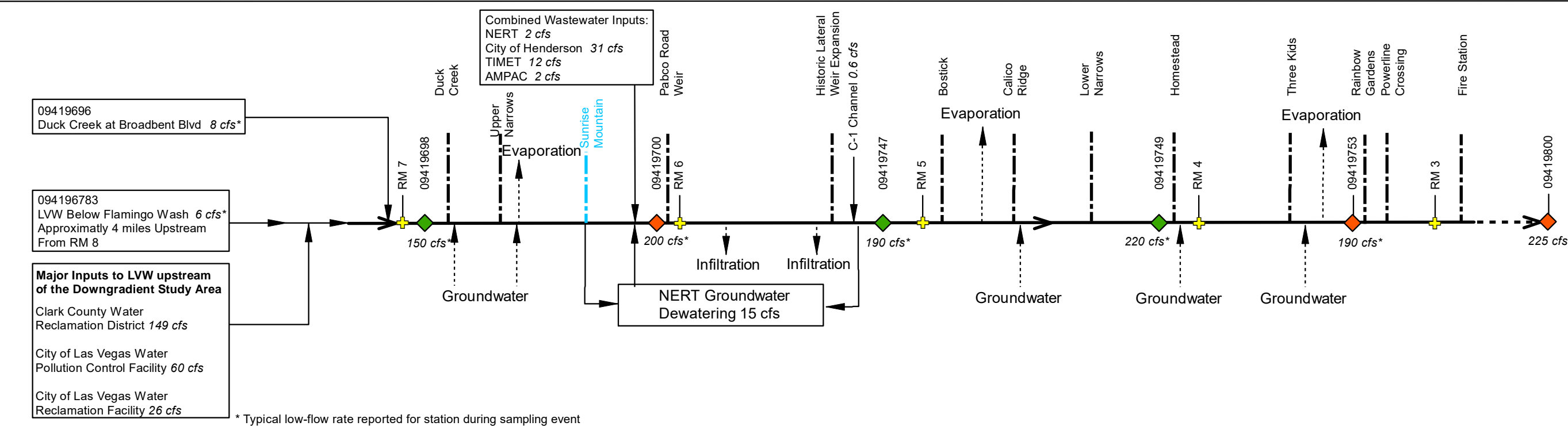
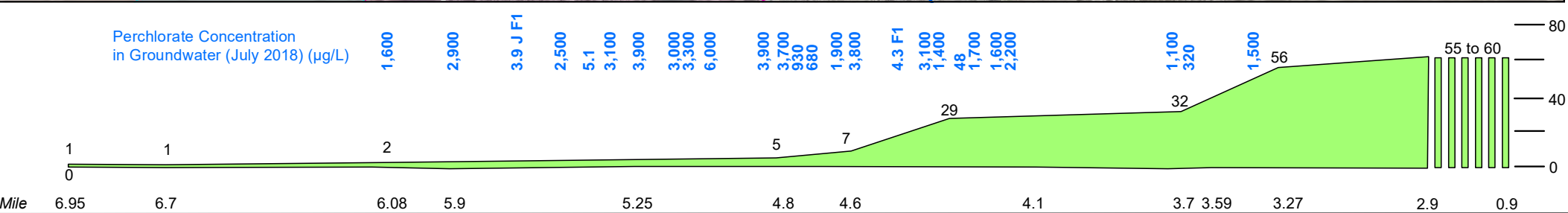
Reference: Google Earth Pro, Imagery Data 3/15/2016

AECOM Figure 19



- Legend**
- ◆ Approximate Location of Temporary USGS Stream Gage (Installed September 2016)
 - ◇ Approximate Location of Permanent USGS Stream Gage
 - ★ Approximate Location of Former Seep
 - ⊕ River Mile (RM)
 - Channels
 - Weir
 - Weir (Proposed)
 - ▭ NERT RI Downgradient Study Area
 - ▭ NERT RI Off-site Study Area
 - ⬇ Non Point Source / Influence
- LVW - Las Vegas Wash
 RM - River Mile
 cfs - Cubic Feet per Second
 lbs/day - Pounds per Day
 J - Result is less than the Reporting Limit but greater than or equal to the Method Detection Limit and the concentration is an approximate value
 F1 - Matrix spike and/or matrix duplicate recovery is outside acceptable limits
 µg/L - Micrograms per liter

May 2018 Estimated Perchlorate Load in lbs/day in Las Vegas Wash. Perchlorate load was estimated from transect and discrete sampling during daily low flow periods. During this period groundwater dewatering and treatment was conducted at Sunrise Mountain Weir and Historic Lateral Weir construction areas. For this reason, the perchlorate load depicted may not be representative of conditions when dewatering is not occurring.

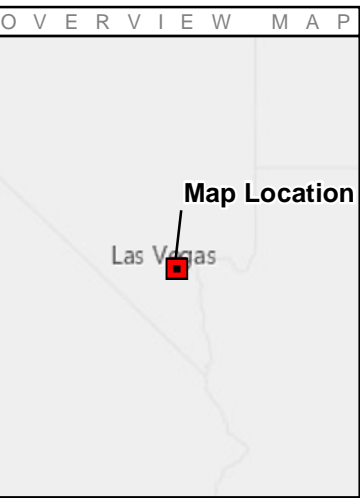
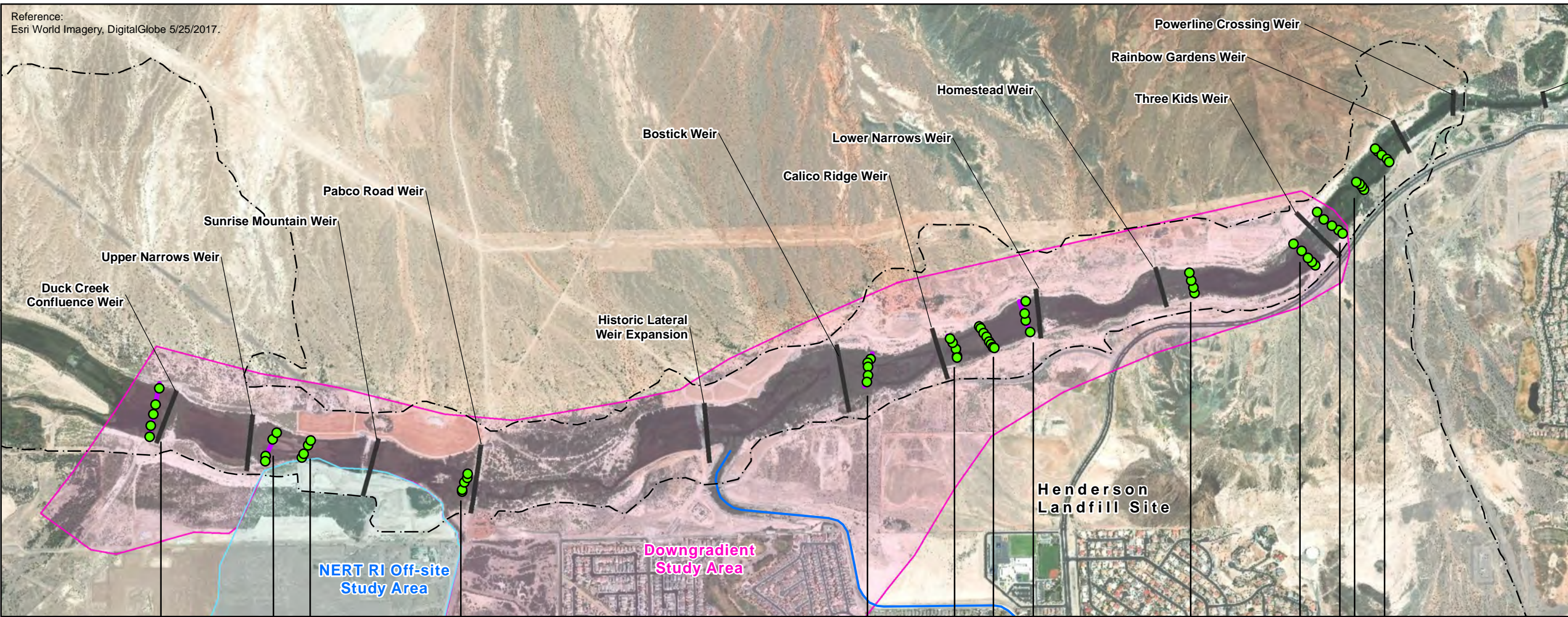


CONCEPTUAL SITE MODEL OF PERCHLORATE IN THE LAS VEGAS WASH

Date: 9/24/2019 Project: 60477365

AECOM Figure 20

Reference:
Esri World Imagery, DigitalGlobe 5/25/2017.



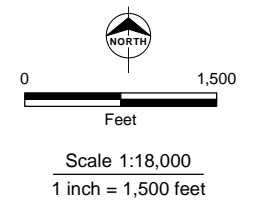
- Legend**
- Surface Water Sample Location Along Transect
 - Transects
 - Weir
 - Northern Rapid Infiltration Basins
 - - - Wetlands Trail
 - Channels
 - NERT RI Downgradient Study Area
 - NERT RI Off-site Study Area

Perchlorate Concentration in µg/L

J - Associated concentration is estimate
µg/L - Micrograms per liter

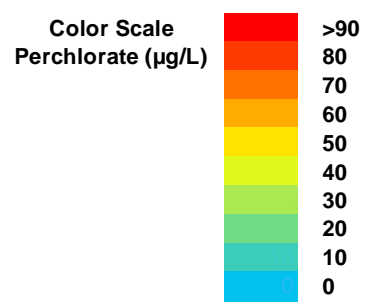
Note:

1. Field duplicates are not presented.
2. Two concentrations for one location indicates sampling conducted at two depths. Shallow depth on left and deep depth on right.



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Transect ID	T6.8	T6.55	T6.5	T6	T4.85	T4.8	T4.7	T4.65	T3.9	T3.8	T3.75	T3.5	T3.3
North Bank	<0.95	<0.95	<0.95	2.7 J	4.7	31	15	14	23	41	200	37	33
	<0.95	<0.95	<0.95	3 J	5.3	5.4	10	11	29	19	19	33	72
	1.9 J	<0.95	<0.95	1.2 J	5.1	5.8	12	35	39	25	26	85	81
	1.6 J	1.3 J	<0.95	1.2 J	5	1800	16	35	44	36	40	91	89
South Bank	<0.95	690	13	1.4 J	7.3	3200	23	22	32	53	90	96	
							21						
							23						

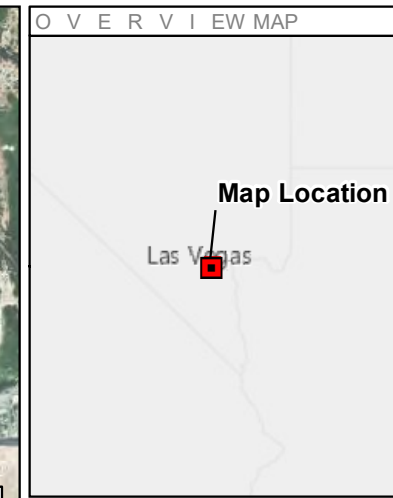
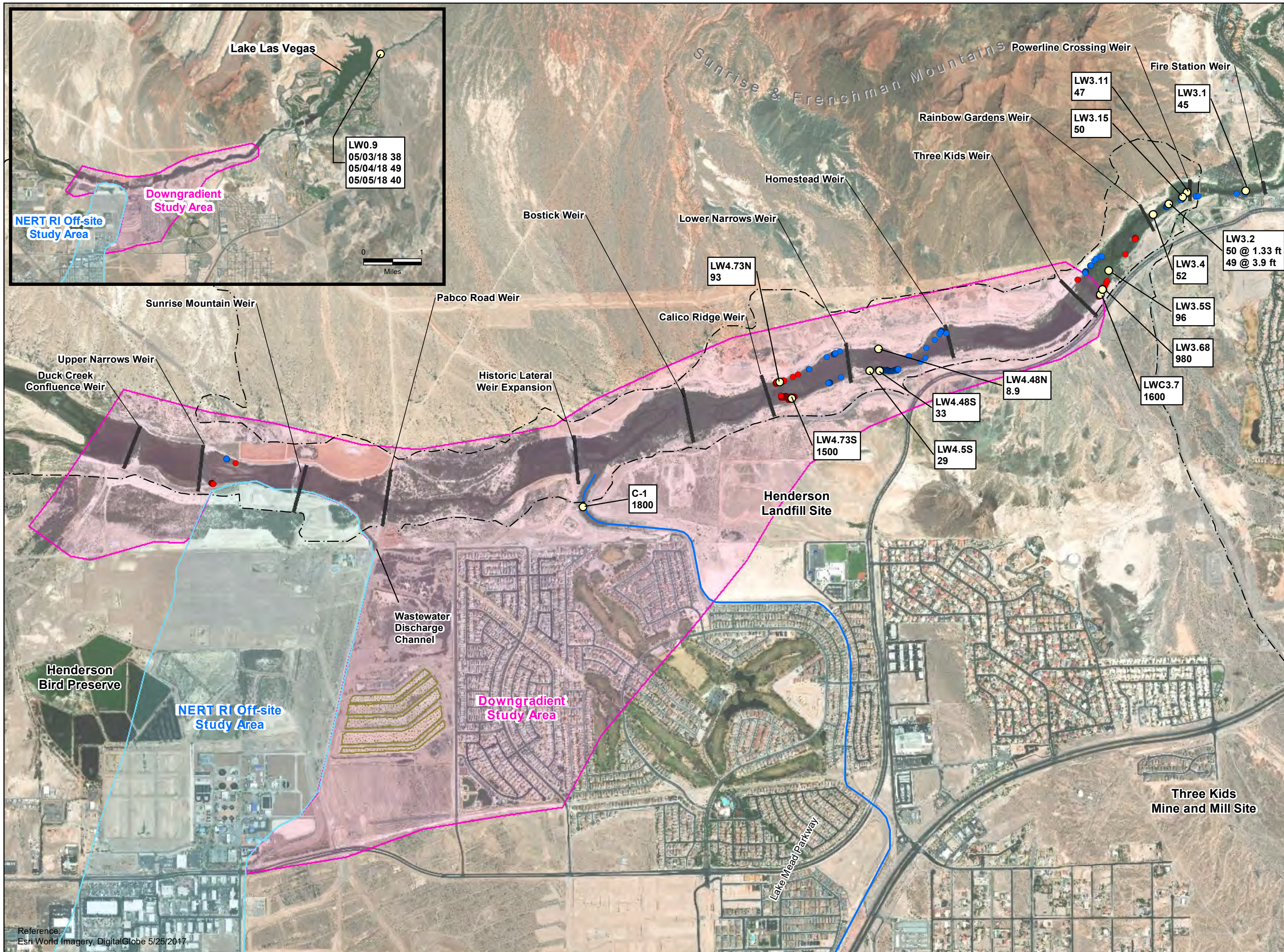


NERT RI
Downgradient Study Area

PERCHLORATE CONCENTRATIONS IN SURFACE WATER SAMPLES - TRANSECT SAMPLING (May 2018)

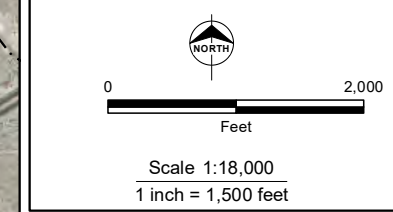
Date: 9/24/2019 Project: 60477365

AECOM Figure 21



- Legend**
- Grab Surface Water Sample Location
 - Warm DTS Anomaly
 - Cool DTS Anomaly
 - Weir
 - Northern Rapid Infiltration Basins
 - Wetlands Trail
 - Channels
 - NERT RI Downgradient Study Area
 - NERT RI Off-site Study Area

Perchlorate Concentration in µg/L
 µg/L - Micrograms per liter



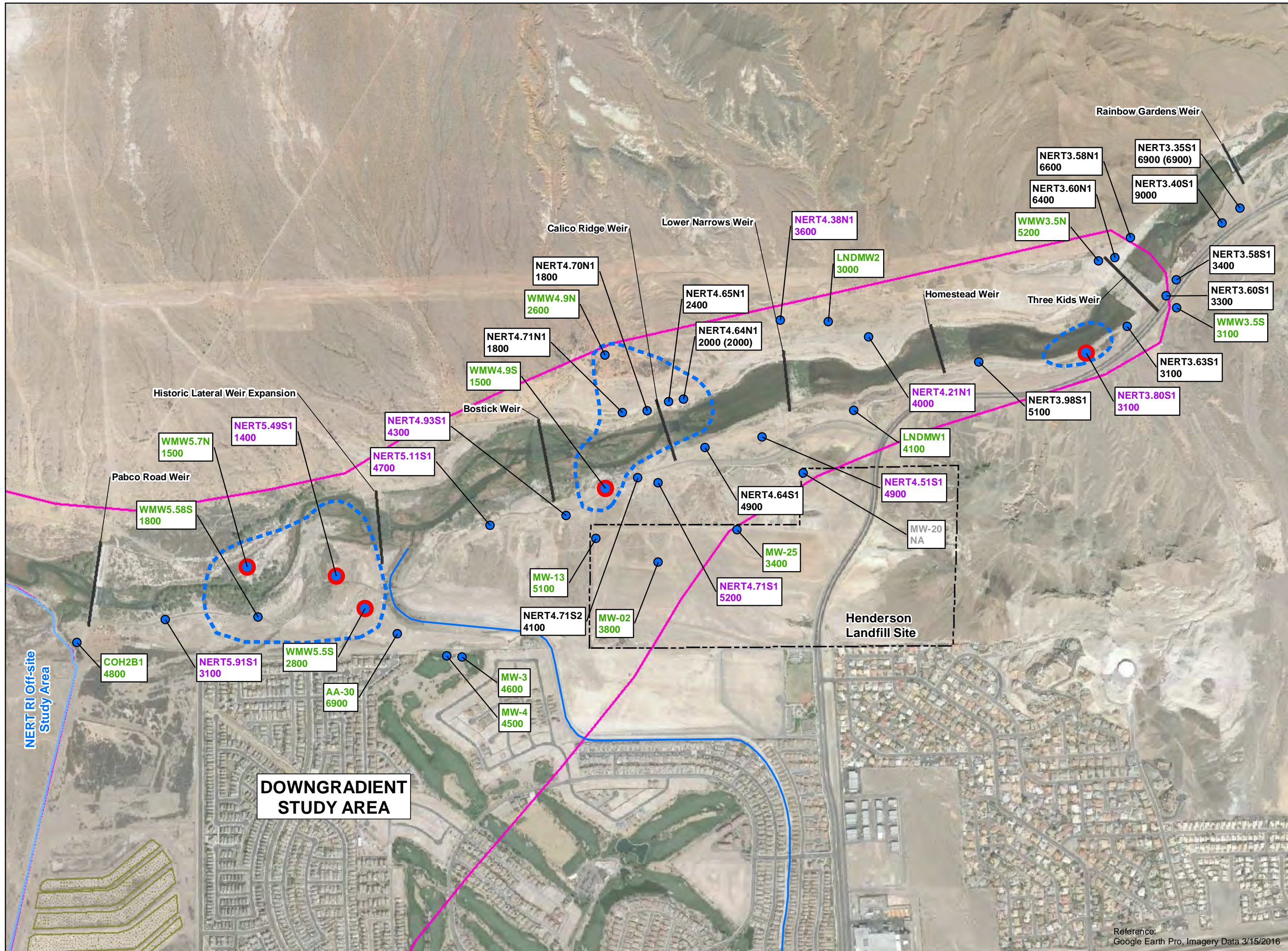
NERT RI
Downgradient Study Area

**PERCHLORATE
CONCENTRATIONS IN
SURFACE WATER
SAMPLES - GRAB
SAMPLING
(May 2018)**

Date: 11/30/2018 Project: 60477365

AECOM Figure 22

Reference:
Esri World Imagery, DigitalGlobe 5/25/2017.



- Legend**
- Groundwater Monitoring Well Sampled in July 2019
 - Groundwater Temperature Change >5° F
 - Estimated Groundwater/Surface water Interface Base on TDS Concentration <3,000 and/or a Temperature Change >5° F
 - Weir
 - C-1 Channel
 - Northern Rapid Infiltration Basins
 - NERT RI Downgradient Study Area
 - NERT RI Off-site Study Area
 - Fault, dashed where inferred, dotted where concealed

Total Dissolved Solids Concentration in mg/L

NA - Sample taken but Not Analyzed for total dissolved solids
 mg/L - Milligrams per liter
 (##) - Duplicate Sample in (Parenthesis)

3100 Data from 2019
3100 Data from 2018
3100 Data from 2016

0 1,000
 Feet
 Scale 1:12,000
 1 inch = 1,000 feet

DOWNGRADIENT STUDY AREA

NERT RI Downgradient Study Area

ESTIMATED GROUNDWATER / SURFACE WATER INTERFACE

Date: 9/25/2019 Project: 60477365

AECOM Figure 23

Reference: Google Earth Pro, Imagery Data 3/15/2016

Appendix A

Response to Stakeholder Comments

Memorandum

To	NDEP: Carlton Parker, J.D. Dotchin	Pages 3
CC	AECOM: Carmen Caceres-Schnell	
Subject	Response to Comments – Downgradient Study Area: Final Draft Data Gap Investigation - Phase II Groundwater Quality Assessment Technical Memorandum	
From	AECOM: Sally Bilodeau/ Harry Vandenberg	
Date	October 31, 2019	

This memorandum summarizes AECOM's responses to comments (RTCs) on the Downgradient Study Area (DGS): Final Draft Data Gap Investigation - Phase II Groundwater Quality Assessment Technical Memorandum received from Maria Lopez, Metropolitan Water District of Southern California (MWD), via email dated October 21, 2019. For context of the comments and RTCs, AECOM provided the portions of the text that the comments pertain to in *italics*, where applicable. Proposed technical memorandum text revisions are also presented in *italics*. A new table (Table 13) has been prepared in response to Comment 3 and is attached to this RTC memorandum.

General Comments:

Comment 1: The data gaps identified in the Phase II DGI were the same data gaps identified in the Phase I DGI, with the exception of three additional data gaps [1) How deep are the high concentration perchlorate-impacted groundwater plumes?; 2) Where does faulting affect the movement of high-concentration perchlorate-impacted groundwater?; and 3) Do high volumes of low-concentration perchlorate-impacted groundwater provide more flux to the LVW than low volumes of high-concentration perchlorate-impacted groundwater?]. Two of the three new data gaps (#1 and #2) were addressed by the data results from the LVW Bioremediation Study and not the Phase II DGI.

RTC 1: The data gaps were identified jointly with NDEP, NERT, and AECOM at the start of the downgradient investigation in 2016. The subsequent investigations by all parties have been used to efficiently address the data gaps and further the understanding of perchlorate occurrence and movement in the DSA. References to studies performed by others are identified, where applicable, in the discussion of each of the individual data gaps. The following sentence was added: *As stated in the DGIP, the following data gaps were identified in 2016 and have been assessed or partially addressed through prior investigations conducted in the Downgradient Study Area, including investigation data collected in preparation for the LVW Bioremediation Pilot Study.*

Comment 2: For some of the original data gaps, the conclusions presented in the Phase II DGI are the same as those presented in the Phase I DGI, and it is not clear how the additional monitoring work and tracer tests provided a better understanding of the data gap questions. For example, the Phase II DGI confirmed that the perchlorate-impacted groundwater is bypassing the seep well field on its eastern side near monitoring well COH2B1. The Phase II DGI also confirmed the groundwater flow direction is generally the same as the surface water flow direction, east to west, adjacent to the LVW, and the tracer tests only confirmed variability in the groundwater flow directions.

RTC 2: The comment is correct in that the Phase II Groundwater Quality Assessment did not provide additional data that changed the Phase I Groundwater Quality Assessment conclusions for some of the original data gaps, but it did provide further confirmation of those Phase I Groundwater Quality Assessment conclusions. Note that the confirmed groundwater (and surface water) flow direction is

from west to east, not east to west as stated in the comment. No change to the Tech Memo is required.

Comment 3: Overall, the Phase II DGI identifies additional data gaps within the Conclusion and Recommendations, and it is not clear how the Phase II DGI further supports the Downgradient Study Area investigation or what additional information is required to further support NERT's completion of the OU-3 RI Report and Feasibility Study. We recommend including an executive summary that clearly identifies the specific findings of the Phase II DGI and the specific data gaps that still need to be addressed to support the OU-3 RI and the groundwater model.

RTC 3: Table 13 has been added to the Phase II technical memorandum to clarify where additional work is needed to further address data gaps.

Specific Comments:

1. **Section 2.2.6 Groundwater Sampling, page 2-4**

Comment 1: This section states that the Phase I wells were analyzed for perchlorate, chlorate, and hexavalent chromium, but the existing wells were only analyzed for perchlorate and chlorate. Please explain why the existing wells were not analyzed for hexavalent chromium.

RTC 1: Consistent with the approved work plan, analysis for hexavalent chromium was not needed in the existing wells because, as shown on Table 12, they had been sampled for hexavalent chromium in 2016. In addition, hexavalent chromium is not widespread in groundwater in the Downgradient Study Area and, where present, it is at concentrations below 50 ug/L. No change to the Tech Memo is required.

2. **Section 2.2.12 Deviations from DGIP – Phase II Groundwater Investigation**

Comment 2: Item 5 states that Ramboll collected soil property samples, and testing was conducted on 14 samples from 10 boreholes instead of the 40 samples from 14 boreholes included in the work plan. "Based on comparing the soil laboratory test results to the field logging, the analysis of fewer samples has compromised the study." Please explain how and to what extent the study has been compromised (such as whether the entire Phase II DGI has been compromised and, if so, in what way).

RTC 2: The word "not" was inadvertently omitted from the sentence. The text has been changed to: *Based on comparing the soil laboratory test results to the field logging, the analysis of fewer samples has not compromised the study.*

3. **Section 3.8, Dissolved Chromium**

Comment 3: This section mentions that none of the dissolved chromium concentrations exceeded the maximum contaminant level for drinking water of 100 µg/L. This statement should be clarified to explain that U.S. EPA's MCL for total chromium is 100 µg/L, and California's MCL for total chromium is 50 µg/L.

RTC 3: The EPA MCL for total chromium applies to drinking water in Nevada. For reference the maximum concentration detected was 46 ug/l as presented in Table 12. No change to the Tech Memo is required.

4. **Section 4.3, Perchlorate Patterns and Suspected Discharges with Phase II Updates**

Comment 4: The following sentences are on page 4-4: "During January to June 2018 dewatering and treatment was [sic] conducted at Sunrise Mountain Weir and Historic Lateral Weir construction areas. For this reason, the perchlorate load identified may not be representative of conditions when dewatering is not occurring. In addition, groundwater levels within the area of dewatering would not be representative of conditions when dewatering is not occurring." If the identified perchlorate load and groundwater levels may not be representative of conditions when dewatering is not occurring (which is most of the time), please explain how they would be different when dewatering is not

occurring.

RTC 4: Groundwater levels would be higher when dewatering is not occurring. Based on a comparison of the surface water data in 2017, before dewatering occurred, to the 2018 data, during dewatering, the perchlorate load profile along the LVW showed significant decreases in 2018 adjacent to the dewatering area; however, the total perchlorate load estimated at Rainbow Garden did not change appreciably between the 2017 and 2018 events. Although several plausible explanations might be offered for these observations, it would be speculative to do so. In addition, since the dewatering was a unique event, it is not considered important to the overall interpretation of the study. No change to the Tech Memo is required.

5. **Section 4.3, Perchlorate Patterns and Suspected Discharges with Phase II Updates**

Comment 5: This section provides information on the surface water and groundwater conditions in 2018, but not in 2019. It states that surface water data was not collected in 2019. Was groundwater data also not collected in 2019? If so, please state that.

RTC 5: Groundwater samples were collected in 2019. The following sentence is in section 4.3, paragraph 8: *In July 2019, 40 wells along the LVW were sampled to further investigate groundwater impacts and the potential groundwater surface water interaction.* No change to the Tech Memo is required.

6. **Section 5.1, Conclusions**

Comment 6: Conclusion statements 9 and 10 disregard the plume with concentrations in excess of 3,000 µg/L south of LVW in the area of the Calico Ridge Weir. This plume appears to be an arm of the plume that emanates from the NERT principal paleochannel that is diverted to the east near the former Rapid Infiltration Basins. A more complete discussion on the occurrence of this portion of the plume should be provided, such as: is this portion of the plume being continuously fed from the west? Or has it been bifurcated based on the weir dewatering or other actions? As in-situ bio treatment is being tested in this area, how should the high variability in aquifer transmissivity be considered in the implementation of the remedial treatability study? More specific recommendations based on the study findings should be provided for consideration during design and implementation of remedial studies in the down-gradient study area.

RTC 6: The comment relates to perchlorate sources and ongoing and future remedial studies, which are outside the scope of the Downgradient Study Area investigation. A more detailed study of the perchlorate plumes in the vicinity of Calico Ridge Weir is being conducted by NERT and will be answered in the full RI for OU-1 and OU-2 by Ramboll in about March 2020 and the full RI for OU-3 in about November 2020. No change to the Tech Memo is required.

Attachment:

Table 13 - Achievement of Investigation Objectives and Potential Future Work

Table 13
Achievement of Investigation Objectives and Potential Future Work
 NERT RI - Downgradient Study Area
 Henderson, Nevada

Investigation Objective	Achievement of Objective	Potential Future Work
1) Where are the high concentration (1,000 µg/L or higher) perchlorate-impacted groundwater plumes?	<ul style="list-style-type: none"> • The Phase I and Phase II wells and the LVW Bioremediation Pilot Study wells provided further definition of the high concentration (>1,000 µg/L) perchlorate-impacted groundwater plumes on the north and south sides of LVW. • Data gaps remain the north side of LVW. 	Additional wells to define perchlorate impacts on the north side of LVW.
2) Why are there noticeable differences in perchlorate concentrations in groundwater over relatively short distances?	<ul style="list-style-type: none"> • High variability in perchlorate concentrations indicates separate discrete flow zones within the alluvium. • Surface water mixing with groundwater in some areas may dilute the perchlorate concentrations. 	None.
3) How deep are the high concentration perchlorate-impacted groundwater plumes?	<ul style="list-style-type: none"> • High perchlorate concentrations at depths <90 feet bgs are well defined • Data gaps remain for deeper groundwater specifically south of Calico Ridge Weir 	Additional deeper wells are needed to further define the extent of perchlorate impacts below 100 feet bgs.
4) Do the high-concentration perchlorate plumes follow distinct water-bearing zones within the alluvium or bedrock formations?	<ul style="list-style-type: none"> • Distinct water-bearing zones have been identified through NMR logging in individual wells but these zones were not identified as being continuous between wells. • Results of tracer tests indicate that specific flow zones do not conform to the generally observed groundwater gradient. 	None.
5) Where does faulting affect the movement of high-concentration perchlorate-impacted groundwater?	<ul style="list-style-type: none"> • The LVW Bioremediation Pilot Study indicates faulting affects the movement of groundwater between Calico Ridge Weir and Lower Narrows weir. • Prior geotechnical studies, the observed seeps and the Phase I and II assessments indicate faulting affects groundwater movement at Three Kids Weir and between Three Kids and Rainbow Gardens Weirs. 	Additional studies are needed to define the effect faulting has on perchlorate movement.
6) Along the LVW, does groundwater flow generally in the same direction as the surface water?	<ul style="list-style-type: none"> • The potentiometric surface of the groundwater generally follows the surface water direction. 	Continue to obtain and evaluate transducer data.

Table 13
Achievement of Investigation Objectives and Potential Future Work
 NERT RI - Downgradient Study Area
 Henderson, Nevada

Investigation Objective	Achievement of Objective	Potential Future Work
7) Where does impacted groundwater discharge to the LVW?	<ul style="list-style-type: none"> • The GW and SW studies show that the main impacted groundwater discharges to LVW occur below Calico Ridge Weir and below Three Kids Weir. • Some evidence of more diffuse discharges along other reaches of LVW. 	None.
8) Where is the groundwater/surface water interface and how far is it from the LVW?	<ul style="list-style-type: none"> • As indicated by total dissolved solids concentrations and temperature variations, the groundwater/surface water interface varies from 0 - 885 feet away from the LVW. 	None.
9) Is there an area of known or suspected perchlorate flux of sufficient magnitude where an interim remedial action would be appropriate?	<ul style="list-style-type: none"> • Perchlorate concentrations in Lake Mead are well below NDEP's interim action level, so interim/emergency actions are not needed. • NERT is completing a pilot study between Bostic and Homestead Weirs that may be considered an interim action. 	None.
10) Is perchlorate-impacted groundwater bypassing the Seep Well Field on its eastern side in the vicinity of monitoring well COH-2B1?	<ul style="list-style-type: none"> • NERT's Annual Remedial Performance Report indicates that the capture zone efficiency of the Seep Well Field is 97.8 percent. 	Continue sampling of COH-2B1 is planned. Consider a tracer test to determine the source of perchlorate in this area.
11) Do high volumes of low-concentration, perchlorate-impacted groundwater provide more flux to the LVW than low volumes of high-concentration perchlorate-impacted groundwater?	<ul style="list-style-type: none"> • Based on surface water data, nearly 45 lb/day (>70%) of perchlorate flux is contributed by two high concentration areas: ~22 lb/day at Calico Ridge Weir and ~23 lb/day at Three Kids Weir. 	Refine contribution estimates by 24-hour sampling and time composite load estimates in key locations.
12) Do concentrations of perchlorate in groundwater fluctuate over time, seasonally, or after a rain event?	<p>Comparison of perchlorate concentrations from 17 sampled wells in 2016 and 2018 indicated:</p> <ul style="list-style-type: none"> • 5 wells changed <10% • 9 wells changed 20-80% • 3 wells changed >200 %. 	Continue to evaluate seasonal changes and changes after rain events.

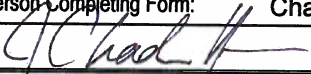
Appendix B

Permits, NOIs, and Underground Alert Tickets

UIC Form U240 – Chemical Use Request

The Nevada Division of Environmental Protection is requiring the following information for any entity seeking approval for chemical use, including chemicals for scale inhibitors, corrosion inhibitors, well rehab or cleaning, cooling towers, water well treatment, etc. (Note: for standard operating procedures using standard industry chemicals approved by Division of Minerals on Class 2 and geothermal wells, this form is not required, however NDEP reserves the right to require for certain situations/chemicals)

1. This form will be returned if all blanks are not completed.
2. Fill out a separate form for each chemical. Attach separate sheets if needed to answer questions.
3. A copy of the approved request shall be maintained in UIC O&M manual or UIC records for as long as the chemical is used.
4. NDEP approval below is only for the action stated on the approved form. Any changes in chemical use, location or amounts must be approved with a new request.

FACILITY AND PERMIT INFORMATION	
1) UIC Permit No.:	3) City/Valley: Henderson/ Las Vegas Valley
2) Project/Facility Name: NERT Remedial Investigation – Downgradient Study Area	4) County: Clark
5) The water this chemical will come in contact with is: <input type="checkbox"/> Cooling tower water <input type="checkbox"/> Well water <input checked="" type="checkbox"/> other: Groundwater	
6) Discuss where the water (in Item #5) will be discharged: Dye will be added to 3 Monitoring wells	
7) List other chemicals used in this water: None	
CHEMICAL INFORMATION – Note: Chemical information shall be submitted to the Division that clearly states the chemical composition (what's in it and at what concentration/mass). If the information is not provided, the Division will not approve this chemical. Proprietary information may be submitted confidentially.	
8) Chemical Name: Rhodamine WT	
9) Chemical formula: $C_{29}H_{29}ClN_2Na_2O_5$	10) CAS No.: 37299-86-8
11) Manufacturer's name, phone and address: Cole Parmer, 625 E. Bunker Ct. Vernon Hills, IL, 60061	
12) Is the chemical radioactive? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO Describe:	
13) Is a MSDS sheet available for this chemical? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO If YES, attach Is an Environmental Data Sheet (EDS) available? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO If YES, attach	
14) At working concentration ¹ , is the chemical hazardous or toxic to humans, livestock, fish, wildlife? If Yes, what entity and at what concentrations?:	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
15) If water is discharged to surface at any time, has the NV Division of Wildlife been consulted?	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
CHEMICAL FEED INFORMATION	
16) Estimated use start date:	March of 2019
17) Describe where the chemical is applied to the water: The dye will be introduced to three monitoring wells approximately 200 feet from the Las Vegas Wash.	
18) Describe how the chemical is applied: The dye will be poured into the well and then mixed for a uniform concentration within the well casing.	
19) Purpose of chemical: <input type="checkbox"/> scale inhibitor <input type="checkbox"/> corrosion inhibitor <input type="checkbox"/> biocide <input type="checkbox"/> algicide <input type="checkbox"/> dispersant <input type="checkbox"/> surfactant <input checked="" type="checkbox"/> Other: Dye Tracer Study	
20) Describe the frequency of application: One time at each well location	
21) What is the feed rate of the chemical as it is fed into the water: Estimated use per month: Four gallons of a 25 grams per liter solution will be added once at each of three well locations.	
22) What is the <u>final, effective concentration</u> of chemical mixture immediately prior to application: 25 grams per liter	
23) What is the <u>"working" concentration</u> of chemical after mixing with the water in the cooling tower/well/etc.: approximately 15 g/L	
24) Is the bulk storage container properly marked with the chemical name and information?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
25) Describe the chemical monitoring before and after application: Dye concentration will be monitored periodically in downgradient and cross- gradient wells. Dye concentration will also be monitored continuously in the adjacent surface water.	
26) Discuss the interaction between the proposed chemicals/additives and chemicals already in use, and the by-products of their interaction: Rhodamine WT dye is a non-reactive, conservative tracer. No reactions are expected.	
FORM COMPLETION	
Print Name of Person Completing Form: Chad Roper, PhD	
Signature: 	Date: January 17, 2018

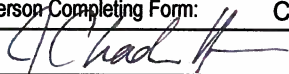
1. Working concentration is the chemical concentration within the final water system (e.g. cooling tower system), found under Item 23 above.

2/28/19

UIC Form U240 – Chemical Use Request

The Nevada Division of Environmental Protection is requiring the following information for any entity seeking approval for chemical use, including chemicals for scale inhibitors, corrosion inhibitors, well rehab or cleaning, cooling towers, water well treatment, etc. (Note: for standard operating procedures using standard industry chemicals approved by Division of Minerals on Class 2 and geothermal wells, this form is not required, however NDEP reserves the right to require for certain situations/chemicals)

1. This form will be returned if all blanks are not completed.
2. Fill out a separate form for each chemical. Attach separate sheets if needed to answer questions.
3. A copy of the approved request shall be maintained in UIC O&M manual or UIC records for as long as the chemical is used.
4. NDEP approval below is only for the action stated on the approved form. Any changes in chemical use, location or amounts must be approved with a new request.

FACILITY AND PERMIT INFORMATION	
1) UIC Permit No.:	3) City/Valley: Henderson/ Las Vegas Valley
2) Project/Facility Name: NERT Remedial Investigation – Downgradient Study Area	4) County: Clark
5) The water this chemical will come in contact with is: <input type="checkbox"/> Cooling tower water <input type="checkbox"/> Well water <input checked="" type="checkbox"/> other: Groundwater	
6) Discuss where the water (in Item #5) will be discharged: Dye will be added to 3 Monitoring wells	
7) List other chemicals used in this water: None	
CHEMICAL INFORMATION – Note: Chemical information shall be submitted to the Division that clearly states the chemical composition (what's in it and at what concentration/mass). If the information is not provided, the Division will not approve this chemical. Proprietary information may be submitted confidentially.	
8) Chemical Name: Fluorescein	
9) Chemical formula: $C_{20}H_{12}O_5$	10) CAS No.: 2321-07-5
11) Manufacturer's name, phone and address: Cole Parmer, 625 E. Bunker Ct. Vernon Hills, IL, 60061	
12) Is the chemical radioactive? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO Describe:	
13) Is a MSDS sheet available for this chemical? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO If YES, attach Is an Environmental Data Sheet (EDS) available? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO If YES, attach	
14) At working concentration ¹ , is the chemical hazardous or toxic to humans, livestock, fish, wildlife? If Yes, what entity and at what concentrations?:	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
15) If water is discharged to surface at any time, has the NV Division of Wildlife been consulted?	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
CHEMICAL FEED INFORMATION	
16) Estimated use start date: March of 2019	
17) Describe where the chemical is applied to the water: The dye will be introduced to three monitoring wells approximately 200 feet from the Las Vegas Wash.	
18) Describe how the chemical is applied: The dye will be poured into the well and then mixed for a uniform concentration within the well casing.	
19) Purpose of chemical: <input type="checkbox"/> scale inhibitor <input type="checkbox"/> corrosion inhibitor <input type="checkbox"/> biocide <input type="checkbox"/> algaecide <input type="checkbox"/> dispersant <input type="checkbox"/> surfactant <input checked="" type="checkbox"/> Other: Dye Tracer Study	
20) Describe the frequency of application: One time at each well location	
21) What is the feed rate of the chemical as it is fed into the water: Estimated use per month: One gallon of a 100 grams per liter solution will be added once at each of three well locations.	
22) What is the <u>final, effective concentration</u> of chemical mixture immediately prior to application: 100 grams per liter	
23) What is the <u>"working" concentration</u> of chemical after mixing with the water in the cooling tower/well/etc.: approximately 12.5 g/L	
24) Is the bulk storage container properly marked with the chemical name and information?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
25) Describe the chemical monitoring before and after application: Dye concentration will be monitored periodically in downgradient and cross- gradient wells. Dye concentration will also be monitored continuously in the adjacent surface water.	
26) Discuss the interaction between the proposed chemicals/additives and chemicals already in use, and the by-products of their interaction: Fluorescein dye is a non-reactive, conservative tracer. No reactions are expected.	
FORM COMPLETION	
Print Name of Person Completing Form: Chad Roper, PhD	
Signature: 	Date: January 17, 2018

1. Working concentration is the chemical concentration within the final water system (e.g. cooling tower system), found under Item 23 above.



**DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES
DIVISION OF WATER RESOURCES**

400 Shadow Lane, Suite 201
Las Vegas, Nevada 89106
(702) 486-2770 · Fax (702) 486-2781
<http://water.nv.gov>

**NOTICE OF INTENT CARD
REVIEW FORM**

To: Neil Hale

Date: March 19, 2019

Facsimile No.: _____ or E-mail Address: nhale@cascade-env.com

This document was: E-mailed Faxed

NOI Card Number: S2019-146 Approved Rejected (See reasons below)

Work performed	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Proposed use of well	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Intended start date	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Waiver/Permit number if applicable	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Well location (legal description, GPS coordinates)	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Parcel number	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Address at well location	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Permit number	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Waiver number or NDEP Facility ID Number	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Address of Client	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Name of client/owner	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Contractor's license number	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Onsite well driller's license number	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Drilling company name/address	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Driller's signature	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Replacement well	Yes	<input type="checkbox"/>	No	<input checked="" type="checkbox"/>

If yes, existing well must be plugged at time the replacement well is drilled, pursuant to NAC 534.300 Replacement Well.

Instructions: Please note that you must provide a copy of the well driller's report for the installation of two (2) monitor wells within 30 days of completion. If you have any questions, please do not hesitate to give our office a call.

Person reviewing NOI Card: Christi Cooper, waiver issued by Tracy Geter

Date reviewed: March 19, 2019

STEVE SISOLAK
Governor

STATE OF NEVADA

TIM WILSON, P.E.
Acting State Engineer

BRADLEY CROWELL
Director



JOHN GUILLORY, P.E.
Supervising Engineer

DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES
DIVISION OF WATER RESOURCES
SOUTHERN NEVADA BRANCH OFFICE

400 Shadow Lane, Suite 201
Las Vegas, Nevada 89106
(702) 486-2770 • Fax (702) 486-2781
<http://water.nv.gov>

March 19, 2019

MO-3622

Neil Hale
Field Supervisor
Cascade Drilling, LP
4221 West Oquendo Road
Las Vegas, Nevada 89118

RE: Request for waiver to install two (2) temporary monitor wells to collect groundwater samples and analyze the samples as requested by Nevada Division of Environmental Protection (NDEP) Order Number H-000539, located at 201 Via Antincendio, Clark County, Nevada and within the Las Vegas Valley Basin (212).

Dear Mr. Hale:

As provided in Nevada Administrative Code (NAC) § 534.450 of the Regulation for Water Well and Related Drilling, permission is herewith **granted** to install two (2) temporary monitor wells to assess water conditions as described in your request received March 12, 2019. Your statement ensuring Nevada Environmental Response Trust responsibility for abandonment of the well upon project completion was received in this office on March 18, 2019.

The two (2) proposed monitor wells referenced in your letter are listed below:

Well Name	Legal Description	GPS Coordinates (NAD 83/ WGS 84)
NERT3.40S1	NE¼, NE¼ Section 28, T.21S, R63E	36.0987694509° N, -114.94362959° W
NERT3.35S1	NE¼, NE¼ Section 28, T.21S, R63E	36.0992883191° N, -114.942838735° W

This office also waives the following regulations:

- 1) NAC § 534.4351. The purpose of this well is to collect groundwater samples and analyze the samples as requested by NDEP Order Number H-000539, located at 201 Via Antincendio, Clark County, Nevada. The wellhead shall be protected from damage due to vandalism or sunlight. If polyvinyl chloride (PVC) casing is used, then the well must be completed with ASTM F-480 (Sch. 40 or heavier) well casing as provided in NAC § 534.362.
- 2) NAC 534.4357(1c) - "If water or vapors which are being monitored in a monitoring well are not encountered within 5 feet below the surface of the ground, the well driller shall place in the annual space of the well: From the seal placed pursuant to paragraph (b) to the surface, a seal, with a minimum thickness of 20 feet below the surface, consisting of cement grout, neat cement or concrete grout." Due to the shallow depth and large screen intervals of the proposed monitor well, you are allowed to install the sanitary seal as shown in your waiver request.

Glued casing joint connections will not be allowed. Full compliance with the remainder of the statute and regulation is required.

A plot map showing the actual location of the completed wells must be submitted upon completion of the drilling operations. Please include an accurate description of the location of the monitor well on the completion reports (GPS coordinates are required).

The well driller's reports shall bear this waiver number: MO-3622.

Authorization to drill under this waiver expires one (1) year from the date of this letter.

The well driller must have a copy of this waiver in possession at all times during drilling activities pertaining to this project. This well may only be pumped when necessary to obtain samples.

Please note that you must notify the Nevada Division of Environmental Protection (NDEP) for possible permitting requirements for groundwater or temporary surface discharge permits, which may include Underground Injection Control (UIC) or National Pollution Discharge Elimination System (NPDES) Permit Numbers. For more information regarding the permitting process with NDEP, please contact NDEP Water Pollution Control Department at (775) 687-4670.

Cascade Drilling, LP

MO-3622

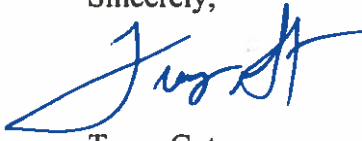
March 19, 2019

Page 3

The wells shall be plugged and abandoned, as provided by regulation, upon project completion. The current owner of Assessor's Parcel Number 160-28-501-003 is shown as Clark County (Parks and Community Services) by the records of the Clark County Assessor's office. This waiver does not imply or grant any land use agreements between Clark County (Parks and Community Services) and any land owners. It is expressly understood that this authorization does not relieve the operator of the requirements of any other state, federal or local agencies.

If you have any questions, please contact this office at 702-486-2770.

Sincerely,



Tracy Geter
Drilling Supervisor

cc: File
Carson City Office
Christi Cooper, SNBO Office
Jay A. Steinberg, President, Nevada Environmental Response Trust, Chicago, IL



**DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES
DIVISION OF WATER RESOURCES**

400 Shadow Lane, Suite 201
Las Vegas, Nevada 89106
(702) 486-2770 · Fax (702) 486-2781
<http://water.nv.gov>

**NOTICE OF INTENT CARD
REVIEW FORM**

To: Neil Hale Date: March 19, 2019

Facsimile No.: _____ or E-mail Address: nhale@cascade-env.com

This document was: E-mailed Faxed

NOI Card Number: S2019-148 Approved Rejected (See reasons below)

Work performed	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Proposed use of well	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Intended start date	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Waiver/Permit number if applicable	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Well location (legal description, GPS coordinates)	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Parcel number	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Address at well location	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Permit number	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Waiver number or NDEP Facility ID Number	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Address of Client	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Name of client/owner	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Contractor's license number	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Onsite well driller's license number	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Drilling company name/address	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Driller's signature	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Replacement well	Yes	<input type="checkbox"/>	No	<input checked="" type="checkbox"/>

**If yes, existing well must be plugged at time the replacement well is drilled,
pursuant to NAC 534.300 Replacement Well.**

ja **Instructions:** Please note that you must provide a copy of the well driller's report for the installation of one (1) monitor wells within 30 days of completion. If you have any questions, please do not hesitate to give our office a call.

Person reviewing NOI Card: Christi Cooper, waiver issued by Tracy Geter

Date reviewed: March 19, 2019

STEVE SISOLAK
Governor

STATE OF NEVADA

TIM WILSON, P.E.
Acting State Engineer

BRADLEY CROWELL
Director



JOHN GUILLORY, P.E.
Supervising Engineer

**DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES
DIVISION OF WATER RESOURCES
SOUTHERN NEVADA BRANCH OFFICE**

**400 Shadow Lane, Suite 201
Las Vegas, Nevada 89106
(702) 486-2770 • Fax (702) 486-2781
<http://water.nv.gov>**

March 19, 2019

MO-3623

Neil Hale
Field Supervisor
Cascade Drilling, LP
4221 West Oquendo Road
Las Vegas, Nevada 89118

RE: Request for waiver to install one (1) temporary monitor well (NERT3.98S1) to collect groundwater samples and analyze the samples as requested by Nevada Division of Environmental Protection (NDEP) Order Number H-000539, located on vacant land just west of 201 Via Antincendio, Clark County, Nevada, within the SE $\frac{1}{4}$ of the NW $\frac{1}{4}$ of Section 28, T.21S, R.63E (Lat: 36.0945914292° N, Long: -114.95261906° W, NAD 83/ WGS 84), and within the Las Vegas Valley Basin (212).

Dear Mr. Hale:

As provided in Nevada Administrative Code (NAC) § 534.450 of the Regulation for Water Well and Related Drilling, permission is herewith **granted** to install one (1) temporary monitor well to assess water conditions as described in your request received March 18, 2019. Your statement ensuring Nevada Environmental Response Trust responsibility for abandonment of the well upon project completion was received in this office on March 18, 2019.

This office also waives the following regulations:

- 1) NAC § 534.4351 (1). The purpose of this well is to collect groundwater samples and analyze the samples as requested by NDEP Order Number H-000539, located on vacant land just west of 201 Via Antincendio, Clark County, Nevada. The wellhead shall be protected from damage due to vandalism or sunlight. If polyvinyl chloride (PVC) casing is used, then the well must be completed with ASTM F-480 (Sch. 40 or heavier) well casing as provided in NAC § 534.362.

- 2) NAC 534.4357(1c) - "If water or vapors which are being monitored in a monitoring well are not encountered within 5 feet below the surface of the ground, the well driller shall place in the annual space of the well: From the seal placed pursuant to paragraph (b) to the surface, a seal, with a minimum thickness of 20 feet below the surface, consisting of cement grout, neat cement or concrete grout." Due to the shallow depth and large screen intervals of the proposed monitor well, you are allowed to install the sanitary seal as shown in your waiver request.

Glued casing joint connections will not be allowed. Full compliance with the remainder of the statute and regulation is required.

A plot map showing the actual location of the completed wells must be submitted upon completion of the drilling operations. Please include an accurate description of the location of the monitor well on the completion reports (GPS coordinates are required).

The well driller's reports shall bear this waiver number: MO-3623.

Authorization to drill under this waiver expires one (1) year from the date of this letter.

The well driller must have a copy of this waiver in possession at all times during drilling activities pertaining to this project. This well may only be pumped when necessary to obtain samples.

Please note that you must notify the Nevada Division of Environmental Protection (NDEP) for possible permitting requirements for groundwater or temporary surface discharge permits, which may include Underground Injection Control (UIC) or National Pollution Discharge Elimination System (NPDES) Permit Numbers. For more information regarding the permitting process with NDEP, please contact NDEP Water Pollution Control Department at (775) 687-4670.

The wells shall be plugged and abandoned, as provided by regulation, upon project completion. The current owner of Assessor's Parcel Number 160-28-201-003 is shown as Clark County (Parks and Community Services) by the records of the Clark County Assessor's office. This waiver does not imply or grant any land use agreements between Clark County (Parks and Community Services) and any land owners. It is expressly understood that this authorization does not relieve the operator of the requirements of any other state, federal or local agencies.

If you have any questions, please contact this office at 702-486-2770.

Sincerely,



Tracy Geter
Drilling Supervisor

cc: File
Carson City Office
Christi Cooper, SNBO Office
Jay A. Steinberg, President, Nevada Environmental Response Trust, Chicago, IL



**DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES
DIVISION OF WATER RESOURCES**

400 Shadow Lane, Suite 201
Las Vegas, Nevada 89106
(702) 486-2770 · Fax (702) 486-2781
<http://water.nv.gov>

**NOTICE OF INTENT CARD
REVIEW FORM**

To: Neil Hale Date: March 19, 2019

Facsimile No.: _____ or E-mail Address: nhale@cascade-env.com

This document was: E-mailed Faxed

NOI Card Number: S2019-147 Approved Rejected (See reasons below)

Work performed	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Proposed use of well	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Intended start date	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Waiver/Permit number if applicable	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Well location (legal description, GPS coordinates)	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Parcel number	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Address at well location	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Permit number	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Waiver number or NDEP Facility ID Number	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Address of Client	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Name of client/owner	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Contractor's license number	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Onsite well driller's license number	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Drilling company name/address	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Driller's signature	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Replacement well	Yes	<input type="checkbox"/>	No	<input checked="" type="checkbox"/>

**If yes, existing well must be plugged at time the replacement well is drilled,
pursuant to NAC 534.300 Replacement Well.**

Jo
Instructions: Please note that you must provide a copy of the well driller's report for the installation of two (2) monitor wells within 30 days of completion. If you have any questions, please do not hesitate to give our office a call.

Person reviewing NOI Card: Christi Cooper, waiver issued by Tracy Geter

Date reviewed: March 19, 2019

STEVE SISOLAK
Governor

STATE OF NEVADA

TIM WILSON, P.E.
Acting State Engineer

BRADLEY CROWELL
Director



JOHN GUILLORY, P.E.
Supervising Engineer

DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES
DIVISION OF WATER RESOURCES
SOUTHERN NEVADA BRANCH OFFICE

400 Shadow Lane, Suite 201
Las Vegas, Nevada 89106
(702) 486-2770 • Fax (702) 486-2781
<http://water.nv.gov>

March 19, 2019

MO-3624

Neil Hale
Field Supervisor
Cascade Drilling, LP
4221 West Oquendo Road
Las Vegas, Nevada 89118

RE: Request for waiver to install two (2) temporary monitor wells to collect groundwater samples and analyze the samples as requested by Nevada Division of Environmental Protection (NDEP) Order Number H-000539, located at 201 Via Antincendio, Clark County, Nevada and within the Las Vegas Valley Basin (212).

Dear Mr. Hale:

As provided in Nevada Administrative Code (NAC) § 534.450 of the Regulation for Water Well and Related Drilling, permission is herewith **granted** to install two (2) temporary monitor wells to assess water conditions as described in your request received March 18, 2019. Your statement ensuring Nevada Environmental Response Trust responsibility for abandonment of the well upon project completion was received in this office on March 18, 2019.

The two (2) proposed monitor wells referenced in your letter are listed below:

Well Name	Legal Description	GPS Coordinates (NAD 83/ WGS 84)
NERT3.60N1	NW¼, NE¼ Section 28, T.21S, R63E	36.0978287866° N, -114.94742318° W
NERT3.58N1	NW¼, NE¼ Section 28, T.21S, R63E	36.0983960000° N, -114.94689100° W

This office also waives the following regulations:

- 1) NAC § 534.4351. The purpose of this well is to collect groundwater samples and analyze the samples as requested by NDEP Order Number H-000539, located at 201 Via Antincendio, Clark County, Nevada. The wellhead shall be protected from damage due to vandalism or sunlight. If polyvinyl chloride (PVC) casing is used, then the well must be completed with ASTM F-480 (Sch. 40 or heavier) well casing as provided in NAC § 534.362.
- 2) NAC 534.4357(1c) - "If water or vapors which are being monitored in a monitoring well are not encountered within 5 feet below the surface of the ground, the well driller shall place in the annular space of the well: From the seal placed pursuant to paragraph (b) to the surface, a seal, with a minimum thickness of 20 feet below the surface, consisting of cement grout, neat cement or concrete grout." Due to the shallow depth and large screen intervals of the proposed monitor well, you are allowed to install the sanitary seal as shown in your waiver request.

Glued casing joint connections will not be allowed. Full compliance with the remainder of the statute and regulation is required.

A plot map showing the actual location of the completed wells must be submitted upon completion of the drilling operations. Please include an accurate description of the location of the monitor well on the completion reports (GPS coordinates are required).

The well driller's reports shall bear this waiver number: MO-3624.

Authorization to drill under this waiver expires one (1) year from the date of this letter.

The well driller must have a copy of this waiver in possession at all times during drilling activities pertaining to this project. This well may only be pumped when necessary to obtain samples.

Please note that you must notify the Nevada Division of Environmental Protection (NDEP) for possible permitting requirements for groundwater or temporary surface discharge permits, which may include Underground Injection Control (UIC) or National Pollution Discharge Elimination System (NPDES) Permit Numbers. For more information regarding the permitting process with NDEP, please contact NDEP Water Pollution Control Department at (775) 687-4670.

Cascade Drilling, LP

MO-3622

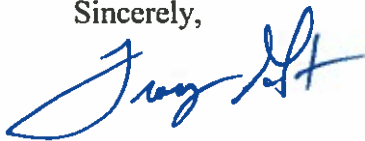
March 19, 2019

Page 3

The wells shall be plugged and abandoned, as provided by regulation, upon project completion. The current owner of Assessor's Parcel Number 160-28-501-003 is shown as Clark County (Parks and Community Services) by the records of the Clark County Assessor's office. This waiver does not imply or grant any land use agreements between Clark County (Parks and Community Services) and any land owners. It is expressly understood that this authorization does not relieve the operator of the requirements of any other state, federal or local agencies.

If you have any questions, please contact this office at 702-486-2770.

Sincerely,



Tracy Geter
Drilling Supervisor

cc: File
Carson City Office
Christi Cooper, SNBO Office
Jay A. Steinberg, President, Nevada Environmental Response Trust, Chicago, IL



**DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES
DIVISION OF WATER RESOURCES**

400 Shadow Lane, Suite 201
Las Vegas, Nevada 89106
(702) 486-2770 · Fax (702) 486-2781
<http://water.nv.gov>

**NOTICE OF INTENT CARD
REVIEW FORM**

To: Neil Hale

Date: March 21, 2019

Facsimile No.: _____

or E-mail Address: nhale@cascade-env.com

This document was: E-mailed Faxed

NOI Card Number: S2019-149

Approved

Rejected (See reasons below)

Work performed	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Proposed use of well	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Intended start date	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Waiver/Permit number if applicable	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Well location (legal description, GPS coordinates)	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Parcel number	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Address at well location	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Permit number	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Waiver number or NDEP Facility ID Number	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Address of Client	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Name of client/owner	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Contractor's license number	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Onsite well driller's license number	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Drilling company name/address	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Driller's signature	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Replacement well	Yes	<input type="checkbox"/>	No	<input checked="" type="checkbox"/>

If yes, existing well must be plugged at time the replacement well is drilled, pursuant to NAC 534.300 Replacement Well.

Jb **Instructions:** Please note that you must provide a copy of the well driller's report for the installation of three (3) monitor wells within 30 days of completion. If you have any questions, please do not hesitate to give our office a call.

Person reviewing NOI Card: Christi Cooper, waiver issued by Tracy Geter

Date reviewed: March 21, 2019

STEVE SISOLAK
Governor

STATE OF NEVADA

TIM WILSON, P.E.
Acting State Engineer

BRADLEY CROWELL
Director



JOHN GUILLORY, P.E.
Supervising Engineer

DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES
DIVISION OF WATER RESOURCES
SOUTHERN NEVADA BRANCH OFFICE

400 Shadow Lane, Suite 201
Las Vegas, Nevada 89106
(702) 486-2770 • Fax (702) 486-2781
<http://water.nv.gov>

March 21, 2019

MO-3629

Neil Hale
Field Supervisor
Cascade Drilling, LP
4221 West Oquendo Road
Las Vegas, Nevada 89118

RE: Request for waiver to install three (3) temporary monitor wells to collect groundwater samples and analyze the samples as requested by Nevada Division of Environmental Protection (NDEP) Order Number H-000539, located on vacant land, just northwest of 1720 East Galleria Drive, Clark County, Nevada and within the Las Vegas Valley Basin (212).

Dear Mr. Hale:

As provided in Nevada Administrative Code (NAC) § 534.450 of the Regulation for Water Well and Related Drilling, permission is herewith **granted** to install three (3) temporary monitor wells to assess water conditions as described in your request received March 18, 2019. Your statement ensuring Nevada Environmental Response Trust responsibility for abandonment of the well upon project completion was received in this office on March 18, 2019.

The three (3) proposed monitor wells referenced in your letter are listed below:

Well Name	Legal Description	GPS Coordinates (NAD 83/ WGS 84)
NERT4.65N1	SW¼, NE¼ Section 29, T.21S, R63E	36.0935780874° N, -114.96407649° W
NERT4.70N1	SW¼, NE¼ Section 29, T.21S, R63E	36.0935934952° N, -114.965031037° W
NERT4.64N1	SW¼, NE¼ Section 29, T.21S, R63E	36.0936439611° N, -114.963599094° W

This office also waives the following regulations:

- 1) NAC § 534.4351. The purpose of this well is to collect groundwater samples and analyze the samples as requested by NDEP Order Number H-000539, located on vacant land, just northwest of 1720 East Galleria Drive, Clark County, Nevada. The wellhead shall be protected from damage due to vandalism or sunlight. If polyvinyl chloride (PVC) casing is used, then the well must be completed with ASTM F-480 (Sch. 40 or heavier) well casing as provided in NAC § 534.362.
- 2) NAC 534.4357(1c) - "If water or vapors which are being monitored in a monitoring well are not encountered within 5 feet below the surface of the ground, the well driller shall place in the annual space of the well: From the seal placed pursuant to paragraph (b) to the surface, a seal, with a minimum thickness of 20 feet below the surface, consisting of cement grout, neat cement or concrete grout." Due to the shallow depth and large screen intervals of the proposed monitor well, you are allowed to install the sanitary seal as shown in your waiver request.

Glued casing joint connections will not be allowed. Full compliance with the remainder of the statute and regulation is required.

A plot map showing the actual location of the completed wells must be submitted upon completion of the drilling operations. Please include an accurate description of the location of the monitor well on the completion reports (GPS coordinates are required).

The well driller's reports shall bear this waiver number: MO-3629.

Authorization to drill under this waiver expires one (1) year from the date of this letter.

The well driller must have a copy of this waiver in possession at all times during drilling activities pertaining to this project. This well may only be pumped when necessary to obtain samples.

Please note that you must notify the Nevada Division of Environmental Protection (NDEP) for possible permitting requirements for groundwater or temporary surface discharge permits, which may include Underground Injection Control (UIC) or National Pollution Discharge Elimination System (NPDES) Permit Numbers. For more information regarding the permitting process with NDEP, please contact NDEP Water Pollution Control Department at (775) 687-4670.

Cascade Drilling, LP

MO-3629

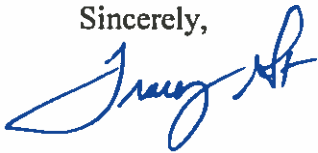
March 21, 2019

Page 3

The wells shall be plugged and abandoned, as provided by regulation, upon project completion. The current owner of Assessor's Parcel Number 160-29-601-001 is shown as Clark County (Parks and Community Services) by the records of the Clark County Assessor's office. This waiver does not imply or grant any land use agreements between Clark County (Parks and Community Services) and any land owners. It is expressly understood that this authorization does not relieve the operator of the requirements of any other state, federal or local agencies.

If you have any questions, please contact this office at 702-486-2770.

Sincerely,



Tracy Geter
Drilling Supervisor

cc: File
Carson City Office
Christi Cooper, SNBO Office
Jay A. Steinberg, President, Nevada Environmental Response Trust, Chicago, IL



**DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES
DIVISION OF WATER RESOURCES**

400 Shadow Lane, Suite 201
Las Vegas, Nevada 89106
(702) 486-2770 · Fax (702) 486-2781
<http://water.nv.gov>

**NOTICE OF INTENT CARD
REVIEW FORM**

To: Neil Hale

Date: March 21, 2019

Facsimile No.: _____ or E-mail Address: nhale@cascade-env.com

This document was: E-mailed Faxed

NOI Card Number: S2019-144 Approved Rejected (See reasons below)

Work performed	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Proposed use of well	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Intended start date	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Waiver/Permit number if applicable	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Well location (legal description, GPS coordinates)	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Parcel number	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Address at well location	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Permit number	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Waiver number or NDEP Facility ID Number	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Address of Client	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Name of client/owner	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Contractor's license number	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Onsite well driller's license number	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Drilling company name/address	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Driller's signature	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Replacement well	Yes	<input type="checkbox"/>	No	<input checked="" type="checkbox"/>

If yes, existing well must be plugged at time the replacement well is drilled, pursuant to NAC 534.300 Replacement Well.

Jo **Instructions:** Please note that you must provide a copy of the well driller's report for the installation of seven (7) monitor wells within 30 days of completion. If you have any questions, please do not hesitate to give our office a call.

Person reviewing NOI Card: Christi Cooper, waiver issued by Tracy Geter

Date reviewed: March 21, 2019

STEVE SISOLAK
Governor

STATE OF NEVADA

TIM WILSON, P.E.
Acting State Engineer

BRADLEY CROWELL
Director



JOHN GUILLORY, P.E.
Supervising Engineer

DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES
DIVISION OF WATER RESOURCES
SOUTHERN NEVADA BRANCH OFFICE

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Las Vegas, Nevada 89106
(702) 486-2770 • Fax (702) 486-2781
<http://water.nv.gov>

March 21, 2019

MO-3630

Neil Hale
Field Supervisor
Cascade Drilling, LP
4221 West Oquendo Road
Las Vegas, Nevada 89118

RE: Request for waiver to install seven (7) temporary monitor wells to collect groundwater samples and analyze the samples as requested by Nevada Division of Environmental Protection (NDEP) Order Number H-000539, located on vacant land, just west of 1720 East Galleria Drive, Clark County, Nevada and within the Las Vegas Valley Basin (212).

Dear Mr. Hale:

As provided in Nevada Administrative Code (NAC) § 534.450 of the Regulation for Water Well and Related Drilling, permission is herewith **granted** to install seven (7) temporary monitor wells to assess water conditions as described in your request received March 18, 2019. Your statement ensuring Nevada Environmental Response Trust responsibility for abandonment of the well upon project completion was received in this office on March 18, 2019.

The seven (7) proposed monitor wells referenced in your letter are listed below:

Well Name	Legal Description	GPS Coordinates (NAD 83/ WGS 84)
NERT4.64S1	NW¼, SE¼ Section 29, T.21S, R63E	36.0920826981° N, -114.96288901° W
NERT4.71S2	NW¼, SE¼ Section 29, T.21S, R63E	36.0912669927° N, -114.965090327° W
NERT4.71N1	NW¼, SE¼ Section 29, T.21S, R63E	36.0931815206° N, -114.965868739° W
OBS4.64S1-A	NW¼, SE¼ Section 29, T.21S, R63E	36.092150000° N, -114.96284000° W
OBS4.64S1-B	NW¼, SE¼ Section 29, T.21S, R63E	36.0921260000° N, -114.9629770° W
OBS4.64S1-C	NW¼, SE¼ Section 29, T.21S, R63E	36.09215000000° N, -114.9628400° W
OBS4.64S1-D	NW¼, SE¼ Section 29, T.21S, R63E	36.09204000000° N, -114.96280100° W

This office also waives the following regulations:

- 1) NAC § 534.4351. The purpose of this well is to collect groundwater samples and analyze the samples as requested by NDEP Order Number H-000539, located on vacant land, just west of 1720 East Galleria Drive, Clark County, Nevada. The wellhead shall be protected from damage due to vandalism or sunlight. If polyvinyl chloride (PVC) casing is used, then the well must be completed with ASTM F-480 (Sch. 40 or heavier) well casing as provided in NAC § 534.362.
- 2) NAC 534.4357(1c) - "If water or vapors which are being monitored in a monitoring well are not encountered within 5 feet below the surface of the ground, the well driller shall place in the annular space of the well: From the seal placed pursuant to paragraph (b) to the surface, a seal, with a minimum thickness of 20 feet below the surface, consisting of cement grout, neat cement or concrete grout." Due to the shallow depth and large screen intervals of the proposed monitor well, you are allowed to install the sanitary seal as shown in your waiver request.

Glued casing joint connections will not be allowed. Full compliance with the remainder of the statute and regulation is required.

A plot map showing the actual location of the completed wells must be submitted upon completion of the drilling operations. Please include an accurate description of the location of the monitor well on the completion reports (GPS coordinates are required).

The well driller's reports shall bear this waiver number: MO-3630.

Authorization to drill under this waiver expires one (1) year from the date of this letter.

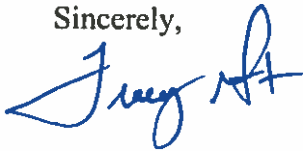
The well driller must have a copy of this waiver in possession at all times during drilling activities pertaining to this project. This well may only be pumped when necessary to obtain samples.

Please note that you must notify the Nevada Division of Environmental Protection (NDEP) for possible permitting requirements for groundwater or temporary surface discharge permits, which may include Underground Injection Control (UIC) or National Pollution Discharge Elimination System (NPDES) Permit Numbers. For more information regarding the permitting process with NDEP, please contact NDEP Water Pollution Control Department at (775) 687-4670.

The wells shall be plugged and abandoned, as provided by regulation, upon project completion. The current owner of Assessor's Parcel Number 160-29-701-002 is shown as Clark County (Parks and Community Services) by the records of the Clark County Assessor's office. This waiver does not imply or grant any land use agreements between Clark County (Parks and Community Services) and any land owners. It is expressly understood that this authorization does not relieve the operator of the requirements of any other state, federal or local agencies.

If you have any questions, please contact this office at 702-486-2770.

Sincerely,



Tracy Geter
Drilling Supervisor

cc: File
Carson City Office
Christi Cooper, SNBO Office
Jay A. Steinberg, President, Nevada Environmental Response Trust, Chicago, IL



**DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES
DIVISION OF WATER RESOURCES**

400 Shadow Lane, Suite 201
Las Vegas, Nevada 89106
(702) 486-2770 · Fax (702) 486-2781
<http://water.nv.gov>

**NOTICE OF INTENT CARD
REVIEW FORM**

To: Neil Hale

Date: March 25, 2019

Facsimile No.: _____ or E-mail Address: nhale@cascade-env.com

This document was: E-mailed Faxed

NOI Card Number: S2019-145 Approved Rejected (See reasons below)

Work performed	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Proposed use of well	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Intended start date	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Waiver/Permit number if applicable	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Well location (legal description, GPS coordinates)	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Parcel number	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Address at well location	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Permit number	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Waiver number or NDEP Facility ID Number	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Address of Client	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Name of client/owner	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Contractor's license number	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Onsite well driller's license number	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Drilling company name/address	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Driller's signature	missing	<input type="checkbox"/>	invalid	<input type="checkbox"/>
Replacement well	Yes	<input type="checkbox"/>	No	<input checked="" type="checkbox"/>

**If yes, existing well must be plugged at time the replacement well is drilled,
pursuant to NAC 534.300 Replacement Well.**

Jo **Instructions:** Please note that you must provide a copy of the well driller's report for the installation of eleven (11) monitor wells within 30 days of completion. If you have any questions, please do not hesitate to give our office a call.

Person reviewing NOI Card: Christi Cooper, waiver issued by Tracy Geter

Date reviewed: March 25, 2019

STEVE SISOLAK
Governor

STATE OF NEVADA

TIM WILSON, P.E.
Acting State Engineer

BRADLEY CROWELL
Director



JOHN GUILLORY, P.E.
Supervising Engineer

DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES
DIVISION OF WATER RESOURCES
SOUTHERN NEVADA BRANCH OFFICE

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Las Vegas, Nevada 89106
(702) 486-2770 • Fax (702) 486-2781
<http://water.nv.gov>

March 25, 2019

MO-3631

Neil Hale
Field Supervisor
Cascade Drilling, LP
4221 West Oquendo Road
Las Vegas, Nevada 89118

RE: Request for waiver to install eleven (11) temporary monitor wells to collect groundwater samples and analyze the samples as requested by Nevada Division of Environmental Protection (NDEP) Order Number H-000539, located at 201 Via Antincendio, Clark County, Nevada and within the Las Vegas Valley Basin (212).

Dear Mr. Hale:

As provided in Nevada Administrative Code (NAC) § 534.450 of the Regulation for Water Well and Related Drilling, permission is herewith **granted** to install eleven (11) temporary monitor wells to assess water conditions as described in your request received March 18, 2019. Your statement ensuring Nevada Environmental Response Trust responsibility for abandonment of the well upon project completion was received in this office on March 18, 2019.

The eleven (11) proposed monitor wells referenced in your letter are listed below:

Well Name	Legal Description	GPS Coordinates (NAD 83/ WGS 84)
NERT3.58S1	SW¼, NE¼ Section 28, T.21S, R63E	36.0971835166° N, -114.94516383° W
NERT3.60S1	SW¼, NE¼ Section 28, T.21S, R63E	36.0966616622° N, -114.945606514° W
NERT3.63S1	SW¼, NE¼ Section 28, T.21S, R63E	36.0956390516° N, -114.947091481° W
OBS3.60S1-A	SW¼, NE¼ Section 28, T.21S, R63E	36.0966180000° N, -114.945652000° W
OBS3.60S1-B	SW¼, NE¼ Section 28, T.21S, R63E	36.0967210000° N, -114.94572100° W
OBS3.60S1-C	SW¼, NE¼ Section 28, T.21S, R63E	36.0967380000° N, -114.94565300° W
OBS3.60S1-D	SW¼, NE¼ Section 28, T.21S, R63E	36.0966460000° N, -114.94550400° W
OBS3.58S1-A	SW¼, NE¼ Section 28, T.21S, R63E	36.0971160000° N, -114.94522200° W
OBS3.58S1-B	SW¼, NE¼ Section 28, T.21S, R63E	36.0972400000° N, -114.9452400° W
OBS3.58S1-C	SW¼, NE¼ Section 28, T.21S, R63E	36.0972500000° N, -114.9451000° W
OBS3.58S1-D	SW¼, NE¼ Section 28, T.21S, R63E	36.0971570000° N, -114.94506500° W

This office also waives the following regulations:

- 1) NAC § 534.4351. The purpose of this well is to collect groundwater samples and analyze the samples as requested by NDEP Order Number H-000539, located at 201 Via Antincendio, Clark County, Nevada. The wellhead shall be protected from damage due to vandalism or sunlight. If polyvinyl chloride (PVC) casing is used, then the well must be completed with ASTM F-480 (Sch. 40 or heavier) well casing as provided in NAC § 534.362.
- 2) NAC 534.4357(1c) - "If water or vapors which are being monitored in a monitoring well are not encountered within 5 feet below the surface of the ground, the well driller shall place in the annual space of the well: From the seal placed pursuant to paragraph (b) to the surface, a seal, with a minimum thickness of 20 feet below the surface, consisting of cement grout, neat cement or concrete grout." Due to the shallow depth and large screen intervals of the proposed monitor well, you are allowed to install the sanitary seal as shown in your waiver request.

Glued casing joint connections will not be allowed. Full compliance with the remainder of the statute and regulation is required.

A plot map showing the actual location of the completed wells must be submitted upon completion of the drilling operations. Please include an accurate description of the location of the monitor well on the completion reports (GPS coordinates are required).

The well driller's reports shall bear this waiver number: MO-3631.

Authorization to drill under this waiver expires one (1) year from the date of this letter.

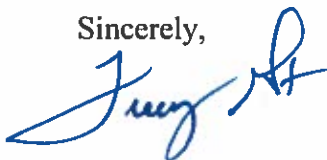
The well driller must have a copy of this waiver in possession at all times during drilling activities pertaining to this project. This well may only be pumped when necessary to obtain samples.

Please note that you must notify the Nevada Division of Environmental Protection (NDEP) for possible permitting requirements for groundwater or temporary surface discharge permits, which may include Underground Injection Control (UIC) or National Pollution Discharge Elimination System (NPDES) Permit Numbers. For more information regarding the permitting process with NDEP, please contact NDEP Water Pollution Control Department at (775) 687-4670.

The wells shall be plugged and abandoned, as provided by regulation, upon project completion. The current owner of Assessor's Parcel Number 160-28-501-003 is shown as Clark County (Parks and Community Services) by the records of the Clark County Assessor's office. This waiver does not imply or grant any land use agreements between Clark County (Parks and Community Services) and any land owners. It is expressly understood that this authorization does not relieve the operator of the requirements of any other state, federal or local agencies.

If you have any questions, please contact this office at 702-486-2770.

Sincerely,



Tracy Geter
Drilling Supervisor

cc: File
Carson City Office
Christi Cooper, SNBO Office
Jay A. Steinberg, President, Nevada Environmental Response Trust, Chicago, IL

Caceres-Schnell, Carmen

From: notification@usan.org
Sent: Thursday, January 24, 2019 12:02 PM
To: Capotrio, Joseph
Subject: USA North 811 Confirmation for Ticket W902400335-00W

EMLCFM 00394 USANW 01/24/19 11:01:30 W902400335-00W NORM NEW POLY LREQ

Message Number: W902400335 Rev: 00W Received by USAN at 10:59 on 01/24/19

Work Begins: 01/31/19 at 07:00 Notice: 040 hrs Priority: 2
Night Work: Weekend Work:

Expires: 02/21/19 at 23:59 Update By: 02/19/19 at 00:00

Field Meet Requested - Please Call and Confirm

Caller: JOSEPH CAPOTRIO
Company: AECOM
Address: 8985 S EASTERN AVE, SUITE 130
City: LAS VEGAS State: NV Zip: 89123
Business Tel: 720-376-8791 Fax:
Email Address: joseph.capotrio@aecom.com

Nature of Work: INSTALL ENVIRONMENTAL MONITORING WELLS
Done for: N.D.E.P. Explosives:
Foreman: CARMEN CACERES-SCHNELL
Cell Tel: 818-517-3126
Area Premarked: Y Premark Method: FLAGS,STAKES,WHITE PAINT
Permit Type: NO
Excavation Enters Into Street Or Sidewalk Area: N

Location:
Street Address: LAKE LAS VEGAS PKWY
Cross Street: E GALLERIA DR

AT A POINT .53 MILES SW AS CROW FLIES OF LAKE LAS VEGAS PKWY & E.GALLERIA DR
GPS: 36.099288, -114.942840, 2)300'SW OF 1 GPS: 36.09877, -114.94363, 3)800'SW
OF 2 GPS: 36.09718, -114.94516, 4)250'SW OF 3, 36.09666, -114.94560, 5)600'SW OF
4 GPS: 36.09564, -114.94709, 6)800' N OF 5 36.09783, -114.94742 , 7)200' NE OF
6, 36.09830, -114.94697, 8)2160' SW OF 7, 36.09459, -114.95262, 10' RADIUS AT
EACH

Place: HENDERSON /U County: CLARK State: NV

Long/Lat Long: -114.939260 Lat: 36.092742 Long: -114.954182 Lat: 36.101455

Comments:
CUSTOMER REQUESTS FIELD MEET PLEASE CONTACT CUSTOMER TO SCHEDULE

Sent to:
BAWACO = BASIC WATER COMPANY CENTE2 = CENTURYLINK
COXLVE = COX COMMUNICATIONS LAS VEGAS CTYHEN = CITY HENDERSON
NENGSO = NV ENERGY SNVWTR = SO NEV WTR AUTHORITY
SWGLVE = SWGAS LAS VEGAS

Caceres-Schnell, Carmen

From: notification@usan.org
Sent: Thursday, January 24, 2019 12:14 PM
To: Capotrio, Joseph
Subject: USA North 811 Confirmation for Ticket W902400349-00W

EMLCFM 00407 USANW 01/24/19 11:14:06 W902400349-00W NORM NEW POLY LREQ

Message Number: W902400349 Rev: 00W Received by USAN at 11:01 on 01/24/19

Work Begins: 01/31/19 at 07:00 Notice: 040 hrs Priority: 2
Night Work: Weekend Work:

Expires: 02/21/19 at 23:59 Update By: 02/19/19 at 00:00

Field Meet Requested - Please Call and Confirm

Caller: JOSEPH CAPOTRIO
Company: AECOM
Address: 8985 S EASTERN AVE, SUITE 130
City: LAS VEGAS State: NV Zip: 89123
Business Tel: 720-376-8791 Fax:
Email Address: joseph.capotrio@aecom.com

Nature of Work: INSTALL ENVIRONMENTAL MONITORING WELLS
Done for: N.D.E.P. Explosives:
Foreman: CARMEN CACERES-SCHNELL
Cell Tel: 818-517-3126
Area Premarked: Y Premark Method: FLAGS,STAKES,WHITE PAINT
Permit Type: NO
Excavation Enters Into Street Or Sidewalk Area: N

Location:
Street Address: LAKE LAS VEGAS PKWY
Cross Street: E GALLERIA DR

AT A POINT 1.78 MILES SW AS CROW FLIES OF LAKE LAS VEGAS PKWY & E.GALLERIA DR
GPS:36.09358, -114.96408, 2)150' E OF 1 GPS:36.09364, -114.96359, 3)450' SW OF 2
GPS:36.09325, -114.96490, 4) 250' SE OF 3, GPS:36.09208, -114.96289, 5) 730'SW
OF 4 GPS: 36.09127, -114.96509, 6)780' NW OF 5 GPS: 36.09318, -114.96587,
INCLUDE 10' RADIUS AT EACH

Place: HENDERSON /U County: CLARK State: NV

Long/Lat Long: -114.959582 Lat: 36.089920 Long: -114.969079 Lat: 36.095427

Sent to:
BAWACO = BASIC WATER COMPANY CENTE2 = CENTURYLINK
CTYHEN = CITY HENDERSON NENGSO = NV ENERGY
SWGLVE = SWGAS LAS VEGAS

Caceres-Schnell, Carmen

From: notification@usan.org
Sent: Wednesday, March 20, 2019 1:26 PM
To: Greg Kinsall
Subject: USA North 811 Confirmation for Ticket X907902102-00X

EMLCFM 04105X USAN 03/20/19 12:26:25 X907902102-00X NEW NORM POLY LREQ

Ticket: X907902102 Rev: 00X Created: 03/20/19 12:26 User: KMB Chan: CSR

Work Start: 03/25/19 09:00 Legal Start: 03/25/19 09:00 Expires: 04/17/19 23:59
Response required: Y Priority: 2

Excavator Information

Company: RAMBOLL ENVIRONMENTAL
Co Addr: 2111 E.HIGHLAND AVE STE 402
City : PHOENIX State: AZ Zip: 85016
Created By: GREG KINSALL Language: ENGLISH
Office Phone: 614-579-3330 SMS/Cell: 614-579-3330
Office Email: gkinsall@ramboll.com

Site Contact: GABE MICLETTE
Site Phone: 707-223-3731 Site SMS/Cell: 707-223-3731
Site Email: gmiclette@ramboll.com

Excavation Area

State: NV County: CLARK Place: HENDERSON
Zip: 89015,89011,89156
Location: Address/Street: LAKE LAS VEGAS PKWY
: X/ST1: E GALLERIA DR
:
: AT A PT 1.78 MI SW OF INTERSECTION OF LAKE LAS VEGAS PKWY & E.
: GALLERIA DR (AS A CROW FLIES, 2) 150' E OF LOCATION 1, 3) 450' SW OF
: LOCATION 2, 4) 250' SE OF LOCATION 3, 5) 730' SW OF LOCATION 4, 6)
: 780' NW OF LOCATION 5

Delineated Method: WHITE PAINT
Work Type: ENVIRONMENTAL SAMPLES
Work For : N.E.R.T.
Permit: Job/Work order:
1 Year: N Boring: V Street/Sidewalk: N Vacuum: N Explosives: N

Lat/Long

Center Generated (NAD83): 36.110591/-114.978143 36.110591/-114.922533
: 36.063700/-114.978143 36.063700/-114.922533

Excavator Provided: 36.093580/-114.964080

Map link:

https://newtin.usan.org/newtinweb/map_tkt.nap?TRG=CETeJkGeHcFhAec-5

Members:

BAWACO = BASIC WATER COMPANY CENTE2 = CENTURYLINK
COXLVE = COX COMMUNICATIONS LAS VEGAS CTYHEN = CITY HENDERSON
LVVWTR = LAS VEGAS VLY WTR NENGSO = NV ENERGY
SNVWTR = SO NEV WTR AUTHORITY SWGHPT = SOUTHWEST GAS (HIGH PRESS LO
SWGLVE = SWGAS LAS VEGAS

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Caceres-Schnell, Carmen

From: notification@usan.org
Sent: Wednesday, March 20, 2019 1:32 PM
To: Greg Kinsall
Subject: USA North 811 Confirmation for Ticket X907902120-00X

EMLCFM 04131X USAN 03/20/19 12:32:20 X907902120-00X NEW NORM POLY LREQ

Ticket: X907902120 Rev: 00X Created: 03/20/19 12:32 User: KMB Chan: CSR

Work Start: 03/22/19 17:00 Legal Start: 03/22/19 17:00 Expires: 04/17/19 23:59
Response required: Y Priority: 2

Excavator Information

Company: RAMBOLL ENVIRONMENTAL
Co Addr: 2111 E.HIGHLAND AVE STE 402
City : PHOENIX State: AZ Zip: 85016
Created By: GREG KINSALL Language: ENGLISH
Office Phone: 614-579-3330 SMS/Cell: 614-579-3330
Office Email: gkinsall@ramboll.com

Site Contact: GABE MICLETTE
Site Phone: 707-223-3731 Site SMS/Cell: 707-223-3731
Site Email: gmiclette@ramboll.com

Excavation Area

State: NV County: CLARK Place: HENDERSON /U
Zip: 89011
Location: Address/Street: LAKE LAS VEGAS PKWY
: X/ST1: E GALLERIA DR
:
: AT A PT .53 MI SW OF INTERSECTION OF LAKE LAS VEGAS PKWY & E. GALLERIA
: DR (AS A CROW FLIES, 2) 300' SW OF LOCATION 1, 3) 800' SW OF LOCATION
: 2, 4) 250' SW OF LOCATION 3, 5) 600' SW OF LOCATION 4, 6) 800' N OF
: LOCATION 5, 7) 200' NE OF LOCATION 6, 8) 2160' SW OF LOCATION 7

Delineated Method: WHITE PAINT
Work Type: ENVIRONMENTAL SAMPLES
Work For : N.E.R.T.
Permit: Job/Work order:
1 Year: N Boring: V Street/Sidewalk: N Vacuum: N Explosives: N

Lat/Long

Center Generated (NAD83): 36.106181/-114.962105 36.105800/-114.937367
: 36.085389/-114.962425 36.085008/-114.937687

Excavator Provided: 36.099288/-114.942840

Map link:

https://newtin.usan.org/newtinweb/map_tkt.nap?TRG=4Fet2Fp3sFeBe9A-d

Members:

BAWACO = BASIC WATER COMPANY CENTE2 = CENTURYLINK
COXLVE = COX COMMUNICATIONS LAS VEGAS CTYHEN = CITY HENDERSON
LVVWTR = LAS VEGAS VLY WTR NENGSO = NV ENERGY
SNVWTR = SO NEV WTR AUTHORITY SWGHPT = SOUTHWEST GAS (HIGH PRESS LO
SWGLVE = SWGAS LAS VEGAS

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Caceres-Schnell, Carmen

From: notification@usan.org
Sent: Thursday, April 18, 2019 7:45 AM
To: Greg Kinsall
Subject: USA North 811 Confirmation for Ticket X910800110-00X

EMLCFM 00456X USAN 04/18/19 06:44:58 X910800110-00X NEW NORM POLY LREQ

Ticket: X910800110 Rev: 00X Created: 04/18/19 06:44 User: JBM Chan: CSR

Work Start: 04/22/19 17:00 Legal Start: 04/22/19 17:00 Expires: 05/16/19 23:59
Response required: Y Priority: 2

Excavator Information

Company: RAMBOLL ENVIRONMENTAL
Co Addr: 2111 E.HIGHLAND AVE STE 402
City : PHOENIX State: AZ Zip: 85016
Created By: GREG KINSALL Language: ENGLISH
Office Phone: 614-579-3330 SMS/Cell: 614-579-3330
Office Email: gkinsall@ramboll.com

Site Contact: GABE MICLETTE
Site Phone: 707-223-3731 Site SMS/Cell: 707-223-3731
Site Email: gmiclette@ramboll.com

Excavation Area

State: NV County: CLARK Place: HENDERSON /U
Zip: 89011
Location: Address/Street: LAKE LAS VEGAS PKWY
: X/ST1: E GALLERIA DR
:
: AT A PT .53 MI SW OF INTERSECTION OF LAKE LAS VEGAS PKWY & E. GALLERIA
: DR (AS A CROW FLIES, 2) 300' SW OF LOCATION 1, 3) 800' SW OF LOCATION
: 2, 4) 250' SW OF LOCATION 3, 5) 600' SW OF LOCATION 4, 6) 800' N OF
: LOCATION 5, 7) 200' NE OF LOCATION 6, 8) 2160' SW OF LOCATION 7

Delineated Method: WHITE PAINT
Work Type: ENVIRONMENTAL SAMPLES
Work For : N.E.R.T.
Permit: Job/Work order:
1 Year: N Boring: V Street/Sidewalk: N Vacuum: N Explosives: N

Lat/Long

Center Generated (NAD83): 36.105328/-114.961642 36.105328/-114.938292
: 36.085606/-114.961642 36.085606/-114.938292
Excavator Provided: 36.099288/-114.942840

Map link:

https://newtin.usan.org/newtinweb/map_tkt.nap?TRG=92mHhJo5sxxvzuum-N

Members:

BAWACO BASIC WATER COMPANY	COLEN WATTS	702-429-8969
	EMERGENCY 1	702-429-8969
CENTE2 CENTURYLINK	TOM STURMER	303-453-9927
	EMERGENCY	702-244-4213
COXLVE COX COMMUNICATIONS LAS VEGAS	CHERYL BUTTS	623-328-4101

	USIC CONTRACT LOCATOR	800-778-9140
CTYHEN CITY HENDERSON	Name not available	702-267-2783
LVVWTR LAS VEGAS VLY WTR	RON LOVELY	702-258-3879
	DISPATCH	702-258-3192
NENGSO NV ENERGY	BOB WARD	702-402-4465
	DAMAGES/EMERGENCY	800-778-9140
SNVWTR SO NEV WTR AUTHORITY	SAM HERNDON	702-691-5372
	LVVWD DISPATCH	702-258-3192
SWGHT SOUTHWEST GAS (HIGH PRESS LOC	DISPATCH	702-651-2111
	For emergencies	800-447-5422
SWGLVE SWGAS LAS VEGAS	DISPATCH	702-651-2111
	For emergencies	800-447-5422

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Caceres-Schnell, Carmen

From: notification@usan.org
Sent: Thursday, April 18, 2019 7:55 AM
To: Greg Kinsall
Subject: USA North 811 Confirmation for Ticket X910800135-00X

EMLCFM 00536X USAN 04/18/19 06:54:59 X910800135-00X NEW NORM POLY LREQ

Ticket: X910800135 Rev: 00X Created: 04/18/19 06:54 User: MAB Chan: CSR

Work Start: 04/22/19 17:00 Legal Start: 04/22/19 17:00 Expires: 05/16/19 23:59
Response required: Y Priority: 2

Excavator Information

Company: RAMBOLL ENVIRONMENTAL
Co Addr: 2111 E.HIGHLAND AVE STE 402
City : PHOENIX State: AZ Zip: 85016
Created By: GREG KINSALL Language: ENGLISH
Office Phone: 614-579-3330 SMS/Cell: 614-579-3330
Office Email: gkinsall@ramboll.com

Site Contact: GABE MICLETTE
Site Phone: 707-223-3731 Site SMS/Cell: 707-223-3731
Site Email: gmiclette@ramboll.com

Excavation Area

State: NV County: CLARK Place: HENDERSON
Zip: 89011
Location: Address/Street: LAKE LAS VEGAS PKWY
: X/ST1: E GALLERIA DR
:
: AT A PT 1.78 MI SW OF INTERSECTION OF LAKE LAS VEGAS PKWY & E.
: GALLERIA DR (AS A CROW FLIES, 2) 150' E OF LOCATION 1, 3) 450' SW OF
: LOCATION 2, 4) 250' SE OF LOCATION 3, 5) 730' SW OF LOCATION 4, 6)
: 780' NW OF LOCATION 5

Delineated Method: WHITE PAINT
Work Type: ENVIRONMENTAL SAMPLES
Work For : N.E.R.T.
Permit: Job/Work order:
1 Year: N Boring: V Street/Sidewalk: N Vacuum: N Explosives: N

Lat/Long

Center Generated (NAD83): 36.099821/-114.970552 36.098725/-114.956766
: 36.088664/-114.971439 36.087568/-114.957653

Excavator Provided: 36.093580/-114.964080

Map link:

https://newtin.usan.org/newtinweb/map_tkt.nap?TRG=D2z7r4zvyvzwtvP-0

Members:

BAWACO BASIC WATER COMPANY	COLEN WATTS	702-429-8969
	EMERGENCY 1	702-429-8969
CENTE2 CENTURYLINK	TOM STURMER	303-453-9927
	EMERGENCY	702-244-4213
CTYHEN CITY HENDERSON	Name not available	702-267-2783

NENGSO NV ENERGY

BOB WARD

702-402-4465

DAMAGES/EMERGENCY

800-778-9140

SNVWTR SO NEV WTR AUTHORITY

SAM HERNDON

702-691-5372

LVVWD DISPATCH

702-258-3192

SWGLVE SWGAS LAS VEGAS

DISPATCH

702-651-2111

For emergencies

800-447-5422

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Appendix C
Soil Boring Logs



AECOM
1220 Avenida Acaso
Camarillo, CA 93012
805-388-3775

Client: NDEP
Project Number: 60477365
Site Description/Location: Las Vegas Wash, Henderson, NV
Coordinates: 26738372.779 N 845391.591 E Elevation: 1470.443 FT
Drilling Equipment/Method: Sonic Rig Weather:
Sample Type(s): Grab Boring Diameter: 8 IN.

Boring No. NERT3.35S1

Ambient PID Reading: NA

Sheet: 1 of 2

Monitoring Well Installed: Yes

Screened Interval: 35-55 FT BGS

Approved By: S. Bilodeau

Logged By: C. Grimes

Date/Time Started: 04-24-19

Depth of Boring: 57 FT BGS

Drilling Contractor: Cascade Drilling

Backfill: See below

Date/Time Finished: 04-24-19

Water Level: 19.6 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram
5	R1					SP-SM		POORLY GRADED SAND WITH SILT AND GRAVEL, light brown (7.5YR 6/3), 10% non-plastic silt, 75% fine to medium-grained subrounded sand, 15% fine to medium gravel with 1.5-inch max gravel size, loose, dry, hand augered to 5 feet bgs	
10						SM		SILTY SAND, brown (7.5YR 4/4), 25% non-plastic silt, 65% fine to medium-grained subrounded sand, 10% medium gravel with 2-inch max gravel size, loose, dry	
15						SP-SM		POORLY GRADED SAND WITH SILT, brown (7.5YR 4/4), 10% non-plastic silt, 80% fine to coarse-grained subrounded and subangular sand, 10% fine to medium gravel with 1.5-inch max gravel size, loose, dry	
20	R2					SM		SILTY SAND, brown (7.5YR 4/4), 25% non-plastic silt, 65% fine to medium-grained subrounded sand, 10% medium to coarse gravel with 3-inch max gravel size, loose, dry -@12 feet - 30% silt, 65% medium-grained sand, 5% gravel with 1-inch max gravel size	
25						SP-SM		POORLY GRADED SAND WITH SILT, brown (7.5YR 4/4), 10% non-plastic silt, 90% fine to medium-grained subrounded sand, loose, dry -@17.5 feet - 10% silt, 75% fine to coarse-grained subangular sand, 15% medium gravel with 1.5-inch max gravel size	
30	R3					SP		POORLY GRADED SAND, dark brown (7.5YR 3/2), 5% non-plastic silt, 85% fine to medium-grained subrounded sand, 10% medium gravel with 1-inch max gravel size, loose, dry	
35						ML		SILTY SAND, brown (7.5YR 5/3), 20% non-plastic silt, 75% fine to coarse-grained subangular sand, 5% fine gravel with 0.10-inch max gravel size	
40								POORLY GRADED SAND WITH SILT AND GRAVEL, brown (7.5YR 5/3), 10% non-plastic silt, 75% fine to coarse-grained subangular sand, 15% medium gravel with 2-inch max gravel size, loose, dry, siliceous limestone -@25 feet - color change to 7.5YR 4/3,	
								POORLY GRADED SAND WITH GRAVEL, brown (7.5YR 4/3), 5% non-plastic silt, 70% fine to medium-grained subangular to angular sand, 25% medium to coarse gravel with 3-inch max gravel size	
								BEDROCK, hard pulverized bedrock or large boulder	
								-@34 feet - grey cemented sandstone -@35 feet - refusal with sonic rig -@35 to 57 feet - ARCH rig used to drill borehole	
								SILT, strong brown (7.5YR 5/6), 100% medium to high plastic fines, stiff, wet	

Notes: ARCH rig drilled through grout to approximate 33 feet bgs. R denotes Ramboll grab sample. For backfill information, refer to well completion diagram.



AECOM
1220 Avenida Acaso
Camarillo, CA 93012
805-388-3775

Client: NDEP	Boring No. NERT3.35S1
Project Number: 60477365	
Site Description/Location: Las Vegas Wash, Henderson, NV	Ambient PID Reading: NA
Coordinates: 26738372.779 N 845391.591 E Elevation: 1470.443 FT	Sheet: 2 of 2
Drilling Equipment/Method: Sonic Rig Weather:	Monitoring Well Installed: Yes
Sample Type(s): Grab Boring Diameter: 8 IN.	Screened Interval: 35-55 FT BGS

Approved By: S. Bilodeau	Logged By: C. Grimes	Date/Time Started: 04-24-19	Depth of Boring: 57 FT BGS
Drilling Contractor: Cascade Drilling	Backfill: See below	Date/Time Finished: 04-24-19	Water Level: 19.6 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram
45						ML		<p>SANDY SILT, strong brown (7.5YR 5/6), 65% medium to high plastic fines, 25% very fine to medium-grained subangular sand, 10% very fine gravel with 0.1-inch max gravel size</p> <p>-@45 feet - color change to 7.5YR 4/6, 70% fines, 25% fine to coarse-grained sand, 5% gravel, medium stiff, weakly cemented siltstones and sandstones</p> <p>-@50 feet - 60% low plastic silt, 30% medium to coarse-grained subangular sand, 10% fine gravel with 0.3-inch max gravel size, medium stiff with gravels are broken up siltstones</p> <p>-@56 feet - 65% medium to high plastic fines, 25% very fine to medium-grained subangular sand, 10% very fine gravel with 0.1-inch max gravel size, stiff</p>	<p>schedule 40 PVC</p> <p>Monterey #3 Sand</p>

Total Depth = 57 feet
Boring Terminated
Target depth achieved

Notes: ARCH rig drilled through grout to approximate 33 feet bgs. R denotes Ramboll grab sample. For backfill information, refer to well completion diagram.



AECOM
1220 Avenida Acaso
Camarillo, CA 93012
805-388-3775

Client: NDEP
Project Number: 60477365
Site Description/Location: Las Vegas Wash, Henderson, NV
Coordinates: 26738206.492 N 845198.154 E Elevation: 1474.579 FT
Drilling Equipment/Method: /Sonic Rig Weather: 70 and cloudy and breezy
Sample Type(s): Grab Boring Diameter: 8 IN.

Boring No. NERT3.40S1

Ambient PID Reading: NA
Sheet: 1 of 2
Monitoring Well Installed: Yes
Screened Interval: 35-55 FT BGS

Approved By: S Bilodeau Logged By: C. Grimes Date/Time Started: 04-15-19 Depth of Boring: 65 FT BGS
Drilling Contractor: Cascade Drilling Backfill: See below Date/Time Finished: 04-16-19 Water Level: 38.11 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram
5	R1					SM		SILTY SAND, light brown (7.5YR 6/4), 20% low plastic silt, 70% very fine to medium-grained subrounded sand, 10% fine gravel with 1-inch max gravel size, loose, dry, hand augured to 5 feet bgs	
10						SP		POORLY GRADED SAND WITH GRAVEL, brown (7.5YR 4/3), 5% non-plastic silt, 80% fine to coarse-grained subrounded to subangular sand, 15% fine to coarse gravel with 2-inch max gravel size, loose, dry -@10 to 15 feet - homogeneous	
15	R2					SM		SILTY SAND, brown (7.5YR 4/4), 25% low-plastic silt, 65% fine to coarse-grained subrounded and subangular sand, 10% fine to medium gravel with 1-inch max gravel size, loose, dry	
20								-@20 feet - color change to dark brown (7.5YR 3/2), 15% non-plastic silt, 75% coarse-grained sand, 10% fine gravel	
25									
30	R3					SP-SM		POORLY GRADED SAND WITH SILT AND GRAVEL, dark yellow brown (10YR 4/4), 10% non-plastic silt, 70% fine to coarse-grained subrounded to angular sand, 20% fine to medium gravel with 1-inch max gravel size, loose, moist, moist possibly from pulverization	
35								-@33 feet - poorly graded sand with silt 10% silt, 80% sand, 10% fine gravel with 0.5-inch max gravel size	
40						SM		SILTY SAND WITH GRAVEL, brown (7.5YR 4/3), 15% non-plastic silt, 70% fine to coarse-grained sand, 15% fine to medium gravel with 1-inch max gravel size, loose, moist	

Notes: R denotes Ramboll grab sample. For backfill information, refer to well completion diagram.

ENSR.BLOG BORING LOGS.GPJ ENSR CA.GDT 9/16/19

Client: NDEP
Project Number: 60477365
Site Description/Location: Las Vegas Wash, Henderson, NV
Coordinates: 26738206.492 N 845198.154 E Elevation: 1474.579 FT
Drilling Equipment/Method: /Sonic Rig Weather: 70 and cloudy and breezy
Sample Type(s): Grab Boring Diameter: 8 IN.

Boring No. NERT3.40S1

Ambient PID Reading: NA
Sheet: 2 of 2
Monitoring Well Installed: Yes
Screened Interval: 35-55 FT BGS

Approved By: S Bilodeau Logged By: C. Grimes Date/Time Started: 04-15-19 Depth of Boring: 65 FT BGS
Drilling Contractor: Cascade Drilling Backfill: See below Date/Time Finished: 04-16-19 Water Level: 38.11 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram
45	R4					SP		POORLY GRADED SAND WITH GRAVEL, dark yellow brown (10YR 4/4), 5% non-plastic silt, 80% fine to coarse-grained subrounded to angular sand, 15% fine to medium gravel with 2.5-inch max gravel size, loose, moist, angular platy gravels	<p>schedule 40 PVC Monterey #3 Sand</p>
50	PT-NERT3.40S 47.0-47.3					ML		SANDY SILT, brown (7.5YR 4/3), 40% low to medium plastic silt, 60% very fine to fine-grained rounded sand, stiff, wet, with mottled yellowish brown (10YR 4/6) fine sand -@47 feet - Core Lab (SM) silty sand -@48 feet - color change to reddish brown (5YR 5/3), 25% medium plastic silt, 70% very fine to fine-grained subangular sand, 5% gravel, very stiff, dry, weakly cemented siltstone and sandstone, easy drilling	
55						CL		WEATHERED BEDROCK (THUMB FORMATION), reddish brown (5YR 4/3), 70% non-plastic to low plastic fines, 25% very fine to fine-grained subrounded to rounded sand, 5% gravel, damp, very dense, strongly cemented sandstones, weakly cemented siltstones with mudstone interbedded every 6 inches	
60	R6					CL		-@57 feet - color change to olive yellow (5Y 6/6), 70% medium plastic fines, 25% fine to medium-grained subrounded sand, 5% fine gravel with 0.5-inch max gravel size, dry, stiff BEDROCK (THUMB FORMATION), reddish brown (5YR 5/4), moderately cemented siltstone, thin and thick interbedding -@60 feet - siltstones become more cemented, bedding thins to 0.25 inch	
65								Refusal at 65 feet. Boring Terminated	

Notes: R denotes Ramboll grab sample. For backfill information, refer to well completion diagram.

Client:	NDEP
Project Number:	60477365
Site Description/Location:	Las Vegas Wash, Henderson, NV
Coordinates:	26738048.58 N 844188.45 E Elevation: 1476.55 FT
Drilling Equipment/Method:	Sonic Rig and ARCH Rig Weather: 90 and sunny
Sample Type(s):	Grab Boring Diameter: 8 IN.

Ambient PID Reading:	NA
Sheet:	1 of 2
Monitoring Well Installed:	Yes
Screened Interval:	40-60 FT BGS

Approved By:	S. Bilodeau	Logged By:	C. Grimes	Date/Time Started:	04-08-19	Depth of Boring:	60 FT BGS
Drilling Contractor:	Cascade Drilling	Backfill:	See below	Date/Time Finished:	04-23-19	Water Level:	52 FT

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram	
5	R1					SM		SILTY SAND, brown (7.5 YR 5/3), 25% low plastic silt, 75% very fine to medium-grained subrounded to subangular sand, loose, dry, hand augured to 5 feet bgs		
10								-@5 feet - color change to gray (5YR 5/1), 30% silt, 70% rounded sand, powdery, relatively homogenous		
15										-@8 feet - 20% silt, 80% rounded sand
20										-@11 feet - 40% silt, 60% sand, gray calcereous sandstone
25										-@12 feet - 25% silt, 60% very fine to medium-grained subangular to rounded sand, 15% medium to coarse gravel with 6-inch max gravel size
30										-@13.5 feet - corebarrel size gravel
35										BEDROCK (THUMB FORMATION), yellowish Red (5 YR 5/6), 100% very fine to fine-grained subrounded sand, very dense, dry, Thumb Formation, strongly cemented sandstone
40										-@17 feet - 90% very fine to coarse-grained sand, 10% gravel
										-@20 feet - color change to yellowish red (4/6), 100% very fine to medium-grained subrounded to rounded sand, sandstone chunks approximately 0.75 inches across
										SANDSTONE AND SILTSTONE -@25 feet - Sandstone, color change to yellowish red (5YR 4/6), 30% low-plastic silt, 70% very fine to medium-grained subangular to subrounded sand, dense, friable, platy siltstone with notable bedding
								-@30 feet - color change to brown (7.5YR 5/4), 15% silt, 65% fine to medium-grained subangular to rounded sand, 20% fine gravel with 0.25-inch max gravel size, very dense		
								-@35 feet - color change to 4/4, 10% silt, 50% sand, 40% gravel with 0.3-inch max gravel size		

Notes: R denotes Ramboll grab sample. For backfill information, refer to well completion diagram. 4/8/2019 - Sonic drilled to 17 feet (refusal). ARCH rig used to complete boring to 60 feet.

Client: NDEP
Project Number: 60477365
Site Description/Location: Las Vegas Wash, Henderson, NV
Coordinates: 26738048.58 N 844188.45 E Elevation: 1476.55 FT
Drilling Equipment/Method: Sonic Rig and ARCH Rig Weather: 90 and sunny
Sample Type(s): Grab Boring Diameter: 8 IN.

Boring No. NERT3.58N1

Ambient PID Reading: NA
Sheet: 2 of 2
Monitoring Well Installed: Yes
Screened Interval: 40-60 FT BGS

Approved By: S. Bilodeau

Logged By: C. Grimes

Date/Time Started: 04-08-19

Depth of Boring: 60 FT BGS

Drilling Contractor: Cascade Drilling

Backfill: See below

Date/Time Finished: 04-23-19

Water Level: 52 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram
45								<p>BEDROCK (THUMB FORMATION), yellowish Red (5 YR 5/6), 100% very fine to fine-grained subrounded sand, very dense, dry, Thumb Formation, strongly cemented sandstone (continued)</p> <p>-@40 feet - color change to yellowish red (5YR 5/6), 10% low to medium-plastic silt, 50% very fine to medium subrounded sand, 40% gravel with 0.75-inch max gravel size</p> <p>-@45 feet - damp, low plastic silt, max gravel size of 0.10 inch</p>	<p>schedule 40 PVC</p> <p>Monterey #3 Sand</p>
50							<p>-@50 feet - 20% silt, 60% very fine to coarse-grained sand, 20% gravel with 0.5-inch max gravel size, moist, medium dense</p> <p>-@52 feet - moist to wet</p>		
55							<p>-@55 feet - 30% low to medium plastic fines, 60% fine to coarse-grained subrounded sand, 10% gravel with 0.05-inch gravel size</p>		
60								<p>Total Depth = 60 feet Boring Terminated Target depth achieved</p>	

Notes: R denotes Ramboll grab sample. For backfill information, refer to well completion diagram. 4/8/2019 - Sonic drilled to 17 feet (refusal). ARCH rig used to complete boring to 60 feet.



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Client: NDEP
Project Number: 60477365
Site Description/Location: Las Vegas Wash, Henderson, NV
Coordinates: 26737583.504 N 844695.297 E Elevation: 1474.297 FT
Drilling Equipment/Method: /Sonic Rig Weather: Partially sunny and windy
Sample Type(s): Grab Boring Diameter: 8 IN.

Boring No. NERT3.58S1

Ambient PID Reading: NA
Sheet: 1 of 2
Monitoring Well Installed: Yes
Screened Interval: 35-55 FT BGS

Approved By: S. Bilodeau Logged By: C. Grimes Date/Time Started: 03-27-19 Depth of Boring: 70 FT BGS
Drilling Contractor: Cascade Drilling Backfill: See below Date/Time Finished: 03-28-19 Water Level: 34.95 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram
5	R1					SM		SILTY SAND, light reddish brown (7.5YR 6/3), artificial fill composed of 15% non-plastic silt, 75% fine to coarse-grained subangular sand, 10% fine gravel with 0.25-inch max gravel size, loose, dry	
						CL		LEAN CLAY, dark brown (7.5 YR 3/2), artificial fill composed of 95% medium-plastic fines, 5% sand	
10						SM		SILTY SAND, dark brown (7.5 YR 3/2), 25% low plastic silt, 65% fine to medium-grained subrounded sand, 10% fine gravel with 0.25-inch max gravel size	
						ML		SANDY SILT, gray (5Y 5/1), 60% low plastic silt, 40% fine-grained subrounded sand	
15	R2					SM		SILTY SAND, brown (7.5YR 5/4), 35% low plastic silt, 60% medium-grained subangular sand, 5% fine to medium gravel with 1-inch max gravel size	
						ML		SILT, olive (5Y 5/4), 100% medium plastic fines	
20						SP		POORLY GRADED SAND, dark reddish brown (5 YR 3/4), 5% silt, 85% fine to medium-grained subrounded sand, 10% fine gravel with 0.10-inch max gravel size	
						ML		SANDY SILT, dark reddish brown (5 YR 3/4), 70% low plastic silt, 25% fine-grained subrounded sand, 5% fine gravel	
25	R3					SP-SM		POORLY GRADED SAND WITH SILT AND GRAVEL, brown (7.5 YR 4/3), 10% non-plastic silt, 75% fine-grained subrounded to angular sand, 15% fine to coarse gravel with 3-inch max gravel size	
						ML		SILT, gray (5Y 5/1), 90% medium plastic fines, 10% fine-grained subrounded sand, medium dense	
30						SP		SILTY SAND WITH GRAVEL, brown (7.5 YR 4/3), 20% low plastic silt, 65% medium to coarse-grained subrounded to subangular sand, 15% fine to coarse gravel with 5-inch max gravel size, loose -@29 feet - becomes coarser	
						CL		LEAN CLAY, 10YR 5/4, 65% medium plastic clay, 20% fine gravel with 0.25 -nch max gravel size, 15% medium to coarse-grained subangular sand, loose, moist	
35						SM		SILTY SAND WITH GRAVEL, yellowish dark brown (7.5 YR 3/3), 15% non-plastic silt, 70% medium coarse-grained subrounded sand, 15% fine to coarse gravel with 2-inch max gravel size, loose, moist	
						SP		POORLY GRADED SAND, yellowish dark brown (7.5 YR 3/3), 5% silt, 95% fine to coarse-grained subrounded to subangular sand, loose, moist -@36 feet - color change to brown (7.5YR 4/4), 15% non-plastic silt, 70% medium to coarse-grained sand, 15% fine to coarse gravel with 2-inch max gravel size	
40						SP-SM		POORLY GRADED SAND WITH SILT AND GRAVEL, brown (7.5YR 4/4), 10% non-plastic silt, 65% medium to coarse-grained subrounded sand, 25% fine to coarse gravel with 3-inch max gravel size, loose, moist, becomes coarser	

Notes: R denotes Ramboll grab sample. For backfill information, refer to well completion diagram.



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Client: NDEP	Boring No. NERT3.58S1
Project Number: 60477365	
Site Description/Location: Las Vegas Wash, Henderson, NV	Ambient PID Reading: NA
Coordinates: 26737583.504 N 844695.297 E Elevation: 1474.297 FT	Sheet: 2 of 2
Drilling Equipment/Method: /Sonic Rig	Weather: Partially sunny and windy
Sample Type(s): Grab	Boring Diameter: 8 IN.
Approved By: S. Bilodeau	Logged By: C. Grimes
Drilling Contractor: Cascade Drilling	Backfill: See below
	Date/Time Started: 03-27-19
	Date/Time Finished: 03-28-19
	Depth of Boring: 70 FT BGS
	Water Level: 34.95 FT BGS
	Monitoring Well Installed: Yes
	Screened Interval: 35-55 FT BGS

Approved By: S. Bilodeau	Logged By: C. Grimes	Date/Time Started: 03-27-19	Depth of Boring: 70 FT BGS
Drilling Contractor: Cascade Drilling	Backfill: See below	Date/Time Finished: 03-28-19	Water Level: 34.95 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram
45	R4					ML		GRAVELLY SILT WITH SAND, brown (7.5YR 4/4), 65% low plastic silt, 25% medium to coarse gravel with 3-inch max gravel size, 10% fine-grained subrounded to subangular sand, loose, moist, becomes finer	<p>schedule 40 PVC</p> <p>Monterey #3 sand</p>
50	R5					SM		SILTY SAND WITH GRAVEL, dark reddish brown (5YR 3/4), 20% low plastic silt, 65% fine to medium-grained subangular sand, 15% medium to coarse gravel with 2-inch max gravel size, loose, moist	
55						SP-SM		POORLY GRADED SAND WITH SILT AND GRAVEL, brown (7.5YR 5/4), 10% non-plastic silt, 75% fine to coarse-grained subrounded to subangular sand, 15% fine gravel with 0.5-inch max gravel size, loose, wet	
						SM		SILTY SAND WITH GRAVEL, 5% non-plastic silt, 80% fine to coarse-grained sand, 15% fine gravel with 1-inch max gravel size, gravel becomes larger	
60						SM		SILTY SAND TO SANDY SILT, light red brown (5 YR 6/4), 45% low plastic silt, 45% fine-grained rounded sand, 10% gravel, medium dense, wet	
						ML		SILT WITH SAND, olive gray (5Y 4/2), 70% low to medium plastic silt, 10% clay, 10% fine to medium-grained subangular sand, 10% medium to coarse gravel with 4-inch max gravel size, medium dense, wet	
						ML		@ 60 feet - LEAN CLAY, Core Lab (CL) Lean Clay with Sand	
65						ML		GRAVELLY SILT, olive (5YR 4/3), 75% low plastic silt, 20% medium to coarse gravel with 3-inch max gravel size, 5% medium-grained subangular sand, medium, wet -@62.5 feet - dry	
						ML		SILT WITH GRAVEL, gray (5/1), 80% low plastic silt, 20% coarse gravel with 5-inch max gravel size, dry, Muddy Creek Formation? Siltstone	
70						ML		GRAVELLY SILT, very dark gray (5YR 3/1), 60% silt, 40% subangular gravel, dense, Horse Spring Formation, limestone with siltstone, silicious limestone, inclusions -@67.5 feet - color change to light gray (5Y 7/2), 70% silt, 20% gravel, 10% sand, weakly cemented to well cemented	

Refusal at 70 feet.
Boring Terminated

Notes: R denotes Ramboll grab sample. For backfill information, refer to well completion diagram.



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Client: NDEP
Project Number: 60477365
Site Description/Location: Las Vegas Wash, Henderson, NV
Coordinates: 26737588.02 N 844690.03 E Elevation: 1474.98 FT
Drilling Equipment/Method: /Sonic Rig Weather:
Sample Type(s): Grab Boring Diameter: 6 IN.

Boring No. NERT3.58S1A

Ambient PID Reading: NA
Sheet: 1 of 2
Monitoring Well Installed: Yes
Screened Interval: 25-45 FT BGS

Approved By: S. Bilodeau

Logged By: C. Schnell

Date/Time Started: 04-24-19

Depth of Boring: 50 FT BGS

Drilling Contractor: Cascade Drilling

Backfill: See below

Date/Time Finished: 04-24-19

Water Level: 35.25 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram
5						ML		SILT, pinkish gray (5YR 7/2), 85% non-plastic silt, 10% subangular sand, 5% coarse gravel, loose, dry -@5 to 10 feet - no recovery	
10								-@11 feet - color change to light gray (5YR 7/1), 95% silt, 5% gravel -@12 feet - 95% silt, 5% sand -@12.5 feet - 6-inch peat layer -@13 feet - color change to pinkish gray (5YR 7/2), 100% silt -@15 feet - color change to 6/2 -@17.5 feet - color change to 7/2	
25						SM		SILTY SAND, light reddish brown (5YR 6/3), 20% non-plastic silt, 75% fine to coarse-grained subrounded to angular sand, 5% fine to coarse gravel with 0.25 max gravel size, loose, dry	hydrated bentonite
30						SP		POORLY GRADED SAND, reddish brown (5YR 4/4), 5% non-plastic silt, 85% fine to coarse-grained subrounded to angular sand, 10% fine to coarse gravel with 0.5-inch max gravel size, loose, moist	
35						ML		SILT, pinkish gray (5YR 7/2), 95% non-plastic silt, 5% very fine-grained sand, loose, dry -@31 feet - 10% silt, 80% sand, 10% gravel	2-inch diameter schedule 40 PVC
						SP		POORLY GRADED SAND WITH GRAVEL, light grayish brown (5YR 6/2), 5% high plastic silt, 75% very fine subangular sand, 20% medium to coarse gravel with 0.75-inch max gravel size, loose, moist, large cobbles -@35 feet - color change to reddish brown (5YR 5/3), 5% non-plastic silt, 80% fine to coarse-grained, subangular 15% fine to coarse gravel with 0.75-inch max gravel size, wet, loose	Monterey #3 sand
						CL		LEAN CLAY, reddish yellow (5YR 6/6), 95% high plastic fines, 5% sand, loose, moist	
40						ML		SILT WITH CLAY, light reddish brown (5YR 6/3), 95% low plastic fines, 5% fine to coarse-grained subangular to angular sand, 10% fine to coarse gravel with 0.5-inch max gravel size, loose, wet	

Notes:



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<i>Client:</i> NDEP	Boring No. NERT3.58S1A
<i>Project Number:</i> 60477365	
<i>Site Description/Location:</i> Las Vegas Wash, Henderson, NV	<i>Ambient PID Reading:</i> NA
<i>Coordinates:</i> 26737588.02 N 844690.03 E <i>Elevation:</i> 1474.98 FT	<i>Sheet:</i> 2 of 2
<i>Drilling Equipment/Method:</i> /Sonic Rig	<i>Weather:</i>
<i>Sample Type(s):</i> Grab	<i>Boring Diameter:</i> 6 IN.
	<i>Monitoring Well Installed:</i> Yes
	<i>Screened Interval:</i> 25-45 FT BGS

<i>Approved By:</i> S. Bilodeau	<i>Logged By:</i> C. Schnell	<i>Date/Time Started:</i> 04-24-19	<i>Depth of Boring:</i> 50 FT BGS
<i>Drilling Contractor:</i> Cascade Drilling	<i>Backfill:</i> See below	<i>Date/Time Finished:</i> 04-24-19	<i>Water Level:</i> 35.25 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram
45						ML3		SILT WITH CLAY, light reddish brown (5YR 6/3), 95% low plastic fines, 5% fine to coarse-grained subangular to angular sand, 10% fine to coarse gravel with 0.5-inch max gravel size, loose, wet (continued) -@42 feet - color change to pinkish gray (5YR 6/2), 80% silt, 20% sand, dry	
50								-@48 feet - color change to white (5YR 8/1), 80% non-plastic silt, 20% sand, dry, dense	

Total Depth = 50 feet.
Boring Terminated
Target depth achieved

Notes:



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Client: NDEP	Boring No. NERT3.58S1B
Project Number: 60477365	
Site Description/Location: Las Vegas Wash, Henderson, NV	Ambient PID Reading:
Coordinates: 26737588.02 N 844690.029 E Elevation: 1474.526 FT	Sheet: 1 of 2
Drilling Equipment/Method: Sonic Rig Weather:	Monitoring Well Installed: Yes
Sample Type(s): Grab Boring Diameter: 6 IN.	Screened Interval: 25-45 FT BGS

Approved By: S. Bilodeau	Logged By: C. Schnell	Date/Time Started: 04-24-19	Depth of Boring: 50 FT BGS
Drilling Contractor: Cascade Drilling	Backfill: See below	Date/Time Finished: 04-24-19	Water Level: 34.56 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram
5						ML		SILT, gray (5YR 5/1), loose, dry, hand augured to 5 feet, organic smell, floated in VOA -@2 to 7.5 feet - no recovery	
10							-@8 feet - color change pinkish gray (5YR 7/2), 100% non-plastic silt, dry, loose		
15						SM		SILTY SAND, 30% non-plastic silt, 65% fine to coarse-grained sand, 5% fine gravel, loose, dry -@14 feet - color change to 7.5YR 6/2, dense	
20						ML SP		SILT, very dark gray (5YR 3/1), 90% non-plastic silt, 10% fine to coarse-grained sand, loose, siltstone, organic material peat 6 inches thick POORLY GRADED SAND WITH GRAVEL, light reddish brown (5YR 6/3), 5% non-plastic silt, 80% fine to coarse-grained subangular sand, 15% fine to coarse gravel with 1.5-inch max gravel size	
25						ML		SILT, gray (5YR 6/1), 95% non-plastic silt, 5% fine to coarse-grained subangular sand, oxidized roots	
30						SP		POORLY GRADED SAND WITH GRAVEL, 5% non-plastic silt, 65% fine to coarse-grained angular sand, 30% fine to coarse gravel with 1.5-inch max gravel size, dense, dry, slightly cemented -@25 to 27.5 feet - no recovery	
35						SP- SM		POORLY GRADED SAND WITH SILT AND GRAVEL, 10% non-plastic silt, 60% fine to coarse-grained subangular sand, 30% fine to coarse gravel with 1.5-inch max gravel size, loose, dry	
						SM ML		SILTY SAND WITH GRAVEL, light gray (5YR 7/1), 40% non-plastic silt, 45% fine to coarse-grained angular sand, 15% fine to coarse gravel with 1.5-inch max gravel size, medium dense, dry SANDY SILT, light reddish brown (5YR 6/3), 60% non-plastic silt, 30% fine to medium-grained subangular sand, 10% coarse gravel with 1-inch max gravel size, dense, moist	
40						SM		SILTY SAND WITH GRAVEL, pinkish gray (5YR 6/2), 30% non-plastic silt, 50% fine to medium-grained subangular	

Notes:



AECOM
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Camarillo, CA 93012
805-388-3775

Client: NDEP

Project Number: 60477365

Site Description/Location: Las Vegas Wash, Henderson, NV

Coordinates: 26737588.02 N 844690.029 E Elevation: 1474.526 FT

Drilling Equipment/Method: Sonic Rig

Weather:

Sample Type(s): Grab

Boring Diameter: 6 IN.

Boring No. NERT3.58S1B

Ambient PID Reading:

Sheet: 2 of 2

Monitoring Well Installed: Yes

Screened Interval: 25-45 FT BGS

Approved By: S. Bilodeau

Logged By: C. Schnell

Date/Time Started: 04-24-19

Depth of Boring: 50 FT BGS

Drilling Contractor: Cascade Drilling

Backfill: See below

Date/Time Finished: 04-24-19

Water Level: 34.56 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram
45						SP-SM		sand, 20% fine to coarse gravel with 1.5-inch max gravel size, loose, wet	
						ML		POORLY GRADED SAND WITH SILT, reddish brown (5YR 5/3), 10% non-plastic silt, 80% fine to coarse-grained subangular sand, 10% fine to coarse gravel with 1-inch max gravel size, loose, wet	
						SC		SILT, gray (5YR 6/1), 90% non-plastic silt, 10% fine to coarse-grained subangular sand, loose, moist	
						ML		CLAYEY SAND WITH GRAVEL, pinkish gray (5YR 6/2), 20% high-plastic fines, 60% fine to medium-grained subangular sand, 20% medium gravel with 0.25-inch max gravel size, loose, moist	
50								SILT, gray (5YR 6/1), 80% non-plastic silt, 20% fine to medium-grained subangular sand, medium dense, dry -@47.5 feet - color change to white (5YR 8/1)	

Total Depth = 50 feet
Boring Terminated
Target depth achieved

Notes:



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805-388-3775

Client: NDEP

Project Number: 60477365

Site Description/Location: Las Vegas Wash, Henderson, NV

Coordinates: 26737593.505 N 844702.727 E Elevation: 1473.941 FT

Drilling Equipment/Method: Sonic Rig

Weather:

Sample Type(s): Grab

Boring Diameter: 6 IN.

Boring No. NERT3.58S1C

Ambient PID Reading:

Sheet: 1 of 2

Monitoring Well Installed: Yes

Screened Interval: 35-55 FT BGS

Approved By: S. Bilodeau

Logged By: C. Schnell

Date/Time Started: 04-25-19

Depth of Boring: 55 FT BGS

Drilling Contractor: Cascade Drilling

Backfill: See below

Date/Time Finished: 04-25-19

Water Level: 34.90 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram
5						ML		SILT WITH SAND, pinkish gray (5YR 6/2), 85% non-plastic silt, 15% very fine sand, loose, dry	
10					ML		SILT, white (5YR 8/1), 100% non-plastic silt, loose, dry		
15							-@15 to 17.5 feet - no recovery		
20									
25						SM SP-SC		SILTY SAND, pink (5YR 7/3), 30% non-plastic silt, 60% fine to coarse-grained subangular sand, 10% fine to medium gravel with 0.25-inch max gravel size, medium dense, dry POORLY GRADED SAND WITH CLAY AND GRAVEL, pinkish gray (5YR 7/2), 10% non-plastic silt, 70% fine to coarse-grained subangular sand, 20% fine to coarse gravel with 0.5-inch max gravel size, loose, dry -@25-27.5 feet - no recovery	
30						ML		SILT, white (5YR 8/1), 100% non-plastic silt, loose, dry	
35						ML		POORLY GRADED SAND WITH CLAY AND GRAVEL, pinkish gray (5YR 7/2), 10% non-plastic silt, 70% fine to coarse-grained subangular sand, 20% fine to coarse gravel with 0.5-inch max gravel size, loose, dry	
40						SP-SM		POORLY GRADED SAND WITH SILT, brown (7.5YR 5/2), 10% non-plastic silt, 85% fine to coarse-grained subangular sand, 5% fine gravel with 0.5-inch max gravel size, loose, moist -@35 feet - wet	

Notes:



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Client: NDEP	Boring No. NERT3.58S1C
Project Number: 60477365	
Site Description/Location: Las Vegas Wash, Henderson, NV	Ambient PID Reading:
Coordinates: 26737593.505 N 844702.727 E Elevation: 1473.941 FT	Sheet: 2 of 2
Drilling Equipment/Method: Sonic Rig Weather:	Monitoring Well Installed: Yes
Sample Type(s): Grab Boring Diameter: 6 IN.	Screened Interval: 35-55 FT BGS

Approved By: S. Bilodeau	Logged By: C. Schnell	Date/Time Started: 04-25-19	Depth of Boring: 55 FT BGS
Drilling Contractor: Cascade Drilling	Backfill: See below	Date/Time Finished: 04-25-19	Water Level: 34.90 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram
45						SP-SM		POORLY GRADED SAND WITH SILT, brown (7.5YR 5/2), 10% non-plastic silt, 85% fine to coarse-grained subangular sand, 5% fine gravel with 0.5-inch max gravel size, loose, moist (continued)	<p>2-inch diameter schedule 40 PVC</p> <p>Monterey #3 Sand</p>
						ML SP-SM		SILT, light brown (7.5YR 6/4), 100% non-plastic silt, loose, wet POORLY GRADED SAND WITH SILT, brown (7.5YR 5/2), 10% non-plastic silt, 85% fine to coarse-grained subangular sand, 5% fine gravel with 0.5-inch max gravel size, loose, moist	
50						GP		POORLY GRADED GRAVEL WITH SAND, light reddish brown (5YR 6/3), 5% non-plastic silt, 20% fine to coarse-grained subangular sand, 75% fine to coarse gravel with 0.75-inch max gravel size, loose, wet, large pebbles -@52 feet - increasing pebble size to small cobbles	
55									

Total Depth = 55 feet
Boring Terminated
Target depth achieved

Notes:



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Client: NDEP	Boring No. NERT3.58S1D
Project Number: 60477365	
Site Description/Location: Las Vegas Wash, Henderson, NV	Ambient PID Reading:
Coordinates: Not Surveyed Elevation:	Sheet: 1 of 1
Drilling Equipment/Method: Sonic Rig Weather:	Monitoring Well Installed: No
Sample Type(s): Grab Boring Diameter: 6 IN.	Screened Interval:

Approved By: S. Bilodeau	Logged By: C. Schnell	Date/Time Started: 04-24-19	Depth of Boring: 37 FT BGS
Drilling Contractor: Cascade Drilling	Backfill: See below	Date/Time Finished: 04-24-19	Water Level: Not Encountered

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.
5						SP-SM		POORLY GRADED SAND WITH GRAVEL, pinkish gray (5YR 7/2), 5% non-plastic silt, 80% fine to coarse-grained subangular sand, 15% fine to coarse gravel with 1.5-inch max gravel size, loose, dry
10						ML		SILT, white (5YR 8/1), 90% non-plastic silt, 10% fine to coarse-grained subangular sand, medium dense, dry -@7.5 to 10 feet - slightly cemented, no recovery -12 feet - 6-inch thick siltstone
15								
20						SM		SILTY SAND WITH GRAVEL, light reddish brown (5YR 6/4), 20% non-plastic silt, 60% fine to coarse-grained subangular sand, 20% fine to coarse gravel with 2-inch max gravel size, loose, dry, large boulders
25						ML		SILT, white (5YR 8/1), 100% non-plastic silt, medium dense, dry, slightly cemented/caliche?
30						SM ML		SILTY SAND, light gray (5YR 7/1), 40% non-plastic silt, 50% fine to coarse-grained subangular sand, 10% fine to coarse gravel, loose, dry SILT, light gray (5YR 7/1), 100% non-plastic silt, dense, dry, weathered siltstone -@31 to 32 feet - 6-inch caliche?/siltstone
35								BEDROCK (THUMB FORMATION), gray (7.5YR N6), dense, dry

Total Depth = 37 feet
Boring Terminated
Target depth achieved

Notes: No water encountered, no well installed.

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Client: NDEP
Project Number: 60477365
Site Description/Location: Las Vegas Wash, Henderson, NV
Coordinates: 26737827.785 N 844016.018 E Elevation: 1483.076 FT
Drilling Equipment/Method: /Sonic Rig Weather: 90 and sunny
Sample Type(s): Grab Boring Diameter: 8 IN.

Boring No. NERT3.60N1

Ambient PID Reading: NA
Sheet: 1 of 3
Monitoring Well Installed: Yes
Screened Interval: 32-52 FT BGS

Approved By: S. Bilodeau

Logged By: C. Grimes

Date/Time Started: 04-08-19

Depth of Boring: 90 FT BGS

Drilling Contractor: Cascade Drilling

Backfill: See below

Date/Time Finished: 04-09-19

Water Level: 38.02 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram
5	R1					SM		SILTY SAND, brown (7.5YR 4/3), 30% low-plastic silt, 65% fine to coarse-grained subrounded sand, 5% fine gravel with 0.10-inch max gravel size, loose, dry, hand augered to 5 feet bgs -@2.5 feet- gravel up to 1 inch -@5 feet - color change to brown (7.5YR 5/3) 40% silt, 60% very fine to coarse-grained sand -@7.5 feet - color change to light grey (7.3YR 7/1), 20% silt, 75% very fine to coarse-grained subrounded sand, 5% gravel with 0.5-inch max gravel size -@10 feet - 40% non-plastic silt, 60% very fine to medium-grained sand, semi-consolidated silt units (max 0.5 inches)	
10						SP-SM		POORLY GRADED SAND WITH SILT, yellow brown (10YR 5/6), 10% non-plastic silt, 90% very fine to fine-grained rounded sand, loose, dry	
15						SM		SILTY SAND, yellow brown (10YR 5/6), 25% silt, 75% very fine to fine-grained subrounded sand, loose, dry	
20	R2					SP-SM		POORLY GRADED SAND WITH SILT, dark yellowish brown (10YR 4/6), 10% non-plastic silt, 80% very fine to fine-grained subrounded sand, 10% fine gravel with 0.3-inch max gravel size, loose, dry	
25						SM		SILTY SAND, brown (10YR 5/3), 15% non-plastic silt, 80% fine to medium-grained subrounded sand, 5% fine gravel with 0.25-inch max gravel size, loose, dry	
26.0-26.4	PT-NERT3.60N					SP		POORLY GRADED SAND, brown (10YR 5/3), 5% non-plastic silt, 95% very fine to medium-grained subrounded sand, loose, dry	
30	R3					ML		SILT, brown (10YR 5/3), 100% medium plastic fines, medium dense, moist -@26 feet - Core Lab (CL) Lean Clay with Sand -@28 feet - 6-inch yellow fine-grained sand layer -@28.5 feet - color change to light brown (2.5YR 6/2), 90% medium plastic fines, medium dense, 10% very fine to fine-grained rounded sand -@30 feet - 90% medium plastic fines, medium stiff to stiff, 10% very fine to fine-grained rounded sand, with mottled yellow sand layers	
35						SP-SM		POORLY GRADED SAND WITH SILT AND GRAVEL, brown (7.5YR 5/4), 10% non-plastic silt, 75% fine to coarse-grained subrounded to subangular sand, 15% fine gravel with 0.5-inch max gravel size, loose, moist	
40						SM		SILTY SAND, red brown (5YR 4/4), 35% low plastic silt, 55% fine to coarse-grained subrounded to subangular sand, 10% fine to medium gravel with 0.5-inch max gravel size, dense, wet	
						ML		GRAVELLY SILT WITH SAND, red brown (5YR 4/4), 65%	

Notes: R denotes Ramboll grab sample. For backfill information, refer to well completion diagram.

Client: NDEP
Project Number: 60477365
Site Description/Location: Las Vegas Wash, Henderson, NV
Coordinates: 26737827.785 N 844016.018 E Elevation: 1483.076 FT
Drilling Equipment/Method: /Sonic Rig Weather: 90 and sunny
Sample Type(s): Grab Boring Diameter: 8 IN.

Boring No. NERT3.60N1

Ambient PID Reading: NA
Sheet: 2 of 3
Monitoring Well Installed: Yes
Screened Interval: 32-52 FT BGS

Approved By: S. Bilodeau Logged By: C. Grimes Date/Time Started: 04-08-19 Depth of Boring: 90 FT BGS
Drilling Contractor: Cascade Drilling Backfill: See below Date/Time Finished: 04-09-19 Water Level: 38.02 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram
42.3-42.5	PT- NERT3.60N1					ML		medium-plastic silt, 15% fine to coarse-grained subrounded to subangular sand, 20% fine to medium gravel with 1.5-inch max grain size, stiff, wet, some bedding structures	
45	R5					ML			
50									
55									
60	R6							<p>SILT, yellow red (5YR 4/6), 80% medium-plastic silt, 10% coarse-grained subangular to angular sand, 10% fine gravel with 0.25-inch max gravel size, moist, hard drilling</p> <ul style="list-style-type: none"> -@42.3 feet - Core Labs (CL) Lean Clay -@45 feet - 70% medium-plastic silt, 15% fine to coarse-grained subangular to angular sand, 15% fine to medium gravel with 2-inch max gravel size -@46 feet - 2-inch red sandstone -@47 feet - 75% fines, stiff, 5% very fine to fine angular sand, 10% gravel with 0.75-inch max gravel size 	
65						SP		<p>SILT WITH GRAVEL, yellow red (2.5Y 6/6), 65% medium plastic fines, stiff, 25% fine to coarse gravel with 6-inch max gravel size, dry bedding structures</p> <ul style="list-style-type: none"> -@55 feet - color change to reddish yellow (5 YR 6/6), 80% silt, 5% fine-grained sand, 15% fine to medium gravel with 2-inch max gravel size, moderately cemented silt to siltstone/mudstone -@60 feet - 85% fines, dense, 15% medium gravel with 3-inch max gravel size, dry 	
70	R7					CL		<p>POORLY GRADED SAND, grayish green (5GY 5/2), 100% very fine to medium-grained subangular sand, very dense, dry</p> <p>LEAN CLAY WITH GRAVEL, grayish green (5GY 3/2), 75% medium plastic fines, stiff, 25% fine to coarse gravel with 5-inch max gravel size, moist</p>	
75						ML		<p>GRAVELY SILT, grayish green (5GY 6/1), 70% low to medium-plastic silt, 5% coarse-grained subangular to angular sand, 25% medium to coarse gravel with 6-inch max gravel size, stiff, moist</p> <ul style="list-style-type: none"> -@72.5 feet - color change to greenish grey (5G 4/2), 50% low plastic silt, 25% medium to coarse-grained sand, 25% gravel, increasing sand -@75 feet - color change to greenish grey (5G 4/2), 55% medium plastic silt, 15% clay, 5% fine-grained sand, 25% fine to medium gravel with 2-inch max gravel size 	
80									

Notes: R denotes Ramboll grab sample. For backfill information, refer to well completion diagram.



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<i>Client:</i> NDEP	Boring No. NERT3.60N1
<i>Project Number:</i> 60477365	
<i>Site Description/Location:</i> Las Vegas Wash, Henderson, NV	<i>Ambient PID Reading:</i> NA
<i>Coordinates:</i> 26737827.785 N 844016.018 E <i>Elevation:</i> 1483.076 FT	<i>Sheet:</i> 3 of 3
<i>Drilling Equipment/Method:</i> /Sonic Rig <i>Weather:</i> 90 and sunny	<i>Monitoring Well Installed:</i> Yes
<i>Sample Type(s):</i> Grab <i>Boring Diameter:</i> 8 IN.	<i>Screened Interval:</i> 32-52 FT BGS

<i>Approved By:</i> S. Bilodeau	<i>Logged By:</i> C. Grimes	<i>Date/Time Started:</i> 04-08-19	<i>Depth of Boring:</i> 90 FT BGS
<i>Drilling Contractor:</i> Cascade Drilling	<i>Backfill:</i> See below	<i>Date/Time Finished:</i> 04-09-19	<i>Water Level:</i> 38.02 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram
85	R8					SP		POORLY GRADED SAND, grayish green (5GY 4/2), 100% fine to medium-grained subangular to angular sand, dry	
						ML		GRAVELY SILT, grayish green (5GY 4/2), 65% low plastic silt, 10% fine-grained sand, 25% fine to medium gravel with 2-inch max gravel size, moist	
90	R9					ML		SILT WITH SAND, brown (7.5YR 5/2), 75% low plastic silt, 25% very fine to fine-grained angular to subrounded sand, dry, semi to firmly cemented silts-@85 feet - Silt with Sand, color change to, 75% low plastic silt, 25% very fine to fine-grained angular to subrounded sand, dry,	

Total Depth = 90 feet.
Boring Terminated
Target depth achieved

Notes: R denotes Ramboll grab sample. For backfill information, refer to well completion diagram.

Client: NDEP
Project Number: 60477365
Site Description/Location: Las Vegas Wash, Henderson, NV
Coordinates: 26737579.776 N 844700.214 E Elevation: 1474.267 FT
Drilling Equipment/Method: /Sonic Rig Weather: 85 and sunny
Sample Type(s): Grab Boring Diameter: 8 IN.

Boring No. NERT3.60S1

Ambient PID Reading: NA
Sheet: 1 of 3
Monitoring Well Installed: Yes
Screened Interval: 35-55 FT BGS

Approved By: S. Bilodeau Logged By: C. Grimes Date/Time Started: 03-26-19 Depth of Boring: 90 FT BGS
Drilling Contractor: Cascade Drilling Backfill: See below Date/Time Finished: 03-27-19 Water Level: 38.75 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram
5	R1					SM		SILTY SAND WITH GRAVEL, brown (7.5YR 5/4), 25% non-plastic silt, 60% fine to coarse-grained subangular sand, 15% fine to medium gravel with 0.25-inch max gravel size, loose, dry, hand augured to 4.5 feet	
10						SP		-@7.5 feet - color change to brown (7.5YR 4/2), 15% non-plastic silt, 70% medium to coarse-grained sand, 15% gravel with 0.10-inch max grain POORLY GRADED SAND, brown (7.5YR 4/2), 5% non-plastic silt, 55% medium to coarse-grained subrounded sand, 40% medium to coarse gravel with 2-inch max gravel size	
15						SP-SM		-@15 feet - color change to brown (7.5YR 4/3), 10% non-plastic silt, 80% subangular to subrounded sand, 10% fine to medium gravel with 0.75-inch max gravel size	
20	R2					SM		SILTY SAND, 25% non-plastic silt, 65% fine to coarse-grained subangular sand, 10% fine to coarse gravel, loose, dry -@21 feet - 15% silt, 75% subrounded sand, 15% gravel with 0.5-inch max gravel	
25								-@26 feet - color changed to light brown (10YR 6/2), 35% medium plastic silt, 65% fine to medium-grained subrounded sand	
30	R3					ML		SANDY SILT, 70% medium plastic silt, 30% fine to medium-grained subrounded sand	
35						SP-SM SM		POORLY GRADED SAND WITH SILT AND GRAVEL, brown (7.5YR 5/4), 10% low plastic silt, 60% fine to coarse-grained subangular sand, 30% fine to medium gravel with 0.25-inch max gravel size, loose, dry, iron oxide staining SILTY SAND, reddish brown (5YR 4/4), 30% low plastic silt, 65% fine to medium-grained subrounded sand, 5% gravel -@33 feet - color change to brown (7.5YR 5/4), 20% low plastic silt, 65% fine to coarse-grained subangular sand, 15% fine to medium gravel with 2-inch max gravel size -@36 feet - conglomerate	
40							SM		

Notes: R denotes Ramboll grab sample. For backfill information, refer to well completion diagram.

Client: NDEP
Project Number: 60477365
Site Description/Location: Las Vegas Wash, Henderson, NV
Coordinates: 26737579.776 N 844700.214 E Elevation: 1474.267 FT
Drilling Equipment/Method: /Sonic Rig Weather: 85 and sunny
Sample Type(s): Grab Boring Diameter: 8 IN.

Boring No. NERT3.60S1

Ambient PID Reading: NA

Sheet: 2 of 3

Monitoring Well Installed: Yes

Screened Interval: 35-55 FT BGS

Approved By: S. Bilodeau

Logged By: C. Grimes

Date/Time Started: 03-26-19

Depth of Boring: 90 FT BGS

Drilling Contractor: Cascade Drilling

Backfill: See below

Date/Time Finished: 03-27-19

Water Level: 38.75 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram
45	R4					SM		-@40 feet - 0.25 inch clay layer	<p>Schedule 40 PVC</p> <p>Monterey #3 Sand</p>
50	R5					SP-SM ML		POORLY GRADED SAND WITH SILT AND GRAVEL, dark brown (7.5YR 3/2), 10% low plastic silt, 70% medium to coarse-grained sand, 20% fine to medium gravel with 0.75-inch max gravel size	
55						SP ML		SANDY SILT, brown (7.5YR 5/2), 55% low to medium plastic silt, 35% medium to coarse-grained subangular sand, 10% fine to medium gravel, medium dense, interbedded clay layers, dry	
60	R6					SP ML		POORLY GRADED SAND WITH GRAVEL, brown (7.5YR 5/3), 5% low plastic silt, 75% medium to coarse-grained subangular sand, 20% fine to medium to gravel with 1.5-inch max gravel size, loose, wet	
65						SP ML		-@46 feet - color change to brown (7.5YR 4/3), 5% silt, 55% subangular sand, 40% medium to coarse gravel, conglomerate layer	
70	PT-NERT3.60S1 68.2-68.5					ML SP-SM SP ML CL		-@50 feet - 5% silt, 70% sand, 25% fine gravel with 0.25-inch max gravel size	
75						SP-SM SP ML CL		SANDY SILT, light brown (7.5YR 6/3), 60% low plastic silt, 30% fine to medium-grained subrounded sand, 10% fine gravel, loose, wet	
80						SP ML CL		POORLY GRADED SAND WITH GRAVEL, dark brown (7.5YR 3/2), 5% silt, 75% fine to coarse-grained subangular sand, 20% fine to medium gravel with 0.5-inch max gravel size, loose, wet	
						SP-SM SP ML CL		SILT WITH SAND, reddish brown (5YR 4/4), 75% low plastic silt, 25% fine-grained subrounded sand	
						SP ML CL		POORLY GRADED SAND WITH SILT, brown (7.5YR 4/3), 10% non-plastic silt, 80% fine to coarse-grained subangular sand, 10% fine to medium gravel with 0.25-inch max gravel size, loose, wet, interbedded conglomerate	
						ML CL		POORLY GRADED SAND WITH SILT AND GRAVEL, brown (7.5YR 5/3), 10% non-plastic silt, 70% fine to coarse-grained subangular sand, 20% fine to medium gravel	
						SP ML CL		SANDY SILT, light brown (7.5YR 6/4), 65% low plastic silt, 20% medium to coarse-grained subangular sand, 15% fine to medium gravel with 2-inch max gravel size, medium dense, wet	
						CL		POORLY GRADED SAND WITH GRAVEL, light brown (7.5YR 4/3), 5% non-plastic silt, 65% medium to coarse-grained subrounded to subangular sand, 30% fine to medium gravel with 3-inch max gravel size, loose, wet	
						ML		LEAN CLAY WITH SAND, reddish brown (5YR 5/3), 70% medium plastic clay, 25% medium to coarse-grained subrounded to subangular sand, 5% fine gravel with 0.25-inch max gravel size, dense, moist	
						ML CL		-@68.2 feet - Core Lab (CL) Lean Clay	
						ML CL		BEDROCK (MUDDY CREEK FORMATION), gray and reddish brown (5YR 5/5), 80% non-plastic to medium plastic fines, 15% medium to coarse-grained subrounded sand, 5% gravel with 0.10-inch max gravel size, interbedded with lithified siltstone and claystone	
						ML CL		SILT, gray and reddish brown (5YR 5/5), 85% medium plastic fines, 15% fine to medium-grained subangular sand, dry, medium dense, interbedded, friable	
						CL		LEAN CLAY, reddish brown (5YR 5/3), 95% medium plastic fines, 5% sand, loose	
						CL		-@76 feet - cemented claystone to friable claystone/sandstone	
						CL		BEDROCK (HORSE SPRING FORMATION), 90% fines, 10% fine-grained subangular to subrounded gravel, dense, moist, 6 inch plug of limestone	

Notes: R denotes Ramboll grab sample. For backfill information, refer to well completion diagram.



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Client: NDEP	Boring No. NERT3.60S1
Project Number: 60477365	
Site Description/Location: Las Vegas Wash, Henderson, NV	Ambient PID Reading: NA
Coordinates: 26737579.776 N 844700.214 E Elevation: 1474.267 FT	Sheet: 3 of 3
Drilling Equipment/Method: /Sonic Rig Weather: 85 and sunny	Monitoring Well Installed: Yes
Sample Type(s): Grab Boring Diameter: 8 IN.	Screened Interval: 35-55 FT BGS

Approved By: S. Bilodeau	Logged By: C. Grimes	Date/Time Started: 03-26-19	Depth of Boring: 90 FT BGS
Drilling Contractor: Cascade Drilling	Backfill: See below	Date/Time Finished: 03-27-19	Water Level: 38.75 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram
85	PT- NERT3.60S1 86.0-86.3					CL		BEDROCK (HORSE SPRING FORMATION), 90% fines, 10% fine-grained subangular to subrounded gravel, dense, moist, 6 inch plug of limestone (continued)	
						CL		SILT WITH LEAN CLAY, reddish brown (5YR 5/3), 90% medium plastic fines, 10% medium-grained sand, 6 inch plug of limestone	
90						CL		LEAN CLAY, Gray (5Y 5/1), 100% medium plastic clay, medium dense -@86 feet - Core Lab (CL) Lean Clay -@86.5 feet - 3 inch cobbles -@87 feet - color change to reddish brown (5YR 5/3), 85% medium plastic fines, 15% medium to coarse gravel with 0.75-inch max gravel size, dry, loose	

-@90 feet - color change to gray (5Y 5/3), 100% fines, siltstone, friable claystone
Total Depth = 90 feet.
Boring Terminated
Target depth achieved

Notes: R denotes Ramboll grab sample. For backfill information, refer to well completion diagram.



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1220 Avenida Acaso
Camarillo, CA 93012
805-388-3775

Client: NDEP
Project Number: 60477365
Site Description/Location: Las Vegas Wash, Henderson, NV
Coordinates: 26737409.271 N 844579.552 E Elevation: 1478.228 FT
Drilling Equipment/Method: Sonic Rig Weather:
Sample Type(s): Grab Boring Diameter: 6 IN.

Boring No. NERT3.60S1A

Ambient PID Reading:
Sheet: 1 of 2
Monitoring Well Installed: Yes
Screened Interval: 35-55 FT BGS

Approved By: S. Bilodeau

Logged By: C. Schnell

Date/Time Started: 04-23-19

Depth of Boring: 55 FT BGS

Drilling Contractor: Cascade Drilling

Backfill: See below

Date/Time Finished: 04-23-19

Water Level: 43.84 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram
5						ML		SILT WITH SAND, pinkish gray (5YR 7/2), 75% non-plastic silt, 20% subangular sand, 5% coarse gravel with 0.25-inch max gravel size, loose, dry, hand augered to 5 feet	
10					SP		POORLY GRADED SAND WITH GRAVEL, strong brown (7.5YR 5/8), 5% non-plastic silt, 80% fine to coarse-grained subangular sand, 15% fine to coarse gravel with 1-inch max gravel size, loose, moist -@7.5 feet - color change to reddish yellow (7.5YR 6/8) -@10 feet - color change to pinkish white (5YR 8/2), 5% non-plastic silt, 75% sand, 20% gravel with 1.5-inch max gravel size, dry, dense -@15 feet - no recovery -@17.5 feet - color change to pinkish gray (5YR 7/2), 5% silt, 70% sand, 25% gravel -@20 to 21 feet- sand layer -@21 feet - 5% non-plastic silt, 90% fine-grained subangular sand, 5% fine gravel with 0.25-inch max gravel size -@22.5 color change to light reddish brown (5YR 6/3), 5% silt, 70% fine to coarse-grained subangular sand, 25% fine to coarse gravel, dry, loose, lightly cemented sandstone -@26 to 27.5 feet - clayey siltstone		
15									
20									
25									
30						ML		SILT, pinkish gray (5YR 7/2), 95% non-plastic silt, 5% coarse subangular sand, dense, moist, slightly consolidated siltstone -@30 to 30.5 feet - coarse gravel layer with 2-inch max gravel size	
35						SP		POORLY GRADED SAND, light reddish brown (5YR 6/3), 5% non-plastic silt, 95% fine-grained subangular sand, loose, moist	
40						SP		POORLY GRADED SAND WITH GRAVEL, pinkish gray (5YR 7/2), 5% non-plastic silt, 80% fine to coarse-grained subangular to angular sand, 15% fine to coarse gravel with 0.25-inch max gravel size, loose, dry -@37.5 feet - 5% silt, 70% subangular sand, 25% gravel with 2-inch max gravel size	

Notes: 5 feet north of NERT3.60S1



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Site Description/Location: Las Vegas Wash, Henderson, NV
Coordinates: 26737409.271 N 844579.552 E Elevation: 1478.228 FT
Drilling Equipment/Method: Sonic Rig Weather:
Sample Type(s): Grab Boring Diameter: 6 IN.

Boring No. NERT3.60S1A

Ambient PID Reading:
Sheet: 2 of 2
Monitoring Well Installed: Yes
Screened Interval: 35-55 FT BGS

Approved By: S. Bilodeau

Logged By: C. Schnell

Date/Time Started: 04-23-19

Depth of Boring: 55 FT BGS

Drilling Contractor: Cascade Drilling

Backfill: See below

Date/Time Finished: 04-23-19

Water Level: 43.84 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram
45						SP-SM		POORLY GRADED SAND WITH SILT, light reddish brown (5YR 6/3), 10% non-plastic silt, 80% fine to coarse-grained subangular sand, 10% fine to coarse gravel with 1-inch max gravel size, loose, wet	
50					SP-SM		POORLY GRADED SAND WITH SILT AND GRAVEL, pinkish gray (5RY 6/2), 10% non-plastic silt, 50% coarse-grained subangular sand, 40% coarse gravel with 1.5-inch max gravel size, loose, wet		
					SP-SM		POORLY GRADED SAND, pinkish gray (5RY 6/2), 5% non-plastic silt, 85% fine to coarse-grained subangular sand, 10% medium to coarse gravel with 0.5-inch max gravel size, loose, wet		
55					SP		POORLY GRADED SAND WITH SILT, 10% non-plastic silt, 85% fine to coarse-grained subangular sand, 5% medium to coarse gravel with 0.5-inch max gravel size, loose, wet		

Total Depth = 55 feet
Boring Terminated
Target depth achieved

Notes: 5 feet north of NERT3.60S1



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1220 Avenida Acaso
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Client: NDEP	Boring No. NERT3.60S1B
Project Number: 60477365	
Site Description/Location: Las Vegas Wash, Henderson, NV	Ambient PID Reading:
Coordinates: 26737412.039 N 844575.892 E Elevation: 1478.497 FT	Sheet: 1 of 2
Drilling Equipment/Method: Sonic Rig Weather:	Monitoring Well Installed: Yes
Sample Type(s): Grab Boring Diameter: 6 IN.	Screened Interval: 35-55 FT BGS

Approved By: S. Bilodeau	Logged By: C. Schnell	Date/Time Started: 04-22-19	Depth of Boring: 55 FT BGS
Drilling Contractor: Cascade Drilling	Backfill: See below	Date/Time Finished: 04-22-19	Water Level: 38.73 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram
5						SP		POORLY GRADED SAND WITH GRAVEL, light brown (7.5YR 5/4), 5% non-plastic silt, 80% fine to coarse-grained subangular sand, 15% fine to medium gravel with 0.25-inch max gravel size, loose, dry, hand augured to 4.5 feet	
10								-@10 feet - color change to dark grayish brown (10YR 4/3), 5% silt, 80% sand, 15% fine to coarse gravel with 1.5-inch max gravel size	
15						SP-SM		POORLY GRADED SAND WITH SILT AND GRAVEL, dark grayish brown (10YR 4/3), 10% non-plastic silt, 75% fine to coarse-grained subangular sand, 15% fine to coarse gravel with 1.5-inch max gravel size, loose, dry	
20						SP		POORLY GRADED SAND WITH GRAVEL, brown (7.5YR 5/2), 5% non-plastic silt, 80% fine to coarse-grained subangular sand, 15% fine to coarse gravel with 1-inch max gravel size, loose, dry	
25								-@25 feet - color change brown (7.5YR 4/4), 6-inch clay layer	
30						ML		SILT, dark brown (7.5YR 3/4), 95% low to medium plastic fines, 5% gravel, medium dense, moist	
35						SP		POORLY GRADED SAND, brown (7.5YR 5/4), 5% low plastic silt, 90% fine to coarse-grained subangular sand, 5% fine to coarse gravel with 0.25-inch max gravel size, medium dense, moist	
40						SP-SM		POORLY GRADED SAND WITH GRAVEL, dark brown (7.5YR 3/4), 5% low plastic silt, 70% fine to coarse-grained subangular sand, 25% fine to coarse gravel with 2-inch max gravel size, loose, moist	

Notes:



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Client: NDEP
Project Number: 60477365

Boring No. NERT3.60S1B

Site Description/Location: Las Vegas Wash, Henderson, NV
Coordinates: 26737412.039 N 844575.892 E Elevation: 1478.497 FT

Ambient PID Reading:

Sheet: 2 of 2

Drilling Equipment/Method: Sonic Rig Weather:

Monitoring Well Installed: Yes

Sample Type(s): Grab Boring Diameter: 6 IN.

Screened Interval: 35-55 FT BGS

Approved By: S. Bilodeau

Logged By: C. Schnell

Date/Time Started: 04-22-19

Depth of Boring: 55 FT BGS

Drilling Contractor: Cascade Drilling

Backfill: See below

Date/Time Finished: 04-22-19

Water Level: 38.73 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram
45						SP-SM		POORLY GRADED SAND WITH SILT AND GRAVEL, light brown (7.5YR 6/4), 10% non-plastic silt, 65% fine to coarse-grained subangular sand, 25% fine to coarse gravel with 1.5-inch max gravel size, loose, moist, lightly cemented sandstone -@42 feet - color change to brown (7.5YR 4/3), 10% non-plastic silt, 75% fine to coarse-grained subangular sand, 15% fine to coarse gravel with 2-inch max gravel size, wet, loose	
50						SP		POORLY GRADED SAND WITH GRAVEL, dark yellowish brown (10YR 4/4), 5% non-plastic silt, 75% coarse-grained subangular sand, 20% fine to coarse gravel with 0.25-inch max gravel size, loose, wet	
55						SP-SM		POORLY GRADED SAND WITH SILT, strong brown (7.5YR 5/6), 10% non-plastic silt, 85% medium-grained subangular sand, 5% fine to coarse gravel with 2-inch max gravel size, loose, wet, 2-inch thick black siltstone	

Total Depth = 55 feet
Boring Terminated
Target depth achieved

Notes:



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Client: NDEP

Project Number: 60477365

Site Description/Location: Las Vegas Wash, Henderson, NV

Coordinates: 26737431.857 N 844597.596 E Elevation: 1478.305 FT

Drilling Equipment/Method: Sonic Rig

Weather:

Sample Type(s): Grab

Boring Diameter: 6 IN.

Boring No. NERT3.60S1C

Ambient PID Reading:

Sheet: 1 of 2

Monitoring Well Installed: Yes

Screened Interval: 35-55 FT BGS

Approved By: S. Bilodeau

Logged By: C. Schnell

Date/Time Started: 04-23-19

Depth of Boring: 55 FT BGS

Drilling Contractor: Cascade Drilling

Backfill: See below

Date/Time Finished: 04-23-19

Water Level: 39.14 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram
5						SP-SM		POORLY GRADED SAND WITH SILT, strong brown (7.5YR 5/8), 10% non-plastic silt, 85% fine sand, 5% gravel with 0.25-inch max gravel size, loose, dry, hand augured to 5 feet	
10					SP		POORLY GRADED SAND WITH GRAVEL, light reddish brown (5YR 6/4), 5% non-plastic silt, 80% fine to coarse-grained subangular sand, 15% medium to coarse gravel with 1-inch max gravel size, loose, dry		
15							-@15 to 17.5 feet - no recovery		
20									
25							-@25 to 27.5 feet - no recovery		
30									
35						ML		SILT, pinkish white (7.5YR 8/2), 100% non-plastic silt, loose, moist -@34 feet - color change to light brown (6/4), 90% non-plastic silt, 10% very fine sand, moist, loose, slightly cemented siltstone	
40						SM		SILTY SAND, light reddish brown (5YR 6/4), 20% non-plastic silt, 70% fine to coarse-grained subangular sand, 10% medium to coarse gravel with 1.5-inch max gravel size, loose, moist, 1-inch thick layer of silt	

Notes:



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Client: NDEP	Boring No. NERT3.60S1C
Project Number: 60477365	
Site Description/Location: Las Vegas Wash, Henderson, NV	Ambient PID Reading:
Coordinates: 26737431.857 N 844597.596 E Elevation: 1478.305 FT	Sheet: 2 of 2
Drilling Equipment/Method: Sonic Rig Weather:	Monitoring Well Installed: Yes
Sample Type(s): Grab Boring Diameter: 6 IN.	Screened Interval: 35-55 FTBGS

Approved By: S. Bilodeau	Logged By: C. Schnell	Date/Time Started: 04-23-19	Depth of Boring: 55 FT BGS
Drilling Contractor: Cascade Drilling	Backfill: See below	Date/Time Finished: 04-23-19	Water Level: 39.14 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram
45						SM		SILTY SAND, light reddish brown (5YR 6/4), 20% non-plastic silt, 70% fine to coarse-grained subangular sand, 10% medium to coarse gravel with 1.5-inch max gravel size, loose, moist, 1-inch thick layer of silt (continued) -@40 feet - color change to light brown (7.5YR 6/4), 20% silt, 70% sand, 10% gravel with 1-inch max gravel size, wet, loose	
50					SP-SM		POORLY GRADED SAND WITH SILT, 10% non-plastic silt, 90% very fine-grained sand, loose, wet, 6-inch layer of slightly cemented silt		
					SP		POORLY GRADED SAND, brown (7.5YR 4/2), 5% non-plastic silt, 90% fine to coarse-grained subangular sand, 5% coarse gravel with 0.25-inch max gravel size, loose, wet		
55					SP		POORLY GRADED SAND WITH GRAVEL, 10% non-plastic silt, 75% fine to coarse-grained sand, 15% fine to coarse gravel with 1-inch max gravel size, loose, wet, slightly cemented coarse sand		

Total Depth = 55 feet
Boring Terminated
Target depth achieved

Notes:



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Client: NDEP
Project Number: 60477365
Site Description/Location: Las Vegas Wash, Henderson, NV
Coordinates: 26737416.279 N 844525.909 E Elevation: 1478.239 FT
Drilling Equipment/Method: Sonic Rig Weather:
Sample Type(s): Grab Boring Diameter: 6 IN.

Boring No. NERT3.60S1D

Ambient PID Reading:
Sheet: 1 of 2
Monitoring Well Installed: Yes
Screened Interval: 35-55 FT BGS

Approved By: S. Bilodeau

Logged By: C. Schnell

Date/Time Started: 04-22-19

Depth of Boring: 55 FT BGS

Drilling Contractor: Cascade Drilling

Backfill: See below

Date/Time Finished: 04-22-19

Water Level: 38.71 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram
5						SM		SILTY SAND, strong brown (7.5YR 4/4), 30% non-plastic silt, 65% fine to medium-grained subangular sand, 5% medium to coarse gravel with 0.75-inch max gravel size, hand augured to 4 feet	
10					SP		POORLY GRADED SAND WITH GRAVEL, light brown (7.5YR 6/4), 5% non-plastic silt, 75% fine to medium-grained subangular sand, 20% medium to coarse gravel, loose		
15					SP		POORLY GRADED SAND, pinkish gray (5YR 7/2), 80% fine to coarse-grained subangular sand, 20% fine to coarse gravel with 1-inch max gravel size, loose, dry -@15 feet - no recovery		
20					SP-SC		POORLY GRADED SAND WITH CLAY AND GRAVEL, 10% non-plastic silt, 70% fine to coarse-grained subangular sand, 20% fine to coarse gravel with 1-inch max gravel size, loose, dry		
25					ML		SILT, light gray (5YR 7/1), 100% non-plastic silt, medium dense, dry, siltstones with laminae		
30									
35					SP		POORLY GRADED SAND WITH GRAVEL, pinkish gray (5YR 7/2), 5% non-plastic silt, 75% fine to coarse-grained subangular sand, 20% gravel with 0.75-inch max gravel, loose, dry, 3-inch pebbles		
					ML		SANDY SILT, light reddish brown (5YR 6/3), 55% non-plastic silt, 35% fine to coarse-grained subangular sand, 10% gravel, loose, moist		
40					SP		POORLY GRADED SAND, light reddish brown (5YR 6/3), 95% medium to coarse-grained subangular sand, 5% coarse		

Notes:



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Client: NDEP
Project Number: 60477365

Boring No. NERT3.60S1D

Site Description/Location: Las Vegas Wash, Henderson, NV
Coordinates: 26737416.279 N 844525.909 E Elevation: 1478.239 FT

Ambient PID Reading:

Drilling Equipment/Method: Sonic Rig Weather:

Sheet: 2 of 2

Sample Type(s): Grab Boring Diameter: 6 IN.

Monitoring Well Installed: Yes

Screened Interval: 35-55 FT BGS

Approved By: S. Bilodeau

Logged By: C. Schnell

Date/Time Started: 04-22-19

Depth of Boring: 55 FT BGS

Drilling Contractor: Cascade Drilling

Backfill: See below

Date/Time Finished: 04-22-19

Water Level: 38.71 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram
45						SM		gravel with 0.25-inch max gravel size, loose, wet SILTY SAND/SILT WITH SAND, light reddish brown (5YR 6/3), 45% low plastic silt, 45% medium to coarse-grained subangular sand, 10% medium to coarse gravel with 2-inch max gravel size, loose, moist	 schedule 40 PVC Monterey #3 Sand
						SM		SILTY SAND WITH GRAVEL, light reddish brown (5YR 6/3), 15% low plastic silt, 65% medium to coarse-grained subangular sand, 20% medium to coarse gravel, increasing gravel	
50						GP-GM ML		POORLY GRADED GRAVEL WITH SILT, light reddish brown (5YR 6/3), 10% non-plastic silt, 90% medium to coarse subangular to angular gravel with 3-inch max gravel size, loose, wet, cemented coarse-grained sandstone conglomerate	
55						SM		SILT WITH SAND, light reddish brown (5YR 6/3), 60% non-plastic silt, 45% fine to coarse-grained subangular to angular sand, 5% fine to coarse gravel with 1-inch max gravel size, loose, wet @47.5 feet - 1-foot thick gravel with volcanics SILTY SAND WITH GRAVEL, dark brown (7.5YR 4/4), 15% non-plastic silt, 75% fine to coarse-grained subangular sand, 15% fine to coarse gravel with 2-inch max gravel size, loose, wet, with sandstone conglomerates as above	

Total Depth = 55 feet
Boring Terminated
Target depth achieved

Notes:

Client:	NDEP
Project Number:	60477365
Site Description/Location:	Las Vegas Wash, Henderson, NV
Coordinates:	26737071.551 N 844152.61 E Elevation: 1461.775 FT
Drilling Equipment/Method:	/Sonic Rig Weather: 70 and cloudy and breezy
Sample Type(s):	Grab Boring Diameter: 8 IN.

Ambient PID Reading:	NA
Sheet:	1 of 2
Monitoring Well Installed:	Yes
Screened Interval:	15-35 FT BGS

Approved By:	S. Bilodeau	Logged By:	C. Grimes	Date/Time Started:	04-17-19	Depth of Boring:	60 FT BGS
Drilling Contractor:	Cascade Drilling	Backfill:	See below	Date/Time Finished:	04-17-19	Water Level:	18.58 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram
5	R1					SM		SILTY SAND, brown (7.5YR 4/4), 15% low plastic silt, 75% fine to coarse-grained subrounded sand, 10% fine gravel with 0.5-inch max gravel size, loose, dry, mostly fine to medium sand	
10						SP		-@5 feet - color change to brown (7.5YR 5/4), 15% silt, 70% very fine to coarse subrounded to angular sand, 15% fine to coarse angular gravel with 2.5-inch to 6-inch max gravel size, moist -@6 feet - 6 inches of volcanics	
15							SM		
20	R2					SM		SILTY SAND, light brown (7.5YR 6/2), 40% low to medium plastic silt, 10% clay, 50% very fine to coarse-grained sand, wet	
25						SP-SM		-@23 feet - 10% silt, 50% sand, 40% gravel -@25 feet - 10% silt, 65% sand, 25% gravel	
30	R3					GP-GM		POORLY GRADED GRAVEL WITH SILT AND SAND, dark brown (7.5YR 3/2), 10% low plastic silt, 30% medium to coarse-grained subangular to angular sand, 60% fine to medium gravel, loose, wet	
35						SM		SILTY SAND, dark brown (7.5YR 3/2), 30% low plastic silt, 70% very fine to fine-grained rounded sand, medium dense, wet -@31 feet - 15% silt, 65% fine to coarse-grained subrounded to angular sand, 20% fine to medium gravel with 2-inch max gravel size, loose, mostly coarse sand -@34 feet - 15% silt, 80% subrounded to subangular sand, 5% fine subangular gravel with 0.3-inch max gravel size -@35 feet - 15% silt, 70% sand, 15% fine to coarse gravel with 3-inch max gravel size	
40							SC		

Notes: R denotes Ramboll grab sample. For backfill information, refer to well completion diagram.



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Client: NDEP
Project Number: 60477365
Site Description/Location: Las Vegas Wash, Henderson, NV
Coordinates: 26737071.551 N 844152.61 E Elevation: 1461.775 FT
Drilling Equipment/Method: /Sonic Rig Weather: 70 and cloudy and breezy
Sample Type(s): Grab Boring Diameter: 8 IN.

Boring No. NERT3.63S1

Ambient PID Reading: NA
Sheet: 2 of 2
Monitoring Well Installed: Yes
Screened Interval: 15-35 FT BGS

Approved By: S. Bilodeau Logged By: C. Grimes Date/Time Started: 04-17-19 Depth of Boring: 60 FT BGS
Drilling Contractor: Cascade Drilling Backfill: See below Date/Time Finished: 04-17-19 Water Level: 18.58 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram
45	R4					SC		CLAYEY SAND, light brown (7.5YR 6/4), 30% low to medium plastic silt, 10% clay, 60% very fine to fine-grained rounded sand, medium dense, wet (<i>continued</i>)	
						ML		SILT WITH SAND, light red (7.5YR 6/6) with light olive gray (5Y 6/2), 60% low to medium plastic silt, 20% clay, 20% very fine to fine-grained sand, stiff, wet, thin (0.3") to thick (3") beds	
						CL		-@42 feet - Silty Sand with Gravel, 15% silt, 70% sand, 15% gravel	
50	PT-NERT3.63S 49.0-49.4 R5							LEAN CLAY, light reddish brown (5YR 6/4), 30% medium to high plastic silt, 70% clay, dry, very stiff, blocky peds, break horizontally	
55								-@49 feet - Core Labs (CL) Lean Clay -@50 feet - beds become more cemented -@52.5 feet - color change to mottled with light olive gray (5Y 6/2), 40% silt, 60% clay, damp/moist, beds become more cemented, moisture may be from water used for drilling	
60								BEDROCK, reddish brown (5Y 4/3), Cemented Sandstone (Middle Thumb Formation) -@56 to 60 feet - very hard drilling	

Refusal at 60 feet.
Boring Terminated

Notes: R denotes Ramboll grab sample. For backfill information, refer to well completion diagram.



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Client: NDEP
Project Number: 60477365
Site Description/Location: Las Vegas Wash, Henderson, NV
Coordinates: 26736678.945 N 842522.475 E Elevation: 1466.271 FT
Drilling Equipment/Method: /Sonic Rig Weather: 80 and sunny
Sample Type(s): Grab Boring Diameter: 8 IN.

Boring No. NERT3.98S1

Ambient PID Reading: NA
Sheet: 1 of 2
Monitoring Well Installed: Yes
Screened Interval: 15-35 FT BGS

Approved By: S. Bilodeau Logged By: C. Grimes Date/Time Started: 04-02-19 Depth of Boring: 55 FT BGS
Drilling Contractor: Cascade Drilling Backfill: See below Date/Time Finished: 04-02-19 Water Level: 10.36 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram
5						SM		SILTY SAND, light brown (7.5YR 6/2), 20% non-plastic silt, 75% fine to medium-grained subrounded sand, 5% medium to coarse gravel with 2-inch max gravel size, loose, dry	<p>bentonite grout</p> <p>schedule 40 PVC</p> <p>No. 3 Monterey Sand</p>
10	PT-NERT3.98S 9.7-10.0					SM		SILTY SAND WITH GRAVEL, brown (7.5YR 5/2), 15% non-plastic silt, 55% medium to coarse-grained subangular to angular sand, 30% medium to coarse gravel with 3-inch max gravel size, loose, wet	
15						SM		SILTY SANDSTONE, 25% low plastic silt, 70% medium to coarse-grained subrounded sand, 5% coarse gravel with 6-inch max gravel size, medium to dense, wet -@9.7 feet - Core Lab (ML) Silty Silt -@10 feet - color change to red brown (2.5 YR 5/4), 35% low plastic silt, 60% fine to medium-grained subangular sand, 5% medium gravel with 1.5-inch max gravel size, damp almost moist, medium dense	
						ML		SILT, red brown (2.5YR 5/4), 90% low to medium plastic fines, 10% medium-grained subrounded sand, dense, dry	
20	PT-NERT3.98S 17.0-17.3					SM		SILTY SAND, red brown (2.5YR 5/4), 40% low to medium plastic fines, 60% very fine to fine-grained subrounded to rounded sand, medium to dense, moist, cemented fragments -@17 feet - Core Lab (SM) Silty Sand	
						ML		SILT, 90% low to medium plastic fines, 10% fine to medium-grained subrounded sand, dense, moist -@20 feet - color change to red brown (2.5YR 4/3), 90% high plastic fines, 10% fine-grained subrounded sand, dry, dense	
25								BEDROCK (MUDDY CREEK FORMATION), 5YR 3/4, 100% fines, cemented, lithified sediments interbedded light brown with dark brown layers, difficult drilling, gypsum crystals with vesicles -@27 feet - Thumb formation? crystalized rock	
30	R3							BEDROCK (THUMB FORMATION), 80% low to medium plastic fines, 20% subrounded sand, 6-inch thick crystalized rock -@30 feet - color change to brown (7.5YR 4/4), 90% medium plastic fines, 10% medium to coarse-grained sand, gypsum content increases, cemented siltstone -@34 feet - thinly bedded gypsum layer -@37 feet - bedding has become homogenous, strong with cemented sandstone	
35									
40									

Notes: R denotes Ramboll grab sample. For backfill information, refer to well completion diagram.



AECOM
1220 Avenida Acaso
Camarillo, CA 93012
805-388-3775

Client: NDEP
Project Number: 60477365

Site Description/Location: Las Vegas Wash, Henderson, NV
Coordinates: 26736678.945 N 842522.475 E Elevation: 1466.271 FT

Drilling Equipment/Method: /Sonic Rig Weather: 80 and sunny
Sample Type(s): Grab Boring Diameter: 8 IN.

Boring No. NERT3.98S1

Ambient PID Reading: NA

Sheet: 2 of 2

Monitoring Well Installed: Yes

Screened Interval: 15-35 FT BGS

Approved By: S. Bilodeau

Logged By: C. Grimes

Date/Time Started: 04-02-19

Depth of Boring: 55 FT BGS

Drilling Contractor: Cascade Drilling

Backfill: See below

Date/Time Finished: 04-02-19

Water Level: 10.36 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram
45	R4							<p>BEDROCK (THUMB FORMATION), 80% low to medium plastic fines, 20% subrounded sand, 6-inch thick crystalized rock (continued)</p> <p>-@42 feet - 90% low to medium plastic fines, 5% very fine to fine-grained subrounded sand, 5% coarse gravel with 4-inch max gravel size, strongly cemented sandstone</p> <p>-@43 feet - gypsum</p> <p>-@45 feet - gypsum</p> <p>-85% fines, 10% very fine to fine-grained sand, 5% coarse gravel with 5-inch max gravel size, cemented sandstone</p>	
50							<p>-@50 feet- color change to brown (7.5YR 4/5) and red brown (5YR 5/3) mottled, 80% low to medium plastic fines, 15% fine-grained gravel with 2 inch max gravel size, very strongly cemented siltstones to sandstones, gypsum present</p>		
55									

Total Depth = 55 feet.
Boring Terminated
Target depth achieved

Notes: R denotes Ramboll grab sample. For backfill information, refer to well completion diagram.



AECOM
1220 Avenida Acaso
Camarillo, CA 93012
805-388-3775

Client: NDEP
Project Number: 60477365
Site Description/Location: Las Vegas Wash, Henderson, NV
Coordinates: 26736269.465 N 839271.619 E Elevation: 1511.580 FT
Drilling Equipment/Method: /Sonic Rig Weather: 80 and sunny
Sample Type(s): Grab Boring Diameter: 8 IN.

Boring No. NERT4.64N1

Ambient PID Reading: NA

Sheet: 1 of 3

Monitoring Well Installed: Yes

Screened Interval: 25-45 FT BGS

Approved By: S. Bilodeau

Logged By: C. Grimes

Date/Time Started: 04-03-19

Depth of Boring: 90 FT BGS

Drilling Contractor: Cascade Drilling

Backfill: See below

Date/Time Finished: 04-03-19

Water Level: 23.03 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram
5	R1					SM		SILTY SAND, light brown (7.5YR 6/4), 25% non-plastic silt, 70% very fine to medium-grained subrounded sand, 5% medium gravel with 2-inch max gravel size, loose, dry	<p>bentonite grout</p>
10								-@5 feet - color change to brown (7.5YR 5/4), 65% very fine to fine-grained rounded sand, 35% low plastic silt	
15								-@8 feet - very homogenous, can be compacted easily	
20	R2					SP-SM		POORLY GRADED SAND WITH SILT, 10% non-plastic silt, 90% fine-grained rounded sand, loose, moist	
25						SP		SAND WITH GRAVEL, 10% non-plastic silt, 65% sand, 25% medium gravel with 1.5-inch max gravel size	
30						SM		-@24 feet - 5% non-plastic silt, 60% medium to coarse-grained sand, 35% fine to medium gravel with 1-inch max gravel size, wet	
						SP-SM		SILTY SAND, light brown (7.5YR 6/4), 15% non-plastic silt, 75% fine to coarse-grained subrounded sand, 10% fine gravel with 0.25-inch max gravel size, loose, wet	
						SM		SAND WITH SILT, red brown (5YR 4/4), 10% non-plastic silt, 90% fine-grained rounded sand	
						SP-SM		SILTY SAND, dark brown (7.5YR 3/2), 15% non-plastic silt, 75% medium to coarse-grained subrounded to subangular sand, 10% fine gravel with 0.5-inch max gravel size, loose, wet	
35						CL		SAND WITH SILT AND GRAVEL, light brown (7.5YR 6/4), 10% high-plastic silt, 70% medium to coarse-grained subangular to angular sand, 20% medium to coarse gravel with 4-inch max gravel size, loose, wet, becomes coarser	
								-@31 feet - matrix supported. 20% silt, 55% sand, 25% gravel	
40	PT-NERT4.64N 37.0-37.3					ML		LEAN CLAY, yellow red (5YR 5/6), 20% medium to high plastic silt, 80% clay, stiff, moist, interbedded clays	<p>schedule 40 PVC</p>
								-@37 feet - 20% silt, 75% clay, 5% fine gravel with 0.25-inch max gravel size	
								-@37 feet - Core Lab (CL) Lean Clay	

Notes: R denotes Ramboll grab sample. For backfill information, refer to well completion diagram.



AECOM
1220 Avenida Acaso
Camarillo, CA 93012
805-388-3775

Client: NDEP
Project Number: 60477365
Site Description/Location: Las Vegas Wash, Henderson, NV
Coordinates: 26736269.465 N 839271.619 E Elevation: 1511.580 FT
Drilling Equipment/Method: /Sonic Rig Weather: 80 and sunny
Sample Type(s): Grab Boring Diameter: 8 IN.

Boring No. NERT4.64N1

Ambient PID Reading: NA
Sheet: 2 of 3
Monitoring Well Installed: Yes
Screened Interval: 25-45 FT BGS

Approved By: S. Bilodeau Logged By: C. Grimes Date/Time Started: 04-03-19 Depth of Boring: 90 FT BGS
Drilling Contractor: Cascade Drilling Backfill: See below Date/Time Finished: 04-03-19 Water Level: 23.03 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram
45	R4					ML		SANDY SILT, brown (7.5YR 5/4), 60% medium plastic silt, 10% clay, 20% medium to coarse-grained subangular sand, 10% fine to medium gravel with 1-inch max gravel size, dense, moist, gypsum crystals present (continued) -@42 feet - color change to strong brown (7.5YR 5/6), 60% low plastic silt, 5% clay, 35% very fine to medium-grained subrounded sand	
50					SP-SM		SAND WITH SILT, 10% silt, 85% very fine to medium-grained subrounded sand, 5% gravel, medium dense, moist, weakly cemented -@46 feet - color change to light brown (7.5YR 6/4), 15% low plastic silt, 74% very fine to fine-grained sand, 15% fine gravel with 0.3-inch max gravel size		
55					SM		SILTY SAND WITH GRAVEL, brown (7.5 YR 5/4), 35% low plastic silt, 50% fine to coarse-grained angular sand, 15% medium gravel with 1.5-inch max gravel size, medium dense, dry, hand drilling		
					ML		SILT WITH SAND, light olive brown (2.5YR 5/4), 80% medium plastic silt, 10% medium-grained sand, 10% fine to coarse gravel with 4-inch max gravel size, medium dense, wet, conglomerate matrix		
					CL		LEAN SILT WITH GRAVEL AND SAND, 50% medium plastic silt, 20% very fine-grained rounded sand, 30% fine angular gravel with 0.1-inch max gravel size, dense, moist, semi cemented between red layers		
					SM		SILTY SAND WITH GRAVEL, dark brown (7.5YR 3/2), 15% low plastic silt, 70% medium to coarse-grained subrounded to rounded sand, 15% fine to medium gravel with 1.5-inch max gravel size, loose, wet, black speckled staining		
60					ML		SANDY SILT WITH GRAVEL, light brown (7.5YR 6/4), 65% low to medium plastic silt, 20% medium to coarse-grained subangular sand, 15% medium to coarse gravel with 3-inch max gravel size, loose, wet, conglomerate weakly cemented -@62 feet - interbedded conglomerates		
65					SM		SANDY SILT WITH GRAVEL, light brown (7.5YR 6/4), 65% low to medium plastic silt, 20% medium to coarse-grained subangular sand, 15% medium to coarse gravel with 3-inch max gravel size, loose, wet, conglomerate weakly cemented -@63 feet - color change to dark brown (7.5YR 3/2), 10% silt, 70% medium to coarse-grained rounded sand, 20% fine to coarse gravel with 0.5-inch max gravel size, wet, loose, more cemented		
70					SM		SILTY SAND, red (2.5YR 5/6), 25% low plastic silt, 75% very fine to fine-grained rounded sand, dense, dry, strongly cemented -@67 feet - thin gypsum, crossbeds, vein, stratified -@68 feet - Core Lab (CL) Sandy Lean Clay		
75					ML		SANDY SILT WITH GRAVEL, light brown (7.5YR 6/4), 65% low to medium plastic silt, 20% medium to coarse-grained subangular sand, 15% medium to coarse gravel with 3-inch max gravel size, loose, wet, conglomerate weakly cemented -@70 feet - color change to reddish brown (5YR 4/4), 30% silt, 70% sand, beds not flat, dip and thicken, vesicular strata		
80					ML		SANDY SILT WITH GRAVEL, light brown (7.5YR 6/4), 65% low to medium plastic silt, 20% medium to coarse-grained subangular sand, 15% medium to coarse gravel with 3-inch max gravel size, loose, wet, conglomerate weakly cemented -@77 feet - color change to light brown (4.5YR 6/2) and dark yellow (5Y 8/2), 80% medium plastic silt, 20% subrounded to subangular sand, dry, hard		

Notes: R denotes Ramboll grab sample. For backfill information, refer to well completion diagram.

ENSR.BLOG BORING LOGS.GPJ ENSR CA.GDT 9/17/19



AECOM
1220 Avenida Acaso
Camarillo, CA 93012
805-388-3775

Client: NDEP

Project Number: 60477365

Site Description/Location: Las Vegas Wash, Henderson, NV

Coordinates: 26736269.465 N 839271.619 E Elevation: 1511.580 FT

Drilling Equipment/Method: /Sonic Rig Weather: 80 and sunny

Sample Type(s): Grab Boring Diameter: 8 IN.

Boring No. NERT4.64N1

Ambient PID Reading: NA

Sheet: 3 of 3

Monitoring Well Installed: Yes

Screened Interval: 25-45 FT BGS

Approved By: S. Bilodeau

Logged By: C. Grimes

Date/Time Started: 04-03-19

Depth of Boring: 90 FT BGS

Drilling Contractor: Cascade Drilling

Backfill: See below

Date/Time Finished: 04-03-19

Water Level: 23.03 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram
85						SP-SM		<p>SAND WITH SILT AND GRAVEL, yellow (7.5Y 7/1), 75% medium plastic silt, 10% clay, 15% fine to medium grained subangular sand, hard, dry</p> <p>-@83 feet - thin yellow (7.5 Y 7/1) to red (2.5YR 4/6) and light brown (7.5YR 6/4)</p> <p>-@85 feet - color change to red (2.5YR 4/6) and gray (10Y 8/1)</p> <p>-@87 feet - homogenous color</p>	
90									

Total Depth = 90 feet.
Boring Terminated
Target depth achieved

Notes: R denotes Ramboll grab sample. For backfill information, refer to well completion diagram.



AECOM
1220 Avenida Acaso
Camarillo, CA 93012
805-388-3775

Client: NDEP
Project Number: 60477365
Site Description/Location: Las Vegas Wash, Henderson, NV
Coordinates: 26735740.735 N 839508.389 E Elevation: 1513.004 FT
Drilling Equipment/Method: Sonic Rig Weather: 78 and sunny
Sample Type(s): Grab Boring Diameter: 8 IN.

Boring No. NERT4.64S1

Ambient PID Reading: NA
Sheet: 1 of 2
Monitoring Well Installed: Yes
Screened Interval: 35-55 FT BGS

Approved By: S. Bilodeau

Logged By: C. Grimes

Date/Time Started: 03-25-19

Depth of Boring: 55 FT BGS

Drilling Contractor: Cascade Drilling

Backfill: See below

Date/Time Finished: 03-25-19

Water Level: 27.10 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram
5						ML		SILT, strong medium brown (7.5YR 4/6), 95% non-plastic silt, 5% very fine sand, loose, dry	
10								-@10 feet - Silt with Sand, 65% silt, 30% very fine-grained subrounded sand, 5% gravel with 0.3 inch max gravel size	
15						SM		SILTY SAND WITH GRAVEL, brown (7.5 YR 4/4), 30% non-plastic silt, 50% medium-grained subrounded sand, 20% subangular gravel with 0.75-max gravel size, loose, dry	
20						SP-SM		POORLY GRADED SAND WITH SILT AND GRAVEL, brown (7.5YR 4/3), 10% non-plastic silt, 75% medium to coarse-grained subrounded sand, 15% gravel with 0.10-inch max gravel size, loose, dry	
25						SP		-@22.5 feet - no silt SAND, brown (7.5YR 5/6), 95% fine to medium-grained subrounded sand, 5% gravel, loose, dry, with bedding layers	
30						SP-SM		POORLY GRADED SAND WITH SILT AND GRAVEL, brown (7.5YR 4/3), 10% non-plastic silt, 75% medium to coarse-grained sunbangular sand, 15% gravel with 0.25-inch max gravel size	
35						SP		POORLY GRADED SAND WITH GRAVEL, reddish yellow (7.5YR 6/6), 5% non-plastic silt, 60% fine to coarse-grained subangular sand, 35% gravel with 5-inch max gravel size, loose, moist, basalt cobbles	
35						SP-SM		POORLY GRADED SAND WITH GRAVEL TO POORLY GRADED GRAVEL WITH SAND, brown (7.5 YR 4/3), 50% fine to coarse-grained sunbangnular sand, 50% subrounded gravel with 0.25-inch max gravel size, loose, moist	
35						ML		SILT, brown (7.5 YR 5/5), 95% low plastic fines, 5% fine-grained sand, loose, moist	
35						SP-SM		POORLY GRADED SAND WITH SILT, 10% low plastic silt, 80% fine to medium-grained subangular sand, 10% subrounded gravel with 0.30-inch max gravel size, loose, moist	
40						GM			hydrated bentonite

Notes: R denotes Ramboll grab sample. For backfill information, refer to well completion diagram.

Client: NDEP
Project Number: 60477365
Site Description/Location: Las Vegas Wash, Henderson, NV
Coordinates: 26735740.735 N 839508.389 E Elevation: 1513.004 FT
Drilling Equipment/Method: Sonic Rig Weather: 78 and sunny
Sample Type(s): Grab Boring Diameter: 8 IN.

Boring No. NERT4.64S1

Ambient PID Reading: NA
Sheet: 2 of 2
Monitoring Well Installed: Yes
Screened Interval: 35-55 FT BGS

Approved By: S. Bilodeau Logged By: C. Grimes Date/Time Started: 03-25-19 Depth of Boring: 55 FT BGS
Drilling Contractor: Cascade Drilling Backfill: See below Date/Time Finished: 03-25-19 Water Level: 27.10 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram
45						GM CL		SILTY GRAVEL WITH SAND, brown (7.5YR 4/4), 5% low plastic silt, 35% medium to coarse-grained subangular sand, 60% medium to coarse-grained subrounded gravel with 3-inch max gravel size, loose, moist to wet, basalt (continued) -@40 feet - increasing clay GRAVELLY LEAN CLAY, light brown (7.5YR 6/3), 65% medium plastic clay, 35% medium to coarse subangular gravel with 5-inch max gravel size, medium dense, wet	<p>schedule 40 PVC Monterey #3 Sand</p>
50					SP-SC SP-SM SC		POORLY GRADED SAND WITH CLAY, dark brown (7.5YR 3/3), 10% medium plastic clay, 80% medium to coarse-grained subrounded sand, 10% gravel with 0.10-inch max gravel size, medium dense, moist, with clay clasts POORLY GRADED SAND WITH SILT AND GRAVEL, very dark brown (7.5YR 6/2), 10% non-plastic silt, 70% medium to coarse-grained subangular sand, 20% gravel with 0.25-inch max gravel size, loose, wet		
55					SP GP-GM		CLAYEY SAND, light brown (7.5YR 6/3), 35% medium plastic fines, 65% fine to coarse-grained subrounded sand, medium dense, wet -@48 feet - 30% clay, 60% sand, 10% gravel with 0.5-inch max gravel size, wet POORLY GRADED SAND WITH GRAVEL, brown (7.5YR 4/3), 5% silt, 75% medium to coarse-grained subrounded sand, 20% gravel with 2-inch max gravel size, wet -@52 feet - 60% sand, 40% gravel -@53 feet - 35% sand, 65% gravel POORLY GRADED GRAVEL WITH SILT, light brown (7.5YR 6/3), 10% silt, 10% sand, 70% subrounded gravel with 3-inch max gravel size, medium dense, wet		
Total Depth = 55 feet Boring Terminated Target depth achieved									

Notes: R denotes Ramboll grab sample. For backfill information, refer to well completion diagram.



AECOM
1220 Avenida Acaso
Camarillo, CA 93012
805-388-3775

Client: NDEP

Project Number: 60477365

Site Description/Location: Las Vegas Wash, Henderson, NV

Coordinates: 267356746.283 N 839506.159E Elevation: 1512.733 FT

Drilling Equipment/Method: Sonic Rig

Weather:

Sample Type(s): Grab

Boring Diameter: 6 IN.

Boring No. NERT4.64S1A

Ambient PID Reading:

Sheet: 1 of 2

Monitoring Well Installed: Yes

Screened Interval 35-55 FT BGS

Approved By: S. Bilodeau

Logged By: C. Schnell

Date/Time Started: 04-26-19

Depth of Boring: 55 FT BGS

Drilling Contractor: Cascade Drilling

Backfill: See below

Date/Time Finished: 04-26-19

Water Level: 26.91 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram	
5						ML		SILT, pink (5YR 7/3), 100% non-plastic silt, loose, dry, hand augured to 5 feet bgs		
10								-@5 to 7 feet - no recovery		
15								-@15 to 18.5 - no recovery		
20						SP		POORLY GRADED SAND, reddish brown (5YR 6/3), 5% non-plastic silt, 85% fine to coarse-grained subangular sand, 10% fine to medium gravel with 0.25-inch max gravel size, loose, dry		
25						SP		SILTY SAND WITH GRAVEL, reddish brown (5YR 5/3), 5% non-plastic silt, 80% fine to coarse-grained subangular sand, 15% fine to coarse gravel with 0.5-inch max gravel size		
30						ML		SILT, 90% non-plastic silt, 10% fine to coarse-grained angular sand, loose, wet		
35						SP-SM		POORLY GRADED SAND WITH SILT AND GRAVEL, reddish gray (5YR 5/2), 5% non-plastic silt, 80% fine to coarse-grained subangular sand, 15% fine to coarse gravel with 0.5-inch max gravel size, loose, wet		
40						ML		SILT, pink (5YR 7/3), 100% medium-plastic silt, dry		
										hydrated bentonite

Notes:



AECOM
1220 Avenida Acaso
Camarillo, CA 93012
805-388-3775

Client: NDEP
Project Number: 60477365
Site Description/Location: Las Vegas Wash, Henderson, NV
Coordinates: 267356746.283 N 839506.159 E Elevation: 1512.733 FT
Drilling Equipment/Method: Sonic Rig Weather:
Sample Type(s): Grab Boring Diameter: 6 IN.

Boring No. NERT4.64S1A

Ambient PID Reading:
Sheet: 2 of 2
Monitoring Well Installed: Yes
Screened Interval: 35-55 FT BGS

Approved By: S. Bilodeau

Logged By: C. Schnell

Date/Time Started: 04-26-19

Depth of Boring: 55 FT BGS

Drilling Contractor: Cascade Drilling

Backfill: See below

Date/Time Finished: 04-26-19

Water Level: 26.91 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram
45						ML		SILT, pink (5YR 7/3), 100% medium-plastic silt, dry (continued) -@41.5 feet - color change to light reddish brown (5YR 6/3), 85% medium plastic silt, 15% sand, dry	<p>schedule 40 PVC</p> <p>Monterey #3 Sand</p>
50					SM		SILTY SAND WITH GRAVEL, 30% non-plastic silt, 50% fine to coarse-grained subangular sand, 20% fine to coarse gravel with 0.75-inch max gravel size, loose, wet		
					SP-SM		POORLY GRADED SAND WITH SILT, 10% non-plastic silt, 85% fine to medium-grained subangular sand, 5% fine to medium gravel with 0.25-inch max gravel size, loose, wet		
					SP		POORLY GRADED SAND WITH GRAVEL, 5% non-plastic silt, 75% fine to coarse-grained subangular sand, 20% fine to coarse gravel with 0.75-inch max gravel size, loose, wet		
55					GP		POORLY GRADED GRAVEL, dark reddish gray (5YR 4/2), 5% non-plastic silt, 95% coarse subangular gravel with 0.75-inch max gravel size, loose, wet, with small pebbles		

Total Depth = 55 feet
Boring Terminated
Target depth achieved

Notes:



AECOM
1220 Avenida Acaso
Camarillo, CA 93012
805-388-3775

Client: NDEP

Project Number: 60477365

Site Description/Location: Las Vegas Wash, Henderson, NV

Coordinates: 26735747.147 N 839522.293 E Elevation: 1512.546 FT

Drilling Equipment/Method: Sonic Rig

Weather:

Sample Type(s): Grab

Boring Diameter: 6 IN.

Boring No. NERT4.64S1B

Ambient PID Reading:

Sheet: 1 of 2

Monitoring Well Installed: Yes

Screened Interval: 35-55 FT BGS

Approved By: S. Bilodeau

Logged By: C. Schnell

Date/Time Started: 04-26-19

Depth of Boring: 55 FT BGS

Drilling Contractor: Cascade Drilling

Backfill: See below

Date/Time Finished: 04-26-19

Water Level: 26.78 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram
5						ML		SILT, pink (5YR 7/3), 95% non-plastic silt, 5% coarse subangular gravel with 0.25-inch max gravel size, loose, dry, hand augured to 5 feet bgs	
10									
15									
20							-@17.5 to 20 feet - no recovery		
25						SP	POORLY GRADED SAND WITH GRAVEL, light brown (7.5YR 6/4), 80% fine to coarse-grained subangular sand, 20% fine to coarse gravel with 0.75-inch max gravel size, dry, loose, loose, dry		
30						SP	POORLY GRADED SAND, 5% non-plastic silt, 85% very fine to fine-grained subangular sand, 10% medium to coarse gravel with 0.25-inch max gravel size, loose, dry		
30						SM	SILTY SAND, light reddish brown (5YR 6/3), 60% non-plastic silt, 30% fine to coarse-grained subangular sand, 10% fine to coarse gravel with 0.15-inch max gravel size, loose, wet		
35						ML	SILT, light brown (5YR 6/4), 95% non-plastic silt, 5% fine to coarse grained subangular sand, medium dense, wet		
40						SP	POORLY GRADED SAND WITH GRAVEL, light reddish brown (5YR 6/3), 5% non-plastic silt, 80% fine to coarse-grained subangular sand, 15% fine to coarse gravel with 0.25-inch max gravel size, loose, wet		
40						SM	SILTY SAND WITH GRAVEL, pinkish gray (5YR 7/2), 30% non-plastic silt, 50% fine to coarse-grained subangular sand, 20% fine to coarse gravel with 0.75-inch max gravel size, loose, wet		

Notes:



AECOM
1220 Avenida Acaso
Camarillo, CA 93012
805-388-3775

Client: NDEP
Project Number: 60477365

Site Description/Location: Las Vegas Wash, Henderson, NV
Coordinates: 26735747.147 N 839522.293 E Elevation: 1512.546 FT

Drilling Equipment/Method: Sonic Rig Weather:

Sample Type(s): Grab Boring Diameter: 6 IN.

Boring No. NERT4.64S1B

Ambient PID Reading:

Sheet: 2 of 2

Monitoring Well Installed: Yes

Screened Interval: 35-55 FT BGS

Approved By: S. Bilodeau

Logged By: C. Schnell

Date/Time Started: 04-26-19

Depth of Boring: 55 FT BGS

Drilling Contractor: Cascade Drilling

Backfill: See below

Date/Time Finished: 04-26-19

Water Level: 26.78 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram
45						SM		SILTY SAND, pinkish gray (5YR 6/2), 15% non-plastic silt, 80% very fine to medium-grained subangular sand, 5% coarse gravel with 0.25-inch max gravel size with small pebbles, loose, wet	<p>schedule 40 PVC</p> <p>Monterey #3 Sand</p>
						ML		SILT WITH SAND, pinkish gray (5YR 7/2), 85% non-plastic silt, 10% very fine to fine-grained subangular sand, 5% fine to medium gravel with 0.25-inch max gravel size, medium dense, moist	
						SP		POORLY GRADED SAND WITH GRAVEL, pinkish gray (5YR 6/2), 5% non-plastic silt, 75% fine to coarse-grained subangular sand, 20% fine to coarse gravel with 0.25-inch max gravel size, loose, wet	
50						ML		SANDY SILT WITH GRAVEL TO GRAVELY SILT WITH SAND, light gray (5YR 7/1), 50% non-plastic silt, 25% fine to coarse grained subangular sand, 25% fine to coarse gravel with 0.75-inch max gravel size, loose, wet, with small cobbles -@52 feet - color change to light reddish brown (5YR 6/3), 0.25-inch max gravel size with small pebbles to cobbles	
55									

Total Depth = 55 feet
Boring Terminated
Target depth achieved

Notes:



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Client: NDEP
Project Number: 60477365
Site Description/Location: Las Vegas Wash, Henderson, NV
Coordinates: 26735735.178 N 839510.44 E Elevation: 1512.976 FT
Drilling Equipment/Method: Sonic Rig Weather:
Sample Type(s): Grab Boring Diameter: 6 IN.

Boring No. NERT4.64S1C

Ambient PID Reading:
Sheet: 1 of 2
Monitoring Well Installed: Yes
Screened Interval: 35-55 FT BGS

Approved By: S. Bilodeau

Logged By: C. Schnell

Date/Time Started: 04-26-19

Depth of Boring: 55 FT BGS

Drilling Contractor: Cascade Drilling

Backfill: See below

Date/Time Finished: 04-26-19

Water Level: 27.14 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram
5						ML		SILT, pink (5YR 7/3), 100% non-plastic silt, loose, dry -@5 to 11 feet- no recovery	
10									
15								-@15 to 16.5 feet - no recovery	
20						ML		SANDY SILT, light reddish brown (5YR 6/3), 60% non-plastic silt, 40% fine to medium-grained sand, loose, moist	
25						SP		POORLY GRADED SAND, 5% non-plastic silt, 85% fine to coarse-grained subangular sand, 10% fine to medium gravel with 0.25-inch max gravel size, loose, dry -@25 feet - color change to reddish brown (5YR 5/3), 5% non-plastic silt, 80% fine to coarse-grained subangular sand, 15% fine to coarse gravel with 0.75-inch max gravel size, wet, loose	
30						SP-SM		SILTY SAND WITH GRAVEL, 20% non-plastic silt, 65% fine to coarse-grained subangular sand, 15% fine to coarse gravel with 0.75-inch max gravel size, loose, wet	
35						ML SP-SM		SILT, 90% non-plastic silt, 10% fine-grained sand, medium dense, wet SILTY SAND WITH GRAVEL, light reddish brown (5YR 6/3), 15% non-plastic silt, 80% fine to coarse-grained subangular sand, 15% fine to coarse gravel with 0.25-inch max gravel size, loose, wet -@35.5 feet - 6-inch silt layer	
40									hydrated bentonite

Notes:



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Client: NDEP

Project Number: 60477365

Site Description/Location: Las Vegas Wash, Henderson, NV

Coordinates: 26735735.178 N 839510.44 E Elevation: 1512.976 FT

Drilling Equipment/Method: Sonic Rig

Weather:

Sample Type(s): Grab

Boring Diameter: 6 IN.

Boring No. NERT4.64S1C

Ambient PID Reading:

Sheet: 2 of 2

Monitoring Well Installed: Yes

Screened Interval: 35-55 FT BGS

Approved By: S. Bilodeau

Logged By: C. Schnell

Date/Time Started: 04-26-19

Depth of Boring: 55 FT BGS

Drilling Contractor: Cascade Drilling

Backfill: See below

Date/Time Finished: 04-26-19

Water Level: 27.14 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram
.....						SP-SM		SILTY SAND, pinkish gray (5YR 7/2), 40% non-plastic silt, 60% fine to coarse-grained subangular sand, loose, wet, cemented	
.....						ML		SILT, pinkish gray (5YR 7/2), 100% non-plastic silt, medium dense, dry	
45						SP		POORLY GRADED SAND WITH GRAVEL, pinkish gray (5YR 6/2), 5% non-plastic silt, 75% fine to coarse-grained subangular sand, 20% fine to coarse gravel with 0.25-inch max gravel size, medium dense, wet	
.....						ML		SANDY SILT WITH GRAVEL TO GRAVELLY SILT WITH SAND, light gray (5YR 7/1), 50% non-plastic silt, 25% fine to coarse-grained subangular sand, 25% fine to coarse gravel with 0.75-inch max gravel size, wet, with small cobbles -@52 feet - color change to light reddish brown (5YR 6/3), with small pebbles to cobbles	
50									
.....									
55									

Total Depth = 55 feet
Boring Terminated
Target depth achieved

Notes:



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Client: NDEP

Project Number: 60477365

Site Description/Location: Las Vegas Wash, Henderson, NV

Coordinates: 26735756.291 N 839544.601 E Elevation: 1512.630 FT

Drilling Equipment/Method: Sonic Rig

Weather:

Sample Type(s): Grab

Boring Diameter: 6 IN.

Boring No. NERT4.64S1D

Ambient PID Reading:

Sheet: 1 of 2

Monitoring Well Installed: Yes

Screened Interval: 35-55 FT BGS

Approved By: S. Bilodeau

Logged By: C. Schnell

Date/Time Started: 04-25-19

Depth of Boring: 55 FT BGS

Drilling Contractor: Cascade Drilling

Backfill: See below

Date/Time Finished: 04-25-19

Water Level: 26.91 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram
5								hand augured to 5 feet bgs	
10					ML		-@5 to 10 feet - no recovery		
15							SILT, pink (5YR 7/4), 100% non-plastic silt, loose, dry		
20							-@14.5 feet - color change to pink (5YR 7/2), 85% non-plastic silt, 10% sand, 5% gravel, dry, loose, increased cementation		
25						SP-SM	-@17.5 to 20 feet - no recovery		
30						SM	POORLY GRADED SAND WITH SILT, 10% non-plastic silt, 90% fine to coarse-grained subangular sand, 10% fine to coarse gravel with 0.25-inch max gravel size, loose, dry		
35						SP	-@22.5 to 25 feet - no recovery		
40						ML	SILTY SAND, light brown (7.5YR 6/4), 20% non-plastic silt, 75% fine to coarse-grained subangular sand, 5% fine to coarse gravel with 0.15-inch max gravel size, medium dense, moist		
							-@27 feet - color change to light reddish brown (5YR 6/3), 60% non-plastic silt, 30% fine to coarse-grained subangular sand, 10% fine to coarse gravel with 0.15-inch max gravel size, wet, loose		
							POORLY GRADED SAND, reddish brown (5YR 5/3), 5% non-plastic silt, 80% fine to coarse-grained subangular sand, 15% fine to coarse gravel with 0.5-inch max gravel size, loose, wet		
							SILT, light brown (7.5YR 6/4), 95% non-plastic silt, 5% fine to coarse-grained subangular sand, medium dense, moist		

Notes:



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805-388-3775

Client: NDEP

Project Number: 60477365

Site Description/Location: Las Vegas Wash, Henderson, NV

Coordinates: 26735756.291 N 839544.601 E Elevation: 1512.630 FT

Drilling Equipment/Method: Sonic Rig

Weather:

Sample Type(s): Grab

Boring Diameter: 6 IN.

Boring No. NERT4.64S1D

Ambient PID Reading:

Sheet: 2 of 2

Monitoring Well Installed: Yes

Screened Interval: 35-55 FT BGS

Approved By: S. Bilodeau

Logged By: C. Schnell

Date/Time Started: 04-25-19

Depth of Boring: 55 FT BGS

Drilling Contractor: Cascade Drilling

Backfill: See below

Date/Time Finished: 04-25-19

Water Level: 26.91 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram
45						ML		SILT, light brown (7.5YR 6/4), 95% non-plastic silt, 5% fine to coarse-grained subangular sand, medium dense, moist (continued)	<p>schedule 40 PVC</p> <p>Monterey #3 Sand</p>
						SP-SM		POORLY GRADED SAND WITH SILT, light reddish brown (5YR 6/3), 10% non-plastic silt, 80% fine to coarse-grained subangular sand, 10% fine to coarse gravel with 0.5-inch max gravel size, loose, wet, with large pebbles	
						SP		POORLY GRADED SAND WITH GRAVEL, pinkish gray (5YR 6/2), 5% non-plastic silt, 75% fine to coarse-grained subangular sand, 20% fine to coarse gravel with 0.5-inch max gravel size, loose, wet	
50						ML		SANDY SILT WITH GRAVEL, 70% non-plastic silt, 10% fine-grained sand, 20% fine to coarse gravel with 0.75-inch max gravel size, loose, wet, with cobbles	
55						GP		POORLY GRADED GRAVEL, 5% non-plastic silt, 5% fine to coarse-grained subangular sand, 90% fine to coarse-grained gravel with 0.75-inch max gravel size, loose, wet	

Total Depth = 55 feet
Boring Terminated
Target depth achieved

Notes:

Client:	NDEP
Project Number:	60477365
Site Description/Location:	Las Vegas Wash, Henderson, NV
Coordinates:	26736244.72 N 839107.823 E Elevation: 1513.006 FT
Drilling Equipment/Method:	/Sonic Rig Weather: 74 and partially sunny to cloudy
Sample Type(s):	Grab Boring Diameter: 8 IN.

Ambient PID Reading:	NA
Sheet:	1 of 3
Monitoring Well Installed:	Yes
Screened Interval:	25-45 FT BGS

Approved By:	S. Bilodeau	Logged By:	C. Grimes	Date/Time Started:	04-10-19	Depth of Boring:	90 FT BGS
Drilling Contractor:	Cascade Drilling	Backfill:	See below	Date/Time Finished:	04-10-19	Water Level:	24.21 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram
5	R1					SM		<p>SILTY SAND, brown (7.5YR 5/4), 40% low plastic silt, 60% very fine to fine-grained rounded sand, loose, dry, hand augured to 5 feet</p> <p>-@5 feet - 30% silt, 70% sand</p> <p>-@5 to 15 feet - homogeneous fill</p>	<p>bentonite grout</p>
10								-@12 feet - 20% silt, 80% sand	
15								-@17 feet - medium dense sand compacted to max 2-inch blocks	
20	R2					SP-SM		<p>POORLY GRADED SAND WITH SILT, brown (7.5YR 4/4), 10% low plastic silt, 90% fine to medium-grained rounded sand, loose, moist</p> <p>-@20 feet - 10% non-plastic silt, 80% coarse-grained subrounded to angular sand, 10% fine to medium angular gravel</p> <p>-@22 feet - color change to dark brown 7.5YR 3/2), 10% silt, 75% very fine to coarse-grained sand, 15% gravel with 0.25-inch max gravel size, wet</p>	
25								-@27 feet - color change to brown (7.5YR 5/4), 10% silt, 90% fine to medium-grained rounded sand, medium dense	
30	R3					SM		SILTY SAND WITH GRAVEL, brown (7.5YR 5/4), 15% non-plastic silt, 65% fine to coarse-grained subangular sand, 20% fine to medium angular gravel with 1-inch max gravel size, medium dense	<p>schedule 40 PVC</p>
						SP-SM		POORLY GRADED SAND WITH SILT AND GRAVEL, dark brown (7.5YR 3/3), 10% low plastic silt, 65% very fine to coarse-grained subangular sand, 25% fine to coarse angular gravel with 2-inch max gravel size, loose, wet	
35						SM		SILTY SAND WITH GRAVEL, 20% low plastic silt, 60% very fine to coarse-grained subangular sand, 20% fine to coarse angular gravel with 1.5-inch max gravel size, wet	
40						ML		-@34 feet - 6-inch thick conglomerate, matrix supported SANDY SILT WITH GRAVEL, light brown (7.5YR 6/2), 55% low to medium plastic silt, 25% fine to coarse-grained subangular sand, 20% fine to medium angular gravel with 4-inch max gravel size	

Notes: R denotes Ramboll grab sample. For backfill information, refer to well completion diagram.



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Client: NDEP
Project Number: 60477365
Site Description/Location: Las Vegas Wash, Henderson, NV
Coordinates: 26736244.72 N 839107.823 E Elevation: 1513.006 FT
Drilling Equipment/Method: /Sonic Rig Weather: 74 and partially sunny to cloudy
Sample Type(s): Grab Boring Diameter: 8 IN.

Boring No. NERT4.65N1

Ambient PID Reading: NA

Sheet: 2 of 3

Monitoring Well Installed: Yes

Screened Interval: 25-45 FT BGS

Approved By: S. Bilodeau

Logged By: C. Grimes

Date/Time Started: 04-10-19

Depth of Boring: 90 FT BGS

Drilling Contractor: Cascade Drilling

Backfill: See below

Date/Time Finished: 04-10-19

Water Level: 24.21 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram
45	R4					SM		SILTY SAND, 25% low plastic silt, 65% fine to coarse grained subangular sand, 10% fine to medium angular gravel with 1.5-inch max gravel size, loose, wet, less conglomerates and gravels	<p>No. 3 Monterey Sand</p>
						ML		SANDY SILT WITH GRAVEL, 55% low plastic silt, 25% fine to coarse grained subangular sand, 20% fine to medium angular gravel with 6-inch max gravel size, loose, wet, conglomerates reappear	
50						ML		SILT WITH SAND, pinkish gray (7.5YR 7/2), 80% medium plastic fines, 15% fine to medium-grained subangular sand, 5% fine gravel with 0.25-inch max gravel size, stiff, moist, interbedded cemented siltstones	
						CL		LEAN CLAY, light gray (5Y 7/2), 100% medium plastic silt, very stiff, moist -@50 to 59 feet - thin interbedded reddish brown (5YR 5/4) -@53 feet - Core Lab (CH) Fat Clay with Sand	
55	PT- NERT4.65N 53.0-53.3					ML		GRAVELLY SILT WITH SAND, light brown (7.5YR 6/2), 60% medium plastic silt, 20% fine to coarse-grained subangular sand, 20% fine to medium angular gravel with 2-inch max gravel size, medium dense, wet	
60	R6					ML		SILT WITH GRAVEL, pale brown (10YR 7/4), 85% low to medium plastic silt, 15% fine subangular gravel with 0.25-inch max gravel size, stiff, moist	
65						ML		GRAVELLY SILT WITH SAND, pinkish gray (7.5YR 7/2), 70% low to medium plastic silt, 15% fine to coarse-grained subangular sand, 20% fine to medium angular gravel with 2-inch max gravel size, medium dense, wet	
						SM		SILTY SAND WITH GRAVEL, light brown (7.5YR 6/2), 20% low plastic silt, 55% fine to coarse grained subangular sand, 25% fine to coarse angular gravel with 6-inch max gravel size, loose, wet	
70	R7					ML		SANDY SILT, light yellow brown (4R 6/4), 65% low plastic silt, 25% fine to coarse grained subangular sand, 10% fine gravel with 1.5-inch max gravel size, medium dense, moist, sharp contact	
						SM		SILTY SAND, pink (7.5YR 7/3), 15% non-plastic silt, 85% very fine to medium-grained subrounded to rounded sand, dense, moist, interbedded sands with silty sands, some dense layers -@75 to 80 feet - no recovery	

Notes: R denotes Ramboll grab sample. For backfill information, refer to well completion diagram.



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Client: NDEP

Project Number: 60477365

Site Description/Location: Las Vegas Wash, Henderson, NV

Coordinates: 26736244.72 N 839107.823 E Elevation: 1513.006 FT

Drilling Equipment/Method: /Sonic Rig Weather: 74 and partially sunny to cloudy

Sample Type(s): Grab Boring Diameter: 8 IN.

Boring No. NERT4.65N1

Ambient PID Reading: NA

Sheet: 3 of 3

Monitoring Well Installed: Yes

Screened Interval: 25-45 FT BGS

Approved By: S. Bilodeau

Logged By: C. Grimes

Date/Time Started: 04-10-19

Depth of Boring: 90 FT BGS

Drilling Contractor: Cascade Drilling

Backfill: See below

Date/Time Finished: 04-10-19

Water Level: 24.21 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram
85	R8.25					SM		<p>SILTY SAND, pink (7.5YR 7/3), 15% non-plastic silt, 85% very fine to medium-grained subrounded to rounded sand, dense, moist, interbedded sands with silty sands, some dense layers (continued)</p> <p>-@82.5 feet - color change to dark brown (7.5YR 3/2), 25% low plastic silt, 65% very fine to coarse-grained subrounded sand, 10% fine gravel with 0.25-inch max gravel size, wet, loose</p> <p>-@85 feet - color change to brown (7.5YR 4/3), 30% silt, 70% very fine to medium-grained rounded sand</p>	
90	R9							-@89 feet - 4 inches of gravel at bottom of core barrel	

Total Depth = 90 feet.
Boring Terminated
Target depth achieved

Notes: R denotes Ramboll grab sample. For backfill information, refer to well completion diagram.



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Client: NDEP
Project Number: 60477365
Site Description/Location: Las Vegas Wash, Henderson, NV
Coordinates: 26736143.637 N 838871.668 E Elevation: 1514.906 FT
Drilling Equipment/Method: Sonic Rig Weather: 73 and sunny to partially sunny
Sample Type(s): Grab Boring Diameter: 8 IN.

Boring No. NERT4.70N1

Ambient PID Reading: NA
Sheet: 1 of 3
Monitoring Well Installed: Yes
Screened Interval: 25-45 FT BGS

Approved By: S. Bilodeau Logged By: C. Grimes Date/Time Started: 04-11-19 Depth of Boring: 82 FT BGS
Drilling Contractor: Cascade Drilling Backfill: See below Date/Time Finished: 04-11-19 Water Level: 24.95 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram	
5	R1					SM		SILTY SAND, brown (7.5YR 6/3), 20% low plastic silt, 70% very fine to fine-grained subrounded sand, 10% medium rounded gravel with 2-inch max gravel size, loose, dry, hand augered to 5 feet bgs -@5 feet - color change to brown (7.5YR 5/4), 35% silt, 65% rounded sand -@5 to 15 feet - homogeneous -@15 feet - 15% silt, 70% sand, 15% gravel		
10										
15										
20	R2					SP-SM		POORLY GRADED SAND WITH SILT, reddish brown (5YR 5/4), 10% non-plastic silt, 90% very fine to medium-grained rounded sand, loose, moist -@20 feet - 10% silt, 75% very fine to coarse-grained subangular sand, 15% fine rounded gravel with 0.75-inch max gravel size, dry		
25						SM		SILTY SAND, 15% low plastic silt, 85% very fine to medium-grained rounded sand, loose, moist		
30	R3					SM		POORLY GRADED SAND WITH SILT, brown (7.5YR 8/4), 10% silt, 80% very fine to medium subrounded sand, 10% fine rounded gravel with 0.5-inch max gravel size, loose, moist		
35						SM		SILTY SAND, 20% low plastic silt, 75% fine to coarse-grained subrounded sand, 5% fine gravel with 0.3-inch max gravel size, medium dense, moist		
							SP-SM			SILTY SAND WITH GRAVEL, dark brown (7.5YR 3/2), 15% low plastic silt, 65% fine to coarse-grained subrounded sand, 20% fine to medium angular gravel with 1.5-inch max gravel size, loose, wet
40							SP-SM			POORLY GRADED SAND AND GRAVEL, 10% low plastic silt, 60% fine to coarse-grained subrounded sand, 30% fine to coarse gravel with 4-inch max gravel size, loose, wet SILTY SAND WITH GRAVEL, light brown (7.5YR 6/3), 25% low plastic silt, 65% fine to coarse-grained subrounded sand, 10% fine to medium subangular gravel with 0.9-inch max gravel size, loose, wet -@35 to 45 feet - limited recovery

schedule 40 PVC

Notes: R denotes Ramboll grab sample. from 45 to 82 feet, hard drilling. For backfill information, refer to well completion diagram.



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Client: NDEP	Boring No. NERT4.70N1
Project Number: 60477365	
Site Description/Location: Las Vegas Wash, Henderson, NV	Ambient PID Reading: NA
Coordinates: 26736143.637 N 838871.668 E Elevation: 1514.906 FT	Sheet: 2 of 3
Drilling Equipment/Method: Sonic Rig	Weather: 73 and sunny to partially sunny
Sample Type(s): Grab	Boring Diameter: 8 IN.
	Screened Interval: 25-45 FT BGS

Approved By: S. Bilodeau	Logged By: C. Grimes	Date/Time Started: 04-11-19	Depth of Boring: 82 FT BGS
Drilling Contractor: Cascade Drilling	Backfill: See below	Date/Time Finished: 04-11-19	Water Level: 24.95 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram
45	R4					SP-SM		SILTY SAND WITH GRAVEL, light brown (7.5YR 6/3), 25% low plastic silt, 65% fine to coarse-grained subrounded sand, 10% fine to medium subangular gravel with 0.9-inch max gravel size, loose, wet (continued) -@45 feet - hard drilling, color change to pink (7.5YR 7/3), 15% silt, 65% subrounded sand, 20% angular gravel with 0.75-inch max gravel size, loose to dense -@46 feet - corebarrel size conglomerate	
50	R5					SM		SILTY SAND, light brown (7.5YR 6/4), 15% low plastic silt, 75% fine to coarse-grained subangular sand, 10% fine angular gravel with 0.10-inch max gravel size, wet, densely cemented units, hard drilling -@50 to 60 feet - conglomerate every 1 inch	
55						ML		SANDY SILT WITH GRAVEL, 40% low plastic silt, 35% medium to fine-grained angular sand, 25% medium to coarse gravel with 3-inch max gravel size	
						SP-SM		POORLY GRADED SAND WITH SILT AND GRAVEL, 10% non-plastic silt, 65% fine to coarse-grained subangular sand, 25% fine to coarse angular gravel with 4-inch max gravel size, moist, 8 inch thick conglomerate	
60	R6					ML		SANDY SILT, strong brown (7.5YR 5/6), 60% low to medium plastic silt, 40% very fine to fine-grained rounded sand, stiff, moist	
65						ML		SILTY SAND, brown (7.5YR 5/4), 35% low plastic silt, 65% very fine to fine-grained rounded sand, dense, wet -@65 feet - color change to dark brown (7.5YR 3/2), 20% silt, 70% fine to coarse-grained subrounded sand, 10% fine to medium subangular gravel with 1-inch max gravel size	
70	R7					SM		SILTY SAND WITH GRAVEL, 35% low to medium plastic silt, 45% fine to coarse-grained subangular sand, 20% fine to coarse angular gravel with 2.5-inch max gravel size, semi-cemented siltstones -@70 feet - color change to dark yellowish brown (10YR 4/4), 15% low plastic silt, 65% sand, 20% gravel with 4-inch max gravel size -@72 feet - color change to yellow brown (10YR 5/4), 35% low to medium plastic silt, 45% medium to coarse-grained sand, 20% fine to medium gravel, moist, sand and gravel in silty cohesive matrix	
75						SP-SM		POORLY GRADED SAND WITH SILT AND GRAVEL, light gray (7.5YR 7/1), 10% non-plastic silt, 60% fine to coarse-grained subangular sand, 30% fine rounded gravel with 0.4-inch max gravel size, wet	
80						SM		SILTY SAND WITH GRAVEL, light gray (7.5YR 7/1), 25% non-plastic silt, 50% fine to coarse subangular sand, 25% fine to coarse gravel with 6-inch max gravel size -@77 to 78 feet - 6-inch matrix supported conglomerates	

Notes: R denotes Ramboll grab sample. from 45 to 82 feet, hard drilling. For backfill information, refer to well completion diagram.



AECOM
1220 Avenida Acaso
Camarillo, CA 93012
805-388-3775

Client: NDEP

Project Number: 60477365

Site Description/Location: Las Vegas Wash, Henderson, NV

Coordinates: 26736143.637 N 838871.668 E Elevation: 1514.906 FT

Drilling Equipment/Method: Sonic Rig

Weather: 73 and sunny to partially sunny

Sample Type(s): Grab

Boring Diameter: 8 IN.

Boring No. NERT4.70N1

Ambient PID Reading: NA

Sheet: 3 of 3

Monitoring Well Installed: Yes

Screened Interval: 25-45 FT BGS

Approved By: S. Bilodeau

Logged By: C. Grimes

Date/Time Started: 04-11-19

Depth of Boring: 82 FT BGS

Drilling Contractor: Cascade Drilling

Backfill: See below

Date/Time Finished: 04-11-19

Water Level: 24.95 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram
.....	R8					SM		POORLY GRADED SAND WITH SILT AND GRAVEL, 10% non-plastic silt, 60% fine to coarse-grained subangular sand, 30% fine gravel with 0.4-inch max gravel size	

Total Depth = 82 feet
Boring Terminated
Target depth achieved

Notes: R denotes Ramboll grab sample. from 45 to 82 feet, hard drilling. For backfill information, refer to well completion diagram.

Client:	NDEP
Project Number:	60477365
Site Description/Location:	Las Vegas Wash, Henderson, NV
Coordinates:	26736123.869 N 838600.288 E Elevation: 1518.722 FT
Drilling Equipment/Method:	/Sonic Rig Weather: 80 and sunny
Sample Type(s):	Grab Boring Diameter: 8 IN.

Ambient PID Reading:	NA
Sheet:	1 of 3
Monitoring Well Installed:	Yes
Screened Interval:	25-45 FT BGS

Approved By:	S. Bilodeau	Logged By:	C. Grimes	Date/Time Started:	04-04-19	Depth of Boring:	90 FT BGS
Drilling Contractor:	Cascade Drilling	Backfill:	See below	Date/Time Finished:	04-04-19	Water Level:	27.89 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram
5	R1					SM		SILTY SAND, brown (7.5YR 5/4), 20% non-plastic silt, 75% very fine to fine-grained rounded sand, 5% fine gravel with max gravel size of 0.5-inch, loose, dry, hand augured to 5 feet bgs -@5 feet - low plastic silt	
10									
15									
20	R2					SP-SM		POORLY GRADED SAND WITH SILT AND GRAVEL, dark brown (7.5YR 3/2), 10% non-plastic silt, 75% medium to coarse-grained subangular sand, 15% fine gravel with 0.75-inch max gravel size, loose, moist -@17 to 19 feet - poorly graded sand with silt -@20 feet - color change to brown (7.5 YR 5/3), fine to medium gravel with 1-inch max gravel size	
25								-@25 feet - color change to light brown (7.5 YR 6/4), low plastic silt, fine to coarse-grained subangular to angular sand, fine to medium angular gravel with 2-inch max gravel size	
30	R3							-@29 to 35 feet - interbedded clay layers with large cobbles	
35						SM		SILTY SAND WITH GRAVEL, light brown (7.5YR 6/4), 15% low plastic silt, 55% very fine to coarse-grained subrounded sand, 30% fine to coarse angular gravel with 3-inch max gravel size, loose to medium dense, wet -@34 feet - weakly cemented sandstone with gravel in matrix -@35 feet - color change to 7.5YR 6/3, fine to coarse-grained sand -@36 feet - Sandstone, color change to brown (7.5YR 6/3)	
40							SP-SM		

Notes: R denotes Ramboll grab sample. For backfill information, refer to well completion diagram.



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Client: NDEP	Boring No. NERT4.71N1
Project Number: 60477365	
Site Description/Location: Las Vegas Wash, Henderson, NV	Ambient PID Reading: NA
Coordinates: 26736123.869 N 838600.288 E Elevation: 1518.722 FT	Sheet: 2 of 3
Drilling Equipment/Method: /Sonic Rig	Weather: 80 and sunny
Sample Type(s): Grab	Boring Diameter: 8 IN.
Approved By: S. Bilodeau	Logged By: C. Grimes
Drilling Contractor: Cascade Drilling	Backfill: See below
	Date/Time Started: 04-04-19
	Date/Time Finished: 04-04-19
	Depth of Boring: 90 FT BGS
	Water Level: 27.89 FT BGS

Approved By: S. Bilodeau	Logged By: C. Grimes	Date/Time Started: 04-04-19	Depth of Boring: 90 FT BGS
Drilling Contractor: Cascade Drilling	Backfill: See below	Date/Time Finished: 04-04-19	Water Level: 27.89 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram
45	R4					SP-SM		POORLY GRADED SAND WITH SILT, red (2.5YR 4/8), 10% low plastic silt, 90% very fine to fine-grained rounded sand, loose, wet (continued)	<p>No. 3 Monterey Sand</p>
50	R5					SM		SILTY SAND, 15% low plastic silt, 75% very fine to fine-grained rounded sand, 10% fine angular gravel with 0.5-inch max gravel size, loose, wet	
55								-@44 feet - color change to yellowish red (5YR 5/6), 25% silt, 70% very fine to medium-grained subrounded sand, 5% gravel -@47 feet - conglomerate -@48 feet - 35% fines, 70% very fine to fine-grained subrounded sand, 10% medium angular gravel with 2-inch max gravel size -@52 feet - 30% silt, 5% clay, 55% fine to coarse-grained sand, 10% fine to medium gravel with 1.5-inch max gravel size -@54 feet - 6 inches of weekly cemented sandstone	
60						CL		-@58.5 feet - Core Labs (CL) lean clay -@60 feet - 85% medium plastic fines, 0 to 15% sand (varies)	
65						ML		SILT WITH SAND, yellowish red (5YR 5/5), 75% low to medium plastic fines, 25% very fine to fine-grained rounded sand, medium dense, moist	
70	R7					SM		SILTY SAND, yellowish red (5YR 4/6), 40% low plastic fines, 60% very fine to fine-grained rounded sand, medium dense, moist	
75								-@72 feet - color change to red (2.5YR 5/6), 35% silt, 60% sand, 5% gravel, wet -@73 feet - sharp color change to light brown (7.5YR 6/4), 65% low plastic silt, 30% very fine-grained rounded sand, 5% fine gravel with 0.25-inch max gravel size, wet, medium dense	
80						SM		SILTY SAND, dark brown (7.5 YR 3/2), 15% non-plastic silt, 85% fine to coarse-grained subrounded sand, loose, wet -@79 feet - thinly bedded sandstone	

Notes: R denotes Ramboll grab sample. For backfill information, refer to well completion diagram.



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805-388-3775

Client: NDEP

Project Number: 60477365

Site Description/Location: Las Vegas Wash, Henderson, NV

Coordinates: 26736123.869 N 838600.288 E Elevation: 1518.722 FT

Drilling Equipment/Method: /Sonic Rig Weather: 80 and sunny

Sample Type(s): Grab Boring Diameter: 8 IN.

Boring No. NERT4.71N1

Ambient PID Reading: NA

Sheet: 3 of 3

Monitoring Well Installed: Yes

Screened Interval: 25-45 FT BGS

Approved By: S. Bilodeau

Logged By: C. Grimes

Date/Time Started: 04-04-19

Depth of Boring: 90 FT BGS

Drilling Contractor: Cascade Drilling

Backfill: See below

Date/Time Finished: 04-04-19

Water Level: 27.89 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram
85	R8					SM		SILTY SAND, dark brown (7.5 YR 3/2), 15% non-plastic silt, 85% fine to coarse-grained subrounded sand, loose, wet (continued) -@82 feet - color change to brown (7.5YR 5/2), 30% low plastic silt, 70% very fine to medium-grained sand	
90	R9					SM		SILTY SAND WITH GRAVEL, light brown (7.5YR 6/4), 25% low plastic silt, 60% medium to coarse-grained angular sand, 15% medium gravel with 3-inch max gravel size, loose to medium dense, wet -@86 feet - 25% silt, 40% fine to coarse-grained sand, 15% fine to medium gravel with 2-inch max gravel size, moist -@88 feet - matrix supported sandstone -@89 feet - 15% silt, 65% sand, 20% gravel, loose	

Total Depth = 90 feet.
Boring Terminated
Target depth achieved

Notes: R denotes Ramboll grab sample. For backfill information, refer to well completion diagram.



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Client: NDEP
Project Number: 60477365
Site Description/Location: Las Vegas Wash, Henderson, NV
Coordinates: 26735408.272 N 838770.32 E Elevation: 1518.222 FT
Drilling Equipment/Method: /Sonic Rig Weather:
Sample Type(s): Grab Boring Diameter: 8 IN.

Boring No. NERT4.71S2

Ambient PID Reading: NA
Sheet: 1 of 2
Monitoring Well Installed: Yes
Screened Interval: 34.5-54.5 FT BGS

Approved By: S. Bilodeau

Logged By: C. Grimes

Date/Time Started: 04-01-19

Depth of Boring: 55 FT BGS

Drilling Contractor: Cascade Drilling

Backfill: See below

Date/Time Finished: 04-01-19

Water Level: 27.26 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram	
5	R1					SM		SILTY SAND, brown (7.5YR 4/4), 25% non-plastic silt, 65% very fine to medium-grained subrounded sand, 10% fine gravel with 1-inch max gravel size, loose, dry, hand auger to 5 feet		
10								-@5 feet - color change to pale brown (10YR 6/3), 25% non-plastic silt, 70% very fine to medium-grained sand, 5% fine gravel with 0.25-inch max gravel size -@8 feet - color change to brown (7.5YR 5/3), 15% non-plastic silt, 70% medium to coarse-grained subangular sand, 15% medium to coarse gravel with 3-inch max gravel size, large phynocrysts, volcanic, more gravel, coarsens		
15						SP		-@12.5 feet - color change to light gray (10YR 7/1), 40% low plastic silt, 60% very fine to fine-grained subrounded sand, medium dense, dry, semi-cemented fine sand to silt POORLY GRADED SAND WITH GRAVEL, brown (7.5YR 4/4), 5% silt, 80% fine to coarse-grained subrounded to subangular sand, 15% fine to medium gravel with 2-inch max gravel size, loose, dry		
20	R2					SM		SILTY SAND, light gray (10YR 7/1), 40% low plastic silt, 60% very fine to fine-grained subrounded sand, medium dense, dry -@19 feet - color change to brown (7.5YR 4/4), 25% silt, 70% fine-grained sand, 5% fine gravel with 0.25-inch max gravel size -@20 feet - color change to brown (7.5YR 5/4), 15% non-plastic silt, 70% fine to medium-grained subangular to subrounded sand, 15% fine to coarse gravel with 3-inch max gravel size, dry, loose, becomes coarser		
25						ML		SILT, very pale brown (10YR 7/2), 90% low to medium plastic fines, 10% very fine sand, medium dense to dense, moist, large igneous rock		
30	PT- NERT4.71S2 29.7-30.0					SM		SILTY SAND WITH GRAVEL, brown (7.5YR 5/4), 15% non-plastic silt, 70% fine to coarse-grained subangular sand, 15% fine to medium gravel with 2-inch max gravel size, loose, wet		
35						ML		SILT WITH SAND, brown (2.5Y 7/4), 75% low to medium plastic fines, 25% very fine to fine-grained subrounded sand, dense, wet -@29.7 feet - Core Lab (CL) Sandy Lean Clay		
40						SP-SM		SILTY SAND, brown (7.5YR 4/3), 20% non-plastic silt, 80% very fine to fine-grained subrounded sand, loose, wet -@32 feet - becomes coarser -@33 feet - 15% non-plastic silt, 75% medium to coarse-grained subrounded to subangular sand, 10% fine to coarse gravel with 4 to 5-inch max gravel size, wet, loose		
								POORLY GRADED SAND WITH SILT, 10% non-plastic silt, 70% medium to coarse-grained subrounded sand, 20% fine to medium gravel with 1.5-inch max gravel size, gravel with quartz veins and feldspar -@38 feet - 10% silt, 80% subrounded sand, 10% medium gravel with 2-inch max gravel size		hydrated bentonite

Notes: R denotes Ramboll grab sample. For backfill information, refer to well completion diagram.



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805-388-3775

Client: NDEP	Boring No. NERT4.71S2
Project Number: 60477365	
Site Description/Location: Las Vegas Wash, Henderson, NV	Ambient PID Reading: NA
Coordinates: 26735408.272 N 838770.32 E Elevation: 1518.222 FT	Sheet: 2 of 2
Drilling Equipment/Method: /Sonic Rig Weather:	Monitoring Well Installed: Yes
Sample Type(s): Grab Boring Diameter: 8 IN.	Screened Interval: 34.5-54.5 FT BGS

Approved By: S. Bilodeau	Logged By: C. Grimes	Date/Time Started: 04-01-19	Depth of Boring: 55 FT BGS
Drilling Contractor: Cascade Drilling	Backfill: See below	Date/Time Finished: 04-01-19	Water Level: 27.26 FT BGS

DEPTH (ft)	Sample ID	Sample Depth (ft)	Blows per 6"/RQD	Recovery (ft)	Headspace (ppm)	USCS	Graphic Log	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Well Diagram
45	R4					SP-SM			
						SM		SILTY SAND WITH GRAVEL, brown (7.5YR 4/3), 15% non-plastic silt, 70% medium to coarse-grained subrounded sand, 15% medium to coarse gravel with 2-inch max gravel size, loose, wet	
50	R5					SM		SILTY SAND, brown (7.5YR 4/4), 20% non-plastic silt, 75% very fine to medium-grained subrounded sand, 5% fine gravel with 0.75-inch max gravel size -@49 feet - 15% non-plastic silt, 75% medium to coarse-grained subrounded sand, 10% gravel with 1.5-inch max gravel size, gravels with mica and quartz matrix	
						SM		POORLY GRADED SAND WITH SILT, dark yellow brown (10YR 4/6), 10% non-plastic silt, 90% very fine to fine-grained rounded sand, loose, wet	
55						SP-SM		POORLY GRADED SAND WITH SILT AND GRAVEL, brown (7.5YR 5/2), 10% non-plastic silt, 65% medium to coarse-grained subrounded to subangular sand, 25% fine to coarse gravel with 2.5-inch max gravel size, loose, wet	

Total Depth = 55 feet.
Boring Terminated
Target depth achieved

Notes: R denotes Ramboll grab sample. For backfill information, refer to well completion diagram.

Appendix D

Well Construction Diagrams



Client: Nevada Division of Environmental Protection

WELL ID: NERT3.35S1

Project Number: 60477365-2018-171-01

Site Location: Las Vegas Wash, Henderson NV

Date Installed: 4/25/2019

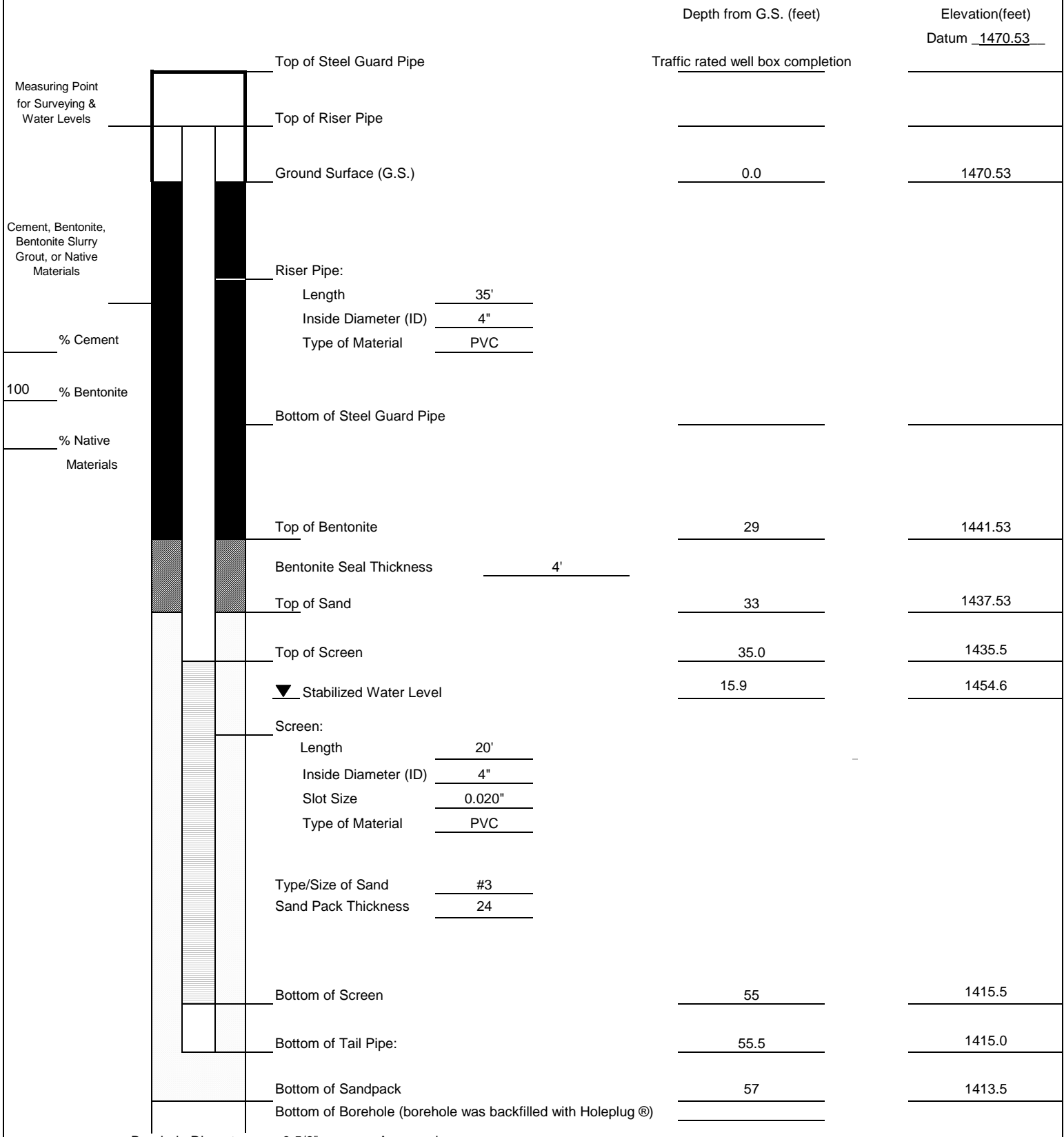
Well Location: River Mile 3.35 Coords: 26738372.78 N 845391.59 E

Inspector: Sally Bilodeau

Method: Sonic

Contractor: Cascade

MONITORING WELL CONSTRUCTION DETAIL



Borehole Diameter: 9 5/8" Approved: Sally Bilodeau 8/13/2019
 Describe Measuring Point: _____ Signature _____ Date _____



Client: Nevada Division of Environmental Protection

WELL ID: NERT3.40S1

Project Number: 60477365-2018-171-01

Site Location: Las Vegas Wash, Henderson NV

Date Installed: 4/16/2019

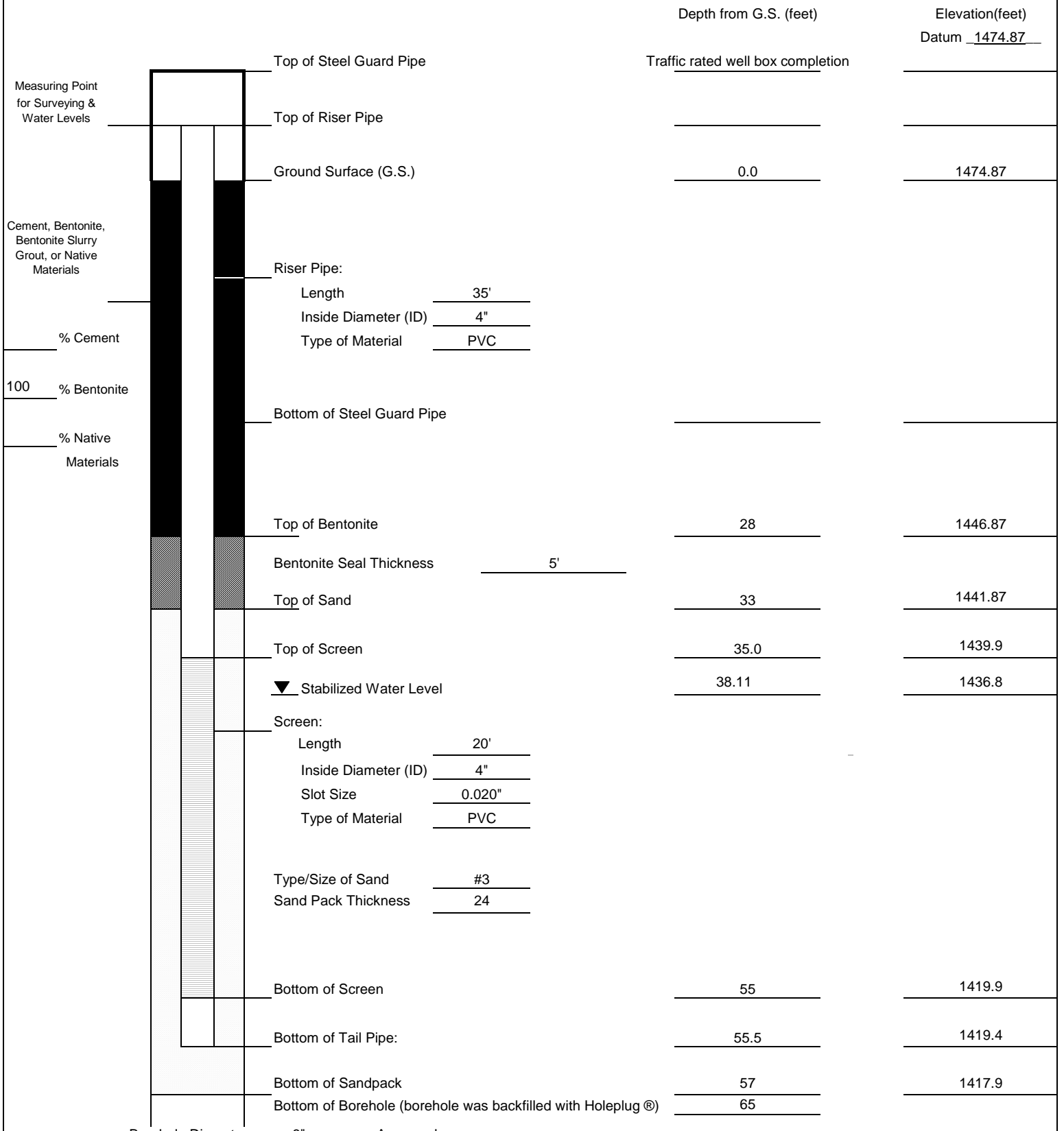
Well Location: River Mile 3.40 Coords: 26738206.49 N 845198.15 E

Inspector: Sally Bilodeau

Method: Sonic

Contractor: Cascade

MONITORING WELL CONSTRUCTION DETAIL



Borehole Diameter: 8" Approved: Sally Bilodeau Signature Date: 8/13/2019

Describe Measuring Point: _____



Client: Nevada Division of Environmental Protection

WELL ID: NERT3.58N1

Project Number: 60477365-2018-171-01

Site Location: Las Vegas Wash, Henderson NV

Date Installed: 4/23/2019

Well Location: River Mile 3.58

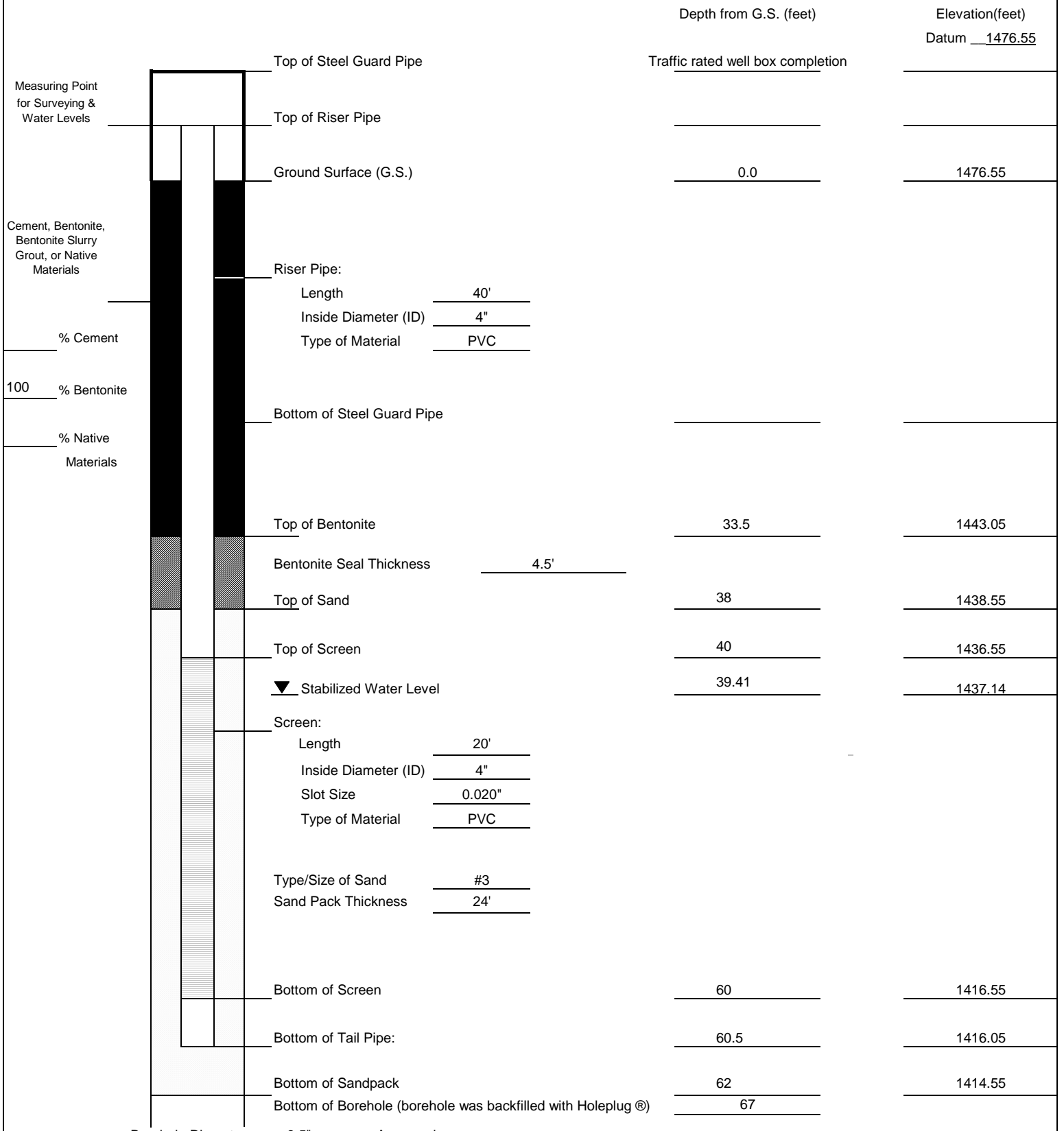
Coords: 26738048.58 N 844188.45 E

Inspector: Sally Bilodeau

Method: Sonic

Contractor: Cascade

MONITORING WELL CONSTRUCTION DETAIL



Describe Measuring Point:

Sally Bilodeau
Signature

8/13/2019
Date



Client: Nevada Division of Environmental Protection

WELL ID: NERT3.58S1

Project Number: 60477365-2018-171-01

Site Location: Las Vegas Wash, Henderson NV

Date Installed: 3/28/2019

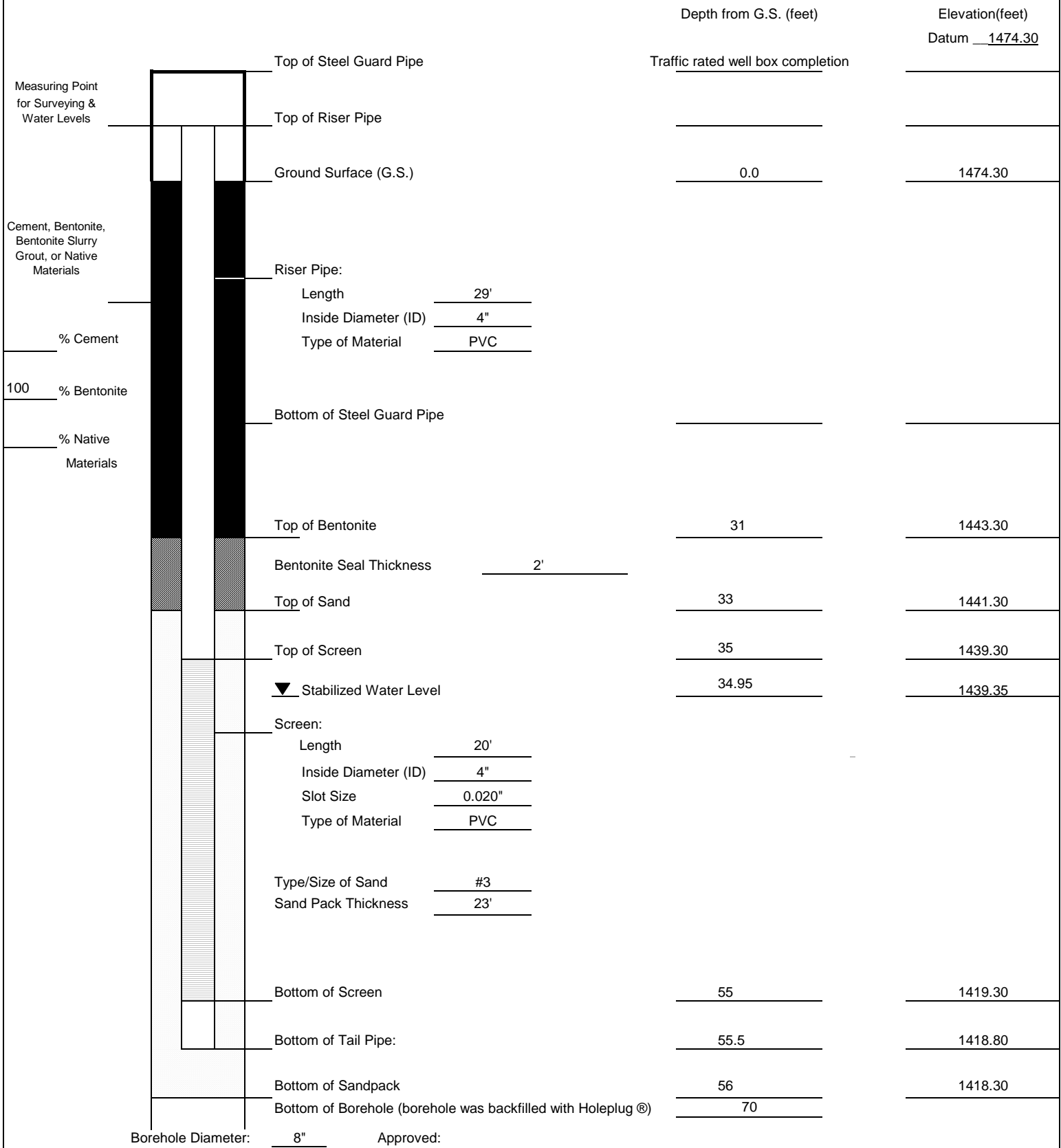
Well Location: River Mile 3.58 Coords: 26737583.5 N 844695.3 E

Inspector: Sally Bilodeau

Method: Sonic

Contractor: Cascade

MONITORING WELL CONSTRUCTION DETAIL



Describe Measuring Point:

Sally Bilodeau
Signature

8/13/2019
Date



Client: Nevada Division of Environmental Protection

WELL ID: NERT3.58S1A

Project Number: 60477365-2018-171-01

Site Location: Las Vegas Wash, Henderson NV

Date Installed: 4/24/2019

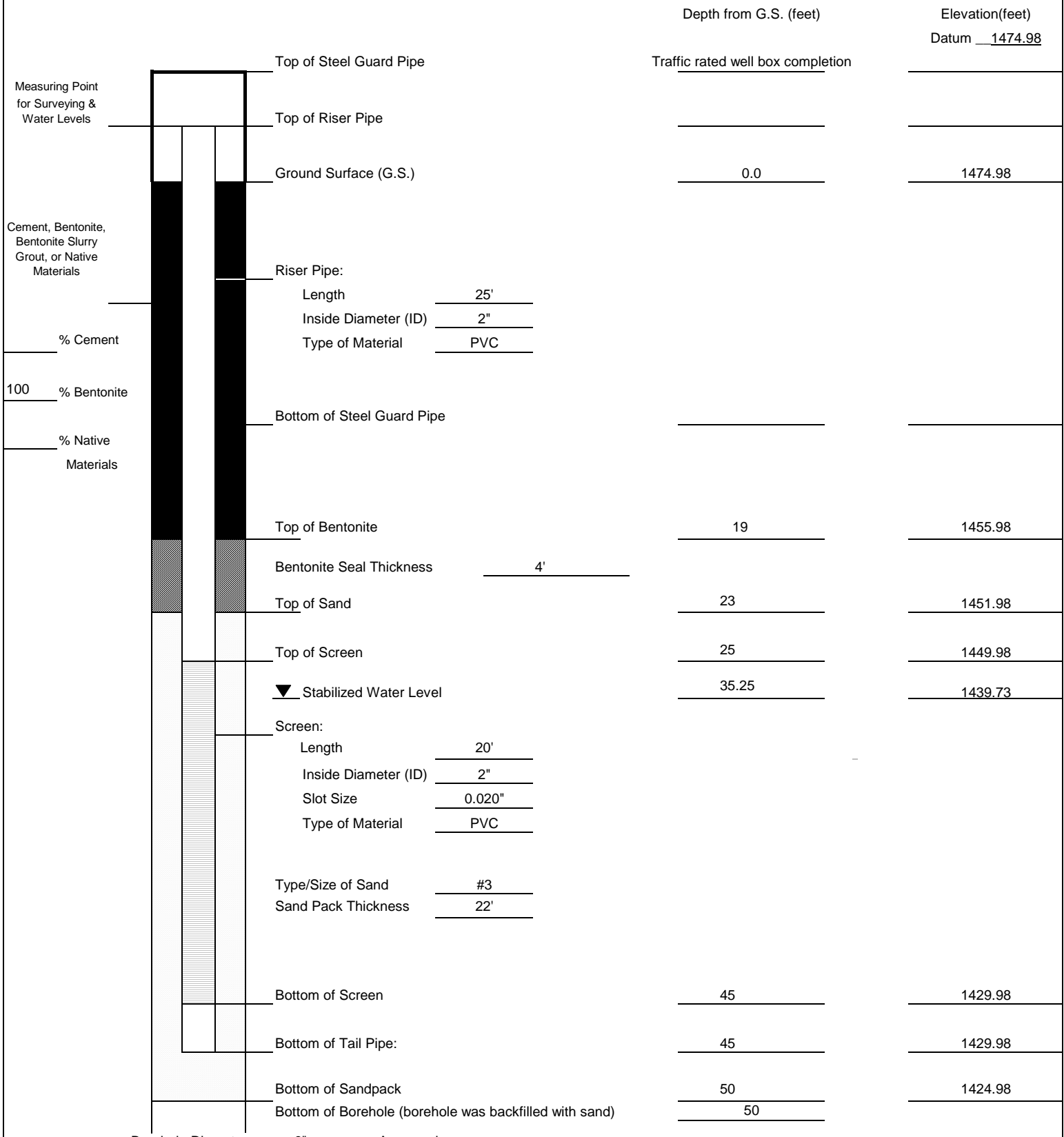
Well Location: River Mile 3.58 Coords: 26737588.02 N 844690.03 E

Inspector: Sally Bilodeau

Method: Sonic

Contractor: Cascade

MONITORING WELL CONSTRUCTION DETAIL



Borehole Diameter: 6"

Approved:

Describe Measuring Point:

Sally Bilodeau
Signature

8/13/2019
Date



Client: Nevada Division of Environmental Protection

WELL ID: NERT3.58S1B

Project Number: 60477365-2018-171-01

Site Location: Las Vegas Wash, Henderson NV

Date Installed: 4/25/2019

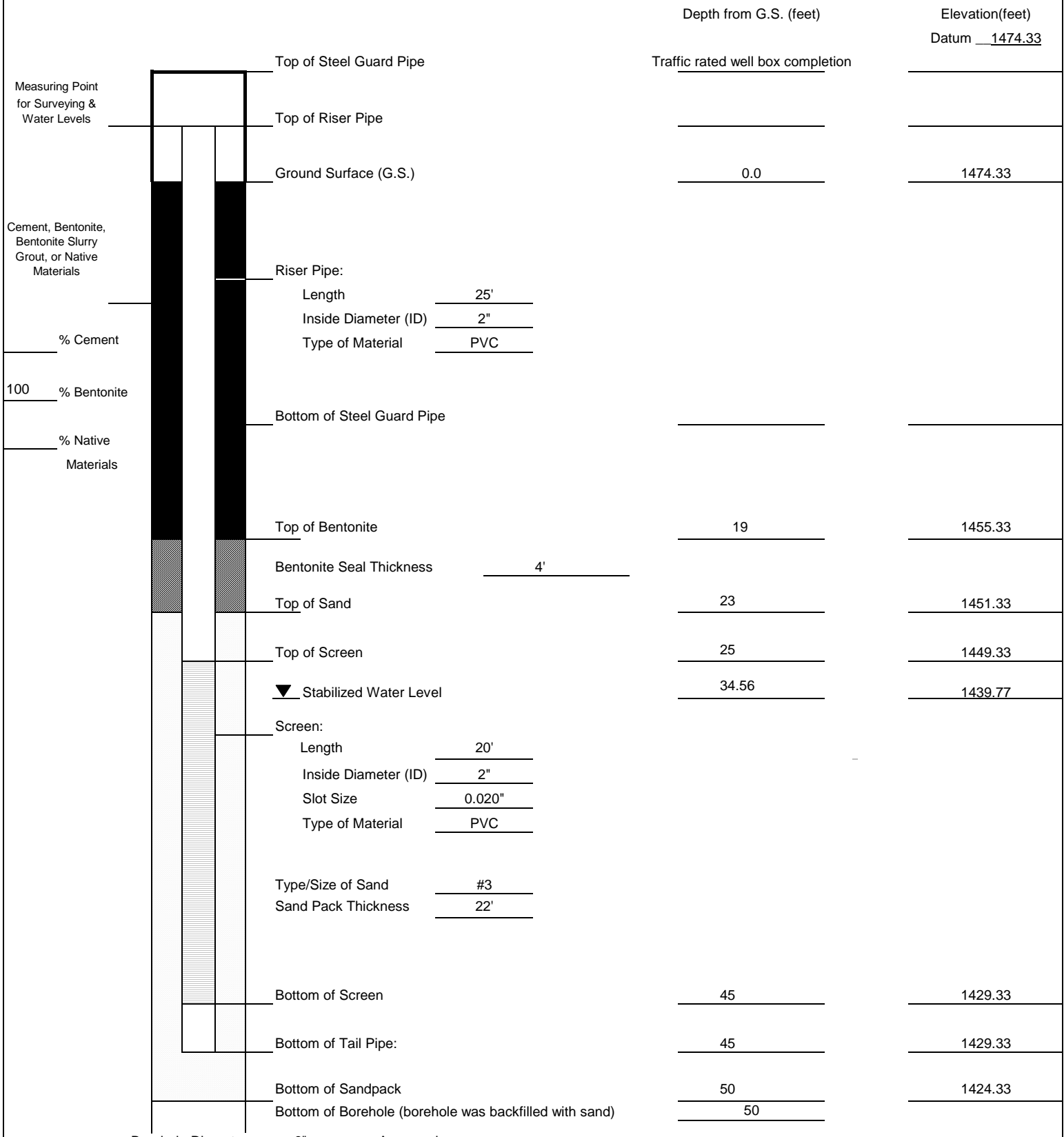
Well Location: River Mile 3.58 Coords: 26737593.51 N 844702.73 E

Inspector: Sally Bilodeau

Method: Sonic

Contractor: Cascade

MONITORING WELL CONSTRUCTION DETAIL



Describe Measuring Point: Sally Bilodeau 8/13/2019
 Signature Date



Client: Nevada Division of Environmental Protection

WELL ID: NERT3.58S1C

Project Number: 60477365-2018-171-01

Site Location: Las Vegas Wash, Henderson NV

Date Installed: 4/25/2019

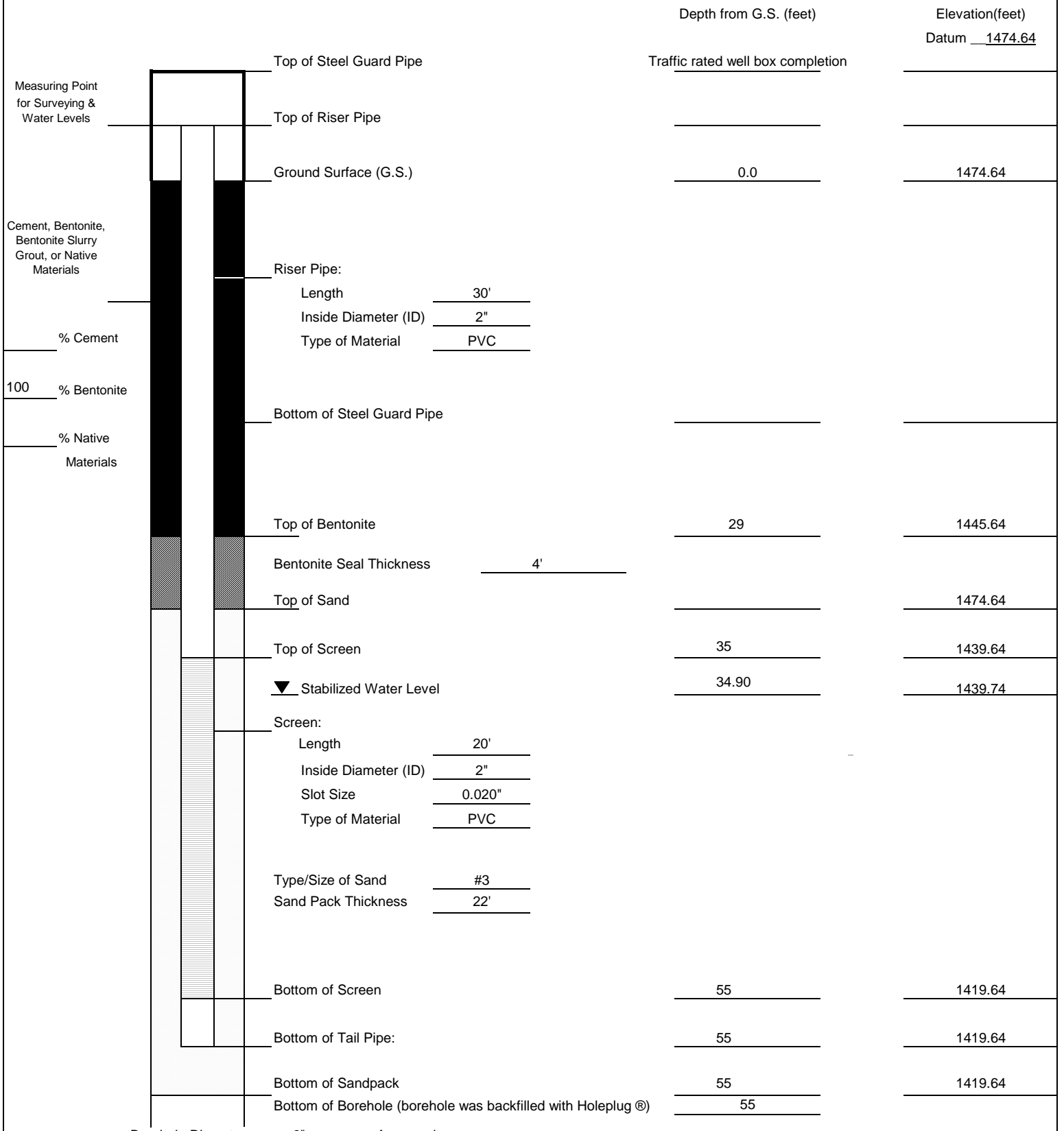
Well Location: River Mile 3.58 Coords: 26737579.78 N 844700.21 E

Inspector: Sally Bilodeau

Method: Sonic

Contractor: Cascade

MONITORING WELL CONSTRUCTION DETAIL



Borehole Diameter: 6" Approved: Sally Bilodeau Signature Date: 8/13/2019

Describe Measuring Point: _____



Client: Nevada Division of Environmental Protection

WELL ID: NERT3.60N1

Project Number: 60477365-2018-171-01

Site Location: Las Vegas Wash, Henderson NV

Date Installed: 4/9/2019

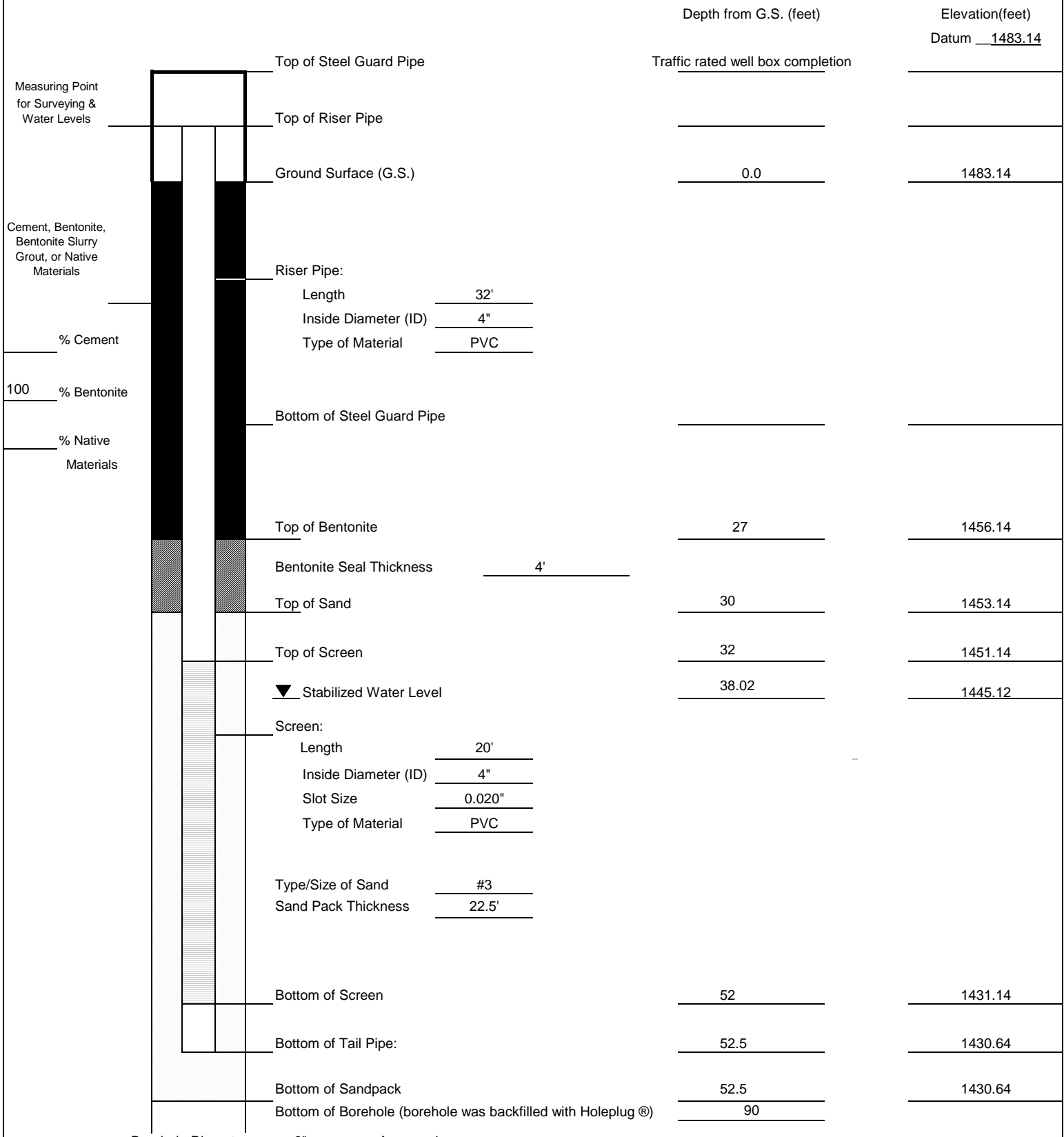
Well Location: River Mile 3.60 Coords: 26737827.79 N 844016.02 E

Inspector: Sally Bilodeau

Method: Sonic

Contractor: Cascade

MONITORING WELL CONSTRUCTION DETAIL



Approved: Sally Bilodeau Signature Date: 8/13/2019

Describe Measuring Point: _____



Client: Nevada Division of Environmental Protection

WELL ID: NERT3.60S1

Project Number: 60477365-2018-171-01

Site Location: Las Vegas Wash, Henderson NV

Date Installed: 3/27/2019

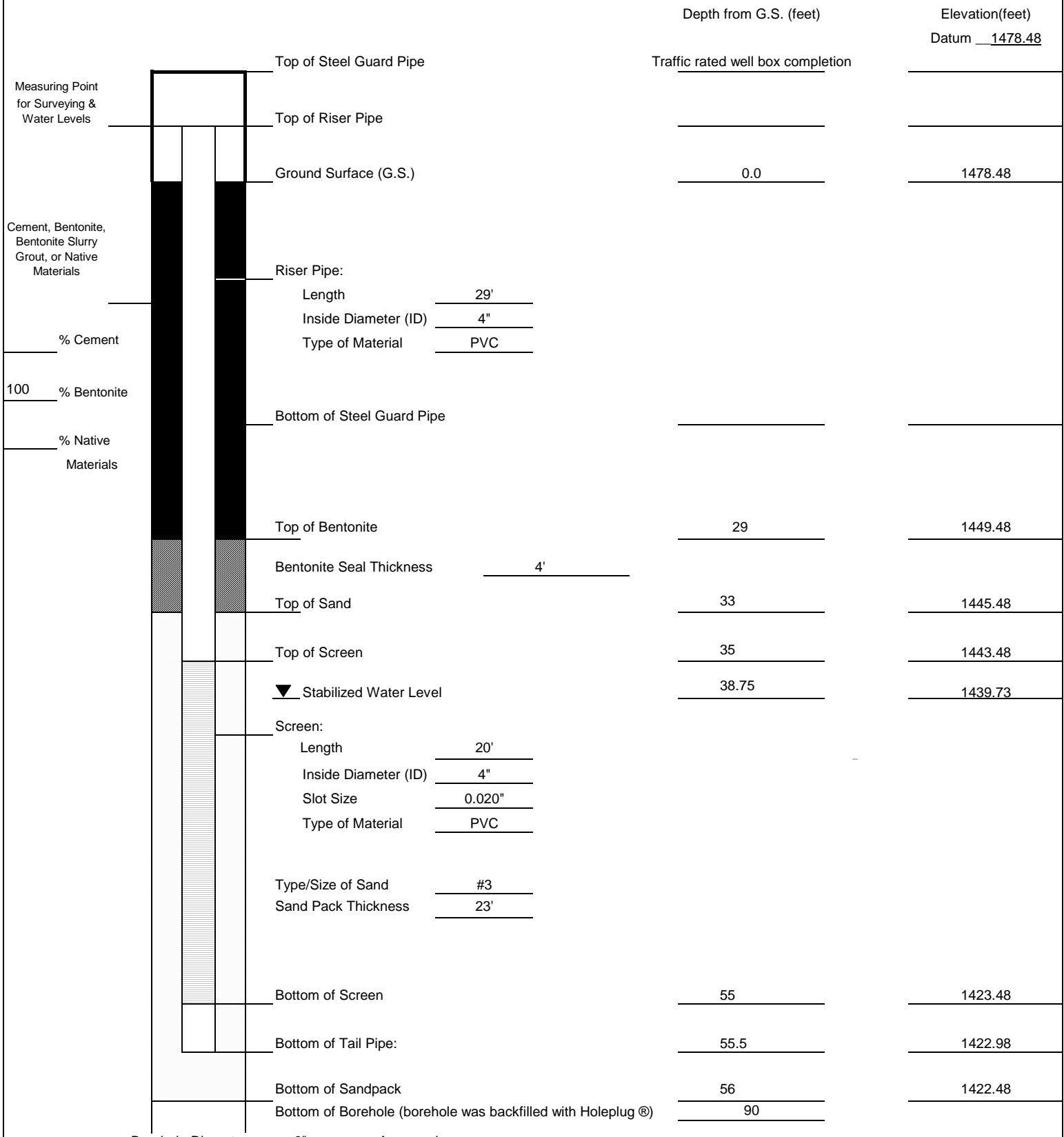
Well Location: River Mile 3.60 Coords: 26737409.27 N 844579.55 E

Inspector: Sally Bilodeau

Method: Sonic

Contractor: Cascade

MONITORING WELL CONSTRUCTION DETAIL



Borehole Diameter: 8"

Approved:

Describe Measuring Point:

Sally Bilodeau
Signature

8/13/2019
Date



Client: Nevada Division of Environmental Protection

WELL ID: NERT3.60S1A

Project Number: 60477365-2018-171-01

Site Location: Las Vegas Wash, Henderson NV

Date Installed: 4/23/2019

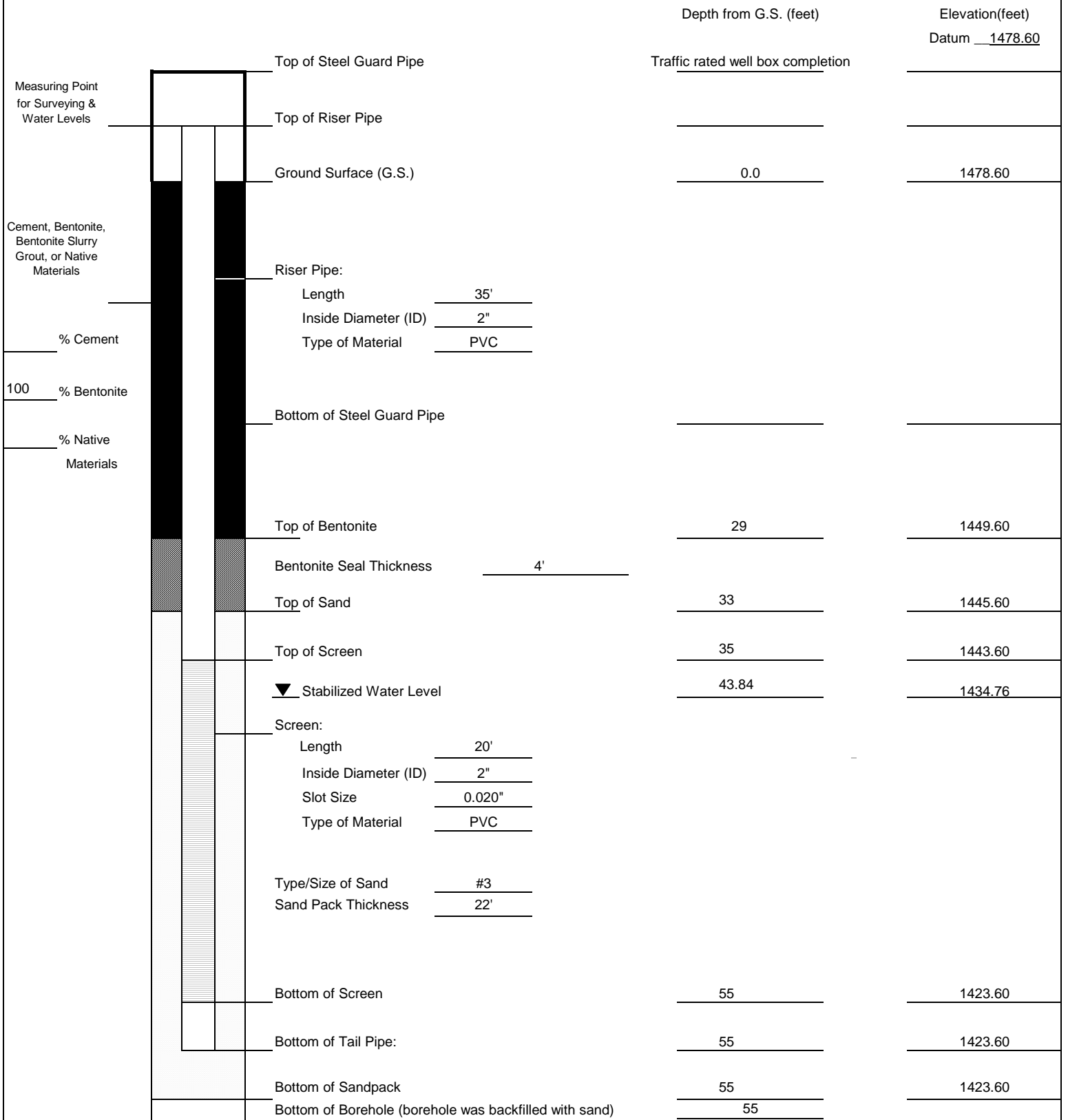
Well Location: River Mile 3.60 Coords: 26737412.04 N 844575.89 E

Inspector: Sally Bilodeau

Method: Sonic

Contractor: Cascade

MONITORING WELL CONSTRUCTION DETAIL



Borehole Diameter: 6" Approved: Sally Bilodeau
Signature

8/13/2019
Date

Describe Measuring Point:



Client: Nevada Division of Environmental Protection

WELL ID: NERT3.60S1B

Project Number: 60477365-2018-171-01

Site Location: Las Vegas Wash, Henderson NV

Date Installed: 4/22/2019

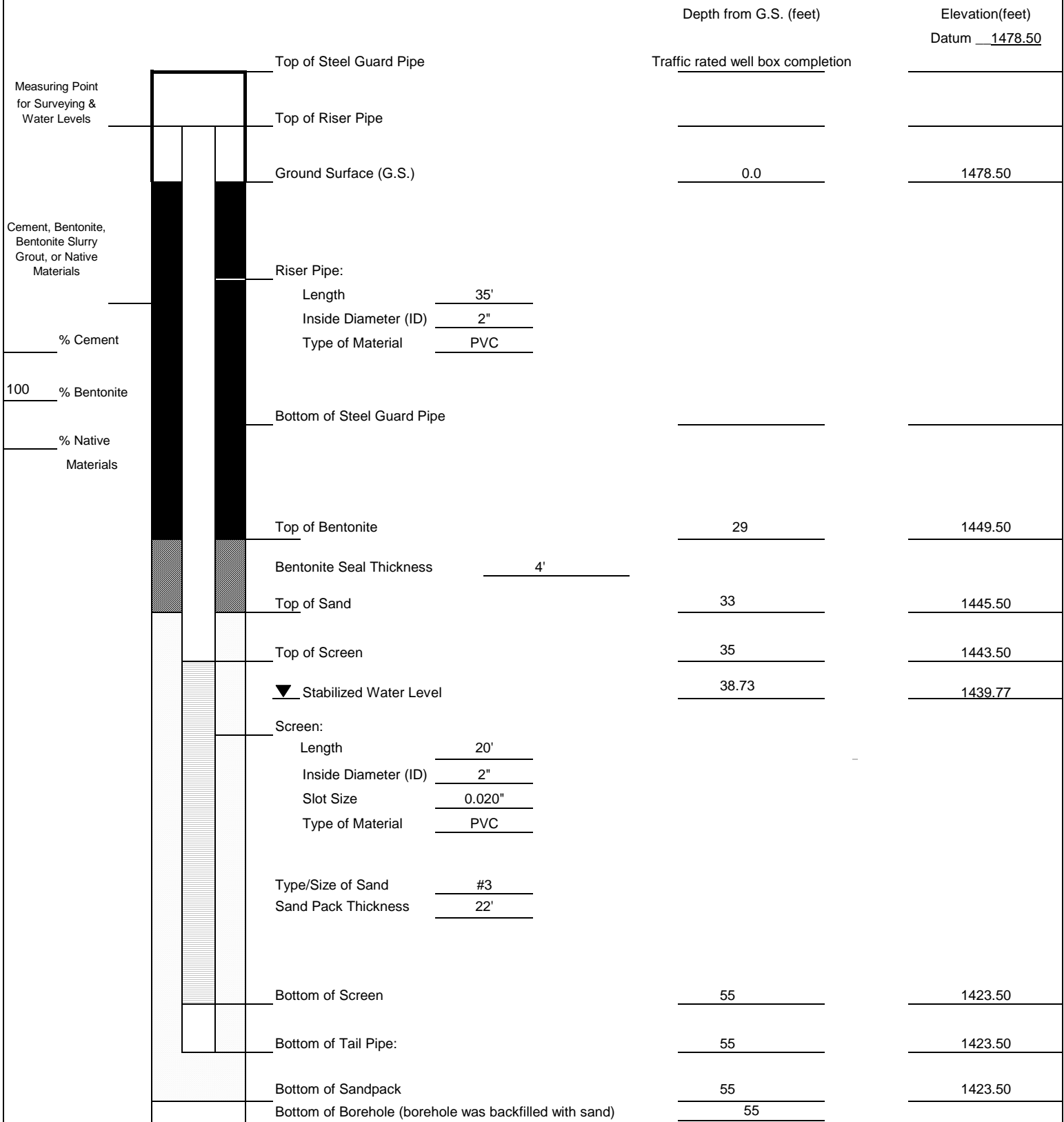
Well Location: River Mile 3.60 Coords: 26737416.28 N 844585.91 E

Inspector: Sally Bilodeau

Method: Sonic

Contractor: Cascade

MONITORING WELL CONSTRUCTION DETAIL



Borehole Diameter: 6" Approved: Sally Bilodeau
 Describe Measuring Point: _____ Signature

8/13/2019
 Date



Client: Nevada Division of Environmental Protection

WELL ID: NERT3.60S1C

Project Number: 60477365-2018-171-01

Site Location: Las Vegas Wash, Henderson NV

Date Installed: 4/23/2019

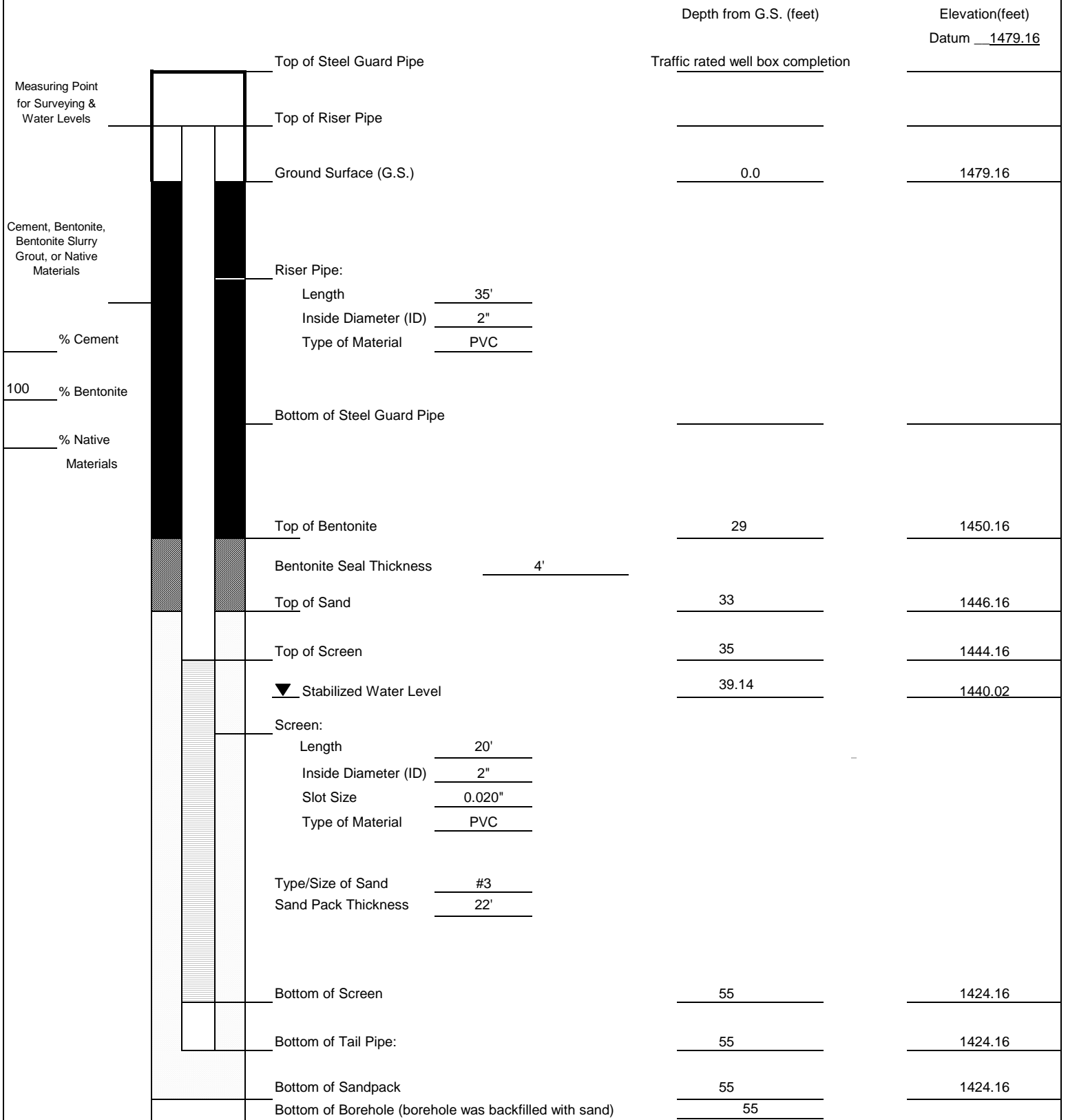
Well Location: River Mile 3.60 Coords: 26737396.28 N 844596.77 E

Inspector: Sally Bilodeau

Method: Sonic

Contractor: Cascade

MONITORING WELL CONSTRUCTION DETAIL



Borehole Diameter: 6"

Approved:

Describe Measuring Point:

Sally Bilodeau
Signature

8/13/2019
Date



Client: Nevada Division of Environmental Protection

WELL ID: NERT3.60SID

Project Number: 60477365-2018-171-01

Site Location: Las Vegas Wash, Henderson NV

Date Installed: 4/22/2019

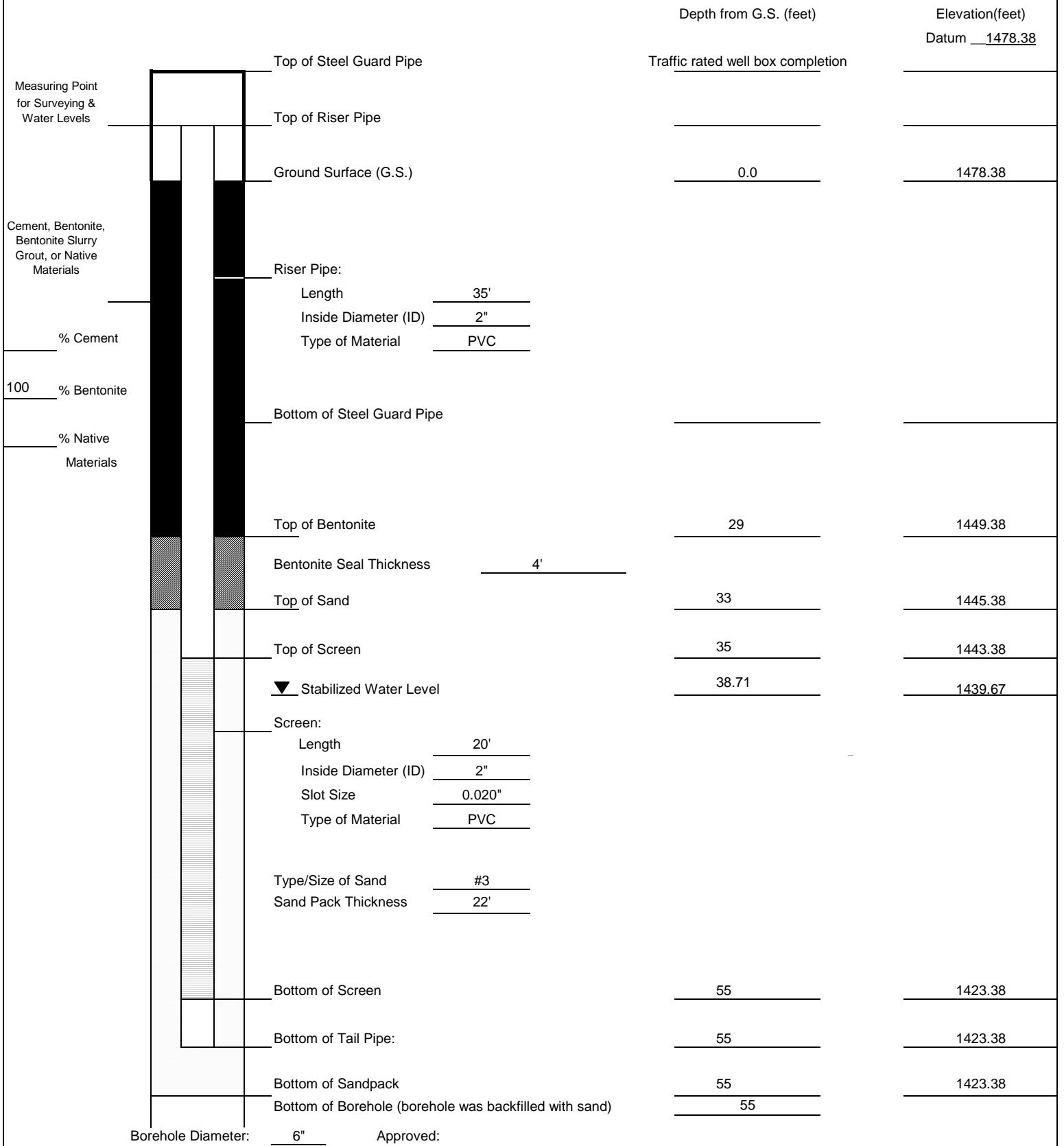
Well Location: River Mile 3.60 Coords: 26737431.86 N 844597.6 E

Inspector: Sally Bilodeau

Method: Sonic

Contractor: Cascade

MONITORING WELL CONSTRUCTION DETAIL



Describe Measuring Point:

Sally Bilodeau
Signature

8/13/2019
Date



Client: Nevada Division of Environmental Protection

WELL ID: NERT3.63S1

Project Number: 60477365-2018-171-01

Site Location: Las Vegas Wash, Henderson NV

Date Installed: 4/17/2019

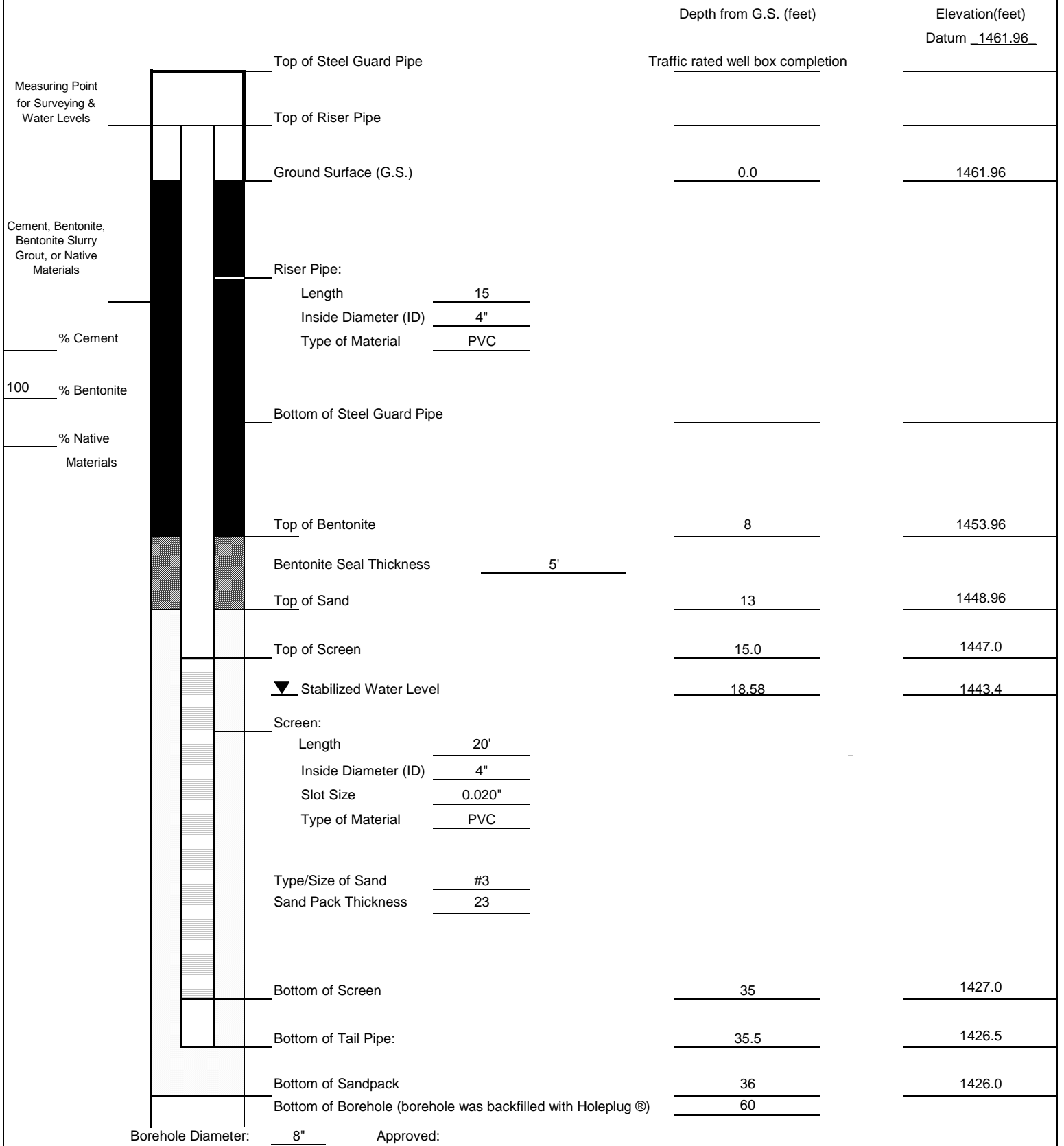
Well Location: River Mile 3.63 Coords: 26737071.55 N 844152.61 E

Inspector: Sally Bilodeau

Method: Sonic

Contractor: Cascade

MONITORING WELL CONSTRUCTION DETAIL



Describe Measuring Point:

Sally Bilodeau
Signature

8/13/2019
Date



Client: Nevada Division of Environmental Protection

WELL ID: NERT3.98S1

Project Number: 60477365-2018-171-01

Site Location: Las Vegas Wash, Henderson NV

Date Installed: 4/2/2019

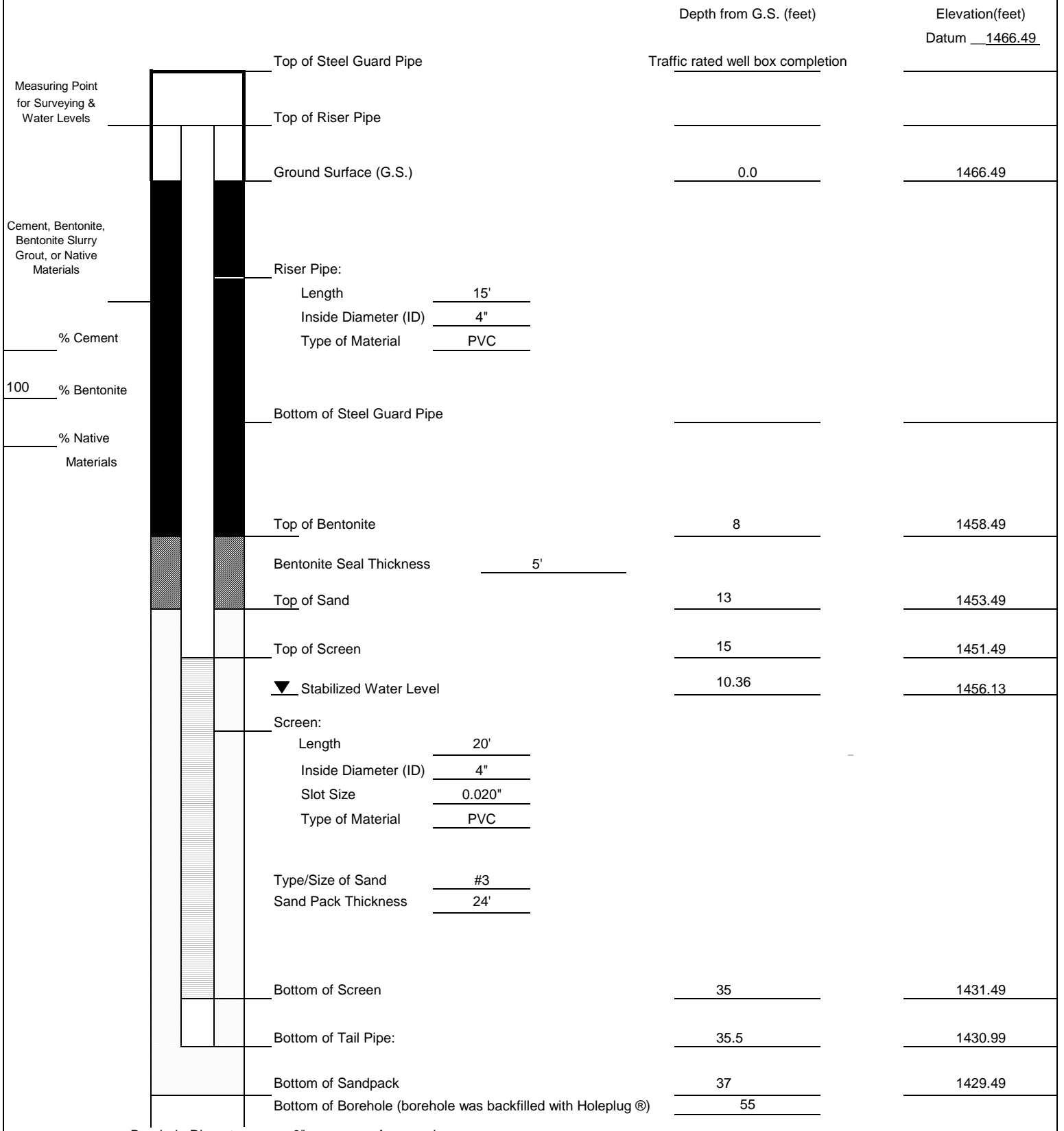
Well Location: River Mile 3.98 Coords: 26736678.95 N 842522.48 E

Inspector: Sally Bilodeau

Method: Sonic

Contractor: Cascade

MONITORING WELL CONSTRUCTION DETAIL



Describe Measuring Point: _____
 Approved: Sally Bilodeau Signature Date: 8/13/2019



Client: Nevada Division of Environmental Protection

WELL ID: NERT4.64N1

Project Number: 60477365-2018-171-01

Site Location: Las Vegas Wash, Henderson NV

Date Installed: 4/4/2019

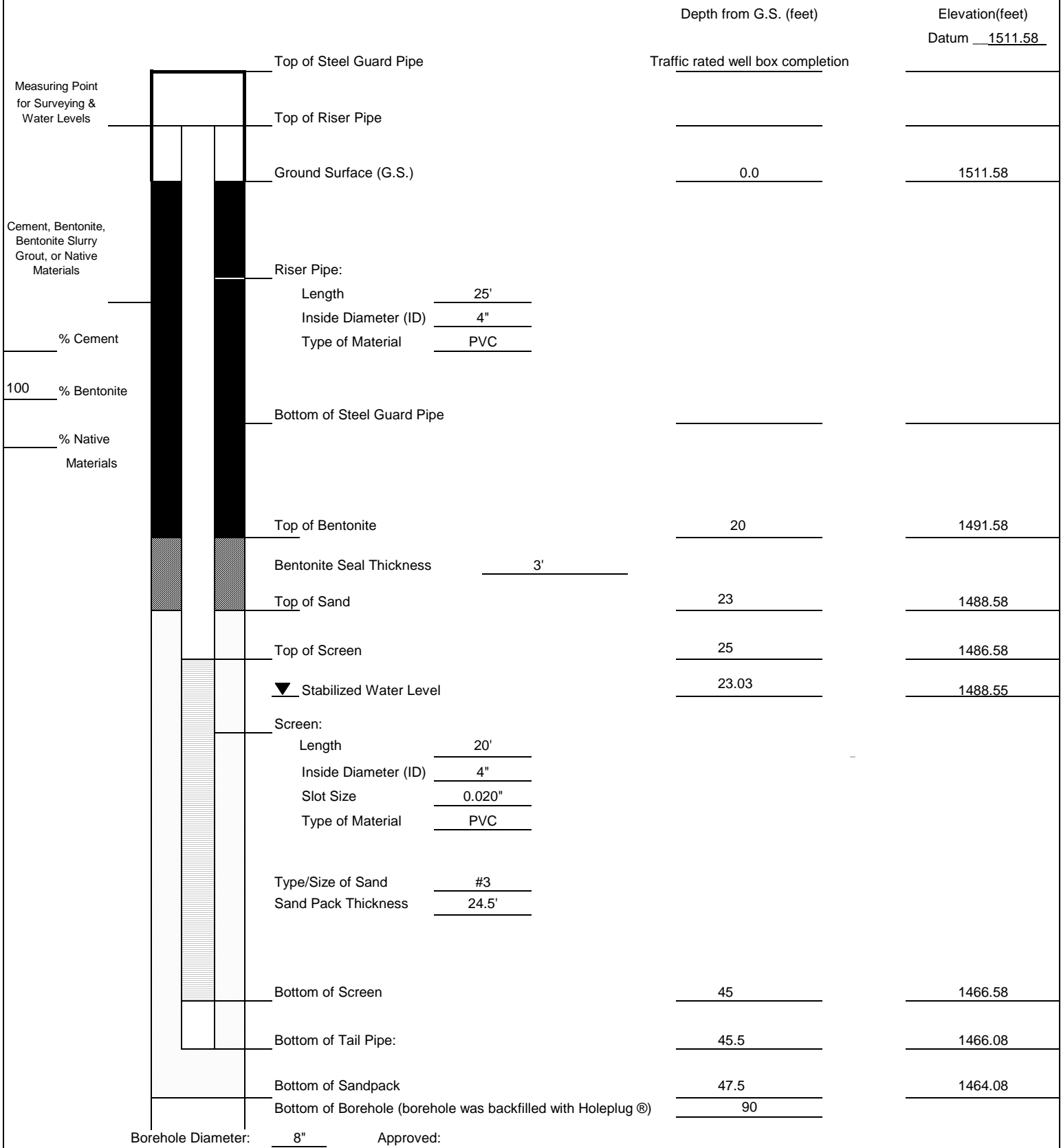
Well Location: River Mile 4.64 Coords: 26736269.47 N 839271.62 E

Inspector: Sally Bilodeau

Method: Sonic

Contractor: Cascade

MONITORING WELL CONSTRUCTION DETAIL



Describe Measuring Point:

Sally Bilodeau
Signature

8/13/2019
Date



Client: Nevada Division of Environmental Protection

WELL ID: NERT4.64S1

Project Number: 60477365-2018-171-01

Site Location: Las Vegas Wash, Henderson NV

Date Installed: 3/26/2019

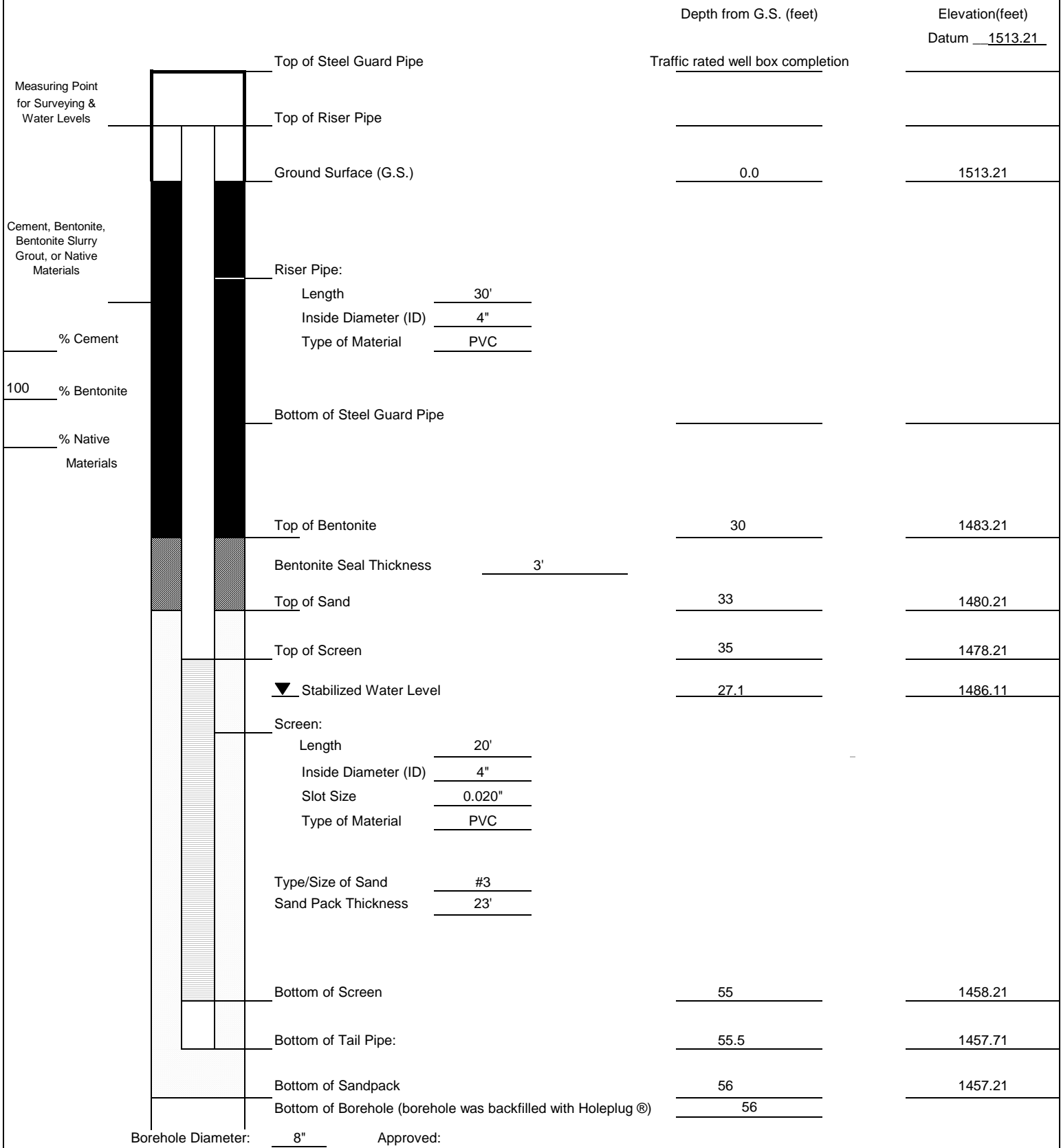
Well Location: River Mile 4.64 Coords: 26735740.74 N 839508.39 E

Inspector: Sally Bilodeau

Method: Sonic

Contractor: Cascade

MONITORING WELL CONSTRUCTION DETAIL



Describe Measuring Point:

Approved: Sally Bilodeau
Signature

8/13/2019
Date



Client: Nevada Division of Environmental Protection

WELL ID: NERT4.64S1A

Project Number: 60477365-2018-171-01

Site Location: Las Vegas Wash, Henderson NV

Date Installed: 4/26/2019

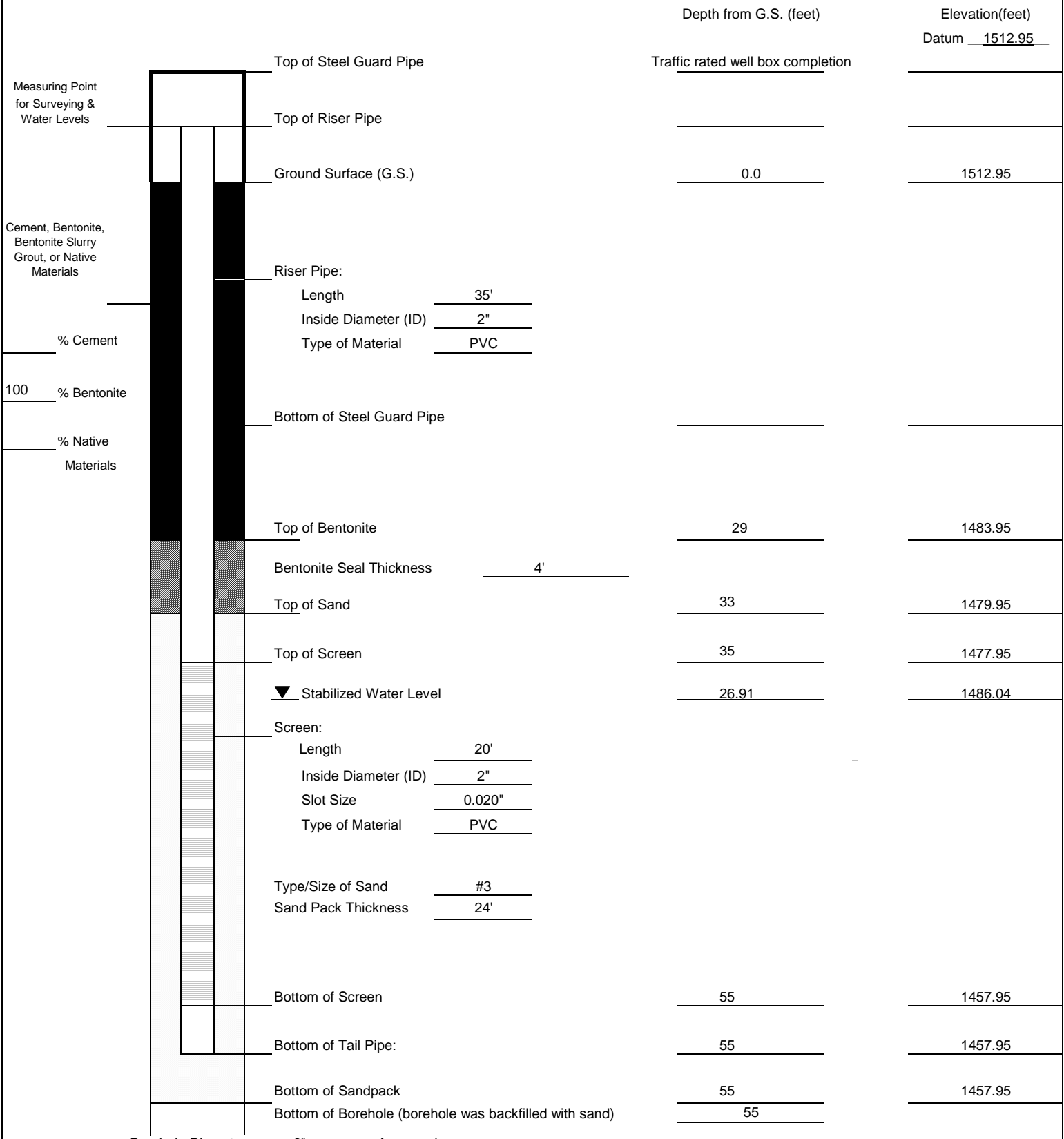
Well Location: River Mile 4.64 Coords: 26735746.28 N 839506.16 E

Inspector: Sally Bilodeau

Method: Sonic

Contractor: Cascade

MONITORING WELL CONSTRUCTION DETAIL



Borehole Diameter: 6" Approved: Sally Bilodeau Date: 8/13/2019
 Describe Measuring Point: _____ Signature _____



Client: Nevada Division of Environmental Protection

WELL ID: NERT4.64S1B

Project Number: 60477365-2018-171-01

Site Location: Las Vegas Wash, Henderson NV

Date Installed: 4/26/2019

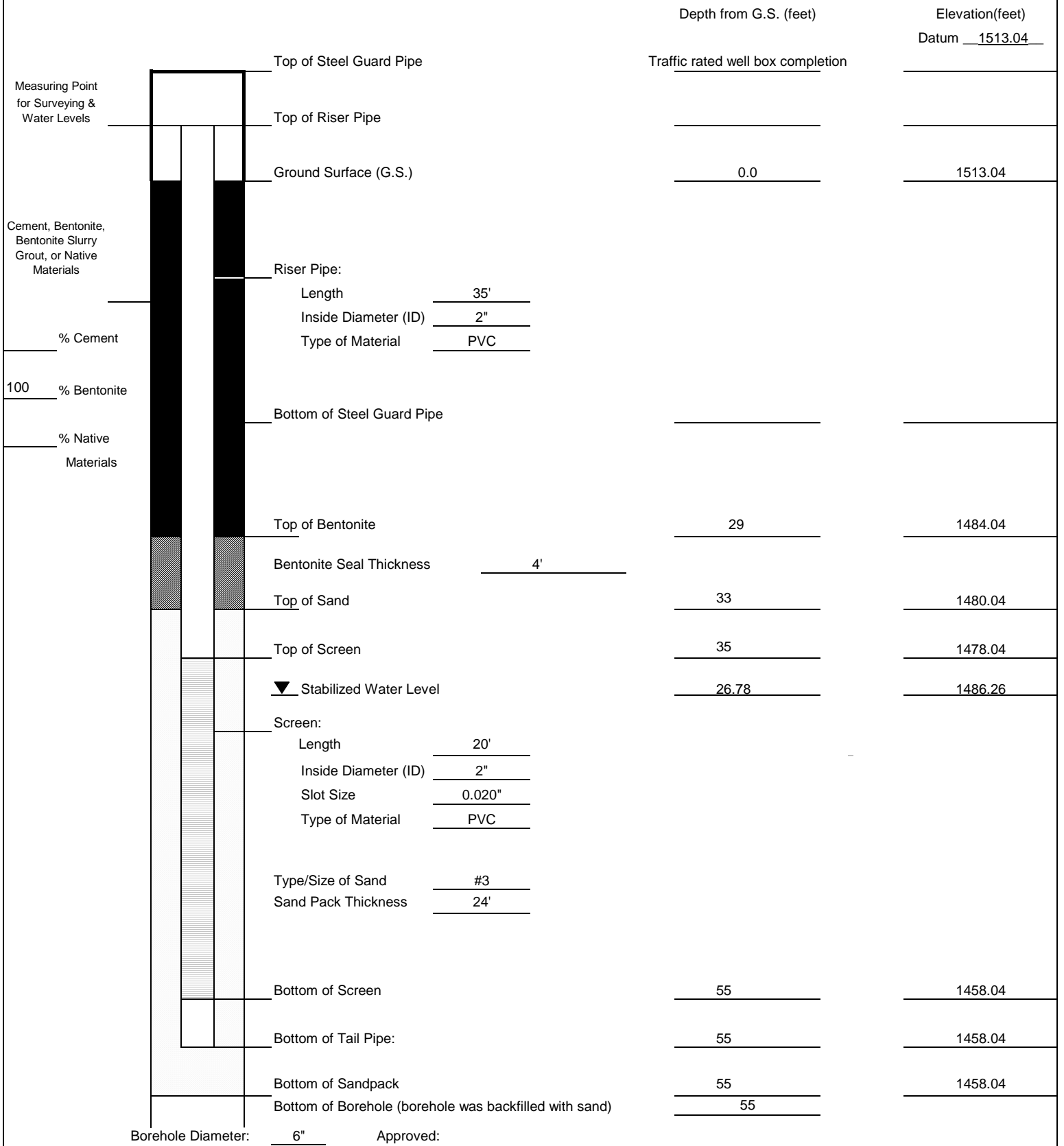
Well Location: River Mile 4.64 Coords: 26735747.15 N 839522.29 E

Inspector: Sally Bilodeau

Method: Sonic

Contractor: Cascade

MONITORING WELL CONSTRUCTION DETAIL



Describe Measuring Point:

Sally Bilodeau
Signature

8/13/2019
Date



Client: Nevada Division of Environmental Protection

WELL ID: NERT4.64S1C

Project Number: 60477365-2018-171-01

Site Location: Las Vegas Wash, Henderson NV

Date Installed: 4/26/2019

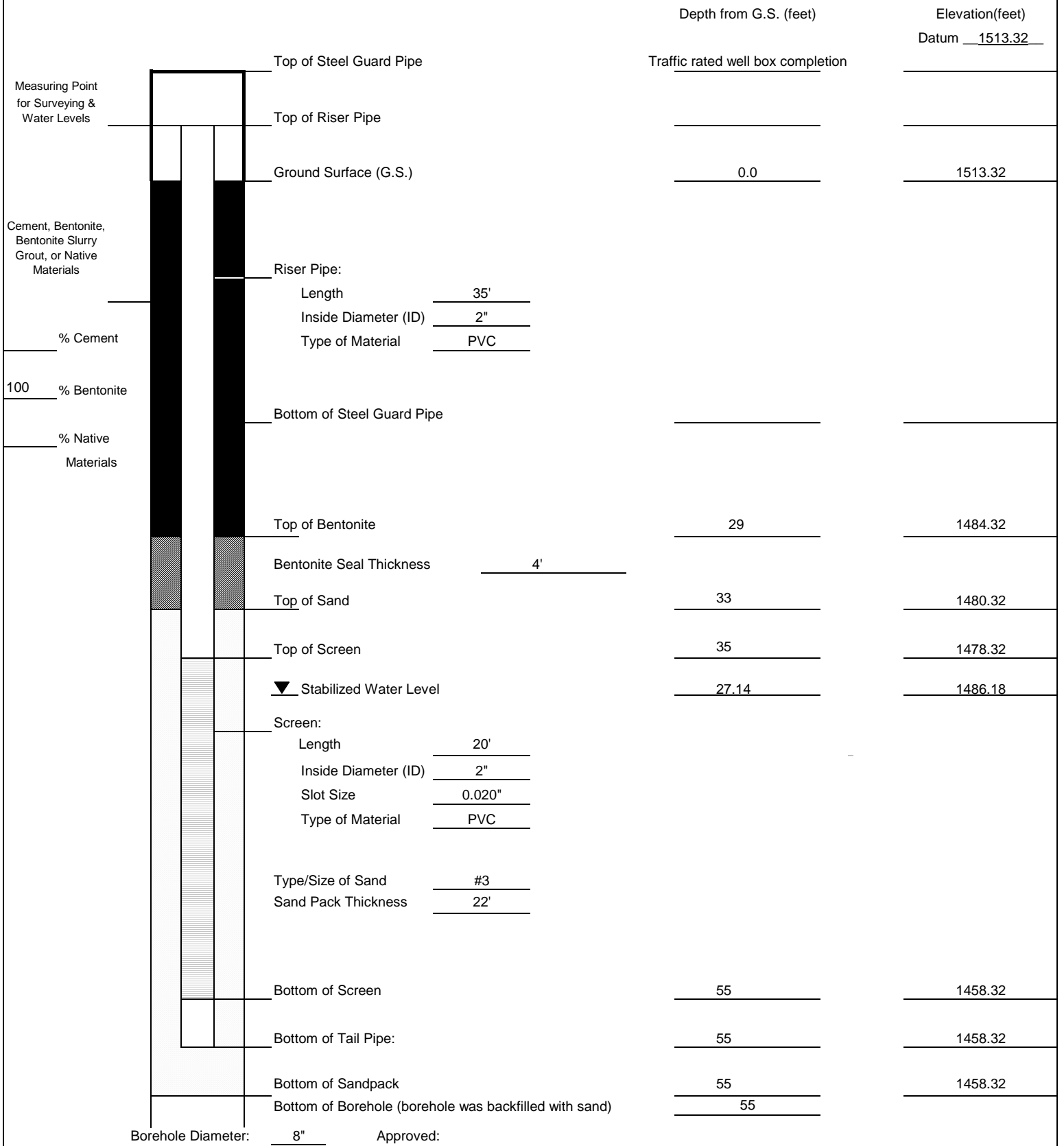
Well Location: River Mile 4.64 Coords: 26735735.18 N 839510.44 E

Inspector: Sally Bilodeau

Method: Sonic

Contractor: Cascade

MONITORING WELL CONSTRUCTION DETAIL



Describe Measuring Point:

Approved: Sally Bilodeau
Signature

8/13/2019
Date



Client: Nevada Division of Environmental Protection

WELL ID: NERT4.64SID

Project Number: 60477365-2018-171-01

Site Location: Las Vegas Wash, Henderson NV

Date Installed: 4/25/2019

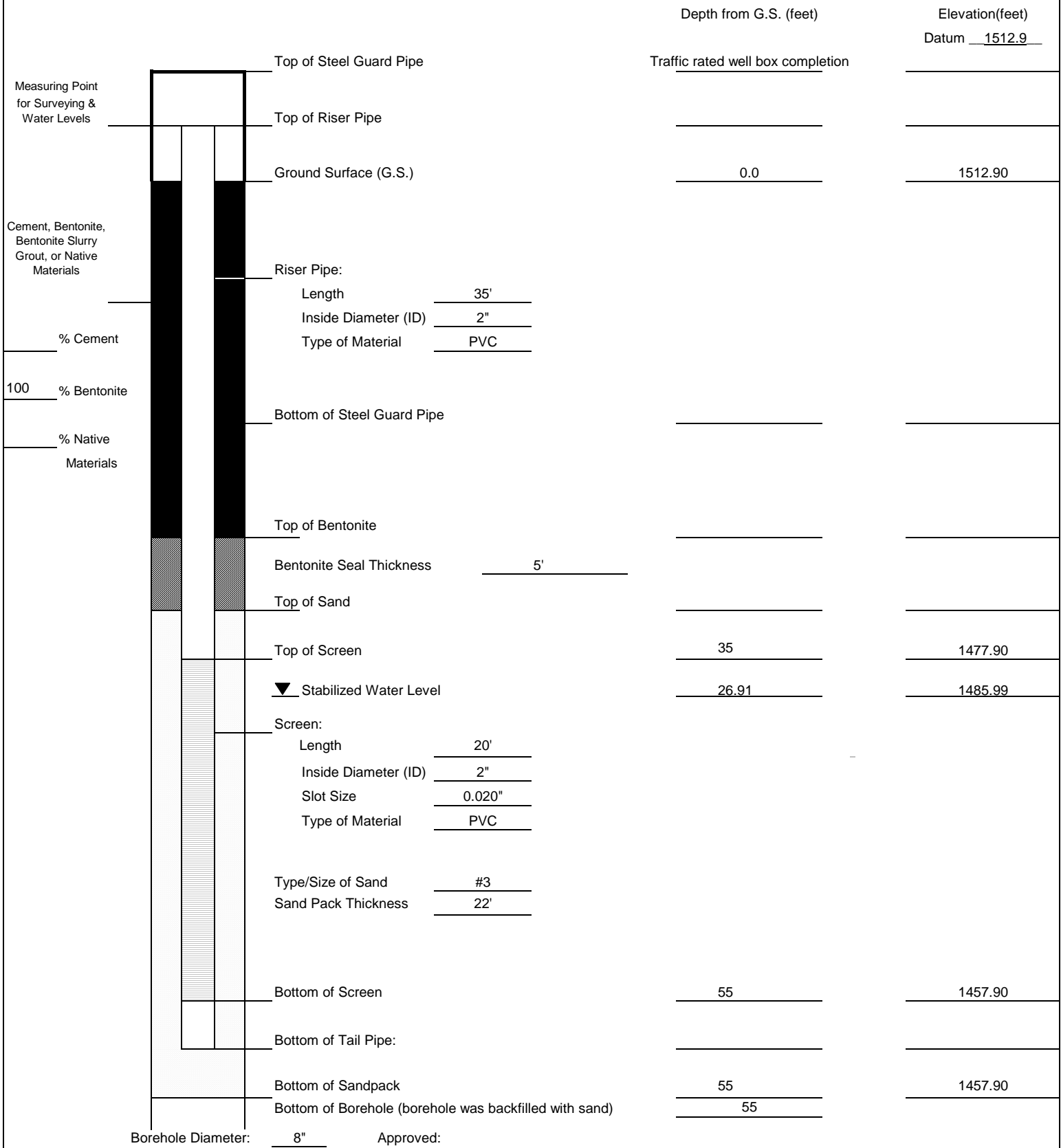
Well Location: River Mile 4.64 Coords: 26735756.29 N 839544.6 E

Inspector: Sally Bilodeau

Method: Sonic

Contractor: Cascade

MONITORING WELL CONSTRUCTION DETAIL



Borehole Diameter: 8"

Approved:

Describe Measuring Point:

Sally Bilodeau
Signature

8/13/2019
Date



Client: Nevada Division of Environmental Protection

WELL ID: NERT4.65N1

Project Number: 60477365-2018-171-01

Site Location: Las Vegas Wash, Henderson NV

Date Installed: 4/10/2019

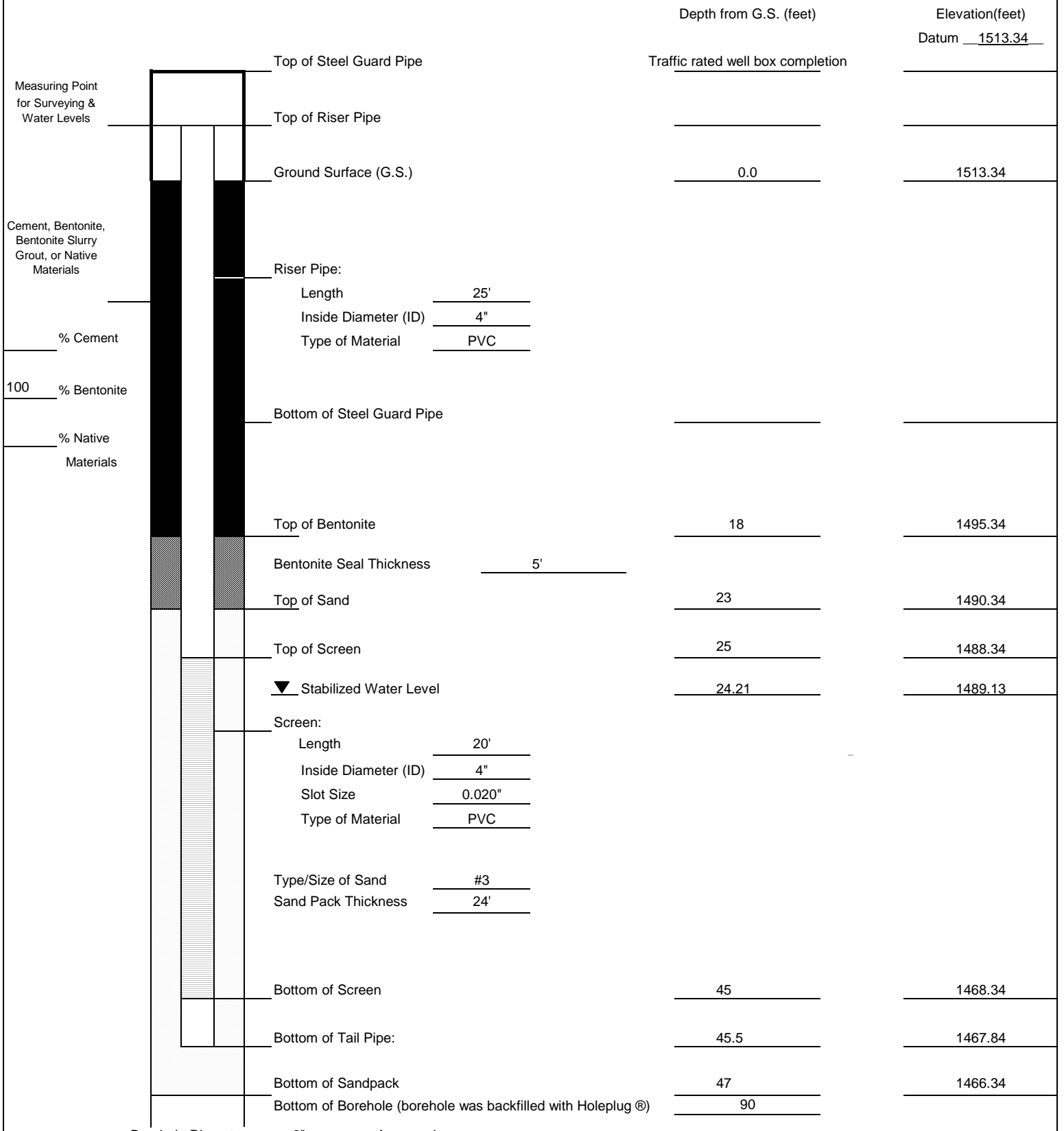
Well Location: River Mile 4.65 Coords: 26736244.72 N 839107.82 E

Inspector: Sally Bilodeau

Method: Sonic

Contractor: Cascade

MONITORING WELL CONSTRUCTION DETAIL



Borehole Diameter: 8" Approved: Sally Bilodeau 8/13/2019
 Describe Measuring Point: _____ Signature _____ Date _____



Client: Nevada Division of Environmental Protection

WELL ID: NERT4.70N1

Project Number: 60477365-2018-171-01

Site Location: Las Vegas Wash, Henderson NV

Date Installed: 4/11/2019

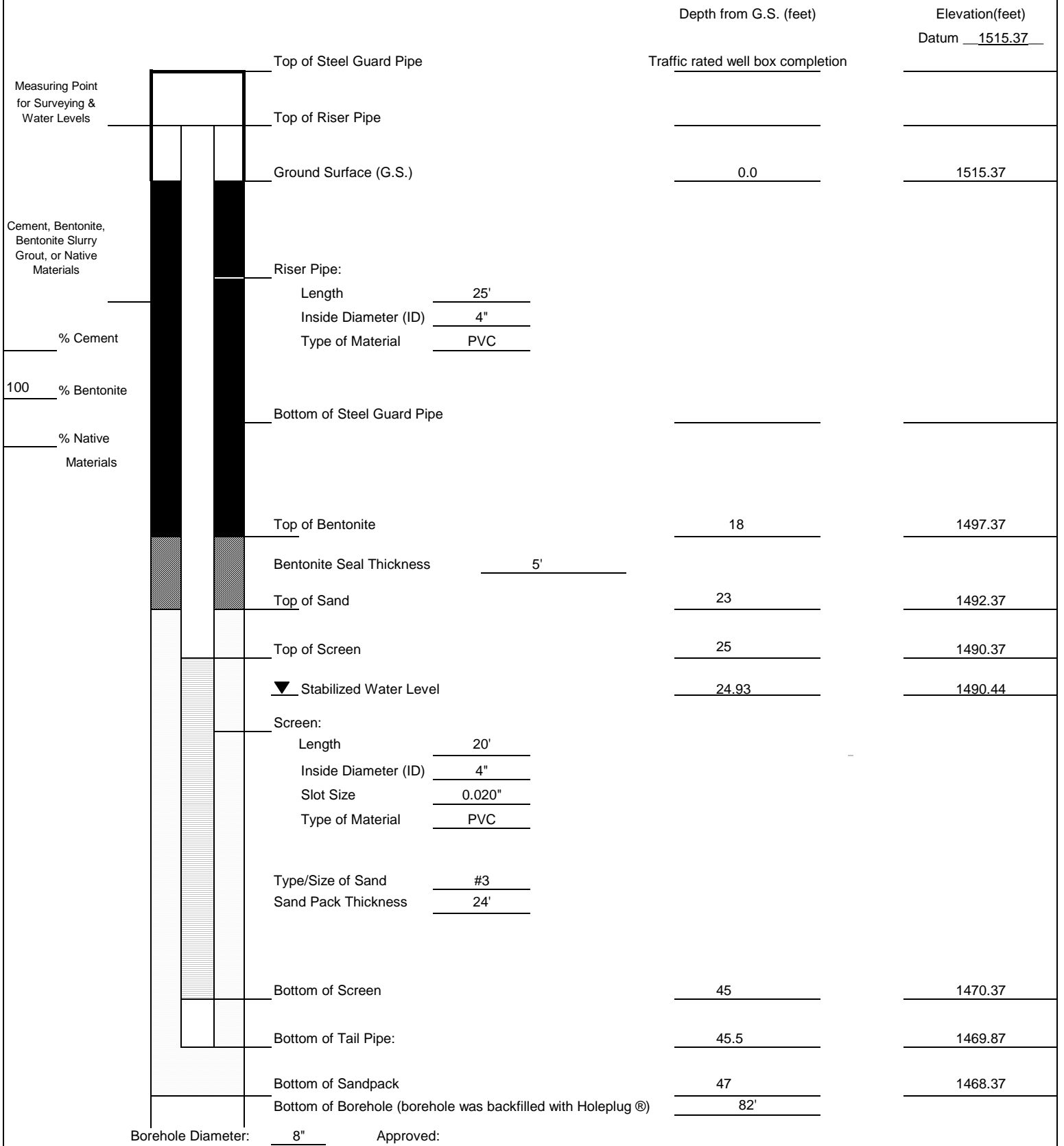
Well Location: River Mile 4.70 Coords: 26736143.64 N 838871.67 E

Inspector: Sally Bilodeau

Method: Sonic

Contractor: Cascade

MONITORING WELL CONSTRUCTION DETAIL



Describe Measuring Point:

Sally Bilodeau
Signature

8/13/2019
Date



Client: Nevada Division of Environmental Protection

WELL ID: NERT4.71N1

Project Number: 60477365-2018-171-01

Site Location: Las Vegas Wash, Henderson NV

Date Installed: 4/5/2019

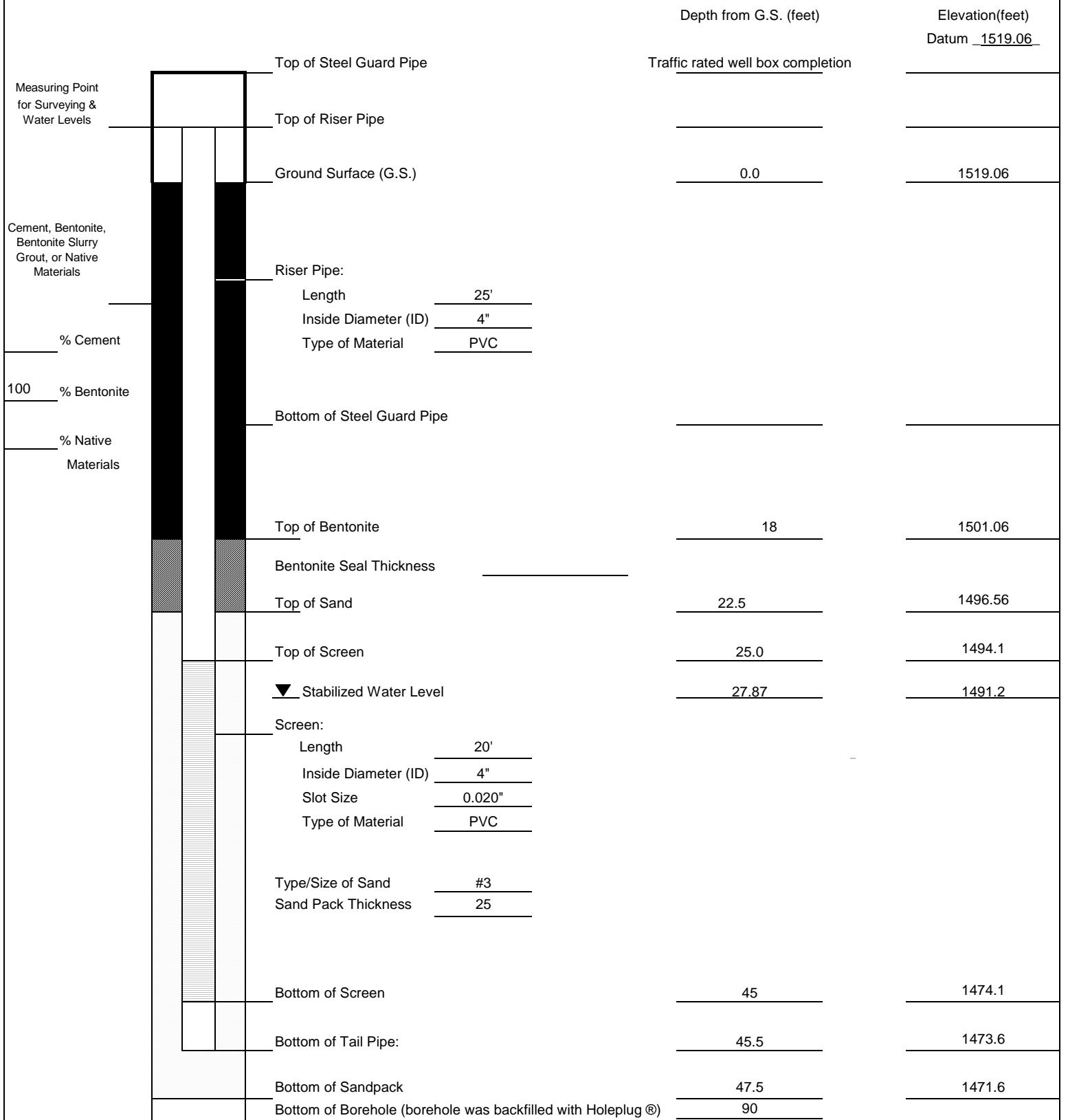
Well Location: River Mile 4.71 Coords: 26736123.87 N 838600.29 E

Inspector: Sally Bilodeau

Method: Sonic

Contractor: Cascade

MONITORING WELL CONSTRUCTION DETAIL



Borehole Diameter: 8" Approved: Sally Bilodeau Signature Date: 8/13/2019

Describe Measuring Point: _____



Client: Nevada Division of Environmental Protection

WELL ID: NERT4.71S2

Project Number: 60477365-2018-171-01

Site Location: Las Vegas Wash, Henderson NV

Date Installed: 4/1/2019

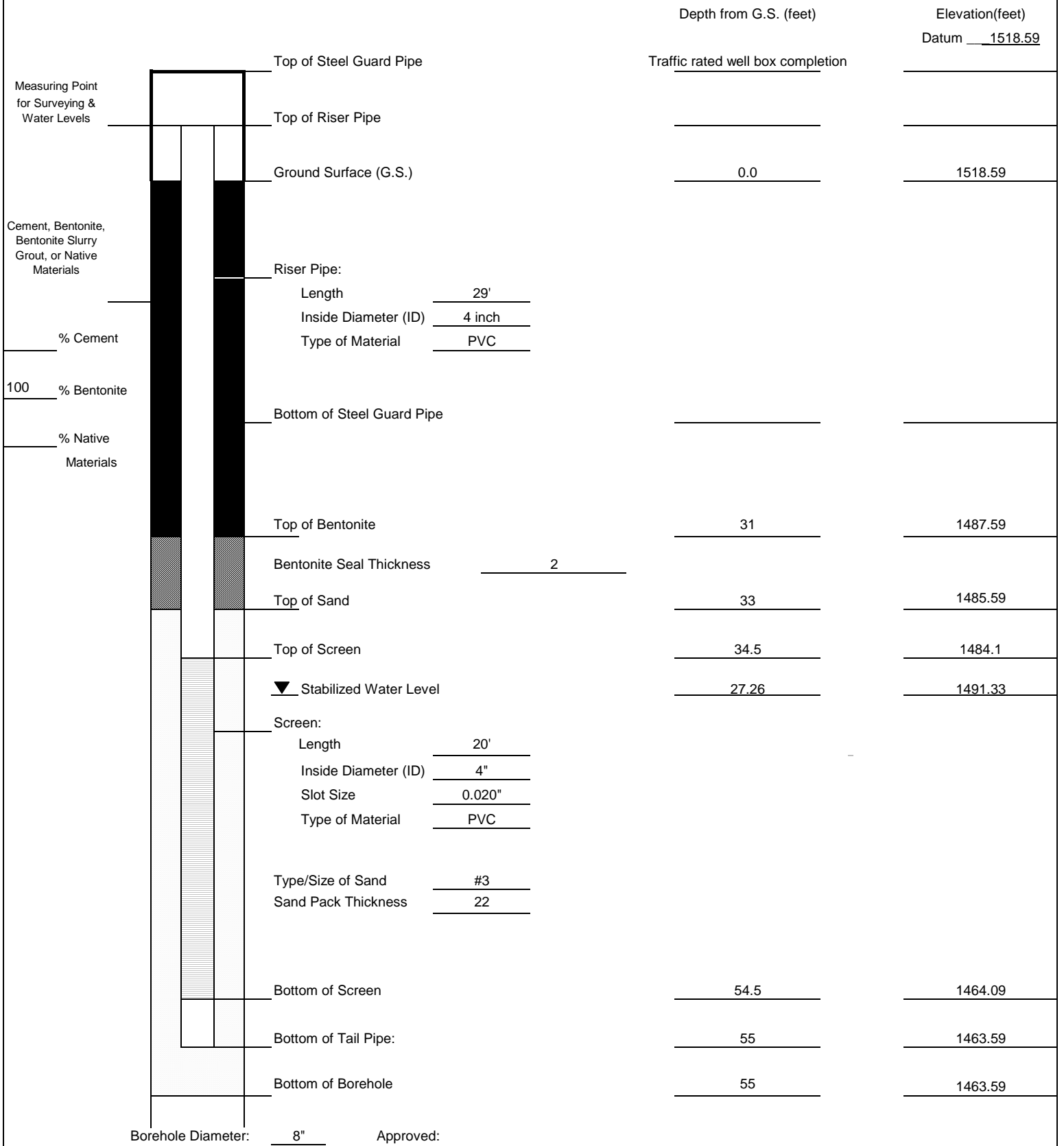
Well Location: River Mile 4.71 Coords: 26735408.27 N 838770.32 E

Inspector: Sally Bilodeau

Method: Sonic

Contractor: Cascade

MONITORING WELL CONSTRUCTION DETAIL



Describe Measuring Point:

Approved:

Sally Bilodeau
Signature

8/13/2019

Date

Appendix E

Well Development Records



Well/Piez. ID: NERT3.35S1

Well/Piezometer Development Record

Client: NDEP Site Location: LV Wash

Project No: 60477365-2016-170 Developer: J Capotrio/ F Verduzco Date: 4/29/19

WELL/PIEZOMETER DATA

Well Piezometer Diameter 4" Material: Sched 40 PVC

Measuring Point Description TOC Geology at Screen Interval _____

Depth to Top of Screen (ft.) 35

Depth to Bottom of Screen (ft.) 55 Time of Water Level Measurement 07:30

Total Well Depth (ft.) 55.37 Calculate Purge Volume (gal.) 190.257

Depth to Static Water Level (ft.) 15.83 Disposal Method Poly IDW Tank Trailer

Original Well Development Redevelopment Wellhead PID/FID N/A

Date of Original Development _____

DEVELOPMENT METHOD Steel Ball/ Surge Block PURGE METHOD Submersible Pump

Field Testing Equipment Used: Make Model Serial Number

Horiba U-52 P1MTDYFE

Field Testing Calibration Documentation Found in Field Notebook # 1 Page # _____

Time	Volume Removed (gal)	T° (C/F)	pH	Spec. Cond (umhos)	Turbidity (NTUs)	DO	¹⁰⁰⁰ Total ORP	Odor	Color	Water Level
1000	25	21.73	7.37	9.51	7999	8.63	17.12	None	Brown	15
1010	55	21.64	8.0	9.35	7999	2.24	22.30	"	Tan	-6
1030	115	21.38	8.00	9.36	7999	2.14	22.45	"	Tan	-8
1040	145	21.45	7.93	9.44	694	3.22	22.50	"	Cloudy	-12
1050	175	21.26	7.92	9.46	900	1.66	22.55	"	"	-22
1100	205	21.23	7.90	9.44	371	1.21	22.60	"	"	-30
1110	235	20.92	7.90	9.49	358	1.28	22.60	"	"	-41
1115	250	20.90	7.89	9.49	391	1.29	22.60	"	"	-38
1120	265	20.90	7.88	9.44	375	1.26	22.60	"	"	-40
<u>Complete</u>										

ACCEPTANCE CRITERIA (from workplan)

Min. Purge Volume (7-10 borehole volumes) <u>150</u> gallons	Has required volume been removed	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>	if there is sufficient recharge but not over 4 hrs
Maximum Turbidity Allowed <u>N/A</u> NTUs	Has required turbidity been reached	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Stabilization of parameters 10%	Have parameters stabilized	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
pH +/-0.1	If no or N/A explain below:				

temp 1 degree C
all others 10%

Pump Set @ 254 ft Purge Rate @ 3 GPM Development Complete 1120 265

Time		Water Level	Total Depth	Comments
	As built	<u>19.6</u>	<u>57</u>	Screen = <u>35-55</u>
<u>0730</u>	Arrive	<u>15.83</u>	<u>55.36</u>	
<u>0835-0845</u>	1st bail	<u>17.68</u>	<u>55.37</u>	<u>7.5</u> Gal removed
<u>0845-0905</u>	surge	<u>17.46</u>	<u>55.37</u>	
<u>0910-0935</u>	2nd bail	<u>18.31</u>	<u>55.37</u>	<u>15</u> Gal removed

Signature _____ Date: 4/29/19

Well/Piezometer Development Record

Client: NDEP Site Location: LV Wash

Project No: 60477365-2016-170 Developer: J Capotrio/ F Verduzco Date: 4/29/19

WELL/PIEZOMETER DATA

Well Piezometer Diameter 4" Material: Sched 40 PVC

Measuring Point Description TOC Geology at Screen Interval _____
 Depth to Top of Screen (ft.) 35
 Depth to Bottom of Screen (ft.) 55 Time of Water Level Measurement 1145
 Total Well Depth (ft.) 54.67 Calculate Purge Volume (gal.) 75.25-107.5
 Depth to Static Water Level (ft.) 38.13 Disposal Method Poly IDW Tank Trailer
10.75 Wellhead PID/FID N/A
 Original Well Development Redevelopment Date of Original Development _____

DEVELOPMENT METHOD Steel Ball/ Surge Block PURGE METHOD Submersible Pump

Field Testing Equipment Used: Make Model Serial Number
Horiba U-52 P1MTDYFE

Field Testing Calibration Documentation Found in Field Notebook # 1 Page # _____

Time	Volume Removed (gal)	T° (C/F)	pH	Spec. Cond (umhos)	Turbidity (NTUs)	DO	ORP	Odor	Color	Water Level
1300	70	21.20	8.10	10.7	901	8.51	91	None	Brown	38.10
1315	57	20.84	7.92	9.12	296	3.41	48	"	Clear	40.90
1325	82	19.98	7.75	8.88	97.3	3.84	39	"	"	40.70
1335	107	19.61	7.78	8.65	21.7	3.65	46	"	"	40.55
1345	132	20.09	7.70	8.52	14.7	2.95	42	"	"	40.45
1350	145	20.11	7.69	8.51	14.3	3.02	45	"	"	40.40
1355	157	20.07	7.71	8.55	14.3	2.98	45	"	"	40.40
<i>Complete</i>										
<u>4/29/19</u>										

ACCEPTANCE CRITERIA (from workplan)

Min. Purge Volume (7-10 borehole volumes) <u>75</u> gallons	Has required volume been removed	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	If there is sufficient recharge but not over 4 hrs
Maximum Turbidity Allowed <u>N/A</u> NTUs	Has required turbidity been reached	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Stabilization of parameters 10%	Have parameters stabilized	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
pH +/-0.1	If no or N/A explain below:				
temp 1 degree C	_____				
all others 10%	_____				

Pump Set @ 153 ft Purge Rate @ 2.5 GPM Development Complete 1355 160 gal

Time		Water Level	Total Depth	Comments
	As built	38.11	57	Screen = 35-55
1145	Arrive	38.13	54.12	
1155-1210	1st bail	40.95	54.65	7.5 Gal removed
1215-1235	surge	38.75	54.54	
1240-1245	2nd bail	38.50	54.54	10 Gal removed

Signature [Signature] Date: 4/29/19

Well/Piezometer Development Record

Client: NDEP Site Location: LV Wash

Project No: 60477365-2016-170 Developer: J Capotrio/ F Verduzco Date: 5/3/19

WELL/PIEZOMETER DATA

Well Piezometer Diameter 4" Material: Sched 40 PVC

Measuring Point Description TOC Geology at Screen Interval _____

Depth to Top of Screen (ft.) 40

Depth to Bottom of Screen (ft.) 60 Time of Water Level Measurement 1210

Total Well Depth (ft.) 60.60 Calculate Purge Volume (gal.) 95.7-137

Depth to Static Water Level (ft.) 39.55 Disposal Method Poly IDW Tank Trailer

Original Well Development Redevelopment Wellhead PID/FID N/A

Date of Original Development _____

DEVELOPMENT METHOD Steel Bail/ Surge Block PURGE METHOD Submersible Pump

Field Testing Equipment Used: Make Model Serial Number
Horiba U-52 P1MTDYFE

Field Testing Calibration Documentation Found in Field Notebook # 1 Page # _____

Time	Volume Removed (gal)	T° (C/F)	pH	Spec. Cond (umhos)	Turbidity (NTUs)	DO	ORP	Odor	Color	Water Level
1300	10	24.66	7.47	7.70	2999	2.68	119	None	Brown	39.80
1335	97.5	21.13	7.31	7.66	96.8	2.87	156	None	clear	39.80
1340	109 110.0	20.76	7.13	7.71	12.0	1.98	153	"	"	"
1345	122.5	20.81	7.14	7.72	13.6	1.87	155	"	"	"
1350	145.0	20.79	7.14	7.72	11.8	1.88	153	"	"	"
<i>Complete</i>										

ACCEPTANCE CRITERIA (from workplan)

Min. Purge Volume (7-10 borehole volumes) <u>96</u> gallons	Has required volume been removed	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	if there is sufficient recharge but not over 4 hrs
Maximum Turbidity Allowed <u>N/A</u> NTUs	Has required turbidity been reached	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A	
Stabilization of parameters 10%	Have parameters stabilized	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	

pH +/-0.1
temp 1 degree C
all others 10%

If no or N/A explain below: _____

Pump Set @ 259 ft Purge Rate @ 2.5 GPM Development Complete 1350 1415 gal

Time	Water Level	Total Depth	Comments
As built	<u>39.41</u>	<u>62</u>	Screen = <u>40-60</u>
<u>1210</u> Arrive	<u>39.55</u>	<u>60.58</u>	
<u>1215-1220</u> 1st bail	<u>39.60</u>	<u>60.60</u>	<u>3</u> Gal removed
<u>1225-1245</u> surge	<u>39.57</u>	<u>60.60</u>	
<u>1245-1250</u> 2nd bail	<u>39.65</u>	<u>60.60</u>	<u>3</u> Gal removed

Signature: [Signature] Date: 5/3/19

Well/Piezometer Development Record

Client: NDEP Site Location: LV Wash
 Project No: 60477365-2018-171 Date: 4/10/19 Developer: J CARTRIO / D MOORE

WELL/PIEZOMETER DATA

Well Piezometer Diameter 4" Material SD 40 PVC
 Measuring Point Description TOC Geology at Screen Interval (if known) _____
 Depth to Top of Screen (ft.) 35 _____
 Depth to Bottom of Screen (ft.) 55 Time of Water Level Measurement 0740
 Total Well Depth (ft.) 34.96 56 Calculate Purge Volume (gal.) 96-137.5
 Depth to Static Water Level (ft.) 34.96 Disposal Method Poly LDW Tank trailer
13.74 vol Wellhead PID/FID N/A
 Original Well Development Redevelopment Date of Original Development _____
 DEVELOPMENT METHOD Steel bail / surge pump PURGE METHOD Submersible pump
 Field Testing Equipment Used: Make Hanna Model U-52 Serial Number PIMTDYFE

Field Testing Calibration Documentation Found in Field Notebook # 1 Page # 6

Time	Volume Removed (gal)	T° (C/F)	pH	Spec. Cond (umhos)	Turbidity (NTUs)	DO	Color	Odor	ORP Other	WSD Level
0900	25	19.94	6.34	3.97	2999	2.32	Brown	None	210	34.92
0915	85	19.24	6.65	3.97	82.5	1.67	Clear	None	150	34.92
0920	105	19.32	6.66	3.96	19.4	0.96	Clear	None	113	34.92
0925	125	19.33	6.66	3.96	20.3	0.95	Clear	None	106	34.92
0930	145	19.34	6.66	3.98	20.1	0.92	Clear	None	99	34.92
<u>Complete</u>										

ACCEPTANCE CRITERIA (from workplan)
 Min. Purge Volume (7-10 borehole volumes) 96 gallon: Has required volume been removed Yes No N/A
 Maximum Turbidity Allowed N/A NTUs: Has required turbidity been reached Yes No N/A
 Stabilization of parameters 10%: Have parameters stabilized Yes No N/A
 pH +/-0.1: If no or N/A explain below: Pump @ 53'
 temp 1 degree C: Pump rate 4 gal/min
 all others 10%: Development Complete - 0930

Signature: [Signature] Date: 4/10/19

As Built - H₂O @ 34.95, TD=56 Screen 35-55
0740 arrive - H₂O @ 34.96, TD=55.30 ; 12 gals
0745-0755 Post Bail 1 H₂O @ 35.0, TD=55.5 ; 12 gals
0900-0920 Post Surge H₂O @ 35.0, TD=53.45
0930-0940 Post Bail 2 H₂O @ 34.97, TD=55.80 ; 12 gals

Well/Piezometer Development Record

Client: NDEP Site Location: LV Wash

Project No: 60477365-2016-170 Developer: J Capotrio/ F Verduzco Date: 4/30/19

WELL/PIEZOMETER DATA

Well Piezometer Diameter 2" Material: Sched 40 PVC

Measuring Point Description TOC Geology at Screen Interval _____

Depth to Top of Screen (ft.) 25

Depth to Bottom of Screen (ft.) 45 Time of Water Level Measurement 0945

Total Well Depth (ft.) 45.66 Calculate Purge Volume (gal.) 12.4-17.7

Depth to Static Water Level (ft.) 34.6 Disposal Method Poly IDW Tank Trailer

1.77 Wellhead PID/FID N/A

Original Well Development Redevelopment Date of Original Development _____

DEVELOPMENT METHOD Steel Bail/ Surge Block PURGE METHOD Submersible Pump

Field Testing Equipment Used: Make Model Serial Number
Horiba U-52 P1MTDYFE

Field Testing Calibration Documentation Found in Field Notebook # / Page # _____

Time	Volume Removed (gal)	T° (C/F)	pH	Spec. Cond (umhos)	Turbidity (NTUs)	DO	ORP	Odor	Color	Water Level
1040	5	18.75	7.52	4.27	7999	5.30	99	None	Brown/ Tan	34.65
1045	17	19.36	7.32	4.22	944	3.53	94	"	Clear	"
1050	29	19.54	7.33	4.16	32.8	2.64	94	"	Clear	34.70
1055	41	19.29	7.31	4.20	19.3	2.49	98	"	Clear	"
1100	53	19.34	7.28	4.19	8.4	2.24	93	"	"	"
1105	65	19.16	7.31	4.20	4.9	2.19	99	"	"	34.75
1110	77	19.21	7.27	4.19	3.7	2.18	104	"	"	"
Complete										

ACCEPTANCE CRITERIA (from workplan)

Min. Purge Volume (7-10 borehole volumes) <u>12.4</u> gallons	Has required volume been removed	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	if there is sufficient recharge but not over 4 hrs
Maximum Turbidity Allowed <u>WIP</u> NTUs	Has required turbidity been reached	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Stabilization of parameters 10%	Have parameters stabilized	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
pH +/-0.1	If no or N/A explain below:				

temp 1 degree C
all others 10%

Pump Set @ ~44 ft Purge Rate @ 2.4 GPM Development Complete 1110 77gal

Time	Water Level	Total Depth	Comments
As built	-	45	Screen = <u>25-45</u>
0945	34.61	45.50	
0945-0955	34.65	45.66	Gal removed
1005-1025	34.66	45.39	
1025-1035	34.65	45.50	Gal removed

Signature [Signature] Date: 4/30/19



Well/Piez. ID: WERT3-58S1B

Well/Piezometer Development Record

Client: NDEP Site Location: LV Wash

Project No: 60477365-2016-170 Developer: J Capotrio/ F Verduzco Date: 4/30/19

WELL/PIEZOMETER DATA

Well Piezometer Diameter 2" Material: Sched 40 PVC

Measuring Point Description TOC Geology at Screen Interval _____

Depth to Top of Screen (ft.) 25

Depth to Bottom of Screen (ft.) 45 Time of Water Level Measurement 0750

Total Well Depth (ft.) 44.92 Calculate Purge Volume (gal.) 12.5-17.8

Depth to Static Water Level (ft.) 33.80 Disposal Method Poly IDW Tank Trailer

Original Well Development Redevelopment Wellhead PID/FID N/A

Date of Original Development _____

DEVELOPMENT METHOD Steel Bail/ Surge Block PURGE METHOD Submersible Pump

Field Testing Equipment Used: Make Model Serial Number
Horiba U-52 P1MTDYFE

Field Testing Calibration Documentation Found in Field Notebook # 1 Page # _____

Time	Volume Removed (gal)	T° (C/F)	pH	Spec. Cond (umhos)	Turbidity (NTUs)	DO	ORP	Odor	Color	Water Level
0905	7	17.52	6.64	4.42	753	3.62	69	None	Tan	33.80
0910	19	18.58	7.00	4.36	394	3.82	67	"	Cloudy	"
0915	31	19.01	7.26	4.23	29.3	2.63	74	"	Clear	"
0920	43	19.06	7.31	4.24	2.3	2.72	86	"	"	"
0925	55	19.14	7.32	4.22	0.2	2.66	84	"	"	"
0930	67	19.13	7.32	4.21	0.1	2.65	82	"	"	"
<i>Complete</i>										

ACCEPTANCE CRITERIA (from workplan)

Min. Purge Volume (7-10 borehole volumes) <u>12.5</u> gallons	Has required volume been removed	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	if there is sufficient recharge but not over 4 hrs
Maximum Turbidity Allowed <u>N/A</u> NTUs	Has required turbidity been reached	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Stabilization of parameters 10%	Have parameters stabilized	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
pH +/-0.1	If no or N/A explain below:				

temp 1 degree C
all others 10%

Pump Set @ -44 ft Purge Rate @ 2.4 GPM Development Complete 0930 67 gal

Time	Water Level	Total Depth	Comments
As built	-	45	Screen = <u>25-45</u>
0750	33.80	44.12	
0755-0910	33.81	44.92	7 Gal removed
0815-0835	33.90	44.30	
0835-0845	33.85	44.90	2 Gal removed

Signature: _____ Date: 4/30/19

Well/Piezometer Development Record

Client: NDEP Site Location: LV Wash

Project No: 60477365-2016-170 Developer: J Capotrio/ F Verduzco Date: 4/30/19

WELL/PIEZOMETER DATA

Well Piezometer Diameter 2" Material: Sched 40 PVC

Measuring Point Description TOC Geology at Screen Interval _____

Depth to Top of Screen (ft.) 35

Depth to Bottom of Screen (ft.) 55 Time of Water Level Measurement 1130

Total Well Depth (ft.) 55.16 Calculate Purge Volume (gal.) 23.4-33.3

Depth to Static Water Level (ft.) 34.30 Disposal Method Poly IDW Tank Trailer

3.33 Wellhead PID/FID N/A

Original Well Development Redevelopment Date of Original Development _____

DEVELOPMENT METHOD Steel Bail/ Surge Block **PURGE METHOD** Submersible Pump

Field Testing Equipment Used: Make Model Serial Number
Horiba U-52 P1MTDYFE

Field Testing Calibration Documentation Found in Field Notebook # _____ Page # _____

Time	Volume Removed (gal)	T° (C/F)	pH	Spec. Cond (umhos)	Turbidity (NTUs)	DO	ORP	Odor	Color	Water Level
1225	5	21.74	7.66	4.12	2999	5.47	122	None	Brown	34.35
1235	32	20.45	7.50	4.16	64.6	2.21	120	"	Clear	"
1240	45.5	20.11	7.41	4.19	19.2	2.18	121	"	"	"
1245	59.0	20.12	7.39	4.17	9.4	2.09	122	"	"	"
1250	72.5	20.07	7.36	4.18	3.3	1.97	119	"	"	"
1255	86.0	20.09	7.33	4.19	2.9	1.97	120	"	"	"

ACCEPTANCE CRITERIA (from workplan)

Min. Purge Volume (7-10 borehole volumes) <u>23.4</u> gallons	Has required volume been removed	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>	if there is sufficient recharge but not over 4 hrs
Maximum Turbidity Allowed <u>N/A</u> NTUs	Has required turbidity been reached	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Stabilization of parameters 10%	Have parameters stabilized	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

pH +/-0.1
temp 1 degree C
all others 10%

If no or N/A explain below:

Pump Set @ -54 ft. Purge Rate @ 2.7 GPM Development Complete 1255 86 gal

Time		Water Level	Total Depth	Comments
	As built	-	55	Screen = 35-55
1130	Arrive	34.30	55.00	
1135-1145	1st bail	34.33	55.16	1 Gal removed
1145-1205	surge	34.34	54.94	
1205-1210	2nd bail	34.34	55.16	1 Gal removed

Signature _____ Date: 4/30/19

Well/Piezometer Development Record

Client: NDEP Site Location: LV Wash

Project No: 60477365-2016-170 Developer: J Capotrio/ F Verduzco Date: 5/3/19

WELL/PIEZOMETER DATA

Well Piezometer Diameter 4" Material: Sched 40 PVC

Measuring Point Description TOC Geology at Screen Interval _____

Depth to Top of Screen (ft.) 37.95

Depth to Bottom of Screen (ft.) 37.95 Time of Water Level Measurement 1000

Total Well Depth (ft.) 54.95 Calculate Purge Volume (gal.) 640 - 88.7 80-114

Depth to Static Water Level (ft.) 37.95 Disposal Method Poly IDW Tank Trailer

Wellhead PID/FID N/A

Original Well Development Redevelopment Date of Original Development _____

DEVELOPMENT METHOD Steel Bail/ Surge Block PURGE METHOD Submersible Pump

Field Testing Equipment Used: Make Model Serial Number
Horiba U-52 P1MTDYFE

Field Testing Calibration Documentation Found in Field Notebook # 1 Page # _____

Time	Volume Removed (gal)	T° (C/F)	pH	Spec. Cond (umhos)	Turbidity (NTUs)	DO	ORP	Odor	Color	Water Level
1100	15	23.36	7.36	5.66	>999	7.20	119	None	Brown	38.15
1125	80	20.93	7.28	5.48	189	1.83	123	"	Clear	38.20
1130	92.5	20.15	7.21	5.48	33.8	2.06	132	"	"	"
1135	105.0	20.04	7.18	5.56	9.3	2.33	132	"	"	"
1140	117.5	19.97	7.17	5.56	8.1	2.24	133	"	"	"
1145	130.0	19.98	7.16	5.56	8.0	2.31	134	"	"	"
<i>Complete</i>										

ACCEPTANCE CRITERIA (from workplan)

Min. Purge Volume (7-10 borehole volumes)	<u>80</u> gallons	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>	if there is sufficient recharge but not over 4 hrs
Maximum Turbidity Allowed <u>N/A</u> NTUs	Has required turbidity been reached	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Stabilization of parameters 10%	Have parameters stabilized	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

pH +/-0.1
temp 1 degree C
all others 10%

If no or N/A explain below: _____

Pump Set @ 254 ft Purge Rate @ 2.5 GPM Development Complete 1145 130 gal

Time	Water Level	Total Depth	Comments
As built	<u>38.65</u>	<u>52.5</u>	Screen = <u>32-52</u>
<u>1000</u> Arrive	<u>37.95</u>	<u>50.48</u>	
<u>1005-1010</u> 1st bail	<u>38.00</u>	<u>51.50</u>	<u>6</u> Gal removed
<u>1015-1035</u> surge	<u>38.00</u>	<u>55.50 51.50</u>	
<u>1035-1050</u> 2nd bail	<u>38.05</u>	<u>55.50</u>	<u>6</u> Gal removed

Signature _____ Date: 5/3/19

Well/Piezometer Development Record

Client: NDEP Site Location: LV Wash
 Project No: 60477365-2018-171 Date: 4/9/19 Developer: J CARTRIO / D MOORE

Arrive 12:10

WELL/PIEZOMETER DATA

Well Piezometer Diameter 4" Material Sched 40 PVC

Measuring Point Description TC Geology at Screen Interval (if known) _____

Depth to Top of Screen (ft.) 35

Depth to Bottom of Screen (ft.) 55 Time of Water Level Measurement 12:30

Total Well Depth (ft.) 56 Calculate Purge Volume (gal.) 71-113 gal

Depth to Static Water Level (ft.) 38.62 Disposal Method Poly IOW tank truck

11.3

Wellhead PID/FID N/A

Original Well Development Redevelopment Date of Original Development _____

DEVELOPMENT METHOD Std Rotor Range block PURGE METHOD Submersible Pump

Field Testing Equipment Used: Make Horiba Model U-52 Serial Number PIMDYFE

Field Testing Calibration Documentation Found in Field Notebook # 1 Page # 4

Time	Volume Removed (gal)	T° (C/F)	pH	Spec. Cond (umhos)	Turbidity (NTUs)	DO	Color	Odor	ORP Other	112 = Level
1405	25	18.77	6.55	4.16	34.1	3.12	clear	None	198	38.61
1420	77.5	18.55	6.78	4.16	0.0	1.32	clear	None	113	38.61
1430	112.5	18.54	6.80	4.14	0.0	0.96	clear	None	108	38.61
1440	147.5	18.54	6.80	4.15	0.0	0.93	clear	None	147	38.61
1450	182.5	18.54	6.81	4.14	0.0	0.91	clear	None	107	38.61
<u>SP Development Complete 4/11/19</u>										

ACCEPTANCE CRITERIA (from workplan)

Min. Purge Volume (7-10 borehole volumes) _____ gallon: Has required volume been removed Yes No N/A if there is sufficient recharge but not over 4 hrs

Maximum Turbidity Allowed _____ NTUs Has required turbidity been reached Yes No N/A

Stabilization of parameters 10% Have parameters stabilized Yes No N/A

pH +/- 0.1 If no or N/A explain below:

temp 1 degree C Pump @ 535'

all others 10% Purge Rate ~ 315 gal/min

Development Complete - 1450 stable @ 198 gal

Signature _____ Date: _____

As Built - 1600 38.65, TD = 56, Screen 35-55

1230 @ Arrive 1600 38.62, TD = 57.92

1255-1255 Post Run 1 1600 38.62, TD = 55.32, 12 gal

1300-1330 Post Range 1600 38.57, TD = 55.27

1335-1345 Post Run 2 1600 38.60, TD = 55.31, 12 gal

Well/Piezometer Development Record

Client: NDEP Site Location: LV Wash

Project No: 60477365-2016-170 Developer: J Capotrio/ F Verduzco Date: 4/30/19

WELL/PIEZOMETER DATA

Well Piezometer Diameter 2" Material: Sched 40 PVC

Measuring Point Description TOC Geology at Screen Interval _____

Depth to Top of Screen (ft.) 35

Depth to Bottom of Screen (ft.) 55 Time of Water Level Measurement 1540

Total Well Depth (ft.) 55.75 Calculate Purge Volume (gal.) 19.5 - 27.8

Depth to Static Water Level (ft.) 38.35 Disposal Method Poly IDW Tank Trailer

2.7k Wellhead PID/FID N/A

Original Well Development Redevelopment Date of Original Development _____

DEVELOPMENT METHOD Steel Bail/ Surge Block **PURGE METHOD** Submersible Pump

Field Testing Equipment Used: Make Model Serial Number
Horiba U-52 P1MTDYFE

Field Testing Calibration Documentation Found in Field Notebook # 1 Page # _____

Time	Volume Removed (gal)	T° (C/F)	pH	Spec. Cond (umhos)	Turbidity (NTUs)	DO	ORP	Odor	Color	Water Level
1645	5	14.45	7.76	4.15	2999	5.62	89	None	Brown	38.40
1650	17	17.93	7.58	4.10	111	3.26	48	"	Clear	"
1655	29	17.93	7.52	4.12	7.4	2.38	42	"	"	"
1700	41	17.97	7.49	4.12	2.7	2.45	44	"	"	"
1705	53	17.98	7.57	4.11	1.5	2.44	47	"	"	"
<i>Complete</i>										
<i>4/30/19</i>										

ACCEPTANCE CRITERIA (from workplan)

Min. Purge Volume (7-10 borehole volumes)	<u>19.5</u> gallons	Has required volume been removed	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	if there is sufficient recharge but not over 4 hrs
Maximum Turbidity Allowed	<u>N/A</u> NTUs	Has required turbidity been reached	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A	
Stabilization of parameters 10%		Have parameters stabilized	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	

pH +/-0.1
temp 1 degree C
all others 10%

If no or N/A explain below:

Pump Set @ ~54 ft Purge Rate @ 2.4 GPM Development Complete 1705 53 gal

Time	Water Level	Total Depth	Comments
As built	-	55	Screen = 35-55
1540	38.35	55.26	
1545-1605	38.36	55.56	1.5 Gal removed
1610-1630	38.40	55.75	
1630-1640	38.40	55.56	2.0 Gal removed

Signature _____ Date: 4/30/19

Well/Piezometer Development Record

Client: NDEP Site Location: LV Wash

Project No: 60477365-2016-170 Developer: J Capotrio/ F Verduzco Date: 4/30/19

WELL/PIEZOMETER DATA

Well Piezometer Diameter 2" Material: Sched 40 PVC

Measuring Point Description TOC Geology at Screen Interval _____

Depth to Top of Screen (ft.) 35

Depth to Bottom of Screen (ft.) 55 Time of Water Level Measurement 1410

Total Well Depth (ft.) 54.53 Calculate Purge Volume (gal.) 183 - 26.2

Depth to Static Water Level (ft.) 38.15 Disposal Method Poly IDW Tank Trailer

2.62 Wellhead PID/FID N/A

Original Well Development Redevelopment Date of Original Development _____

DEVELOPMENT METHOD Steel Bail/ Surge Block **PURGE METHOD** Submersible Pump

Field Testing Equipment Used: Make Model Serial Number
Horiba U-52 P1MTDYFE

Field Testing Calibration Documentation Found in Field Notebook # _____ Page # _____

Time	Volume Removed (gal)	T° (C/F)	pH	Spec. Cond (umhos)	Turbidity (NTUs)	DO	ORP	Odor	Color	Water Level
1515	10	20.26	7.44	3.99	162.1	3.32	141	None	Clear	38.20
1520	22.5	19.03	7.63	4.08	5.2	3.44	129	"	"	"
1525	35	18.29	7.51	4.08	0.0	2.64	112	"	"	"
1530	47.5	18.04	7.53	4.82	0.0	2.59	108	"	"	"
1535	60.0	18.04	7.52	4.14	0.0	3.52	107	"	"	"
<i>Complete</i>										
<i>OP 4/30/19</i>										

ACCEPTANCE CRITERIA (from workplan)

Min. Purge Volume (7-10 borehole volumes)	<u>183</u> gallons	Has required volume been removed	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>	if there is sufficient recharge but not over 4 hrs
Maximum Turbidity Allowed	<u>N/A</u> NTUs	Has required turbidity been reached	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Stabilization of parameters 10%		Have parameters stabilized	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
pH +/-0.1		If no or N/A explain below:				

temp 1 degree C
all others 10%

Pump Set @ ~53 ft Purge Rate @ 2.5 GPM Development Complete 535 60gal

Time	Water Level	Total Depth	Comments
As built	-	55	Screen = 35-55
1410	38.15	54.49	
1415 - 1425	38.18	54.52	1.5 Gal removed
1430 - 1440	38.16	54.07	
1440 - 1500	38.14	54.53	2 Gal removed

Signature: _____ Date: 4/30/19

Well/Piezometer Development Record

Client: NDEP Site Location: LV Wash

Project No: 60477365-2016-170 Developer: J Capotrio/ F Verduzco Date: 5/1/19

WELL/PIEZOMETER DATA

Well Piezometer Diameter 2" Material: Sched 40 PVC

Measuring Point Description TOC Geology at Screen Interval _____

Depth to Top of Screen (ft.) 35

Depth to Bottom of Screen (ft.) 55 Time of Water Level Measurement 0735

Total Well Depth (ft.) 55.60 Calculate Purge Volume (gal.) 18.7-26.7

Depth to Static Water Level (ft.) 38.90 Disposal Method Poly IDW Tank Trailer

2.67 Wellhead PID/FID N/A

Original Well Development Redevelopment Date of Original Development _____

DEVELOPMENT METHOD Steel Bail/ Surge Block PURGE METHOD Submersible Pump

Field Testing Equipment Used: Make Model Serial Number
Horiba U-52 P1MTDYFE

Field Testing Calibration Documentation Found in Field Notebook # 1 Page # _____

Time	Volume Removed (gal)	T° (C/F)	pH	Spec. Cond (umhos)	Turbidity (NTUs)	DO	ORP	Odor	Color	Water Level
0845	5	15.79	7.49	4.34	7999	6.25	48	None	Brown	38.95
0850	20	16.52	7.52	4.25	56.4	2.52	55	"	Clear	"
0855	35	16.95	7.52	4.25	29.6	2.84	59	"	"	"
0900	50	16.90	7.48	4.25	23.6	2.70	57	"	"	"
0905	65	16.56	7.47	4.27	10.1	2.17	57	"	"	"
0910	80	16.55	7.47	4.27	6.8	2.12	58	"	"	39.00
0915	95	16.57	7.48	4.26	7.7	2.20	59	"	"	"
<i>Complete</i>										
<i>5/1/19</i>										

ACCEPTANCE CRITERIA (from workplan)

Min. Purge Volume (7-10 borehole volumes) 14.7 gallons Has required volume been removed Yes No N/A

Maximum Turbidity Allowed N/A NTUs Has required turbidity been reached Yes No N/A

Stabilization of parameters 10% Have parameters stabilized Yes No N/A

pH +/-0.1 If no or N/A explain below: _____

temp 1 degree C

all others 10%

Pump Set @ ~54 ft Purge Rate @ 3 GPM Development Complete 0915 95 gal

Time	Water Level	Total Depth	Comments
0735	-	55	Screen = 35-K
0740-0750	38.90	54.95	
0755-0815	38.90	55.60	1.5 Gal removed
	38.92	54.46	
1500-0830	38.92	55.60	1 Gal removed

Signature [Signature] Date: 5/1/19

Well/Piezometer Development Record

Client: NDEP Site Location: LV Wash

Project No: 60477365-2016-170 Developer: J Capotrio/ F Verduzco Date: 5/1/19

WELL/PIEZOMETER DATA

Well Piezometer Diameter 2" Material: Sched 40 PVC

Measuring Point Description TOC Geology at Screen Interval _____

Depth to Top of Screen (ft.) 35

Depth to Bottom of Screen (ft.) 55 Time of Water Level Measurement 0940

Total Well Depth (ft.) 55.95 Calculate Purge Volume (gal.) 19.4-29

Depth to Static Water Level (ft.) 38.54 Disposal Method Poly IDW Tank Trailer

2.9 Wellhead PID/FID N/A

Original Well Development Redevelopment Date of Original Development _____

DEVELOPMENT METHOD Steel Bail/ Surge Block PURGE METHOD Submersible Pump

Field Testing Equipment Used: Make Model Serial Number
Horiba U-52 P1MTDYFE

Field Testing Calibration Documentation Found in Field Notebook # _____ Page # _____

Time	Volume Removed (gal)	T° (C/F)	pH	Spec. Cond (umhos)	Turbidity (NTUs)	DO	ORP	Odor	Color	Water Level
1055	5	19.23	7.91	4.13	2999	3.89	85	None	Brown	38.60
1100	20	19.35	7.59	4.09	45.6	2.53	66	"	Clear	"
1105	35	18.91	7.56	4.13	8.4	1.86	66	"	"	38.65
1110	50	18.92	7.44	4.13	4.9	1.49	65	"	"	"
1115	65	18.99	7.45	4.13	3.2	1.51	65	"	"	"
1120	80	18.93	7.44	4.14	1.0	1.47	65	"	"	"
<i>Complete</i>										

ACCEPTANCE CRITERIA (from workplan)

Min. Purge Volume (7-10 borehole volumes)	<u>19.4</u> gallons	Has required volume been removed	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>	if there is sufficient recharge but not over 4 hrs
Maximum Turbidity Allowed	<u>10</u> NTUs	Has required turbidity been reached	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Stabilization of parameters 10%		Have parameters stabilized	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
pH +/-0.1		If no or N/A explain below:				

temp 1 degree C
all others 10%

Pump Set @ ~54 ft Purge Rate @ 3 GPM Development Complete 1120 90gal

Time	Water Level	Total Depth	Comments
As built	-	55	Screen = 3555
0940	38.54	55.68	
0950-1000	38.56	55.80	1 Gal removed
1010-1030	38.54	55.45	
1030-1040	38.60	55.85	2 Gal removed

Signature [Signature] Date: 5/1/19

Well/Piezometer Development Record

Client: NDEP Site Location: LV Wash

Project No: 60477365-2016-170 Developer: J Capotrio/ F Verduzco Date: 5/1/19

WELL/PIEZOMETER DATA

Well Piezometer Diameter 4" Material: Sched 40 PVC

Measuring Point Description TOC Geology at Screen Interval _____

Depth to Top of Screen (ft.) 15

Depth to Bottom of Screen (ft.) 35 Time of Water Level Measurement 1230

Total Well Depth (ft.) 35.05 Calculate Purge Volume (gal.) 75.5-108

Depth to Static Water Level (ft.) 18.45 Disposal Method Poly IDW Tank Trailer

10.79 Wellhead PID/FID N/A

Original Well Development Redevelopment Date of Original Development _____

DEVELOPMENT METHOD Steel Bail/ Surge Block **PURGE METHOD** Submersible Pump

Field Testing Equipment Used: Make Model Serial Number
Horiba U-52 P1MTDYFE

Field Testing Calibration Documentation Found in Field Notebook # 1 Page # _____

Time	Volume Removed (gal)	T° (C/F)	pH	Spec. Cond (umhos)	Turbidity (NTUs)	DO	ORP	Odor	Color	Water Level
1335	12	20.94	7.84	3.82	>999	5.75	100	None	Brown	19.45
1355	72	14.77	7.56	3.94	153	3.55	151	"	Clear	19.50
1403	102	18.31	7.46	3.87	224.7	1.73	149	"	"	"
1416	117	18.48	7.39	3.87	8.5	1.44	151	"	"	"
1415	132	18.43	7.41	3.94	8.0	1.47	149	"	"	"
1420	147	18.42	7.41	3.97	8.4	1.48	149	"	"	"
<i>Complete</i>										
AP										
5/1/19										

ACCEPTANCE CRITERIA (from workplan)

Min. Purge Volume (7-10 borehole volumes) <u>75.5</u> gallons	Has required volume been removed	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>	if there is sufficient recharge but not over 4 hrs
Maximum Turbidity Allowed <u>N/A</u> NTUs	Has required turbidity been reached	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Stabilization of parameters 10%	Have parameters stabilized	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
pH +/-0.1	If no or N/A explain below:				

temp 1 degree C
all others 10%

Pump Set @ -34 ft Purge Rate @ 3 GPM Development Complete 1420 147 gal

Time		Water Level	Total Depth	Comments
	As built	<u>18.58</u>	<u>36</u>	Screen = <u>15-35</u>
<u>1230</u>	Arrive	<u>18.45</u>	<u>34.32</u>	
<u>1240-1250</u>	1st bail	<u>18.49</u>	<u>35.05</u>	<u>7.5</u> Gal removed
<u>1255-1315</u>	surge	<u>18.45</u>	<u>34.90</u>	
<u>1315-1320</u>	2nd bail	<u>18.45</u>	<u>35.05</u>	<u>2.5</u> Gal removed

Signature [Signature] Date: 5/1/19

Well/Piezometer Development Record

Client: NDEP Site Location: LV Wash
 Project No: 60477365-2018-171 Date: 4/9/19 Developer: J CARTRIO

WELL/PIEZOMETER DATA

Well Piezometer Diameter 4" Material Sec 40 PVC
 Measuring Point Description TOC Geology at Screen Interval (if known) _____
 Depth to Top of Screen (ft.) 15
 Depth to Bottom of Screen (ft.) 35 Time of Water Level Measurement 0935
 Total Well Depth (ft.) 35.20 Calculate Purge Volume (gal.) 112-161
 Depth to Static Water Level (ft.) 10.43 Disposal Method Poly Tank Trailer
16.1 gal Wellhead PID/FID N/A
 Original Well Development Redevelopment Date of Original Development _____
 DEVELOPMENT METHOD Steel boiler / surge block PURGE METHOD Submersible pump
 Field Testing Equipment Used: _____ Make Horiba Model U52 Serial Number PIMFDYEE

Field Testing Calibration Documentation Found in Field Notebook # Volume 1 Page # 14
4/9/19 Calibration Cert

Time	Volume Removed (gal)	T° (C/F)	pH	Spec. Cond (umhos)	Turbidity (NTUs)	DO	Color	Odor	ORP Other	ht ^o level
1005	30	17.94	6.57	5.09	2999	4.21	Brown	None	43	10.56
1035	80	16.67	6.42	2.91	897	1.81	cloudy	None	34	15.31
1055	105	16.96	6.52	3.11	349	3.54	clear	None	35	18.95
1105	120	16.98	6.53	3.20	329	2.88	clear	None	34	19.32
1115	135	17.01	6.53	3.19	292	2.96	clear	None	32	19.65
1125	150	17.02	6.52	3.17	299	2.87	clear	None	33	
1130										

ACCEPTANCE CRITERIA (from workplan)

Min. Purge Volume (7-10 borehole volumes) 112 gallons: Has required volume been removed
 Maximum Turbidity Allowed N/A NTUs: Has required turbidity been reached
 Stabilization of parameters 10%
 pH +/-0.1: Have parameters stabilized
 temp 1 degree C: If no or N/A explain below:
 all others 10%

Development Complete 1130
 Pump @ 34 gal
 Pump Rate 2 gal/min @ 1.5 gal/min

Yes No N/A
 if there is sufficient recharge but not over 4 hrs

Signature: _____ Date: 4/9/19

as built 1120 10.36 TD=37.5 Screen 15-35
 @ 10M3 TD=34.58 - 890-0945N
 over post Build 1 1120 @ 21.15 TD=35.19 15 gal
 over post Surge 1120 @ 10.22 TD 35.20
 over post Build 2 1120 @ 19.01 TD 35.20 15 gal

Well/Piezometer Development Record

Client: NDEP Site Location: 10 Wash
 Project No: 60477365-2018-171 Date: 4/10/19 Developer: J CAPOTRIO / D MOORE

WELL/PIEZOMETER DATA

Well Piezometer Diameter 4" Material SLU 40 PVC
 Measuring Point Description TOC Geology at Screen Interval _____
 Depth to Top of Screen (ft.) 25 (if known) _____
 Depth to Bottom of Screen (ft.) 45 Time of Water Level Measurement 1400
 Total Well Depth (ft.) 45.45 Calculate Purge Volume (gal) 102-145 ~~145~~
 Depth to Static Water Level (ft.) 23.03 Disposal Method Poly EDW Tank Transfer
14.5gal Wellhead PID/FID N/A

Original Well Development Redevelopment Date of Original Development _____
 DEVELOPMENT METHOD Steel Bailer / Surge block PURGE METHOD submersible pump

Field Testing Equipment Used Make Model Serial Number
Heraeus U-52 PIMTOYFE

Field Testing Calibration Documentation Found in Field Notebook # 1 Page # 6

Time	Volume Removed (gal)	T° (C/F)	pH	Spec. Cond (umhos)	Turbidity (NTUs)	DO	Color	Odor	GRP Other	Wd Level
1515	25	18.06	7.10	2.71	4.29	3.27	clear	None	-25	23.31
1525	75	18.27	7.00	2.71	17.1	1.97	clear	None	-21	23.31
1530	100	18.29	6.95	2.71	19.7	1.47	clear	None	-21	23.31
1535	125	18.33	6.95	2.71	10.9	1.06	clear	None	-19	23.31
1540	150	18.34	6.94	2.71	10.1	1.06	clear	None	-18	23.31
1545	175	18.33	6.94	2.71	10.2	0.98	clear	None	-18	23.31
					<u>EC</u>					
					<u>4/10/19</u>					

ACCEPTANCE CRITERIA (from workplan)
 Min. Purge Volume (7-10 borehole volumes) 102 gallon: Has required volume been removed Yes No N/A
 Maximum Turbidity Allowed N/A NTUs: Has required turbidity been reached Yes No N/A
 Stabilization of parameters 10%: Have parameters stabilized Yes No N/A
 pH +/-0.1: If no or N/A explain below:
 temp 1 degree C
 all others 10%

Pump @ - 44'
Purge Rate - 5 gal / min
Development Complete - 1545

Signature: _____ Date: 4/10/19

As Result Wd @ 23.03; 47.5 Screen 25-45
1400 Arrive Wd @ 23.03, TD = 47.34
1420-1445 Post Bail 1 - Wd @ 23.11, TD = 45.47, 12 gal
1420-1450 Post Surge - Wd @ 23.05, TD = 45.45
1450-1300 Post Bail 2 - Wd @ 23.32, TD = 45.45, 12 gal

Well/Piezometer Development Record

Client: NDEP Site Location: LV Wash
 Project No: 60477365-2018-171 Date: 4/18/19 Developer: J CARTRIO / D Moore

WELL/PIEZOMETER DATA

Well Piezometer Diameter 4" Material Sed 4/8 AC
 Measuring Point Description FOC Geology at Screen Interval _____
 Depth to Top of Screen (ft.) 34.5
 Depth to Bottom of Screen (ft.) 35.5 Time of Water Level Measurement 1310
 Total Well Depth (ft.) 55.48 Calculate Purge Volume (gal.) 129-184
 Depth to Static Water Level (ft.) 27.01 Disposal Method Pol. EDW Tank Transfer
 Wellhead PID/FID N/A

Original Well Development Redevelopment Date of Original Development _____

DEVELOPMENT METHOD Shot Drill / Surge block PURGE METHOD Submersible pump

Field Testing Equipment Used: Make Horiba Model UA-52 Serial Number PIMTDYFE

Field Testing Calibration Documentation Found in Field Notebook # Verdeh Page # 1
mslem Calibration Cert.

Time	Volume Removed (gal)	T(O/F)	pH	Spec. Cond (umhos)	Turbidity (NTUs)	DO	Color	Odor	GRP - Other	
1430	25	19.36	6.75	5.63	2999	11.01	Brown/tau	non	143	1420
1450	118	18.71	6.92	5.69	43.2	4.67	clear	non	132	1404
1455	140.5	18.71	6.92	5.70	46.7	4.45	clear	non	131	1403
1500	163	18.71	6.92	5.70	44.5	4.33	clear	non	130	1403
1505										
<u>AC 4/18/19 Complete Stable @ 165 gal</u>										

ACCEPTANCE CRITERIA (from workplan)

Min. Purge Volume (7-10 borehole volumes) 129 gallon: Has required volume been removed Yes No N/A
 Maximum Turbidity Allowed _____ NTUs: Has required turbidity been reached Yes No N/A
 Stabilization of parameters 10%: Have parameters stabilized Yes No N/A
 pH +/-0.1: If no or N/A explain below: Development complete - stable @ 165 gal pump @ 3'
 temp 1 degree C
 all others 10%

Signature: [Signature] Date: 4/18/19

132X-1330 Ac built 1600 27.1, TD 55, Screen 34.5-55.5 Flow Rate = 4.5 gal/min
1310 pre bail H2O 27.01; TD 55.01
1315-1330 H2O Post Bail 1 H2O 27.05, TD 55.45 18 gal
1335-1405 Post Surge H2O 27.12, TD 55.48
1410-1415 Post Bail 2 H2O 27.09, TD 55.48 15 gal

Well/Piez. ID: NER74451A

Well/Piezometer Development Record

Client: NDEP Site Location: LV WashProject No: 60477365-2016-170 Developer: J Capotrio/ F Verduzco Date: 5/2/19

WELL/PIEZOMETER DATA

Well Piezometer Diameter 2" Material: Sched 40 PVCMeasuring Point Description TOC Geology at Screen Interval _____Depth to Top of Screen (ft.) 35 _____Depth to Bottom of Screen (ft.) 55 Time of Water Level Measurement _____Total Well Depth (ft.) 55.65 Calculate Purge Volume (gal.) 32.4 - 46.2Depth to Static Water Level (ft.) 26.75 Disposal Method Poly IDW Tank TrailerOriginal Well Development Redevelopment Wellhead PID/FID N/A

Date of Original Development _____

DEVELOPMENT METHOD Steel Bail/ Surge Block PURGE METHOD Submersible PumpField Testing Equipment Used: Make Horiba Model U-52 Serial Number P1MTDYFE

Field Testing Calibration Documentation Found in Field Notebook # _____ Page # _____

Time	Volume Removed (gal)	T° (C/F)	pH	Spec. Cond (umhos)	Turbidity (NTUs)	DO	ORP	Odor	Color	Water Level
1225	5	22.13	7.32	5.22	333	3.97	121	None	cloudy	26.90
1235	40	20.52	7.12	5.31	3.4	2.05	144	"	clear	26.85
1240	57.5	19.81	7.06	5.34	0.0	1.98	144	"	"	"
1245	75	19.21	7.04	5.38	0.0	1.94	147	"	"	"
1250	92.5	19.25	7.04	5.37	0.0	1.99	147	"	"	"
<u>Complete</u>					<u>5/2/19</u>					

ACCEPTANCE CRITERIA (from workplan)

Min. Purge Volume (7-10 borehole volumes) 32.4 gallons Yes No N/A if there is sufficient recharge but not over 4 hrs

Maximum Turbidity Allowed N/A NTUs Yes No N/A

Stabilization of parameters 10% Yes No N/A

pH +/-0.1

temp 1 degree C

all others 10%

If no or N/A explain below: _____

Pump Set @ _____ ft. Purge Rate @ 3.5 GPM Development Complete 1250 92.5 gal

Time		Water Level	Total Depth	Comments
	As built	<u>-</u>	<u>55</u>	Screen = <u>35-55</u>
	Arrive	<u>26.75</u>	<u>55.55</u>	
<u>1135-1140</u>	1st bail	<u>26.96</u>	<u>55.65</u>	<u>1</u> Gal removed
<u>1145-1205</u>	surge	<u>26.98</u>	<u>55.18</u>	
<u>1205-1215</u>	2nd bail	<u>26.98</u>	<u>55.65</u>	<u>1</u> Gal removed

Signature [Signature] Date: 5/2/19

Well/Piezometer Development Record

Client: NDEP Site Location: LV Wash
 Project No: 60477365-2016-170 Developer: J Capotrio/ F Verduzco Date: 5/2/19

WELL/PIEZOMETER DATA

Well Piezometer Diameter 2" Material: Sched 40 PVC
 Measuring Point Description TOC Geology at Screen Interval _____
 Depth to Top of Screen (ft.) 35
 Depth to Bottom of Screen (ft.) 35 Time of Water Level Measurement 0740
 Total Well Depth (ft.) 55.20 Calculate Purge Volume (gal.) 32-45.7
 Depth to Static Water Level (ft.) 26.61 Disposal Method Poly IDW Tank Trailer
4.57 Wellhead PID/FID N/A
 Original Well Development Redevelopment Date of Original Development _____

DEVELOPMENT METHOD Steel Bail/ Surge Block PURGE METHOD Submersible Pump

Field Testing Equipment Used: Make Model Serial Number
Horiba U-52 P1MTDYFE

Field Testing Calibration Documentation Found in Field Notebook # 1 Page # _____

Time	Volume Removed (gal)	T° (C/F)	pH	Spec. Cond (umhos)	Turbidity (NTUs)	DO	ORP	Odor	Color	Water Level
0845	5	16.89	5.94	5.61	360	4.40	227	None	Tan/gray	55.2-26.7
0850	24.4	17.65	6.64	5.60	24-1291	3.85	185	"	Clear	"
0855	54.0	17.99	6.90	5.56	12-6136	3.43	152	"	"	"
0900	73.5	18.05	7.01	5.58	121	3.01	129	"	"	"
0905	93.0	18.27	7.04	5.56	120	3.26	121	"	"	"
0910	112.5	18.22	7.06	5.56	122	3.15	123	"	"	"
<i>Complete</i>										

ACCEPTANCE CRITERIA (from workplan)

Min. Purge Volume (7-10 borehole volumes)	<u>32</u> gallons	Has required volume been removed	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>	if there is sufficient recharge but not over 4 hrs
Maximum Turbidity Allowed	<u>n/a</u> NTUs	Has required turbidity been reached	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Stabilization of parameters 10%		Have parameters stabilized	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
pH +/-0.1		If no or N/A explain below:				

temp 1 degree C
all others 10%

Pump Set @ ~54 ft Purge Rate @ 3.9 GPM Development Complete 0910 112 gal

Time	Water Level	Total Depth	Comments
	As built	<u>~27</u>	Screen = <u>35-55</u>
0740-0740	Arrive	<u>26.61</u>	<u>54.50</u>
<u>0745-0755</u>	1st bail	<u>26.82</u>	<u>55.20</u> 2 Gal removed
<u>0800-0820</u>	surge	<u>26.82</u>	<u>54.45</u>
<u>0820-0830</u>	2nd bail	<u>26.75</u>	<u>55.20</u> 1 Gal removed

Signature: _____ Date: 5/2/19



Well/Piez. ID: NERT 464 S1C

Well/Piezometer Development Record

Client: NDEP Site Location: LV Wash

Project No: 60477365-2016-170 Developer: J Capotrio/ F Verduzco Date: 5/2/19

WELL/PIEZOMETER DATA

Well Piezometer Diameter 2" Material: Sched 40 PVC

Measuring Point Description TOC Geology at Screen Interval _____

Depth to Top of Screen (ft.) 35

Depth to Bottom of Screen (ft.) 55 Time of Water Level Measurement 0920

Total Well Depth (ft.) 55.06 Calculate Purge Volume (gal.) 314-449

Depth to Static Water Level (ft.) 27.02 Disposal Method Poly IDW Tank Trailer

4.49 Wellhead PID/FID N/A

Original Well Development Redevelopment Date of Original Development _____

DEVELOPMENT METHOD Steel Bail/ Surge Block PURGE METHOD Submersible Pump

Field Testing Equipment Used: Make Model Serial Number
Horiba U-52 P1MTDYFE

Field Testing Calibration Documentation Found in Field Notebook # _____ Page # _____

Time	Volume Removed (gal)	T° (C/F)	pH	Spec. Cond (umhos)	Turbidity (NTUs)	DO	ORP	Odor	Color	Water Level
<u>1040</u>	<u>5</u>	<u>20.41</u>	<u>7.35</u>	<u>5.43</u>	<u>7999</u>	<u>4.65</u>	<u>118</u>	<u>None</u>	<u>Brown</u>	<u>27.15</u>
<u>1050</u>	<u>35</u>	<u>19.71</u>	<u>7.21</u>	<u>5.34</u>	<u>73.2</u>	<u>2.62</u>	<u>140</u>	<u>"</u>	<u>Clear</u>	<u>"</u>
<u>1055</u>	<u>50</u>	<u>18.96</u>	<u>7.11</u>	<u>5.40</u>	<u>87.3</u>	<u>2.27</u>	<u>133</u>	<u>"</u>	<u>"</u>	<u>"</u>
<u>1100</u>	<u>65</u>	<u>19.22</u>	<u>7.10</u>	<u>5.34</u>	<u>83.1</u>	<u>2.33</u>	<u>134</u>	<u>"</u>	<u>"</u>	<u>"</u>
<u>1105</u>	<u>80</u>	<u>19.05</u>	<u>7.10</u>	<u>5.39</u>	<u>84.4</u>	<u>2.26</u>	<u>136</u>	<u>"</u>	<u>"</u>	<u>"</u>
<u>Complete</u>										

ACCEPTANCE CRITERIA (from workplan)

Min. Purge Volume (7-10 borehole volumes) <u>314</u> gallons	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>	if there is sufficient recharge but not over 4 hrs
Maximum Turbidity Allowed <u>N/A</u> NTUs	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Stabilization of parameters 10%	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

pH +/-0.1
temp 1 degree C
all others 10%

If no or N/A explain below:

Pump Set @ ~54 ft Purge Rate @ 3 GPM Development Complete 1105 80 gal

Time	Water Level	Total Depth	Comments
As built	-	55	Screen = <u>35-55</u>
<u>0920</u> Arrive	<u>27.02</u>	<u>54.78</u>	
<u>0930-0945</u> 1st bail	<u>27.05</u>	<u>55.06</u>	<u>1</u> Gal removed
<u>0955-1015</u> surge	<u>27.14</u>	<u>45.60</u>	
<u>1015-1025</u> 2nd bail	<u>27.12</u>	<u>55.10</u>	<u>2</u> Gal removed

Signature: _____ Date: 5/2/19



Well/Piez. ID: VERT 4.451D

Well/Piezometer Development Record

Client: NDEP Site Location: LV Wash

Project No: 60477365-2016-170 Developer: J Capotrio/ F Verduzco Date: 5/1/19

WELL/PIEZOMETER DATA

Well Piezometer Diameter _____ Material: Sched 40 PVC

Measuring Point Description TOC Geology at Screen Interval _____
 Depth to Top of Screen (ft.) 35
 Depth to Bottom of Screen (ft.) 55 Time of Water Level Measurement 1500
 Total Well Depth (ft.) 55.76 Calculate Purge Volume (gal.) 31.8-45.5
 Depth to Static Water Level (ft.) 26.68 Disposal Method Poly IDW Tank Trailer
 Wellhead PID/FID N/A

Original Well Development Redevelopment Date of Original Development _____

DEVELOPMENT METHOD Steel Bail/ Surge Block PURGE METHOD Submersible Pump

Field Testing Equipment Used: Make Model Serial Number
Horiba U-52 P1MTDYFE

Field Testing Calibration Documentation Found in Field Notebook # 1 Page # _____

Time	Volume Removed (gal)	T° (C/F)	pH	Spec. Cond (umhos)	Turbidity (NTUs)	DO	ORP	Odor	Color	Water Level
1620	5	21.77	7.93	5.48	2999	2.84	97	None	Brown	26.95
1625	21.5	19.58	7.64	5.69	167	2.37	96	"	Clear	26.95
1630	38	19.76	7.52	5.74	29.2	1.87	97	"	"	26.95
1635	54.5	19.48	7.50	5.80	9.2	1.89	101	"	"	26.95
1640	71	19.28	7.46	5.85	4.8	1.92	103	"	"	26.75
1645	86.5	19.30	7.47	5.83	3.5	1.96	103	"	"	26.70
<i>Complete</i>										
<i>5/1/19</i>										

ACCEPTANCE CRITERIA (from workplan)

Min. Purge Volume (7-10 borehole volumes) <u>32</u> gallons	Has required volume been removed	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>	if there is sufficient recharge but not over 4 hrs
Maximum Turbidity Allowed <u>N/A</u> NTUs	Has required turbidity been reached	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Stabilization of parameters 10%	Have parameters stabilized	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

If no or N/A explain below: _____

pH +/-0.1
temp 1 degree C
all others 10%

Pump Set @ ~54 ft Purge Rate @ 3.3 GPM Development Complete 1645 ~87 gal

Time	Water Level	Total Depth	Comments
	As built <u>~27</u>	<u>55</u>	Screen = <u>35-55</u>
<u>1500</u>	Arrive <u>26.68</u>	<u>55.10</u>	
	1st bail <u>26.47</u>	<u>55.76</u>	<u>2</u> Gal removed
	surge <u>27.20</u>	<u>55.25</u>	
	2nd bail <u>27.00</u>	<u>55.76</u>	<u>2</u> Gal removed

Signature [Signature] Date: 5/1/19



Well/Piez. ID: NET 4.65 NJ

Well/Piezometer Development Record

Client: NDEP Site Location: LV Wash

Project No: 60477365-2016-170 Developer: J Capotrio/ F Verduzco Date: 5/3/19

WELL/PIEZOMETER DATA

Well Piezometer Diameter 4" Material: Sched 40 PVC

Measuring Point Description TOC Geology at Screen Interval _____

Depth to Top of Screen (ft.) 25

Depth to Bottom of Screen (ft.) 45 Time of Water Level Measurement 0745

Total Well Depth (ft.) 45.70 Calculate Purge Volume (gal.) 98-140

Depth to Static Water Level (ft.) 24.11 Disposal Method Poly IDW Tank Trailer

14.0 Wellhead PID/FID N/A

Original Well Development Redevelopment Date of Original Development _____

DEVELOPMENT METHOD Steel Bail/ Surge Block PURGE METHOD Submersible Pump

Field Testing Equipment Used: Make Model Serial Number
Horiba U-52 P1MTDYFE

Field Testing Calibration Documentation Found in Field Notebook # 1 Page # _____

Time	Volume Removed (gal)	T° (C/F)	pH	Spec. Cond (umhos)	Turbidity (NTUs)	DO	ORP	Odor	Color	Water Level
0835	10	16.79	6.57	2.72	>999	3.33	15	None	Brown	24.25
0905	100	18.58	7.05	2.59	514	2.56	80	"	Cloudy	24.20
0910	115	18.82	7.27	2.65	181	2.01	29	"	Clear	24.20
0915	130	18.88	7.36	2.62	136	1.71	18	"	"	"
0920	145	18.95	7.36	2.64	99.2	1.78	15	"	"	"
0925	160	19.01	7.36	2.63	106.3	1.72	16	"	"	"
Complete										

ACCEPTANCE CRITERIA (from workplan)

Min. Purge Volume (7-10 borehole volumes)	<u>98</u> gallons	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>	If there is sufficient recharge but not over 4 hrs
Maximum Turbidity Allowed <u>N/A</u> NTUs		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Stabilization of parameters 10%		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

pH +/-0.1
temp 1 degree C
all others 10%

If no or N/A explain below: _____

Pump Set @ -44 ft Purge Rate @ 3 GPM Development Complete 0925 160gal

Time	Water Level	Total Depth	Comments
As built	<u>24.21</u>	<u>47</u>	Screen = <u>25-45</u>
<u>0745</u> Arrive	<u>24.11</u>	<u>45.66</u>	
<u>740-755</u> 1st bail	<u>24.20</u>	<u>45.70</u>	<u>3</u> Gal removed
<u>755-815</u> surge	<u>24.26</u>	<u>45.60</u>	
<u>815-825</u> 2nd bail	<u>24.25</u>	<u>45.70</u>	<u>3</u> Gal removed

Signature [Signature] Date: 5/3/19

Well/Piezometer Development Record

Client: NDEP Site Location: LV Wash

Project No: 60477365-2016-170 Developer: J Capotrio/ F Verduzco Date: 5/2/19

WELL/PIEZOMETER DATA

Well Piezometer Diameter 4" Material: Sched 40 PVC

Measuring Point Description TOC Geology at Screen Interval _____

Depth to Top of Screen (ft.) 25

Depth to Bottom of Screen (ft.) 45 Time of Water Level Measurement 1410

Total Well Depth (ft.) 45.24 Calculate Purge Volume (gal.) 92.75 - 132.5

Depth to Static Water Level (ft.) 24.85 Disposal Method Poly IDW Tank Trailer

Wellhead PID/FID N/A

Original Well Development Redevelopment Date of Original Development _____

DEVELOPMENT METHOD Steel Bail/ Surge Block PURGE METHOD Submersible Pump

Field Testing Equipment Used: Make Model Serial Number
Horiba U-52 P1MTDYFE

Field Testing Calibration Documentation Found in Field Notebook # 1 Page # _____

Time	Volume Removed (gal)	T° (C/F)	pH	Spec. Cond (umhos)	Turbidity (NTUs)	DO	ORP	Odor	Color	Water Level
1520	15	24.79	7.40	2.29	>999	4.25	-9	None	Brown	25.10
1550	10.5	22.22	7.38	442.19	>999	1.42	-51	None	Brown/tan	26.40
1600	135	20.75	7.30	2.16	>999	1.30	-69	"	"	26.40
1610	165	20.18	7.18	2.18	577	1.05	-58	"	Cloudy	26.40
1615	180	20.32	7.13	2.20	132	0.93	-58	"	Clear	26.40
1620	195	20.04	7.13	2.24	62.7	0.76	-56	"	"	26.40
1625	210	19.98	7.12	2.17	20.6	0.89	-49	"	"	"
1630	240	19.94	7.10	2.18	22.3	0.94	-48	"	"	"
1635	270	19.98	7.11	2.20	20.8	0.97	-47	"	"	"
<u>Complete</u>										

ACCEPTANCE CRITERIA (from workplan)

Min. Purge Volume (7-10 borehole volumes) 92.75 gallons Has required volume been removed Yes No N/A if there is sufficient recharge but not over 4 hrs

Maximum Turbidity Allowed N/A NTUs Has required turbidity been reached Yes No N/A

Stabilization of parameters 10% Have parameters stabilized Yes No N/A

pH +/-0.1 If no or N/A explain below: _____

temp 1 degree C

all others 10%

Pump Set @ -44 ft Purge Rate @ 3 GPM Development Complete 1635 270 gal

Time	Water Level	Total Depth	Comments
	As built <u>27.87</u>	<u>50</u>	Screen = <u>30-50</u>
<u>1410</u>	Arrive <u>24.85</u>	<u>43.08</u>	
<u>1420 - 1430</u>	1st bail <u>26.40</u>	<u>45.24</u>	<u>6</u> Gal removed
<u>1435 - 1455</u>	surge <u>24.09</u>	<u>45.20</u>	
<u>1455 1505</u>	2nd bail <u>25.07</u>	<u>45.24</u>	<u>6</u> Gal removed

Signature _____ Date: 5/2/19

Well/Piezometer Development Record

Client: NDEP Site Location: LV Wash
 Project No: 60477365-2018-171 Date: 4/10/19 Developer: J CAROTRIS / D MOORE

WELL/PIEZOMETER DATA

Well Piezometer Diameter 4" Material Sched 40 PVC
 Measuring Point Description TOC Geology at Screen Interval _____
 Depth to Top of Screen (ft.) 25
 Depth to Bottom of Screen (ft.) 45 Time of Water Level Measurement 1130
 Total Well Depth (ft.) 45.5 Calculate Purge Volume (gal) 80-115
 Depth to Static Water Level (ft.) 27.86 Disposal Method Poly I.D.W Tank Trailer
11.47 Wellhead PID/FID N/A
 Original Well Development Redevelopment Date of Original Development _____
 DEVELOPMENT METHOD Steel Bailer / Surge pump PURGE METHOD Submersible pump
 Field Testing Equipment Used: Make Horiba Model U-52 Serial Number P1MTOYFE

Field Testing Calibration Documentation Found in Field Notebook # 1 Page # 6

Time	Volume Removed (gal)	T° (C/F)	pH	Spec. Cond (umhos)	Turbidity (NTUs)	DO	Color	Odor	ORP / Other	W ₂ vol
1250	25	19.16	6.84	2.15	2999	3.20	Brown	None	2.14	27.90
1300	65	19.57	6.92	2.11	41.9	1.76	Clear	None	-10	27.90
1305	85	19.55	6.93	2.10	19.4	1.62	clear	None	-16	27.90
1320	105	19.56	6.94	2.10	19.7	0.99	clear	None	-16	27.90
1315	125	19.56	6.94	2.10	19.8	0.97	clear	None	-16	27.90
<u>4/10/19</u>										

ACCEPTANCE CRITERIA (from workplan)

Min. Purge Volume (7-10 borehole volumes) 50 gallon: Has required volume been removed Yes No N/A
 Maximum Turbidity Allowed N/A NTUs: Has required turbidity been reached Yes No N/A
 Stabilization of parameters 10%: Have parameters stabilized Yes No N/A
 pH ±0.1: If no or N/A explain below: _____
 temp 1 degree C: _____
 all others 10%: _____

Signature: [Signature] Date: 4/10/19

As Built 160 27.87, TDE 47.5 Screen 25.45
1130 e Arrived - 1600 27.96 TD = 44.3
1135 - 1450 Post Bail 1 - 1600 27.97 TD = 48.53, 12 gal
1155 - 1230 Post Surge - 1600 27.92 TD = 48.5, 12 gal
1225 - 1230 Post Bail 2 - 1600 27.90 TD = 48.5, 12 gal

Well/Piezometer Development Record

Client: NDEP Site Location: LV Wash
 Project No: 60477365-2018-171 Date: 4/8/19 Developer: J CAPOTRIO / D MOORE

WELL/PIEZOMETER DATA

Well Piezometer Diameter 4" Material Sch 40 PVC

Measuring Point Description TC Geology at Screen Interval (if known) _____

Depth to Top of Screen (ft.) 34.5

Depth to Bottom of Screen (ft.) 54.5 Time of Water Level Measurement 100F

Total Well Depth (ft.) 55 Calculate Purge Volume (gal.) 123-177

Depth to Static Water Level (ft.) 27.51 Disposal Method Apply EDW Tank Breaker

Wellhead PID/FID N/A

Original Well Development Redevelopment Date of Original Development _____

DEVELOPMENT METHOD Steel Reel / Surge block PURGE METHOD Submersible pump

Field Testing Equipment Used: Make Honda Model US2 Serial Number P1MTPYFE

Field Testing Calibration Documentation Found in Field Notebook # Vendor Calibration Cert Page # 1

Time	Volume Removed (gal)	T° (C/F)	pH	Spec. Cond (umhos)	Turbidity (NTUs)	DO	Color	Odor	GRP Other
1130	24	19.54	6.68	5.05	299P	8.53	Brown/lt	None	110
1145	69	19.01	7.01	5.02	724	2.94	clear		58
1200	114	18.93	7.00	5.02	453	2.41			62
1205	129	18.99	7.00	5.03	274	2.53			67
1210	144	18.98	6.99	5.03	196	2.34			67
1215	159	18.97	6.98	5.03	167	2.28			67
1220	174	18.96	6.98	5.03	158	2.26	L	L	67
1225	189	18.97	6.98	5.03	149	2.23	L	L	67

1420 level
 27.35
 27.35
 27.35
 27.35
 27.35
 27.35
 27.35
 27.35

ACCEPTANCE CRITERIA (from workplan)

Min. Purge Volume (7-10 borehole volumes) 123 gallon: Has required volume been removed
 Maximum Turbidity Allowed N/A NTUs: Has required turbidity been reached
 Stabilization of parameters 10%: Have parameters stabilized
 pH +/-0.1: If no or N/A explain below:
 temp 1 degree C
 all others 10%

Yes/ No N/A
 if there is sufficient recharge but not over 4 hrs

pump ~ 2' off bottom / stable @ 10x Vol
Rate = 3 gal/min

Signature: _____ Date: 4/9/19

As built 1420 27.26 TD=55 Screen 34.5-54.5
 0955-1000 Port Reel 1420 27.26 TD=52.52 12 gal
 1005 Port Reel 1420 27.51 TD=54.64 12 gal
 1015-1055 Port Reel 1420 27.48 TD=54.68
 1100 Port Reel 1420 27.50 TD=54.63 12 gal

Appendix F

Soil Property Lab Reports



Physical Properties Data

Petroleum Services

Ramboll US Corporation

Core Lab File No.: 1901575

Project Name : NERT Phase 3 Modification 6

Project Number : 1690011200-050

Sample ID.	Depth ft.	METHODS: Sample ¹ Orientation	ASTM D2216		ASTM D2937 Dry Bulk Density g/cc	API RP40		Total Organic Carbon mg/kg	Walkley-Black Fractional Organic Carbon g/g
			Moisture Content			Porosity			
			%	ml/ml		Total ² %Vb ⁴	Air Filled ³ %Vb ⁴		
PT-NERT3.60S1-68.2-68.5	68.2-68.5	V	16.9	0.314	1.86	31.6	0.171	15200	1.52E-02
PT-NERT3.60S1-86.0-86.3	86.0-86.3	V	14.9	0.291	1.95	29.1	0.015	23800	2.38E-02
PT-NERT3.58S1-60.0-60.3	60.0-63.3	--	6.58	0.122	1.86	30.6	18.4	7000	7.00E-03
PT-NERT4.71S2-29.7-30.0	29.7-30.0	V	23.0	0.394	1.66	38.2	0.035	4900	4.90E-03
PT-NERT3.98S1-9.7-10.0	9.7-10.0	V	11.2	0.224	2.00	25.1	2.66	10700	1.07E-02
PT-NERT3.98S1-17.0-17.3	17.0-17.3	V	11.7	0.225	1.92	27.8	5.25	6200	6.20E-03
PT-NERT4.64N1-37.0-37.3	37.0-37.3	V	18.0	0.322	1.79	33.7	1.47	11100	1.11E-02
PT-NERT4.64N1-68.0-68.3	68.0-68.3	V	11.9	0.239	2.02	25.5	1.57	7600	7.60E-03
PT-NERT4.71N1-58.5-59.0	58.5-59.0	V	32.3	0.468	1.44	46.7	0.023	8400	8.40E-03
PT-NERT3.60N1-26.0-26.4	26.0-26.4	V	28.8	0.435	1.51	43.6	0.038	23400	2.34E-02
PT-NERT3.60N1-42.3-42.5	42.3-42.5	V	15.6	0.281	1.80	34.1	5.97	7100	7.10E-03
PT-NERT-4.65N1-53.0-53.3	53.0-53.3	V	34.9	0.485	1.39	48.6	0.086	10200	1.02E-02
PT-NERT3.40S1-47.0-47.3	47.0-47.3	V	10.1	0.207	2.05	23.7	2.99	5000	5.00E-03
PT-NERT3.63S1-49.0-49.4	49.0-49.4	V	22.7	0.379	1.67	39.1	1.13	7100	7.10E-03

(1) Sample Orientation: H = horizontal; V = vertical; (--) = Sample received as loose grains in a bag.

(2) Total Porosity = no pore fluids in place; all interconnected pore channels.

(3) Air Filled Porosity = pore channels not occupied by pore fluids.

(4) Vb = Bulk Volume, cc.



ATTERBERG LIMITS AND SOIL CLASSIFICATION DATA

PETROLEUM SERVICES

Ramboll US Corporation
 Project Name : NERT Phase 3 Modification 6
 Project Number : 1690011200-050

Core Lab File No.: 1901575

Sample ID	Depth, ft.	METHODS: ASTM D4318			ASTM D4318	ASTM D2487	USDA
		Atterberg Limits ¹			USCS / Plasticity Chart Symbol (Fines: <#40 Sieve)	USCS Classification Group Symbol: Name	USDA/SCS ² Soil Texture Scheme
		Liquid Limit LL	Plastic Limit PL	Plasticity Index PI			
PT-NERT3.60S1-68.2-68.5	68.2-68.5	32	20	12	CL	Lean Clay	Silty Clay Loam
PT-NERT3.60S1-86.0-86.3	86.0-86.3	27	16	11	CL	Lean Clay	Silty Clay Loam
PT-NERT3.58S1-60.0-60.3	60.0-60.3	31	16	15	CL	Lean Clay with Sand	Silt Loam
PT-NERT4.71S2-29.7-30.0	29.7-30.0	24	15	9	CL	Sandy Lean Clay	Loam
PT-NERT3.98S1-9.7-10.0	9.7-10.0	17	14	3	ML	Sandy Silt	Loam
PT-NERT3.98S1-17.0-17.3	17.0-17.3	15	13	2	ML	SM: Silty Sand	Sandy Loam
PT-NERT4.64N1-37.0-37.3	37.0-37.3	30	18	12	CL	Lean Clay	Silty Clay Loam
PT-NERT4.64N1-68.0-68.3	68.0-68.3	36	17	19	CL	Sandy Lean Clay	Loam
PT-NERT4.71N1-58.5-59.0	58.5-59.0	43	22	21	CL	Lean Clay	Silty Clay
PT-NERT3.60N1-26.0-26.4	26.0-26.4	34	23	11	CL	Lean Clay with Sand	Silty Clay Loam
PT-NERT3.60N1-42.3-42.5	42.3-42.5	31	16	15	CL	Lean Clay	Silty Clay Loam
PT-NERT-4.65N1-53.0-53.3	53.0-53.3	51	20	31	CH	Fat Clay with Sand	Silt Loam
PT-NERT3.40S1-47.0-47.3	47.0-47.3	16	14	2	ML	SM: Silty Sand	Loam
PT-NERT3.63S1-49.0-49.4	49.0-49.4	38	21	17	CL	Lean Clay	Silty Clay

USCS: Unified Soil Classification System
 USDA: US Department of Agriculture
 SCS: Soil Conservation Service

(1) Silt assumed as fine fraction for NON-PLASTIC (NP) samples.
 (2) Sand considered to be >No. 200 sieve for USDA SOIL TEXTURE SCHEME.



SIEVE and LASER PARTICLE SIZE SUMMARY

(METHODOLOGY: ASTM D422/D4464M)

Petroleum Services

Company: Ramboll US Corporation
Project Name: NERT Phase 3 MOD 6
Project Number: 1690011200-050

CL File No.: 1901575
Date: 8/29/2019

Depth (ft)	Grain Size Description** (Mean from Trask)	Median Grain Size, mm	Component Percentages						
			Gravel	Sand Sized			Silt	Clay	Silt & Clay
				Coarse	Medium	Fine			
Nert 3.60 S1-68.2-68.5	Silt	0.0103	0.00	0.00	0.03	7.18	57.14	35.65	92.79
Nert 3.60 S1-86.0-86.3	Silt	0.0120	0.00	0.00	0.00	7.90	56.97	35.13	92.10
Nert 3.58 S1-60.0-60.3	Silt	0.0237	0.00	0.00	0.16	23.93	50.72	25.19	75.91
Nert 4.71 S2-29.7-30.0	Fine Grain Sand	0.0456	0.00	1.64	16.95	24.25	40.08	17.09	57.17
Nert3.98S1-9.7-10.0	Silt	0.0366	0.00	0.00	2.62	31.67	45.87	19.84	65.71
Nert3.98S1-17.0-17.3	Fine Grain Sand	0.0891	0.00	0.00	2.96	50.54	28.21	18.29	46.50
Nert4.64N1-37.0-37.3	Silt	0.0125	0.00	0.00	0.82	6.18	65.20	27.80	93.00
Nert4.64N1-68.0-68.3	Silt	0.0313	0.00	0.00	5.99	24.98	47.92	21.10	69.02
Nert4.71N1-58.5-59.0	Silt	0.0075	0.00	0.00	0.00	1.95	56.83	41.22	98.05
Nert3.60N1-26.0-26.4	Silt	0.0095	0.00	0.00	0.00	19.46	42.76	37.78	80.54
Nert3.60N1-42.3-42.5	Silt	0.0093	0.00	0.00	0.00	6.20	55.22	38.58	93.80
Nert4.65N1-53.0-53.3	Silt	0.0149	0.00	0.00	2.15	18.14	52.99	26.73	79.71
Nert3.40S1-47.0-47.3	Fine Grain Sand	0.0747	0.00	2.48	14.14	33.47	28.28	21.63	49.91
Nert3.63S1-49.0-49.4	Silt	0.0047	0.00	0.00	0.00	1.41	43.52	55.07	98.59

**USCS Scale



SIEVE and LASER PARTICLE SIZE SUMMARY

(METHODOLOGY: ASTM D422/D4464M)

Petroleum Services

Company: Ramboll US Corporation
 Project Name: NERT Phase 3 MOD 6
 Project Number: 1690011200-050

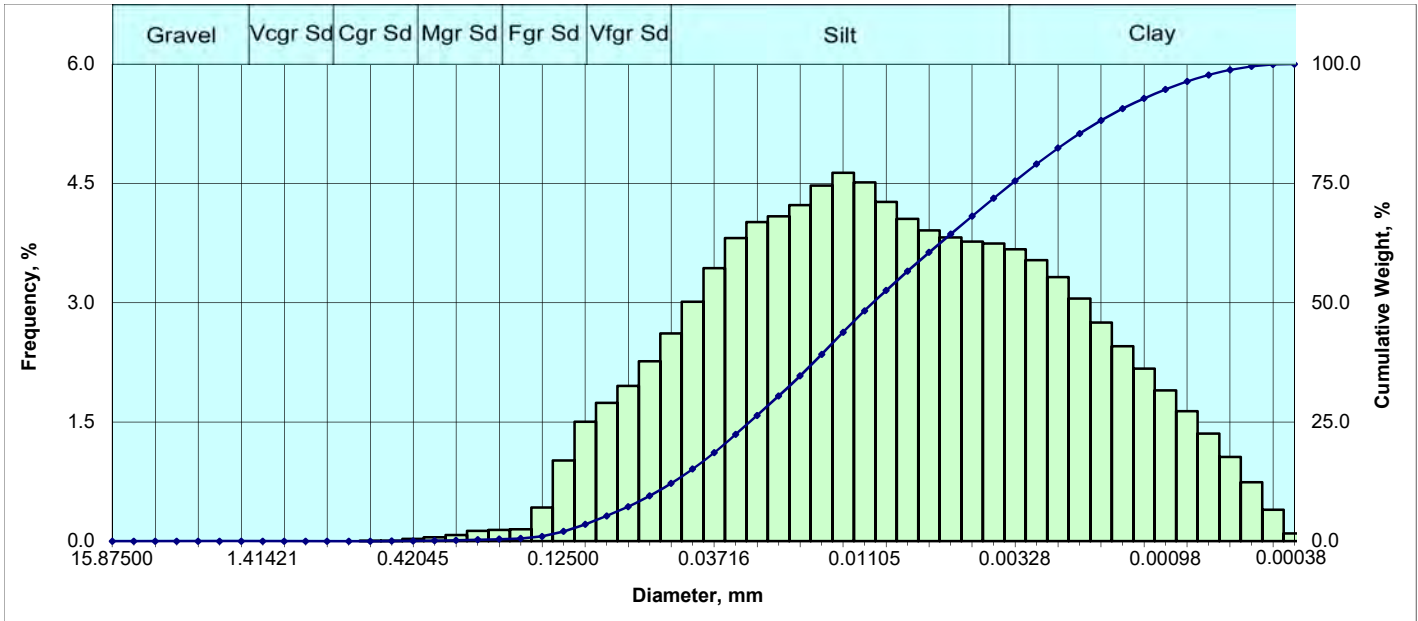
CL File No.: 1901575
 Date: 8/29/2019

Depth (ft)	Grain Size Description** (Mean from Folk)	Median Grain Size, mm	Component Percentages								
			Gravel	Sand Size					Silt	Clay	Silt & Clay
				VCoarse	Coarse	Medium	Fine	VFine			
Nert 3.60 S1-68.2-68.5	Silt	0.0103	0.00	0.00	0.00	0.28	1.73	7.46	62.39	28.14	90.53
Nert 3.60 S1-86.0-86.3	Silt	0.0120	0.00	0.00	0.00	0.00	1.51	9.74	59.97	28.78	88.75
Nert 3.58 S1-60.0-60.3	Silt	0.0237	0.00	0.00	0.02	2.32	10.00	15.64	51.97	20.05	72.02
Nert 4.71 S2-29.7-30.0	Silt	0.0456	1.64	5.14	9.06	11.08	8.67	9.76	41.56	13.09	54.65
Nert3.98S1-9.7-10.0	Silt	0.0366	0.00	0.26	1.58	5.37	13.26	18.12	45.67	15.74	61.41
Nert3.98S1-17.0-17.3	Silt	0.0891	0.00	1.60	0.70	11.08	26.96	15.81	29.18	14.67	43.85
Nert4.64N1-37.0-37.3	Silt	0.0125	0.00	0.00	0.65	0.85	1.19	6.61	70.35	20.35	90.70
Nert4.64N1-68.0-68.3	Silt	0.0313	0.00	2.07	3.03	5.05	9.89	14.74	49.03	16.19	65.22
Nert4.71N1-58.5-59.0	Silt	0.0075	0.00	0.00	0.00	0.00	0.33	2.50	65.85	31.33	97.17
Nert3.60N1-26.0-26.4	Silt	0.0095	0.00	0.00	0.00	1.30	10.75	9.17	49.35	29.42	78.78
Nert3.60N1-42.3-42.5	Silt	0.0093	0.00	0.00	0.00	0.00	0.87	7.86	60.19	31.08	91.27
Nert4.65N1-53.0-53.3	Silt	0.0149	0.00	0.47	0.92	4.82	7.87	8.06	57.63	20.24	77.88
Nert3.40S1-47.0-47.3	Silt	0.0747	2.48	6.61	6.13	8.01	14.79	15.09	29.05	17.85	46.90
Nert3.63S1-49.0-49.4	Silt	0.0047	0.00	0.00	0.00	0.00	0.21	1.80	53.78	44.21	97.99

**Wentworth Scale



Sieve and Laser Particle Size Analysis



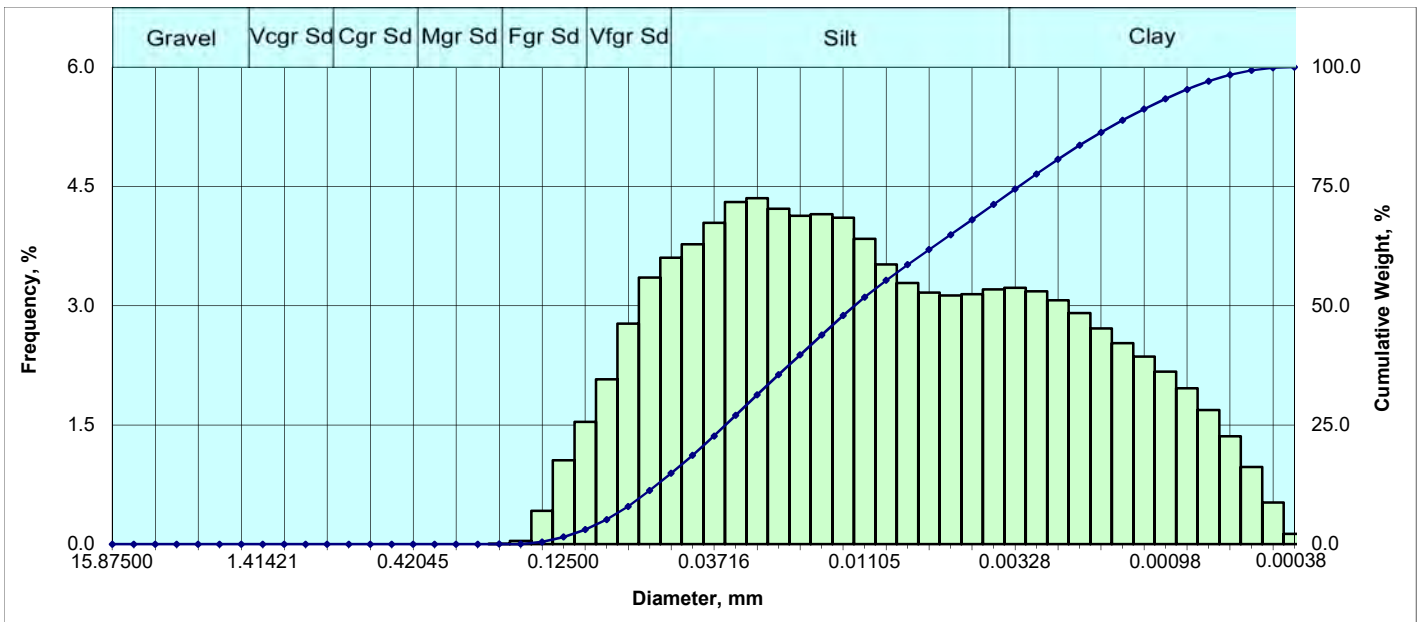
Particle Size Distribution							
	Diameter			Weight %			
	[US Mesh]	[in.]	[mm]	[φ]	[Incl.] [Cum.]		
Gravel	5/8 in.	0.625000	15.87500	-4.00	0.000	0.00	
	3/8 in.	0.375000	9.50000	-3.25	0.000	0.00	
	4	0.187008	4.75000	-2.25	0.000	0.00	
	6	0.131890	3.35000	-1.75	0.000	0.00	
	8	0.092913	2.36000	-1.25	0.000	0.00	
V Crse Sand	10	0.078740	2.00000	-1.00	0.000	0.00	
	12	0.066212	1.68179	-0.75	0.000	0.00	
	14	0.055678	1.41421	-0.50	0.000	0.00	
	16	0.046819	1.18921	-0.25	0.000	0.00	
Coarse Sand	18	0.039370	1.00000	0.00	0.000	0.00	
	20	0.033106	0.84090	0.25	0.000	0.00	
	25	0.027839	0.70711	0.50	0.000	0.00	
	30	0.023410	0.59460	0.75	0.000	0.00	
	35	0.019685	0.50000	1.00	0.004	0.00	
Medium Sand	40	0.016553	0.42045	1.25	0.027	0.03	
	45	0.013919	0.35355	1.50	0.049	0.08	
	50	0.011705	0.29730	1.75	0.077	0.16	
	60	0.009843	0.25000	2.00	0.130	0.29	
Fine Sand	70	0.008277	0.21022	2.25	0.140	0.43	
	80	0.006960	0.17678	2.50	0.149	0.57	
	100	0.005852	0.14865	2.75	0.423	1.00	
	120	0.004921	0.12500	3.00	1.015	2.01	
V. Fine Sand	140	0.004138	0.10511	3.25	1.503	3.52	
	170	0.003480	0.08839	3.50	1.741	5.26	
	200	0.002926	0.07433	3.75	1.952	7.21	
	230	0.002461	0.06250	4.00	2.263	9.47	
	270	0.002069	0.05256	4.25	2.614	12.09	
	325	0.001740	0.04419	4.50	3.014	15.10	
Silt	400	0.001463	0.03716	4.75	3.436	18.54	
	450	0.001230	0.03125	5.00	3.814	22.35	
	500	0.001035	0.02628	5.25	4.015	26.36	
	635	0.000870	0.02210	5.50	4.086	30.45	
		0.000732	0.01858	5.75	4.226	34.68	
		0.000615	0.01562	6.00	4.473	39.15	
		0.000517	0.01314	6.25	4.634	43.78	
		0.000435	0.01105	6.50	4.512	48.30	
		0.000366	0.00929	6.75	4.270	52.57	
		0.000308	0.00781	7.00	4.056	56.62	
		0.000259	0.00657	7.25	3.908	60.53	
		0.000217	0.00552	7.50	3.819	64.35	
		0.000183	0.00465	7.75	3.769	68.12	
		0.000154	0.00391	8.00	3.745	71.86	
	Clay		0.000129	0.00328	8.25	3.673	75.54
			0.000109	0.00276	8.50	3.534	79.07
		0.000091	0.00232	8.75	3.321	82.39	
		0.000077	0.00195	9.00	3.053	85.45	
		0.000065	0.00164	9.25	2.752	88.20	
		0.000054	0.00138	9.50	2.452	90.65	
		0.000046	0.00116	9.75	2.171	92.82	
		0.000038	0.00098	10.00	1.897	94.72	
		0.000032	0.00082	10.25	1.635	96.35	
		0.000027	0.00069	10.50	1.355	97.71	
		0.000023	0.00058	10.75	1.058	98.77	
		0.000019	0.00049	11.00	0.741	99.51	
		0.000016	0.00041	11.25	0.396	99.90	
		0.000015	0.00038	11.50	0.097	100.00	

Sorting Statistics (Folk)				
Parameter	Trask	Inman	Folk	
Median	Silt sized			
(in)	0.0004	0.0004	0.0004	
(mm)	0.0103	0.0103	0.0103	
Mean	Silt sized			
(in)	0.0006	0.0004	0.0004	
(mm)	0.0157	0.0095	0.0098	
Sorting	Very poor			
	2.878	2.157	2.076	
Skewness	Near symmetrical			
	0.939	0.072	0.052	
Kurtosis	Platykurtic			
	0.208	0.525	0.884	
Component Percentages				
Gravel	Sand	Silt	Clay	Silt + Clay
0.00	9.47	62.39	28.14	90.53
Percentile [Weight, %]	Particle Diameter			
	[in.]	[mm]	[phi]	
5	0.0036	0.0909	3.4603	
10	0.0024	0.0605	4.0471	
16	0.0017	0.0424	4.5614	
25	0.0011	0.0280	5.1601	
40	0.0006	0.0152	6.0427	
50	0.0004	0.0103	6.5946	
70	0.0002	0.0043	7.8701	
75	0.0001	0.0034	8.2106	
84	0.0001	0.0021	8.8762	
90	0.0001	0.0015	9.4294	
95	0.0000	0.0009	10.0400	

**All Grain Sizes Classed Using Wentworth Scale



Sieve and Laser Particle Size Analysis



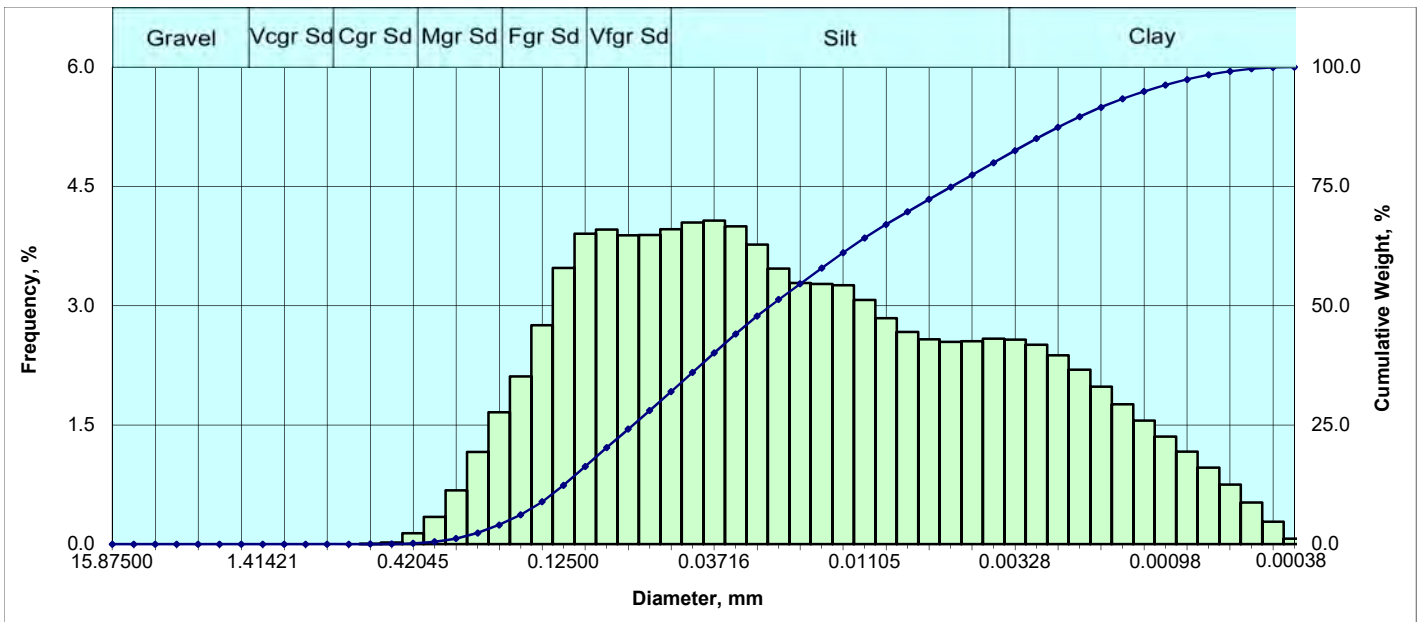
Particle Size Distribution						
	Diameter			Weight %		
	[US Mesh]	[in.]	[mm]	[φ]	[Incl.] [Cum.]	
Gravel	5/8 in.	0.625000	15.87500	-4.00	0.000	0.00
	3/8 in.	0.375000	9.50000	-3.25	0.000	0.00
	4	0.187008	4.75000	-2.25	0.000	0.00
	6	0.131890	3.35000	-1.75	0.000	0.00
	8	0.092913	2.36000	-1.25	0.000	0.00
V Crse Sand	10	0.078740	2.00000	-1.00	0.000	0.00
	12	0.066212	1.68179	-0.75	0.000	0.00
	14	0.055678	1.41421	-0.50	0.000	0.00
	16	0.046819	1.18921	-0.25	0.000	0.00
Coarse Sand	18	0.039370	1.00000	0.00	0.000	0.00
	20	0.033106	0.84090	0.25	0.000	0.00
	25	0.027839	0.70711	0.50	0.000	0.00
	30	0.023410	0.59460	0.75	0.000	0.00
	35	0.019685	0.50000	1.00	0.000	0.00
Medium Sand	40	0.016553	0.42045	1.25	0.000	0.00
	45	0.013919	0.35355	1.50	0.000	0.00
	50	0.011705	0.29730	1.75	0.000	0.00
	60	0.009843	0.25000	2.00	0.000	0.00
Fine Sand	70	0.008277	0.21022	2.25	0.001	0.00
	80	0.006960	0.17678	2.50	0.040	0.04
	100	0.005852	0.14865	2.75	0.420	0.46
	120	0.004921	0.12500	3.00	1.054	1.51
V. Fine Sand	140	0.004138	0.10511	3.25	1.538	3.05
	170	0.003480	0.08839	3.50	2.072	5.12
	200	0.002926	0.07433	3.75	2.775	7.90
	230	0.002461	0.06250	4.00	3.354	11.25
	Silt	270	0.002069	0.05256	4.25	3.603
325		0.001740	0.04419	4.50	3.772	18.63
400		0.001463	0.03716	4.75	4.042	22.67
450		0.001230	0.03125	5.00	4.305	26.97
500		0.001035	0.02628	5.25	4.354	31.33
635		0.000870	0.02210	5.50	4.221	35.55
		0.000732	0.01858	5.75	4.130	39.68
		0.000615	0.01562	6.00	4.150	43.83
		0.000517	0.01314	6.25	4.105	47.93
		0.000435	0.01105	6.50	3.840	51.77
		0.000366	0.00929	6.75	3.519	55.29
		0.000308	0.00781	7.00	3.286	58.58
		0.000259	0.00657	7.25	3.163	61.74
		0.000217	0.00552	7.50	3.127	64.87
		0.000183	0.00465	7.75	3.147	68.02
	0.000154	0.00391	8.00	3.205	71.22	
Clay		0.000129	0.00328	8.25	3.224	74.44
		0.000109	0.00276	8.50	3.180	77.62
		0.000091	0.00232	8.75	3.068	80.69
		0.000077	0.00195	9.00	2.906	83.60
		0.000065	0.00164	9.25	2.715	86.31
		0.000054	0.00138	9.50	2.529	88.84
		0.000046	0.00116	9.75	2.359	91.20
		0.000038	0.00098	10.00	2.171	93.37
		0.000032	0.00082	10.25	1.961	95.33
		0.000027	0.00069	10.50	1.688	97.02
		0.000023	0.00058	10.75	1.357	98.38
		0.000019	0.00049	11.00	0.970	99.35
		0.000016	0.00041	11.25	0.524	99.87
		0.000015	0.00038	11.50	0.128	100.00

Sorting Statistics (Folk)				
Parameter	Trask	Inman	Folk	
Median	Silt sized			
(in)	0.0005	0.0005	0.0005	
(mm)	0.0120	0.0120	0.0120	
Mean	Silt sized			
(in)	0.0007	0.0004	0.0004	
(mm)	0.0186	0.0098	0.0105	
Sorting	Very poor			
	3.261	2.356	2.197	
Skewness	Finely skewed			
	0.867	0.197	0.133	
Kurtosis	Platykurtic			
	0.234	0.426	0.808	
Component Percentages				
Gravel	Sand	Silt	Clay	Silt + Clay
0.00	11.25	59.97	28.78	88.75
Percentile [Weight, %]	Particle Diameter			
	[in.]	[mm]	[phi]	
5	0.0035	0.0894	3.4837	
10	0.0026	0.0669	3.9015	
16	0.0020	0.0500	4.3214	
25	0.0013	0.0340	4.8799	
40	0.0007	0.0184	5.7679	
50	0.0005	0.0120	6.3791	
70	0.0002	0.0042	7.8996	
75	0.0001	0.0032	8.2906	
84	0.0001	0.0019	9.0343	
90	0.0001	0.0013	9.6172	
95	0.0000	0.0008	10.2043	

**All Grain Sizes Classed Using Wentworth Scale



Sieve and Laser Particle Size Analysis



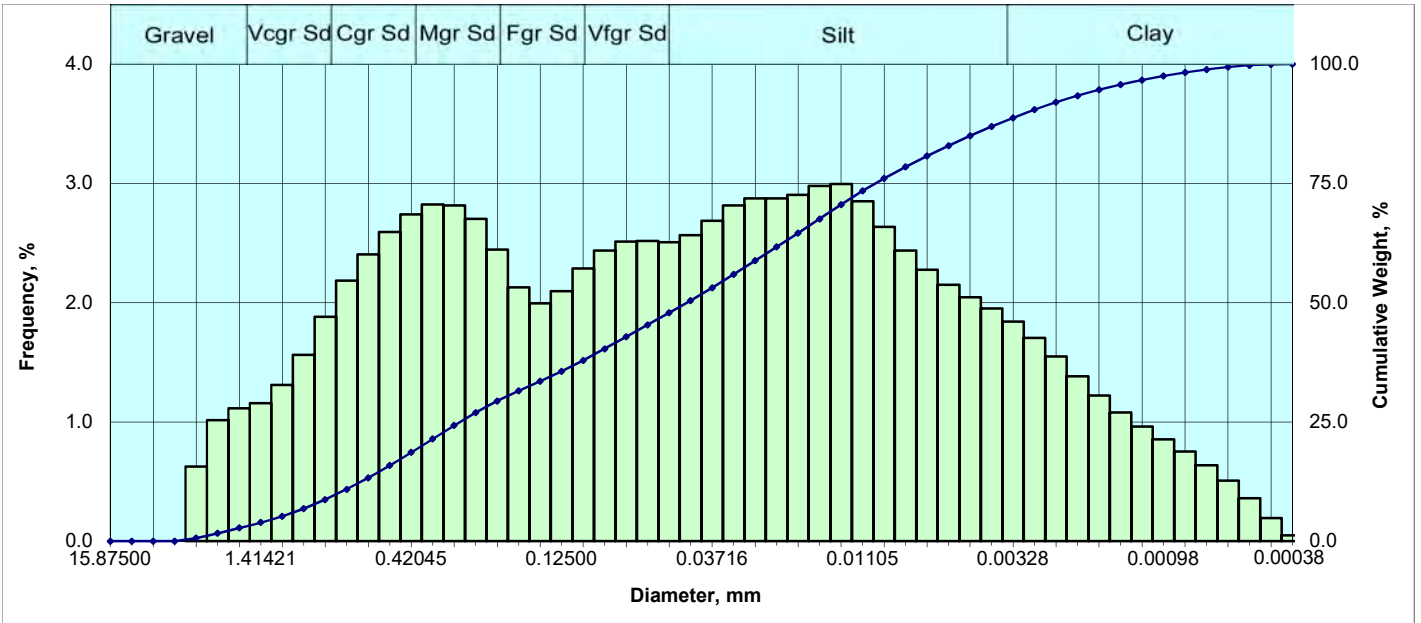
	Particle Size Distribution					Weight %	
	Diameter					[Incl.]	[Cum.]
	[US Mesh]	[in.]	[mm]	[φ]			
Gravel	5/8 in.	0.625000	15.87500	-4.00	0.000	0.00	
	3/8 in.	0.375000	9.50000	-3.25	0.000	0.00	
	4	0.187008	4.75000	-2.25	0.000	0.00	
	6	0.131890	3.35000	-1.75	0.000	0.00	
	8	0.092913	2.36000	-1.25	0.000	0.00	
V Crse Sand	10	0.078740	2.00000	-1.00	0.000	0.00	
	12	0.066212	1.68179	-0.75	0.000	0.00	
	14	0.055678	1.41421	-0.50	0.000	0.00	
	16	0.046819	1.18921	-0.25	0.000	0.00	
Coarse Sand	18	0.039370	1.00000	0.00	0.000	0.00	
	20	0.033106	0.84090	0.25	0.000	0.00	
	25	0.027839	0.70711	0.50	0.000	0.00	
	30	0.023410	0.59460	0.75	0.000	0.00	
Medium Sand	35	0.019685	0.50000	1.00	0.022	0.02	
	40	0.016553	0.42045	1.25	0.137	0.16	
	45	0.013919	0.35355	1.50	0.344	0.50	
	50	0.011705	0.29730	1.75	0.677	1.18	
Fine Sand	60	0.009843	0.25000	2.00	1.161	2.34	
	70	0.008277	0.21022	2.25	1.659	4.00	
	80	0.006960	0.17678	2.50	2.112	6.11	
	100	0.005852	0.14865	2.75	2.755	8.87	
V. Fine Sand	120	0.004921	0.12500	3.00	3.475	12.34	
	140	0.004138	0.10511	3.25	3.907	16.25	
	170	0.003480	0.08839	3.50	3.957	20.20	
	200	0.002926	0.07433	3.75	3.884	24.09	
Silt	230	0.002461	0.06250	4.00	3.891	27.98	
	270	0.002069	0.05256	4.25	3.961	31.94	
	325	0.001740	0.04419	4.50	4.047	35.99	
	400	0.001463	0.03716	4.75	4.070	40.06	
	450	0.001230	0.03125	5.00	3.997	44.06	
	500	0.001035	0.02628	5.25	3.768	47.82	
	635	0.000870	0.02210	5.50	3.466	51.29	
		0.000732	0.01858	5.75	3.285	54.58	
		0.000615	0.01562	6.00	3.273	57.85	
		0.000517	0.01314	6.25	3.258	61.11	
		0.000435	0.01105	6.50	3.074	64.18	
		0.000366	0.00929	6.75	2.841	67.02	
		0.000308	0.00781	7.00	2.670	69.69	
		0.000259	0.00657	7.25	2.576	72.27	
		0.000217	0.00552	7.50	2.545	74.81	
		0.000183	0.00465	7.75	2.553	77.36	
	0.000154	0.00391	8.00	2.583	79.95		
Clay		0.000129	0.00328	8.25	2.574	82.52	
		0.000109	0.00276	8.50	2.507	85.03	
		0.000091	0.00232	8.75	2.375	87.40	
		0.000077	0.00195	9.00	2.193	89.60	
		0.000065	0.00164	9.25	1.979	91.58	
		0.000054	0.00138	9.50	1.762	93.34	
		0.000046	0.00116	9.75	1.555	94.89	
		0.000038	0.00098	10.00	1.355	96.25	
		0.000032	0.00082	10.25	1.164	97.41	
		0.000027	0.00069	10.50	0.963	98.37	
		0.000023	0.00058	10.75	0.751	99.13	
		0.000019	0.00049	11.00	0.525	99.65	
		0.000016	0.00041	11.25	0.280	99.93	
		0.000015	0.00038	11.50	0.069	100.00	

Sorting Statistics (Folk)				
Parameter	Trask	Inman	Folk	
Median	Silt sized			
(in)	0.0009	0.0009	0.0009	
(mm)	0.0237	0.0237	0.0237	
Mean	Silt sized			
(in)	0.0015	0.0007	0.0008	
(mm)	0.0385	0.0178	0.0196	
Sorting	Very poor			
	3.620	2.580	2.412	
Skewness	Finely skewed			
	0.836	0.257	0.169	
Kurtosis	Platykurtic			
	0.238	0.435	0.818	
Component Percentages				
Gravel	Sand	Silt	Clay	Silt + Clay
0.00	27.98	51.97	20.05	72.02
Percentile [Weight, %]	Particle Diameter			
	[in.]	[mm]	[phi]	
5	0.0077	0.1944	2.3630	
10	0.0055	0.1409	2.8269	
16	0.0042	0.1064	3.2328	
25	0.0028	0.0716	3.8048	
40	0.0015	0.0373	4.7461	
50	0.0009	0.0237	5.4018	
70	0.0003	0.0077	7.0278	
75	0.0002	0.0055	7.5171	
84	0.0001	0.0030	8.3921	
90	0.0001	0.0019	9.0475	
95	0.0000	0.0011	9.7682	

**All Grain Sizes Classed Using Wentworth Scale



Sieve and Laser Particle Size Analysis



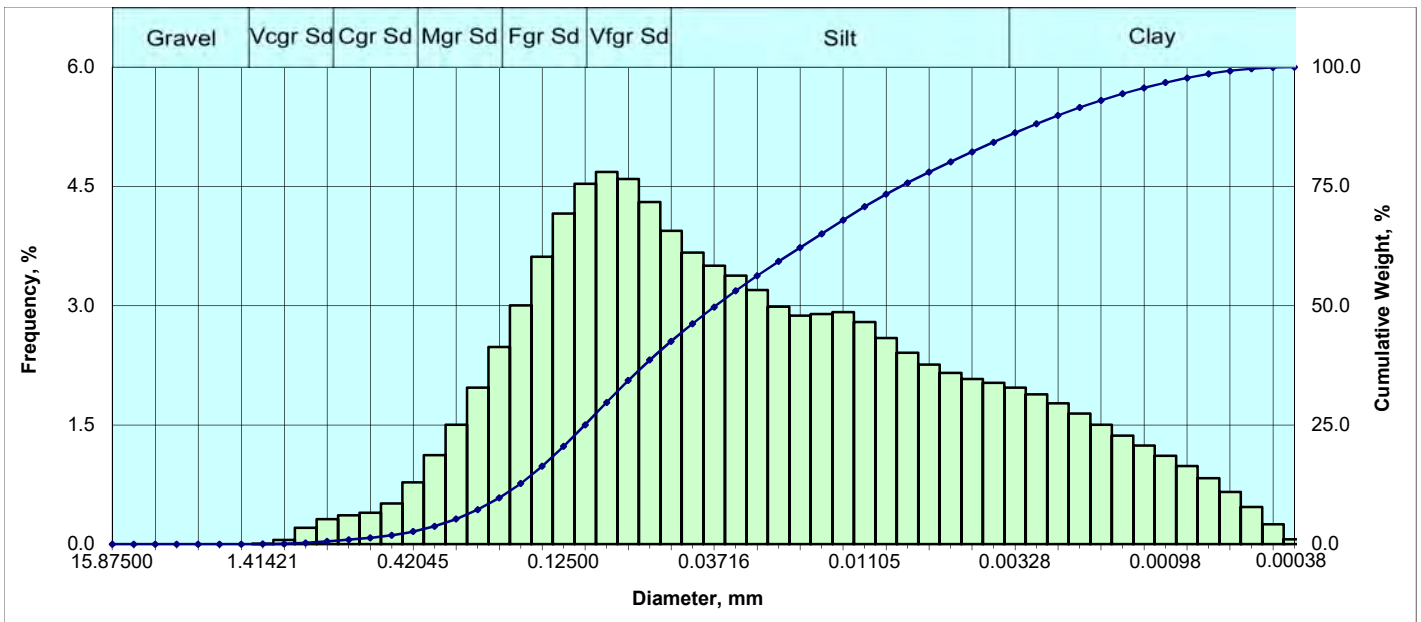
	Particle Size Distribution					Weight %	
	Diameter					[Incl.] [Cum.]	
	[US Mesh]	[in.]	[mm]	[φ]			
Gravel	5/8 in.	0.625000	15.87500	-4.00	0.000	0.00	
	3/8 in.	0.375000	9.50000	-3.25	0.000	0.00	
	4	0.187008	4.75000	-2.25	0.000	0.00	
	6	0.131890	3.35000	-1.75	0.000	0.00	
	8	0.092913	2.36000	-1.25	0.625	0.62	
	10	0.078740	2.00000	-1.00	1.015	1.64	
V Crse Sand	12	0.066212	1.68179	-0.75	1.113	2.75	
	14	0.055678	1.41421	-0.50	1.156	3.91	
	16	0.046819	1.18921	-0.25	1.309	5.22	
	18	0.039370	1.00000	0.00	1.562	6.78	
Coarse Sand	20	0.033106	0.84090	0.25	1.882	8.66	
	25	0.027839	0.70711	0.50	2.185	10.85	
	30	0.023410	0.59460	0.75	2.404	13.25	
	35	0.019685	0.50000	1.00	2.592	15.84	
	40	0.016553	0.42045	1.25	2.741	18.58	
Medium Sand	45	0.013919	0.35355	1.50	2.823	21.41	
	50	0.011705	0.29730	1.75	2.816	24.22	
	60	0.009843	0.25000	2.00	2.702	26.93	
	70	0.008277	0.21022	2.25	2.445	29.37	
Fine Sand	80	0.006960	0.17678	2.50	2.130	31.50	
	100	0.005852	0.14865	2.75	1.995	33.50	
	120	0.004921	0.12500	3.00	2.097	35.59	
	140	0.004138	0.10511	3.25	2.286	37.88	
V. Fine Sand	170	0.003480	0.08839	3.50	2.438	40.32	
	200	0.002926	0.07433	3.75	2.513	42.83	
	230	0.002461	0.06250	4.00	2.518	45.35	
	270	0.002069	0.05256	4.25	2.506	47.86	
	325	0.001740	0.04419	4.50	2.567	50.42	
Silt	400	0.001463	0.03716	4.75	2.688	53.11	
	450	0.001230	0.03125	5.00	2.816	55.93	
	500	0.001035	0.02628	5.25	2.875	58.80	
	635	0.000870	0.02210	5.50	2.875	61.68	
		0.000732	0.01858	5.75	2.905	64.58	
		0.000615	0.01562	6.00	2.980	67.56	
		0.000517	0.01314	6.25	2.996	70.56	
		0.000435	0.01105	6.50	2.850	73.41	
		0.000366	0.00929	6.75	2.636	76.04	
		0.000308	0.00781	7.00	2.438	78.48	
		0.000259	0.00657	7.25	2.277	80.76	
		0.000217	0.00552	7.50	2.150	82.91	
		0.000183	0.00465	7.75	2.045	84.95	
		0.000154	0.00391	8.00	1.953	86.91	
	Clay		0.000129	0.00328	8.25	1.841	88.75
		0.000109	0.00276	8.50	1.706	90.45	
		0.000091	0.00232	8.75	1.549	92.00	
		0.000077	0.00195	9.00	1.383	93.38	
		0.000065	0.00164	9.25	1.222	94.61	
		0.000054	0.00138	9.50	1.080	95.69	
		0.000046	0.00116	9.75	0.961	96.65	
		0.000038	0.00098	10.00	0.853	97.50	
		0.000032	0.00082	10.25	0.751	98.25	
		0.000027	0.00069	10.50	0.637	98.89	
		0.000023	0.00058	10.75	0.507	99.40	
		0.000019	0.00049	11.00	0.361	99.76	
		0.000016	0.00041	11.25	0.194	99.95	
		0.000015	0.00038	11.50	0.048	100.00	

Sorting Statistics (Folk)				
Parameter	Trask	Inman	Folk	
Median	Silt sized			
(in)	0.0018	0.0018	0.0018	
(mm)	0.0456	0.0456	0.0456	
Mean	Silt sized			
(in)	0.0058	0.0020	0.0019	
(mm)	0.1469	0.0500	0.0485	
Sorting	Very poor			
	5.330	3.307	3.113	
Skewness	Near symmetrical			
	1.168	0.020	-0.014	
Kurtosis	Platykurtic			
	0.181	0.456	0.817	
Component Percentages				
Gravel	Sand	Silt	Clay	Silt + Clay
1.64	43.71	41.56	13.09	54.65
Percentile [Weight, %]	Particle Diameter			
	[in.]	[mm]	[phi]	
5	0.0483	1.2267	-0.2947	
10	0.0299	0.7590	0.3978	
16	0.0195	0.4955	1.0132	
25	0.0112	0.2837	1.8175	
40	0.0036	0.0906	3.4648	
50	0.0018	0.0456	4.4558	
70	0.0005	0.0136	6.2002	
75	0.0004	0.0100	6.6459	
84	0.0002	0.0051	7.6281	
90	0.0001	0.0029	8.4293	
95	0.0001	0.0015	9.3360	

**All Grain Sizes Classed Using Wentworth Scale



Sieve and Laser Particle Size Analysis



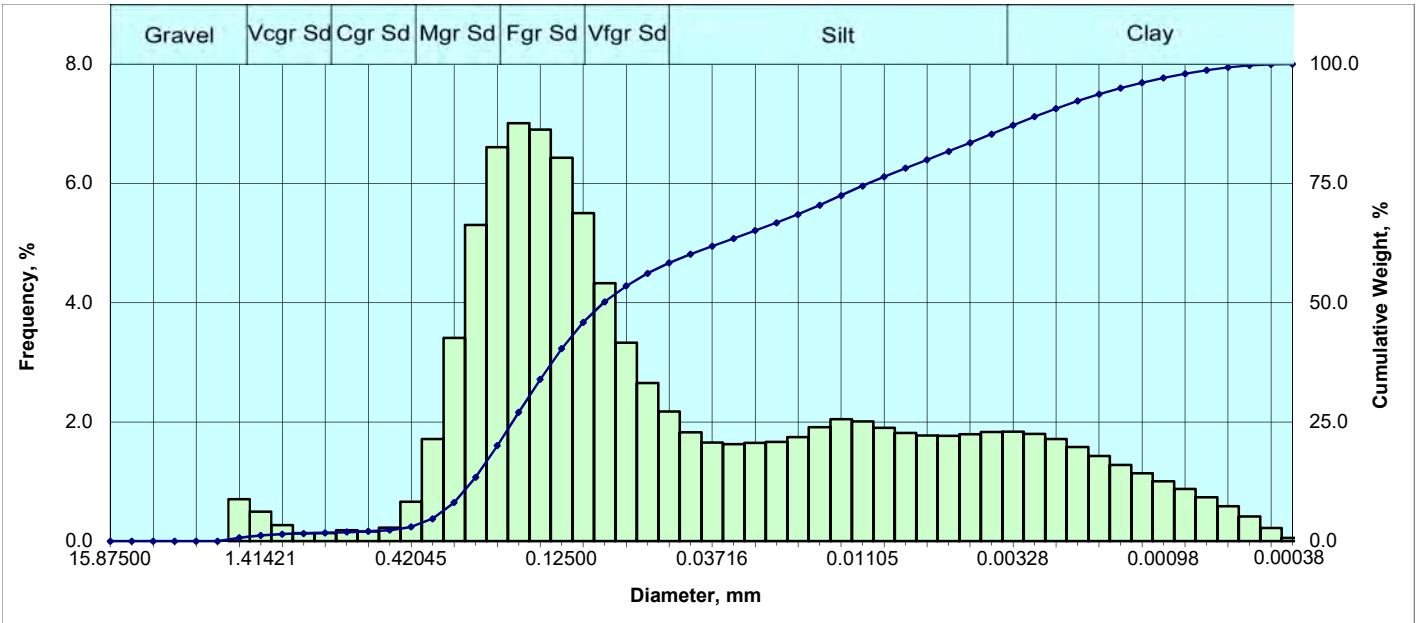
Particle Size Distribution						
	Diameter			Weight %		
	[US Mesh]	[in.]	[mm]	[φ]	[Incl.] [Cum.]	
Gravel	5/8 in.	0.625000	15.87500	-4.00	0.000	0.00
	3/8 in.	0.375000	9.50000	-3.25	0.000	0.00
	4	0.187008	4.75000	-2.25	0.000	0.00
	6	0.131890	3.35000	-1.75	0.000	0.00
	8	0.092913	2.36000	-1.25	0.000	0.00
V Crse Sand	10	0.078740	2.00000	-1.00	0.000	0.00
	12	0.066212	1.68179	-0.75	0.000	0.00
	14	0.055678	1.41421	-0.50	0.001	0.00
	16	0.046819	1.18921	-0.25	0.051	0.05
Coarse Sand	18	0.039370	1.00000	0.00	0.206	0.26
	20	0.033106	0.84090	0.25	0.314	0.57
	25	0.027839	0.70711	0.50	0.364	0.94
	30	0.023410	0.59460	0.75	0.394	1.33
	35	0.019685	0.50000	1.00	0.511	1.84
Medium Sand	40	0.016553	0.42045	1.25	0.779	2.62
	45	0.013919	0.35355	1.50	1.119	3.74
	50	0.011705	0.29730	1.75	1.504	5.24
	60	0.009843	0.25000	2.00	1.968	7.21
Fine Sand	70	0.008277	0.21022	2.25	2.480	9.69
	80	0.006960	0.17678	2.50	3.006	12.70
	100	0.005852	0.14865	2.75	3.617	16.31
	120	0.004921	0.12500	3.00	4.160	20.47
V. Fine Sand	140	0.004138	0.10511	3.25	4.532	25.01
	170	0.003480	0.08839	3.50	4.684	29.69
	200	0.002926	0.07433	3.75	4.596	34.29
	230	0.002461	0.06250	4.00	4.305	38.59
	Silt	270	0.002069	0.05256	4.25	3.940
325		0.001740	0.04419	4.50	3.666	46.20
400		0.001463	0.03716	4.75	3.504	49.70
450		0.001230	0.03125	5.00	3.377	53.08
500		0.001035	0.02628	5.25	3.196	56.27
635		0.000870	0.02210	5.50	2.987	59.26
		0.000732	0.01858	5.75	2.875	62.14
		0.000615	0.01562	6.00	2.894	65.03
		0.000517	0.01314	6.25	2.918	67.95
		0.000435	0.01105	6.50	2.794	70.74
		0.000366	0.00929	6.75	2.595	73.34
		0.000308	0.00781	7.00	2.408	75.74
		0.000259	0.00657	7.25	2.260	78.00
		0.000217	0.00552	7.50	2.153	80.16
		0.000183	0.00465	7.75	2.077	82.23
		0.000154	0.00391	8.00	2.028	84.26
Clay			0.000129	0.00328	8.25	1.968
		0.000109	0.00276	8.50	1.884	88.11
		0.000091	0.00232	8.75	1.774	89.89
		0.000077	0.00195	9.00	1.643	91.53
		0.000065	0.00164	9.25	1.502	93.03
		0.000054	0.00138	9.50	1.366	94.40
		0.000046	0.00116	9.75	1.241	95.64
		0.000038	0.00098	10.00	1.113	96.75
		0.000032	0.00082	10.25	0.982	97.73
		0.000027	0.00069	10.50	0.830	98.56
		0.000023	0.00058	10.75	0.658	99.22
		0.000019	0.00049	11.00	0.466	99.69
		0.000016	0.00041	11.25	0.250	99.94
		0.000015	0.00038	11.50	0.061	100.00

Sorting Statistics (Folk)				
Parameter	Trask	Inman	Folk	
Median	Silt sized			
(in)	0.0014	0.0014	0.0014	
(mm)	0.0366	0.0366	0.0366	
Mean	Silt sized			
(in)	0.0022	0.0010	0.0011	
(mm)	0.0567	0.0246	0.0281	
Sorting	Very poor			
	3.566	2.619	2.508	
Skewness	Finely skewed			
	0.805	0.340	0.222	
Kurtosis	Platykurtic			
	0.237	0.510	0.884	
Component Percentages				
Gravel	Sand	Silt	Clay	Silt + Clay
0.00	38.59	45.67	15.74	61.41
Percentile [Weight, %]	Particle Diameter			
	[in.]	[mm]	[phi]	
5	0.0121	0.3064	1.7064	
10	0.0081	0.2068	2.2738	
16	0.0059	0.1511	2.7265	
25	0.0041	0.1051	3.2496	
40	0.0023	0.0589	4.0845	
50	0.0014	0.0366	4.7704	
70	0.0005	0.0116	6.4293	
75	0.0003	0.0083	6.9180	
84	0.0002	0.0040	7.9652	
90	0.0001	0.0023	8.7659	
95	0.0001	0.0013	9.6159	

**All Grain Sizes Classed Using Wentworth Scale



Sieve and Laser Particle Size Analysis



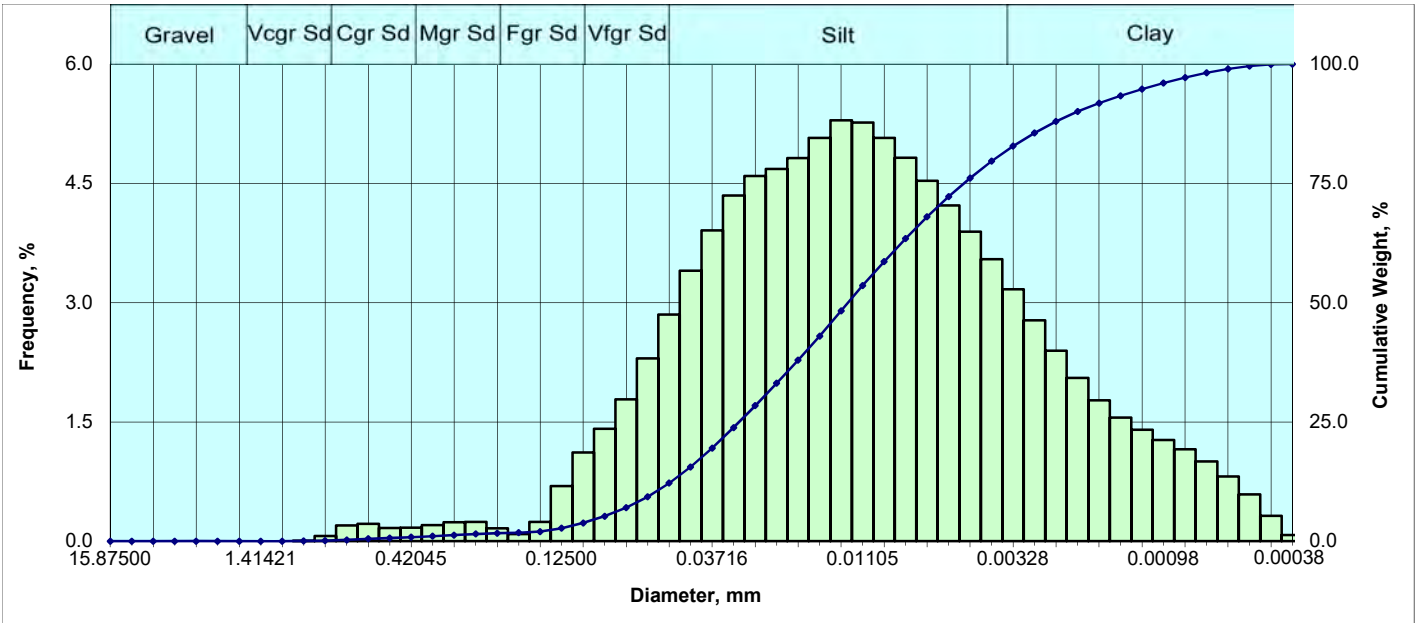
	Particle Size Distribution					Weight %	
	Diameter					[Incl.]	[Cum.]
	[US Mesh]	[in.]	[mm]	[φ]			
Gravel	5/8 in.	0.625000	15.87500	-4.00	0.000	0.00	
	3/8 in.	0.375000	9.50000	-3.25	0.000	0.00	
	4	0.187008	4.75000	-2.25	0.000	0.00	
	6	0.131890	3.35000	-1.75	0.000	0.00	
	8	0.092913	2.36000	-1.25	0.000	0.00	
V Crse Sand	10	0.078740	2.00000	-1.00	0.000	0.00	
	12	0.066212	1.68179	-0.75	0.702	0.70	
	14	0.055678	1.41421	-0.50	0.492	1.19	
	16	0.046819	1.18921	-0.25	0.269	1.46	
Coarse Sand	18	0.039370	1.00000	0.00	0.135	1.60	
	20	0.033106	0.84090	0.25	0.135	1.73	
	25	0.027839	0.70711	0.50	0.181	1.91	
	30	0.023410	0.59460	0.75	0.163	2.08	
Medium Sand	35	0.019685	0.50000	1.00	0.226	2.30	
	40	0.016553	0.42045	1.25	0.659	2.96	
	45	0.013919	0.35355	1.50	1.711	4.67	
	50	0.011705	0.29730	1.75	3.410	8.08	
Fine Sand	60	0.009843	0.25000	2.00	5.304	13.39	
	70	0.008277	0.21022	2.25	6.610	20.00	
	80	0.006960	0.17678	2.50	7.013	27.01	
	100	0.005852	0.14865	2.75	6.904	33.91	
V. Fine Sand	120	0.004921	0.12500	3.00	6.429	40.34	
	140	0.004138	0.10511	3.25	5.503	45.85	
	170	0.003480	0.08839	3.50	4.329	50.18	
	200	0.002926	0.07433	3.75	3.327	53.50	
Silt	230	0.002461	0.06250	4.00	2.651	56.15	
	270	0.002069	0.05256	4.25	2.177	58.33	
	325	0.001740	0.04419	4.50	1.827	60.16	
	400	0.001463	0.03716	4.75	1.652	61.81	
	450	0.001230	0.03125	5.00	1.629	63.44	
	500	0.001035	0.02628	5.25	1.647	65.08	
	635	0.000870	0.02210	5.50	1.663	66.75	
		0.000732	0.01858	5.75	1.744	68.49	
		0.000615	0.01562	6.00	1.913	70.40	
		0.000517	0.01314	6.25	2.047	72.45	
		0.000435	0.01105	6.50	2.010	74.46	
		0.000366	0.00929	6.75	1.899	76.36	
		0.000308	0.00781	7.00	1.812	78.17	
		0.000259	0.00657	7.25	1.772	79.94	
		0.000217	0.00552	7.50	1.769	81.71	
		0.000183	0.00465	7.75	1.791	83.50	
	0.000154	0.00391	8.00	1.830	85.33		
Clay		0.000129	0.00328	8.25	1.838	87.17	
		0.000109	0.00276	8.50	1.800	88.97	
		0.000091	0.00232	8.75	1.711	90.68	
		0.000077	0.00195	9.00	1.581	92.26	
		0.000065	0.00164	9.25	1.429	93.69	
		0.000054	0.00138	9.50	1.277	94.97	
		0.000046	0.00116	9.75	1.138	96.11	
		0.000038	0.00098	10.00	1.005	97.11	
		0.000032	0.00082	10.25	0.878	97.99	
		0.000027	0.00069	10.50	0.738	98.73	
		0.000023	0.00058	10.75	0.584	99.31	
		0.000019	0.00049	11.00	0.413	99.72	
		0.000016	0.00041	11.25	0.222	99.95	
		0.000015	0.00038	11.50	0.054	100.00	

Sorting Statistics (Folk)			
Parameter	Trask	Inman	Folk
Median	Very fine sand sized		
(in)	0.0035	0.0035	0.0035
(mm)	0.0891	0.0891	0.0891
Mean	Silt sized		
(in)	0.0039	0.0013	0.0018
(mm)	0.0985	0.0323	0.0453
Sorting	Very poor		
	4.203	2.860	2.640
Skewness	Strongly fine skewed		
	0.498	0.708	0.510
Kurtosis	Platykurtic		
	0.317	0.396	0.790
Component Percentages			
Gravel	Sand	Silt	Clay
0.00	56.15	29.18	14.67
			Silt + Clay
			43.85
Percentile [Weight, %]	Particle Diameter		
	[in.]	[mm]	[phi]
5	0.0137	0.3482	1.5222
10	0.0110	0.2802	1.8354
16	0.0092	0.2343	2.0937
25	0.0073	0.1864	2.4238
40	0.0050	0.1263	2.9855
50	0.0035	0.0891	3.4890
70	0.0006	0.0163	5.9434
75	0.0004	0.0105	6.5667
84	0.0002	0.0044	7.8136
90	0.0001	0.0025	8.6449
95	0.0001	0.0014	9.5061

**All Grain Sizes Classed Using Wentworth Scale



Sieve and Laser Particle Size Analysis



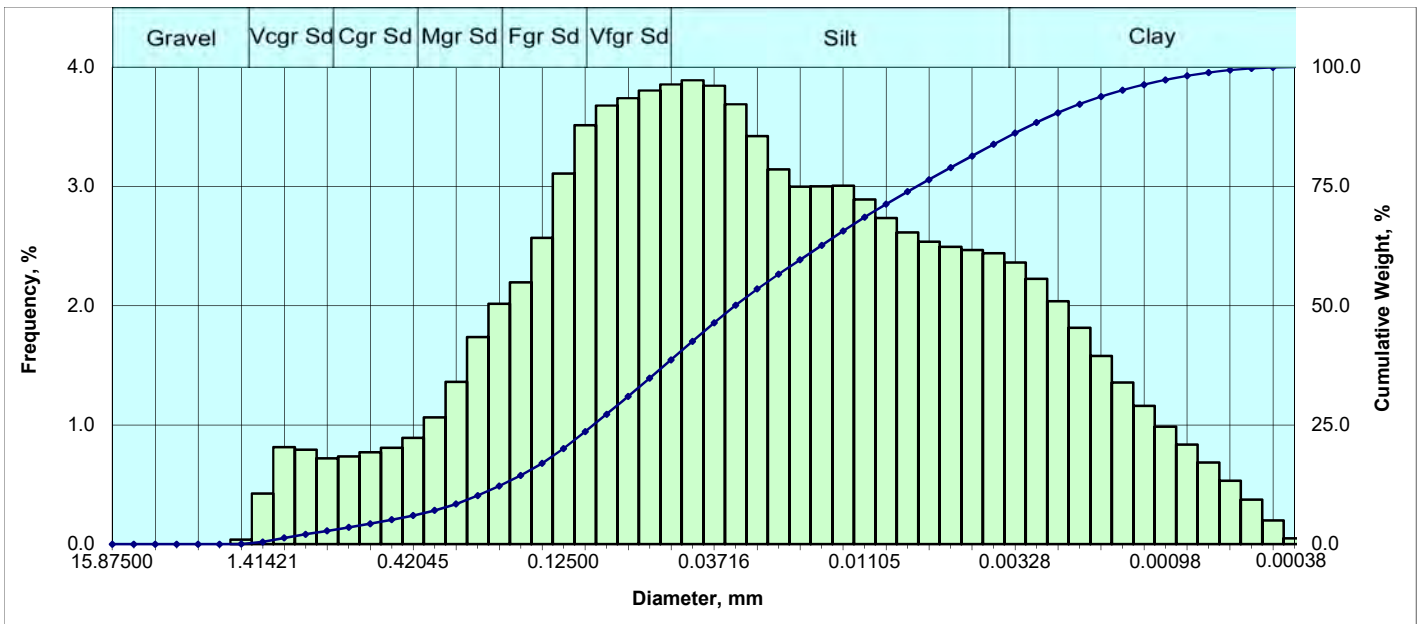
Particle Size Distribution						
	Diameter				Weight %	
	[US Mesh]	[in.]	[mm]	[φ]	[Incl.]	[Cum.]
Gravel	5/8 in.	0.625000	15.87500	-4.00	0.000	0.00
	3/8 in.	0.375000	9.50000	-3.25	0.000	0.00
	4	0.187008	4.75000	-2.25	0.000	0.00
	6	0.131890	3.35000	-1.75	0.000	0.00
	8	0.092913	2.36000	-1.25	0.000	0.00
V Crse Sand	10	0.078740	2.00000	-1.00	0.000	0.00
	12	0.066212	1.68179	-0.75	0.000	0.00
	14	0.055678	1.41421	-0.50	0.000	0.00
	16	0.046819	1.18921	-0.25	0.000	0.00
Coarse Sand	18	0.039370	1.00000	0.00	0.004	0.00
	20	0.033106	0.84090	0.25	0.066	0.07
	25	0.027839	0.70711	0.50	0.197	0.27
	30	0.023410	0.59460	0.75	0.219	0.49
	35	0.019685	0.50000	1.00	0.168	0.65
Medium Sand	40	0.016553	0.42045	1.25	0.168	0.82
	45	0.013919	0.35355	1.50	0.202	1.02
	50	0.011705	0.29730	1.75	0.237	1.26
	60	0.009843	0.25000	2.00	0.242	1.50
Fine Sand	70	0.008277	0.21022	2.25	0.162	1.66
	80	0.006960	0.17678	2.50	0.089	1.75
	100	0.005852	0.14865	2.75	0.243	1.99
	120	0.004921	0.12500	3.00	0.694	2.69
V. Fine Sand	140	0.004138	0.10511	3.25	1.115	3.80
	170	0.003480	0.08839	3.50	1.414	5.22
	200	0.002926	0.07433	3.75	1.783	7.00
	230	0.002461	0.06250	4.00	2.299	9.30
	Silt	270	0.002069	0.05256	4.25	2.851
325		0.001740	0.04419	4.50	3.403	15.55
400		0.001463	0.03716	4.75	3.912	19.46
450		0.001230	0.03125	5.00	4.348	23.81
500		0.001035	0.02628	5.25	4.595	28.41
635		0.000870	0.02210	5.50	4.685	33.09
		0.000732	0.01858	5.75	4.819	37.91
		0.000615	0.01562	6.00	5.073	42.98
		0.000517	0.01314	6.25	5.297	48.28
		0.000435	0.01105	6.50	5.265	53.55
		0.000366	0.00929	6.75	5.075	58.62
		0.000308	0.00781	7.00	4.822	63.44
		0.000259	0.00657	7.25	4.534	67.98
		0.000217	0.00552	7.50	4.225	72.20
		0.000183	0.00465	7.75	3.896	76.10
		0.000154	0.00391	8.00	3.548	79.65
Clay			0.000129	0.00328	8.25	3.168
		0.000109	0.00276	8.50	2.777	85.59
		0.000091	0.00232	8.75	2.396	87.99
		0.000077	0.00195	9.00	2.055	90.04
		0.000065	0.00164	9.25	1.770	91.81
		0.000054	0.00138	9.50	1.553	93.37
		0.000046	0.00116	9.75	1.400	94.77
		0.000038	0.00098	10.00	1.273	96.04
		0.000032	0.00082	10.25	1.154	97.19
		0.000027	0.00069	10.50	1.004	98.20
		0.000023	0.00058	10.75	0.815	99.01
		0.000019	0.00049	11.00	0.589	99.60
		0.000016	0.00041	11.25	0.320	99.92
		0.000015	0.00038	11.50	0.078	100.00

Sorting Statistics (Folk)				
Parameter	Trask	Inman	Folk	
Median	Silt sized			
(in)	0.0005	0.0005	0.0005	
(mm)	0.0125	0.0125	0.0125	
Mean	Silt sized			
(in)	0.0007	0.0005	0.0005	
(mm)	0.0174	0.0115	0.0118	
Sorting	Poor			
	2.475	1.912	1.916	
Skewness	Near symmetrical			
	0.972	0.156	0.076	
Kurtosis	Mesokurtic			
	0.216	0.656	0.993	
Component Percentages				
Gravel	Sand	Silt	Clay	Silt + Clay
0.00	9.30	70.35	20.35	90.70
Percentile [Weight, %]	Particle Diameter			
	[in.]	[mm]	[phi]	
5	0.0036	0.0909	3.4588	
10	0.0024	0.0601	4.0576	
16	0.0017	0.0434	4.5265	
25	0.0012	0.0300	5.0606	
40	0.0007	0.0174	5.8478	
50	0.0005	0.0125	6.3270	
70	0.0002	0.0061	7.3643	
75	0.0002	0.0049	7.6750	
84	0.0001	0.0031	8.3514	
90	0.0001	0.0020	8.9944	
95	0.0000	0.0011	9.7928	

**All Grain Sizes Classed Using Wentworth Scale



Sieve and Laser Particle Size Analysis



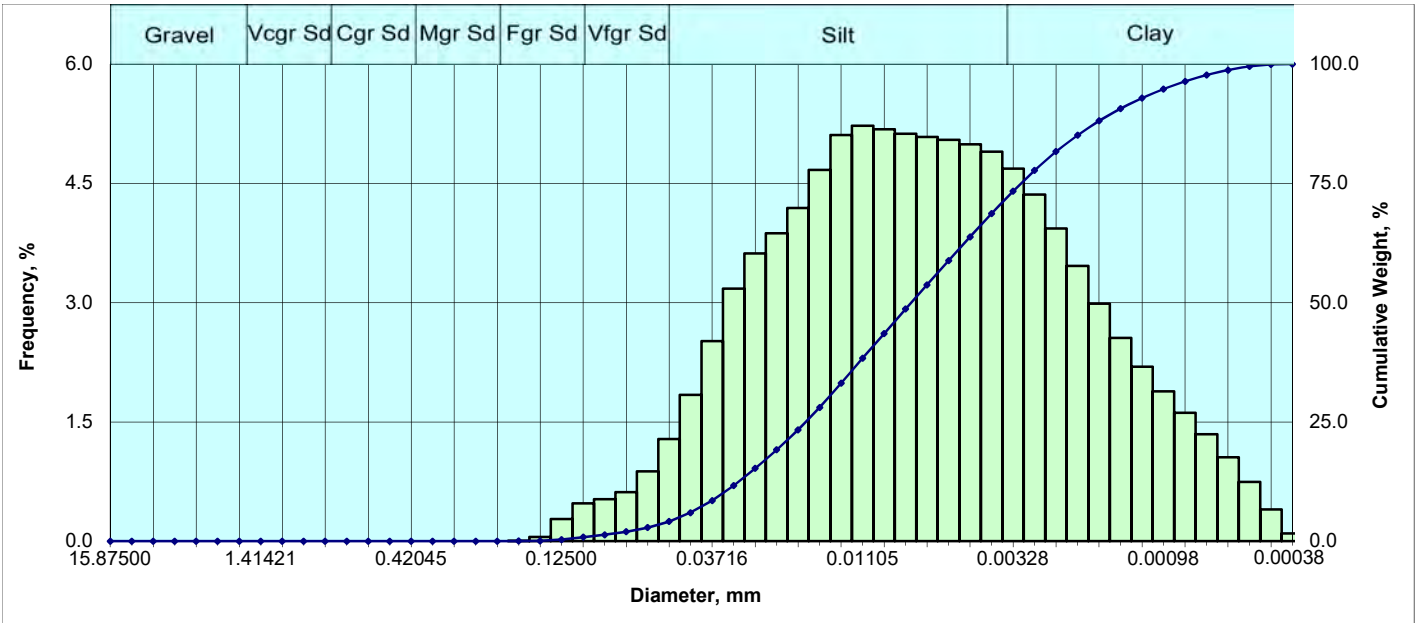
	Particle Size Distribution					Weight %	
	Diameter					[Incl.]	[Cum.]
	[US Mesh]	[in.]	[mm]	[φ]			
Gravel	5/8 in.	0.625000	15.87500	-4.00	0.000	0.00	
	3/8 in.	0.375000	9.50000	-3.25	0.000	0.00	
	4	0.187008	4.75000	-2.25	0.000	0.00	
	6	0.131890	3.35000	-1.75	0.000	0.00	
	8	0.092913	2.36000	-1.25	0.000	0.00	
V Crse Sand	10	0.078740	2.00000	-1.00	0.000	0.00	
	12	0.066212	1.68179	-0.75	0.039	0.04	
	14	0.055678	1.41421	-0.50	0.425	0.46	
	16	0.046819	1.18921	-0.25	0.813	1.28	
Coarse Sand	18	0.039370	1.00000	0.00	0.791	2.07	
	20	0.033106	0.84090	0.25	0.719	2.79	
	25	0.027839	0.70711	0.50	0.736	3.52	
	30	0.023410	0.59460	0.75	0.771	4.29	
Medium Sand	35	0.019685	0.50000	1.00	0.807	5.10	
	40	0.016553	0.42045	1.25	0.891	5.99	
	45	0.013919	0.35355	1.50	1.063	7.06	
	50	0.011705	0.29730	1.75	1.362	8.42	
Fine Sand	60	0.009843	0.25000	2.00	1.737	10.15	
	70	0.008277	0.21022	2.25	2.016	12.17	
	80	0.006960	0.17678	2.50	2.196	14.37	
	100	0.005852	0.14865	2.75	2.570	16.94	
V. Fine Sand	120	0.004921	0.12500	3.00	3.109	20.04	
	140	0.004138	0.10511	3.25	3.514	23.56	
	170	0.003480	0.08839	3.50	3.678	27.24	
	200	0.002926	0.07433	3.75	3.741	30.98	
Silt	230	0.002461	0.06250	4.00	3.803	34.78	
	270	0.002069	0.05256	4.25	3.854	38.63	
	325	0.001740	0.04419	4.50	3.890	42.52	
	400	0.001463	0.03716	4.75	3.843	46.37	
	450	0.001230	0.03125	5.00	3.690	50.06	
	500	0.001035	0.02628	5.25	3.422	53.48	
	635	0.000870	0.02210	5.50	3.143	56.62	
		0.000732	0.01858	5.75	2.999	59.62	
		0.000615	0.01562	6.00	3.000	62.62	
		0.000517	0.01314	6.25	3.007	65.63	
		0.000435	0.01105	6.50	2.892	68.52	
		0.000366	0.00929	6.75	2.736	71.26	
		0.000308	0.00781	7.00	2.614	73.87	
		0.000259	0.00657	7.25	2.538	76.41	
		0.000217	0.00552	7.50	2.495	78.90	
		0.000183	0.00465	7.75	2.467	81.37	
	0.000154	0.00391	8.00	2.439	83.81		
Clay		0.000129	0.00328	8.25	2.362	86.17	
		0.000109	0.00276	8.50	2.227	88.40	
		0.000091	0.00232	8.75	2.038	90.43	
		0.000077	0.00195	9.00	1.814	92.25	
		0.000065	0.00164	9.25	1.578	93.83	
		0.000054	0.00138	9.50	1.355	95.18	
		0.000046	0.00116	9.75	1.159	96.34	
		0.000038	0.00098	10.00	0.986	97.33	
		0.000032	0.00082	10.25	0.834	98.16	
		0.000027	0.00069	10.50	0.685	98.85	
		0.000023	0.00058	10.75	0.533	99.38	
		0.000019	0.00049	11.00	0.373	99.75	
		0.000016	0.00041	11.25	0.199	99.95	
		0.000015	0.00038	11.50	0.049	100.00	

Sorting Statistics (Folk)			
Parameter	Trask	Inman	Folk
Median	Silt sized		
(in)	0.0012	0.0012	0.0012
(mm)	0.0313	0.0313	0.0313
Mean	Silt sized		
(in)	0.0021	0.0010	0.0011
(mm)	0.0529	0.0248	0.0268
Sorting	Very poor		
	3.685	2.682	2.629
Skewness	Near symmetrical		
	0.853	0.082	0.089
Kurtosis	Mesokurtic		
	0.181	0.584	0.925
Component Percentages			
Gravel	Sand	Silt	Clay
0.00	34.78	49.03	16.19
			Silt + Clay
			65.22
Percentile [Weight, %]	Particle Diameter		
	[in.]	[mm]	[phi]
5	0.0202	0.5119	0.9662
10	0.0100	0.2542	1.9760
16	0.0063	0.1589	2.6539
25	0.0039	0.0986	3.3429
40	0.0020	0.0496	4.3330
50	0.0012	0.0313	4.9958
70	0.0004	0.0101	6.6299
75	0.0003	0.0073	7.1061
84	0.0002	0.0039	8.0188
90	0.0001	0.0024	8.6930
95	0.0001	0.0014	9.4639

**All Grain Sizes Classed Using Wentworth Scale



Sieve and Laser Particle Size Analysis



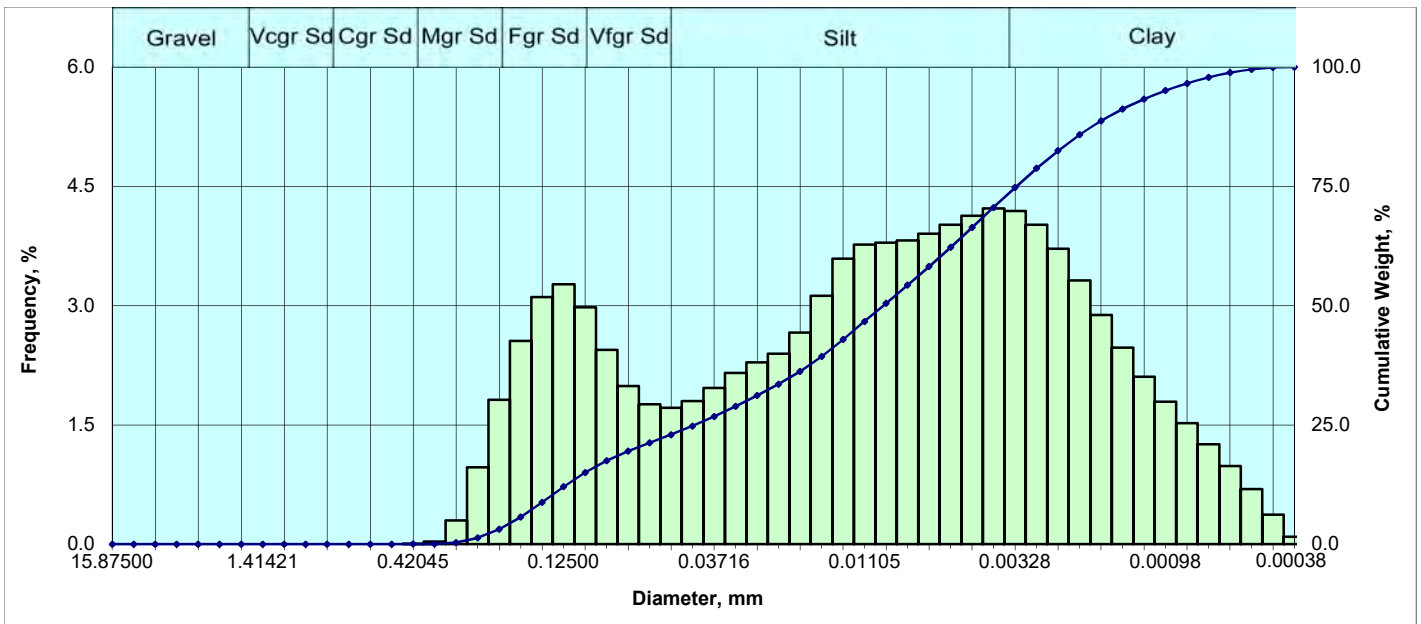
Particle Size Distribution						
	Diameter				Weight %	
	[US Mesh]	[in.]	[mm]	[φ]	[Incl.]	[Cum.]
Gravel	5/8 in.	0.625000	15.87500	-4.00	0.000	0.00
	3/8 in.	0.375000	9.50000	-3.25	0.000	0.00
	4	0.187008	4.75000	-2.25	0.000	0.00
	6	0.131890	3.35000	-1.75	0.000	0.00
	8	0.092913	2.36000	-1.25	0.000	0.00
V Crse Sand	10	0.078740	2.00000	-1.00	0.000	0.00
	12	0.066212	1.68179	-0.75	0.000	0.00
	14	0.055678	1.41421	-0.50	0.000	0.00
	16	0.046819	1.18921	-0.25	0.000	0.00
Coarse Sand	18	0.039370	1.00000	0.00	0.000	0.00
	20	0.033106	0.84090	0.25	0.000	0.00
	25	0.027839	0.70711	0.50	0.000	0.00
	30	0.023410	0.59460	0.75	0.000	0.00
	35	0.019685	0.50000	1.00	0.000	0.00
Medium Sand	40	0.016553	0.42045	1.25	0.000	0.00
	45	0.013919	0.35355	1.50	0.000	0.00
	50	0.011705	0.29730	1.75	0.000	0.00
	60	0.009843	0.25000	2.00	0.000	0.00
Fine Sand	70	0.008277	0.21022	2.25	0.000	0.00
	80	0.006960	0.17678	2.50	0.001	0.00
	100	0.005852	0.14865	2.75	0.053	0.05
	120	0.004921	0.12500	3.00	0.278	0.33
	140	0.004138	0.10511	3.25	0.474	0.81
V. Fine Sand	170	0.003480	0.08839	3.50	0.526	1.33
	200	0.002926	0.07433	3.75	0.616	1.95
	230	0.002461	0.06250	4.00	0.879	2.83
	270	0.002069	0.05256	4.25	1.284	4.11
	325	0.001740	0.04419	4.50	1.842	5.95
Silt	400	0.001463	0.03716	4.75	2.515	8.47
	450	0.001230	0.03125	5.00	3.177	11.64
	500	0.001035	0.02628	5.25	3.620	15.26
	635	0.000870	0.02210	5.50	3.873	19.14
		0.000732	0.01858	5.75	4.192	23.33
		0.000615	0.01562	6.00	4.671	28.00
		0.000517	0.01314	6.25	5.109	33.11
		0.000435	0.01105	6.50	5.227	38.34
		0.000366	0.00929	6.75	5.183	43.52
		0.000308	0.00781	7.00	5.126	48.65
		0.000259	0.00657	7.25	5.085	53.73
		0.000217	0.00552	7.50	5.050	58.78
		0.000183	0.00465	7.75	4.994	63.77
		0.000154	0.00391	8.00	4.900	68.67
	Clay		0.000129	0.00328	8.25	4.688
		0.000109	0.00276	8.50	4.359	77.72
		0.000091	0.00232	8.75	3.935	81.66
		0.000077	0.00195	9.00	3.461	85.12
		0.000065	0.00164	9.25	2.986	88.10
		0.000054	0.00138	9.50	2.557	90.66
		0.000046	0.00116	9.75	2.194	92.86
		0.000038	0.00098	10.00	1.884	94.74
		0.000032	0.00082	10.25	1.615	96.35
		0.000027	0.00069	10.50	1.343	97.70
		0.000023	0.00058	10.75	1.057	98.75
		0.000019	0.00049	11.00	0.746	99.50
		0.000016	0.00041	11.25	0.401	99.90
		0.000015	0.00038	11.50	0.098	100.00

Sorting Statistics (Folk)				
Parameter	Trask	Inman	Folk	
Median	Silt sized			
(in)	0.0003	0.0003	0.0003	
(mm)	0.0075	0.0075	0.0075	
Mean	Silt sized			
(in)	0.0004	0.0003	0.0003	
(mm)	0.0103	0.0073	0.0073	
Sorting	Poor			
	2.382	1.810	1.764	
Skewness	Near symmetrical			
	0.983	0.077	0.036	
Kurtosis	Mesokurtic			
	0.220	0.567	0.928	
Component Percentages				
Gravel	Sand	Silt	Clay	Silt + Clay
0.00	2.83	65.85	31.33	97.17
Percentile [Weight, %]	Particle Diameter			
	[in.]	[mm]	[phi]	
5	0.0019	0.0485	4.3653	
10	0.0014	0.0343	4.8652	
16	0.0010	0.0255	5.2942	
25	0.0007	0.0175	5.8345	
40	0.0004	0.0105	6.5756	
50	0.0003	0.0075	7.0625	
70	0.0001	0.0037	8.0664	
75	0.0001	0.0031	8.3389	
84	0.0001	0.0021	8.9144	
90	0.0001	0.0014	9.4311	
95	0.0000	0.0010	10.0375	

**All Grain Sizes Classed Using Wentworth Scale



Sieve and Laser Particle Size Analysis



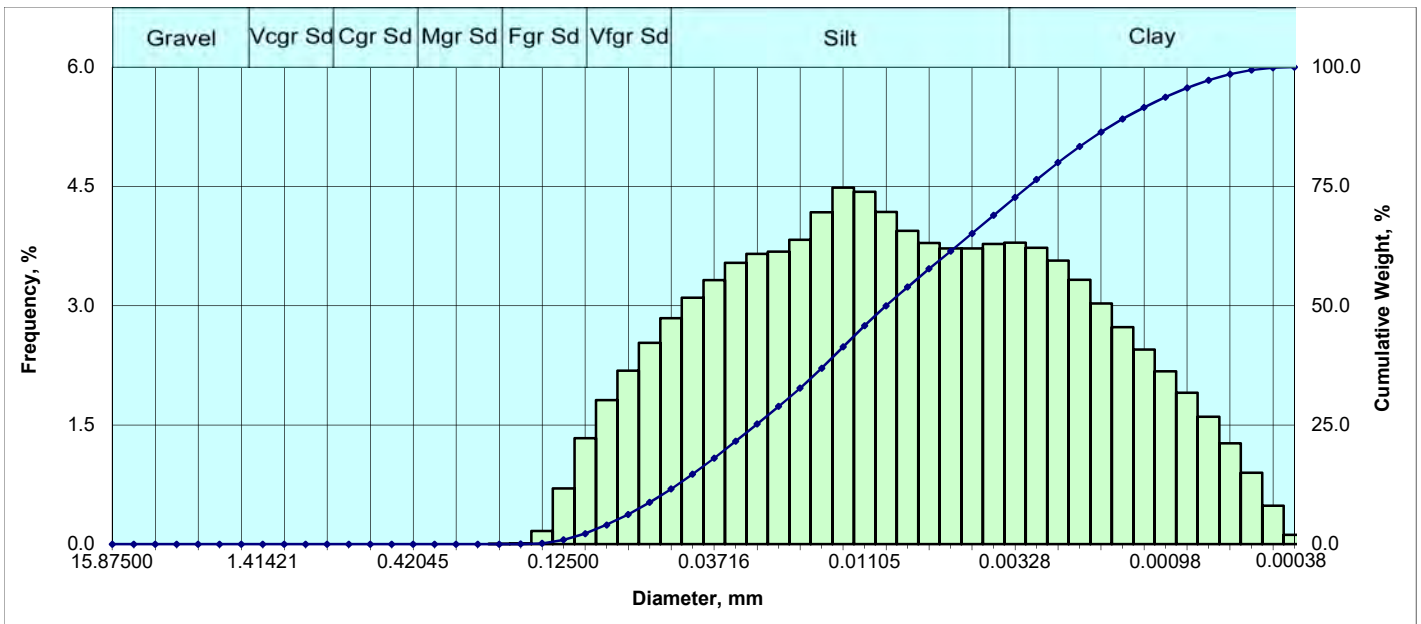
	Particle Size Distribution					Weight %	
	Diameter					[Incl.]	[Cum.]
	[US Mesh]	[in.]	[mm]	[φ]			
Gravel	5/8 in.	0.625000	15.87500	-4.00	0.000	0.00	
	3/8 in.	0.375000	9.50000	-3.25	0.000	0.00	
	4	0.187008	4.75000	-2.25	0.000	0.00	
	6	0.131890	3.35000	-1.75	0.000	0.00	
	8	0.092913	2.36000	-1.25	0.000	0.00	
V Crse Sand	10	0.078740	2.00000	-1.00	0.000	0.00	
	12	0.066212	1.68179	-0.75	0.000	0.00	
	14	0.055678	1.41421	-0.50	0.000	0.00	
	16	0.046819	1.18921	-0.25	0.000	0.00	
Coarse Sand	18	0.039370	1.00000	0.00	0.000	0.00	
	20	0.033106	0.84090	0.25	0.000	0.00	
	25	0.027839	0.70711	0.50	0.000	0.00	
	30	0.023410	0.59460	0.75	0.000	0.00	
Medium Sand	35	0.019685	0.50000	1.00	0.000	0.00	
	40	0.016553	0.42045	1.25	0.000	0.00	
	45	0.013919	0.35355	1.50	0.032	0.03	
	50	0.011705	0.29730	1.75	0.299	0.33	
Fine Sand	60	0.009843	0.25000	2.00	0.966	1.30	
	70	0.008277	0.21022	2.25	1.815	3.11	
	80	0.006960	0.17678	2.50	2.558	5.67	
	100	0.005852	0.14865	2.75	3.109	8.78	
V. Fine Sand	120	0.004921	0.12500	3.00	3.269	12.05	
	140	0.004138	0.10511	3.25	2.979	15.03	
	170	0.003480	0.08839	3.50	2.444	17.47	
	200	0.002926	0.07433	3.75	1.990	19.46	
Silt	230	0.002461	0.06250	4.00	1.762	21.22	
	270	0.002069	0.05256	4.25	1.715	22.94	
	325	0.001740	0.04419	4.50	1.800	24.74	
	400	0.001463	0.03716	4.75	1.966	26.70	
	450	0.001230	0.03125	5.00	2.156	28.86	
	500	0.001035	0.02628	5.25	2.286	31.15	
	635	0.000870	0.02210	5.50	2.396	33.54	
		0.000732	0.01858	5.75	2.661	36.20	
		0.000615	0.01562	6.00	3.126	39.33	
		0.000517	0.01314	6.25	3.590	42.92	
		0.000435	0.01105	6.50	3.769	46.69	
		0.000366	0.00929	6.75	3.791	50.48	
		0.000308	0.00781	7.00	3.822	54.30	
		0.000259	0.00657	7.25	3.904	58.21	
		0.000217	0.00552	7.50	4.017	62.22	
		0.000183	0.00465	7.75	4.130	66.35	
	0.000154	0.00391	8.00	4.223	70.58		
Clay		0.000129	0.00328	8.25	4.192	74.77	
		0.000109	0.00276	8.50	4.019	78.79	
		0.000091	0.00232	8.75	3.715	82.50	
		0.000077	0.00195	9.00	3.319	85.82	
		0.000065	0.00164	9.25	2.885	88.71	
		0.000054	0.00138	9.50	2.471	91.18	
		0.000046	0.00116	9.75	2.107	93.29	
		0.000038	0.00098	10.00	1.793	95.08	
		0.000032	0.00082	10.25	1.524	96.60	
		0.000027	0.00069	10.50	1.258	97.86	
		0.000023	0.00058	10.75	0.985	98.84	
		0.000019	0.00049	11.00	0.692	99.54	
		0.000016	0.00041	11.25	0.372	99.91	
		0.000015	0.00038	11.50	0.091	100.00	

Sorting Statistics (Folk)				
Parameter	Trask	Inman	Folk	
Median	Silt sized			
(in)	0.0004	0.0004	0.0004	
(mm)	0.0095	0.0095	0.0095	
Mean	Silt sized			
(in)	0.0009	0.0006	0.0005	
(mm)	0.0233	0.0146	0.0126	
Sorting	Very poor			
	3.646	2.757	2.523	
Skewness	Coarse skewed			
	1.247	-0.184	-0.179	
Kurtosis	Platykurtic			
	0.145	0.371	0.830	
Component Percentages				
Gravel	Sand	Silt	Clay	Silt + Clay
0.00	21.22	49.35	29.42	78.78
Percentile [Weight, %]	Particle Diameter			
	[in.]	[mm]	[phi]	
5	0.0073	0.1855	2.4301	
10	0.0055	0.1398	2.8384	
16	0.0039	0.0985	3.3443	
25	0.0017	0.0433	4.5309	
40	0.0006	0.0152	6.0435	
50	0.0004	0.0095	6.7158	
70	0.0002	0.0040	7.9631	
75	0.0001	0.0033	8.2632	
84	0.0001	0.0022	8.8574	
90	0.0001	0.0015	9.3754	
95	0.0000	0.0010	9.9881	

**All Grain Sizes Classed Using Wentworth Scale



Sieve and Laser Particle Size Analysis



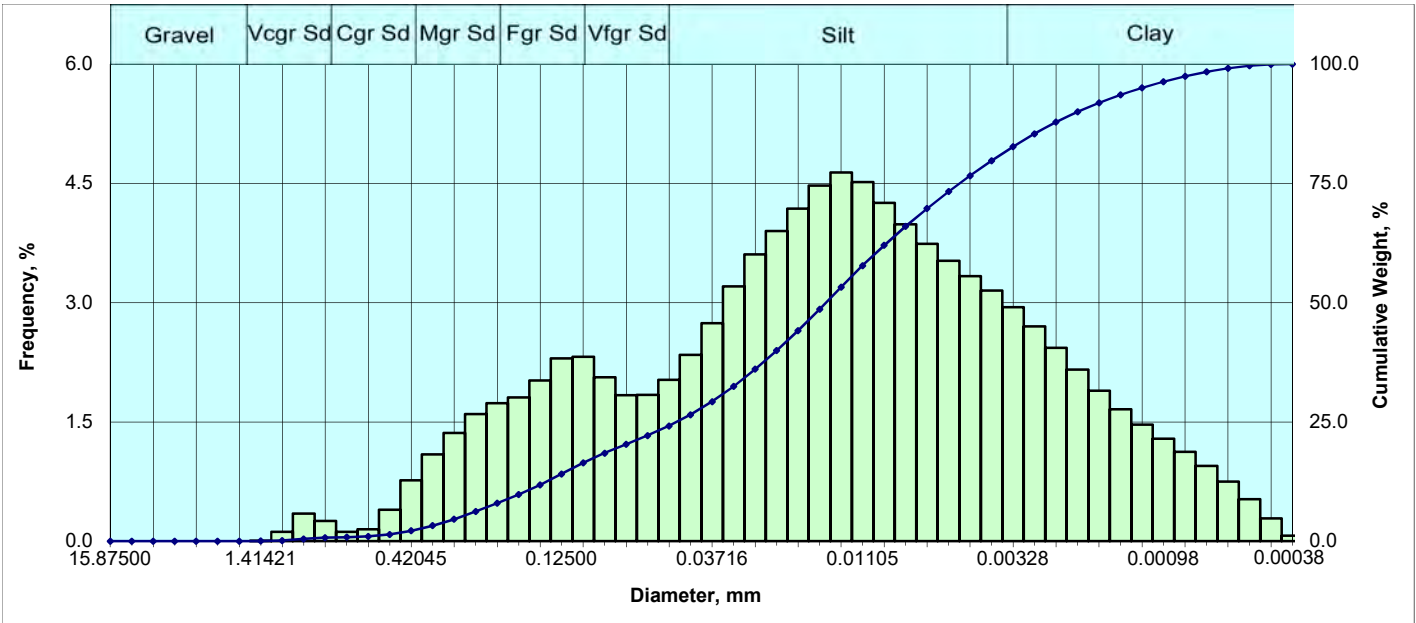
	Particle Size Distribution					
	Diameter				Weight %	
	[US Mesh]	[in.]	[mm]	[φ]	[Incl.]	[Cum.]
Gravel	5/8 in.	0.625000	15.87500	-4.00	0.000	0.00
	3/8 in.	0.375000	9.50000	-3.25	0.000	0.00
	4	0.187008	4.75000	-2.25	0.000	0.00
	6	0.131890	3.35000	-1.75	0.000	0.00
	8	0.092913	2.36000	-1.25	0.000	0.00
V Crse Sand	10	0.078740	2.00000	-1.00	0.000	0.00
	12	0.066212	1.68179	-0.75	0.000	0.00
	14	0.055678	1.41421	-0.50	0.000	0.00
	16	0.046819	1.18921	-0.25	0.000	0.00
Coarse Sand	18	0.039370	1.00000	0.00	0.000	0.00
	20	0.033106	0.84090	0.25	0.000	0.00
	25	0.027839	0.70711	0.50	0.000	0.00
	30	0.023410	0.59460	0.75	0.000	0.00
Medium Sand	35	0.019685	0.50000	1.00	0.000	0.00
	40	0.016553	0.42045	1.25	0.000	0.00
	45	0.013919	0.35355	1.50	0.000	0.00
	50	0.011705	0.29730	1.75	0.000	0.00
Fine Sand	60	0.009843	0.25000	2.00	0.000	0.00
	70	0.008277	0.21022	2.25	0.000	0.00
	80	0.006960	0.17678	2.50	0.007	0.01
	100	0.005852	0.14865	2.75	0.166	0.17
V. Fine Sand	120	0.004921	0.12500	3.00	0.700	0.87
	140	0.004138	0.10511	3.25	1.332	2.21
	170	0.003480	0.08839	3.50	1.813	4.02
	200	0.002926	0.07433	3.75	2.182	6.20
Silt	230	0.002461	0.06250	4.00	2.534	8.73
	270	0.002069	0.05256	4.25	2.843	11.58
	325	0.001740	0.04419	4.50	3.102	14.68
	400	0.001463	0.03716	4.75	3.324	18.00
	450	0.001230	0.03125	5.00	3.538	21.54
	500	0.001035	0.02628	5.25	3.651	25.19
	635	0.000870	0.02210	5.50	3.680	28.87
		0.000732	0.01858	5.75	3.829	32.70
		0.000615	0.01562	6.00	4.175	36.88
		0.000517	0.01314	6.25	4.484	41.36
		0.000435	0.01105	6.50	4.433	45.79
		0.000366	0.00929	6.75	4.180	49.97
		0.000308	0.00781	7.00	3.940	53.91
		0.000259	0.00657	7.25	3.788	57.70
		0.000217	0.00552	7.50	3.721	61.42
		0.000183	0.00465	7.75	3.721	65.14
	0.000154	0.00391	8.00	3.778	68.92	
Clay		0.000129	0.00328	8.25	3.795	72.72
		0.000109	0.00276	8.50	3.730	76.45
		0.000091	0.00232	8.75	3.569	80.02
		0.000077	0.00195	9.00	3.324	83.34
		0.000065	0.00164	9.25	3.029	86.37
		0.000054	0.00138	9.50	2.730	89.10
		0.000046	0.00116	9.75	2.449	91.55
		0.000038	0.00098	10.00	2.174	93.72
		0.000032	0.00082	10.25	1.905	95.63
		0.000027	0.00069	10.50	1.604	97.23
		0.000023	0.00058	10.75	1.270	98.50
		0.000019	0.00049	11.00	0.898	99.40
		0.000016	0.00041	11.25	0.483	99.88
		0.000015	0.00038	11.50	0.118	100.00

Sorting Statistics (Folk)				
Parameter	Trask	Inman	Folk	
Median	Silt sized			
(in)	0.0004	0.0004	0.0004	
(mm)	0.0093	0.0093	0.0093	
Mean	Silt sized			
(in)	0.0006	0.0003	0.0004	
(mm)	0.0148	0.0088	0.0090	
Sorting	Very poor			
	2.992	2.228	2.107	
Skewness	Near symmetrical			
	0.956	0.060	0.036	
Kurtosis	Platykurtic			
	0.208	0.471	0.850	
Component Percentages				
Gravel	Sand	Silt	Clay	Silt + Clay
0.00	8.73	60.19	31.08	91.27
Percentile [Weight, %]	Particle Diameter			
	[in.]	[mm]	[phi]	
5	0.0032	0.0821	3.6071	
10	0.0023	0.0581	4.1059	
16	0.0016	0.0414	4.5942	
25	0.0010	0.0265	5.2356	
40	0.0005	0.0139	6.1694	
50	0.0004	0.0093	6.7515	
70	0.0001	0.0037	8.0667	
75	0.0001	0.0030	8.3978	
84	0.0001	0.0019	9.0509	
90	0.0001	0.0013	9.5870	
95	0.0000	0.0009	10.1628	

**All Grain Sizes Classed Using Wentworth Scale



Sieve and Laser Particle Size Analysis



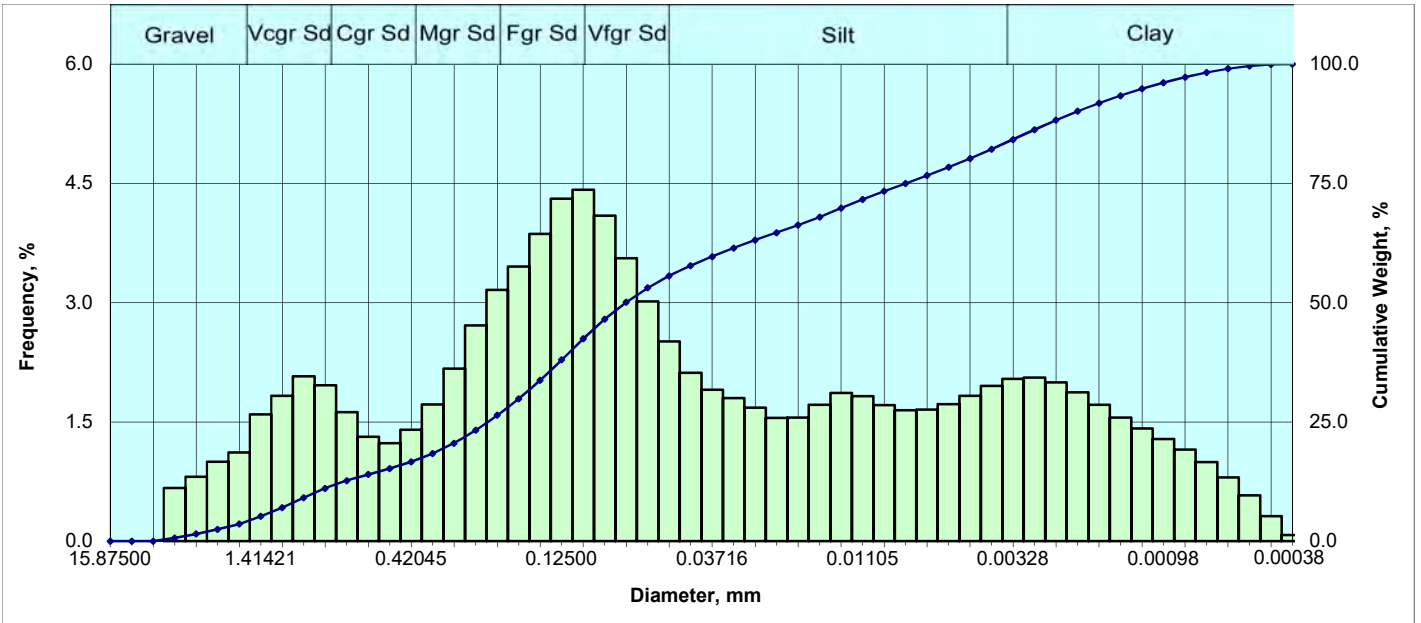
	Particle Size Distribution					Weight %	
	Diameter					[Incl.]	[Cum.]
	[US Mesh]	[in.]	[mm]	[φ]			
Gravel	5/8 in.	0.625000	15.87500	-4.00	0.000	0.00	
	3/8 in.	0.375000	9.50000	-3.25	0.000	0.00	
	4	0.187008	4.75000	-2.25	0.000	0.00	
	6	0.131890	3.35000	-1.75	0.000	0.00	
	8	0.092913	2.36000	-1.25	0.000	0.00	
V Crse Sand	10	0.078740	2.00000	-1.00	0.000	0.00	
	12	0.066212	1.68179	-0.75	0.000	0.00	
	14	0.055678	1.41421	-0.50	0.003	0.00	
	16	0.046819	1.18921	-0.25	0.117	0.12	
Coarse Sand	18	0.039370	1.00000	0.00	0.348	0.47	
	20	0.033106	0.84090	0.25	0.254	0.72	
	25	0.027839	0.70711	0.50	0.115	0.84	
	30	0.023410	0.59460	0.75	0.150	0.99	
Medium Sand	35	0.019685	0.50000	1.00	0.396	1.38	
	40	0.016553	0.42045	1.25	0.765	2.15	
	45	0.013919	0.35355	1.50	1.092	3.24	
	50	0.011705	0.29730	1.75	1.362	4.60	
Fine Sand	60	0.009843	0.25000	2.00	1.598	6.20	
	70	0.008277	0.21022	2.25	1.738	7.94	
	80	0.006960	0.17678	2.50	1.807	9.74	
	100	0.005852	0.14865	2.75	2.022	11.77	
V. Fine Sand	120	0.004921	0.12500	3.00	2.300	14.07	
	140	0.004138	0.10511	3.25	2.320	16.39	
	170	0.003480	0.08839	3.50	2.063	18.45	
	200	0.002926	0.07433	3.75	1.836	20.29	
Silt	230	0.002461	0.06250	4.00	1.839	22.12	
	270	0.002069	0.05256	4.25	2.028	24.15	
	325	0.001740	0.04419	4.50	2.343	26.50	
	400	0.001463	0.03716	4.75	2.742	29.24	
	450	0.001230	0.03125	5.00	3.205	32.44	
	500	0.001035	0.02628	5.25	3.609	36.05	
	635	0.000870	0.02210	5.50	3.903	39.95	
		0.000732	0.01858	5.75	4.182	44.14	
		0.000615	0.01562	6.00	4.472	48.61	
		0.000517	0.01314	6.25	4.637	53.25	
		0.000435	0.01105	6.50	4.516	57.76	
		0.000366	0.00929	6.75	4.256	62.02	
		0.000308	0.00781	7.00	3.985	66.00	
		0.000259	0.00657	7.25	3.741	69.75	
		0.000217	0.00552	7.50	3.528	73.27	
	0.000183	0.00465	7.75	3.334	76.61		
	0.000154	0.00391	8.00	3.153	79.76		
Clay		0.000129	0.00328	8.25	2.942	82.70	
		0.000109	0.00276	8.50	2.700	85.40	
		0.000091	0.00232	8.75	2.432	87.83	
		0.000077	0.00195	9.00	2.157	89.99	
		0.000065	0.00164	9.25	1.894	91.89	
		0.000054	0.00138	9.50	1.661	93.55	
		0.000046	0.00116	9.75	1.464	95.01	
		0.000038	0.00098	10.00	1.288	96.30	
		0.000032	0.00082	10.25	1.124	97.42	
		0.000027	0.00069	10.50	0.945	98.37	
		0.000023	0.00058	10.75	0.748	99.12	
		0.000019	0.00049	11.00	0.530	99.65	
		0.000016	0.00041	11.25	0.285	99.93	
		0.000015	0.00038	11.50	0.070	100.00	

Sorting Statistics (Folk)				
Parameter	Trask	Inman	Folk	
Median	Silt sized			
(in)	0.0006	0.0006	0.0006	
(mm)	0.0149	0.0149	0.0149	
Mean	Silt sized			
(in)	0.0011	0.0007	0.0007	
(mm)	0.0273	0.0181	0.0170	
Sorting	Very poor			
	3.126	2.580	2.493	
Skewness	Near symmetrical			
	1.065	-0.113	-0.092	
Kurtosis	Mesokurtic			
	0.130	0.539	0.989	
Component Percentages				
Gravel	Sand	Silt	Clay	Silt + Clay
0.00	22.12	57.63	20.24	77.88
Percentile [Weight, %]	Particle Diameter			
	[in.]	[mm]	[phi]	
5	0.0112	0.2855	1.8082	
10	0.0068	0.1732	2.5292	
16	0.0043	0.1084	3.2052	
25	0.0020	0.0495	4.3355	
40	0.0009	0.0221	5.5025	
50	0.0006	0.0149	6.0705	
70	0.0003	0.0065	7.2667	
75	0.0002	0.0051	7.6241	
84	0.0001	0.0030	8.3648	
90	0.0001	0.0020	9.0010	
95	0.0000	0.0012	9.7480	

**All Grain Sizes Classed Using Wentworth Scale



Sieve and Laser Particle Size Analysis



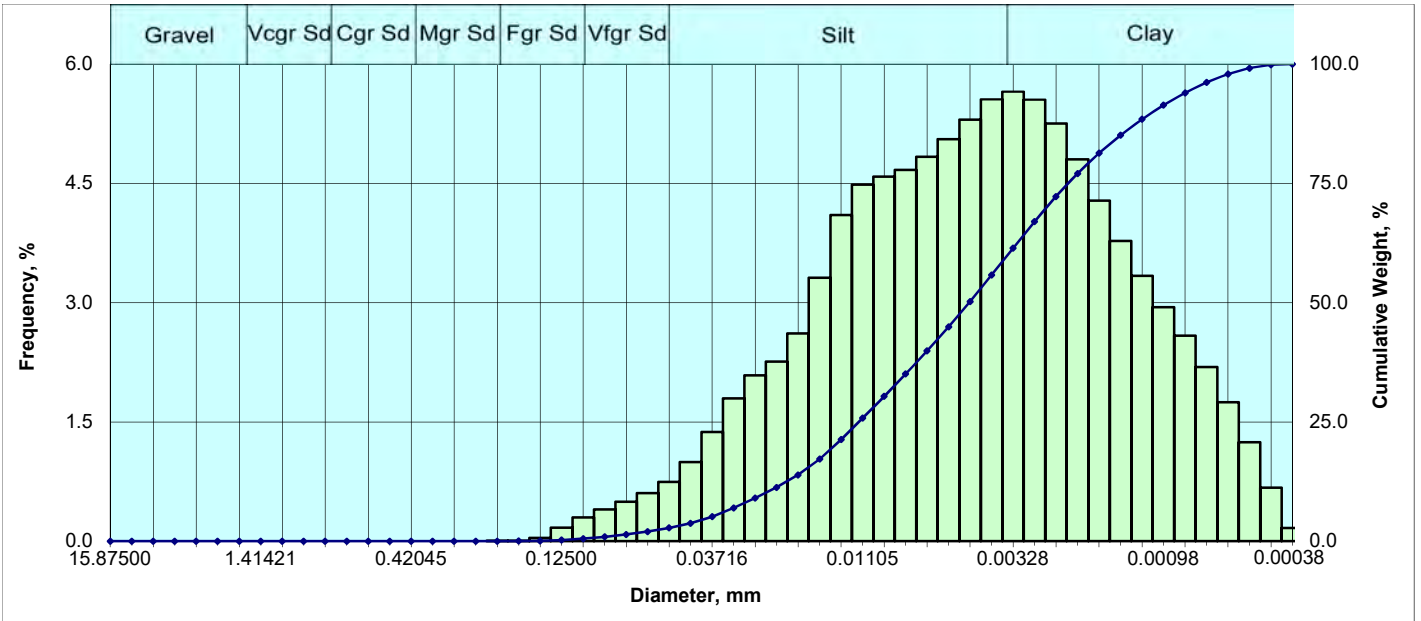
	Particle Size Distribution					Weight %	
	Diameter					[Incl.]	[Cum.]
	[US Mesh]	[in.]	[mm]	[φ]			
Gravel	5/8 in.	0.625000	15.87500	-4.00	0.000	0.00	
	3/8 in.	0.375000	9.50000	-3.25	0.000	0.00	
	4	0.187008	4.75000	-2.25	0.000	0.00	
	6	0.131890	3.35000	-1.75	0.667	0.67	
	8	0.092913	2.36000	-1.25	0.810	1.48	
V Crse Sand	10	0.078740	2.00000	-1.00	1.000	2.48	
	12	0.066212	1.68179	-0.75	1.118	3.59	
	14	0.055678	1.41421	-0.50	1.596	5.19	
	16	0.046819	1.18921	-0.25	1.827	7.02	
	18	0.039370	1.00000	0.00	2.073	9.09	
Coarse Sand	20	0.033106	0.84090	0.25	1.960	11.05	
	25	0.027839	0.70711	0.50	1.622	12.67	
	30	0.023410	0.59460	0.75	1.312	13.99	
	35	0.019685	0.50000	1.00	1.233	15.22	
	40	0.016553	0.42045	1.25	1.401	16.62	
Medium Sand	45	0.013919	0.35355	1.50	1.721	18.34	
	50	0.011705	0.29730	1.75	2.171	20.51	
	60	0.009843	0.25000	2.00	2.713	23.22	
	70	0.008277	0.21022	2.25	3.159	26.38	
	80	0.006960	0.17678	2.50	3.453	29.84	
Fine Sand	100	0.005852	0.14865	2.75	3.865	33.70	
	120	0.004921	0.12500	3.00	4.309	38.01	
	140	0.004138	0.10511	3.25	4.422	42.43	
	170	0.003480	0.08839	3.50	4.094	46.53	
	200	0.002926	0.07433	3.75	3.559	50.09	
V. Fine Sand	230	0.002461	0.06250	4.00	3.015	53.10	
	270	0.002069	0.05256	4.25	2.513	55.61	
	325	0.001740	0.04419	4.50	2.120	57.73	
	400	0.001463	0.03716	4.75	1.906	59.64	
	450	0.001230	0.03125	5.00	1.801	61.44	
	500	0.001035	0.02628	5.25	1.679	63.12	
	635	0.000870	0.02210	5.50	1.551	64.67	
		0.000732	0.01858	5.75	1.555	66.23	
		0.000615	0.01562	6.00	1.716	67.94	
		0.000517	0.01314	6.25	1.864	69.81	
		0.000435	0.01105	6.50	1.823	71.63	
		0.000366	0.00929	6.75	1.710	73.34	
		0.000308	0.00781	7.00	1.646	74.98	
		0.000259	0.00657	7.25	1.657	76.64	
		0.000217	0.00552	7.50	1.724	78.37	
	0.000183	0.00465	7.75	1.827	80.19		
	0.000154	0.00391	8.00	1.955	82.15		
Clay		0.000129	0.00328	8.25	2.041	84.19	
		0.000109	0.00276	8.50	2.058	86.25	
		0.000091	0.00232	8.75	1.997	88.24	
		0.000077	0.00195	9.00	1.873	90.12	
		0.000065	0.00164	9.25	1.714	91.83	
		0.000054	0.00138	9.50	1.556	93.39	
		0.000046	0.00116	9.75	1.416	94.80	
		0.000038	0.00098	10.00	1.284	96.09	
		0.000032	0.00082	10.25	1.153	97.24	
		0.000027	0.00069	10.50	0.993	98.23	
		0.000023	0.00058	10.75	0.802	99.03	
		0.000019	0.00049	11.00	0.576	99.61	
		0.000016	0.00041	11.25	0.313	99.92	
		0.000015	0.00038	11.50	0.077	100.00	

Sorting Statistics (Folk)				
Parameter	Trask	Inman	Folk	
Median	Very fine sand sized			
(in)	0.0029	0.0029	0.0029	
(mm)	0.0747	0.0747	0.0747	
Mean	Silt sized			
(in)	0.0046	0.0015	0.0019	
(mm)	0.1177	0.0390	0.0484	
Sorting	Very poor			
	5.402	3.545	3.336	
Skewness	Finely skewed			
	0.564	0.249	0.218	
Kurtosis	Platykurtic			
	0.119	0.455	0.869	
Component Percentages				
Gravel	Sand	Silt	Clay	Silt + Clay
2.48	50.62	29.05	17.85	46.90
Percentile [Weight, %]	Particle Diameter			
	[in.]	[mm]	[phi]	
5	0.0569	1.4461	-0.5322	
10	0.0365	0.9262	0.1106	
16	0.0179	0.4556	1.1341	
25	0.0090	0.2277	2.1351	
40	0.0046	0.1161	3.1071	
50	0.0029	0.0747	3.7434	
70	0.0005	0.0129	6.2747	
75	0.0003	0.0078	7.0021	
84	0.0001	0.0033	8.2250	
90	0.0001	0.0020	8.9831	
95	0.0000	0.0011	9.7857	

**All Grain Sizes Classed Using Wentworth Scale



Sieve and Laser Particle Size Analysis

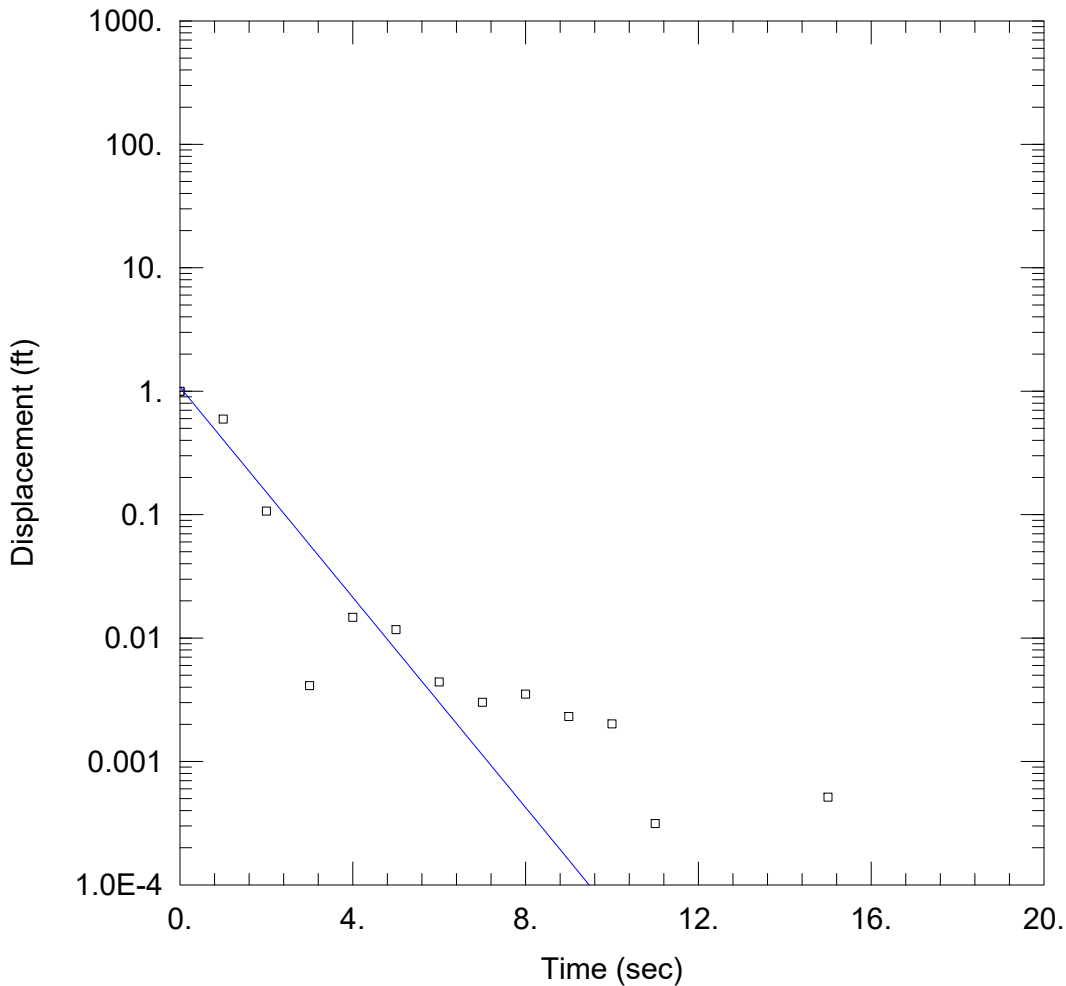


Particle Size Distribution						
	Diameter			Weight %		
	[US Mesh]	[in.]	[mm]	[φ]	[Incl.] [Cum.]	
Gravel	5/8 in.	0.625000	15.87500	-4.00	0.000	0.00
	3/8 in.	0.375000	9.50000	-3.25	0.000	0.00
	4	0.187008	4.75000	-2.25	0.000	0.00
	6	0.131890	3.35000	-1.75	0.000	0.00
	8	0.092913	2.36000	-1.25	0.000	0.00
V Crse Sand	10	0.078740	2.00000	-1.00	0.000	0.00
	12	0.066212	1.68179	-0.75	0.000	0.00
	14	0.055678	1.41421	-0.50	0.000	0.00
	16	0.046819	1.18921	-0.25	0.000	0.00
Coarse Sand	18	0.039370	1.00000	0.00	0.000	0.00
	20	0.033106	0.84090	0.25	0.000	0.00
	25	0.027839	0.70711	0.50	0.000	0.00
	30	0.023410	0.59460	0.75	0.000	0.00
	35	0.019685	0.50000	1.00	0.000	0.00
Medium Sand	40	0.016553	0.42045	1.25	0.000	0.00
	45	0.013919	0.35355	1.50	0.000	0.00
	50	0.011705	0.29730	1.75	0.000	0.00
	60	0.009843	0.25000	2.00	0.000	0.00
Fine Sand	70	0.008277	0.21022	2.25	0.000	0.00
	80	0.006960	0.17678	2.50	0.002	0.00
	100	0.005852	0.14865	2.75	0.042	0.04
	120	0.004921	0.12500	3.00	0.169	0.21
	140	0.004138	0.10511	3.25	0.299	0.51
V. Fine Sand	170	0.003480	0.08839	3.50	0.400	0.91
	200	0.002926	0.07433	3.75	0.496	1.41
	230	0.002461	0.06250	4.00	0.604	2.01
	270	0.002069	0.05256	4.25	0.745	2.76
	325	0.001740	0.04419	4.50	0.994	3.75
Silt	400	0.001463	0.03716	4.75	1.374	5.12
	450	0.001230	0.03125	5.00	1.797	6.92
	500	0.001035	0.02628	5.25	2.085	9.00
	635	0.000870	0.02210	5.50	2.259	11.26
		0.000732	0.01858	5.75	2.614	13.88
		0.000615	0.01562	6.00	3.313	17.19
		0.000517	0.01314	6.25	4.103	21.29
		0.000435	0.01105	6.50	4.486	25.78
		0.000366	0.00929	6.75	4.585	30.36
		0.000308	0.00781	7.00	4.671	35.04
		0.000259	0.00657	7.25	4.835	39.87
		0.000217	0.00552	7.50	5.059	44.93
		0.000183	0.00465	7.75	5.304	50.23
		0.000154	0.00391	8.00	5.555	55.79
	Clay		0.000129	0.00328	8.25	5.652
		0.000109	0.00276	8.50	5.553	66.99
		0.000091	0.00232	8.75	5.254	72.25
		0.000077	0.00195	9.00	4.805	77.05
		0.000065	0.00164	9.25	4.283	81.34
		0.000054	0.00138	9.50	3.779	85.11
		0.000046	0.00116	9.75	3.337	88.45
		0.000038	0.00098	10.00	2.943	91.39
		0.000032	0.00082	10.25	2.583	93.98
		0.000027	0.00069	10.50	2.189	96.17
		0.000023	0.00058	10.75	1.748	97.91
		0.000019	0.00049	11.00	1.246	99.16
		0.000016	0.00041	11.25	0.674	99.83
		0.000015	0.00038	11.50	0.166	100.00

Sorting Statistics (Folk)				
Parameter	Trask	Inman	Folk	
Median	Silt sized			
(in)	0.0002	0.0002	0.0002	
(mm)	0.0047	0.0047	0.0047	
Mean	Silt sized			
(in)	0.0003	0.0002	0.0002	
(mm)	0.0068	0.0049	0.0048	
Sorting	Poor			
	2.325	1.758	1.733	
Skewness	Near symmetrical			
	1.048	-0.111	-0.056	
Kurtosis	Mesokurtic			
	0.199	0.603	0.949	
Component Percentages				
Gravel	Sand	Silt	Clay	Silt + Clay
0.00	2.01	53.78	44.21	97.99
Percentile [Weight, %]	Particle Diameter			
	[in.]	[mm]	[phi]	
5	0.0015	0.0378	4.7258	
10	0.0010	0.0244	5.3549	
16	0.0007	0.0167	5.9051	
25	0.0004	0.0114	6.4534	
40	0.0003	0.0065	7.2559	
50	0.0002	0.0047	7.7380	
70	0.0001	0.0025	8.6377	
75	0.0001	0.0021	8.8879	
84	0.0001	0.0015	9.4217	
90	0.0000	0.0011	9.8762	
95	0.0000	0.0008	10.3615	

**All Grain Sizes Classified Using Wentworth Scale

Appendix G
AQTESOLV Analysis



NERT3.58S1 FALLING HEAD TEST

Data Set: C:\...\NERT3.58S1 Falling Head Test.aqt

Date: 05/02/19

Time: 15:53:39

PROJECT INFORMATION

Company: AECOM

Client: NDEP

Project: 60477365

Location: Las Vegas Wash, Henderson NV

Test Well: NERT3.58S1

Test Date: 4/19/2019

AQUIFER DATA

Saturated Thickness: 20.54 ft

Anisotropy Ratio (Kz/Kr): 0.3

WELL DATA (NERT3.58S1)

Initial Displacement: 0.996 ft

Static Water Column Height: 20.54 ft

Total Well Penetration Depth: 55. ft

Screen Length: 20. ft

Casing Radius: 0.167 ft

Well Radius: 0.3333 ft

Gravel Pack Porosity: 0.3

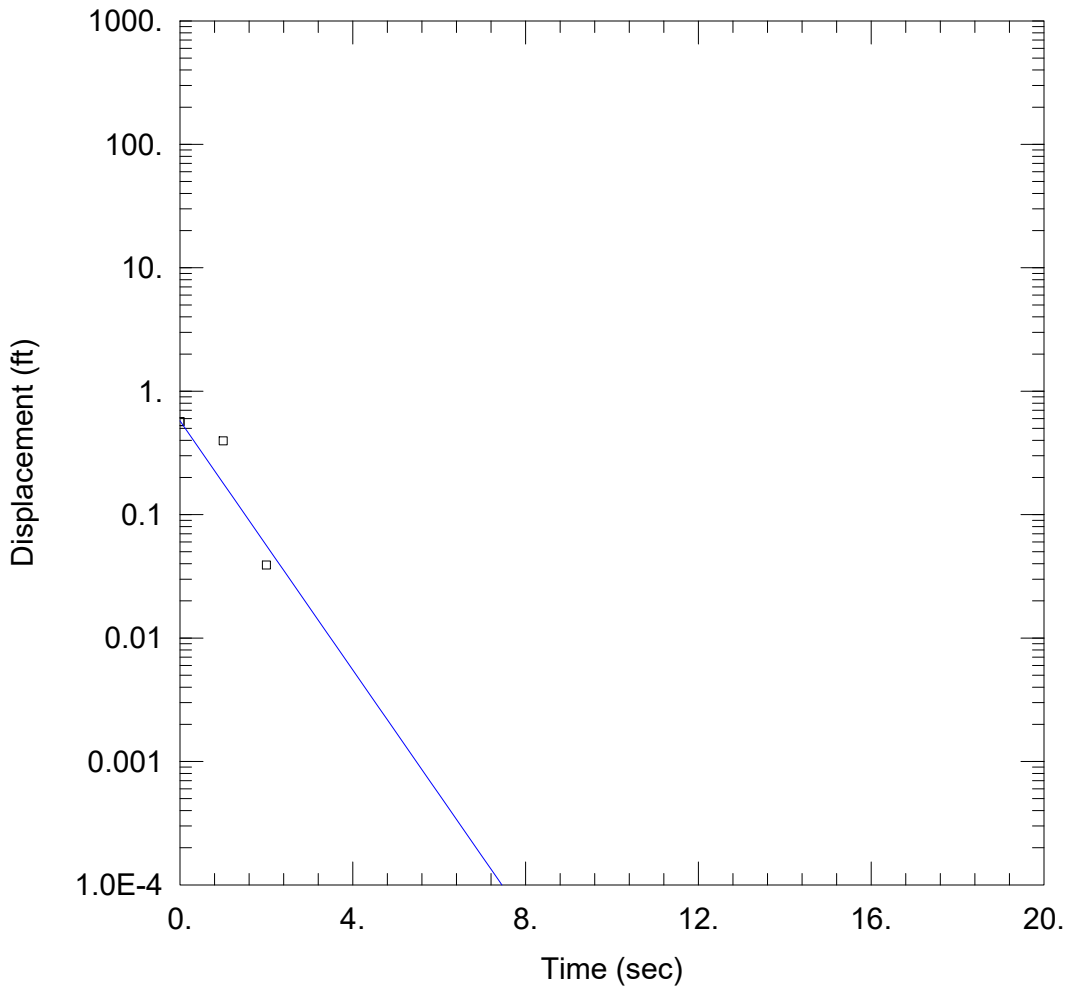
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 413.8 ft/day

y0 = 1.078 ft



NERT3.58S1 RISING HEAD TEST

Data Set: C:\...\NERT3.58S1 Rising Head Test.aqt

Date: 05/03/19

Time: 13:45:38

PROJECT INFORMATION

Company: AECOM

Client: NDEP

Project: 60477365

Location: Las Vegas Wash, Henderson NV

Test Well: NERT3.58S1

Test Date: 4/19/2019

AQUIFER DATA

Saturated Thickness: 20.54 ft

Anisotropy Ratio (Kz/Kr): 0.3

WELL DATA (NERT3.58S1)

Initial Displacement: 0.5663 ft

Static Water Column Height: 20.54 ft

Total Well Penetration Depth: 55 ft

Screen Length: 20 ft

Casing Radius: 0.167 ft

Well Radius: 0.3333 ft

Gravel Pack Porosity: 0.3

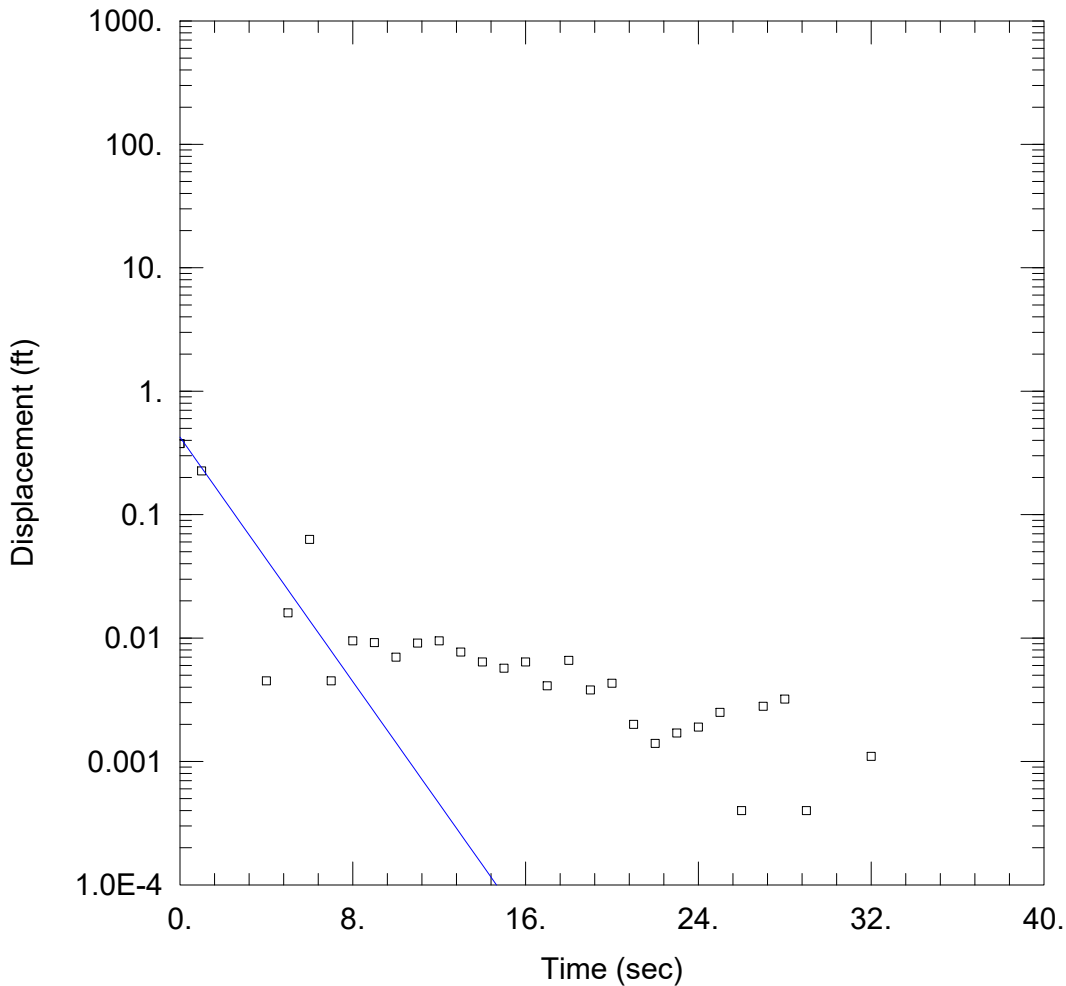
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 490.3 ft/day

y0 = 0.5745 ft



NERT3.60S1 FALLING HEAD TEST

Data Set: C:\...\NERT3.60S1 Falling Head Test.aqt

Date: 05/02/19

Time: 15:56:22

PROJECT INFORMATION

Company: AECOM

Client: NDEP

Project: 60477365

Location: Las Vegas Wash, Henderson NV

Test Well: NERT3.60S1

Test Date: 4/19/2019

AQUIFER DATA

Saturated Thickness: 26.48 ft

Anisotropy Ratio (Kz/Kr): 0.3

WELL DATA (NERT3.60S1)

Initial Displacement: 0.3764 ft

Static Water Column Height: 16.48 ft

Total Well Penetration Depth: 55 ft

Screen Length: 20 ft

Casing Radius: 0.167 ft

Well Radius: 0.3333 ft

Gravel Pack Porosity: 0.3

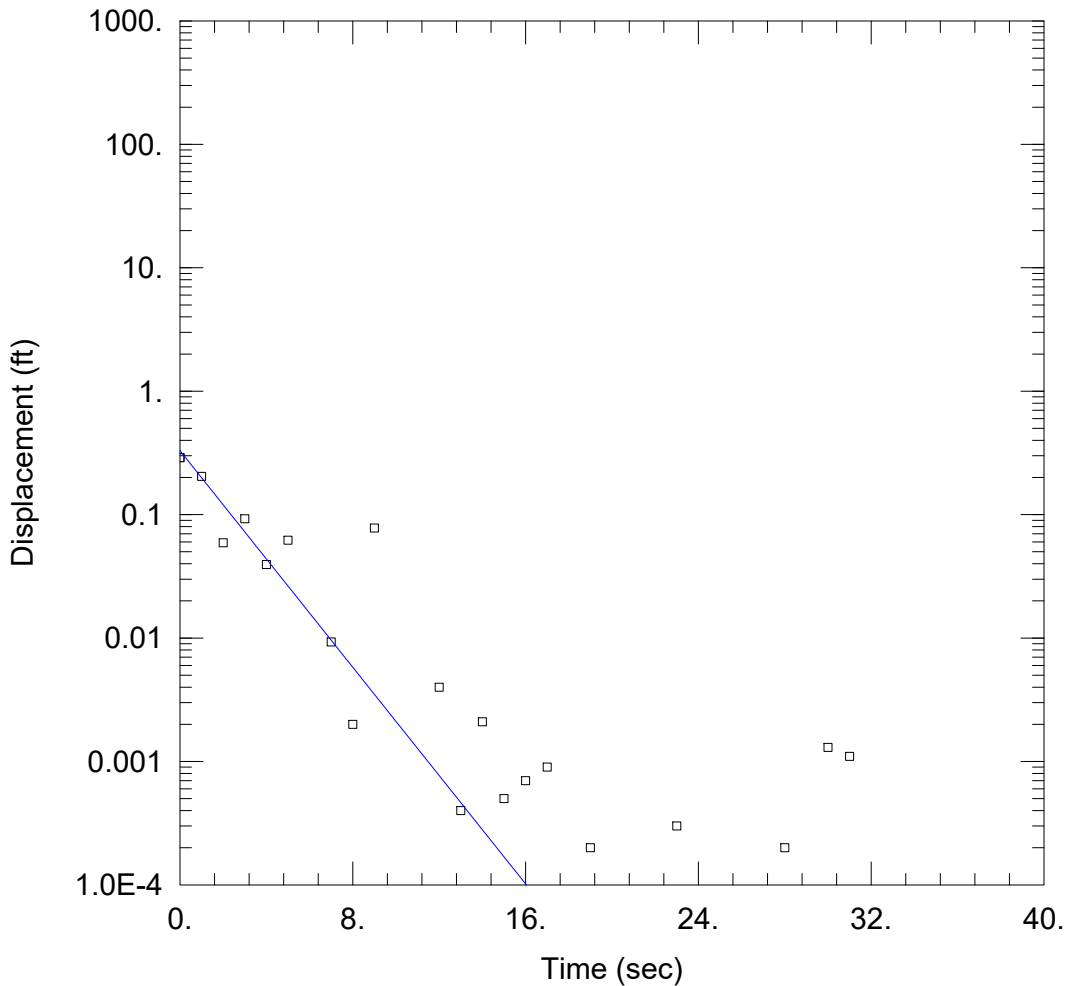
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bower-Rice

K = 240.6 ft/day

y0 = 0.4246 ft



NERT3.60S1 RISING HEAD TEST

Data Set: C:\...\NERT3.60S1 Rising Head Test.aqt

Date: 05/03/19

Time: 09:55:26

PROJECT INFORMATION

Company: AECOM

Client: NDEP

Project: 60477365

Location: Las Vegas Wash, Henderson NV

Test Well: NERT3.60S1

Test Date: 4/19/2019

AQUIFER DATA

Saturated Thickness: 26.48 ft

Anisotropy Ratio (Kz/Kr): 0.3

WELL DATA (NERT3.60S1)

Initial Displacement: 0.2894 ft

Static Water Column Height: 16.48 ft

Total Well Penetration Depth: 55. ft

Screen Length: 20. ft

Casing Radius: 0.167 ft

Well Radius: 0.3333 ft

Gravel Pack Porosity: 0.3

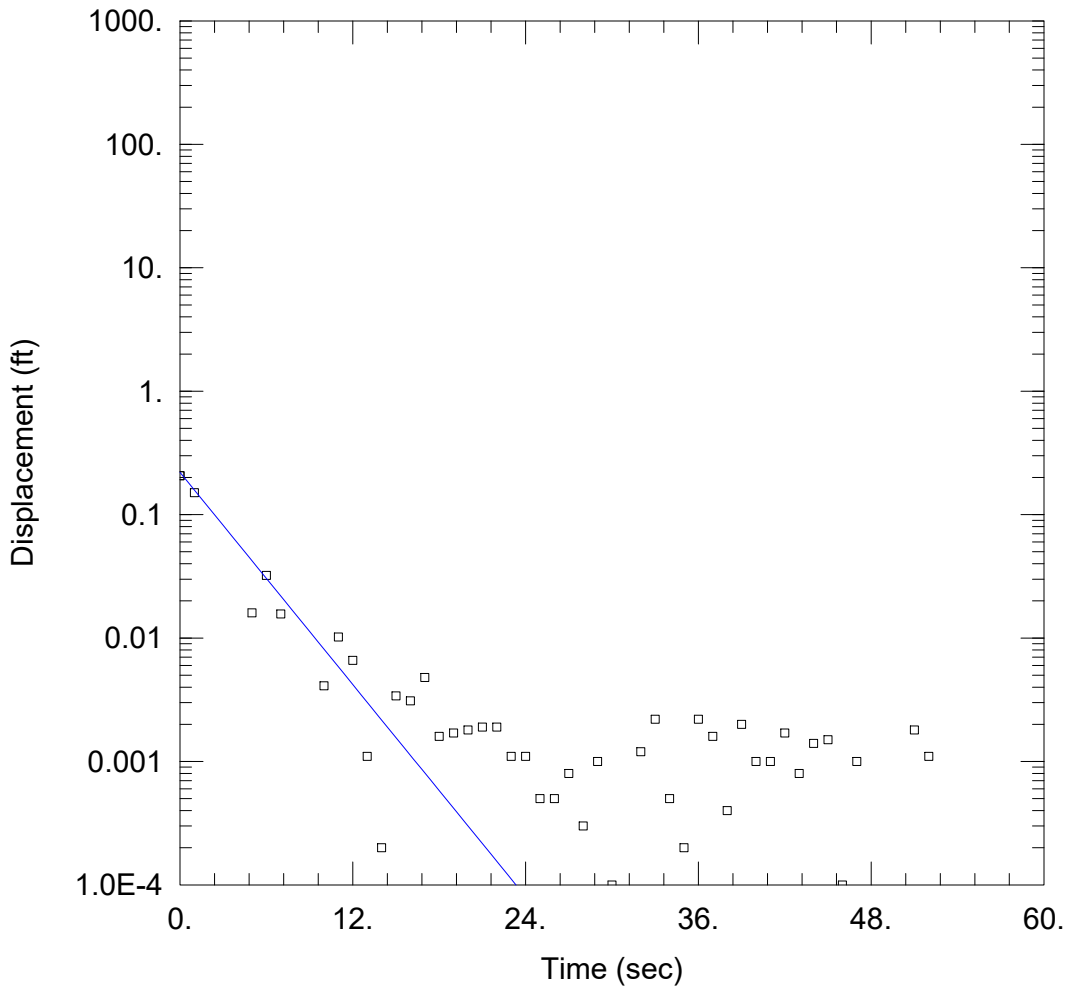
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bower-Rice

K = 213.2 ft/day

y0 = 0.3297 ft



NERT4.64S1 FALLING HEAD TEST

Data Set: C:\...\NERT4.64S1 Falling Head Test_2.aqt

Date: 05/03/19

Time: 09:56:40

PROJECT INFORMATION

Company: AECOM

Client: NDEP

Project: 60477365

Location: Las Vegas Wash, Henderson NV

Test Well: NERT4.64S1

Test Date: 4/19/2019

AQUIFER DATA

Saturated Thickness: 20.54 ft

Anisotropy Ratio (Kz/Kr): 0.3

WELL DATA (NERT4.64S1)

Initial Displacement: 0.2064 ft

Static Water Column Height: 20.54 ft

Total Well Penetration Depth: 55. ft

Screen Length: 20. ft

Casing Radius: 0.167 ft

Well Radius: 0.3333 ft

Gravel Pack Porosity: 0.3

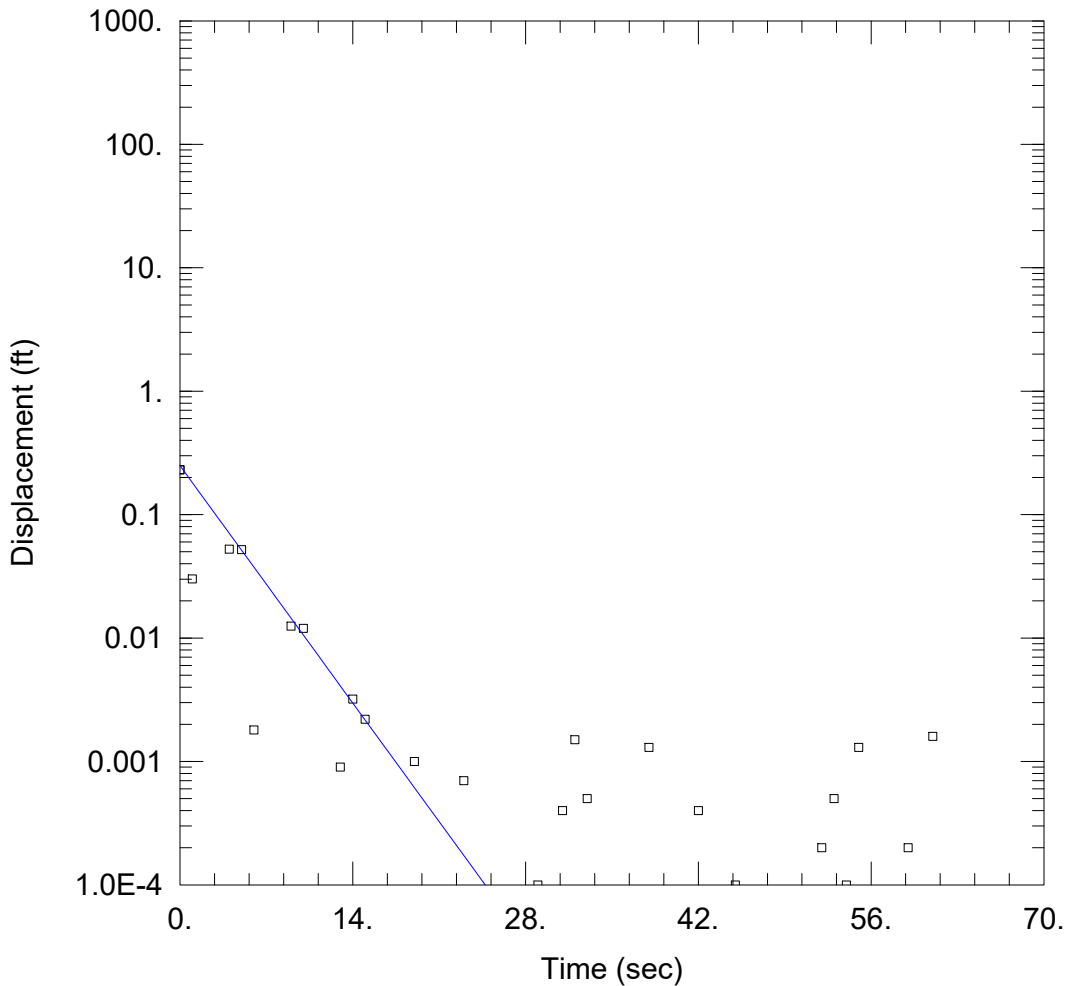
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bower-Rice

K = 139.2 ft/day

y0 = 0.2201 ft



NERT4.64S1 RISING HEAD TEST

Data Set: C:\...\NERT4.64S1 Rising Head Test_2.aqt

Date: 05/03/19

Time: 09:58:04

PROJECT INFORMATION

Company: AECOM

Client: NDEP

Project: 60477365

Location: Las Vegas Wash, Henderson NV

Test Well: NERT4.64S1

Test Date: 4/19/2019

AQUIFER DATA

Saturated Thickness: 20.54 ft

Anisotropy Ratio (Kz/Kr): 0.3

WELL DATA (NERT4.64S1)

Initial Displacement: 0.23 ft

Static Water Column Height: 20.54 ft

Total Well Penetration Depth: 55. ft

Screen Length: 20. ft

Casing Radius: 0.167 ft

Well Radius: 0.3333 ft

Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bower-Rice

K = 133.4 ft/day

y0 = 0.2492 ft

Appendix H
Nuclear Magnetic Resonance Logs

NDEP Phase II Groundwater
Investigation – Javelin Nuclear
Magnetic Resonance Logging
NERT Downgradient Study Area

Final NMR Logging Results Provide by Ramboll

NMR Logging Method Overview

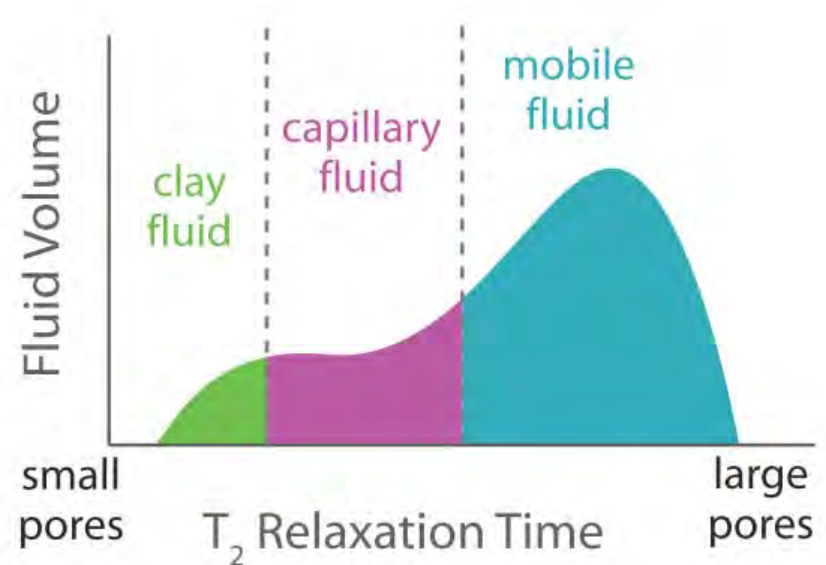
The Nuclear Magnetic Resonance (NMR) logging method uses the physics of nuclear magnetic resonance to directly measure fluid hydrogen in groundwater. The downhole NMR probe contains magnets that polarize the fluid hydrogen, creating a net nuclear magnetization, the magnitude of which is proportional to the number of fluid hydrogen present. Radio-frequency coils within the probe transmit EM pulses to excite this hydrogen magnetization and measure its response. The measured NMR signal has a detected amplitude and decays over time. The signal amplitude and decay rate provides useful information about the hydrogeologic properties of the investigated material. (e.g. a sand). In heterogeneous materials, the T2 distribution provides an indication of the relative pore-size distribution with shorter T2 components being associated with smaller pores and longer T2 components being associated with larger pores. Given the sensitivity to water content and pore size, the NMR data may also be used to estimate permeability or hydraulic conductivity. Equations used to estimate hydraulic conductivity are explained later.

The initial amplitude of the NMR signal directly reflects the quantity of hydrogen in the formation or the volumetric water content (porosity if saturated). The decay time of the signal T2 indicates whether the water is in “bound” small pores (e.g. as in a silt) or is mobile in large pores

“Mobile” and “Bound” Water

The T₂ distribution indicates a relative pore size distribution and can be subdivided to estimate the fraction of water that is more bound and more mobile. The total integral (total area under) the T₂ distribution is the total water content. The area under any subdivided range of the distribution represents the total amount of water having T₂ within that range.

Using standard cutoff times derived from oil reservoir sandstones, water with T₂ longer than 33ms is estimated as “mobile” water; water with T₂ less than 33ms is estimated as “bound” water. Because these standard cutoff times are based on reservoir sandstones, in other rock/sediment types, the cutoffs and definitions of “bound” and “mobile” should not be considered in a definite sense but rather a way to distinguish “more bound” water from “more mobile” water.



Hydraulic Conductivity Estimation

Hydraulic conductivity (K) estimation from NMR is based on the fact that the NMR measurement is sensitive to both porosity (via the signal amplitude) and pore size (via the decay time T2). These are the two most important parameters determining hydraulic conductivity in sedimentary rocks and unconsolidated sediments. The Kozeny-Carmen equation is an analytical equation that predicts K based on the pore diameter (dpore), porosity (φ), and tortuosity (τ) of the system. The NMR K estimators used here, essentially can be understood as substituting NMR measured parameters into the well-known analytically derived Kozeny-Carmen equation KKC. These equations are shown below:

$$K_{KC} = \frac{\phi d_{pore}^2}{\tau} \quad S_0 \propto \phi \quad T_2 \sim d_{pore}$$

$$K_{SDR} = b_{SDR} T_{2ml}^2 S_0^N$$

$$K_{SOE} = b_{SOE} \overline{S(t)}^2$$

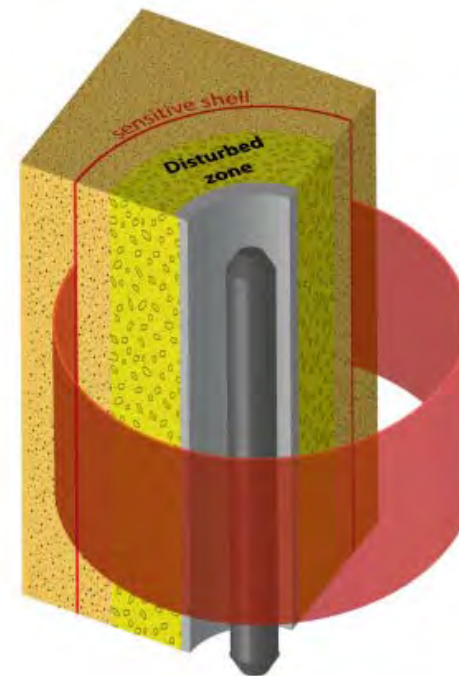
The equation for KSDR is known as the Schlumberger Doll Research Equation, and estimates K using NMR estimated porosity (from the initial amplitude S0) and the mean-log T2 decay time in the T2 distribution. The equation for KSOE is known as the squared mean-of-echoes equation and estimates K as a function of the mean signal amplitude squared, thereby incorporating both signal amplitude and decay time. Both equations include a calibration coefficient b. For this data, we have used calibration coefficients that have been derived from NMR logs and pump tests from several unconsolidated sediment aquifer sites through the US.

The K values estimated from these two equations will differ to some extent because they are based on different models. In practice has shown the SOE estimator to be more stable in high noise environments. Because the SOE is strongly weighted by the longest relaxation time, it is not strongly influenced by the presence of clay fractions. The SDR, which is weighted by the log-mean relaxation time, tends to be more strongly influenced by the mean pore size and presence of clay fractions. These equations have primarily been calibrated and validated in materials ranging from <10-3 m/d to 102 m/d.

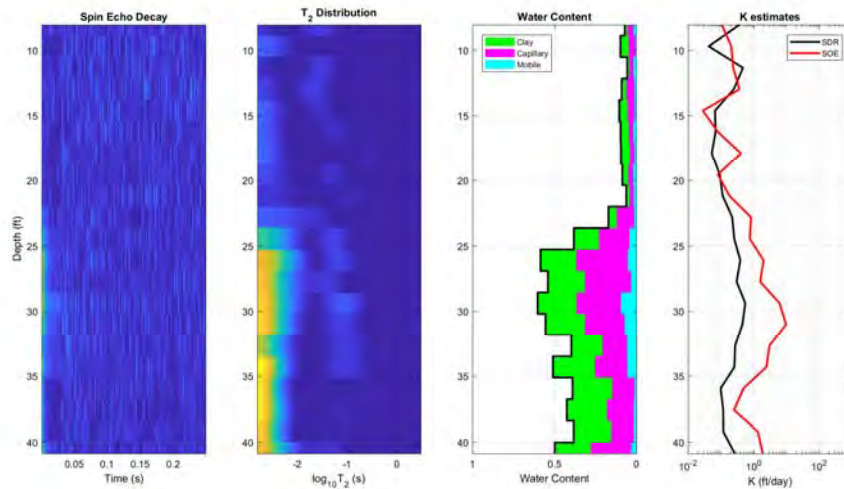
Javelin NMR Instrumentation

The configuration of the Vista Clara Javelin NMR logging tools allows data to be acquired within a sensitive zone shaped as a thin cylindrical shell that avoids sensitivity to formation disturbance and well construction nearby the tool. Javelin probes are available in different diameters with larger diameter tools providing a larger diameter sensitive zone. For the tools used in this work, the JP175 has a sensitive diameter of approximately 10 inches and the JP350 has a sensitive diameter of approximately 15 inches. In both cases, the sensitive zone has a vertical length of 50cm, which defines the vertical resolution of the measurements.

Data are acquired using a dual-frequency mode allowing independent measurements of two discrete sensitive shells located within ~0.5 inches of the nominal sensitive shell diameter. A lower frequency measurement is used to detect water in the deeper sensitive shell and a higher frequency is used to measure water in the shallower sensitive shell. In most cases, the formation is sufficiently homogeneous radially that data at these different radial distances are identical. As such, these two datasets are typically combined by averaging to generate a combined dual-frequency log. Significant differences between data for the two shells can indicate the measurements are influenced by well disturbance or construction artifacts.



Example Log



An example NMR log is shown here with four panels. In all panels, depth below the well head is on the y-axis. The panel at the far left shows the NMR signal decaying in time. The second panel shows the T₂ distribution at every depth level. Water signals are shown in warm colors (dark blue is not signal) and the position of the signal along the horizontal axis indicates the T₂ decay time of the signal on a logarithmic scale [e.g. log₁₀(-2) s = 10⁻² s = 10ms]. Water constricted in smaller pores will plot towards the left of the distribution (short T₂) and water in large spaces will plot to the right of the distribution (long T₂). The third panel shows the total water content, mobile fraction, capillary fraction, and clay fraction at every depth level. The fourth panel shows the estimated K, based on the SDR (black) and SOE (red) equations. The fourth panel shows the noise level for each depth measurement. The noise level reflects the reliability of the data. The red and blue curves indicate the noise level in each of the two frequency datasets; the green curve shows the noise level of the combined frequency data. In areas where the combined (green) noise is very low (<7%), the data are most reliable; in areas where the noise is moderate to high 7%-10% the data are of reduced reliability but can still be quantitatively interpreted; in areas where the noise is 10-20%, the data should be interpreted qualitatively; data should not be interpreted in area where the noise is >20%. In general, the noise level is good at this site when the tool is below the water table and can become poor when the tool is above the water table. Therefore results in the vadose zone should be interpreted with caution.

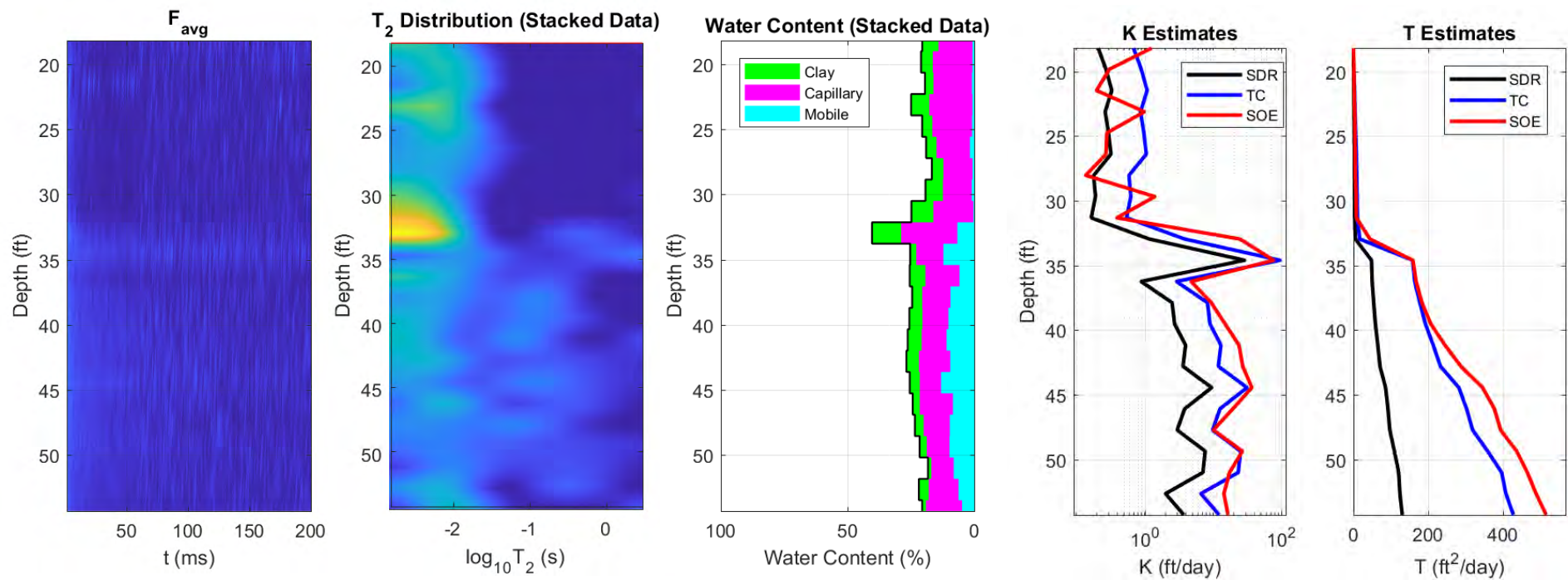
Data Processing

- Data were processed with the following parameters (selectable as options in Vista Clara's Javelin NMR processing software):
- Multi (2 or 4) frequency data were combined in final processing. Uncombined individual frequency data were visualized in preprocessing to assess variability between the frequency shells.
- A regularization value of 30 was used in all cases.
- The following hydraulic conductivity estimation coefficients were used: bSDR=8900; bSOE=4200.

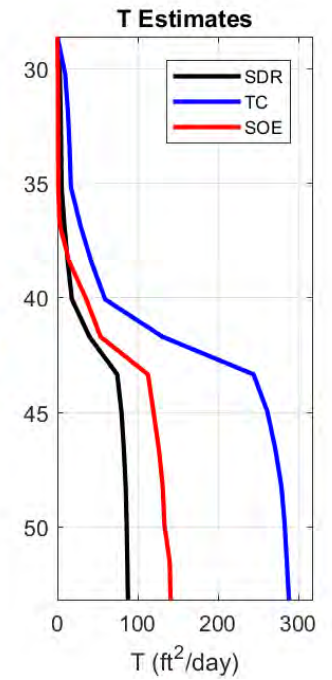
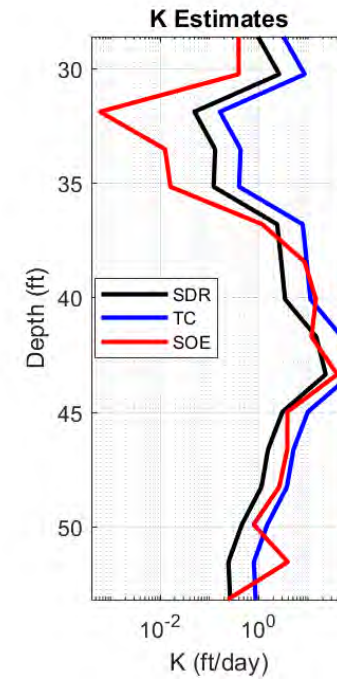
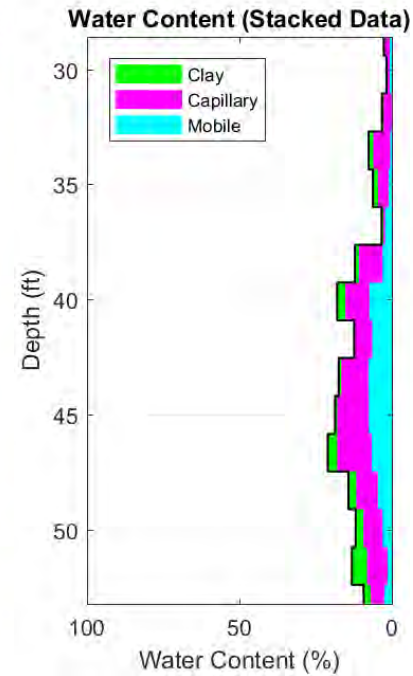
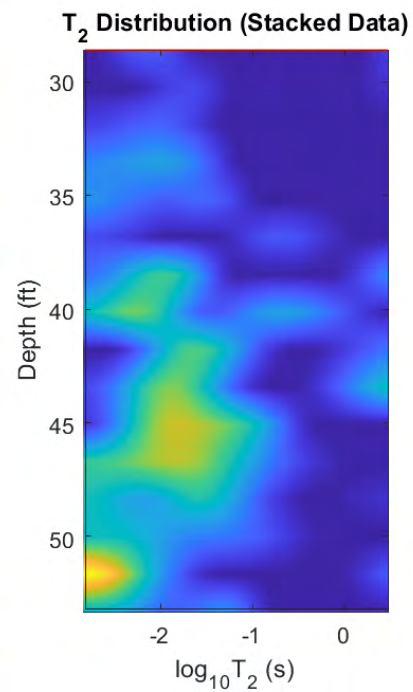
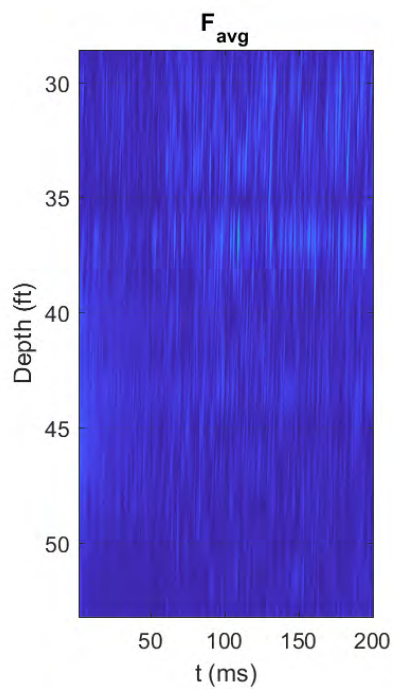
NMR Logs

On the following pages, the NMR log composites for each hole are plotted.

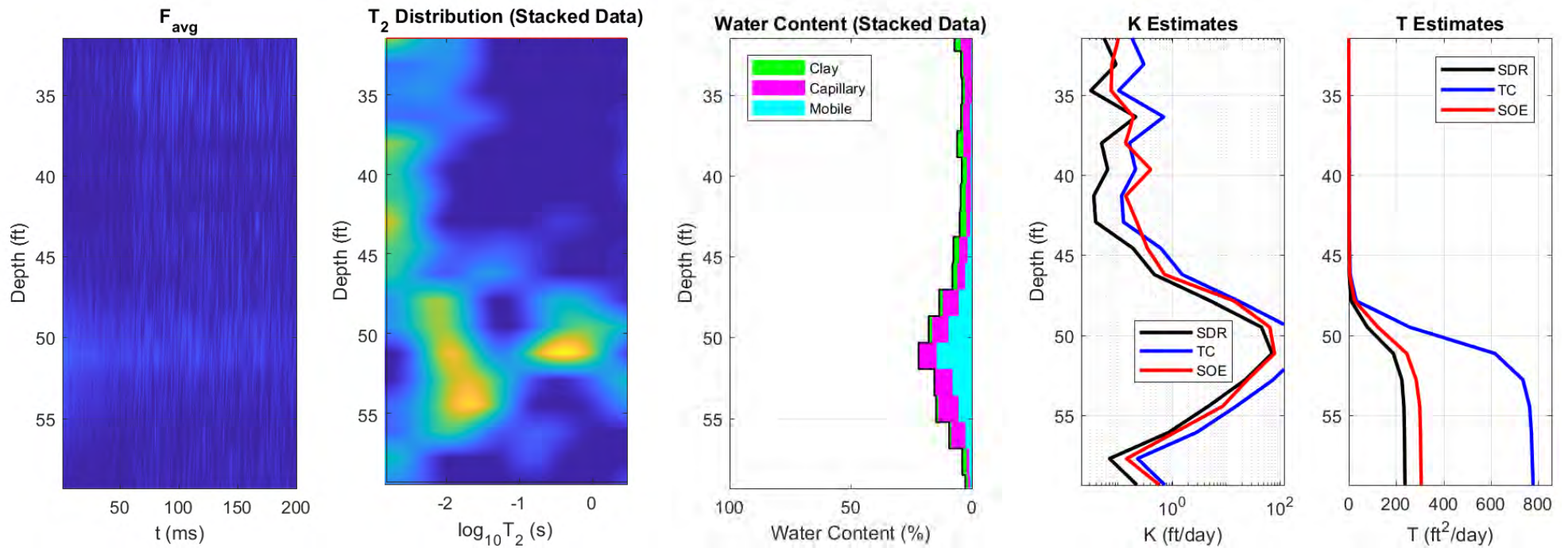
NERT3.35S1 – Phase II Groundwater Well



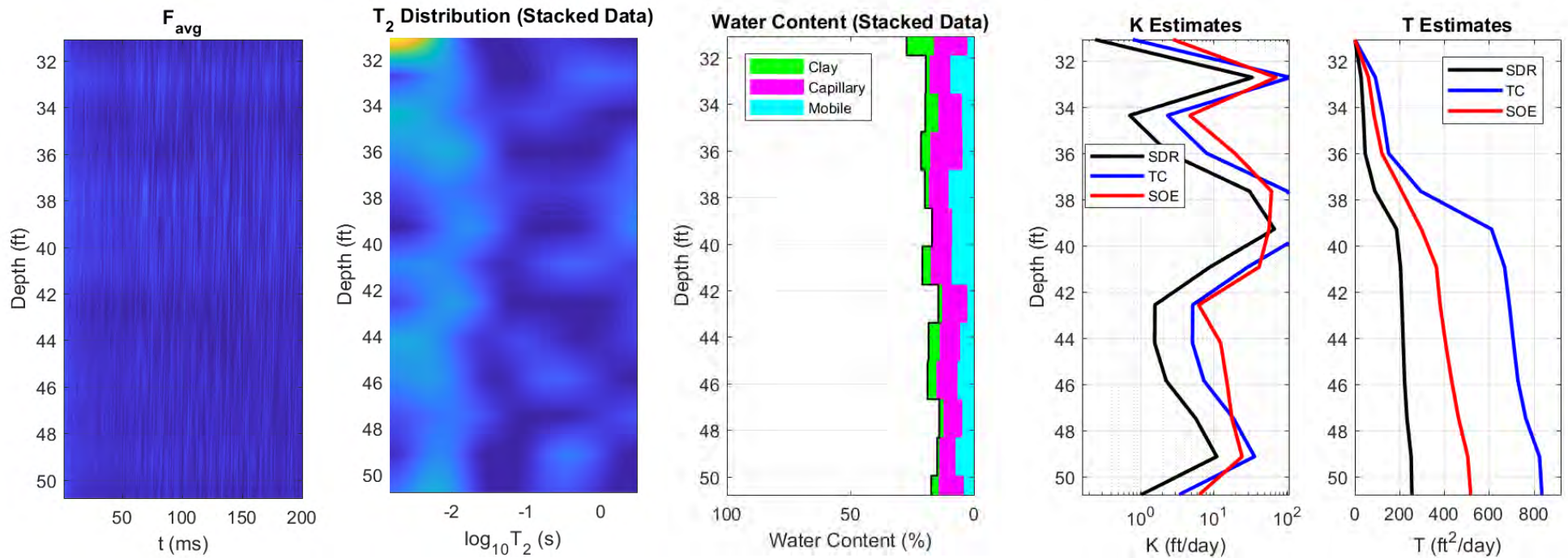
NERT3.40S1 – Phase II Groundwater Well



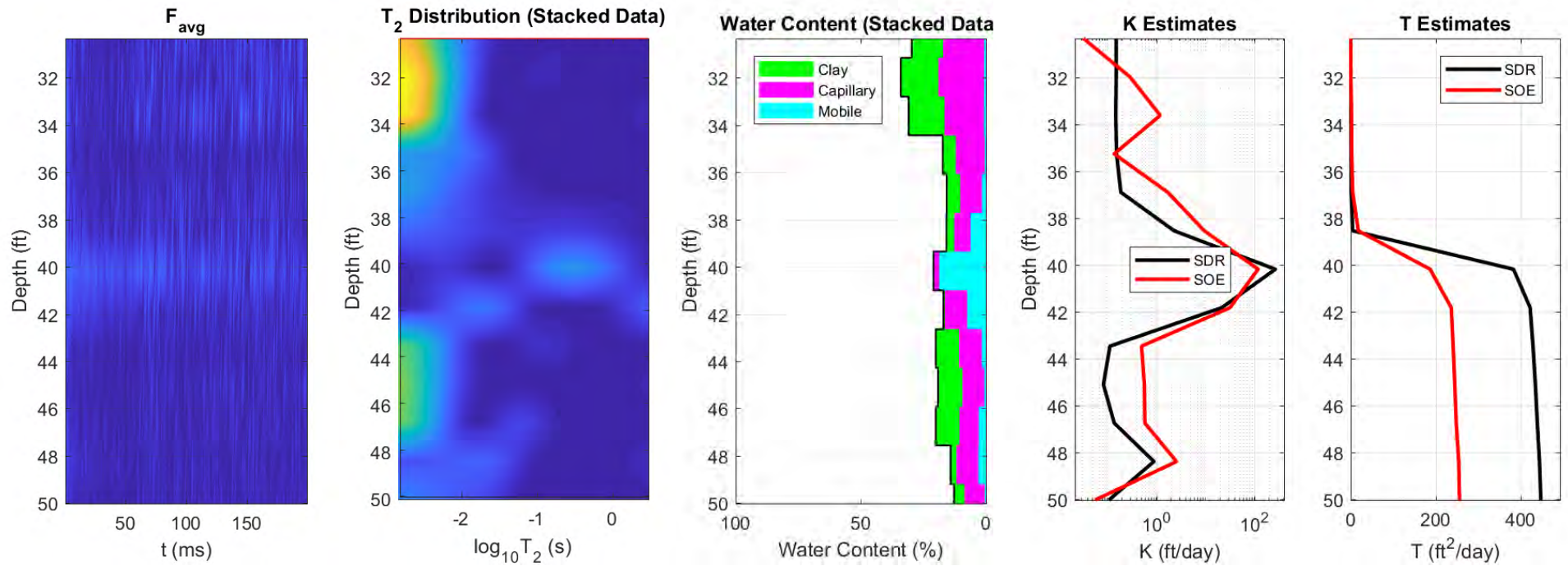
NERT3.58N1 – Phase II Groundwater Well



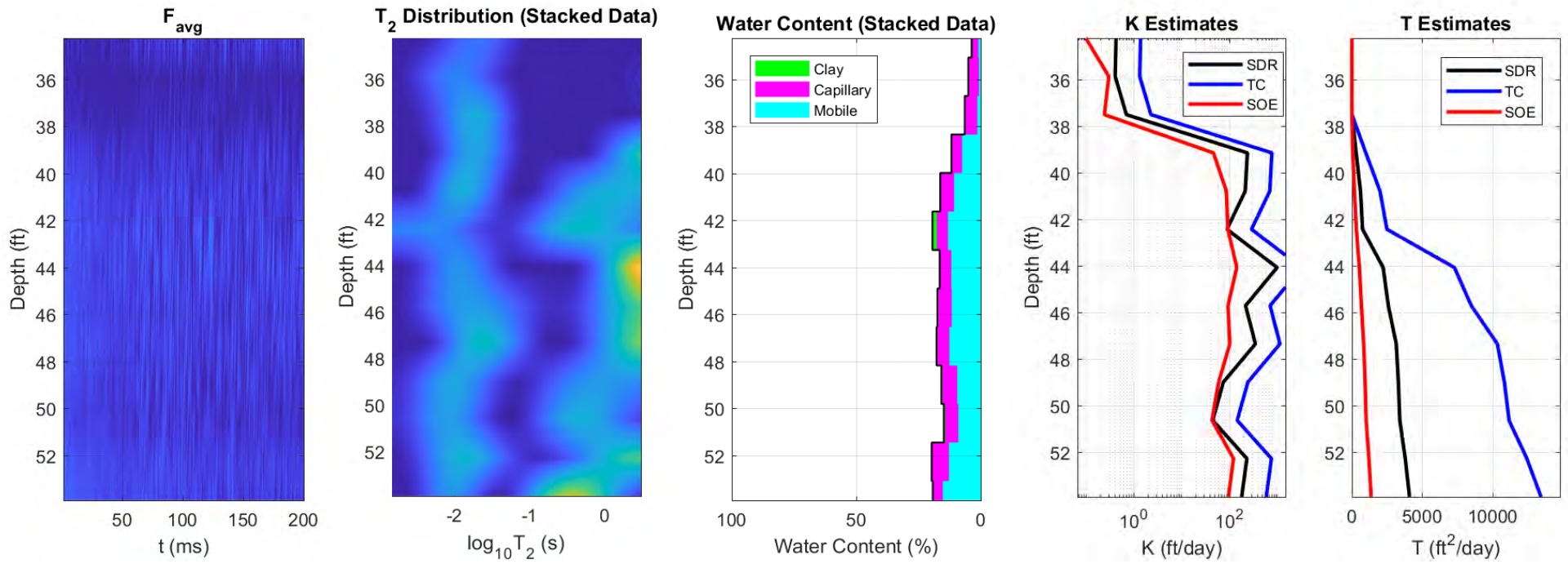
NERT3.58S1 – Phase II Groundwater Well



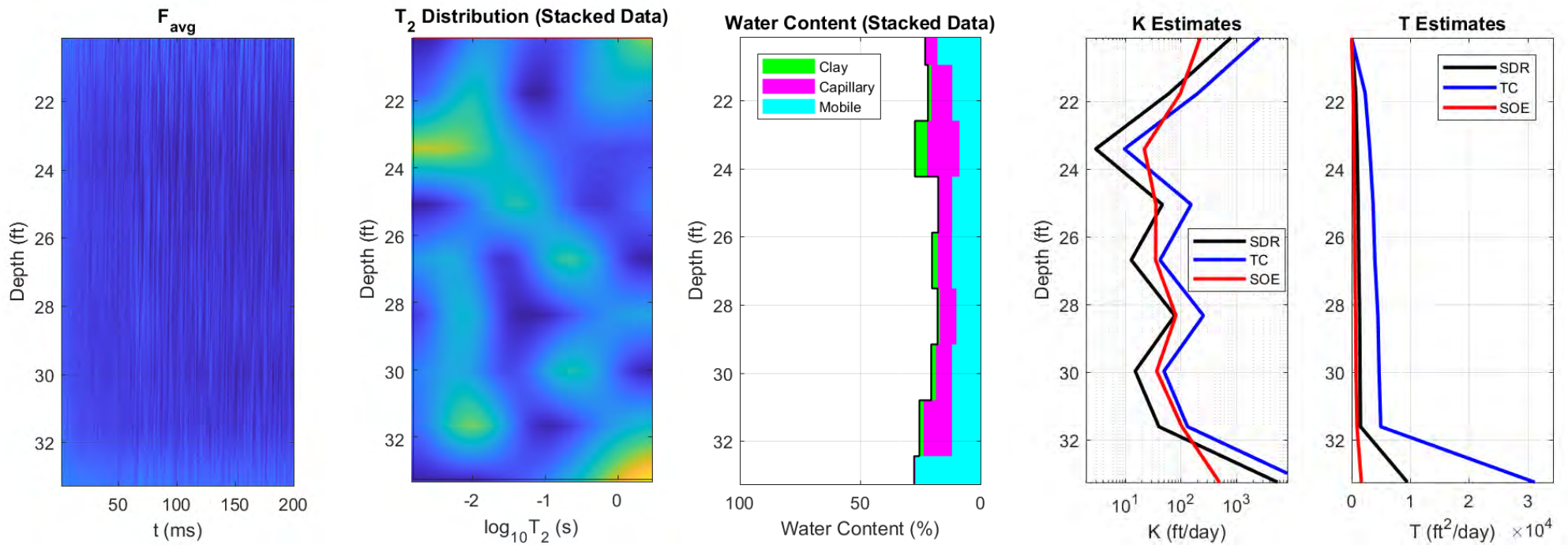
NERT3.60N1 – Phase II Groundwater Well



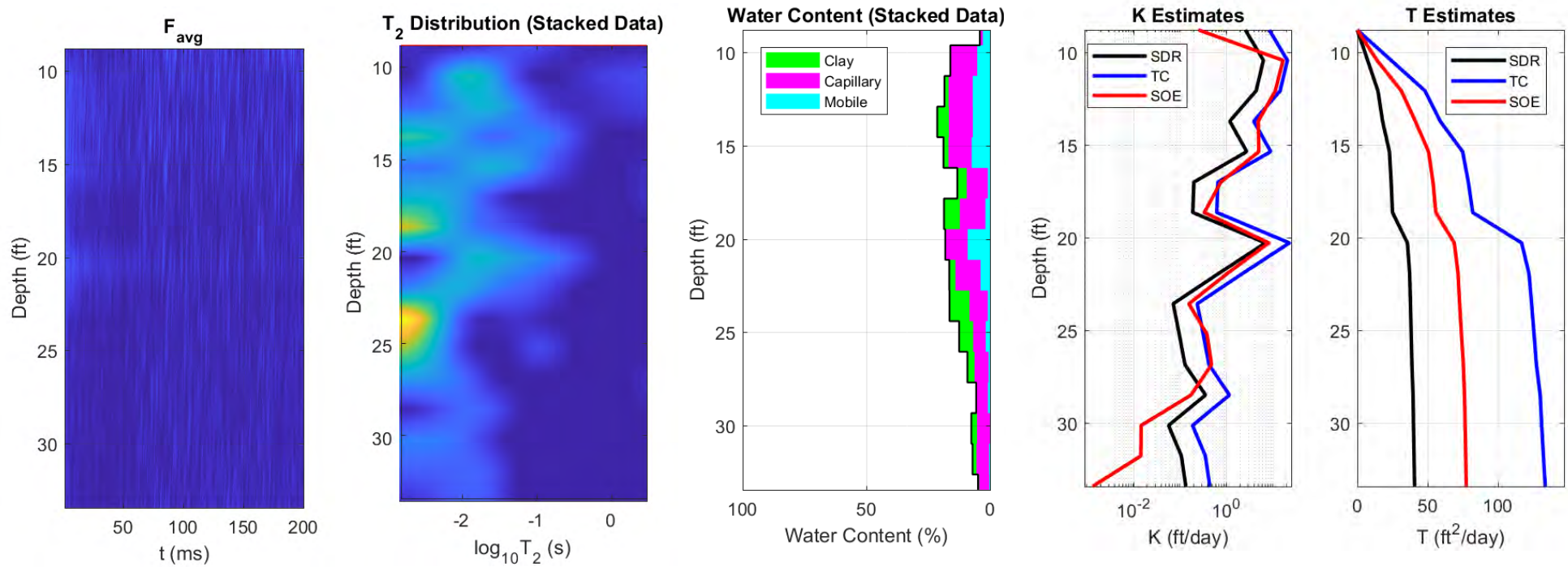
NERT3.60S1 – Phase II Groundwater Well



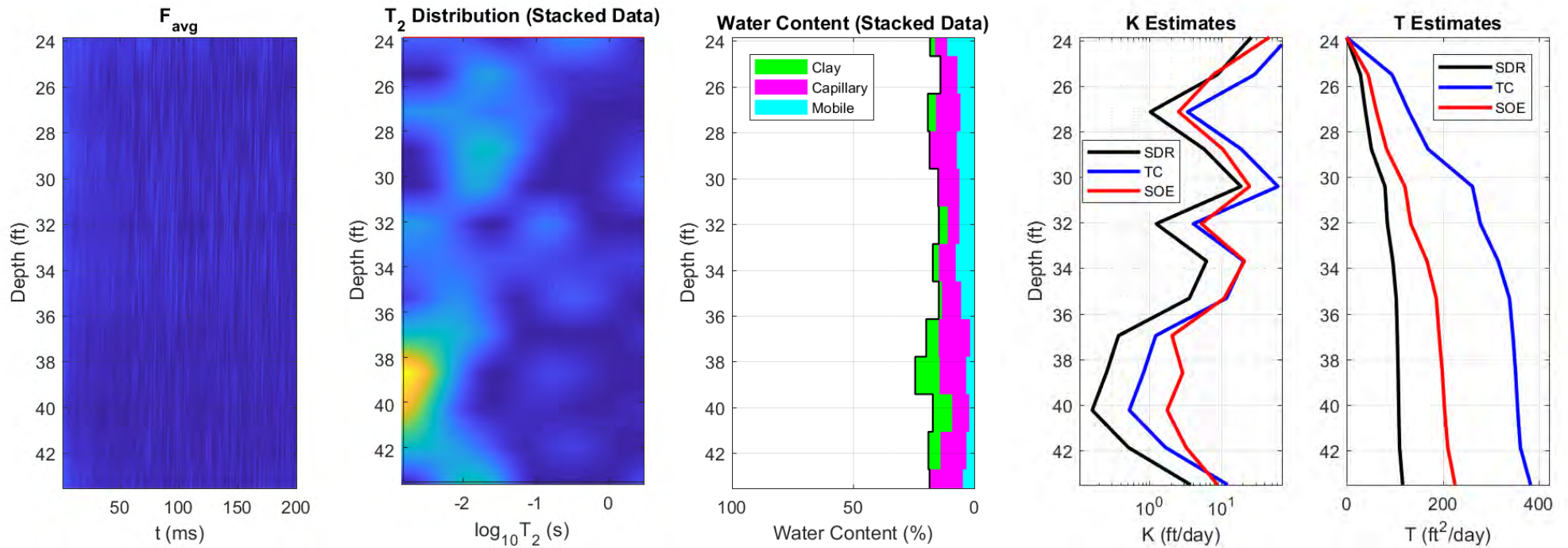
NERT3.63S1 – Phase II Groundwater Well



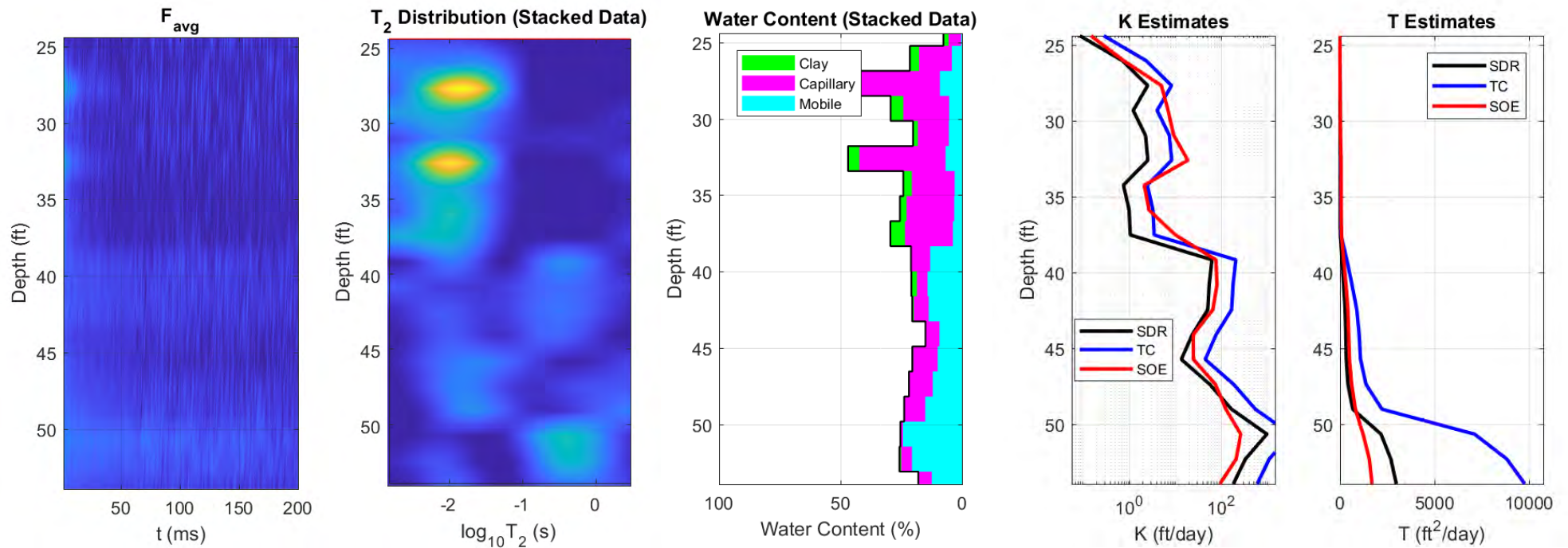
NERT3.98S1 – Phase II Groundwater Well



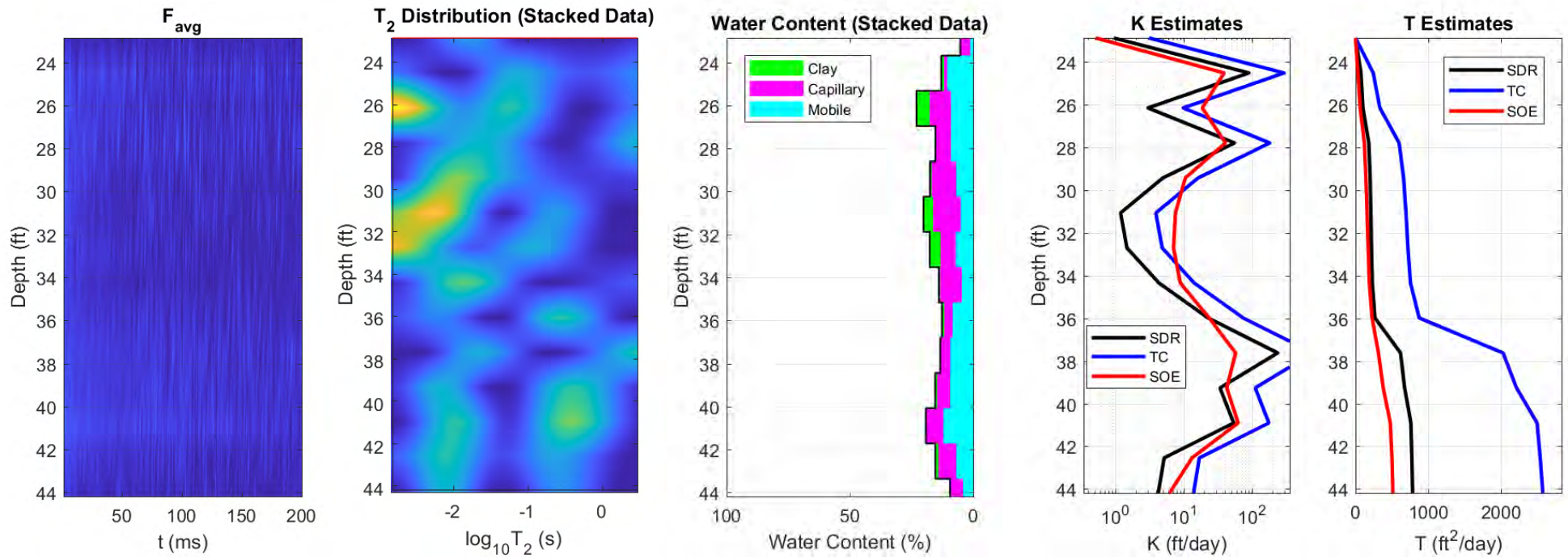
NERT4.64N1 – Phase II Groundwater Well



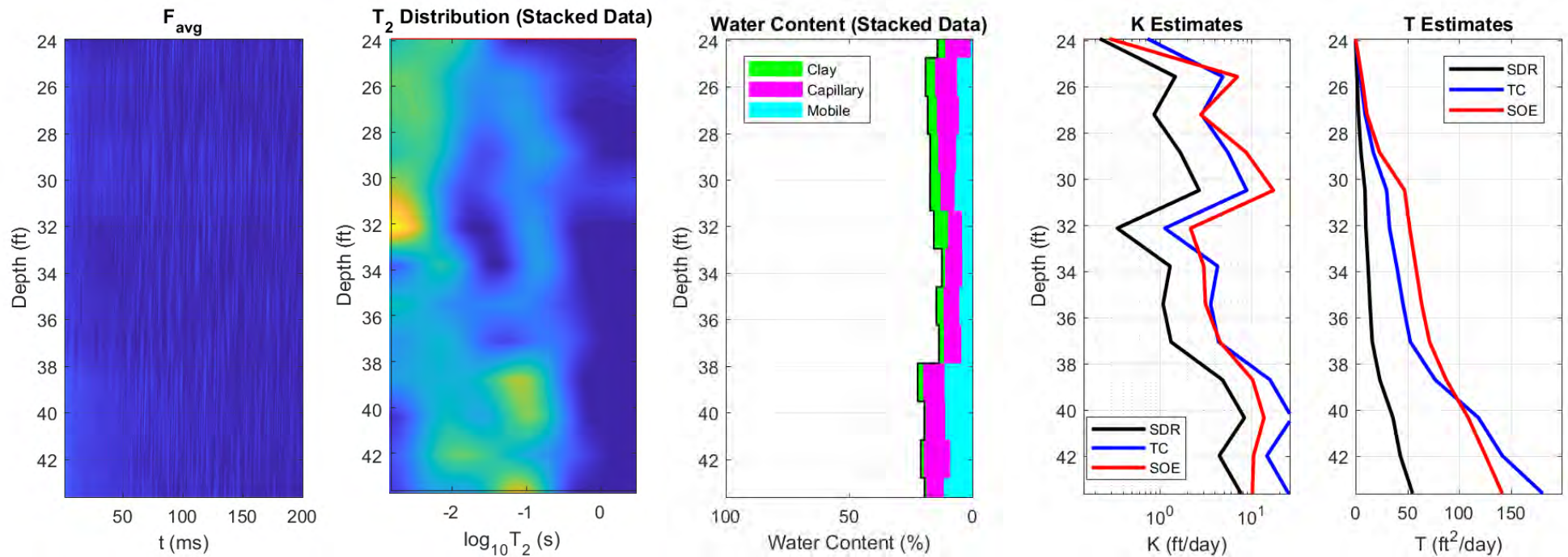
NERT4.64S1 – Phase II Groundwater Well



NERT4.65N1 – Phase II Groundwater Well

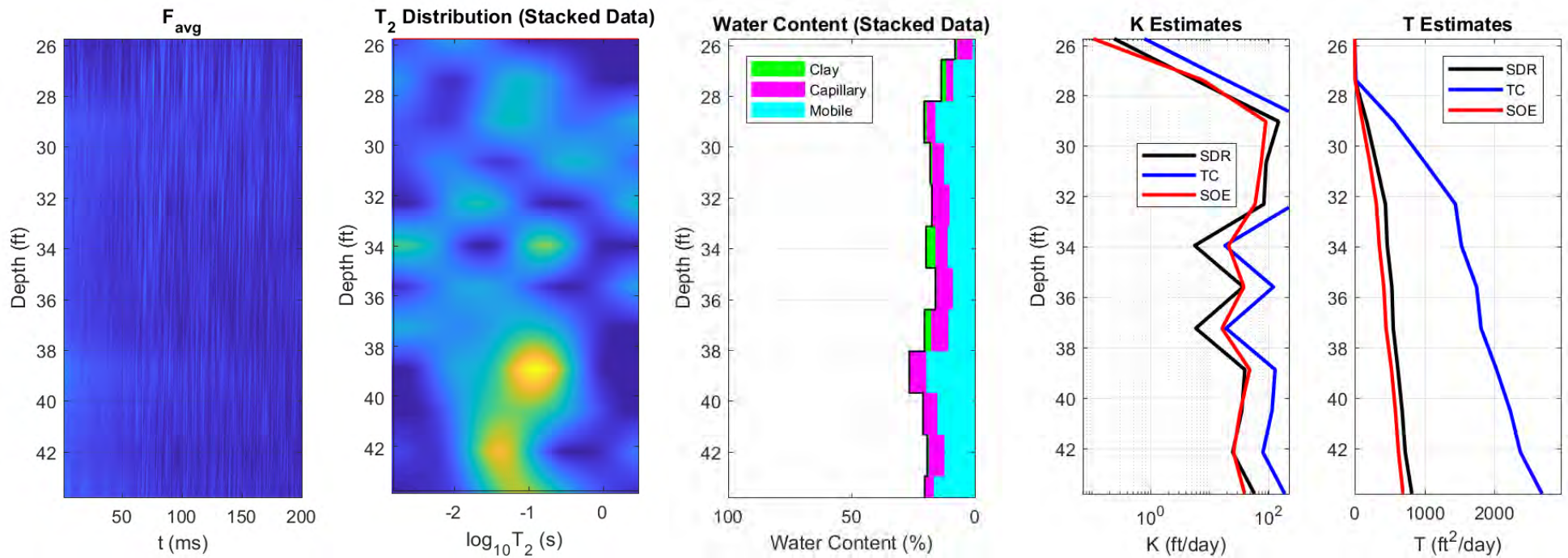


NERT4.70N1 – Phase II Groundwater Well



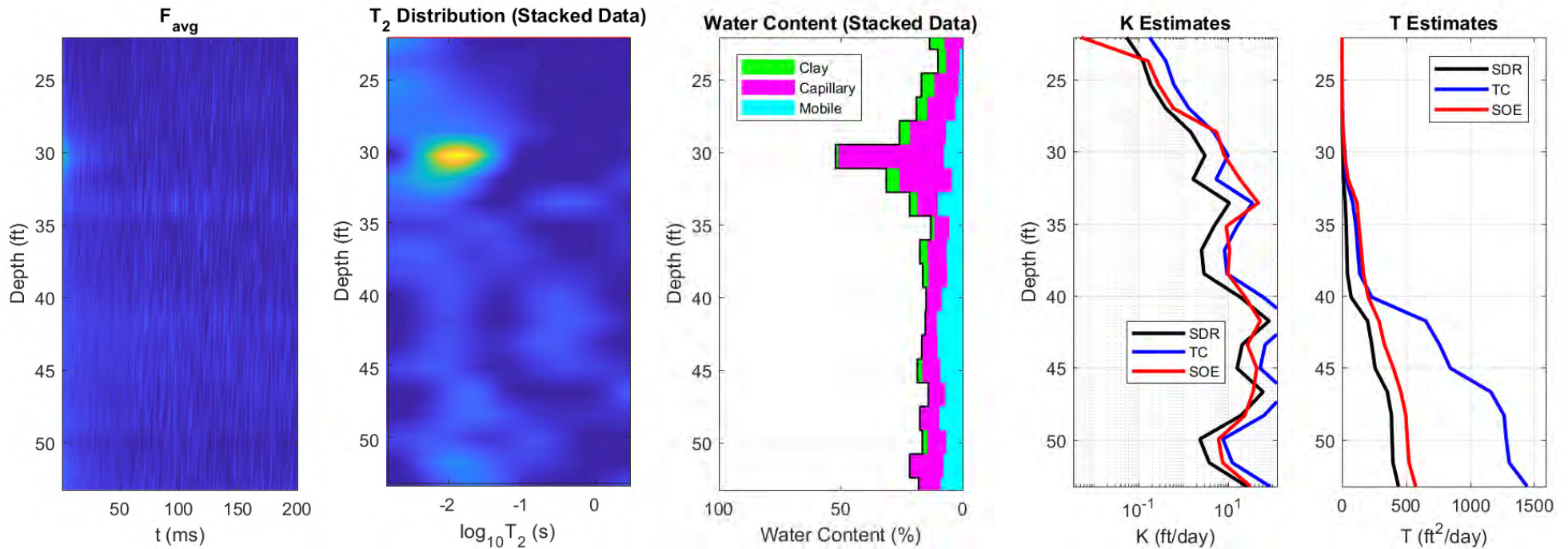
PRELIMINARY – SUBJECT TO CHANGE

NERT4.71N1 – Phase II Groundwater Well



PRELIMINARY – SUBJECT TO CHANGE

NERT4.71S2 – Phase II Groundwater Well



PRELIMINARY – SUBJECT TO CHANGE

Appendix I
Groundwater Sampling Records



Well ID: AA-30

Low-Flow Ground Water Sample Collection Record

Client: NDP Date: 07/19/19 Time: Start 0955 am/pm
 Project No: 60477365 Finish 1100 am/pm
 Site Location: NERT LUW
 Weather Conds: Cloudy, Sunny, Heat 90° Collector(s): J CAROTRUIO(AECom) E WANG(GCS)

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 3410 c. Length of Water Column 15.02 (a-b) Casing Diameter/Material 4"
 b. Water Table Depth 1906 d. Calculated System Volume (see back) 9.8

2. WELL PURGE DATA

a. Purge Method: Low flow bladder pump

b. Acceptance Criteria defined (see workplan)

- Temperature ±2°C -D.O. 0.3 mg/l
- pH ±0.1 unit Turbidity 10% if NTU reading is > 10 NTUs
- Sp. Cond. ±3% ORP ± 10 milivolts

c. Field Testing Equipment used:

Make	Model	Serial Number
<u>Lo. Motte</u>	<u>Turbidimeter</u>	<u>20205</u>
<u>USE</u>	<u>556</u>	<u>152100963</u>

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor
1005	0.5	26.15	7.31	10728	5.42	65.0	21.1	180	19.04	Clear/None
1011	1.6	24.78	7.27	11404	5.11	65.9	17.3	180	19.08	"
1017	2.7	24.74	7.17	9916	3.50	72.1	14.3	180	19.08	"
1023	3.8	24.55	7.12	9144	2.44	72.5	15.1	180	19.08	"
1029	4.9	24.67	7.09	7365	1.82	72.9	11.3	180	19.09	"
1035	6.0	24.52	7.06	6991	1.42	72.9	9.27	180	19.09	"
1041	7.1	24.79	7.07	6859	1.53	74.3	9.96	180	19.08	"
1047	9.2	24.75	7.06	6497	1.50	72.4	9.04	180	19.08	"

d. Acceptance criteria pass/fail Yes No N/A (continued on back)

Have parameters stabilized

If no or N/A - Explain below.

N/A

3. SAMPLE COLLECTION: Method: Low flow tubing

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
<u>AA-30-20190708</u>					
	<u>250 mL Poly</u>	<u>1</u>	<u>None</u>	<u>Residuals</u>	<u>1050</u>
	<u>125 mL EDA Poly</u>	<u>1</u>	<u>EDA</u>	<u>Chloride</u>	<u>1050</u>

Comments Pump @ -30'
Recon @ -105'

Signature [Signature] Date 7/19/19



Well ID: COH2B1

Low-Flow Ground Water Sample Collection Record

Client: NDEP Date: 7/3/19 Time: Start 0955 am/pm
 Project No: 60477365 Finish 1106 am/pm
 Site Location: NERT LNW
 Weather Conds: Breezy, few clouds, +95 Collector(s): JCARVERIS (AECOM) EWANG (GES)

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 64.38 c. Length of Water Column 47.65 (a-b) Casing Diameter/Material 2"
 b. Water Table Depth 16.73 d. Calculated System Volume (see back) 7.78

2. WELL PURGE DATA

a. Purge Method: Low flow bladder Pump

b. Acceptance Criteria defined (see workplan)

- Temperature $\pm 2^{\circ}\text{C}$ -D.O. 0.3 mg/l
- pH ± 0.1 unit Turbidity 10% if NTU reading is > 10 NTUs
- Sp. Cond. $\pm 3\%$ ORP ± 10 millivolts

c. Field Testing Equipment used:

Make	Model	Serial Number
<u>La Motte Turbidimeter</u>	<u>20006</u>	<u>71-3218</u>
<u>YSI</u>	<u>556</u>	<u>152100967</u>

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor
1005	0.6	26.45	7.44	3619	2.41	52.9	62.5	150	16.70	<u>Clear/Grey - new color</u>
1011	1.7	24.54	7.20	3376	1.05	46.6	26.5	150	16.71	<u>Cloudy / White</u>
1017	2.8	24.57	7.15	3237	1.00	49.4	106.5	150	16.71	<u>"</u>
1023	3.9	24.63	7.13	3243	1.00	49.4	37.4	150	16.71	<u>Clear / White</u>
1029	5.0	24.57	7.13	3216	1.49	49.6	12.4	150	16.71	<u>"</u>
1035	6.1	24.51	7.13	3215	1.52	49.7	10.17	150	16.71	<u>"</u>
1041	7.2	24.55	7.13	3205	1.45	49.0	9.82	150	16.71	<u>"</u>
1045	<u>Sampled</u>									

d. Acceptance criteria pass/fail Yes No N/A (continued on back)

Have parameters stabilized Yes No N/A

If no or N/A - Explain below.

N/A

3. SAMPLE COLLECTION: Method: Low flow tubing

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
<u>COH2B1-20190703</u>					
	<u>250 mL Poly</u>	<u>1</u>	<u>None</u>	<u>Perchlorate</u>	<u>1045</u>
	<u>125 mL EPA Poly</u>	<u>1</u>	<u>EPA</u>	<u>chloride</u>	<u>1045</u>

Comments: Pump @ ~62'
Decom @ 1050

Signature: [Signature] Date: 7/3/19



Well ID: LNDMW1

Low-Flow Ground Water Sample Collection Record

Client: NOEP Date: 6/28/19 Time: Start 0930 am/pm
 Project No: 60477365 Finish 1030 am/pm
 Site Location: NEPT-LVW
 Weather Conds: Sunny, calm, warm ~ 91° Collector(s): J CAROT (AECOM) & WANG D (MHC LABS)

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 61.63 c. Length of Water Column 24.92 (a-b) Casing Diameter/Material 2"
 b. Water Table Depth 36.91 d. Calculated System Volume (see back) 4.05

2. WELL PURGE DATA

a. Purge Method: Low flow bladder Pump

b. Acceptance Criteria defined (see workplan)

- Temperature $\pm 2^{\circ}\text{C}$ -D.O. 0.3 mg/l
- pH ± 0.1 unit Turbidity 10% if NTU reading is > 10 NTUs
- Sp. Cond. $\pm 3\%$ ORP ± 10 millivolts

c. Field Testing Equipment used:

Make	Model	Serial Number
<u>La Motte</u>	<u>Turbidimeter</u>	<u>2020E</u>
<u>YSI</u>	<u>556</u>	<u>71-3218</u>
		<u>152100963</u>

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor
0944	0.9	26.70	6.99	5277	3.25	79.5	E	150	36.50	Yum / none
0950	2.0	25.93	6.98	5256	3.01	77.4	E	150	36.50	Cloudy / None
0956	3.1	24.56	6.97	5310	2.85	78.1	E	150	36.50	"
1003	4.2	24.54	6.97	5326	2.79	77.9	E	150	36.50	"
1009	5.3	24.78	6.96	5325	2.77	77.7	E	150	36.50	"
1014	6.4	24.93	6.97	5322	2.81	77.6	E	150	36.50	"
1015	<u>Scrapped</u>									

d. Acceptance criteria pass/fail Yes No N/A E=over Cal Range (continued on back)

Have parameters stabilized

If no or N/A - Explain below.

could not get turb when cal range of instrument - rest of parameters stable

3. SAMPLE COLLECTION: Method: Low flow tubing

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
<u>LNDMW1-20190617</u>	<u>250 mL Poly</u>		<u>None</u>	<u>Perchlorate</u>	<u>1015</u>
	<u>125 mL EOA Poly</u>		<u>EOA</u>	<u>Chlorate</u>	<u>1015</u>

Comments Pump @ ~58'
Duration @ 1020

Signature [Signature] Date 6/28/19



Well ID: LNDMLW2

Low-Flow Ground Water Sample Collection Record

Client: NDEP Date: 7/5/19 Time: Start 1055 am/pm
 Project No: 62477365 Finish 1140 am/pm
 Site Location: NERT LWW
 Weather Conds: Light Breezy few clouds 95° Collector(s): J CAROTTO (AECOM) E. WANG (GER)

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 5510 c. Length of Water Column 20.79 (a-b) Casing Diameter/Material 2"
 b. Water Table Depth 34.31 d. Calculated System Volume (see back) 3.39

2. WELL PURGE DATA

a. Purge Method: Low flow bladder Pump

b. Acceptance Criteria defined (see workplan)

- Temperature $\pm 2^{\circ}\text{C}$ -D.O. 0.3 mg/l
- pH ± 0.1 unit Turbidity 10% if NTU reading is > 10 NTUs
- Sp. Cond. $\pm 3\%$ ORP ± 10 millivolts

c. Field Testing Equipment used:

Make	Model	Serial Number
<u>La Motte Turbidimeter</u>	<u>2020t</u>	<u>71-32-18</u>
<u>YSI</u>	<u>556</u>	<u>152100963</u>

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor
1100	0.7	25.38	7.10	3007	2.68	66.4	244	200	34.31	Turn / None
1105	1.7	23.58	7.03	3046	1.38	58.3	524	200	34.31	"
1110	2.7	23.53	7.03	3094	1.37	57.1	499	200	34.31	"
1115	3.7	23.20	7.05	3136	1.56	59.4	490	200	34.31	"
1120	4.7	23.31	7.05	3145	1.53	60.1	487	200	34.31	"
1125	<u>Sampled</u>									

d. Acceptance criteria pass/fail Yes No N/A (continued on back)

Have parameters stabilized Yes No N/A

If no or N/A - Explain below. N/A

3. SAMPLE COLLECTION: Method: Low flow tubing

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
<u>LNDMLW2-20190705</u>					
	<u>250 mL Poly</u>	<u>1</u>	<u>None</u>	<u>Perchlorate</u>	<u>1125</u>
	<u>125 mL EDA Poly</u>	<u>1</u>	<u>EDA</u>	<u>chloride</u>	<u>1125</u>

Comments Pump @ ~53'
Drawn @ 1130

Signature [Signature] Date 7/5/19



Well ID: MW02

Low-Flow Ground Water Sample Collection Record

Client: NDEP Date: 7/3/19 Time: Start 1220 am/pm
 Project No: 60477365 Finish 1345 am/pm
 Site Location: NEPT LVW
 Weather Conds: W. wind, Part Cloudy, Hot 102° Collector(s): J CAPORIO (AECOM) ERIC WANG (GES)

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 43.47 c. Length of Water Column 3.85 (a-b) Casing Diameter/Material 2"
 b. Water Table Depth 39.62 d. Calculated System Volume (see back) 0.63

2. WELL PURGE DATA

a. Purge Method: Low flow bladder pump

- b. Acceptance Criteria defined (see workplan)
- Temperature ±2°C -D.O. 0.3 mg/l
 - pH ±0.1 unit Turbidity 10% if NTU reading is > 10 NTUs
 - Sp. Cond. ±3% ORP ± 10 milivolts

c. Field Testing Equipment used:

Make	Model	Serial Number
<u>Lo. Mott's turbidimeter</u>	<u>2020+</u>	<u>71-2218</u>
<u>VSI</u>	<u>556</u>	<u>152100963</u>

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor
<u>121304</u>	<u>0.9</u>	<u>31.32</u>	<u>7.19</u>	<u>3496</u>	<u>6.49</u>	<u>63.4</u>	<u>103.4</u>	<u>180</u>	<u>39.60</u>	<u>Cloudy / None</u>
<u>1309</u>	<u>2.0</u>	<u>29.05</u>	<u>7.06</u>	<u>3476</u>	<u>6.19</u>	<u>63.6</u>	<u>54.3</u>	<u>180</u>	<u>39.61</u>	<u>"</u>
<u>1314</u>	<u>3.1</u>	<u>27.53</u>	<u>7.06</u>	<u>3429</u>	<u>6.37</u>	<u>70.1</u>	<u>15.6</u>	<u>180</u>	<u>39.61</u>	<u>Clear / None</u>
<u>1319</u>	<u>4.2</u>	<u>27.27</u>	<u>7.06</u>	<u>3433</u>	<u>6.26</u>	<u>68.6</u>	<u>13.9</u>	<u>180</u>	<u>39.62</u>	<u>"</u>
<u>1324</u>	<u>5.7</u>	<u>27.39</u>	<u>7.06</u>	<u>3435</u>	<u>6.27</u>	<u>69.1</u>	<u>14.2</u>	<u>180</u>	<u>39.62</u>	<u>"</u>
<u>1325</u>	<u>Sampled</u>				<u>4.0</u>					

d. Acceptance criteria pass/fail Yes No N/A (continued on back)

Have parameters stabilized Yes No N/A

If no or N/A - Explain below. N/A

3. SAMPLE COLLECTION: Method: Low flow tubing

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
<u>MW-02-20190703</u>	<u>250 mL Poly</u>	<u>1</u>	<u>None</u>	<u>Perchlorate</u>	<u>1325</u>
	<u>125 mL EDA Poly</u>	<u>1</u>	<u>EDA</u>	<u>chlorate</u>	<u>1325</u>

Comments Pump @ 43' Return @ 1335 Tubing in well ~3' RTCC - had to "fish" to get

Signature [Signature] Date 7/3/19



Well ID: MW-3

Low-Flow Ground Water Sample Collection Record

Client: NDEP Date: 7/5/19 Time: Start 1425 am/pm
 Project No: 60577365 Finish 1445 am/pm
 Site Location: NEAR LVW
 Weather Conds: Light breeze, Fair clouds, ~100° Collector(s): J CAROTRUIO (AECOM) & WANG CGES

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 14.45 c. Length of Water Column 8.33 (a-b) Casing Diameter/Material 4"
 b. Water Table Depth 6.12 d. Calculated System Volume (see back) 5.44

2. WELL PURGE DATA

a. Purge Method: Bailer

b. Acceptance Criteria defined (see workplan)

- Temperature ±2°C -D.O. 0.3 mg/l
- pH ±0.1 unit Turbidity 10% if NTU reading is > 10 NTUs
- Sp. Cond. ±3% ORP ± 10 millivolts

c. Field Testing Equipment used: Make Model Serial Number

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor
1430	-	24.03	7.48	4081	4.35	55.2	8.33	-	-	clear/None
1435	Sampled									

d. Acceptance criteria pass/fail Yes No N/A (continued on back)

Have parameters stabilized Yes No N/A

If no or N/A - Explain below. N/A

3. SAMPLE COLLECTION: Method: Bailer

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
<u>MW-3-20190705</u>					
	<u>250 mL Poly</u>	<u>1</u>	<u>None</u>	<u>Residuals</u>	<u>1435</u>
	<u>125 mL EDA Poly</u>	<u>1</u>	<u>EDA</u>	<u>Chloride</u>	<u>1435</u>

Comments Done 1440

Signature [Signature] Date 7/5/19



Well ID: MW-4

Low-Flow Ground Water Sample Collection Record

Client: NDEP Date: 7/5/19 Time: Start 1320 am/pm
 Project No: 60477365 Finish 1425 am/pm
 Site Location: NERT LVW
 Weather Conds: Light Breeze, fine clouds, 100° Collector(s): J CAPOTRIG (AECOM) E WANG (GES)

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 13.23 c. Length of Water Column 10.27 (a-b) Casing Diameter/Material 4"
 b. Water Table Depth 2.96 d. Calculated System Volume (see back) 6.7

2. WELL PURGE DATA

a. Purge Method: Peristaltic Pump Bailer

b. Acceptance Criteria defined (see workplan)

- Temperature ±2°C -D.O. 0.3 mg/l
- pH ±0.1 unit Turbidity 10% if NTU reading is > 10 NTUs
- Sp. Cond. ±3% ORP ± 10 millivolts

c. Field Testing Equipment used:

Make	Model	Serial Number
<u>La Motte Turbidimeter</u>	<u>2000E</u>	<u>71-3214</u>
<u>VST</u>	<u>556</u>	<u>152100963</u>

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor
<u>1400</u>	<u>-</u>	<u>23.01</u>	<u>7.68</u>	<u>503</u>	<u>6.68</u>	<u>68.7</u>	<u>6.21</u>	<u>-</u>	<u>-</u>	<u>clear</u>
<u>1415</u>	<u>Sample</u>									

d. Acceptance criteria pass/fail Yes No N/A (continued on back)

Have parameters stabilized Yes No N/A

If no or N/A - Explain below. N/A

3. SAMPLE COLLECTION: Method: Peristaltic Pumping 7/5/19 Bailer

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
<u>MW-4-20190205</u>					
	<u>250 mL Poly</u>	<u>1</u>	<u>None</u>	<u>Residuals</u>	
	<u>125 mL E.O.A Poly</u>	<u>1</u>	<u>E.O.A</u>	<u>chloride</u>	

Comments Quon @ 1415

Signature [Signature] Date 7/5/19



Well ID: MW13

Low-Flow Ground Water Sample Collection Record

Client: NDEP Date: 6/24/19 Time: Start 1255 am/pm
 Project No: 60477365 Finish 1335 am/pm
 Site Location: NERF LVW
 Weather Conds: Jimmy, heavy, Hot 100° Collector(s): EWANG + D GRUSE (GES)
J CAPOTEK (AECOM)

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 49.40 c. Length of Water Column 14.16 (a-b) Casing Diameter/Material 4"
 b. Water Table Depth 38.24 d. Calculated System Volume (see back) 924

2. WELL PURGE DATA

a. Purge Method: Low flow bladder pump

- b. Acceptance Criteria defined (see workplan)
- Temperature $\pm 2^{\circ}\text{C}$ -D.O. 0.3 mg/l
 - pH ± 0.1 unit Turbidity 10% if NTU reading is > 10 NTUs
 - Sp. Cond. $\pm 3\%$ ORP ± 10 millivolts

c. Field Testing Equipment used:

Make	Model	Serial Number
<u>La Motte</u>	<u>Turbidometer</u>	<u>20202</u>
<u>VST</u>	<u>556</u>	<u>152100963</u>

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor
1310	1.0	27.11	6.99	5942	4.10	73.9	15.1	200	35.26	clear/None
1315	2.0	25.91	7.00	5940	4.56	73.6	14.9	200	35.26	"
1320	3.0	25.70	7.03	5937	4.77	74.0	15.1	200	35.26	"
1325	4.0	25.64	7.03	5941	4.75	74.5	15.6	200	35.26	"
1330	<u>Sample</u>									

d. Acceptance criteria pass/fail Yes No N/A (continued on back)

Have parameters stabilized Yes No N/A

If no or N/A - Explain below. N/A

3. SAMPLE COLLECTION: Method: Low flow submerg

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
<u>MW13-20192819</u>					
	<u>250 ml Poly</u>	<u>1</u>	<u>None</u>	<u>Residuals</u>	<u>1330</u>
	<u>125 ml Poly, EDA</u>	<u>1</u>	<u>EDA</u>	<u>Chloride</u>	<u>1330</u>

Comments Pump @ -416'
Discharge @ 1340

Signature [Signature] Date 6/24/19



Well ID: MW-20

Low-Flow Ground Water Sample Collection Record

Client: NDEP Date: 6/24/19 Time: Start 12:11K am/pm
 Project No: 100477365 Finish 12:50 am/pm
 Site Location: N.P.R.T. - L.V.W.
 Weather Conds: Sunny, Breezy, Hot 99° Collector(s): E. WANG + D. GRUSE (GAS) J. CASTRINO (AFCOM)

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 67.23 c. Length of Water Column 34.55 (a-b) Casing Diameter/Material 2"
 b. Water Table Depth 32.68 d. Calculated System Volume (see back) 5.64

2. WELL PURGE DATA

a. Purge Method: Low flow - Blacker Pump
 b. Acceptance Criteria defined (see workplan)
 - Temperature $\pm 2^{\circ}\text{C}$ -D.O. 0.3 mg/l
 - pH ± 0.1 unit Turbidity 10% if NTU reading is > 10 NTUs
 - Sp. Cond. $\pm 3\%$ ORP ± 10 millivolts

c. Field Testing Equipment used:

Make	Model	Serial Number
<u>Lo Matic Turbidimeter</u>	<u>2020 t</u>	<u>71-3218</u>
<u>VSI</u>	<u>556</u>	<u>152100963</u>

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor
1202	0.3	29.47	7.27	6166	4.21	64.0	E	280L	32.63	Brown / None
1204	1.4	25.79	7.37	6141	6.08	69.1	E	700	29.19	"
1214	2.6	26.33	7.42	6152	6.03	72.1	E	150	29.92	"
1220	3.7	26.26	7.42	6165	6.01	72.4	E	150	29.98	"
1226	4.8	26.21	7.43	6157	6.09	72.2	E	150	29.94	"
1232	<u>Sample</u>									

d. Acceptance criteria pass/fail Yes No N/A
 Have parameters stabilized Yes No N/A
 E = Exceed Instrument Calibration Range (continued on back)

If no or N/A - Explain below.
Turbidity would not get in calibration range - all other parameters stable

3. SAMPLE COLLECTION: Method: Low Flow Tubing

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
<u>MW20-20190626</u>					
	<u>250 mL Poly</u>	<u>1</u>	<u>None</u>	<u>Residuals</u>	<u>12:30</u>
	<u>125 mL EPA Poly</u>	<u>1</u>	<u>EPA</u>	<u>Chloride</u>	<u>12:30</u>

Comments Pump @ -65'
Recess @ 12:40

Signature [Signature] Date 6/28/19



Well ID: MW25

Low-Flow Ground Water Sample Collection Record

Client: NDEP Date: 7/3/19 Time: Start 1120 am/pm
 Project No: 60477365 Finish 1215 am/pm
 Site Location: NERT LVW
 Weather Conds: Few clouds, Breezy, Hot 100° Collector(s): J CAPOTRIV (AECOM) E WANG (GES)

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 54.78 c. Length of Water Column 15.38 (a-b) Casing Diameter/Material 4"
 b. Water Table Depth 39.40 d. Calculated System Volume (see back) 10.04

2. WELL PURGE DATA

a. Purge Method: Low Flow Bladder Pumping

b. Acceptance Criteria defined (see workplan)

- Temperature ± 2°C -D.O. 0.3 mg/l
- pH ± 0.1 unit Turbidity 10% if NTU reading is > 10 NTUs
- Sp. Cond. ± 3% ORP ± 10 millivolts

c. Field Testing Equipment used:

Make	Model	Serial Number
<u>LaMotte Turbidimeter</u>	<u>2020 B</u>	<u>71-3218</u>
<u>YSI</u>	<u>556</u>	<u>152100963</u>

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor
1137	0.2	30.12	7.19	3994	5.86	59.3	75.9	180	39.41	<u>cloudy / none</u>
1143	1.8	29.30	7.06	3993	5.17	63.6	71.5	180	39.40	<u>"</u>
1150	2.9	29.13	7.06	3988	5.12	71.5	63.4	180	39.40	<u>"</u>
1156	4.0	28.10	7.06	3979	5.15	69.9	69.8	180	39.40	<u>"</u>
1200	<u>Sampled</u>									

d. Acceptance criteria pass/fail Yes No N/A (continued on back)

Have parameters stabilized Yes No N/A

If no or N/A - Explain below. N/A

3. SAMPLE COLLECTION: Method: Low flow tubing

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
<u>MW25-20190703</u>					
	<u>250 mL Poly</u>	<u>1</u>	<u>None</u>	<u>Residuals</u>	<u>1200</u>
	<u>125 mL EPA Poly</u>	<u>1</u>	<u>EPA</u>	<u>chloride</u>	<u>1200</u>

Comments Pump @ ~52'
Draw @ 1205

Signature [Signature] Date 7/3/19



Well ID: NERT 3.3591

Low-Flow Ground Water Sample Collection Record

Client: NDEP Date: 6/26/19 Time: Start 1135 (am/pm) Finish 1245 (am/pm)
 Project No: 60477365
 Site Location: NERT LVW
 Weather Conds: Sunny, Windy -95° Collector(s): J. CAOTRIO (AECOM); D. GRUSE (GES)

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 55.21 c. Length of Water Column 39.16 (a-b) Casing Diameter/Material 4"
 b. Water Table Depth 16.05 d. Calculated System Volume (see back) V = 25.56

2. WELL PURGE DATA

a. Purge Method: bladder pump - low flow

b. Acceptance Criteria defined (see workplan)

- Temperature $\pm 2^\circ\text{C}$ -D.O. 0.3 mg/l
- pH ± 0.1 unit Turbidity 10% if NTU reading is > 10 NTUs
- Sp. Cond. $\pm 3\%$ ORP ± 10 millivolts

c. Field Testing Equipment used:

Make	Model	Serial Number
<u>La Motte Turbidimeter</u>	<u>2020+</u>	<u>71-3218</u>
<u>YSI</u>	<u>556</u>	<u>121100963</u>

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor
1205	0.250	28.12	7.15	9869	2.39	35.3	10.9	0.140	0.01	Clear/None
1212	1.250	27.70	7.38	9885	1.42	16.7	3.52	0.140	0.01	"
1219	2.250	27.40	7.41	9912	1.14	-50.6	0.90	0.140	0.01	"
1226	3.250	27.32	7.43	9913	1.06	-52.3	0.92	0.140	0.01	"
1233	4.250	27.36	7.43	9908	1.09	-51.6	1.08	0.140	0.01	"
1235	<u>Sampled</u>									

d. Acceptance criteria pass/fail Yes No N/A (continued on back)

Have parameters stabilized

If no or N/A - Explain below.

N/A

3. SAMPLE COLLECTION: Method: Tubing from bladder pump

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
<u>NERT-3.3591-2090626 + NERT-3.3591-2090626-FD</u>					
	<u>250 mL Poly</u>	<u>1 + FD</u>	<u>Nitric</u>	<u>Dis. Chrome</u>	<u>1235</u>
	<u>250 mL Poly</u>	<u>1 + FD</u>	<u>None</u>	<u>Perm. Chrome</u>	<u>1235</u>
	<u>250 mL Poly</u>	<u>1 + FD</u>	<u>None</u>	<u>Perchlorate (FD)</u>	<u>1235</u>
	<u>125 mL EPA Poly</u>	<u>1 + FD</u>	<u>E.DTA</u>	<u>Chloride</u>	<u>1235</u>

Comments: Pump @ ~52'
1240 - Decon equipment

Signature: [Signature] Date: 6/26/19



Well ID: NER13.4091

Low-Flow Ground Water Sample Collection Record

Client: NDEP Date: 6/26/19 Time: Start 1400 am/pm
 Project No: 60477365 Finish 1300 am/pm
 Site Location: NER1 LVM
 Weather Conds: Sunny, windy, -99° Collector(s): J CAROTRIN (AECOM); D GRUSE (GES)

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 54.31 c. Length of Water Column 16.05 (a-b) Casing Diameter/Material 4"
 b. Water Table Depth 38.25 d. Calculated System Volume (see back) 10.48

2. WELL PURGE DATA

a. Purge Method: bladder pump - low flow

b. Acceptance Criteria defined (see workplan)

- Temperature $\pm 2^{\circ}\text{C}$ -D.O. 0.3 mg/l
- pH ± 0.1 unit Turbidity 10% if NTU reading is > 10 NTUs
- Sp. Cond. $\pm 3\%$ ORP ± 10 millivolts

c. Field Testing Equipment used:

Make	Model	Serial Number
<u>La Motte Turbidimeter</u>	<u>20206</u>	<u>71-3218</u>
<u>YSI</u>	<u>556</u>	<u>12.1108963</u>

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. ($\mu\text{S/cm}$)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor
<u>1420</u>	<u>0.500</u>	<u>29.91</u>	<u>7.27</u>	<u>13109</u>	<u>1.49</u>	<u>62.6</u>	<u>35.7</u>	<u>0.170</u>	<u>38.28</u>	<u>Cloudy from Air</u>
<u>1426</u>	<u>1.5</u>	<u>29.44</u>	<u>7.27</u>	<u>13041</u>	<u>1.07</u>	<u>53.8</u>	<u>47.7</u>	<u>0.170</u>	<u>38.28</u>	<u>Slight Cloudy from Air</u>
<u>1432</u>	<u>2.5</u>	<u>27.44</u>	<u>7.26</u>	<u>13178</u>	<u>0.97</u>	<u>48.0</u>	<u>49.0</u>	<u>0.170</u>	<u>38.28</u>	<u>" "</u>
<u>1438</u>	<u>3.5</u>	<u>27.51</u>	<u>7.29</u>	<u>13151</u>	<u>1.17</u>	<u>46.0</u>	<u>47.3</u>	<u>0.170</u>	<u>38.28</u>	<u>" "</u>
<u>1444</u>	<u>4.5</u>	<u>27.56</u>	<u>7.29</u>	<u>13165</u>	<u>1.19</u>	<u>45.3</u>	<u>47.1</u>	<u>0.170</u>	<u>38.28</u>	<u>" "</u>
<u>1445</u>	<u>Sample taken</u>									

d. Acceptance criteria pass/fail Yes No N/A 38.28 (continued on back)

Have parameters stabilized Yes No N/A

If no or N/A - Explain below.

N/A

3. SAMPLE COLLECTION:

Method: from tubing - bladder pump

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
<u>NER13.4091-20190626 + MS 6/26</u>	<u>250 ml Poly 40ml VOA</u>	<u>1 + MS</u>	<u>None</u>	<u>Hex Chrome</u>	<u>1445</u>
	<u>250 ml Poly</u>	<u>1 + MS</u>	<u>Nitric</u>	<u>Dix Chrome</u>	<u>1445</u>
	<u>250 ml Poly</u>	<u>1 + MS</u>	<u>None</u>	<u>Perchlorate-TDS</u>	<u>1445</u>
	<u>125 ml EDA Poly</u>	<u>1 + MS</u>	<u>E.D.A</u>	<u>Chloride</u>	<u>1445</u>

Comments: Pumping @ - 51' Discern @ 1440

Signature: [Signature] Date: 6/26/19



Well ID: NERT 358S1

Low-Flow Ground Water Sample Collection Record

Client: N/DEP Date: 6/27/19 Time: Start 0945 am/pm
 Project No: 60477367 Finish _____ am/pm
 Site Location: NERT-2VW
 Weather Conds: warm, breezy, 86° Collector(s): J. MATRICK (AECOM) ERIC WANG & D. GUNSE (UES)

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 55.30 c. Length of Water Column 22.3 (a-b) Casing Diameter/Material 4"
 b. Water Table Depth 34.94 d. Calculated System Volume (see back) 1x = 1325

2. WELL PURGE DATA

a. Purge Method: Low Flow - bladder Pump

b. Acceptance Criteria defined (see workplan)

- Temperature $\pm 2^{\circ}\text{C}$ -D.O. 0.3 mg/l
- pH ± 0.1 unit Turbidity 10% if NTU reading is > 10 NTUs
- Sp. Cond. $\pm 3\%$ ORP ± 10 millivolts

c. Field Testing Equipment used:

Make	Model	Serial Number
<u>La Motte Turbidimeter</u>	<u>20207</u>	<u>713218</u>
<u>YSI</u>	<u>556</u>	<u>12J100963</u>

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor
0915	0.300	25.08	6.88	4285	1.83	72.2	73.3	0.180	34.96	Pink / None
0921	1.4	24.56	6.88	4264	1.47	70.9	29.8	0.150	34.95	Pink / None
0927	2.5	24.24	6.90	4263	1.61	71.1	22.8	0.150	34.95	Pink / None
0933	3.6	24.35	6.89	4265	1.48	69.7	15.8	0.140	34.96	Pink / None
0939	4.7	24.18	6.89	4266	1.49	68.9	18.9	0.140	34.95	Pink / None
0940	Sampled									

d. Acceptance criteria pass/fail Yes No N/A 34.96 (continued on back)

Have parameters stabilized Yes No N/A

If no or N/A - Explain below.

N/A

3. SAMPLE COLLECTION: Method: Low flow tubing

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
<u>NERT 358S1-20190627 + MS</u>					
	<u>40 ml VOA</u>	<u>1+MS</u>	<u>None</u>	<u>None Change</u>	<u>0940</u>
	<u>250 ml Poly</u>	<u>1+MS</u>	<u>nitric</u>	<u>Dir Change</u>	<u>0940</u>
	<u>250 ml Poly</u>	<u>1+MS</u>	<u>None</u>	<u>Resubmits + MS</u>	<u>0940</u>
	<u>125 ml EDA Poly</u>	<u>1+MS</u>	<u>EDA</u>	<u>Chloride</u>	<u>0940</u>

Comments: Pump @ ~51'
Draw @ 0950

Signature: [Signature] Date: 6/27/19



Well ID: NERT3.58N1

Low-Flow Ground Water Sample Collection Record

Client: NDEP Date: 7/2/19 Time: Start 0800 am/pm
 Project No: 604177365 Finish 0850 am/pm
 Site Location: NERT LVW Collector(s): EWANG (GES) D GRUSE (GES)
 Weather Conds: Wax on, calm, clear - 90' J CAPOTRIS (AECOM)

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 6096 c. Length of Water Column 20.97 (a-b) Casing Diameter/Material 4"
 b. Water Table Depth 39.41 d. Calculated System Volume (see back) 13.69

2. WELL PURGE DATA

a. Purge Method: Low flow bladder pump

b. Acceptance Criteria defined (see workplan)

- Temperature $\pm 2^{\circ}\text{C}$ -D.O. 0.3 mg/l
- pH ± 0.1 unit Turbidity 10% if NTU reading is > 10 NTUs
- Sp. Cond. $\pm 3\%$ ORP ± 10 millivolts

c. Field Testing Equipment used:

Make	Model	Serial Number
<u>La Motte Turbidimeter</u>	<u>ZUZUT</u>	<u>71-3218</u>
<u>YSI</u>	<u>556</u>	<u>1521001963</u>

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor
0810	25.25	25.75	6.99	6939	2.42	42.4	24.6	150	39.51	clear/none
0816	2.0	24.99	6.56	6923	1.88	58.0	33.8	150	39.52	"
0822	3.1	24.94	6.85	6951	1.88	61.5	23.4	150	39.52	"
0828	4.2	24.92	6.85	6954	1.87	62.0	22.1	150	39.52	"
0834	5.3	24.84	6.83	6956	1.93	62.5	19.8	150	39.52	"
0835	<u>Sampled</u>									

d. Acceptance criteria pass/fail Yes No N/A (continued on back)

Have parameters stabilized

If no or N/A - Explain below.

N/A

3. SAMPLE COLLECTION:

Method: Low flow Tubing

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
<u>NERT3.58N1-20190702</u>					
	<u>250 ml Poly</u>	<u>2</u>	<u>None</u>	<u>Perchlorate + TDS</u>	<u>0835</u>
	<u>250 ml Poly</u>	<u>1</u>	<u>Nitric</u>	<u>Dis Chlorine</u>	<u>0835</u>
	<u>125 ml EDA Poly</u>	<u>1</u>	<u>EDA</u>	<u>Chlorate</u>	<u>0835</u>
	<u>40 ml VOl</u>	<u>1</u>	<u>None</u>	<u>EDA</u>	<u>0835</u>

Comments: Pump @ -57' 39.51 Pre H2O level 39.51 Post H2O level
Drawn @ 0845 Transducer Set @ 55' @ 0850

Signature: [Signature] Date: 7/2/19



Well ID: NERF3.60N1

Low-Flow Ground Water Sample Collection Record

Client: NDEP Date: 7/12/19 Time: Start 0900 am/pm
 Project No: 60177365 Finish 1000 am/pm
 Site Location: NERF LVW
 Weather Conds: Warm, Breeze, Clear, -90" Collector(s): E WANG (GES) D GRASE (GES) J CAROTIS (AECOM)

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 51.37 c. Length of Water Column 13.28 (a-b) Casing Diameter/Material 4"
 b. Water Table Depth 38.09 d. Calculated System Volume (see back) 8.67

2. WELL PURGE DATA

a. Purge Method: Low flow bladder Pump

b. Acceptance Criteria defined (see workplan)

- Temperature $\pm 2^{\circ}\text{C}$ -D.O. 0.3 mg/l
- pH ± 0.1 unit Turbidity 10% if NTU reading is > 10 NTUs
- Sp. Cond. $\pm 3\%$ ORP ± 10 millivolts

c. Field Testing Equipment used:

Make	Model	Serial Number
<u>La Motte</u>	<u>Turbidimeter</u>	<u>20206</u>
<u>VSI</u>	<u>556</u>	<u>152100963</u>

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor
0915	0.6	25.59	7.39	6739	1.88	57.2	59.5	150	38.08	Clear/None
0921	1.7	24.68	6.93	6829	1.28	56.8	41.6	150	38.08	"
0927	2.8	24.04	6.90	6831	1.02	55.9	38.3	150	38.08	"
0933	3.9	24.59	6.86	6837	1.07	56.9	29.0	150	38.08	"
0941	5.0	24.57	6.84	6835	1.11	57.3	27.7	150	38.08	1
0945	<u>Sampled</u>									

d. Acceptance criteria pass/fail Yes No N/A (continued on back)

Have parameters stabilized

If no or N/A - Explain below.

N/A

3. SAMPLE COLLECTION:

Method: Low flow tubing

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
<u>NERF3.60N1-20190702</u>					
	<u>250 mL Poly</u>	<u>2</u>	<u>None</u>	<u>Perchlorate/TDS</u>	<u>0945</u>
	<u>250 mL Poly</u>	<u>1</u>	<u>Nitric</u>	<u>Dig Chromic</u>	<u>0945</u>
	<u>125 mL EDA Poly</u>	<u>1</u>	<u>EDA</u>	<u>Chlorate</u>	<u>0945</u>
	<u>40 mL VOA</u>	<u>1</u>	<u>None</u>	<u>Chromic</u>	<u>0945</u>

Comments: Pump @ ~45' Pre. H₂O = 38.09 Post H₂O = 38.09
Recon @ 0955 Transducer @ 45' @ 0950

Signature: [Signature] Date: 7/12/19



Well ID: NER36091

Low-Flow Ground Water Sample Collection Record

Client: NDEP Date: 7/1/19 Time: Start 1055 am/pm
 Project No: 10477365 Finish 1210 am/pm
 Site Location: NER3 LVW E WANG (GES) O GRUSE (GES)
 Weather Conds: Breeze, Sunny, Hot, 99° Collector(s): J CARTRON (AECOM)

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 53.10 c. Length of Water Column 16.43 (a-b) Casing Diameter/Material 4"
 b. Water Table Depth 38.67 d. Calculated System Volume (see back) 10.72

2. WELL PURGE DATA

a. Purge Method: Low flow bladder pump

b. Acceptance Criteria defined (see workplan)

- Temperature $\pm 2^{\circ}\text{C}$ -D.O. 0.3 mg/l
 - pH ± 0.1 unit Turbidity 10% if NTU reading is > 10 NTUs
 - Sp. Cond. $\pm 3\%$ ORP ± 10 millivolts

c. Field Testing Equipment used:

Make	Model	Serial Number
<u>La Motte Turbiditymeter</u>	<u>2020T</u>	<u>71-3218</u>
<u>VSI</u>	<u>556</u>	<u>15200963</u>

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. ($\mu\text{S/cm}$)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor
1125	1.1	27.82	7.04	4245	1.99	74.7	20.3	180	38.67	Light / None
1131	2.2	26.27	6.99	4214	1.61	69.2	10.43	180	38.67	Light / None
1137	3.3	25.76	7.00	4200	1.49	69.9	7.16	180	38.67	"
1143	4.4	25.32	7.01	4199	1.53	68.1	3.89	180	38.67	"
1149	5.5	25.29	7.01	4202	1.54	68.7	4.72	180	38.67	"
1150										

d. Acceptance criteria pass/fail Yes No N/A (continued on back)

Have parameters stabilized

If no or N/A - Explain below.

N/A

3. SAMPLE COLLECTION: Method: Low flow from tubing

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
<u>NER36091-20190701 + MSD</u>	<u>250 mL Poly</u>	<u>2 + 2 MSD</u>	<u>None</u>	<u>Perchlorate + TDS</u>	<u>1150</u>
	<u>250 mL Poly</u>	<u>2 + 2 MSD</u>	<u>Nitric</u>	<u>Dix Chrome</u>	<u>1150</u>
	<u>125 mL COA Poly</u>	<u>2 + 2 MSD</u>	<u>EDA</u>	<u>Chloride</u>	<u>1150</u>
	<u>50 mL VOA</u>	<u>1 + MSD</u>	<u>None</u>	<u>Hexachrome</u>	<u>1150</u>

Comments: Pump = 52.5 (email 7/24/2019)
Drawdown = 1700

Signature: [Signature] Date: 7/1/19



Well ID: NERT3.63

Low-Flow Ground Water Sample Collection Record

Client: NDEP Date: 6/27/19 Time: Start 1010 am/pm
 Project No: 60477365 Finish 1055 am/pm
 Site Location: NERT L/VW
 Weather Conds: Hot Windy Collector(s): J CARROLL (AECOM) E WANG & D Gruec (GES)

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 34.83 c. Length of Water Column 16.15 (a-b) Casing Diameter/Material 4"
 b. Water Table Depth 18.68 d. Calculated System Volume (see back) 10.54

2. WELL PURGE DATA

a. Purge Method: Low Flow - bladder Pump

b. Acceptance Criteria defined (see workplan)

- Temperature $\pm 2^{\circ}\text{C}$ -D.O. 0.3 mg/l
- pH ± 0.1 unit Turbidity 10% if NTU reading is > 10 NTUs
- Sp. Cond. $\pm 3\%$ ORP ± 10 millivolts

c. Field Testing Equipment used:

Make	Model	Serial Number
<u>La Motte Turbidometer</u>	<u>2020 t</u>	<u>71-3218</u>
<u>YSI</u>	<u>556</u>	<u>120100963</u>

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor
1025	1.0	24.45	6.95	4000	1.39	80.2	8.09	200	18.67	Clear/None
1030	2.0	24.17	6.95	3981	1.27	75.0	7.25	200	18.67	"
1035	3.0	23.93	6.95	3979	1.12	71.3	6.97	200	18.67	"
1040	4.0	23.81	6.95	3978	1.14	72.0	7.05	200	18.67	"
1045	<u>Sampled</u>									
						<u>6/27/19</u>				

d. Acceptance criteria pass/fail Yes No N/A (continued on back)

Have parameters stabilized

If no or N/A - Explain below.

N/A

3. SAMPLE COLLECTION: Method: Low flow tubing

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
<u>NERT3.6351-20190627</u>	<u>40 ml vial</u>	<u>1</u>	<u>None</u>	<u>Hex Chrome</u>	<u>1045</u>
	<u>250 ml Poly</u>	<u>1</u>	<u>N/A</u>	<u>Dis Chrome</u>	<u>1045</u>
	<u>250 ml Poly</u>	<u>1</u>	<u>None</u>	<u>Perchlorate & TDS</u>	<u>1045</u>
	<u>125 ml Poly EDA</u>	<u>1</u>	<u>EDA</u>	<u>Chlorate</u>	<u>1045</u>

Comments: Pump e - 35' tubing 31' 31' 162 Dis 18.68 162 Pert 18.6
Down 0 use Transducer e 35' BTUC. P1050

Signature: [Signature] Date: 6/27/19



Well ID: NERT3.90S1

Low-Flow Ground Water Sample Collection Record

Client: NDEP Date: 6/27/19 Time: Start 1110 am/pm
 Project No: 60477365 Finish 1205 am/pm
 Site Location: NERT LVW
 Weather Conds: Hot, windy, -91° Collector(s): J CARROLL (AECOM) & WANG D GRUBE (GES)

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 19.37 c. Length of Water Column 8.89 (a-b) Casing Diameter/Material 4"
 b. Water Table Depth 10.48 d. Calculated System Volume (see back) 5.80

2. WELL PURGE DATA

a. Purge Method: low-flow bladder pump

b. Acceptance Criteria defined (see workplan)

- Temperature $\pm 2^{\circ}\text{C}$ -D.O. 0.3 mg/l
- pH ± 0.1 unit Turbidity 10% if NTU reading is > 10 NTUs
- Sp. Cond. $\pm 3\%$ ORP ± 10 millivolts

c. Field Testing Equipment used:

Make	Model	Serial Number
<u>Co Mark Turbidimeter</u>	<u>20206</u>	<u>71-3218</u>
<u>VSI</u>	<u>356</u>	<u>125100963</u>

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor
1130	1.25	23.90	6.72	3994	1.87	72.3	49.8	6200	10.44	clear/None
1135	2.25	24.46	6.68	3986	1.78	67.7	20.2	200	10.50	clear/None
1140	3.25	24.36	6.67	3976	1.61	67.0	9.41	200	10.50	"
1145	4.25	24.36	6.68	3971	1.57	66.9	6.11	200	10.50	"
1150	4.25	24.34	6.69	3972	1.57	66.9	5.82	200	10.50	"
<u>Sampled</u>										

d. Acceptance criteria pass/fail Yes No N/A (continued on back)

Have parameters stabilized Yes No N/A

If no or N/A - Explain below.

N/A

3. SAMPLE COLLECTION: Method: low flow tubing

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
<u>NERT3.90S1-20190627 + NERT3.90S1-20190627-F1)</u>					
	<u>40 mL Vol</u>	<u>1 + FD</u>	<u>None</u>	<u>Hex Chlorine</u>	<u>1150</u>
	<u>250 mL Poly</u>	<u>1 + FD</u>	<u>None</u>	<u>Dist Chlorine</u>	<u>1150</u>
	<u>250 mL Poly</u>	<u>1 + FD</u>	<u>None</u>	<u>Residual + PPT</u>	<u>1150</u>
	<u>125 mL EPA Poly</u>	<u>1 + FD</u>	<u>EPA</u>	<u>Chlorate</u>	<u>1150</u>

Comments: Pump @ -17'
Down @ 1200

Signature: [Signature] Date: 6/27/19



Well ID: NERT3.9991

Low-Flow Ground Water Sample Collection Record

Client: NDFP Date: 6/27/19 Time: Start 1220 am/pm
 Project No: 60477365 Finish 1310 am/pm
 Site Location: NERT LVW Collector(s): E WONG + D GRAYSON C G E S
 Weather Conds: Hot, windy, 970 5 CAPTRON C AECOM

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 34.93 c. Length of Water Column 24.26 (a-b) Casing Diameter/Material 4"
 b. Water Table Depth 10.67 d. Calculated System Volume (see back) 15.84

2. WELL PURGE DATA

a. Purge Method: Low Flow Bladder Pump

b. Acceptance Criteria defined (see workplan)

- Temperature $\pm 2^{\circ}\text{C}$ -D.O. 0.3 mg/l
- pH ± 0.1 unit Turbidity 10% if NTU reading is > 10 NTUs
- Sp. Cond. $\pm 3\%$ ORP ± 10 millivolts

c. Field Testing Equipment used:

Make	Model	Serial Number
<u>La Motte Turbidimeter</u>	<u>2020e</u>	<u>71-3218</u>
<u>USE</u>	<u>556</u>	<u>152100963</u>

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor
1245	0.4	25.75	7.01	5933	1.36	-19.3	50.2	150	10.75	Clear/None
1251	1.5	24.40	6.96	6061	0.78	-45.1	43.9	150	10.75	"
1257	2.6	23.98	6.98	6100	0.62	-55.0	43.1	150	10.75	"
1303	3.7	24.18	6.99	6099	0.71	-63.2	38.7	150	10.75	"
1309	4.8	24.01	6.99	6100	0.75	-63.5	39.3	150	10.75	"
1310	<u>Sample Left</u>									

d. Acceptance criteria pass/fail Yes No N/A (continued on back)

Have parameters stabilized Yes No N/A

If no or N/A - Explain below. n/a

3. SAMPLE COLLECTION: Method: Low flow tubing

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
<u>NERT3.9991-20190627</u>	<u>40 mL VOA</u>	<u>1</u>	<u>None</u>	<u>Meta Chrome</u>	<u>1310</u>
	<u>250 mL Poly</u>	<u>2</u>	<u>none</u>	<u>Perchlorate + TDS</u>	<u>1310</u>
	<u>250 mL Poly</u>	<u>1</u>	<u>Nitric</u>	<u>Dis Chrom</u>	<u>1310</u>
	<u>125 mL EPA Poly</u>	<u>1</u>	<u>EPA</u>	<u>Chlorate</u>	<u>1310</u>

Comments Pump @ -32' H2O Prc 10.66 H2O Part 10.66
Draw @ 1305 Transducer @ 30' E

Signature [Signature] Date 6/27/19





Well ID: NERT421N1

Low-Flow Ground Water Sample Collection Record

Client: NDEP Date: 7/2/19 Time: Start 1000 am/pm
 Project No: 60477365 Finish 1105 am/pm
 Site Location: NERT LVL Collector(s): E WANG & D GRUSE (G&E)
 Weather Conds: Calm, Clear, Hdb - 95° Collector(s): J CAROTRO (AECOM)

1. WATER LEVEL DATA: (measured from Top of Casing)
 a. Total Well Length 54.65 c. Length of Water Column 19.27 (a-b) Casing Diameter/Material 4"
 b. Water Table Depth 35.38 d. Calculated System Volume (see back) 12.58

2. WELL PURGE DATA
 a. Purge Method: Low flow bladder pump
 b. Acceptance Criteria defined (see workplan)
 - Temperature $\pm 2^{\circ}\text{C}$ -D.O. 0.3 mg/l
 - pH ± 0.1 unit Turbidity 10% if NTU reading is > 10 NTUs
 - Sp. Cond. $\pm 3\%$ ORP ± 10 millivolts
 c. Field Testing Equipment used:
- | Make | Model | Serial Number |
|--------------------------------|--------------|------------------|
| <u>In Mente Turbiditymeter</u> | <u>20206</u> | <u>71-3218</u> |
| <u>YSI</u> | <u>556</u> | <u>152100967</u> |

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor
1020	0.4	26.19	7.37	3701	4.64	63.2	115	200	35.40	Clear/None
1025	1.4	24.74	7.11	3935	4.29	61.1	170	200	35.39	Cloudy/None
1030	2.4	24.67	7.09	3919	4.19	67.5	25.0	200	35.39	Clear/None
1035	3.4	24.71	7.08	3919	4.14	71.1	5.22	200	35.39	"
1040	4.4	24.61	7.09	3930	4.21	72.7	3.03	200	35.39	"
1045	5.4	24.67	7.08	3933	4.21	72.7	2.23	200	35.39	"
1050	Sample									

d. Acceptance criteria pass/fail Yes No N/A (continued on back)
 Have parameters stabilized Yes No N/A

If no or N/A - Explain below. N/A

3. SAMPLE COLLECTION: Method: Low flow tubing

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
<u>NERT421N1-20190702-1-1000</u>	<u>250 mL Poly</u>	<u>1 + EB</u>	<u>None</u>	<u>Residuals</u>	<u>1050</u>
	<u>125 mL EPA W4</u>	<u>1 + EB</u>	<u>EPA</u>	<u>Chloride</u>	<u>1050</u>
	<u>40 mL VOA</u>	<u>1 + FB</u>	<u>None</u>	<u>Hexachrome</u>	<u>1050</u>

Comments: Pump @ 52'
Pressure @ 1100'

Signature: [Signature] Date: 7/2/19



Well ID: NER 4.38N

Low-Flow Ground Water Sample Collection Record

Client: NDEP Date: 7/2/19 Time: Start 1110 am/pm
 Project No: 60477365 Finish 1250 am/pm
 Site Location: NER 4.38N
 Weather Conds: Breeze, Clear, 16° 100° Collector(s): J CARTRIO (AECOM) E. WANG (AES)

1. WATER LEVEL DATA: (measured from Top of Casing)
 a. Total Well Length 39.47 c. Length of Water Column 6.86 (a-b) Casing Diameter/Material 4"
 b. Water Table Depth 32.61 d. Calculated System Volume (see back) 4.57

2. WELL PURGE DATA
 a. Purge Method: Low Flow bladder Pump
 b. Acceptance Criteria defined (see workplan)
 - Temperature $\pm 2^{\circ}\text{C}$ -D.O. 0.3 mg/l
 - pH ± 0.1 unit Turbidity 10% if NTU reading is > 10 NTUs
 - Sp. Cond. $\pm 3\%$ ORP ± 10 millivolts

c. Field Testing Equipment used:

Make	Model	Serial Number
<u>Con Motta</u>	<u>Turbidimeter</u>	<u>20706</u>
<u>VSI</u>	<u>556</u>	<u>152100963</u>

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor
1215	1.0	24.55	7.00	35.99	5.20	54.5	23.0	200	32.65	Clear / None
1220	2.0	25.50	6.92	35.68	5.11	57.0	25.4	200	32.65	"
1225	3.0	25.47	6.91	35.66	5.02	61.1	27.7	200	32.65	"
1230	4.0	25.51	6.91	35.67	5.12	62.8	26.3	200	32.67	"
1235	Sample									

- d. Acceptance criteria pass/fail Yes No N/A (continued on back)
 Have parameters stabilized

If no or N/A - Explain below. N/A

3. SAMPLE COLLECTION: Method: Low flow tubing

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
<u>NER 4.38N1-20190702 + EB</u>					
	<u>250 mL Poly</u>	<u>1 + EB</u>	<u>None</u>	<u>Residuals</u>	<u>1235</u>
	<u>125 mL EPA Poly</u>	<u>1 + EB</u>	<u>EPA</u>	<u>Chloride</u>	<u>1235</u>
	<u>40 mL VOA</u>	<u>1 + EB</u>	<u>None</u>	<u>Hex Chloride</u>	<u>1235</u>

Comments: Pump @ -38'
Resume @ 1245

Signature: [Signature] Date: 7/2/19



Well ID: NERT 4.5181

Low-Flow Ground Water Sample Collection Record

Client: NDEP Date: 6/27/19 Time: Start 1:50 am/pm
 Project No: 6047785 Finish 12:48 am/pm
 Site Location: NERT LVW E WANG & D Gmax (GES)
 Weather Conds: Sunny, Hot, Windy - 100° Collector(s): J CAROTRIO (AECOM)

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 50.00 c. Length of Water Column 23.83 (a-b) Casing Diameter/Material 4"
 b. Water Table Depth 26.17 d. Calculated System Volume (see back) 15.56

2. WELL PURGE DATA

a. Purge Method: Low flow bladder pump

b. Acceptance Criteria defined (see workplan)

- Temperature $\pm 2^{\circ}\text{C}$ -D.O. 0.3 mg/l
- pH ± 0.1 unit Turbidity 10% if NTU reading is > 10 NTUs
- Sp. Cond. $\pm 3\%$ ORP ± 10 millivolts

c. Field Testing Equipment used:

Make	Model	Serial Number
<u>La Motte Turbidimeter</u>	<u>ZDWE</u>	<u>71-3218</u>
<u>YST</u>	<u>556</u>	<u>125100963</u>

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor
1410	0.3	31.56	7.04	5493	4.35	66.8	16.5	200	26.16	Clear / Slight
1415	1.3	29.12	6.97	5505	4.10	64.6	4.09	200	26.16	Clear / None
1420	2.3	29.01	6.96	5506	3.99	66.0	1.56	200	26.16	"
1425	3.3	28.98	6.96	5508	4.05	66.4	1.22	200	26.16	"
1430	<u>Sampled</u>									

d. Acceptance criteria pass/fail Yes No N/A (continued on back)

Have parameters stabilized Yes No N/A

If no or N/A - Explain below.

N/A

3. SAMPLE COLLECTION: Method: Low flow tubing

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
<u>NERT 4.5181-20190627</u>	<u>40 mL VOA</u>	<u>1</u>	<u>None</u>	<u>Hex Chrome</u>	<u>1430</u>
	<u>250 mL Poly</u>	<u>1</u>	<u>None</u>	<u>Residuals</u>	<u>1430</u>
	<u>125 mL EPA Poly</u>	<u>1</u>	<u>EPA</u>	<u>Chloride</u>	<u>1430</u>

Comments Depth ~ 47'
Depth @ 1440

Signature [Signature] Date 6/27/19



Well ID: NER744N1

Low-Flow Ground Water Sample Collection Record

Client: WDEP Date: 7/2/19 Time: Start 1300 am/pm
 Project No: 10477365 Finish 1400 am/pm
 Site Location: NER744N1 E WANG C GSS
 Weather Conds: Sunny, Breezy, hot 102° Collector(s): J CAROTRIS (AECOM)

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 48.25 c. Length of Water Column 22.05 (a-b) Casing Diameter/Material 4"
 b. Water Table Depth 23.20 d. Calculated System Volume (see back) 14.39

2. WELL PURGE DATA

a. Purge Method: low flow bladder pump

b. Acceptance Criteria defined (see workplan)

- Temperature $\pm 2^{\circ}\text{C}$ -D.O. 0.3 mg/l
- pH ± 0.1 unit Turbidity 10% if NTU reading is > 10 NTUs
- Sp. Cond. $\pm 3\%$ ORP ± 10 millivolts

c. Field Testing Equipment used:

Make	Model	Serial Number
<u>La Motte Turbidimeter</u>	<u>2000t</u>	<u>71-3218</u>
<u>VSE</u>	<u>556</u>	<u>152100963</u>

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. ($\mu\text{S/cm}$)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor
1320	0.5	27.25	7.22	2445	2.72	52.6	6.74	200	23.20	clear/none
1325	1.5	25.03	7.14	2411	1.35	46.1	1.95	200	23.20	"
1330	2.0	25.23	7.12	2412	1.26	46.3	2.03	200	23.70	"
1335	2.5	25.18	7.12	2410	1.30	46.8	1.09	200	23.70	"
1340	<u>Sampled</u>									

d. Acceptance criteria pass/fail Yes No N/A (continued on back)

Have parameters stabilized Yes No N/A

If no or N/A - Explain below. N/A

3. SAMPLE COLLECTION: Method: low flow tubing

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
<u>NER744N1-20190702 + FD</u>					
	<u>250 mL Poly</u>	<u>2 + FD</u>	<u>None</u>	<u>Residuals + TDS</u>	<u>1340</u>
	<u>250 mL Poly</u>	<u>1 + FD</u>	<u>Nitric</u>	<u>Dis Charge</u>	<u>1340</u>
	<u>125 mL EDA Poly</u>	<u>1 + FD</u>	<u>EDA</u>	<u>Chloride</u>	<u>1340</u>
	<u>40 mL VEA</u>	<u>1 + FD</u>	<u>None</u>	<u>1-Hr Chloride</u>	<u>1340</u>

Comments Pump @ ~48' Pressure = 23.20 Point = 23.20
Discharge 1350 Free draw @ 40' @ 1350

Signature [Signature] Date 7/2/19



Well ID: NERT46491

Low-Flow Ground Water Sample Collection Record

Client: NDEP Date: 7/1/19 Time: Start 0735 am/pm
 Project No: 60477365 Finish 0845 am/pm
 Site Location: NERT LVW
 Weather Conds: Sunny, Calm, Humid ~85° Collector(s): E Wang & D Grise (L6ES) / J CARREIRO (LAEcom)

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 55.20 c. Length of Water Column 28.10 (a-b) Casing Diameter/Material 4"
 b. Water Table Depth 27.10 d. Calculated System Volume (see back) 19.34

2. WELL PURGE DATA

a. Purge Method: Low flow bladder pump

b. Acceptance Criteria defined (see workplan)

- Temperature ±2°C -D.O. 0.3 mg/l
- pH ±0.1 unit Turbidity 10% if NTU reading is > 10 NTUs
- Sp. Cond. ±3% ORP ± 10 millivolts

c. Field Testing Equipment used:

Make	Model	Serial Number
<u>La Motte Turbulometer</u>	<u>20204</u>	<u>71-3618</u>
<u>YSI</u>	<u>556</u>	<u>1T2100968</u>

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor
<u>800</u>	<u>1.0</u>	<u>24.73</u>	<u>7.15</u>	<u>5737</u>	<u>4.37</u>	<u>77.7</u>	<u>8.34</u>	<u>190</u>	<u>27.05</u>	<u>Clear / None</u>
<u>806</u>	<u>2.1</u>	<u>24.22</u>	<u>7.12</u>	<u>5641</u>	<u>4.68</u>	<u>79.4</u>	<u>2.67</u>	<u>190</u>	<u>27.05</u>	<u>"</u>
<u>812</u>	<u>3.2</u>	<u>23.10</u>	<u>7.12</u>	<u>5655</u>	<u>4.29</u>	<u>83.3</u>	<u>2.20</u>	<u>190</u>	<u>27.08</u>	<u>"</u>
<u>818</u>	<u>4.3</u>	<u>23.10</u>	<u>7.11</u>	<u>5644</u>	<u>3.99</u>	<u>83.6</u>	<u>1.88</u>	<u>190</u>	<u>27.08</u>	<u>"</u>
<u>820</u>	<u>4.8</u>	<u>23.59</u>	<u>7.11</u>	<u>5648</u>	<u>4.06</u>	<u>83.7</u>	<u>1.90</u>	<u>190</u>	<u>27.08</u>	<u>"</u>
<u>Sampled</u>										
					<u>7/1/19</u>					

d. Acceptance criteria pass/fail Yes No N/A (continued on back)

Have parameters stabilized

If no or N/A - Explain below.

N/A

3. SAMPLE COLLECTION: Method: Low flow tubing

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
<u>NERT46491-20190701</u>	<u>250 ml Poly</u>	<u>2</u>	<u>None</u>	<u>Perchlorate & TDS</u>	<u>820</u>
	<u>250 ml Poly</u>	<u>1</u>	<u>Nitric</u>	<u>Dis. Chrome</u>	<u>820</u>
	<u>125 ml EDA Poly</u>	<u>1</u>	<u>EDA</u>	<u>Chloride</u>	<u>820</u>
	<u>40 ml VOA</u>	<u>1</u>	<u>None</u>	<u>Hex. Chrome</u>	<u>820</u>

Comments: Pump @ ~50'
Descon @ 840

Signature: [Signature] Date: 7/1/19



Well ID: NERT4.65N1

Low-Flow Ground Water Sample Collection Record

Client: NDEP Date: 7/8/19 Time: Start 1145 am/pm
 Project No: 160477365 Finish 1245 am/pm
 Site Location: NERT LVW
 Weather Conds: Windy, No clouds, Hum 97° Collector(s): J CAPOTRIO (AECOM) E WANG (GES)

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 45.50 c. Length of Water Column 21.31 (a-b) Casing Diameter/Material 4"
 b. Water Table Depth 24.19 d. Calculated System Volume (see back) 13.91

2. WELL PURGE DATA

a. Purge Method: Low flow bladder pump

b. Acceptance Criteria defined (see workplan)

- Temperature ±2°C -D.O. 0.3 mg/l
- pH ±0.1 unit Turbidity 10% if NTU reading is > 10 NTUs
- Sp. Cond. ±3% ORP ± 10 millivolts

c. Field Testing Equipment used:

Make	Model	Serial Number
<u>La Motte Turbidimeter</u>	<u>2020t</u>	<u>71-3218</u>
<u>YSI</u>	<u>556</u>	<u>152100963</u>

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor
1205	1.7	26.41	7.20	2332	2.28	34.0	15.4	180	24.19	clear / none
1211	1.8	26.28	7.13	2316	1.29	36.2	4.63	190	24.19	"
1217	2.9	25.16	7.12	2306	0.96	38.2	5.98	190	24.19	"
1223	4.0	25.26	7.13	2306	1.05	40.1	3.48	190	24.19	"
1230	<u>Sampled</u>									

d. Acceptance criteria pass/fail Yes No N/A (continued on back)

Have parameters stabilized Yes No N/A

If no or N/A - Explain below.

N/A

3. SAMPLE COLLECTION: Method: Low flow Tubing

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
<u>NERT4.65N1-20190708 + FB (1215)</u>	<u>250 mL Poly</u>	<u>2 + FB</u>	<u>None</u>	<u>Residuals + TDS</u>	<u>1235</u>
	<u>250 mL Poly</u>	<u>1 + FB</u>	<u>Nutric</u>	<u>Dis. chem</u>	<u>1235</u>
	<u>125 mL EPA Poly</u>	<u>1 + FB</u>	<u>EPA</u>	<u>Chloride</u>	<u>1230</u>
	<u>50 mL VOA</u>	<u>1 + FB</u>	<u>None</u>	<u>Res. chem</u>	<u>1236</u>

Comments Pump @ -21.5' Turbidimeter re-set @ 40' e
Recon @ 1235 per flow record = that 160' level =

Signature [Signature] Date 7/8/19



Well ID: NERT4.70N1

Low-Flow Ground Water Sample Collection Record

Client: NDEP Date: 7/9/19 Time: Start 1110 am/pm
 Project No: 60477365 Finish 1210 am/pm
 Site Location: NERT LVW
 Weather Conds: Partly Sunny, Hot 97° Collector(s): J CARTRIO (AECOM) E WANG (GES)

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 45.03 c. Length of Water Column 19.95 (a-b) Casing Diameter/Material 4"
 b. Water Table Depth 25.08 d. Calculated System Volume (see back) 13.02

2. WELL PURGE DATA

a. Purge Method: Low flow bladder Pump

b. Acceptance Criteria defined (see workplan)

- Temperature $\pm 2^{\circ}\text{C}$ -D.O. 0.3 mg/l
- pH ± 0.1 unit Turbidity 10% if NTU reading is > 10 NTUs
- Sp. Cond. $\pm 3\%$ ORP ± 10 millivolts

c. Field Testing Equipment used:

Make	Model	Serial Number
<u>La Motte Turbidimeter</u>	<u>20206</u>	<u>71-3218</u>
<u>YSI</u>	<u>556</u>	<u>152100963</u>

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor
1122	1.1	25.52	7.31	1904	2.11	826	30.2	40250	25.08	Clear / None
1127	2.1	24.02	7.22	1895	1.67	118.5	25.6	200	25.08	"
1132	3.1	24.15	7.18	1899	1.23	124.8	11.4	200	25.08	"
1137	4.1	23.92	7.18	1910	1.04	154.2	9.63	200	25.08	"
1142	5.1	23.98	7.18	1907	1.12	156.2	7.65	200	25.08	"
1147	6.1	23.93	7.18	1908	1.14	161.1	7.34	200	25.08	"
1150	<u>Sampled</u>				<u>SP</u>					

d. Acceptance criteria pass/fail Yes No N/A (continued on back)

Have parameters stabilized

If no or N/A - Explain below. N/A

3. SAMPLE COLLECTION: Method: Low flow tubing

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
<u>NERT4.70N1-20190709 + EB</u>					
<u>250 mL Poly</u>		<u>2 + 2 EB</u>	<u>None</u>	<u>Bicarbonate + TDS</u>	<u>1150</u>
<u>250 mL Poly</u>		<u>1 + EB</u>	<u>As-is</u>	<u>Dis Chrom</u>	<u>1150</u>
<u>125 mL EDA Poly</u>		<u>1 + EB</u>	<u>EDA</u>	<u>Chlorate</u>	<u>1150</u>
<u>40 mL VOA</u>		<u>1 + EB</u>	<u>None</u>	<u>Hex Chrom</u>	<u>1150</u>

Comments Range ~ 425' Transducer Read @ 40' @ 1200
Draw @ 1200 Res. 1000 Level = 25.08 Res. 1000 Level = 25.08

Signature [Signature] Date 7/9/19



Well ID: NERF4.71N1

Low-Flow Ground Water Sample Collection Record

Client: NDEP Date: 7/9/19 Time: Start 1220 am/pm
 Project No: 60477365 Finish 1310 am/pm
 Site Location: NERF LVW
 Weather Conds: Breezy, Sunny, Hot 100° Collector(s): J CARTER (AECOM) E WANG (GES)

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 45.30 c. Length of Water Column 17.39 (a-b) Casing Diameter/Material 4"
 b. Water Table Depth 27.91 d. Calculated System Volume (see back) 11.35

2. WELL PURGE DATA

a. Purge Method: Low flow bladder pump

b. Acceptance Criteria defined (see workplan)

- Temperature $\pm 2^{\circ}\text{C}$ -D.O. 0.3 mg/l
- pH ± 0.1 unit Turbidity 10% if NTU reading is > 10 NTUs
- Sp. Cond. $\pm 3\%$ ORP ± 10 millivolts

c. Field Testing Equipment used:

Make	Model	Serial Number
<u>La Motte</u>	<u>Turbidimeter</u>	<u>20208</u>
<u>VSI</u>	<u>556</u>	<u>152100963</u>

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. ($\mu\text{S/cm}$)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor
1233	1.0	25.73	7.32	1989	2.20	75.2	8.50	200	27.91	Clear/None
1238	2.0	23.94	7.19	1867	1.08	107.2	9.71	200	27.91	"
1243	3.0	23.63	7.16	1950	0.91	134.2	12.6	200	27.91	"
1248	4.0	23.46	7.16	1944	0.95	138.6	13.2	200	27.91	"
1253	5.0	23.67	7.16	1947	0.97	140.9	12.9	200	27.91	"
1255	<u>Sampled</u>									

d. Acceptance criteria pass/fail Yes No N/A (continued on back)

Have parameters stabilized Yes No N/A

If no or N/A - Explain below. N/A

3. SAMPLE COLLECTION: Method: Low Flow Purging

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
<u>NERF4.71N1-20190709</u>					
<u>250 mL Poly</u>	<u>2</u>	<u>None</u>	<u>Pouchbacks + TDS</u>	<u>1255</u>	
<u>250 mL Poly</u>	<u>1</u>	<u>Aspic</u>	<u>Dis Chrome</u>	<u>1255</u>	
<u>125 mL EDA Poly</u>	<u>1</u>	<u>EDA</u>	<u>Chloride</u>	<u>1255</u>	
<u>40 mL VOA</u>	<u>1</u>	<u>None</u>	<u>Hex Chrome</u>	<u>1255</u>	

Comments Pump @ 43'
Recess @ 1300'

Signature [Signature] Date 7/9/19



Well ID: NERT4.71S1

Low-Flow Ground Water Sample Collection Record

Client: NDEP Date: 7/1/19 Time: Start 0940 am/pm
 Project No: 60477365 Finish 1035 am/pm
 Site Location: NERT LVW Collector(s): E WANG & D GRUSE (G.E.S) J CAPRIGIO (AECOM)
 Weather Conds: Sunny, breeze, clear, -95°

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 46.75' c. Length of Water Column 17.92' (a-b) Casing Diameter/Material 4" I
 b. Water Table Depth 28.83' d. Calculated System Volume (see back) 11.70

2. WELL PURGE DATA

a. Purge Method: Low flow Bladder Pump

b. Acceptance Criteria defined (see workplan)

- Temperature $\pm 2^{\circ}\text{C}$ -D.O. 0.3 mg/l
- pH ± 0.1 unit Turbidity 10% if NTU reading is > 10 NTUs
- Sp. Cond. $\pm 3\%$ ORP ± 10 millivolts

c. Field Testing Equipment used:

Make	Model	Serial Number
<u>LaMotte Turbiditymeter</u>	<u>2020t</u>	<u>71-3218</u>
<u>VSE</u>	<u>556</u>	<u>152100903</u>

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. ($\mu\text{S}/\text{cm}$)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor
0955	0.90	26.66	7.07	552.2	4.89	71.3	21.1	150	28.85	Clear / None
1001	2.0	25.67	7.01	588.7	3.19	69.1	22.9	150	28.85	"
1007	3.1	25.49	7.03	547.3	3.22	70.6	21.0	150	28.85	"
1013	4.2	25.48	7.04	557.4	3.26	71.2	20.1	150	28.85	"
1015	<u>Sampled</u>									

d. Acceptance criteria pass/fail Yes No N/A (continued on back)

Have parameters stabilized Yes No N/A

If no or N/A - Explain below.

N/A

3. SAMPLE COLLECTION: Method: Low flow tubing

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
<u>NERT4.71S1-20190701</u>					
	<u>250 ml Poly</u>	<u>1</u>	<u>None</u>	<u>Pacheco</u>	<u>1015</u>
	<u>125 ml Poly/EDA</u>	<u>1</u>	<u>EDA</u>	<u>Chloride</u>	<u>1015</u>
	<u>40 ml 40</u>	<u>1</u>	<u>None</u>	<u>Hex Chromo</u>	<u>1015</u>

Comments: Pump @ ~ 4/1'
Drawn @ 1025

Signature: [Signature] Date: 7/1/19



Well ID: NER4.7192

Low-Flow Ground Water Sample Collection Record

Client: NDEP Date: 7/1/19 Time: Start 0845 am/pm
 Project No: 10477365 Finish 0945 am/pm
 Site Location: NER4 LVW Collector(s): E WANG + D GRUSE (GFS)
 Weather Conds: Cal m, Sunny, Warm - 90° J CARTRIO (AECOM)

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 54.40 c. Length of Water Column 27.1 (a-b) Casing Diameter/Material 4"
 b. Water Table Depth 27.30 d. Calculated System Volume (see back) 17149

2. WELL PURGE DATA

a. Purge Method: low flow bladder pump

b. Acceptance Criteria defined (see workplan)

- Temperature $\pm 2^{\circ}\text{C}$ -D.O. 0.3 mg/l
- pH ± 0.1 unit Turbidity 10% if NTU reading is > 10 NTUs
- Sp. Cond. $\pm 3\%$ ORP ± 10 millivolts

c. Field Testing Equipment used:

Make	Model	Serial Number
<u>La Motte Turbidimeter</u>	<u>2020E</u>	<u>71-3218</u>
<u>YSI</u>	<u>556</u>	<u>1T2100963</u>

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. ($\mu\text{S/cm}$)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor
0850	0.4	25.38	7.04	4924	2.18	73.7	E	180	27.31	Cloudy / None
0856	1.5	23.99	7.00	4949	1.66	74.7	E	180	27.31	"
0902	2.6	23.94	7.01	4962	1.61	73.4	E	180	27.31	"
0909	3.7	24.03	7.01	4962	1.54	72.1	168	180	27.31	"
0914	4.8	24.04	7.01	4968	1.56	72.4	154	180	27.31	"
0920	5.9	24.09	7.01	4970	1.59	71.6	163	180	27.31	"
0925	<u>Sunny</u>	<u>71/19</u>								

d. Acceptance criteria pass/fail Yes No N/A E=Exceeds Instruments Calibration Range (continued on back)

Have parameters stabilized

If no or N/A - Explain below.

N/A

3. SAMPLE COLLECTION: Method: Low flow tubing

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
<u>NER4.7192-20190701</u>					
	<u>250 mL Poly</u>	<u>2</u>	<u>None</u>	<u>Perchlorate/TDS</u>	<u>0925</u>
	<u>250 mL Poly</u>	<u>1</u>	<u>Nitric</u>	<u>Pis Chroms</u>	<u>0925</u>
	<u>225 mL Poly/SDA</u>	<u>1</u>	<u>None/SDA</u>	<u>Chlorate</u>	<u>0925</u>
	<u>4K mL VOA</u>	<u>1</u>	<u>None</u>	<u>1-10K Chroms</u>	<u>0925</u>

Comments Pump @ - 52' Pre. H₂O = 27.30, Post. H₂O 27.30
Return @ - 0935 Turbidity: Post @ 50' @ 0930

Signature [Signature] Date 7/1/19



Well ID: NERT4.93S1

Low-Flow Ground Water Sample Collection Record

Client: NDP Date: 7/1/19 Time: Start 1310 am/pm
 Project No: 60472365 Finish 1410 am/pm
 Site Location: NERT LVW
 Weather Conds: Sunny, Breezy, Hot 105 Collector(s): E WANG (GES) D GRUBE (GES)
J CARTRIO (AECOM)

1. WATER LEVEL DATA: (measured from Top of Casing)
 a. Total Well Length 54.03 c. Length of Water Column 26.43 (a-b) Casing Diameter/Material 4"
 b. Water Table Depth 827.60 d. Calculated System Volume (see back) 17.25

2. WELL PURGE DATA
 a. Purge Method: Low flow bladder Pump
 b. Acceptance Criteria defined (see workplan)
 - Temperature $\pm 2^{\circ}\text{C}$ -D.O. 0.3 mg/l
 - pH ± 0.1 unit Turbidity 10% if NTU reading is > 10 NTUs
 - Sp. Cond. $\pm 3\%$ ORP ± 10 millivolts
 c. Field Testing Equipment used:

Make	Model	Serial Number
<u>La Motte Turbomotor</u>	<u>2000C</u>	<u>71-3218</u>
<u>VSI</u>	<u>556</u>	<u>152100963</u>

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor
1330	0.5	29.22	7.02	4024	2.21	77.8	30.4	150	27.58	Clear/None
1336	1.6	26.63	6.99	4000	1.81	74.0	22.2	140	27.58	"
1342	2.7	26.74	7.00	3984	1.82	72.9	14.4	140	27.58	"
1348	3.8	26.58	7.00	3988	1.85	70.3	12.8	140	27.58	"
1354	4.9	26.53	7.00	3988	1.85	70.7	13.1	140	27.58	"
1355	<u>Scrapped</u>									

d. Acceptance criteria pass/fail Yes No N/A (continued on back)
 Have parameters stabilized

If no or N/A - Explain below.
N/A

3. SAMPLE COLLECTION: Method: Low flow Tubing

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
<u>NERT 4.93S1-20190701</u>					
	<u>250 mL Poly</u>	<u>1</u>	<u>None</u>	<u>Residuals</u>	<u>1355</u>
	<u>125 mL EDA Poly</u>	<u>1</u>	<u>EDA</u>	<u>Chloride</u>	<u>1355</u>
	<u>40 mL VOA</u>	<u>1</u>	<u>None</u>	<u>Hexachloro</u>	<u>1355</u>

Comments Pump @ 251'
Pressure @ 140'

Signature [Signature] Date 7/1/19



Well ID: NERT5.1181

Low-Flow Ground Water Sample Collection Record

Client: NDEP Date: 7/1/19 Time: Start 1225 am/pm
 Project No: 60477365 Finish 1320 am/pm
 Site Location: NERT LVW Collector(s): E WANG (GFS) D. GEUSE (GFS)
 Weather Conds: Breezy, Hot, Sunny 102° J CARTER (AECOM)

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 44.71 c. Length of Water Column 23.9 (a-b) Casing Diameter/Material 4"
 b. Water Table Depth 20.81 d. Calculated System Volume (see back) 15.60

2. WELL PURGE DATA

a. Purge Method: Low flow bladder pump

b. Acceptance Criteria defined (see workplan)

- Temperature ±2°C -D.O. 0.3 mg/l
- pH ±0.1 unit Turbidity 10% if NTU reading is > 10 NTUs
- Sp. Cond. ±3% ORP ± 10 milivolts

c. Field Testing Equipment used:

Make	Model	Serial Number
<u>La Motte</u>	<u>Turbidimeter</u>	<u>20202</u>
<u>VSI</u>	<u>556</u>	<u>71-3218</u>
		<u>152100963</u>

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor
1240	0.75	26.99	7.07	4032	1.33	76.7	15.1	250	20.81	Clear / 1600
1245	2.0	26.27	7.04	4029	1.01	66.9	14.9	250	20.81	"
1250	3.25	25.10	7.01	4056	0.70	70.2	14.7	250	20.81	"
1255	4.50	25.11	7.01	4056	0.74	69.8	15.7	250	20.81	"
1300	6.25	25.11	7.01	4051	0.74	69.4	15.9	250	20.81	"
1305	Sample									

d. Acceptance criteria pass/fail Yes No N/A (continued on back)

Have parameters stabilized

If no or N/A - Explain below.

N/A

3. SAMPLE COLLECTION: Method: Low flow tubing

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
<u>NERT5.1181-20190701</u>	<u>250 mL Poly</u>	<u>1</u>	<u>None</u>	<u>Perchlorate</u>	<u>1305</u>
	<u>125 mL Poly EDA</u>	<u>1</u>	<u>EDA</u>	<u>Chlorate</u>	<u>1305</u>
	<u>40 mL VOA</u>	<u>1</u>	<u>None</u>	<u>Hex Chrome</u>	<u>1305</u>

Comments Pump - 41.5'
Recess @ 1315

Signature [Signature] Date 7/1/19



Well ID: NERTS-4981

Low-Flow Ground Water Sample Collection Record

Client: NDEP Date: 7/8/19 Time: Start 0900 am/pm
 Project No: 60477365 Finish 0950 am/pm
 Site Location: NERT LVW
 Weather Conds: Calm, Sunny, 60°C Collector(s): JCAPOTRIO (AECOM) E WANG (GFS)

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 39.73 c. Length of Water Column 13.02 (a-b) Casing Diameter/Material 4"
 b. Water Table Depth 26.71 d. Calculated System Volume (see back) 8.49

2. WELL PURGE DATA

a. Purge Method: low flow bladder pump

b. Acceptance Criteria defined (see workplan)

- Temperature ±2°C -D.O. 0.3 mg/l
- pH ±0.1 unit Turbidity 10% if NTU reading is > 10 NTUs
- Sp. Cond. ±3% ORP ± 10 millivolts

c. Field Testing Equipment used:

Make	Model	Serial Number
<u>La Motte</u>	<u>Turbidometer</u>	<u>20206</u>
<u>YSI</u>	<u>556</u>	<u>152100963</u>

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor
0910	0.8	26.37	7.50	1672	2.73	32.9	36.8	200	26.71	clear / None
0915	1.8	25.12	7.42	1657	1.23	30.4	18.4	200	26.71	"
0920	2.8	25.02	7.42	1651	0.93	34.7	8.44	200	26.71	"
0925	3.8	24.91	7.43	1650	0.97	38.2	5.33	200	26.71	"
0930	4.8	24.89	7.43	1648	0.99	39.8	6.73	200	26.71	"
0935	<u>Sampled</u>									
						<u>2/8/19</u>				

d. Acceptance criteria pass/fail Yes No N/A (continued on back)

Have parameters stabilized Yes No N/A

If no or N/A - Explain below.

N/A

3. SAMPLE COLLECTION:

Method: Low flow bladder tubing

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
<u>NERTS-4981-20190709</u>					
	<u>250 mL Poly</u>	<u>1</u>	<u>None</u>	<u>Perchlorate</u>	<u>0935</u>
	<u>125 mL EDA Poly</u>	<u>1</u>	<u>EDA</u>	<u>Chloride</u>	<u>0935</u>
	<u>90 mL VOA</u>	<u>1</u>	<u>None</u>	<u>Van Chrom</u>	<u>0935</u>

Comments: Pump @ ~37'
Quinn @ 0940

Signature: [Signature] Date: 7/8/19



Well ID: NER-59151

Low-Flow Ground Water Sample Collection Record

Client: AIDEP Date: 7/1/19 Time: Start 1410 am/pm
 Project No: 60477365 Finish 1500 am/pm
 Site Location: NER-1 VW
 Weather Conds: Sunny, Windy, Hot ~105° Collector(s): EWANG, (GES) DGRUSE (GES) J CARTRIG CAECOM

1. WATER LEVEL DATA: (measured from Top of Casing)
 a. Total Well Length 49.61 c. Length of Water Column 36.29 (a-b) Casing Diameter/Material 4"
 b. Water Table Depth 13.32 d. Calculated System Volume (see back) 19.77

2. WELL PURGE DATA
 a. Purge Method: Low flow bladder pump
 b. Acceptance Criteria defined (see workplan)
 - Temperature ±2°C -D.O. 0.3 mg/l
 - pH ±0.1 unit Turbidity 10% if NTU reading is > 10 NTUs
 - Sp. Cond. ±3% ORP ± 10 millivolts
 c. Field Testing Equipment used:
- | Make | Model | Serial Number |
|------------------------------|--------------|------------------|
| <u>La Motte Turbidimeter</u> | <u>2020Z</u> | <u>71-3218</u> |
| <u>YSI</u> | <u>556</u> | <u>152100963</u> |

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor
14125	12.5	27.61	7.03	4071	2.83	68.1	40.4	220	13.44	Clear/None
1420	1.6	27.64	7.03	4082	1.48	61.6	38.9	220	13.49	clear/None
1435	2.7	26.85	7.02	4069	0.94	63.9	36.4	220	13.49	"
1440	3.8	26.58	7.02	4074	0.93	62.3	38.3	220	13.49	"
1445	<u>Sampled</u>									
						<u>7/1/19</u>				

- d. Acceptance criteria pass/fail Yes No N/A (continued on back)
 Have parameters stabilized
 If no or N/A - Explain below. N/A

3. SAMPLE COLLECTION: Method: Low flow tubing

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
<u>NER-59151-20190701</u>					
	<u>250 mL Poly</u>	<u>1</u>	<u>None</u>	<u>Residuals</u>	<u>1445</u>
	<u>125 EPA Poly</u>	<u>1</u>	<u>EPA</u>	<u>Chlorate</u>	<u>1445</u>
	<u>40 mL VOA</u>	<u>1</u>	<u>None</u>	<u>Res. chrome</u>	<u>1445</u>

Comments: Pump @ -47'
Recom @ 1455

Signature: [Signature] Date: 7/1/19



Well ID: WMW 3.5N

Low-Flow Ground Water Sample Collection Record

Client: NDEP Date: 7/5/19 Time: Start 0850 am/pm
 Project No: 60477365 Finish 1040 am/pm
 Site Location: NERT LVW
 Weather Conds: Light breeze, few clouds, warm 90° Collector(s): JCARSTRO (AECOM) & WANG (GES)

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 55.06 c. Length of Water Column 19.75 (a-b) Casing Diameter/Material 2"
 b. Water Table Depth 35.31 d. Calculated System Volume (see back) 3.22

2. WELL PURGE DATA

a. Purge Method: Low flow bladder pump

b. Acceptance Criteria defined (see workplan)

- Temperature $\pm 2^{\circ}\text{C}$ -D.O. 0.3 mg/l
- pH ± 0.1 unit Turbidity 10% if NTU reading is > 10 NTUs
- Sp. Cond. $\pm 3\%$ ORP ± 10 millivolts

c. Field Testing Equipment used:

Make	Model	Serial Number
<u>La Motte</u>	<u>Turbid-Meter</u>	<u>2020t</u>
<u>1/5±</u>	<u>556</u>	<u>71-3218</u>
		<u>152100963</u>

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor
0955	1.0	26.91	6.96	6102	4.16	71.1	E	180	35.31	Brown/None
1001	2.1	25.05	6.93	6238	5.08	76.7	E	180	35.31	Brown/None
1007	3.2	24.64	6.95	6178	5.99	80.9	E	180	35.31	"
1013	4.3	24.63	6.95	6133	6.08	82.2	E	180	35.31	"
1019	5.4	24.62	6.97	6123	6.05	84.4	E	180	35.31	"
1020	<u>Sampled</u>									
					<u>7/5/19</u>					

d. Acceptance criteria pass/fail Yes No N/A *E = Exceed cal range of instrument* (continued on back)

Have parameters stabilized Yes No N/A

If no or N/A - Explain below.

Turbid would not clear up to below max of instrument

3. SAMPLE COLLECTION: Method: Low flow tubing

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
<u>WMW 3.5N-20190705</u>					
	<u>250 mL PB4</u>	<u>1</u>	<u>None</u>	<u>Pachymete</u>	<u>1020</u>
	<u>125 mL EDA Poly</u>	<u>1</u>	<u>EDA</u>	<u>chlorate</u>	<u>1020</u>

Comments Pump @ -52'
Recon @ 1030

Signature [Signature] Date 7/5/19



Well ID: WMW 3.55

Low-Flow Ground Water Sample Collection Record

Client: NDEP Date: 6/28/19 Time: Start 0830 am/pm
 Project No: 60477365 Finish 0930 am/pm
 Site Location: NERT L11A1
 Weather Conds: 6 am, Light Breeze, Sunny - 85° Collector(s): J. CAPUTO (AECOM) E. WANG & D. GIBUSE (GES)

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 59.90 c. Length of Water Column 16.32 (a-b) Casing Diameter/Material 2"
 b. Water Table Depth 43.58 d. Calculated System Volume (see back) 2.46

2. WELL PURGE DATA

a. Purge Method: Low flow bladder pump

b. Acceptance Criteria defined (see workplan)

- Temperature ±2°C -D.O. 0.3 mg/l
- pH ±0.1 unit Turbidity 10% if NTU reading is > 10 NTUs
- Sp. Cond. ±3% ORP ± 10 millivolts

c. Field Testing Equipment used:

Make	Model	Serial Number
<u>La Motte Turbidimeter</u>	<u>2020t</u>	<u>71-3218</u>
<u>YSI</u>	<u>556</u>	<u>152100963</u>

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor
0845	0.4	24.98	6.98	4047	2.64	73.7	43.8	140	43.54	Fan / None
0851	1.5	24.17	6.97	4036	1.59	71.2	29.4	140	43.54	cloudy / None
0857	2.6	23.56	6.98	4042	1.37	71.7	15.5	140	43.54	Clear / None
0903	3.7	23.47	6.99	4047	1.29	71.1	11.68	140	43.54	"
0909	4.8	23.48	6.98	4046	1.23	71.3	10.57	140	43.54	"
0910	<u>Sampled</u>									

d. Acceptance criteria pass/fail Yes No N/A 43.54 (continued on back)

Have parameters stabilized

If no or N/A - Explain below.

N/A

3. SAMPLE COLLECTION: Method: Low flow tubing

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
<u>WMW3.55-20190628 + FD</u>	<u>250 mL Poly</u>	<u>1 + FD</u>	<u>None</u>	<u>Perchlorate</u>	<u>0910</u>
<u>WMW3.55-20190628</u>	<u>125 mL FDB Poly</u>	<u>1 + FD</u>	<u>EDA</u>	<u>Chlorate</u>	<u>0910</u>

Comments Purge - 57'
Recom 0930

Signature [Signature] Date 6/28/19



Well ID: WMW4.9N

Low-Flow Ground Water Sample Collection Record

Client: NDEP Date: 7/5/19 Time: Start 1146 am/pm
 Project No: 60477365 Finish 1245 am/pm
 Site Location: NERT LVW
 Weather Conds: Breezy, overcast, Hot 100° Collector(s): JCAPOTRIO (AECOM) EWANG (GEO)

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 52.62 c. Length of Water Column 20.42 (a-b) Casing Diameter/Material 2"
 b. Water Table Depth 31.80 d. Calculated System Volume (see back) 3.40

2. WELL PURGE DATA

a. Purge Method: Low flow bladder pump

b. Acceptance Criteria defined (see workplan)

- Temperature $\pm 2^{\circ}\text{C}$ -D.O. 0.3 mg/l
- pH ± 0.1 unit Turbidity 10% if NTU reading is > 10 NTUs
- Sp. Cond. $\pm 3\%$ ORP ± 10 millivolts

c. Field Testing Equipment used:

Make	Model	Serial Number
<u>La Motte turbidimeter</u>	<u>20206</u>	<u>71-3218</u>
<u>YSI</u>	<u>576</u>	<u>152100963</u>

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor
1200	0.5	27.52	7.17	2646	2.81	57.6	922	200	31.79	Fem / None
1205	1.5	25.24	7.04	2608	1.61	54.6	508	200	31.80	"
1210	2.5	25.09	7.03	2612	1.69	53.0	533	200	31.80	"
1215	3.5	24.99	7.03	2630	1.67	53.3	298	200	31.80	Cloudy / None
1220	4.5	24.70	7.03	2642	1.62	53.7	290	200	31.80	Cloudy / None
1225	6.5	24.72	7.03	2643	1.64	53.6	287	200	21.80	"
1230	Sample									

d. Acceptance criteria pass/fail Yes No N/A (continued on back)

Have parameters stabilized Yes No N/A

If no or N/A - Explain below.

N/A

3. SAMPLE COLLECTION:

Method: Low flow tubing

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
<u>WMW4.9N-20190705</u>					
	<u>250 mL Poly</u>	<u>1</u>	<u>None</u>	<u>Residuals</u>	<u>1225-1230</u>
	<u>125 mL EPA Poly</u>	<u>1</u>	<u>EPA</u>	<u>Chloride</u>	<u>1225-1230</u>

Comments: Pump @ ~50'
Recon @ 1235

Signature: [Signature] Date: 7/5/19



Well ID: wmw4.95

Low-Flow Ground Water Sample Collection Record

Client: NDEP Date: 7/9/19 Time: Start 0910 am/pm
 Project No: 60477365 Finish 1015 am/pm
 Site Location: NERT LUN
 Weather Conds: Calm, Clear, Warm 90° Collector(s): J CARTER (AECOM) E WANG (GES)

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 46.66 c. Length of Water Column 20.21 (a-b) Casing Diameter/Material 4"
 b. Water Table Depth 26.45 d. Calculated System Volume (see back) 13.19

2. WELL PURGE DATA

a. Purge Method: Low flow bladder Pump

- b. Acceptance Criteria defined (see workplan)
- Temperature $\pm 2^{\circ}\text{C}$ -D.O. 0.3 mg/l
 - pH ± 0.1 unit Turbidity 10% if NTU reading is > 10 NTUs
 - Sp. Cond. $\pm 3\%$ ORP ± 10 millivolts

c. Field Testing Equipment used:

Make	Model	Serial Number
<u>La Motte Turbidimeter</u>	<u>2020E</u>	<u>71-3218</u>
<u>VSI</u>	<u>556</u>	<u>152100963</u>

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor
0935	0.9	26.36	7.09	2454	4.63	54.1	27.9	200	26.45	Clear / None
0940	1.9	24.57	7.03	2457	3.77	77.0	30.5	200	26.45	"
0945	2.9	24.37	7.03	2456	3.68	101.1	13.4	200	26.45	"
0950	3.9	24.35	7.03	2454	3.28	127.2	6.1	200	26.45	"
0955	4.9	24.37	7.04	2453	3.37	131.6	5.65	200	26.45	"
1000	5.9	24.29	7.04	2453	3.38	132.4	5.41	200	26.45	"
1005	Sampled									

d. Acceptance criteria pass/fail Yes No N/A (continued on back)

Have parameters stabilized Yes No N/A

If no or N/A - Explain below. N/A

3. SAMPLE COLLECTION: Method: Low flow tubing

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
<u>WMW4.95-20190709</u>					
	<u>250 mL Poly</u>	<u>1</u>	<u>None</u>	<u>Pesticide</u>	<u>1005</u>
	<u>125 mL EDTA Poly</u>	<u>1</u>	<u>EDTA</u>	<u>Chloride</u>	<u>1005</u>

Comments Purge ~ 4 1/2
Drawn @ 1010

Signature [Signature] Date 7/9/19



Well ID: WMW5.55

Low-Flow Ground Water Sample Collection Record

Client: NDEP Date: 6/24/19 Time: Start 1045 am/pm
 Project No: 60477365 Finish 1140 am/pm
 Site Location: NERT L/V/W
 Weather Conds: Breezy, Sunny, Hot 95° Collector(s): EWANG + D GRUSE (GES) / J CARPENTER (AECOM)

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 39.27 c. Length of Water Column 23.33 (a-b) Casing Diameter/Material 4"
 b. Water Table Depth 15.94 d. Calculated System Volume (see back) 15.26

2. WELL PURGE DATA

a. Purge Method: Low flow bladder Pumping

b. Acceptance Criteria defined (see workplan)

- Temperature ±2°C -D.O. 0.3 mg/l
- pH ±0.1 unit Turbidity 10% if NTU reading is > 10 NTUs
- Sp. Cond. ±3% ORP ± 10 millivolts

c. Field Testing Equipment used:

Make	Model	Serial Number
<u>La Motte Turbidimeter</u>	<u>2020c</u>	<u>71-3218</u>
<u>45#</u>	<u>556</u>	<u>152100863</u>

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor
1055	0.3	24.91	7.22	3094	3.26	59.1	4.16	190	13.92	clear/none
1101	1.4	24.62	7.16	3071	2.98	59.9	9.63	190	13.92	"
1107	2.5	23.79	7.16	3056	2.93	61.5	9.59	190	13.92	"
1107	3.6	23.62	7.17	3061	2.93	63.1	9.36	190	13.92	"
1109	4.7	23.62	7.17	3059	2.90	63.0	7.42	190	13.92	"
1120	Sample 1									

d. Acceptance criteria pass/fail Yes No N/A (continued on back)

Have parameters stabilized Yes No N/A

If no or N/A - Explain below.

N/A

3. SAMPLE COLLECTION:

Method: Low flow tubing

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
<u>WMW5.55-20190625</u>	<u>250 mL Poly</u>	<u>1</u>	<u>None</u>	<u>Resubstrate</u>	<u>1120</u>
	<u>125 mL EVA Poly</u>	<u>1</u>	<u>EDA</u>	<u>chloride</u>	<u>1120</u>

Comments: Purge @ ~35'
Return @ 11:30

Signature: [Signature] Date: 6/26/19



Well ID: WMW5585

Low-Flow Ground Water Sample Collection Record

Client: NDEP Date: 7/3/19 Time: Start 0820 am/pm
 Project No: 160477365 Finish 0956 am/pm
 Site Location: NERT LUW
 Weather Conds: Light Breeze, Sunny-fair Collector(s): J CARVALHO (AECOM) E WANG (GSS)

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 47.63 c. Length of Water Column 36.77 (a-b) Casing Diameter/Material 2"
 b. Water Table Depth 16.87 d. Calculated System Volume (see back) 5.02

2. WELL PURGE DATA

a. Purge Method: Low flow bladder pump

b. Acceptance Criteria defined (see workplan)

- Temperature $\pm 2^{\circ}\text{C}$ -D.O. 0.3 mg/l
- pH ± 0.1 unit Turbidity 10% if NTU reading is > 10 NTUs
- Sp. Cond. $\pm 3\%$ ORP ± 10 millivolts

c. Field Testing Equipment used:

Make	Model	Serial Number
<u>Lee Mettler</u>	<u>Turbidimeter</u>	<u>20206</u>
<u>YSI</u>	<u>556</u>	<u>71-3218</u>
		<u>152100963</u>

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor
0850	0.6	25.23	7.25	4430	4.69	10.4	E	150	17.10	Brown/None
0856	1.2	24.21	7.14	4505	1.49	-24.6	782	100	17.12	Brown/None
0904	2.0	24.23	7.16	4483	1.28	-63.3	284	100	17.12	"
0912	2.8	24.40	7.22	4423	1.05	-67.6	237	100	17.12	"
0920	3.4	24.35	7.25	4429	1.07	-68.4	221	100	17.12	Fan/None
0928	4.2	24.39	7.23	4426	1.09	-69.1	219	100	17.12	"
0930	<u>Sampled</u>									

d. Acceptance criteria pass/fail Yes No N/A E = Exceeds Instrument Calibration Range (continued on back)

Have parameters stabilized

If no or N/A - Explain below. N/A

3. SAMPLE COLLECTION: Method: Low flow tubing

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
<u>WMW5585-20190703</u>					
	<u>250 mL Poly</u>	<u>1</u>	<u>None</u>	<u>Purch/units</u>	<u>0930</u>
	<u>125 mL EDA Poly</u>	<u>1</u>	<u>EDA</u>	<u>Ch/units</u>	<u>0930</u>

Comments Pump e. ~45'
Pump e. 0940

Signature [Signature] Date 7/3/19



Well ID: WMW5.7N

Low-Flow Ground Water Sample Collection Record

Client: NDEP Date: 7/9/19 Time: Start 1320 am/pm
 Project No: 60477365 Finish 1415 am/pm
 Site Location: NERT LVW
 Weather Conds: Breezy, Sunny, Hot 100 Collector(s): J CABOTRIO (AECOM) E. WANG (GES)

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 21.0 c. Length of Water Column 12.54 (a-b) Casing Diameter/Material 4"
 b. Water Table Depth 8.42 d. Calculated System Volume (see back) 8.21

2. WELL PURGE DATA

a. Purge Method: Low flow bladder pump

b. Acceptance Criteria defined (see workplan)

- Temperature $\pm 2^{\circ}\text{C}$ -D.O. 0.3 mg/l
- pH ± 0.1 unit Turbidity 10% if NTU reading is > 10 NTUs
- Sp. Cond. $\pm 3\%$ ORP ± 10 millivolts

c. Field Testing Equipment used:

Make	Model	Serial Number
<u>La Motte</u>	<u>Turbidimeter</u>	<u>20220t</u>
<u>YSI</u>	<u>55C</u>	<u>71-3218</u>
		<u>15260963</u>

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor
<u>1335</u>	<u>0.5</u>	<u>30.51</u>	<u>7.28</u>	<u>1769</u>	<u>2.36</u>	<u>109.1</u>	<u>5.74</u>	<u>200</u>	<u>8.40</u>	<u>Clear/None</u>
<u>1340</u>	<u>1.5</u>	<u>28.57</u>	<u>7.23</u>	<u>1763</u>	<u>1.34</u>	<u>93.7</u>	<u>4.85</u>	<u>200</u>	<u>8.40</u>	<u>"</u>
<u>1345</u>	<u>2.5</u>	<u>28.64</u>	<u>7.20</u>	<u>1754</u>	<u>1.12</u>	<u>74.2</u>	<u>4.51</u>	<u>200</u>	<u>8.41</u>	<u>"</u>
<u>1350</u>	<u>3.5</u>	<u>29.75</u>	<u>7.19</u>	<u>1755</u>	<u>0.94</u>	<u>85.7</u>	<u>4.16</u>	<u>200</u>	<u>8.41</u>	<u>"</u>
<u>1355</u>	<u>4.5</u>	<u>29.69</u>	<u>7.21</u>	<u>1751</u>	<u>0.95</u>	<u>81.3</u>	<u>4.09</u>	<u>200</u>	<u>8.41</u>	<u>"</u>
<u>1400</u>	<u>Sampled</u>									

d. Acceptance criteria pass/fail Yes No N/A (continued on back)

Have parameters stabilized Yes No N/A

If no or N/A - Explain below.

N/A

3. SAMPLE COLLECTION: Method: Low flow tubing

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
<u>WMW5.7N-20190709</u>					
	<u>250 mL Poly</u>	<u>1</u>	<u>None</u>	<u>Residuals</u>	<u>1400</u>
	<u>125 mL EDA Poly</u>	<u>1</u>	<u>EDA</u>	<u>Chloride</u>	<u>1400</u>

Comments: Pump @ -18.5' Rock particles floating in water
Down @ 1405

Signature: [Signature] Date: 7/9/19

Appendix J
Laboratory Reports

ANALYTICAL REPORT

Eurofins TestAmerica, Irvine
17461 Derian Ave
Suite 100
Irvine, CA 92614-5817
Tel: (949)261-1022

Laboratory Job ID: 440-244812-1
Laboratory Sample Delivery Group: LVW
Client Project/Site: NDEP Phase II

For:
AECOM
1220 Avenida Acaso
Camarillo, California 93012

Attn: Carmen Caceres-Schnell



Authorized for release by:
7/10/2019 3:50:26 PM

Danielle Roberts, Senior Project Manager
(949)260-3249
danielle.roberts@testamericainc.com

LINKS

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The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.



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Sample Summary

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-244812-1
SDG: LVW

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
440-244812-1	NERT3.35S1-20190626	Water	06/26/19 12:35	06/28/19 10:00	
440-244812-2	NERT3.35S1-20190626-FD	Water	06/26/19 12:35	06/28/19 10:00	
440-244812-3	NERT3.40S1-20190626	Water	06/26/19 14:45	06/28/19 10:00	
440-244812-4	NERT3.58S1-20190627	Water	06/27/19 09:40	06/28/19 10:00	
440-244812-5	NERT3.63S1-20190627	Water	06/27/19 10:45	06/28/19 10:00	
440-244812-6	NERT3.80S1-20190627	Water	06/27/19 11:50	06/28/19 10:00	
440-244812-7	NERT3.80S1-20190627-FD	Water	06/27/19 11:50	06/28/19 10:00	
440-244812-8	NERT4.51S1-20190627	Water	06/27/19 14:30	06/28/19 10:00	
440-244812-9	NERT3.98S1-20190627	Water	06/27/19 13:10	06/28/19 10:00	

Case Narrative

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-244812-1
SDG: LVW

Job ID: 440-244812-1

Laboratory: Eurofins TestAmerica, Irvine

Narrative

Job Narrative 440-244812-1

Comments

No additional comments.

Receipt

The samples were received on 6/28/2019 10:00 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 4.6° C.

HPLC/IC

Method(s) 300.1B: The following sample was diluted for the chlorate analyte due to the nature of the sample matrix: NERT3.35S1-20190626 (440-244812-1). Elevated reporting limits (RLs) are provided.

Method(s) 300.1B: The following samples were diluted for the chlorate analyte due to the nature of the sample matrix: NERT3.35S1-20190626-FD (440-244812-2), NERT3.40S1-20190626 (440-244812-3) and NERT3.98S1-20190627 (440-244812-9). Elevated reporting limits (RLs) are provided.

Method(s) 300.1B: The following samples were diluted for the chlorate analyte due to the nature of the sample matrix: NERT3.35S1-20190626 (440-244812-1) and NERT3.40S1-20190626 (440-244812-3). Elevated reporting limits (RLs) are provided.

Method(s) 314.0: The following samples were diluted due to the nature of the sample matrix: NERT3.35S1-20190626 (440-244812-1), NERT3.35S1-20190626-FD (440-244812-2), NERT3.40S1-20190626 (440-244812-3) and NERT3.98S1-20190627 (440-244812-9). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

General Chemistry

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Detection Summary

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-244812-1
SDG: LVW

Client Sample ID: NERT3.35S1-20190626

Lab Sample ID: 440-244812-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Total Dissolved Solids	6900		100	50	mg/L	1		SM 2540C	Total/NA

Client Sample ID: NERT3.35S1-20190626-FD

Lab Sample ID: 440-244812-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Total Dissolved Solids	6900		100	50	mg/L	1		SM 2540C	Total/NA

Client Sample ID: NERT3.40S1-20190626

Lab Sample ID: 440-244812-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Total Dissolved Solids	9000		100	50	mg/L	1		SM 2540C	Total/NA

Client Sample ID: NERT3.58S1-20190627

Lab Sample ID: 440-244812-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chlorate	2700		200	20	ug/L	10		300.1B	Total/NA
Perchlorate	1000		200	48	ug/L	50		314.0	Total/NA
Total Dissolved Solids	3400		20	10	mg/L	1		SM 2540C	Total/NA

Client Sample ID: NERT3.63S1-20190627

Lab Sample ID: 440-244812-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chlorate	3900		400	40	ug/L	20		300.1B	Total/NA
Perchlorate	1200		80	19	ug/L	20		314.0	Total/NA
Total Dissolved Solids	3100		20	10	mg/L	1		SM 2540C	Total/NA

Client Sample ID: NERT3.80S1-20190627

Lab Sample ID: 440-244812-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chlorate	1400		100	10	ug/L	5		300.1B	Total/NA
Perchlorate	820		80	19	ug/L	20		314.0	Total/NA

Client Sample ID: NERT3.80S1-20190627-FD

Lab Sample ID: 440-244812-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chlorate	1400		100	10	ug/L	5		300.1B	Total/NA
Perchlorate	820		80	19	ug/L	20		314.0	Total/NA

Client Sample ID: NERT4.51S1-20190627

Lab Sample ID: 440-244812-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chlorate	8200		1000	100	ug/L	50		300.1B	Total/NA
Perchlorate	2400		400	95	ug/L	100		314.0	Total/NA

Client Sample ID: NERT3.98S1-20190627

Lab Sample ID: 440-244812-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Total Dissolved Solids	5100		100	50	mg/L	1		SM 2540C	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Irvine

Client Sample Results

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-244812-1
SDG: LVW

Client Sample ID: NERT3.35S1-20190626

Lab Sample ID: 440-244812-1

Date Collected: 06/26/19 12:35

Matrix: Water

Date Received: 06/28/19 10:00

Method: 300.1B - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	ND		100	10	ug/L	-		07/02/19 09:51	5

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	98		90 - 115		07/02/19 09:51	5

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		20	4.8	ug/L	-		07/08/19 13:59	5

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	6900		100	50	mg/L	-		07/01/19 09:09	1

Client Sample ID: NERT3.35S1-20190626-FD

Lab Sample ID: 440-244812-2

Date Collected: 06/26/19 12:35

Matrix: Water

Date Received: 06/28/19 10:00

Method: 300.1B - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	ND		100	10	ug/L	-		07/02/19 09:09	5

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	95		90 - 115		07/02/19 09:09	5

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		20	4.8	ug/L	-		07/08/19 14:20	5

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	6900		100	50	mg/L	-		07/01/19 09:09	1

Client Sample ID: NERT3.40S1-20190626

Lab Sample ID: 440-244812-3

Date Collected: 06/26/19 14:45

Matrix: Water

Date Received: 06/28/19 10:00

Method: 300.1B - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	ND		200	20	ug/L	-		07/02/19 15:49	10

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	102		90 - 115		07/02/19 15:49	10

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		20	4.8	ug/L	-		07/08/19 14:40	5

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	9000		100	50	mg/L	-		07/01/19 09:09	1

Client Sample Results

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-244812-1
SDG: LVW

Client Sample ID: NERT3.58S1-20190627

Lab Sample ID: 440-244812-4

Date Collected: 06/27/19 09:40

Matrix: Water

Date Received: 06/28/19 10:00

Method: 300.1B - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	2700		200	20	ug/L	-		07/05/19 11:25	10

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	104		90 - 115		07/05/19 11:25	10

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	1000		200	48	ug/L	-		07/08/19 11:21	50

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	3400		20	10	mg/L	-		07/02/19 08:12	1

Client Sample ID: NERT3.63S1-20190627

Lab Sample ID: 440-244812-5

Date Collected: 06/27/19 10:45

Matrix: Water

Date Received: 06/28/19 10:00

Method: 300.1B - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	3900		400	40	ug/L	-		07/07/19 22:53	20

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	106		90 - 115		07/07/19 22:53	20

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	1200		80	19	ug/L	-		07/08/19 15:41	20

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	3100		20	10	mg/L	-		07/03/19 11:00	1

Client Sample ID: NERT3.80S1-20190627

Lab Sample ID: 440-244812-6

Date Collected: 06/27/19 11:50

Matrix: Water

Date Received: 06/28/19 10:00

Method: 300.1B - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	1400		100	10	ug/L	-		07/05/19 14:24	5

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	112		90 - 115		07/05/19 14:24	5

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	820		80	19	ug/L	-		07/08/19 16:02	20

Client Sample Results

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-244812-1
SDG: LVW

Client Sample ID: NERT3.80S1-20190627-FD

Lab Sample ID: 440-244812-7

Date Collected: 06/27/19 11:50

Matrix: Water

Date Received: 06/28/19 10:00

Method: 300.1B - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	1400		100	10	ug/L	-		07/05/19 14:54	5

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	109		90 - 115		07/05/19 14:54	5

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	820		80	19	ug/L	-		07/08/19 16:22	20

Client Sample ID: NERT4.51S1-20190627

Lab Sample ID: 440-244812-8

Date Collected: 06/27/19 14:30

Matrix: Water

Date Received: 06/28/19 10:00

Method: 300.1B - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	8200		1000	100	ug/L	-		07/07/19 21:05	50

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	105		90 - 115		07/07/19 21:05	50

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	2400		400	95	ug/L	-		07/08/19 12:22	100

Client Sample ID: NERT3.98S1-20190627

Lab Sample ID: 440-244812-9

Date Collected: 06/27/19 13:10

Matrix: Water

Date Received: 06/28/19 10:00

Method: 300.1B - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	ND		200	20	ug/L	-		07/02/19 10:21	10

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	96		90 - 115		07/02/19 10:21	10

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		20	4.8	ug/L	-		07/08/19 15:00	5

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	5100		100	50	mg/L	-		07/02/19 08:12	1

Surrogate Summary

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-244812-1
SDG: LVW

Method: 300.1B - Disinfection By-Products, (IC)

Matrix: Water

Prep Type: Total/NA

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	DCAA (90-115)
440-244812-1	NERT3.35S1-20190626	98
440-244812-1 MS	NERT3.35S1-20190626	100
440-244812-1 MSD	NERT3.35S1-20190626	99
440-244812-2	NERT3.35S1-20190626-FD	95
440-244812-2 MS	NERT3.35S1-20190626-FD	92
440-244812-2 MSD	NERT3.35S1-20190626-FD	92
440-244812-3	NERT3.40S1-20190626	102
440-244812-3 MS	NERT3.40S1-20190626	103
440-244812-3 MSD	NERT3.40S1-20190626	102
440-244812-4	NERT3.58S1-20190627	104
440-244812-4 MS	NERT3.58S1-20190627	108
440-244812-4 MSD	NERT3.58S1-20190627	106
440-244812-5	NERT3.63S1-20190627	106
440-244812-6	NERT3.80S1-20190627	112
440-244812-7	NERT3.80S1-20190627-FD	109
440-244812-8	NERT4.51S1-20190627	105
440-244812-9	NERT3.98S1-20190627	96
440-245143-A-2 MS	Matrix Spike	105
440-245143-A-2 MSD	Matrix Spike Duplicate	106
LCS 440-555700/4	Lab Control Sample	100
LCS 440-555709/4	Lab Control Sample	104
LCS 440-556143/4	Lab Control Sample	109
LCS 440-556356/4	Lab Control Sample	107
MB 440-555700/5	Method Blank	98
MB 440-555709/5	Method Blank	105
MB 440-556143/5	Method Blank	109
MB 440-556356/5	Method Blank	106
MRL 440-555700/3	Lab Control Sample	99
MRL 440-555709/3	Lab Control Sample	104
MRL 440-556143/3	Lab Control Sample	109
MRL 440-556356/3	Lab Control Sample	107

Surrogate Legend

DCAA = Dichloroacetic acid(Surr)

Method Summary

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-244812-1
SDG: LVW

Method	Method Description	Protocol	Laboratory
300.1B	Disinfection By-Products, (IC)	EPA	TAL IRV
314.0	Perchlorate (IC)	EPA	TAL IRV
SM 2540C	Solids, Total Dissolved (TDS)	SM	TAL IRV

Protocol References:

EPA = US Environmental Protection Agency
SM = "Standard Methods For The Examination Of Water And Wastewater"

Laboratory References:

TAL IRV = Eurofins TestAmerica, Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022



Lab Chronicle

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-244812-1
SDG: LVW

Client Sample ID: NERT3.35S1-20190626

Lab Sample ID: 440-244812-1

Date Collected: 06/26/19 12:35

Matrix: Water

Date Received: 06/28/19 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.1B		5			555709	07/02/19 09:51	YZ	TAL IRV
Total/NA	Analysis	314.0		5			556406	07/08/19 13:59	CTH	TAL IRV
Total/NA	Analysis	SM 2540C		1	10 mL	100 mL	555543	07/01/19 09:09	XL	TAL IRV

Client Sample ID: NERT3.35S1-20190626-FD

Lab Sample ID: 440-244812-2

Date Collected: 06/26/19 12:35

Matrix: Water

Date Received: 06/28/19 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.1B		5			555700	07/02/19 09:09	YZ	TAL IRV
Total/NA	Analysis	314.0		5			556406	07/08/19 14:20	CTH	TAL IRV
Total/NA	Analysis	SM 2540C		1	10 mL	100 mL	555543	07/01/19 09:09	XL	TAL IRV

Client Sample ID: NERT3.40S1-20190626

Lab Sample ID: 440-244812-3

Date Collected: 06/26/19 14:45

Matrix: Water

Date Received: 06/28/19 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.1B		10			555709	07/02/19 15:49	YZ	TAL IRV
Total/NA	Analysis	314.0		5			556406	07/08/19 14:40	CTH	TAL IRV
Total/NA	Analysis	SM 2540C		1	10 mL	100 mL	555543	07/01/19 09:09	XL	TAL IRV

Client Sample ID: NERT3.58S1-20190627

Lab Sample ID: 440-244812-4

Date Collected: 06/27/19 09:40

Matrix: Water

Date Received: 06/28/19 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.1B		10			556143	07/05/19 11:25	YZ	TAL IRV
Total/NA	Analysis	314.0		50			556406	07/08/19 11:21	CTH	TAL IRV
Total/NA	Analysis	SM 2540C		1	50 mL	100 mL	555746	07/02/19 08:12	XL	TAL IRV

Client Sample ID: NERT3.63S1-20190627

Lab Sample ID: 440-244812-5

Date Collected: 06/27/19 10:45

Matrix: Water

Date Received: 06/28/19 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.1B		20			556356	07/07/19 22:53	YZ	TAL IRV
Total/NA	Analysis	314.0		20			556406	07/08/19 15:41	CTH	TAL IRV
Total/NA	Analysis	SM 2540C		1	50 mL	100 mL	555972	07/03/19 11:00	XL	TAL IRV

Lab Chronicle

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-244812-1
SDG: LVW

Client Sample ID: NERT3.80S1-20190627

Lab Sample ID: 440-244812-6

Date Collected: 06/27/19 11:50

Matrix: Water

Date Received: 06/28/19 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.1B		5			556143	07/05/19 14:24	YZ	TAL IRV
Total/NA	Analysis	314.0		20			556406	07/08/19 16:02	CTH	TAL IRV

Client Sample ID: NERT3.80S1-20190627-FD

Lab Sample ID: 440-244812-7

Date Collected: 06/27/19 11:50

Matrix: Water

Date Received: 06/28/19 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.1B		5			556143	07/05/19 14:54	YZ	TAL IRV
Total/NA	Analysis	314.0		20			556406	07/08/19 16:22	CTH	TAL IRV

Client Sample ID: NERT4.51S1-20190627

Lab Sample ID: 440-244812-8

Date Collected: 06/27/19 14:30

Matrix: Water

Date Received: 06/28/19 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.1B		50			556356	07/07/19 21:05	YZ	TAL IRV
Total/NA	Analysis	314.0		100			556406	07/08/19 12:22	CTH	TAL IRV

Client Sample ID: NERT3.98S1-20190627

Lab Sample ID: 440-244812-9

Date Collected: 06/27/19 13:10

Matrix: Water

Date Received: 06/28/19 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.1B		10			555700	07/02/19 10:21	YZ	TAL IRV
Total/NA	Analysis	314.0		5			556406	07/08/19 15:00	CTH	TAL IRV
Total/NA	Analysis	SM 2540C		1	10 mL	100 mL	555746	07/02/19 08:12	XL	TAL IRV

Laboratory References:

TAL IRV = Eurofins TestAmerica, Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022

QC Sample Results

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-244812-1
SDG: LVW

Method: 300.1B - Disinfection By-Products, (IC)

Lab Sample ID: MB 440-555700/5
Matrix: Water
Analysis Batch: 555700

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	ND		20	2.0	ug/L			07/02/19 07:56	1
Surrogate	MB %Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	98		90 - 115					07/02/19 07:56	1

Lab Sample ID: LCS 440-555700/4
Matrix: Water
Analysis Batch: 555700

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorate	100	104		ug/L		104	75 - 125
Surrogate	LCS %Recovery	LCS Qualifier	Limits				
Dichloroacetic acid(Surr)	100		90 - 115				

Lab Sample ID: MRL 440-555700/3
Matrix: Water
Analysis Batch: 555700

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorate	20.0	19.9	J	ug/L		99	50 - 150
Surrogate	MRL %Recovery	MRL Qualifier	Limits				
Dichloroacetic acid(Surr)	99		90 - 115				

Lab Sample ID: 440-244812-2 MS
Matrix: Water
Analysis Batch: 555700

Client Sample ID: NERT3.35S1-20190626-FD
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorate	ND		200	169		ug/L		84	75 - 125
Surrogate	MS %Recovery	MS Qualifier	Limits						
Dichloroacetic acid(Surr)	92		90 - 115						

Lab Sample ID: 440-244812-2 MSD
Matrix: Water
Analysis Batch: 555700

Client Sample ID: NERT3.35S1-20190626-FD
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Chlorate	ND		200	172		ug/L		86	75 - 125	2	25
Surrogate	MSD %Recovery	MSD Qualifier	Limits								
Dichloroacetic acid(Surr)	92		90 - 115								

QC Sample Results

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-244812-1
SDG: LVW

Method: 300.1B - Disinfection By-Products, (IC) (Continued)

Lab Sample ID: MB 440-555709/5
Matrix: Water
Analysis Batch: 555709

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	ND		20	2.0	ug/L			07/02/19 07:52	1
Surrogate	MB %Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	105		90 - 115					07/02/19 07:52	1

Lab Sample ID: LCS 440-555709/4
Matrix: Water
Analysis Batch: 555709

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorate	100	103		ug/L		103	75 - 125
Surrogate	LCS %Recovery	LCS Qualifier	Limits				
Dichloroacetic acid(Surr)	104		90 - 115				

Lab Sample ID: MRL 440-555709/3
Matrix: Water
Analysis Batch: 555709

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorate	20.0	20.8		ug/L		104	50 - 150
Surrogate	MRL %Recovery	MRL Qualifier	Limits				
Dichloroacetic acid(Surr)	104		90 - 115				

Lab Sample ID: 440-244812-1 MS
Matrix: Water
Analysis Batch: 555709

Client Sample ID: NERT3.35S1-20190626
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorate	ND		200	201		ug/L		101	75 - 125
Surrogate	MS %Recovery	MS Qualifier	Limits						
Dichloroacetic acid(Surr)	100		90 - 115						

Lab Sample ID: 440-244812-1 MSD
Matrix: Water
Analysis Batch: 555709

Client Sample ID: NERT3.35S1-20190626
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Chlorate	ND		200	201		ug/L		100	75 - 125	0	25
Surrogate	MSD %Recovery	MSD Qualifier	Limits								
Dichloroacetic acid(Surr)	99		90 - 115								

QC Sample Results

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-244812-1
SDG: LVW

Method: 300.1B - Disinfection By-Products, (IC) (Continued)

Lab Sample ID: 440-244812-3 MS
Matrix: Water
Analysis Batch: 555709

Client Sample ID: NERT3.40S1-20190626
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits	
Chlorate	ND		200	179	J	ug/L		90	75 - 125	
Surrogate	%Recovery	MS Qualifier	Limits							
Dichloroacetic acid(Surr)	103		90 - 115							

Lab Sample ID: 440-244812-3 MSD
Matrix: Water
Analysis Batch: 555709

Client Sample ID: NERT3.40S1-20190626
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chlorate	ND		200	180	J	ug/L		90	75 - 125	0	25
Surrogate	%Recovery	MSD Qualifier	Limits								
Dichloroacetic acid(Surr)	102		90 - 115								

Lab Sample ID: MB 440-556143/5
Matrix: Water
Analysis Batch: 556143

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac	
Chlorate	ND		20	2.0	ug/L			07/05/19 06:27	1	
Surrogate	%Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac				
Dichloroacetic acid(Surr)	109		90 - 115		07/05/19 06:27	1				

Lab Sample ID: LCS 440-556143/4
Matrix: Water
Analysis Batch: 556143

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorate	100	102		ug/L		102	75 - 125
Surrogate	%Recovery	LCS Qualifier	Limits				
Dichloroacetic acid(Surr)	109		90 - 115				

Lab Sample ID: MRL 440-556143/3
Matrix: Water
Analysis Batch: 556143

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorate	20.0	21.2		ug/L		106	50 - 150
Surrogate	%Recovery	MRL Qualifier	Limits				
Dichloroacetic acid(Surr)	109		90 - 115				

QC Sample Results

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-244812-1
SDG: LVW

Method: 300.1B - Disinfection By-Products, (IC) (Continued)

Lab Sample ID: 440-244812-4 MS
Matrix: Water
Analysis Batch: 556143

Client Sample ID: NERT3.58S1-20190627
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits	
Chlorate	2700		200	2860	4	ug/L		81	75 - 125	
Surrogate	%Recovery	MS Qualifier	Limits							
Dichloroacetic acid(Surr)	108		90 - 115							

Lab Sample ID: 440-244812-4 MSD
Matrix: Water
Analysis Batch: 556143

Client Sample ID: NERT3.58S1-20190627
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chlorate	2700		200	2800	4	ug/L		51	75 - 125	2	25
Surrogate	%Recovery	MSD Qualifier	Limits								
Dichloroacetic acid(Surr)	106		90 - 115								

Lab Sample ID: MB 440-556356/5
Matrix: Water
Analysis Batch: 556356

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac	
Chlorate	ND		20	2.0	ug/L			07/07/19 09:36	1	
Surrogate	%Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac				
Dichloroacetic acid(Surr)	106		90 - 115		07/07/19 09:36	1				

Lab Sample ID: LCS 440-556356/4
Matrix: Water
Analysis Batch: 556356

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorate	100	101		ug/L		101	75 - 125
Surrogate	%Recovery	LCS Qualifier	Limits				
Dichloroacetic acid(Surr)	107		90 - 115				

Lab Sample ID: MRL 440-556356/3
Matrix: Water
Analysis Batch: 556356

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorate	20.0	19.8	J	ug/L		99	50 - 150
Surrogate	%Recovery	MRL Qualifier	Limits				
Dichloroacetic acid(Surr)	107		90 - 115				

QC Sample Results

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-244812-1
SDG: LVW

Method: 300.1B - Disinfection By-Products, (IC) (Continued)

Lab Sample ID: 440-245143-A-2 MS
Matrix: Water
Analysis Batch: 556356

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorate	160		200	381		ug/L		110	75 - 125
Surrogate	%Recovery	MS Qualifier	Limits						
Dichloroacetic acid(Surr)	105		90 - 115						

Lab Sample ID: 440-245143-A-2 MSD
Matrix: Water
Analysis Batch: 556356

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chlorate	160		200	376		ug/L		108	75 - 125	1	25
Surrogate	%Recovery	MSD Qualifier	Limits								
Dichloroacetic acid(Surr)	106		90 - 115								

Method: 314.0 - Perchlorate (IC)

Lab Sample ID: MB 440-556406/6
Matrix: Water
Analysis Batch: 556406

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		4.0	0.95	ug/L			07/08/19 09:17	1

Lab Sample ID: LCS 440-556406/5
Matrix: Water
Analysis Batch: 556406

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	25.0	23.4		ug/L		94	85 - 115

Lab Sample ID: MRL 440-556406/8
Matrix: Water
Analysis Batch: 556406

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	4.00	3.72	J	ug/L		93	75 - 125

Lab Sample ID: 440-244812-4 MS
Matrix: Water
Analysis Batch: 556406

Client Sample ID: NERT3.58S1-20190627
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	1000		1250	2320		ug/L		104	80 - 120

QC Sample Results

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-244812-1
SDG: LVW

Method: 314.0 - Perchlorate (IC) (Continued)

Lab Sample ID: 440-244812-4 MSD
Matrix: Water
Analysis Batch: 556406

Client Sample ID: NERT3.58S1-20190627
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perchlorate	1000		1250	2310		ug/L		103	80 - 120	0	15

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 440-555543/1
Matrix: Water
Analysis Batch: 555543

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	ND		10	5.0	mg/L			07/01/19 09:09	1

Lab Sample ID: LCS 440-555543/2
Matrix: Water
Analysis Batch: 555543

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Dissolved Solids	1000	1010		mg/L		101	90 - 110

Lab Sample ID: 440-244541-D-11 DU
Matrix: Water
Analysis Batch: 555543

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Dissolved Solids	940		959		mg/L		2	5

Lab Sample ID: MB 440-555746/1
Matrix: Water
Analysis Batch: 555746

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	ND		10	5.0	mg/L			07/02/19 08:12	1

Lab Sample ID: LCS 440-555746/2
Matrix: Water
Analysis Batch: 555746

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Dissolved Solids	1000	996		mg/L		100	90 - 110

Lab Sample ID: 440-244812-4 DU
Matrix: Water
Analysis Batch: 555746

Client Sample ID: NERT3.58S1-20190627
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Dissolved Solids	3400		3380		mg/L		0.1	5

QC Sample Results

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-244812-1
SDG: LVW

Method: SM 2540C - Solids, Total Dissolved (TDS) (Continued)

Lab Sample ID: MB 440-555972/1
Matrix: Water
Analysis Batch: 555972

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	ND		10	5.0	mg/L			07/03/19 11:00	1

Lab Sample ID: LCS 440-555972/2
Matrix: Water
Analysis Batch: 555972

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Dissolved Solids	1000	1000		mg/L		100	90 - 110

Lab Sample ID: 440-245091-I-1 DU
Matrix: Water
Analysis Batch: 555972

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Dissolved Solids	860		887		mg/L		3	5

QC Association Summary

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-244812-1
SDG: LVW

HPLC/IC

Analysis Batch: 555700

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-244812-2	NERT3.35S1-20190626-FD	Total/NA	Water	300.1B	
440-244812-9	NERT3.98S1-20190627	Total/NA	Water	300.1B	
MB 440-555700/5	Method Blank	Total/NA	Water	300.1B	
LCS 440-555700/4	Lab Control Sample	Total/NA	Water	300.1B	
MRL 440-555700/3	Lab Control Sample	Total/NA	Water	300.1B	
440-244812-2 MS	NERT3.35S1-20190626-FD	Total/NA	Water	300.1B	
440-244812-2 MSD	NERT3.35S1-20190626-FD	Total/NA	Water	300.1B	

Analysis Batch: 555709

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-244812-1	NERT3.35S1-20190626	Total/NA	Water	300.1B	
440-244812-3	NERT3.40S1-20190626	Total/NA	Water	300.1B	
MB 440-555709/5	Method Blank	Total/NA	Water	300.1B	
LCS 440-555709/4	Lab Control Sample	Total/NA	Water	300.1B	
MRL 440-555709/3	Lab Control Sample	Total/NA	Water	300.1B	
440-244812-1 MS	NERT3.35S1-20190626	Total/NA	Water	300.1B	
440-244812-1 MSD	NERT3.35S1-20190626	Total/NA	Water	300.1B	
440-244812-3 MS	NERT3.40S1-20190626	Total/NA	Water	300.1B	
440-244812-3 MSD	NERT3.40S1-20190626	Total/NA	Water	300.1B	

Analysis Batch: 556143

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-244812-4	NERT3.58S1-20190627	Total/NA	Water	300.1B	
440-244812-6	NERT3.80S1-20190627	Total/NA	Water	300.1B	
440-244812-7	NERT3.80S1-20190627-FD	Total/NA	Water	300.1B	
MB 440-556143/5	Method Blank	Total/NA	Water	300.1B	
LCS 440-556143/4	Lab Control Sample	Total/NA	Water	300.1B	
MRL 440-556143/3	Lab Control Sample	Total/NA	Water	300.1B	
440-244812-4 MS	NERT3.58S1-20190627	Total/NA	Water	300.1B	
440-244812-4 MSD	NERT3.58S1-20190627	Total/NA	Water	300.1B	

Analysis Batch: 556356

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-244812-5	NERT3.63S1-20190627	Total/NA	Water	300.1B	
440-244812-8	NERT4.51S1-20190627	Total/NA	Water	300.1B	
MB 440-556356/5	Method Blank	Total/NA	Water	300.1B	
LCS 440-556356/4	Lab Control Sample	Total/NA	Water	300.1B	
MRL 440-556356/3	Lab Control Sample	Total/NA	Water	300.1B	
440-245143-A-2 MS	Matrix Spike	Total/NA	Water	300.1B	
440-245143-A-2 MSD	Matrix Spike Duplicate	Total/NA	Water	300.1B	

Analysis Batch: 556406

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-244812-1	NERT3.35S1-20190626	Total/NA	Water	314.0	
440-244812-2	NERT3.35S1-20190626-FD	Total/NA	Water	314.0	
440-244812-3	NERT3.40S1-20190626	Total/NA	Water	314.0	
440-244812-4	NERT3.58S1-20190627	Total/NA	Water	314.0	
440-244812-5	NERT3.63S1-20190627	Total/NA	Water	314.0	
440-244812-6	NERT3.80S1-20190627	Total/NA	Water	314.0	
440-244812-7	NERT3.80S1-20190627-FD	Total/NA	Water	314.0	
440-244812-8	NERT4.51S1-20190627	Total/NA	Water	314.0	

QC Association Summary

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-244812-1
SDG: LVW

HPLC/IC (Continued)

Analysis Batch: 556406 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-244812-9	NERT3.98S1-20190627	Total/NA	Water	314.0	
MB 440-556406/6	Method Blank	Total/NA	Water	314.0	
LCS 440-556406/5	Lab Control Sample	Total/NA	Water	314.0	
MRL 440-556406/8	Lab Control Sample	Total/NA	Water	314.0	
440-244812-4 MS	NERT3.58S1-20190627	Total/NA	Water	314.0	
440-244812-4 MSD	NERT3.58S1-20190627	Total/NA	Water	314.0	

General Chemistry

Analysis Batch: 555543

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-244812-1	NERT3.35S1-20190626	Total/NA	Water	SM 2540C	
440-244812-2	NERT3.35S1-20190626-FD	Total/NA	Water	SM 2540C	
440-244812-3	NERT3.40S1-20190626	Total/NA	Water	SM 2540C	
MB 440-555543/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 440-555543/2	Lab Control Sample	Total/NA	Water	SM 2540C	
440-244541-D-11 DU	Duplicate	Total/NA	Water	SM 2540C	

Analysis Batch: 555746

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-244812-4	NERT3.58S1-20190627	Total/NA	Water	SM 2540C	
440-244812-9	NERT3.98S1-20190627	Total/NA	Water	SM 2540C	
MB 440-555746/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 440-555746/2	Lab Control Sample	Total/NA	Water	SM 2540C	
440-244812-4 DU	NERT3.58S1-20190627	Total/NA	Water	SM 2540C	

Analysis Batch: 555972

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-244812-5	NERT3.63S1-20190627	Total/NA	Water	SM 2540C	
MB 440-555972/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 440-555972/2	Lab Control Sample	Total/NA	Water	SM 2540C	
440-245091-I-1 DU	Duplicate	Total/NA	Water	SM 2540C	

Definitions/Glossary

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-244812-1
SDG: LVW

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
▫	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Accreditation/Certification Summary

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-244812-1
SDG: LVW

Laboratory: Eurofins TestAmerica, Irvine

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Nevada	State Program	9	CA015312019-5	07-31-19 *

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Login Sample Receipt Checklist

Client: AECOM

Job Number: 440-244812-1

SDG Number: LVW

Login Number: 244812

List Number: 1

Creator: Escalante, Maria I

List Source: Eurofins TestAmerica, Irvine

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	Not Present
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



ANALYTICAL REPORT

Eurofins TestAmerica, Irvine
17461 Derian Ave
Suite 100
Irvine, CA 92614-5817
Tel: (949)261-1022

Laboratory Job ID: 440-244812-2
Laboratory Sample Delivery Group: LVW
Client Project/Site: NDEP Phase II

For:
AECOM
1220 Avenida Acaso
Camarillo, California 93012

Attn: Carmen Caceres-Schnell



Authorized for release by:
7/10/2019 4:05:26 PM

Danielle Roberts, Senior Project Manager
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The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.



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Sample Summary

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-244812-2
SDG: LVW

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
440-244812-1	NERT3.35S1-20190626	Water	06/26/19 12:35	06/28/19 10:00	
440-244812-2	NERT3.35S1-20190626-FD	Water	06/26/19 12:35	06/28/19 10:00	
440-244812-3	NERT3.40S1-20190626	Water	06/26/19 14:45	06/28/19 10:00	
440-244812-4	NERT3.58S1-20190627	Water	06/27/19 09:40	06/28/19 10:00	
440-244812-5	NERT3.63S1-20190627	Water	06/27/19 10:45	06/28/19 10:00	
440-244812-9	NERT3.98S1-20190627	Water	06/27/19 13:10	06/28/19 10:00	

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Case Narrative

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-244812-2
SDG: LVW

Job ID: 440-244812-2

Laboratory: Eurofins TestAmerica, Irvine

Narrative

Job Narrative
440-244812-2

Comments

No additional comments.

Receipt

The samples were received on 6/28/2019 10:00 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 4.6° C.

Metals

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

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Detection Summary

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-244812-2
SDG: LVW

Client Sample ID: NERT3.35S1-20190626

Lab Sample ID: 440-244812-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chromium	0.57	J	2.0	0.50	ug/L	1		200.8	Dissolved

Client Sample ID: NERT3.35S1-20190626-FD

Lab Sample ID: 440-244812-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chromium	0.64	J	2.0	0.50	ug/L	1		200.8	Dissolved

Client Sample ID: NERT3.40S1-20190626

Lab Sample ID: 440-244812-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chromium	0.71	J	2.0	0.50	ug/L	1		200.8	Dissolved

Client Sample ID: NERT3.58S1-20190627

Lab Sample ID: 440-244812-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chromium	5.5		2.0	0.50	ug/L	1		200.8	Dissolved

Client Sample ID: NERT3.63S1-20190627

Lab Sample ID: 440-244812-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chromium	8.6		2.0	0.50	ug/L	1		200.8	Dissolved

Client Sample ID: NERT3.98S1-20190627

Lab Sample ID: 440-244812-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chromium	0.79	J	2.0	0.50	ug/L	1		200.8	Dissolved

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Irvine

Client Sample Results

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-244812-2
SDG: LVW

Client Sample ID: NERT3.35S1-20190626

Lab Sample ID: 440-244812-1

Date Collected: 06/26/19 12:35

Matrix: Water

Date Received: 06/28/19 10:00

Method: 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	0.57	J	2.0	0.50	ug/L		07/02/19 12:05	07/02/19 14:56	1

Client Sample ID: NERT3.35S1-20190626-FD

Lab Sample ID: 440-244812-2

Date Collected: 06/26/19 12:35

Matrix: Water

Date Received: 06/28/19 10:00

Method: 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	0.64	J	2.0	0.50	ug/L		07/02/19 12:05	07/02/19 15:02	1

Client Sample ID: NERT3.40S1-20190626

Lab Sample ID: 440-244812-3

Date Collected: 06/26/19 14:45

Matrix: Water

Date Received: 06/28/19 10:00

Method: 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	0.71	J	2.0	0.50	ug/L		07/02/19 12:05	07/02/19 15:05	1

Client Sample ID: NERT3.58S1-20190627

Lab Sample ID: 440-244812-4

Date Collected: 06/27/19 09:40

Matrix: Water

Date Received: 06/28/19 10:00

Method: 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	5.5		2.0	0.50	ug/L		07/02/19 12:05	07/02/19 14:50	1

Client Sample ID: NERT3.63S1-20190627

Lab Sample ID: 440-244812-5

Date Collected: 06/27/19 10:45

Matrix: Water

Date Received: 06/28/19 10:00

Method: 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	8.6		2.0	0.50	ug/L		07/02/19 12:05	07/02/19 15:07	1

Client Sample ID: NERT3.98S1-20190627

Lab Sample ID: 440-244812-9

Date Collected: 06/27/19 13:10

Matrix: Water

Date Received: 06/28/19 10:00

Method: 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	0.79	J	2.0	0.50	ug/L		07/02/19 12:05	07/02/19 15:09	1

Method Summary

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-244812-2
SDG: LVW

Method	Method Description	Protocol	Laboratory
200.8	Metals (ICP/MS)	EPA	TAL IRV
200.2	Preparation, Total Recoverable Metals	EPA	TAL IRV

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

TAL IRV = Eurofins TestAmerica, Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022



Lab Chronicle

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-244812-2
SDG: LVW

Client Sample ID: NERT3.35S1-20190626

Lab Sample ID: 440-244812-1

Date Collected: 06/26/19 12:35

Matrix: Water

Date Received: 06/28/19 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	200.2			25 mL	25 mL	555821	07/02/19 12:05	BV	TAL IRV
Dissolved	Analysis	200.8		1			555868	07/02/19 14:56	EMS	TAL IRV

Client Sample ID: NERT3.35S1-20190626-FD

Lab Sample ID: 440-244812-2

Date Collected: 06/26/19 12:35

Matrix: Water

Date Received: 06/28/19 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	200.2			25 mL	25 mL	555821	07/02/19 12:05	BV	TAL IRV
Dissolved	Analysis	200.8		1			555868	07/02/19 15:02	EMS	TAL IRV

Client Sample ID: NERT3.40S1-20190626

Lab Sample ID: 440-244812-3

Date Collected: 06/26/19 14:45

Matrix: Water

Date Received: 06/28/19 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	200.2			25 mL	25 mL	555821	07/02/19 12:05	BV	TAL IRV
Dissolved	Analysis	200.8		1			555868	07/02/19 15:05	EMS	TAL IRV

Client Sample ID: NERT3.58S1-20190627

Lab Sample ID: 440-244812-4

Date Collected: 06/27/19 09:40

Matrix: Water

Date Received: 06/28/19 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	200.2			25 mL	25 mL	555821	07/02/19 12:05	BV	TAL IRV
Dissolved	Analysis	200.8		1			555868	07/02/19 14:50	EMS	TAL IRV

Client Sample ID: NERT3.63S1-20190627

Lab Sample ID: 440-244812-5

Date Collected: 06/27/19 10:45

Matrix: Water

Date Received: 06/28/19 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	200.2			25 mL	25 mL	555821	07/02/19 12:05	BV	TAL IRV
Dissolved	Analysis	200.8		1			555868	07/02/19 15:07	EMS	TAL IRV

Client Sample ID: NERT3.98S1-20190627

Lab Sample ID: 440-244812-9

Date Collected: 06/27/19 13:10

Matrix: Water

Date Received: 06/28/19 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	200.2			25 mL	25 mL	555821	07/02/19 12:05	BV	TAL IRV
Dissolved	Analysis	200.8		1			555868	07/02/19 15:09	EMS	TAL IRV

Laboratory References:

TAL IRV = Eurofins TestAmerica, Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022

Eurofins TestAmerica, Irvine

QC Sample Results

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-244812-2
SDG: LVW

Method: 200.8 - Metals (ICP/MS)

Lab Sample ID: MB 440-555821/1-A
Matrix: Water
Analysis Batch: 555868

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 555821

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	ND		2.0	0.50	ug/L		07/02/19 12:05	07/02/19 14:42	1

Lab Sample ID: LCS 440-555821/2-A
Matrix: Water
Analysis Batch: 555868

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 555821

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Chromium	80.0	78.9		ug/L		99	85 - 115

Lab Sample ID: LCSD 440-555821/3-A
Matrix: Water
Analysis Batch: 555868

Client Sample ID: Lab Control Sample Dup
Prep Type: Total Recoverable
Prep Batch: 555821

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Chromium	80.0	78.1		ug/L		98	85 - 115	1	20

Lab Sample ID: 440-244812-4 MS
Matrix: Water
Analysis Batch: 555868

Client Sample ID: NERT3.58S1-20190627
Prep Type: Dissolved
Prep Batch: 555821

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Chromium	5.5		80.0	81.5		ug/L		95	70 - 130

Lab Sample ID: 440-244812-4 MSD
Matrix: Water
Analysis Batch: 555868

Client Sample ID: NERT3.58S1-20190627
Prep Type: Dissolved
Prep Batch: 555821

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Chromium	5.5		80.0	82.0		ug/L		96	70 - 130	1	20

QC Association Summary

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-244812-2
SDG: LVW

Metals

Prep Batch: 555821

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-244812-1	NERT3.35S1-20190626	Dissolved	Water	200.2	
440-244812-2	NERT3.35S1-20190626-FD	Dissolved	Water	200.2	
440-244812-3	NERT3.40S1-20190626	Dissolved	Water	200.2	
440-244812-4	NERT3.58S1-20190627	Dissolved	Water	200.2	
440-244812-5	NERT3.63S1-20190627	Dissolved	Water	200.2	
440-244812-9	NERT3.98S1-20190627	Dissolved	Water	200.2	
MB 440-555821/1-A	Method Blank	Total Recoverable	Water	200.2	
LCS 440-555821/2-A	Lab Control Sample	Total Recoverable	Water	200.2	
LCSD 440-555821/3-A	Lab Control Sample Dup	Total Recoverable	Water	200.2	
440-244812-4 MS	NERT3.58S1-20190627	Dissolved	Water	200.2	
440-244812-4 MSD	NERT3.58S1-20190627	Dissolved	Water	200.2	

Analysis Batch: 555868

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-244812-1	NERT3.35S1-20190626	Dissolved	Water	200.8	555821
440-244812-2	NERT3.35S1-20190626-FD	Dissolved	Water	200.8	555821
440-244812-3	NERT3.40S1-20190626	Dissolved	Water	200.8	555821
440-244812-4	NERT3.58S1-20190627	Dissolved	Water	200.8	555821
440-244812-5	NERT3.63S1-20190627	Dissolved	Water	200.8	555821
440-244812-9	NERT3.98S1-20190627	Dissolved	Water	200.8	555821
MB 440-555821/1-A	Method Blank	Total Recoverable	Water	200.8	555821
LCS 440-555821/2-A	Lab Control Sample	Total Recoverable	Water	200.8	555821
LCSD 440-555821/3-A	Lab Control Sample Dup	Total Recoverable	Water	200.8	555821
440-244812-4 MS	NERT3.58S1-20190627	Dissolved	Water	200.8	555821
440-244812-4 MSD	NERT3.58S1-20190627	Dissolved	Water	200.8	555821

Definitions/Glossary

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-244812-2
SDG: LVW

Qualifiers

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Accreditation/Certification Summary

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-244812-2
SDG: LVW

Laboratory: Eurofins TestAmerica, Irvine

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Nevada	State Program	9	CA015312019-5	07-31-19 *

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* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Regulatory Program: DW NPDES RCRA Other:

Client Contact Company Name: AECOM Address: 1220 Avenida Arroyo City/State/Zip: Camarillo CA 93012 Phone: 805-704-4027 Fax: Project Name: NDEP Phase II Site: 2VW P O #: 60477365		Project Manager: C. Covert Schmitt Tel/Fax: 805-704-4031 Analysis Turnaround Time <input type="checkbox"/> CALENDAR DAYS <input type="checkbox"/> WORKING DAYS TAT if different from Below _____ <input type="checkbox"/> 2 weeks <input type="checkbox"/> 1 week Per WO <input type="checkbox"/> 2 days <input type="checkbox"/> 1 day		Site Contact: J CARTER Lab Contact: Date: Carrier:		COC No 1 of 1 COCs Sampler: For Lab Use Only: Walk-in Client <input type="checkbox"/> Lab Sampling <input type="checkbox"/> Job / SDG No.:							
Sample Identification		Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	Perchlorate	TDS	Chlorophate	Dis Chlorom	Sample Specific Notes
NERT 3.3581-20190626		6/26/19	1235	G	GW	3			x	x	x	x	
NERT 3.3581-20190626-FD		I	1235	G	GW	3			x	x	x	x	
NERT 3.4081-20190626		I	1445	G	GW	3			x	x	x	x	
NERT 3.5881-20190626		6/27/19	0940	I	I	6			x	x	x	x	Extra Vol MS
NERT 3.6381-20190627		I	1048	I	I	3			x	x	x	x	
NERT 3.8081-20190627		I	1150	I	I	2			x	x			
NERT 3.8081-20190627-FD		I	1150	I	I	2			x	x			
NERT 4.5181-20190627		I	1430	I	I	2			x	x			
NERT 3.9881-20190612		I	1310	I	I	4			x	x	x	x	
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other		Possible Hazard Identification: Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample. <input checked="" type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown		Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) Per WO <input type="checkbox"/> Return to Client <input type="checkbox"/> Disposal by Lab <input type="checkbox"/> Archive for _____ Months		Special Instructions/QC Requirements & Comments:		Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No Custody Seal No. _____ Cooler Temp. (°C) Obs'd: 4.2 Corr'd: 4.6 Therm ID No. 889					
Relinquished by: J CARTER Company: AECOM Date/Time: 6/27/19		Relinquished by: JAM Company: TALVS Date/Time: 6-27-19		Received by: JAM Company: TALVS Date/Time: 6-27-19 1600		Received by: FedEx Company: TA 12V Date/Time: 6/28/19 TA 12V		Received in Laboratory by: [Signature] Company: TA 12V Date/Time: 6/28/19 TA 12V					
Relinquished by: FedEx 1045631765 Company: _____ Date/Time: _____		Relinquished by: _____ Company: _____ Date/Time: _____		Received by: _____ Company: _____ Date/Time: _____		Received by: _____ Company: _____ Date/Time: _____		Received in Laboratory by: _____ Company: _____ Date/Time: _____					



440-244812 Chain of Custody

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7/10/2019

TALVS IR-91 20.1 10:00



Login Sample Receipt Checklist

Client: AECOM

Job Number: 440-244812-2

SDG Number: LVW

Login Number: 244812

List Number: 1

Creator: Escalante, Maria I

List Source: Eurofins TestAmerica, Irvine

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	Not Present
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



ANALYTICAL REPORT

Eurofins TestAmerica, Irvine
17461 Derian Ave
Suite 100
Irvine, CA 92614-5817
Tel: (949)261-1022

Laboratory Job ID: 440-244905-1
Laboratory Sample Delivery Group: LVW
Client Project/Site: NDEP NERT Phase II
Revision: 1

For:
AECOM
1220 Avenida Acaso
Camarillo, California 93012

Attn: Andrea Christian



Authorized for release by:
7/15/2019 12:58:45 PM

Danielle Roberts, Senior Project Manager
(949)260-3249
danielle.roberts@testamericainc.com

LINKS

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results through
TotalAccess

Have a Question?



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www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.



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Sample Summary

Client: AECOM
Project/Site: NDEP NERT Phase II

Job ID: 440-244905-1
SDG: LVW

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
440-244905-1	WMW3.5S-20190628	Water	06/28/19 09:10	06/29/19 10:45	
440-244905-2	WMW3.5S-20190628-FD	Water	06/28/19 09:10	06/29/19 10:45	
440-244905-3	LNDMW1-20190628	Water	06/28/19 10:15	06/29/19 10:45	
440-244905-4	WMW5.5S-20190628	Water	06/28/19 11:20	06/29/19 10:45	
440-244905-5	MW20-20190628	Water	06/28/19 12:30	06/29/19 10:45	
440-244905-6	MW13-20190628	Water	06/28/19 13:30	06/29/19 10:45	

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Case Narrative

Client: AECOM
Project/Site: NDEP NERT Phase II

Job ID: 440-244905-1
SDG: LVW

Job ID: 440-244905-1

Laboratory: Eurofins TestAmerica, Irvine

Narrative

Job Narrative 440-244905-1

Comments

Revised sample Id's: (440-244905-1) WMW3.53-20190628 to WMW3.5S-20190628. (440-244905-4)WMW5.6S-20190628 to WMW5.5S-20190628, 7/15/2019.

No additional comments.

Receipt

The samples were received on 6/29/2019 10:45 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.0° C.

HPLC/IC

Method(s) 300.1B: The following samples were diluted for the chlorate analyte due to the nature of the sample matrix: MW20-20190628 (440-244905-5) and (440-244812-A-2). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: AECOM
Project/Site: NDEP NERT Phase II

Job ID: 440-244905-1
SDG: LVW

Client Sample ID: WMW3.5S-20190628

Lab Sample ID: 440-244905-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chlorate	3500		1000	100	ug/L	50		300.1B	Total/NA
Perchlorate	1300		400	95	ug/L	100		314.0	Total/NA

Client Sample ID: WMW3.5S-20190628-FD

Lab Sample ID: 440-244905-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chlorate	3400		1000	100	ug/L	50		300.1B	Total/NA
Perchlorate	1300		400	95	ug/L	100		314.0	Total/NA

Client Sample ID: LNDMW1-20190628

Lab Sample ID: 440-244905-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chlorate	3700		1000	100	ug/L	50		300.1B	Total/NA
Perchlorate	1400		400	95	ug/L	100		314.0	Total/NA

Client Sample ID: WMW5.5S-20190628

Lab Sample ID: 440-244905-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chlorate	3500		1000	100	ug/L	50		300.1B	Total/NA
Perchlorate	1000		400	95	ug/L	100		314.0	Total/NA

Client Sample ID: MW20-20190628

Lab Sample ID: 440-244905-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chlorate	46	J	100	10	ug/L	5		300.1B	Total/NA
Perchlorate	57		20	4.8	ug/L	5		314.0	Total/NA

Client Sample ID: MW13-20190628

Lab Sample ID: 440-244905-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chlorate	9400		1000	100	ug/L	50		300.1B	Total/NA
Perchlorate	3100		400	95	ug/L	100		314.0	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Irvine

Client Sample Results

Client: AECOM
Project/Site: NDEP NERT Phase II

Job ID: 440-244905-1
SDG: LVW

Client Sample ID: WMW3.5S-20190628

Lab Sample ID: 440-244905-1

Date Collected: 06/28/19 09:10

Matrix: Water

Date Received: 06/29/19 10:45

Method: 300.1B - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	3500		1000	100	ug/L			06/30/19 21:37	50

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	100		90 - 115		06/30/19 21:37	50

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	1300		400	95	ug/L			07/09/19 14:29	100

Client Sample ID: WMW3.5S-20190628-FD

Lab Sample ID: 440-244905-2

Date Collected: 06/28/19 09:10

Matrix: Water

Date Received: 06/29/19 10:45

Method: 300.1B - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	3400		1000	100	ug/L			06/30/19 22:13	50

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	101		90 - 115		06/30/19 22:13	50

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	1300		400	95	ug/L			07/09/19 15:40	100

Client Sample ID: LNDMW1-20190628

Lab Sample ID: 440-244905-3

Date Collected: 06/28/19 10:15

Matrix: Water

Date Received: 06/29/19 10:45

Method: 300.1B - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	3700		1000	100	ug/L			06/30/19 22:49	50

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	101		90 - 115		06/30/19 22:49	50

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	1400		400	95	ug/L			07/09/19 15:59	100

Client Sample ID: WMW5.5S-20190628

Lab Sample ID: 440-244905-4

Date Collected: 06/28/19 11:20

Matrix: Water

Date Received: 06/29/19 10:45

Method: 300.1B - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	3500		1000	100	ug/L			06/30/19 23:26	50

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	102		90 - 115		06/30/19 23:26	50

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	1000		400	95	ug/L			07/09/19 16:17	100

Eurofins TestAmerica, Irvine

Client Sample Results

Client: AECOM
Project/Site: NDEP NERT Phase II

Job ID: 440-244905-1
SDG: LVW

Client Sample ID: MW20-20190628

Lab Sample ID: 440-244905-5

Date Collected: 06/28/19 12:30

Matrix: Water

Date Received: 06/29/19 10:45

Method: 300.1B - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	46	J	100	10	ug/L	-		07/02/19 18:12	5

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	98		90 - 115		07/02/19 18:12	5

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	57		20	4.8	ug/L	-		07/10/19 11:37	5

Client Sample ID: MW13-20190628

Lab Sample ID: 440-244905-6

Date Collected: 06/28/19 13:30

Matrix: Water

Date Received: 06/29/19 10:45

Method: 300.1B - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	9400		1000	100	ug/L	-		07/01/19 00:38	50

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	103		90 - 115		07/01/19 00:38	50

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	3100		400	95	ug/L	-		07/09/19 16:53	100

Surrogate Summary

Client: AECOM
Project/Site: NDEP NERT Phase II

Job ID: 440-244905-1
SDG: LVW

Method: 300.1B - Disinfection By-Products, (IC)

Matrix: Water

Prep Type: Total/NA

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	DCAA (90-115)
440-244905-1	WMW3.5S-20190628	100
440-244905-2	WMW3.5S-20190628-FD	101
440-244905-3	LNDMW1-20190628	101
440-244905-4	WMW5.5S-20190628	102
440-244905-5	MW20-20190628	98
440-244905-5 MS	MW20-20190628	100
440-244905-5 MSD	MW20-20190628	98
440-244905-6	MW13-20190628	103
550-124988-A-1 MS	Matrix Spike	99
550-124988-A-1 MSD	Matrix Spike Duplicate	101
LCS 440-555427/4	Lab Control Sample	100
LCS 440-555700/4	Lab Control Sample	100
MB 440-555427/5	Method Blank	102
MB 440-555700/5	Method Blank	98
MRL 440-555427/3	Lab Control Sample	101
MRL 440-555700/3	Lab Control Sample	99

Surrogate Legend

DCAA = Dichloroacetic acid(Surr)

Method Summary

Client: AECOM
Project/Site: NDEP NERT Phase II

Job ID: 440-244905-1
SDG: LVW

Method	Method Description	Protocol	Laboratory
300.1B	Disinfection By-Products, (IC)	EPA	TAL IRV
314.0	Perchlorate (IC)	EPA	TAL IRV

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

TAL IRV = Eurofins TestAmerica, Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022



Lab Chronicle

Client: AECOM
Project/Site: NDEP NERT Phase II

Job ID: 440-244905-1
SDG: LVW

Client Sample ID: WMW3.5S-20190628

Lab Sample ID: 440-244905-1

Date Collected: 06/28/19 09:10

Matrix: Water

Date Received: 06/29/19 10:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.1B		50			555427	06/30/19 21:37	YZ	TAL IRV
Total/NA	Analysis	314.0		100			556610	07/09/19 14:29	CTH	TAL IRV

Client Sample ID: WMW3.5S-20190628-FD

Lab Sample ID: 440-244905-2

Date Collected: 06/28/19 09:10

Matrix: Water

Date Received: 06/29/19 10:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.1B		50			555427	06/30/19 22:13	YZ	TAL IRV
Total/NA	Analysis	314.0		100			556610	07/09/19 15:40	CTH	TAL IRV

Client Sample ID: LNDMW1-20190628

Lab Sample ID: 440-244905-3

Date Collected: 06/28/19 10:15

Matrix: Water

Date Received: 06/29/19 10:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.1B		50			555427	06/30/19 22:49	YZ	TAL IRV
Total/NA	Analysis	314.0		100			556610	07/09/19 15:59	CTH	TAL IRV

Client Sample ID: WMW5.5S-20190628

Lab Sample ID: 440-244905-4

Date Collected: 06/28/19 11:20

Matrix: Water

Date Received: 06/29/19 10:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.1B		50			555427	06/30/19 23:26	YZ	TAL IRV
Total/NA	Analysis	314.0		100			556610	07/09/19 16:17	CTH	TAL IRV

Client Sample ID: MW20-20190628

Lab Sample ID: 440-244905-5

Date Collected: 06/28/19 12:30

Matrix: Water

Date Received: 06/29/19 10:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.1B		5			555700	07/02/19 18:12	YZ	TAL IRV
Total/NA	Analysis	314.0		5			556815	07/10/19 11:37	CTH	TAL IRV

Client Sample ID: MW13-20190628

Lab Sample ID: 440-244905-6

Date Collected: 06/28/19 13:30

Matrix: Water

Date Received: 06/29/19 10:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.1B		50			555427	07/01/19 00:38	YZ	TAL IRV
Total/NA	Analysis	314.0		100			556610	07/09/19 16:53	CTH	TAL IRV

Laboratory References:

TAL IRV = Eurofins TestAmerica, Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022

Eurofins TestAmerica, Irvine

QC Sample Results

Client: AECOM
Project/Site: NDEP NERT Phase II

Job ID: 440-244905-1
SDG: LVW

Method: 300.1B - Disinfection By-Products, (IC)

Lab Sample ID: MB 440-555427/5
Matrix: Water
Analysis Batch: 555427

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	ND		20	2.0	ug/L			06/30/19 08:20	1
Surrogate	MB %Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	102		90 - 115					06/30/19 08:20	1

Lab Sample ID: LCS 440-555427/4
Matrix: Water
Analysis Batch: 555427

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorate	100	105		ug/L		105	75 - 125
Surrogate	LCS %Recovery	LCS Qualifier	Limits				
Dichloroacetic acid(Surr)	100		90 - 115				

Lab Sample ID: MRL 440-555427/3
Matrix: Water
Analysis Batch: 555427

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorate	20.0	20.9		ug/L		104	50 - 150
Surrogate	MRL %Recovery	MRL Qualifier	Limits				
Dichloroacetic acid(Surr)	101		90 - 115				

Lab Sample ID: 550-124988-A-1 MS
Matrix: Water
Analysis Batch: 555427

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorate	180		200	386		ug/L		101	75 - 125
Surrogate	MS %Recovery	MS Qualifier	Limits						
Dichloroacetic acid(Surr)	99		90 - 115						

Lab Sample ID: 550-124988-A-1 MSD
Matrix: Water
Analysis Batch: 555427

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chlorate	180		200	377		ug/L		97	75 - 125	2	25
Surrogate	MSD %Recovery	MSD Qualifier	Limits								
Dichloroacetic acid(Surr)	101		90 - 115								

QC Sample Results

Client: AECOM
Project/Site: NDEP NERT Phase II

Job ID: 440-244905-1
SDG: LVW

Method: 300.1B - Disinfection By-Products, (IC) (Continued)

Lab Sample ID: MB 440-555700/5
Matrix: Water
Analysis Batch: 555700

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	ND		20	2.0	ug/L			07/02/19 07:56	1
Surrogate	MB %Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	98		90 - 115					07/02/19 07:56	1

Lab Sample ID: LCS 440-555700/4
Matrix: Water
Analysis Batch: 555700

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorate	100	104		ug/L		104	75 - 125
Surrogate	LCS %Recovery	LCS Qualifier	Limits				
Dichloroacetic acid(Surr)	100		90 - 115				

Lab Sample ID: MRL 440-555700/3
Matrix: Water
Analysis Batch: 555700

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorate	20.0	19.9	J	ug/L		99	50 - 150
Surrogate	MRL %Recovery	MRL Qualifier	Limits				
Dichloroacetic acid(Surr)	99		90 - 115				

Lab Sample ID: 440-244905-5 MS
Matrix: Water
Analysis Batch: 555700

Client Sample ID: MW20-20190628
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorate	46	J	200	239		ug/L		97	75 - 125
Surrogate	MS %Recovery	MS Qualifier	Limits						
Dichloroacetic acid(Surr)	100		90 - 115						

Lab Sample ID: 440-244905-5 MSD
Matrix: Water
Analysis Batch: 555700

Client Sample ID: MW20-20190628
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Chlorate	46	J	200	233		ug/L		94	75 - 125	3	25
Surrogate	MSD %Recovery	MSD Qualifier	Limits								
Dichloroacetic acid(Surr)	98		90 - 115								

QC Sample Results

Client: AECOM
Project/Site: NDEP NERT Phase II

Job ID: 440-244905-1
SDG: LVW

Method: 314.0 - Perchlorate (IC)

Lab Sample ID: MB 440-556610/6
Matrix: Water
Analysis Batch: 556610

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		4.0	0.95	ug/L			07/09/19 09:12	1

Lab Sample ID: LCS 440-556610/5
Matrix: Water
Analysis Batch: 556610

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	25.0	24.1		ug/L		96	85 - 115

Lab Sample ID: MRL 440-556610/8
Matrix: Water
Analysis Batch: 556610

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	4.00	3.87	J	ug/L		97	75 - 125

Lab Sample ID: 440-245124-D-2 MS
Matrix: Water
Analysis Batch: 556610

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	17		25.0	42.2		ug/L		102	80 - 120

Lab Sample ID: 440-245124-D-2 MSD
Matrix: Water
Analysis Batch: 556610

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perchlorate	17		25.0	42.1		ug/L		101	80 - 120	0	15

Lab Sample ID: MB 440-556815/6
Matrix: Water
Analysis Batch: 556815

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		4.0	0.95	ug/L			07/10/19 10:36	1

Lab Sample ID: LCS 440-556815/5
Matrix: Water
Analysis Batch: 556815

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	25.0	25.8		ug/L		103	85 - 115

Lab Sample ID: MRL 440-556815/8
Matrix: Water
Analysis Batch: 556815

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	4.00	4.08		ug/L		102	75 - 125

Eurofins TestAmerica, Irvine

QC Sample Results

Client: AECOM
 Project/Site: NDEP NERT Phase II

Job ID: 440-244905-1
 SDG: LVW

Method: 314.0 - Perchlorate (IC)

Lab Sample ID: 440-245219-D-1 MS
Matrix: Water
Analysis Batch: 556815

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	4.2		25.0	30.8		ug/L		107	80 - 120

Lab Sample ID: 440-245219-D-1 MSD
Matrix: Water
Analysis Batch: 556815

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perchlorate	4.2		25.0	30.7		ug/L		106	80 - 120	0	15

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15

QC Association Summary

Client: AECOM
Project/Site: NDEP NERT Phase II

Job ID: 440-244905-1
SDG: LVW

HPLC/IC

Analysis Batch: 555427

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-244905-1	WMW3.5S-20190628	Total/NA	Water	300.1B	
440-244905-2	WMW3.5S-20190628-FD	Total/NA	Water	300.1B	
440-244905-3	LNDMW1-20190628	Total/NA	Water	300.1B	
440-244905-4	WMW5.5S-20190628	Total/NA	Water	300.1B	
440-244905-6	MW13-20190628	Total/NA	Water	300.1B	
MB 440-555427/5	Method Blank	Total/NA	Water	300.1B	
LCS 440-555427/4	Lab Control Sample	Total/NA	Water	300.1B	
MRL 440-555427/3	Lab Control Sample	Total/NA	Water	300.1B	
550-124988-A-1 MS	Matrix Spike	Total/NA	Water	300.1B	
550-124988-A-1 MSD	Matrix Spike Duplicate	Total/NA	Water	300.1B	

Analysis Batch: 555700

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-244905-5	MW20-20190628	Total/NA	Water	300.1B	
MB 440-555700/5	Method Blank	Total/NA	Water	300.1B	
LCS 440-555700/4	Lab Control Sample	Total/NA	Water	300.1B	
MRL 440-555700/3	Lab Control Sample	Total/NA	Water	300.1B	
440-244905-5 MS	MW20-20190628	Total/NA	Water	300.1B	
440-244905-5 MSD	MW20-20190628	Total/NA	Water	300.1B	

Analysis Batch: 556610

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-244905-1	WMW3.5S-20190628	Total/NA	Water	314.0	
440-244905-2	WMW3.5S-20190628-FD	Total/NA	Water	314.0	
440-244905-3	LNDMW1-20190628	Total/NA	Water	314.0	
440-244905-4	WMW5.5S-20190628	Total/NA	Water	314.0	
440-244905-6	MW13-20190628	Total/NA	Water	314.0	
MB 440-556610/6	Method Blank	Total/NA	Water	314.0	
LCS 440-556610/5	Lab Control Sample	Total/NA	Water	314.0	
MRL 440-556610/8	Lab Control Sample	Total/NA	Water	314.0	
440-245124-D-2 MS	Matrix Spike	Total/NA	Water	314.0	
440-245124-D-2 MSD	Matrix Spike Duplicate	Total/NA	Water	314.0	

Analysis Batch: 556815

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-244905-5	MW20-20190628	Total/NA	Water	314.0	
MB 440-556815/6	Method Blank	Total/NA	Water	314.0	
LCS 440-556815/5	Lab Control Sample	Total/NA	Water	314.0	
MRL 440-556815/8	Lab Control Sample	Total/NA	Water	314.0	
440-245219-D-1 MS	Matrix Spike	Total/NA	Water	314.0	
440-245219-D-1 MSD	Matrix Spike Duplicate	Total/NA	Water	314.0	

Definitions/Glossary

Client: AECOM
Project/Site: NDEP NERT Phase II

Job ID: 440-244905-1
SDG: LVW

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
▫	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Accreditation/Certification Summary

Client: AECOM
Project/Site: NDEP NERT Phase II

Job ID: 440-244905-1
SDG: LVW

Laboratory: Eurofins TestAmerica, Irvine

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Alaska	State Program	10	CA01531	06-30-20
Arizona	State Program	9	AZ0671	10-14-19
California	LA Cty Sanitation Districts	9	10256	06-30-20
California	State Program	9	CA ELAP 2706	06-30-19 *
Guam	State Program	9	Cert. No. 19-005R	01-23-20
Hawaii	State Program	9	N/A	01-29-20
Kansas	NELAP	7	E-10420	07-31-19 *
Nevada	State Program	9	CA015312019-5	07-31-19 *
New Mexico	State Program	6	N/A	01-29-20
Oregon	NELAP	10	4028	01-29-20
US Fish & Wildlife	Federal		058448	07-31-19 *
USDA	Federal		P330-18-00214	07-09-21
Washington	State Program	10	C900	09-03-19

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Eurofins TestAmerica, Irvine

Regulatory Program: DW NPDES RCRA Other:

Client Contact		Company Name: AELOM		Address: 1220 Avenida Arroyo		City/State/Zip: Cambridge CA 93012		Phone: 905 764 4127		Fax: 60477365		Project Name: UNDER NEBT Phase II		Site: Lvw		P O # 60477365															
Project Manager: C. [Signature]		Lab Contact: 300.1		Sampler Turnaround Time		Analysis Turnaround Time		<input type="checkbox"/> 2 weeks <input type="checkbox"/> 1 week <input type="checkbox"/> 2 days <input type="checkbox"/> 1 day TAT if different from Below		<input type="checkbox"/> CALENDAR DAYS <input type="checkbox"/> WORKING DAYS		<input type="checkbox"/> 2 weeks <input type="checkbox"/> 1 week <input type="checkbox"/> 2 days <input type="checkbox"/> 1 day		<input type="checkbox"/> 2 weeks <input type="checkbox"/> 1 week <input type="checkbox"/> 2 days <input type="checkbox"/> 1 day		<input type="checkbox"/> 2 weeks <input type="checkbox"/> 1 week <input type="checkbox"/> 2 days <input type="checkbox"/> 1 day															
Project Manager: C. [Signature]		Lab Contact: 300.1		Sampler		Analysis Turnaround Time		<input type="checkbox"/> 2 weeks <input type="checkbox"/> 1 week <input type="checkbox"/> 2 days <input type="checkbox"/> 1 day		<input type="checkbox"/> CALENDAR DAYS <input type="checkbox"/> WORKING DAYS		<input type="checkbox"/> 2 weeks <input type="checkbox"/> 1 week <input type="checkbox"/> 2 days <input type="checkbox"/> 1 day		<input type="checkbox"/> 2 weeks <input type="checkbox"/> 1 week <input type="checkbox"/> 2 days <input type="checkbox"/> 1 day		<input type="checkbox"/> 2 weeks <input type="checkbox"/> 1 week <input type="checkbox"/> 2 days <input type="checkbox"/> 1 day															
Site Contact: 300.1		Carrier:		For Lab Use Only:		Walk-in Client:		Lab Sampling:		Job / SDG No:		Sample Specific Notes:		Sample Identification		Sample Date		Sample Time		Sample Type (C=Comp, G=Grab)		# of Matrix Cont.		Filtered Sample (Y/N)		Perform MS / MSD (Y/N)		Architect: 314.0		Concrete: 300.1	

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	# of Matrix Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	Architect (Y/N)	Concrete (Y/N)
WMW/3.53-20190628	6/28/19	0910	G	2	X	X	X	X
WMW355-20190628-FD	0910	0910	G	2	X	X	X	X
LNDMM1-20190628	1015	1015	G	2	X	X	X	X
WMW5.68-20190628	1120	1120	G	2	X	X	X	X
WMW20-20190628	1230	1230	G	2	X	X	X	X
WMW13-20190628	1330	1330	G	2	X	X	X	X

Preservation Used: 1=Ice, 2=HCl, 3=H2SO4, 4=HNO3, 5=NaOH, 6=Other

Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

Non-Hazardous
 Flammable
 Skin Irritant
 Poison B
 Unknown

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: Yes No

Custody Seal No. _____

Requisitioned by: **[Signature]** Company: **AELOM** Date/Time: **6/28/19 14:55** Received by: **[Signature]** Company: **[Signature]** Date/Time: **6/28/19 14:55**

Requisitioned by: **[Signature]** Company: **[Signature]** Date/Time: **6/28/19 14:55** Received by: **[Signature]** Company: **[Signature]** Date/Time: **6/28/19 14:55**

Requisitioned by: _____ Company: _____ Date/Time: _____ Received by: _____ Company: _____ Date/Time: _____

Cooler Temp. (°C) Obsd. **13** Corrd. **10** Therm ID No. **18-94**



65 TRK-1045 6317 6644

11-91 46

Login Sample Receipt Checklist

Client: AECOM

Job Number: 440-244905-1

SDG Number: LVW

Login Number: 244905

List Number: 1

Creator: Skinner, Alma D

List Source: Eurofins TestAmerica, Irvine

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	Not present
Sample custody seals, if present, are intact.	N/A	Not Present
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



ANALYTICAL REPORT

Eurofins TestAmerica, Irvine
17461 Derian Ave
Suite 100
Irvine, CA 92614-5817
Tel: (949)261-1022

Laboratory Job ID: 440-245201-1
Laboratory Sample Delivery Group: LVW
Client Project/Site: NDEP Phase II

For:
AECOM
1220 Avenida Acaso
Camarillo, California 93012

Attn: Carmen Caceres-Schnell



Authorized for release by:
7/15/2019 3:20:25 PM

Danielle Roberts, Senior Project Manager
(949)260-3249
danielle.roberts@testamericainc.com

LINKS

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results through
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www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Sample Summary

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-245201-1
SDG: LVW

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
440-245201-1	NERT4.64S1-20190701	Water	07/01/19 08:20	07/03/19 10:20	
440-245201-2	NERT4.71S2-20190701	Water	07/01/19 09:25	07/03/19 10:20	
440-245201-3	NERT4.71S1-20190701	Water	07/01/19 10:15	07/03/19 10:20	
440-245201-4	NERT3.60S1-20190701	Water	07/01/19 11:50	07/03/19 10:20	
440-245201-5	NERT5.11S1-20190701	Water	07/01/19 13:05	07/03/19 10:20	
440-245201-6	NERT4.93S1-20190701	Water	07/01/19 13:55	07/03/19 10:20	
440-245201-7	NERT5.91S1-20190701	Water	07/01/19 14:45	07/03/19 10:20	
440-245201-8	NERT3.58N1-20190702	Water	07/02/19 08:35	07/03/19 10:20	
440-245201-9	NERT3.60N1-20190702	Water	07/02/19 09:45	07/03/19 10:20	
440-245201-10	NERT4.21N1-20190702	Water	07/02/19 10:50	07/03/19 10:20	
440-245201-11	NERT4.21N1-20190702-FB	Water	07/02/19 10:15	07/03/19 10:20	
440-245201-12	NERT4.38N1-20190702-EB	Water	07/02/19 11:15	07/03/19 10:20	
440-245201-13	NERT4.38N1-20190702	Water	07/02/19 12:35	07/03/19 10:20	
440-245201-14	NERT4.64N1-20190702	Water	07/02/19 13:40	07/03/19 10:20	
440-245201-15	NERT4.64N1-20190702-FD	Water	07/02/19 13:40	07/03/19 10:20	

Case Narrative

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-245201-1
SDG: LVW

Job ID: 440-245201-1

Laboratory: Eurofins TestAmerica, Irvine

Narrative

Job Narrative 440-245201-1

Comments

No additional comments.

Receipt

The samples were received on 7/3/2019 10:20 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.3° C.

HPLC/IC

Method(s) 300.1B: The following samples were diluted for the chlorate analyte due to the nature of the sample matrix: NERT3.58N1-20190702 (440-245201-8), NERT3.60N1-20190702 (440-245201-9), NERT4.64N1-20190702 (440-245201-14) and NERT4.64N1-20190702-FD (440-245201-15). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

General Chemistry

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.



Detection Summary

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-245201-1
SDG: LVW

Client Sample ID: NERT4.64S1-20190701

Lab Sample ID: 440-245201-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chlorate	8900		1000	100	ug/L	50		300.1B	Total/NA
Perchlorate	3200		800	190	ug/L	200		314.0	Total/NA
Total Dissolved Solids	4900		100	50	mg/L	1		SM 2540C	Total/NA

Client Sample ID: NERT4.71S2-20190701

Lab Sample ID: 440-245201-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chlorate	14000		1000	100	ug/L	50		300.1B	Total/NA
Perchlorate	2900		800	190	ug/L	200		314.0	Total/NA
Total Dissolved Solids	4100		100	50	mg/L	1		SM 2540C	Total/NA

Client Sample ID: NERT4.71S1-20190701

Lab Sample ID: 440-245201-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chlorate	10000		1000	100	ug/L	50		300.1B	Total/NA
Perchlorate	3400		800	190	ug/L	200		314.0	Total/NA

Client Sample ID: NERT3.60S1-20190701

Lab Sample ID: 440-245201-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chlorate	4900		1000	100	ug/L	50		300.1B	Total/NA
Perchlorate	1600		400	95	ug/L	100		314.0	Total/NA
Total Dissolved Solids	3300		50	25	mg/L	1		SM 2540C	Total/NA

Client Sample ID: NERT5.11S1-20190701

Lab Sample ID: 440-245201-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chlorate	10000		1000	100	ug/L	50		300.1B	Total/NA
Perchlorate	2300		800	190	ug/L	200		314.0	Total/NA

Client Sample ID: NERT4.93S1-20190701

Lab Sample ID: 440-245201-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chlorate	8600		1000	100	ug/L	50		300.1B	Total/NA
Perchlorate	1800		800	190	ug/L	200		314.0	Total/NA

Client Sample ID: NERT5.91S1-20190701

Lab Sample ID: 440-245201-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chlorate	450		100	10	ug/L	5		300.1B	Total/NA
Perchlorate	2800		800	190	ug/L	200		314.0	Total/NA

Client Sample ID: NERT3.58N1-20190702

Lab Sample ID: 440-245201-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chlorate	24	J	100	10	ug/L	5		300.1B	Total/NA
Perchlorate	88		20	4.8	ug/L	5		314.0	Total/NA
Total Dissolved Solids	6600		100	50	mg/L	1		SM 2540C	Total/NA

Client Sample ID: NERT3.60N1-20190702

Lab Sample ID: 440-245201-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chlorate	27	J	100	10	ug/L	5		300.1B	Total/NA
Perchlorate	57		20	4.8	ug/L	5		314.0	Total/NA
Total Dissolved Solids	6400		100	50	mg/L	1		SM 2540C	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Irvine

Detection Summary

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-245201-1
SDG: LVW

Client Sample ID: NERT4.21N1-20190702

Lab Sample ID: 440-245201-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chlorate	5500		1000	100	ug/L	50		300.1B	Total/NA
Perchlorate	1800		400	95	ug/L	100		314.0	Total/NA

Client Sample ID: NERT4.21N1-20190702-FB

Lab Sample ID: 440-245201-11

No Detections.

Client Sample ID: NERT4.38N1-20190702-EB

Lab Sample ID: 440-245201-12

No Detections.

Client Sample ID: NERT4.38N1-20190702

Lab Sample ID: 440-245201-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chlorate	340		100	10	ug/L	5		300.1B	Total/NA
Perchlorate	1500		200	48	ug/L	50		314.0	Total/NA

Client Sample ID: NERT4.64N1-20190702

Lab Sample ID: 440-245201-14

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chlorate	28		20	2.0	ug/L	1		300.1B	Total/NA
Perchlorate	500		80	19	ug/L	20		314.0	Total/NA
Total Dissolved Solids	2000		20	10	mg/L	1		SM 2540C	Total/NA

Client Sample ID: NERT4.64N1-20190702-FD

Lab Sample ID: 440-245201-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chlorate	28		20	2.0	ug/L	1		300.1B	Total/NA
Perchlorate	500		80	19	ug/L	20		314.0	Total/NA
Total Dissolved Solids	2000		20	10	mg/L	1		SM 2540C	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Irvine

Client Sample Results

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-245201-1
SDG: LVW

Client Sample ID: NERT4.64S1-20190701

Lab Sample ID: 440-245201-1

Date Collected: 07/01/19 08:20

Matrix: Water

Date Received: 07/03/19 10:20

Method: 300.1B - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	8900		1000	100	ug/L	-		07/08/19 20:48	50

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	104		90 - 115		07/08/19 20:48	50

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	3200		800	190	ug/L	-		07/12/19 15:02	200

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	4900		100	50	mg/L	-		07/05/19 15:41	1

Client Sample ID: NERT4.71S2-20190701

Lab Sample ID: 440-245201-2

Date Collected: 07/01/19 09:25

Matrix: Water

Date Received: 07/03/19 10:20

Method: 300.1B - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	14000		1000	100	ug/L	-		07/08/19 21:25	50

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	105		90 - 115		07/08/19 21:25	50

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	2900		800	190	ug/L	-		07/12/19 15:20	200

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	4100		100	50	mg/L	-		07/05/19 15:41	1

Client Sample ID: NERT4.71S1-20190701

Lab Sample ID: 440-245201-3

Date Collected: 07/01/19 10:15

Matrix: Water

Date Received: 07/03/19 10:20

Method: 300.1B - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	10000		1000	100	ug/L	-		07/08/19 15:40	50

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	108		90 - 115		07/08/19 15:40	50

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	3400		800	190	ug/L	-		07/12/19 15:38	200

Client Sample Results

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-245201-1
SDG: LVW

Client Sample ID: NERT3.60S1-20190701

Lab Sample ID: 440-245201-4

Date Collected: 07/01/19 11:50

Matrix: Water

Date Received: 07/03/19 10:20

Method: 300.1B - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	4900		1000	100	ug/L	-		07/08/19 10:32	50

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	104		90 - 115		07/08/19 10:32	50

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	1600		400	95	ug/L	-		07/12/19 19:01	100

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	3300		50	25	mg/L	-		07/05/19 15:41	1

Client Sample ID: NERT5.11S1-20190701

Lab Sample ID: 440-245201-5

Date Collected: 07/01/19 13:05

Matrix: Water

Date Received: 07/03/19 10:20

Method: 300.1B - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	10000		1000	100	ug/L	-		07/08/19 13:33	50

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	105		90 - 115		07/08/19 13:33	50

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	2300		800	190	ug/L	-		07/12/19 15:57	200

Client Sample ID: NERT4.93S1-20190701

Lab Sample ID: 440-245201-6

Date Collected: 07/01/19 13:55

Matrix: Water

Date Received: 07/03/19 10:20

Method: 300.1B - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	8600		1000	100	ug/L	-		07/08/19 14:10	50

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	106		90 - 115		07/08/19 14:10	50

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	1800		800	190	ug/L	-		07/12/19 16:15	200

Client Sample ID: NERT5.91S1-20190701

Lab Sample ID: 440-245201-7

Date Collected: 07/01/19 14:45

Matrix: Water

Date Received: 07/03/19 10:20

Method: 300.1B - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	450		100	10	ug/L	-		07/07/19 19:36	5

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	113		90 - 115		07/07/19 19:36	5

Eurofins TestAmerica, Irvine

Client Sample Results

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-245201-1
SDG: LVW

Client Sample ID: NERT5.91S1-20190701

Lab Sample ID: 440-245201-7

Date Collected: 07/01/19 14:45

Matrix: Water

Date Received: 07/03/19 10:20

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	2800		800	190	ug/L			07/12/19 16:34	200

Client Sample ID: NERT3.58N1-20190702

Lab Sample ID: 440-245201-8

Date Collected: 07/02/19 08:35

Matrix: Water

Date Received: 07/03/19 10:20

Method: 300.1B - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	24	J	100	10	ug/L			07/07/19 21:35	5

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	106		90 - 115		07/07/19 21:35	5

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	88		20	4.8	ug/L			07/11/19 18:45	5

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	6600		100	50	mg/L			07/05/19 15:41	1

Client Sample ID: NERT3.60N1-20190702

Lab Sample ID: 440-245201-9

Date Collected: 07/02/19 09:45

Matrix: Water

Date Received: 07/03/19 10:20

Method: 300.1B - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	27	J	100	10	ug/L			07/07/19 22:05	5

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	107		90 - 115		07/07/19 22:05	5

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	57		20	4.8	ug/L			07/11/19 19:04	5

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	6400		100	50	mg/L			07/05/19 15:41	1

Client Sample ID: NERT4.21N1-20190702

Lab Sample ID: 440-245201-10

Date Collected: 07/02/19 10:50

Matrix: Water

Date Received: 07/03/19 10:20

Method: 300.1B - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	5500		1000	100	ug/L			07/08/19 15:58	50

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	106		90 - 115		07/08/19 15:58	50

Client Sample Results

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-245201-1
SDG: LVW

Client Sample ID: NERT4.21N1-20190702

Lab Sample ID: 440-245201-10

Date Collected: 07/02/19 10:50

Matrix: Water

Date Received: 07/03/19 10:20

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	1800		400	95	ug/L			07/12/19 14:25	100

Client Sample ID: NERT4.21N1-20190702-FB

Lab Sample ID: 440-245201-11

Date Collected: 07/02/19 10:15

Matrix: Water

Date Received: 07/03/19 10:20

Method: 300.1B - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	ND		20	2.0	ug/L			07/07/19 20:05	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	108		90 - 115		07/07/19 20:05	1

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		4.0	0.95	ug/L			07/11/19 15:23	1

Client Sample ID: NERT4.38N1-20190702-EB

Lab Sample ID: 440-245201-12

Date Collected: 07/02/19 11:15

Matrix: Water

Date Received: 07/03/19 10:20

Method: 300.1B - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	ND		20	2.0	ug/L			07/05/19 15:54	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	107		90 - 115		07/05/19 15:54	1

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		4.0	0.95	ug/L			07/11/19 15:42	1

Client Sample ID: NERT4.38N1-20190702

Lab Sample ID: 440-245201-13

Date Collected: 07/02/19 12:35

Matrix: Water

Date Received: 07/03/19 10:20

Method: 300.1B - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	340		100	10	ug/L			07/07/19 23:34	5

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	108		90 - 115		07/07/19 23:34	5

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	1500		200	48	ug/L			07/12/19 14:07	50

Client Sample Results

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-245201-1
SDG: LVW

Client Sample ID: NERT4.64N1-20190702

Lab Sample ID: 440-245201-14

Date Collected: 07/02/19 13:40

Matrix: Water

Date Received: 07/03/19 10:20

Method: 300.1B - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	28		20	2.0	ug/L	-		07/09/19 20:32	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	99		90 - 115		07/09/19 20:32	1

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	500		80	19	ug/L	-		07/12/19 13:11	20

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	2000		20	10	mg/L	-		07/05/19 15:41	1

Client Sample ID: NERT4.64N1-20190702-FD

Lab Sample ID: 440-245201-15

Date Collected: 07/02/19 13:40

Matrix: Water

Date Received: 07/03/19 10:20

Method: 300.1B - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	28		20	2.0	ug/L	-		07/09/19 21:08	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	103		90 - 115		07/09/19 21:08	1

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	500		80	19	ug/L	-		07/12/19 13:30	20

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	2000		20	10	mg/L	-		07/05/19 15:41	1

Surrogate Summary

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-245201-1
SDG: LVW

Method: 300.1B - Disinfection By-Products, (IC)

Matrix: Water

Prep Type: Total/NA

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	DCAA (90-115)
440-244812-A-4 MS	Matrix Spike	108
440-244812-A-4 MSD	Matrix Spike Duplicate	106
440-245201-1	NERT4.64S1-20190701	104
440-245201-2	NERT4.71S2-20190701	105
440-245201-3	NERT4.71S1-20190701	108
440-245201-3 MS	NERT4.71S1-20190701	109
440-245201-4	NERT3.60S1-20190701	104
440-245201-4 MS	NERT3.60S1-20190701	106
440-245201-4 MSD	NERT3.60S1-20190701	106
440-245201-5	NERT5.11S1-20190701	105
440-245201-6	NERT4.93S1-20190701	106
440-245201-7	NERT5.91S1-20190701	113
440-245201-8	NERT3.58N1-20190702	106
440-245201-9	NERT3.60N1-20190702	107
440-245201-10	NERT4.21N1-20190702	106
440-245201-10 MS	NERT4.21N1-20190702	105
440-245201-10 MSD	NERT4.21N1-20190702	107
440-245201-11	NERT4.21N1-20190702-FB	108
440-245201-12	NERT4.38N1-20190702-EB	107
440-245201-13	NERT4.38N1-20190702	108
440-245201-14	NERT4.64N1-20190702	99
440-245201-15	NERT4.64N1-20190702-FD	103
440-245263-A-2 MS	Matrix Spike	103
440-245263-A-2 MSD	Matrix Spike Duplicate	103
LCS 440-556143/4	Lab Control Sample	109
LCS 440-556356/44	Lab Control Sample	109
LCS 440-556360/4	Lab Control Sample	112
LCS 440-556360/40	Lab Control Sample	111
LCS 440-556577/4	Lab Control Sample	102
MB 440-556143/5	Method Blank	109
MB 440-556356/45	Method Blank	107
MB 440-556360/41	Method Blank	111
MB 440-556360/5	Method Blank	110
MB 440-556577/5	Method Blank	105
MRL 440-556143/3	Lab Control Sample	109
MRL 440-556356/43	Lab Control Sample	106
MRL 440-556360/3	Lab Control Sample	109
MRL 440-556360/39	Lab Control Sample	110
MRL 440-556577/3	Lab Control Sample	103

Surrogate Legend

DCAA = Dichloroacetic acid(Surr)

Method Summary

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-245201-1
SDG: LVW

Method	Method Description	Protocol	Laboratory
300.1B	Disinfection By-Products, (IC)	EPA	TAL IRV
314.0	Perchlorate (IC)	EPA	TAL IRV
SM 2540C	Solids, Total Dissolved (TDS)	SM	TAL IRV

Protocol References:

EPA = US Environmental Protection Agency
SM = "Standard Methods For The Examination Of Water And Wastewater"

Laboratory References:

TAL IRV = Eurofins TestAmerica, Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022



Lab Chronicle

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-245201-1
SDG: LVW

Client Sample ID: NERT4.64S1-20190701

Lab Sample ID: 440-245201-1

Date Collected: 07/01/19 08:20

Matrix: Water

Date Received: 07/03/19 10:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.1B		50			556356	07/08/19 20:48	YZ	TAL IRV
Total/NA	Analysis	314.0		200			557216	07/12/19 15:02	CTH	TAL IRV
Total/NA	Analysis	SM 2540C		1	10 mL	100 mL	556281	07/05/19 15:41	HTL	TAL IRV

Client Sample ID: NERT4.71S2-20190701

Lab Sample ID: 440-245201-2

Date Collected: 07/01/19 09:25

Matrix: Water

Date Received: 07/03/19 10:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.1B		50			556356	07/08/19 21:25	YZ	TAL IRV
Total/NA	Analysis	314.0		200			557216	07/12/19 15:20	CTH	TAL IRV
Total/NA	Analysis	SM 2540C		1	10 mL	100 mL	556281	07/05/19 15:41	HTL	TAL IRV

Client Sample ID: NERT4.71S1-20190701

Lab Sample ID: 440-245201-3

Date Collected: 07/01/19 10:15

Matrix: Water

Date Received: 07/03/19 10:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.1B		50			556360	07/08/19 15:40	YZ	TAL IRV
Total/NA	Analysis	314.0		200			557216	07/12/19 15:38	CTH	TAL IRV

Client Sample ID: NERT3.60S1-20190701

Lab Sample ID: 440-245201-4

Date Collected: 07/01/19 11:50

Matrix: Water

Date Received: 07/03/19 10:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.1B		50			556356	07/08/19 10:32	YZ	TAL IRV
Total/NA	Analysis	314.0		100			557216	07/12/19 19:01	CTH	TAL IRV
Total/NA	Analysis	SM 2540C		1	20 mL	100 mL	556281	07/05/19 15:41	HTL	TAL IRV

Client Sample ID: NERT5.11S1-20190701

Lab Sample ID: 440-245201-5

Date Collected: 07/01/19 13:05

Matrix: Water

Date Received: 07/03/19 10:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.1B		50			556356	07/08/19 13:33	YZ	TAL IRV
Total/NA	Analysis	314.0		200			557216	07/12/19 15:57	CTH	TAL IRV

Client Sample ID: NERT4.93S1-20190701

Lab Sample ID: 440-245201-6

Date Collected: 07/01/19 13:55

Matrix: Water

Date Received: 07/03/19 10:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.1B		50			556356	07/08/19 14:10	YZ	TAL IRV
Total/NA	Analysis	314.0		200			557216	07/12/19 16:15	CTH	TAL IRV

Eurofins TestAmerica, Irvine

Lab Chronicle

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-245201-1
SDG: LVW

Client Sample ID: NERT5.91S1-20190701

Lab Sample ID: 440-245201-7

Date Collected: 07/01/19 14:45

Matrix: Water

Date Received: 07/03/19 10:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.1B		5			556360	07/07/19 19:36	YZ	TAL IRV
Total/NA	Analysis	314.0		200			557216	07/12/19 16:34	CTH	TAL IRV

Client Sample ID: NERT3.58N1-20190702

Lab Sample ID: 440-245201-8

Date Collected: 07/02/19 08:35

Matrix: Water

Date Received: 07/03/19 10:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.1B		5			556360	07/07/19 21:35	YZ	TAL IRV
Total/NA	Analysis	314.0		5			557008	07/11/19 18:45	CTH	TAL IRV
Total/NA	Analysis	SM 2540C		1	10 mL	100 mL	556281	07/05/19 15:41	HTL	TAL IRV

Client Sample ID: NERT3.60N1-20190702

Lab Sample ID: 440-245201-9

Date Collected: 07/02/19 09:45

Matrix: Water

Date Received: 07/03/19 10:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.1B		5			556360	07/07/19 22:05	YZ	TAL IRV
Total/NA	Analysis	314.0		5			557008	07/11/19 19:04	CTH	TAL IRV
Total/NA	Analysis	SM 2540C		1	10 mL	100 mL	556281	07/05/19 15:41	HTL	TAL IRV

Client Sample ID: NERT4.21N1-20190702

Lab Sample ID: 440-245201-10

Date Collected: 07/02/19 10:50

Matrix: Water

Date Received: 07/03/19 10:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.1B		50			556356	07/08/19 15:58	YZ	TAL IRV
Total/NA	Analysis	314.0		100			557216	07/12/19 14:25	CTH	TAL IRV

Client Sample ID: NERT4.21N1-20190702-FB

Lab Sample ID: 440-245201-11

Date Collected: 07/02/19 10:15

Matrix: Water

Date Received: 07/03/19 10:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.1B		1			556360	07/07/19 20:05	YZ	TAL IRV
Total/NA	Analysis	314.0		1			557008	07/11/19 15:23	CTH	TAL IRV

Client Sample ID: NERT4.38N1-20190702-EB

Lab Sample ID: 440-245201-12

Date Collected: 07/02/19 11:15

Matrix: Water

Date Received: 07/03/19 10:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.1B		1			556143	07/05/19 15:54	YZ	TAL IRV
Total/NA	Analysis	314.0		1			557008	07/11/19 15:42	CTH	TAL IRV

Lab Chronicle

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-245201-1
SDG: LVW

Client Sample ID: NERT4.38N1-20190702

Lab Sample ID: 440-245201-13

Date Collected: 07/02/19 12:35

Matrix: Water

Date Received: 07/03/19 10:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.1B		5			556360	07/07/19 23:34	YZ	TAL IRV
Total/NA	Analysis	314.0		50			557216	07/12/19 14:07	CTH	TAL IRV

Client Sample ID: NERT4.64N1-20190702

Lab Sample ID: 440-245201-14

Date Collected: 07/02/19 13:40

Matrix: Water

Date Received: 07/03/19 10:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.1B		1			556577	07/09/19 20:32	YZ	TAL IRV
Total/NA	Analysis	314.0		20			557216	07/12/19 13:11	CTH	TAL IRV
Total/NA	Analysis	SM 2540C		1	50 mL	100 mL	556281	07/05/19 15:41	HTL	TAL IRV

Client Sample ID: NERT4.64N1-20190702-FD

Lab Sample ID: 440-245201-15

Date Collected: 07/02/19 13:40

Matrix: Water

Date Received: 07/03/19 10:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.1B		1			556577	07/09/19 21:08	YZ	TAL IRV
Total/NA	Analysis	314.0		20			557216	07/12/19 13:30	CTH	TAL IRV
Total/NA	Analysis	SM 2540C		1	50 mL	100 mL	556281	07/05/19 15:41	HTL	TAL IRV

Laboratory References:

TAL IRV = Eurofins TestAmerica, Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022

QC Sample Results

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-245201-1
SDG: LVW

Method: 300.1B - Disinfection By-Products, (IC)

Lab Sample ID: MB 440-556143/5
Matrix: Water
Analysis Batch: 556143

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	ND		20	2.0	ug/L			07/05/19 06:27	1
Surrogate	MB %Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	109		90 - 115					07/05/19 06:27	1

Lab Sample ID: LCS 440-556143/4
Matrix: Water
Analysis Batch: 556143

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorate	100	102		ug/L		102	75 - 125
Surrogate	LCS %Recovery	LCS Qualifier	Limits				
Dichloroacetic acid(Surr)	109		90 - 115				

Lab Sample ID: MRL 440-556143/3
Matrix: Water
Analysis Batch: 556143

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorate	20.0	21.2		ug/L		106	50 - 150
Surrogate	MRL %Recovery	MRL Qualifier	Limits				
Dichloroacetic acid(Surr)	109		90 - 115				

Lab Sample ID: 440-244812-A-4 MS
Matrix: Water
Analysis Batch: 556143

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorate	2700		200	2860	4	ug/L		81	75 - 125
Surrogate	MS %Recovery	MS Qualifier	Limits						
Dichloroacetic acid(Surr)	108		90 - 115						

Lab Sample ID: 440-244812-A-4 MSD
Matrix: Water
Analysis Batch: 556143

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Chlorate	2700		200	2800	4	ug/L		51	75 - 125	2	25
Surrogate	MSD %Recovery	MSD Qualifier	Limits								
Dichloroacetic acid(Surr)	106		90 - 115								

QC Sample Results

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-245201-1
SDG: LVW

Method: 300.1B - Disinfection By-Products, (IC) (Continued)

Lab Sample ID: MB 440-556356/45
Matrix: Water
Analysis Batch: 556356

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	ND		20	2.0	ug/L			07/08/19 09:56	1
Surrogate	MB %Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	107		90 - 115					07/08/19 09:56	1

Lab Sample ID: LCS 440-556356/44
Matrix: Water
Analysis Batch: 556356

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorate	100	104		ug/L		104	75 - 125
Surrogate	LCS %Recovery	LCS Qualifier	Limits				
Dichloroacetic acid(Surr)	109		90 - 115				

Lab Sample ID: MRL 440-556356/43
Matrix: Water
Analysis Batch: 556356

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorate	20.0	20.3		ug/L		101	50 - 150
Surrogate	MRL %Recovery	MRL Qualifier	Limits				
Dichloroacetic acid(Surr)	106		90 - 115				

Lab Sample ID: 440-245201-4 MS
Matrix: Water
Analysis Batch: 556356

Client Sample ID: NERT3.60S1-20190701
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorate	4900		200	4820	4	ug/L		-60	75 - 125
Surrogate	MS %Recovery	MS Qualifier	Limits						
Dichloroacetic acid(Surr)	106		90 - 115						

Lab Sample ID: 440-245201-4 MSD
Matrix: Water
Analysis Batch: 556356

Client Sample ID: NERT3.60S1-20190701
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Chlorate	4900		200	4880	4	ug/L		-29	75 - 125	1	25
Surrogate	MSD %Recovery	MSD Qualifier	Limits								
Dichloroacetic acid(Surr)	106		90 - 115								

QC Sample Results

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-245201-1
SDG: LVW

Method: 300.1B - Disinfection By-Products, (IC) (Continued)

Lab Sample ID: 440-245201-10 MS
Matrix: Water
Analysis Batch: 556356

Client Sample ID: NERT4.21N1-20190702
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorate	5500		200	5450	4	ug/L		-30	75 - 125
Surrogate		MS Qualifier		MS %Recovery					Limits
<i>Dichloroacetic acid(Surr)</i>				105					90 - 115

Lab Sample ID: 440-245201-10 MSD
Matrix: Water
Analysis Batch: 556356

Client Sample ID: NERT4.21N1-20190702
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chlorate	5500		200	5420	4	ug/L		-45	75 - 125	1	25
Surrogate		MSD Qualifier		MSD %Recovery							
<i>Dichloroacetic acid(Surr)</i>				107							90 - 115

Lab Sample ID: MB 440-556360/41
Matrix: Water
Analysis Batch: 556360

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	ND		20	2.0	ug/L			07/08/19 07:42	1
Surrogate		MB Qualifier					Prepared	Analyzed	Dil Fac
<i>Dichloroacetic acid(Surr)</i>								07/08/19 07:42	1

Lab Sample ID: MB 440-556360/5
Matrix: Water
Analysis Batch: 556360

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	ND		20	2.0	ug/L			07/07/19 10:38	1
Surrogate		MB Qualifier					Prepared	Analyzed	Dil Fac
<i>Dichloroacetic acid(Surr)</i>								07/07/19 10:38	1

Lab Sample ID: LCS 440-556360/4
Matrix: Water
Analysis Batch: 556360

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorate	100	99.4		ug/L		99	75 - 125
Surrogate		LCS %Recovery	LCS Qualifier				Limits
<i>Dichloroacetic acid(Surr)</i>		112					90 - 115

QC Sample Results

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-245201-1
SDG: LVW

Method: 300.1B - Disinfection By-Products, (IC) (Continued)

Lab Sample ID: LCS 440-556360/40
Matrix: Water
Analysis Batch: 556360

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorate	100	102		ug/L	-	102	75 - 125
Surrogate	%Recovery	LCS	LCS	Qualifier		Limits	
Dichloroacetic acid(Surr)	111					90 - 115	

Lab Sample ID: MRL 440-556360/3
Matrix: Water
Analysis Batch: 556360

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorate	20.0	20.3		ug/L	-	101	50 - 150
Surrogate	%Recovery	MRL	MRL	Qualifier		Limits	
Dichloroacetic acid(Surr)	109					90 - 115	

Lab Sample ID: MRL 440-556360/39
Matrix: Water
Analysis Batch: 556360

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorate	20.0	20.3		ug/L	-	102	50 - 150
Surrogate	%Recovery	MRL	MRL	Qualifier		Limits	
Dichloroacetic acid(Surr)	110					90 - 115	

Lab Sample ID: 440-245201-3 MS
Matrix: Water
Analysis Batch: 556360

Client Sample ID: NERT4.71S1-20190701
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorate	10000		200	9890	4	ug/L	-	-170	75 - 125
Surrogate	%Recovery	MS	MS	Qualifier		Limits			
Dichloroacetic acid(Surr)	109					90 - 115			

Lab Sample ID: 440-245201-3 MSD
Matrix: Water
Analysis Batch: 556360

Client Sample ID: NERT4.71S1-20190701
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Chlorate	10000		200	9940	4	ug/L	-	-143	75 - 125	1	25

Lab Sample ID: MB 440-556577/5
Matrix: Water
Analysis Batch: 556577

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	ND		20	2.0	ug/L	-		07/09/19 06:38	1

Eurofins TestAmerica, Irvine

QC Sample Results

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-245201-1
SDG: LVW

Method: 300.1B - Disinfection By-Products, (IC) (Continued)

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	105		90 - 115		07/09/19 06:38	1

Lab Sample ID: LCS 440-556577/4
Matrix: Water
Analysis Batch: 556577

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorate	100	104		ug/L		104	75 - 125

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Dichloroacetic acid(Surr)	102		90 - 115

Lab Sample ID: MRL 440-556577/3
Matrix: Water
Analysis Batch: 556577

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorate	20.0	20.3		ug/L		101	50 - 150

Surrogate	MRL %Recovery	MRL Qualifier	Limits
Dichloroacetic acid(Surr)	103		90 - 115

Lab Sample ID: 440-245263-A-2 MS
Matrix: Water
Analysis Batch: 556577

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorate	4600		200	4570	4	ug/L		-19	75 - 125

Surrogate	MS %Recovery	MS Qualifier	Limits
Dichloroacetic acid(Surr)	103		90 - 115

Lab Sample ID: 440-245263-A-2 MSD
Matrix: Water
Analysis Batch: 556577

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Chlorate	4600		200	4610	4	ug/L		2	75 - 125	1	25

Surrogate	MSD %Recovery	MSD Qualifier	Limits
Dichloroacetic acid(Surr)	103		90 - 115

Method: 314.0 - Perchlorate (IC)

Lab Sample ID: MB 440-557008/6
Matrix: Water
Analysis Batch: 557008

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		4.0	0.95	ug/L			07/11/19 10:45	1

Eurofins TestAmerica, Irvine

QC Sample Results

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-245201-1
SDG: LVW

Method: 314.0 - Perchlorate (IC) (Continued)

Lab Sample ID: LCS 440-557008/5
Matrix: Water
Analysis Batch: 557008

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	25.0	26.5		ug/L		106	85 - 115

Lab Sample ID: MRL 440-557008/8
Matrix: Water
Analysis Batch: 557008

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	4.00	4.37		ug/L		109	75 - 125

Lab Sample ID: 320-51755-D-2 MS
Matrix: Water
Analysis Batch: 557008

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	ND		25.0	26.5		ug/L		106	80 - 120

Lab Sample ID: 320-51755-D-2 MSD
Matrix: Water
Analysis Batch: 557008

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Perchlorate	ND		25.0	27.4		ug/L		110	80 - 120	3	15

Lab Sample ID: MB 440-557216/6
Matrix: Water
Analysis Batch: 557216

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		4.0	0.95	ug/L			07/12/19 09:57	1

Lab Sample ID: LCS 440-557216/5
Matrix: Water
Analysis Batch: 557216

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	25.0	26.0		ug/L		104	85 - 115

Lab Sample ID: MRL 440-557216/8
Matrix: Water
Analysis Batch: 557216

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	4.00	4.53		ug/L		113	75 - 125

Lab Sample ID: 440-245201-4 MS
Matrix: Water
Analysis Batch: 557216

Client Sample ID: NERT3.60S1-20190701
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	1600		2500	4340		ug/L		108	80 - 120

Eurofins TestAmerica, Irvine

QC Sample Results

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-245201-1
SDG: LVW

Method: 314.0 - Perchlorate (IC)

Lab Sample ID: 440-245201-4 MSD
Matrix: Water
Analysis Batch: 557216

Client Sample ID: NERT3.60S1-20190701
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perchlorate	1600		2500	4260		ug/L		105	80 - 120	2	15

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 440-556281/1
Matrix: Water
Analysis Batch: 556281

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	ND		10	5.0	mg/L			07/05/19 15:41	1

Lab Sample ID: LCS 440-556281/2
Matrix: Water
Analysis Batch: 556281

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Dissolved Solids	1000	962		mg/L		96	90 - 110

Lab Sample ID: 440-245201-4 DU
Matrix: Water
Analysis Batch: 556281

Client Sample ID: NERT3.60S1-20190701
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Dissolved Solids	3300		3210		mg/L		2	5

QC Association Summary

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-245201-1
SDG: LVW

HPLC/IC

Analysis Batch: 556143

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245201-12	NERT4.38N1-20190702-EB	Total/NA	Water	300.1B	
MB 440-556143/5	Method Blank	Total/NA	Water	300.1B	
LCS 440-556143/4	Lab Control Sample	Total/NA	Water	300.1B	
MRL 440-556143/3	Lab Control Sample	Total/NA	Water	300.1B	
440-244812-A-4 MS	Matrix Spike	Total/NA	Water	300.1B	
440-244812-A-4 MSD	Matrix Spike Duplicate	Total/NA	Water	300.1B	

Analysis Batch: 556356

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245201-1	NERT4.64S1-20190701	Total/NA	Water	300.1B	
440-245201-2	NERT4.71S2-20190701	Total/NA	Water	300.1B	
440-245201-4	NERT3.60S1-20190701	Total/NA	Water	300.1B	
440-245201-5	NERT5.11S1-20190701	Total/NA	Water	300.1B	
440-245201-6	NERT4.93S1-20190701	Total/NA	Water	300.1B	
440-245201-10	NERT4.21N1-20190702	Total/NA	Water	300.1B	
MB 440-556356/45	Method Blank	Total/NA	Water	300.1B	
LCS 440-556356/44	Lab Control Sample	Total/NA	Water	300.1B	
MRL 440-556356/43	Lab Control Sample	Total/NA	Water	300.1B	
440-245201-4 MS	NERT3.60S1-20190701	Total/NA	Water	300.1B	
440-245201-4 MSD	NERT3.60S1-20190701	Total/NA	Water	300.1B	
440-245201-10 MS	NERT4.21N1-20190702	Total/NA	Water	300.1B	
440-245201-10 MSD	NERT4.21N1-20190702	Total/NA	Water	300.1B	

Analysis Batch: 556360

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245201-3	NERT4.71S1-20190701	Total/NA	Water	300.1B	
440-245201-7	NERT5.91S1-20190701	Total/NA	Water	300.1B	
440-245201-8	NERT3.58N1-20190702	Total/NA	Water	300.1B	
440-245201-9	NERT3.60N1-20190702	Total/NA	Water	300.1B	
440-245201-11	NERT4.21N1-20190702-FB	Total/NA	Water	300.1B	
440-245201-13	NERT4.38N1-20190702	Total/NA	Water	300.1B	
MB 440-556360/41	Method Blank	Total/NA	Water	300.1B	
MB 440-556360/5	Method Blank	Total/NA	Water	300.1B	
LCS 440-556360/4	Lab Control Sample	Total/NA	Water	300.1B	
LCS 440-556360/40	Lab Control Sample	Total/NA	Water	300.1B	
MRL 440-556360/3	Lab Control Sample	Total/NA	Water	300.1B	
MRL 440-556360/39	Lab Control Sample	Total/NA	Water	300.1B	
440-245201-3 MS	NERT4.71S1-20190701	Total/NA	Water	300.1B	
440-245201-3 MSD	NERT4.71S1-20190701	Total/NA	Water	300.1B	

Analysis Batch: 556577

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245201-14	NERT4.64N1-20190702	Total/NA	Water	300.1B	
440-245201-15	NERT4.64N1-20190702-FD	Total/NA	Water	300.1B	
MB 440-556577/5	Method Blank	Total/NA	Water	300.1B	
LCS 440-556577/4	Lab Control Sample	Total/NA	Water	300.1B	
MRL 440-556577/3	Lab Control Sample	Total/NA	Water	300.1B	
440-245263-A-2 MS	Matrix Spike	Total/NA	Water	300.1B	
440-245263-A-2 MSD	Matrix Spike Duplicate	Total/NA	Water	300.1B	

QC Association Summary

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-245201-1
SDG: LVW

HPLC/IC

Analysis Batch: 557008

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245201-8	NERT3.58N1-20190702	Total/NA	Water	314.0	
440-245201-9	NERT3.60N1-20190702	Total/NA	Water	314.0	
440-245201-11	NERT4.21N1-20190702-FB	Total/NA	Water	314.0	
440-245201-12	NERT4.38N1-20190702-EB	Total/NA	Water	314.0	
MB 440-557008/6	Method Blank	Total/NA	Water	314.0	
LCS 440-557008/5	Lab Control Sample	Total/NA	Water	314.0	
MRL 440-557008/8	Lab Control Sample	Total/NA	Water	314.0	
320-51755-D-2 MS	Matrix Spike	Total/NA	Water	314.0	
320-51755-D-2 MSD	Matrix Spike Duplicate	Total/NA	Water	314.0	

Analysis Batch: 557216

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245201-1	NERT4.64S1-20190701	Total/NA	Water	314.0	
440-245201-2	NERT4.71S2-20190701	Total/NA	Water	314.0	
440-245201-3	NERT4.71S1-20190701	Total/NA	Water	314.0	
440-245201-4	NERT3.60S1-20190701	Total/NA	Water	314.0	
440-245201-5	NERT5.11S1-20190701	Total/NA	Water	314.0	
440-245201-6	NERT4.93S1-20190701	Total/NA	Water	314.0	
440-245201-7	NERT5.91S1-20190701	Total/NA	Water	314.0	
440-245201-10	NERT4.21N1-20190702	Total/NA	Water	314.0	
440-245201-13	NERT4.38N1-20190702	Total/NA	Water	314.0	
440-245201-14	NERT4.64N1-20190702	Total/NA	Water	314.0	
440-245201-15	NERT4.64N1-20190702-FD	Total/NA	Water	314.0	
MB 440-557216/6	Method Blank	Total/NA	Water	314.0	
LCS 440-557216/5	Lab Control Sample	Total/NA	Water	314.0	
MRL 440-557216/8	Lab Control Sample	Total/NA	Water	314.0	
440-245201-4 MS	NERT3.60S1-20190701	Total/NA	Water	314.0	
440-245201-4 MSD	NERT3.60S1-20190701	Total/NA	Water	314.0	

General Chemistry

Analysis Batch: 556281

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245201-1	NERT4.64S1-20190701	Total/NA	Water	SM 2540C	
440-245201-2	NERT4.71S2-20190701	Total/NA	Water	SM 2540C	
440-245201-4	NERT3.60S1-20190701	Total/NA	Water	SM 2540C	
440-245201-8	NERT3.58N1-20190702	Total/NA	Water	SM 2540C	
440-245201-9	NERT3.60N1-20190702	Total/NA	Water	SM 2540C	
440-245201-14	NERT4.64N1-20190702	Total/NA	Water	SM 2540C	
440-245201-15	NERT4.64N1-20190702-FD	Total/NA	Water	SM 2540C	
MB 440-556281/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 440-556281/2	Lab Control Sample	Total/NA	Water	SM 2540C	
440-245201-4 DU	NERT3.60S1-20190701	Total/NA	Water	SM 2540C	

Definitions/Glossary

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-245201-1
SDG: LVW

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
▫	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Accreditation/Certification Summary

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-245201-1
SDG: LVW

Laboratory: Eurofins TestAmerica, Irvine

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Nevada	State Program	9	CA015312019-5	07-31-19 *

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* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Regulatory Program: DW NPDES RCRA Other:

Client Contact		Project Manager: <u>E Coombs-Schwell</u>		Site Contact: <u>J CAPARRO</u>		Date:		COC No	
Company Name: <u>AE.com</u>		Tel/Fax: <u>805-764-4031</u>		Lab Contact:		Carrier:		<u>1</u> of <u>2</u> COCs	
Address: <u>1220 Avenida Arosa</u>		Analysis Turnaround Time							
City/State/Zip: <u>Cambridge 93022</u>		<input type="checkbox"/> CALENDAR DAYS <input type="checkbox"/> WORKING DAYS							
Phone: <u>465 764 4627</u>		TAT if different from Below _____							
Fax:		<input type="checkbox"/> 2 weeks							
Project Name: <u>NDEP Phase II</u>		<input type="checkbox"/> 1 week <u>Per WO</u>							
Site: <u>LVW</u>		<input type="checkbox"/> 2 days							
P O # <u>60477365</u>		<input type="checkbox"/> 1 day							

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS/MSD (Y/N)	Perchlorate	TDS	Chlorate	Dir. Chlorine	Sample Specific Notes:
NERT 4.04S1-20190701	7/1/19	0920	G	GW	4			X	X	X	X	
NERT 4.71S2-20190701		0925			4			X	X	X	X	
NERT 4.71S1-20190701		1015			2			X	X			
NERT 3.60S1-20190701		1150			8			X	X	X	X	Extra Vol = MSD
NERT 5.11S1-20190701		1305			2			X	X			
NERT 4.93S1-20190701		1355			2			X	X			
NERT 5.91S1-20190701		1445			2			X	X			7/3/19 LD
NERT 3.58N1-20190702	7/2/19	0935	G	GW	4			X	X	X	X	
NERT 3.60N1-20190702		0945			4			X	X	X	X	
NERT 4.21N1-20190702		1050			2			X	X			
NERT 4.21N1-20190702-FB		1015			2			X	X			
NERT 4.38N1-20190702-EB		1115			2			X	X			



440-245201 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification: Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

Non-Hazard Flammable Skin Irritant Poison B Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

Per WO

Return to Client Disposal by Lab Archive for _____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact <input type="checkbox"/> Yes <input type="checkbox"/> No		Custody Seal No :		Cooler Temp (°C) Obs'd _____ Corr'd _____		Therm ID No _____	
Relinquished by: <u>J CAPARRO</u>	Company: <u>AE.com</u>	Date/Time: <u>7/2/19 1620</u>	Received by: <u>JAM</u>	Company: <u>TALVS</u>	Date/Time: <u>7-2-19 1620</u>		
Relinquished by: <u>JAM</u>	Company: <u>TALVS</u>	Date/Time: <u>7-2-19 1100</u>	Received by: <u>Fed X</u>	Company: _____	Date/Time: _____		
Relinquished by: _____	Company: _____	Date/Time: _____	Received in Laboratory By: <u>Joanna Onelas</u>	Company: <u>TALVS</u>	Date/Time: <u>7/3/19 1020</u>		

TALVS 8-9
1015 6317 6470
c/s 3.6/33 IR-94

7/3/2019



Regulatory Program: DW NPDES RCRA Other:

Client Contact		Project Manager: <i>E. Lawrence Schmitt</i>		Site Contact: <i>J. CARPANO</i>		Date:		COC No:	
Company Name: <i>AECOM</i>		Tel/Fax: <i>905-764-4031</i>		Lab Contact:		Carrier:		<i>2</i> of <i>2</i> COCs	
Address: <i>1220 Avenida Acaso</i>		Analysis Turnaround Time		Filtered Sample (Y/N) Perform MS/MSD (Y/N) <i>Perchlorate 314.0</i> <i>TD5 2540C</i> <i>Chlorate 300.1</i> <i>Dis Chroma 700.58</i>				Sampler:	
City/State/Zip: <i>Camarillo CA 93012</i>		<input type="checkbox"/> CALENDAR DAYS <input type="checkbox"/> WORKING DAYS TAT if different from Below _____						For Lab Use Only: Walk-in Client <input type="checkbox"/> Lab Sampling <input type="checkbox"/> Job / SDG No. _____	
Phone: <i>805-764-4027</i>		<input type="checkbox"/> 2 weeks <input type="checkbox"/> 1 week <i>RWO</i> <input type="checkbox"/> 2 days <input type="checkbox"/> 1 day							
Fax:									
Project Name: <i>NDEP Phase II</i>									
Site: <i>LVW</i>									
P O # <i>6047736</i>									

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS/MSD (Y/N)	Sample Specific Notes:	
<i>NERT 4.38 NI-20190702</i>	<i>7/2/19</i>	<i>1235</i>	<i>G</i>	<i>GW</i>	<i>2</i>	<i>X</i>	<i>X</i>	<i>X</i>	
<i>NERT 4.64 NI-20190702</i>	<i>7/2/19</i>	<i>1340</i>	<i>L</i>	<i>L</i>	<i>4</i>	<i>X</i>	<i>X</i>	<i>X</i>	
<i>NERT 4.41 NI-20190702-FD</i>	<i>7/2/19</i>	<i>1340</i>	<i>L</i>	<i>L</i>	<i>4</i>	<i>X</i>	<i>X</i>	<i>X</i>	

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4= HNO3; 5= NaOH; 6= Other _____

Possible Hazard Identification: Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample

Non-Hazard Flammable Skin Irritant Poison B Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

RWO Return to Client Disposal by Lab Archive for _____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No		Custody Seal No.:		Cooler Temp. (°C): Obs'd: _____ Cor'd: _____		Therm ID No. _____	
Relinquished by: <i>J. CARPANO</i>	Company: <i>AECOM</i>	Date/Time: <i>7/2/19 1600</i>	Received by: <i>JAM</i>	Company: <i>TALVS</i>	Date/Time: <i>7-2-19 1620</i>		
Relinquished by: <i>JAM</i>	Company: <i>TALVS</i>	Date/Time: <i>7-2-19 1700</i>	Received by: <i>Red X</i>	Company:	Date/Time:		
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: <i>Ja (Enelas)</i>	Company: <i>TA IRV</i>	Date/Time: <i>7/3/19 1020</i>		

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7/3/2019

C/S



Login Sample Receipt Checklist

Client: AECOM

Job Number: 440-245201-1

SDG Number: LVW

Login Number: 245201

List Number: 1

Creator: Skinner, Alma D

List Source: Eurofins TestAmerica, Irvine

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	Not Present
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



ANALYTICAL REPORT

Eurofins TestAmerica, Irvine
17461 Derian Ave
Suite 100
Irvine, CA 92614-5817
Tel: (949)261-1022

Laboratory Job ID: 440-245201-2
Laboratory Sample Delivery Group: LVW
Client Project/Site: NDEP Phase II

For:
AECOM
1220 Avenida Acaso
Camarillo, California 93012

Attn: Carmen Caceres-Schnell



Authorized for release by:
7/12/2019 9:27:36 AM

Danielle Roberts, Senior Project Manager
(949)260-3249
danielle.roberts@testamericainc.com

LINKS

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results through
TotalAccess

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www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.



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Sample Summary

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-245201-2
SDG: LVW

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
440-245201-1	NERT4.64S1-20190701	Water	07/01/19 08:20	07/03/19 10:20	
440-245201-2	NERT4.71S2-20190701	Water	07/01/19 09:25	07/03/19 10:20	
440-245201-4	NERT3.60S1-20190701	Water	07/01/19 11:50	07/03/19 10:20	
440-245201-8	NERT3.58N1-20190702	Water	07/02/19 08:35	07/03/19 10:20	
440-245201-9	NERT3.60N1-20190702	Water	07/02/19 09:45	07/03/19 10:20	
440-245201-14	NERT4.64N1-20190702	Water	07/02/19 13:40	07/03/19 10:20	
440-245201-15	NERT4.64N1-20190702-FD	Water	07/02/19 13:40	07/03/19 10:20	

Case Narrative

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-245201-2
SDG: LVW

Job ID: 440-245201-2

Laboratory: Eurofins TestAmerica, Irvine

Narrative

**Job Narrative
440-245201-2**

Comments

No additional comments.

Receipt

The samples were received on 7/3/2019 10:20 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.3° C.

Metals

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

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Detection Summary

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-245201-2
SDG: LVW

Client Sample ID: NERT4.64S1-20190701

Lab Sample ID: 440-245201-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chromium	20		2.0	0.50	ug/L	1		200.8	Dissolved

Client Sample ID: NERT4.71S2-20190701

Lab Sample ID: 440-245201-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chromium	19		2.0	0.50	ug/L	1		200.8	Dissolved

Client Sample ID: NERT3.60S1-20190701

Lab Sample ID: 440-245201-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chromium	9.9		2.0	0.50	ug/L	1		200.8	Dissolved

Client Sample ID: NERT3.58N1-20190702

Lab Sample ID: 440-245201-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chromium	1.3	J	2.0	0.50	ug/L	1		200.8	Dissolved

Client Sample ID: NERT3.60N1-20190702

Lab Sample ID: 440-245201-9

No Detections.

Client Sample ID: NERT4.64N1-20190702

Lab Sample ID: 440-245201-14

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chromium	0.55	J	2.0	0.50	ug/L	1		200.8	Dissolved

Client Sample ID: NERT4.64N1-20190702-FD

Lab Sample ID: 440-245201-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chromium	0.72	J	2.0	0.50	ug/L	1		200.8	Dissolved

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Irvine

Client Sample Results

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-245201-2
SDG: LVW

Client Sample ID: NERT4.64S1-20190701

Lab Sample ID: 440-245201-1

Date Collected: 07/01/19 08:20

Matrix: Water

Date Received: 07/03/19 10:20

Method: 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	20		2.0	0.50	ug/L		07/09/19 11:27	07/09/19 13:29	1

Client Sample ID: NERT4.71S2-20190701

Lab Sample ID: 440-245201-2

Date Collected: 07/01/19 09:25

Matrix: Water

Date Received: 07/03/19 10:20

Method: 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	19		2.0	0.50	ug/L		07/09/19 11:27	07/09/19 13:31	1

Client Sample ID: NERT3.60S1-20190701

Lab Sample ID: 440-245201-4

Date Collected: 07/01/19 11:50

Matrix: Water

Date Received: 07/03/19 10:20

Method: 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	9.9		2.0	0.50	ug/L		07/09/19 11:27	07/09/19 13:23	1

Client Sample ID: NERT3.58N1-20190702

Lab Sample ID: 440-245201-8

Date Collected: 07/02/19 08:35

Matrix: Water

Date Received: 07/03/19 10:20

Method: 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	1.3	J	2.0	0.50	ug/L		07/09/19 11:27	07/09/19 13:33	1

Client Sample ID: NERT3.60N1-20190702

Lab Sample ID: 440-245201-9

Date Collected: 07/02/19 09:45

Matrix: Water

Date Received: 07/03/19 10:20

Method: 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	ND		2.0	0.50	ug/L		07/09/19 11:27	07/09/19 13:36	1

Client Sample ID: NERT4.64N1-20190702

Lab Sample ID: 440-245201-14

Date Collected: 07/02/19 13:40

Matrix: Water

Date Received: 07/03/19 10:20

Method: 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	0.55	J	2.0	0.50	ug/L		07/09/19 11:27	07/09/19 13:42	1

Client Sample ID: NERT4.64N1-20190702-FD

Lab Sample ID: 440-245201-15

Date Collected: 07/02/19 13:40

Matrix: Water

Date Received: 07/03/19 10:20

Method: 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	0.72	J	2.0	0.50	ug/L		07/09/19 11:27	07/09/19 13:44	1

Method Summary

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-245201-2
SDG: LVW

Method	Method Description	Protocol	Laboratory
200.8	Metals (ICP/MS)	EPA	TAL IRV
200.2	Preparation, Total Recoverable Metals	EPA	TAL IRV

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

TAL IRV = Eurofins TestAmerica, Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022



Lab Chronicle

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-245201-2
SDG: LVW

Client Sample ID: NERT4.64S1-20190701

Lab Sample ID: 440-245201-1

Date Collected: 07/01/19 08:20

Matrix: Water

Date Received: 07/03/19 10:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	200.2			25 mL	25 mL	556670	07/09/19 11:27	EP	TAL IRV
Dissolved	Analysis	200.8		1			556701	07/09/19 13:29	MQP	TAL IRV

Client Sample ID: NERT4.71S2-20190701

Lab Sample ID: 440-245201-2

Date Collected: 07/01/19 09:25

Matrix: Water

Date Received: 07/03/19 10:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	200.2			25 mL	25 mL	556670	07/09/19 11:27	EP	TAL IRV
Dissolved	Analysis	200.8		1			556701	07/09/19 13:31	MQP	TAL IRV

Client Sample ID: NERT3.60S1-20190701

Lab Sample ID: 440-245201-4

Date Collected: 07/01/19 11:50

Matrix: Water

Date Received: 07/03/19 10:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	200.2			25 mL	25 mL	556670	07/09/19 11:27	EP	TAL IRV
Dissolved	Analysis	200.8		1			556701	07/09/19 13:23	MQP	TAL IRV

Client Sample ID: NERT3.58N1-20190702

Lab Sample ID: 440-245201-8

Date Collected: 07/02/19 08:35

Matrix: Water

Date Received: 07/03/19 10:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	200.2			25 mL	25 mL	556670	07/09/19 11:27	EP	TAL IRV
Dissolved	Analysis	200.8		1			556701	07/09/19 13:33	MQP	TAL IRV

Client Sample ID: NERT3.60N1-20190702

Lab Sample ID: 440-245201-9

Date Collected: 07/02/19 09:45

Matrix: Water

Date Received: 07/03/19 10:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	200.2			25 mL	25 mL	556670	07/09/19 11:27	EP	TAL IRV
Dissolved	Analysis	200.8		1			556701	07/09/19 13:36	MQP	TAL IRV

Client Sample ID: NERT4.64N1-20190702

Lab Sample ID: 440-245201-14

Date Collected: 07/02/19 13:40

Matrix: Water

Date Received: 07/03/19 10:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	200.2			25 mL	25 mL	556670	07/09/19 11:27	EP	TAL IRV
Dissolved	Analysis	200.8		1			556701	07/09/19 13:42	MQP	TAL IRV

Lab Chronicle

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-245201-2
SDG: LVW

Client Sample ID: NERT4.64N1-20190702-FD

Lab Sample ID: 440-245201-15

Date Collected: 07/02/19 13:40

Matrix: Water

Date Received: 07/03/19 10:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	200.2			25 mL	25 mL	556670	07/09/19 11:27	EP	TAL IRV
Dissolved	Analysis	200.8		1			556701	07/09/19 13:44	MQP	TAL IRV

Laboratory References:

TAL IRV = Eurofins TestAmerica, Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022

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QC Sample Results

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-245201-2
SDG: LVW

Method: 200.8 - Metals (ICP/MS)

Lab Sample ID: MB 440-556670/1-A
Matrix: Water
Analysis Batch: 556701

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 556670

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	ND		2.0	0.50	ug/L		07/09/19 11:27	07/09/19 13:19	1

Lab Sample ID: LCS 440-556670/2-A
Matrix: Water
Analysis Batch: 556701

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 556670

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Chromium	80.0	79.5		ug/L		99	85 - 115

Lab Sample ID: 440-245201-4 MS
Matrix: Water
Analysis Batch: 556701

Client Sample ID: NERT3.60S1-20190701
Prep Type: Dissolved
Prep Batch: 556670

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Chromium	9.9		80.0	83.8		ug/L		92	70 - 130

Lab Sample ID: 440-245201-4 MSD
Matrix: Water
Analysis Batch: 556701

Client Sample ID: NERT3.60S1-20190701
Prep Type: Dissolved
Prep Batch: 556670

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Chromium	9.9		80.0	84.3		ug/L		93	70 - 130	1	20

QC Association Summary

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-245201-2
SDG: LVW

Metals

Prep Batch: 556670

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245201-1	NERT4.64S1-20190701	Dissolved	Water	200.2	
440-245201-2	NERT4.71S2-20190701	Dissolved	Water	200.2	
440-245201-4	NERT3.60S1-20190701	Dissolved	Water	200.2	
440-245201-8	NERT3.58N1-20190702	Dissolved	Water	200.2	
440-245201-9	NERT3.60N1-20190702	Dissolved	Water	200.2	
440-245201-14	NERT4.64N1-20190702	Dissolved	Water	200.2	
440-245201-15	NERT4.64N1-20190702-FD	Dissolved	Water	200.2	
MB 440-556670/1-A	Method Blank	Total Recoverable	Water	200.2	
LCS 440-556670/2-A	Lab Control Sample	Total Recoverable	Water	200.2	
440-245201-4 MS	NERT3.60S1-20190701	Dissolved	Water	200.2	
440-245201-4 MSD	NERT3.60S1-20190701	Dissolved	Water	200.2	

Analysis Batch: 556701

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245201-1	NERT4.64S1-20190701	Dissolved	Water	200.8	556670
440-245201-2	NERT4.71S2-20190701	Dissolved	Water	200.8	556670
440-245201-4	NERT3.60S1-20190701	Dissolved	Water	200.8	556670
440-245201-8	NERT3.58N1-20190702	Dissolved	Water	200.8	556670
440-245201-9	NERT3.60N1-20190702	Dissolved	Water	200.8	556670
440-245201-14	NERT4.64N1-20190702	Dissolved	Water	200.8	556670
440-245201-15	NERT4.64N1-20190702-FD	Dissolved	Water	200.8	556670
MB 440-556670/1-A	Method Blank	Total Recoverable	Water	200.8	556670
LCS 440-556670/2-A	Lab Control Sample	Total Recoverable	Water	200.8	556670
440-245201-4 MS	NERT3.60S1-20190701	Dissolved	Water	200.8	556670
440-245201-4 MSD	NERT3.60S1-20190701	Dissolved	Water	200.8	556670

Definitions/Glossary

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-245201-2
SDG: LVW

Qualifiers

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Accreditation/Certification Summary

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-245201-2
SDG: LVW

Laboratory: Eurofins TestAmerica, Irvine

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Nevada	State Program	9	CA015312019-5	07-31-19 *

- 1
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- 14

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Regulatory Program: DW NPDES RCRA Other:

Client Contact		Project Manager: <u>E. Coombs-Schwell</u>		Site Contact: <u>J. CAPARRO</u>		Date:		COC No			
Company Name: <u>AE.com</u>		Tel/Fax: <u>805-764-4031</u>		Lab Contact:		Carrier:		<u>7</u> of <u>2</u> COCs			
Address: <u>1220 Avenida Ansa</u>		Analysis Turnaround Time		Filtered Sample (Y/N) Perform MS/MSD (Y/N) <u>Perchlorate 3/40</u> <u>TDS 25/100</u> <u>Chlorate 300.1</u> <u>Dir. Chlorine 200.5</u>				Sampler:			
City/State/Zip: <u>Camarillo 93022</u>		<input type="checkbox"/> CALENDAR DAYS <input type="checkbox"/> WORKING DAYS						For Lab Use Only:			
Phone: <u>405 764 4627</u>		TAT if different from Below						Walk-in Client:			
Fax:		<input type="checkbox"/> 2 weeks						Lab Sampling:			
Project Name: <u>NDEP Phase II</u>		<input type="checkbox"/> 1 week <u>Per WO</u>						Job / SDG No.:			
Site: <u>LVW</u>		<input type="checkbox"/> 2 days									
PO#: <u>60477365</u>		<input type="checkbox"/> 1 day									
Sample Identification		Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Sample Specific Notes:				
<u>NERT 4.61S1-20190701</u>		<u>7/1/19</u>	<u>0920</u>	<u>G</u>	<u>GW</u>	<u>4</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	
<u>NERT 4.71S2-20190701</u>			<u>0925</u>			<u>4</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	
<u>NERT 4.71S1-20190701</u>			<u>1015</u>			<u>2</u>	<u>X</u>	<u>X</u>			
<u>NERT 3.60S1-20190701</u>			<u>1150</u>			<u>8</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>Extra Vol = MSD</u>
<u>NERT 5.11S1-20190701</u>			<u>1305</u>			<u>2</u>	<u>X</u>	<u>X</u>			
<u>NERT 4.93S1-20190701</u>			<u>1355</u>			<u>2</u>	<u>X</u>	<u>X</u>			
<u>NERT 5.91S1-20190701</u>			<u>1445</u>			<u>2</u>	<u>X</u>	<u>X</u>			<u>= 7/3/19 LD</u>
<u>NERT 3.58NI-20190702</u>		<u>7/2/19</u>	<u>0935</u>	<u>G</u>	<u>GW</u>	<u>4</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	
<u>NERT 3.60NI-20190702</u>			<u>0945</u>			<u>4</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	
<u>NERT 4.21NI-20190702</u>			<u>1050</u>			<u>2</u>	<u>X</u>	<u>X</u>			
<u>NERT 4.21NI-20190702-FB</u>			<u>1015</u>			<u>2</u>	<u>X</u>	<u>X</u>			
<u>NERT 4.38NI-20190702-EB</u>			<u>1115</u>			<u>2</u>	<u>X</u>	<u>X</u>			
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4= HNO3; 5= NaOH; 6= Other						Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)					
Possible Hazard Identification: Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.						<u>Per WO</u>					
<input checked="" type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown						<input type="checkbox"/> Return to Client <input type="checkbox"/> Disposal by Lab <input type="checkbox"/> Archive for _____ Months					
Special Instructions/QC Requirements & Comments:											
Custody Seals Intact <input type="checkbox"/> Yes <input type="checkbox"/> No		Custody Seal No :		Cooler Temp (°C) Obs'd _____ Corr'd _____		Therm ID No _____					
Relinquished by: <u>J. CAPARRO</u>		Company: <u>AE.com</u>		Date/Time: <u>7/2/19 1620</u>		Received by: <u>JAM</u>		Company: <u>TALVS</u>		Date/Time: <u>7-2-19 1620</u>	
Relinquished by: <u>JAM</u>		Company: <u>TALVS</u>		Date/Time: <u>7-2-19 1100</u>		Received by: <u>Fed X</u>		Company: _____		Date/Time: _____	
Relinquished by: _____		Company: _____		Date/Time: _____		Received in Laboratory By: <u>Ana Onelas</u>		Company: <u>TALVS</u>		Date/Time: <u>7/3/19 1020</u>	



TALVS 8.9
c/s 3.6/33 IR-94
#: 1045 6317 6470

7/2/2019

Regulatory Program: DW NPDES RCRA Other:

Client Contact		Project Manager: <i>E. Lawrence Schmitt</i>		Site Contact: <i>J. CARPPIO</i>		Date:		COC No:	
Company Name: <i>AECOM</i>		Tel/Fax: <i>905-764-4031</i>		Lab Contact:		Carrier:		<i>2</i> of <i>2</i> COCs	
Address: <i>1220 Avenida Acaso</i>		Analysis Turnaround Time		Filtered Sample (Y/N) Perform MS/MSD (Y/N) <i>Perchlorate 314.0</i> <i>TD5 2540C</i> <i>Chlorate 350.1</i> <i>Dis Chroma 750.58</i>				Sampler:	
City/State/Zip: <i>Camarillo CA 93012</i>		<input type="checkbox"/> CALENDAR DAYS <input type="checkbox"/> WORKING DAYS						For Lab Use Only:	
Phone: <i>805-764-4027</i>		TAT if different from Below _____						Walk-in Client <input type="checkbox"/>	
Fax:		<input type="checkbox"/> 2 weeks <input type="checkbox"/> 1 week <i>RWO</i> <input type="checkbox"/> 2 days <input type="checkbox"/> 1 day						Lab Sampling <input type="checkbox"/>	
Project Name: <i>NDEP Phase II</i>								Job / SDG No.	
Site: <i>LVW</i>									
P O # <i>6047736</i>									

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS/MSD (Y/N)	Sample Specific Notes:	
<i>NERT 4.38 NI-20190702</i>	<i>7/2/19</i>	<i>1235</i>	<i>G</i>	<i>GW</i>	<i>2</i>	<i>X</i>	<i>X</i>	<i>X</i>	
<i>NERT 4.64 NI-20190702</i>	<i>7/2/19</i>	<i>1340</i>	<i>L</i>	<i>L</i>	<i>4</i>	<i>X</i>	<i>X</i>	<i>X</i>	
<i>NERT 4.41 NI-20190702-FD</i>	<i>7/2/19</i>	<i>1340</i>	<i>L</i>	<i>L</i>	<i>4</i>	<i>X</i>	<i>X</i>	<i>X</i>	

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4= HNO3; 5= NaOH; 6= Other _____

Possible Hazard Identification: Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample

Non-Hazard Flammable Skin Irritant Poison B Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

RWO Return to Client Disposal by Lab Archive for _____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No	Custody Seal No.:	Cooler Temp. (°C): Obs'd: _____ Cor'd: _____	Therm ID No.:
Relinquished by: <i>J. CARPPIO</i>	Company: <i>AECOM</i>	Date/Time: <i>7/2/19 1600</i>	Received by: <i>JAM</i>
Relinquished by: <i>JAM</i>	Company: <i>TALVS</i>	Date/Time: <i>7-2-19 1700</i>	Received by: <i>Red X</i>
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: <i>Ja @ melas</i>
			Company: <i>TA IRV</i>
			Date/Time: <i>7/3/19 1020</i>

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7/2/2019



Login Sample Receipt Checklist

Client: AECOM

Job Number: 440-245201-2

SDG Number: LVW

Login Number: 245201

List Number: 1

Creator: Skinner, Alma D

List Source: Eurofins TestAmerica, Irvine

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	Not Present
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



ANALYTICAL REPORT

Eurofins TestAmerica, Irvine
17461 Derian Ave
Suite 100
Irvine, CA 92614-5817
Tel: (949)261-1022

Laboratory Job ID: 440-245262-1
Laboratory Sample Delivery Group: LVW
Client Project/Site: NDEP Phase II

For:
AECOM
1220 Avenida Acaso
Camarillo, California 93012

Attn: Carmen Caceres-Schnell



Authorized for release by:
7/17/2019 1:08:23 PM

Danielle Roberts, Senior Project Manager
(949)260-3249
danielle.roberts@testamericainc.com

LINKS

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results through
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Have a Question?



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www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.



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Sample Summary

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-245262-1
SDG: LVW

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
440-245262-1	WMW5.58S-20190703	Water	07/03/19 09:30	07/06/19 10:40	
440-245262-2	COH2B1-20190703	Water	07/03/19 10:45	07/06/19 10:40	
440-245262-3	MW-25-20190703	Water	07/03/19 12:00	07/06/19 10:40	
440-245262-4	MW-02-20190703	Water	07/03/19 13:25	07/06/19 10:40	

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Case Narrative

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-245262-1
SDG: LVW

Job ID: 440-245262-1

Laboratory: Eurofins TestAmerica, Irvine

Narrative

**Job Narrative
440-245262-1**

Comments

No additional comments.

Receipt

The samples were received on 7/6/2019 10:40 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.2° C.

HPLC/IC

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

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Detection Summary

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-245262-1
SDG: LVW

Client Sample ID: WMW5.58S-20190703

Lab Sample ID: 440-245262-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chlorate	8000		1000	100	ug/L	50		300.1B	Total/NA
Perchlorate	4000		400	95	ug/L	100		314.0	Total/NA

Client Sample ID: COH2B1-20190703

Lab Sample ID: 440-245262-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chlorate	790		100	10	ug/L	5		300.1B	Total/NA
Perchlorate	1800		400	95	ug/L	100		314.0	Total/NA

Client Sample ID: MW-25-20190703

Lab Sample ID: 440-245262-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chlorate	56	J	100	10	ug/L	5		300.1B	Total/NA
Perchlorate	13		4.0	0.95	ug/L	1		314.0	Total/NA

Client Sample ID: MW-02-20190703

Lab Sample ID: 440-245262-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chlorate	2400		200	20	ug/L	10		300.1B	Total/NA
Perchlorate	1700		400	95	ug/L	100		314.0	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Irvine

Client Sample Results

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-245262-1
SDG: LVW

Client Sample ID: WMW5.58S-20190703

Lab Sample ID: 440-245262-1

Date Collected: 07/03/19 09:30

Matrix: Water

Date Received: 07/06/19 10:40

Method: 300.1B - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	8000		1000	100	ug/L			07/09/19 12:41	50

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	103		90 - 115		07/09/19 12:41	50

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	4000		400	95	ug/L			07/16/19 19:28	100

Client Sample ID: COH2B1-20190703

Lab Sample ID: 440-245262-2

Date Collected: 07/03/19 10:45

Matrix: Water

Date Received: 07/06/19 10:40

Method: 300.1B - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	790		100	10	ug/L			07/08/19 19:00	5

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	106		90 - 115		07/08/19 19:00	5

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	1800		400	95	ug/L			07/15/19 17:32	100

Client Sample ID: MW-25-20190703

Lab Sample ID: 440-245262-3

Date Collected: 07/03/19 12:00

Matrix: Water

Date Received: 07/06/19 10:40

Method: 300.1B - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	56	J	100	10	ug/L			07/08/19 19:36	5

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	105		90 - 115		07/08/19 19:36	5

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	13		4.0	0.95	ug/L			07/16/19 18:51	1

Client Sample ID: MW-02-20190703

Lab Sample ID: 440-245262-4

Date Collected: 07/03/19 13:25

Matrix: Water

Date Received: 07/06/19 10:40

Method: 300.1B - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	2400		200	20	ug/L			07/09/19 09:39	10

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	101		90 - 115		07/09/19 09:39	10

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	1700		400	95	ug/L			07/15/19 18:08	100

Eurofins TestAmerica, Irvine

Surrogate Summary

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-245262-1
SDG: LVW

Method: 300.1B - Disinfection By-Products, (IC)

Matrix: Water

Prep Type: Total/NA

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	DCAA (90-115)
440-245201-A-10 MS	Matrix Spike	105
440-245201-A-10 MSD	Matrix Spike Duplicate	107
440-245262-1	WMW5.58S-20190703	103
440-245262-2	COH2B1-20190703	106
440-245262-3	MW-25-20190703	105
440-245262-4	MW-02-20190703	101
440-245262-4 MS	MW-02-20190703	104
440-245262-4 MSD	MW-02-20190703	104
LCS 440-556356/44	Lab Control Sample	109
LCS 440-556577/4	Lab Control Sample	102
MB 440-556356/45	Method Blank	107
MB 440-556577/5	Method Blank	105
MRL 440-556356/43	Lab Control Sample	106
MRL 440-556577/3	Lab Control Sample	103

Surrogate Legend

DCAA = Dichloroacetic acid(Surr)

Method Summary

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-245262-1
SDG: LVW

Method	Method Description	Protocol	Laboratory
300.1B	Disinfection By-Products, (IC)	EPA	TAL IRV
314.0	Perchlorate (IC)	EPA	TAL IRV

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

TAL IRV = Eurofins TestAmerica, Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022



Lab Chronicle

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-245262-1
SDG: LVW

Client Sample ID: WMW5.58S-20190703

Lab Sample ID: 440-245262-1

Date Collected: 07/03/19 09:30

Matrix: Water

Date Received: 07/06/19 10:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.1B		50			556577	07/09/19 12:41	YZ	TAL IRV
Total/NA	Analysis	314.0		100			557816	07/16/19 19:28	CTH	TAL IRV

Client Sample ID: COH2B1-20190703

Lab Sample ID: 440-245262-2

Date Collected: 07/03/19 10:45

Matrix: Water

Date Received: 07/06/19 10:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.1B		5			556356	07/08/19 19:00	YZ	TAL IRV
Total/NA	Analysis	314.0		100			557511	07/15/19 17:32	CTH	TAL IRV

Client Sample ID: MW-25-20190703

Lab Sample ID: 440-245262-3

Date Collected: 07/03/19 12:00

Matrix: Water

Date Received: 07/06/19 10:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.1B		5			556356	07/08/19 19:36	YZ	TAL IRV
Total/NA	Analysis	314.0		1			557816	07/16/19 18:51	CTH	TAL IRV

Client Sample ID: MW-02-20190703

Lab Sample ID: 440-245262-4

Date Collected: 07/03/19 13:25

Matrix: Water

Date Received: 07/06/19 10:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.1B		10			556577	07/09/19 09:39	YZ	TAL IRV
Total/NA	Analysis	314.0		100			557511	07/15/19 18:08	CTH	TAL IRV

Laboratory References:

TAL IRV = Eurofins TestAmerica, Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022

QC Sample Results

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-245262-1
SDG: LVW

Method: 300.1B - Disinfection By-Products, (IC)

Lab Sample ID: MB 440-556356/45
Matrix: Water
Analysis Batch: 556356

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	ND		20	2.0	ug/L			07/08/19 09:56	1
Surrogate	MB %Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	107		90 - 115					07/08/19 09:56	1

Lab Sample ID: LCS 440-556356/44
Matrix: Water
Analysis Batch: 556356

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorate	100	104		ug/L		104	75 - 125
Surrogate	LCS %Recovery	LCS Qualifier	Limits				
Dichloroacetic acid(Surr)	109		90 - 115				

Lab Sample ID: MRL 440-556356/43
Matrix: Water
Analysis Batch: 556356

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorate	20.0	20.3		ug/L		101	50 - 150
Surrogate	MRL %Recovery	MRL Qualifier	Limits				
Dichloroacetic acid(Surr)	106		90 - 115				

Lab Sample ID: 440-245201-A-10 MS
Matrix: Water
Analysis Batch: 556356

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorate	5500		200	5450	4	ug/L		-30	75 - 125
Surrogate	MS %Recovery	MS Qualifier	Limits						
Dichloroacetic acid(Surr)	105		90 - 115						

Lab Sample ID: 440-245201-A-10 MSD
Matrix: Water
Analysis Batch: 556356

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chlorate	5500		200	5420	4	ug/L		-45	75 - 125	1	25
Surrogate	MSD %Recovery	MSD Qualifier	Limits								
Dichloroacetic acid(Surr)	107		90 - 115								

QC Sample Results

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-245262-1
SDG: LVW

Method: 300.1B - Disinfection By-Products, (IC) (Continued)

Lab Sample ID: MB 440-556577/5
Matrix: Water
Analysis Batch: 556577

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	ND		20	2.0	ug/L			07/09/19 06:38	1
Surrogate	MB %Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	105		90 - 115					07/09/19 06:38	1

Lab Sample ID: LCS 440-556577/4
Matrix: Water
Analysis Batch: 556577

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorate	100	104		ug/L		104	75 - 125
Surrogate	LCS %Recovery	LCS Qualifier	Limits				
Dichloroacetic acid(Surr)	102		90 - 115				

Lab Sample ID: MRL 440-556577/3
Matrix: Water
Analysis Batch: 556577

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorate	20.0	20.3		ug/L		101	50 - 150
Surrogate	MRL %Recovery	MRL Qualifier	Limits				
Dichloroacetic acid(Surr)	103		90 - 115				

Lab Sample ID: 440-245262-4 MS
Matrix: Water
Analysis Batch: 556577

Client Sample ID: MW-02-20190703
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorate	2400		200	2640	4	ug/L		112	75 - 125
Surrogate	MS %Recovery	MS Qualifier	Limits						
Dichloroacetic acid(Surr)	104		90 - 115						

Lab Sample ID: 440-245262-4 MSD
Matrix: Water
Analysis Batch: 556577

Client Sample ID: MW-02-20190703
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Chlorate	2400		200	2380	4	ug/L		-19	75 - 125	10	25
Surrogate	MSD %Recovery	MSD Qualifier	Limits								
Dichloroacetic acid(Surr)	104		90 - 115								

QC Sample Results

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-245262-1
SDG: LVW

Method: 314.0 - Perchlorate (IC)

Lab Sample ID: MB 440-557511/6
Matrix: Water
Analysis Batch: 557511

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		4.0	0.95	ug/L			07/15/19 09:25	1

Lab Sample ID: LCS 440-557511/5
Matrix: Water
Analysis Batch: 557511

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	10.0	10.4		ug/L		104	85 - 115

Lab Sample ID: MRL 440-557511/8
Matrix: Water
Analysis Batch: 557511

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	4.00	4.00		ug/L		100	75 - 125

Lab Sample ID: 440-245452-D-3 MS
Matrix: Water
Analysis Batch: 557511

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	ND		10.0	9.50		ug/L		95	80 - 120

Lab Sample ID: 440-245452-D-3 MSD
Matrix: Water
Analysis Batch: 557511

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perchlorate	ND		10.0	9.64		ug/L		96	80 - 120	1	15

Lab Sample ID: MB 440-557816/6
Matrix: Water
Analysis Batch: 557816

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		4.0	0.95	ug/L			07/16/19 14:49	1

Lab Sample ID: LCS 440-557816/5
Matrix: Water
Analysis Batch: 557816

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	25.0	24.2		ug/L		97	85 - 115

Lab Sample ID: MRL 440-557816/8
Matrix: Water
Analysis Batch: 557816

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	4.00	4.12		ug/L		103	75 - 125

Eurofins TestAmerica, Irvine

QC Sample Results

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-245262-1
SDG: LVW

Method: 314.0 - Perchlorate (IC)

Lab Sample ID: 440-245693-B-5 MS
Matrix: Water
Analysis Batch: 557816

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	12		25.0	37.8		ug/L		104	80 - 120

Lab Sample ID: 440-245693-B-5 MSD
Matrix: Water
Analysis Batch: 557816

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perchlorate	12		25.0	37.7		ug/L		103	80 - 120	0	15

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QC Association Summary

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-245262-1
SDG: LVW

HPLC/IC

Analysis Batch: 556356

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245262-2	COH2B1-20190703	Total/NA	Water	300.1B	
440-245262-3	MW-25-20190703	Total/NA	Water	300.1B	
MB 440-556356/45	Method Blank	Total/NA	Water	300.1B	
LCS 440-556356/44	Lab Control Sample	Total/NA	Water	300.1B	
MRL 440-556356/43	Lab Control Sample	Total/NA	Water	300.1B	
440-245201-A-10 MS	Matrix Spike	Total/NA	Water	300.1B	
440-245201-A-10 MSD	Matrix Spike Duplicate	Total/NA	Water	300.1B	

Analysis Batch: 556577

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245262-1	WMW5.58S-20190703	Total/NA	Water	300.1B	
440-245262-4	MW-02-20190703	Total/NA	Water	300.1B	
MB 440-556577/5	Method Blank	Total/NA	Water	300.1B	
LCS 440-556577/4	Lab Control Sample	Total/NA	Water	300.1B	
MRL 440-556577/3	Lab Control Sample	Total/NA	Water	300.1B	
440-245262-4 MS	MW-02-20190703	Total/NA	Water	300.1B	
440-245262-4 MSD	MW-02-20190703	Total/NA	Water	300.1B	

Analysis Batch: 557511

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245262-2	COH2B1-20190703	Total/NA	Water	314.0	
440-245262-4	MW-02-20190703	Total/NA	Water	314.0	
MB 440-557511/6	Method Blank	Total/NA	Water	314.0	
LCS 440-557511/5	Lab Control Sample	Total/NA	Water	314.0	
MRL 440-557511/8	Lab Control Sample	Total/NA	Water	314.0	
440-245452-D-3 MS	Matrix Spike	Total/NA	Water	314.0	
440-245452-D-3 MSD	Matrix Spike Duplicate	Total/NA	Water	314.0	

Analysis Batch: 557816

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245262-1	WMW5.58S-20190703	Total/NA	Water	314.0	
440-245262-3	MW-25-20190703	Total/NA	Water	314.0	
MB 440-557816/6	Method Blank	Total/NA	Water	314.0	
LCS 440-557816/5	Lab Control Sample	Total/NA	Water	314.0	
MRL 440-557816/8	Lab Control Sample	Total/NA	Water	314.0	
440-245693-B-5 MS	Matrix Spike	Total/NA	Water	314.0	
440-245693-B-5 MSD	Matrix Spike Duplicate	Total/NA	Water	314.0	

Definitions/Glossary

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-245262-1
SDG: LVW

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
▫	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Accreditation/Certification Summary

Client: AECOM
Project/Site: NDEP Phase II

Job ID: 440-245262-1
SDG: LVW

Laboratory: Eurofins TestAmerica, Irvine

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Nevada	State Program	9	CA015312019-5	07-31-19 *

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* Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica Phoenix
 4625 E. Cotton Center Blvd.
 Suite 189
 Phoenix, AZ 85040
 Phone: 602.437.3340 Fax:

TestAmerica Las Vegas
 219

Chain of Custody Record

179787

TestAmerica
 THE LEADER IN ENVIRONMENTAL TESTING
 TestAmerica Laboratories, Inc.
 TAL-8210 (0713)

Regulatory Program: DW NPDES RCRA Other:

Client Contact	Project Manager: <i>C. Lucas-schnell</i>	Site Contact: <i>J. CARTRIO</i>	Date:	COC No:
Company Name: <i>AECOM</i>	Tel/Fax: <i>405-746-4031</i>	Lab Contact:	Carrier:	<i>1</i> of <i>1</i> COCs
Address: <i>1220 Avenida Arce</i>	Analysis Turnaround Time		Sampler:	
City/State/Zip: <i>Camarillo CA 93012</i>	<input type="checkbox"/> CALENDAR DAYS <input type="checkbox"/> WORKING DAYS		For Lab Use Only:	
Phone: <i>805 764 4027</i>	TAT if different from Below _____		Walk-in Client:	
Fax:	<input type="checkbox"/> 2 weeks		Lab Sampling:	
Project Name: <i>NOEP Phase II</i>	<input type="checkbox"/> 1 week <i>Per W.C.</i>		Job / SDG No:	
Site: <i>LVW</i>	<input type="checkbox"/> 2 days			
P O #: <i>60477365</i>	<input type="checkbox"/> 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (G=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS/MSD (Y/N)	Sample Specific Notes
<i>WMW 5.585-20190703</i>	<i>7/3/19</i>	<i>0930</i>	<i>G</i>	<i>GW</i>	<i>2</i>		<i>Perchinate 314.0</i>	
<i>COH 281-20190703</i>	<i> </i>	<i>1045</i>	<i> </i>	<i> </i>	<i> </i>		<i>Chlorate 300.1</i>	
<i>MW-25-20190703</i>	<i> </i>	<i>1200</i>	<i> </i>	<i> </i>	<i> </i>			
<i>MW-02-20190703</i>	<i> </i>	<i>1325</i>	<i> </i>	<i> </i>	<i> </i>			<i>7/6/19 CD</i>

Preservation Used: 1= Ice, 2=HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification: Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample

Non-Hazardous Flammable Skin Irritant Poison B Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

Return to Client Disposal by Lab Archive for _____ Months

Special Instructions/QC Requirements & Comments:

1.8/2.2 1289 C/S

Custody Seals Intact. <input type="checkbox"/> Yes <input type="checkbox"/> No	Custody Seal No.	Cooler Temp (°C): Obs'd. _____ Corr'd _____	Therm ID No _____
Relinquished by: <i>J. CARTRIO</i>	Company: <i>AECOM</i>	Date/Time: <i>7/3/19 1420</i>	Received by: <i>J. CARTRIO</i>
Relinquished by: <i>J. CARTRIO</i>	Company: <i>TALVS</i>	Date/Time: <i>7/5/19 1020</i>	Received by: <i>Fed X</i>
Relinquished by: _____	Company: _____	Date/Time: _____	Received in Laboratory by: <i>J. CARTRIO</i>
			Company: <i>TALVS</i>
			Date/Time: <i>7/6/19 1040</i>

1045 (3176791) *TALVS SC-6 19.9/19.7*

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Login Sample Receipt Checklist

Client: AECOM

Job Number: 440-245262-1

SDG Number: LVW

Login Number: 245262

List Number: 1

Creator: Escalante, Maria I

List Source: Eurofins TestAmerica, Irvine

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	Not Present
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



ANALYTICAL REPORT

Eurofins TestAmerica, Irvine
17461 Derian Ave
Suite 100
Irvine, CA 92614-5817
Tel: (949)261-1022

Laboratory Job ID: 440-245263-1
Laboratory Sample Delivery Group: LVW
Client Project/Site: NERT NDEP Phase II

For:
AECOM
1220 Avenida Acaso
Camarillo, California 93012

Attn: Carmen Caceres-Schnell



Authorized for release by:
7/17/2019 9:05:03 AM

Danielle Roberts, Senior Project Manager
(949)260-3249
danielle.roberts@testamericainc.com

LINKS

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results through
TotalAccess

Have a Question?



Visit us at:
www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.



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Sample Summary

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245263-1
SDG: LVW

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
440-245263-1	WMW3.5N-20190705	Water	07/05/19 10:20	07/06/19 10:40	
440-245263-2	LNDMW2-20190705	Water	07/05/19 11:25	07/06/19 10:40	
440-245263-3	WMW4.9N-20190705	Water	07/05/19 12:30	07/06/19 10:40	
440-245263-4	MW-4-20190705	Water	07/05/19 14:05	07/06/19 10:40	
440-245263-5	MW-3-20190705	Water	07/05/19 14:35	07/06/19 10:40	

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Case Narrative

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245263-1
SDG: LVW

Job ID: 440-245263-1

Laboratory: Eurofins TestAmerica, Irvine

Narrative

Job Narrative
440-245263-1

Comments

No additional comments.

Receipt

The samples were received on 7/6/2019 10:40 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.4° C.

HPLC/IC

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

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Detection Summary

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245263-1
SDG: LVW

Client Sample ID: WMW3.5N-20190705

Lab Sample ID: 440-245263-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chlorate	300		100	10	ug/L	5		300.1B	Total/NA
Perchlorate	260		40	9.5	ug/L	10		314.0	Total/NA

Client Sample ID: LNDMW2-20190705

Lab Sample ID: 440-245263-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chlorate	4600		400	40	ug/L	20		300.1B	Total/NA
Perchlorate	1500		400	95	ug/L	100		314.0	Total/NA

Client Sample ID: WMW4.9N-20190705

Lab Sample ID: 440-245263-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chlorate	16	J	100	10	ug/L	5		300.1B	Total/NA
Perchlorate	660		400	95	ug/L	100		314.0	Total/NA

Client Sample ID: MW-4-20190705

Lab Sample ID: 440-245263-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chlorate	5900		400	40	ug/L	20		300.1B	Total/NA
Perchlorate	2700		400	95	ug/L	100		314.0	Total/NA

Client Sample ID: MW-3-20190705

Lab Sample ID: 440-245263-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chlorate	6000		400	40	ug/L	20		300.1B	Total/NA
Perchlorate	2900		400	95	ug/L	100		314.0	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Irvine

Client Sample Results

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245263-1
SDG: LVW

Client Sample ID: WMW3.5N-20190705

Lab Sample ID: 440-245263-1

Date Collected: 07/05/19 10:20

Matrix: Water

Date Received: 07/06/19 10:40

Method: 300.1B - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	300		100	10	ug/L	-		07/08/19 13:11	5

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	107		90 - 115		07/08/19 13:11	5

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	260		40	9.5	ug/L	-		07/16/19 17:37	10

Client Sample ID: LNDMW2-20190705

Lab Sample ID: 440-245263-2

Date Collected: 07/05/19 11:25

Matrix: Water

Date Received: 07/06/19 10:40

Method: 300.1B - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	4600		400	40	ug/L	-		07/09/19 13:17	20

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	103		90 - 115		07/09/19 13:17	20

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	1500		400	95	ug/L	-		07/16/19 03:40	100

Client Sample ID: WMW4.9N-20190705

Lab Sample ID: 440-245263-3

Date Collected: 07/05/19 12:30

Matrix: Water

Date Received: 07/06/19 10:40

Method: 300.1B - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	16	J	100	10	ug/L	-		07/08/19 14:10	5

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	107		90 - 115		07/08/19 14:10	5

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	660		400	95	ug/L	-		07/16/19 04:00	100

Client Sample ID: MW-4-20190705

Lab Sample ID: 440-245263-4

Date Collected: 07/05/19 14:05

Matrix: Water

Date Received: 07/06/19 10:40

Method: 300.1B - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	5900		400	40	ug/L	-		07/08/19 22:08	20

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	115		90 - 115		07/08/19 22:08	20

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	2700		400	95	ug/L	-		07/16/19 04:20	100

Eurofins TestAmerica, Irvine

Client Sample Results

Client: AECOM
 Project/Site: NERT NDEP Phase II

Job ID: 440-245263-1
 SDG: LVW

Client Sample ID: MW-3-20190705

Lab Sample ID: 440-245263-5

Date Collected: 07/05/19 14:35

Matrix: Water

Date Received: 07/06/19 10:40

Method: 300.1B - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	6000		400	40	ug/L	-		07/08/19 22:38	20
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	114		90 - 115					07/08/19 22:38	20

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	2900		400	95	ug/L	-		07/16/19 04:41	100



Surrogate Summary

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245263-1
SDG: LVW

Method: 300.1B - Disinfection By-Products, (IC)

Matrix: Water

Prep Type: Total/NA

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	DCAA (90-115)
440-245201-A-3 MS	Matrix Spike	109
440-245263-1	WMW3.5N-20190705	107
440-245263-2	LNDMW2-20190705	103
440-245263-2 MS	LNDMW2-20190705	103
440-245263-2 MSD	LNDMW2-20190705	103
440-245263-3	WMW4.9N-20190705	107
440-245263-4	MW-4-20190705	115
440-245263-5	MW-3-20190705	114
LCS 440-556360/40	Lab Control Sample	111
LCS 440-556577/4	Lab Control Sample	102
MB 440-556360/41	Method Blank	111
MB 440-556577/5	Method Blank	105
MRL 440-556360/39	Lab Control Sample	110
MRL 440-556577/3	Lab Control Sample	103

Surrogate Legend

DCAA = Dichloroacetic acid(Surr)

Method Summary

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245263-1
SDG: LVW

Method	Method Description	Protocol	Laboratory
300.1B	Disinfection By-Products, (IC)	EPA	TAL IRV
314.0	Perchlorate (IC)	EPA	TAL IRV

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

TAL IRV = Eurofins TestAmerica, Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022



Lab Chronicle

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245263-1
SDG: LVW

Client Sample ID: WMW3.5N-20190705

Lab Sample ID: 440-245263-1

Date Collected: 07/05/19 10:20

Matrix: Water

Date Received: 07/06/19 10:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.1B		5			556360	07/08/19 13:11	YZ	TAL IRV
Total/NA	Analysis	314.0		10			557815	07/16/19 17:37	CTH	TAL IRV

Client Sample ID: LNDMW2-20190705

Lab Sample ID: 440-245263-2

Date Collected: 07/05/19 11:25

Matrix: Water

Date Received: 07/06/19 10:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.1B		20			556577	07/09/19 13:17	YZ	TAL IRV
Total/NA	Analysis	314.0		100			557509	07/16/19 03:40	CTH	TAL IRV

Client Sample ID: WMW4.9N-20190705

Lab Sample ID: 440-245263-3

Date Collected: 07/05/19 12:30

Matrix: Water

Date Received: 07/06/19 10:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.1B		5			556360	07/08/19 14:10	YZ	TAL IRV
Total/NA	Analysis	314.0		100			557509	07/16/19 04:00	CTH	TAL IRV

Client Sample ID: MW-4-20190705

Lab Sample ID: 440-245263-4

Date Collected: 07/05/19 14:05

Matrix: Water

Date Received: 07/06/19 10:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.1B		20			556360	07/08/19 22:08	YZ	TAL IRV
Total/NA	Analysis	314.0		100			557509	07/16/19 04:20	CTH	TAL IRV

Client Sample ID: MW-3-20190705

Lab Sample ID: 440-245263-5

Date Collected: 07/05/19 14:35

Matrix: Water

Date Received: 07/06/19 10:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.1B		20			556360	07/08/19 22:38	YZ	TAL IRV
Total/NA	Analysis	314.0		100			557509	07/16/19 04:41	CTH	TAL IRV

Laboratory References:

TAL IRV = Eurofins TestAmerica, Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022

QC Sample Results

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245263-1
SDG: LVW

Method: 300.1B - Disinfection By-Products, (IC)

Lab Sample ID: MB 440-556360/41
Matrix: Water
Analysis Batch: 556360

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	ND		20	2.0	ug/L			07/08/19 07:42	1
Surrogate	MB %Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	111		90 - 115					07/08/19 07:42	1

Lab Sample ID: LCS 440-556360/40
Matrix: Water
Analysis Batch: 556360

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorate	100	102		ug/L		102	75 - 125
Surrogate	LCS %Recovery	LCS Qualifier	Limits				
Dichloroacetic acid(Surr)	111		90 - 115				

Lab Sample ID: MRL 440-556360/39
Matrix: Water
Analysis Batch: 556360

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorate	20.0	20.3		ug/L		102	50 - 150
Surrogate	MRL %Recovery	MRL Qualifier	Limits				
Dichloroacetic acid(Surr)	110		90 - 115				

Lab Sample ID: 440-245201-A-3 MS
Matrix: Water
Analysis Batch: 556360

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorate	10000		200	9890	4	ug/L		-170	75 - 125
Surrogate	MS %Recovery	MS Qualifier	Limits						
Dichloroacetic acid(Surr)	109		90 - 115						

Lab Sample ID: 440-245201-A-3 MSD
Matrix: Water
Analysis Batch: 556360

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chlorate	10000		200	9940	4	ug/L		-143	75 - 125	1	25

Lab Sample ID: MB 440-556577/5
Matrix: Water
Analysis Batch: 556577

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	ND		20	2.0	ug/L			07/09/19 06:38	1

Eurofins TestAmerica, Irvine

QC Sample Results

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245263-1
SDG: LVW

Method: 300.1B - Disinfection By-Products, (IC) (Continued)

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	105		90 - 115		07/09/19 06:38	1

Lab Sample ID: LCS 440-556577/4
Matrix: Water
Analysis Batch: 556577

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorate	100	104		ug/L		104	75 - 125

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Dichloroacetic acid(Surr)	102		90 - 115

Lab Sample ID: MRL 440-556577/3
Matrix: Water
Analysis Batch: 556577

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorate	20.0	20.3		ug/L		101	50 - 150

Surrogate	MRL %Recovery	MRL Qualifier	Limits
Dichloroacetic acid(Surr)	103		90 - 115

Lab Sample ID: 440-245263-2 MS
Matrix: Water
Analysis Batch: 556577

Client Sample ID: LNDMW2-20190705
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorate	4600		200	4570	4	ug/L		-19	75 - 125

Surrogate	MS %Recovery	MS Qualifier	Limits
Dichloroacetic acid(Surr)	103		90 - 115

Lab Sample ID: 440-245263-2 MSD
Matrix: Water
Analysis Batch: 556577

Client Sample ID: LNDMW2-20190705
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Chlorate	4600		200	4610	4	ug/L		2	75 - 125	1	25

Surrogate	MSD %Recovery	MSD Qualifier	Limits
Dichloroacetic acid(Surr)	103		90 - 115

Method: 314.0 - Perchlorate (IC)

Lab Sample ID: MB 440-557509/46
Matrix: Water
Analysis Batch: 557509

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		4.0	0.95	ug/L			07/15/19 23:15	1

Eurolins TestAmerica, Irvine

QC Sample Results

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245263-1
SDG: LVW

Method: 314.0 - Perchlorate (IC) (Continued)

Lab Sample ID: LCS 440-557509/47
Matrix: Water
Analysis Batch: 557509

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	25.0	24.5		ug/L		98	85 - 115

Lab Sample ID: MRL 440-557509/8
Matrix: Water
Analysis Batch: 557509

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	4.00	4.12		ug/L		103	75 - 125

Lab Sample ID: 440-245046-A-3 MS
Matrix: Water
Analysis Batch: 557509

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	1500		2500	4080		ug/L		104	80 - 120

Lab Sample ID: 440-245046-A-3 MSD
Matrix: Water
Analysis Batch: 557509

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perchlorate	1500		2500	4120		ug/L		105	80 - 120	1	15

Lab Sample ID: MB 440-557815/6
Matrix: Water
Analysis Batch: 557815

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		4.0	0.95	ug/L			07/16/19 15:37	1

Lab Sample ID: LCS 440-557815/5
Matrix: Water
Analysis Batch: 557815

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	25.0	25.2		ug/L		101	85 - 115

Lab Sample ID: MRL 440-557815/8
Matrix: Water
Analysis Batch: 557815

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	4.00	4.18		ug/L		105	75 - 125

Lab Sample ID: 440-245263-1 MS
Matrix: Water
Analysis Batch: 557815

Client Sample ID: WMW3.5N-20190705
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	260		250	523		ug/L		105	80 - 120

Eurofins TestAmerica, Irvine

QC Sample Results

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245263-1
SDG: LVW

Method: 314.0 - Perchlorate (IC)

Lab Sample ID: 440-245263-1 MSD
Matrix: Water
Analysis Batch: 557815

Client Sample ID: WMW3.5N-20190705
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perchlorate	260		250	525		ug/L		106	80 - 120	0	15

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QC Association Summary

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245263-1
SDG: LVW

HPLC/IC

Analysis Batch: 556360

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245263-1	WMW3.5N-20190705	Total/NA	Water	300.1B	
440-245263-3	WMW4.9N-20190705	Total/NA	Water	300.1B	
440-245263-4	MW-4-20190705	Total/NA	Water	300.1B	
440-245263-5	MW-3-20190705	Total/NA	Water	300.1B	
MB 440-556360/41	Method Blank	Total/NA	Water	300.1B	
LCS 440-556360/40	Lab Control Sample	Total/NA	Water	300.1B	
MRL 440-556360/39	Lab Control Sample	Total/NA	Water	300.1B	
440-245201-A-3 MS	Matrix Spike	Total/NA	Water	300.1B	
440-245201-A-3 MSD	Matrix Spike Duplicate	Total/NA	Water	300.1B	

Analysis Batch: 556577

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245263-2	LNDMW2-20190705	Total/NA	Water	300.1B	
MB 440-556577/5	Method Blank	Total/NA	Water	300.1B	
LCS 440-556577/4	Lab Control Sample	Total/NA	Water	300.1B	
MRL 440-556577/3	Lab Control Sample	Total/NA	Water	300.1B	
440-245263-2 MS	LNDMW2-20190705	Total/NA	Water	300.1B	
440-245263-2 MSD	LNDMW2-20190705	Total/NA	Water	300.1B	

Analysis Batch: 557509

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245263-2	LNDMW2-20190705	Total/NA	Water	314.0	
440-245263-3	WMW4.9N-20190705	Total/NA	Water	314.0	
440-245263-4	MW-4-20190705	Total/NA	Water	314.0	
440-245263-5	MW-3-20190705	Total/NA	Water	314.0	
MB 440-557509/46	Method Blank	Total/NA	Water	314.0	
LCS 440-557509/47	Lab Control Sample	Total/NA	Water	314.0	
MRL 440-557509/8	Lab Control Sample	Total/NA	Water	314.0	
440-245046-A-3 MS	Matrix Spike	Total/NA	Water	314.0	
440-245046-A-3 MSD	Matrix Spike Duplicate	Total/NA	Water	314.0	

Analysis Batch: 557815

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245263-1	WMW3.5N-20190705	Total/NA	Water	314.0	
MB 440-557815/6	Method Blank	Total/NA	Water	314.0	
LCS 440-557815/5	Lab Control Sample	Total/NA	Water	314.0	
MRL 440-557815/8	Lab Control Sample	Total/NA	Water	314.0	
440-245263-1 MS	WMW3.5N-20190705	Total/NA	Water	314.0	
440-245263-1 MSD	WMW3.5N-20190705	Total/NA	Water	314.0	

Definitions/Glossary

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245263-1
SDG: LVW

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
▫	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Accreditation/Certification Summary

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245263-1
SDG: LVW

Laboratory: Eurofins TestAmerica, Irvine

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Nevada	State Program	9	CA015312019-5	07-31-19 *

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* Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica Phoenix

4625 E. Cotton Center Blvd.
Suite 189

Phoenix, AZ 85040
Phone: 602.437.3340 Fax:



Chain of Custody Record

179792

TestAmerica
Las Vegas
219

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.

TAL-8210 (0713)

Regulatory Program: DW NPDES RCRA Other:

Client Contact		Project Manager: <i>C. Caceres-Schnell</i>		Site Contact: <i>J. CARTRIO</i>		Date:		COC No:	
Company Name: <i>AECOM</i>		Tel/Fax: <i>818-517-3126</i>		Lab Contact:		Carrier:		/ of / COCs	
Address: <i>1220 Avenida Araso</i>		Analysis Turnaround Time		Filtered Sample (Y/N) Perform MS/MSD (Y/N) <i>Perchlorate 34.0</i> <i>Chlorate 300.1</i>				Sampler:	
City/State/Zip: <i>Lamarillo CA 93012</i>		<input type="checkbox"/> CALENDAR DAYS <input type="checkbox"/> WORKING DAYS						For Lab Use Only: Walk-in Client <input type="checkbox"/> Lab Sampling <input type="checkbox"/>	
Phone: <i>805 388 3225</i>		TAT if different from Below							
Fax:		<input type="checkbox"/> 2 weeks <input type="checkbox"/> 1 week <i>Per W.O.</i> <input type="checkbox"/> 2 days <input type="checkbox"/> 1 day							
Project Name: <i>NERT NDEP Phase II</i>		Site: <i>LVW</i>		Job / SDG No.:					
P O #: <i>60977365</i>									

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS/MSD (Y/N)	Sample Specific Notes	
<i>WMW3.5N-20190705</i>	<i>7/5/19</i>	<i>1020</i>	<i>G</i>	<i>GW</i>	<i>2</i>	<i>x</i>	<i>x</i>		
<i>LNDMW12-20190705</i>	<i> </i>	<i>1125</i>	<i> </i>	<i> </i>	<i> </i>	<i>x</i>	<i>x</i>		
<i>WMW4.9N-20190705</i>	<i> </i>	<i>1230</i>	<i> </i>	<i> </i>	<i> </i>	<i>x</i>	<i>x</i>		
<i>MW-4-20190705</i>	<i> </i>	<i>1405</i>	<i> </i>	<i> </i>	<i> </i>	<i>x</i>	<i>x</i>		
<i>MW-3-20190705</i>	<i> </i>	<i>1435</i>	<i> </i>	<i> </i>	<i> </i>	<i>x</i>	<i>x</i>		



7/15/19

Page 18 of 19

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification: Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample

Non-Hazardous Flammable Skin Irritant Poison B Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month): Return to Client Disposal by Lab Archive for _____ Months

Special Instructions/QC Requirements & Comments: *1.9/2.4 1289 o/s*

Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No	Custody Seal No.:	Cooler Temp. (°C) Obs'd: _____	Corr'd: _____	Therm ID No.:
Relinquished by: <i>J. CARTRIO</i>	Company: <i>AECOM</i>	Date/Time: <i>7/5/19 1420</i>	Received by: <i>JAM</i>	Company: <i>TALVS</i>
Relinquished by: <i>JAM</i>	Company: <i>TALVS</i>	Date/Time: <i>7-5-19 1600</i>	Received by: <i>Fed X</i>	Company: _____
Relinquished by: <i>1045 63176839</i>	Company: _____	Date/Time: _____	Received in Laboratory by: <i>JAM</i>	Company: <i>TALVS</i>

TALVS SC6 9.9/ 9.7



Login Sample Receipt Checklist

Client: AECOM

Job Number: 440-245263-1

SDG Number: LVW

Login Number: 245263

List Source: Eurofins TestAmerica, Irvine

List Number: 1

Creator: Escalante, Maria I

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	Not Present
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



ANALYTICAL REPORT

Eurofins TestAmerica, Irvine
17461 Derian Ave
Suite 100
Irvine, CA 92614-5817
Tel: (949)261-1022

Laboratory Job ID: 440-245430-1
Laboratory Sample Delivery Group: LVW
Client Project/Site: NERT NDEP Phase II

For:
AECOM
1220 Avenida Acaso
Camarillo, California 93012

Attn: Carmen Caceres-Schnell



Authorized for release by:
7/17/2019 1:15:33 PM

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.



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Sample Summary

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245430-1
SDG: LVW

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
440-245430-1	NERT5.49S1-20190708	Water	07/08/19 09:35	07/09/19 10:20	
440-245430-2	AA-30-20190708	Water	07/08/19 10:50	07/09/19 10:20	
440-245430-3	NERT4.65N1-20190708	Water	07/08/19 12:30	07/09/19 10:20	
440-245430-4	NERT4.65N1-20190708-EB	Water	07/08/19 12:15	07/09/19 10:20	

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Case Narrative

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245430-1
SDG: LVW

Job ID: 440-245430-1

Laboratory: Eurofins TestAmerica, Irvine

Narrative

Job Narrative
440-245430-1

Comments

No additional comments.

Receipt

The samples were received on 7/9/2019 10:20 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.4° C.

HPLC/IC

Method(s) 300.1B: The following samples were diluted for the chlorate analyte due to the nature of the sample matrix: NERT5.49S1-20190708 (440-245430-1), NERT4.65N1-20190708 (440-245430-3) and (440-245417-B-5). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

General Chemistry

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Detection Summary

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245430-1
SDG: LVW

Client Sample ID: NERT5.49S1-20190708

Lab Sample ID: 440-245430-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perchlorate	13		4.0	0.95	ug/L	1		314.0	Total/NA

Client Sample ID: AA-30-20190708

Lab Sample ID: 440-245430-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chlorate	9500		1000	100	ug/L	50		300.1B	Total/NA
Perchlorate	3300		400	95	ug/L	100		314.0	Total/NA

Client Sample ID: NERT4.65N1-20190708

Lab Sample ID: 440-245430-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chlorate	13	J	100	10	ug/L	5		300.1B	Total/NA
Perchlorate	470		400	95	ug/L	100		314.0	Total/NA
Total Dissolved Solids	2400		20	10	mg/L	1		SM 2540C	Total/NA

Client Sample ID: NERT4.65N1-20190708-EB

Lab Sample ID: 440-245430-4

No Detections.

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Irvine

Client Sample Results

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245430-1
SDG: LVW

Client Sample ID: NERT5.49S1-20190708

Lab Sample ID: 440-245430-1

Date Collected: 07/08/19 09:35

Matrix: Water

Date Received: 07/09/19 10:20

Method: 300.1B - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	ND		100	10	ug/L	-		07/12/19 00:09	5
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	108		90 - 115					07/12/19 00:09	5

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	13		4.0	0.95	ug/L	-		07/16/19 16:57	1

Client Sample ID: AA-30-20190708

Lab Sample ID: 440-245430-2

Date Collected: 07/08/19 10:50

Matrix: Water

Date Received: 07/09/19 10:20

Method: 300.1B - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	9500		1000	100	ug/L	-		07/11/19 03:02	50
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	107		90 - 115					07/11/19 03:02	50

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	3300		400	95	ug/L	-		07/16/19 01:37	100

Client Sample ID: NERT4.65N1-20190708

Lab Sample ID: 440-245430-3

Date Collected: 07/08/19 12:30

Matrix: Water

Date Received: 07/09/19 10:20

Method: 300.1B - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	13	J	100	10	ug/L	-		07/11/19 01:13	5
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	107		90 - 115					07/11/19 01:13	5

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	470		400	95	ug/L	-		07/16/19 01:58	100

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	2400		20	10	mg/L	-		07/15/19 09:17	1

Client Sample ID: NERT4.65N1-20190708-EB

Lab Sample ID: 440-245430-4

Date Collected: 07/08/19 12:15

Matrix: Water

Date Received: 07/09/19 10:20

Method: 300.1B - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	ND		20	2.0	ug/L	-		07/10/19 13:08	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	106		90 - 115					07/10/19 13:08	1

Eurofins TestAmerica, Irvine

Client Sample Results

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245430-1
SDG: LVW

Client Sample ID: NERT4.65N1-20190708-EB

Lab Sample ID: 440-245430-4

Date Collected: 07/08/19 12:15

Matrix: Water

Date Received: 07/09/19 10:20

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		4.0	0.95	ug/L			07/15/19 16:21	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	ND		10	5.0	mg/L			07/15/19 09:17	1

Surrogate Summary

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245430-1
SDG: LVW

Method: 300.1B - Disinfection By-Products, (IC)

Matrix: Water

Prep Type: Total/NA

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	DCAA (90-115)
440-245417-B-5 MS	Matrix Spike	107
440-245417-B-5 MSD	Matrix Spike Duplicate	105
440-245430-1	NERT5.49S1-20190708	108
440-245430-2	AA-30-20190708	107
440-245430-3	NERT4.65N1-20190708	107
440-245430-4	NERT4.65N1-20190708-EB	106
440-245519-A-1 MS	Matrix Spike	111
440-245519-A-1 MSD	Matrix Spike Duplicate	112
LCS 440-556774/4	Lab Control Sample	107
LCS 440-556774/40	Lab Control Sample	110
MB 440-556774/41	Method Blank	109
MB 440-556774/5	Method Blank	109
MRL 440-556774/3	Lab Control Sample	107
MRL 440-556774/39	Lab Control Sample	108

Surrogate Legend

DCAA = Dichloroacetic acid(Surr)

Method Summary

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245430-1
SDG: LVW

Method	Method Description	Protocol	Laboratory
300.1B	Disinfection By-Products, (IC)	EPA	TAL IRV
314.0	Perchlorate (IC)	EPA	TAL IRV
SM 2540C	Solids, Total Dissolved (TDS)	SM	TAL IRV

Protocol References:

EPA = US Environmental Protection Agency
SM = "Standard Methods For The Examination Of Water And Wastewater"

Laboratory References:

TAL IRV = Eurofins TestAmerica, Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022



Lab Chronicle

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245430-1
SDG: LVW

Client Sample ID: NERT5.49S1-20190708

Lab Sample ID: 440-245430-1

Date Collected: 07/08/19 09:35

Matrix: Water

Date Received: 07/09/19 10:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.1B		5			556774	07/12/19 00:09	YZ	TAL IRV
Total/NA	Analysis	314.0		1			557815	07/16/19 16:57	CTH	TAL IRV

Client Sample ID: AA-30-20190708

Lab Sample ID: 440-245430-2

Date Collected: 07/08/19 10:50

Matrix: Water

Date Received: 07/09/19 10:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.1B		50			556774	07/11/19 03:02	YZ	TAL IRV
Total/NA	Analysis	314.0		100			557509	07/16/19 01:37	CTH	TAL IRV

Client Sample ID: NERT4.65N1-20190708

Lab Sample ID: 440-245430-3

Date Collected: 07/08/19 12:30

Matrix: Water

Date Received: 07/09/19 10:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.1B		5			556774	07/11/19 01:13	YZ	TAL IRV
Total/NA	Analysis	314.0		100			557509	07/16/19 01:58	CTH	TAL IRV
Total/NA	Analysis	SM 2540C		1	50 mL	100 mL	557514	07/15/19 09:17	XL	TAL IRV

Client Sample ID: NERT4.65N1-20190708-EB

Lab Sample ID: 440-245430-4

Date Collected: 07/08/19 12:15

Matrix: Water

Date Received: 07/09/19 10:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.1B		1			556774	07/10/19 13:08	YZ	TAL IRV
Total/NA	Analysis	314.0		1			557511	07/15/19 16:21	CTH	TAL IRV
Total/NA	Analysis	SM 2540C		1	100 mL	100 mL	557514	07/15/19 09:17	XL	TAL IRV

Laboratory References:

TAL IRV = Eurofins TestAmerica, Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022

QC Sample Results

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245430-1
SDG: LVW

Method: 300.1B - Disinfection By-Products, (IC)

Lab Sample ID: MB 440-556774/41
Matrix: Water
Analysis Batch: 556774

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	ND		20	2.0	ug/L			07/11/19 06:39	1
Surrogate	MB %Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	109		90 - 115					07/11/19 06:39	1

Lab Sample ID: MB 440-556774/5
Matrix: Water
Analysis Batch: 556774

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	ND		20	2.0	ug/L			07/10/19 08:54	1
Surrogate	MB %Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	109		90 - 115					07/10/19 08:54	1

Lab Sample ID: LCS 440-556774/4
Matrix: Water
Analysis Batch: 556774

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorate	100	101		ug/L		101	75 - 125
Surrogate	LCS %Recovery	LCS Qualifier	Limits				
Dichloroacetic acid(Surr)	107		90 - 115				

Lab Sample ID: LCS 440-556774/40
Matrix: Water
Analysis Batch: 556774

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorate	100	106		ug/L		106	75 - 125
Surrogate	LCS %Recovery	LCS Qualifier	Limits				
Dichloroacetic acid(Surr)	110		90 - 115				

Lab Sample ID: MRL 440-556774/3
Matrix: Water
Analysis Batch: 556774

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorate	20.0	10.2	J	ug/L		51	50 - 150
Surrogate	MRL %Recovery	MRL Qualifier	Limits				
Dichloroacetic acid(Surr)	107		90 - 115				

QC Sample Results

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245430-1
SDG: LVW

Method: 300.1B - Disinfection By-Products, (IC) (Continued)

Lab Sample ID: MRL 440-556774/39
Matrix: Water
Analysis Batch: 556774

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorate	20.0	20.1		ug/L	-	101	50 - 150
Surrogate	MRL %Recovery	MRL Qualifier	Limits				
<i>Dichloroacetic acid(Surr)</i>	108		90 - 115				

Lab Sample ID: 440-245417-B-5 MS
Matrix: Water
Analysis Batch: 556774

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorate	20	J	200	226		ug/L	-	103	75 - 125
Surrogate	MS %Recovery	MS Qualifier	Limits						
<i>Dichloroacetic acid(Surr)</i>	107		90 - 115						

Lab Sample ID: 440-245417-B-5 MSD
Matrix: Water
Analysis Batch: 556774

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Chlorate	20	J	200	224		ug/L	-	102	75 - 125	1	25
Surrogate	MSD %Recovery	MSD Qualifier	Limits								
<i>Dichloroacetic acid(Surr)</i>	105		90 - 115								

Lab Sample ID: 440-245519-A-1 MS
Matrix: Water
Analysis Batch: 556774

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorate	180		200	397		ug/L	-	108	75 - 125
Surrogate	MS %Recovery	MS Qualifier	Limits						
<i>Dichloroacetic acid(Surr)</i>	111		90 - 115						

Lab Sample ID: 440-245519-A-1 MSD
Matrix: Water
Analysis Batch: 556774

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Chlorate	180		200	396		ug/L	-	107	75 - 125	0	25
Surrogate	MSD %Recovery	MSD Qualifier	Limits								
<i>Dichloroacetic acid(Surr)</i>	112		90 - 115								

QC Sample Results

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245430-1
SDG: LVW

Method: 314.0 - Perchlorate (IC)

Lab Sample ID: MB 440-557509/46
Matrix: Water
Analysis Batch: 557509

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		4.0	0.95	ug/L			07/15/19 23:15	1

Lab Sample ID: LCS 440-557509/47
Matrix: Water
Analysis Batch: 557509

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	25.0	24.5		ug/L		98	85 - 115

Lab Sample ID: MRL 440-557509/8
Matrix: Water
Analysis Batch: 557509

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	4.00	4.12		ug/L		103	75 - 125

Lab Sample ID: 440-245046-A-3 MS
Matrix: Water
Analysis Batch: 557509

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	1500		2500	4080		ug/L		104	80 - 120

Lab Sample ID: 440-245046-A-3 MSD
Matrix: Water
Analysis Batch: 557509

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perchlorate	1500		2500	4120		ug/L		105	80 - 120	1	15

Lab Sample ID: MB 440-557511/6
Matrix: Water
Analysis Batch: 557511

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		4.0	0.95	ug/L			07/15/19 09:25	1

Lab Sample ID: LCS 440-557511/5
Matrix: Water
Analysis Batch: 557511

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	10.0	10.4		ug/L		104	85 - 115

Lab Sample ID: MRL 440-557511/8
Matrix: Water
Analysis Batch: 557511

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	4.00	4.00		ug/L		100	75 - 125

Eurofins TestAmerica, Irvine

QC Sample Results

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245430-1
SDG: LVW

Method: 314.0 - Perchlorate (IC)

Lab Sample ID: 440-245452-D-3 MS
Matrix: Water
Analysis Batch: 557511

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	ND		10.0	9.50		ug/L		95	80 - 120

Lab Sample ID: 440-245452-D-3 MSD
Matrix: Water
Analysis Batch: 557511

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perchlorate	ND		10.0	9.64		ug/L		96	80 - 120	1	15

Lab Sample ID: MB 440-557815/6
Matrix: Water
Analysis Batch: 557815

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		4.0	0.95	ug/L			07/16/19 15:37	1

Lab Sample ID: LCS 440-557815/5
Matrix: Water
Analysis Batch: 557815

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	25.0	25.2		ug/L		101	85 - 115

Lab Sample ID: MRL 440-557815/8
Matrix: Water
Analysis Batch: 557815

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	4.00	4.18		ug/L		105	75 - 125

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 440-557514/1
Matrix: Water
Analysis Batch: 557514

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	ND		10	5.0	mg/L			07/15/19 09:17	1

Lab Sample ID: LCS 440-557514/2
Matrix: Water
Analysis Batch: 557514

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Dissolved Solids	1000	994		mg/L		99	90 - 110

QC Sample Results

Client: AECOM
 Project/Site: NERT NDEP Phase II

Job ID: 440-245430-1
 SDG: LVW

Method: SM 2540C - Solids, Total Dissolved (TDS) (Continued)

Lab Sample ID: 440-245380-G-6 DU
Matrix: Water
Analysis Batch: 557514

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Dissolved Solids	1100		1130		mg/L	-	5	5

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- 14
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QC Association Summary

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245430-1
SDG: LVW

HPLC/IC

Analysis Batch: 556774

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245430-1	NERT5.49S1-20190708	Total/NA	Water	300.1B	
440-245430-2	AA-30-20190708	Total/NA	Water	300.1B	
440-245430-3	NERT4.65N1-20190708	Total/NA	Water	300.1B	
440-245430-4	NERT4.65N1-20190708-EB	Total/NA	Water	300.1B	
MB 440-556774/41	Method Blank	Total/NA	Water	300.1B	
MB 440-556774/5	Method Blank	Total/NA	Water	300.1B	
LCS 440-556774/4	Lab Control Sample	Total/NA	Water	300.1B	
LCS 440-556774/40	Lab Control Sample	Total/NA	Water	300.1B	
MRL 440-556774/3	Lab Control Sample	Total/NA	Water	300.1B	
MRL 440-556774/39	Lab Control Sample	Total/NA	Water	300.1B	
440-245417-B-5 MS	Matrix Spike	Total/NA	Water	300.1B	
440-245417-B-5 MSD	Matrix Spike Duplicate	Total/NA	Water	300.1B	
440-245519-A-1 MS	Matrix Spike	Total/NA	Water	300.1B	
440-245519-A-1 MSD	Matrix Spike Duplicate	Total/NA	Water	300.1B	

Analysis Batch: 557509

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245430-2	AA-30-20190708	Total/NA	Water	314.0	
440-245430-3	NERT4.65N1-20190708	Total/NA	Water	314.0	
MB 440-557509/46	Method Blank	Total/NA	Water	314.0	
LCS 440-557509/47	Lab Control Sample	Total/NA	Water	314.0	
MRL 440-557509/8	Lab Control Sample	Total/NA	Water	314.0	
440-245046-A-3 MS	Matrix Spike	Total/NA	Water	314.0	
440-245046-A-3 MSD	Matrix Spike Duplicate	Total/NA	Water	314.0	

Analysis Batch: 557511

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245430-4	NERT4.65N1-20190708-EB	Total/NA	Water	314.0	
MB 440-557511/6	Method Blank	Total/NA	Water	314.0	
LCS 440-557511/5	Lab Control Sample	Total/NA	Water	314.0	
MRL 440-557511/8	Lab Control Sample	Total/NA	Water	314.0	
440-245452-D-3 MS	Matrix Spike	Total/NA	Water	314.0	
440-245452-D-3 MSD	Matrix Spike Duplicate	Total/NA	Water	314.0	

Analysis Batch: 557815

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245430-1	NERT5.49S1-20190708	Total/NA	Water	314.0	
MB 440-557815/6	Method Blank	Total/NA	Water	314.0	
LCS 440-557815/5	Lab Control Sample	Total/NA	Water	314.0	
MRL 440-557815/8	Lab Control Sample	Total/NA	Water	314.0	

General Chemistry

Analysis Batch: 557514

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245430-3	NERT4.65N1-20190708	Total/NA	Water	SM 2540C	
440-245430-4	NERT4.65N1-20190708-EB	Total/NA	Water	SM 2540C	
MB 440-557514/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 440-557514/2	Lab Control Sample	Total/NA	Water	SM 2540C	
440-245380-G-6 DU	Duplicate	Total/NA	Water	SM 2540C	

Definitions/Glossary

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245430-1
SDG: LVW

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
▫	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Accreditation/Certification Summary

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245430-1
SDG: LVW

Laboratory: Eurofins TestAmerica, Irvine

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Nevada	State Program	9	CA015312019-5	07-31-19 *

- 1
- 2
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* Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica Phoenix
 4625 E. Cotton Center Blvd.
 Suite 189
 Phoenix, AZ 85040
 Phone: 602.437.3340 Fax:

TestAmerica
 Las Vegas
 219

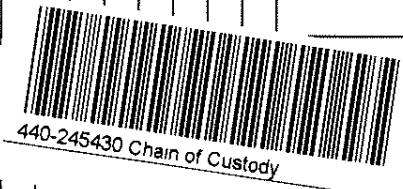
Chain of Custody Record

179788

TestAmerica
 THE LEADER IN ENVIRONMENTAL TESTING
 TestAmerica Laboratories, Inc.
 TAL-8210 (0713)

Regulatory Program: DW NPDES RCRA Other:

Client Contact		Project Manager: <i>C. Schmidt</i>		Site Contact: <i>J. CARSTRIO</i>		Date:		COC No:										
Company Name: <i>AECOM</i>		Tel/Fax: <i>719-577-3774</i>		Lab Contact:		Carrier:		_____ of _____ COCs										
Address: <i>1220 Avenida Acacia</i>		Analysis Turnaround Time <input type="checkbox"/> CALENDAR DAYS <input type="checkbox"/> WORKING DAYS TAT if different from Below _____ <input type="checkbox"/> 2 weeks <input type="checkbox"/> 1 week <i>RW</i> <input type="checkbox"/> 2 days <input type="checkbox"/> 1 day																
City/State/Zip: <i>Camarillo CA 93012</i>																		
Phone: <i>805 399 3775</i>		Sample Identification		Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	<i>Perchlorate 314.5</i>	<i>Chlorate 300.1</i>	<i>TDS 25410C</i>	<i>Dis chlorate 200.8</i>	Sampler:			
Project Name: <i>NERT NDEP Phase II</i>															For Lab Use Only:			
Site: <i>LVW</i>															Walk-in Client			
P O #: <i>60477365</i>															Lab Sampling:			
														Job / SDG No				
														Sample Specific Notes				
<i>NERT 54981-2090708</i>		<i>7/9/19</i>		<i>0935</i>	<i>G</i>	<i>SW</i>		<i>2</i>			<i>X</i>	<i>X</i>						
<i>AA-30-20190708</i>		<i>7/9/19</i>		<i>1050</i>	<i>G</i>	<i>I</i>		<i>2</i>			<i>X</i>	<i>X</i>						
<i>NERT 465N1-20190708</i>		<i>7/9/19</i>		<i>1230</i>	<i>G</i>	<i>I</i>		<i>4</i>			<i>X</i>	<i>X</i>	<i>X</i>	<i>X</i>				
<i>NERT 465N1-20190708-EB</i>		<i>7/9/19</i>		<i>1215</i>	<i>G</i>	<i>I</i>		<i>4</i>			<i>X</i>	<i>X</i>	<i>X</i>	<i>X</i>				
Preservation Used: 1=Ice, 2=HCl, 3=H2SO4, 4=HNO3, 5=NaOH, 6=Other										Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)								
Possible Hazard Identification: Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.										<i>RW</i>								
<input checked="" type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown										<input type="checkbox"/> Return to Client <input type="checkbox"/> Disposal by Lab <input type="checkbox"/> Archive for _____ Months								
Special Instructions/QC Requirements & Comments:																		
Custody Seals Intact <input type="checkbox"/> Yes <input type="checkbox"/> No																		
Relinquished by: <i>J. CARSTRIO</i>		Company: <i>AECOM</i>		Date/Time: <i>7/8/19 1300</i>		Received by: <i>[Signature]</i>		Company: <i>TRW</i>		Date/Time: <i>7/8/19 1400</i>		Cooler Temp. (°C) Obs'd: <i>32/34</i>		Therm ID No.: <i>1A-8f</i>				
Relinquished by: <i>[Signature]</i>		Company: <i>RW</i>		Date/Time: <i>7/8/19</i>		Received by: <i>[Signature]</i>		Company:		Date/Time:		Corr'd:						
Relinquished by:		Company:		Date/Time:		Received in Laboratory by: <i>[Signature]</i>		Company: <i>TRW</i>		Date/Time: <i>7/12/19</i>		Therm ID No.: <i>2/4/19 1020</i>						



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 7/19/2019

(15) TRK-1045 6317 6872



Login Sample Receipt Checklist

Client: AECOM

Job Number: 440-245430-1

SDG Number: LVW

Login Number: 245430

List Source: Eurofins TestAmerica, Irvine

List Number: 1

Creator: Escalante, Maria I

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	Not Present
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



ANALYTICAL REPORT

Eurofins TestAmerica, Irvine
17461 Derian Ave
Suite 100
Irvine, CA 92614-5817
Tel: (949)261-1022

Laboratory Job ID: 440-245430-2
Laboratory Sample Delivery Group: LVW
Client Project/Site: NERT NDEP Phase II

For:
AECOM
1220 Avenida Acaso
Camarillo, California 93012

Attn: Carmen Caceres-Schnell



Authorized for release by:
7/16/2019 4:24:27 PM

Danielle Roberts, Senior Project Manager
(949)260-3249
danielle.roberts@testamericainc.com

LINKS

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results through
TotalAccess

Have a Question?



Visit us at:
www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.



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Sample Summary

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245430-2
SDG: LVW

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
440-245430-3	NERT4.65N1-20190708	Water	07/08/19 12:30	07/09/19 10:20	
440-245430-4	NERT4.65N1-20190708-EB	Water	07/08/19 12:15	07/09/19 10:20	

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Case Narrative

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245430-2
SDG: LVW

Job ID: 440-245430-2

Laboratory: Eurofins TestAmerica, Irvine

Narrative

Job Narrative
440-245430-2

Comments

No additional comments.

Receipt

The samples were received on 7/9/2019 10:20 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.4° C.

Metals

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

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Detection Summary

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245430-2
SDG: LVW

Client Sample ID: NERT4.65N1-20190708

Lab Sample ID: 440-245430-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chromium	0.59	J	2.0	0.50	ug/L	1		200.8	Dissolved

Client Sample ID: NERT4.65N1-20190708-EB

Lab Sample ID: 440-245430-4

No Detections.

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Irvine



Client Sample Results

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245430-2
SDG: LVW

Client Sample ID: NERT4.65N1-20190708

Lab Sample ID: 440-245430-3

Date Collected: 07/08/19 12:30

Matrix: Water

Date Received: 07/09/19 10:20

Method: 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	0.59	J	2.0	0.50	ug/L		07/15/19 12:47	07/15/19 19:02	1

Client Sample ID: NERT4.65N1-20190708-EB

Lab Sample ID: 440-245430-4

Date Collected: 07/08/19 12:15

Matrix: Water

Date Received: 07/09/19 10:20

Method: 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	ND		2.0	0.50	ug/L		07/15/19 12:47	07/15/19 19:05	1

Method Summary

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245430-2
SDG: LVW

Method	Method Description	Protocol	Laboratory
200.8	Metals (ICP/MS)	EPA	TAL IRV
200.2	Preparation, Total Recoverable Metals	EPA	TAL IRV

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

TAL IRV = Eurofins TestAmerica, Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022



Lab Chronicle

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245430-2
SDG: LVW

Client Sample ID: NERT4.65N1-20190708

Lab Sample ID: 440-245430-3

Date Collected: 07/08/19 12:30

Matrix: Water

Date Received: 07/09/19 10:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	200.2			25 mL	25 mL	557574	07/15/19 12:47	EP	TAL IRV
Dissolved	Analysis	200.8		1			557666	07/15/19 19:02	P1R	TAL IRV

Client Sample ID: NERT4.65N1-20190708-EB

Lab Sample ID: 440-245430-4

Date Collected: 07/08/19 12:15

Matrix: Water

Date Received: 07/09/19 10:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	200.2			25 mL	25 mL	557574	07/15/19 12:47	EP	TAL IRV
Dissolved	Analysis	200.8		1			557666	07/15/19 19:05	P1R	TAL IRV

Laboratory References:

TAL IRV = Eurofins TestAmerica, Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022

QC Sample Results

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245430-2
SDG: LVW

Method: 200.8 - Metals (ICP/MS)

Lab Sample ID: MB 440-557574/1-A
Matrix: Water
Analysis Batch: 557666

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 557574

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	ND		2.0	0.50	ug/L		07/15/19 12:47	07/15/19 18:11	1

Lab Sample ID: LCS 440-557574/2-A
Matrix: Water
Analysis Batch: 557666

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 557574

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Chromium	80.0	80.0		ug/L		100	85 - 115

Lab Sample ID: 720-93985-C-6-B MS
Matrix: Water
Analysis Batch: 557666

Client Sample ID: Matrix Spike
Prep Type: Dissolved
Prep Batch: 557574

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Chromium	5.3		80.0	81.7		ug/L		95	70 - 130

Lab Sample ID: 720-93985-C-6-C MSD
Matrix: Water
Analysis Batch: 557666

Client Sample ID: Matrix Spike Duplicate
Prep Type: Dissolved
Prep Batch: 557574

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Chromium	5.3		80.0	82.3		ug/L		96	70 - 130	1	20

QC Association Summary

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245430-2
SDG: LVW

Metals

Prep Batch: 557574

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245430-3	NERT4.65N1-20190708	Dissolved	Water	200.2	
440-245430-4	NERT4.65N1-20190708-EB	Dissolved	Water	200.2	
MB 440-557574/1-A	Method Blank	Total Recoverable	Water	200.2	
LCS 440-557574/2-A	Lab Control Sample	Total Recoverable	Water	200.2	
720-93985-C-6-B MS	Matrix Spike	Dissolved	Water	200.2	
720-93985-C-6-C MSD	Matrix Spike Duplicate	Dissolved	Water	200.2	

Analysis Batch: 557666

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245430-3	NERT4.65N1-20190708	Dissolved	Water	200.8	557574
440-245430-4	NERT4.65N1-20190708-EB	Dissolved	Water	200.8	557574
MB 440-557574/1-A	Method Blank	Total Recoverable	Water	200.8	557574
LCS 440-557574/2-A	Lab Control Sample	Total Recoverable	Water	200.8	557574
720-93985-C-6-B MS	Matrix Spike	Dissolved	Water	200.8	557574
720-93985-C-6-C MSD	Matrix Spike Duplicate	Dissolved	Water	200.8	557574

Definitions/Glossary

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245430-2
SDG: LVW

Qualifiers

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
▫	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Accreditation/Certification Summary

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245430-2
SDG: LVW

Laboratory: Eurofins TestAmerica, Irvine

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Nevada	State Program	9	CA015312019-5	07-31-19 *

- 1
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* Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica Phoenix
 4625 E. Cotton Center Blvd.
 Suite 189
 Phoenix, AZ 85040
 Phone: 602.437.3340 Fax:


TestAmerica
 Las Vegas
 219

Chain of Custody Record

179788

TestAmerica
 THE LEADER IN ENVIRONMENTAL TESTING
 TestAmerica Laboratories, Inc.
 TAL-8210 (0713)

Regulatory Program: DW NPDES RCRA Other:

Client Contact		Project Manager: <i>C. Schmidt</i>		Site Contact: <i>J. CARSTRIO</i>		Date:		COC No:	
Company Name: <i>AECOM</i>		Tel/Fax: <i>719-577-3774</i>		Lab Contact:		Carrier:		_____ of _____ COCs	
Address: <i>1220 Avenida Acacia</i>		Analysis Turnaround Time		Filtered Sample (Y/N) Perform MS / MSD (Y/N) <i>Perchlorate 314.5</i> <i>Chlorate 300.1</i> <i>TDS 25410C</i> <i>Dis Chlorm 200.8</i>		Sampler: For Lab Use Only: Walk-in Client Lab Sampling:		Job / SDG No	
City/State/Zip: <i>Cambridge CA 93012</i>		<input type="checkbox"/> CALENDAR DAYS <input type="checkbox"/> WORKING DAYS TAT if different from Below _____						Sample Specific Notes	
Phone: <i>805 399 3775</i>		<input type="checkbox"/> 2 weeks <input type="checkbox"/> 1 week <i>RW</i> <input type="checkbox"/> 2 days <input type="checkbox"/> 1 day							
Project Name: <i>NERT NDEP Phase II</i>									
Site: <i>LVW</i>									
P O #: <i>60477365</i>									
Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.				
<i>NERT 549S1-2090708</i>	<i>7/9/19</i>	<i>0935</i>	<i>G</i>	<i>SW</i>	<i>2</i>	<i>X</i>	<i>X</i>		
<i>AA-30-2090708</i>	<i>7/9/19</i>	<i>1050</i>	<i>G</i>	<i>I</i>	<i>2</i>	<i>X</i>	<i>X</i>		
<i>NERT 465N1-2090708</i>	<i>7/9/19</i>	<i>1230</i>	<i>G</i>	<i>I</i>	<i>4</i>	<i>X</i>	<i>X</i>	<i>X</i>	<i>X</i>
<i>NERT 465N1-2090708-EB</i>	<i>7/9/19</i>	<i>1215</i>	<i>G</i>	<i>I</i>	<i>4</i>	<i>X</i>	<i>X</i>	<i>X</i>	<i>X</i>
<div style="text-align: center;">  440-245430 Chain of Custody </div>									
Preservation Used: 1=Ice, 2=HCl, 3=H2SO4, 4=HNO3, 5=NaOH, 6=Other						Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input checked="" type="checkbox"/> Return to Client <input type="checkbox"/> Disposal by Lab <input type="checkbox"/> Archive for _____ Months			
Possible Hazard Identification: Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample. <input checked="" type="checkbox"/> Non-Hazardous <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown						<i>RW</i>			
Special Instructions/QC Requirements & Comments: <div style="text-align: right;"><i>32/34 1A-8F</i></div>									
Custody Seals Intact <input type="checkbox"/> Yes <input type="checkbox"/> No		Custody Seal No.:		Cooler Temp. (°C) Obs'd _____ Corr'd _____		Therm ID No.:			
Relinquished by: <i>J. CARSTRIO</i>		Company: <i>AECOM</i>		Date/Time: <i>7/8/19 1300</i>		Received by: <i>[Signature]</i>		Company: <i>TRW</i>	
Relinquished by: <i>[Signature]</i>		Company: <i>RW</i>		Date/Time: <i>7/8/19</i>		Received by: <i>[Signature]</i>		Company: _____	
Relinquished by: _____		Company: _____		Date/Time: _____		Received in Laboratory by: <i>[Signature]</i>		Company: <i>TRW</i>	

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7/19/2019

(MS) TRK-1045 6317 6872



Login Sample Receipt Checklist

Client: AECOM

Job Number: 440-245430-2

SDG Number: LVW

Login Number: 245430

List Source: Eurofins TestAmerica, Irvine

List Number: 1

Creator: Escalante, Maria I

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	Not Present
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



ANALYTICAL REPORT

Eurofins TestAmerica, Irvine
17461 Derian Ave
Suite 100
Irvine, CA 92614-5817
Tel: (949)261-1022

Laboratory Job ID: 440-245693-1
Laboratory Sample Delivery Group: LVW
Client Project/Site: NERT NDEP Phase II

For:
AECOM
1220 Avenida Acaso
Camarillo, California 93012

Attn: Carmen Caceres-Schnell



Authorized for release by:
7/18/2019 4:45:27 PM

Danielle Roberts, Senior Project Manager
(949)260-3249
danielle.roberts@testamericainc.com

LINKS

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www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.



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Sample Summary

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245693-1
SDG: LVW

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
440-245693-1	WMW4.9S-20190709	Water	07/09/19 10:05	07/11/19 10:20	
440-245693-2	NERT4.70N1-20190709	Water	07/09/19 11:50	07/11/19 10:20	
440-245693-3	NERT4.70N1-20190709-EB	Water	07/09/19 12:05	07/11/19 10:20	
440-245693-4	NERT4.71N1-20190709	Water	07/09/19 12:55	07/11/19 10:20	
440-245693-5	WMW5.7N-20190709	Water	07/09/19 14:00	07/11/19 10:20	

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Case Narrative

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245693-1
SDG: LVW

Job ID: 440-245693-1

Laboratory: Eurofins TestAmerica, Irvine

Narrative

Job Narrative
440-245693-1

Comments

No additional comments.

Receipt

The samples were received on 7/11/2019 10:20 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.0° C.

HPLC/IC

Method(s) 300.1B: The following samples were diluted for the chlorate analyte due to the nature of the sample matrix: NERT4.70N1-20190709 (440-245693-2), NERT4.71N1-20190709 (440-245693-4) and WMW5.7N-20190709 (440-245693-5). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

General Chemistry

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

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Detection Summary

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245693-1
SDG: LVW

Client Sample ID: WMW4.9S-20190709

Lab Sample ID: 440-245693-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chlorate	3000		1000	100	ug/L	50		300.1B	Total/NA
Perchlorate	850		400	95	ug/L	100		314.0	Total/NA

Client Sample ID: NERT4.70N1-20190709

Lab Sample ID: 440-245693-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perchlorate	140		40	9.5	ug/L	10		314.0	Total/NA
Total Dissolved Solids	1800		20	10	mg/L	1		SM 2540C	Total/NA

Client Sample ID: NERT4.70N1-20190709-EB

Lab Sample ID: 440-245693-3

No Detections.

Client Sample ID: NERT4.71N1-20190709

Lab Sample ID: 440-245693-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perchlorate	160		40	9.5	ug/L	10		314.0	Total/NA
Total Dissolved Solids	1800		20	10	mg/L	1		SM 2540C	Total/NA

Client Sample ID: WMW5.7N-20190709

Lab Sample ID: 440-245693-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perchlorate	12		4.0	0.95	ug/L	1		314.0	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Irvine

Client Sample Results

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245693-1
SDG: LVW

Client Sample ID: WMW4.9S-20190709

Lab Sample ID: 440-245693-1

Date Collected: 07/09/19 10:05

Matrix: Water

Date Received: 07/11/19 10:20

Method: 300.1B - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	3000		1000	100	ug/L	-		07/15/19 19:09	50
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	103		90 - 115					07/15/19 19:09	50

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	850		400	95	ug/L	-		07/16/19 05:01	100

Client Sample ID: NERT4.70N1-20190709

Lab Sample ID: 440-245693-2

Date Collected: 07/09/19 11:50

Matrix: Water

Date Received: 07/11/19 10:20

Method: 300.1B - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	ND		100	10	ug/L	-		07/16/19 04:13	5
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	102		90 - 115					07/16/19 04:13	5

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	140		40	9.5	ug/L	-		07/16/19 16:13	10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	1800		20	10	mg/L	-		07/16/19 10:01	1

Client Sample ID: NERT4.70N1-20190709-EB

Lab Sample ID: 440-245693-3

Date Collected: 07/09/19 12:05

Matrix: Water

Date Received: 07/11/19 10:20

Method: 300.1B - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	ND		20	2.0	ug/L	-		07/16/19 00:36	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	103		90 - 115					07/16/19 00:36	1

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		4.0	0.95	ug/L	-		07/15/19 16:03	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	ND		10	5.0	mg/L	-		07/16/19 10:01	1

Client Sample Results

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245693-1
SDG: LVW

Client Sample ID: NERT4.71N1-20190709

Lab Sample ID: 440-245693-4

Date Collected: 07/09/19 12:55

Matrix: Water

Date Received: 07/11/19 10:20

Method: 300.1B - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	ND		100	10	ug/L	-		07/16/19 04:49	5

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	105		90 - 115		07/16/19 04:49	5

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	160		40	9.5	ug/L	-		07/16/19 16:31	10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	1800		20	10	mg/L	-		07/16/19 10:01	1

Client Sample ID: WMW5.7N-20190709

Lab Sample ID: 440-245693-5

Date Collected: 07/09/19 14:00

Matrix: Water

Date Received: 07/11/19 10:20

Method: 300.1B - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	ND		100	10	ug/L	-		07/16/19 05:25	5

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	103		90 - 115		07/16/19 05:25	5

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	12		4.0	0.95	ug/L	-		07/16/19 15:55	1

Surrogate Summary

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245693-1
SDG: LVW

Method: 300.1B - Disinfection By-Products, (IC)

Matrix: Water

Prep Type: Total/NA

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	DCAA (90-115)
440-245693-1	WMW4.9S-20190709	103
440-245693-2	NERT4.70N1-20190709	102
440-245693-2 MS	NERT4.70N1-20190709	102
440-245693-2 MSD	NERT4.70N1-20190709	103
440-245693-3	NERT4.70N1-20190709-EB	103
440-245693-4	NERT4.71N1-20190709	105
440-245693-5	WMW5.7N-20190709	103
LCS 440-557434/46	Lab Control Sample	103
MB 440-557434/47	Method Blank	103
MRL 440-557434/45	Lab Control Sample	104

Surrogate Legend

DCAA = Dichloroacetic acid(Surr)

Method Summary

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245693-1
SDG: LVW

Method	Method Description	Protocol	Laboratory
300.1B	Disinfection By-Products, (IC)	EPA	TAL IRV
314.0	Perchlorate (IC)	EPA	TAL IRV
SM 2540C	Solids, Total Dissolved (TDS)	SM	TAL IRV

Protocol References:

EPA = US Environmental Protection Agency
SM = "Standard Methods For The Examination Of Water And Wastewater"

Laboratory References:

TAL IRV = Eurofins TestAmerica, Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022



Lab Chronicle

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245693-1
SDG: LVW

Client Sample ID: WMW4.9S-20190709

Lab Sample ID: 440-245693-1

Date Collected: 07/09/19 10:05

Matrix: Water

Date Received: 07/11/19 10:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.1B		50			557434	07/15/19 19:09	YZ	TAL IRV
Total/NA	Analysis	314.0		100			557509	07/16/19 05:01	CTH	TAL IRV

Client Sample ID: NERT4.70N1-20190709

Lab Sample ID: 440-245693-2

Date Collected: 07/09/19 11:50

Matrix: Water

Date Received: 07/11/19 10:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.1B		5			557434	07/16/19 04:13	YZ	TAL IRV
Total/NA	Analysis	314.0		10			557816	07/16/19 16:13	CTH	TAL IRV
Total/NA	Analysis	SM 2540C		1	50 mL	100 mL	557739	07/16/19 10:01	XL	TAL IRV

Client Sample ID: NERT4.70N1-20190709-EB

Lab Sample ID: 440-245693-3

Date Collected: 07/09/19 12:05

Matrix: Water

Date Received: 07/11/19 10:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.1B		1			557434	07/16/19 00:36	YZ	TAL IRV
Total/NA	Analysis	314.0		1			557511	07/15/19 16:03	CTH	TAL IRV
Total/NA	Analysis	SM 2540C		1	100 mL	100 mL	557739	07/16/19 10:01	XL	TAL IRV

Client Sample ID: NERT4.71N1-20190709

Lab Sample ID: 440-245693-4

Date Collected: 07/09/19 12:55

Matrix: Water

Date Received: 07/11/19 10:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.1B		5			557434	07/16/19 04:49	YZ	TAL IRV
Total/NA	Analysis	314.0		10			557816	07/16/19 16:31	CTH	TAL IRV
Total/NA	Analysis	SM 2540C		1	50 mL	100 mL	557739	07/16/19 10:01	XL	TAL IRV

Client Sample ID: WMW5.7N-20190709

Lab Sample ID: 440-245693-5

Date Collected: 07/09/19 14:00

Matrix: Water

Date Received: 07/11/19 10:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.1B		5			557434	07/16/19 05:25	YZ	TAL IRV
Total/NA	Analysis	314.0		1			557816	07/16/19 15:55	CTH	TAL IRV

Laboratory References:

TAL IRV = Eurofins TestAmerica, Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022

QC Sample Results

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245693-1
SDG: LVW

Method: 300.1B - Disinfection By-Products, (IC)

Lab Sample ID: MB 440-557434/47
Matrix: Water
Analysis Batch: 557434

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	ND		20	2.0	ug/L			07/15/19 13:07	1
Surrogate	MB %Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	103		90 - 115					07/15/19 13:07	1

Lab Sample ID: LCS 440-557434/46
Matrix: Water
Analysis Batch: 557434

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorate	100	102		ug/L		102	75 - 125
Surrogate	LCS %Recovery	LCS Qualifier	Limits				
Dichloroacetic acid(Surr)	103		90 - 115				

Lab Sample ID: MRL 440-557434/45
Matrix: Water
Analysis Batch: 557434

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorate	20.0	19.2	J	ug/L		96	50 - 150
Surrogate	MRL %Recovery	MRL Qualifier	Limits				
Dichloroacetic acid(Surr)	104		90 - 115				

Lab Sample ID: 440-245693-2 MS
Matrix: Water
Analysis Batch: 557434

Client Sample ID: NERT4.70N1-20190709
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorate	ND		200	196		ug/L		98	75 - 125
Surrogate	MS %Recovery	MS Qualifier	Limits						
Dichloroacetic acid(Surr)	102		90 - 115						

Lab Sample ID: 440-245693-2 MSD
Matrix: Water
Analysis Batch: 557434

Client Sample ID: NERT4.70N1-20190709
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Chlorate	ND		200	199		ug/L		99	75 - 125	1	25
Surrogate	MSD %Recovery	MSD Qualifier	Limits								
Dichloroacetic acid(Surr)	103		90 - 115								

QC Sample Results

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245693-1
SDG: LVW

Method: 314.0 - Perchlorate (IC)

Lab Sample ID: MB 440-557509/46
Matrix: Water
Analysis Batch: 557509

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		4.0	0.95	ug/L			07/15/19 23:15	1

Lab Sample ID: LCS 440-557509/47
Matrix: Water
Analysis Batch: 557509

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	25.0	24.5		ug/L		98	85 - 115

Lab Sample ID: MRL 440-557509/8
Matrix: Water
Analysis Batch: 557509

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	4.00	4.12		ug/L		103	75 - 125

Lab Sample ID: 440-245046-A-3 MS
Matrix: Water
Analysis Batch: 557509

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	1500		2500	4080		ug/L		104	80 - 120

Lab Sample ID: 440-245046-A-3 MSD
Matrix: Water
Analysis Batch: 557509

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perchlorate	1500		2500	4120		ug/L		105	80 - 120	1	15

Lab Sample ID: MB 440-557511/6
Matrix: Water
Analysis Batch: 557511

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		4.0	0.95	ug/L			07/15/19 09:25	1

Lab Sample ID: LCS 440-557511/5
Matrix: Water
Analysis Batch: 557511

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	10.0	10.4		ug/L		104	85 - 115

Lab Sample ID: MRL 440-557511/8
Matrix: Water
Analysis Batch: 557511

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	4.00	4.00		ug/L		100	75 - 125

Eurofins TestAmerica, Irvine

QC Sample Results

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245693-1
SDG: LVW

Method: 314.0 - Perchlorate (IC)

Lab Sample ID: 440-245452-D-3 MS
Matrix: Water
Analysis Batch: 557511

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	ND		10.0	9.50		ug/L		95	80 - 120

Lab Sample ID: 440-245452-D-3 MSD
Matrix: Water
Analysis Batch: 557511

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perchlorate	ND		10.0	9.64		ug/L		96	80 - 120	1	15

Lab Sample ID: MB 440-557816/6
Matrix: Water
Analysis Batch: 557816

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		4.0	0.95	ug/L			07/16/19 14:49	1

Lab Sample ID: LCS 440-557816/5
Matrix: Water
Analysis Batch: 557816

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	25.0	24.2		ug/L		97	85 - 115

Lab Sample ID: MRL 440-557816/8
Matrix: Water
Analysis Batch: 557816

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	4.00	4.12		ug/L		103	75 - 125

Lab Sample ID: 440-245693-5 MS
Matrix: Water
Analysis Batch: 557816

Client Sample ID: WMW5.7N-20190709
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	12		25.0	37.8		ug/L		104	80 - 120

Lab Sample ID: 440-245693-5 MSD
Matrix: Water
Analysis Batch: 557816

Client Sample ID: WMW5.7N-20190709
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perchlorate	12		25.0	37.7		ug/L		103	80 - 120	0	15

QC Sample Results

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245693-1
SDG: LVW

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 440-557739/1
Matrix: Water
Analysis Batch: 557739

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	ND		10	5.0	mg/L			07/16/19 10:01	1

Lab Sample ID: LCS 440-557739/2
Matrix: Water
Analysis Batch: 557739

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Dissolved Solids	1000	1060		mg/L		106	90 - 110

Lab Sample ID: 440-245493-A-1 DU
Matrix: Water
Analysis Batch: 557739

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Dissolved Solids	290		287		mg/L		0.3	5

QC Association Summary

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245693-1
SDG: LVW

HPLC/IC

Analysis Batch: 557434

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245693-1	WMW4.9S-20190709	Total/NA	Water	300.1B	
440-245693-2	NERT4.70N1-20190709	Total/NA	Water	300.1B	
440-245693-3	NERT4.70N1-20190709-EB	Total/NA	Water	300.1B	
440-245693-4	NERT4.71N1-20190709	Total/NA	Water	300.1B	
440-245693-5	WMW5.7N-20190709	Total/NA	Water	300.1B	
MB 440-557434/47	Method Blank	Total/NA	Water	300.1B	
LCS 440-557434/46	Lab Control Sample	Total/NA	Water	300.1B	
MRL 440-557434/45	Lab Control Sample	Total/NA	Water	300.1B	
440-245693-2 MS	NERT4.70N1-20190709	Total/NA	Water	300.1B	
440-245693-2 MSD	NERT4.70N1-20190709	Total/NA	Water	300.1B	

Analysis Batch: 557509

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245693-1	WMW4.9S-20190709	Total/NA	Water	314.0	
MB 440-557509/46	Method Blank	Total/NA	Water	314.0	
LCS 440-557509/47	Lab Control Sample	Total/NA	Water	314.0	
MRL 440-557509/8	Lab Control Sample	Total/NA	Water	314.0	
440-245046-A-3 MS	Matrix Spike	Total/NA	Water	314.0	
440-245046-A-3 MSD	Matrix Spike Duplicate	Total/NA	Water	314.0	

Analysis Batch: 557511

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245693-3	NERT4.70N1-20190709-EB	Total/NA	Water	314.0	
MB 440-557511/6	Method Blank	Total/NA	Water	314.0	
LCS 440-557511/5	Lab Control Sample	Total/NA	Water	314.0	
MRL 440-557511/8	Lab Control Sample	Total/NA	Water	314.0	
440-245452-D-3 MS	Matrix Spike	Total/NA	Water	314.0	
440-245452-D-3 MSD	Matrix Spike Duplicate	Total/NA	Water	314.0	

Analysis Batch: 557816

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245693-2	NERT4.70N1-20190709	Total/NA	Water	314.0	
440-245693-4	NERT4.71N1-20190709	Total/NA	Water	314.0	
440-245693-5	WMW5.7N-20190709	Total/NA	Water	314.0	
MB 440-557816/6	Method Blank	Total/NA	Water	314.0	
LCS 440-557816/5	Lab Control Sample	Total/NA	Water	314.0	
MRL 440-557816/8	Lab Control Sample	Total/NA	Water	314.0	
440-245693-5 MS	WMW5.7N-20190709	Total/NA	Water	314.0	
440-245693-5 MSD	WMW5.7N-20190709	Total/NA	Water	314.0	

General Chemistry

Analysis Batch: 557739

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245693-2	NERT4.70N1-20190709	Total/NA	Water	SM 2540C	
440-245693-3	NERT4.70N1-20190709-EB	Total/NA	Water	SM 2540C	
440-245693-4	NERT4.71N1-20190709	Total/NA	Water	SM 2540C	
MB 440-557739/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 440-557739/2	Lab Control Sample	Total/NA	Water	SM 2540C	
440-245493-A-1 DU	Duplicate	Total/NA	Water	SM 2540C	

Definitions/Glossary

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245693-1
SDG: LVW

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
▫	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Accreditation/Certification Summary

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245693-1
SDG: LVW

Laboratory: Eurofins TestAmerica, Irvine

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Nevada	State Program	9	CA015312019-5	07-31-19 *

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* Accreditation/Certification renewal pending - accreditation/certification considered valid.

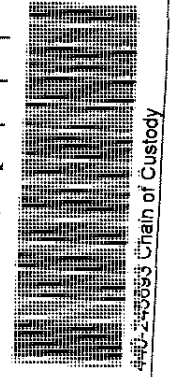
TA 12W

Regulatory Program: DW NPDES RCRA Other:

Client Contact	Project Manager: <i>C Casarot-Schnell</i>	Site Contact: <i>J CARTRIO</i>	Date:	COC No
Company Name: <i>AECOM</i>	Tel/Fax: <i>818-517-3126</i>	Lab Contact:	Carrier:	<i>1</i> of <i>1</i> COCs
Address: <i>1220 Avenida Nevada</i>	Analysis Turnaround Time		Sampler:	
City/State/Zip: <i>Cambridge CA 93012</i>	<input type="checkbox"/> CALENDAR DAYS <input type="checkbox"/> WORKING DAYS		For Lab Use Only:	
Phone: <i>905 398 3725</i>	TAT if different from Below _____		Walk-in Client:	
Fax:	<input type="checkbox"/> 2 weeks		Lab Sampling:	
Project Name: <i>NERT NDEP Phase II</i>	<input type="checkbox"/> 1 week <i>Per WO</i>		Job / SDG No: <i>6/12</i>	
Site: <i>LVW</i>	<input type="checkbox"/> 2 days			
P O #: <i>60477365</i>	<input type="checkbox"/> 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS/MSD (Y/N)	Arch Chlorate 314.6	Chlorate 300.1	TDS 2540	D15 Chrome 200.8	Sample Specific Notes
<i>WMW4.9S-20190709</i>	<i>7/9/19</i>	<i>1005</i>	<i>G</i>	<i>GW</i>	<i>2</i>			<i>x</i>	<i>x</i>			
<i>NERT4.70N1-20190709</i>	<i>7/9/19</i>	<i>1150</i>			<i>4</i>			<i>x</i>	<i>x</i>	<i>x</i>	<i>x</i>	
<i>NERT4.70N1-20190709-EB</i>		<i>1205</i>			<i>4</i>			<i>x</i>	<i>x</i>	<i>x</i>	<i>x</i>	
<i>NERT4.71N1-20190709</i>		<i>1255</i>			<i>4</i>			<i>x</i>	<i>x</i>	<i>x</i>	<i>x</i>	
<i>WMW5.7N-20190709</i>		<i>1400</i>			<i>2</i>			<i>x</i>	<i>x</i>			

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Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4= HNO3; 5= NaOH; 6= Other _____

Possible Hazard Identification: Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample

Non-Hazard Flammable Skin Irritant Poison B Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

Per WO Return to Client Disposal by Lab Archive for _____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No	Custody Seal No: _____	Cooler Temp (°C) Obs'd: _____	Therm ID No: _____
Relinquished by: <i>J CARTRIO</i>	Company: <i>AECOM</i>	Date/Time: <i>7/10/19 0920</i>	Received by: <i>CU</i>
Relinquished by: <i>JAM</i>	Company: <i>TALVS</i>	Date/Time: <i>7-10-19 1600</i>	Received by: <i>FedEx</i>
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: <i>Oga Omeles</i>
			Company: <i>TA 12W</i>
			Date/Time: <i>7/11/19 1020</i>

7/18/2019

12-91 8.6
 23/20 IR-94
 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1

TA# 1045 6317 6953

cls

Login Sample Receipt Checklist

Client: AECOM

Job Number: 440-245693-1

SDG Number: LVW

Login Number: 245693

List Number: 1

Creator: Skinner, Alma D

List Source: Eurofins TestAmerica, Irvine

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	Not Present
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



ANALYTICAL REPORT

Eurofins TestAmerica, Irvine
17461 Derian Ave
Suite 100
Irvine, CA 92614-5817
Tel: (949)261-1022

Laboratory Job ID: 440-245693-2
Laboratory Sample Delivery Group: LVW
Client Project/Site: NERT NDEP Phase II

For:
AECOM
1220 Avenida Acaso
Camarillo, California 93012

Attn: Carmen Caceres-Schnell



Authorized for release by:
7/18/2019 4:54:49 PM

Danielle Roberts, Senior Project Manager
(949)260-3249
danielle.roberts@testamericainc.com

LINKS

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The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.



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Sample Summary

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245693-2
SDG: LVW

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
440-245693-2	NERT4.70N1-20190709	Water	07/09/19 11:50	07/11/19 10:20	
440-245693-3	NERT4.70N1-20190709-EB	Water	07/09/19 12:05	07/11/19 10:20	
440-245693-4	NERT4.71N1-20190709	Water	07/09/19 12:55	07/11/19 10:20	

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Case Narrative

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245693-2
SDG: LVW

Job ID: 440-245693-2

Laboratory: Eurofins TestAmerica, Irvine

Narrative

**Job Narrative
440-245693-2**

Comments

No additional comments.

Receipt

The samples were received on 7/11/2019 10:20 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.0° C.

Metals

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

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Detection Summary

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245693-2
SDG: LVW

Client Sample ID: NERT4.70N1-20190709

Lab Sample ID: 440-245693-2

No Detections.

Client Sample ID: NERT4.70N1-20190709-EB

Lab Sample ID: 440-245693-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chromium	0.70	J	2.0	0.50	ug/L	1		200.8	Dissolved

Client Sample ID: NERT4.71N1-20190709

Lab Sample ID: 440-245693-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chromium	0.69	J	2.0	0.50	ug/L	1		200.8	Dissolved

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Irvine



Client Sample Results

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245693-2
SDG: LVW

Client Sample ID: NERT4.70N1-20190709

Lab Sample ID: 440-245693-2

Date Collected: 07/09/19 11:50

Matrix: Water

Date Received: 07/11/19 10:20

Method: 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	ND		2.0	0.50	ug/L		07/17/19 12:07	07/17/19 20:00	1

Client Sample ID: NERT4.70N1-20190709-EB

Lab Sample ID: 440-245693-3

Date Collected: 07/09/19 12:05

Matrix: Water

Date Received: 07/11/19 10:20

Method: 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	0.70	J	2.0	0.50	ug/L		07/15/19 12:39	07/15/19 22:10	1

Client Sample ID: NERT4.71N1-20190709

Lab Sample ID: 440-245693-4

Date Collected: 07/09/19 12:55

Matrix: Water

Date Received: 07/11/19 10:20

Method: 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	0.69	J	2.0	0.50	ug/L		07/15/19 12:39	07/15/19 22:13	1

Method Summary

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245693-2
SDG: LVW

Method	Method Description	Protocol	Laboratory
200.8	Metals (ICP/MS)	EPA	TAL IRV
200.2	Preparation, Total Recoverable Metals	EPA	TAL IRV

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

TAL IRV = Eurofins TestAmerica, Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022



Lab Chronicle

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245693-2
SDG: LVW

Client Sample ID: NERT4.70N1-20190709

Lab Sample ID: 440-245693-2

Date Collected: 07/09/19 11:50

Matrix: Water

Date Received: 07/11/19 10:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	200.2			25 mL	25 mL	557997	07/17/19 12:07	EP	TAL IRV
Dissolved	Analysis	200.8		1			558111	07/17/19 20:00	P1R	TAL IRV

Client Sample ID: NERT4.70N1-20190709-EB

Lab Sample ID: 440-245693-3

Date Collected: 07/09/19 12:05

Matrix: Water

Date Received: 07/11/19 10:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	200.2			25 mL	25 mL	557573	07/15/19 12:39	EP	TAL IRV
Dissolved	Analysis	200.8		1			557670	07/15/19 22:10	P1R	TAL IRV

Client Sample ID: NERT4.71N1-20190709

Lab Sample ID: 440-245693-4

Date Collected: 07/09/19 12:55

Matrix: Water

Date Received: 07/11/19 10:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	200.2			25 mL	25 mL	557573	07/15/19 12:39	EP	TAL IRV
Dissolved	Analysis	200.8		1			557670	07/15/19 22:13	P1R	TAL IRV

Laboratory References:

TAL IRV = Eurofins TestAmerica, Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022

QC Sample Results

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245693-2
SDG: LVW

Method: 200.8 - Metals (ICP/MS)

Lab Sample ID: MB 440-557573/1-A
Matrix: Water
Analysis Batch: 557670

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 557573

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	ND		2.0	0.50	ug/L		07/15/19 12:39	07/15/19 21:20	1

Lab Sample ID: LCS 440-557573/2-A
Matrix: Water
Analysis Batch: 557670

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 557573

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Chromium	80.0	76.6		ug/L		96	85 - 115

Lab Sample ID: MB 440-557997/1-A
Matrix: Water
Analysis Batch: 558111

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 557997

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	ND		2.0	0.50	ug/L		07/17/19 12:07	07/17/19 19:26	1

Lab Sample ID: LCS 440-557997/2-A
Matrix: Water
Analysis Batch: 558111

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 557997

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Chromium	80.0	79.6		ug/L		99	85 - 115

Lab Sample ID: 440-245657-J-1-H MS
Matrix: Water
Analysis Batch: 557670

Client Sample ID: Matrix Spike
Prep Type: Dissolved
Prep Batch: 557573

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Chromium	12		80.0	85.6		ug/L		92	70 - 130

Lab Sample ID: 440-245657-J-1-I MSD
Matrix: Water
Analysis Batch: 557670

Client Sample ID: Matrix Spike Duplicate
Prep Type: Dissolved
Prep Batch: 557573

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Chromium	12		80.0	84.9		ug/L		91	70 - 130	1	20

Lab Sample ID: 440-245802-J-1-H MS
Matrix: Water
Analysis Batch: 558111

Client Sample ID: Matrix Spike
Prep Type: Dissolved
Prep Batch: 557997

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Chromium	2.0		80.0	78.9		ug/L		96	70 - 130

Lab Sample ID: 440-245802-J-1-I MSD
Matrix: Water
Analysis Batch: 558111

Client Sample ID: Matrix Spike Duplicate
Prep Type: Dissolved
Prep Batch: 557997

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Chromium	2.0		80.0	75.7		ug/L		92	70 - 130	4	20

Eurofins TestAmerica, Irvine

QC Association Summary

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245693-2
SDG: LVW

Metals

Prep Batch: 557573

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245693-3	NERT4.70N1-20190709-EB	Dissolved	Water	200.2	
440-245693-4	NERT4.71N1-20190709	Dissolved	Water	200.2	
MB 440-557573/1-A	Method Blank	Total Recoverable	Water	200.2	
LCS 440-557573/2-A	Lab Control Sample	Total Recoverable	Water	200.2	
440-245657-J-1-H MS	Matrix Spike	Dissolved	Water	200.2	
440-245657-J-1-I MSD	Matrix Spike Duplicate	Dissolved	Water	200.2	

Analysis Batch: 557670

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245693-3	NERT4.70N1-20190709-EB	Dissolved	Water	200.8	557573
440-245693-4	NERT4.71N1-20190709	Dissolved	Water	200.8	557573
MB 440-557573/1-A	Method Blank	Total Recoverable	Water	200.8	557573
LCS 440-557573/2-A	Lab Control Sample	Total Recoverable	Water	200.8	557573
440-245657-J-1-H MS	Matrix Spike	Dissolved	Water	200.8	557573
440-245657-J-1-I MSD	Matrix Spike Duplicate	Dissolved	Water	200.8	557573

Prep Batch: 557997

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245693-2	NERT4.70N1-20190709	Dissolved	Water	200.2	
MB 440-557997/1-A	Method Blank	Total Recoverable	Water	200.2	
LCS 440-557997/2-A	Lab Control Sample	Total Recoverable	Water	200.2	
440-245802-J-1-H MS	Matrix Spike	Dissolved	Water	200.2	
440-245802-J-1-I MSD	Matrix Spike Duplicate	Dissolved	Water	200.2	

Analysis Batch: 558111

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245693-2	NERT4.70N1-20190709	Dissolved	Water	200.8	557997
MB 440-557997/1-A	Method Blank	Total Recoverable	Water	200.8	557997
LCS 440-557997/2-A	Lab Control Sample	Total Recoverable	Water	200.8	557997
440-245802-J-1-H MS	Matrix Spike	Dissolved	Water	200.8	557997
440-245802-J-1-I MSD	Matrix Spike Duplicate	Dissolved	Water	200.8	557997

Definitions/Glossary

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245693-2
SDG: LVW

Qualifiers

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
▫	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Accreditation/Certification Summary

Client: AECOM
Project/Site: NERT NDEP Phase II

Job ID: 440-245693-2
SDG: LVW

Laboratory: Eurofins TestAmerica, Irvine

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Nevada	State Program	9	CA015312019-5	07-31-19 *

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica Phoenix
 4625 E. Cotton Center Blvd.
 Suite 189
 Phoenix, AZ 85046
 Phone: 602.437.3340 Fax:

TA 12W

TestAmerica Chain of Custody Record
 Las Vegas
 219

179791

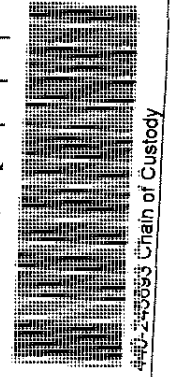
TestAmerica
 THE LEADER IN ENVIRONMENTAL TESTING
 TestAmerica Laboratories, Inc.
 TAL-8210 (0713)

Regulatory Program: DW NPDES RCRA Other:

Client Contact	Project Manager: <i>C Casarot-Schnell</i>	Site Contact: <i>J CARSTRIO</i>	Date:	COC No
Company Name: <i>AECOM</i>	Tel/Fax: <i>818-517-3126</i>	Lab Contact:	Carrier:	<i>1</i> of <i>1</i> COCs
Address: <i>1220 Avenida Nevada</i>	Analysis Turnaround Time		Sampler:	
City/State/Zip: <i>Cambridge CA 93012</i>	<input type="checkbox"/> CALENDAR DAYS <input type="checkbox"/> WORKING DAYS		For Lab Use Only:	
Phone: <i>905 398 3725</i>	TAT if different from Below _____		Walk-in Client:	
Fax:	<input type="checkbox"/> 2 weeks <input type="checkbox"/> 1 week <input type="checkbox"/> 2 days <input type="checkbox"/> 1 day		Lab Sampling:	
Project Name: <i>NERT NDEP Phase II</i>	<i>Per WO</i>		Job / SDG No: <i>6/12</i>	
Site: <i>LVW</i>				
P O #: <i>60477365</i>				

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS/MSD (Y/N)	Arch Chlorate 314.6	Chlorate 300.1	TDS 2540	D15 Chrome 200.8	Sample Specific Notes
<i>WMW4.9S-20190709</i>	<i>7/9/19</i>	<i>1005</i>	<i>G</i>	<i>GW</i>	<i>2</i>			<i>x</i>	<i>x</i>			
<i>NERT4.70N1-20190709</i>	<i>7/9/19</i>	<i>1150</i>			<i>4</i>			<i>x</i>	<i>x</i>	<i>x</i>	<i>x</i>	
<i>NERT4.70N1-20190709-EB</i>		<i>1205</i>			<i>4</i>			<i>x</i>	<i>x</i>	<i>x</i>	<i>x</i>	
<i>NERT4.71N1-20190709</i>		<i>1255</i>			<i>4</i>			<i>x</i>	<i>x</i>	<i>x</i>	<i>x</i>	
<i>WMW5.7N-20190709</i>		<i>1400</i>			<i>2</i>			<i>x</i>	<i>x</i>			

Page 13 of 14



Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4= HNO3; 5= NaOH; 6= Other _____

Possible Hazard Identification: Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample

Non-Hazard Flammable Skin Irritant Poison B Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

Per WO Return to Client Disposal by Lab Archive for _____ Months

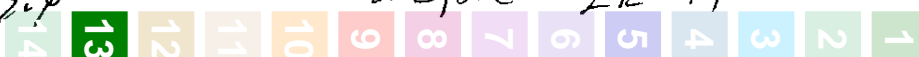
Special Instructions/QC Requirements & Comments:

Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No	Custody Seal No: _____	Cooler Temp (°C) Obs'd: _____	Therm ID No: _____
Relinquished by: <i>J CARSTRIO</i>	Company: <i>AECOM</i>	Date/Time: <i>7/10/19 0920</i>	Received by: <i>CU</i> Company: _____ Date/Time: <i>7/10/19 9:20</i>
Relinquished by: <i>JAM</i>	Company: <i>TALVS</i>	Date/Time: <i>7-10-19 1600</i>	Received by: <i>FedEx</i> Company: _____ Date/Time: _____
Relinquished by: _____	Company: _____	Date/Time: _____	Received in Laboratory by: <i>Oga Omeles</i> Company: <i>TA 12W</i> Date/Time: <i>7/11/19 1020</i>

7/18/2019

12-91 8.4 *23/20 IR-94* *cls*

TA# 1045 6317 6953



Login Sample Receipt Checklist

Client: AECOM

Job Number: 440-245693-2

SDG Number: LVW

Login Number: 245693

List Number: 1

Creator: Skinner, Alma D

List Source: Eurofins TestAmerica, Irvine

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	Not Present
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



July 11, 2019

Chad Roper
AECOM
1220 Avenida Acaso
Camarillo, CA 93012

Lab ID:

- Las Vegas, NV (NV930, CA3029)
 Reno, NV (NV015, CA2526)

Project: 60477365

Workorder No.: 19061527

Dear Chad Roper:

Silver State Labs-Las Vegas received 3 sample(s) on 6/26/2019 for the analyses presented in the following report.

There were no problems with the analytical events associated with this report unless noted in the Case Narrative. Analytical results reported as non-detect (ND) in the result field are below the Practical Quantification Limit (PQL). Analytical results above the PQL are reported as the measured value in the results field.

Quality control data is within laboratory defined or method specified acceptance limits except if noted.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,



John Sloan
Laboratory Technical Director
3626 E. Sunset Road, Suite 100
Las Vegas, NV 89120



Silver State Labs-Las Vegas
 3626 E. Sunset Road, Suite 100
 Las Vegas, NV 89120
 (702) 873-4478 FAX: (702) 873-7967
 www.ssalabs.com

Analytical Report

WO#: 19061527
 Date Reported: 7/11/2019

CLIENT: AECOM **Collection Date:** 6/26/2019 12:35:00 PM
Project: 60477365
Lab ID: 19061527-01 **Matrix:** GROUNDWATER
Client Sample ID NERT-3.35S1-20190626

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
----------	--------	----	------	-------	----	---------------

HEXAVALENT CHROMIUM-SDWA-LO LEVEL				EPA 218.7		Analyst: JS
Chromium, Hexavalent	ND	1.00		µg/L	1	7/7/2019 9:09:00 PM

**Qualifiers:
(Qual)**

DF Dilution Factor.
 MCL Maximum Contaminant Level.
 PQL Practical Quantitation Limit.

H Holding times for preparation or analysis exceeded.
 ND Not Detected at the PQL.

Original



Silver State Labs-Las Vegas
 3626 E. Sunset Road, Suite 100
 Las Vegas, NV 89120
 (702) 873-4478 FAX: (702) 873-7967
 www.ssalabs.com

Analytical Report

WO#: 19061527
 Date Reported: 7/11/2019

CLIENT: AECOM **Collection Date:** 6/26/2019 12:35:00 PM
Project: 60477365
Lab ID: 19061527-02 **Matrix:** GROUNDWATER
Client Sample ID NERT-3.35S1-20190626-FD

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
HEXAVALENT CHROMIUM-SDWA-LO LEVEL				EPA 218.7		Analyst: JS
Chromium, Hexavalent	ND	1.00		µg/L	1	7/7/2019 9:23:00 PM

**Qualifiers:
(Qual)**

DF Dilution Factor.
 MCL Maximum Contaminant Level.
 PQL Practical Quantitation Limit.

H Holding times for preparation or analysis exceeded.
 ND Not Detected at the PQL.

Original



Silver State Labs-Las Vegas
 3626 E. Sunset Road, Suite 100
 Las Vegas, NV 89120
 (702) 873-4478 FAX: (702) 873-7967
 www.ssalabs.com

Analytical Report

WO#: 19061527
 Date Reported: 7/11/2019

CLIENT: AECOM **Collection Date:** 6/26/2019 2:45:00 PM
Project: 60477365
Lab ID: 19061527-03 **Matrix:** GROUNDWATER
Client Sample ID NERT-3.40S1-20190626

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
HEXAVALENT CHROMIUM-SDWA-LO LEVEL				EPA 218.7		Analyst: JS
Chromium, Hexavalent	ND	1.00		µg/L	1	7/7/2019 9:38:00 PM

**Qualifiers:
(Qual)**

DF Dilution Factor.
 MCL Maximum Contaminant Level.
 PQL Practical Quantitation Limit.

H Holding times for preparation or analysis exceeded.
 ND Not Detected at the PQL.

Original



Silver State Labs-Las Vegas
 3626 E. Sunset Road, Suite 100
 Las Vegas, NV 89120
 (702) 873-4478 FAX: (702) 873-7967
 www.ssalabs.com

QC SUMMARY REPORT

WO#: 19061527

11-Jul-19

Client: AECOM

Project: 60477365

TestCode: CR6-SDWA-218.7

Sample ID: ICV-R31012	SampType: ICV	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/7/2019	RunNo: 31012						
Client ID: ICV	Batch ID: R31012	TestNo: E218.7	Analysis Date: 7/7/2019	SeqNo: 713304							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	53.9	1.00	50.00	0	108	90	110				

Sample ID: ICB-R31012	SampType: ICB	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/7/2019	RunNo: 31012						
Client ID: ICB	Batch ID: R31012	TestNo: E218.7	Analysis Date: 7/7/2019	SeqNo: 713305							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	ND	1.00									

Sample ID: CCV-R31012	SampType: CCV	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/8/2019	RunNo: 31012						
Client ID: CCV	Batch ID: R31012	TestNo: E218.7	Analysis Date: 7/8/2019	SeqNo: 713306							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	52.2	1.00	50.00	0	104	90	110				

Sample ID: CCB-R31012	SampType: CCB	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/8/2019	RunNo: 31012						
Client ID: CCB	Batch ID: R31012	TestNo: E218.7	Analysis Date: 7/8/2019	SeqNo: 713307							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	ND	1.00									

Qualifiers: H Holding times for preparation or analysis exceeded.

MCL Maximum Contaminant Level.

ND Not Detected at the PQL.

Original



Silver State Labs-Las Vegas
3626 E. Sunset Road, Suite 100
Las Vegas, NV 89120
(702) 873-4478 FAX: (702) 873-7967
www.ssalabs.com

QC SUMMARY REPORT

WO#: 19061527

11-Jul-19

Client: AECOM
Project: 60477365

TestCode: CR6-SDWA-218.7

Sample ID: CCB-R31012	SampType: CCB	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/8/2019	RunNo: 31012
Client ID: CCB	Batch ID: R31012	TestNo: E218.7		Analysis Date: 7/8/2019	SeqNo: 713307
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qual

Sample ID: MB-R31012	SampType: MBLK	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/7/2019	RunNo: 31012
Client ID: PBW	Batch ID: R31012	TestNo: E218.7		Analysis Date: 7/7/2019	SeqNo: 713308
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qual
Chromium, Hexavalent	ND	1.00			

Sample ID: LCS-R31012	SampType: LCS	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/7/2019	RunNo: 31012
Client ID: LCSW	Batch ID: R31012	TestNo: E218.7		Analysis Date: 7/7/2019	SeqNo: 713309
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qual
Chromium, Hexavalent	20.7	1.00	20.00	0	104 90 110

Sample ID: 19061403-04CMS	SampType: MS	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/7/2019	RunNo: 31012
Client ID: BatchQC	Batch ID: R31012	TestNo: E218.7		Analysis Date: 7/7/2019	SeqNo: 713313
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qual
Chromium, Hexavalent	18.8	1.00	5.000	14.04	95.4 90 110

Qualifiers: H Holding times for preparation or analysis exceeded.

MCL Maximum Contaminant Level.

ND Not Detected at the PQL.

Original



Silver State Labs-Las Vegas
3626 E. Sunset Road, Suite 100
Las Vegas, NV 89120
(702) 873-4478 FAX: (702) 873-7967
www.ssalabs.com

QC SUMMARY REPORT

WO#: 19061527

11-Jul-19

Client: AECOM

Project: 60477365

TestCode: CR6-SDWA-218.7

Sample ID: 19061403-04CMSD	SampType: MSD	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/7/2019	RunNo: 31012						
Client ID: BatchQC	Batch ID: R31012	TestNo: E218.7	Analysis Date: 7/7/2019	SeqNo: 713314							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	19.1	1.00	5.000	14.04	101	90	110	18.81	1.45	20	

Sample ID: 19061616-01AMS	SampType: MS	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/7/2019	RunNo: 31012						
Client ID: BatchQC	Batch ID: R31012	TestNo: E218.7	Analysis Date: 7/7/2019	SeqNo: 713322							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	13.9	1.00	5.000	9.093	96.6	90	110				

Sample ID: 19061616-01AMSD	SampType: MSD	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/7/2019	RunNo: 31012						
Client ID: BatchQC	Batch ID: R31012	TestNo: E218.7	Analysis Date: 7/7/2019	SeqNo: 713323							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	13.8	1.00	5.000	9.093	94.7	90	110	13.92	0.662	20	

Qualifiers: H Holding times for preparation or analysis exceeded.

MCL Maximum Contaminant Level.

ND Not Detected at the PQL.

Original

Report Results To:
 Report Attention: Chad Roper
 Company: AECOM
 Mailing Address: 1220 Avenida Acaso
 City, State, Zip: Camarillo CA 93012
 Phone: 805-764-4027 Email / Fax: chad.ropert@aecom.com

Project Number: 60477365

Send Invoice To:
 Invoice Attention: Carmen Caceras Schnell PO# _____ Quote # _____
 Company: AECOM
 Mailing Address: 6200 South Quebec St
 City, State, Zip: Greenwood Village Co 80111
 Phone: 805 764 4031 Email / Fax: Carmen.Caceras-schnell@aecom.com

COMPLIANCE MONITORING?
 Yes No
 Results: Invoice:

NEW ADDRESS:

Applicable Program
 SDWA CWA RCRA
 Mining Other _____

QC Level Report
 I II III IV Per w/d

NOTE: Surcharges apply to Level II, III and IV reports.

Sampled by: J CAROTRIX Signature: [Signature]

I attest to the validity and authenticity of the sample. I am aware that tampering with or intentionally mislabeling the sample location, date or time is considered fraud and may be grounds for legal action.

Standard: Standard TAT 7-10 Business Days. Note that some tests vary.
Rush
 Same Day: 3 Day: Other (specify): Per work order
 1 Day: 4 Day:
 2 Day: 5 Day: Rush results will be issued after 4:00 p.m.

NOTE: A Rush Surcharge is applied for rush samples

Other Pertinent Information / Special Instructions

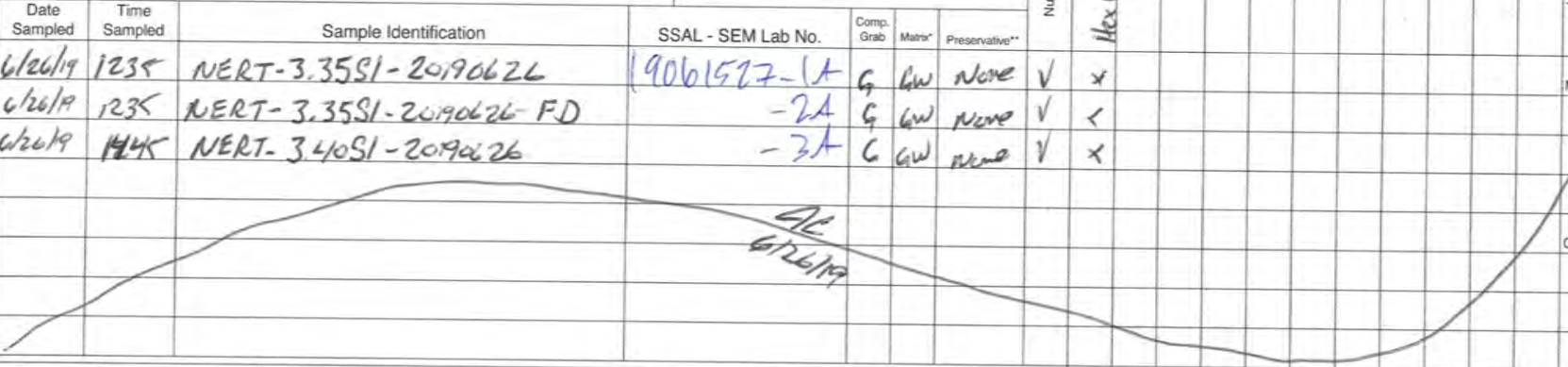
ANALYSES REQUESTED

Date Sampled	Time Sampled	Sample Identification	SSAL - SEM Lab No.	Comp. Grab	Matr*	Preservative**	Number / Type of Containers ...	Metals*
6/26/19	1235	NERT-3.3551-20190626	19061527-1A	G	GW	None	Method Hex Chromium 219.7	✓ x
6/26/19	1235	NERT-3.3551-20190626-FD	-2A	G	GW	None		✓ <
6/26/19	1445	NERT-3.4051-20190626	-3A	G	GW	None		✓ x

Send Results Via:
 Mail: Email: Fax:
Per work order

Send Invoice Via:
 Mail: Email: Fax:

Field Measurements
 On-Site pH: _____ Chlorine: _____
 Temperature: _____ Other: _____



COMMENTS:

Signature	Print Name	Company	Date	Time
<u>[Signature]</u>	<u>J CAROTRIX</u>	<u>AECOM</u>	<u>6/26/19</u>	<u>1610</u>
<u>[Signature]</u>	<u>Kathryn Rawlins</u>	<u>SSAL</u>	<u>6-22-19</u>	<u>1610</u>
<u>[Signature]</u>	<u>J CAROTRIX</u>	<u>AECOM</u>	<u>6/26/19</u>	<u>1610</u>

Authorization is required to process samples. This obligates your organization for service fees. SSAL Standard T & C's or other written agreement applies. If collections or legal services are required to recover said fees, your organization will be responsible for all fees and costs in addition to service fees.

Matrix* DW-Drinking Water, WW-Waste Water, GW-Ground Water, SW-Surface Water, SS-Soil, S-Solid, OT-Other
 Preservative** 1=H₂SO₄, 2=HNO₃, 3=HCl, 4=NaOH, 5=Na₂S₂O₃, 6=None, 7=Other

Samples are discarded 30 days after results are reported unless other arrangements are made and storage fees may apply. The analytical results associated with this COC apply only to these samples as they are received by the laboratory. The liability of the laboratory is limited to the amount paid for the report.

Container*** P-Plastic, G-Glass, V-Voa Vial, OT-Other

Certificate of Analysis

Hexavalent Chromium Standard, 100 ppm Cr⁶⁺
Lot Number: 1807D61

Product Number: 2095

Manufacture Date: JUL 11, 2018

Expiration Date: JAN 2020

Name	CAS#	Grade
Water	7732-18-5	ACS/ASTM/USP/EP
Potassium Dichromate	7778-50-9	ACS

Test	Specification	Result	NIST SRM#
Appearance	Orange liquid	Passed	
Assay (vs. Sodium Thiosulfate/Starch)	99.5-100.5 ppm Cr	100.5 ppm Cr	136

Specification	Reference
Cr(VI) stock solution, 100 mg/L Cr ⁶⁺	APHA (3500-Cr C)

Volumetric glassware complies with Class A tolerance requirements of ASTM E 288 and NIST Circular 434; it is calibrated before first use and recalibrated regularly in accordance with ASTM E 542 and NIST Procedure NBSIR 74-461. Balances are calibrated regularly with weights certified traceable to the NIST national mass standard. Thermometers and temperature probes are calibrated before first use and recalibrated regularly with a thermometer traceable to NIST standards. All products are prepared according to master documents that assure manufacture according to validated methods. Batch records document raw material traceability and production and testing history for each lot manufactured.

Part Number	Size / Package Type	Shelf Life (Unopened Container)
2095-4	120 mL natural poly	18 months

Recommended Storage: 15°C - 30°C (59°F - 86°F)



Israel Alamudun (07/11/2018)

Quality Control Supervisor

This Certificate of Analysis is designed to comply with ISO Guide 31 "Reference Materials -- Contents of Certificates and Labels."

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Certificate of analysis

Product No.: 42234

Hexavalent Chromium Standard

Concentration: **1000 ± 5 µg/mL**Starting Material: $((\text{NH}_4)_2\text{Cr}_2\text{O}_7)$

Lot No.: 8132650

Matrix: H_2O

Expiry Date: November 30, 2020

This solution is intended for use as a calibration standard for Hexavalent Chromium (Cr^{6+}). The certified concentration is based upon gravimetric procedures, ie., weight per volume composition of high purity raw material dissolved and diluted with ASTM Type I water. The uncertainty associated with the certified concentration is approximated by summing the estimated errors due to the purity of the starting material, the gravimetric preparation of the solution, and transpiration of the solution through the container wall.

NIST Traceability: All balances and class A volumetrics are calibrated regularly in accordance with NIST recommended procedures. In order to verify the concentration, the final solution was checked by titration against NIST SRM 136f.

Shelf Life: Alfa Aesar guarantees the accuracy of this Specpure® solution until the expiry date shown above, provided it is kept tightly capped and stored under normal laboratory conditions. We recommend preparing fresh working solutions daily by diluting with the same matrix and using certified class A volumetrics.

5/14/2018

Certification Date

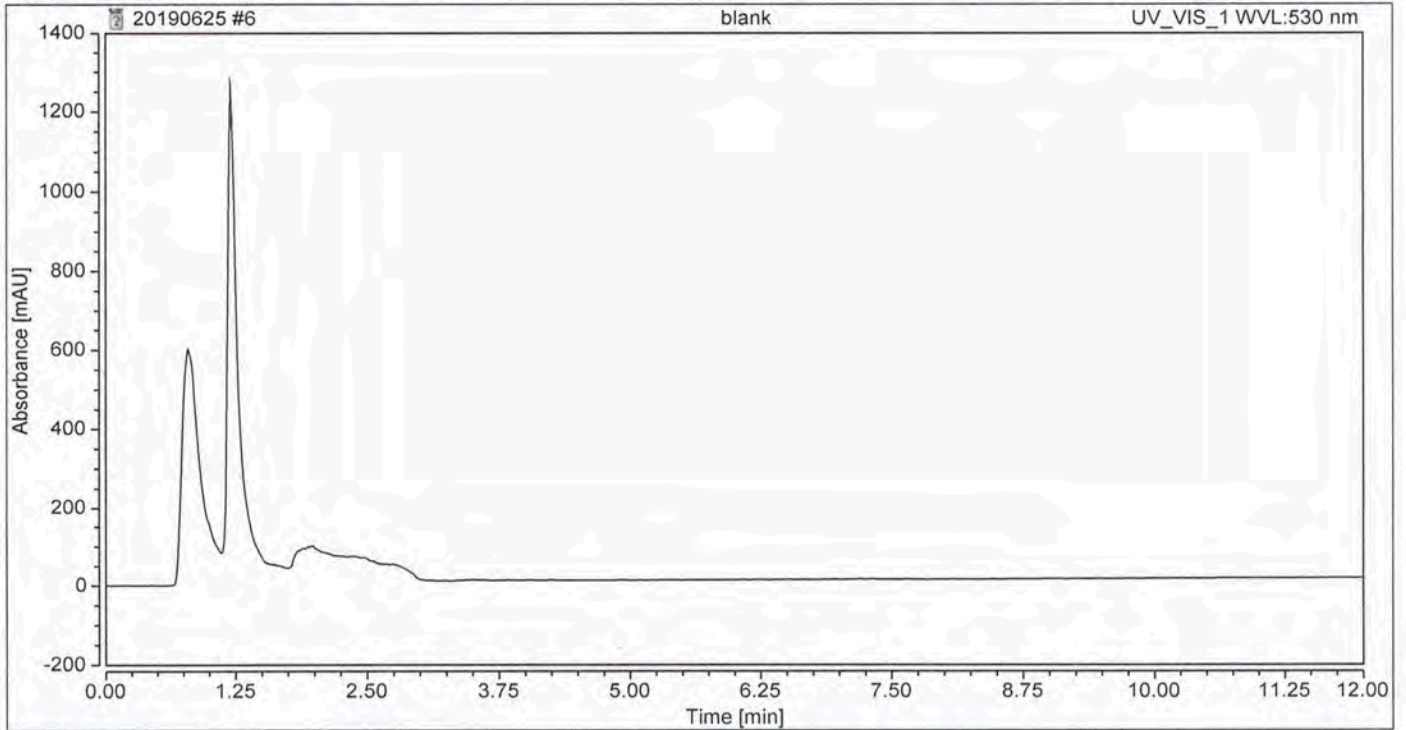
This document has been electronically generated and does not require a signature.

Chromatogram and Results

Injection Details

Injection Name:	blank	Run Time (min):	12.00
Vial Number:	4	Injection Volume:	5000.00
Injection Type:	Unknown	Channel:	UV_VIS_1
Calibration Level:		Wavelength:	530.0
Instrument Method:	AS7_8min	Bandwidth:	n.a.
Processing Method:	AS_CR_8min_0409	Dilution Factor:	1.0000
Injection Date/Time:	7/7/2019 16:21	Sample Weight:	1.0000

Chromatogram



Integration Results

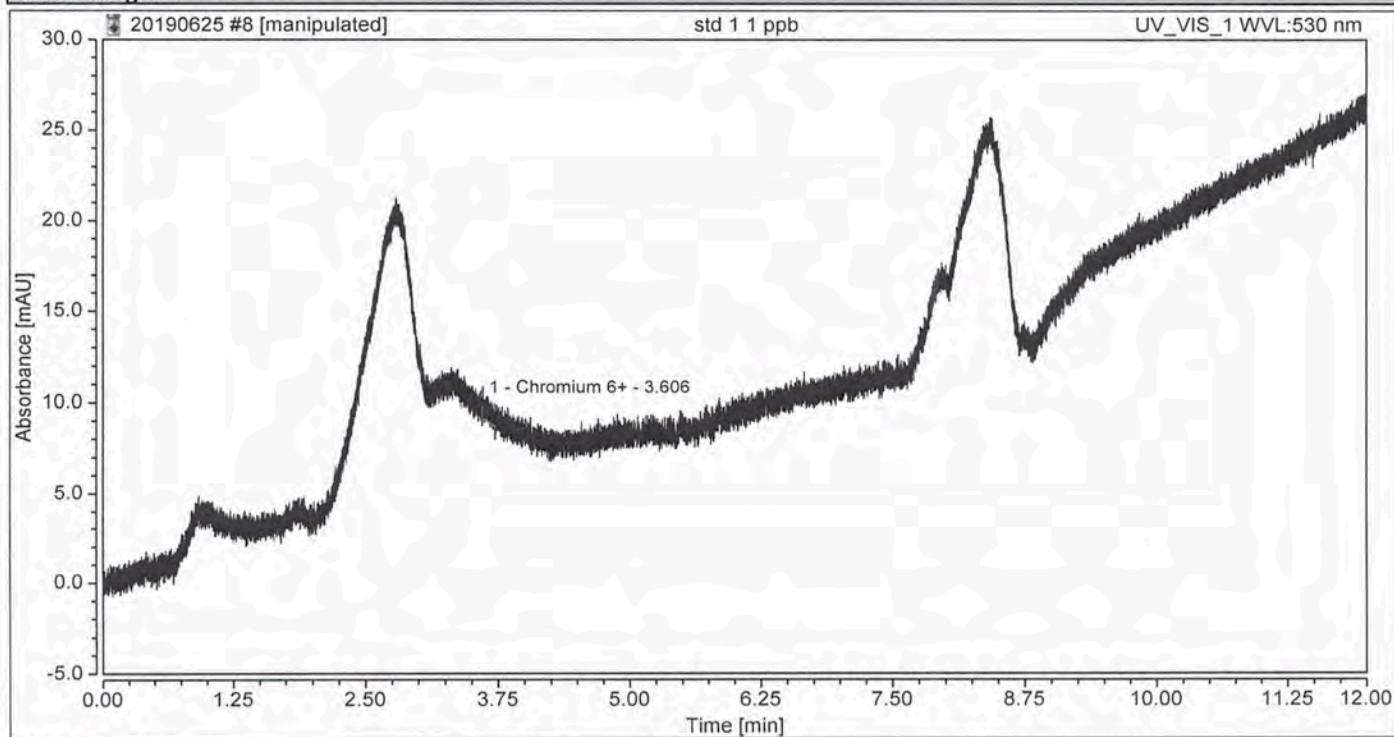
No.	Peak Name	Retention Time min	Area mAU*min	Height mAU	Relative Area %	Relative Height %	Amount
n.a.	Chromium 6+	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Total:			0.000	0.000	0.00	0.00	

Chromatogram and Results

Injection Details

Injection Name:	std 1 1 ppb	Run Time (min):	12.00
Vial Number:	4	Injection Volume:	5000.00
Injection Type:	Calibration Standard	Channel:	UV_VIS_1
Calibration Level:	01	Wavelength:	530.0
Instrument Method:	AS7_8min	Bandwidth:	n.a.
Processing Method:	AS_CR_8min_0409	Dilution Factor:	1.0000
Injection Date/Time:	7/7/2019 16:50	Sample Weight:	1.0000

Chromatogram



Integration Results

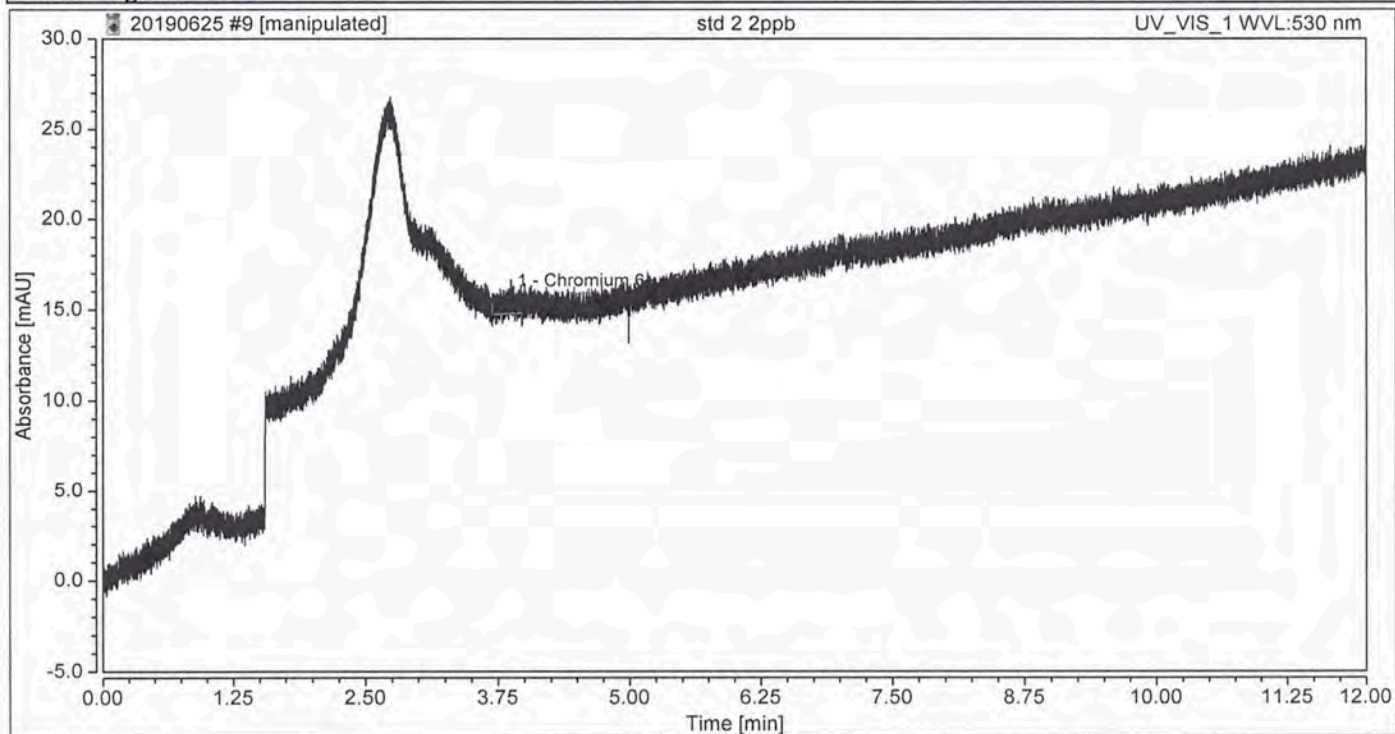
No.	Peak Name	Retention Time min	Area mAU*min	Height mAU	Relative Area %	Relative Height %	Amount
1	Chromium 6+	3.606	0.064	1.074	100.00	100.00	0.6698
Total:			0.064	1.074	100.00	100.00	

Chromatogram and Results

Injection Details

Injection Name:	std 2 2ppb	Run Time (min):	12.00
Vial Number:	4	Injection Volume:	5000.00
Injection Type:	Calibration Standard	Channel:	UV_VIS_1
Calibration Level:	02	Wavelength:	530.0
Instrument Method:	AS7_8min	Bandwidth:	n.a.
Processing Method:	AS_CR_8min_0409	Dilution Factor:	1.0000
Injection Date/Time:	7/7/2019 17:04	Sample Weight:	1.0000

Chromatogram



Integration Results

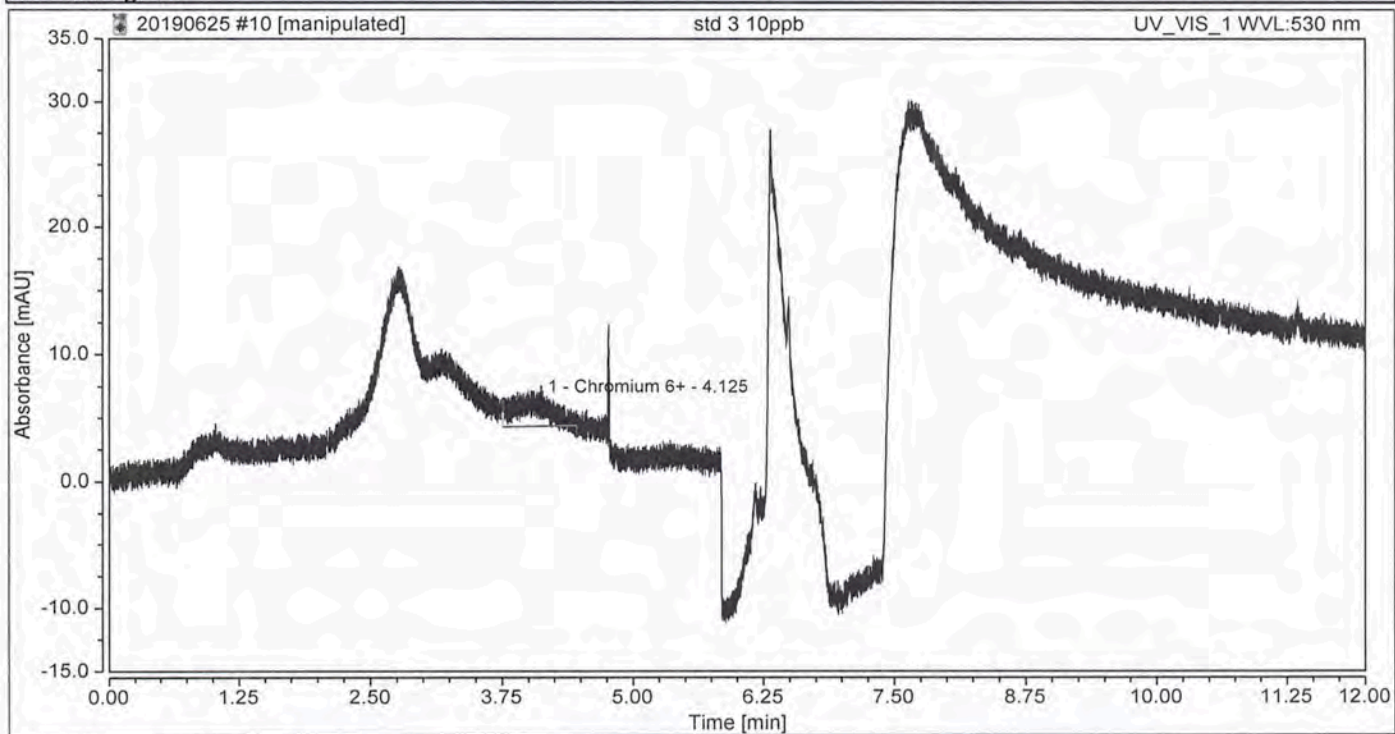
No.	Peak Name	Retention Time min	Area mAU*min	Height mAU	Relative Area %	Relative Height %	Amount
1	Chromium 6+	3.873	0.143	1.199	100.00	100.00	1.4947
Total:			0.143	1.199	100.00	100.00	

Chromatogram and Results

Injection Details

Injection Name:	std 3 10ppb	Run Time (min):	12.00
Vial Number:	4	Injection Volume:	5000.00
Injection Type:	Calibration Standard	Channel:	UV_VIS_1
Calibration Level:	03	Wavelength:	530.0
Instrument Method:	AS7_8min	Bandwidth:	n.a.
Processing Method:	AS_CR_8min_0409	Dilution Factor:	1.0000
Injection Date/Time:	7/7/2019 17:19	Sample Weight:	1.0000

Chromatogram



Integration Results

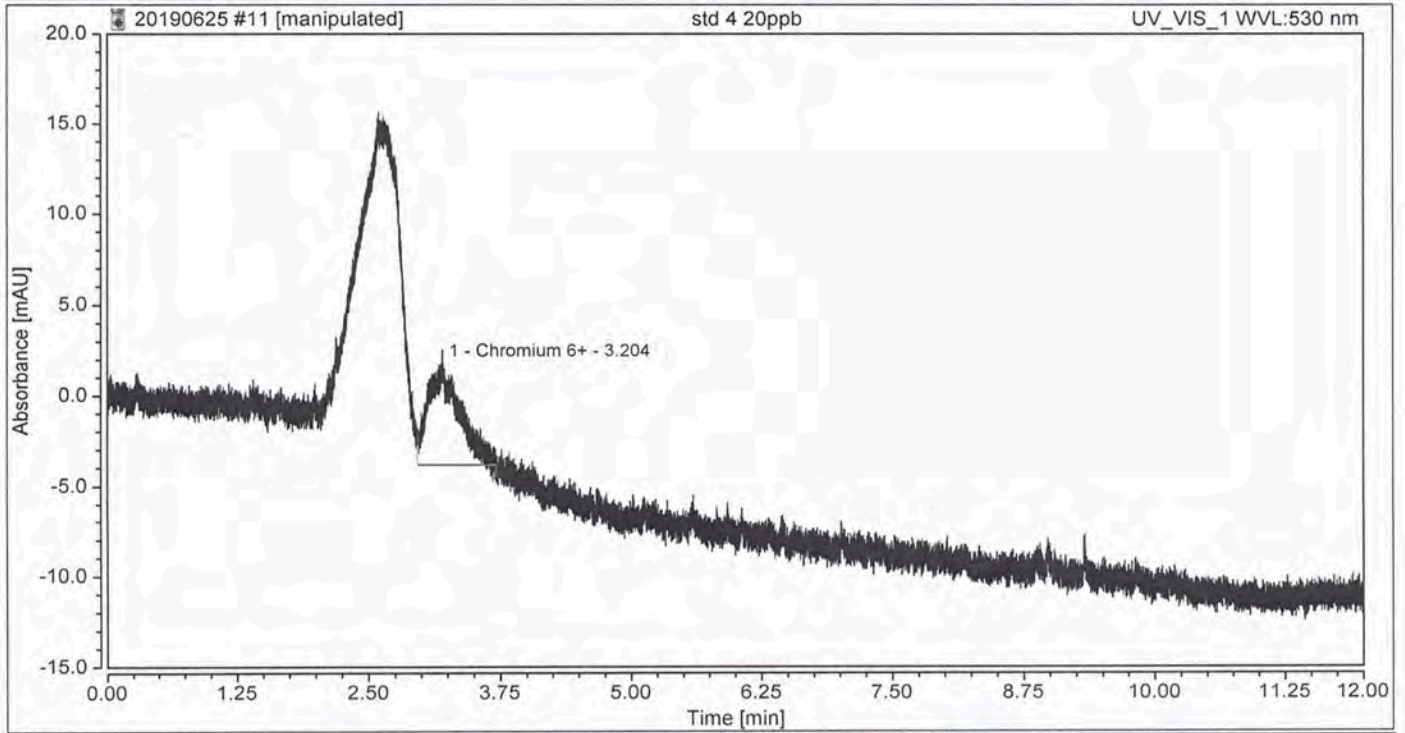
No.	Peak Name	Retention Time min	Area mAU*min	Height mAU	Relative Area %	Relative Height %	Amount
1	Chromium 6+	4.125	0.856	2.208	100.00	100.00	8.9432
Total:			0.856	2.208	100.00	100.00	

Chromatogram and Results

Injection Details

Injection Name:	std 4 20ppb	Run Time (min):	12.00
Vial Number:	4	Injection Volume:	5000.00
Injection Type:	Calibration Standard	Channel:	UV_VIS_1
Calibration Level:	04	Wavelength:	530.0
Instrument Method:	AS7_8min	Bandwidth:	n.a.
Processing Method:	AS_CR_8min_0409	Dilution Factor:	1.0000
Injection Date/Time:	7/7/2019 17:33	Sample Weight:	1.0000

Chromatogram



Integration Results

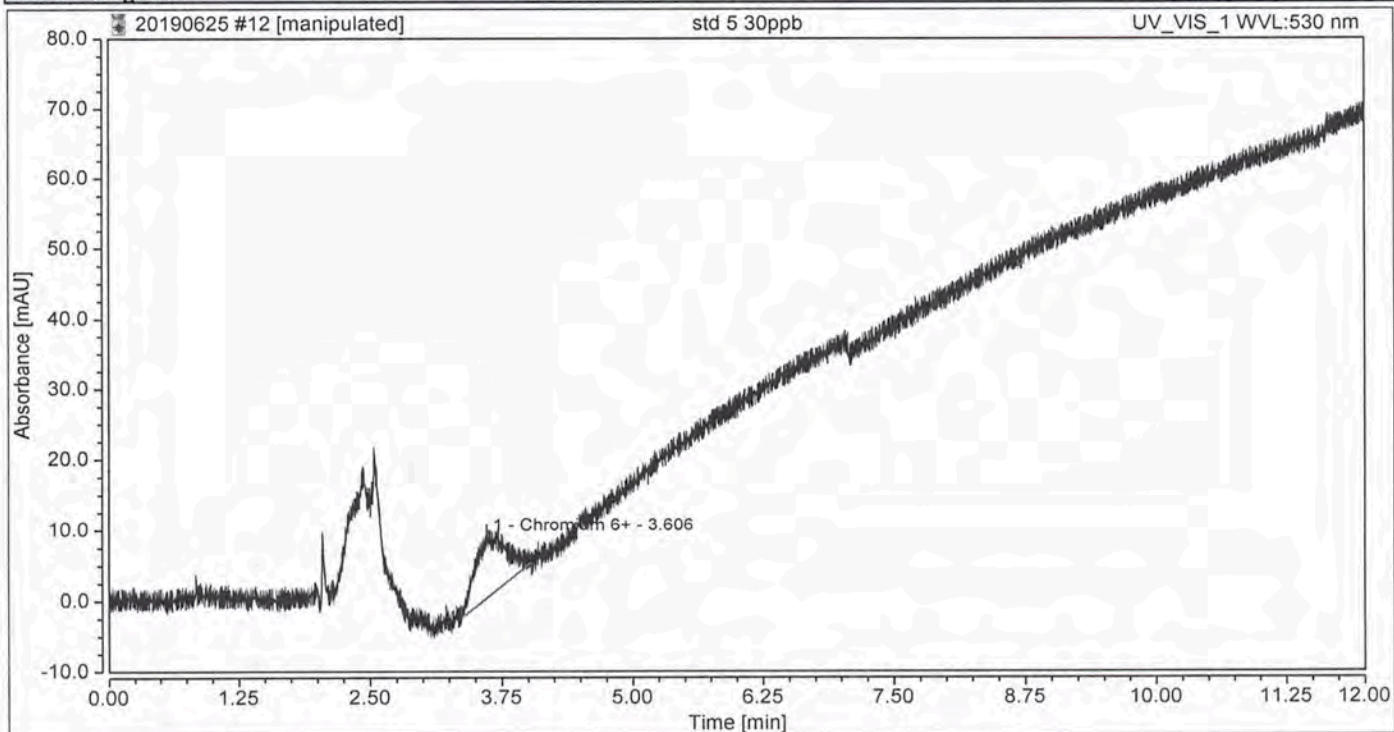
No.	Peak Name	Retention Time min	Area mAU*min	Height mAU	Relative Area %	Relative Height %	Amount
1	Chromium 6+	3.204	1.880	5.679	100.00	100.00	19.6387
Total:			1.880	5.679	100.00	100.00	

Chromatogram and Results

Injection Details

Injection Name:	std 5 30ppb	Run Time (min):	12.00
Vial Number:	4	Injection Volume:	5000.00
Injection Type:	Calibration Standard	Channel:	UV_VIS_1
Calibration Level:	05	Wavelength:	530.0
Instrument Method:	AS7_8min	Bandwidth:	n.a.
Processing Method:	AS_CR_8min_0409	Dilution Factor:	1.0000
Injection Date/Time:	7/7/2019 17:47	Sample Weight:	1.0000

Chromatogram



Integration Results

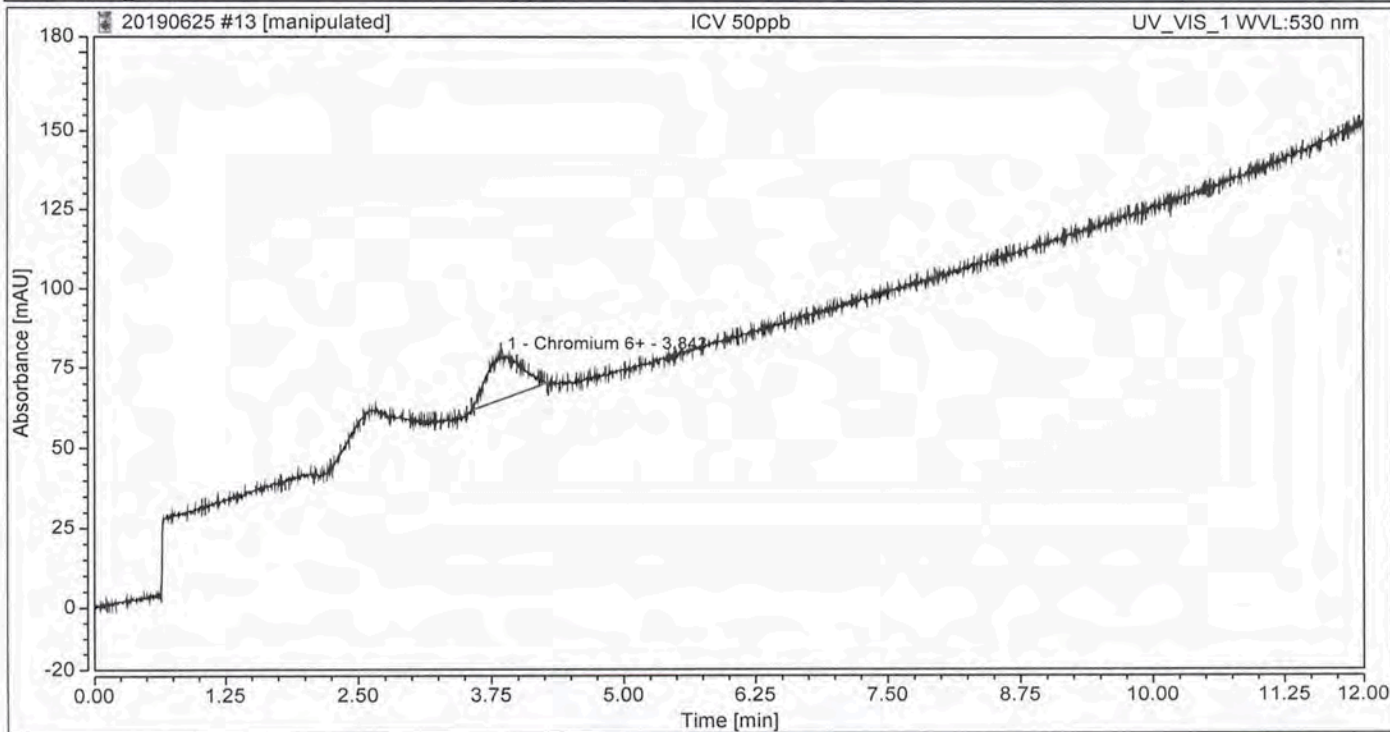
No.	Peak Name	Retention Time min	Area mAU*min	Height mAU	Relative Area %	Relative Height %	Amount
1	Chromium 6+	3.606	2.933	8.715	100.00	100.00	30.6378
Total:			2.933	8.715	100.00	100.00	

Chromatogram and Results

Injection Details

Injection Name:	ICV 50ppb	Run Time (min):	12.00
Vial Number:	4	Injection Volume:	5000.00
Injection Type:	Calibration Standard	Channel:	UV_VIS_1
Calibration Level:	06	Wavelength:	530.0
Instrument Method:	AS7_8min	Bandwidth:	n.a.
Processing Method:	AS_CR_8min_0409	Dilution Factor:	1.0000
Injection Date/Time:	7/7/2019 18:02	Sample Weight:	1.0000

Chromatogram

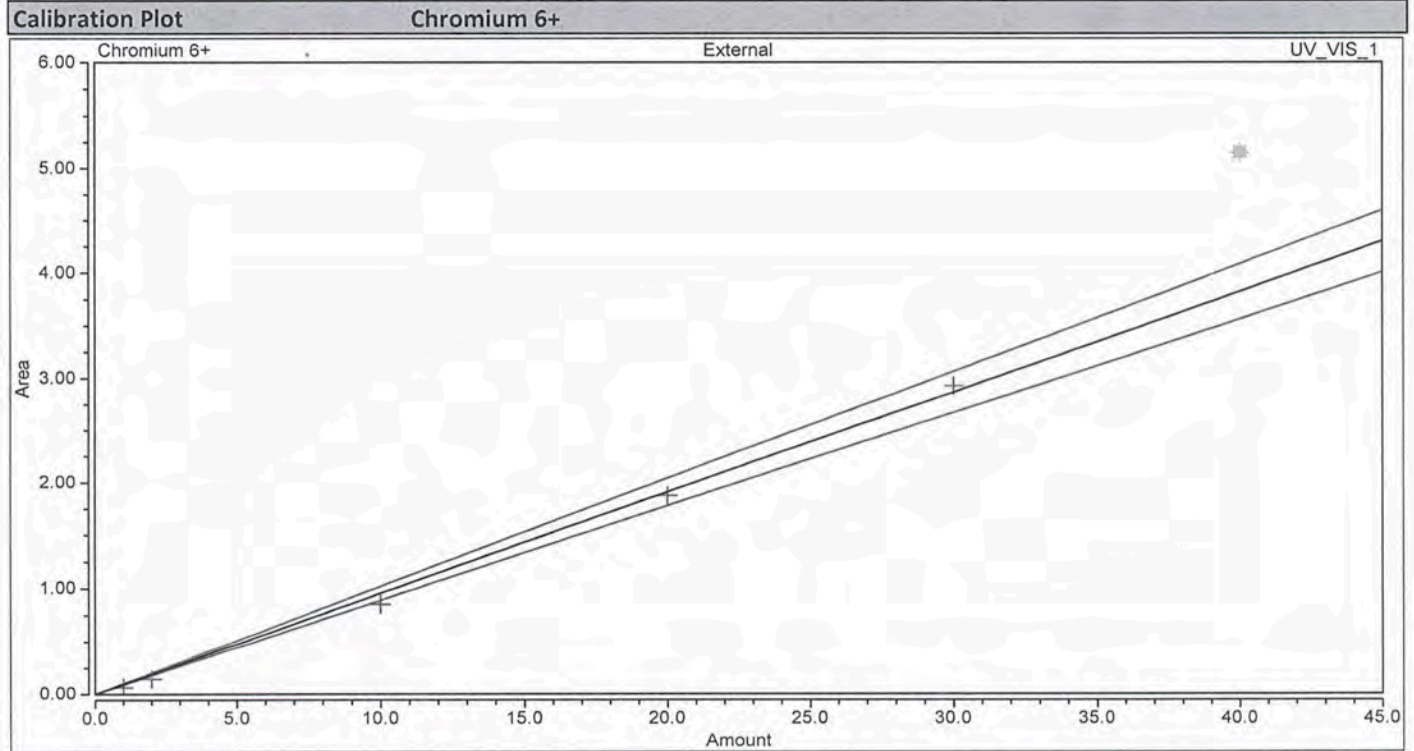


Integration Results

No.	Peak Name	Retention Time min	Area mAU*min	Height mAU	Relative Area %	Relative Height %	Amount
1	Chromium 6+	3.843	5.155	13.931	100.00	100.00	53.8569
Total:			5.155	13.931	100.00	100.00	

Calibration

Calibration Details		Chromium 6+	
Calibration Type	Lin	Offset (C0)	0.0000
Evaluation Type	Area	Slope (C1)	0.0957
Number of Calibration Points	5	Curve (C2)	0.0000
Number of disabled Calibration Points	1	R-Square	0.9969



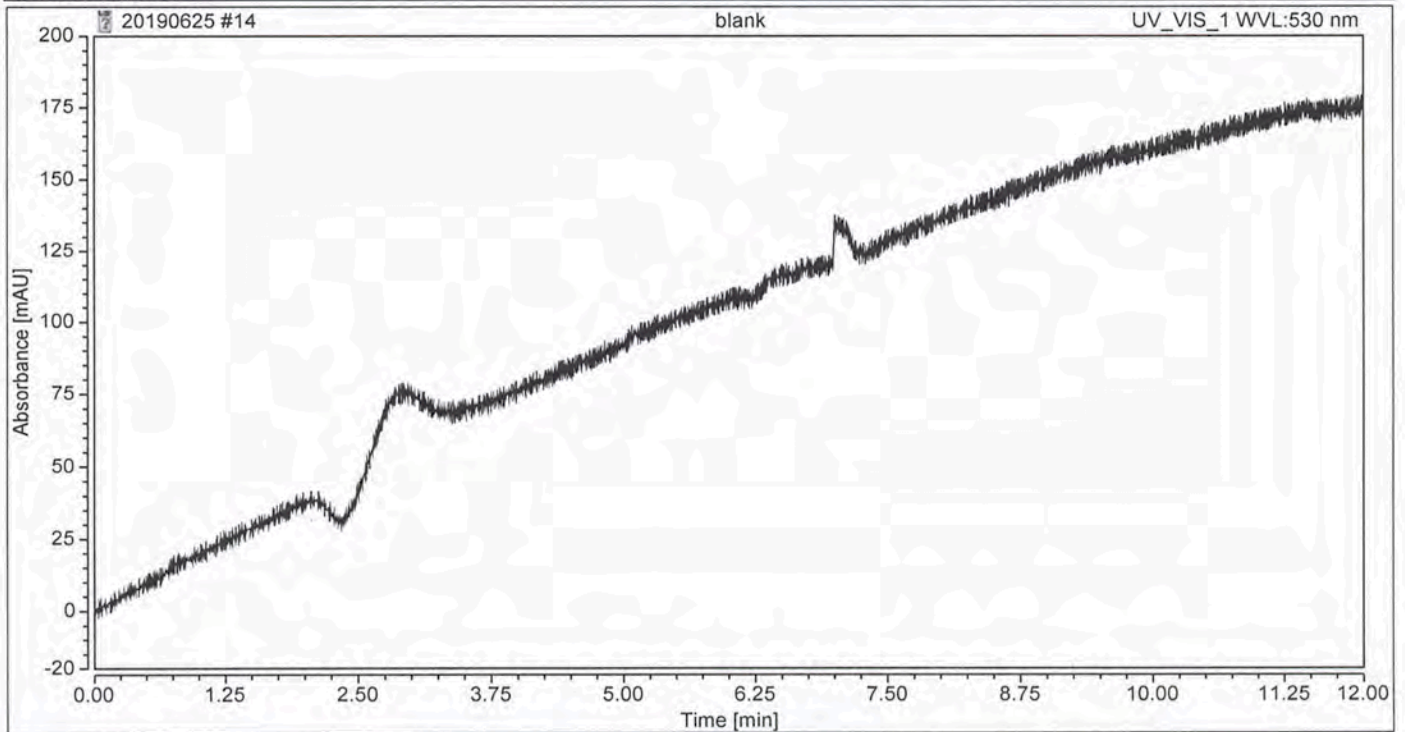
Calibration Results		Chromium 6+					
No.	Injection Name	Calibration Level	X Value	Y Value	Y Value	Area	Height
			Chromium 6+ UV VIS 1	Chromium 6+ UV VIS 1	Chromium 6+ UV VIS 1	mAU*min Chromium 6+ UV VIS 1	mAU Chromium 6+ UV VIS 1
8	std 1 1 ppb	01	1.0000	0.0641	0.0641	0.064	1.074
9	std 2 2ppb	02	2.0000	0.1431	0.1431	0.143	1.199
10	std 3 10ppb	03	10.0000	0.8560	0.8560	0.856	2.208
11	std 4 20ppb	04	20.0000	1.8797	1.8797	1.880	5.679
12	std 5 30ppb	05	30.0000	2.9325	2.9325	2.933	8.715
13	ICV 50ppb	06	40.0000	5.1549	5.1549	5.155	13.931

Chromatogram and Results

Injection Details

Injection Name:	blank	Run Time (min):	12.00
Vial Number:	4	Injection Volume:	5000.00
Injection Type:	Unknown	Channel:	UV_VIS_1
Calibration Level:		Wavelength:	530.0
Instrument Method:	AS7_8min	Bandwidth:	n.a.
Processing Method:	AS_CR_8min_0409	Dilution Factor:	1.0000
Injection Date/Time:	7/7/2019 18:16	Sample Weight:	1.0000

Chromatogram



Integration Results

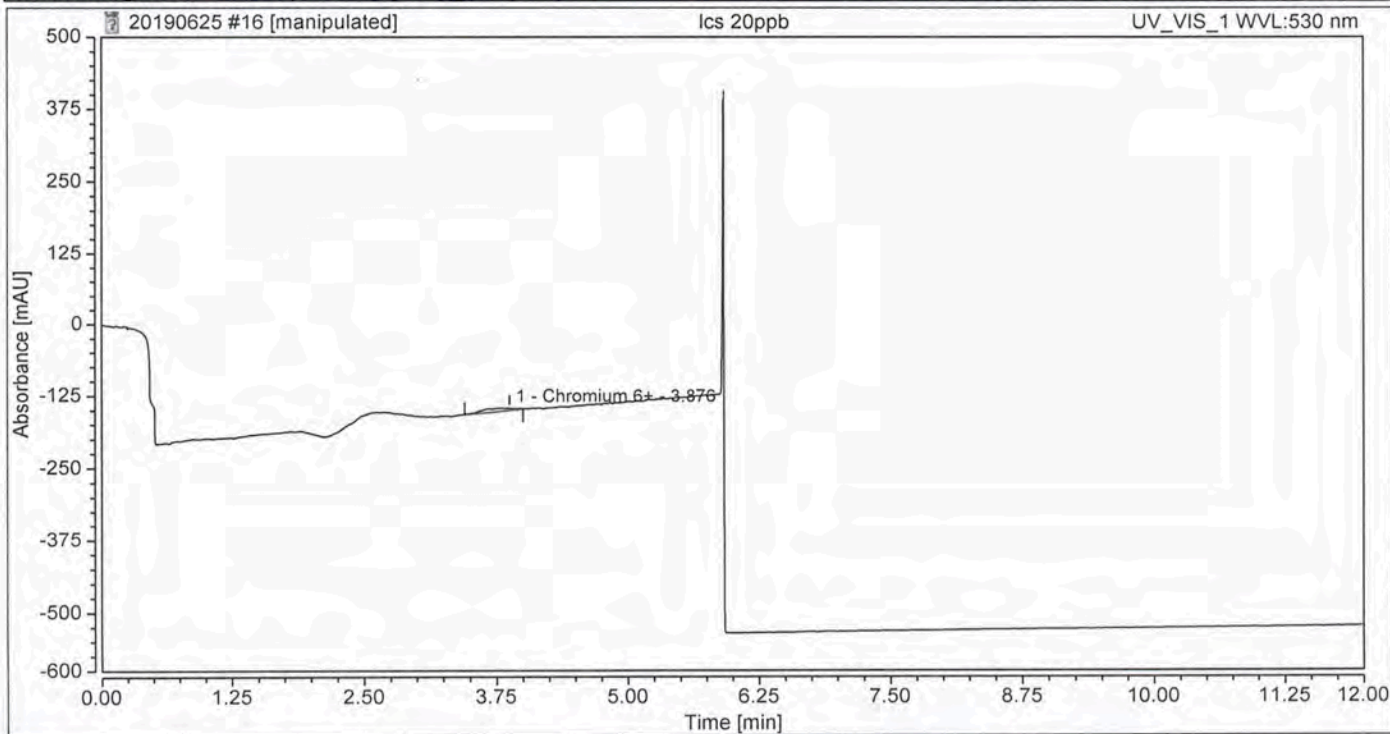
No.	Peak Name	Retention Time min	Area mAU*min	Height mAU	Relative Area %	Relative Height %	Amount
n.a.	Chromium 6+	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Total:			0.000	0.000	0.00	0.00	

Chromatogram and Results

Injection Details

Injection Name:	lcs 20ppb	Run Time (min):	12.00
Vial Number:	4	Injection Volume:	5000.00
Injection Type:	Unknown	Channel:	UV_VIS_1
Calibration Level:		Wavelength:	530.0
Instrument Method:	AS7_8min	Bandwidth:	n.a.
Processing Method:	AS_CR_8min_0409	Dilution Factor:	1.0000
Injection Date/Time:	7/7/2019 18:45	Sample Weight:	1.0000

Chromatogram



Integration Results

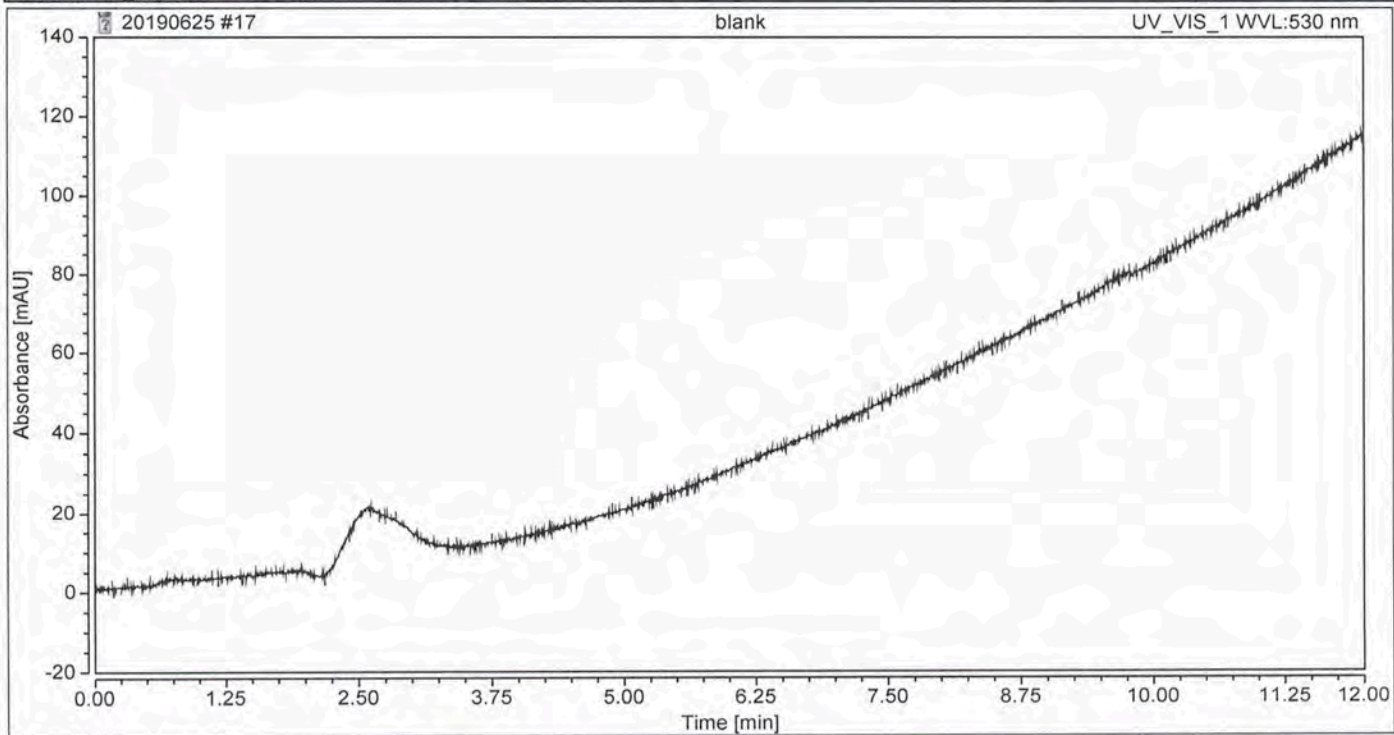
No.	Peak Name	Retention Time min	Area mAU*min	Height mAU	Relative Area %	Relative Height %	Amount
1	Chromium 6+	3.876	1.985	4.837	100.00	100.00	20.7354
Total:			1.985	4.837	100.00	100.00	

Chromatogram and Results

Injection Details

Injection Name:	blank	Run Time (min):	12.00
Vial Number:	4	Injection Volume:	5000.00
Injection Type:	Unknown	Channel:	UV_VIS_1
Calibration Level:		Wavelength:	530.0
Instrument Method:	AS7_8min	Bandwidth:	n.a.
Processing Method:	AS_CR_8min_0409	Dilution Factor:	1.0000
Injection Date/Time:	7/7/2019 18:59	Sample Weight:	1.0000

Chromatogram



Integration Results

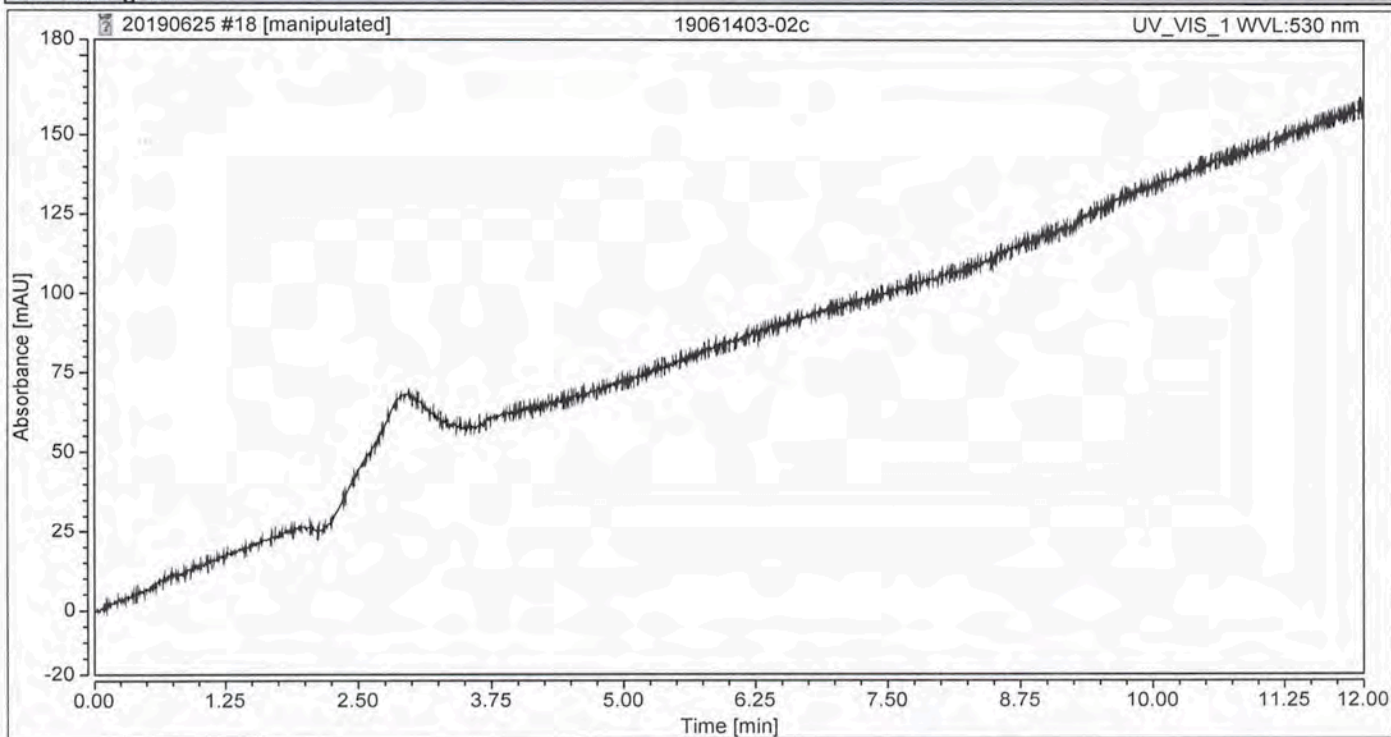
No.	Peak Name	Retention Time min	Area mAU*min	Height mAU	Relative Area %	Relative Height %	Amount
n.a.	Chromium 6+	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Total:			0.000	0.000	0.00	0.00	

Chromatogram and Results

Injection Details

Injection Name:	19061403-02c	Run Time (min):	12.00
Vial Number:	4	Injection Volume:	5000.00
Injection Type:	Unknown	Channel:	UV_VIS_1
Calibration Level:		Wavelength:	530.0
Instrument Method:	AS7_8min	Bandwidth:	n.a.
Processing Method:	AS_CR_8min_0409	Dilution Factor:	1.0000
Injection Date/Time:	7/7/2019 19:14	Sample Weight:	1.0000

Chromatogram



Integration Results

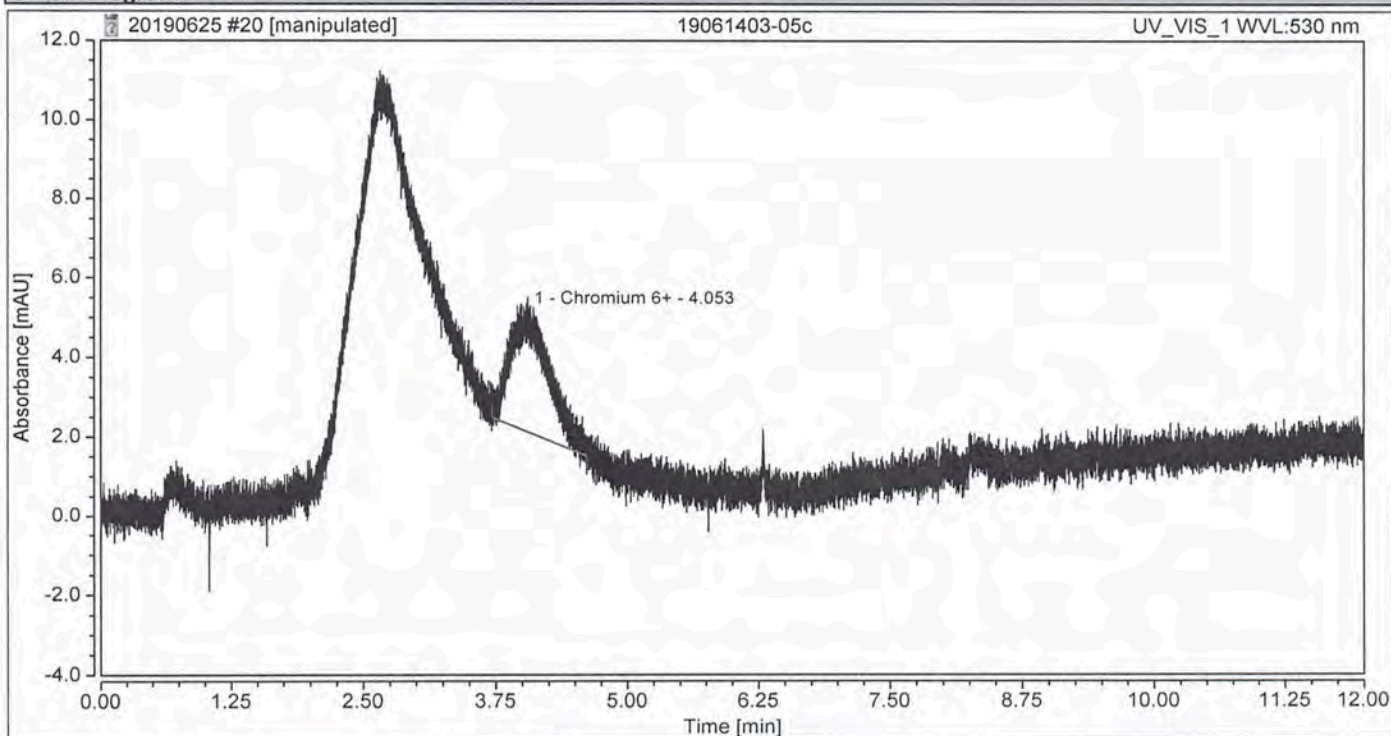
No.	Peak Name	Retention Time min	Area mAU*min	Height mAU	Relative Area %	Relative Height %	Amount
n.a.	Chromium 6+	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Total:			0.000	0.000	0.00	0.00	

Chromatogram and Results

Injection Details

Injection Name:	19061403-05c	Run Time (min):	12.00
Vial Number:	4	Injection Volume:	5000.00
Injection Type:	Unknown	Channel:	UV_VIS_1
Calibration Level:		Wavelength:	530.0
Instrument Method:	AS7_8min	Bandwidth:	n.a.
Processing Method:	AS_CR_8min_0409	Dilution Factor:	1.0000
Injection Date/Time:	7/7/2019 19:43	Sample Weight:	1.0000

Chromatogram



Integration Results

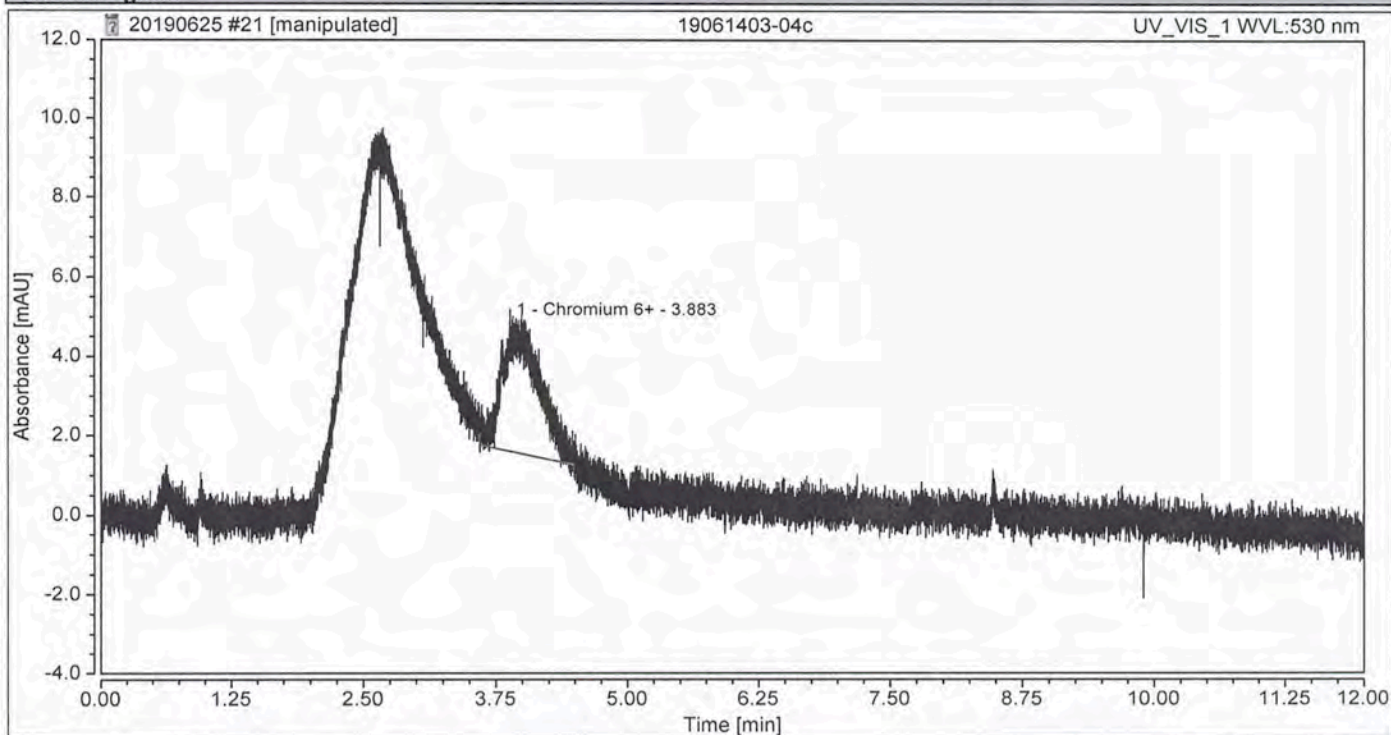
No.	Peak Name	Retention Time min	Area mAU*min	Height mAU	Relative Area %	Relative Height %	Amount
1	Chromium 6+	4.053	1.280	3.071	100.00	100.00	13.3700
Total:			1.280	3.071	100.00	100.00	

Chromatogram and Results

Injection Details

Injection Name:	19061403-04c	Run Time (min):	12.00
Vial Number:	4	Injection Volume:	5000.00
Injection Type:	Unknown	Channel:	UV_VIS_1
Calibration Level:		Wavelength:	530.0
Instrument Method:	AS7_8min	Bandwidth:	n.a.
Processing Method:	AS_CR_8min_0409	Dilution Factor:	1.0000
Injection Date/Time:	7/7/2019 19:57	Sample Weight:	1.0000

Chromatogram



Integration Results

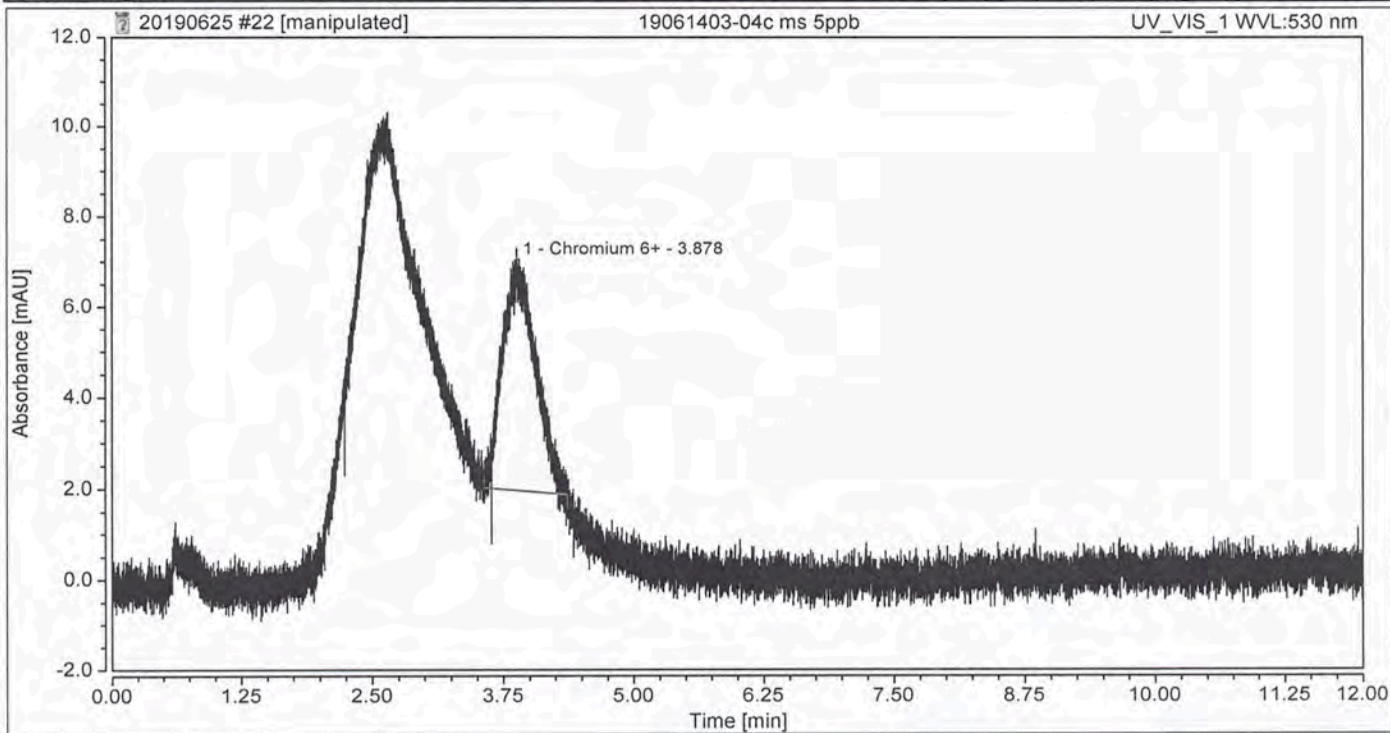
No.	Peak Name	Retention Time min	Area mAU*min	Height mAU	Relative Area %	Relative Height %	Amount
1	Chromium 6+	3.883	1.344	3.292	100.00	100.00	14.0419
Total:			1.344	3.292	100.00	100.00	

Chromatogram and Results

Injection Details

Injection Name:	19061403-04c ms 5ppb	Run Time (min):	12.00
Vial Number:	4	Injection Volume:	5000.00
Injection Type:	Unknown	Channel:	UV_VIS_1
Calibration Level:		Wavelength:	530.0
Instrument Method:	AS7_8min	Bandwidth:	n.a.
Processing Method:	AS_CR_8min_0409	Dilution Factor:	1.0000
Injection Date/Time:	7/7/2019 20:11	Sample Weight:	1.0000

Chromatogram



Integration Results

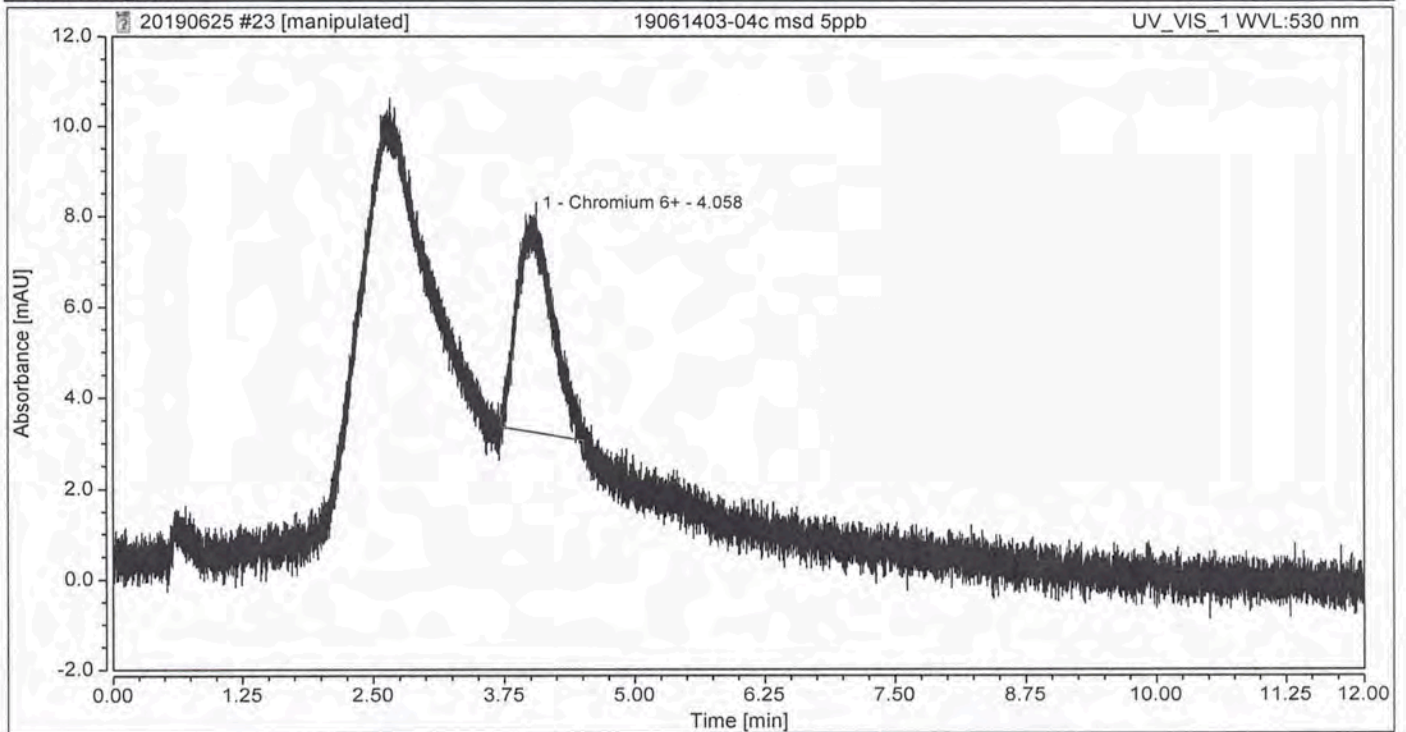
No.	Peak Name	Retention Time min	Area mAU*min	Height mAU	Relative Area %	Relative Height %	Amount
1	Chromium 6+	3.878	1.800	5.063	100.00	100.00	18.8107
Total:			1.800	5.063	100.00	100.00	

Chromatogram and Results

Injection Details

Injection Name:	19061403-04c msd 5ppb	Run Time (min):	12.00
Vial Number:	4	Injection Volume:	5000.00
Injection Type:	Unknown	Channel:	UV_VIS_1
Calibration Level:		Wavelength:	530.0
Instrument Method:	AS7_8min	Bandwidth:	n.a.
Processing Method:	AS_CR_8min_0409	Dilution Factor:	1.0000
Injection Date/Time:	7/7/2019 20:26	Sample Weight:	1.0000

Chromatogram



Integration Results

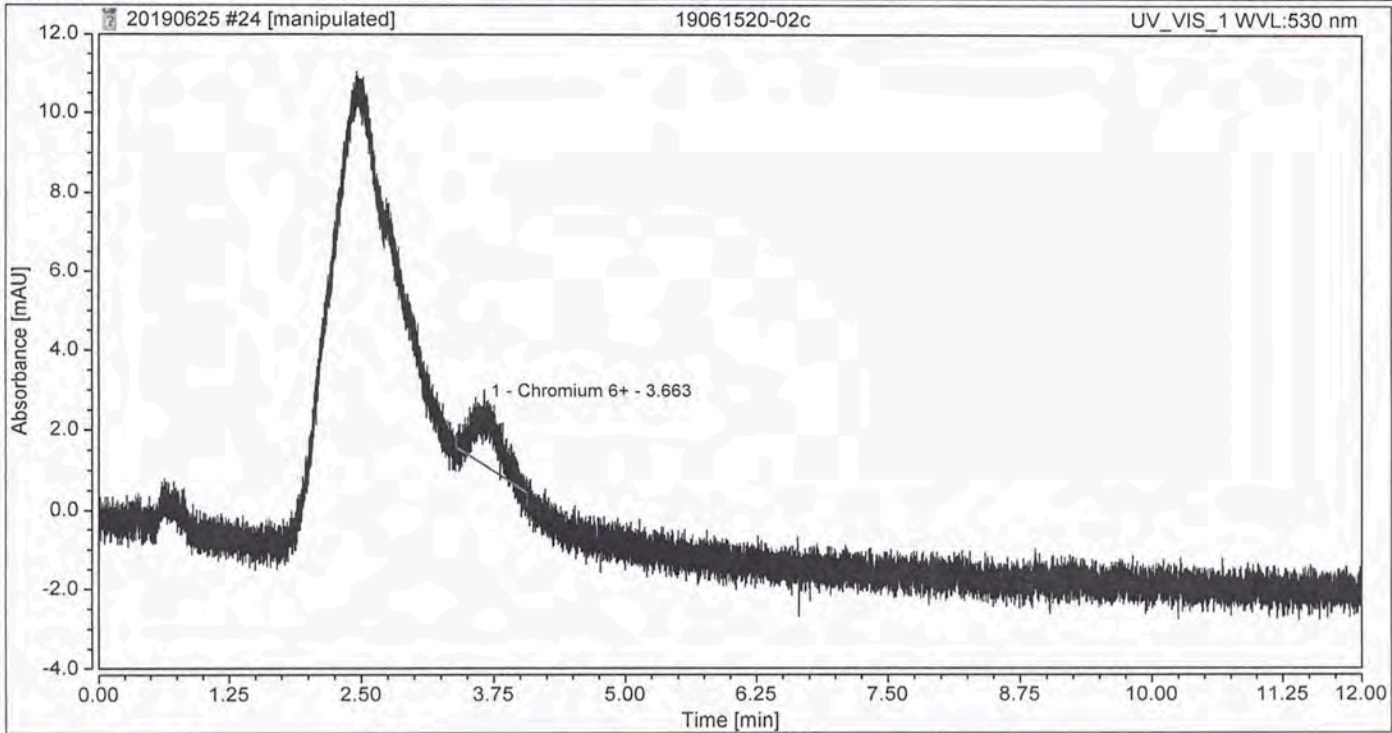
No.	Peak Name	Retention Time min	Area mAU*min	Height mAU	Relative Area %	Relative Height %	Amount
1	Chromium 6+	4.058	1.827	4.813	100.00	100.00	19.0859
Total:			1.827	4.813	100.00	100.00	

Chromatogram and Results

Injection Details

Injection Name:	19061520-02c	Run Time (min):	12.00
Vial Number:	4	Injection Volume:	5000.00
Injection Type:	Unknown	Channel:	UV_VIS_1
Calibration Level:		Wavelength:	530.0
Instrument Method:	AS7_8min	Bandwidth:	n.a.
Processing Method:	AS_CR_8min_0409	Dilution Factor:	1.0000
Injection Date/Time:	7/7/2019 20:40	Sample Weight:	1.0000

Chromatogram



Integration Results

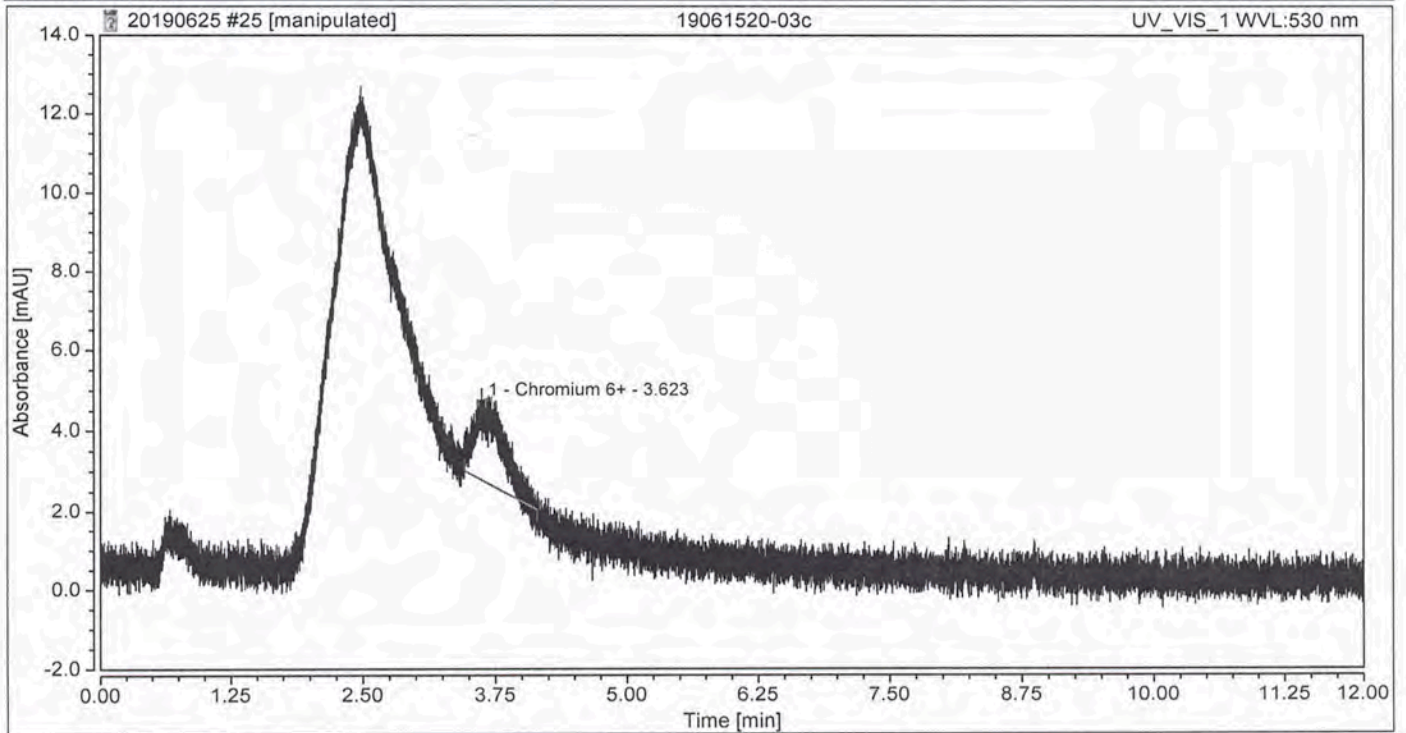
No.	Peak Name	Retention Time min	Area mAU*min	Height mAU	Relative Area %	Relative Height %	Amount
1	Chromium 6+	3.663	0.373	1.565	100.00	100.00	3.8924
Total:			0.373	1.565	100.00	100.00	

Chromatogram and Results

Injection Details

Injection Name:	19061520-03c	Run Time (min):	12.00
Vial Number:	4	Injection Volume:	5000.00
Injection Type:	Unknown	Channel:	UV_VIS_1
Calibration Level:		Wavelength:	530.0
Instrument Method:	AS7_8min	Bandwidth:	n.a.
Processing Method:	AS_CR_8min_0409	Dilution Factor:	1.0000
Injection Date/Time:	7/7/2019 20:55	Sample Weight:	1.0000

Chromatogram



Integration Results

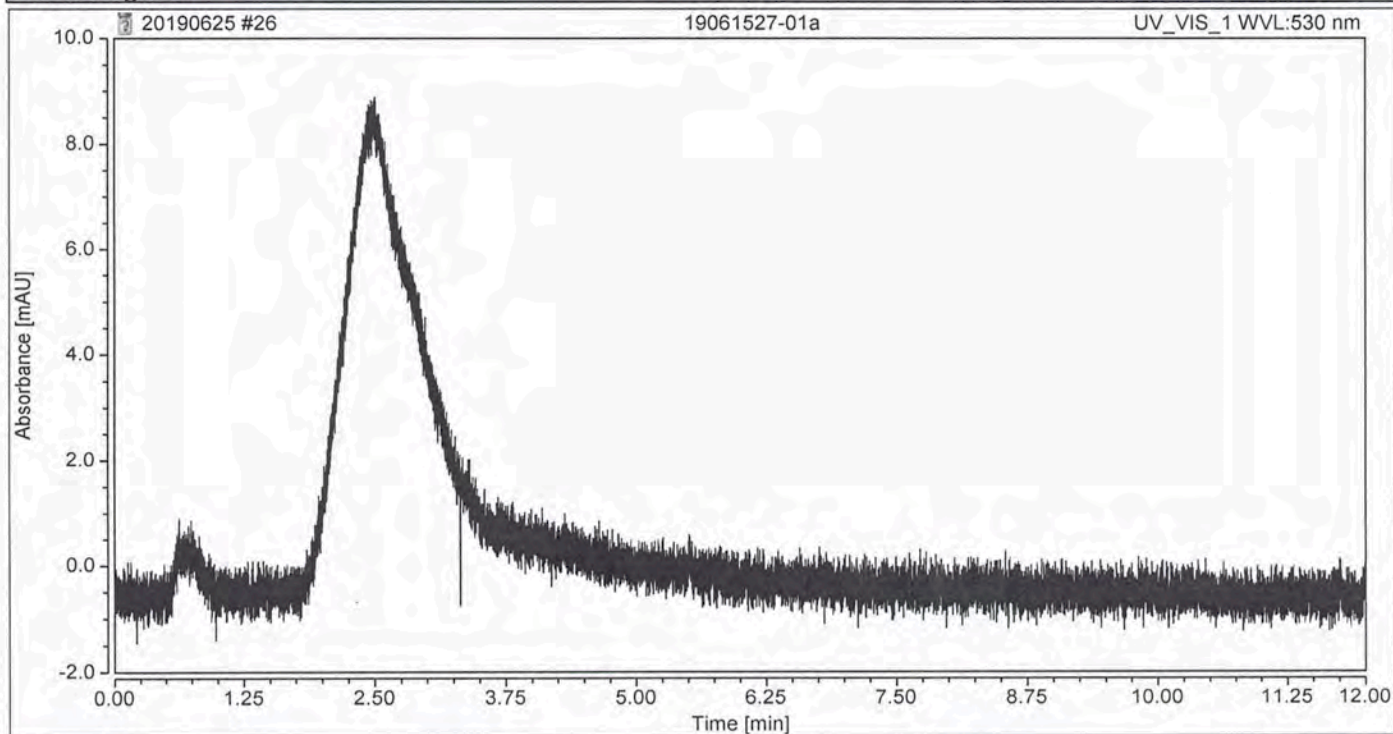
No.	Peak Name	Retention Time min	Area mAU*min	Height mAU	Relative Area %	Relative Height %	Amount
1	Chromium 6+	3.623	0.589	1.948	100.00	100.00	6.1567
Total:			0.589	1.948	100.00	100.00	

Chromatogram and Results

Injection Details

Injection Name:	19061527-01a	Run Time (min):	12.00
Vial Number:	4	Injection Volume:	5000.00
Injection Type:	Unknown	Channel:	UV_VIS_1
Calibration Level:		Wavelength:	530.0
Instrument Method:	AS7_8min	Bandwidth:	n.a.
Processing Method:	AS_CR_8min_0409	Dilution Factor:	1.0000
Injection Date/Time:	7/7/2019 21:09	Sample Weight:	1.0000

Chromatogram



Integration Results

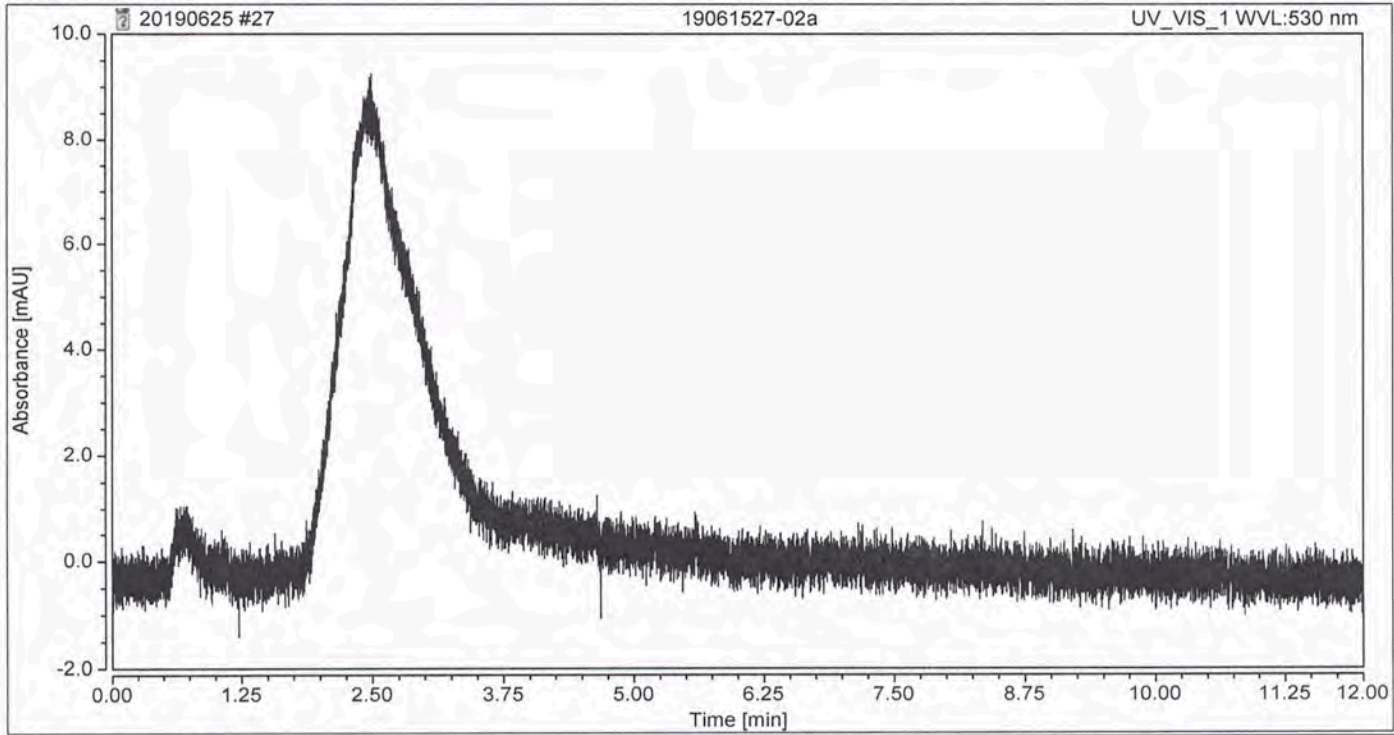
No.	Peak Name	Retention Time min	Area mAU*min	Height mAU	Relative Area %	Relative Height %	Amount
n.a.	Chromium 6+	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Total:			0.000	0.000	0.00	0.00	

Chromatogram and Results

Injection Details

Injection Name:	19061527-02a	Run Time (min):	12.00
Vial Number:	4	Injection Volume:	5000.00
Injection Type:	Unknown	Channel:	UV_VIS_1
Calibration Level:		Wavelength:	530.0
Instrument Method:	AS7_8min	Bandwidth:	n.a.
Processing Method:	AS_CR_8min_0409	Dilution Factor:	1.0000
Injection Date/Time:	7/7/2019 21:23	Sample Weight:	1.0000

Chromatogram



Integration Results

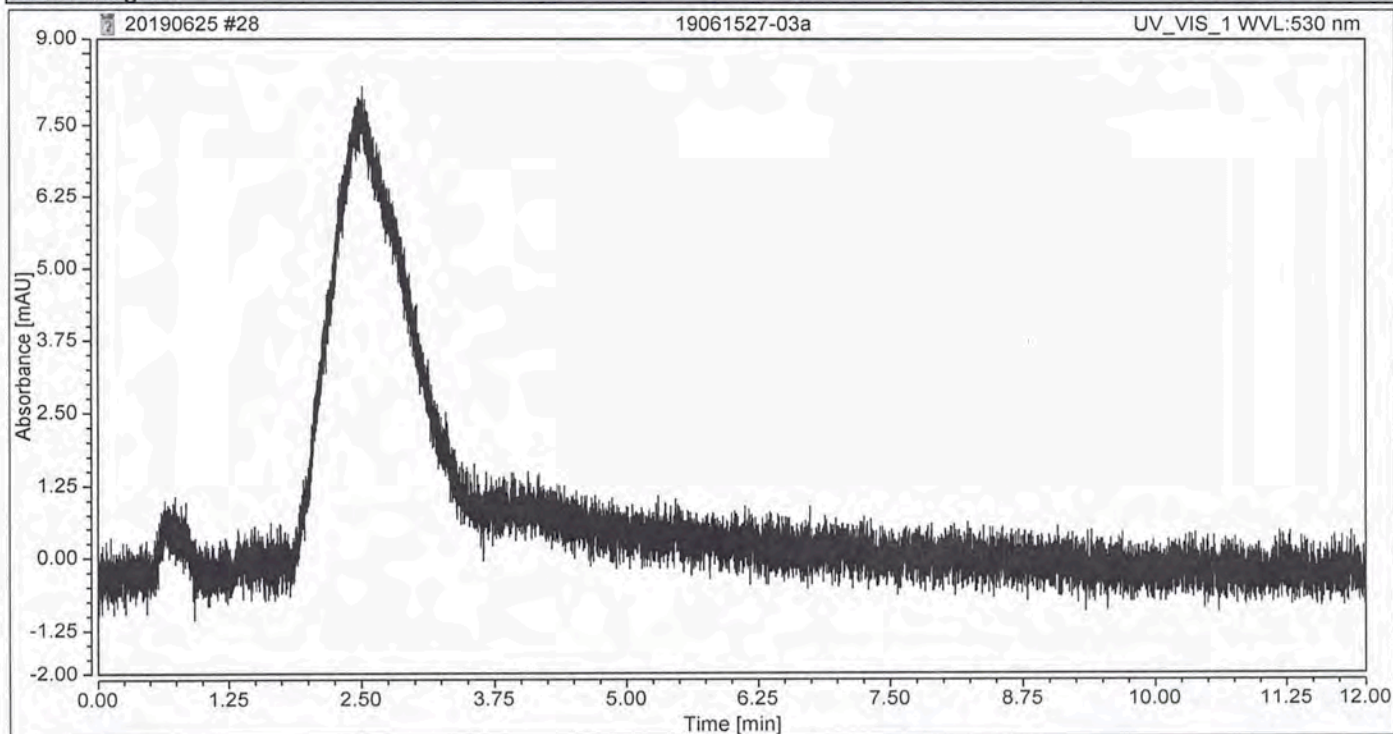
No.	Peak Name	Retention Time min	Area mAU*min	Height mAU	Relative Area %	Relative Height %	Amount
n.a.	Chromium 6+	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Total:			0.000	0.000	0.00	0.00	

Chromatogram and Results

Injection Details

Injection Name:	19061527-03a	Run Time (min):	12.00
Vial Number:	4	Injection Volume:	5000.00
Injection Type:	Unknown	Channel:	UV_VIS_1
Calibration Level:		Wavelength:	530.0
Instrument Method:	AS7_8min	Bandwidth:	n.a.
Processing Method:	AS_CR_8min_0409	Dilution Factor:	1.0000
Injection Date/Time:	7/7/2019 21:38	Sample Weight:	1.0000

Chromatogram



Integration Results

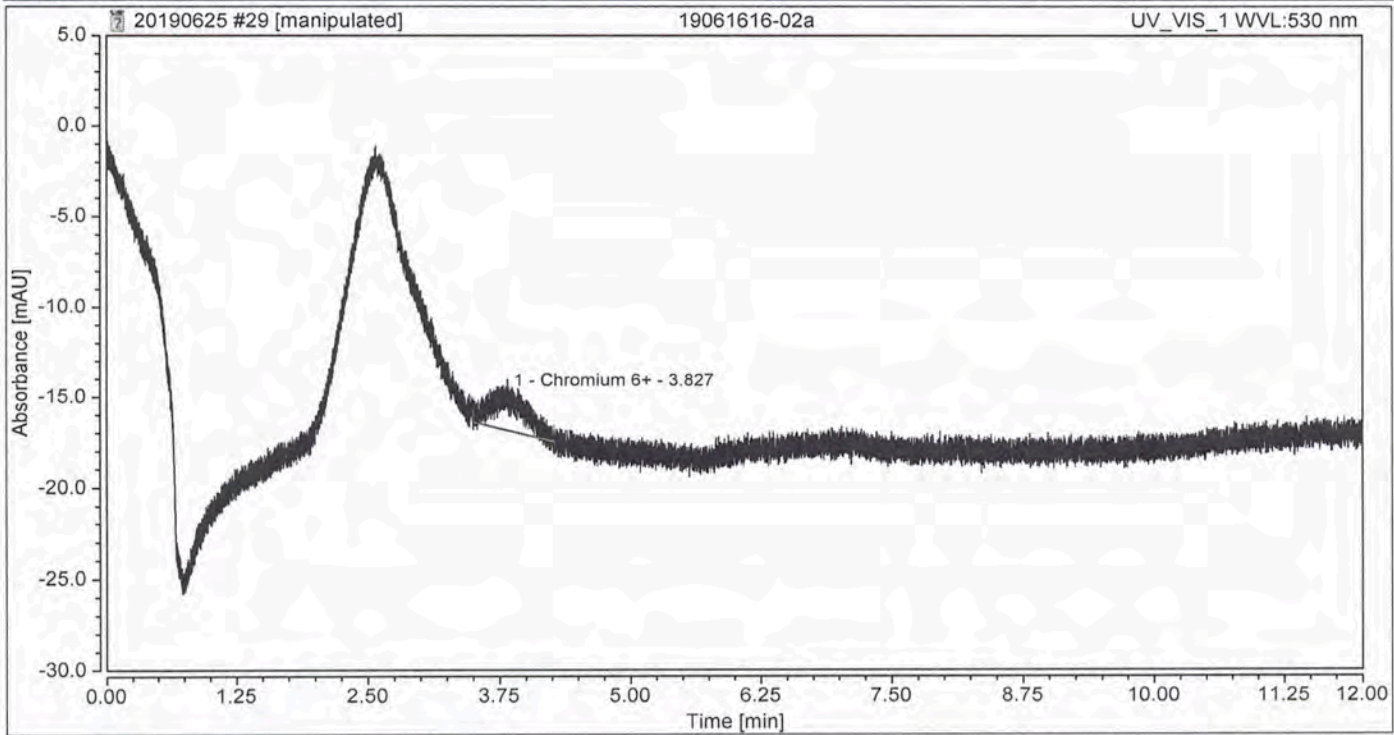
No.	Peak Name	Retention Time min	Area mAU*min	Height mAU	Relative Area %	Relative Height %	Amount
n.a.	Chromium 6+	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Total:			0.000	0.000	0.00	0.00	

Chromatogram and Results

Injection Details

Injection Name:	19061616-02a	Run Time (min):	12.00
Vial Number:	4	Injection Volume:	5000.00
Injection Type:	Unknown	Channel:	UV_VIS_1
Calibration Level:		Wavelength:	530.0
Instrument Method:	AS7_8min	Bandwidth:	n.a.
Processing Method:	AS_CR_8min_0409	Dilution Factor:	1.0000
Injection Date/Time:	7/7/2019 21:52	Sample Weight:	1.0000

Chromatogram



Integration Results

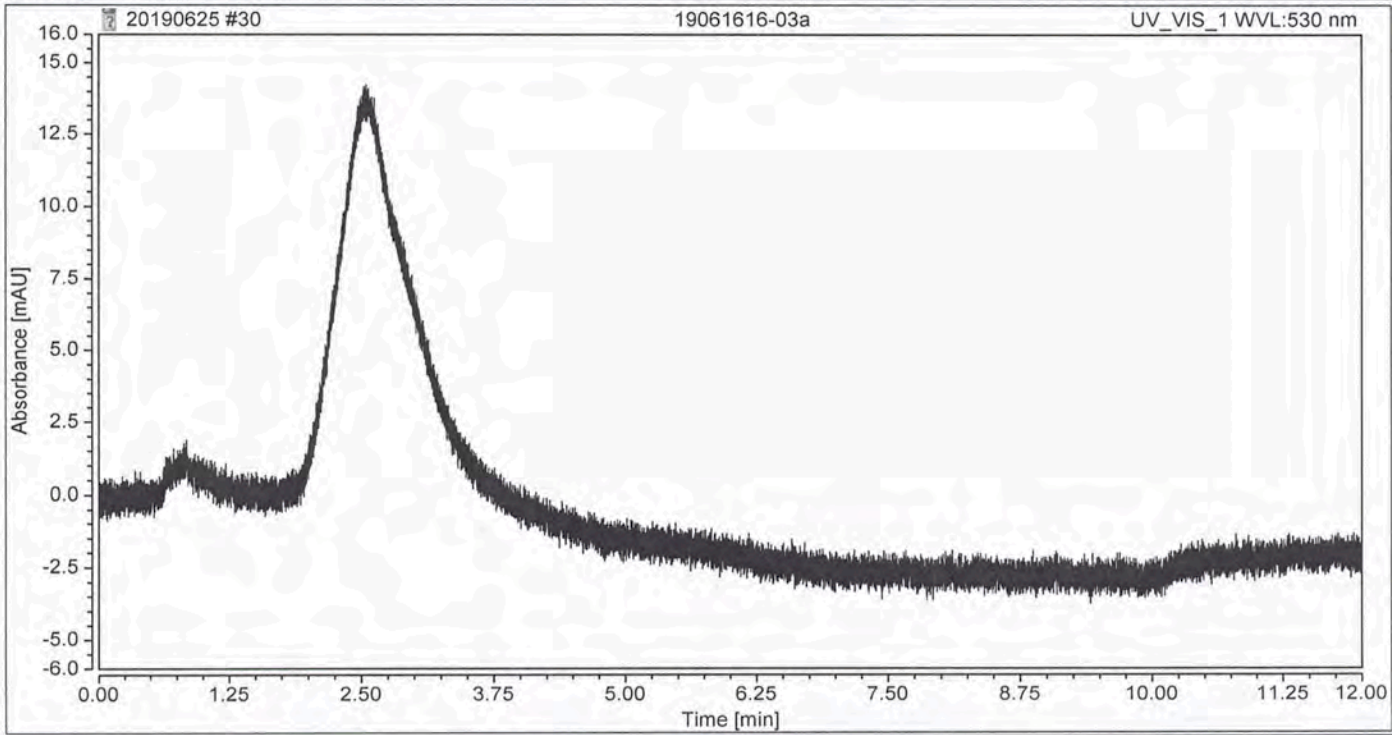
No.	Peak Name	Retention Time min	Area mAU*min	Height mAU	Relative Area %	Relative Height %	Amount
1	Chromium 6+	3.827	0.817	2.147	100.00	100.00	8.5382
Total:			0.817	2.147	100.00	100.00	

Chromatogram and Results

Injection Details

Injection Name:	19061616-03a	Run Time (min):	12.00
Vial Number:	4	Injection Volume:	5000.00
Injection Type:	Unknown	Channel:	UV_VIS_1
Calibration Level:		Wavelength:	530.0
Instrument Method:	AS7_8min	Bandwidth:	n.a.
Processing Method:	AS_CR_8min_0409	Dilution Factor:	1.0000
Injection Date/Time:	7/7/2019 22:07	Sample Weight:	1.0000

Chromatogram



Integration Results

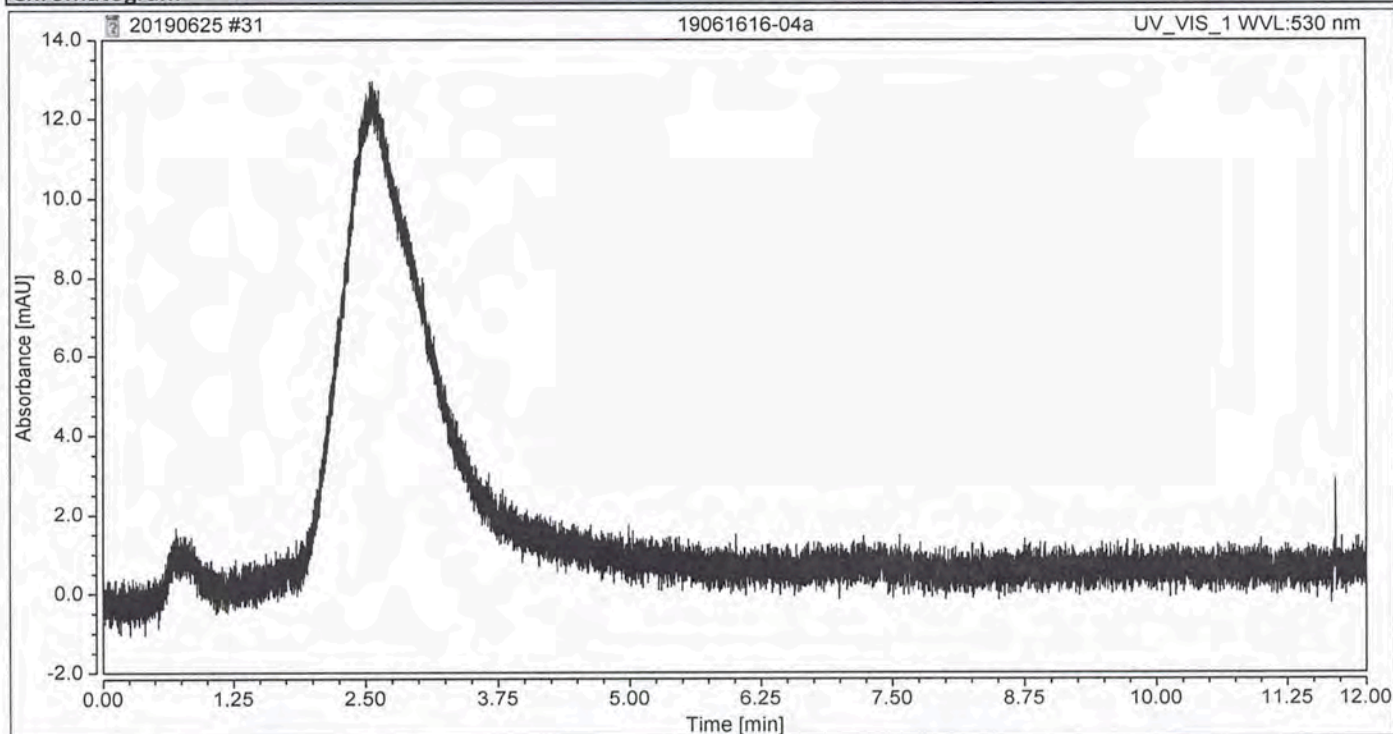
No.	Peak Name	Retention Time min	Area mAU*min	Height mAU	Relative Area %	Relative Height %	Amount
n.a.	Chromium 6+	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Total:			0.000	0.000	0.00	0.00	

Chromatogram and Results

Injection Details

Injection Name:	19061616-04a	Run Time (min):	12.00
Vial Number:	4	Injection Volume:	5000.00
Injection Type:	Unknown	Channel:	UV_VIS_1
Calibration Level:		Wavelength:	530.0
Instrument Method:	AS7_8min	Bandwidth:	n.a.
Processing Method:	AS_CR_8min_0409	Dilution Factor:	1.0000
Injection Date/Time:	7/7/2019 22:21	Sample Weight:	1.0000

Chromatogram



Integration Results

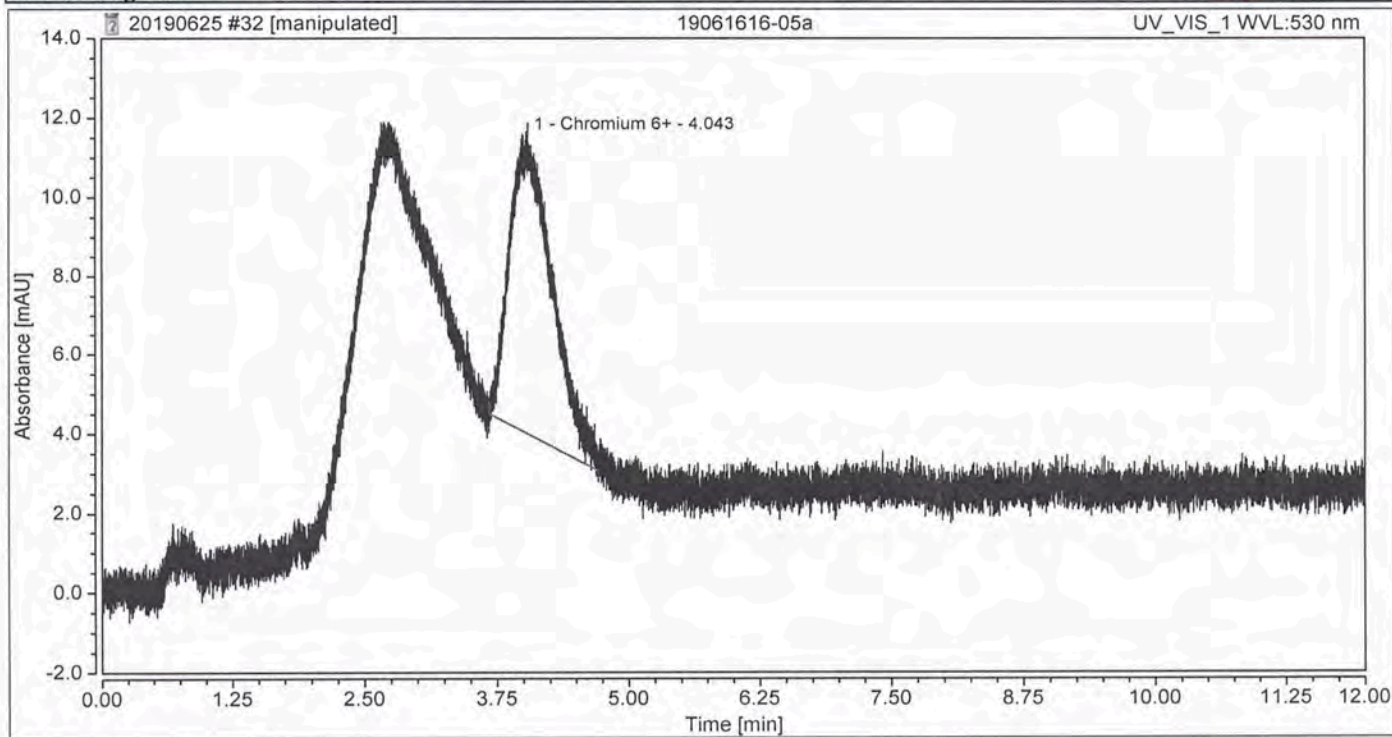
No.	Peak Name	Retention Time min	Area mAU*min	Height mAU	Relative Area %	Relative Height %	Amount
n.a.	Chromium 6+	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Total:			0.000	0.000	0.00	0.00	

Chromatogram and Results

Injection Details

Injection Name:	19061616-05a	Run Time (min):	12.00
Vial Number:	4	Injection Volume:	5000.00
Injection Type:	Unknown	Channel:	UV_VIS_1
Calibration Level:		Wavelength:	530.0
Instrument Method:	AS7_8min	Bandwidth:	n.a.
Processing Method:	AS_CR_8min_0409	Dilution Factor:	1.0000
Injection Date/Time:	7/7/2019 22:35	Sample Weight:	1.0000

Chromatogram



Integration Results

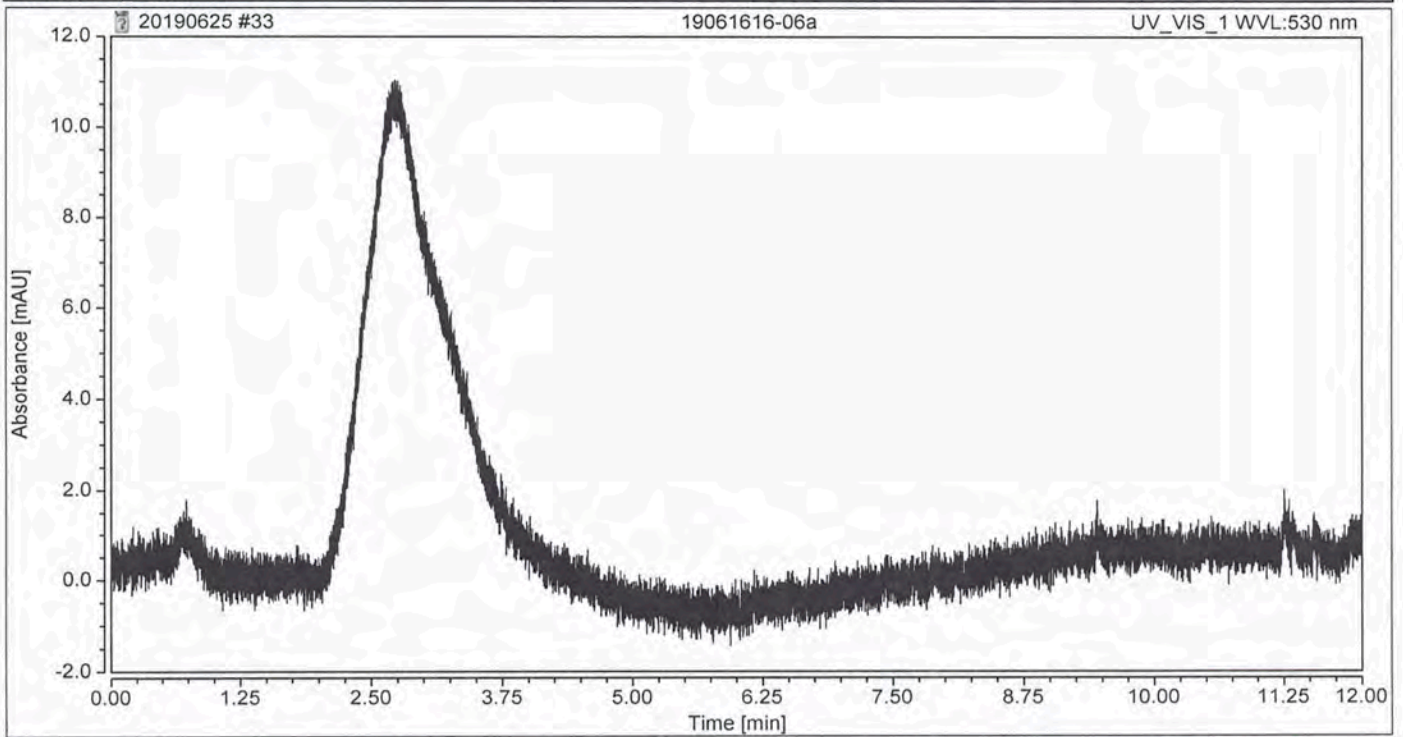
No.	Peak Name	Retention Time min	Area mAU*min	Height mAU	Relative Area %	Relative Height %	Amount
1	Chromium 6+	4.043	3.524	7.556	100.00	100.00	36.8206
Total:			3.524	7.556	100.00	100.00	

Chromatogram and Results

Injection Details

Injection Name:	19061616-06a	Run Time (min):	12.00
Vial Number:	4	Injection Volume:	5000.00
Injection Type:	Unknown	Channel:	UV_VIS_1
Calibration Level:		Wavelength:	530.0
Instrument Method:	AS7_8min	Bandwidth:	n.a.
Processing Method:	AS_CR_8min_0409	Dilution Factor:	1.0000
Injection Date/Time:	7/7/2019 22:50	Sample Weight:	1.0000

Chromatogram



Integration Results

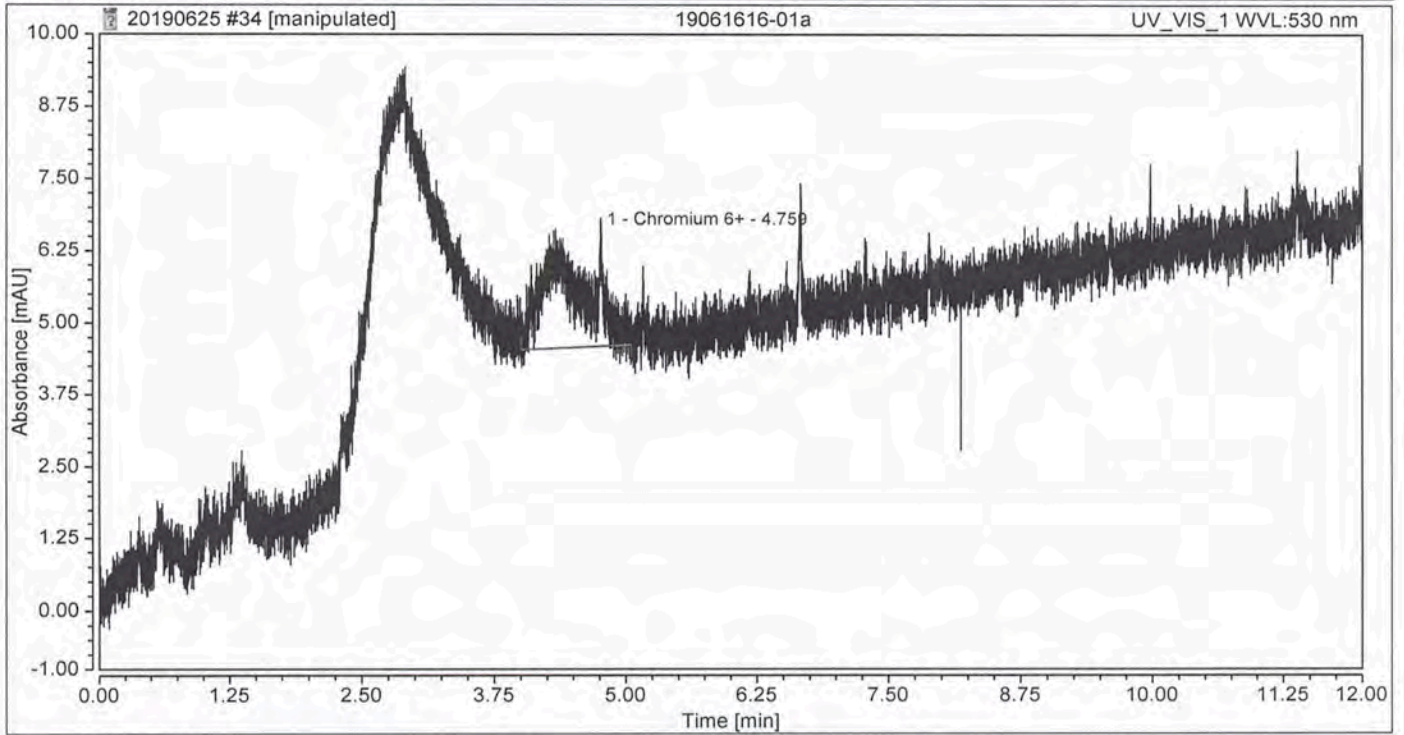
No.	Peak Name	Retention Time min	Area mAU*min	Height mAU	Relative Area %	Relative Height %	Amount
n.a.	Chromium 6+	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Total:			0.000	0.000	0.00	0.00	

Chromatogram and Results

Injection Details

Injection Name:	19061616-01a	Run Time (min):	12.00
Vial Number:	4	Injection Volume:	5000.00
Injection Type:	Unknown	Channel:	UV_VIS_1
Calibration Level:		Wavelength:	530.0
Instrument Method:	AS7_8min	Bandwidth:	n.a.
Processing Method:	AS_CR_8min_0409	Dilution Factor:	1.0000
Injection Date/Time:	7/7/2019 23:04	Sample Weight:	1.0000

Chromatogram



Integration Results

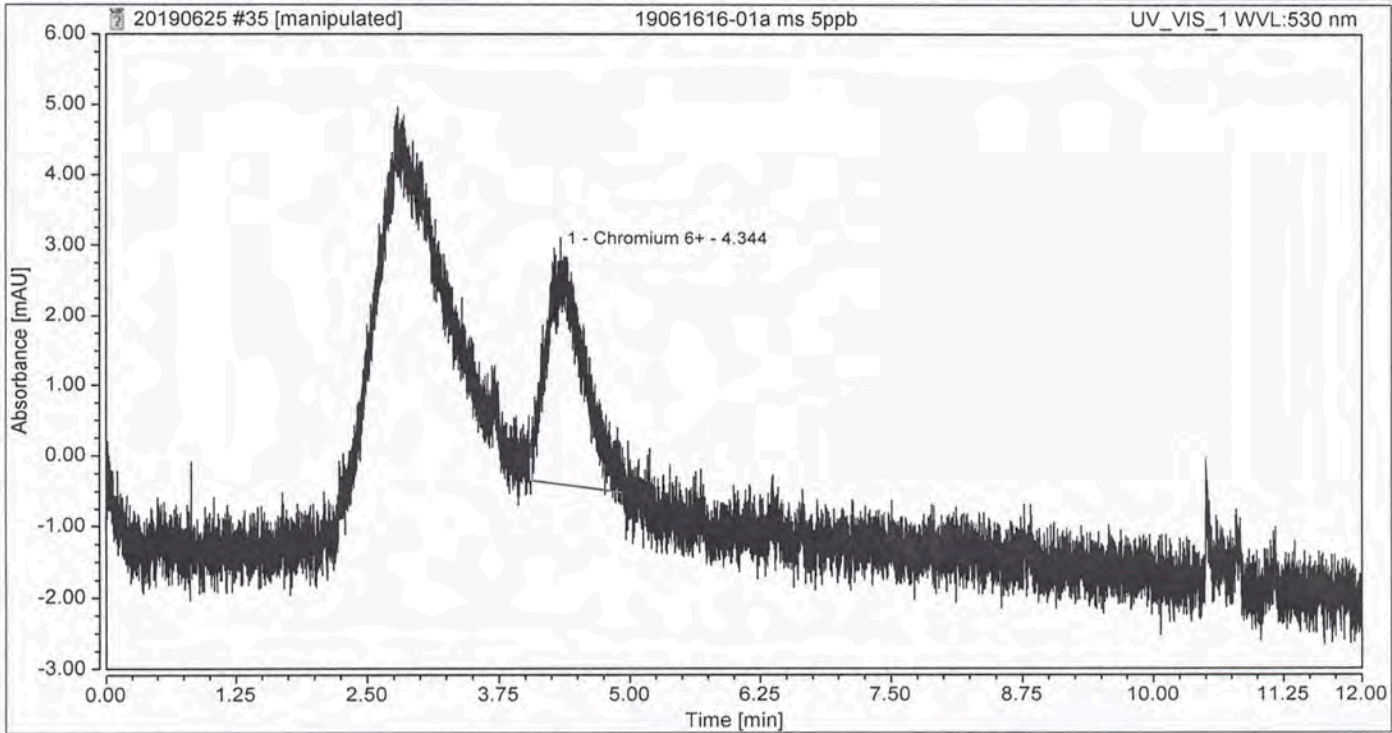
No.	Peak Name	Retention Time min	Area mAU*min	Height mAU	Relative Area %	Relative Height %	Amount
1	Chromium 6+	4.759	0.870	2.003	100.00	100.00	9.0932
Total:			0.870	2.003	100.00	100.00	

Chromatogram and Results

Injection Details

Injection Name:	19061616-01a ms 5ppb	Run Time (min):	12.00
Vial Number:	4	Injection Volume:	5000.00
Injection Type:	Unknown	Channel:	UV_VIS_1
Calibration Level:		Wavelength:	530.0
Instrument Method:	AS7_8min	Bandwidth:	n.a.
Processing Method:	AS_CR_8min_0409	Dilution Factor:	1.0000
Injection Date/Time:	7/7/2019 23:19	Sample Weight:	1.0000

Chromatogram



Integration Results

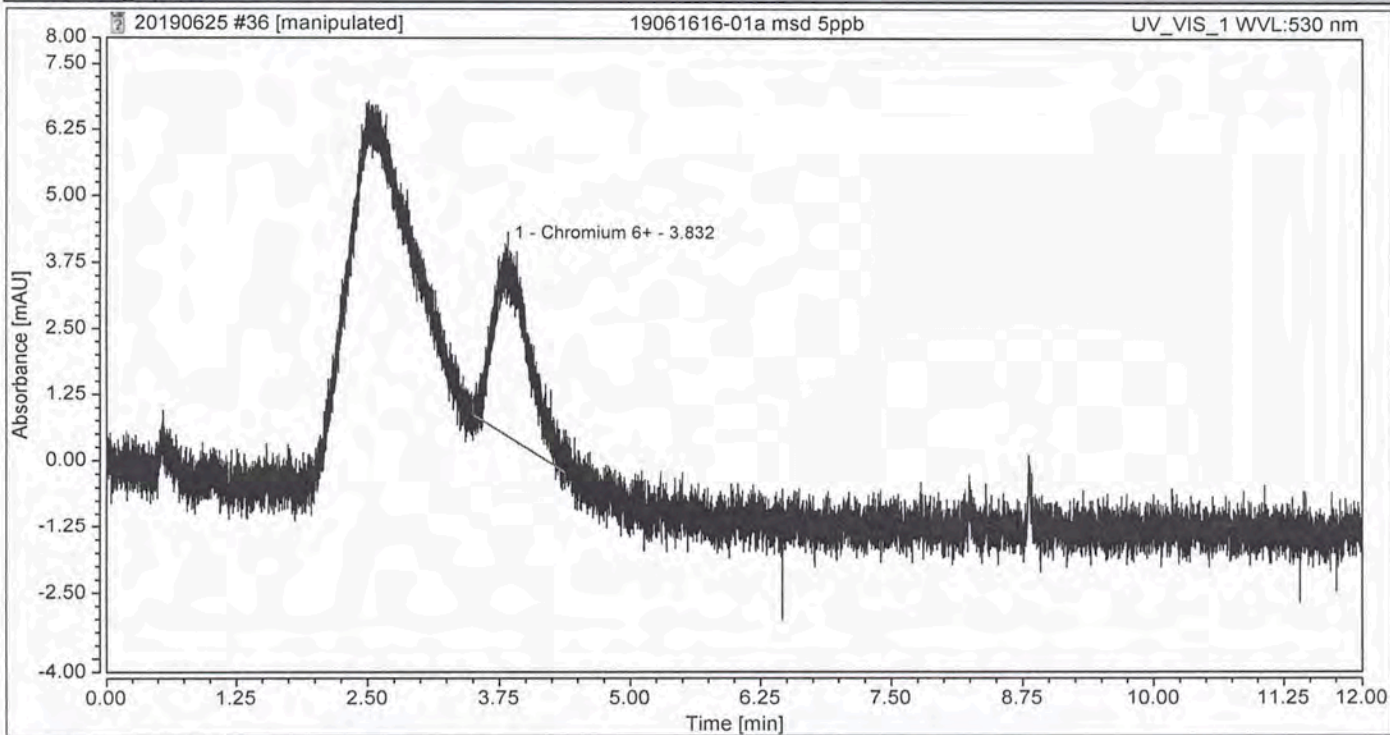
No.	Peak Name	Retention Time min	Area mAU*min	Height mAU	Relative Area %	Relative Height %	Amount
1	Chromium 6+	4.344	1.332	3.336	100.00	100.00	13.9208
Total:			1.332	3.336	100.00	100.00	

Chromatogram and Results

Injection Details

Injection Name:	19061616-01a msd 5ppb	Run Time (min):	12.00
Vial Number:	4	Injection Volume:	5000.00
Injection Type:	Unknown	Channel:	UV_VIS_1
Calibration Level:		Wavelength:	530.0
Instrument Method:	AS7_8min	Bandwidth:	n.a.
Processing Method:	AS_CR_8min_0409	Dilution Factor:	1.0000
Injection Date/Time:	7/7/2019 23:33	Sample Weight:	1.0000

Chromatogram



Integration Results

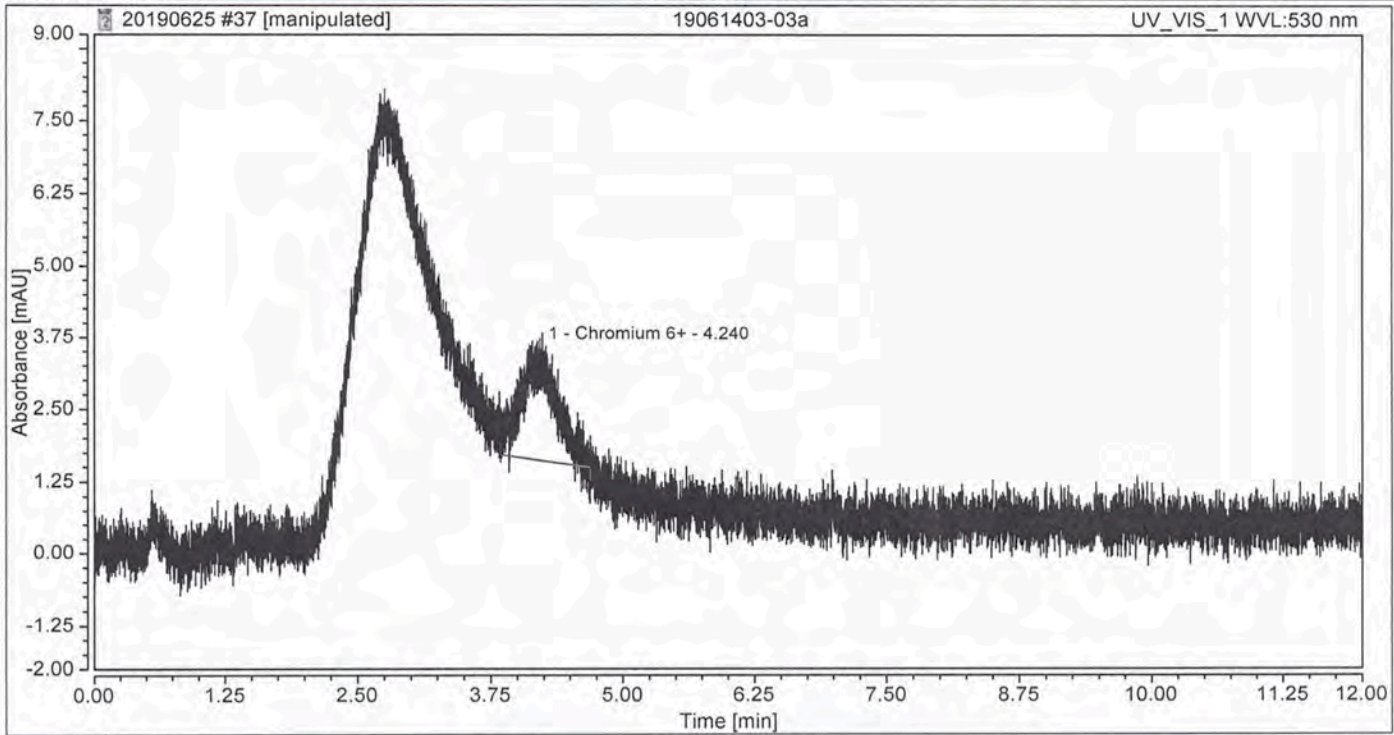
No.	Peak Name	Retention Time min	Area mAU*min	Height mAU	Relative Area %	Relative Height %	Amount
1	Chromium 6+	3.832	1.324	3.635	100.00	100.00	13.8290
Total:			1.324	3.635	100.00	100.00	

Chromatogram and Results

Injection Details

Injection Name:	19061403-03a	Run Time (min):	12.00
Vial Number:	4	Injection Volume:	5000.00
Injection Type:	Unknown	Channel:	UV_VIS_1
Calibration Level:		Wavelength:	530.0
Instrument Method:	AS7_8min	Bandwidth:	n.a.
Processing Method:	AS_CR_8min_0409	Dilution Factor:	1.0000
Injection Date/Time:	7/7/2019 23:47	Sample Weight:	1.0000

Chromatogram



Integration Results

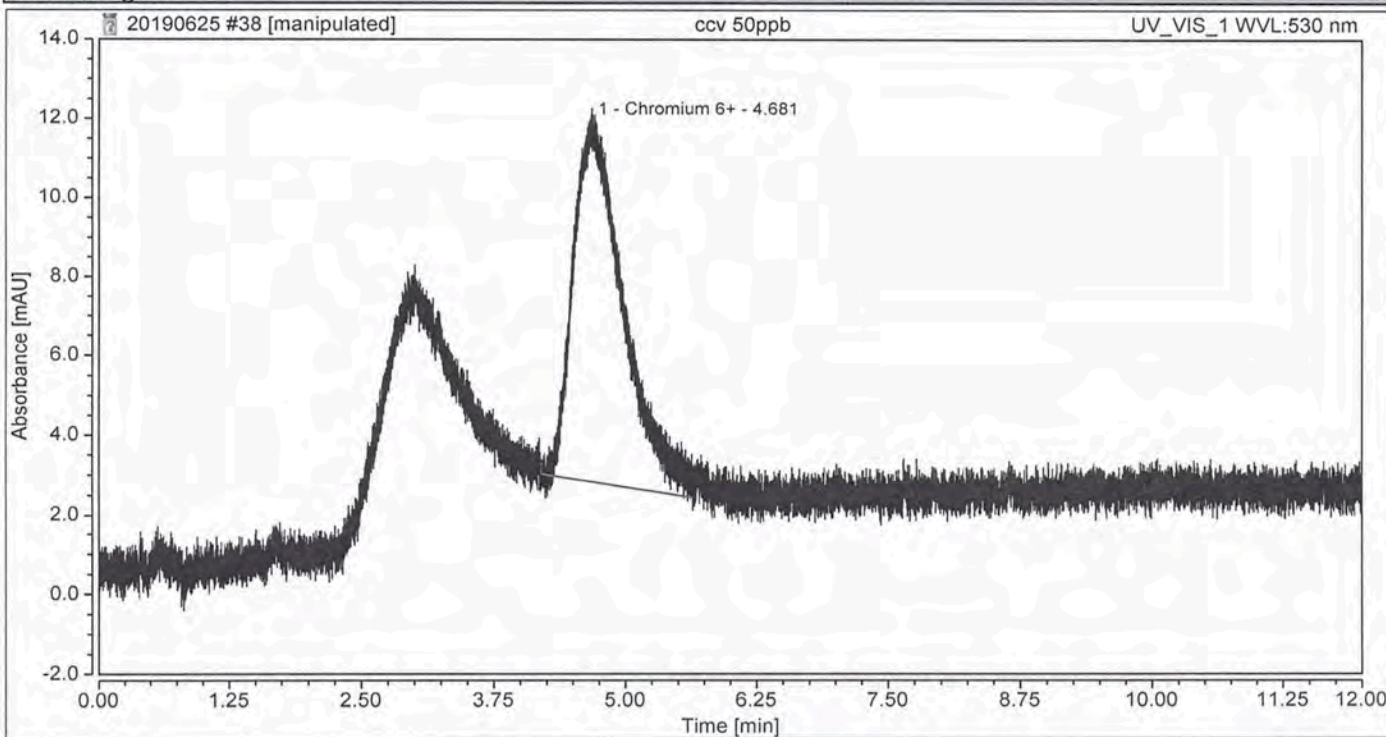
No.	Peak Name	Retention Time min	Area mAU*min	Height mAU	Relative Area %	Relative Height %	Amount
1	Chromium 6+	4.240	0.725	2.007	100.00	100.00	7.5793
Total:			0.725	2.007	100.00	100.00	

Chromatogram and Results

Injection Details

Injection Name:	ccv 50ppb	Run Time (min):	12.00
Vial Number:	4	Injection Volume:	5000.00
Injection Type:	Unknown	Channel:	UV_VIS_1
Calibration Level:		Wavelength:	530.0
Instrument Method:	AS7_8min	Bandwidth:	n.a.
Processing Method:	AS_CR_8min_0409	Dilution Factor:	1.0000
Injection Date/Time:	7/8/2019 0:02	Sample Weight:	1.0000

Chromatogram



Integration Results

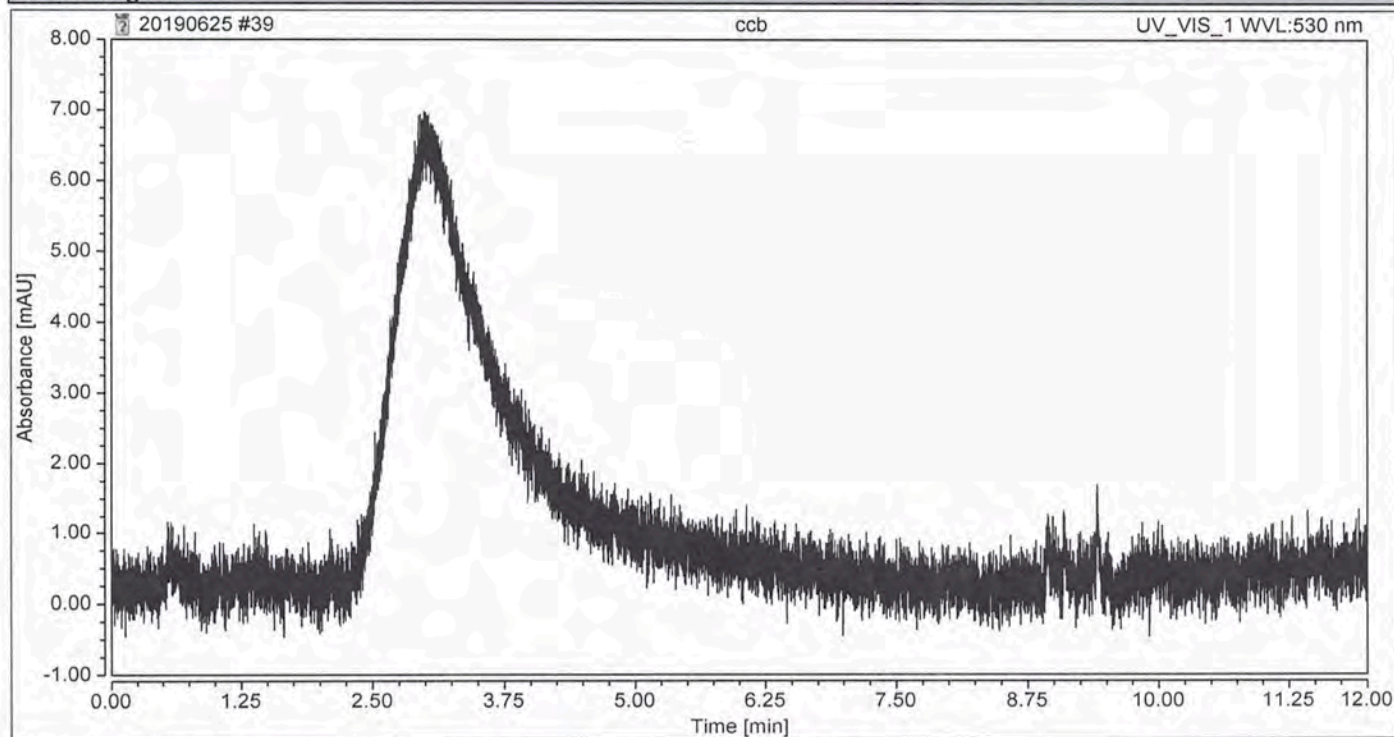
No.	Peak Name	Retention Time min	Area mAU*min	Height mAU	Relative Area %	Relative Height %	Amount
1	Chromium 6+	4.681	5.001	9.123	100.00	100.00	52.2457
Total:			5.001	9.123	100.00	100.00	

Chromatogram and Results

Injection Details

Injection Name:	ccb	Run Time (min):	12.00
Vial Number:	4	Injection Volume:	5000.00
Injection Type:	Unknown	Channel:	UV_VIS_1
Calibration Level:		Wavelength:	530.0
Instrument Method:	AS7_8min	Bandwidth:	n.a.
Processing Method:	AS_CR_8min_0409	Dilution Factor:	1.0000
Injection Date/Time:	7/8/2019 0:16	Sample Weight:	1.0000

Chromatogram



Integration Results

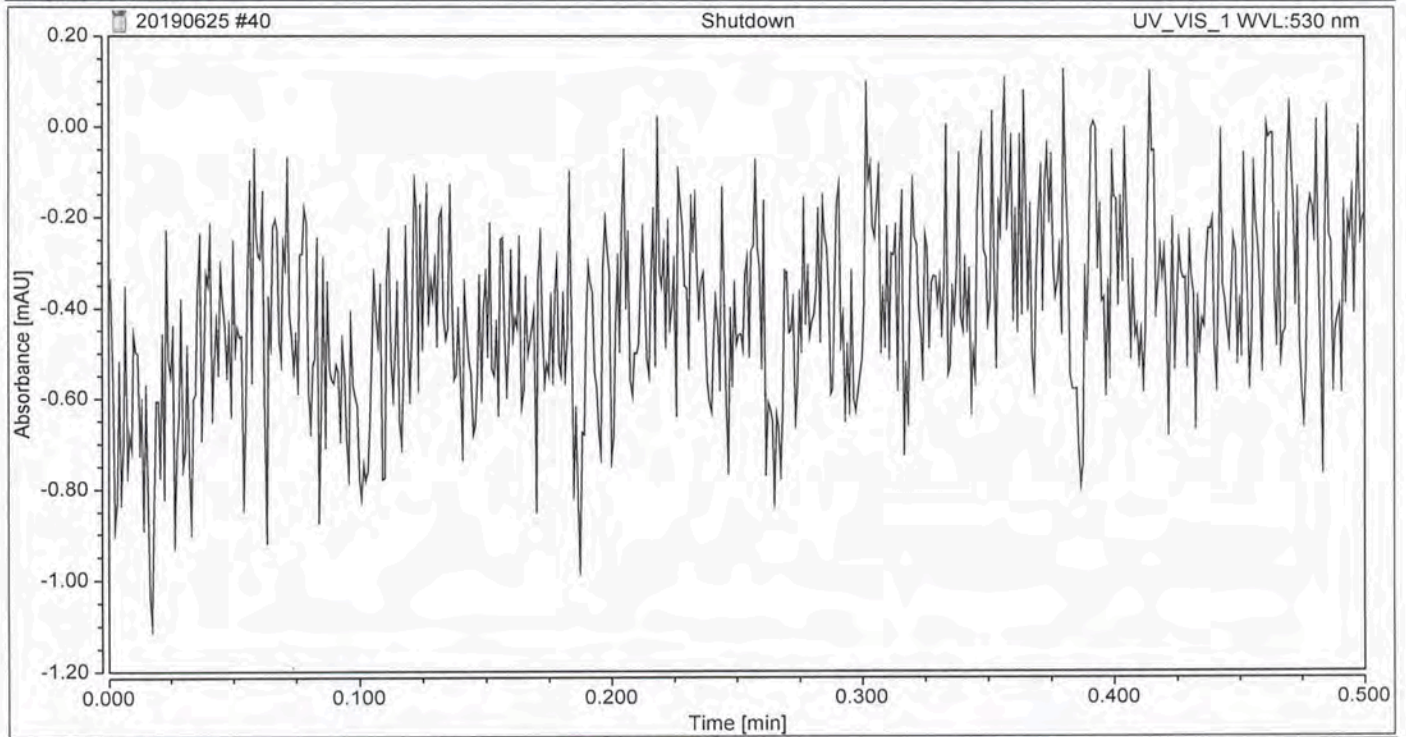
No.	Peak Name	Retention Time min	Area mAU*min	Height mAU	Relative Area %	Relative Height %	Amount
n.a.	Chromium 6+	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Total:			0.000	0.000	0.00	0.00	

Chromatogram and Results

Injection Details

Injection Name:	Shutdown	Run Time (min):	0.50
Vial Number:	19	Injection Volume:	5000.00
Injection Type:	Blank	Channel:	UV_VIS_1
Calibration Level:		Wavelength:	530.0
Instrument Method:	Shutdown	Bandwidth:	n.a.
Processing Method:	AS_CR_8min_0409	Dilution Factor:	1.0000
Injection Date/Time:	7/8/2019 0:31	Sample Weight:	1.0000

Chromatogram



Integration Results

No.	Peak Name	Retention Time min	Area mAU*min	Height mAU	Relative Area %	Relative Height %	Amount
n.a.	Chromium 6+	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Total:			0.000	0.000	0.00	0.00	

July 12, 2019

Chad Roper
AECOM
1220 Avenida Acaso
Camarillo, CA 93012

Lab ID:

- Las Vegas, NV (NV930, CA3029)
 Reno, NV (NV015, CA2526)

Project: 60477365

Workorder No.: 19061616

Dear Chad Roper:

Silver State Labs-Las Vegas received 6 sample(s) on 6/27/2019 for the analyses presented in the following report.

There were no problems with the analytical events associated with this report unless noted in the Case Narrative. Analytical results reported as non-detect (ND) in the result field are below the Practical Quantification Limit (PQL). Analytical results above the PQL are reported as the measured value in the results field.

Quality control data is within laboratory defined or method specified acceptance limits except if noted.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,



John Sloan
Laboratory Technical Director
3626 E. Sunset Road, Suite 100
Las Vegas, NV 89120



Silver State Labs-Las Vegas
 3626 E. Sunset Road, Suite 100
 Las Vegas, NV 89120
 (702) 873-4478 FAX: (702) 873-7967
 www.ssalabs.com

Analytical Report

WO#: 19061616
 Date Reported: 7/12/2019

CLIENT: AECOM **Collection Date:** 6/27/2019 9:40:00 AM
Project: 60477365
Lab ID: 19061616-01 **Matrix:** GROUNDWATER
Client Sample ID NERT3.58S1 - 20190627

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
HEXAVALENT CHROMIUM-SDWA-LO LEVEL		EPA 218.7		Analyst: JS		
Chromium, Hexavalent	9.09	1.00		µg/L	1	7/7/2019 11:04:00 PM

**Qualifiers:
(Qual)**

DF Dilution Factor.
 MCL Maximum Contaminant Level.
 PQL Practical Quantitation Limit.

H Holding times for preparation or analysis exceeded.
 ND Not Detected at the PQL.

Original



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Analytical Report

WO#: 19061616
 Date Reported: 7/12/2019

CLIENT: AECOM **Collection Date:** 6/27/2019 10:45:00 AM
Project: 60477365
Lab ID: 19061616-02 **Matrix:** GROUNDWATER
Client Sample ID NERT3.63S1 - 20190627

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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HEXAVALENT CHROMIUM-SDWA-LO LEVEL				EPA 218.7		Analyst: JS
Chromium, Hexavalent	8.54	1.00		µg/L	1	7/7/2019 9:52:00 PM

**Qualifiers:
(Qual)**

DF Dilution Factor.
 MCL Maximum Contaminant Level.
 PQL Practical Quantitation Limit.

H Holding times for preparation or analysis exceeded.
 ND Not Detected at the PQL.

Original



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Analytical Report

WO#: 19061616
 Date Reported: 7/12/2019

CLIENT: AECOM **Collection Date:** 6/27/2019 11:50:00 AM
Project: 60477365
Lab ID: 19061616-03 **Matrix:** GROUNDWATER
Client Sample ID NERT3.80S1 - 20190627

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
HEXAVALENT CHROMIUM-SDWA-LO LEVEL		EPA 218.7		Analyst: JS		
Chromium, Hexavalent	ND	1.00		µg/L	1	7/7/2019 10:07:00 PM

**Qualifiers:
(Qual)**

DF Dilution Factor.
 MCL Maximum Contaminant Level.
 PQL Practical Quantitation Limit.

H Holding times for preparation or analysis exceeded.
 ND Not Detected at the PQL.

Original



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 Las Vegas, NV 89120
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Analytical Report

WO#: 19061616
 Date Reported: 7/12/2019

CLIENT: AECOM **Collection Date:** 6/27/2019 1:10:00 PM
Project: 60477365
Lab ID: 19061616-04 **Matrix:** GROUNDWATER
Client Sample ID NERT3.98S1 - 20190627

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
HEXAVALENT CHROMIUM-SDWA-LO LEVEL		EPA 218.7		Analyst: JS		
Chromium, Hexavalent	ND	1.00		µg/L	1	7/7/2019 10:21:00 PM

**Qualifiers:
(Qual)**

DF Dilution Factor.
 MCL Maximum Contaminant Level.
 PQL Practical Quantitation Limit.

H Holding times for preparation or analysis exceeded.
 ND Not Detected at the PQL.

Original



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Analytical Report

WO#: 19061616
 Date Reported: 7/12/2019

CLIENT: AECOM **Collection Date:** 6/27/2019 2:30:00 PM
Project: 60477365
Lab ID: 19061616-05 **Matrix:** GROUNDWATER
Client Sample ID NERT4.51S1 - 20190627

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
HEXAVALENT CHROMIUM-SDWA-LO LEVEL				EPA 218.7		Analyst: JS
Chromium, Hexavalent	36.8	1.00		µg/L	1	7/7/2019 10:35:00 PM

**Qualifiers:
(Qual)**

DF Dilution Factor.
 MCL Maximum Contaminant Level.
 PQL Practical Quantitation Limit.

H Holding times for preparation or analysis exceeded.
 ND Not Detected at the PQL.

Original



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Analytical Report

WO#: 19061616
 Date Reported: 7/12/2019

CLIENT: AECOM **Collection Date:** 6/27/2019 11:50:00 AM
Project: 60477365
Lab ID: 19061616-06 **Matrix:** GROUNDWATER
Client Sample ID NERT3.80S1 - 20190627-FD

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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HEXAVALENT CHROMIUM-SDWA-LO LEVEL				EPA 218.7		Analyst: JS
Chromium, Hexavalent	ND	1.00		µg/L	1	7/7/2019 10:50:00 PM

**Qualifiers:
(Qual)**

DF Dilution Factor.
 MCL Maximum Contaminant Level.
 PQL Practical Quantitation Limit.

H Holding times for preparation or analysis exceeded.
 ND Not Detected at the PQL.

Original



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QC SUMMARY REPORT

WO#: 19061616
12-Jul-19

Client: AECOM
Project: 60477365

TestCode: CR6-SDWA-218.7

Sample ID: ICV-R31012	SampType: ICV	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/7/2019	RunNo: 31012						
Client ID: ICV	Batch ID: R31012	TestNo: E218.7		Analysis Date: 7/7/2019	SeqNo: 713304						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	53.9	1.00	50.00	0	108	90	110				

Sample ID: ICB-R31012	SampType: ICB	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/7/2019	RunNo: 31012						
Client ID: ICB	Batch ID: R31012	TestNo: E218.7		Analysis Date: 7/7/2019	SeqNo: 713305						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	ND	1.00									

Sample ID: CCV-R31012	SampType: CCV	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/8/2019	RunNo: 31012						
Client ID: CCV	Batch ID: R31012	TestNo: E218.7		Analysis Date: 7/8/2019	SeqNo: 713306						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	52.2	1.00	50.00	0	104	90	110				

Sample ID: CCB-R31012	SampType: CCB	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/8/2019	RunNo: 31012						
Client ID: CCB	Batch ID: R31012	TestNo: E218.7		Analysis Date: 7/8/2019	SeqNo: 713307						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	ND	1.00									

Qualifiers: H Holding times for preparation or analysis exceeded.

MCL Maximum Contaminant Level.

ND Not Detected at the PQL.

Original



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QC SUMMARY REPORT

WO#: 19061616
12-Jul-19

Client: AECOM
Project: 60477365

TestCode: CR6-SDWA-218.7

Sample ID: CCB-R31012	SampType: CCB	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/8/2019	RunNo: 31012
Client ID: CCB	Batch ID: R31012	TestNo: E218.7		Analysis Date: 7/8/2019	SeqNo: 713307
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qual

Sample ID: MB-R31012	SampType: MBLK	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/7/2019	RunNo: 31012
Client ID: PBW	Batch ID: R31012	TestNo: E218.7		Analysis Date: 7/7/2019	SeqNo: 713308
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qual
Chromium, Hexavalent	ND	1.00			

Sample ID: LCS-R31012	SampType: LCS	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/7/2019	RunNo: 31012
Client ID: LCSW	Batch ID: R31012	TestNo: E218.7		Analysis Date: 7/7/2019	SeqNo: 713309
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qual
Chromium, Hexavalent	20.7	1.00	20.00	0	104 90 110

Sample ID: 19061403-04CMS	SampType: MS	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/7/2019	RunNo: 31012
Client ID: BatchQC	Batch ID: R31012	TestNo: E218.7		Analysis Date: 7/7/2019	SeqNo: 713313
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qual
Chromium, Hexavalent	18.8	1.00	5.000	14.04	95.4 90 110

Qualifiers: H Holding times for preparation or analysis exceeded.

MCL Maximum Contaminant Level.

ND Not Detected at the PQL.

Original



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QC SUMMARY REPORT

WO#: 19061616
12-Jul-19

Client: AECOM
Project: 60477365

TestCode: CR6-SDWA-218.7

Sample ID: 19061403-04CMSD	SampType: MSD	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/7/2019	RunNo: 31012						
Client ID: BatchQC	Batch ID: R31012	TestNo: E218.7	Analysis Date: 7/7/2019	SeqNo: 713314							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	19.1	1.00	5.000	14.04	101	90	110	18.81	1.45	20	

Sample ID: 19061616-01AMS	SampType: MS	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/7/2019	RunNo: 31012						
Client ID: NERT3.58S1 - 20190	Batch ID: R31012	TestNo: E218.7	Analysis Date: 7/7/2019	SeqNo: 713322							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	13.9	1.00	5.000	9.093	96.6	90	110				

Sample ID: 19061616-01AMSD	SampType: MSD	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/7/2019	RunNo: 31012						
Client ID: NERT3.58S1 - 20190	Batch ID: R31012	TestNo: E218.7	Analysis Date: 7/7/2019	SeqNo: 713323							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	13.8	1.00	5.000	9.093	94.7	90	110	13.92	0.662	20	

Qualifiers: H Holding times for preparation or analysis exceeded.

MCL Maximum Contaminant Level.

ND Not Detected at the PQL.

Original

Report Results To:
Report Attention: Chad Roper Project Number: 604177365
Company: AECOM
Mailing Address: 1220 Avenida Arcata
City, State, Zip: Camarillo CA 93012
Phone: 805-741-4027 Email / Fax: chad.ropere@aecom.com

Send Invoice To:
Invoice Attention: Carmen Caceras Schnell PO# _____ Quote # _____
Company: AECOM
Mailing Address: 6200 S. Quebec St
City, State, Zip: Greenwood Village CO 80111
Phone: 805-741-4031 Email / Fax: Carmen.Caceras-Schnell@aecom.com

COMPLIANCE MONITORING?
Yes No
NEW ADDRESS?
Results: Invoiced:

Applicable Program
SDWA CWA RCRA
Mining Other

QC Level Report
I II III IV
NOTE: Surcharges apply to Level II, III and IV reports

Sampled by: J. CAROTRICK Signature: [Signature]

ANALYSES REQUESTED

Send Results Via:
Mail: Email: Fax:

Send Invoice Via:
Mail: Email: Fax:

Field Measurements

On-Site pH: _____ Chlorine: _____

Temperature: _____ Other: _____

I attest to the validity and authenticity of the sample. I am aware that tampering with or intentionally mislabeling the sample location, date or time is considered fraud and may be grounds for legal action.

Standard: Standard TAT 7-10 Business Days. Note that some tests vary.
Rush
Same Day: 3 Day: Other (specify): _____
1 Day: 4 Day: Rush results will be issued after 4:00 p.m.
2 Day: 5 Day:
NOTE: A Rush Surcharge is applied for rush samples

Other Pertinent Information / Special Instructions

Number / Type of Containers ***	Method	Matrix	Preservative**
2	Key Chrome	GW	2V
4			1V
4			1V
4			1V
4			1V
4			1V

Date Sampled	Time Sampled	Sample Identification	SSAL - SEM Lab No.	Comp. Grab	Matrix*	Preservative**
6/27/19	0940	NERT 3.5831-20190627	19061616-1A	G	GW	2V
	1045	NERT 3.6331-20190627	-2A			1V
	1150	NERT 3.8031-20190627	-3A			1V
	1310	NERT 3.9831-20190627	-4A			1V
	1430	NERT 4.5131-20190627	-5A			1V
	1150	NERT 3.8031-20190627-FD	-6A			1V

Metals: Extra Vol = MS

COMMENTS:

Signature	Print Name	Company	Date	Time
<u>[Signature]</u>	J. CAROTRICK	AECOM	6/27/19	1530
<u>[Signature]</u>	Kyler Rawlins	SSAL	6-27-19	1530
<u>[Signature]</u>	J. CAROTRICK	AECOM	6/27/19	1530

Authorization is required to process samples. This obligates your organization for service fees. SSAL Standard T & C or other written agreement applies. If collections of legal services are required to recover said fees, your organization will be responsible for all fees and costs in addition to service fees.
Samples are discarded 30 days after results are reported unless other arrangements are made and storage fees may apply. The analytical results associated with this COC apply only to these samples as they are received by the laboratory. The liability of the laboratory is limited to the amount paid for the report.

July 16, 2019

Chad Roper
AECOM
1220 Avenida Acaso
Camarillo, CA 93012

Lab ID:

- Las Vegas, NV (NV930, CA3029)
 Reno, NV (NV015, CA2526)

Project: 60477365

Workorder No.: 19070063

Dear Chad Roper:

Silver State Labs-Las Vegas received 7 sample(s) on 7/1/2019 for the analyses presented in the following report.

There were no problems with the analytical events associated with this report unless noted in the Case Narrative. Analytical results reported as non-detect (ND) in the result field are below the Practical Quantification Limit (PQL). Analytical results above the PQL are reported as the measured value in the results field.

Quality control data is within laboratory defined or method specified acceptance limits except if noted.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,



John Sloan
Laboratory Technical Director
3626 E. Sunset Road, Suite 100
Las Vegas, NV 89120



Silver State Labs-Las Vegas
 3626 E. Sunset Road, Suite 100
 Las Vegas, NV 89120
 (702) 873-4478 FAX: (702) 873-7967
 www.ssalabs.com

Analytical Report

WO#: 19070063
 Date Reported: 7/16/2019

CLIENT: AECOM **Collection Date:** 7/1/2019 8:20:00 AM
Project: 60477365
Lab ID: 19070063-01 **Matrix:** GROUNDWATER
Client Sample ID NERT4.64S1 - 20190701

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
HEXAVALENT CHROMIUM-SDWA-LO LEVEL				EPA 218.7		Analyst: JS
Chromium, Hexavalent	38.2	1.00		µg/L	1	7/14/2019 10:52:00 PM

**Qualifiers:
(Qual)**

DF Dilution Factor.
 MCL Maximum Contaminant Level.
 PQL Practical Quantitation Limit.

H Holding times for preparation or analysis exceeded.
 ND Not Detected at the PQL.

Original



Silver State Labs-Las Vegas
 3626 E. Sunset Road, Suite 100
 Las Vegas, NV 89120
 (702) 873-4478 FAX: (702) 873-7967
 www.ssalabs.com

Analytical Report

WO#: 19070063
 Date Reported: 7/16/2019

CLIENT: AECOM **Collection Date:** 7/1/2019 9:25:00 AM
Project: 60477365
Lab ID: 19070063-02 **Matrix:** GROUNDWATER
Client Sample ID NERT4.71S2 - 20190701

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
HEXAVALENT CHROMIUM-SDWA-LO LEVEL				EPA 218.7		Analyst: JS
Chromium, Hexavalent	26.6	1.00		µg/L	1	7/14/2019 11:07:00 PM

**Qualifiers:
(Qual)**

DF Dilution Factor.
 MCL Maximum Contaminant Level.
 PQL Practical Quantitation Limit.

H Holding times for preparation or analysis exceeded.
 ND Not Detected at the PQL.

Original



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 www.ssalabs.com

Analytical Report

WO#: 19070063
 Date Reported: 7/16/2019

CLIENT: AECOM **Collection Date:** 7/1/2019 10:15:00 AM
Project: 60477365
Lab ID: 19070063-03 **Matrix:** GROUNDWATER
Client Sample ID NERT4.71S1 - 20190701

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
HEXAVALENT CHROMIUM-SDWA-LO LEVEL				EPA 218.7		Analyst: JS
Chromium, Hexavalent	37.4	1.00		µg/L	1	7/14/2019 11:21:00 PM

**Qualifiers:
(Qual)**

DF Dilution Factor.
 MCL Maximum Contaminant Level.
 PQL Practical Quantitation Limit.

H Holding times for preparation or analysis exceeded.
 ND Not Detected at the PQL.

Original



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 3626 E. Sunset Road, Suite 100
 Las Vegas, NV 89120
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 www.ssalabs.com

Analytical Report

WO#: 19070063
 Date Reported: 7/16/2019

CLIENT: AECOM **Collection Date:** 7/1/2019 11:50:00 AM
Project: 60477365
Lab ID: 19070063-04 **Matrix:** GROUNDWATER
Client Sample ID NERT3.60S1 - 20190701

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
HEXAVALENT CHROMIUM-SDWA-LO LEVEL				EPA 218.7		Analyst: JS
Chromium, Hexavalent	14.7	1.00		µg/L	1	7/14/2019 11:35:00 PM

**Qualifiers:
(Qual)**

DF Dilution Factor.
 MCL Maximum Contaminant Level.
 PQL Practical Quantitation Limit.

H Holding times for preparation or analysis exceeded.
 ND Not Detected at the PQL.

Original



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 www.ssalabs.com

Analytical Report

WO#: 19070063
 Date Reported: 7/16/2019

CLIENT: AECOM **Collection Date:** 7/1/2019 1:05:00 PM
Project: 60477365
Lab ID: 19070063-05 **Matrix:** GROUNDWATER
Client Sample ID NERT5.11S1 - 20190701

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
HEXAVALENT CHROMIUM-SDWA-LO LEVEL				EPA 218.7		Analyst: JS
Chromium, Hexavalent	14.2	1.00		µg/L	1	7/15/2019 12:19:00 AM

**Qualifiers:
(Qual)**

DF Dilution Factor.
 MCL Maximum Contaminant Level.
 PQL Practical Quantitation Limit.

H Holding times for preparation or analysis exceeded.
 ND Not Detected at the PQL.

Original



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 www.ssalabs.com

Analytical Report

WO#: 19070063
 Date Reported: 7/16/2019

CLIENT: AECOM **Collection Date:** 7/1/2019 1:55:00 PM
Project: 60477365
Lab ID: 19070063-06 **Matrix:** GROUNDWATER
Client Sample ID NERT4.93S1 - 20190701

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
HEXAVALENT CHROMIUM-SDWA-LO LEVEL				EPA 218.7		Analyst: JS
Chromium, Hexavalent	16.8	1.00		µg/L	1	7/15/2019 12:33:00 AM

**Qualifiers:
(Qual)**

DF Dilution Factor.
 MCL Maximum Contaminant Level.
 PQL Practical Quantitation Limit.

H Holding times for preparation or analysis exceeded.
 ND Not Detected at the PQL.

Original



Silver State Labs-Las Vegas
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 Las Vegas, NV 89120
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 www.ssalabs.com

Analytical Report

WO#: 19070063
 Date Reported: 7/16/2019

CLIENT: AECOM **Collection Date:** 7/1/2019 2:45:00 PM
Project: 60477365
Lab ID: 19070063-07 **Matrix:** GROUNDWATER
Client Sample ID NERT5.91S1 - 20190701

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
HEXAVALENT CHROMIUM-SDWA-LO LEVEL				EPA 218.7		Analyst: JS
Chromium, Hexavalent	ND	1.00		µg/L	1	7/15/2019 12:47:00 AM

**Qualifiers:
(Qual)**

DF Dilution Factor.
 MCL Maximum Contaminant Level.
 PQL Practical Quantitation Limit.

H Holding times for preparation or analysis exceeded.
 ND Not Detected at the PQL.

Original



Silver State Labs-Las Vegas
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www.ssalabs.com

QC SUMMARY REPORT

WO#: 19070063

16-Jul-19

Client: AECOM
Project: 60477365

TestCode: CR6-SDWA-218.7

Sample ID: ICV-R31286	SampType: ICV	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/14/2019	RunNo: 31286						
Client ID: ICV	Batch ID: R31286	TestNo: E218.7	Analysis Date: 7/14/2019	SeqNo: 719755							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	25.8	1.00	25.00	0	103	90	110				

Sample ID: ICB-R31286	SampType: ICB	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/14/2019	RunNo: 31286						
Client ID: ICB	Batch ID: R31286	TestNo: E218.7	Analysis Date: 7/14/2019	SeqNo: 719756							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	ND	1.00									

Sample ID: CCV-R31286	SampType: CCV	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/15/2019	RunNo: 31286						
Client ID: CCV	Batch ID: R31286	TestNo: E218.7	Analysis Date: 7/15/2019	SeqNo: 719757							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	22.5	1.00	25.00	0	90.1	90	110				

Sample ID: CCB-R31286	SampType: CCB	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/15/2019	RunNo: 31286						
Client ID: CCB	Batch ID: R31286	TestNo: E218.7	Analysis Date: 7/15/2019	SeqNo: 719758							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	ND	1.00									

Qualifiers: H Holding times for preparation or analysis exceeded.

MCL Maximum Contaminant Level.

ND Not Detected at the PQL.

Original



Silver State Labs-Las Vegas
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Las Vegas, NV 89120
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www.ssalabs.com

QC SUMMARY REPORT

WO#: 19070063
16-Jul-19

Client: AECOM
Project: 60477365

TestCode: CR6-SDWA-218.7

Sample ID: CCB-R31286	SampType: CCB	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/15/2019	RunNo: 31286						
Client ID: CCB	Batch ID: R31286	TestNo: E218.7		Analysis Date: 7/15/2019	SeqNo: 719758						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Sample ID: 19070063-04AMS	SampType: MS	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/14/2019	RunNo: 31286						
Client ID: NERT3.60S1 - 20190	Batch ID: R31286	TestNo: E218.7		Analysis Date: 7/14/2019	SeqNo: 719763						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	19.7	1.00	5.000	14.70	101	90	110				

Sample ID: 19070063-04AMSD	SampType: MSD	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/15/2019	RunNo: 31286						
Client ID: NERT3.60S1 - 20190	Batch ID: R31286	TestNo: E218.7		Analysis Date: 7/15/2019	SeqNo: 719764						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	19.3	1.00	5.000	14.70	92.0	90	110	19.75	2.25	20	

Sample ID: MB-R31286	SampType: MBLK	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/14/2019	RunNo: 31286						
Client ID: PBW	Batch ID: R31286	TestNo: E218.7		Analysis Date: 7/14/2019	SeqNo: 719779						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	ND	1.00									

Qualifiers: H Holding times for preparation or analysis exceeded.

MCL Maximum Contaminant Level.

ND Not Detected at the PQL.

Original



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Las Vegas, NV 89120
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www.ssalabs.com

QC SUMMARY REPORT

WO#: 19070063

16-Jul-19

Client: AECOM

Project: 60477365

TestCode: CR6-SDWA-218.7

Sample ID: LCS-R31286	SampType: LCS	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/14/2019	RunNo: 31286						
Client ID: LCSW	Batch ID: R31286	TestNo: E218.7		Analysis Date: 7/14/2019	SeqNo: 719780						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	10.6	1.00	10.00	0	106	90	110				

Qualifiers: H Holding times for preparation or analysis exceeded.

MCL Maximum Contaminant Level.

ND Not Detected at the PQL.

Original

Report Results To:

Report Attention: **Chad Ruper** Project Number: **66477365**

Company: **AECOM**

Mailing Address: **1220 Avenida Acaso**

City, State, Zip: **Camarillo CA 93012**

Phone: **805-764-4027** Email / Fax: **chad.ruper@aecom.com**

Send Invoice To:

Invoice Attention: **German Carreras Schnel** PO# _____ Quote # _____

Company: **AECOM**

Mailing Address: **6200 S. Quebec St**

City, State, Zip: **Greenwood Village CO 80111**

Phone: **905 744 4031** Email / Fax: **German.carreras.schnel@aecom.com**

COMPLIANCE MONITORING?

Yes No

NEW ADDRESS:

Results: Invoice:

Applicable Program

SDWA CWA RCRA

Mining Other _____

QC Level Report

I II III IV **per WO**

NOTE: Surcharges apply to Level II, III and IV reports

Sampled by: **J CARTRIO** Signature: *[Signature]*

ANALYSES REQUESTED

Send Results Via:

Mail: Email: Fax:

per WO

Send Invoice Via:

Mail: Email: Fax:

I attest to the validity and authenticity of the sample. I am aware that tampering with or intentionally mislabeling the sample location, date or time is considered fraud and may be grounds for legal action.

Standard: Standard TAT 7-10 Business Days. Note that some tests vary.

Rush

Same Day: 3 Day: Other (specify): **per work order**

1 Day: 4 Day: Rush results will be issued after 4:00 p.m.

2 Day: 5 Day:

NOTE: A Rush Surcharge is applied for rush samples

Date Sampled	Time Sampled	Sample Identification	SSAL - SEM Lab No.	Comp. Grab	Matrix	Preservative**	Number / Type of Containers**
7/1/19	0820	NERT4.64S1-20190701	19070063-1A	G	GW	None	V X
	0925	NERT4.71S2-20190701	-2A				X
	1015	NERT4.71S1-20190701	3A				X
	1150	NERT3.66S1-20190701	4A				X
	1305	NERT5.11S1-20190701	5A				X
	1355	NERT4.93S1-20190701	6A				X
	1445	NERT5.91S1-20190701	7A				X

Field Measurements

On-Site pH: _____ Chlorine: _____

Temperature: _____ Other: _____

Date Sampled	Time Sampled	Sample Identification	SSAL - SEM Lab No.	Comp. Grab	Matrix	Preservative**	Number / Type of Containers**
7/1/19	0820	NERT4.64S1-20190701	19070063-1A	G	GW	None	V X
	0925	NERT4.71S2-20190701	-2A				X
	1015	NERT4.71S1-20190701	3A				X
	1150	NERT3.66S1-20190701	4A				X
	1305	NERT5.11S1-20190701	5A				X
	1355	NERT4.93S1-20190701	6A				X
	1445	NERT5.91S1-20190701	7A				X

Metals*

Extra vol = MSB

Signature	Print Name	Company	Date	Time
<i>[Signature]</i>	J CARTRIO	AECOM	7/1/17	1556
<i>[Signature]</i>	Walter Raudins	SSAL	7-1-17	1550
<i>[Signature]</i>	J CARTRIO	AECOM	7/1/17	1550

Authorization is required to process samples. This obligates your organization for service fees. SSAL Standard T & C's or other written agreement applies. If collections or legal services are required to recover said fees, your organization will be responsible for all fees and costs in addition to service fees.

Samples are discarded 30 days after results are reported unless other arrangements are made and storage fees may apply. The analytical results associated with this COC apply only to these samples as they are received by the laboratory. The liability of the laboratory is limited to the amount paid for the report.

July 16, 2019

Chad Roper
AECOM
1220 Avenida Acaso
Camarillo, CA 93012

Lab ID:

- Las Vegas, NV (NV930, CA3029)
 Reno, NV (NV015, CA2526)

Project: 60477365

Workorder No.: 19070163

Dear Chad Roper:

Silver State Labs-Las Vegas received 8 sample(s) on 7/2/2019 for the analyses presented in the following report.

There were no problems with the analytical events associated with this report unless noted in the Case Narrative. Analytical results reported as non-detect (ND) in the result field are below the Practical Quantification Limit (PQL). Analytical results above the PQL are reported as the measured value in the results field.

Quality control data is within laboratory defined or method specified acceptance limits except if noted.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,



John Sloan
Laboratory Technical Director
3626 E. Sunset Road, Suite 100
Las Vegas, NV 89120



Silver State Labs-Las Vegas
 3626 E. Sunset Road, Suite 100
 Las Vegas, NV 89120
 (702) 873-4478 FAX: (702) 873-7967
 www.ssalabs.com

Analytical Report

WO#: 19070163
 Date Reported: 7/16/2019

CLIENT: AECOM **Collection Date:** 7/2/2019 8:35:00 AM
Project: 60477365
Lab ID: 19070163-01 **Matrix:** GROUNDWATER
Client Sample ID NERT 3.58N1-20190702

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
HEXAVALENT CHROMIUM-SDWA-LO LEVEL				EPA 218.7		Analyst: JS
Chromium, Hexavalent	ND	1.00		µg/L	1	7/15/2019 1:02:00 AM

**Qualifiers:
(Qual)**

DF Dilution Factor.
 MCL Maximum Contaminant Level.
 PQL Practical Quantitation Limit.

H Holding times for preparation or analysis exceeded.
 ND Not Detected at the PQL.

Original



Silver State Labs-Las Vegas
 3626 E. Sunset Road, Suite 100
 Las Vegas, NV 89120
 (702) 873-4478 FAX: (702) 873-7967
 www.ssalabs.com

Analytical Report

WO#: 19070163
 Date Reported: 7/16/2019

CLIENT: AECOM **Collection Date:** 7/2/2019 9:45:00 AM
Project: 60477365
Lab ID: 19070163-02 **Matrix:** GROUNDWATER
Client Sample ID NERT 3.60N1-20190702

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
----------	--------	----	------	-------	----	---------------

HEXAVALENT CHROMIUM-SDWA-LO LEVEL				EPA 218.7		Analyst: JS
Chromium, Hexavalent	ND	1.00		µg/L	1	7/15/2019 1:16:00 AM

**Qualifiers:
(Qual)**

DF Dilution Factor.
 MCL Maximum Contaminant Level.
 PQL Practical Quantitation Limit.

H Holding times for preparation or analysis exceeded.
 ND Not Detected at the PQL.

Original



Silver State Labs-Las Vegas
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 www.ssalabs.com

Analytical Report

WO#: 19070163
 Date Reported: 7/16/2019

CLIENT: AECOM **Collection Date:** 7/2/2019 10:50:00 AM
Project: 60477365
Lab ID: 19070163-03 **Matrix:** GROUNDWATER
Client Sample ID NERT 4.21N1-20190702

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
HEXAVALENT CHROMIUM-SDWA-LO LEVEL				EPA 218.7		Analyst: JS
Chromium, Hexavalent	27.1	1.00		µg/L	1	7/15/2019 1:31:00 AM

**Qualifiers:
(Qual)**

DF Dilution Factor.
 MCL Maximum Contaminant Level.
 PQL Practical Quantitation Limit.

H Holding times for preparation or analysis exceeded.
 ND Not Detected at the PQL.

Original



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 www.ssalabs.com

Analytical Report

WO#: 19070163
 Date Reported: 7/16/2019

CLIENT: AECOM **Collection Date:** 7/2/2019 10:15:00 AM
Project: 60477365
Lab ID: 19070163-04 **Matrix:** GROUNDWATER
Client Sample ID NERT 4.21N1-20190702-FB

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
HEXAVALENT CHROMIUM-SDWA-LO LEVEL				EPA 218.7		Analyst: JS
Chromium, Hexavalent	ND	1.00		µg/L	1	7/15/2019 1:45:00 AM

**Qualifiers:
(Qual)**

DF Dilution Factor.
 MCL Maximum Contaminant Level.
 PQL Practical Quantitation Limit.

H Holding times for preparation or analysis exceeded.
 ND Not Detected at the PQL.

Original



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 www.ssalabs.com

Analytical Report

WO#: 19070163
 Date Reported: 7/16/2019

CLIENT: AECOM **Collection Date:** 7/2/2019 11:15:00 AM
Project: 60477365
Lab ID: 19070163-05 **Matrix:** GROUNDWATER
Client Sample ID NERT 4.38N1-20190702-EB

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
HEXAVALENT CHROMIUM-SDWA-LO LEVEL				EPA 218.7		Analyst: JS
Chromium, Hexavalent	ND	1.00		µg/L	1	7/15/2019 1:59:00 AM

**Qualifiers:
(Qual)**

DF Dilution Factor.
 MCL Maximum Contaminant Level.
 PQL Practical Quantitation Limit.

H Holding times for preparation or analysis exceeded.
 ND Not Detected at the PQL.

Original



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 www.ssalabs.com

Analytical Report

WO#: 19070163
 Date Reported: 7/16/2019

CLIENT: AECOM **Collection Date:** 7/2/2019 12:35:00 PM
Project: 60477365
Lab ID: 19070163-06 **Matrix:** GROUNDWATER
Client Sample ID NERT 4.38N1-20190702

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
HEXAVALENT CHROMIUM-SDWA-LO LEVEL				EPA 218.7		Analyst: JS
Chromium, Hexavalent	ND	1.00		µg/L	1	7/15/2019 2:14:00 AM

**Qualifiers:
(Qual)**

DF Dilution Factor.
 MCL Maximum Contaminant Level.
 PQL Practical Quantitation Limit.

H Holding times for preparation or analysis exceeded.
 ND Not Detected at the PQL.

Original



Silver State Labs-Las Vegas
 3626 E. Sunset Road, Suite 100
 Las Vegas, NV 89120
 (702) 873-4478 FAX: (702) 873-7967
 www.ssalabs.com

Analytical Report

WO#: 19070163
 Date Reported: 7/16/2019

CLIENT: AECOM **Collection Date:** 7/2/2019 1:40:00 PM
Project: 60477365
Lab ID: 19070163-07 **Matrix:** GROUNDWATER
Client Sample ID NERT 4.64N1-20190702

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
----------	--------	----	------	-------	----	---------------

HEXAVALENT CHROMIUM-SDWA-LO LEVEL				EPA 218.7		Analyst: JS
Chromium, Hexavalent	ND	1.00		µg/L	1	7/15/2019 2:28:00 AM

**Qualifiers:
(Qual)**

DF Dilution Factor.
 MCL Maximum Contaminant Level.
 PQL Practical Quantitation Limit.

H Holding times for preparation or analysis exceeded.
 ND Not Detected at the PQL.

Original



Silver State Labs-Las Vegas
 3626 E. Sunset Road, Suite 100
 Las Vegas, NV 89120
 (702) 873-4478 FAX: (702) 873-7967
 www.ssalabs.com

Analytical Report

WO#: 19070163
 Date Reported: 7/16/2019

CLIENT: AECOM **Collection Date:** 7/2/2019 1:40:00 PM
Project: 60477365
Lab ID: 19070163-08 **Matrix:** GROUNDWATER
Client Sample ID NERT 4.64N1-20190702-FD

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
----------	--------	----	------	-------	----	---------------

HEXAVALENT CHROMIUM-SDWA-LO LEVEL				EPA 218.7		Analyst: JS
Chromium, Hexavalent	ND	1.00		µg/L	1	7/15/2019 2:43:00 AM

**Qualifiers:
(Qual)**

DF Dilution Factor.
 MCL Maximum Contaminant Level.
 PQL Practical Quantitation Limit.

H Holding times for preparation or analysis exceeded.
 ND Not Detected at the PQL.

Original



Silver State Labs-Las Vegas
3626 E. Sunset Road, Suite 100
Las Vegas, NV 89120
(702) 873-4478 FAX: (702) 873-7967
www.ssalabs.com

QC SUMMARY REPORT

WO#: 19070163

16-Jul-19

Client: AECOM
Project: 60477365

TestCode: CR6-SDWA-218.7

Sample ID: ICV-R31286	SampType: ICV	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/14/2019	RunNo: 31286						
Client ID: ICV	Batch ID: R31286	TestNo: E218.7		Analysis Date: 7/14/2019	SeqNo: 719755						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	25.8	1.00	25.00	0	103	90	110				

Sample ID: ICB-R31286	SampType: ICB	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/14/2019	RunNo: 31286						
Client ID: ICB	Batch ID: R31286	TestNo: E218.7		Analysis Date: 7/14/2019	SeqNo: 719756						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	ND	1.00									

Sample ID: CCV-R31286	SampType: CCV	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/15/2019	RunNo: 31286						
Client ID: CCV	Batch ID: R31286	TestNo: E218.7		Analysis Date: 7/15/2019	SeqNo: 719757						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	22.5	1.00	25.00	0	90.1	90	110				

Sample ID: CCB-R31286	SampType: CCB	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/15/2019	RunNo: 31286						
Client ID: CCB	Batch ID: R31286	TestNo: E218.7		Analysis Date: 7/15/2019	SeqNo: 719758						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	ND	1.00									

Qualifiers: H Holding times for preparation or analysis exceeded.

MCL Maximum Contaminant Level.

ND Not Detected at the PQL.

Original



Silver State Labs-Las Vegas
 3626 E. Sunset Road, Suite 100
 Las Vegas, NV 89120
 (702) 873-4478 FAX: (702) 873-7967
 www.ssalabs.com

QC SUMMARY REPORT

WO#: 19070163
 16-Jul-19

Client: AECOM
Project: 60477365

TestCode: CR6-SDWA-218.7

Sample ID: CCB-R31286	SampType: CCB	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/15/2019	RunNo: 31286						
Client ID: CCB	Batch ID: R31286	TestNo: E218.7		Analysis Date: 7/15/2019	SeqNo: 719758						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Sample ID: 19070063-04AMS	SampType: MS	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/14/2019	RunNo: 31286						
Client ID: BatchQC	Batch ID: R31286	TestNo: E218.7		Analysis Date: 7/14/2019	SeqNo: 719763						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	19.7	1.00	5.000	14.70	101	90	110				

Sample ID: 19070063-04AMSD	SampType: MSD	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/15/2019	RunNo: 31286						
Client ID: BatchQC	Batch ID: R31286	TestNo: E218.7		Analysis Date: 7/15/2019	SeqNo: 719764						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	19.3	1.00	5.000	14.70	92.0	90	110	19.75	2.25	20	

Sample ID: MB-R31286	SampType: MBLK	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/14/2019	RunNo: 31286						
Client ID: PBW	Batch ID: R31286	TestNo: E218.7		Analysis Date: 7/14/2019	SeqNo: 719779						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	ND	1.00									

Qualifiers: H Holding times for preparation or analysis exceeded.

MCL Maximum Contaminant Level.

ND Not Detected at the PQL.

Original



Silver State Labs-Las Vegas
3626 E. Sunset Road, Suite 100
Las Vegas, NV 89120
(702) 873-4478 FAX: (702) 873-7967
www.ssalabs.com

QC SUMMARY REPORT

WO#: 19070163
16-Jul-19

Client: AECOM
Project: 60477365

TestCode: CR6-SDWA-218.7

Sample ID: LCS-R31286	SampType: LCS	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/14/2019	RunNo: 31286						
Client ID: LCSW	Batch ID: R31286	TestNo: E218.7		Analysis Date: 7/14/2019	SeqNo: 719780						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	10.6	1.00	10.00	0	106	90	110				

Qualifiers: H Holding times for preparation or analysis exceeded.

MCL Maximum Contaminant Level.

ND Not Detected at the PQL.

Original

Report Results To:
 Report Attention: Chad Reper Project Number: 60477365
 Company: AECOM
 Mailing Address: 1220 Avenida Alaso
 City, State, Zip: Camarillo CA 93012
 Phone: 805-764-463 Email / Fax: chad.reper@aecom.com

Send Invoice To:
 Invoice Attention: Carmen Caceres Schnell PO# _____ Quote # _____
 Company: AECOM
 Mailing Address: 6200 S Quebec St
 City, State, Zip: Greenwood Village CO 80111
 Phone: 805-744-4031 Email / Fax: carmen.caceres-schnell@aecom.com

COMPLIANCE MONITORING?
 Yes No
NEW ADDRESS
 Results: Invoice:

Sampled by: J. CAPOTRIO Signature: [Signature]

ANALYSES REQUESTED

Applicable Program
 SDWA CWA RCRA
 Mining Other _____

QC Level Report
 I II III IV
 NOTE: Surcharges apply to Level II, III and IV reports

Send Results Via:
 Mail: Email: Fax:

Send Invoice Via:
 Mail: Email: Fax:

Field Measurements
 On-Site pH: _____ Chlorine: _____
 Temperature: _____ Other: _____

I attest to the validity and authenticity of the sample. I am aware that tampering with or intentionally mislabeling the sample location, date or time is considered fraud and may be grounds for legal action.

Standard: Standard TAT 7-10 Business Days. Note that some tests vary.
Rush
 Same Day: 3 Day: Other (specify): _____
 1 Day: 4 Day: Rush results will be issued after 4:00 p.m.
 2 Day: 5 Day:
NOTE: A Rush Surcharge is applied for rush samples

Date Sampled	Time Sampled	Sample Identification	SSAL - SEM Lab No.	Comp. Grab	Matrix*	Preservative**	Number / Type of Containers ***	Method
7/2/19	0735	NERT 3.58 NI-20190702	19070163-1A	G	GW	6	1V	X
[Bracket]	0945	NERT 3.66 NI-20190702	-2A				1V	X
	1050	NERT 4.21 NI-20190702	-3A				1V	X
	1015	NERT 4.21 NI-20190702-FB	-4A				1V	X
	1115	NERT 4.38 NI-20190702-EB	-5A				1V	X
	1235	NERT 4.38 NI-20190702	-6A				1V	X
	1340	NERT 4.64 NI-20190702	-7A				1V	X
	1340	NERT 4.64 NI-20190702-FD	-8A				1V	X

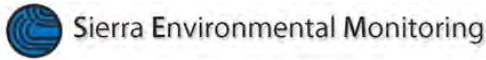
Hex Chrome 214.7

Signature	Print Name	Company	Date	Time
<u>[Signature]</u>	J CAPOTRIO	AECOM	7/2/19	1605
<u>[Signature]</u>	V...	SSAL	7-2-19	1605
<u>[Signature]</u>	J CAPOTRIO	AECOM	7/2/19	1605

Authorization is required to process samples. This obligates your organization for service fees, SSAL Standard T & C's or other written agreement applies. If collections or legal services are required to recover said fees, your organization will be responsible for all fees and costs in addition to service fees.

Samples are discarded 30 days after results are reported unless other arrangements are made and storage fees may apply. The analytical results associated with this COC apply only to these samples as they are received by the laboratory. The liability of the laboratory is limited to the amount paid for the report.

Page 13 of 13



July 16, 2019

Chad Roper
AECOM
1220 Avenida Acaso
Camarillo, CA 93012

Lab ID:

- Las Vegas, NV (NV930, CA3029)
- Reno, NV (NV015, CA2526)

Project: 60477365

Workorder No.: 19070339

Dear Chad Roper:

Silver State Labs-Las Vegas received 3 sample(s) on 7/8/2019 for the analyses presented in the following report.

There were no problems with the analytical events associated with this report unless noted in the Case Narrative. Analytical results reported as non-detect (ND) in the result field are below the Practical Quantification Limit (PQL). Analytical results above the PQL are reported as the measured value in the results field.

Quality control data is within laboratory defined or method specified acceptance limits except if noted.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

John Sloan
Laboratory Technical Director
3626 E. Sunset Road, Suite 100
Las Vegas, NV 89120

3626 East Sunset Road, Suite 100, Las Vegas, NV 89120 - Tel: 702-873-4478
1135 Financial Blvd, Reno, NV 89502 - Tel: 775-857-2400
1250 Lamoille Hwy, Suite 629, Elko, NV 89801 - Tel: 775-778-9828
11275 Sunrise Gold Circle, Unit V, Rancho Cordova, CA 95742 - Tel: 916-975-7492
1440 S. State College Blvd., Suite 4-J, Anaheim, CA 92806 - Tel: 714-426-0366

ssalabs.com



Silver State Labs-Las Vegas
 3626 E. Sunset Road, Suite 100
 Las Vegas, NV 89120
 (702) 873-4478 FAX: (702) 873-7967
 www.ssalabs.com

Analytical Report

WO#: 19070339
 Date Reported: 7/16/2019

CLIENT: AECOM **Collection Date:** 7/8/2019 9:35:00 AM
Project: 60477365
Lab ID: 19070339-01 **Matrix:** GROUNDWATER
Client Sample ID NERT-5.49S1-201907081

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
HEXAVALENT CHROMIUM-SDWA-LO LEVEL		EPA 218.7		Analyst: JS		
Chromium, Hexavalent	ND	1.00		µg/L	1	7/15/2019 2:57:00 AM

**Qualifiers:
(Qual)**

DF Dilution Factor.
 MCL Maximum Contaminant Level.
 PQL Practical Quantitation Limit.

H Holding times for preparation or analysis exceeded.
 ND Not Detected at the PQL.

Original



Silver State Labs-Las Vegas
 3626 E. Sunset Road, Suite 100
 Las Vegas, NV 89120
 (702) 873-4478 FAX: (702) 873-7967
 www.ssalabs.com

Analytical Report

WO#: 19070339
 Date Reported: 7/16/2019

CLIENT: AECOM **Collection Date:** 7/8/2019 12:15:00 PM
Project: 60477365
Lab ID: 19070339-02 **Matrix:** GROUNDWATER
Client Sample ID NERT-4.65N1-201907082-FB

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
HEXAVALENT CHROMIUM-SDWA-LO LEVEL				EPA 218.7		Analyst: JS
Chromium, Hexavalent	ND	1.00		µg/L	1	7/15/2019 3:11:00 AM

**Qualifiers:
(Qual)**

DF Dilution Factor.
 MCL Maximum Contaminant Level.
 PQL Practical Quantitation Limit.

H Holding times for preparation or analysis exceeded.
 ND Not Detected at the PQL.

Original



Silver State Labs-Las Vegas
 3626 E. Sunset Road, Suite 100
 Las Vegas, NV 89120
 (702) 873-4478 FAX: (702) 873-7967
 www.ssalabs.com

Analytical Report

WO#: 19070339
 Date Reported: 7/16/2019

CLIENT: AECOM **Collection Date:** 7/8/2019 12:30:00 PM
Project: 60477365
Lab ID: 19070339-03 **Matrix:** GROUNDWATER
Client Sample ID NERT-4.65N1-20190708

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
HEXAVALENT CHROMIUM-SDWA-LO LEVEL				EPA 218.7		Analyst: JS
Chromium, Hexavalent	ND	1.00		µg/L	1	7/15/2019 3:26:00 AM

**Qualifiers:
(Qual)**

DF Dilution Factor.
 MCL Maximum Contaminant Level.
 PQL Practical Quantitation Limit.

H Holding times for preparation or analysis exceeded.
 ND Not Detected at the PQL.

Original



Silver State Labs-Las Vegas
3626 E. Sunset Road, Suite 100
Las Vegas, NV 89120
(702) 873-4478 FAX: (702) 873-7967
www.ssalabs.com

QC SUMMARY REPORT

WO#: 19070339

16-Jul-19

Client: AECOM
Project: 60477365

TestCode: CR6-SDWA-218.7

Sample ID: ICV-R31286	SampType: ICV	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/14/2019	RunNo: 31286						
Client ID: ICV	Batch ID: R31286	TestNo: E218.7		Analysis Date: 7/14/2019	SeqNo: 719755						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	25.8	1.00	25.00	0	103	90	110				

Sample ID: ICB-R31286	SampType: ICB	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/14/2019	RunNo: 31286						
Client ID: ICB	Batch ID: R31286	TestNo: E218.7		Analysis Date: 7/14/2019	SeqNo: 719756						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	ND	1.00									

Sample ID: CCV-R31286	SampType: CCV	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/15/2019	RunNo: 31286						
Client ID: CCV	Batch ID: R31286	TestNo: E218.7		Analysis Date: 7/15/2019	SeqNo: 719757						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	22.5	1.00	25.00	0	90.1	90	110				

Sample ID: CCB-R31286	SampType: CCB	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/15/2019	RunNo: 31286						
Client ID: CCB	Batch ID: R31286	TestNo: E218.7		Analysis Date: 7/15/2019	SeqNo: 719758						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	ND	1.00									

Qualifiers: H Holding times for preparation or analysis exceeded.

MCL Maximum Contaminant Level.

ND Not Detected at the PQL.

Original



Silver State Labs-Las Vegas
3626 E. Sunset Road, Suite 100
Las Vegas, NV 89120
(702) 873-4478 FAX: (702) 873-7967
www.ssalabs.com

QC SUMMARY REPORT

WO#: 19070339

16-Jul-19

Client: AECOM

Project: 60477365

TestCode: CR6-SDWA-218.7

Sample ID: CCB-R31286	SampType: CCB	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/15/2019	RunNo: 31286						
Client ID: CCB	Batch ID: R31286	TestNo: E218.7		Analysis Date: 7/15/2019	SeqNo: 719758						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Sample ID: 19070063-04AMS	SampType: MS	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/14/2019	RunNo: 31286						
Client ID: BatchQC	Batch ID: R31286	TestNo: E218.7		Analysis Date: 7/14/2019	SeqNo: 719763						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	19.7	1.00	5.000	14.70	101	90	110				

Sample ID: 19070063-04AMSD	SampType: MSD	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/15/2019	RunNo: 31286						
Client ID: BatchQC	Batch ID: R31286	TestNo: E218.7		Analysis Date: 7/15/2019	SeqNo: 719764						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	19.3	1.00	5.000	14.70	92.0	90	110	19.75	2.25	20	

Sample ID: MB-R31286	SampType: MBLK	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/14/2019	RunNo: 31286						
Client ID: PBW	Batch ID: R31286	TestNo: E218.7		Analysis Date: 7/14/2019	SeqNo: 719779						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	ND	1.00									

Qualifiers: H Holding times for preparation or analysis exceeded.

MCL Maximum Contaminant Level.

ND Not Detected at the PQL.

Original



Silver State Labs-Las Vegas
3626 E. Sunset Road, Suite 100
Las Vegas, NV 89120
(702) 873-4478 FAX: (702) 873-7967
www.ssalabs.com

QC SUMMARY REPORT

WO#: 19070339
16-Jul-19

Client: AECOM
Project: 60477365

TestCode: CR6-SDWA-218.7

Sample ID: LCS-R31286	SampType: LCS	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/14/2019	RunNo: 31286						
Client ID: LCSW	Batch ID: R31286	TestNo: E218.7	Analysis Date: 7/14/2019	SeqNo: 719780							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	10.6	1.00	10.00	0	106	90	110				

Qualifiers: H Holding times for preparation or analysis exceeded.

MCL Maximum Contaminant Level.

ND Not Detected at the PQL.

Original

Report Results To:
 Report Attention: Chad Roper
 Project Number: 604177365
 Company: AECOM
 Mailing Address: 1220 Avenida Araso
 City, State, Zip: Camarillo CA 93012
 Phone: 805 764 4031 Email / Fax: chad.ropert@aecom.com

Send Invoice To:
 Invoice Attention: Carmen Caceres-Schnell PO#
 Quote #
 Company: AECOM
 Mailing Address: 6205 S. Quebec ST
 City, State, Zip: Greenwood Village CO 80111
 Phone: 818-517-3126 Email / Fax:

COMPLIANCE MONITORING?
 Yes No
NEW ADDRESS?
 Results: Invoice:

Applicable Program
 SDWA CWA RCRA
 Mining Other _____

QC Level Report
Per W/O I II III IV
 NOTE: Surcharges apply to Level II, III and IV reports

Sampled by: J CAROTRIK Signature: _____

ANALYSES REQUESTED

I attest to the validity and authenticity of the sample. I am aware that tampering with or intentionally mislabeling the sample location, date or time is considered fraud and may be grounds for legal action.

Standard: Standard TAT 7-10 Business Days. Note that some tests vary.
Rush
 Same Day: 3 Day: Other (specify): per W/O
 1 Day: 4 Day: Rush results will be issued after 4:00 p.m.
 2 Day: 5 Day:
 NOTE: A Rush Surcharge is applied for rush samples

Other Pertinent Information / Special Instructions

Date Sampled	Time Sampled	Sample Identification	SSAL - SEM Lab No.	Comp. Grab	Matrix*	Preservative**	Number / Type of Containers ***
<u>7/8/19</u>	<u>0935</u>	<u>NERT5.4951-20190708</u>	<u>19070339-1A</u>	<u>G</u>	<u>GW</u>	<u>7</u>	<u>1/1 X</u>
<u>7/8/19</u>	<u>1215</u>	<u>NERT4.65NI-20190708-FB</u>	<u>2A</u>	<u>S</u>	<u>I</u>	<u>I</u>	<u>I X</u>
<u>7/8/19</u>	<u>1230</u>	<u>NERT4.65NI-20190708</u>	<u>3A</u>	<u>S</u>	<u>I</u>	<u>I</u>	<u>I X</u>

Hex Chrome 25% 7

Send Results Via:
 Mail: Email: Fax:
per W/O
Send Invoice Via:
 Mail: Email: Fax:

Field Measurements
 On-Site pH: _____ Chlorine: _____
 Temperature: _____ Other: _____

Metals* _____

COMMENTS:

Signature	Print Name	Company	Date	Time
<u>[Signature]</u>	<u>J CAROTRIK</u>	<u>AECOM</u>	<u>7/8/19</u>	<u>1410</u>
<u>[Signature]</u>	<u>Melissa Vega</u>	<u>SSAL</u>	<u>7/8/19</u>	<u>1410</u>
<u>[Signature]</u>	<u>J CAROTRIK</u>	<u>AECOM</u>	<u>7/8/19</u>	<u>1410</u>

Authorization is required to process samples. This obligates your organization for service fees. SSAL Standard T & C's or other written agreement applies. If collections or legal services are required to recover said fees, your organization will be responsible for all fees and costs in addition to service fees. Per W/O

Samples are discarded 30 days after results are reported unless other arrangements are made and storage fees may apply. The analytical results associated with this COC apply only to these samples as they are received by the laboratory. The liability of the laboratory is limited to the amount paid for the report. Per W/O

July 23, 2019

Chad Roper
AECOM
1220 Avenida Acaso
Camarillo, CA 93012

Lab ID:

- Las Vegas, NV (NV930, CA3029)
 Reno, NV (NV015, CA2526)

Project: 60477365

Workorder No.: 19070468

Dear Chad Roper:

Silver State Labs-Las Vegas received 3 sample(s) on 7/10/2019 for the analyses presented in the following report.

There were no problems with the analytical events associated with this report unless noted in the Case Narrative. Analytical results reported as non-detect (ND) in the result field are below the Practical Quantification Limit (PQL). Analytical results above the PQL are reported as the measured value in the results field.

Quality control data is within laboratory defined or method specified acceptance limits except if noted.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,



John Sloan
Laboratory Technical Director
3626 E. Sunset Road, Suite 100
Las Vegas, NV 89120



Silver State Labs-Las Vegas
 3626 E. Sunset Road, Suite 100
 Las Vegas, NV 89120
 (702) 873-4478 FAX: (702) 873-7967
 www.ssalabs.com

Analytical Report

WO#: 19070468
 Date Reported: 7/23/2019

CLIENT: AECOM **Collection Date:** 7/9/2019 11:50:00 AM
Project: 60477365
Lab ID: 19070468-01 **Matrix:** GROUNDWATER
Client Sample ID NERT4.70N1 - 20190709

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
HEXAVALENT CHROMIUM-SDWA-LO LEVEL				EPA 218.7		Analyst: JS
Chromium, Hexavalent	ND	1.00		µg/L	1	7/22/2019 4:32:00 PM

**Qualifiers:
(Qual)**

DF Dilution Factor.
 MCL Maximum Contaminant Level.
 PQL Practical Quantitation Limit.

H Holding times for preparation or analysis exceeded.
 ND Not Detected at the PQL.

Original



Silver State Labs-Las Vegas
 3626 E. Sunset Road, Suite 100
 Las Vegas, NV 89120
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 www.ssalabs.com

Analytical Report

WO#: 19070468
 Date Reported: 7/23/2019

CLIENT: AECOM **Collection Date:** 7/9/2019 12:05:00 PM
Project: 60477365
Lab ID: 19070468-02 **Matrix:** GROUNDWATER
Client Sample ID NERT4.70N1 - 20190709-EB

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
HEXAVALENT CHROMIUM-SDWA-LO LEVEL				EPA 218.7		Analyst: JS
Chromium, Hexavalent	ND	1.00		µg/L	1	7/22/2019 4:46:00 PM

**Qualifiers:
(Qual)**

DF Dilution Factor.
 MCL Maximum Contaminant Level.
 PQL Practical Quantitation Limit.

H Holding times for preparation or analysis exceeded.
 ND Not Detected at the PQL.

Original



Silver State Labs-Las Vegas
 3626 E. Sunset Road, Suite 100
 Las Vegas, NV 89120
 (702) 873-4478 FAX: (702) 873-7967
 www.ssalabs.com

Analytical Report

WO#: 19070468
 Date Reported: 7/23/2019

CLIENT: AECOM **Collection Date:** 7/9/2019 12:55:00 PM
Project: 60477365
Lab ID: 19070468-03 **Matrix:** GROUNDWATER
Client Sample ID NERT4.71N1 - 20190709

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
HEXAVALENT CHROMIUM-SDWA-LO LEVEL				EPA 218.7		Analyst: JS
Chromium, Hexavalent	ND	1.00		µg/L	1	7/22/2019 5:01:00 PM

**Qualifiers:
(Qual)**

DF Dilution Factor.
 MCL Maximum Contaminant Level.
 PQL Practical Quantitation Limit.

H Holding times for preparation or analysis exceeded.
 ND Not Detected at the PQL.

Original



Silver State Labs-Las Vegas
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Las Vegas, NV 89120
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QC SUMMARY REPORT

WO#: 19070468
23-Jul-19

Client: AECOM
Project: 60477365

TestCode: CR6-SDWA-218.7

Sample ID: ICV-R31496	SampType: ICV	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/22/2019	RunNo: 31496						
Client ID: ICV	Batch ID: R31496	TestNo: E218.7		Analysis Date: 7/22/2019	SeqNo: 726457						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	47.6	1.00	50.00	0	95.3	90	110				

Sample ID: ICB-R31496	SampType: ICB	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/22/2019	RunNo: 31496						
Client ID: ICB	Batch ID: R31496	TestNo: E218.7		Analysis Date: 7/22/2019	SeqNo: 726458						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	ND	1.00									

Sample ID: MB-R31496	SampType: MBLK	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/22/2019	RunNo: 31496						
Client ID: PBW	Batch ID: R31496	TestNo: E218.7		Analysis Date: 7/22/2019	SeqNo: 726459						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	ND	1.00									

Sample ID: LCS-R31496	SampType: LCS	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/22/2019	RunNo: 31496						
Client ID: LCSW	Batch ID: R31496	TestNo: E218.7		Analysis Date: 7/22/2019	SeqNo: 726460						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	49.6	1.00	50.00	0	99.1	90	110				

Qualifiers: H Holding times for preparation or analysis exceeded.

MCL Maximum Contaminant Level.

ND Not Detected at the PQL.

Original



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Las Vegas, NV 89120
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www.ssalabs.com

QC SUMMARY REPORT

WO#: 19070468
23-Jul-19

Client: AECOM
Project: 60477365

TestCode: CR6-SDWA-218.7

Sample ID: LCS-R31496	SampType: LCS	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/22/2019	RunNo: 31496						
Client ID: LCSW	Batch ID: R31496	TestNo: E218.7		Analysis Date: 7/22/2019	SeqNo: 726460						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Sample ID: 19070386-01BMS	SampType: MS	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/22/2019	RunNo: 31496						
Client ID: BatchQC	Batch ID: R31496	TestNo: E218.7		Analysis Date: 7/22/2019	SeqNo: 726466						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	9.61	1.00	10.00	0	96.1	90	110				

Sample ID: 19070386-01BMSD	SampType: MSD	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/22/2019	RunNo: 31496						
Client ID: BatchQC	Batch ID: R31496	TestNo: E218.7		Analysis Date: 7/22/2019	SeqNo: 726467						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	7.20	1.00	10.00	0	72.0	90	110	9.610	28.7	20	RS

Sample ID: CCV-R31496	SampType: CCV	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/22/2019	RunNo: 31496						
Client ID: CCV	Batch ID: R31496	TestNo: E218.7		Analysis Date: 7/22/2019	SeqNo: 726468						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	48.0	1.00	50.00	0	95.9	90	110				

Qualifiers: H Holding times for preparation or analysis exceeded.

MCL Maximum Contaminant Level.

ND Not Detected at the PQL.

Original



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QC SUMMARY REPORT

WO#: 19070468
23-Jul-19

Client: AECOM
Project: 60477365

TestCode: CR6-SDWA-218.7

Sample ID: CCB-R31496	SampType: CCB	TestCode: CR6-SDWA-2	Units: µg/L	Prep Date: 7/22/2019	RunNo: 31496						
Client ID: CCB	Batch ID: R31496	TestNo: E218.7		Analysis Date: 7/22/2019	SeqNo: 726469						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	ND	1.00									

Qualifiers: H Holding times for preparation or analysis exceeded.

MCL Maximum Contaminant Level.

ND Not Detected at the PQL.

Original

1135 FINANCIAL BOULEVARD, RENO, NV 89502
Phone (775) 857-2400 Fax: (888) 398-7002 (EPA#: NV00015, CA2526)

Report Results To:

Report Attention: Chad Ruper Project Number: 60477365

Company: AECOM

Mailing Address: 1220 Avenida Arco

City, State, Zip: Camarillo CA 93012

Phone: 805 764 41631 Email / Fax: chad.ruper@aecom.com

Send Invoice To:

Invoice Attention: Carman Cecere-Schwilt PO#

Company: AECOM Quote #

Mailing Address: 6200 S. Quebec St

City, State, Zip: Greenwood Village CO 80111

Phone: 818-517-3123 Email / Fax:

COMPLIANCE MONITORING?

Yes No

NEW ADDRESS?

Results: Invoice:

Applicable Program

SDWA CWA RCRA

Mining Other

QC Level Report

Per WO I II III IV

NOTE: Surcharges apply to Level II, III and IV reports

Sampled by: _____ Signature: _____

ANALYSES REQUESTED

Send Results Via:

Mail: Email: Fax:

Send Invoice Via:

Mail: Email: Fax:

Field Measurements

On-Site pH: _____ Chlorine: _____

Temperature: _____ Other: _____

I attest to the validity and authenticity of the sample. I am aware that tampering with or intentionally mislabeling the sample location, date or time is considered fraud and may be grounds for legal action.

Standard: Standard TAT 7-10 Business Days. Note that some tests vary.

Rush

Same Day: 3 Day: Other (specify): Per WO

1 Day: 4 Day: Rush results will be issued after 4:00 p.m.

2 Day: 5 Day:

NOTE: A Rush Surcharge is applied for rush samples

Date Sampled	Time Sampled	Sample Identification	SSAL - SEM Lab No.	Comp. Grab	Matrix	Preservative**	Number / Type of Containers**
7/9/19	1150	NERT4.70NI-20190709	19070468-1A	G	GW	7	1/V X
	1205	NERT4.70NI-20190709-EB	-2A	I	I	I	I X
	1255	NERT4.71NI-20190709	-3A	I	I	I	I X

Date Sampled	Time Sampled	Sample Identification	SSAL - SEM Lab No.	Comp. Grab	Matrix	Preservative**	Number / Type of Containers**
7/9/19	1150	NERT4.70NI-20190709	19070468-1A	G	GW	7	1/V X
	1205	NERT4.70NI-20190709-EB	-2A	I	I	I	I X
	1255	NERT4.71NI-20190709	-3A	I	I	I	I X

Signature	Print Name	Company	Date	Time
<u>[Signature]</u>	J. CARTRIO	AECOM	7/10/19	0900
<u>[Signature]</u>	Walter Rawlins	SSAL	7-10-19	0900
Relinquished By:				
Received By:				
Relinquished By:				
Received By:				
Relinquished By:				
Received By:				
Authorized By:	J. CARTRIO	AECOM	7/10/19	0900

Authorization is required to process samples. This obligates your organization for service fees. SSAL Standard T & C's or other written agreement applies. If collections or legal services are required to recover said fees, your organization will be responsible for all fees and costs in addition to service fees. Per WO

Samples are discarded 30 days after results are reported unless other arrangements are made and storage fees may apply. The analytical results associated with this COC apply only to these samples as they are received by the laboratory. The liability of the laboratory is limited to the amount paid for the report. Per WO

Certificate of Analysis

Date of certificate: March 18, 2019

Client: AECOM

8985 South Eastern Avenue, Suite 130

Las Vegas, NV 89123

Project name/location: Ph2 GW Invest, Henderson, NV / Las Vegas Wash

Contact people: Chad.Roper@aecom.com

Carmen.Caceres-Schnell@aecom.com

Jessica.Budin-Caloroso@aecom.com

Patty.Mata@testamericainc.com

Samples collected by: Joseph Capotrio and Eric Wang

Date samples shipped: March 7, 2019

Date samples rec'd at OUL: March 8, 2019

Date analyzed by OUL: March 13 and 14, 2019

Included with certificate of analysis: Table of results and copies of sample collection data sheets

Results for charcoal and water samples analyzed for the presence of fluorescein, eosine, rhodamine WT (RWT) and sulforhodamine B (SRB) dyes.

Peak wavelengths are reported in nanometers (nm); dye concentrations are reported in parts per billion (ppb).

All results are for charcoal unless otherwise indicated.

OUL Number	Station Name	Date/Time Placed	Date/Time Collected	Fluorescein		Eosine		RWT		SRB	
				Peak (nm)	Conc (ppb)	Peak (nm)	Conc (ppb)	Peak (nm)	Conc (ppb)	Peak (nm)	Conc (ppb)
D5355	T4.60C	3/7/19 0755	3/7/19 1210	516.8 *	0.186	ND		ND		ND	
D5356	T4.61C	3/7/19 0800	3/7/19 1215	513.4 *	0.355	ND		ND		ND	
D5357	T4.62C	3/7/19 0805	3/7/19 1220	ND		ND		ND		ND	
D5358	T3.60C	3/7/19 0825	3/7/19 1240	516.0	0.585	ND		ND		ND	
D5359	T3.58C	3/7/19 0830	3/7/19 1245	516.2	0.728	ND		ND		ND	
D5360	Laboratory control charcoal blank										
D5361	T3.57C	3/7/19 0845	3/7/19 1250	516.4	0.851	ND		ND		ND	
D5566	T4.60	Water	3/7/19 1210	ND		ND		ND		581.8	0.087
D5567	T4.61	Water	3/7/19 1215	ND		ND		ND		582.2	0.081
D5568	T3.60	Water	3/7/19 1240	ND		ND		ND		582.0	0.093
D5569	T3.58	Water	3/7/19 1245	ND		ND		ND		580.8	0.067
D5570	T3.57	Water	3/7/19 1250	ND		ND		ND		582.6	0.081

Note: Dye concentrations are based upon standards used at the OUL. The standard concentrations are based upon the as sold weight of the dye that the OUL use. If the client is not using OUL dyes, the client should provide the OUL with a sample of the dye to compare to the OUL dyes.

Footnotes: ND = No dye detected

* = A fluorescence peak is present that does not meet all the criteria for a positive dye result. However, it has been calculated as though it was the tracer dye.

Thomas J. Aley, PHG and RG



Appendix K
Licensed Well Survey

Project file data		Coordinate System	
Name:	H:\Field_Services\dataproject\26871.01.00 AECOM-NDEP LV WASH\Wetlands Wells \WETLAND WELLS .vce	Name:	US State Plane 1983
Size:	784 KB	Datum:	NAD 1983 (Conus)
Modified:	6/17/2019 8:23:19 AM (UTC:-7)	Zone:	Nevada East 2701
Time zone:	Pacific Standard Time	Geoid:	GEOID12A (Conus)
Reference number:		Vertical datum:	NAVD88
Description:		Calibrated site:	
Comment 1:			
Comment 2:			
Comment 3:			

Additional Coordinate System Details

Local Site Settings			
Project latitude:	?	Ground scale factor:	1
Project longitude:	?	False northing offset:	0.000
Project height:	1465.355	False easting offset:	0.000

Point List

ID	Latitude (Global)	Longitude (Global)	Height (Global) (US survey foot)	Feature Code
31244	N36°05'57.30725"	W 114°56'34.04499"	1378.035	NERT3.35S1
31245	N36°05'57.31245"	W 114°56'34.05240"	1378.410	CONC N SIDE
31246	N36°05'57.31107"	W 114°56'34.05709"	1378.122	NG N SIDE
31247	N36°05'55.67540"	W 114°56'36.41547"	1382.164	NERT3.40S1
31248	N36°05'55.68274"	W 114°56'36.41971"	1382.706	CONC N SIDE
31249	N36°05'55.68399"	W 114°56'36.41994"	1382.453	NG N SIDE
31250	N36°05'49.54716"	W 114°56'42.59289"	1381.861	NERT3.58S1
31251	N36°05'49.55195"	W 114°56'42.59890"	1382.254	CONC N SIDE
31252	N36°05'49.55050"	W 114°56'42.60566"	1382.071	NG N SIDE
31253	N36°05'49.59217"	W 114°56'42.65672"	1382.090	NERT3.58S1B
31254	N36°05'49.59748"	W 114°56'42.66363"	1382.688	CONC N SIDE
31255	N36°05'49.59791"	W 114°56'42.66781"	1382.547	NG N SIDE
31256	N36°05'49.64558"	W 114°56'42.50155"	1381.506	NERT3.58S1C
31257	N36°05'49.65095"	W 114°56'42.50856"	1381.993	CONC N SIDE
31258	N36°05'49.64958"	W 114°56'42.51285"	1381.892	NG N SIDE
31259	N36°05'49.50998"	W 114°56'42.53328"	1381.831	NERT3.60S1
31260	N36°05'49.51396"	W 114°56'42.54132"	1382.317	CONC N SIDE
31261	N36°05'49.51637"	W 114°56'42.54420"	1382.202	NG N SIDE

31262	N36°05'47.83163"	W114°56'44.01719"	1385.787	NERT3.60S1A
31263	N36°05'47.83566"	W114°56'44.02447"	1386.282	CONC N SIDE
31264	N36°05'47.83552"	W114°56'44.02895"	1386.038	NG N SIDE
31265	N36°05'47.85924"	W114°56'44.06157"	1386.056	NERT3.60S1B
31266	N36°05'47.86372"	W114°56'44.06831"	1386.383	CONC N SIDE
31267	N36°05'47.86485"	W114°56'44.07321"	1386.162	NG N SIDE
31268	N36°05'47.90052"	W114°56'43.93918"	1385.798	NERT3.60S1D
31269	N36°05'47.90585"	W114°56'43.94499"	1386.248	CONC N SIDE
31270	N36°05'47.90744"	W114°56'43.94774"	1386.055	NG N SIDE
31271	N36°05'48.05382"	W114°56'43.79552"	1385.865	NERT3.60S1C
31272	N36°05'48.05862"	W114°56'43.80359"	1386.053	CONC N SIDE
31273	N36°05'48.05967"	W114°56'43.80536"	1385.944	NG N SIDE
31274	N36°05'47.70201"	W114°56'43.80843"	1386.295	NERT3.60S1C
31275	N36°05'47.70619"	W114°56'43.81536"	1386.832	CONC N SIDE
31276	N36°05'47.70723"	W114°56'43.81924"	1386.718	NG N SIDE
31277	N36°05'44.51947"	W114°56'49.24651"	1369.320	NERT3.63S1
31278	N36°05'44.52549"	W114°56'49.24832"	1369.736	CONC N SIDE
31279	N36°05'44.52643"	W114°56'49.25376"	1369.500	NG N SIDE
31280	N36°05'46.05032"	W114°56'47.74325"	1360.993	THREE KIDS WEIR
31281	N36°05'46.05022"	W114°56'47.74385"	1361.000	THREE KIDS WEIR CHECK
31282	N36°05'40.74189"	W114°57'09.14091"	1373.779	NERT3.98S1
31283	N36°05'40.74751"	W114°57'09.14227"	1374.162	CONC N SIDE
31284	N36°05'40.75159"	W114°57'09.14487"	1373.998	NG N SIDE
31285	N36°05'31.65540"	W114°57'45.94037"	1420.434	NERT4.64S1
31286	N36°05'31.66131"	W114°57'45.94577"	1420.838	CONC N SIDE
31287	N36°05'31.66311"	W114°57'45.94979"	1420.635	NG N SIDE
31288	N36°05'31.71041"	W114°57'45.96711"	1420.163	NERT4.64S1A
31289	N36°05'31.71676"	W114°57'45.96972"	1420.719	CONC N SIDE
31290	N36°05'31.71878"	W114°57'45.97456"	1420.382	NG N SIDE
31291	N36°05'31.71794"	W114°57'45.77046"	1419.976	NERT4.64S1B
31292	N36°05'31.72105"	W114°57'45.77154"	1420.633	CONC N SIDE
31293	N36°05'31.72738"	W114°57'45.77493"	1420.474	NG N SIDE
31294	N36°05'31.60031"	W114°57'45.91581"	1420.406	NERT4.64S1C
31295	N36°05'31.60715"	W114°57'45.91761"	1420.960	CONC N SIDE
31296	N36°05'31.60811"	W114°57'45.92083"	1420.747	NG N SIDE
31297	N36°05'31.80695"	W114°57'45.49794"	1420.061	NERT4.64S1D
31298	N36°05'31.81386"	W114°57'45.50059"	1420.451	CONC N SIDE
31299	N36°05'31.81640"	W114°57'45.50337"	1420.330	NG N SIDE

31300	N36°05'28.41404"	W114°57'54.95918"	1425.633	NERT4.71S2
31301	N36°05'28.41679"	W114°57'54.96724"	1426.003	CONC N SIDE
31302	N36°05'28.42126"	W114°57'54.97136"	1425.996	NG N SIDE
31303	N36°05'31.77197"	W114°57'51.15500"	1399.324	NG S SIDE CALICO RIDGE WEIR (INACCESSABLE)
31304	N36°05'54.17929"	W114°56'48.73173"	1384.065	NERT3.58N1
31305	N36°05'54.17929"	W114°56'48.73188"	1384.059	NERT3.58N1
31306	N36°05'54.18473"	W114°56'48.73900"	1384.279	CONC N SIDE
31307	N36°05'54.18534"	W114°56'48.74133"	1384.115	NG N SIDE
31308	N36°05'52.00693"	W114°56'50.85065"	1390.634	NERT3.60N1
31309	N36°05'52.01093"	W114°56'50.85684"	1390.918	CONC N SIDE
31310	N36°05'52.01161"	W114°56'50.86229"	1390.697	NG N SIDE
31311	N36°05'36.89912"	W114°57'48.78426"	1419.017	NERT4.64N1
31312	N36°05'36.90481"	W114°57'48.78792"	1419.415	CONC N SIDE
31313	N36°05'36.90542"	W114°57'48.79173"	1419.319	NG N SIDE
31314	N36°05'36.66472"	W114°57'50.78201"	1420.439	NERT4.65N1
31315	N36°05'36.66862"	W114°57'50.78835"	1420.844	CONC N SIDE
31316	N36°05'36.67058"	W114°57'50.79203"	1420.775	NG N SIDE
31317	N36°05'35.67994"	W114°57'53.66734"	1422.333	NERT4.70N1
31318	N36°05'35.68577"	W114°57'53.67362"	1422.803	CONC N SIDE
31319	N36°05'35.68614"	W114°57'53.67384"	1422.795	CONC N SIDE
31322	N36°05'35.50150"	W114°57'56.97557"	1426.143	NERT4.71N1
31323	N36°05'35.50442"	W114°57'56.97578"	1426.545	CONC N SIDE
31324	N36°05'35.51305"	W114°57'56.98120"	1426.481	NG N SIDE

6/17/2019 8:27:32 AM	H:\Field_Services\dataproject\26871.01.00 AECOM-NDEP LV WASH\Wetlands Wells \WETLAND WELLS .vce	Trimble Business Center
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Project file data		Coordinate System	
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Modified:	6/17/2019 8:23:19 AM (UTC:-7)	Zone:	Nevada East 2701
Time zone:	Pacific Standard Time	Geoid:	GEOID12A (Conus)
Reference number:		Vertical datum:	NAVD88
Description:		Calibrated site:	
Comment 1:			
Comment 2:			
Comment 3:			

Additional Coordinate System Details

Local Site Settings			
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Project longitude:	?	False northing offset:	0.000
Project height:	1465.355	False easting offset:	0.000

Point List

ID	Northing (US survey foot)	Easting (US survey foot)	Elevation (US survey foot)	Feature Code
31244	26738372.779	845391.591	1470.443	NERT3.35S1
31245	26738373.301	845390.979	1470.818	CONC N SIDE
31246	26738373.158	845390.595	1470.530	NG N SIDE
31247	26738206.492	845198.154	1474.579	NERT3.40S1
31248	26738207.233	845197.802	1475.120	CONC N SIDE
31249	26738207.360	845197.781	1474.868	NG N SIDE
31250	26737583.504	844695.297	1474.297	NERT3.58S1
31251	26737583.985	844694.801	1474.690	CONC N SIDE
31252	26737583.834	844694.247	1474.507	NG N SIDE
31253	26737588.020	844690.029	1474.526	NERT3.58S1B
31254	26737588.554	844689.458	1475.123	CONC N SIDE
31255	26737588.595	844689.115	1474.982	NG N SIDE
31256	26737593.505	844702.727	1473.941	NERT3.58S1C
31257	26737594.044	844702.148	1474.428	CONC N SIDE
31258	26737593.903	844701.798	1474.328	NG N SIDE
31259	26737579.776	844700.214	1474.267	NERT3.60S1
31260	26737580.175	844699.551	1474.752	CONC N SIDE
31261	26737580.417	844699.313	1474.638	NG N SIDE

31262	26737409.271	844579.552	1478.228	NERT3.60S1A
31263	26737409.674	844578.953	1478.723	CONC N SIDE
31264	26737409.658	844578.585	1478.479	NG N SIDE
31265	26737412.039	844575.892	1478.497	NERT3.60S1B
31266	26737412.489	844575.336	1478.824	CONC N SIDE
31267	26737412.600	844574.934	1478.604	NG N SIDE
31268	26737416.279	844585.909	1478.239	NERT3.60S1D
31269	26737416.815	844585.428	1478.689	CONC N SIDE
31270	26737416.974	844585.202	1478.496	NG N SIDE
31271	26737431.857	844597.596	1478.305	NERT3.60S1C
31272	26737432.338	844596.931	1478.494	CONC N SIDE
31273	26737432.443	844596.785	1478.384	NG N SIDE
31274	26737396.276	844596.771	1478.736	NERT3.60S1C
31275	26737396.696	844596.199	1479.273	CONC N SIDE
31276	26737396.799	844595.879	1479.159	NG N SIDE
31277	26737071.551	844152.610	1461.775	NERT3.63S1
31278	26737072.159	844152.458	1462.191	CONC N SIDE
31279	26737072.250	844152.011	1461.955	NG N SIDE
31280	26737227.150	844274.960	1453.443	THREE KIDS WEIR
31281	26737227.139	844274.911	1453.450	THREE KIDS WEIR CHECK
31282	26736678.945	842522.475	1466.271	NERT3.98S1
31283	26736679.512	842522.360	1466.654	CONC N SIDE
31284	26736679.923	842522.143	1466.490	NG N SIDE
31285	26735740.735	839508.389	1513.004	NERT4.64S1
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31287	26735741.510	839507.611	1513.205	NG N SIDE
31288	26735746.283	839506.159	1512.733	NERT4.64S1A
31289	26735746.924	839505.941	1513.290	CONC N SIDE
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31292	26735747.461	839522.202	1513.202	CONC N SIDE
31293	26735748.100	839521.920	1513.044	NG N SIDE
31294	26735735.178	839510.440	1512.976	NERT4.64S1C
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31296	26735735.963	839510.023	1513.317	NG N SIDE
31297	26735756.291	839544.601	1512.630	NERT4.64S1D
31298	26735756.989	839544.379	1513.020	CONC N SIDE
31299	26735757.244	839544.149	1512.899	NG N SIDE

31300	26735408.272	838770.320	1518.222	NERT4.71S2
31301	26735408.546	838769.656	1518.592	CONC N SIDE
31302	26735408.996	838769.316	1518.585	NG N SIDE
31303	26735749.795	839080.362	1491.901	NG S SIDE CALICO RIDGE WEIR (INACCESSABLE)
31304	26738048.580	844188.462	1476.499	NERT3.58N1
31305	26738048.581	844188.450	1476.493	NERT3.58N1
31306	26738049.127	844187.862	1476.713	CONC N SIDE
31307	26738049.187	844187.671	1476.549	NG N SIDE
31308	26737827.785	844016.018	1483.076	NERT3.60N1
31309	26737828.186	844015.507	1483.359	CONC N SIDE
31310	26737828.252	844015.060	1483.139	NG N SIDE
31311	26736269.465	839271.619	1511.580	NERT4.64N1
31312	26736270.038	839271.315	1511.978	CONC N SIDE
31313	26736270.098	839271.002	1511.883	NG N SIDE
31314	26736244.720	839107.823	1513.006	NERT4.65N1
31315	26736245.111	839107.299	1513.411	CONC N SIDE
31316	26736245.307	839106.997	1513.342	NG N SIDE
31317	26736143.637	838871.668	1514.906	NERT4.70N1
31318	26736144.224	838871.148	1515.376	CONC N SIDE
31319	26736144.260	838871.130	1515.368	CONC N SIDE
31322	26736123.869	838600.288	1518.722	NERT4.71N1
31323	26736124.164	838600.269	1519.124	CONC N SIDE
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6/17/2019 8:28:59 AM	H:\Field_Services\dataproject\26871.01.00 AECOM-NDEP LV WASH\Wetlands Wells \WETLAND WELLS .vce	Trimble Business Center
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Project File Data	Coordinate System
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Modified: 5/10/2019 8:23:29 AM (UTC:-7)	Zone: Nevada East 2701
Time zone: Pacific Standard Time	Geoid: GEOID12A (Conus)
Reference number:	Vertical datum: NAVD88
Description:	Calibrated site:
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Comment 2:	
Comment 3:	

Additional Coordinate System Details

Local Site Settings			
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Project longitude:	?	False northing offset:	0.000 ft
Project height:	1465.355 ft	False easting offset:	0.000 ft

Vector List

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<u>V1005</u>	<u>Hen1</u>	<u>31250</u>	Fixed	5/9/2019 8:27:56 AM
<u>V1009</u>	<u>Hen1</u>	<u>31253</u>	Fixed	5/9/2019 8:30:22 AM
<u>V1013</u>	<u>Hen1</u>	<u>31256</u>	Fixed	5/9/2019 8:33:27 AM
<u>V1017</u>	<u>Hen1</u>	<u>31259</u>	Fixed	5/9/2019 8:36:11 AM
<u>V1021</u>	<u>Hen1</u>	<u>31262</u>	Fixed	5/9/2019 8:41:01 AM
<u>V1025</u>	<u>Hen1</u>	<u>31265</u>	Fixed	5/9/2019 8:43:17 AM
<u>V1029</u>	<u>Hen1</u>	<u>31268</u>	Fixed	5/9/2019 8:46:02 AM
<u>V1033</u>	<u>Hen1</u>	<u>31271</u>	Fixed	5/9/2019 8:48:26 AM
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<u>V1041</u>	<u>Hen1</u>	<u>31277</u>	Fixed	5/9/2019 8:57:16 AM
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<u>V1055</u>	<u>Hen1</u>	<u>31288</u>	Fixed	5/9/2019 9:27:54 AM
<u>V1059</u>	<u>Hen1</u>	<u>31291</u>	Fixed	5/9/2019 9:29:53 AM
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<u>V1094</u>	<u>Hen1</u>	<u>31317</u>	Fixed	5/9/2019 10:45:33 AM
<u>V1100</u>	<u>Hen1</u>	<u>31322</u>	Fixed	5/9/2019 10:52:28 AM

Date: 5/15/2019 1:52:28 PM	Project: H:\Field_Services\dataproject\26871.01.00 AECOM-NDEP LV WASH\Wetlands Wells\WETLAND WELLS .vce	Trimble Business Center
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Appendix L

2019 Proposed Borehole Dilution Testing as an Alternative to Pump Testing for Hydraulic Conductivity Determination Memo

Project name:
NDEP Downgradient Study Area

Project ref:
60477365

From:
Sally Bilodeau, CEM, Chad Roper, CEM

Date:
May 13, 2019

To:
Carlton Parker, PG
Nevada Division of Environmental Protection
2030 E Flamingo Road, Suite 230
Las Vegas, NV 89119

CC:
Carmen Caceres-Schnell, CEM; Harry Vandenberg,
CEM

Memo

Subject: Proposed Borehole Dilution Testing as an Alternative to Pump Testing for Hydraulic Conductivity Determination

This memorandum documents AECOM's proposal to perform dilution testing as an alternative aquifer test in lieu of the Phase II pump tests proposed in the Data Gap Investigation Plan – Phase II Groundwater Quality Assessment work plan (Phase II work plan).¹ An alternative is needed due to the difficulty in storing and disposing the large quantities of water that can be expected during the proposed pump test as estimated based on slug testing performed in the target wells. In addition, pump testing is no longer deemed critical because the use of automated dye-measuring probes in the surface water allows for continual readings over an extended period of time without the need for personnel to continually travel to the Las Vegas Wash (LVW). This makes the estimate of travel time from the injection well to the LVW less important to cost-effective completion of the tracer test.

Three newly installed wells were identified in the Phase II work plan for slug, pump and tracer testing: NERT4.64S1, NERT3.60S1 and NERT3.58S1. The slug and pump tests were intended to determine hydraulic conductivity for use in the tracer test design and monitoring and to provide multiple lines of evidence supporting the hydraulic conductivity estimate. Slug tests performed in the wells NERT4.64S1, NERT3.60S1 and NERT3.58S1 indicate that a pump rate of around 30 gallons per minute (gpm) will be needed to sufficiently stress the aquifer. This rate is higher than what was assumed in the work plan (between 5 and 10 gpm).

The Phase II work plan proposed running a 12-hour pump test in each of the selected wells. If the pump tests were run at 30 gpm, each test would generate approximately 21,600 gallons of groundwater per test or a total of 64,800 gallons. This amount of water would require large capacity water storage and an efficient means to dispose of the generated water at the NERT Site. For reference, 10,000-gallon Baker tanks are approximately 9.5 feet high, 8.5 feet wide and 26.5 feet long and weigh between 10,500 and 12,700 pounds before filling. Storage, handling, and disposal of this volume of water would be problematic due to the following logistical constraints at the well locations:

- Well NERT4.64S1 near Calico Ridge Weir: The area is physically constrained by areas where vegetation has been restored.
- Wells NERT3.60S1 and NERT3.58S1 near Three Kids Weir: The area is physically constrained by a bike path, vegetation, and slopes to the north and south. An additional concern in this location is that the area is faulted which may affect the results and interpretation of the pump tests.

¹ AECOM 2019. Data Gap Investigation Plan – Phase II Groundwater Quality Assessment, NERT Remedial Investigation-Downgradient Study Area, Nevada Environmental Response Trust Site, Henderson, Nevada, Final January.

Since approval of the Phase II work plan, numerous wells have been installed, sampled, and tested near NERT4.64S1 for the LVW Bioremediation Pilot Study (Tetra Tech). The data available from the slug tests in NERT3.58S1, NERT 3.60S1, and NERT 4.64S1 and from nearby LVW Bioremediation Pilot Study wells is deemed sufficient to support tracer test design and monitoring.

In addition, because the proposed 12-hour pump test described faces significant hurdles due to the above constraints and the results of pump testing are not considered essential for dye tracer testing due to the use of automated probes, dilution testing and additional observation well monitoring concurrent with the dye tracer testing in the LVW are proposed to supplement existing hydraulic conductivity data. This testing will not generate waste water and therefore will not be subject to the constraints of pump testing.

Dilution Test

One reason for determining the hydraulic conductivity was to estimate the travel time from between the dye injection point to the LVW. A dye-dilution test could be performed concurrently with the dye tracer tests to estimate hydraulic conductivity. As stated by Pitrak et al. 2007, "Borehole dilution techniques use repeated fluid column profiling after establishment of an initial uniform condition to monitor the rate at which ambient ground water moves into a borehole. Application of the dilution technique in a monitoring well makes it possible to estimate the horizontal Darcy flow velocity of ground water in the aquifer surrounding the borehole."² Although Pitrak and others incorporated vertical profiling into their studies, the proposed dilution test would homogenize the well contents to study the dilution across the entirety of the screened interval.

Injection well sampling would consist of collecting four sets of at least five samples at uniform time intervals in the injection well on the day the dye was introduced. Four sampling events at each injection location are proposed in order to adequately define the dilution of dye in the well due to groundwater movement and its appearance in the nearest observation wells. Samples would also be collected from each observation well. Each sample will be collected with dedicated or disposable sampling equipment.

Dye concentration would be quantified by visual comparison to prepared standards (this measurement is effective in the range from approximately 200,000 milligrams per liter (mg/L) [20%] to 1,000 mg/L [0.1%]). Since data from each sample will consist of a small aliquot compared to a known concentration, sampling will include homogenization (mixing within the water column of the well prior to sample collection) to ensure a uniform concentration within the well and to minimize any vertical stratification.

The trend (decline in dye concentration) observed in the initial sampling of the injection well will be used to determine the timing for the next sampling event. The next event would be scheduled for the time when a 50% reduction from the initial concentration would be predicted. The schedule for subsequent sampling events will be determined by field personnel based on similar data and criteria.

Once the dilution data is collected, the data are fit to a simple model (defined in Pitrak et al 2007) of logarithmic decay. The solution of this model includes parameters which correspond to aquifer properties including flow velocity. Flow velocity is then used to estimate hydraulic conductivity. This estimate will represent another line of evidence in aquifer characterization in addition to the slug testing, and dye testing from the injection well to its entry in the LVW.

Data collected from the observation wells is analyzed similarly to that collected in the LVW. The time to the initial detection of dye and the time to the peak observed dye concentration are used as boundaries of the time needed for the groundwater to travel from the injection well to the observation point. This data provides flow velocity. Additionally, the concentration at each observation well can be used to estimate the dispersivity of the aquifer materials along the flow path.

Data and discussion of the results of the dilution testing would be presented in the DGIP II Report as well as the rationale for not performing the 12-hour pump tests as discussed in this memorandum. Cost for the dilution test is estimated at less than 1/3 of the costs of the proposed pump tests (about \$120,000) described in the work plan and therefore would represent a considerable cost-savings. AECOM recommends proceeding with the dilution test as it would support achieving the objectives of the work plan and yield at least 67% cost savings compared to performing the pumping tests described in the work plan.

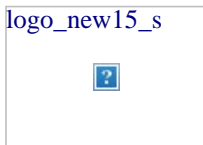
² Pitrak, Michal, Mares, S & Kobr, Miroslav. (2007). A Simple Borehole Dilution Technique in Measuring Horizontal Ground Water Flow. Ground water. 45. 89-92.

From: [James Carlton Parker](#)
To: [Bilodeau, Sally](#); [Vandenberg, Harry](#)
Cc: [Caceres-Schnell, Carmen](#); [Roper, Chad](#); [James Dotchin](#); "Fong, Allison"; [Weiquan Dong](#); [Alan Pineda](#); "Steve Clough"
Subject: Approval for OU3 Phase II Mod Tech Memo for Dilution Testing
Date: Thursday, May 16, 2019 3:01:07 PM
Attachments: [image003.png](#)
[2019_05_13 NDEP Ph II Mod Tech Memo Dilution Testing.docx](#)

Sally and Harry,

NDEP has reviewed the requested change from traditional well aquifer testing to dilution testing and approves of the requested change. Contact me if there are questions.

Thanks,
Carlton



[Carlton Parker, P.G.](#)
Supervisor
Bureau of Industrial Site Cleanup
Environmental Scientist IV
Nevada Division of Environmental Protection
2030 E. Flamingo Road, Suite 230
Las Vegas, NV 89119
p: 702.486.2850 Ext. 228 f: 702.486.2863
c: 702.659.3243
www.ndep.nv.gov

From: Bilodeau, Sally <Sally.Bilodeau@aecom.com>
Sent: Monday, May 13, 2019 4:49 PM
To: James Carlton Parker <jcarltonparker@ndep.nv.gov>
Cc: Vandenberg, Harry <Harry.VanDenBerg@aecom.com>; Caceres-Schnell, Carmen <Carmen.Caceres-Schnell@aecom.com>; Roper, Chad <Chad.Roper@aecom.com>
Subject: OU3 Phase II Mod Tech Memo for Dilution Testing

Carlton,

As discussed in our last conference call we have evaluated options for conducting aquifer tests for the OU3 Phase II study. Attached is a technical memorandum that describes AECOM's proposal to perform dilution testing as an alternative aquifer test in lieu of the 12 hour pump tests proposed in the Data Gap Investigation Plan – Phase II Groundwater Quality Assessment work plan. An alternative is needed due to the difficulty in storing and disposing the large quantities of water that can be expected during the proposed pump test as estimated based on slug testing performed in the target wells. In addition, pump testing is no longer deemed critical because the use of automated dye-measuring probes in the surface water allows for continual readings over an extended period of time without the need for personnel to continually travel to the Las Vegas Wash (LVW). AECOM recommends proceeding with the dilution test as it would support achieving the objectives of the work plan and yield at least 67% cost savings compared to performing the pumping tests described in the work plan.

Please do not hesitate to contact Harry, Carmen or me if you have any questions or require additional information.

Sally Bilodeau, PG, CEG, CHG, CEM
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Appendix M

Dye Testing Photologs

Project: NERT Downgradient Study
Area - Dye Tracer Study**Site Location:** Henderson, NV near Three
Kids Weir**Photographed By:** AECOM
Date: 6/21/19**Photo Number**
1**Photo Direction:**
N/ASamples collected from:
Well NERT3.58S1Samples collected on
6/3/19At (time-from left to right):
1025
1120
1150
1225
1300**Photo Number**
2**Direction Photo Taken:**
N/ASamples collected from:
Well NERT3.58S1Samples collected on
6/3/19At (time-from left to right):
1300
1330
1400,
1430
1500

Photo Number
3

Direction Photo Taken:
N/A

Samples collected from:
Well NERT3.58S1

Samples collected on
6/3/19

At (time-from left to right):
1500
1530
1555

And on 6/4/19

0855
0945



Photo Number
4

Direction Photo Taken:
N/A

Samples collected from:
Well NERT3.58S1

Samples collected on
6/4/19

At (time-from left to right):
0945
1045
1145
1245

And on 6/5/19

0945



Photo Number
5

Direction Photo Taken:
N/A

Samples collected from:
Well NERT3.58S1

Samples collected on
6/4/19

At (time-from left to right):
0945
1045
1145
1245

And on 6/5/19

0840



Photo Number
6

Direction Photo Taken:
NA

Samples collected from:
Well NERT3.58S1

Samples collected on
6/5/19

At (time-from left to right):
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1045
1145
1245

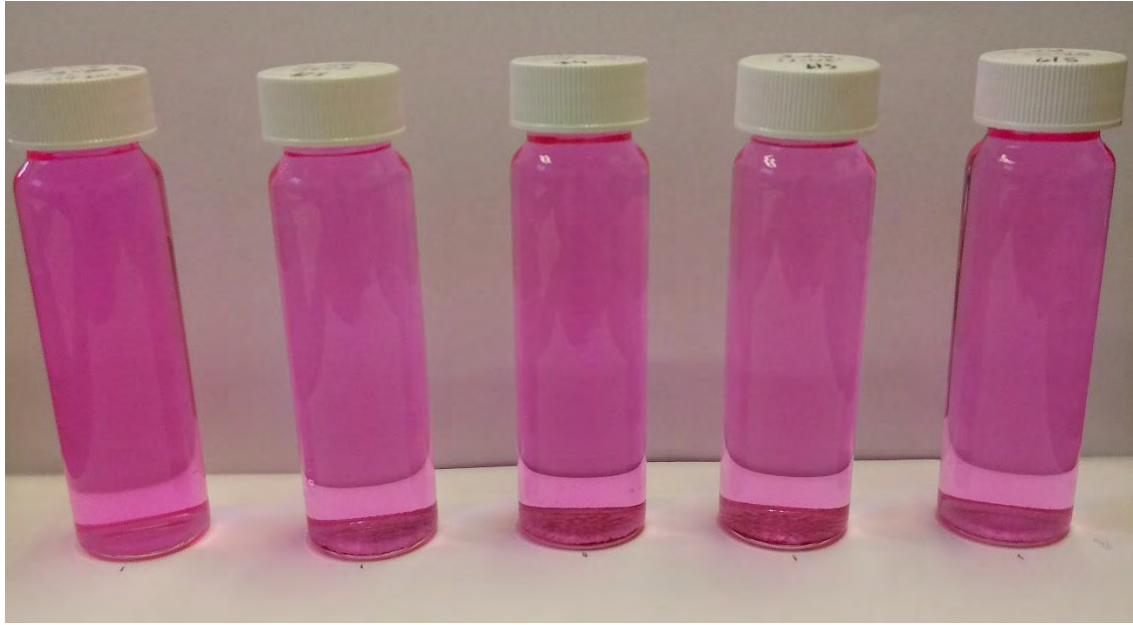


Photo Number
7

Direction Photo Taken:
N/A

amples collected from:
Well NERT3.58S1

Samples collected on:
6/5/19

At (time-from left to right):
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And on 6/7/19
0850
And on 6/10/19
0840
And on 6/13/19
1445
And on 6/18/19
1045

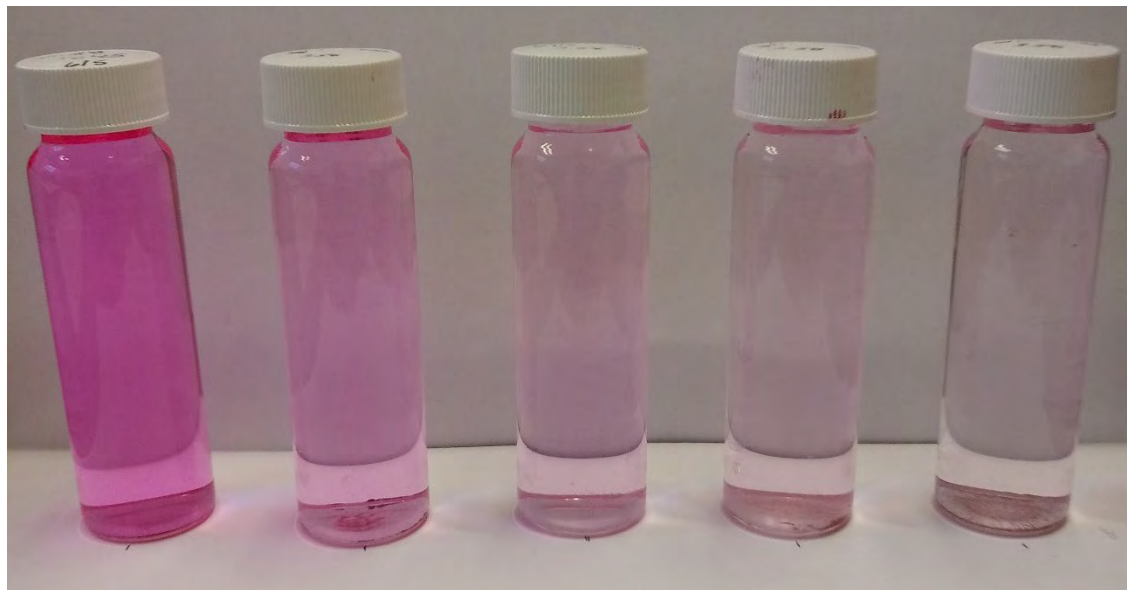


Photo Number
8

Direction Photo Taken:
N/A

0.064 standard, three samples, and "no dye" blank

Samples collected from:
Well NERT3.58S1A

Samples collected on
6/3/19

At (time-from left to right):
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1150

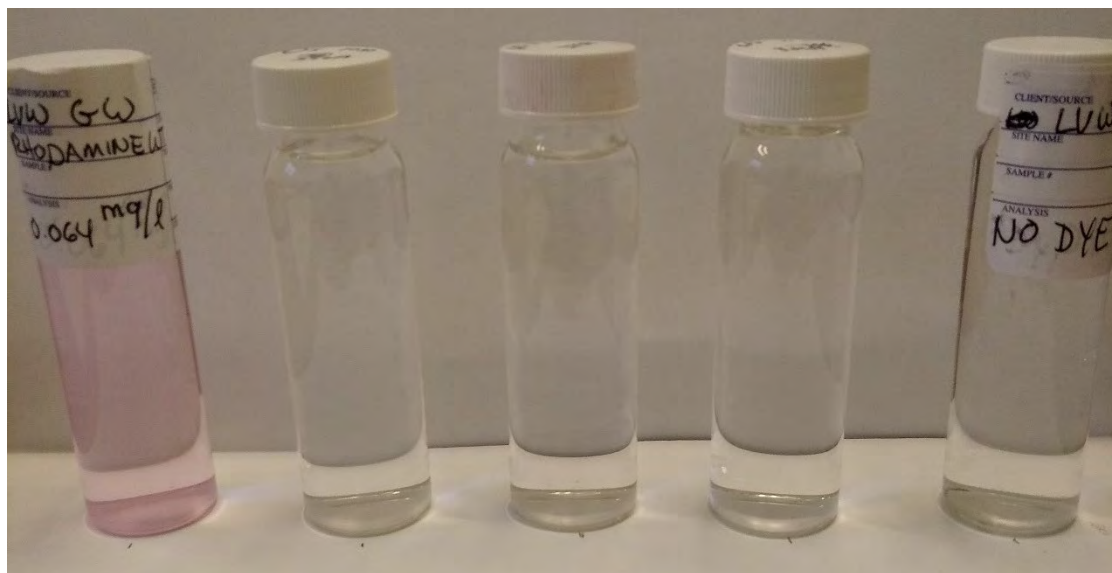


Photo Number
9

Direction Photo Taken:
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Samples collected from:
Well NERT3.58S1A

Samples collected on
6/3/19

At (time-from left to right):
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1300
1335

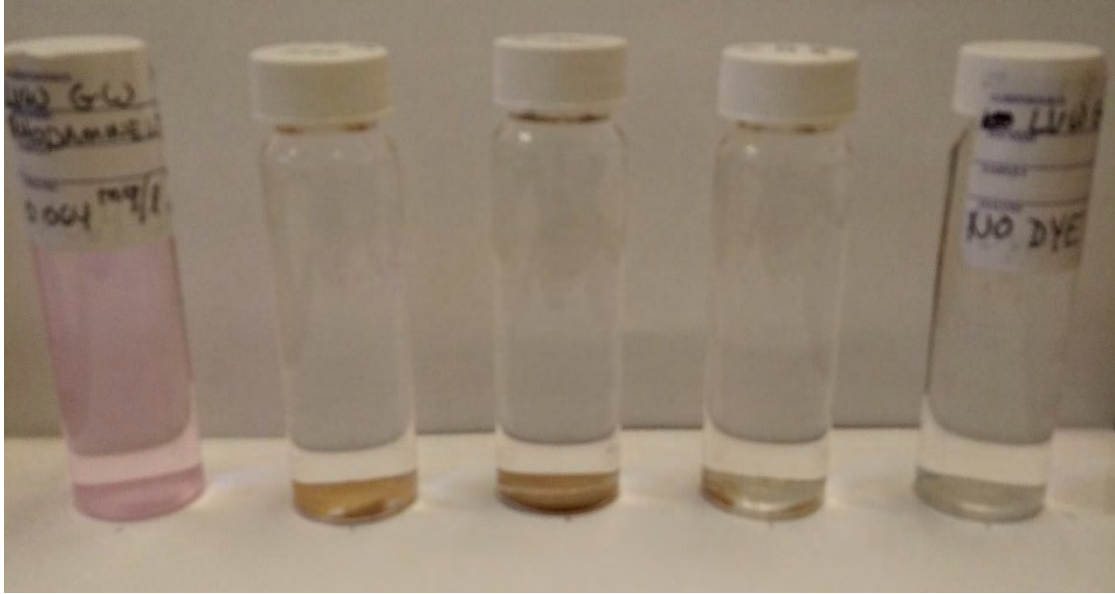


Photo Number
10

Direction Photo Taken:
N/A
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Samples collected from:
Well NERT3.58S1A

Samples collected on
6/3/19

At (time-from left to right)
Between Standards:
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1435
1505

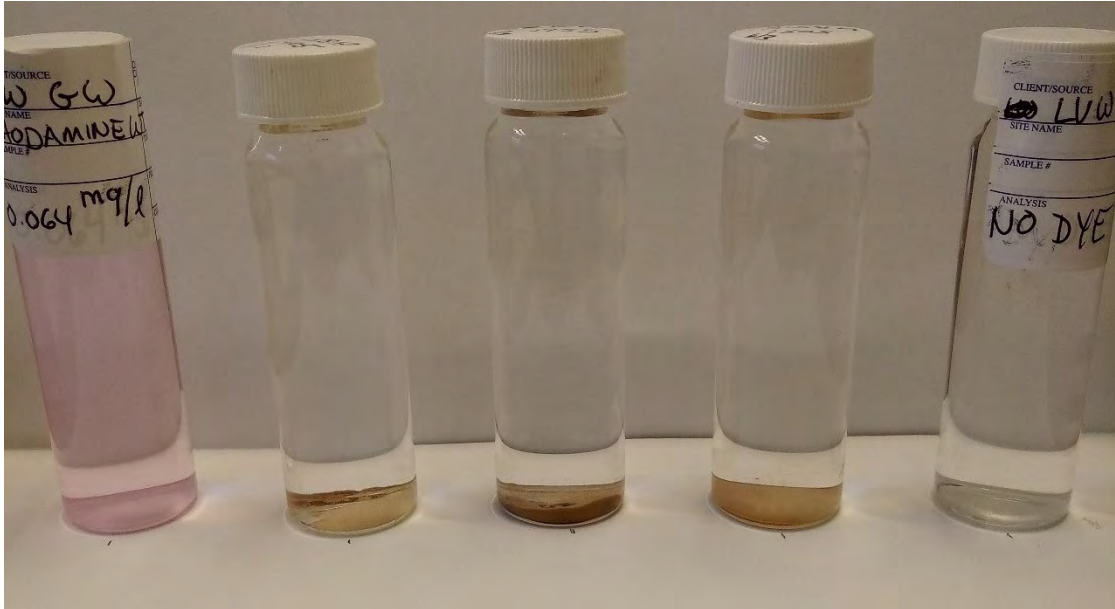


Photo Number
11

Direction Photo Taken:
N/A
0.064 standard, three samples, and "no dye" blank

Samples collected from:
Well NERT3.58S1A

Samples collected on
6/3/19
At (time-from left to right)
Between Standards:

1535
1600

Well NERT3.58S1B
1040

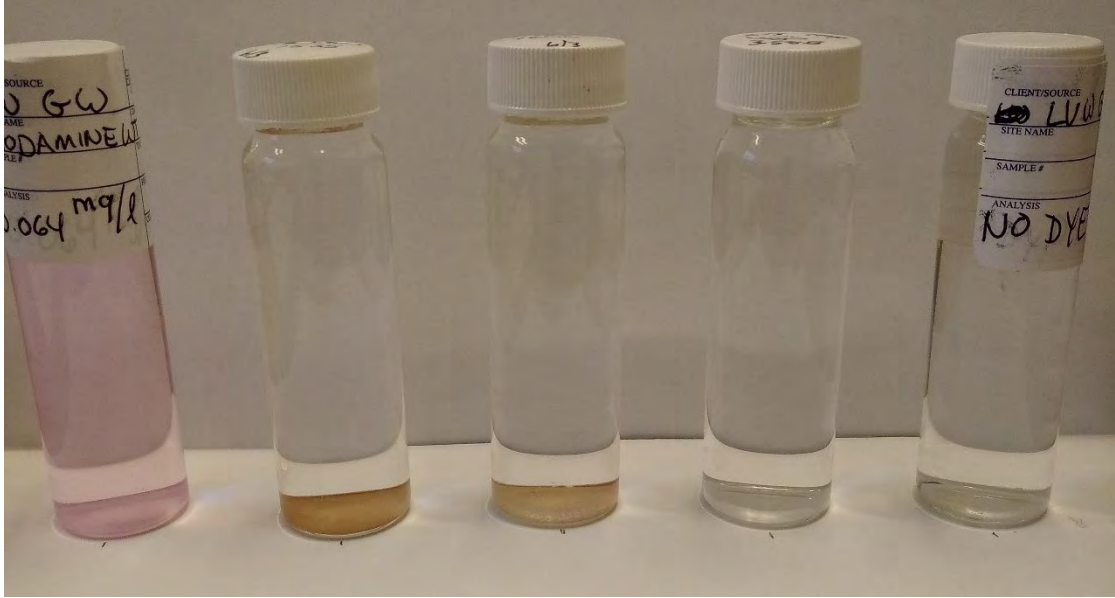


Photo Number
12

Direction Photo Taken:
N/A
0.064 standard, three samples, and "no dye" blank

Samples collected from:
Well NERT3.58S1B

Samples collected on
6/3/19
At (time-from left to right)
Between Standards:

1120
1155
1235



Photo Number
13

Direction Photo Taken:
N/A
0.064 standard, three samples, and "no dye" blank

Samples collected from:
Well NERT3.58S1B

Samples collected on
6/3/19

At (time-from left to right)
Between Standards:
1305
1335
1405

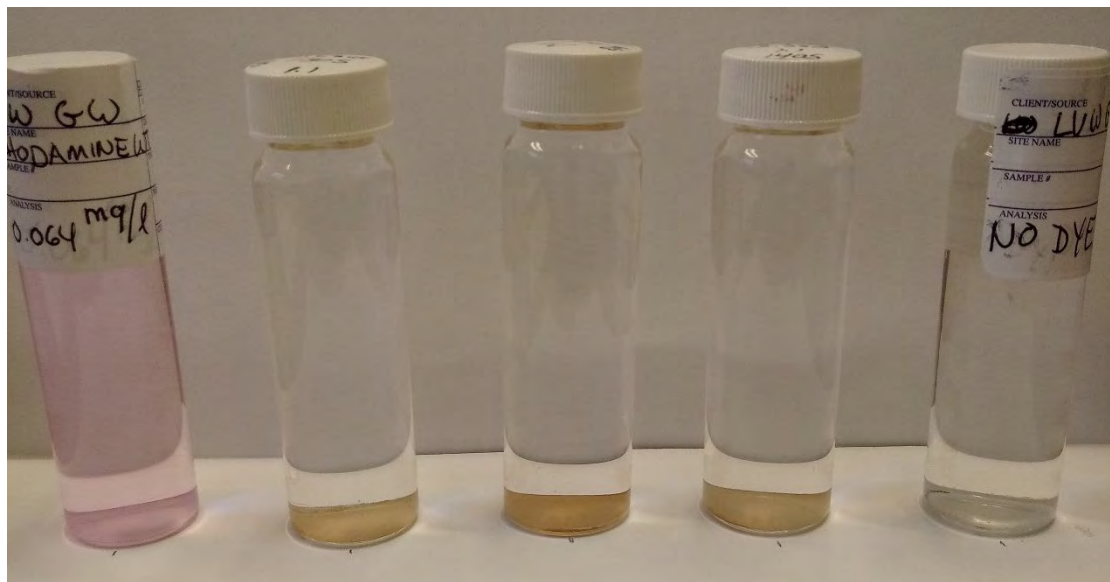


Photo Number
14

Direction Photo Taken:
N/A
0.064 standard, three samples, and "no dye" blank

Samples collected from:
Well NERT3.58S1B

Samples collected on
6/3/19

At (time-from left to right)
Between Standards:
1435
1505
1535

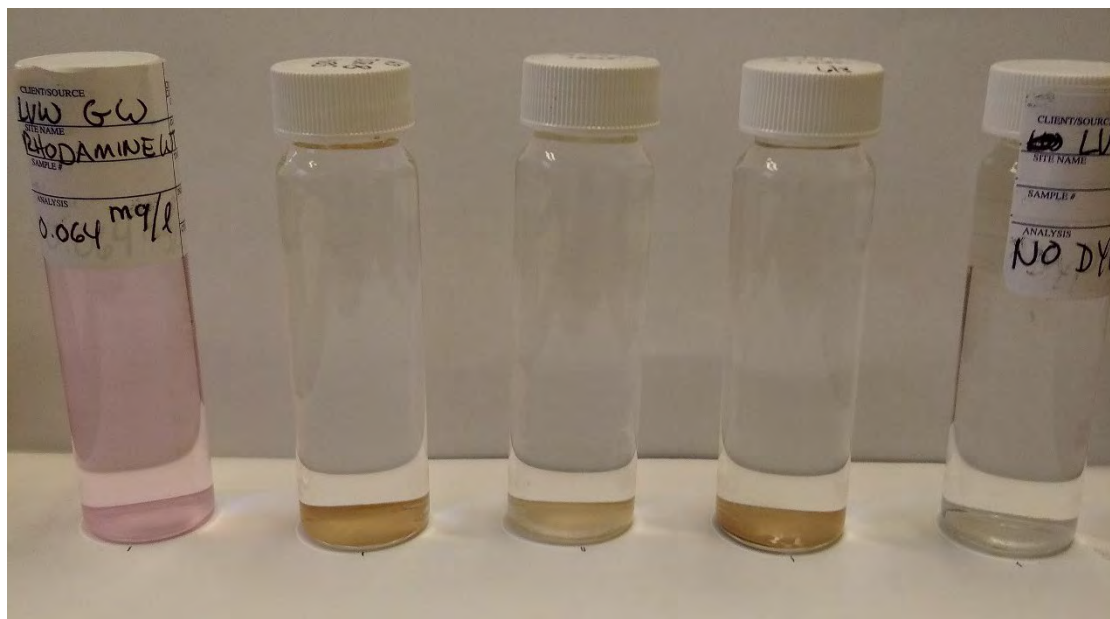


Photo Number
15

Direction Photo Taken:
N/A
0.064 standard, three samples, and "no dye" blank

Samples collected from:
Well NERT3.58S1B
Samples collected on
6/3/19

At (time-from left to right)
Between Standards:
1600
And
Well NERT3.58S1C
Samples collected on
6/3/19

1045
1125

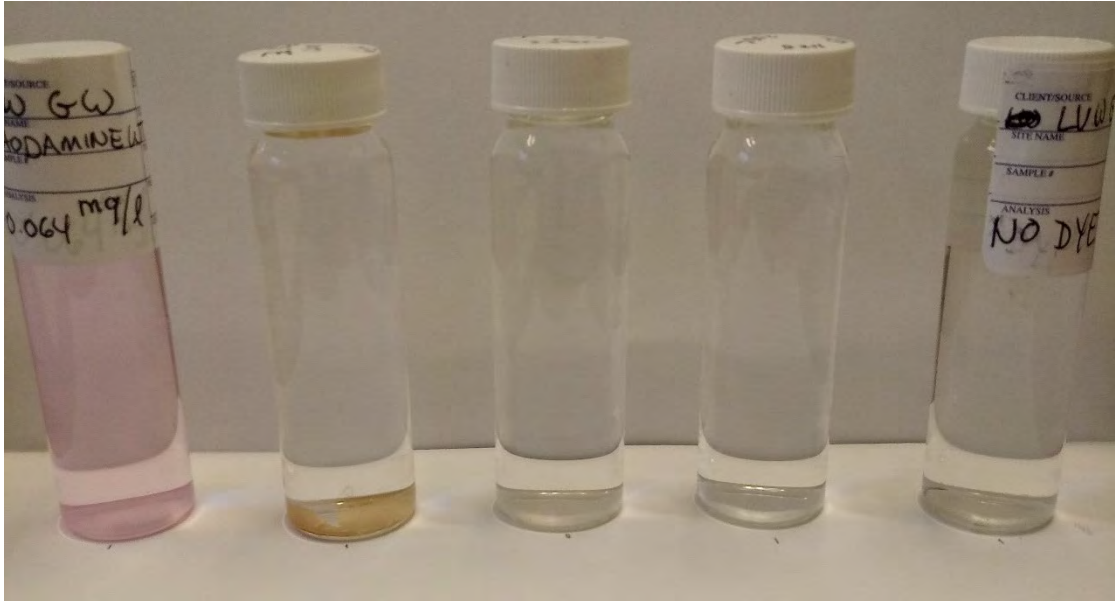


Photo Number
16

Direction Photo Taken:
N/A
0.064 standard, three samples, and "no dye" blank

Samples collected from:
Well NERT3.58S1C
Samples collected on
6/3/19

At (time-from left to right)
Between Standards:
1155
1245
1305

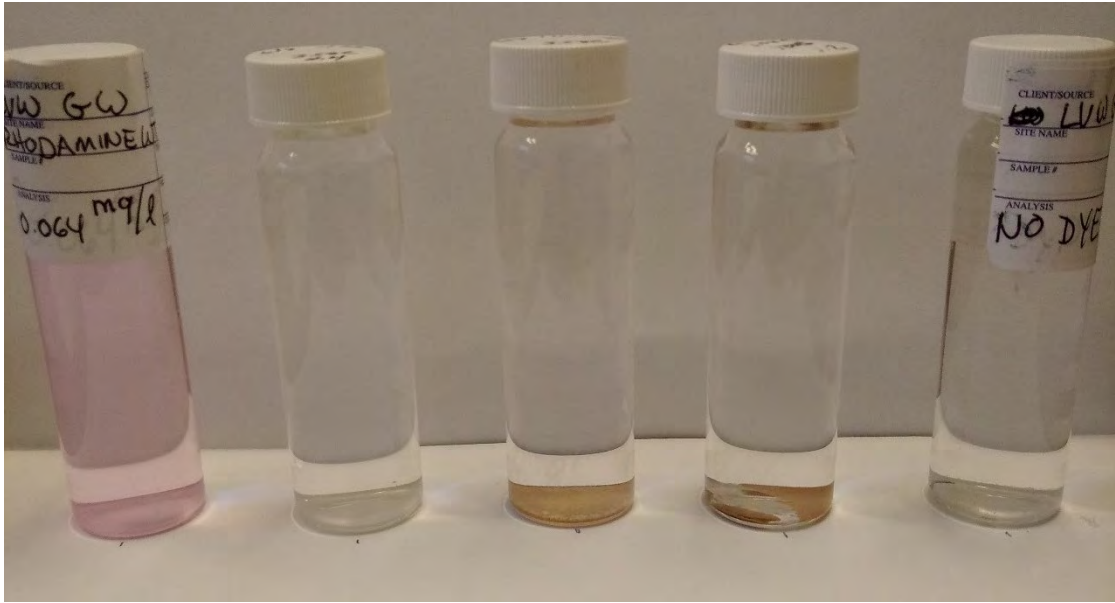


Photo Number
17

Direction Photo Taken:
N/A
0.064 standard, three samples, and "no dye" blank

Samples collected from:
Well NERT3.58S1C

Samples collected on
6/3/19
At (time-from left to right)
Between Standards:
1330
1400
1430

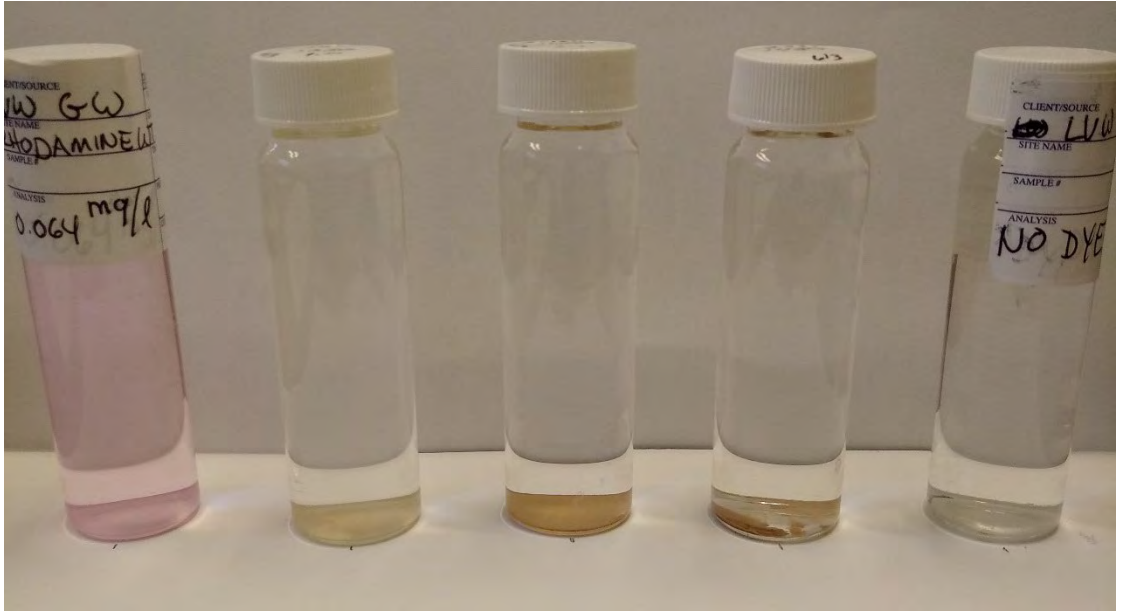


Photo Number
18

Direction Photo Taken:
N/A
0.064 standard, three samples, and "no dye" blank

Samples collected from:
Well NERT3.58S1C

Samples collected on
6/3/19
At (time-from left to right)
Between Standards:
1500
1530
1555

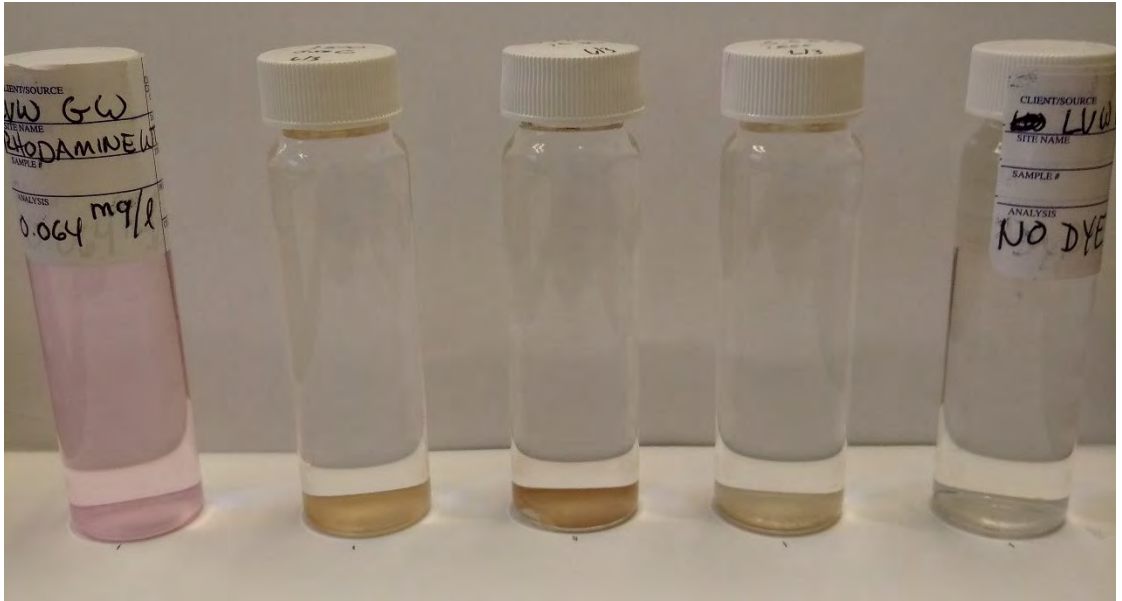


Photo Number
19

Direction Photo Taken:
N/A
0.064 standard, three samples, and "no dye" blank

Samples collected from:
Well NERT3.58S1
Observation Wells

Samples collected on
6/18/19

At (time-from left to right)
Between Standards:
A1050
B1055
C1100



Photo Number
20

Direction Photo Taken:
N/A
0.064 standard, three samples, and "no dye" blank

Samples collected from:
Well NERT3.58S1
Observation Wells

Samples collected on
6/17/19

At (time-from left to right)
Between Standards:
A0855
B0900
C0905

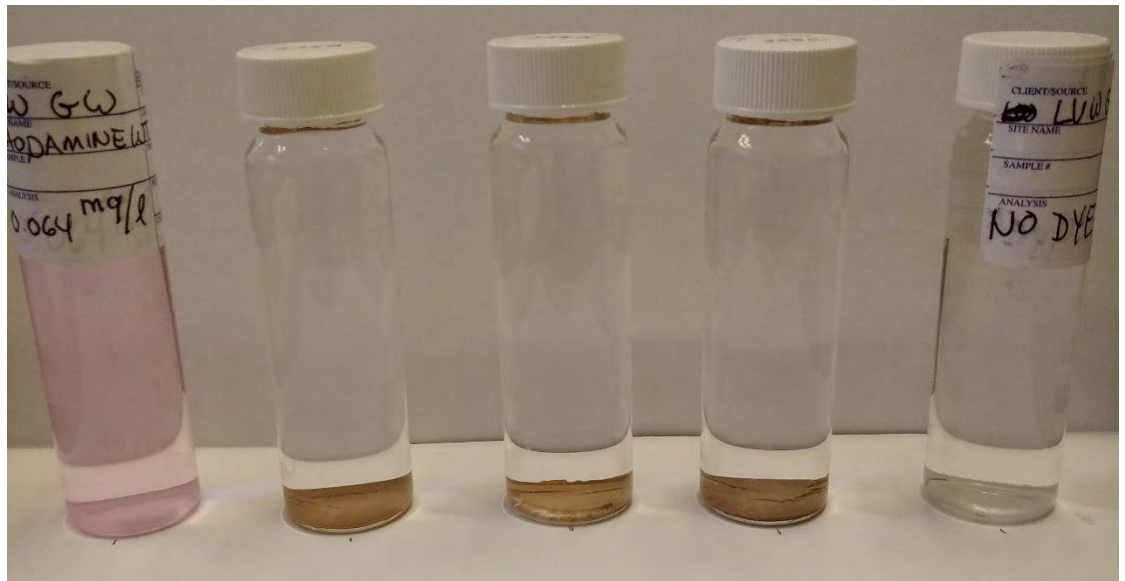


Photo Number
21

Direction Photo Taken:
N/A
0.064 standard, three samples, and "no dye" blank

Samples collected from:
Well NERT3.58S1
Observation Wells

Samples collected on
6/10/19

At (time-from left to right)
Between Standards:
A0845
B0850
C0855



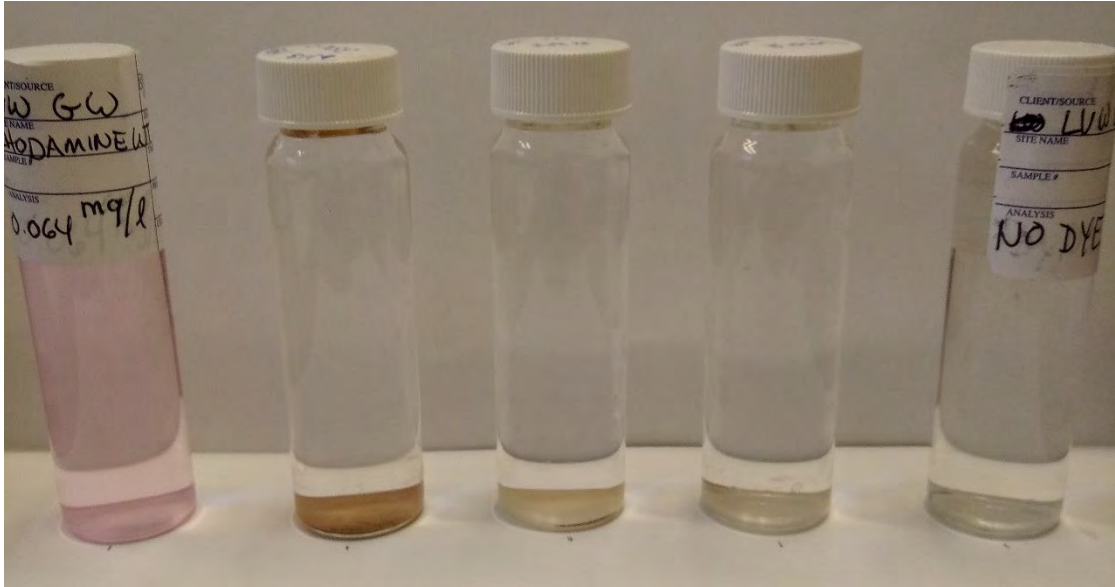
Photo Number
22

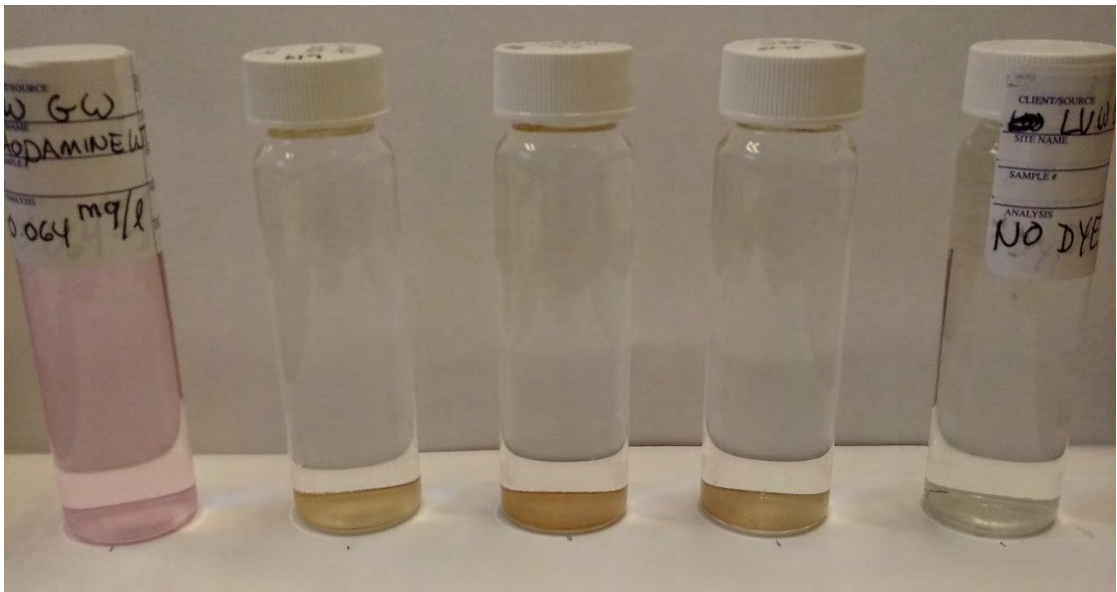
Direction Photo Taken:
N/A
0.064 standard, three samples, and "no dye" blank

Samples collected from:
Well NERT3.58S1
Observation Wells

Samples collected on
6/13/19

At (time-from left to right)
Between Standards:
A1450
B1500
C1505



<p>Photo Number 23</p>	
<p>Direction Photo Taken: N/A 0.064 standard, three samples, and "no dye" blank</p>	
<p>Samples collected from: Well NERT3.58S1 Observation Wells</p> <p>Samples collected on <u>6/4/19</u> At (time-from left to right) Between Standards: A0855 B0900 C0900</p>	


<p>Photo Number 24</p>	
<p>Direction Photo Taken: N/A 0.064 standard, three samples, and "no dye" blank</p>	
<p>Samples collected from: Well NERT3.58S1 Observation Wells</p> <p>Samples collected on <u>6/4/19</u> At (time-from left to right) Between Standards: A1050 B1045 C1050</p>	

Photo Number
25

Direction Photo Taken:
N/A
0.064 standard, three samples, and "no dye" blank

Samples collected from:
Well NERT3.58S1
Observation Wells

Samples collected on
6/4/19
At (time-from left to right)
Between Standards:
A1150
B1150
C1145

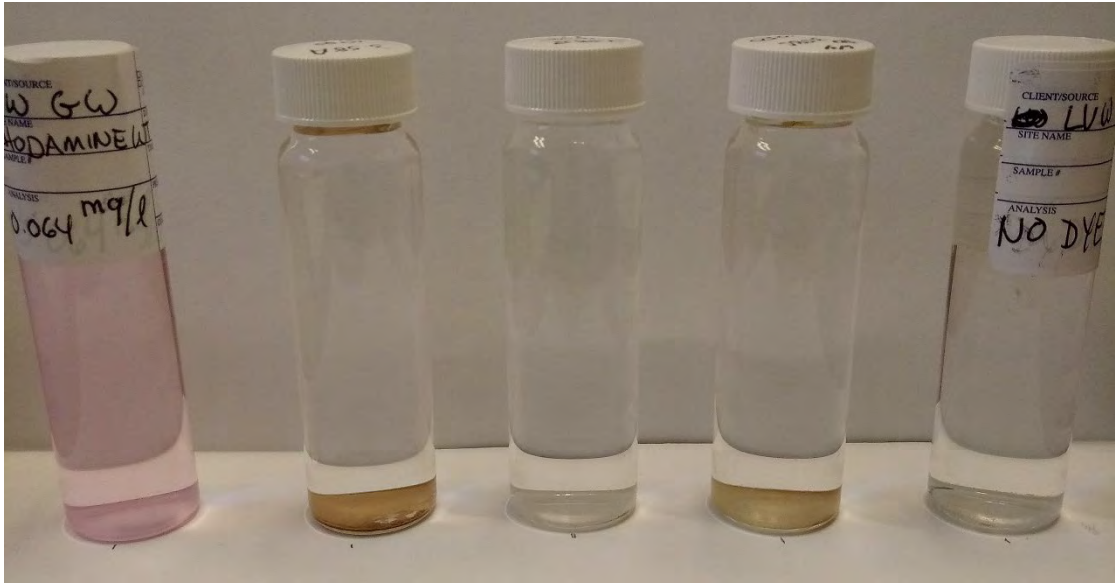


Photo Number
26

Direction Photo Taken:
N/A
0.064 standard, three samples, and "no dye" blank

Samples collected from:
Well 3.58 Observation Wells

Samples collected on
6/4/19
At (time-from left to right)
Between Standards:
A1250
B1250
C1245

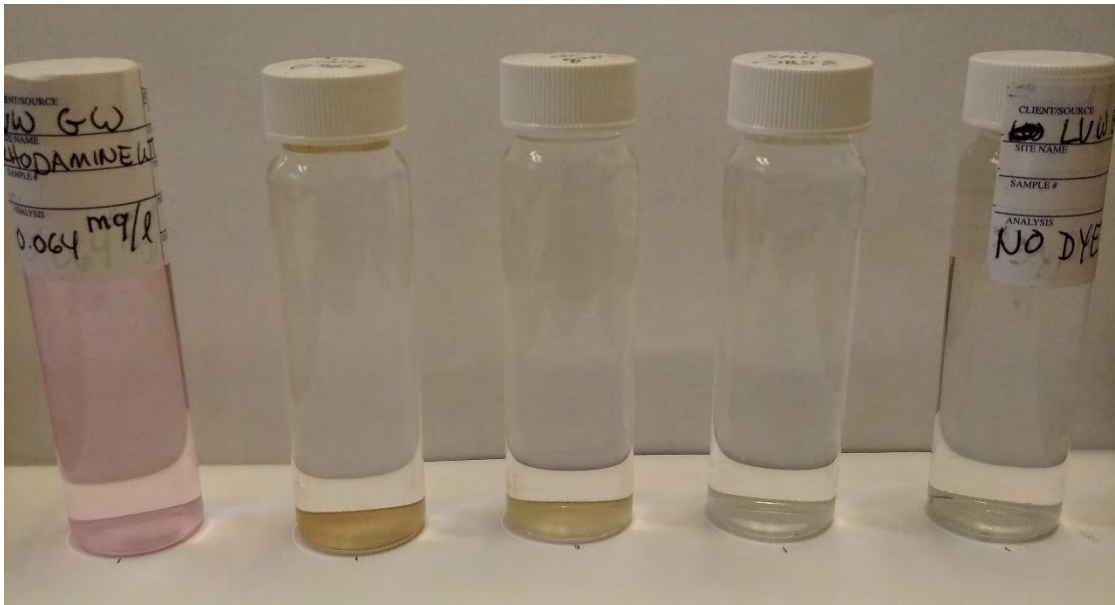


Photo Number
27

Direction Photo Taken:
N/A
0.064 standard, three samples, and "no dye" blank

Samples collected from:
Well NERT3.58S1
Observation Wells

Samples collected on
6/5/19
At (time-from left to right)
Between Standards:
A0845
B0840
C0845



Photo Number
28

Direction Photo Taken:
N/A
0.064 standard, three samples, and "no dye" blank

Samples collected from:
Well NERT3.58S1
Observation Wells

Samples collected on
6/5/19
At (time-from left to right)
Between Standards:
A0950
B0950
C0945

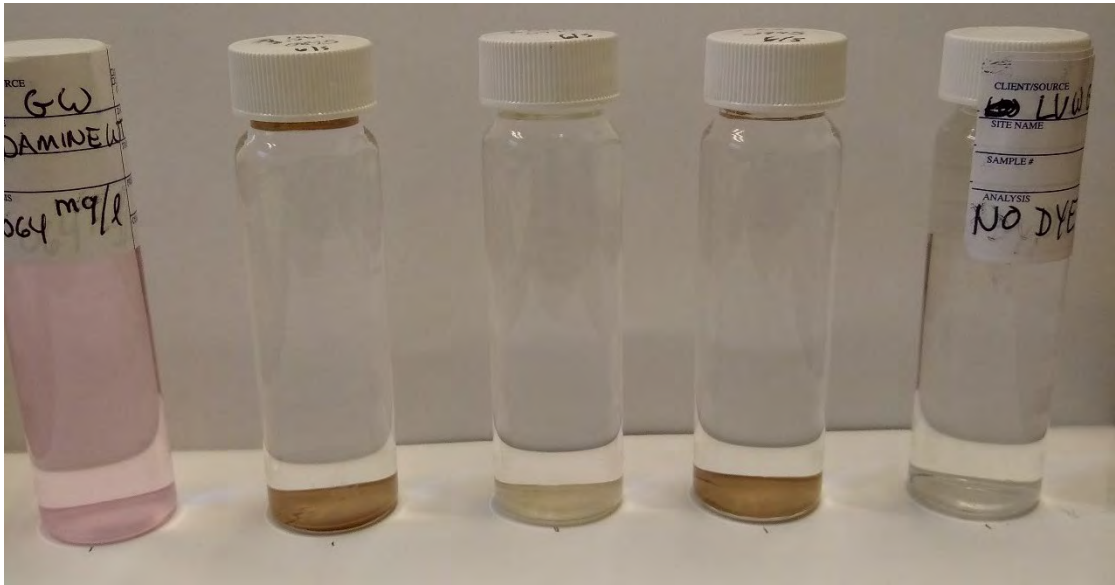


Photo Number
29

Direction Photo Taken:
N/A
0.064 standard, three samples, and "no dye" blank

Samples collected from:
Well NERT3.58S1
Observation Wells

Samples collected on
6/5/19

At (time-from left to right)
Between Standards:
A1045
B1045
C1045

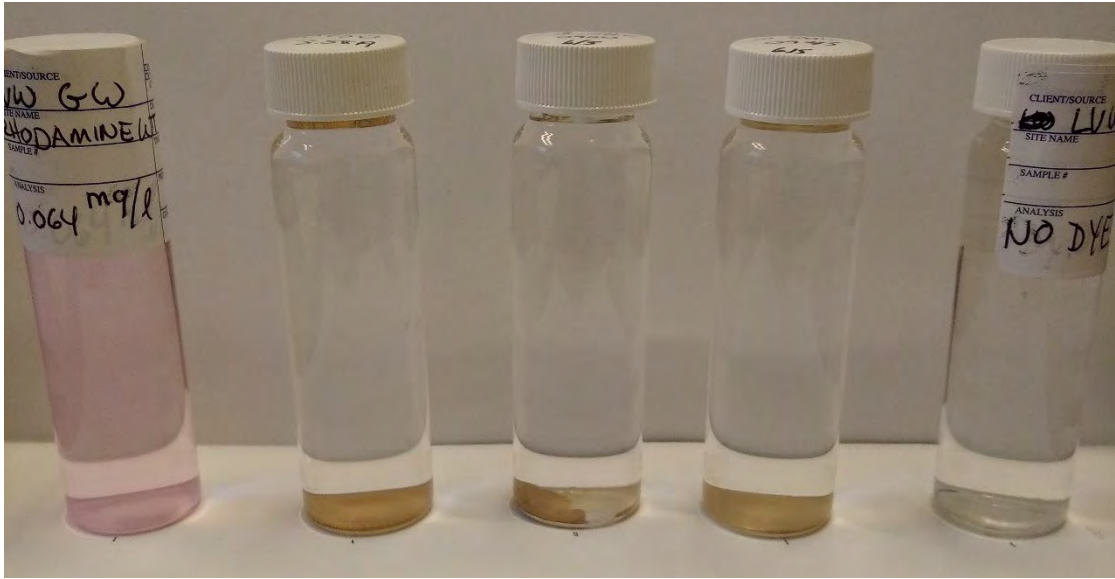


Photo Number
30

Direction Photo Taken:
N/A
0.064 standard, three samples, and "no dye" blank

Samples collected from:
Well NERT3.58S1
Observation Wells

Samples collected on
6/5/19

At (time-from left to right)
Between Standards:
A1150
B1145
C1150

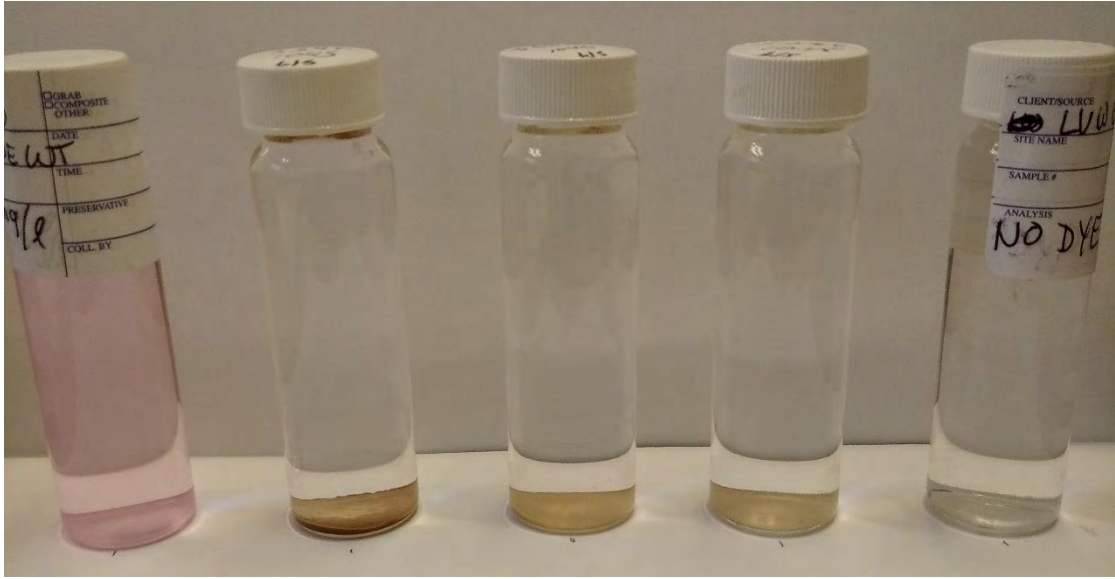


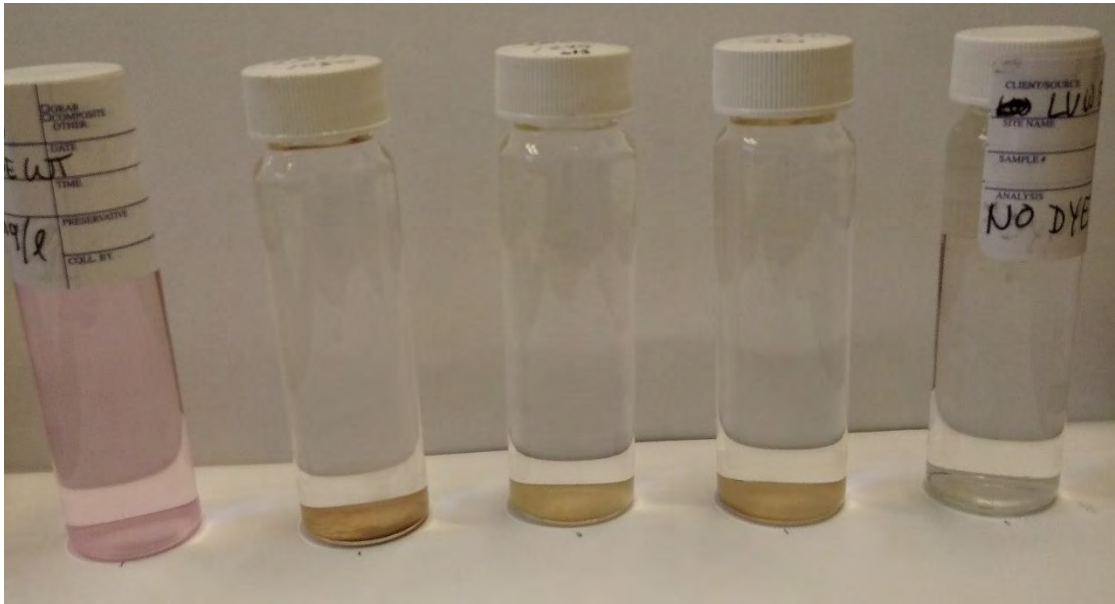
Photo Number
31

Direction Photo Taken:
N/A
0.064 standard, three samples, and "no dye" blank

Samples collected from:
Well NERT3.58S1
Observation Wells

Samples collected on
6/5/19

At (time-from left to right)
Between Standards:
A1250
B1245
C1250



Project: NERT Downgradient Study Area – Dye Tracer Study

Site Location: Henderson, NV near Three Kids Weir

Photographed By: AECOM
Date: 7/18/19

Photo Number
1

Photo Direction:
N/A

Samples collected on
6/24/19

Location	Time
0 STD	NA
NERT3.60	1125
NERT3.60A	1130
NERT3.60B	1135
NERT3.60C	1145
NERT3.60D	1140
0.064 STD	NA



Photo Number
2

Direction Photo Taken:
N/A

Injection at 12 noon.

Samples collected on:
6/24/19

Location	Time
NERT3.60	1215
NERT3.60	1245
NERT3.60	1315
NERT3.60	1345
NERT3.60	1415



Photo Number
3

Direction Photo Taken:
N/A

Description:
Dilutions of NERT3.60S1
on 6/24/19 at 1215



Photo Number
4

Direction Photo Taken:
N/A

Description:
Dilution of NERT3.60S1
on 6/24/19 at 1245



Photo Number
5

Direction Photo Taken:
N/A

Description:
Dilution of NERT 3.60
1315 6/24/19



Photo Number
6

Direction Photo Taken:
N/A

Description:
Samples collected on:
6/24/19

Location	Time
NERT3.60	1445
NERT3.60	1515
NERT3.60	1545



Photo Number
7

Direction Photo Taken:
N/A

Description:
Samples collected on:
6/24/19

Location	Time
NERT3.60A	1220
NERT3.60B	1225
NERT3.60C	1235
NERT3.60D	1230



Photo Number
8

Direction Photo Taken:
N/A

Description:
Samples collected on:
6/24/19

Location	Time
NERT3.60A	1250
NERT3.60B	1255
NERT3.60C	1300
NERT3.60D	1305



Photo Number 9	
Direction Photo Taken: N/A	
Description: Samples collected on: 6/24/19	
Location	Time
NERT3.60A	1320
NERT3.60B	1325
NERT3.60C	1330
NERT3.60D	1335



Photo Number 10	
Direction Photo Taken: N/A	
Description: Samples collected on: 6/24/19	
Location	Time
NERT3.60A	1350
NERT3.60B	1355
NERT3.60C	1400
NERT3.60D	1405



Photo Number 11	
Direction Photo Taken: N/A	
Description: Samples collected on: 6/24/19	
Location	Time
NERT3.60A	1420
NERT3.60B	1425
NERT3.60C	1430
NERT3.60D	1435



Photo Number 12	
Direction Photo Taken: N/A	
Description: Samples collected on: 6/24/19	
Location	Time
NERT3.60A	1450
NERT3.60B	1455
NERT3.60C	1500
NERT3.60D	1505



Photo Number
13

Direction Photo Taken:
N/A

Description:
Samples collected on:
6/24/19

Location	Time
NERT3.60A	1520
NERT3.60B	1525
NERT3.60C	1530
NERT3.60D	1535



Photo Number
14

Direction Photo Taken:
N/A

Description:
Samples collected on:
6/24/19

Location	Time
NERT3.60A	1550
NERT3.60B	1555
NERT3.60C	1600
NERT3.60D	1605



Photo Number
15

Direction Photo Taken:
N/A

Description:
Samples collected on:
6/25/19

Location	Time
NERT3.60	1030
NERT3.60	1130
NERT3.60	1230
NERT3.60	1330
NERT3.60	1430
NERT3.60	1530



Photo Number
16

Direction Photo Taken:
N/A

Description:
Samples collected on:
6/25/19

Location	Time
NERT3.60A	1035
NERT3.60B	1040
NERT3.60C	1045
NERT3.60D	1050



Photo Number
17

Direction Photo Taken:
N/A

Description:
Samples collected on:
6/25/19

Location	Time
NERT3.60A	1135
NERT3.60B	1140
NERT3.60C	1145
NERT3.60D	1150



Photo Number
18

Direction Photo Taken:
N/A

Description:
Samples collected on:
6/25/19

Location	Time
NERT3.60A	1235
NERT3.60B	1240
NERT3.60C	1245
NERT3.60D	1250



Photo Number 19	
Direction Photo Taken: N/A	
Description: Samples collected on: 6/25/19	
Location	Time
NERT3.60A	1335
NERT3.60B	1340
NERT3.60C	1345
NERT3.60D	1350



Photo Number 20	
Direction Photo Taken: N/A	
Description: Samples collected on: 6/25/19	
Location	Time
NERT3.60A	1435
NERT3.60B	1440
NERT3.60C	1445
NERT3.60D	1450



Photo Number 21	
Direction Photo Taken: N/A	
Description: Samples collected on: 6/25/19	
Location	Time
NERT3.60A	1535
NERT3.60B	1540
NERT3.60C	1545
NERT3.60D	1550



Photo Number 22	
Direction Photo Taken: N/A	
Description: Samples collected on: 6/26/19	
Location	Time
NERT3.60	1040
NERT3.60A	1045
NERT3.60B	1050
NERT3.60C	1055
NERT3.60D	1100



Photo Number 23	
Direction Photo Taken: N/A	
Description: Samples collected on: 6/26/19	
Location	Time
NERT3.60	1515
NERT3.60A	1520
NERT3.60B	1525
NERT3.60C	1530
NERT3.60D	1535



Photo Number 24	
Direction Photo Taken: N/A	
Description: Samples collected on: 6/28/19	
Location	Time
NERT3.60	1410
NERT3.60A	1410
NERT3.60B	1415
NERT3.60C	1405
NERT3.60D	1415

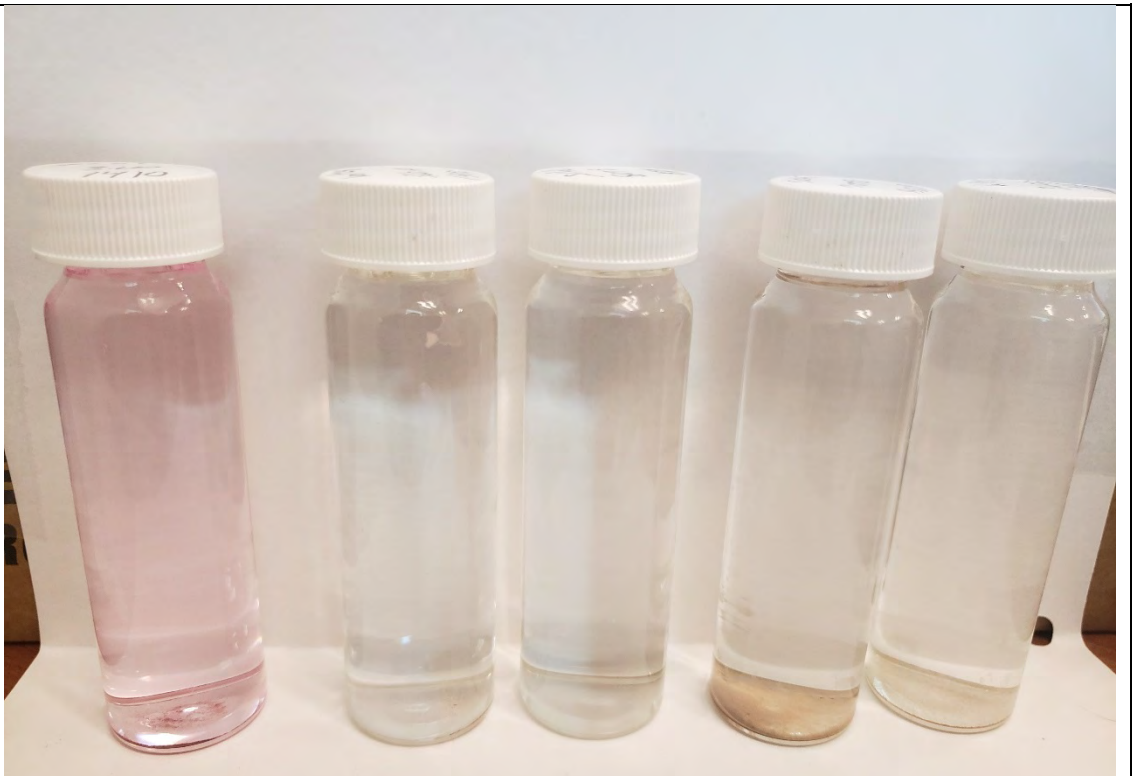


Photo Number 25	
Direction Photo Taken: N/A	
Description: Samples collected on: 07/01/19	
Location	Time
NERT3.60	1100
NERT3.60A	1105
NERT3.60B	1105
NERT3.60C	1100
NERT3.60D	1110



Project: NERT Downgradient Study
Area – Dye Tracer Study

Site Location: Henderson, NV near Calico
Ridge Weir

Photographed By: AECOM
Date: 8/6/2019

Photo Number
1

Photo Direction:
N/A

Samples collected on:
7/16/19

Location	Time
0 STD	NA
NERT4.64S1	835
NERT4.64S1	910
NERT4.64S1	940
NERT4.64S1	1010
NERT4.64S1	1040
1000 STD	NA



Photo Number
2

Direction Photo Taken:
N/A

Samples collected on:
7/16/19

Location	Time
900 STD	NA
NERT4.64S1	1110
NERT4.64S1	1140
NERT4.64S1	1210
240 STD	NA



Photo Number
3

Direction Photo Taken:
N/A

Samples collected on:
7/17/19

Location	Time
40 STD	NA
NERT4.64S1	1050
NERT4.64S1	1150
NERT4.64S1	1250
NERT4.64S1	1350
28 STD	NA



Photo Number
4

Direction Photo Taken:
N/A

Samples collected on:
7/18/19

Location	Time
10 STD	NA
NERT4.64S1	1015
NERT4.64S1	1115
NERT4.64S1	1215
NERT4.64S1	1315
4 STD	NA

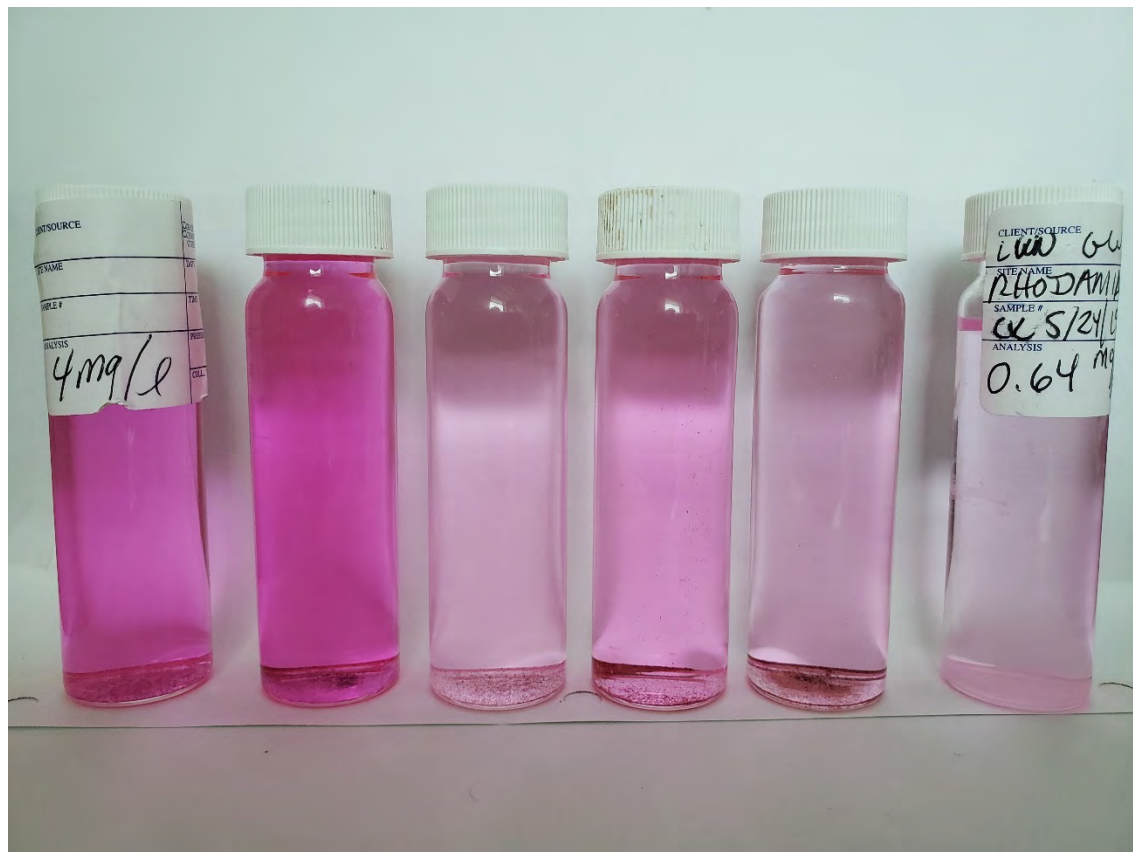


**Photo Number
5**

Direction Photo Taken:
N/A

Samples collected on:
7/19/19

Location	Time
4 STD	NA
NERT4.64S1	915
NERT4.64S1	1515
NERT4.64S1	1030
NERT4.64S1	1110
0.64 STD	NA



**Photo Number
6**

Direction Photo Taken:
N/A

Samples collected on:
7/29/19

Location	Time
0.64 STD	NA
NERT4.64S1	1250
NERT4.64S1	1600
NERT4.64S1	1520
NERT4.64S1	1535
0.064 STD	NA



Photo Number
7

Direction Photo Taken:
N/A

Samples collected on:
7/16/19

Location	Time
0 STD	NA
NERT4.64S1A	840
NERT4.64S1A	910
NERT4.64S1A	940
NERT4.64S1A	1010

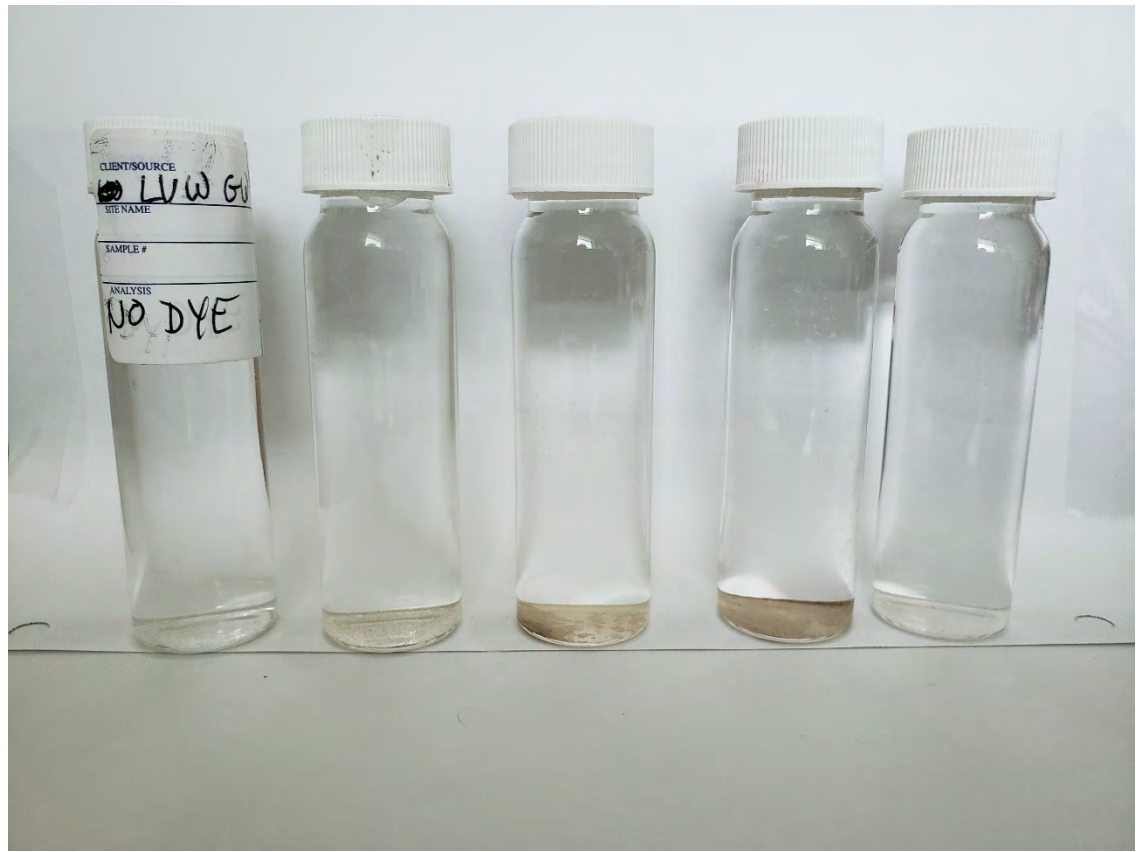


Photo Number
8

Direction Photo Taken:
N/A

Samples collected on:
7/16/19

Location	Time
NERT4.64S1A	1040
NERT4.64S1A	1110
NERT4.64S1A	1140
NERT4.64S1A	1210

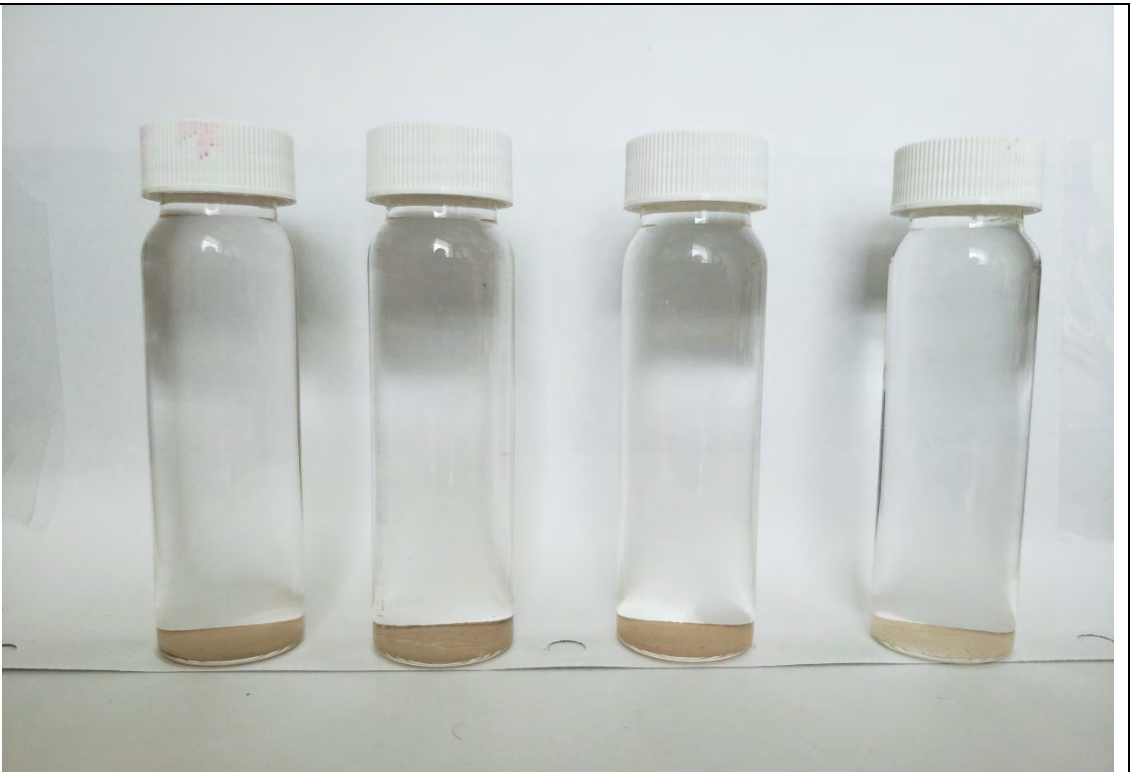


Photo Number 9	
Direction Photo Taken: N/A	
Samples collected on: 7/17/19	
Location	Time
NERT4.64S1A	1050
NERT4.64S1A	1150
NERT4.64S1A	1250
NERT4.64S1A	1350



Photo Number 10	
Direction Photo Taken: N/A	
Samples collected on: 7/18/19	
Location	Time
NERT4.64S1A	1015
NERT4.64S1A	1115
NERT4.64S1A	1215
NERT4.64S1A	1315



Photo Number 11	
Direction Photo Taken: N/A	
Samples collected on: 7/19 thru 7/26/19	
Location	Time
NERT4.64S1A	915
NERT4.64S1A	1520
NERT4.64S1A	1035
NERT4.64S1A	1115



Photo Number 12	
Direction Photo Taken: N/A	
Samples collected on: 7/29-8/05 2019	
Location	Time
NERT4.64S1A	1255
NERT4.64S1A	1605
NERT4.64S1A	1525
NERT4.64S1A	1540



Photo Number
13

Direction Photo Taken:
N/A

Samples collected on:
7/16/19

Location	Time
0 STD	NA
NERT4.64S1B	845
NERT4.64S1B	915
NERT4.64S1B	945
NERT4.64S1B	1015



Photo Number
14

Direction Photo Taken:
N/A

Samples collected on:
7/16/19

Location	Time
NERT4.64S1B	1040
NERT4.64S1B	1110
NERT4.64S1B	1140
NERT4.64S1B	1210



Photo Number 15	
Direction Photo Taken: N/A	
Samples collected on: 7/17/19	
Location	Time
NERT4.64S1B	1055
NERT4.64S1B	1155
NERT4.64S1B	1255
NERT4.64S1B	1355



Photo Number 16	
Direction Photo Taken: N/A	
Samples collected on: 7/18/19	
Location	Time
NERT4.64S1B	1020
NERT4.64S1B	1120
NERT4.64S1B	1220
NERT4.64S1B	1320



Photo Number
17

Direction Photo Taken:
N/A

Samples collected on:
7/19-7/26 2019

Location	Time
NERT4.64S1B	920
NERT4.64S1B	1520
NERT4.64S1B	1035
NERT4.64S1B	1115



Photo Number
18

Direction Photo Taken:
N/A

Samples collected on:
7/29-8/05 2019

Location	Time
NERT4.64S1B	1255
NERT4.64S1B	1605
NERT4.64S1B	1525
NERT4.64S1B	1540



Photo Number
19

Direction Photo Taken:
N/A

Samples collected on:
7/16/19

Location	Time
0 STD	NA
NERT4.64S1C	850
NERT4.64S1C	915
NERT4.64S1C	945
NERT4.64S1C	1015



Photo Number
20

Direction Photo Taken:
N/A

Samples collected on:
7/16/19

Location	Time
NERT4.64S1C	1045
NERT4.64S1C	1115
NERT4.64S1C	1145
NERT4.64S1C	1215



Photo Number
21

Direction Photo Taken:
N/A

Samples collected on:
7/17/19

Location	Time
NERT4.64S1C	1055
NERT4.64S1C	1155
NERT4.64S1C	1255
NERT4.64S1C	1355



Photo Number
22

Direction Photo Taken:
N/A

Samples collected on:
7/18/19

Location	Time
NERT4.64S1C	1020
NERT4.64S1C	1120
NERT4.64S1C	1220
NERT4.64S1C	1320



Photo Number
23

Direction Photo Taken:
N/A

Samples collected on:
7/19-7/26 2019

Location	Time
NERT4.64S1C	920
NERT4.64S1C	1520
NERT4.64S1C	1035
NERT4.64S1C	1115



Photo Number
24

Direction Photo Taken:
N/A

Samples collected on:
7/16/19

Location	Time
0 STD	NA
NERT4.64S1D	855
NERT4.64S1D	920
NERT4.64S1D	950
NERT4.64S1D	1020
0.64 STD	NA



Photo Number
25

Direction Photo Taken:
N/A

Samples collected on:
7/16/19

Location	Time
0.64 STD	NA
NERT4.64S1D	1050
NERT4.64S1D	1120
NERT4.64S1D	1150
NERT4.64S1D	1220



Photo Number
26

Direction Photo Taken:
N/A

Samples collected on:
7/17/19

Location	Time
NERT4.64S1D	1100
NERT4.64S1D	1200
NERT4.64S1D	1300
NERT4.64S1D	1400



Photo Number
27

Direction Photo Taken:
N/A

Samples collected on:
7/18/19

Location	Time
NERT4.64S1D	1025
NERT4.64S1D	1125
NERT4.64S1D	1225
NERT4.64S1D	1325



Photo Number
28

Direction Photo Taken:
N/A

Samples collected on:
7/19-7/26 2019

Location	Time
NERT4.64S1D	925
NERT4.64S1D	1520
NERT4.64S1D	1035
NERT4.64S1D	1115



Photo Number
29

Direction Photo Taken:
N/A

Samples collected on:
7/29-8/05 2019

Location	Time
NERT4.64S1D	1255
NERT4.64S1D	1605
NERT4.64S1D	1525
NERT4.64S1D	1540



Appendix N

Data Validation Summary Report

Data Validation Summary Report

June / July 2019 Groundwater Sampling

NERT Remedial Investigation – Downgradient Study Area
Nevada Environmental Response Trust Site
Henderson, Nevada

Final



Data Validation Summary Report

June / July 2019 Groundwater Sampling



Prepared by Cathy Larson



Reviewed by Steve Szocik

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List of Acronyms

DQO	data quality objectives
DUP	duplicate
EB	equipment blank
EPA	United States Environmental Protection Agency
FB	field blank
FD	field duplicate
ID	identification
LCS	laboratory control sample
MS/MSD	matrix spike / matrix spike duplicate
NDEP	Nevada Division of Environmental Protection
NERT	Nevada Environmental Response Trust
PARCCS	precision, accuracy, representativeness, comparability, completeness, sensitivity
PQL	practical quantitation limit
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
RPD	relative percent difference
SDG	sample delivery group
SQL	sample quantitation limit
TDS	Total Dissolved Solids
%R	percent recovery

1.0 Introduction

This Data Validation Summary Report has been prepared by AECOM to assess the validity and usability of laboratory analytical data from the June / July 2019 groundwater sampling conducted in the Downgradient Study Area of the Nevada Environmental Response Trust (NERT) site in Henderson, Nevada. The assessment was performed by AECOM under their May 2017 Quality Assurance Project Plan (QAPP) and included the collection and analyses of 48 environmental and quality control (QC) samples. The analyses were performed by the following methods:

- Chlorate by United States Environmental Protection Agency (EPA) Method 300.1B
- Perchlorate by EPA Method 314.0
- Total Dissolved Solids (TDS) by Standard Method 2540C
- Chromium by EPA Method 200.8
- Hexavalent Chromium by EPA Method 218.7

Laboratory analytical services for hexavalent chromium were provided by Silver State Analytical Laboratories (Las Vegas, Nevada). All other analytical testing was provided by Euorofins TestAmerica, Inc. (Irvine, California). The samples were grouped into sample delivery groups (SDGs). The water samples are associated with quality assurance (QA)/QC samples designed to document the data quality of the entire SDG or a sub-group of samples within an SDG. **Table 1** is a cross-reference table listing each sample identification (ID), analysis, SDG, sample date, laboratory sample ID, matrix, and validation level. **Table 2** is a reference table that identifies the QC elements reviewed.

The laboratory analytical data were validated in accordance with procedures described in:

- The Nevada Division of Environmental Protection (NDEP) Data Verification and Validation Requirements - Supplement established for the BMI Plant Sites and Common Areas Projects, Henderson, Nevada, dated July 13, 2018;
- AECOM's QAPP Downgradient Study Area, Henderson, Nevada, Revision, dated May 2017; and
- EPA's Contract Laboratory Program National Functional Guidelines for Inorganic Data Review dated January 2017.

In accordance with the project QAPP and NDEP requirements, 100 percent of the analytical data were validated according to Stage 2A data validation procedures.

This report summarizes the QA/QC evaluation of the data according to precision, accuracy, representativeness, completeness, comparability, and sensitivity (PARCCS) relative to the project data quality objectives (DQOs). This report provides a quantitative and qualitative assessment of the data and identifies potential sources of error, uncertainty, and bias that may affect the overall usability.

The PARCCS summary report evaluates and summarizes the results of QA/QC data validation for the entire sampling program. Section 2.0 interprets specific QC deviations and their effects on both individual data points and the analyses as a whole. Section 4.0 presents a summary of the PARCCS criteria by comparing quantitative

parameters with acceptability criteria defined in the project DQOs. Qualitative PARCCS criteria are also summarized in this section.

1.1 Precision and Accuracy of Environmental Data

Environmental data quality depends on sample collection procedures, analytical methods and instrumentation, documentation, and sample matrix properties. Both sample collection procedures and laboratory analyses contain potential sources of uncertainty, error, and/or bias, which affect the overall quality of a measurement. Errors in sample data may result from incomplete equipment decontamination, inappropriate sampling techniques, sample heterogeneity, improper filtering, and improper preservation. The accuracy of analytical results is dependent on selecting appropriate analytical methods, maintaining equipment properly, and complying with QC requirements. The sample matrix (i.e. groundwater) is also an important factor in the ability to obtain precise and accurate results within a given media.

Environmental and laboratory QA/QC samples assess the effects of sampling procedures and evaluate laboratory contamination, laboratory performance, and matrix effects. QA/QC samples include equipment blanks (EBs), field blanks (FBs), field duplicates (FDs), method blanks, laboratory control samples (LCSs), and matrix spike/matrix spike duplicates (MS/MSDs).

Before conducting the PARCCS evaluation, the analytical data were validated according to the QAPP (AECOM 2017), Functional Guidelines (EPA 2017), and NDEP July 13, 2018 Data Validation Guidance (NDEP 2018). Samples not meeting the acceptance criteria were qualified with a flag, an abbreviation indicating a deficiency with the data. The following are flags used in data validation:

J-	Estimated - The associated numerical value is an estimated quantity with a negative bias. The analyte was detected but the reported value may not be accurate or precise.
J+	Estimated - The associated numerical value is an estimated quantity with a positive bias. The analyte was detected but the reported value may not be accurate or precise.
J	Estimated - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample. It is not possible to assess the direction of the potential bias. The analyte was detected but the reported value may not be accurate or precise.
R	Rejected - The data is unusable (the compound or analyte may or may not be present). Use of the "R" qualifier indicates a significant variance from functional guideline acceptance criteria. Either resampling or reanalysis is necessary to determine the presence or absence of the rejected analyte.
U	Nondetected - Analyses were performed for the compound or analyte, but it was not detected.
UJ	Estimated/Nondetected - The analyte was analyzed for, but not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
DNR	Do Not Report - A more appropriate result is reported from another analysis or dilution.
A	Indicates the finding is based upon technical validation criteria.
P	Indicates the finding is related to a protocol/contractual deviation.

The hierarchy of flags is listed below:

R > J	The R flag will always take precedence over the J qualifier.
J+	The high bias (J+) flag is applied only to detected results.
J > J+ or J-	A non-biased (J) flag will always supersede biased (J+ or J-) flags since it is not possible to assess the direction of the potential bias.
J = J+ plus J-	Adding biased (J+, J-) flags with opposite signs will result in a nonbiased flag (J).
UJ = U plus J	The UJ flag is used when a non-detected (U) flag is added to J flag.

Table 3 lists the reason codes used. Reason codes explain why flags have been applied and identify possible limitations of data use. Reason codes are cumulative except when one of the flags is R then only the reason code associated to the R flag will be used.

Table 4 presents the overall qualified results after all the flags or validation qualifiers and associated reason codes have been applied.

Once the data are reviewed and qualified according to the QAPP, functional guidelines, and NDEP guidance the data set is then evaluated using PARCCS criteria. PARCCS criteria provide an evaluation of overall data usability. The following is a discussion of PARCCS criteria as related to the project DQOs.

Precision measures the reproducibility of repetitive measurements. It is defined as the degree of mutual agreement among independent measurements as the result of repeated application of the sample analytical process under similar conditions.

Components of precision include analytical precision and total precision. Analytical precision is a measurement of the variability associated with duplicate or replicate analyses of the same sample in the laboratory, and is determined by analysis of laboratory QC samples, such as duplicate control samples (MSD, or sample duplicates). If the recoveries of analytes in the specified control samples are comparable within established control limits, then precision is within limits.

Total precision is a measurement of the variability associated with the entire sampling and analytical process. It is determined by analysis of duplicate or replicate field samples, and measures variability introduced by both the laboratory and field operations. FD samples are analyzed to assess field and analytical precision.

Duplicate results are assessed using the relative percent difference (RPD) between duplicate measurements. If the RPD for laboratory QC samples exceeds the laboratory's statistically determined acceptance ranges, data will be qualified as described in the applicable validation procedure. If the RPD between primary and duplicate field samples exceeds 50 percent for groundwater, data will be qualified as described in the applicable validation procedure.

The RPD will be calculated as follows:

$$RPD = \frac{|x_1 - x_2|}{\left(\frac{x_1 + x_2}{2}\right)} * 100$$

where:

x_1 = analyte concentration in the primary sample, and

x_2 = analyte concentration in the duplicate sample

Possible causes of poor precision include improper sample collection or handling, inconsistent sample preparation, and poor instrument stability. In some duplicate pairs, results may be reported in either the primary or duplicate samples at levels below the practical quantitation limit (PQL) or non-detected. Since these values are considered to be estimates, RPD exceedances from these duplicate pairs do not suggest a significant impact on the data quality.

Accuracy is a measure of the agreement of an experimental determination and the true value of the parameter being measured. It is used to identify bias in a given measurement system. Recoveries outside acceptable QC limits may be caused by factors such as instrumentation, analyst error, or matrix interference. Accuracy is assessed through the analysis of surrogates, MSs, MSDs, and LCSs. In some cases, samples from multiple SDGs were within one QC batch and therefore are associated with the same laboratory QC samples.

Accuracy of inorganic analyses is determined using the percent recoveries of MS and LCS analyses. Surrogates were also used to assess accuracy for the chlorate test. Additionally, an "MRL" spike was reported by the laboratory for the chlorate and perchlorate tests. The laboratory did not define the acronym MRL however, the MRL spike was a blank spike at the concentration of the PQL.

Percent recovery (%R) in a MS or MSD is calculated using the following equation:

$$\%R = (A-B)/C \times 100$$

where:

A = measured concentration in the spiked sample

B = measured concentration of the spike compound in the unspiked sample

C = concentration of the spike

%R for a surrogate or LCS is calculated using the following equation:

$$\%R = A/B \times 100$$

where:

A = measured concentration in the spiked sample

B = concentration of the spike

The %R for MS/MSD samples and LCSs is evaluated with the acceptance criteria specified by the previously noted documents. The MRL spike and surrogate recoveries were compared to limits included in the laboratory reports. Spike recoveries outside the acceptable QC accuracy limits provide an indication of bias, where the reported data may overestimate or underestimate the actual concentration of compounds detected or quantitation limits reported for environmental samples.

Representativeness is a qualitative parameter that expresses the degree to which the sample data are characteristic of a population. It is evaluated by reviewing the QC results of blanks, samples and holding times. Positive detects of compounds in the blank samples identify compounds that may have been introduced into the samples during sample collection, transport, preparation, or analysis. The QA/QC blanks collected and analyzed are method blanks, calibration blanks, EBs, and FBs.

A method blank is a laboratory-grade water or solid matrix that contains the method reagents and has undergone the same preparation and analysis as the environmental samples. The method blank provides a measure of the combined contamination derived from the laboratory-source water, glassware, instruments, reagents, and sample preparation steps. Method blanks are prepared for each sample of a similar matrix extracted by the same method at a similar concentration level.

EBs consist of analyte-free water poured over or through the sample collection equipment. The water is collected in a sample container for laboratory analysis. These blanks are collected after the sampling equipment is decontaminated and measure efficiency of the decontamination procedure. EBs were collected and analyzed for all target analytes.

FBs consist of analyte-free source water stored at the sample collection site. Water is collected from each source water used during each sampling event. FBs were collected and analyzed for all target analytes.

For inorganic analyses, contaminants found in both the environmental sample and the blank sample are assumed to be laboratory artifacts if both values are less than the PQL or if a sample result and blank contaminant value are greater than the PQL and the sample result is less than 10 times the blank contaminant value. The blanks and associated samples are evaluated according to the NDEP July 13, 2018 Data Validation Guidance (NDEP 2018).

Holding times are evaluated to assure that the sample integrity is intact for accurate sample preparation and analysis. Holding times will be specific for each method and matrix analyzed. Holding time exceedance can cause loss of sample constituents due to biodegradation, precipitation, volatilization, and chemical degradation. In accordance with NDEP Guidance (NDEP 2018) sample results for analyses that were performed after the method holding time but less than two times the method holding time would be qualified as estimated (J- or UJ). For analyses that were performed after two times the method holding time, detected sample results would be qualified as estimated (J-) and nondetect sample results would be qualified as rejected (R).

Comparability is a qualitative expression of the confidence with which one data set may be compared to another. It provides an assessment of the equivalence of the analytical results to data obtained from other analyses. It is important that data sets be comparable if they are used in conjunction with other data sets. The factors affecting comparability include the following: sample collection and handling techniques, matrix type, and analytical method. If these aspects of sampling and analysis are carried out according to standard analytical procedures, the data are considered comparable. Comparability is also dependent upon other PARCCS criteria, because only when precision, accuracy, and representativeness are known can data sets be compared with confidence.

Completeness is defined as the percentage of acceptable sample results compared to the total number of sample results. Completeness is evaluated to determine if an acceptable amount of usable data were obtained so that a valid scientific site assessment can be completed. Completeness equals the total number of sample results for each fraction minus the total number of rejected sample results divided by the total number of sample results multiplied by 100. As specified in the project DQOs, the goal for completeness for target analytes in each analytical fraction is 90 percent.

Percent completeness is calculated using the following equation:

$$\%C = (T - R)/T \times 100$$

where:

%C = percent completeness

T = total number of sample results

R = total number of rejected sample results

Completeness is also determined by comparing the planned number of samples per method and matrix as specified in the QAPP, with the number determined above.

Sensitivity is the ability of an analytical method or instrument to discriminate between measurement responses representing different concentrations. This capability is established during the planning phase to meet the DQOs. It is important that calibration requirements, detection limits, and PQLs presented in the QAPP are achieved and that target analytes can be detected at concentrations necessary to support the DQOs. The method detection

limits (MDLs) represent the minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero. Sample quantitation limits (SQLs) are adjusted MDL values that reflect sample-specific actions, such as dilutions or varying aliquot sizes. PQLs are the lowest level at which the entire analytical system gives a recognizable signal and acceptable calibration point for the analyte. The laboratory is required to report detected analytes down to the SQL for this project. The laboratory uses a format that reports estimated values down to the SQL. Target compounds detected below the PQLs but greater than or equal to the SQLs were flagged (J) by the laboratory and should be considered estimated. In addition, sample results are compared to method blank, EB, and FB results to identify potential effects of laboratory background and field procedures on sensitivity.

The following sections present a review of QC data for chlorate, perchlorate, TDS, chromium, and hexavalent chromium analyses.

2.0 Analysis

A total of 40 primary water samples and 8 QC samples were collectively analyzed for one or more of the following tests: hexavalent chromium by EPA Method 218.7, chromium by EPA Method 200.8, chlorate by EPA Method 300.1B; perchlorate by EPA Method 314.0; and TDS by Standard Method 2540C. Samples analyzed for chromium were filtered in the field.

All analytical data were assessed to be valid. This section discusses the QA/QC supporting documentation as defined by the PARCCS criteria and evaluated based on the DQOs.

2.1 Precision and Accuracy

2.1.1 Surrogate

Surrogate (dichloroacetic acid) recoveries were evaluated for chlorate analysis by EPA Method 300.1B. All surrogate %Rs met the acceptance criteria as stated in the laboratory report of 90-115% recovery.

2.1.2 MS/MSD Samples

MS/MSD sample analysis was performed on associated project samples. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

MS/MSD recovery limits do not apply when the sample concentration is $\geq 4x$ the spike added. In such an event, the data would be reported unflagged (*USEPA National Functional Guidelines*). In addition, batch or non-project MS/MSD data were not evaluated.

The details regarding the qualification of results are presented in Attachment A, Section 5.

2.1.3 DUP Samples

Duplicate (DUP) samples were evaluated for TDS analysis by SM 2540C. All DUP RPDs met the acceptance criteria as stated in the QAPP.

2.1.4 LCS Samples

LCS samples were evaluated for all wet chemistry methods. All LCS %Rs met the acceptance criteria as stated in the QAPP.

2.1.5 MRL Samples

The MRL spikes were evaluated for the chlorate and perchlorate tests. All MRL %Rs met the acceptance criteria as stated in the laboratory reports.

2.1.6 FD Samples

The FD samples were evaluated for acceptable precision with RPDs. Acceptable field and analytical precision were demonstrated for all FD pairs.

The details regarding the FD RPDs are presented in Attachment A, Section 9.

2.1.7 Analyte Quantitation and Target Identification

All SQLs are lower than the screening criteria presented in the QAPP. Target compounds detected below the PQLs were flagged (J) by the laboratory and should be considered estimated.

2.2 Representativeness

2.2.1 Sample Preservation and Holding Times

The evaluation of holding times to verify compliance with all analytical methods was conducted. All water samples met the 7-day analysis holding time criteria for TDS, the 14-day holding time for hexavalent chromium, the 28-day analysis holding time criteria for chlorate and perchlorate, and the 180-day holding analysis holding time for chromium.

The details regarding sample preservation and holding times are presented in Attachment A, Section 1.

2.2.2 Blanks

Method blanks, EBs, and FBs were analyzed to evaluate representativeness.

2.2.2.1 Method Blanks

No contaminants were found in the method blanks.

2.2.2.2 EBs and FBs

Three EBs (NERT4.38N1-20190702-EB_20190702, NERT4.65N1-20190708-EB_20190708 and NERT4.70N1-20190709-EB_20190709) and one FB (NERT4.21N1-20190702-FB_20190702 NERT4.21N1-20190702-FB_20190702) were submitted for analyses.

Due to low-level blank contamination in an associated EB, the result for chromium for sample NERT4.71N1-20190709_20190709 was qualified as estimated ("J+"). The details regarding the qualification of these results are presented in Attachment A, Section 3.

2.3 Comparability

The laboratory used standard analytical methods identified in the QAPP for all the analyses. The comparability of the data is regarded as acceptable.

2.4 Completeness

The completeness level attained for wet chemistry field samples was 100 percent. This percentage was calculated as the total number of accepted sample results divided by the total number of sample results multiplied by 100.

2.5 Sensitivity

All laboratory SQLs were below the screening criteria specified in the QAPP and meet the project DQOs.

3.0 Variances in Analytical Performance

The laboratory used standard analytical methods for all of the analyses throughout the project. No systematic variances in analytical performance were noted in the laboratory case narratives.

4.0 Summary of PARCCS Criteria

The validation reports present the PARCCS results for all SDGs. Each PARCCS criterion is discussed in detail in the following sections.

4.1 Precision and Accuracy

Precision and accuracy were evaluated using data quality indicators such as surrogates, MS/MSD, DUP, LCS, MRL spikes, and field duplicates. The precision and accuracy of the data set were considered acceptable after incorporation of validation-qualified results.

All surrogate, MS/MSD, RPDs, DUP, LCS, MRL spikes, and FD %Rs and RPDs met acceptance criteria.

4.2 Representativeness

All samples for each method and matrix were evaluated for holding time compliance. All samples were associated with a method blank in each individual SDG. Sampling frequency requirements were met in obtaining necessary EBs, FBs and FDs. The representativeness of the project data is considered acceptable after incorporation of validation-qualified results.

4.3 Comparability

The laboratory used standard analytical methods for the analyses. The analytical results were reported in correct standard units. Sample integrity criteria were met. Sample preservation and holding times were within QC criteria. The overall comparability is considered acceptable after incorporation of validation-qualified results.

4.4 Completeness

Of the 162 total analytes reported, including primary samples, field duplicates, and field blanks, , 0 sample results were rejected. The completeness for the SDGs is as follows:

Parameter	Total Analytes	No. of Rejects	% Completeness
Perchlorate	48	0	100
Chlorate	48	0	100
TDS	18	0	100
Hexavalent Chromium	30	0	100
Chromium	18	0	100
Total	162	0	100

The completeness percentage based on rejected data met the 90-percent DQO goal.

4.5 Sensitivity

Sensitivity was achieved by the laboratory to support the DQOs.

5.0 Conclusions and Recommendations

The analytical data quality assessment for the water sample laboratory analytical results generated during the June / July 2019 groundwater sampling in the Downgradient Study Area of the NERT site in Henderson, Nevada, established that the overall project requirements and completeness levels were met. No results were rejected. Sample results that were found to be estimated ("J+") are usable for limited purposes only. Based upon the Stage 2A data validation, all other results are considered valid and usable for all purposes.

6.0 References

AECOM, 2017. Quality Assurance Project Plan, Downgradient Study Area, Henderson, Nevada (QAPP), May (Rev 1).

EPA, 2017. Contract Laboratory Program National Functional Guidelines for Inorganic Data Review. January 2017.

EPA, 1983. EPA Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, Cincinnati, Ohio. March.

NDEP, 2018. NDEP Data Validation and Verification Requirements for the BMI Complex and Common Areas. July 13.

Tables

Table 1
Sample Cross Reference
 NERT Downgradient Study Area
 Henderson, Nevada

SDG	Client Sample ID	Lab Sample ID	Matrix	Sample Date	QC Type	Validation Level	Chlorate (E300.1B)	Perchlorate (E314.0)	Chromium (E200.8) ^a	Total Dissolved Solids (SM2540C)	Hexavalent Chromium (E218.7) ^b
4402454301	AA-30-20190708_20190708	440-245430-2	W	07/08/19	N	Stage 2A	X	X			
4402452621	COH2B1-20190703_20190703	440-245262-2	W	07/03/19	N	Stage 2A	X	X			
4402449051	LNDMW1-20190628_20190628	440-244905-3	W	06/28/19	N	Stage 2A	X	X			
4402452631	LNDMW2-20190705_20190705	440-245263-2	W	07/05/19	N	Stage 2A	X	X			
4402452621	MW-02-20190703_20190703	440-245262-4	W	07/03/19	N	Stage 2A	X	X			
4402449051	MW13-20190628_20190628	440-244905-6	W	06/28/19	N	Stage 2A	X	X			
4402449051	MW20-20190628_20190628	440-244905-5	W	06/28/19	N	Stage 2A	X	X			
4402452621	MW-25-20190703_20190703	440-245262-3	W	07/03/19	N	Stage 2A	X	X			
4402452631	MW-3-20190705_20190705	440-245263-5	W	07/05/19	N	Stage 2A	X	X			
4402452631	MW-4-20190705_20190705	440-245263-4	W	07/05/19	N	Stage 2A	X	X			
4402448121	NERT3.35S1-20190626_20190626	440-244812-1	W	06/26/19	N	Stage 2A	X	X	X	X	19061527-01A
4402448121	NERT3.35S1-20190626-FD_20190626	440-244812-2	W	06/26/19	FD	Stage 2A	X	X	X	X	19061527-02A
4402448121	NERT3.40S1-20190626_20190626	440-244812-3	W	06/26/19	N	Stage 2A	X	X	X	X	19061527-03A
4402452011	NERT3.58N1-20190702_20190702	440-245201-8	W	07/02/19	N	Stage 2A	X	X	X	X	19070163-01A
4402448121	NERT3.58S1-20190627_20190627	440-244812-4	W	06/27/19	N	Stage 2A	X	X	X	X	19061616-01A
4402452011	NERT3.60N1-20190702_20190702	440-245201-9	W	07/02/19	N	Stage 2A	X	X	X	X	19070163-02A
4402452011	NERT3.60S1-20190701_20190701	440-245201-4	W	07/01/19	N	Stage 2A	X	X	X	X	19070063-04A
4402448121	NERT3.63S1-20190627_20190627	440-244812-5	W	06/27/19	N	Stage 2A	X	X	X	X	19061616-02A
4402448121	NERT3.80S1-20190627_20190627	440-244812-6	W	06/27/19	N	Stage 2A	X	X			19061616-03A
4402448121	NERT3.80S1-20190627-FD_20190627	440-244812-7	W	06/27/19	FD	Stage 2A	X	X			19061616-06A
4402448121	NERT3.98S1-20190627_20190627	440-244812-9	W	06/27/19	N	Stage 2A	X	X	X	X	19061616-04A
4402452011	NERT4.21N1-20190702_20190702	440-245201-10	W	07/02/19	N	Stage 2A	X	X			19070163-03A
4402452011	NERT4.21N1-20190702-FB_20190702	440-245201-11	W	07/02/19	FB	Stage 2A	X	X			19070163-04A
4402452011	NERT4.38N1-20190702_20190702	440-245201-13	W	07/02/19	N	Stage 2A	X	X			19070163-05A
4402452011	NERT4.38N1-20190702-EB_20190702	440-245201-12	W	07/02/19	EB	Stage 2A	X	X			19070163-06A
4402448121	NERT4.51S1-20190627_20190627	440-244812-8	W	06/27/19	N	Stage 2A	X	X			19061616-05A

Table 1
Sample Cross Reference
 NERT Downgradient Study Area
 Henderson, Nevada

SDG	Client Sample ID	Lab Sample ID	Matrix	Sample Date	QC Type	Validation Level	Chlorate (E300.1B)	Perchlorate (E314.0)	Chromium (E200.8) ^a	Total Dissolved Solids (SM2540C)	Hexavalent Chromium (E218.7) ^b
4402452011	NERT4.64N1-20190702_20190702	440-245201-14	W	07/02/19	N	Stage 2A	X	X	X	X	19070163-07A
4402452011	NERT4.64N1-20190702-FD_20190702	440-245201-15	W	07/02/19	FD	Stage 2A	X	X	X	X	19070163-08A
4402452011	NERT4.64S1-20190701_20190701	440-245201-1	W	07/01/19	N	Stage 2A	X	X	X	X	19070063-01A
4402454301	NERT4.65N1-20190708_20190708	440-245430-3	W	07/08/19	N	Stage 2A	X	X	X	X	19070339-03A
4402454301	NERT4.65N1-20190708-EB_20190708	440-245430-4	W	07/08/19	EB	Stage 2A	X	X	X	X	19070339-02A
4402456931	NERT4.70N1-20190709_20190709	440-245693-2	W	07/09/19	N	Stage 2A	X	X	X	X	19070468-01A
4402456931	NERT4.70N1-20190709-EB_20190709	440-245693-3	W	07/09/19	EB	Stage 2A	X	X	X	X	19070468-02A
4402456931	NERT4.71N1-20190709_20190709	440-245693-4	W	07/09/19	N	Stage 2A	X	X	X	X	19070468-03A
4402452011	NERT4.71S1-20190701_20190701	440-245201-3	W	07/01/19	N	Stage 2A	X	X			19070063-03A
4402452011	NERT4.71S2-20190701_20190701	440-245201-2	W	07/01/19	N	Stage 2A	X	X	X	X	19070063-02A
4402452011	NERT4.93S1-20190701_20190701	440-245201-6	W	07/01/19	N	Stage 2A	X	X			19070063-06A
4402452011	NERT5.11S1-20190701_20190701	440-245201-5	W	07/01/19	N	Stage 2A	X	X			19070063-05A
4402454301	NERT5.49S1-20190708_20190708	440-245430-1	W	07/08/19	N	Stage 2A	X	X			19070339-01A
4402452011	NERT5.91S1-20190701_20190701	440-245201-7	W	07/01/19	N	Stage 2A	X	X			19070468-07A
4402452631	WMW3.5N-20190705_20190705	440-245263-1	W	07/05/19	N	Stage 2A	X	X			
4402449051	WMW3.5S-20190628_20190628	440-244905-1	W	06/28/19	N	Stage 2A	X	X			
4402449051	WMW3.5S-20190628-FD_20190628	440-244905-2	W	06/28/19	FD	Stage 2A	X	X			
4402452631	WMW4.9N-20190705_20190705	440-245263-3	W	07/05/19	N	Stage 2A	X	X			
4402456931	WMW4.9S-20190709_20190709	440-245693-1	W	07/09/19	N	Stage 2A	X	X			
4402452621	WMW5.58S-20190703_20190703	440-245262-1	W	07/03/19	N	Stage 2A	X	X			
4402449051	WMW5.5S-20190628_20190628	440-244905-4	W	06/28/19	N	Stage 2A	X	X			
4402456931	WMW5.7N-20190709_20190709	440-245693-5	W	07/09/19	N	Stage 2A	X	X			

Notes:

a - The SDG for chromium is that listed in the SDG column with the last digit changed from a "1" to a "2".

b - Samples for hexavalent chromium analysis were submitted to Silver State Analytical Laboratories. The laboratory ID is provided in this column.

SDG - Sample Delivery Group

FB - Field Blank

ID – Identifier

QC - Quality control

W – Water

EB - Equipment Blank

Table 2
Validation Elements
NERT Downgradient Study Area
Henderson, Nevada

Stage 2A	All Analyses
Sample Receipt & Technical Holding Time	√
Laboratory Blanks	√
Field Blanks	√
Surrogate Spikes	√
Matrix Spike (MS), Matrix Spike Duplicate (MSD)	√
Laboratory Duplicate (DUP)	√
Laboratory Control Sample (LCS)	√
Field Duplicate	√
Project Quantitation Limits (PQL)	√
Overall Data Usability Assessment	√

Notes:

√ = Reviewed

Table 3
Qualification Codes and Definitions
 NERT Downgradient Study Area

Henderson,	Explanation
a	qualified due to low abundance (radiochemical activity)
be	qualified due to equipment blank contamination
bf	qualified due to field blank contamination
bl	qualified due to laboratory blank contamination
bt	qualified due to trip blank contamination
bp	qualified due to pump blank contamination (wells w/o dedicated pumps, when contamination is detected in the Pump Blk)
br	qualified due to filter blank contamination (aqueous Hexavalent Chromium and Dissolved sample fractions)
c	qualified due to calibration problems
cp	qualified due to insufficient ingrowth (radiochemical only)
dc	dual column confirmation %D exceeded
e	concentration exceeded the calibration range
fd	qualified due to field duplicate imprecision
h	qualified due to holding time exceedance
i	qualified due to internal standard areas
k	qualified as Estimated Maximum Possible Concentrations (dioxins and PCB congeners)
l	qualified due to LCS recoveries
ld	qualified due to laboratory duplicate imprecision (matrix duplicate, MSD, LCSD)
m	qualified due to matrix spike recoveries
nb	qualified due to negative laboratory blank contamination (nondetect results only)
nd	qualified due to non-detected target analyte
o	other
p	qualified as a false positive due to contamination during shipping
pH	sample preservation not within acceptance range
q	qualified due to quantitation problem
s	qualified due to surrogate recoveries
sd	serial dilution did not meet control criteria
sp	detected value reported >SQL <PQL
st	sample receipt temperature exceeded
t	qualified due to elevated helium tracer concentrations
vh	volatile headspace detected in aqueous sample containers submitted for VOC analysis
x	qualified due to low % solids
z	qualified due to ICS results

Table 4
Qualified Results
 NERT Downgradient Study Area, Henderson, Nevada

SDG	Client Sample ID	Sample Date	Method	CAS No.	Analyte	Lab Result	Lab Qualifier	SQL	PQL	Units	Validator Qualifier	Reason Code	Reason Code Definition	Qualification Finding
4402454301	AA-30-20190708_20190708	7/8/19	E300.1	14866-68-3	Chlorate	9500		100	1000	ug/L				
4402454301	AA-30-20190708_20190708	7/8/19	E314.0	14797-73-0	Perchlorate	3300		95	400	ug/L				
4402452621	COH2B1-20190703_20190703	7/3/19	E300.1	14866-68-3	Chlorate	790		10	100	ug/L				
4402452621	COH2B1-20190703_20190703	7/3/19	E314.0	14797-73-0	Perchlorate	1800		95	400	ug/L				
4402449051	LNDMW1-20190628_20190628	6/28/19	E300.1	14866-68-3	Chlorate	3700		100	1000	ug/L				
4402449051	LNDMW1-20190628_20190628	6/28/19	E314.0	14797-73-0	Perchlorate	1400		95	400	ug/L				
4402452631	LNDMW2-20190705_20190705	7/5/19	E300.1	14866-68-3	Chlorate	4600		40	400	ug/L				
4402452631	LNDMW2-20190705_20190705	7/5/19	E314.0	14797-73-0	Perchlorate	1500		95	400	ug/L				
4402452621	MW-02-20190703_20190703	7/3/19	E300.1	14866-68-3	Chlorate	2400		20	200	ug/L				
4402452621	MW-02-20190703_20190703	7/3/19	E314.0	14797-73-0	Perchlorate	1700		95	400	ug/L				
4402449051	MW13-20190628_20190628	6/28/19	E300.1	14866-68-3	Chlorate	9400		100	1000	ug/L				
4402449051	MW13-20190628_20190628	6/28/19	E314.0	14797-73-0	Perchlorate	3100		95	400	ug/L				
4402449051	MW20-20190628_20190628	6/28/19	E300.1	14866-68-3	Chlorate	46	J	10	100	ug/L	J	sp	Detect <PQL	
4402449051	MW20-20190628_20190628	6/28/19	E314.0	14797-73-0	Perchlorate	57		4.8	20	ug/L				
4402452621	MW-25-20190703_20190703	7/3/19	E300.1	14866-68-3	Chlorate	56	J	10	100	ug/L	J	sp	Detect <PQL	
4402452621	MW-25-20190703_20190703	7/3/19	E314.0	14797-73-0	Perchlorate	13		0.95	4.0	ug/L				
4402452631	MW-3-20190705_20190705	7/5/19	E300.1	14866-68-3	Chlorate	6000		40	400	ug/L				
4402452631	MW-3-20190705_20190705	7/5/19	E314.0	14797-73-0	Perchlorate	2900		95	400	ug/L				
4402452631	MW-4-20190705_20190705	7/5/19	E300.1	14866-68-3	Chlorate	5900		40	400	ug/L				
4402452631	MW-4-20190705_20190705	7/5/19	E314.0	14797-73-0	Perchlorate	2700		95	400	ug/L				
4402448121	NERT3.35S1-20190626_20190626	6/26/19	E300.1	14866-68-3	Chlorate	10	U	10	100	ug/L	U	nd	Not detected	
4402448122	NERT3.35S1-20190626_20190626	6/26/19	E200.8	7440-47-3	Chromium	0.57	J	0.50	2.0	ug/L	J	sp	Detect <PQL	
19061527	NERT3.35S1-20190626_20190626	6/26/19	E218.7	18540-29-9	Chromium VI	1.00	U	1.00	1.00	ug/L	U	nd	Not detected	
4402448121	NERT3.35S1-20190626_20190626	6/26/19	SM2540C	TDS	Dissolved Solids (total)	6900		50	100	mg/L				
4402448121	NERT3.35S1-20190626_20190626	6/26/19	E314.0	14797-73-0	Perchlorate	4.8	U	4.8	20	ug/L	U	nd	Not detected	
4402448121	NERT3.35S1-20190626-FD_20190626	6/26/19	E300.1	14866-68-3	Chlorate	10	U	10	100	ug/L	U	nd	Not detected	
4402448122	NERT3.35S1-20190626-FD_20190626	6/26/19	E200.8	7440-47-3	Chromium	0.64	J	0.50	2.0	ug/L	J	sp	Detect <PQL	
19061527	NERT3.35S1-20190626_20190626-FD	6/26/19	E218.7	18540-29-9	Chromium VI	1.00	U	1.00	1.00	ug/L	U	nd	Not detected	
4402448121	NERT3.35S1-20190626-FD_20190626	6/26/19	SM2540C	TDS	Dissolved Solids (total)	6900		50	100	mg/L				
4402448121	NERT3.35S1-20190626-FD_20190626	6/26/19	E314.0	14797-73-0	Perchlorate	4.8	U	4.8	20	ug/L	U	nd	Not detected	
4402448121	NERT3.40S1-20190626_20190626	6/26/19	E300.1	14866-68-3	Chlorate	20	U	20	200	ug/L	U	nd	Not detected	
4402448122	NERT3.40S1-20190626_20190626	6/26/19	E200.8	7440-47-3	Chromium	0.71	J	0.50	2.0	ug/L	J	sp	Detect <PQL	
19061527	NERT3.40S1-20190626_20190626	6/26/19	E218.7	18540-29-9	Chromium VI	1.00	U	1.00	1.00	ug/L	U	nd	Not detected	
4402448121	NERT3.40S1-20190626_20190626	6/26/19	SM2540C	TDS	Dissolved Solids (total)	9000		50	100	mg/L				
4402448121	NERT3.40S1-20190626_20190626	6/26/19	E314.0	14797-73-0	Perchlorate	4.8	U	4.8	20	ug/L	U	nd	Not detected	

Table 4
Qualified Results
 NERT Downgradient Study Area, Henderson, Nevada

SDG	Client Sample ID	Sample Date	Method	CAS No.	Analyte	Lab Result	Lab Qualifier	SQL	PQL	Units	Validator Qualifier	Reason Code	Reason Code Definition	Qualification Finding
4402452011	NERT3.58N1-20190702_20190702	7/2/19	E300.1	14866-68-3	Chlorate	24	J	10	100	ug/L	J	sp	Detect <PQL	
4402452012	NERT3.58N1-20190702_20190702	7/2/19	E200.8	7440-47-3	Chromium	1.3	J	0.50	2.0	ug/L	J	sp	Detect <PQL	
19070163	NERT3.58N1-20190702_20190702	7/2/19	E218.7	18540-29-9	Chromium VI	1.00	U	1.00	1.00	ug/L	U	nd	Not detected	
4402452011	NERT3.58N1-20190702_20190702	7/2/19	SM2540C	TDS	Dissolved Solids (total)	6600		50	100	mg/L				
4402452011	NERT3.58N1-20190702_20190702	7/2/19	E314.0	14797-73-0	Perchlorate	88		4.8	20	ug/L				
4402448121	NERT3.58S1-20190627_20190627	6/27/19	E300.1	14866-68-3	Chlorate	2700		20	200	ug/L				
4402448122	NERT3.58S1-20190627_20190627	6/27/19	E200.8	7440-47-3	Chromium	5.5		0.50	2.0	ug/L				
19061616	NERT3.58S1-20190627_20190627	6/27/19	E218.7	18540-29-9	Chromium VI	9.09		1.00	1.00	ug/L				
4402448121	NERT3.58S1-20190627_20190627	6/27/19	SM2540C	TDS	Dissolved Solids (total)	3400		10	20	mg/L				
4402448121	NERT3.58S1-20190627_20190627	6/27/19	E314.0	14797-73-0	Perchlorate	1000		48	200	ug/L				
4402452011	NERT3.60N1-20190702_20190702	7/2/19	E300.1	14866-68-3	Chlorate	27	J	10	100	ug/L	J	sp	Detect <PQL	
4402452012	NERT3.60N1-20190702_20190702	7/2/19	E200.8	7440-47-3	Chromium	0.50	U	0.50	2.0	ug/L	U	nd	Not detected	
19070163	NERT3.60N1-20190702_20190702	7/2/19	E218.7	18540-29-9	Chromium VI	1.00	U	1.00	1.00	ug/L	U	nd	Not detected	
4402452011	NERT3.60N1-20190702_20190702	7/2/19	SM2540C	TDS	Dissolved Solids (total)	6400		50	100	mg/L				
4402452011	NERT3.60N1-20190702_20190702	7/2/19	E314.0	14797-73-0	Perchlorate	57		4.8	20	ug/L				
4402452011	NERT3.60S1-20190701_20190701	7/1/19	E300.1	14866-68-3	Chlorate	4900		100	1000	ug/L				
4402452012	NERT3.60S1-20190701_20190701	7/1/19	E200.8	7440-47-3	Chromium	9.9		0.50	2.0	ug/L				
19070063	NERT3.60S1-20190701_20190701	7/1/19	E218.7	18540-29-9	Chromium VI	14.7		1.00	1.00	ug/L				
4402452011	NERT3.60S1-20190701_20190701	7/1/19	SM2540C	TDS	Dissolved Solids (total)	3300		25	50	mg/L				
4402452011	NERT3.60S1-20190701_20190701	7/1/19	E314.0	14797-73-0	Perchlorate	1600		95	400	ug/L				
4402448121	NERT3.63S1-20190627_20190627	6/27/19	E300.1	14866-68-3	Chlorate	3900		40	400	ug/L				
4402448122	NERT3.63S1-20190627_20190627	6/27/19	E200.8	7440-47-3	Chromium	8.6		0.50	2.0	ug/L				
19061616	NERT3.63S1-20190627_20190627	6/27/19	E218.7	18540-29-9	Chromium VI	8.54		1.00	1.00	ug/L				
4402448121	NERT3.63S1-20190627_20190627	6/27/19	SM2540C	TDS	Dissolved Solids (total)	3100		10	20	mg/L				
4402448121	NERT3.63S1-20190627_20190627	6/27/19	E314.0	14797-73-0	Perchlorate	1200		19	80	ug/L				
4402448121	NERT3.80S1-20190627_20190627	6/27/19	E300.1	14866-68-3	Chlorate	1400		10	100	ug/L				
19061616	NERT3.80S1-20190627_20190627	6/27/19	E218.7	18540-29-9	Chromium VI	1.00	U	1.00	1.00	ug/L	U	nd	Not detected	
4402448121	NERT3.80S1-20190627_20190627	6/27/19	E314.0	14797-73-0	Perchlorate	820		19	80	ug/L				
4402448121	NERT3.80S1-20190627-FD_20190627	6/27/19	E300.1	14866-68-3	Chlorate	1400		10	100	ug/L				
19061616	NERT3.80S1-20190627_20190627-FD	6/27/19	E218.7	18540-29-9	Chromium VI	1.00	U	1.00	1.00	ug/L	U	nd	Not detected	
4402448121	NERT3.80S1-20190627-FD_20190627	6/27/19	E314.0	14797-73-0	Perchlorate	820		19	80	ug/L				
4402448121	NERT3.98S1-20190627_20190627	6/27/19	E300.1	14866-68-3	Chlorate	20	U	20	200	ug/L	U	nd	Not detected	
4402448122	NERT3.98S1-20190627_20190627	6/27/19	E200.8	7440-47-3	Chromium	0.79	J	0.50	2.0	ug/L	J	sp	Detect <PQL	
19061616	NERT3.98S1-20190627_20190627	6/27/19	E218.7	18540-29-9	Chromium VI	1.00	U	1.00	1.00	ug/L	U	nd	Not detected	

Table 4
Qualified Results
 NERT Downgradient Study Area, Henderson, Nevada

SDG	Client Sample ID	Sample Date	Method	CAS No.	Analyte	Lab Result	Lab Qualifier	SQL	PQL	Units	Validator Qualifier	Reason Code	Reason Code Definition	Qualification Finding
4402448121	NERT3.98S1-20190627_20190627	6/27/19	SM2540C	TDS	Dissolved Solids (total)	5100		50	100	mg/L				
4402448121	NERT3.98S1-20190627_20190627	6/27/19	E314.0	14797-73-0	Perchlorate	4.8	U	4.8	20	ug/L	U	nd	Not detected	
4402452011	NERT4.21N1-20190702_20190702	7/2/19	E300.1	14866-68-3	Chlorate	5500		100	1000	ug/L				
19070163	NERT4.21N1-20190702_20190702	7/2/19	E218.7	18540-29-9	Chromium VI	27.1		1.00	1.00	ug/L				
4402452011	NERT4.21N1-20190702_20190702	7/2/19	E314.0	14797-73-0	Perchlorate	1800		95	400	ug/L				
4402452011	NERT4.21N1-20190702-FB_20190702	7/2/19	E300.1	14866-68-3	Chlorate	2.0	U	2.0	20	ug/L	U	nd	Not detected	
19070163	NERT4.21N1-20190702_20190702-FB	7/2/19	E218.7	18540-29-9	Chromium VI	1.00	U	1.00	1.00	ug/L	U	nd	Not detected	
4402452011	NERT4.21N1-20190702-FB_20190702	7/2/19	E314.0	14797-73-0	Perchlorate	0.95	U	0.95	4.0	ug/L	U	nd	Not detected	
4402452011	NERT4.38N1-20190702_20190702	7/2/19	E300.1	14866-68-3	Chlorate	340		10	100	ug/L				
19070163	NERT4.38N1-20190702_20190702	7/2/19	E218.7	18540-29-9	Chromium VI	1.00	U	1.00	1.00	ug/L	U	nd	Not detected	
4402452011	NERT4.38N1-20190702_20190702	7/2/19	E314.0	14797-73-0	Perchlorate	1500		48	200	ug/L				
4402452011	NERT4.38N1-20190702-EB_20190702	7/2/19	E300.1	14866-68-3	Chlorate	2.0	U	2.0	20	ug/L	U	nd	Not detected	
19070163	NERT4.38N1-20190702_20190702-EB	7/2/19	E218.7	18540-29-9	Chromium VI	1.00	U	1.00	1.00	ug/L	U	nd	Not detected	
4402452011	NERT4.38N1-20190702-EB_20190702	7/2/19	E314.0	14797-73-0	Perchlorate	0.95	U	0.95	4.0	ug/L	U	nd	Not detected	
4402448121	NERT4.51S1-20190627_20190627	6/27/19	E300.1	14866-68-3	Chlorate	8200		100	1000	ug/L				
19061616	NERT4.51S1-20190627_20190627	6/27/19	E218.7	18540-29-9	Chromium VI	36.8		1.00	1.00	ug/L				
4402448121	NERT4.51S1-20190627_20190627	6/27/19	E314.0	14797-73-0	Perchlorate	2400		95	400	ug/L				
4402452011	NERT4.64N1-20190702_20190702	7/2/19	E300.1	14866-68-3	Chlorate	28		2.0	20	ug/L				
4402452012	NERT4.64N1-20190702_20190702	7/2/19	E200.8	7440-47-3	Chromium	0.55	J	0.50	2.0	ug/L	J	sp	Detect <PQL	
19070163	NERT4.64N1-20190702_20190702	7/2/19	E218.7	18540-29-9	Chromium VI	1.00	U	1.00	1.00	ug/L	U	nd	Not detected	
4402452011	NERT4.64N1-20190702_20190702	7/2/19	SM2540C	TDS	Dissolved Solids (total)	2000		10	20	mg/L				
4402452011	NERT4.64N1-20190702_20190702	7/2/19	E314.0	14797-73-0	Perchlorate	500		19	80	ug/L				
4402452011	NERT4.64N1-20190702-FD_20190702	7/2/19	E300.1	14866-68-3	Chlorate	28		2.0	20	ug/L				
4402452012	NERT4.64N1-20190702-FD_20190702	7/2/19	E200.8	7440-47-3	Chromium	0.72	J	0.50	2.0	ug/L	J	sp	Detect <PQL	
19070163	NERT4.64N1-20190702_20190702-FD	7/2/19	E218.7	18540-29-9	Chromium VI	1.00	U	1.00	1.00	ug/L	U	nd	Not detected	
4402452011	NERT4.64N1-20190702-FD_20190702	7/2/19	SM2540C	TDS	Dissolved Solids (total)	2000		10	20	mg/L				
4402452011	NERT4.64N1-20190702-FD_20190702	7/2/19	E314.0	14797-73-0	Perchlorate	500		19	80	ug/L				
4402452011	NERT4.64S1-20190701_20190701	7/1/19	E300.1	14866-68-3	Chlorate	8900		100	1000	ug/L				
4402452012	NERT4.64S1-20190701_20190701	7/1/19	E200.8	7440-47-3	Chromium	20		0.50	2.0	ug/L				
19070063	NERT4.64S1-20190701_20190701	7/1/19	E218.7	18540-29-9	Chromium VI	38.2		1.00	1.00	ug/L				
4402452011	NERT4.64S1-20190701_20190701	7/1/19	SM2540C	TDS	Dissolved Solids (total)	4900		50	100	mg/L				
4402452011	NERT4.64S1-20190701_20190701	7/1/19	E314.0	14797-73-0	Perchlorate	3200		190	800	ug/L				
4402454301	NERT4.65N1-20190708_20190708	7/8/19	E300.1	14866-68-3	Chlorate	13	J	10	100	ug/L	J	sp	Detect <PQL	
4402454302	NERT4.65N1-20190708_20190708	7/8/19	E200.8	7440-47-3	Chromium	0.59	J	0.50	2.0	ug/L	J	sp	Detect <PQL	

Table 4
Qualified Results
NERT Downgradient Study Area, Henderson, Nevada

SDG	Client Sample ID	Sample Date	Method	CAS No.	Analyte	Lab Result	Lab Qualifier	SQL	PQL	Units	Validator Qualifier	Reason Code	Reason Code Definition	Qualification Finding
19070339	NERT4.65N1-20190708_20190708	7/8/19	E218.7	18540-29-9	Chromium VI	1.00	U	1.00	1.00	ug/L	U	nd	Not detected	
4402454301	NERT4.65N1-20190708_20190708	7/8/19	SM2540C	TDS	Dissolved Solids (total)	2400		10	20	mg/L				
4402454301	NERT4.65N1-20190708_20190708	7/8/19	E314.0	14797-73-0	Perchlorate	470		95	400	ug/L				
4402454301	NERT4.65N1-20190708-EB_20190708	7/8/19	E300.1	14866-68-3	Chlorate	2.0	U	2.0	20	ug/L	U	nd	Not detected	
4402454302	NERT4.65N1-20190708-EB_20190708	7/8/19	E200.8	7440-47-3	Chromium	0.50	U	0.50	2.0	ug/L	U	nd	Not detected	
4402454301	NERT4.65N1-20190708-EB_20190708	7/8/19	SM2540C	TDS	Dissolved Solids (total)	5.0	U	5.0	10	mg/L	U	nd	Not detected	
4402454301	NERT4.65N1-20190708-EB_20190708	7/8/19	E314.0	14797-73-0	Perchlorate	0.95	U	0.95	4.0	ug/L	U	nd	Not detected	
19070339	NERT-4.65N1-20190708-FB_20190708	7/8/19	E218.7	18540-29-9	Chromium VI	1.00	U	1.00	1.00	ug/L	U	nd	Not detected	
4402456931	NERT4.70N1-20190709_20190709	7/9/19	E300.1	14866-68-3	Chlorate	10	U	10	100	ug/L	U	nd	Not detected	
4402456932	NERT4.70N1-20190709_20190709	7/9/19	E200.8	7440-47-3	Chromium	0.50	U	0.50	2.0	ug/L	U	nd	Not detected	
19070468	NERT4.70N1-20190709_20190709	7/9/19	E218.7	18540-29-9	Chromium VI	1.00	U	1.00	1.00	ug/L	U	nd	Not detected	
4402456931	NERT4.70N1-20190709_20190709	7/9/19	SM2540C	TDS	Dissolved Solids (total)	1800		10	20	mg/L				
4402456931	NERT4.70N1-20190709_20190709	7/9/19	E314.0	14797-73-0	Perchlorate	140		9.5	40	ug/L				
4402456931	NERT4.70N1-20190709-EB_20190709	7/9/19	E300.1	14866-68-3	Chlorate	2.0	U	2.0	20	ug/L	U	nd	Not detected	
4402456932	NERT4.70N1-20190709-EB_20190709	7/9/19	E200.8	7440-47-3	Chromium	0.70	J	0.50	2.0	ug/L	J	sp	Detect <PQL	
19070468	NERT4.70N1-20190709-EB_20190709	7/9/19	E218.7	18540-29-9	Chromium VI	1.00	U	1.00	1.00	ug/L	U	nd	Not detected	
4402456931	NERT4.70N1-20190709-EB_20190709	7/9/19	SM2540C	TDS	Dissolved Solids (total)	5.0	U	5.0	10	mg/L	U	nd	Not detected	
4402456931	NERT4.70N1-20190709-EB_20190709	7/9/19	E314.0	14797-73-0	Perchlorate	0.95	U	0.95	4.0	ug/L	U	nd	Not detected	
4402456931	NERT4.71N1-20190709_20190709	7/9/19	E300.1	14866-68-3	Chlorate	10	U	10	100	ug/L	U	nd	Not detected	
4402456932	NERT4.71N1-20190709_20190709	7/9/19	E200.8	7440-47-3	Chromium	0.69	J	0.50	2.0	ug/L	J+	be	Equipment Blank	0.7 ug/L
19070468	NERT4.71N1-20190709_20190709	7/9/19	E218.7	18540-29-9	Chromium VI	1.00	U	1.00	1.00	ug/L	U	nd	Not detected	
4402456931	NERT4.71N1-20190709_20190709	7/9/19	SM2540C	TDS	Dissolved Solids (total)	1800		10	20	mg/L				
4402456931	NERT4.71N1-20190709_20190709	7/9/19	E314.0	14797-73-0	Perchlorate	160		9.5	40	ug/L				
4402452011	NERT4.71S1-20190701_20190701	7/1/19	E300.1	14866-68-3	Chlorate	10000		100	1000	ug/L				
19070063	NERT4.71S1-20190701_20190701	7/1/19	E218.7	18540-29-9	Chromium VI	37.4		1.00	1.00	ug/L				
4402452011	NERT4.71S1-20190701_20190701	7/1/19	E314.0	14797-73-0	Perchlorate	3400		190	800	ug/L				
4402452011	NERT4.71S2-20190701_20190701	7/1/19	E300.1	14866-68-3	Chlorate	14000		100	1000	ug/L				
4402452012	NERT4.71S2-20190701_20190701	7/1/19	E200.8	7440-47-3	Chromium	19		0.50	2.0	ug/L				
19070063	NERT4.71S2-20190701_20190701	7/1/19	E218.7	18540-29-9	Chromium VI	26.6		1.00	1.00	ug/L				
4402452011	NERT4.71S2-20190701_20190701	7/1/19	SM2540C	TDS	Dissolved Solids (total)	4100		50	100	mg/L				
4402452011	NERT4.71S2-20190701_20190701	7/1/19	E314.0	14797-73-0	Perchlorate	2900		190	800	ug/L				
4402452011	NERT4.93S1-20190701_20190701	7/1/19	E300.1	14866-68-3	Chlorate	8600		100	1000	ug/L				
19070063	NERT4.93S1-20190701_20190701	7/1/19	E218.7	18540-29-9	Chromium VI	16.8		1.00	1.00	ug/L				
4402452011	NERT4.93S1-20190701_20190701	7/1/19	E314.0	14797-73-0	Perchlorate	1800		190	800	ug/L				
4402452011	NERT5.11S1-20190701_20190701	7/1/19	E300.1	14866-68-3	Chlorate	10000		100	1000	ug/L				

Table 4
Qualified Results
NERT Downgradient Study Area, Henderson, Nevada

SDG	Client Sample ID	Sample Date	Method	CAS No.	Analyte	Lab Result	Lab Qualifier	SQL	PQL	Units	Validator Qualifier	Reason Code	Reason Code Definition	Qualification Finding
19070063	NERT5.11S1-20190701_20190701	7/1/19	E218.7	18540-29-9	Chromium VI	14.2		1.00	1.00	ug/L				
4402452011	NERT5.11S1-20190701_20190701	7/1/19	E314.0	14797-73-0	Perchlorate	2300		190	800	ug/L				
4402454301	NERT5.49S1-20190708_20190708	7/8/19	E300.1	14866-68-3	Chlorate	10	U	10	100	ug/L	U	nd	Not detected	
19070339	NERT5.49S1-20190708_20190708	7/8/19	E218.7	18540-29-9	Chromium VI	1.00	U	1.00	1.00	ug/L	U	nd	Not detected	
4402454301	NERT5.49S1-20190708_20190708	7/8/19	E314.0	14797-73-0	Perchlorate	13		0.95	4.0	ug/L				
4402452011	NERT5.91S1-20190701_20190701	7/1/19	E300.1	14866-68-3	Chlorate	450		10	100	ug/L				
19070063	NERT5.91S1-20190701_20190701	7/1/19	E218.7	18540-29-9	Chromium VI	1.00	U	1.00	1.00	ug/L	U	nd	Not detected	
4402452011	NERT5.91S1-20190701_20190701	7/1/19	E314.0	14797-73-0	Perchlorate	2800		190	800	ug/L				
4402452631	WMW3.5N-20190705_20190705	7/5/19	E300.1	14866-68-3	Chlorate	300		10	100	ug/L				
4402452631	WMW3.5N-20190705_20190705	7/5/19	E314.0	14797-73-0	Perchlorate	260		9.5	40	ug/L				
4402449051	WMW3.5S-20190628_20190628	6/28/19	E300.1	14866-68-3	Chlorate	3500		100	1000	ug/L				
4402449051	WMW3.5S-20190628_20190628	6/28/19	E314.0	14797-73-0	Perchlorate	1300		95	400	ug/L				
4402449051	WMW3.5S-20190628-FD_20190628	6/28/19	E300.1	14866-68-3	Chlorate	3400		100	1000	ug/L				
4402449051	WMW3.5S-20190628-FD_20190628	6/28/19	E314.0	14797-73-0	Perchlorate	1300		95	400	ug/L				
4402452631	WMW4.9N-20190705_20190705	7/5/19	E300.1	14866-68-3	Chlorate	16	J	10	100	ug/L	J	sp	Detect <PQL	
4402452631	WMW4.9N-20190705_20190705	7/5/19	E314.0	14797-73-0	Perchlorate	660		95	400	ug/L				
4402456931	WMW4.9S-20190709_20190709	7/9/19	E300.1	14866-68-3	Chlorate	3000		100	1000	ug/L				
4402456931	WMW4.9S-20190709_20190709	7/9/19	E314.0	14797-73-0	Perchlorate	850		95	400	ug/L				
4402452621	WMW5.58S-20190703_20190703	7/3/19	E300.1	14866-68-3	Chlorate	8000		100	1000	ug/L				
4402452621	WMW5.58S-20190703_20190703	7/3/19	E314.0	14797-73-0	Perchlorate	4000		95	400	ug/L				
4402449051	WMW5.5S-20190628_20190628	6/28/19	E300.1	14866-68-3	Chlorate	3500		100	1000	ug/L				
4402449051	WMW5.5S-20190628_20190628	6/28/19	E314.0	14797-73-0	Perchlorate	1000		95	400	ug/L				
4402456931	WMW5.7N-20190709_20190709	7/9/19	E300.1	14866-68-3	Chlorate	10	U	10	100	ug/L	U	nd	Not detected	
4402456931	WMW5.7N-20190709_20190709	7/9/19	E314.0	14797-73-0	Perchlorate	12		0.95	4.0	ug/L				

Notes:

be = qualified due to equipment blank contamination

ID = identifier

J = Estimated. The associated numerical value is the approximate concentration of the analyte in the sample. It is not possible to assess the direction of the potential bias. The analyte was detected but the reported value may not be accurate or precise.

mg/L = milligrams per liter

nd = qualified due to non-detected target analyte

PQL = practical quantitation limit

SDG = Sample Delivery Group

SQL = sample quantitation limits

sp = detected value reported >SQL<PQL

U = Nondetected. Analyses were performed for the compound or analyte, but it was not detected.

ug/L = micrograms per liter

< = less than

Attachment A

Wet Chemistry Data Validation

Chlorate by EPA Method 300.1B
Perchlorate by EPA Method 314.0
Total Dissolved Solids by Standard Method 2540C
Chromium by EPA Method 200.8
Hexavalent Chromium by EPA Method 218.7

1. Sample Receipt and Technical Holding Times

All samples were collected and preserved appropriately, and all analyses were performed within the method-specified holding times. Note, the method specified holding time for hexavalent chromium is 14 days while the QAPP specifies a holding time of 7 days (preserved). The method holding time was used for evaluation. The laboratory confirmed the samples for hexavalent chromium were preserved in accordance with the method.

All analyses were performed as requested on the chain of custodies. The laboratory reported all requested analyses and the deliverable data reports were complete.

2. Laboratory Blanks

Laboratory method blanks were analyzed at the proper frequency as required by each analytical method. No contaminants were found in the laboratory method blanks.

3. Field Blanks

Samples NERT4.38N1-20190702-EB_20190702, NERT4.65N1-20190708-EB_20190708 and NERT4.70N1-20190709-EB_20190709 were identified as equipment blanks. No contaminants were found in the equipment blanks with the following exception:

Method	Blank	Analyte	Concentration	Qualified Samples	Qualifier
EPA 200.8	NERT4.70N1-20190709-EB_20190709	Chromium	0.70 ug/L	NERT4.71N1-20190709_20190709	J+

Sample NERT4.21N1-20190702-FB_20190702 was identified as a field blank. No contaminants were found in the field blank.

4. Surrogate

Surrogate (dichloroacetic acid) recoveries were evaluated for chlorate analysis by EPA Method 300.1B. All surrogate percent recoveries met the acceptance criteria.

5. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on associated project samples. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits. MS/MSD recovery limits do not apply when the sample concentration is $\geq 4x$ the spike added. In such an event, the data would be reported unflagged (*USEPA National Functional Guidelines*). In addition, batch or non-project MS/MSD data were not evaluated.

6. Duplicate Sample Analysis

Duplicate (DUP) analyses were performed for Total Dissolved Solids by Standard Method 2540C. All duplicate analyses met criteria and therefore no samples were qualified based on duplicate analysis results.

7. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

8. MRL Samples

The QC samples associated with the chlorate and perchlorate tests included an MRL sample for each analytical batch. The MRL sample was a laboratory blank spiked at the PQL. All recoveries were within the laboratory specified control criteria.

9. Field Duplicates

Samples NERT3.35S1-20190626_20190626, NERT3.80S1-20190627_20190627, NERT4.64N1-20190702_20190702, and WMW3.5S-20190628_20190628 were identified as field duplicates. The RPD was calculated for detected results. As shown below, acceptable field and analytical precision were demonstrated for all field duplicate pairs with the calculated RPDs being below the QAPP criteria of ≤30%.

Analyte	NERT3.35S1-20190626_20190626	NERT3.35S1-20190626-FD_20190626	RPD %
Chromium	0.57	0.64	12
Dissolved Solids (total)	6900	6900	0
	NERT3.80S1-20190627_20190627	NERT3.80S1-20190627-FD_20190627	
Chlorate	1400	1400	0
Perchlorate	820	820	0
	NERT4.64N1-20190702_20190702	NERT4.64N1-20190702-FD_20190702	
Chlorate	28	28	0
Chromium	0.55	0.72	27
Dissolved Solids (total)	2000	2000	0
Perchlorate	500	500	0
	WMW3.5S-20190628_20190628	WMW3.5S-20190628-FD_20190628	
Chlorate	3500	3400	3
Perchlorate	1300	1300	0

RPD = Relative Percent Difference

10. Sample Result Verification

Raw data were not reviewed for Stage 2A validation.

11. Overall Assessment of Data

All samples were analyzed as requested and all holding times were met. Due to low-level blank contamination, the result for chromium in one sample was qualified as estimated ("J+"). No other data were qualified.

Overall, based on this data validation, the data as qualified, are useable for meeting project objectives. All results are considered to be valid; the analytical completeness defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for analysis, for the project is 100%. Additionally, because all samples in each data set were collected and analyzed under similar prescribed conditions, the data are comparable.

Appendix O

Dilution Testing Model Reports

**NERT3.58S1 Borehole Dilution Test
Groundwater Velocity Calculation**

Input Data

Depth to water (ft)	34.91
Bottom of screen depth (ft)	55.00
Height of water column (ft)	20.09
Well radius (ft)	0.33
Cross sectional area (ft ²)	13.33
Volume of water in well (ft ³)	7.01

Results

Apparent Velocity	0.010340779	ft/minute
	14.89072194	ft/day
Darcy Velocity	0.00517039	ft/day
porosity	0.33	--
alpha	2	Well shape factor
Groundwater velocity	22.56169991	ft/day
Local Gradient	0.01	ft/ft
Gradient Direction	N/NW	

$$\frac{C}{C_0} = e^{-(v_a * A * t) / V}$$

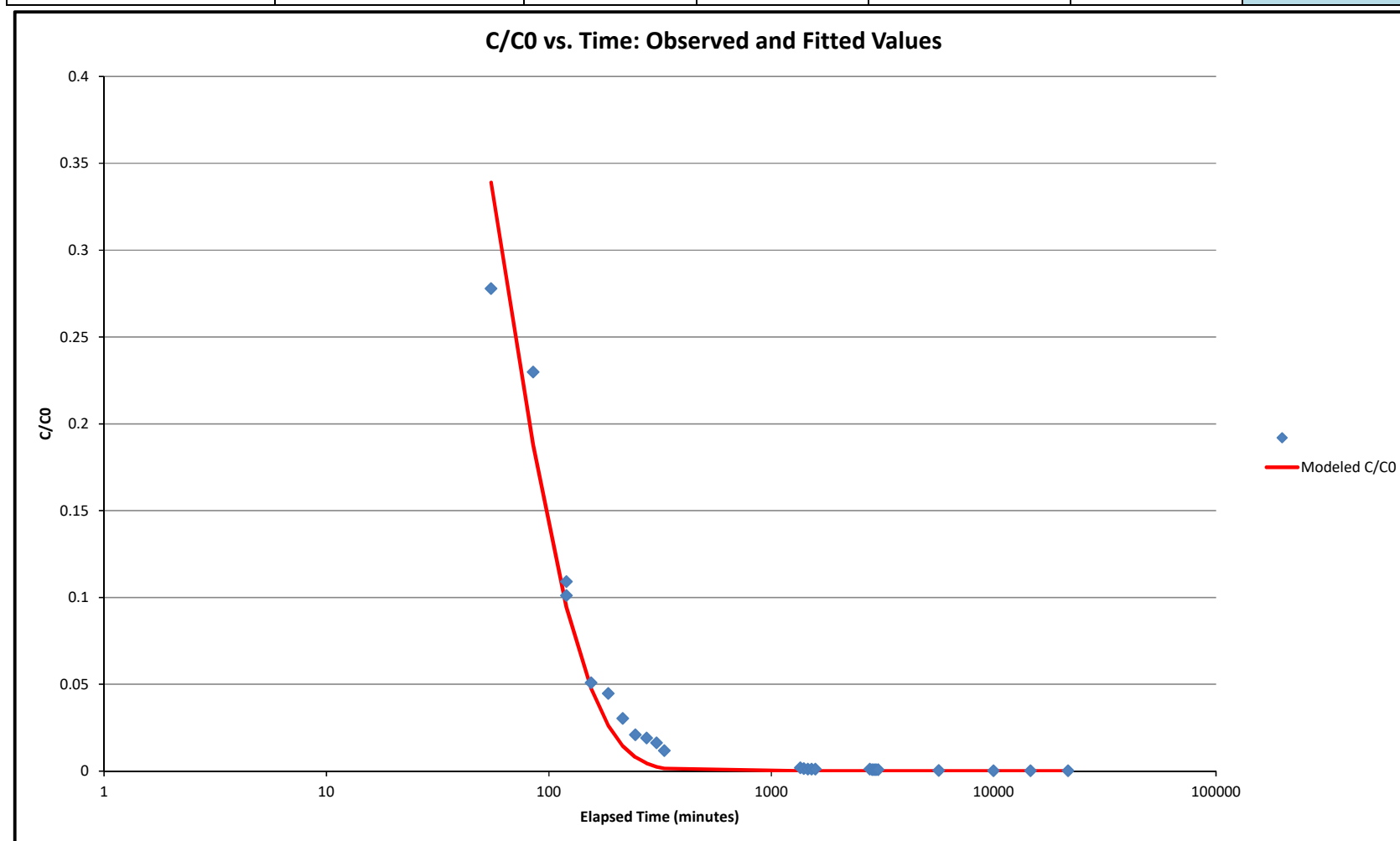
$$v_a = \alpha * v_d$$

$$v = \frac{v_a}{\alpha * n}$$

Model Data

Elapsed Time (minutes)	Observed Concentration (mg/L)	Observed C/C0	Ln(C/C0)	Modeled C/C0	Residual	Squared Residual
0	2040	1	0	1	0	0
55	567	0.277941176	-1.280345783	0.338950492	0.061009315	0.003722137
85	469	0.229901961	-1.470102318	0.187865468	-0.042036492	0.001767067
120	223	0.109117647	-2.215328648	0.094371915	-0.014745732	0.000217437
120	206	0.101078431	-2.291858515	0.094371915	-0.006706517	4.49774E-05
155	104	0.050882353	-2.978239116	0.047406574	-0.003475779	1.2081E-05
185	91	0.044705882	-3.10765019	0.026275396	-0.018430487	0.000339683
215	62	0.030294118	-3.496801722	0.014563305	-0.015730812	0.000247458
245	43	0.020882353	-3.868850834	0.008071805	-0.012810548	0.00016411
275	39	0.019019608	-3.96228484	0.004473849	-0.014545759	0.000211579
305	33	0.01627451	-4.118155211	0.002479659	-0.01379485	0.000190298
330	24	0.011715686	-4.446826628	0.001516413	-0.010199273	0.000104025
1350	4	0.001862745	-6.28570402	2.93077E-12	-0.001862745	3.46982E-06
1400	3	0.001421569	-6.55599435	1.09605E-12	-0.001421569	2.02086E-06
1460	2	0.001127451	-6.787795964	3.36708E-13	-0.001127451	1.27115E-06
1520	2	0.001127451	-6.787795964	1.03437E-13	-0.001127451	1.27115E-06
1580	2	0.001078431	-6.832247726	3.17758E-14	-0.001078431	1.16301E-06
2775	2	0.001127451	-6.787795964	1.96444E-24	-0.001127451	1.27115E-06
2840	2	0.000833333	-7.090076836	5.46947E-25	-0.000833333	6.94444E-07
2900	2	0.000833333	-7.090076836	1.68022E-25	-0.000833333	6.94444E-07
2960	2	0.000784314	-7.150701458	5.16165E-26	-0.000784314	6.15148E-07
3020	2	0.000784314	-7.150701458	1.58566E-26	-0.000784314	6.15148E-07
5665	1	0.000392157	-7.843848638	4.01824E-49	-0.000392157	1.53787E-07
9975	1	0.000245098	-8.313852267	6.07862E-86	-0.000245098	6.0073E-08
14660	0	0.000196078	-8.536995819	5.7538E-126	-0.000196078	3.84468E-08
21620	0	0.000147059	-8.824677891	1.9991E-185	-0.000147059	2.16263E-08
					RSS	0.00703419

C/C0 vs. Time: Observed and Fitted Values



**NERT3.60S1 Borehole Dilution Test
Groundwater Velocity Calculation**

Input Data

Depth to water (ft)	38.63
Bottom of screen depth (ft)	55
Height of water column (ft)	16.37
Well radius (ft)	0.33
Cross sectional area (ft ²)	13.33
Volume of water in well (ft ³)	5.71

Results

Apparent Velocity	0.025300326	ft/minute
	36.43246915	ft/day
Darcy Velocity	0.012650163	ft/day
porosity	0.33	--
alpha	2	Well shape factor
Groundwater velocity	55.20071083	ft/day
Local Gradient	0.01	ft/ft
Gradient Direction	N/NE	

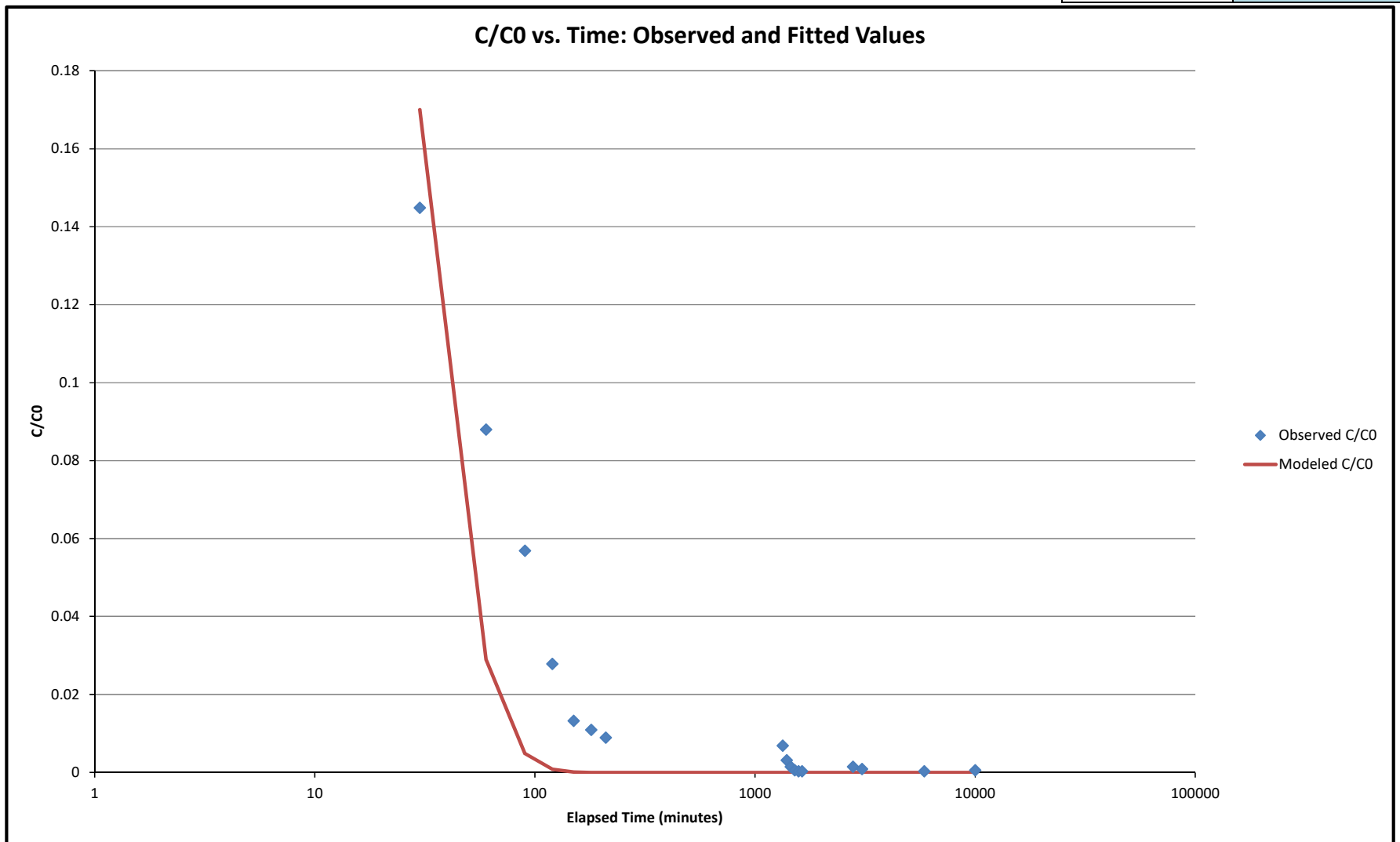
$$\frac{C}{C_0} = e^{-(v_a + A \cdot t)/V}$$

$$v_a = \alpha v_d$$

$$v = \frac{v_a}{\alpha \cdot n}$$

Model Data

Elapsed Time (minutes)	Observed Concentration (mg/L)	Observed C/C0	Ln(C/C0)	Modeled C/C0	Residual	Squared Residual
0	348	1	0	1	0	0
30	50.4	0.144827586	-1.932211305	0.170001979	0.025174393	0.00063375
60.00000001	30.6	0.087931034	-2.431202471	0.028900673	-0.059030362	0.003484584
90	19.8	0.056896552	-2.866520542	0.004913172	-0.05198338	0.002702272
120	9.7	0.027873563	-3.580076594	0.000835249	-0.027038314	0.00073107
150	4.6	0.013218391	-4.326146176	0.000141994	-0.013076397	0.000170992
180	3.8	0.01091954	-4.517201413	2.41393E-05	-0.010895401	0.00011871
210	3.1	0.008908046	-4.720800368	4.10372E-06	-0.008903942	7.92802E-05
1335	2.4	0.006896552	-4.976733742	5.69118E-35	-0.006896552	4.75624E-05
1395	1.1	0.00316092	-5.7568923	1.64479E-36	-0.00316092	9.99141E-06
1455	0.5	0.001436782	-6.54534966	4.75355E-38	-0.001436782	2.06434E-06
1515	0.2	0.000574713	-7.461640392	1.37381E-39	-0.000574713	3.30295E-07
1575	0.1	0.000287356	-8.154787573	3.9704E-41	-0.000287356	8.25737E-08
1635	0.1	0.000287356	-8.154787573	1.14747E-42	-0.000287356	8.25737E-08
2785	0.5	0.001436782	-6.54534966	3.63477E-72	-0.001436782	2.06434E-06
3060	0.3	0.000862069	-7.056175284	3.20853E-79	-0.000862069	7.43163E-07
5875	0.1	0.000287356	-8.154787573	1.9826E-151	-0.000287356	8.25737E-08
10005	0.2	0.000574713	-7.461640392	2.272E-257	-0.000574713	3.30295E-07
					RSS	0.007983992



**NERT4.64S1 Borehole Dilution Test
Groundwater Velocity Calculation**

Input Data

Depth to water (ft)	27.1
Bottom of screen depth (ft)	55
Height of water column (ft)	27.9
Well radius (ft)	0.33
Cross sectional area (ft ²)	13.33
Volume of water in well (ft ³)	9.73

Results

Apparent Velocity	0.004401475	ft/minute
	6.338124627	ft/day
Darcy Velocity	0.002200738	ft/day
porosity	0.33	--
alpha	2	Well shape factor
Groundwater velocity	9.603219131	ft/day
Local Gradient	0.009	ft/ft
Gradient Direction	N	

$$\frac{C}{C_0} = e^{-(v_a * A * t) / V}$$

$$v_a = \alpha v_d$$

$$v = \frac{v_d}{\alpha * n}$$

Model Data

Elapsed Time (minutes)	Observed Concentration (mg/L)	Observed C/C0	Ln(C/C0)	Modeled C/C0	Residual	Squared Residual
0	653	1	0	1	0	0
30	526	0.805513017	-0.216275917	0.834543706	0.029030689	0.000842781
60	466	0.713629403	-0.337391495	0.696463197	-0.017166206	0.000294679
90	390	0.597243492	-0.51543039	0.581228977	-0.016014515	0.000256465
120	366	0.560490046	-0.578943796	0.485060984	-0.075429062	0.005689543
150	251	0.384379786	-0.95612419	0.404804591	0.020424806	0.000417173
180	177.7	0.272128637	-1.301480394	0.337827124	0.065698487	0.004316291
1540	32.2	0.049310873	-3.009610677	9.28367E-05	-0.049218036	0.002422415
1600	30.1	0.046094946	-3.077051958	6.46574E-05	-0.046030289	0.002118788
1660	19.3	0.029555896	-3.521472033	4.50315E-05	-0.029510864	0.000870891
1720	30.1	0.046094946	-3.077051958	3.13628E-05	-0.046063584	0.002121854
2945	8.8	0.013476263	-4.306825408	1.945E-08	-0.013476244	0.000181609
3005	7.1	0.010872894	-4.521482345	1.35462E-08	-0.010872881	0.00011822
3065	4.3	0.006584992	-5.022962107	9.43441E-09	-0.006584983	4.3362E-05
3125	4.6	0.00704441	-4.955520826	6.57072E-09	-0.007044404	4.96236E-05
4325	3.5	0.005359877	-5.228814161	4.7378E-12	-0.005359877	2.87283E-05
9005	0.5	0.000765697	-7.17472431	2.64018E-24	-0.000765697	5.86292E-07
11600	0.9	0.001378254	-6.586937645	4.23623E-31	-0.001378254	1.89958E-06
14520	0.5	0.000765697	-7.17472431	9.57983E-39	-0.000765697	5.86292E-07
18940	0.3	0.000459418	-7.685549934	2.5597E-50	-0.000459418	2.11065E-07
22010	0.2	0.000306279	-8.091015042	2.34322E-58	-0.000306279	9.38067E-08
24850	0.2	0.000306279	-8.091015042	8.5834E-66	-0.000306279	9.38067E-08
29185	0.2	0.000306279	-8.091015042	3.82871E-77	-0.000306279	9.38067E-08
					RSS	0.019774907

