ISD™ GROUNDWATER RECIRCULATION PILOT SYSTEM INSTALLATION WORK PLAN BAY ROAD HOLDINGS SITE 2081 BAY ROAD EAST PALO ALTO, CALIFORNIA

PREPARED FOR:
Bay Road Holdings, LLC
37 West 20th Street, No. 908
New York, New York 10011

PREPARED BY:
Ninyo & Moore
Geotechnical and Environmental Sciences Consultants
1956 Webster Street, Suite 400
Oakland, California 94612

September 23, 2016
Project No. 402643001

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Mr. Ronald Leach, P.E.
Environmental Engineer
United States Environmental Protection Agency, Region 9
75 Hawthorne Street
San Francisco, California 94105

Subject: ISD™ Groundwater Recirculation Pilot System Installation Work Plan
Bay Road Holdings Site
2081 Bay Road
East Palo Alto, California

Dear Mr. Leach:

On behalf of Bay Road Holdings, LLC, Ninyo & Moore is pleased to submit to the United States Environmental Protection Agency (US EPA) this *ISD™ Groundwater Recirculation Pilot System Installation Work Plan (Work Plan)* prepared for the Bay Road Holdings Site located at 2081 Bay Road, East Palo Alto, California. Please contact us at (510) 343-3000 should you have any questions or comments on this *Work Plan*.

Sincerely,
NINYO & MOORE

Kris M. Larson, PG 8059
Principal Environmental Geologist

Duane W. Blamer, PG 6913
Manager, Environmental Services

KML/DWB/vmp/slm

Distribution: Addressee
Mr. Bill Uhrig, Bay Road Holdings, LLC
Ms. Katherine Baylor, United State Environmental Protection Agency
Mr. Robert Boggs, California Department of Toxic Substances Control
Mr. Jerry Aarons, California Department of Toxic Substances Control
Mr. Mark Johnson, San Francisco Bay Regional Water Quality Control Board
Mr. Brian Timmins, ETEC, LLC Environmental Technologies

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1. INTRODUCTION

On behalf of Bay Road Holdings, LLC, Ninyo & Moore has prepared this *ISD™ Groundwater Recirculation Pilot System Installation Work Plan (Work Plan)* for the Bay Road Holdings Site[1] located at 2081 Bay Road, East Palo Alto, California (the Site). This *Work Plan* presents the activities to be performed to install, operate, maintain and monitor an In-Situ Delivery™ (ISD) groundwater recirculation pilot system at the Site to remediate the contaminated groundwater. The objectives of the activities presented in this Work Plan are to evaluate the pilot system's performance in order to optimize its remedial effectiveness and determine design and operational parameters for the full scale ISD™ groundwater recirculation system.

2. BACKGROUND

The Site is an approximately 12.6-acre property historically operated as a hazardous waste management facility, whose services included solvent recycling, fuel blending, wastewater treatment, and hazardous waste storage and treatment. Previous facility operations conducted on the Site by the Romic Environmental Technologies Corporation (Romic) and predecessor companies dating back to the mid-1950's resulted in the release of chemical contaminants to both soil and groundwater. The primary contaminants of concern (COCs) for the Site are volatile organic compounds (VOCs), mostly comprised of chlorinated solvents (also known as halogenated VOCs, or HVOCs), with the key indicator COC being trichloroethylene (TCE). Other contaminants are also present, including: non-halogenated VOCs; metals; polychlorinated biphenyls (PCBs); petroleum hydrocarbons; and semi-VOCs (SVOCs). Romic ceased operations in 2008, and the facility was closed and dismantled in 2009.

[1] This property was previously known as the Former Romic Environmental Technologies Corporation Facility.

The Site is a former Resource Conservation and Recovery Act (RCRA) facility currently undergoing corrective action and closure. The United States Environmental Protection Agency (US EPA) is the lead regulatory agency overseeing the Site's corrective action, while the DTSC is the lead regulatory agency responsible for overseeing the final closure and redevelopment activities. The San Francisco Bay Regional Water Quality Control Board (RWQCB) is providing further regulatory oversight as they are responsible for maintaining groundwater quality in the San Francisco Bay region. These three regulatory oversight agencies are collectively referred to as the Joint Agencies. The US EPA prepared a *Statement of Basis for Proposed Soil and Groundwater Remedy*, dated September 14, 2007, and the associated *Final Remedy Decision (Remedy)*, dated July 2008, which presented the Site's remediation requirements in order to complete the RCRA corrective action. The *Remedy* specified the Site's corrective action to mitigate its groundwater contamination is enhanced biological treatment.

2.1. Location/Environmental Setting

The Site is located approximately 0.5 miles west of San Francisco Bay at 2081 Bay Road, East Palo Alto, San Mateo County, California (Figure 1). The Site and its immediate surrounding area are zoned for light and heavy industrial use. Properties bordering the Site on the west, south and southeast include auto-wreckage yards, an electrical substation and a former chemical manufacturing plant. The nearest residential property is located approximately 0.3 miles to the west. Bordering the Site's north and east boundaries are two narrow tidal channels, respectively identified as the North Slough and the East Slough, which drain to the San Francisco Bay. A former 130-acre saltwater evaporation pond is located further to the east, which has been reclaimed and reconstructed as a marsh and wetland designated as the Ravenswood Open Space Preserve. The Site is located within the 100-year flood plain, and is protected by levees to mitigate flooding hazards.

2.2. Geology/Hydrogeology

The Site's subsurface soil is composed of heterogeneous sediment deposits consisting of sands and gravels interbedded with silts and clays. The subsurface units encountered below

the Site included more permeable zones separated by less permeable aquitards, which have been designated as follows:

- Fill: a layer of engineered fill ranging in thickness between approximately 1 and 3 feet (ft.) is present beneath most of the Site's concrete surface.
- A-Zone: an unconfined zone ranging in thickness between approximately 5 and 20 ft., and consisting of discontinuous layers of clayey to silty sands and gravels interbedded with silts and clays, with organic matter occasionally observed. The average bottom of the A-Zone corresponds to approximately 15 to 20 ft. below ground surface (bgs).
- A/B Aquitard: a laterally discontinuous aquitard, ranging between 5 and 20 ft. in thickness.
- B-Zone: an unconfined zone ranging in thickness between 5 and 25 ft., with a similar composition as the A-Zone consisting of discontinuous layers of clayey to silty sands and gravels interbedded with sandy silts and clays. The average bottom of the B-Zone corresponds to approximately 40 to 45 ft. bgs.
- B/C Aquitard: a locally-identified aquitard, ranging in thickness between 5 and 20 ft.
- C-Zone: a confined zone ranging in thickness between approximately 10 and 30 ft., consisting of a relatively continuous layer of sand and silty sand interbedded with silt and clay lenses. The average bottom of the C-Zone corresponds to approximately 70 to 80 ft. bgs.
- C/D Aquitard: a regionally found aquitard, approximately 70 ft. or greater in thickness.
- D-Zone: a confined zone present below approximately 160 ft. bgs, consisting of clayey sands and gravels interbedded with clays and clay with gravel.

Groundwater is present beneath the Site in two regional aquifers, the Newark Aquifer, which includes the A-, B-, and C-Zones, and the Centerville Aquifer, which includes the D-Zone. Groundwater has been encountered at depths typically ranging between 2 and 10 ft. bgs. The Site's groundwater gradient has been measured to generally flow east towards the San Francisco Bay, with relatively shallow hydraulic gradients. A downward hydraulic gradient has been observed between the A-Zone and B-Zone, while an upward hydraulic gradient has been observed between the C-Zone and B-Zone and the D-Zone and C-Zone. The vertical gradients may be affected by tidal fluctuations, with tidal influence studies indicating a minimal vertical hydraulic gradient existing from the A-Zone towards the tidal channels.

Groundwater sampling results obtained during the Substrate Pilot Study (see Section 2.4.1.1) indicated that the B-Zone appears to be experiencing significant saltwater intrusion, while minimal saltwater intrusion was also observed in the A-Zone. It is suspected that historical water supply wells located in the wetland areas east of the Site may be contributing to the observed saltwater intrusion as these wells were not properly abandoned and are believed to be left uncapped with rusted casings. Saltwater contains high concentrations of sulfate, which is a competing terminal electron acceptor in the anaerobic dechlorination process. The main concern with the mass flux of sulfate into the site is that it will cause a larger requirement/mass of substrate to overcome the bass balance of electron acceptors to electron donors. During the system operation of the B-Zone, sulfate concentrations in groundwater will be monitored from extraction wells and monitoring wells to evaluate the degree of mass flux occurring in this horizon and the requirement for additional substrate to maintain low sulfate concentrations (<50 mg/L). There are no other concerns regarding the saltwater intrusion in regards to enhanced anaerobic dechlorination.

2.3. Operational History

The Site's historic operations have generally consisted of the handling and processing of various industrial waste streams, which included solvent recycling, fuel blending, wastewater treatment and hazardous waste storage and treatment. In 1956, Hird Chemical Corporation constructed a chemical processing plant at the Site, which was transferred to Carad Chemical Corporation in 1959. The Site was purchased by P.D. Electronics in 1963, with Romic initiating operations at the same time. Romic purchased the Site in 1979 and continued operations through 2007.

The Site's operations included over 20 permitted operational units (primarily aboveground storage tank [AST] farms) and 20 solid waste management units (SWMUs). Between 2007 and 2010, Romic conducted surface closure activities of these permitted units and SWMUs as required for the first phase of the Site's RCRA corrective action. Surface closure has been completed and no aboveground structures currently exist at the Site.

2.4. Previous Investigation Activities

Starting in 1985, environmental investigation activities were initiated to assess the nature and extent of subsurface contamination suspected to be the result of chemical releases resulting from the Site's historical operations. These investigations continued through 2015 and included the collection of soil, soil gas, and groundwater samples to assess the Site's subsurface environmental conditions. In addition, the sediment and surface water conditions of the adjacent tidal channels were evaluated.

The Site's previous investigation activities identified the following chemicals as being released to the environment and present at concentrations of potential concern to human health and the environment: VOCs; SVOCs; metals; PCBs; and dioxins/furans. The Site's primary COCs are VOCs, with the TCE and its breakdown products cis-1,2-dichloroethylene (DCE) and vinyl chloride (VC) representing the majority of the VOC impact. The investigation activities also identified non-aqueous phase liquid (NAPL; also identified as "free product") in select locations across the Site.

Given the findings of these previous investigation activities, the Site has been divided into the following five general areas of concern:

- Northern Area: this area of the Site is also identified as the Former Pond Area as it previously contained two ponds, which were constructed to collect storm water and also received wastewater and waste material discharges. These ponds were decommissioned in the late 1970s, backfilled and capped with concrete. Warehouses used to process waste drums were constructed on top of the former ponds. Significant environmental impacts are present in this area of the Site.

- Central Processing Area: this is the area of the Site where the majority of the waste processing operations were conducted. It includes several of the Site's previous permitted units and SWMUs, was used for bulk product storage, and contained a formerly unpaved area used for drum storage. Significant environmental impacts are present in this area of the Site.

- Western Area: this area of the Site formerly contained another unpaved drum storage area, as well as a permitted tank farm that contained ASTs with unlined, sandy bottoms. Less significant environmental impacts are present in this area of the Site.

- Panhandle and Eastern Area: no operations of concern are known to have occurred in this area of the Site. Minimal environmental impacts are present in this area of the Site, except for the downgradient migration of contaminated groundwater.

- Truck Wash Area: truck washing activities occurred in this area of the Site. No known environmental impacts resulting from this historical activity are present in this area of the Site.

Figure 2 shows the locations of the Site's five areas of concern.

2.4.1. Supplemental Remedial Investigations

Supplemental remedial investigation activities were conducted in order to evaluate the effectiveness of the substrate amendment, define the presence of non-aqueous phase liquid (NAPL) in Northern Area vadose zone soils, and the zone of influence (ZOI) in areas of proposed Site extraction wells.

2.4.1.1. Substrate Pilot Test

The ISD™ groundwater recirculation system will be operated with an amendment (or substrate) material that has the physical properties to easily recirculate through the groundwater treatment system. Therefore, our proposed amendment (Carstrate™) is a low viscosity substrate for this remedial system. Carbstrate™ is a substrate manufactured by ETEC, LLC Environmental Technologies (ETEC) designed to promote anaerobic biodegradation and is composed of a dry powder mixed to generate a low viscosity injection solution. As requested by the Joint Agencies, injecting Carbstrate™ into the Site's subsurface was pilot tested to evaluate whether switching to this substrate would continue the enhanced reductive dechlorination (ERD) remedial process previously established using the cheese whey/molasses mixture.

The Substrate pilot test was performed by Ninyo & Moore during a 10-week period (12/17/15 to 2/17/16) following their Push-Pull Pilot Test Work Plan, dated November 20, 2014, with the results of this pilot testing documented in Ninyo & Moore's Pilot Test Results Report, dated March 25, 2016

(Ninyo & Moore 2016). The pilot test activities included: conducting three push-pull tests; injecting Carbstrate™ into the A-Zone, B-Zone and Additional Pilot Test Source Areas; and performing microbial bioassays.

The results of the push-pull testing activities have concluded that injection of the Carbstrate™ solution yielded reduced anaerobic conditions in the Site's subsurface that promoted reductive dechlorination. This conclusion was based on the collection of up to ten weeks of groundwater sampling data and the corresponding observed concentration trends. The results obtained from the push-pull tests confirmed utilization of the injected solution resulted in anaerobic reducing conditions being almost immediately generated, with corresponding reductions in concentrations of PCE, TCE, cis-1,2-DCE and VC. As the push-pull tests progressed, increases and decreases in cis-1,2-DCE and VC concentrations were observed as is expected for the reduction dechlorination process, and the final end products ethene/ethane were detected confirming complete reductive dechlorination was achieved.

The microbial bioassays results confirmed the presence of up to seven microorganisms in the Site's subsurface that have been identified to be responsible for reductive dechlorination, including dehalococcoides spp. (DHC), with the largest population detected in the most contaminated well included in this study.

The pilot test activities also illustrated limitations with injecting a high concentration/low volume solution into vertical IPs as has been occurring at the Site since 2001. These limitations included generating conditions that are too reduced and under methanogenic conditions, thereby, creating acidic conditions that are toxic to the microorganisms required for reductive dechlorination. These acidic conditions dissipated over time given the Site's subsurface natural buffering capacity, which allowed the microbial activity to recommence. In addition, distribution of the injected solution was found to be non-uniform, and the use of potable water to create the solution is not desirable given its aerobic condition.

Joint Agency Review and Additional Testing

Subsequent to Joint Agency review of the March 2016 Pilot Test Results Report, Ninyo & Moore, ETEC and the US EPA convened informally to discuss the effectiveness of Carbstrate™ as it relates to ERD. Based on our discussion, we agreed that additional data would help support our conclusion that Carbstrate™ was beneficial in promoting ERD and it was agreed upon to conduct an additional round of groundwater sampling on six of the previous sampling points where the Push-Pull Pilot Test was conducted. On July 18th, 2016 Ninyo & Moore mobilized on Site to collect groundwater samples (using low-flow sampling procedures) from wells RW-1A, RW-8B, RW-11B, RW-20B, EW-1B and EW-2B. Once the samples were collected, they were stored in a cooler with ice and transported via courier under signed chain of custody documentation to SGS Laboratories in East Palo Alto, California. The samples were analyzed for VOCs using EPA Method 8260B, ethane, ethene and methane using Method RSK 175, and Total Organic Carbon (TOC) using EPA Method 5310C.

The sample results of the additional sampling are included in Table 1, and a detailed description of the ERD results is included in the *Push-Pull and IRM Pilot Test Source Area Study Data Evaluation* and the associated laboratory analytical report are included in Appendix A. In summary, the data evaluation indicates that aggressive ERD has been stimulated in the target injection zones and Push/Pull wells over the 30-week period following the injection of the CarbstrateTM substrate solution. Furthermore, ideal groundwater conditions (iron-reducing, sulfate-reducing and methanogenic) have been created to stimulate long-term dechlorination of residual solvent concentrations.

2.4.1.2. Ultra-Violet Optical Screening Tool Investigation

Ninyo & Moore conducted a Ultra-Violet Optical Screening Tool (UVOST®) investigation in June 2016 within the central section of the Northern Area in order to evaluate non-aqueous phase liquids (NAPL) in the Northern Area vadose zone. A

total of 18 borings were located in areas where the groundwater monitoring wells, specifically RW-11A, EW-6A and RW-28A, historically reported NAPL during groundwater monitoring events. Nine additional borings were located north and east of these wells to further characterize potential NAPL within the vadose zone. The 27 locations were separated into three separate areas of concern, including UA-1 through UA-9, UB-1 through UB-9, and UC-1 through UC-9 (Figure 3). Each of the three areas of UVOST® investigation was approximately 2,500 square ft. (sf), located within an approximately 50-foot by 50-foot area. A copy of the UVOST Investigation logs are presented in Appendix B.

Prior to conducting the investigation the concrete slab was cored in the 27 locations. The investigation was conducted using a direct-push rig, where the UVOST® rods (probes) were hydraulic pushed into the subsurface to a maximum depth of approximately 24 ft. bgs in each boring, with the exception of borings UB-4, UB-5 and UC-7, where the probes were pushed to depths of approximately 25.5 ft. bgs. Refusal due to subsurface obstructions at shallow depths (approximately 1.5 ft. bgs) occurred at boring UC-2 and UC-9, so no data was collected from these borings.

The UVOST® collected the NAPL data through a probe that features a sapphire window in the side allowing direct fluorescence measurements as the probe is advanced into the soil. Polycyclic aromatic hydrocarbon (PAH) fluorescence of fuels/oils is directed back to the surface where it is analyzed, and responses are indicated in real-time on a graph of UVOST® signal vs. depth. The logged results were color-coded and contain hundreds of waveforms to aid in proper interpretation of the fluorescence response.

The resulting UVOST® investigation data indicated that NAPL was observed at two to three depths in every boring where refusal was not encountered. The depth of NAPL ranged from near the surface (0.5 ft. bgs) in boring UA-3, to 24.9 ft. bgs in boring UC-7. NAPL thickness ranged from 0.1 ft. in borings UB-2, UB-7 and UB-9 to 6.2 ft. (7.3 ft. to 13.5 ft. bgs) in boring UB-3 (Table 2, Figure 3).

Because every boring where the UVOST investigation was conducted detected NAPL, it is reasonable to conclude that NAPL has infiltrated multiple depths within most of the Northern Area vadose zone. The majority of this LNAPL is trapped and not mobile, as shown in the lack of any significant apparent LNAPL thicknesses across this area. The trapped LNAPL in the pore space is not a confining layer, and will allow the percolation of injected groundwater via gravitational and capillary forces. Our approach to dissolving and desorbing the LNAPL is discussed in Section 3.7 below.

2.4.1.3. Pump Test

Ninyo & Moore conducted a pump test for groundwater Zones-A and -B in July 2016 by utilizing two 4-inch extraction wells (RW-4A and RW-2B) for production, and existing and newly installed piezometers used as observation wells. Pump test details are included in Tables 3 and 4, the well/piezometer locations are illustrated on Figure 4, and field forms are presented in Appendix C.

The piezometers were installed in June 2016 and included A-Zone piezometers OW-1A, OW-2A, OW-3A, and B-Zone piezometers OW-4B, OW-5B, and OW-6B. The A-Zone piezometers were screened between 7 ft. to 22ft. bgs, and the B-Zone piezometers were screened between 30 to 45 ft. bgs. The remaining observation wells included RW-2A and RW-29A (A-Zone), and RW-19B, RW-20B and RW-21B (B-Zone) (Figure 4). All wells were located along the eastern perimeter of the Site.

The pump test was conducted utilizing a 2-inch Grundfos Redi-flo 90 pump (pump) and Grundfos VDF 24 controller (controller). Several Solonist WLM water level meters were deployed in each observation and extraction well throughout the entirety of the pump test. The pump test was conducted to evaluate the zone of influence (ZOI) of the production wells within the A- and B-Zone aquifers, and to evaluate ability for Site production wells to maintain hydraulic control of the Site groundwater during operation of the proposed groundwater recirculation system.

The following is a summary of the results of the pump test for the two groundwater zones.

A-Zone:

The A-Zone pump test was conducted between 9:15 am and 11:30 am on July 7th, 2016. Prior to conducting the pump test, the pump was set at 20.1 ft. bgs in Well RW-4A, and a Blue-White 0-2.0 gallons per minute (gpm) flow meter was installed to monitor groundwater flow rates. The flow rate used for the A-Zone test was based on actual pump rates observed during the well development of extraction well RW-4A (which occurred in June 2016), where the well had been pumped dry at less than 1 gpm. Based on this information, a flow rate of 0.2 gpm was proposed for this well. An initial depth to water (DTW) measurement of 8.85 ft. from top of casing (TOC) was observed at RW-4A prior to operating the pump. Upon activating the pump, the water level immediately dropped to 16.82 bgs. Water-level measurements were collected immediately after the pump was started from the extraction and observation wells, and every 15 minute minutes thereafter until termination of the test. A drawdown of 10.41 ft. was observed at the extraction well during the first 2 hours of the test, at which point the well was pumped dry. In order to continue the pump test, the pump was reset at the bottom of the well and the test continued for another 15 minutes, with an additional drawdown of 0.41 ft. observed.

Drawdown was observed in the closest observation well (OW-1A, located approximately 20 ft. west of RW-4A) at 0.12 ft. over the 2-hour and 15-minute test period. No drawdown was observed at any of the other wells included in the pump test, which were located between 115 ft. (RW-2A) and 40 ft. (OW-2A) from extraction well RW-4A. LNAPL was observed in piezometer OW-3A, located approximately 60 ft. south of RW-4A, so no measurements were taken at this location. In addition, a reverse trend was observed in piezometer OW-2A, where water levels increased 0.75 ft. during the first 2 hours of the test, and decreased 0.06 ft. during the last

reading collected. Boring logs for this piezometer indicate a silty sandy lens with gravels between 10 and 12 ft. bgs. The increase in water levels may be the result of perched groundwater conditions within this piezometer.

A-Zone pump test results include the following conclusions:

- Drawdown was observed in the piezometer OW-1A, located approximately 20 ft. west of extraction well RW-4A, where a drawdown of 0.12 ft. was observed over the 2-hour and 15-minute period.
- No drawdown was observed at any of the other wells included in the pump test.
- A reverse trend was observed in piezometer OW-2A, where water levels increased 0.75 ft.
- Based on the drawdown observed from the A-Zone pump test data, the ZOI observed when pumping at rate of 0.2 gallons per minute (gpm) is probably limited to between 20 and 30 ft. as indicated from the lack of drawdown from wells greater than a 20-foot distance from RW-4A.

B-Zone:

The B-Zone pump test was conducted between 8:00 am and 3:15 pm on July 9th, 2016. The pump was set in 4-inch extraction well RW-2B at 40 ft. bgs, and a FloTot 0-20 gpm totalizer was used to manage the flow rate. The totalizer was calibrated using a stopwatch and a graduated cylinder. The calibrated flow rate was then compared to the totalizer dial readings and subsequent measurements were made using the totalizer dial, and field confirmed with the graduated cylinder method at the beginning of each subsequent increase in flow rate. Pump test extraction rates varied between 2 to 3.75 gpm during the test.

The pump test began with an extraction rate of 2.0 gpm, and remained constant for a period of two hours and 45 minutes. The extraction well drawdown was measured at 13.4 ft. after 15 minutes of pumping in well RW-2B, and drew down to 27.22 ft. below TOC at test termination where the pump extraction rate was at 4 gpm.

Groundwater equilibrium appeared to be reached at 4 gpm near the end of the pump test.

During the first phase of the pump test (where the pump rate was set at 2 gpm) drawdown ranged from 0.96 ft. in observation well OW-4B, located approximately 20 ft. north from the extraction well, to 0.1 and 0.08 ft. in observation wells RW-19B and RW-20B, located approximately 90 and 100 ft. southeast and west of the extraction well. The flow rate was increased to 3 gpm for approximately two hours, in which time the water level at RW-19B stabilized; however, the drawdown increased in all of the other wells. During the 3 gpm extraction rate, drawdowns were recorded ranging from 0.08 ft. in OW-6B to 1.61 ft. in well OW-4B. After two hours of pumping at 3 gpm, the flow rate was increased to approximately 3.75 gpm for an additional 2 hours. Drawdown was observed in all wells, ranging from 0.03 ft. in well RW-20B to 1.18 ft. in well OW-4B during this period.

B-Zone pump test results include the following conclusions:

- The least amount of drawdown over the course of the 7.5-hour pump test was observed at the furthest observation wells (RW-19B and RW-20B, located approximately 90 and 100 ft. from RW-4B), where drawdown was measured at 0.24 ft. and 0.21 ft., respectively.

- During the entire pump period, the most drawdown was observed at well OW-4B (located approximately 25 ft. from RW-4B), where total drawdown was measured at 4.06 ft.

- Drawdown was observed over the pump test period in all of the other wells, ranging from 0.32 ft. in well OW-6 to 0.56 ft. in well RW-21B. These wells are located approximately 65 ft. and 90 ft. from RW-4B, respectively.

- Well RW-19B appeared to stabilize after reaching a maximum drawdown of 0.24 ft. Drawdown continued at a fairly slow rate in all other wells, with the exception of OW-4B.

- Based on the drawdown observed from the B-Zone pump test data, the ZOI observed when pumping at rate of 3.75 gpm is greater than 100 ft. as indicated by the drawdown observed in wells RW-19B and RW-20B.

2.5. Previous Remedial Activities

Remediation of the Site's impacted subsurface environment was initiated in 1993 with the installation and operation of a groundwater extraction and treatment system. This remediation system included eight A-Zone and two B-Zone extraction wells, and was operated through 2005. In 2001, ERD[2] pilot testing was initiated at the Site, which consisted of injecting a cheese whey and molasses substrate mixture to promote in-situ anaerobic biodegradation. ERD proved successful and was selected as an interim remedial measure (IRM) to be conducted in the following four areas:

- A-Zone Pilot Test Source Area: this source area is located in the Site's Western Area, and consists of seven injection points screened in the A-Zone.
- B-Zone Pilot Test Source Area: this source area is located in the Site's Central Processing Area, and consists of nine injection points screened in the B-Zone.
- Additional Pilot Test Source Area: this source area is located in the Site's Central Processing Area, and consists of four injection points screened in the B-Zone and three injection points screened in the C-Zone.
- Off-Site Migration Control Area: this area is located along the Site's eastern perimeter, and consists of 74 injection points screened in the A-Zone, B-Zone and C-Zone.

The cheese whey/molasses substrate injections have been routinely performed in each of these IRM areas, with between two and three injection events conducted per year. However, the substrate injection areas are currently limited to only the eastern Site boundary, and will be conducted on an as-needed basis, based on the total organic carbon (TOC) concentrations reported in the eastern boundary wells during our groundwater monitoring events.

[2] ERD is a biological treatment process identified to remediate HVOCs.

2.6. Current Groundwater Contamination

Beginning in 2000, the Site's groundwater contamination has been assessed through performing routine groundwater monitoring events. The Site's groundwater monitoring program currently includes the 54 monitoring wells, consisting of 16 A-Zone wells, 22 B-Zone wells, 14 C-Zone wells and 2 D-Zone wells (Figure 2). These wells are sampled quarterly, semi-annually or annually depending on each respective well's monitoring objective. The most recent annual monitoring event with groundwater samples collected Site-wide from all 54 wells was conducted in September 2015 (i.e., the Third Quarter 2015) and the groundwater monitoring results associated with this event are included in the Second Half 2015 Semiannual Groundwater Monitoring Report prepared by Ninyo & Moore in February 2016 (Ninyo & Moore, 2016) .

The Site's groundwater contamination was additionally evaluated in June and July 2015 through conducting an investigation using membrane interface probe (MIP) technology and Hydropunch^{TM} groundwater sampling. The results of this investigation are documented in the *Supplemental Groundwater Investigation Data Summary Report*, dated September 2015 (Iris, 2015), prepared by Iris Environmental. This supplemental investigation was performed in areas of the Site where groundwater monitoring data was limited and included sampling depths that are not represented by the monitoring wells' screen intervals.

In order to provide a comprehensive depiction of the Site's current groundwater contamination, the analytical results obtained from the supplement investigation were combined with those obtained from the Third Quarter 2015 monitoring event. These groundwater concentrations were relied upon to generate the total HVOC concentration contours shown for the A-Zone, B-Zone and C-Zone on Figures 5, 6, and 7, respectively. In addition, total HVOC concentration contours are shown on the three geologic cross-section maps. A plan view of the cross-sections is provided as Figures 8, and the cross-sections are identified as Figure 9 (Proposed A-Zone Horizontal and Vertical Wells), Figure 10 (Proposed B-Zone Horizontal and Vertical Wells), and Figure 11 (Proposed C-Zone Horizontal and Vertical Wells). The Site's current groundwater conditions as represented by these figures are discussed below.

2.6.1. Lateral Groundwater Impacts

Information for the lateral extent of HVOC groundwater impacts on Site was reviewed primarily from the Ninyo & Moore February 2016 groundwater monitoring report.

- A-Zone: The total HVOC isoconcentration lateral contours represented on Figure 5 indicate significant contamination present in both the Central Processing Area and the Northern Area, with the highest concentrations of total HVOCs located in the vicinity of wells RW-1A (approximately 100,000 µg/L) and RW-28A (approximately 75,000 µg/L). Less significant contamination is present in the Western Area, where total HVOCs were reported at well RW-9A at approximately 700 µg/L. Limited contamination was reported in the Panhandle and Eastern Area, with most of the contouring generated in this area influenced by non-detectable results.

- B-Zone: The total HVOC lateral isoconcentration contours represented on Figure 6 indicate similar contours to that of the A-zone, where the most significant contamination was reported in the Central Processing Area and the Northern Area. In fact, the two wells where the highest total HVOC concentrations were reported (EW-2B and RW-20B were very close or adjacent to their A-zone counterparts (RW-1A and RW-28A). The concentrations were reported at approximately 38,000 µg/L (EW-2B) and 88,000 µg/L (RW-20B). Less significant contamination was also present in the Western Area, and limited contamination was reported in the Panhandle and Eastern Area.

- C-Zone: The total HVOC isoconcentration contours represented on Figure 7 indicate significant contamination is present in only the Northern Area, where approximate HVOC concentrations of 1,100 µg/L were reported in well RW-19C. Low levels of HVOC contamination were reported in the Central Processing Area, while little to no contamination was reported in either the Western Area or the Panhandle and Eastern Area.

2.6.2. Vertical Groundwater Impacts

Vertical groundwater impacts are illustrated by isoconcentration contours shown on Figures 9 through 11. Much of the groundwater data included in these figures was collected from the HydroPunch™ samples collected by Iris in 2015. The HydroPunch™ sample analytical results indicated that the concentrations of total HVOCs in groundwater were much higher than previous groundwater monitoring well sample results have shown.

The highest vertical zone of total HVOC concentration was located in the Northern Area, approximately 20 ft. north of wells RW-28A, RW-20B, and RW-19C, and was collected at HydroPunch™ sample location RCPT-18, where a total HVOC concentration was reported at 1,700,000 µg/L. A vertical isoconcentration of 1,000,000 µg/L encompasses the upper and lower B-zone and a portion of the B-C aquitard in this location. In addition, a 100,000 µg/L total HVOC vertical contour also encompasses the A-, B- and upper C-Zones within this area, and included total HVOC concentrations ranging from100,000 µg/L (RCPT-16) to 290,000 µg/L (RCPT-24). The other vertical 100,000 µg/L contour encompasses the Central Processing Area A-, B- and C- Zones between RW-1A, RW-12A, RW-13A, EW-1B and EW-2B where HydroPunch™ locations RCPT-07, RCPT-08, RCPT-10, RCPT-15, RCPT-21, RCPT-22, and RCPT-23 reported total HVOC concentrations between 100,000 µg/L and 420,000 µg/L.

3. ISD™ GROUNDWATER RECIRCULATION PILOT SYSTEM

This section describes the ISD™ groundwater recirculation pilot system to be installed and operated at the Site. This pilot system will include: a remediation equipment enclosure; horizontal injection wells; vertical extraction wells; monitoring wells; injection trenches; and conveyance lines.

3.1. Health and Safety Plan

Ninyo & Moore has prepared a Site-specific Health and Safety Plan (HASP) to be followed when performing field activities at the Site. This HASP was prepared to comply with the requirements of Title 29 of the Code of Federal Regulations, Part 1910 (20 CFR 1910) and Title 8 of the California Code of Regulations, Section 1529 (8 CCR 1529), collectively referred to as “Hazardous Waste Operations and Emergency Response (HAZWOPER)”. The HASP identifies physical, industrial, chemical and biological hazards, establishes hazard monitoring action levels, specifies the required Personal Protective Equipment (PPE), and includes a map showing the route to the nearest hospital with an emergency medical facility. A copy of the HASP will be maintained on the Site, and all visitors to the Site will be provided a health and safety briefing prior to commencing with their activities.

3.2. System Overview

The ISD™ groundwater recirculation system is an automated, programmable treatment process designed by ETEC to extract contaminated groundwater, add a remedial substrate, and reinject the groundwater/substrate mixture back into the aquifer. This recirculation provides a continuous supply of remedial substrate to be utilized by the established microbial community responsible for ERD process. Through operating horizontal injection wells in conjunction with vertical extraction wells, artificial groundwater gradients can be produced within a groundwater plume to induce the cycling of biologically-active and remedial substrate-rich treatment water uniformly throughout the contaminated zone. In addition, the substrate injections promote desorption of the majority contaminant mass present on the soil matrix, thereby dissolving this mass into the groundwater and furthering the overall ERD remedial process.[3] The recirculation loop has the added benefit of providing a degree of hydraulic control to mitigate downgradient migration of the contaminated groundwater plume.

For the pilot demonstration, one ISD™ groundwater recirculation system will be installed and used to operate each Zone independently. This will be accomplished by starting with the A-Zone first, then the B-Zone, and finally the C-Zone. Each zone will be operated for 4-6 months (timeframe will be evaluated as data is collected for each Zone to verify that remedial goals are achieved prior to initiating the next Zone). In addition, for Zone-A, initially HW-2A, EX-5A, and the vadose zone vertical injection wells will not be operated in order to better evaluate the ability to saturate the vadose zone with the trenches and obtain hydraulic capture. When each Zone is initially turned on and the extraction pumps are all extracting, groundwater elevations will be collected to evaluate the degree of communication with key monitoring locations and radius of influence.

[3] The microbial community responsible for ERD requires dissolved contamination as mass adsorbed to the soil matrix is not readily bioavailable to these microbes.

3.3. Remediation Equipment Enclosure

The pilot ISD™ groundwater recirculation system will be operated using aboveground equipment housed in a secure weatherproof enclosure. The remediation equipment enclosure will be situated on the Site at the location shown on Figures 12 through 15. Equipment contained within this enclosure will include: a 200-gallon poly tank to contain the concentrated Substrate™ injection solution ("solution tank"); an air compressor; a programmable logic controller (PLC) system; and injection and extraction manifolds, with their respective pressure gauges, ball valves, flow meters and sampling ports. In addition, a 1,000-gallon poly tank to hold the extracted groundwater ("holding tank") and a 1,000-gallon poly tank to collect LNAPL with be located immediately outside the enclosure and placed within secondary containment. Appendix D provides the general layout of the remediation equipment enclosure and presents the process and instrumentation diagram of this remediation system. A copy of the Material Safety Data Sheets (SDS) for Carbstrate™ is located in Appendix E.

3.4. Substrate Concentrations

The proposed remedial approach is to pulse-inject a nutrient-amended carbohydrate to a recirculating groundwater system to overcome the terminal electron acceptor (TEA) sinks (i.e. dissolved oxygen, nitrate, sulfate, etc.) and create sulfate-reducing and/or methanogenic conditions throughout the desired saturated zone. Either of these conditions will promote the transfer of electrons to the chlorinated solvents, which will reduce their concentrations and remediate the target area. The Site-wide delivery of the substrate throughout the saturated zone will be optimized via groundwater recirculation facilitated by the automated ISD™ system.

The desired substrate concentration was calculated using stoichiometric ratios of carbohydrate to TEAs and chlorinated solvents, which will then be multiplied by a factor that is based on ETEC's field experience. ETEC's field implementation shows that the theoretical stoichiometric value is not sufficient to create the desired conditions at a Site. The proposed ISD™ system will pulse-inject a higher concentration of nutrient/carbohydrate-amended groundwater throughout the target zone (saturated and smear zones) to achieve a 50-200

mg/L TOC concentration. This concentration of TOC has been shown to be the effective concentration to achieve robust anaerobic dechlorination (https://cluin.org/techfocus/default.focus/sec/Bioremediation/cat/Anaerobic_Bioremediation_(Direct)/)

The goal is to not only fully dechlorinate the minor mass of chlorinated solvents dissolved in groundwater, but also fully dechlorinate the majority of the chlorinated solvent mass sorbed onto the organic fraction in the soil as it partitions into the groundwater.

3.5. Permitting

The installation of the pilot system will be properly permitting through the appropriate regulatory agencies. The well installations will be conducted under a drilling permit issued by the San Mateo County Environmental Health Services Division (SMCEHSD). An electrical permit will be obtained by from the City of East Palo Alto to install the 400 amp 120/240v single-phase temporary service required for the operation of this pilot system.

3.6. Well Installations

The pilot system will require the installation of horizontal injection wells, vertical extraction wells and new monitoring wells. These wells will be installed by a California C-57 licensed well driller following the provisions of the SMCEHSD drilling permit. Prior to conducting the well installations, Underground Service Alert (USA) will be notified as required by California law at least 48 hours in advance of the field activities.

3.6.1. Horizontal Injection Wells

The location and depths of the pilot system horizontal injection wells, as well as the proposed development footprint and foundations, are illustrated on plan view Figures 12 through 15. Cross-sectional views of the wells are illustrated on Figures 9 through 11. The horizontal wells will be placed in areas where interference with future development plans, including installation of piles extending approximately 120 ft. bgs, will not occur. A summary of the locations and depths is also discussed below.

- Two A-Zone wells will be installed in the Northern and Central Processing Areas. The Northern Area well will be placed near the center of the Area, and the Central Processing Area well will be located near the western end of the Area. The wells will be installed at a depth of approximately 20 feet bgs in the Northern Area and 15 feet bgs in the Central Processing Area, where the vertical isoconcentrations indicate the highest total VOC concentrations within the A-Zone.

- One Northern Area upper B-Zone well will be installed at approximately 35 bgs, and a lower B-Zone well will be placed within the Northern Area B/C Aquitard at approximately 55 feet bgs. Both wells will be located close to the center of the Northern Area. The wells will be placed at a depth where the vertical isoconcentrations indicate the highest total VOC B-Zone concentrations, which were reported in the range of 1,000,000 µg/L.

- Two sets of upper and lower B-Zone wells will be installed at approximately 30 ft. and 50 ft. bgs in the Central Processing Area. The upper B-Zone wells will be installed in the B-Zone aquifer, and the lower B-Zone wells will be installed in the B/C Aquitard. The lateral distance between the wells will be between approximately 140 to 240 ft. The wells will be placed in zones where the highest total VOC has been reported (100,000 µg/L).

- A set of two C-Zone wells be located within the same horizon in the Central Processing Area at approximately 65 ft. bgs (bottom of the C-Zone). The wells will be placed where the highest concentrations of total VOCs have been reported, and lateral distance between the wells will be approximately 100 ft.

- The screen length of each of these A, B and C-Zone horizontal injection wells will be approximately 210 ft. to 240 ft. in their respective horizontal plane (i.e., not including the angled riser pipes connecting the horizontal wells to the ground surface). These locations were selected to target areas and depths with significant groundwater contamination, and take into consideration the layout of the Site's proposed commercial redevelopment plans.

The horizontal injection wells will be installed using a mud-rotary, directional drilling technology system. The drilling fluid used will the biodegradable polymer Baroid Biobore (or equivalent). Prior to initiating the directional drilling, an entry pit will be excavated. The entry location for the drilling will depend on the depth of the horizontal injection well. Direction drilling requires a setback distance at a ratio of 5 (horizontal) to 1 (vertical). Therefore, a horizontal injection well set at 20 ft. bgs will require an entry location 100 ft. back from where the horizontal injection well begins.

The directional drilling will be conducted using a 4.5-inch diameter pilot boring. Upon completing the pilot boring, the drill rods will be removed and specially manufactured, 3-inch diameter high-density polyethylene (HDPE) Air Diffusion System (ADS)[4] pipes will be installed into the horizontal section of the open borehole. The ADS pipes will come into direct contact with the surrounding soil as the borehole collapses. Solid steel pipe will be placed in the angled portion of each open borehole, with neat cement grout placed in the annular space using a tremie pipe. The last 5 ft. of the boreholes will be overdrilled to 8-inches in diameter so that a 5 ft. long cement surface seal can be installed around the steel pipe. The wells will be completed with a concrete vault. Camlock fittings will be installed on the well heads for connecting with the remediation system's conveyance lines. The mud-rotary drill cuttings will be contained within watertight roll-off bins pending offsite disposal. Concrete and soil excavated for the entry pits will be stockpile on and covered with plastic sheeting pending offsite disposal.

The down-hole drilling equipment will be decontaminated following each well installation using a high-pressure rinse. The used decontamination rinse water will be stored within 55-gallon steel drums or a poly tank pending offsite disposal.

Development of the horizontal wells will commence immediately following the installation of the well materials. Clean water will be initially flushed through the inside of the well casing and screen to remove as much drilling as possible. Following this initial flushing, a pH adjusting and fluid-breaking enzyme solution will be introduced into

[4] ADS pipes are constructed of high-density plastic (HDP) and include of micro-slotted cuts (approximately 25 microns) which are placed along the pipes to provide a uniform distribution of the injected solution. In ADS pipes the screens are closed when not under pressure, and then open under low pressures to allow fluid discharge.

screened section, followed by high-pressure, rotating jetting. Residual development water will be contained in poly tanks pending offsite disposal.

3.6.2. Vertical Extraction Wells

Because the existing monitoring wells on Site are either not the proper diameter, or not screened to the target pilot system depths, a series of new A- and B-Zone wells will be installed for the pilot system. Cross-sectional views of the vertical wells are included on Figures 9 through 11 and plan views of the wells are included on Figures 12 through 15. Six new 6-inch diameter A-Zone wells will be installed at various depths between the surface and 30 ft. bgs, and will be partially screened within both the A-Zone aquifer and the A/B aquitard. Eight 6-inch diameter B-Zone wells will also be installed at various depths between the surface and 55 ft. bgs and will be screened between the A/B aquitard, the B-Zone, and terminate approximately 5 ft. into the B/C aquitard. One C-Zone extraction well (6-inch diameter) will be installed to an approximate depth of 70 ft. bgs, and the screen will start within the B/C Aquitard, continue through the C-zone, and terminate 5 ft. into the C/D aquitard. The Zone A and Zone B vertical well locations were selected to correspond with the respective zone's horizontal injection wells, and are spaced based on the observed ZOI for each zone during the June 2016 pump test (Tables 3 and 4).

The vertical extraction wells will be installed using sonic drilling technology, which advances steel conductor casing, thereby mitigating potential cross-contamination of the aquifer zones. In addition, sonic drilling will limit the exposure of vapors emanating from the open borehole and generated from the soil cuttings. The vertical extraction wells will be constructed in 12inch diameter borings using 6-inch diameter, Schedule 40 PVC (A- and B-Zones) and Schedule 80 PVC (C-Zone), with threaded connections. The screened sections for the A-Zone and B-Zone wells constructed using 0.020-inch machine slotting, while the C-Zone extraction wells will be constructed using 0.010-inch machine slotting. Each well will be hung within the center of the borehole, with sand filter pack (#2/12 sand, or equivalent) placed within the annular space as the conductor

casing is removed. The sand filter pack will extend 2 ft. above the screen intervals, followed by 1 foot of hydrated bentonite, and then cement to the ground surface. Each well will be completed in a concrete vault, with camlock fittings installed on the well heads for connecting with the remediation system's conveyance lines.

The down-hole drilling equipment will be decontaminated following each well installation using a high-pressure rinse. The used decontamination rinse water will be stored within 55-gallon steel drums or a poly tank pending offsite disposal.

Development of the extraction wells will proceed no sooner than 48 hours following the well installation activities to allow time for the cement surface seal to set. Each well will be developed using a surge block to remove the fines from the filter pack. Following the surging, groundwater within each well will be pumped out and monitored for pH, turbidity, electrical conductivity (EC) and temperature. The pumping will continue until these parameters stabilize to within a 10 percent fluctuation or until a maximum of 10 well casing volumes are purged.

Following the completion of the development activities, each well head will be retrofitted to support the extraction equipment. For the pilot system, this equipment will include: a 3-inch diameter, stainless steel submersible pump (Grunfos Redi-Flo3, or equivalent); electrical line; and 1-inch diameter discharge hose.

3.6.2.1. Extraction Well Zone of Influence

Based on the pump test data discussed in Section 2.4.1.3, the estimated ZOI for the A-Zone extraction wells is 20 to 30 ft., and the B-Zone extraction wells is 100 to 120 ft. (Figures 16 and 17). Because we have not conducted a pump test for the C-Zone, we will evaluate the ZOI subsequent to installation of the C-Zone extraction well as well as three additional groundwater monitoring wells (Figure 15) located southwest of EX-1C. In order better describe the fluid movement in the A and B Zones, Figures 18 and 19 have been prepared to illustrate the presumed groundwa-

ter movement direction between the horizontal injection and vertical extraction wells in Zones A and B.

The results of the A-Zone aquifer test showed a low yield and small radius of influence using a 2-inch diameter well screened in only a portion of the A-Zone. The newly installed A-Zone extraction wells will be 6-inch diameter wells that will also have a larger screen interval. This will likely increase the sustainable extraction flow rate and radius of influence in the A-Zone. During initial A-Zone system startup (as all extraction wells are turned on), groundwater elevations will be collected from key monitoring locations to evaluate the radius of influence of new infrastructure. In order to be protective of offsite migration to the eastern boundary, A-Zone extraction wells EX-1A, EX-2A and EX-3A, and B-Zone extraction wells EX-1B, EX-2B, EX-3B and EX-4B will be operated at higher groundwater extraction flow rates.

3.6.3. Groundwater Monitoring Wells

Several new A-Zone, B-Zone and C-Zone groundwater monitoring wells will be installed in order to have additional wells for groundwater monitoring during the pilot study. These wells are illustrated on Figures 12 through 15 and discussed further in Section 3.12 below. All new monitoring wells will be developed followed those development guidelines discussed in Section 3.6.2. In addition, all existing monitoring wells to be sampled during the pilot study will be redeveloped prior to sampling following the development guidelines discussed in Section 3.6.2. The existing wells will also be inspected for damage, and will be either repaired or replaced depending on the severity of the damage.

3.7. Injection Trenches

Three injection trenches, spaced approximately 50 ft. on center (Figure 12), will be installed in Northern Area in order to irrigate (using recirculated water and amendments) and treat vadose zone soils to enhance bioremediation. The pilot system irrigation area will remediate VOCs within vadose zone soils by injecting Carbstrate™ and surfactant treated groundwater

through horizontal piping installed in shallow trenches between 12 to 24 inches bgs in the Northern Area. Even distribution of the amended groundwater will be achieved by utilizing Air Diffusion System (ADS)-slotted piping that facilitates even distribution of solutions due to the specific design of the piping (surgical slotting that opens at specific pressures). The treated groundwater will spread laterally beneath the concrete slab in the more permeable sandy/gravelly material, which, according to the 2013 Iris Revised Comprehensive Site-Wide Sampling and Analysis Program Report (CSAP) (Iris, 2013) boring logs, is prevalent beneath the majority of the concrete slab and ranges in depth from approximately 6 inches to 3 ft. bgs. The sub-slab lateral spreading action will allow the treated groundwater to infiltrate and remediate impacted vadose zone soil throughout the Northern, Area.

The objective of using the treated groundwater is to promote desorption of the LNAPL and desorption and dechlorination of the HVOCs. 3 to 5% of the surfactant will initially be injected into the trenches to enhance the desorption of all contaminants of interest and solubilizing of trapped NAPL (i.e. increasing permeability). If surfacing is observed in the trenches indicating the inability to percolate into the vadose zone, the system will be used to inject a 3 to 5% dilute solution of hydrogen peroxide into the trenches/vadose zone (subsequent to the Carbstrate™ and surfactant injection) in order to attempt to increase the permeability of the material in the vadose zone that might be impeding downward transport/percolation via oxidizing any material (e.g. latex paint, etc.). A detailed discussion of the substrate and surfactant, as well as the hydrogen peroxide solution follows.

3.7.1. Substrate

Carbstrate™, a nutrient-amended carbohydrate amendment, is proposed as the electron donor substrate. Carbstrate™ indicated very promising ERD characteristics during the substrate pilot test conducted between December 2015 and February 2016; the results of which are discussed in Section 2.4.1.1 above. Its qualities include high water solubility, no particulate matter, low viscosity, and a low retardation factor in order to ensure mobility within the target treatment zone. If the substrate has a low solubility or significant retardation factor, then delivery via induced hydraulic gradients would require multiple

pore volumes of recirculation prior to achieving site-wide delivery. In addition to its solubility and low-retardation factor, it is a non-toxic, food-grade product that includes the macro-nutrients that will be necessary for effective microbial growth (i.e. nitrogen and phosphate) as well as a specific suite of trace metals that have been shown to be critical for active anaerobic microbial activity. It is also a dry substrate, which helps prevent fouling of injection points and equipment components.

3.7.2. Surfactant

The surfactant proposed to assist in the desorption and dissolution of LNAPL in the vadose zone will be PetroSolv™, which is a naturally-formulated, non-toxic, biodegradable, non-ionic surfactant designed for temporary emulsification of hydrophobic constituents (like VOC compounds). PetroSolv™ has been used successfully on many gasoline- and diesel-impacted sites around the country. Prior to conducting the pilot test, a sample of LNAPL will be collected from an onsite well (RW-28A) to be utilized in a shake test in order to evaluate the desorption capabilities of the chosen surfactant to make an emulsion with the LNAPL. The LNAPL (5-10 mL) will be added to a series of Erlenmeyer flasks (1,000 mL) containing a range of surfactant concentrations (2%, 4%, 8%). The flasks will be agitated for 30 seconds to create an emulsion, and then allowed to remain undisturbed for an hour. Immediately after agitation, and every 10-15 min thereafter for 1-2 hours observations will be made on how well the surfactant solution creates an emulsion with the LNAPL. A strong emulsion will be observed by a significant color change in the water column, the reduction in the floating LNAPL mass/volume, and the longevity the LANPL remains in solution/emulsion.

Laboratory results from various surfactant studies have shown that non-ionic surfactant solutions at concentrations ranging from 0.1 to 10.0% can effectively provide emulsification and mobilization of sorbed constituents. However, PetroSolv™ application is also a function of the impacted saturated soil volume being treated. Assuming a 150 ft. x 100 ft. area with an average 7-feet of accessible vadose zone, there is approximately 3,900 cy of impacted soil requiring contact. Using ETEC's general application guide-

line, which estimates that 1 gallon of concentrated PetroSolv™ is typically appropriate for application to 2-5 cy of saturated soil volume for full scale treatment, then this project would require 780 to 1,950 gallons of PetroSolv™. Using a median value, this results in a need for 1,360 gallons of PetroSolv™ for a full scale surfactant recirculation event in the target zone. For the pilot test, we are recommending testing 25-50% of this volume (based on the results of the flask test results described above), or 340-680 gallons of surfactant. The addition of a biodegradable surfactant will help the overall anaerobic dechlorination process by adding addition biochemical oxygen demand (BOD) via the biodegradation of the surfactant itself, and the biodegradation of the desorbed VOCs (i.e. petroleum hydrocarbons, etc.). There may be some degree of inhibition/toxicity due to the initial flushing event (week 1 only), but as the following literature (web links below) indicates, the consortium will recover quickly.

http://pubs.acs.org/doi/abs/10.1021/es049675i

http://pubs.acs.org/doi/abs/10.1021/es061926v

https://books.google.com/books?id=VgHABAAAQBAJ&pg=PA572&lpg=PA572&dq=nonionic+surfactant+enhanced+anaerobic+dechlorination&source=bl&ots=Ced9HlA4oO&sig=9NM5P5j8eAHpSAC5-NhmuIES-6A&hl=en&sa=X&ved=0ahUKEwiFguSs5pnPAhVQ0GMKHTpzB-gQ6AEIVzAH#v=onepage&q=nonionic%20surfactant%20enhanced%20anaerobic%20dechlorination&f=false

The surfactant will be added as a diluted working solution (exact percent solution will be evaluated in the flask test) as evenly as possible to the three injection trenches during the first week of operation (require 1-2 days to complete). Once the solution is injected the system will be allowed to flush the trenches and push the solution through the vadose zone and into the shallow saturated zone. Substrate will be added after the surfactant flushing is completed (week 2 of system operation). In order to evaluate the effectiveness of the surfactant flushing event, key monitoring wells (see Section 3.12) in

the A-zone will be sampled weekly for the first four weeks for VOCs. The additional VOC data will aid in the evaluation of the success of the surfactant flush (i.e. VOC concentration spikes), and the degree of trapped NAPL in the vadose zone (i.e. trend in VOCs over time).

3.7.3. Hydrogen Peroxide Solution

We propose to inject a dilute 3% to 5% solution of hydrogen peroxide in order to oxidize any organic matter it comes into contact with. The solution will ultimately degrade into water and dissolved oxygen. The dissolved oxygen is a competing electron acceptor for anaerobic dechlorination, but the relative mass balance of this approach is not a significant concern. Each 50% drum of hydrogen peroxide contains approximately 250 lbs of dissolved oxygen if all of it went into solution. Using a stoichiometric ration for oxygen to glucose of 3:1, this yields a substrate demand of 83 lbs of substrate. This potential dissolved oxygen demand can easily be overcome by a small addition of substrate. The addition of hydrogen peroxide will also be temporarily detrimental to the bacterial community in the vadose zone. This will only occur during the first 24 hours when the peroxide is active. Once the hydrogen peroxide solution is exhausted (after an approximate 8-hour period), the system will be turned back on and the trenches will receive highly anaerobic/augmented groundwater that will re-populate the vadose zone in a short timeframe.

3.7.4. Irrigation and Monitoring

Each irrigation trench will have its own independent irrigation line in order to have a high degree of control of the flow rate and total volume that each trench will receive. The trench irrigation lines will be connected to the ISD™ system, and controlled by the programmable logic control (PLC) component, which will inject the amended water in intermittent pulses. The system will maintain ideal microbial conditions (i.e. pH, moisture content, nutrients, etc.) in the vadose zone throughout this remedial process. Ideal microbial conditions would be as follows:

- Groundwater pH: Ranging from 6.0-7.5 standard units

- Moisture Content: Ranging from 25% to field saturation (100%)
- Nutrients: Detectable concentrations of ammonia and phosphate
- Substrate Concentrations: Ranging from 50-200 mg/L

During the pilot test we will evaluate the ability to effectively inject into and remediate the impacted vadose zone in the Northern Area. The shallow injection trenches will be used to inject the augmented groundwater to the 10-foot-thick vadose zone. There are three shallow injection trenches being proposed for the pilot test that are on 50-foot centers. Thirty six (36) soil moisture sensors will be placed in between and on the sides of the trenches at varying depths (3 ft. bgs, 5 ft. bgs, and 8 ft. bgs) in clusters of three at twelve locations (for a total of 36 borings)(Figure 20). The moisture sensors will be installed by initially coring the concrete, using a direct push rig to remove soil at the depth of the moisture sensor placement, installing the moisture sensor at the bottom of the boring, placing the excavated soil back into the boring and lightly compacting it with hand tools. The pilot test will use the ML3 ThetaProbe Soil Moisture sensor, which can be buried, and has an extendable cable that connects to a data logger unit. A brochure for this sensor is presented in the following link:

http://dynamax.com/images/uploads/papers/ML3.pdf

During the initial injection system start up (month 1) the sensors will be used to evaluate the ability to saturate and maintain moisture content in the Northern Area vadose zone. The data will be used to evaluate the lateral and vertical distribution of the re-injected, amended groundwater via the trenches.

This method of evaluating moisture content will help determine the delivery of amendments in vadose zone that will be responsible for treatment. The system PLC will be adjusted as-needed (i.e. irrigation times/rates) until saturation reaches the desired level (field capacity) in the vadose zone. Data loggers will be used to collect moisture reading throughout the first month of system operation in the A-zone. The data collected

from the monitors will be plotted spatially and temporally to evaluate the delivery of the groundwater to the vadose zone using injection trenches.

Boring logs from the CSAP indicate that there are several permeable fill horizons within the Northern Area vadose zone, which will be ideal for pore water monitoring with the use of these moisture sensors. Initially, piezometers were being considered for the Northern Area vadose zone to evaluate saturation and potentially VOC transformation. The use of piezometers to evaluate saturation will be very insignificant in comparison to the now proposed 36 in situ moisture sensors. In addition, using piezometers to collect samples in a vadose zone environment will be difficult, if possible at all. Since plug flow fluid dynamics is occurring in the pore space (i.e. limited mixing), and the retention time is short (due to the system injecting every hour and displacing the water each cycle) in the vadose zone, any water collected in the piezometers would be more representative of what was in the system holding tank. This would likely not provide the biodegradation data for this area. More representative data on VOC biodegradation/flushing will be obtained from the new monitoring wells (RW-30A, RW-31A, RW-34A and RW-35A, Figure 12) that will be screened in the shallow A-Zone aquifer immediately below the injection trenches where the bulk of the amended groundwater will be retained for longer, samples can be collected (can be purged and water quality parameters collected), and biodegradation will be observable.

3.8. Injection Wells

If distribution of the substrate, surfactant and hydrogen peroxide are not effectively distributed throughout the vadose zone due to a lateral barrier (e.g. latex paint) three vertical injection wells will be installed in Northern Area in order to irrigate (using recirculated water and amendments) and treat vadose zone soils to enhance bioremediation. The vertical injection wells will be screened from 3-6 ft bgs, with a bentonite/grout seal that extends from the ground surface to 2.5 ft bgs. The seal will allow for some degree of pressurized injection (10-20 psi). The vertical injection wells will be constructed in 8-inch diameter

borings using 4-inch diameter, Schedule 40 PVC, with threaded connections. The screened sections for the wells will be constructed using 0.020-inch machine slotting.

3.9. Conveyance Lines

Belowground conveyance lines will be installed connecting to the injection and extraction wells. The lines will be installed in trenches approximately 16-inches wide by 2 feet deep. The conveyance lines will merge into a common trench near the treatment system compound that will be approximately 3 feet wide by 2 feet deep. These conveyance lines will be constructed using 1-inch diameter PVC pipe Electrical conduit for the extraction well pumps will also be included within the conveyance line trenches. Waste material associated with trenching activity, including concrete and soil, will be assumed to be industrial derived waste (IDW). The handling and disposal of IDW is discussed below.

3.10. IDW

Investigation derived waste (IDW) generated from the installation of the remediation system trenching and drilling activities will include drill cuttings from extraction and injection well installation, soil and concrete excavated from the construction of the directional drilling entry pits and the injection trenches, well development water, and decontamination rinse water. This IDW will be stored in either water-proof roll-off containers or 55-gallon drums that will be labeled, and sampled for waste characterization and profiling, and stored on Site pending receipt of the analytical data. It is assumed that the generated IDW may be disposed as either California non-hazardous or California hazardous waste, and some waste may potentially require disposal as RCRA hazardous waste.

3.11. System Startup and Operation

Startup activities required for the operation of the pilot system will begin following the completion of the well installations and construction of the remediation equipment enclosure. An Operation and Maintenance Manual and Touch Screen guide for the ISD™ system is included in Appendix D. As only one pilot system will be operated at the Site, startup activities will be separately conducted for each treatment zone (A-Zone, B-Zone, C-Zone and the Vadose Zone Injection Trenches) over a 4- to 6-month timeframe (or as dictated by per-

formance monitoring data). This will allow an evaluation of each zone's required operational parameters (flow rates, pressures, short-circuiting, etc.) to be referenced for designing their respective full-scale system, and also prevent the mixing of contamination between the respective aquifer units.

Startup of the pilot system will consist of initially filling the holding tank with extracted groundwater from the A-Zone. This stored groundwater will be used to individually test horizontal injection well HW-1A, three injection trenches, and (if needed) 3 vertical injection wells for the successful operation of this system, including float level switches, pressure gauges, flow meters and metering pumps. In addition, alarm conditions will be simulated to ensure the PLC is operating correctly and the visual alarm on the outside of the enclosure is functioning. Once the A-Zone pilot study is completed, the holding tank will be pumped dry and the system evacuated of groundwater as best as possible. The A-zone piping for the injection and extraction wells will be severed and the injection piping/conduit for the B-zone infrastructure will be connected to the system. The B-zone wells will then be operated for 4-6 months, followed by the C-zone for 4-6 months.

Based on the results of the Substrate pilot system, the ISD™ groundwater recirculation pilot system will be designed to operate each A-Zone extraction well at between 1 to 2 gpm, each B-Zone extraction well at 3 to 4 gpm, and less than 1 gpm for the C-Zone extraction well. The pilot system will simultaneously turn on all extraction wells within a treatment zone when the system detects the holding tank at its minimum allowable float level, and then turn off these wells when the system detects the maximum allowable float level. In addition, float levels and pressure settings for each extraction well will be established so that no extraction well runs dry (i.e. run-dry logic control), and gate valves will be adjusted to maintain system functions and to target subsurface areas where extraction should be prioritized (i.e., along the Site's eastern perimeter to control offsite migration).

The pilot system is designed to inject the Substrate solution using batch treatment cycles. For the horizontal injection wells, the solution will be injected at 5 to 10 gpm, whereas for the injection trenches this flow rate will be 10 to 15 gpm. Injection pressures will not exceed

20 pounds per square inch (psi). Each individual horizontal injection well/trench will be operated for approximately 5 to 10 minutes, with this injection time adjusted depending on the observed back pressure and total flow. Each individual injection location will have its own injection line, gate valve for flow control, flow meter, and pressure gauge (i.e. injection header). This will allow specific amended groundwater delivery to each location, which will optimize the approach. The PLC of the system will inject a given rate and time to each injection location as specified in the program. The rates and times will be set based on field observation made during the initial system startup.

The susbrate pilot study conducted in late 2015/early 2016 was performed using a 50,000 milligram per liter (mg/L) injection solution of Carbstrate™, which was observed to be too concentrated, as this 5 percent solution resulted in acidic subsurface conditions that were undesirable for the anaerobic microbial community. Therefore, the pilot system will be operated to create a lower dosage 50-200 mg/L Carbstrate™ solution (or 0.02 percent) to provide the substrate and nutrients required for ERD, while not generating the unfavorable acidic conditions. In order to prepare this solution for an average 10 gpm injection rate, 800 pounds of Carbstrate™ are required to be mixed into solution every month.[5] This will be accomplished by mixing 200 pounds of Carbstrate™ into the solution tank each week, which will result in higher initial dosing that will average out through the week and month. The 200 lbs of substrate will be mixed into the 200 gal mixing tank inside the system, which is connected to the system metering pump. The metering pump will inject at a specified rate (gal/hour) into the injection header whenever the system is in injection mode. The metering pump rate will be set to evacuate and flush out the mixing tank over a period of 3-4 days during the week. The remaining 3-4 days of system operation will have no substrate added. This

[5] 10 gpm injection rate requires 432,000 gallons per month, or approximately 1,640,000 L. 800 pounds of Substrate™ equals 363,000,000 mg.

'pulsed delivery' strategy increases the efficiency of the substrate (i.e. utilization rate), and most importantly prevents biofouling of the injection infrastructure and system components.

3.12. System Monitoring

For baseline and system performance monitoring data, groundwater samples will be collected from the key monitoring wells proposed herein. For the A-Zone, groundwater data (VOCs only) will be collected weekly from key wells for the first month of operation to evaluate the effectiveness of the surfactant flushing event. After the first month, groundwater samples will be collected monthly from each Zone as they are operated in sequence. All key monitoring wells will be analyzed for at a minimum, the following parameters:

- VOCs (limited chlorinated solvent suite, EPA 8260B).
- Ammonia-nitrogen (EPA 350.1).
- Sulfate-sulfur (EPA 375.4 MOD).
- Methane/ethene/ethane (low level analysis via Microseeps, Inc.).
- Total organic carbon (TOC, multiple methods).
- Dissolved iron.

Table 5 presents specific groundwater parameters and ISD™ system performance parameters that will be part of the overall system performance. These parameters will be collected weekly/monthly during the pilot study for each specific groundwater zone according to the schedule included in Table 6 and presented as part of the progress and assessment reporting. The key extraction and monitoring wells to be sampled will include:

- A-Zone wells RW-2A, RW-5A, RW-10A, RW-28A, RW-29A, RW-30A, RW-31A, RW-32A, RW-34A, RW-35A, RW-36A, EX-2A, EX-4A and EX-6A. Baseline only samples will be collected from monitoring well RW-6A and extraction well EX-5A.
- B-Zone Wells RW-2B, RW-5B, RW-8B, RW-19B, RW-21B, RW-23B, RW-24B, RW-25B, RW-26B, RW-27B, RW-28B, RW-29B, EW-1B, EW-2B, EX-1B, EX-2B, EX-3B, EX-4B, EX-5B, EX-6B, EX-7B and EX-8B.
- C-Zone Wells RW-5C, RW-10C, RW-17C, RW-22C, RW-23C, RW-24C and EX-1C.

Extraction wells will be sampled in a manner to minimize any aeration of groundwater samples. The extraction pumps can be operated manually using the PLC of the system by the field technicians. Each extraction well conveyance line will have its own flow meter and gate valve to control the extraction flow rate. In addition, each line will have its own sample port and tubing to collect samples from. Once the pump is turned on, the conveyance line will be evacuated/filled and the pump flow rate will be reduced using the gate valve (to about 1-2 gpm). Once the flow rate is reduced, the sample port will be opened to flush the line and check for air bubbles. If no air bubbles are observed, then a sample will be collected. If bubbles are observed, the flow rate will be reduced until no bubble is observed. All extraction wells will be sampled for baseline conditions prior to system startup.

3.12.1. Bio-Trap® installation and monitoring:

In order to evaluate the microbial activity prior to and following the system operations, a Bio-Trap®[6] will be inserted into two groundwater monitoring wells (RW-28A and RW-34A). The baseline evaluation will include placing the Bio-Traps® in the wells for 60 days, at which point they will be removed and submitted to Microbial Insights to undergo quantitative polymerase chain reaction (qPCR) to identify the concentration of Dehalococcoides present in the groundwater contained within the injection points and monitoring well. In addition to qPCR, Microbial Insights will analyze each Bio-Trap® for TCE Reductase (tceA) and Vinyl Chloride Reductase (bcvA and vcrA), functional genes in some Dehalococcoides strains encoding the enzymes responsible for the reductive dechlorination process. Just prior to the A-Zone treatment system operations, another set of biotraps will be positioned in the same wells and remain in place for a 60 day incubation period. Just prior to the A-Zone sytem operations, Bio-Traps® will be reinstalled in the same two wells, and, following the 60 day incubation period, submit-

[6] Bio-Traps® are manufactured by Microbial Insights.

ted to Microbial Insights for similar testing as the baseline samples. The baseline and treatment system operations data will be compared to evaluate the positive or negative effects the surfactant, substrate and hydrogen peroxide have (if any) on the A-Zone microbial population.

3.13. Schedule

The construction of the infrastructure and subsequent installation of the ISD™ groundwater recirculation pilot system will immediately commence following the Joint Agencies' approval of this Work Plan. It is anticipated that the permitting and mobilization activities will require up to one month. The well installation and development activities are expected to require another 4 to 6 weeks, which will be followed by the initial system start-up (1 week).

Once the system is operational, Ninyo & Moore will prepare monthly e-mailed status reports on pilot study activities. These reports will discuss: 1) what occurred over the previous month and what is expected to occur over the coming month, 2) modifications considered for the pilot study, 3) problems encountered and how they were resolved, 4) outstanding issues and 5) any additional relevant issues that are important for the success of the pilot study. Our e-mail reports will be distributed to the Joint Agencies within 14 days following the reporting period. In addition, monthly conference calls attended by Joint Agencies, Ninyo & Moore and ETEC will be scheduled in order to discuss progress and any outstanding issues. These monthly e-mail reports and conference calls will continue for the first two quarters at a minimum. In addition to the monthly e-mailed status reports, Ninyo & Moore will submit quarterly reports that evaluate and assess system performance. The quarterly reports will include: 1) a discussion of progress made and system effectiveness during the reporting period, 2) evaluation of environmental monitoring data collected during the reporting period, 3) data tables and graphs, and (4) a discussion of problems encountered and how they were rectified, and 5) any additional relevant issues that are important for the success of the pilot study. The quarterly reports will be submitted to the Joint Agencies within 30 days following the reporting period.

4. LIMITATIONS

The environmental services described in this report have been conducted in general accordance with current regulatory guidelines and the standard-of-care exercised by environmental consultants performing similar work in the project area. No warranty, expressed or implied, is made regarding the professional opinions presented in this report. Variations in Site conditions may exist and conditions not observed or described in this report may be encountered during subsequent activities. Please also note that this assessment did not include an evaluation of geotechnical conditions or potential geologic hazards.

Ninyo & Moore's opinions and recommendations regarding environmental conditions, as presented in this report, are based on limited subsurface assessment and chemical analysis. Further assessment of potential adverse environmental impacts from past on-Site and/or nearby use of hazardous materials may be accomplished by a more comprehensive assessment. The samples collected and used for testing, and the observations made, are believed to be representative of the area(s) evaluated; however, conditions can vary significantly between sampling locations. Variations in soil and/or groundwater conditions will exist beyond the points explored in this evaluation.

The environmental interpretations and opinions contained in this report are based on the results of laboratory tests and analyses intended to detect the presence and concentration of specific chemical or physical constituents in samples collected from the Site. The testing and analyses have been conducted by an independent laboratory which is certified by the State of California to conduct such tests. Ninyo & Moore has no involvement in, or control over, such testing and analysis. Ninyo & Moore, therefore, disclaims responsibility for any inaccuracy in such laboratory results.

Ninyo & Moore’s conclusions, recommendations, and opinions are based on an analysis of the observed Site conditions. It should be understood that the conditions of a site could change with time as a result of natural processes or the activities of man at the Site or nearby sites. In addition, changes to the applicable laws, regulations, codes, and standards of practice may occur due to government action or the broadening of knowledge. The findings of this report may, therefore,

be invalidated over time, in part or in whole, by changes over which Ninyo & Moore has no control.

This document is intended to be used only in its entirety. No portion of the document, by itself, is designed to completely represent any aspect of the project described herein. Ninyo & Moore should be contacted if the reader requires any additional information, or has questions regarding content, interpretations presented, or completeness of this document.

This report is intended exclusively for use by the client. Any use or reuse of the findings, conclusions, and/or recommendations of this report by parties other than those noted is undertaken at said parties' sole risk.

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TABLE 1 - PUSH-PULL and IRM PILOT TEST SOURCE AREA TEST RESULTS

Well ID	Sampling Event	Date Sampled	pH	EC	DO[a]	ORP	Tetrachloroethylene (PCE)	Trichloroethylene (TCE)	cis-1,2-Dichloroethylene (Cis 1,2-DCE)	Vinyl Chloride	Methane	Ethane	Ethene	Manganese	Bromide	Chloride	Iron, Ferrous	Ammonia	Nitrate	Nitrite	Ortho-phosphate	Sulfate	Sulfide	Total Organic Carbon (TOC)
			(SU)	(µS/cm)	(mg/L)	(mV)	(µg/L)				(µg/L)			(µg/L)	(mg/L)									
RW-1A	Baseline	12/7/2015	6.15	58,772	0.78	56.6	1,150	33,600	26,700	8,400	3,120	ND<1.0	3,210	28,300	80.1	22,000	1.3	ND<1.0	ND<1.0	ND<2.5	ND<0.010	2,350	ND<0.40	9.1
	Day 1	12/11/2015	6.08	54,189	0.36	-5.3	800	30,100	26,700	7,960	2,900	19.2	3,600	16,000	126	19,900	ND<0.10	800	ND<2.5	ND<2.5	225	2,220	ND<0.020	7,970
	Week 1	12/15/2015	5.77	56,090	2.36	-212.2	843	31,900	28,900	10,200	2,080	ND<1.0	2,840	18,600	100	20,900	ND<0.50	685	ND<1.0	ND<1.0	338	2,350	ND<0.020	4,300
	Week 2	12/21/2015	5.62	56,257	2.03	-205.7	681	28,400	29,900	5,920	94.1	1.8	462	29,000	90.7	20,500	3.4	685	ND<1.0	ND<2.0	397	2,330	ND<0.020	2,090
	Week 3	12/29/2015	5.87	51,410	4.72	-170.2	462 J	19,300	20,000	3,710	27.2	0.85 J	256	33,200	87.2	24,500	4.7	368	ND<2.5	ND<2.5	213	2,390	ND<0.020	941
	Week 4	1/8/2016	5.71	52,220	13.43	-222.1	655	20,200	18,700	3,770	476	783	1,080	30,200	83.9	21,900	8	238	ND<0.50	ND<2.5	126	2,110	ND<0.020	824
	Week 10	2/16/2016	6.20	51,089	0.11	-241.7	619	13,600	56,300	10,000	974	ND<1.0	1,660	34,400	86.3	22,700	40.5	189	ND<1.0	ND<2.5	30.3	1,930	ND<0.020	636
	Week 30	7/18/2016	6.37	50,403	-0.58	-413.9	142	4,100	57,100	17,400	4,420	ND<1.0	4,470	--	--	--	--	--	--	--	--	--	--	27.2
RW-11B	Baseline	12/7/2015	6.48	53,510	0.34	-82.2	930	1,980	7,000	38.7	12.5	ND<1.0	1.1	19,200	64.8	19,400	0.27	ND<1.0	ND<0.25	ND<2.5	0.028	2,790	ND<0.020	2.7
	Day 1	12/10/2015	6.03	47,114	0.27	9.6	202	633	2,640	9.3	22.7	0.32 J	ND<1.0	8,140	111	19,800	ND<0.10	665	5.1	ND<5.0	412	2,100	ND<0.020	9,730
	Week 1	12/14/2015	5.49	49,328	1.42	-305.7	ND<130	434	2,360	ND<130	10.6	ND<1.0	0.89 J	19,900	94.9	16,900	ND<2.5	540	2.2	ND<1.0	611	2,110	ND<0.020	4,530
	Week 2	12/21/2015	4.79	47,781	3.62	-202.9	183	484	2,950	144	ND<0.50	ND<1.0	ND<1.0	20,900	80.2	17,300	4.8	342	1.0	ND<2.0	326	2,140	ND<0.10	2,700
	Week 3	12/30/2015	4.95	45,192	-0.59	-193.9	417	848	3,240	73.8 J	0.68	ND<1.0	ND<1.0	26,100	77.3	16,000	12.7	228	ND<2.5	ND<2.5	256	1,960	ND<0.020	2,460
	Week 4	1/6/2016	5.4	47,654	36.74	-83.6	317	677	2,990	52.6	7.4	ND<1.0	0.48 J	25,600	75	18,000	16.3	173	ND<0.50	ND<2.5	140	2,220	ND<0.020	1,540
	Week 10	2/17/2016	6.75	44,354	-5.34	-333.3	ND<100	ND<100	5,190	267	54.8	ND<1.0	0.70 J	26,400	68.6	16,000	4.2	240	ND<0.50	ND<1.0	171	996	ND<0.020	1,400
	Week 30	7/18/2016	6.19	47,104	0.49	-252.3	ND<5.0	11.3	137	6,760	779	0.52 J	146	--	--	--	--	--	--	--	--	--	--	6.6
RW-20B	Baseline	12/7/2015	6.27	51,123	0.33	-102.9	157 J	2,320	9,880	14,700	3,000	ND<1.0	4,290	18,000	67.1	19,200	0.73	ND<1.0	ND<0.50	ND<2.5	0.015	2,100	ND<0.020	6.8
	Day 1	12/14/2015	5.79	43,940	0.61	-199.2	ND<500	1,440	5,280	6,990	349	ND<1.0	1,650	23,700	92.8	16,200	3.1	1,710	ND<1.0	ND<1.0	742	1,820	0.033	3,710
	Week 1	12/15/2015	5.66	51,555	2.37	-217.7	ND<500	1,220	5010.0	5,330	99	ND<1.0	484	28,700	101	18,300	2.9	815	ND<1.0	ND<1.0	785	1,950	0.035	4,410
	Week 2	12/21/2015	5.71	51,535	2.23	-271	ND<250	826	4,300	2,050	14.4	ND<1.0	99.3	39,300	93.5	18,100	11	690	ND<1.0	ND<2.0	412	2,060	ND<0.020	2,730
	Week 3	12/29/2015	6.01	41,950	-3.95	-222.6	ND<250	769	4,770	2,900	31.0	ND<1.0	169	31,400	74.3	93,600	8.3	352	ND<0.50	ND<2.5	216	11,500	ND<0.020	2,240
	Week 4	1/6/2016	6.16	30,102	36.47	-253.4	ND<250	535	3,290	2,130	125	ND<1.0	355	22,100	62.2	12,900	4.2	240	ND<0.50	ND<1.0	171	996	ND<0.020	1,400
	Week 10	2/17/2016	6.38	41,042	-1.12	-330.8	ND<100	426	6,990	5,320	67.7	ND<1.0	255	25,000	66.7	13,600	22.6	389	ND<0.50	ND<2.5	164	753	ND<0.20	2,070
	Week 30	7/18/2016	6.2	42,654	-17.09	-324.6	ND<7.5	6.7 J	406	1,310	717	ND<1.0	1,750	--	--	--	--	--	--	--	--	--	--	588
RW-8B	Baseline	12/8/2015	6.18	49,798	-0.05	-278.2	3.6 J	78.3	16,300	26,300	2,460	24.6	4,640	32,400	67.2	17,800	11.5	3.2	ND<0.50	ND<2.5	ND<0.010	1,450	0.033	22.3
	Day 1	12/11/2015	6.23	50,175	0.52	-211.9	3.9 J	83.7	17,300	19,300	2,500	18.9	4,380	29,300	59.1	19,400	15.1	2.2	ND<0.50	ND<2.5	ND<0.010	1,310	ND<0.020	43.7
	Week 1	12/15/2015	6.16	48,884	-2.2	-252	ND<500	112 J	16,660	28,300	2,880	30.8	5,610	23,400	63.1	18,100	17.1	2.0	ND<1.0	ND<1.0	ND<0.010	1,050	0.041	90.2
	Week 2	12/21/2015	6.17	47,770	-1.38	-298.4	ND<500	ND<500	13,800	19,300	3,090	16.2	2,600	26,600	59.8	17,600	ND<0.50	1.5	ND<1.0	ND<2.0	3.5	805	0.35	115
	Week 3	12/29/2015	6.18	43,331	10.01	-317.1	ND<500	ND<500	11,600	15,100	2,900	27.9	3,830	29,100	71.7	23,200	ND<0.20	ND<1.0	ND<0.50	ND<5.0	3.5	729	0.83	98.6
	Week 4	1/7/2016	6.19	42,460	51.5	-328	ND<100	43.5 J	8,890	6,790	2,810	ND<1.0	4,020	16,660	61.5	22,600	ND<0.50	1.3	ND<0.50	ND<2.5	6.9	381	1.6	143
	Week 10	2/16/2016	6.79	38,973	0.99	-313.8	ND<100	28.6 J	3,130	6,300	4,860	38.9	7,010	16,500	53.0	14,700	3.2	3.3	ND<0.50	ND<0.50	9.7	203	ND<0.020	194
	Week 30	7/18/2016	6.43	44,376	0.5	-214.1	ND<60	100 J	5,830	11,300	2,520	33.1	4,610	--	--	--	--	--	--	--	--	--	--	68.6
EW-2B	Baseline	12/9/2015	6.42	50,152	-2.91	-380	ND<100	111	11,400	15,500	1,600	ND<1.0	4,910	28,800	61.4	20,400	1.0	22.6	ND<1.0	ND<1.0	6.7	1,630	ND<0.020	467
	Day 1	12/11/2015	6.17	46,924	-4.00	-389.5	ND<100	334	8,220	6,630	1,750	23.2	3,650	21,500	65.7	16,400	7.8	64.8	ND<1.0	ND<5.0	194	920	1.1	2,160
	Week 1	12/15/2015	5.51	46,686	-1.92	-342.2	ND<100	379	16,700	11,000	907	7.2J	2,470	20,000	61.4	15,900	28.3	34.3	ND<1.0	ND<1.0	95	954	18	2,090
	Week 2	12/21/2015	5.74	48,645	-9.42	-365.2	ND<100	241	18,900	8,930	790	13.7	2,130	25,200	66.6	17,500	7.7	26.1	ND<1.0	ND<2.0	58.4	969	55.2	1,230
	Week 3	12/29/2015	5.91	46,607	-1.49	-370.6	ND<500	ND<500	18,700	6,530	1,160	19.7	2,530	26,900	66.6	17,600	ND<0.50	20.9	ND<0.50	ND<2.5	40.5	850	83.6	750

TABLE 1 - PUSH-PULL and IRM PILOT TEST SOURCE AREA TEST RESULTS

Well ID	Sampling Event	Date Sampled	pH	EC	DO[a]	ORP	Tetrachloroethylene (PCE)	Trichloroethylene (TCE)	cis-1,2-Dichloroethylene (Cis 1,2-DCE)	Vinyl Chloride	Methane	Ethane	Ethene	Manganese	Bromide	Chloride	Iron, Ferrous	Ammonia	Nitrate	Nitrite	Ortho-phosphate	Sulfate	Sulfide	Total Organic Carbon (TOC)
			(SU)	(µS/cm)	(mg/L)	(mV)	(µg/L)				(µg/L)			(µg/L)	(mg/L)									
	Week 4	1/7/2016	6.00	46,250	14.71	-375.6	ND<250	107 J	20,100	8,650	1,300	ND<1.0	2,650	19,400	67.1	19,500	ND<0.50	31	ND<0.50	ND<1.0	34.2	641	121	655
	Week 10	2/16/2016	6.83	44,841	-1.56	-328.5	ND<250	130 J	26,000	14,300	1,050	ND<1.0	2,620	22,900	49.9	14,000	ND<2.5	34.6	ND<2.5	ND<2.5	16.7	812	176	134
	Week 30	7/18/2016	6.69	46,587	0.38	-361.1	ND<150	171 J	7,090	25,500	1,900	ND<1.0	5,370	--	--	--	--	--	--	--	--	--	--	166
EW-1B	Baseline	12/9/2015	6.28	18,588	-0.14	-300.3	ND<50	ND<50	32.9 J	445	4,990	68.2	5,630	16,700	18.5	6,330	3.2	8.6	ND<1.0	ND<1.0	0.78	448	ND<0.020	31.5
	Day 1	12/14/2015	5.46	14,444	0.22	-164.8	ND<50	22.7 J	504	862	1,310	15.3	2,210	14,500	19.7	4,760	13.9	2.1	ND<1.0	ND<1.0	23.3	422	0.053	338
	Week 2	12/30/2015	6.34	7,628	17.06	-186	ND<100	975	4,780	1,380	5,480	54.3	665	5,370	7.8	2,020	10.9	2.5	ND<0.50	ND<0.50	0.060	180	ND<0.020	36.1
	Week 4	1/7/2016	6.32	7,359	11.35	-255.5	ND<50	431	3,020	1,320	8,050	62.5	636	5,400	8.7	2,170	9.9	5.9	ND<0.50	ND<0.50	0.028	145	ND<0.020	58.1
	Week 10	2/17/2016	6.46	19,244	6.47	-100.4	ND<500	151	22,300	8,110	3,260	49.7	4,300	18,400	26.6	7,230	17.7	9.0	ND<0.50	ND<0.50	0.047	914	ND<0.020	11.4
	Week 30	7/18/2016	6.38	30,671	1.67	-150	ND<100	655	58,300	22,300	1,190	37.9	4,360	--	--	--	--	--	--	--	--	--	--	8.2

Notes:

Field parameters including pH, dissolved oxygen (DO), oxidation-reduction potential (ORP) and electrical conductivity (EC), measured using a YSI 556

Volatile Organic Compounds (VOCs), including PCE, TCE, cis-1,2-DCE and Vinyl Chloride, analyzed using USEPA Method 8260B; for the complete list of VOC analytical results, please see Appendix D

Dissolved gases (methane, ethane and ethene) analyzed using method RSK 147/175

Manganese analyzed using USEPA Method 3010a

Anions (bromide, chloride, nitrate, nitrite, ortho-phosphate and sulfate) analyzed using USEPA Method 300/SM 4500

Ammonia analyzed using SM4500

Sulfide analyzed using USEPA Method 376.1

Ferrous Iron analyzed using SM3500D

Total Organic Carbon (TOC) analyzed using SM5310B

SU - Standard Units

µS/cm - microSiemens per centimeter

mg/L - milligrams per liter

µg/L - micrograms per liter

mV - millivolts

a - Due to calibration issues with the field meter, DO concentrations starting Week 1 are suspicious

ND<X indicates constituent was not detected at a concentration greater than the laboratory reporting limit of X

J - indicates an estimated value

TABLE 2 - UVOST INVESTIGATION
NAPL RESULTS

Boring	depth (ft bgs) and vertical range		
UA-1	5.6-6.3	7.9-8.3	9.5-9.7
UA-2	3.7-4.9	5.6-6.2	--
UA-3	0.5-0.8	6.1-6.6	--
UA-4	5.4-5.9	8.9-9.2	14.7-15.4
UA-5	5.0-5.3	6.3-7.1	--
UA-6	2.9-5.0	7.9-8.7	9.0-10.2
UA-7	8.0-9.6	14.0-15.0	15.6-15.8
UA-8	2.2-4.5	5.2-7.8	13.0-15.0
UA-9	7.6-8.7	13.6-13.7	--
UB-1	2.3-2.7	4.1-5.0	5.3-5.9
UB-2	3.9-4.6	6.4-6.8	9.2
UB-3	3.6-5.4	7.3-13.5	20.2-21.1
UB-4	2.3-5.5	8.1-10.5	21.3-23.3
UB-5	9.4-10.1	11.0-13.5	13.9-14.7
UB-6	11.8-13.8	14.5-16.3	16.7-17.1
UB-7	2.3-5.2	6.9-7.8	8.6
UB-8	2.2-4.9	5.1-8.5	20.5-21.1
UB-9	4	6.3-9.5	--
UC-1	3.9-4.8	5.3-5.9	7.0-8.3
UC-2	No Data		
UC-3	4.2-4.9	5.8-8.3	18.1-18.6
UC-4	3.7-10.6	12.7-14.6	--
UC-5	3.1-6.3	6.6-9.2	19.4-21.4
UC-6	6.0-6.7	7.8-9.1	9.6-10.4
UC-7	7.5-10.1	19.9-24.9	--
UC-8	4.9-6.8	7.5-10.5	--
UC-9	No Data		

Notes:
UVOST - Ultra-Violet Optical Screening Tool
NAPL - Non aqueous phase liquid
ft bgs-Feet below ground surface
-- no data point

TABLE 3 - A-ZONE PUMPING DATA							
Time	Time Elapsed in Minutes	Extraction Well	Observation Wells				
		RW-4A	RW-2A	RW-29A	OW-1A	OW-2A	OW-3A
		Distance from RW-4A (ft)	114	80	20	40	60
		Measured Depth to Groundwater (ft)					
9:00	0	8.85	7.76	8.09	7.49	9.48	-- [a]
9:15	15	16.82	7.76	8.09	7.49	9.48	-- [a]
9:30	30	16.88	7.76	8.09	7.51	9.35	-- [a]
9:45	45	17.23	7.76	8.10	7.56	9.26	-- [a]
10:00	60	17.81	7.78	8.10	7.52	9.15	-- [a]
10:15	75	18.31	7.78	8.09	7.54	9.05	-- [a]
10:30	90	18.31	7.78	8.10	7.56	8.96	-- [a]
10:45	105	18.31	7.78	8.09	7.58	8.85	-- [a]
11:00	120	18.25	7.78	8.09	7.57	8.78	-- [a]
11:15	135	19.21	7.79	8.07	7.65	8.73	-- [a]
11:30	150	19.65	7.78	8.07	7.61	8.79	-- [a]
Total Drawdown		10.8	0.02	-0.02	0.12	-0.69	-- [a]

Notes:

a - Free product was too thick to accurately read groundwater depth

Entire test was conducted at a pumping rate of 0.2 gallons per minute

Test completed using a Grundfos 2 inch pump.

Pump was originally placed at a depth of approximately 19 ft, and lowered to the bottom after 2 hours

TABLE 4 - B-ZONE PUMPING DATA

Time	Time Elapsed in Minutes	Pump Rate (gallons per minute)	Extraction Well	Observation Wells					
			RW-2B	RW-19B	RW-20B	RW-21B	OW-4B	OW-5B	OW-6B
			Distance from RW-2B (ft)	90	102	80	20	40	60
			Measured Depth to Groundwater (ft)						
8:00	0	2 gpm	7.01	7.21	7.13	7.48	6.71	6.96	6.96
9:00	15		20.5	7.25	7.18	7.5	6.73	7	7.02
9:15	30		21.35	7.25	7.18	7.51	6.79	7.01	7.03
9:30	45		21.88	7.27	7.19	7.53	6.86	7.04	7.02
9:45	60		22.37	7.28	7.19	7.56	7.00	7.04	7.04
10:00	75		22.7	7.29	7.19	7.58	7.14	7.04	7.05
10:15	90		22.94	7.29	7.2	7.61	7.33	7.05	7.06
10:30	105		23.18	7.29	7.21	7.63	7.5	7.06	7.08
10:45	120		23.31	7.31	7.21	7.64	7.67	7.06	7.06
Drawdown			16.3	0.1	0.08	0.16	0.96	0.1	0.1
11:00	135	3 gpm	26.13	7.32	7.22	7.67	7.84	7.08	7.08
11:15	150		27.3	7.34	7.24	7.69	8.00	7.09	7.08
11:30	165		27.9	7.34	7.25	7.71	8.19	7.09	7.09
11:45	180		27.36	7.34	7.25	7.76	8.41	7.11	7.11
12:00	195		28.35	7.29	7.27	7.8	8.67	7.13	7.11
12:15	210		28.12	7.29	7.28	7.82	8.91	7.15	7.14
12:30	225		27.76	7.26	7.29	7.86	9.13	7.17	7.16
12:45	240		27.61	7.29	7.3	7.89	9.33	7.2	7.16
13:00	255		27.52	7.31	7.31	7.91	9.45	7.21	7.16
Drawdown			1.39	-0.01	0.09	0.24	1.61	0.13	0.08
13:15	270	3.75 gpm	32.5	7.33	7.31	7.94	9.59	7.23	7.17
13:30	285		28.29	7.35	7.31	7.98	9.77	7.25	7.18
13:45	300		27.6	7.35	7.32	7.99	9.9	7.27	7.19
14:00	315		27.64	7.36	7.33	8.02	10.07	7.29	7.24
14:15	330		27.18	7.45	7.34	8.02	10.24	7.31	7.26
14:30	345		27.18	7.39	7.34	8.03	10.39	7.32	7.27
14:45	360		27.15	7.42	7.33	8.03	10.52	7.35	7.28
15:00	375		27.41	7.42	7.33	8.04	10.64	7.36	7.28
15:15	390		27.22	7.34	7.34	8.04	10.77	7.37	7.28
Drawdown			-5.28	0.01	0.03	0.1	1.18	0.14	0.11
Total Drawdown			20.21	0.13	0.21	0.56	4.06	0.41	0.32

Notes:

Test completed using a Grundfos 2 inch pump.

Pump was placed at a depth of approximately 40 ft bgs

TABLE 5 - INDICATORS OF AEROBIC AND ANAEROBIC BIODEGREDATION	
Parameter	**Indications of Anaerobic Biodegradation or System Performance**
Oxidation-Reductino Potential (ORP) (mV)	A shift to more negative ORP readings after the injection of substrate would demonstrate the creation of more reductive groundwater conditions at a given location, which would be deemed a favorable shift.
pH	A decrease in groundwater pH may indicate enhanced microbial activity and CO2 production due to substrate addition/delivery. A downward shift in groundwater pH will likely correlate with substrate delivery to a location (favorable). However, the pH needs to be maintained between 6.0-7.5 standard units for effecive dechlorination.
Conductivity (uS/cm)	Increases in groundwater conductivity (favorable) will occur due to the injection of the substrate containing salts (diammonium phosphate), and due to the anaerobic process that entrains ferrous iron and Mn (2+) into solution. An increase in conductivity will be be used to evalaute substrate delivery to a location
Dissolved Oxygen (DO)	If DO is present initially, it will decrease after the introduction of the substrate since it is utilized as a terminal electron acceptor (TEA). Less than 1 mg/L DO indicates anoxic to anaerobic conditions (favorable), which are conducive for anaerobic dechlorination.
Methane	An increase in methane concentrations in groundwater would indicate more favorable anaerobic conditions have been created or enhanced. Carbon dioxide is reduced to methane, which is the most anaerobic condition that can be achieved.
Ammonia	The introduction of Carbstrate will cause an initial spike in ammonia concentrations in groundwater (favorable), followed by a decrease as it is utilzed as a nutrient. Moderate ammonia concentrations to act as a nitrogen source for microbial growth, and maintain high micribal kinetic rates.
Sulfate/Hydrogen Sulfide	If sulfate is presenet initially, it will decrease in concentration after the introduction of the substrate since it is utilized as a TEA (favorable). Sulfate is reduced to hydrogen sulfide; therefore, the generation of hydrogen sulfide will be additional evidence that sulfate-reducting conditions are being created by the addtion of the substrate.
Iron (+2)	Ferric iron in the soil matrix can be utilized as a TEA under anaerobic conditions. An increase in ferrous iron indciates the microorganisms are reducing ferric iron (Fe3+) to ferrous iron (Fe2+) due to the introduction of the substrate (favorable).
Ethene/Ethane	Increases in groundwater concentrations of ethene/ethane will indicate complete dechlorination is occuring after the injection of the substrate (favorable).
TOC (mg/L)	TOC will represent the concentration of degradable substrate in groundwater. This value should increase after the injection of the substrate (favorable), and be maintained at 50-200 mg/L.
VOCs (limited suite)	Observing reductions in parent compounds (PCE/TCE) and generation of daughter products (cis-DCE/VC/ethene) would be deemed favorable. A overall reduction in total molar mass of VOCs will be evaluated.
Horizontal Injection Well Rates	Each horizontal injection well injection rate (gpm) and back pressure will be monitored weekly and recorded on field forms. Favorable injection rates for one horizontal injection well (all Zones) is 3-10 gpm at <30-40 psi. Injection rates of 2 gpm or less at 30-40 psi will be unfavorable.
Zone A Injection Trench Rates	Each injection trench injection rate (gpm) and back pressure will be monitored weekly and recorded on field forms. Favorable injection rates for one injection trench (without surfacing) is 5-15 gpm at <20 psi. Injection rates of 4 gpm or less will be unfavorable.
Extraction Well Rates	Each groundwater well extraction rate (gpm) and back pressure will be monitored weekly and recorded on field forms. Favorable extraction rates for one extraction well in the A-Zone will be 1.5-3 gpm, 4-8 gpm in the B-Zone, and 1-2 gpm in the C-Zone.

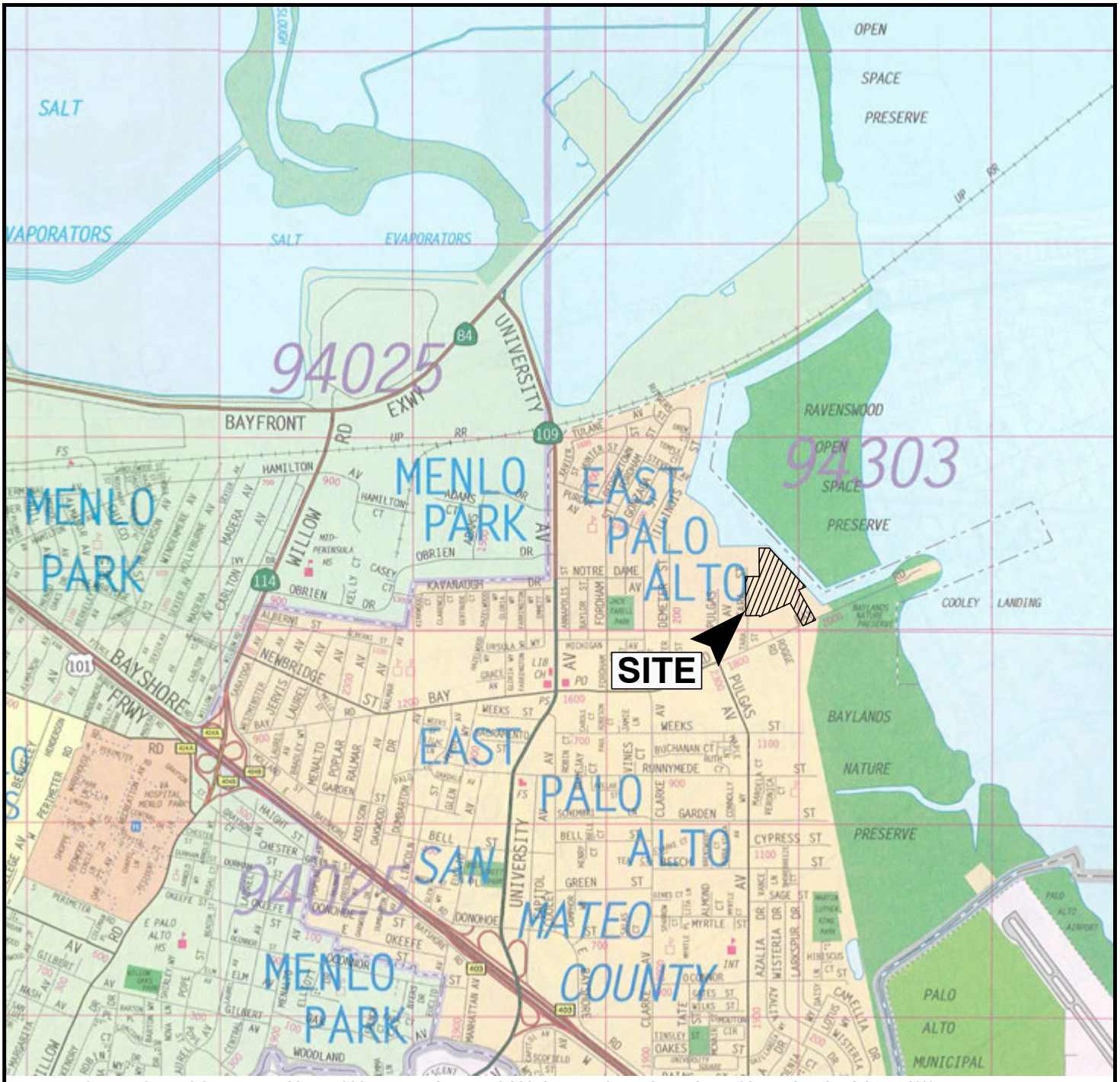
TABLE 6 - PILOT STUDY GROUNDWATER MONITORING PROGRAM AND WELL CONSTRUTION DETAILS

Monitoring Location	Monitoring Well Identification	Sampling Frequency	Top of Casing (ft msl)	Well Casing Diameter (inches)	Well Screen Interval (ft bgs)	Well Screen Interval (ft msl)	Area of Concern
A-Zone	RW-2A	Monthly	10.44	2	5.0 - 25.0	5.44 - (-14.56)	Northern Area
	RW-5A	Monthly	9.59	4	4.0 - 14.0	5.59 - (-4.41)	Panhandle and Eastern Area
	RW-6A	Baseline Only	8.07	2	4.6 - 17.3	3.47 - (-9.23)	Panhandle and Eastern Area
	RW-10A	Monthly	4.2	4	4.0 - 9.5	0.2 - (-5.3)	Central Processing Area
	RW-28A	Monthly	10.04	2	10.0 - 15.0	0.04 - (-4.96)	Northern Area
	RW-29A [a]	Monthly	10.47	2	-	-	Northern Area
	RW-30A[b]	Weekly[d]	TBD	2	10.0-20.0	TBD	Northern Area
	RW-31A[b]	Weekly[d]	TBD	2	10.0-20.0	TBD	Northern Area
	RW-32A[b]	Weekly[d]	TBD	2	3.0-18.0	TBD	Central Processing Area
	RW-33A[b]	Baseline Only	TBD	2	3.0-18.0	TBD	Western Area
	RW-34A[b]	Weekly[d]	TBD	2	10.0-20.0	TBD	Central Processing Area
	RW-35A[b]	Weekly[d]	TBD	2	10.0-20.0	TBD	Western Area
	RW-36A[b]	Monthly	TBD	2	3.0-18.0	TBD	Western Area
	EX-1A[c]	Weekly[d]	TBD	6	5.0-25.0	TBD	Northern Area
	EX-2A[c]	Weekly[d]	TBD	6	5.0-25.0	TBD	Northern Area
	EX-3A[c]	Weekly[d]	TBD	6	3.0-20.0	TBD	Northern Area
	EX-4A[c]	Monthly	TBD	6	3.0-20.0	TBD	Central Processing Area
	EX-5A[c]	Baseline Only	TBD	6	3.0-20.0	TBD	Western Area
	EX-6A[c]	Monthly	TBD	6	5.0-25.0	TBD	Northern Area

TABLE 6 - PILOT STUDY GROUNDWATER MONITORING PROGRAM AND WELL CONSTRUTION DETAILS

Monitoring Location	Monitoring Well Identification	Sampling Frequency	Top of Casing (ft msl)	Well Casing Diameter (inches)	Well Screen Interval (ft bgs)	Well Screen Interval (ft msl)	Area of Concern
B-Zone	RW-2B	Monthly	9.46	4	27.0 - 42.0	(-17.54) - (-32.54)	Northern Area
	RW-5B	Monthly	7.82	2	32.5 - 42.5	(-24.68) - (-64.68)	Panhandle and Eastern Area
	RW-8B	Monthly	5.46	4	20.0 - 39.4	(-14.54) - (-33.94)	Central Processing Area
	RW-19B	Monthly	9.39	2	30.0 - 39.5	(-20.61) - (-30.11)	Panhandle and Eastern Area
	RW-21B[a]	Monthly	10.16	2	-	-	Northern Area
	RW-23B[b]	Monthly	TBD	2	30.0-45.0	TBD	Northern Area
	RW-24B[b]	Monthly	TBD	2	35.0-45.0	TBD	Northern Area
	RW-25B[b]	Monthly	TBD	2	35.0-50.0	TBD	Northern Area
	RW-26B[b]	Monthly	TBD	2	35.0-50.0	TBD	Northern Area
	RW-27B[b]	Monthly	TBD	2	25.0-38.0	TBD	Western Area
	RW-28B[b]	Monthly	TBD	2	25.0-38.0	TBD	Western Area
	RW-29B[b]	Monthly	TBD	2	25.0-38.0	TBD	Western Area
	EW-1B	Monthly	5.7	4	24.0 - 39.0	(-18.3) - (-33.3)	Central Processing Area
	EW-2B	Monthly	6.22	4	23.0 - 38.0	(-16.78) - (-31.78)	Central Processing Area
	EX-1B[c]	Monthly	TBD	6	25.0-50.0	TBD	Northern Area
	EX-2B[c]	Monthly	TBD	6	28.0-55.0	TBD	Northern Area
	EX-3B[c]	Monthly	TBD	6	25.0-47.0	TBD	Central Processing Area
	EX-4B[c]	Monthly	TBD	6	25.0-48.0	TBD	Central Processing Area
	EX-5B[c]	Monthly	TBD	6	20.0-43.0	TBD	Western Area
	EX-6B[c]	Monthly	TBD	6	25.0-47.0	TBD	Western Area
	EX-7B[c]	Monthly	TBD	6	25.0-50.0	TBD	Northern Area
	EX-8B[c]	Monthly	TBD	6	25.0-47.0	TBD	Northern Area
C-Zone	RW-5C	Monthly	7.83	2	50.0 - 60.0	(-42.17) - (-52.17)	Panhandle and Eastern Area
	RW-10C	Monthly	4.3	2	39.0 - 59.0	(-34.7) - (-54.7)	Central Processing Area
	RW-17C	Monthly	8.82	2	55.0 - 69.5	(-46.18) - (-60.68)	Panhandle and Eastern Area
	RW-22C[b]	Monthly	TBD	2	45.0-60.0	TBD	Central Processing Area
	RW-23-C[b]	Monthly	TBD	2	45.0-60.0	TBD	Central Processing Area
	RW-24C[b]	Monthly	TBD	2	45.0-60.0	TBD	Central Processing Area
	EX-1C[c]	Monthly	TBD	6	43.0-65.0	TBD	Central Processing Area

Notes
a: well construction details were not provided to Ninyo & Moore by Aracdis, and therefore, are unknown
b: Proposed groundwater monitoring well
c: Proposed groundwater extraction well
d: Weekly sampling for one month, and monthly for the remainder of the pilot study.
TBD: To be determined pending well survey
ft bgs: Feet below ground surface
ft msl: Feet mean sea level



REFERENCE: METRO AREAS OF ALAMEDA, CONTRA COSTA, MARIN, SAN FRANCISCO, SAN MATEO, AND SANTA CLARA COUNTIES, THOMAS GUIDE, 2008.

N

SCALE IN FEET

0 2,000 4,000

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE.

Ninyo & Moore		SITE LOCATION	FIGURE
PROJECT NO.	DATE	BAY ROAD HOLDINGS SITE 2081 BAY ROAD EAST PALO ALTO, CALIFORNIA	1
402643001	9/16		

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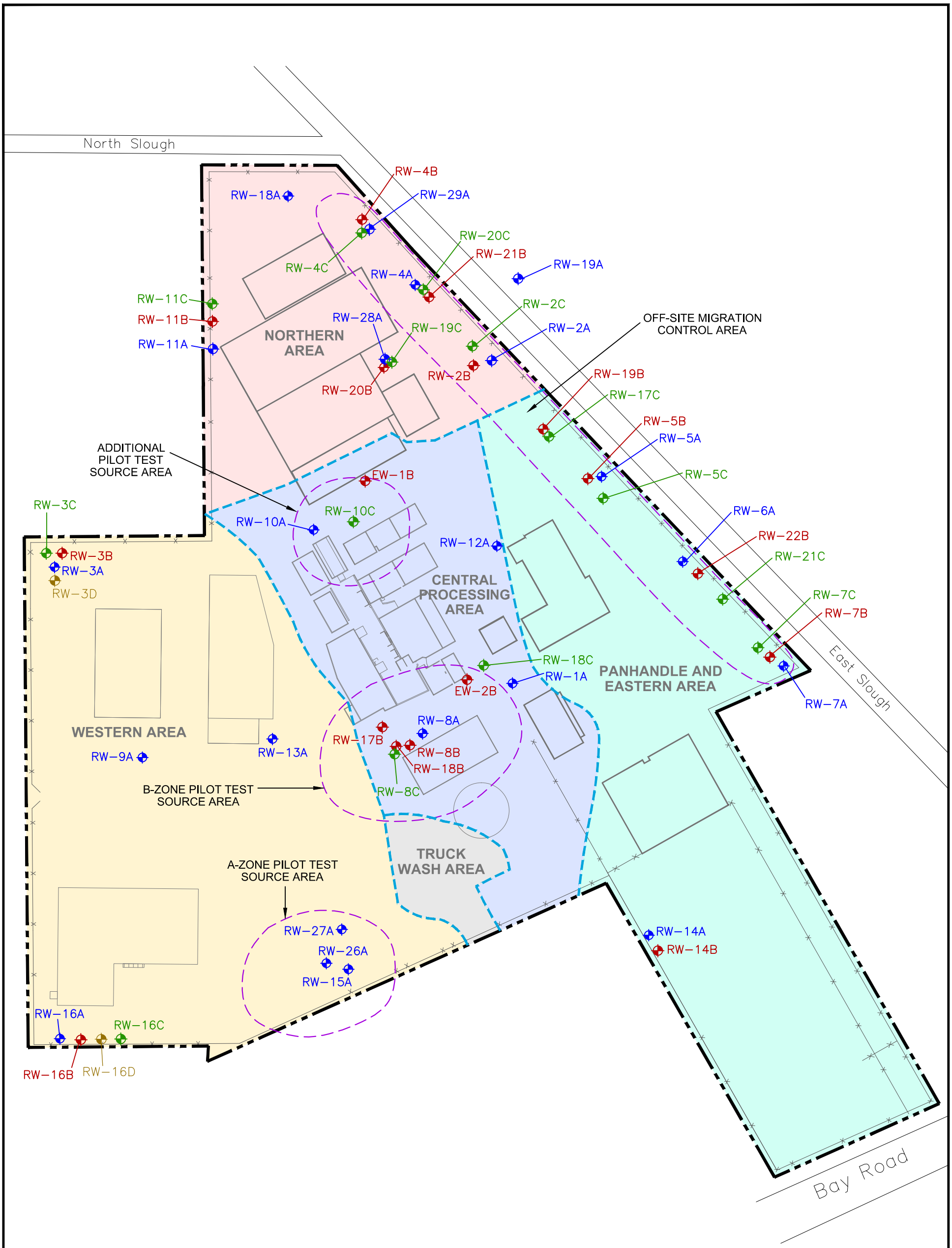
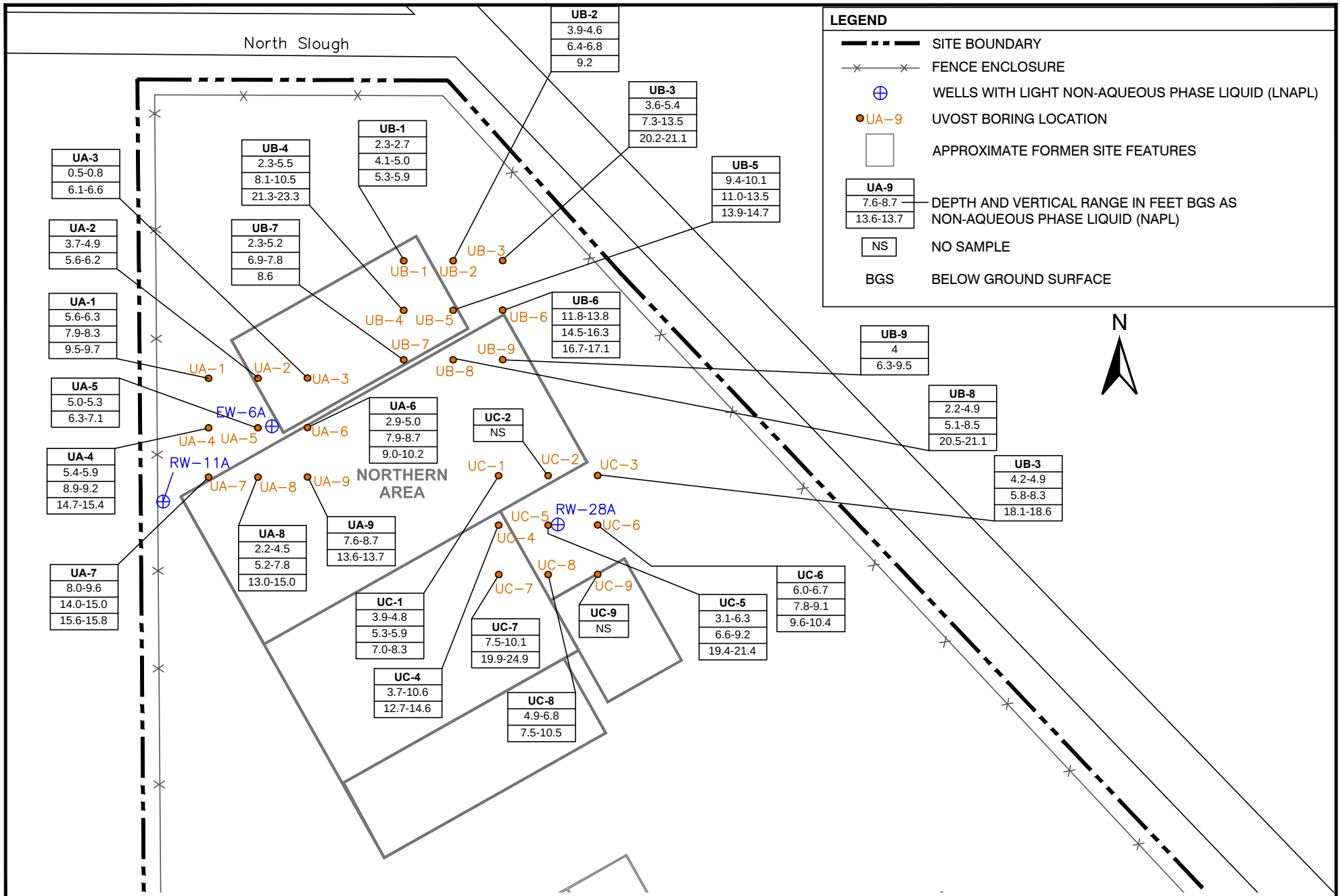
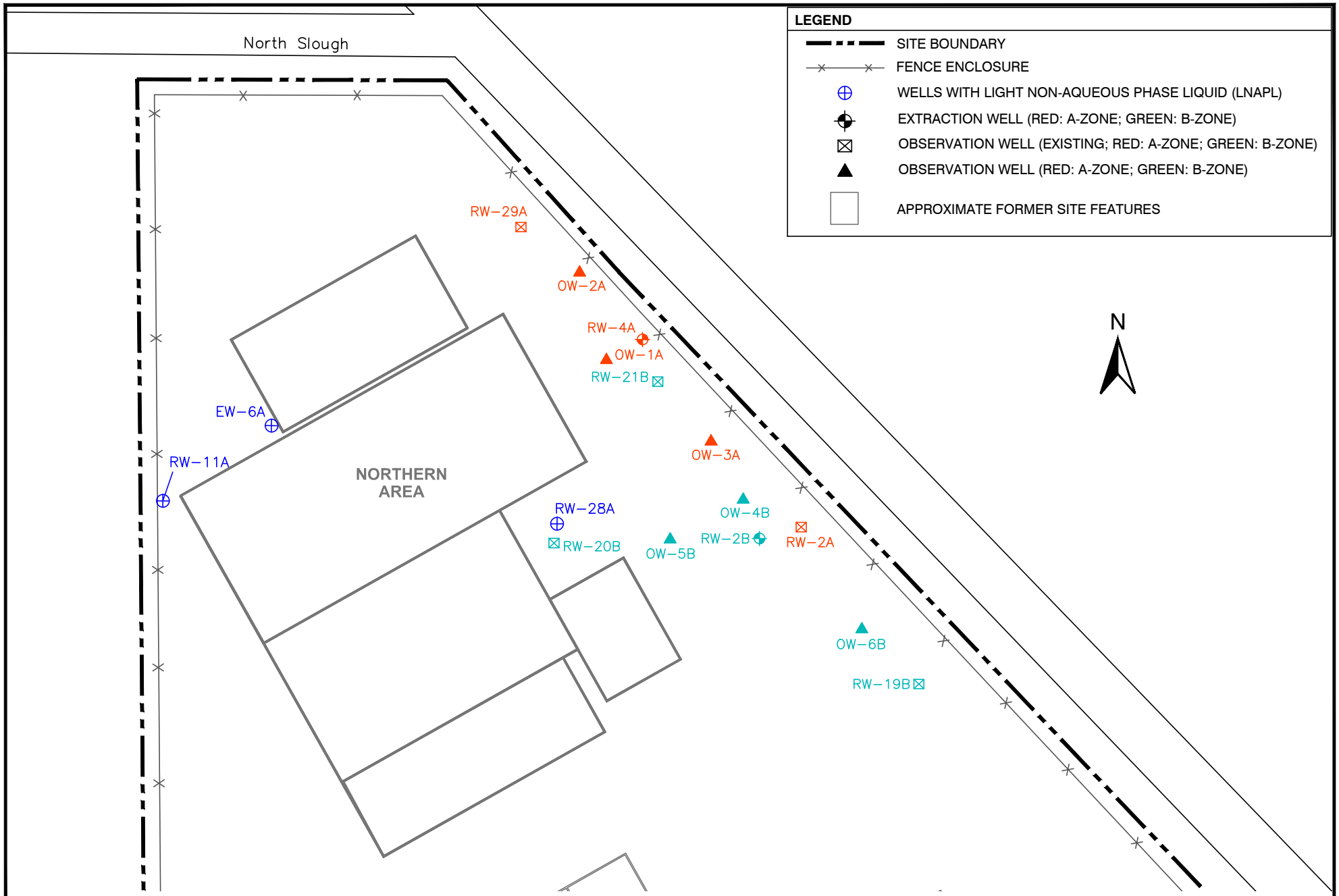


Ninyo & Moore		SITE PLAN	FIGURE
PROJECT NO.	DATE	BAY ROAD HOLDINGS SITE 2081 BAY ROAD EAST PALO ALTO, CALIFORNIA	2
402643001	9/16		



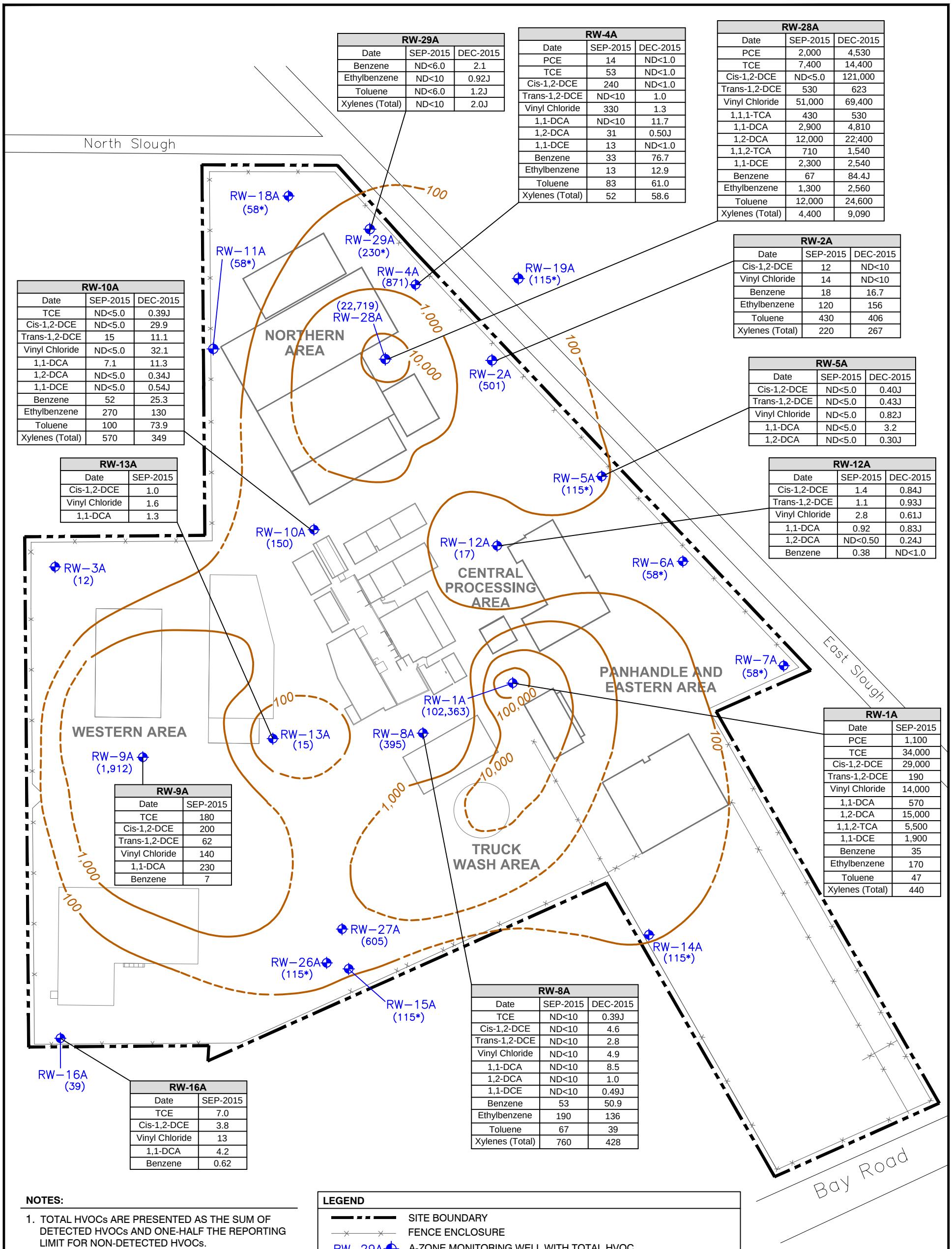
NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE.

Ninyo & Moore	UVOST PROBE RESULTS	FIGURE
PROJECT NO. 402643001 / DATE 9/16	BAY ROAD HOLDINGS SITE 2081 BAY ROAD EAST PALO ALTO, CALIFORNIA	3



Ninyo & Moore		PUMP TEST WELL AND PIEZOMETER LOCATIONS	FIGURE
PROJECT NO.	DATE	BAY ROAD HOLDINGS/FORMER ROMIC FACILITY 2081 BAY ROAD EAST PALO ALTO, CALIFORNIA	4
402643001	9/16		

4 402643001 PTW.dwg AOB



RW-29A		
Date	SEP-2015	DEC-2015
Benzene	ND<6.0	2.1
Ethylbenzene	ND<10	0.92J
Toluene	ND<6.0	1.2J
Xylenes (Total)	ND<10	2.0J

RW-4A		
Date	SEP-2015	DEC-2015
PCE	14	ND<1.0
TCE	53	ND<1.0
Cis-1,2-DCE	240	ND<1.0
Trans-1,2-DCE	ND<10	1.0
Vinyl Chloride	330	1.3
1,1-DCA	ND<10	11.7
1,2-DCA	31	0.50J
1,1-DCE	13	ND<1.0
Benzene	33	76.7
Ethylbenzene	13	12.9
Toluene	83	61.0
Xylenes (Total)	52	58.6

RW-28A		
Date	SEP-2015	DEC-2015
PCE	2,000	4,530
TCE	7,400	14,400
Cis-1,2-DCE	ND<5.0	121,000
Trans-1,2-DCE	530	623
Vinyl Chloride	51,000	69,400
1,1,1-TCA	430	530
1,1-DCA	2,900	4,810
1,2-DCA	12,000	22;400
1,1,2-TCA	710	1,540
1,1-DCE	2,300	2,540
Benzene	67	84.4J
Ethylbenzene	1,300	2,560
Toluene	12,000	24,600
Xylenes (Total)	4,400	9,090

RW-2A		
Date	SEP-2015	DEC-2015
Cis-1,2-DCE	12	ND<10
Vinyl Chloride	14	ND<10
Benzene	18	16.7
Ethylbenzene	120	156
Toluene	430	406
Xylenes (Total)	220	267

RW-10A		
Date	SEP-2015	DEC-2015
TCE	ND<5.0	0.39J
Cis-1,2-DCE	ND<5.0	29.9
Trans-1,2-DCE	15	11.1
Vinyl Chloride	ND<5.0	32.1
1,1-DCA	7.1	11.3
1,2-DCA	ND<5.0	0.34J
1,1-DCE	ND<5.0	0.54J
Benzene	52	25.3
Ethylbenzene	270	130
Toluene	100	73.9
Xylenes (Total)	570	349

RW-5A		
Date	SEP-2015	DEC-2015
Cis-1,2-DCE	ND<5.0	0.40J
Trans-1,2-DCE	ND<5.0	0.43J
Vinyl Chloride	ND<5.0	0.82J
1,1-DCA	ND<5.0	3.2
1,2-DCA	ND<5.0	0.30J

RW-13A	
Date	SEP-2015
Cis-1,2-DCE	1.0
Vinyl Chloride	1.6
1,1-DCA	1.3

RW-12A		
Date	SEP-2015	DEC-2015
Cis-1,2-DCE	1.4	0.84J
Trans-1,2-DCE	1.1	0.93J
Vinyl Chloride	2.8	0.61J
1,1-DCA	0.92	0.83J
1,2-DCA	ND<0.50	0.24J
Benzene	0.38	ND<1.0

RW-1A	
Date	SEP-2015
PCE	1,100
TCE	34,000
Cis-1,2-DCE	29,000
Trans-1,2-DCE	190
Vinyl Chloride	14,000
1,1-DCA	570
1,2-DCA	15,000
1,1,2-TCA	5,500
1,1-DCE	1,900
Benzene	35
Ethylbenzene	170
Toluene	47
Xylenes (Total)	440

RW-9A	
Date	SEP-2015
TCE	180
Cis-1,2-DCE	200
Trans-1,2-DCE	62
Vinyl Chloride	140
1,1-DCA	230
Benzene	7

RW-8A		
Date	SEP-2015	DEC-2015
TCE	ND<10	0.39J
Cis-1,2-DCE	ND<10	4.6
Trans-1,2-DCE	ND<10	2.8
Vinyl Chloride	ND<10	4.9
1,1-DCA	ND<10	8.5
1,2-DCA	ND<10	1.0
1,1-DCE	ND<10	0.49J
Benzene	53	50.9
Ethylbenzene	190	136
Toluene	67	39
Xylenes (Total)	760	428

RW-16A	
Date	SEP-2015
TCE	7.0
Cis-1,2-DCE	3.8
Vinyl Chloride	13
1,1-DCA	4.2
Benzene	0.62

NOTES:

1. TOTAL HVOCs ARE PRESENTED AS THE SUM OF DETECTED HVOCs AND ONE-HALF THE REPORTING LIMIT FOR NON-DETECTED HVOCs.
2. ANALYTICAL RESULTS ARE PRESENTED IN MICROGRAMS PER LITER (µg/L).

LEGEND

	SITE BOUNDARY
	FENCE ENCLOSURE
RW-29A (230*)	A-ZONE MONITORING WELL WITH TOTAL HVOC CONCENTRATION FOR SEPTEMBER 2015
*	HVOCs WERE NOT DETECTED ABOVE THE REPORTING LIMIT
VOCs	VOLATILE ORGANIC COMPOUNDS
HVOCs	HALOGENATED VOLATILE ORGANIC COMPOUNDS
DCA	DICHLOROETHANE
DCE	DICHLOROETHENE
PCE	TETRACHLOROETHENE
TCA	TRICHLOROETHANE
TCE	TRICHLOROETHENE
ND	NOT DETECTED FOR VOC CONSTITUENTS
J	ANALYTE VALUE IS ESTIMATED
ND<X	NOT DETECTED ABOVE REPORTING LIMIT INDICATED BY X
100	TOTAL HVOC ISCONCENTRATION CONTOUR FOR SEPTEMBER 2015 (DASHED WHERE INFERRED)

N

SCALE IN FEET

0 100 200

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE.

Ninyo & Moore

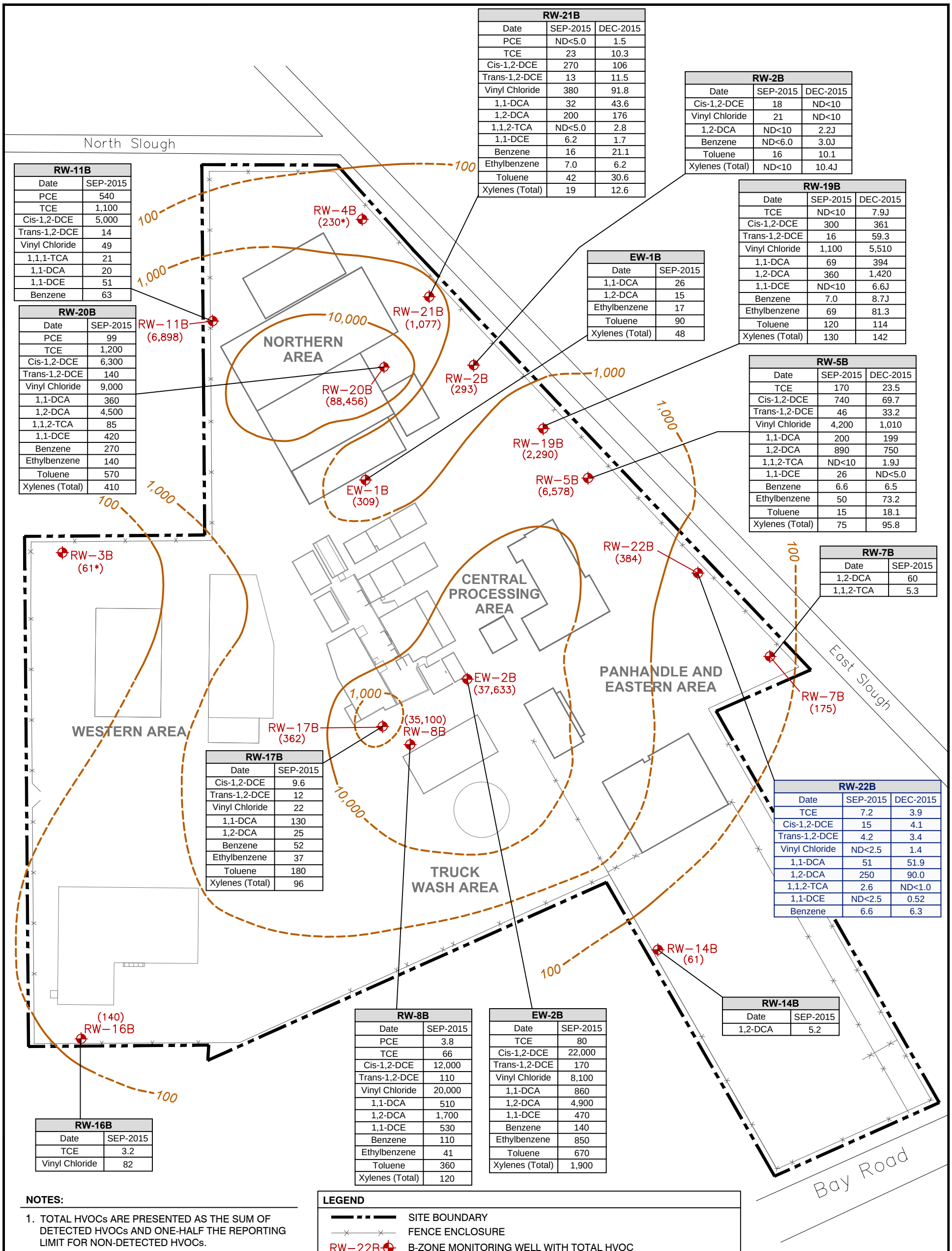
A-ZONE VOCs IN GROUNDWATER - SECOND HALF OF 2015

FIGURE 5

PROJECT NO.	DATE
402643001	9/16

BAY ROAD HOLDINGS SITE
2081 BAY ROAD
EAST PALO ALTO, CALIFORNIA

5_402643001-A ZONE-VOC.dwg, Sep 23, 2016, 9:34am, SN



RW-21B		
Date	SEP-2015	DEC-2015
PCE	ND<5.0	1.5
TCE	23	10.3
Cis-1,2-DCE	270	106
Trans-1,2-DCE	13	11.5
Vinyl Chloride	380	91.8
1,1-DCA	32	43.6
1,2-DCA	200	176
1,1,2-TCA	ND<5.0	2.8
1,1-DCE	6.2	1.7
Benzene	16	21.1
Ethylbenzene	7.0	6.2
Toluene	42	30.6
Xylenes (Total)	19	12.6

RW-2B		
Date	SEP-2015	DEC-2015
Cis-1,2-DCE	18	ND<10
Vinyl Chloride	21	ND<10
1,2-DCA	ND<10	2.2J
Benzene	ND<6.0	3.0J
Toluene	16	10.1
Xylenes (Total)	ND<10	10.4J

RW-11B	
Date	SEP-2015
PCE	540
TCE	1,100
Cis-1,2-DCE	5,000
Trans-1,2-DCE	14
Vinyl Chloride	49
1,1,1-TCA	21
1,1-DCA	20
1,1-DCE	51
Benzene	63

EW-1B	
Date	SEP-2015
1,1-DCA	26
1,2-DCA	15
Ethylbenzene	17
Toluene	90
Xylenes (Total)	48

RW-19B		
Date	SEP-2015	DEC-2015
TCE	ND<10	7.9J
Cis-1,2-DCE	300	361
Trans-1,2-DCE	16	59.3
Vinyl Chloride	1,100	5,510
1,1-DCA	69	394
1,2-DCA	360	1,420
1,1-DCE	ND<10	6.6J
Benzene	7.0	8.7J
Ethylbenzene	69	81.3
Toluene	120	114
Xylenes (Total)	130	142

RW-20B	
Date	SEP-2015
PCE	99
TCE	1,200
Cis-1,2-DCE	6,300
Trans-1,2-DCE	140
Vinyl Chloride	9,000
1,1-DCA	360
1,2-DCA	4,500
1,1,2-TCA	85
1,1-DCE	420
Benzene	270
Ethylbenzene	140
Toluene	570
Xylenes (Total)	410

RW-5B		
Date	SEP-2015	DEC-2015
TCE	170	23.5
Cis-1,2-DCE	740	69.7
Trans-1,2-DCE	46	33.2
Vinyl Chloride	4,200	1,010
1,1-DCA	200	199
1,2-DCA	890	750
1,1,2-TCA	ND<10	1.9J
1,1-DCE	26	ND<5.0
Benzene	6.6	6.5
Ethylbenzene	50	73.2
Toluene	15	18.1
Xylenes (Total)	75	95.8

RW-7B	
Date	SEP-2015
1,2-DCA	60
1,1,2-TCA	5.3

RW-22B		
Date	SEP-2015	DEC-2015
TCE	7.2	3.9
Cis-1,2-DCE	15	4.1
Trans-1,2-DCE	4.2	3.4
Vinyl Chloride	ND<2.5	1.4
1,1-DCA	51	51.9
1,2-DCA	250	90.0
1,1,2-TCA	2.6	ND<1.0
1,1-DCE	ND<2.5	0.52
Benzene	6.6	6.3

RW-17B	
Date	SEP-2015
Cis-1,2-DCE	9.6
Trans-1,2-DCE	12
Vinyl Chloride	22
1,1-DCA	130
1,2-DCA	25
Benzene	52
Ethylbenzene	37
Toluene	180
Xylenes (Total)	96

RW-8B	
Date	SEP-2015
PCE	3.8
TCE	66
Cis-1,2-DCE	12,000
Trans-1,2-DCE	110
Vinyl Chloride	20,000
1,1-DCA	510
1,2-DCA	1,700
1,1-DCE	530
Benzene	110
Ethylbenzene	41
Toluene	360
Xylenes (Total)	120

EW-2B	
Date	SEP-2015
TCE	80
Cis-1,2-DCE	22,000
Trans-1,2-DCE	170
Vinyl Chloride	8,100
1,1-DCA	860
1,2-DCA	4,900
1,1-DCE	470
Benzene	140
Ethylbenzene	850
Toluene	670
Xylenes (Total)	1,900

RW-14B	
Date	SEP-2015
1,2-DCA	5.2

RW-16B	
Date	SEP-2015
TCE	3.2
Vinyl Chloride	82

NOTES:

1. TOTAL HVOCs ARE PRESENTED AS THE SUM OF DETECTED HVOCs AND ONE-HALF THE REPORTING LIMIT FOR NON-DETECTED HVOCs.
2. ANALYTICAL RESULTS ARE PRESENTED IN MICROGRAMS PER LITER (μg/L).

LEGEND

	SITE BOUNDARY
	FENCE ENCLOSURE
RW-22B (384)	B-ZONE MONITORING WELL WITH TOTAL HVOC CONCENTRATION FOR SEPTEMBER 2015
*	HVOCs WERE NOT DETECTED ABOVE THE REPORTING LIMIT
VOCs	VOLATILE ORGANIC COMPOUNDS
HVOCs	HALOGENATED VOLATILE ORGANIC COMPOUNDS
DCA	DICHLOROETHANE
DCE	DICHLOROETHENE
PCE	TETRACHLOROETHENE
TCA	TRICHLOROETHANE
TCE	TRICHLOROETHENE
ND	NOT DETECTED FOR VOC CONSTITUENTS
J	ANALYTE VALUE IS ESTIMATED
ND<X	NOT DETECTED ABOVE REPORTING LIMIT INDICATED BY X
100	TOTAL HVOC ISCONCENTRATION CONTOUR FOR SEPTEMBER 2015 (DASHED WHERE INFERRED)

N

SCALE IN FEET

0 100 200

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE.

Ninyo & Moore

B-ZONE VOCs IN GROUNDWATER - SECOND HALF OF 2015

FIGURE 6

PROJECT NO.	DATE
402643001	9/16

BAY ROAD HOLDINGS SITE
2081 BAY ROAD
EAST PALO ALTO, CALIFORNIA

6_402643001-B ZONE-VOC.dwg, Sep 23, 2016, 9:35am, SN

RW-20C		
Date	SEP-2015	DEC-2015
Cis-1,2-DCE	1.5	0.90J
Vinyl Chloride	ND<0.50	0.58J
1,2-DCA	1.0	0.53
Toluene	0.60	0.42J

RW-2C		
Date	SEP-2015	DEC-2015
TCE	28	20.8
Cis-1,2-DCE	24	12.1
Trans-1,2-DCE	ND<2.5	2.0J
Vinyl Chloride	33	11.4
1,1-DCA	11	12.5
1,2-DCA	460	686
1,1,2-TCA	16	46.0
1,1-DCE	26	26.9
Toluene	3.3	ND<2.5

RW-17C		
Date	SEP-2015	DEC-2015
TCE	ND<10	0.64
Cis-1,2-DCE	ND<10	2.5
Trans-1,2-DCE	ND<10	1.7
Vinyl Chloride	ND<10	3.2
1,1-DCA	ND<10	2.7
1,2-DCA	ND<10	3.3
Benzene	ND<6.0	0.41
Ethylbenzene	ND<10	2.6
Toluene	ND<6.0	0.66
Xylenes (Total)	ND<10	6.4

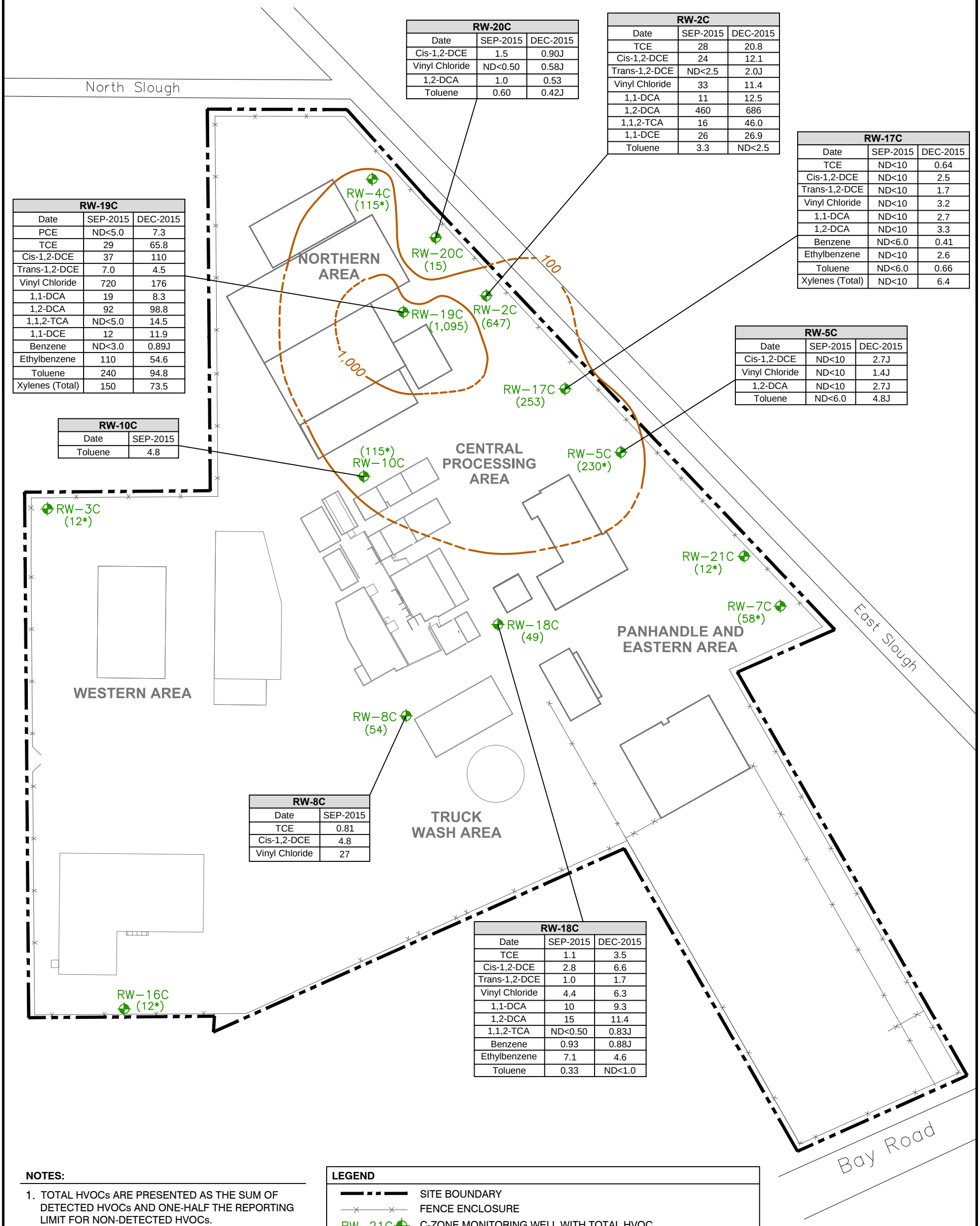
RW-19C		
Date	SEP-2015	DEC-2015
PCE	ND<5.0	7.3
TCE	29	65.8
Cis-1,2-DCE	37	110
Trans-1,2-DCE	7.0	4.5
Vinyl Chloride	720	176
1,1-DCA	19	8.3
1,2-DCA	92	98.8
1,1,2-TCA	ND<5.0	14.5
1,1-DCE	12	11.9
Benzene	ND<3.0	0.89J
Ethylbenzene	110	54.6
Toluene	240	94.8
Xylenes (Total)	150	73.5

RW-5C		
Date	SEP-2015	DEC-2015
Cis-1,2-DCE	ND<10	2.7J
Vinyl Chloride	ND<10	1.4J
1,2-DCA	ND<10	2.7J
Toluene	ND<6.0	4.8J

RW-10C	
Date	SEP-2015
Toluene	4.8

RW-8C	
Date	SEP-2015
TCE	0.81
Cis-1,2-DCE	4.8
Vinyl Chloride	27

RW-18C		
Date	SEP-2015	DEC-2015
TCE	1.1	3.5
Cis-1,2-DCE	2.8	6.6
Trans-1,2-DCE	1.0	1.7
Vinyl Chloride	4.4	6.3
1,1-DCA	10	9.3
1,2-DCA	15	11.4
1,1,2-TCA	ND<0.50	0.83J
Benzene	0.93	0.88J
Ethylbenzene	7.1	4.6
Toluene	0.33	ND<1.0



NOTES:

1. TOTAL HVOCs ARE PRESENTED AS THE SUM OF DETECTED HVOCs AND ONE-HALF THE REPORTING LIMIT FOR NON-DETECTED HVOCs.
2. ANALYTICAL RESULTS ARE PRESENTED IN MICROGRAMS PER LITER (μg/L).

LEGEND

	SITE BOUNDARY
	FENCE ENCLOSURE
RW-21C (12*)	C-ZONE MONITORING WELL WITH TOTAL HVOC CONCENTRATION FOR SEPTEMBER 2015
*	HVOCs WERE NOT DETECTED ABOVE THE REPORTING LIMIT
VOCs	VOLATILE ORGANIC COMPOUNDS
HVOCs	HALOGENATED VOLATILE ORGANIC COMPOUNDS
DCA	DICHLOROETHANE
DCE	DICHLOROETHENE
PCE	TETRACHLOROETHENE
TCA	TRICHLOROETHANE
TCE	TRICHLOROETHENE
ND	NOT DETECTED FOR VOC CONSTITUENTS
J	ANALYTE VALUE IS ESTIMATED
ND<X	NOT DETECTED ABOVE REPORTING LIMIT INDICATED BY X
100	TOTAL HVOC ISCONCENTRATION CONTOUR FOR SEPTEMBER 2015 (DASHED WHERE INFERRED)

N

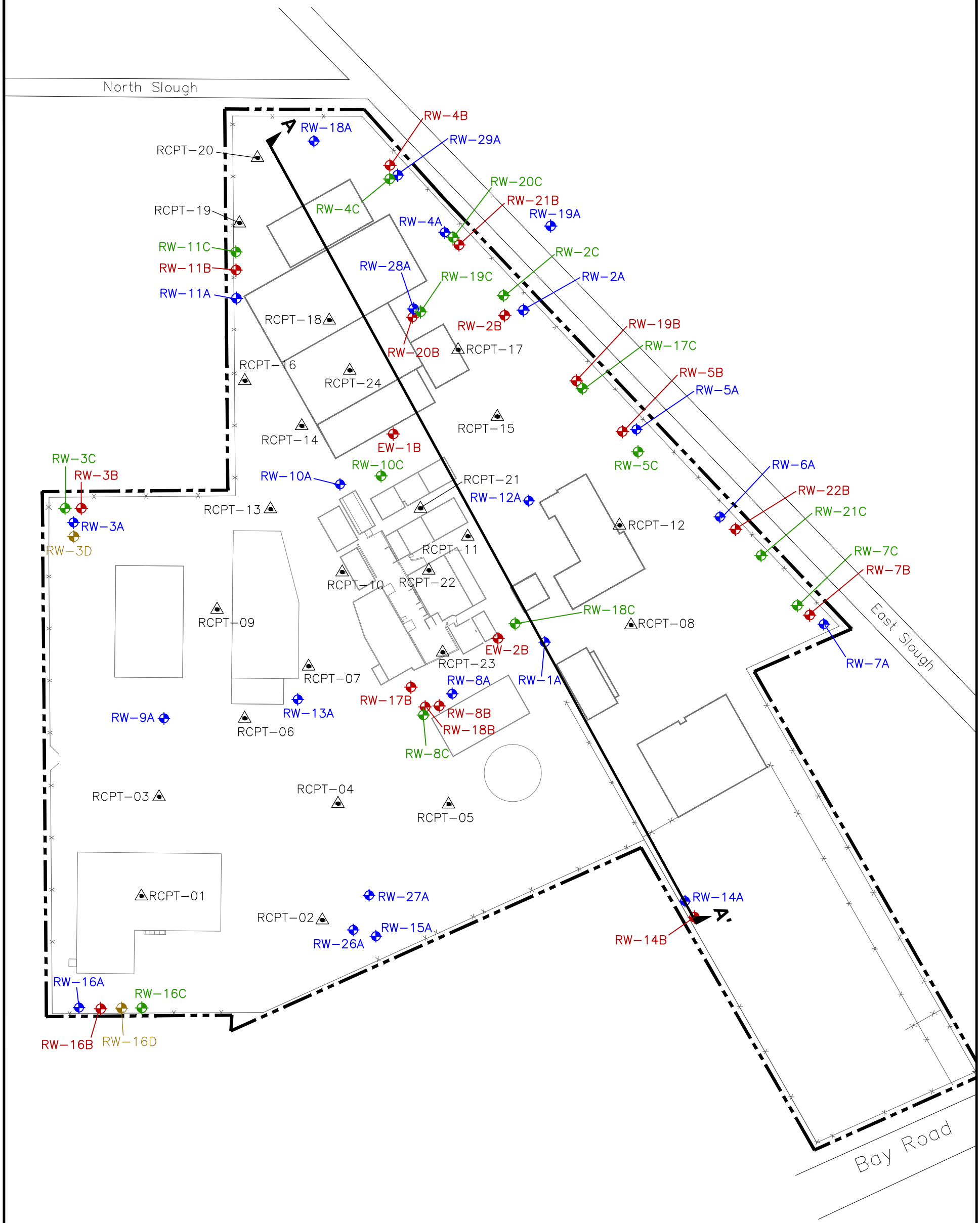
SCALE IN FEET

0 100 200

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE.

Ninyo & Moore	C-ZONE VOCs IN GROUNDWATER - SECOND HALF OF 2015	FIGURE
PROJECT NO. 402643001 / DATE 9/16	BAY ROAD HOLDINGS SITE 2081 BAY ROAD EAST PALO ALTO, CALIFORNIA	7

7_402643001-C ZONE-VOC.dwg, Sep 23, 2016, 9:36am, SN



N

SCALE IN FEET

0 100 200

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE.

DRAFT

LEGEND

- SITE BOUNDARY
- FENCE ENCLOSURE
- A A' CROSS SECTION LOCATION
- RW-29A A-ZONE MONITORING WELL
- RW-22B B-ZONE MONITORING WELL
- RW-21C C-ZONE MONITORING WELL
- RW-16D D-ZONE MONITORING WELL
- RCPT-24 HYDROPUNCH SAMPLE LOCATION

Ninyo & Moore

PROJECT NO.	DATE
402643001	9/16

CROSS SECTION PLAN VIEW

BAY ROAD HOLDINGS SITE
2081 BAY ROAD
EAST PALO ALTO, CALIFORNIA

FIGURE

8

8 402643001 SP.dwg, Sep 23, 2016, 9:38am, SN

(NW) **A** — **A'** (SE)

RCPT-20 (PROJECTED 31.5') | RW-18A (PROJECTED 39') | RCPT-19 (PROJECTED 69') | EX-6A | EX-1A | RW-4B (PROJECTED 97.5') | RW-11C (PROJECTED 82.5') | RW-11B (PROJECTED 93') | RW-4C (PROJECTED 91.5') | RCPT-18 (PROJECTED 33') | EX-2A | RW-28A (PROJECTED 48') | RW-19C (PROJECTED 52.5') | RW-20B (PROJECTED 42') | CROSS SECTION C-C' | RCPT-24 (PROJECTED 37.5') | RCPT-17 (PROJECTED 67.5') | EX-5A | EX-3A | EX-4A | EW-1B (PROJECTED 30') | RW-10C (PROJECTED 63') | RCPT-15 (PROJECTED 69') | RCPT-21 (PROJECTED 43.5') | RW-12A (PROJECTED 58.5') | RCPT-11 (PROJECTED 15') | RCPT-22 (PROJECTED 67.5') | CROSS SECTION D-D' | RCPT-23 (PROJECTED 94.5') | RW-18C (PROJECTED 15') | EW-2B (PROJECTED 37.5') | RW-1A (PROJECTED 1.5') | RCPT-08 (PROJECTED 87') | FILL | RW-14A | RW-14B

ELEVATION (FEET MSL)

HW-1A | HW-2A

A-ZONE | A/B AQUITARD | B-ZONE | B/C AQUITARD | C-ZONE | C/D AQUITARD

DISTANCE (FEET)

SCALE IN FEET: 20, 0; 0, 60

DRAFT

LEGEND

1,700,000	WELL SCREEN INTERVAL WITH TOTAL HVOC CONCENTRATIONS FOR SEPTEMBER 2015
	INTERPRETED MAJOR ZONE OR AQUITARD CONTACT
	TOTAL HVOCs ISOCONCENTRATION CONTOURS FOR SEPTEMBER 2015
	INTERPRETED TOTAL HVOCs ISOCONCENTRATION CONTOURS FOR SEPTEMBER 2015
EX-6A	PROPOSED VERTICAL EXTRACTION WELL LOCATION
HW-2A	PROPOSED HORIZONTAL INJECTION WELL LOCATION
RCPT-24	PROPOSED IRIS 2015 GROUNDWATER SAMPLE LOCATION
R2/MW	MONITORING WELLS
*	HVOCs WERE NOT DETECTED ABOVE REPORTING LIMIT
▼	WATER LEVEL FOR SEPTEMBER 2015
TD	TOTAL DEPTH IN FEET
MSL	MEAN SEA LEVEL

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE.

NOTES:

1. TOTAL HVOCs ARE PRESENTED AS THE SUMS OF DETECTED HVOCs AND ONE HALF THE REPORTING LIMIT FOR NON-DETECTED HVOCs.
2. ANALYTICAL RESULTS ARE PRESENTED IN MICROGRAMS PER LITER (µg/L).
3. HORIZONTAL WELLS NOT TO SCALE DUE TO ORIENTATION.

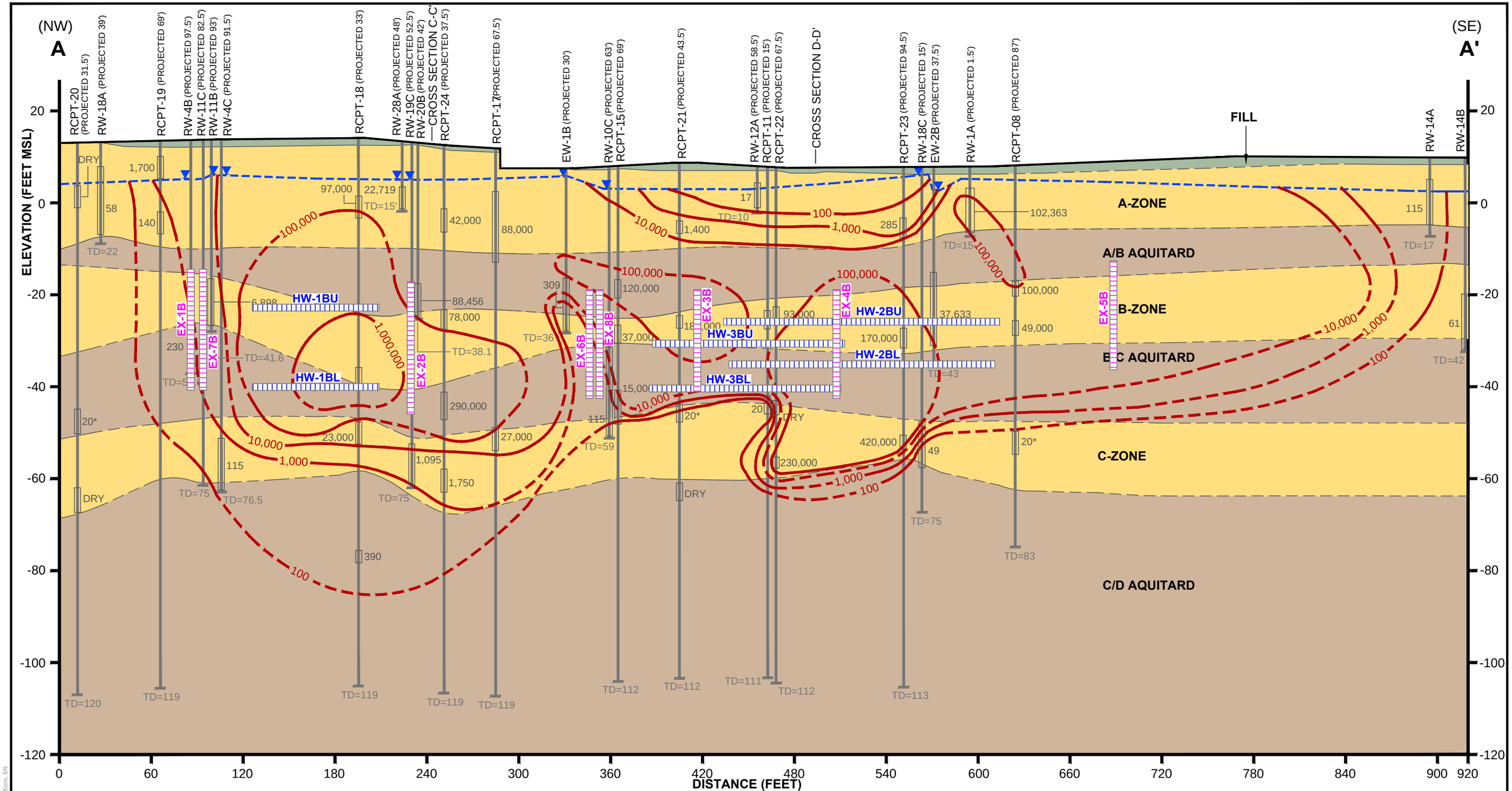
Ninyo & Moore

PROJECT NO.	DATE
402643001	9/16

CROSS SECTION AT PROPOSED A-ZONE HORIZONTAL INJECTION AND VERTICAL EXTRACTION WELLS

BAY ROAD HOLDINGS SITE
2081 BAY ROAD
EAST PALO ALTO, CALIFORNIA

FIGURE **9**



DRAFT

SCALE IN FEET: 0, 20

SCALE IN FEET: 0, 60

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE.

LEGEND

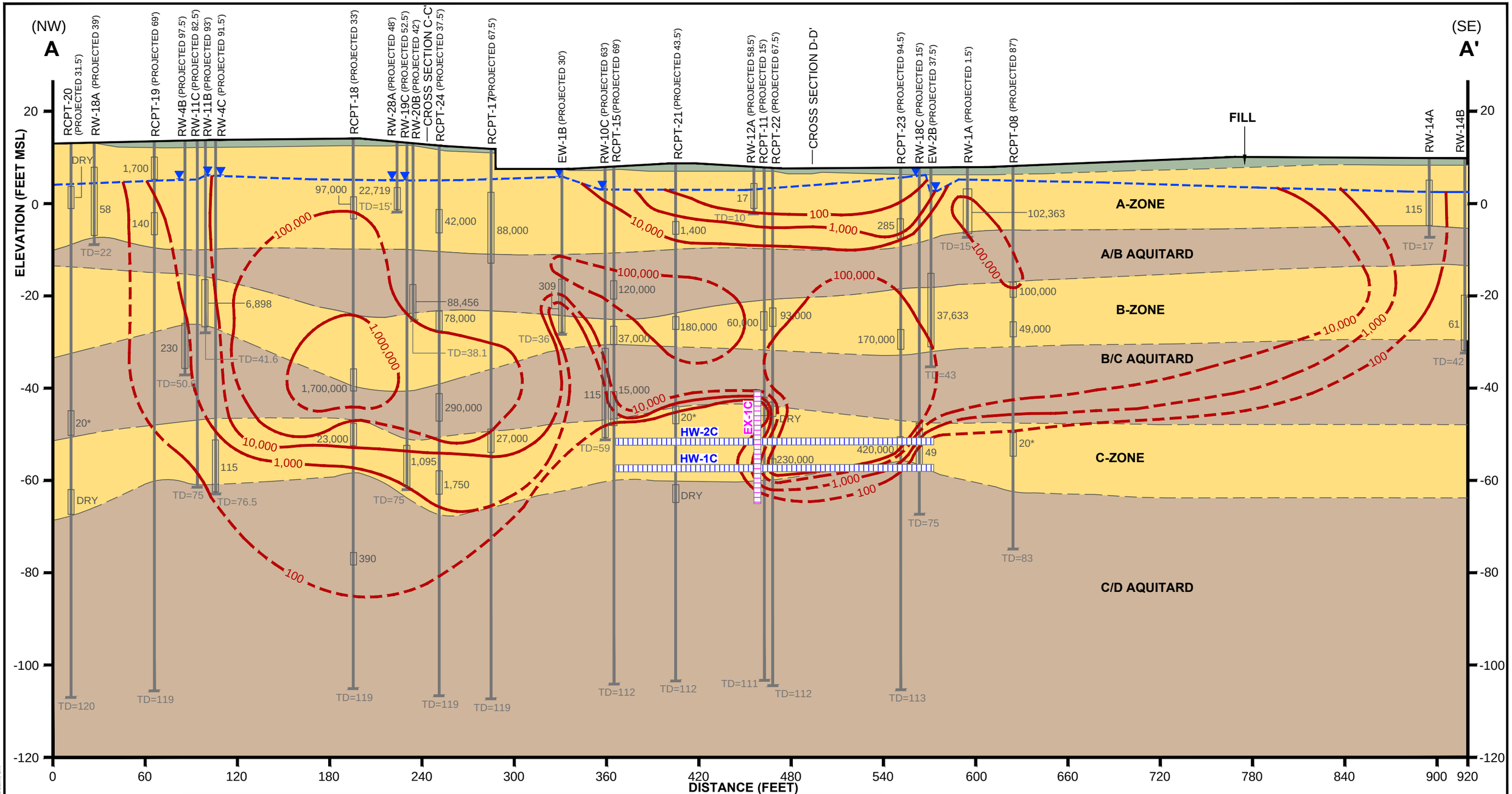
1,700,000	WELL SCREEN INTERVAL WITH TOTAL HVOC CONCENTRATIONS FOR SEPTEMBER 2015	EX-7B	PROPOSED VERTICAL EXTRACTION WELL LOCATION
	INTERPRETED MAJOR ZONE OR AQUITARD CONTACT	HW-3BU/L	PROPOSED HORIZONTAL INJECTION WELL LOCATION
	TOTAL HVOCs ISOCONCENTRATION CONTOURS FOR SEPTEMBER 2015	RCPT-24	PROPOSED IRIS 2015 GROUNDWATER SAMPLE LOCATION
	INTERPRETED TOTAL HVOCs ISOCONCENTRATION CONTOURS FOR SEPTEMBER 2015	R2/MW	MONITORING WELLS
		*	HVOCs WERE NOT DETECTED ABOVE REPORTING LIMIT
		▼	WATER LEVEL FOR SEPTEMBER 2015
		TD	TOTAL DEPTH IN FEET
		MSL	MEAN SEA LEVEL

NOTES:

1. TOTAL HVOCs ARE PRESENTED AS THE SUMS OF DETECTED HVOCs AND ONE HALF THE REPORTING LIMIT FOR NON-DETECTED HVOCs.
2. ANALYTICAL RESULTS ARE PRESENTED IN MICROGRAMS PER LITER (µg/L).
3. HORIZONTAL WELLS NOT TO SCALE DUE TO ORIENTATION.

Ninyo & Moore	CROSS SECTION AT PROPOSED B-ZONE HORIZONTAL INJECTION AND VERTICAL EXTRACTION WELLS	FIGURE
PROJECT NO. 402643001 / DATE 9/16	BAY ROAD HOLDINGS SITE 2081 BAY ROAD EAST PALO ALTO, CALIFORNIA	10

10 402643001-B ZONE CS-AA.DWG, Sep 21, 2016, 4:26pm, SN



DRAFT

SCALE IN FEET: 20, 0; 0, 60

LEGEND

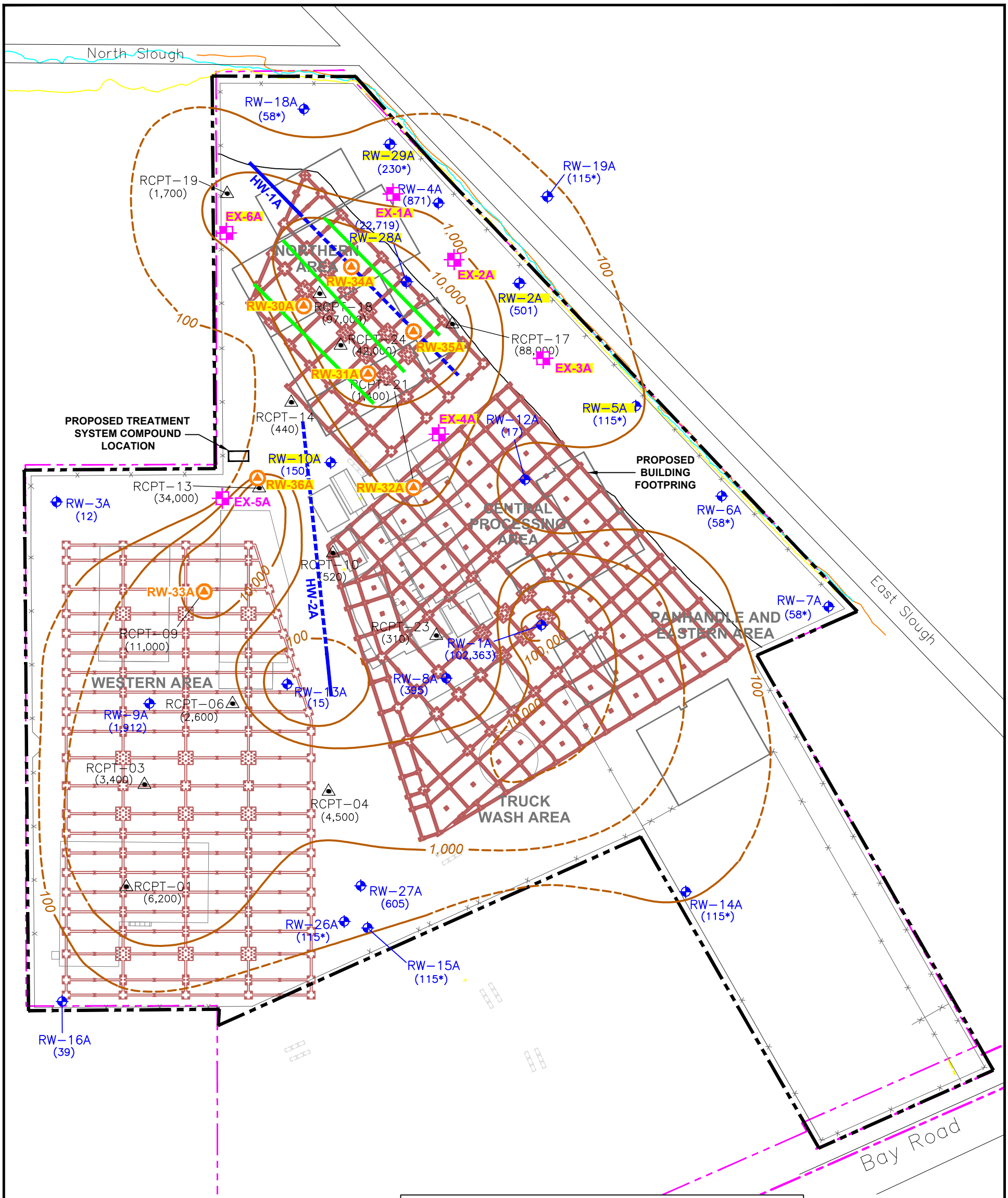
1,700,000	WELL SCREEN INTERVAL WITH TOTAL HVOC CONCENTRATIONS FOR SEPTEMBER 2015
	INTERPRETED MAJOR ZONE OR AQUITARD CONTACT
	TOTAL HVOCs ISOCONCENTRATION CONTOURS FOR SEPTEMBER 2015
	INTERPRETED TOTAL HVOCs ISOCONCENTRATION CONTOURS FOR SEPTEMBER 2015
EX-1C	PROPOSED VERTICAL EXTRACTION WELL LOCATION
HW-2C	PROPOSED HORIZONTAL INJECTION WELL LOCATION
RCPT-24	PROPOSED IRIS 2015 GROUNDWATER SAMPLE LOCATION
R2/MW	MONITORING WELLS
*	HVOCs WERE NOT DETECTED ABOVE REPORTING LIMIT
▼	WATER LEVEL FOR SEPTEMBER 2015
TD	TOTAL DEPTH IN FEET
MSL	MEAN SEA LEVEL

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE.

NOTES:

1. TOTAL HVOCs ARE PRESENTED AS THE SUMS OF DETECTED HVOCs AND ONE HALF THE REPORTING LIMIT FOR NON-DETECTED HVOCs.
2. ANALYTICAL RESULTS ARE PRESENTED IN MICROGRAMS PER LITER (µg/L).
3. HORIZONTAL WELLS NOT TO SCALE DUE TO ORIENTATION.

Ninyo & Moore	CROSS SECTION AT PROPOSED C-ZONE HORIZONTAL INJECTION AND VERTICAL EXTRACTION WELLS	FIGURE
PROJECT NO. / DATE	BAY ROAD HOLDINGS SITE 2081 BAY ROAD EAST PALO ALTO, CALIFORNIA	11
402643001 / 9/16		



NOTES:

1. TOTAL HVOCs ARE PRESENTED AS THE SUM OF DETECTED HVOCs AND ONE-HALF THE REPORTING LIMIT FOR NON-DETECTED HVOCs.
2. ANALYTICAL RESULTS ARE PRESENTED IN MICROGRAMS PER LITER (μg/L).

LEGEND

	SITE BOUNDARY
	FENCE ENCLOSURE
	PILOT STUDY MONITORING WELL
RW–29A (230*)	A-ZONE MONITORING WELL WITH TOTAL HVOC CONCENTRATION FOR SEPTEMBER 2015
*	HVOCs WERE NOT DETECTED ABOVE THE REPORTING LIMIT
RCPT–24 (42,000)	HYDROPUNCH SAMPLE LOCATION WITH TOTAL HVOC CONCENTRATION FOR JUNE AND JULY 2015
VOCs	VOLATILE ORGANIC COMPOUNDS
HVOCs	HALOGENATED VOLATILE ORGANIC COMPOUNDS
ND	NOT DETECTED FOR VOC CONSTITUENTS
J	ANALYTE VALUE IS ESTIMATED
ND<X	NOT DETECTED ABOVE REPORTING LIMIT INDICATED BY X
100	TOTAL HVOC ISCONCENTRATION CONTOUR FOR SEPTEMBER 2015 (DASHED WHERE INFERRED)
RW-35A	PROPOSED NEW A-ZONE MONTIORING WELL
EX-6A	PROPOSED EXTRACTION WELL
HW-2A	PROPOSED HORIZONTAL INJECTION WELL SCREEN
	PROPOSED RISER PIPES
	PROPOSED INJECTION TRENCHES IN EXCAVATIONS

N

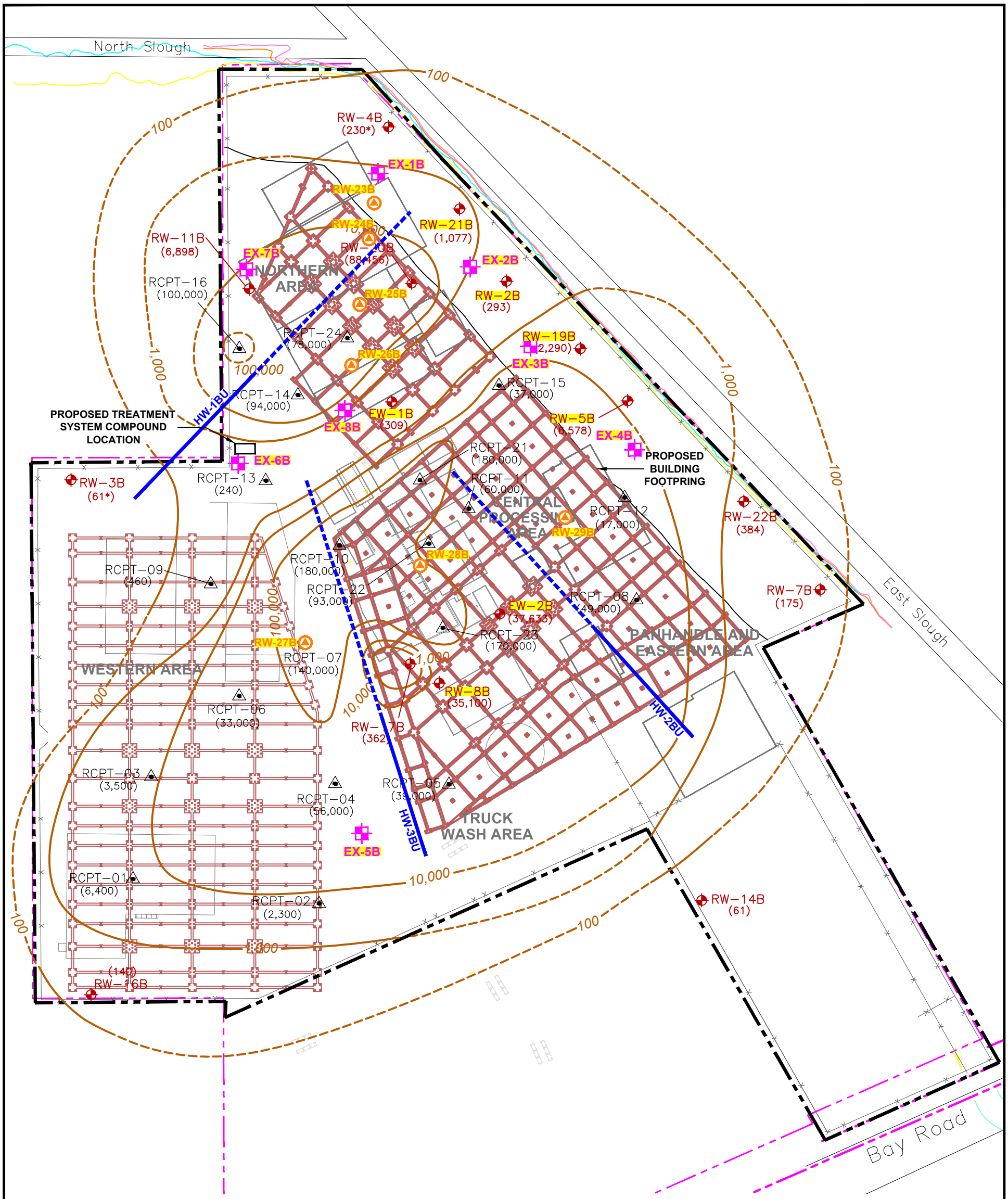
SCALE IN FEET

0 100 200

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE.

Ninyo & Moore	PROPOSED A-ZONE HORIZONTAL INJECTION AND VERTICAL EXTRACTION WELL LOCATIONS	FIGURE
PROJECT NO. 402643001 / DATE 9/16	BAY ROAD HOLDINGS SITE 2081 BAY ROAD EAST PALO ALTO, CALIFORNIA	12

12_402643001-A ZONE-VOC FOUNDATION.dwg, Sep 21, 2016, 4:37pm, SN



NOTES:

1. TOTAL HVOCs ARE PRESENTED AS THE SUM OF DETECTED HVOCs AND ONE-HALF THE REPORTING LIMIT FOR NON-DETECTED HVOCs.
2. ANALYTICAL RESULTS ARE PRESENTED IN MICROGRAMS PER LITER (μg/L).

LEGEND

	SITE BOUNDARY
	FENCE ENCLOSURE
	PILOT STUDY MONITORING WELL
RW-22B (384) *	B-ZONE MONITORING WELL WITH TOTAL HVOC CONCENTRATION FOR SEPTEMBER 2015 HVOCs WERE NOT DETECTED ABOVE THE REPORTING LIMIT
RCPT-24 (78,000)	HYDROPUNCH SAMPLE LOCATION WITH TOTAL HVOC CONCENTRATION FOR JUNE AND JULY 2015
VOCs	VOLATILE ORGANIC COMPOUNDS
HVOCs	HALOGENATED VOLATILE ORGANIC COMPOUNDS
ND	NOT DETECTED FOR VOC CONSTITUENTS
J	ANALYTE VALUE IS ESTIMATED
ND<X	NOT DETECTED ABOVE REPORTING LIMIT INDICATED BY X
100	TOTAL HVOC ISCONCENTRATION CONTOUR FOR SEPTEMBER 2015 (DASHED WHERE INFERRED)
RW-27B	PROPOSED NEW B-ZONE MONTIORING WELL
EX-7B	PROPOSED EXTRACTION WELL
HW-3BU	PROPOSED HORIZONTAL INJECTION WELL SCREEN
	PROPOSED RISER PIPES

N

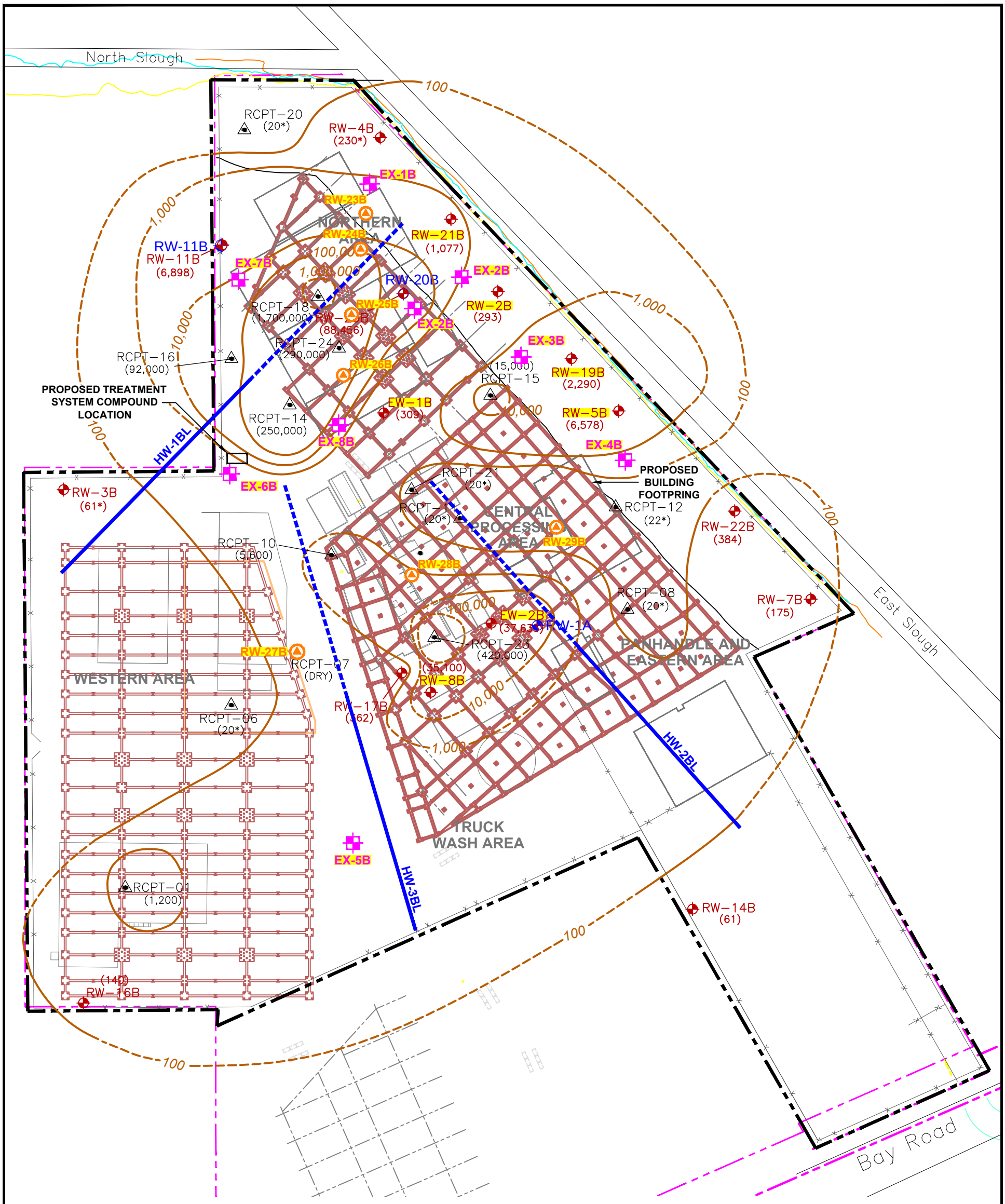
SCALE IN FEET

0 100 200

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE.

Ninyo & Moore		PROPOSED UPPER B-ZONE HORIZONTAL INJECTION AND VERTICAL EXTRACTION WELL LOCATIONS	FIGURE 13
PROJECT NO.	DATE	BAY ROAD HOLDINGS SITE 2081 BAY ROAD EAST PALO ALTO, CALIFORNIA	
402643001	9/16		

13_402643001-B ZONE-VOC FOUNDATION.dwg, Sep 22, 2016, 4:18pm, SN



NOTES:

1. TOTAL HVOCs ARE PRESENTED AS THE SUM OF DETECTED HVOCs AND ONE-HALF THE REPORTING LIMIT FOR NON-DETECTED HVOCs.
2. ANALYTICAL RESULTS ARE PRESENTED IN MICROGRAMS PER LITER (μg/L).

LEGEND

	SITE BOUNDARY
	FENCE ENCLOSURE
	PILOT STUDY MONITORING WELL
RW–22B (384) *	B-ZONE MONITORING WELL WITH TOTAL HVOC CONCENTRATION FOR SEPTEMBER 2015 HVOCs WERE NOT DETECTED ABOVE THE REPORTING LIMIT
RCPT–24 (290,000)	HYDROPUNCH SAMPLE LOCATION WITH TOTAL HVOC CONCENTRATION FOR JUNE AND JULY 2015
VOCs	VOLATILE ORGANIC COMPOUNDS
HVOCs	HALOGENATED VOLATILE ORGANIC COMPOUNDS
ND	NOT DETECTED FOR VOC CONSTITUENTS
J	ANALYTE VALUE IS ESTIMATED
ND<X	NOT DETECTED ABOVE REPORTING LIMIT INDICATED BY X
100	TOTAL HVOC ISCONCENTRATION CONTOUR FOR SEPTEMBER 2015 (DASHED WHERE INFERRED)
RW-27B	PROPOSED NEW A-ZONE MONTIORING WELL
EX-7B	PROPOSED EXTRACTION WELL
HW-3BL	PROPOSED HORIZONTAL INJECTION WELL SCREEN
	PROPOSED RISER PIPES

N

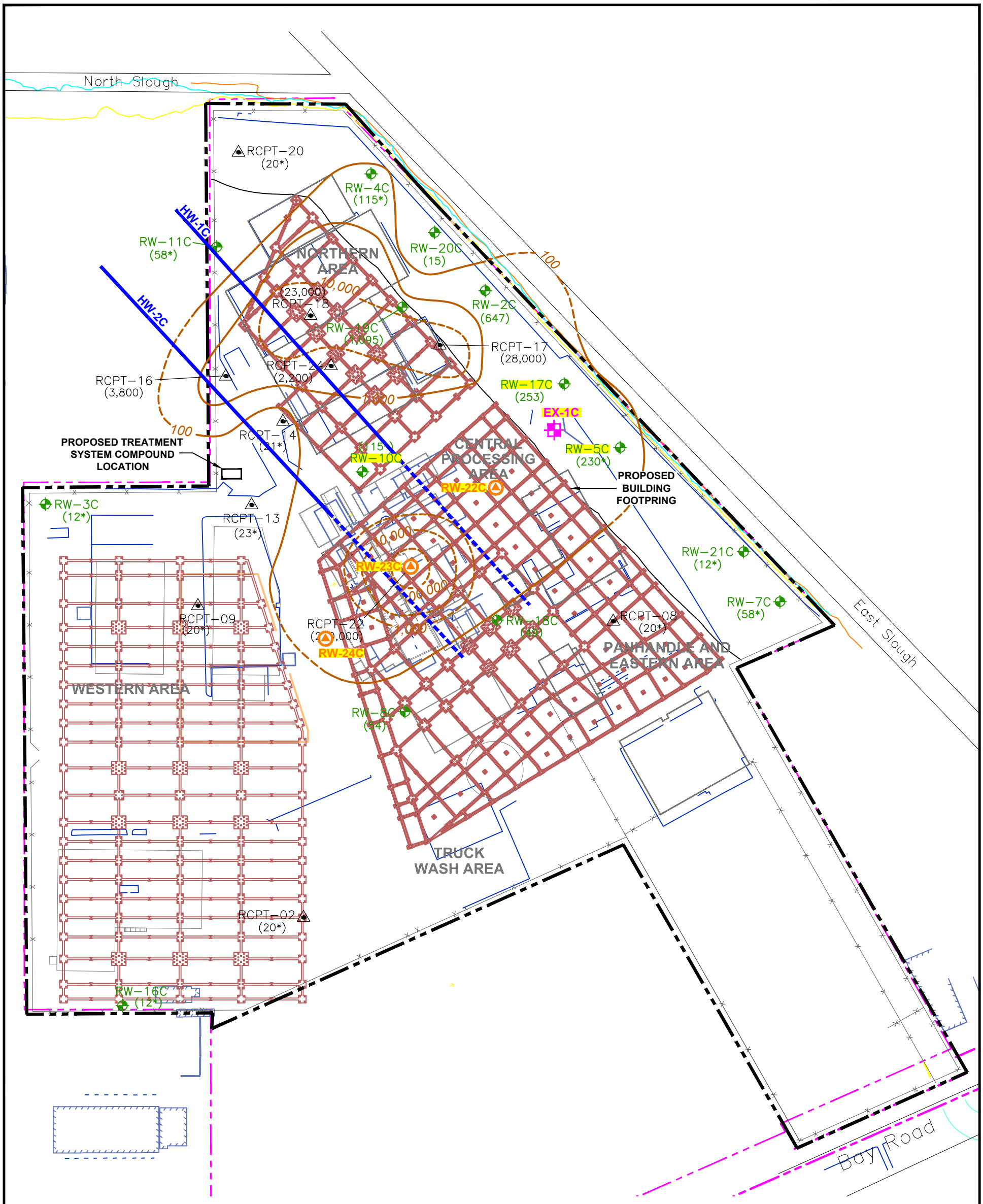
SCALE IN FEET

0 100 200

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE.

Ninyo & Moore		PROPOSED LOWER B-ZONE HORIZONTAL INJECTION AND VERTICAL EXTRACTION WELL LOCATIONS	FIGURE 14
PROJECT NO.	DATE	BAY ROAD HOLDINGS SITE 2081 BAY ROAD EAST PALO ALTO, CALIFORNIA	
402643001	9/16		

14_402643001-B ZONE-VOC FOUNDATION.dwg, Sep 22, 2016, 4:18pm, SN



NOTES:

1. TOTAL HVOCs ARE PRESENTED AS THE SUM OF DETECTED HVOCs AND ONE-HALF THE REPORTING LIMIT FOR NON-DETECTED HVOCs.
2. ANALYTICAL RESULTS ARE PRESENTED IN MICROGRAMS PER LITER (μg/L).

LEGEND

	SITE BOUNDARY
	FENCE ENCLOSURE
	PILOT STUDY MONITORING WELL
RW–21C (12*) *	C-ZONE MONITORING WELL WITH TOTAL HVOC CONCENTRATION FOR SEPTEMBER 2015 HVOCs WERE NOT DETECTED ABOVE THE REPORTING LIMIT
RCPT–24 (2,200)	HYDROPUNCH SAMPLE LOCATION WITH TOTAL HVOC CONCENTRATION FOR JUNE AND JULY 2015
VOCs	VOLATILE ORGANIC COMPOUNDS
HVOCs	HALOGENATED VOLATILE ORGANIC COMPOUNDS
ND	NOT DETECTED FOR VOC CONSTITUENTS
J	ANALYTE VALUE IS ESTIMATED
ND<X	NOT DETECTED ABOVE REPORTING LIMIT INDICATED BY X
100	TOTAL HVOC ISCONCENTRATION CONTOUR FOR SEPTEMBER 2015 (DASHED WHERE INFERRED)
RW-24C	PROPOSED NEW A-ZONE MONTIORING WELL
EX-1C	PROPOSED EXTRACTION WELL
HW-2C	PROPOSED HORIZONTAL INJECTION WELL SCREEN PROPOSED RISER PIPES

N

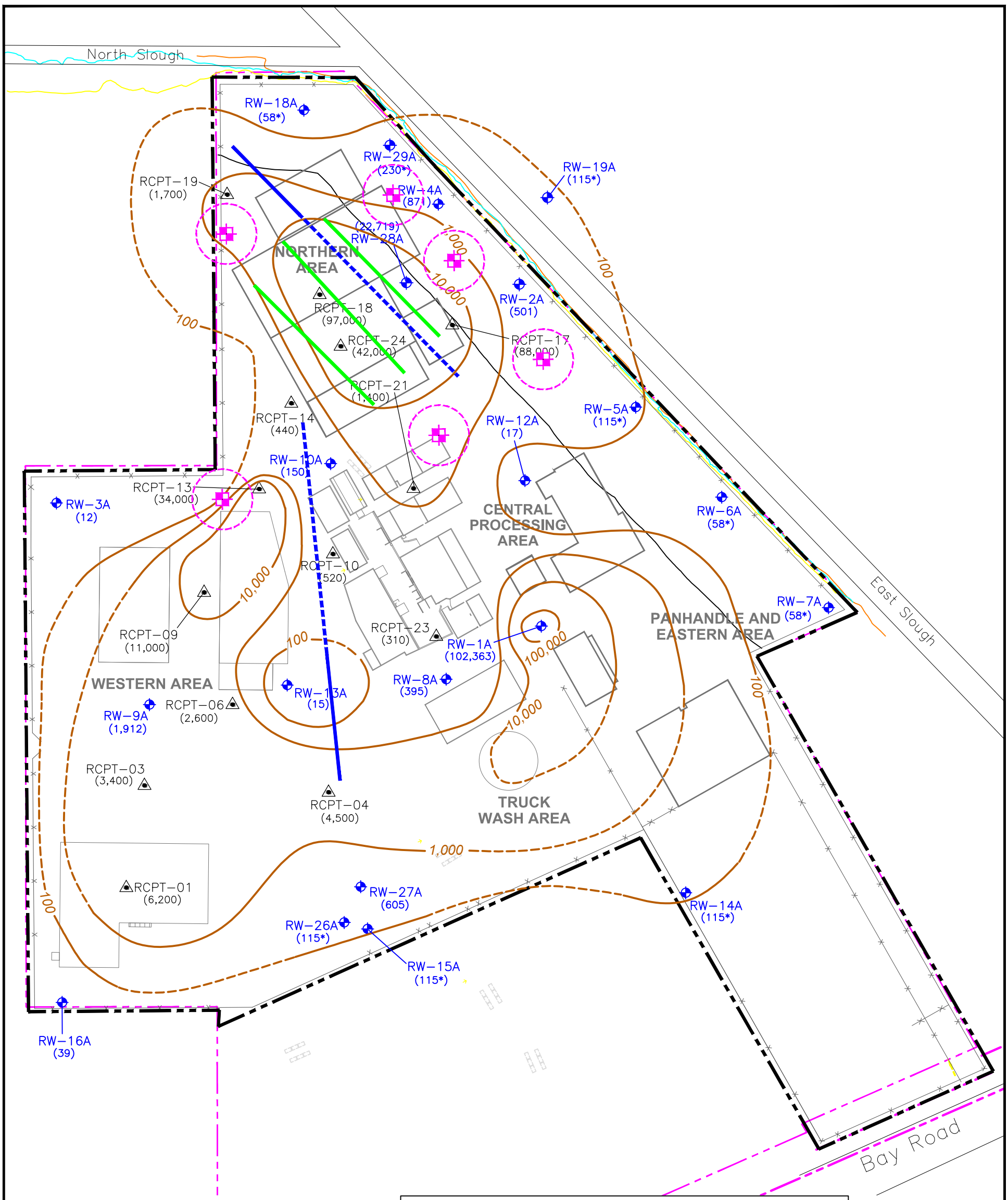
SCALE IN FEET

0 100 200

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE.

Ninyo & Moore	PROPOSED C-ZONE HORIZONTAL INJECTION AND VERTICAL EXTRACTION WELL LOCATIONS	FIGURE
PROJECT NO. 402643001 / DATE 9/16	BAY ROAD HOLDINGS SITE 2081 BAY ROAD EAST PALO ALTO, CALIFORNIA	15

15_402643001-C ZONE-VOC FOUNDATION.dwg, Sep 16, 2016, 5:47pm, SN



NOTES:

1. TOTAL HVOCs ARE PRESENTED AS THE SUM OF DETECTED HVOCs AND ONE-HALF THE REPORTING LIMIT FOR NON-DETECTED HVOCs.
2. ANALYTICAL RESULTS ARE PRESENTED IN MICROGRAMS PER LITER (μg/L).

LEGEND

	SITE BOUNDARY
	FENCE ENCLOSURE
RW-29A (230*)	A-ZONE MONITORING WELL WITH TOTAL HVOC CONCENTRATION FOR SEPTEMBER 2015
*	HVOCs WERE NOT DETECTED ABOVE THE REPORTING LIMIT
RCPT-24 (42,000)	HYDROPUNCH SAMPLE LOCATION WITH TOTAL HVOC CONCENTRATION FOR JUNE AND JULY 2015
VOCs	VOLATILE ORGANIC COMPOUNDS
HVOCs	HALOGENATED VOLATILE ORGANIC COMPOUNDS
ND	NOT DETECTED FOR VOC CONSTITUENTS
J	ANALYTE VALUE IS ESTIMATED
ND<X	NOT DETECTED ABOVE REPORTING LIMIT INDICATED BY X
100	TOTAL HVOC ISCONCENTRATION CONTOUR FOR SEPTEMBER 2015 (DASHED WHERE INFERRED)
	PROPOSED EXTRACTION WELL
	PROPOSED HORIZONTAL INJECTION WELL
	PROPOSED RISER PIPES
	PROPOSED INJECTION TRENCHES IN EXCAVATIONS

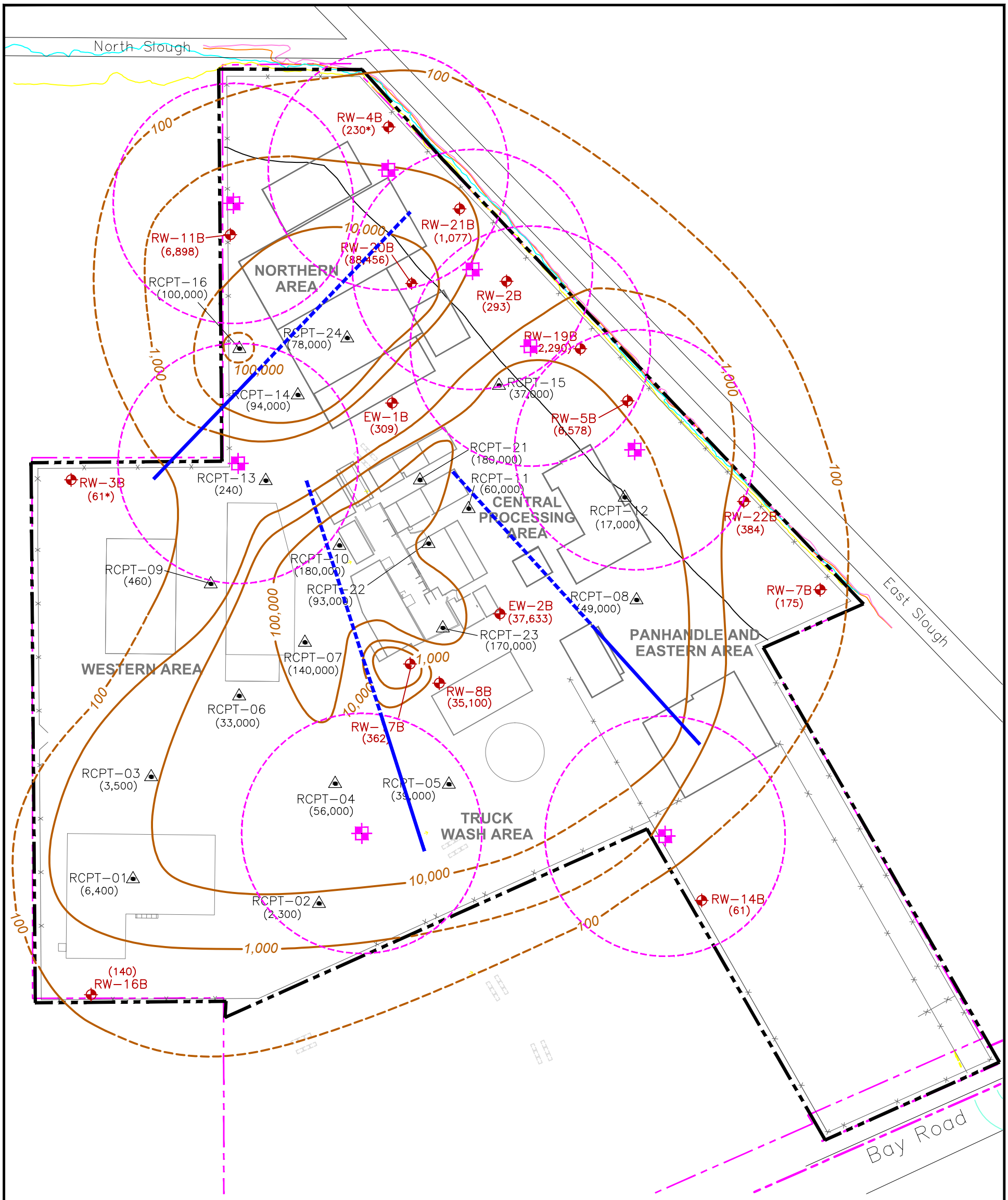
N

SCALE IN FEET

0 100 200

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE.

Ninyo & Moore	A-ZONE TOTAL HALOGENATED VOCs IN GROUNDWATER - SECOND HALF OF 2015	FIGURE
PROJECT NO. 402643001 / DATE 9/16	BAY ROAD HOLDINGS SITE 2081 BAY ROAD EAST PALO ALTO, CALIFORNIA	16



NOTES:

1. TOTAL HVOCs ARE PRESENTED AS THE SUM OF DETECTED HVOCs AND ONE-HALF THE REPORTING LIMIT FOR NON-DETECTED HVOCs.
2. ANALYTICAL RESULTS ARE PRESENTED IN MICROGRAMS PER LITER (μg/L).

LEGEND

	SITE BOUNDARY
	FENCE ENCLOSURE
RW-22B (384)	B-ZONE MONITORING WELL WITH TOTAL HVOC CONCENTRATION FOR SEPTEMBER 2015
*	HVOCs WERE NOT DETECTED ABOVE THE REPORTING LIMIT
RCPT-24 (78,000)	HYDROPUNCH SAMPLE LOCATION WITH TOTAL HVOC CONCENTRATION FOR JUNE AND JULY 2015
VOCs	VOLATILE ORGANIC COMPOUNDS
HVOCs	HALOGENATED VOLATILE ORGANIC COMPOUNDS
ND	NOT DETECTED FOR VOC CONSTITUENTS
J	ANALYTE VALUE IS ESTIMATED
ND<X	NOT DETECTED ABOVE REPORTING LIMIT INDICATED BY X
100	TOTAL HVOC ISCONCENTRATION CONTOUR FOR SEPTEMBER 2015 (DASHED WHERE INFERRED)
	PROPOSED EXTRACTION WELL
	PROPOSED HORIZONTAL INJECTION WELL
	PROPOSED RISER PIPES

N

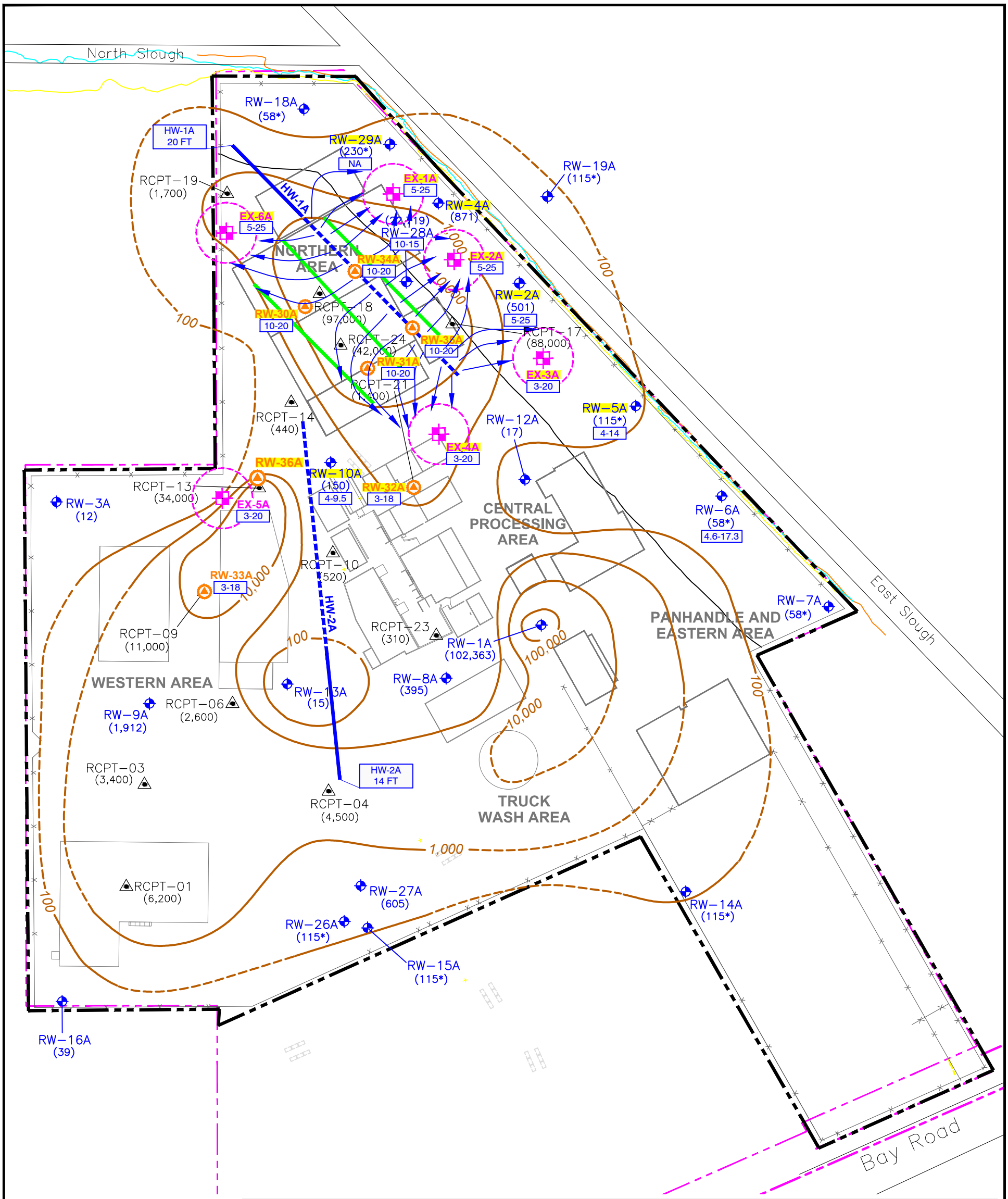
SCALE IN FEET

0 100 200

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE.

Ninyo & Moore	UPPER B-ZONE TOTAL HALOGENATED VOCs IN GROUNDWATER -SECOND HALF OF 2015	FIGURE
PROJECT NO. 402643001 / DATE 9/16	BAY ROAD HOLDINGS SITE 2081 BAY ROAD EAST PALO ALTO, CALIFORNIA	17

17_402643001-B ZONE-VOC ZOI.dwg, Sep 23, 2016, 9:56am, SN



LEGEND

	SITE BOUNDARY	VOCs	VOLATILE ORGANIC COMPOUNDS
	FENCE ENCLOSURE	HVOCs	HALOGENATED VOLATILE ORGANIC COMPOUNDS
	PILOT STUDY MONITORING WELL	ND	NOT DETECTED FOR VOC CONSTITUENTS
		J	ANALYTE VALUE IS ESTIMATED
25-38	PILOT STUDY MONITORING WELL SCREEN INTERVAL	ND<X	NOT DETECTED ABOVE REPORTING LIMIT INDICATED BY X
HW-2A 14 FT	DEPTH OF HORIZONTAL INJECTION WELLS	100	TOTAL HVOC ISCONCENTRATION CONTOUR FOR SEPTEMBER 2015 (DASHED WHERE INFERRED)
RW-29A (230*) *	A-ZONE MONITORING WELL WITH TOTAL HVOC CONCENTRATION FOR SEPTEMBER 2015 HVOCs WERE NOT DETECTED ABOVE THE REPORTING LIMIT	RW-35A	PROPOSED NEW B-ZONE MONTIORING WELL
		EX-6A	PROPOSED EXTRACTION WELL
RCPT-24 (78,000)	HYDROPUNCH SAMPLE LOCATION WITH TOTAL HVOC CONCENTRATION FOR JUNE AND JULY 2015	HW-2A	PROPOSED HORIZONTAL INJECTION WELL SCREEN
			PROPOSED RISER PIPES

NOTES:

1. TOTAL HVOCs ARE PRESENTED AS THE SUM OF DETECTED HVOCs AND ONE-HALF THE REPORTING LIMIT FOR NON-DETECTED HVOCs.
2. ANALYTICAL RESULTS ARE PRESENTED IN MICROGRAMS PER LITER (μg/L).

N

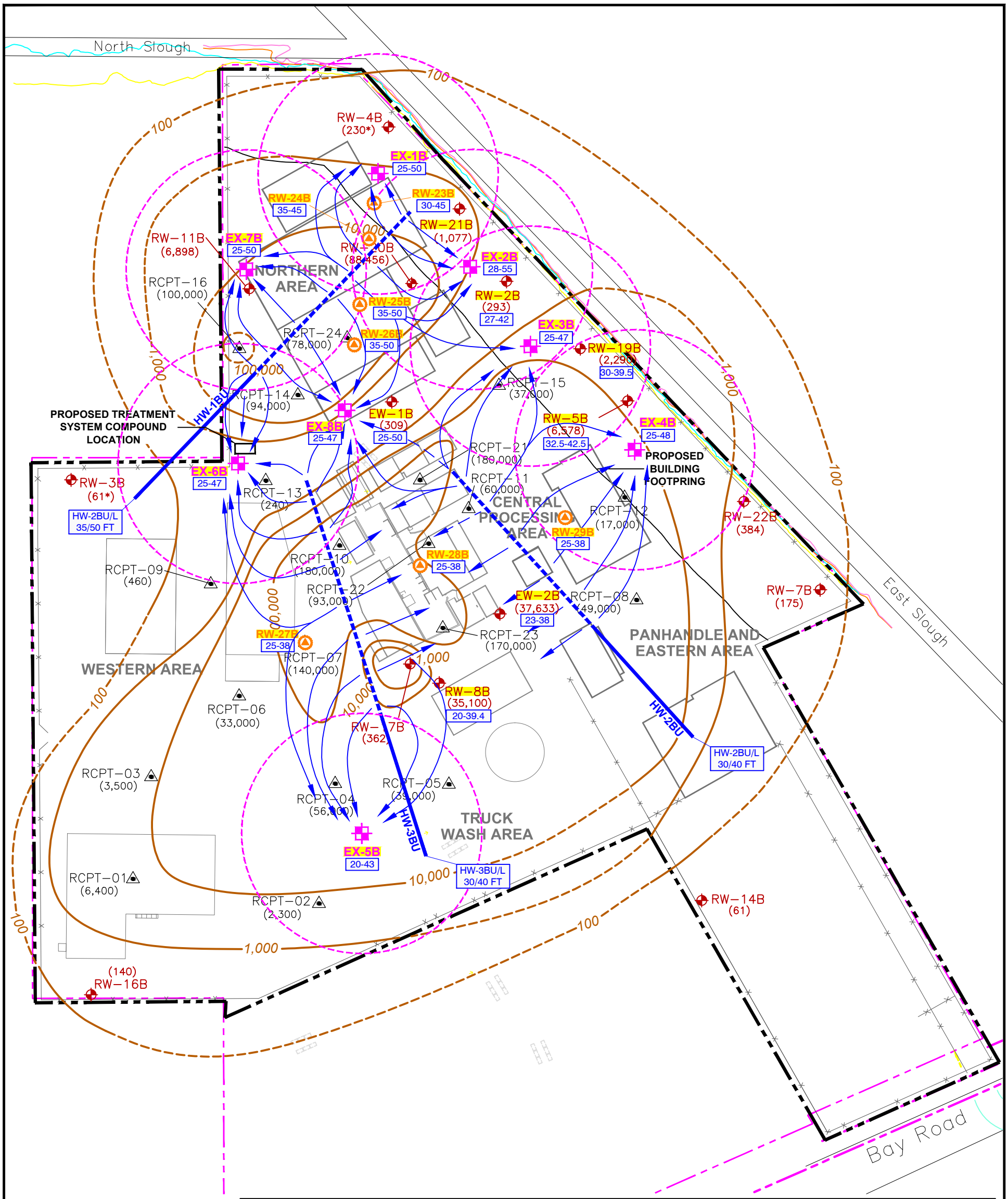
SCALE IN FEET

0 100 200

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE.

Ninyo & Moore		A-ZONE PILOT STUDY HORIZONTAL/VERTICAL WELL PRESUMED GROUNDWATER FLOW	FIGURE 18
PROJECT NO.	DATE	BAY ROAD HOLDINGS SITE 2081 BAY ROAD EAST PALO ALTO, CALIFORNIA	
402643001	9/16		

18_402643001-A ZONE-PILOT.dwg, Sep 22, 2016, 4:19pm, SN



LEGEND

	SITE BOUNDARY	VOCs	VOLATILE ORGANIC COMPOUNDS
	FENCE ENCLOSURE	HVOCs	HALOGENATED VOLATILE ORGANIC COMPOUNDS
	PILOT STUDY MONITORING WELL	ND	NOT DETECTED FOR VOC CONSTITUENTS
		J	ANALYTE VALUE IS ESTIMATED
25-38	PILOT STUDY MONITORING WELL SCREEN INTERVAL	ND<X	NOT DETECTED ABOVE REPORTING LIMIT INDICATED BY X
HW-3BU/L 30/40 FT	DEPTH OF UPPER AND LOWER HORIZONTAL INJECTION WELLS	100	TOTAL HVOC ISCONCENTRATION CONTOUR FOR SEPTEMBER 2015 (DASHED WHERE INFERRED)
RW-22B (384) *	B-ZONE MONITORING WELL WITH TOTAL HVOC CONCENTRATION FOR SEPTEMBER 2015 HVOCs WERE NOT DETECTED ABOVE THE REPORTING LIMIT	RW-27B	PROPOSED NEW B-ZONE MONTIORING WELL
		EX-7B	PROPOSED EXTRACTION WELL
RCPT-24 (78,000)	HYDROPUNCH SAMPLE LOCATION WITH TOTAL HVOC CONCENTRATION FOR JUNE AND JULY 2015	HW-3BU	PROPOSED HORIZONTAL INJECTION WELL SCREEN
			PROPOSED RISER PIPES

NOTES:

1. TOTAL HVOCs ARE PRESENTED AS THE SUM OF DETECTED HVOCs AND ONE-HALF THE REPORTING LIMIT FOR NON-DETECTED HVOCs.
2. ANALYTICAL RESULTS ARE PRESENTED IN MICROGRAMS PER LITER (μg/L).

N

SCALE IN FEET

0 100 200

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE.

Ninyo & Moore		B-ZONE PILOT STUDY HORIZONTAL/VERTICAL WELL PRESUMED GROUNDWATER FLOW	FIGURE 19
PROJECT NO.	DATE	BAY ROAD HOLDINGS SITE 2081 BAY ROAD EAST PALO ALTO, CALIFORNIA	
402643001	9/16		

North Slough

RW–18A (58*)

RW–29A (230*)

RW–19A (115*)

RCPT–19 (1,700)

MS10(3,5,8)

HW-1A

RW–4A (871)

EX-1A (22,719)

EX-6A

RW–28A

MS11(3,5,8)

1,000

EX-2A

MS7(3,5,8)

MS4(3,5,8)

MS1(3,5,8)

MS5(3,5,8)

NORTHERN AREA

RW-34A

10,000

RW–2A (501)

RW-30A

RCPT–18 (97,000)

MS8(3,5,8)

MS12(3,5,8)

100

MS2(3,5,8)

RCPT–20 (43,000)

RW-35A

RCPT–17 (88,000)

MS6(3,5,8)

EX-3A

MS3(3,5,8)

RW-31A

RCPT–21 (1,400)

MS9(3,5,8)

RW–5A (115*)

RCPT–14 (440)

EX-4A

RW–12A (17)

PROPOSED TREATMENT SYSTEM COMPOUND LOCATION

RW–10A (150)

PROPOSED BUILDING FOOTPRING

RW-36A

RW-32A

RCPT–13 (34,000)

RW–3A (12)

EX-5A

CENTRAL PROCESSING AREA

RW–6A (58*)

RCPT–10 (520)

East Slough

RW–7A (58*)

RW-33A

10,000

HW-2A

RCPT–23 (310)

PANHANDLE AND EASTERN AREA

RCPT–09 (11,000)

RW–1A (102,363)

100,000

100

RW–8A (395)

WESTERN AREA

RW–13A (15)

RW–9A (1,912)

RCPT–06 (2,600)

10,000

100

RCPT–03 (3,400)

RCPT–04 (4,500)

TRUCK WASH AREA

1,000

RCPT–01 (6,200)

RW–27A (605)

RW–14A (115*)

RW–26A (115*)

RW–15A (115*)

RW–16A (39)

Bay Road

LEGEND

	SITE BOUNDARY
	FENCE ENCLOSURE
	PILOT STUDY MONITORING WELL
MS12(3,5,8)	MOISTURE SENSOR METER CLUSTER LOCATION
RW–29A (230*)	A-ZONE MONITORING WELL WITH TOTAL HVOC CONCENTRATION FOR SEPTEMBER 2015
*	HVOCs WERE NOT DETECTED ABOVE THE REPORTING LIMIT
RCPT–24 (42,000)	HYDROPUNCH SAMPLE LOCATION WITH TOTAL HVOC CONCENTRATION FOR JUNE AND JULY 2015
VOCs	VOLATILE ORGANIC COMPOUNDS
HVOCs	HALOGENATED VOLATILE ORGANIC COMPOUNDS
ND	NOT DETECTED FOR VOC CONSTITUENTS
J	ANALYTE VALUE IS ESTIMATED
ND<X	NOT DETECTED ABOVE REPORTING LIMIT INDICATED BY X
100	TOTAL HVOC ISCONCENTRATION CONTOUR FOR SEPTEMBER 2015 (DASHED WHERE INFERRED)
RW-35A	PROPOSED NEW A-ZONE MONTIORING WELL
EX-6A	PROPOSED EXTRACTION WELL
HW-2A	PROPOSED HORIZONTAL INJECTION WELL SCREEN
	PROPOSED RISER PIPES
	PROPOSED INJECTION TRENCHES IN EXCAVATIONS

NOTES:

1. TOTAL HVOCs ARE PRESENTED AS THE SUM OF DETECTED HVOCs AND ONE-HALF THE REPORTING LIMIT FOR NON-DETECTED HVOCs.
2. ANALYTICAL RESULTS ARE PRESENTED IN MICROGRAMS PER LITER (µg/L).

N

SCALE IN FEET

0 100 200

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE.

20_402643001-VADOSE ZONE.dwg, Sep 22, 2016, 4:21pm, SN

Ninyo & Moore

PROJECT NO.	DATE
402643001	9/16

PROPOSED VADOSE-ZONE MOISTURE SENSOR METER LOCATIONS

BAY ROAD HOLDINGS SITE
2081 BAY ROAD
EAST PALO ALTO, CALIFORNIA

FIGURE

20

APPENDIX A

PUSH-PULL AND IRM PILOT TEST SOURCE AREA STUDY DATA EVALUATION

3830 S. Truman St., Bldg. 12, Suite 4
Washougal, WA 98671
(971) 222-3580 • (971) 222-3903 Fax
www.etecllc.com

July 28, 2016

RE: PUSH-PULL AND IRM PILOT TEST SOURCE AREA STUDY DATA EVALUATION, BAY ROAD HOLDINGS SITE, EAST PALO ALTO, CA

DATA EVALUATION AND DISCUSSION

N&M collected field and laboratory data on selected parameters from key site wells. The following section presents an overall discussion of this date, with figures created in order to help illustrate the anaerobic bioremedial processes.

B-ZONE PILOT TEST SOURCE AREA (RW-8B AND EW-2B)

The B-Zone pilot test area contains very high concentrations of cVOCs compared to the A-zone, since it is closer to a known release area (Central Processing Area). It is also in the middle saturated zone that has a higher permeable lithology, compared with the A and C zones. In December 2015, as part of the push-pull pilot study, a total of approximately 6,000 gallons of the substrate solution were injected into this area's eight IPs, with 750 gallons of substrate injected per IP at approximately 8 psi.

When evaluating the groundwater data we first look for shifts in parameters that indicate substrate breakthrough (i.e. TOC, ammonia, bromide, ortho-phosphate), then evaluate if the substrate created conditions favorable for reductive dechlorination of cVOCs (sulfate-reducing or methanogenic). This section reviewed the trends at each key monitoring well, as follows:

***RW-8B*:** RW-8B is 10-20 ft away from injection points IP-53B, IP-54B and IP-5B, and it is almost surrounded on three sides providing the best opportunity for communication. The figures for RW-8B below shows the data collected from the baseline event to the most recent sampling event (7/18/16). The injection event into the B-zone started on 12/9/15 after baseline samples were collected by N&M, and was completed by end of the day 12/10/15. The next sampling event occurred on 12/11/15 (less than one day after the injection occurred), weekly thereafter for another four weeks, with one final sampling event ten weeks after the baseline. An additional sample (outside of the original sampling scope) was collected on week 30 to further evaluate the groundwater conditions.

The previous memo showed that the substrate was delivered and it did create anaerobic conditions. The substrate is represented in the concentration of TOC, which is presented in Table 1. The baseline TOC concentration in RW-8B was 22.3 mg/L, then it steadily increased after the injection event as the substrate migrated towards this location. The TOC concentration peaked at 194 mg/L at week 10, then decreased to 67 mg/L at week 30, showing that the substrate is still present and being utilized by the bacteria.

Figure 1 below presents the cVOC and ethene/ethane concentrations in RW-8B. PCE was not detected above the detection limits for the majority of the test (only detected at 3.6-3.9 µg/L), and is not discussed herein. TCE was detected at low concentrations (78.3 µg/L baseline), and gradually increased on Day 1 and week 1 sampling events to 112 µg/L. During the week 2 and 3 sampling events, the detection limits were raised to 200 µg/L, and TCE was below that value. Therefore, we entered in a value of 100 µg/L (half the detection limit) to plot the data. The TCE trend is difficult to ascertain due to that, but the next two sampling events (week 4 and 10) show TCE decreasing to 28.6 µg/L which is a definitive decline from baseline. What is observable, are the slight increases in cis-DCE and VC concentrations after the injection event, followed by a steady and rapid decrease through week 10. By week 10, cis-DCE was reduced to 3,130 µg/L from 16,300 µg/L, and VC was reduced from 26,300 µg/L to 6,300 µg/L. After week 10, cis-DCE increased slightly to 5,830 ug/L, while VC increased to 14,300 ug/L, then decreased to

11,300 ug/L. Both cis-DCE and VC concentrations are well below their respective baseline values 30 weeks after the injection event. Ethene/ethane increased slightly after the injection event, then slightly decreased during week 2 and 3, and then spiked to 7,049 µg/L at week 10. At week 30, the ethene/ethane concentration decreased to to 4,643 ug/L, which is similar to the baseline concentration. This data shows that the injection of substrate enhanced the overall anaerobic conditions of this area, and significantly enhanced the anaerobic biodegradation of the cVOCs.

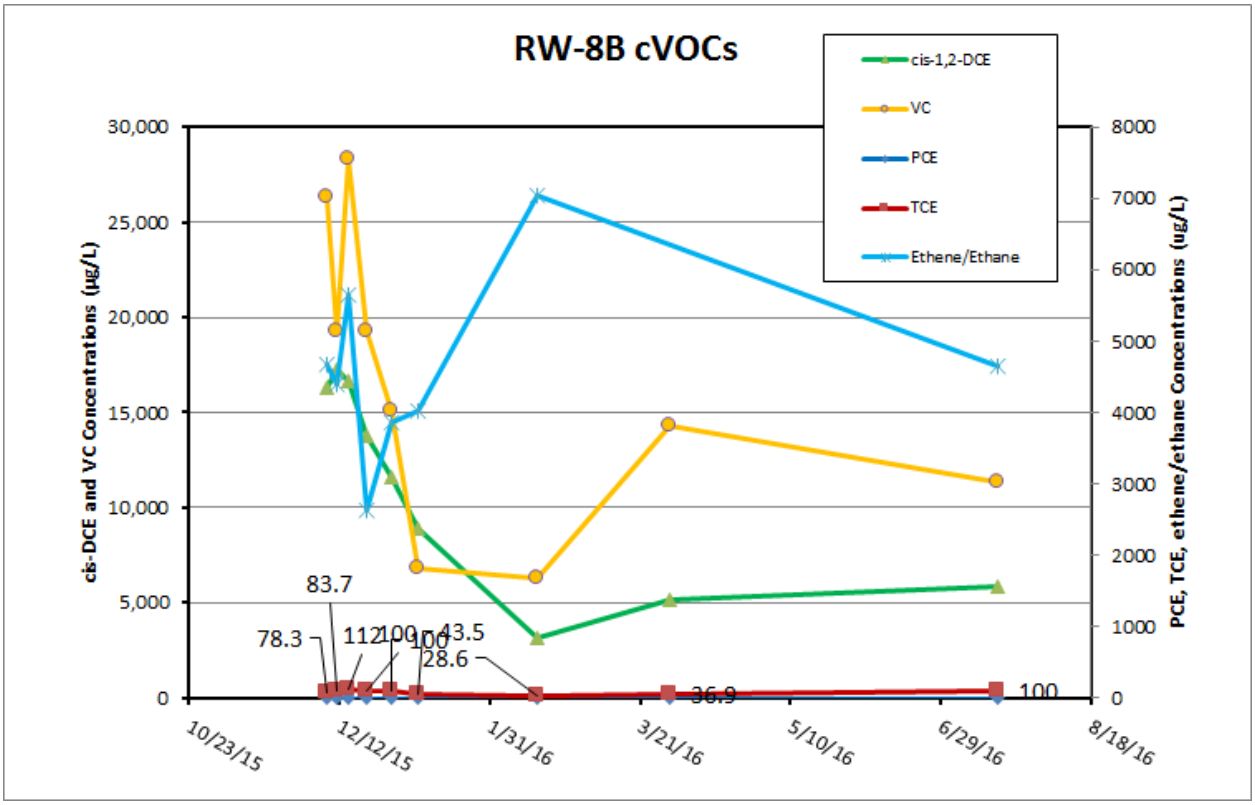


Figure 1. cVOC and ethene/ethane concentrations in RW-8B.

***EW-2B*:** EW-2B is 10-20 ft away from injection points IP-50B and IP-51B, yet it is only covered on one side. The figures for EW-2B below shows the data collected from the baseline event to the most recent sampling event (2/16/16). The injection event into the B-zone started on 12/9/15 after baseline samples were collected by N&M, and was completed by end of the day 12/10/15. The next sampling event occurred on 12/11/15 (less than one day after the injection occurred), weekly thereafter for another four weeks, then other sampling event 10, 16, and 30 weeks after the baseline.

The previous memo showed that the substrate was delivered and it did create anaerobic conditions. The substrate is represented in the concentration of TOC, which is presented in Table 1 of the Work Plan. The baseline TOC concentration in EW-2B was already elevated at 467 mg/L due to previous injection events, then it immediately increased after the injection event to 2,160 mg/L at day 1. The TOC concentration then decreased to 134-166 mg/L at weeks 16 through 30, showing that the substrate is still present and being utilized by the bacteria (yet below baseline values).

Figure 2 below presents the cVOC and ethene/ethane concentrations in EW-2B. PCE was not detected above the detection limits during the test (only a 2.2 ug/L detection during week 11), and is not discussed

herein. TCE was detected at low concentrations (111 µg/L baseline), and increased on Day 1and week 1 to 379 µg/L. During the week 1 through week 11 sampling events, TCE was on a decreasing trend to 87 µg/L (week 11), then moderately increased week 30 (171 µg/L). While it appears TCE was pushed into this area after the injection event, we didn't observe that with cis-DCE/VC. Instead we observe significant decreases in cis-DCE and VC concentrations 1 day after the injection event, followed by a steady increase in cis-DCE through week 9 where it peaks at 26,000 ug/L. By week 11, cis-DCE began to decline to 22,500 µg/L, then decreased significantly to 1,780 ug/L at week 16. At week 30, cis-DCE concentrations increased to 7,090 ug/L, which is still far below the baseline value of 11,400 ug/L. VC shows a more erratic pattern or rising and falling through week 11, with a low detection of 7,620 ug/L during week 11 and a maximum detection f 14,300 ug/L on week 9. At week 22 when the low of 7,620 ug/L of VC was detected there was also 22,500 ug/L of cis-DCE detected. The week 16 sampling event shows the majority of the cis-DCE being dechlorinated and an equal concentration of VC being generated, showing a classic dechlorination pattern. As the cis-DCE decreased dramatically, the VC increased accordingly to 21,500-25,500 ug/L during week 16 and 30. Ethene/ethane decreased slightly after the injection event, then was maintained at a slightly lower concentration during weeks 2 through 9, but still showing consistent final end product production. At week 30, the ethene/ethane concentration increased significantly to 5,370 ug/L (baseline was 4,910 ug/L) as the cis-DCE was dechlorinated and VC increased, showing enhanced complete dechlorination. This data shows that the injection of substrate enhanced the overall anaerobic conditions of this area, and significantly enhanced the anaerobic dechlorination of the cVOCs.

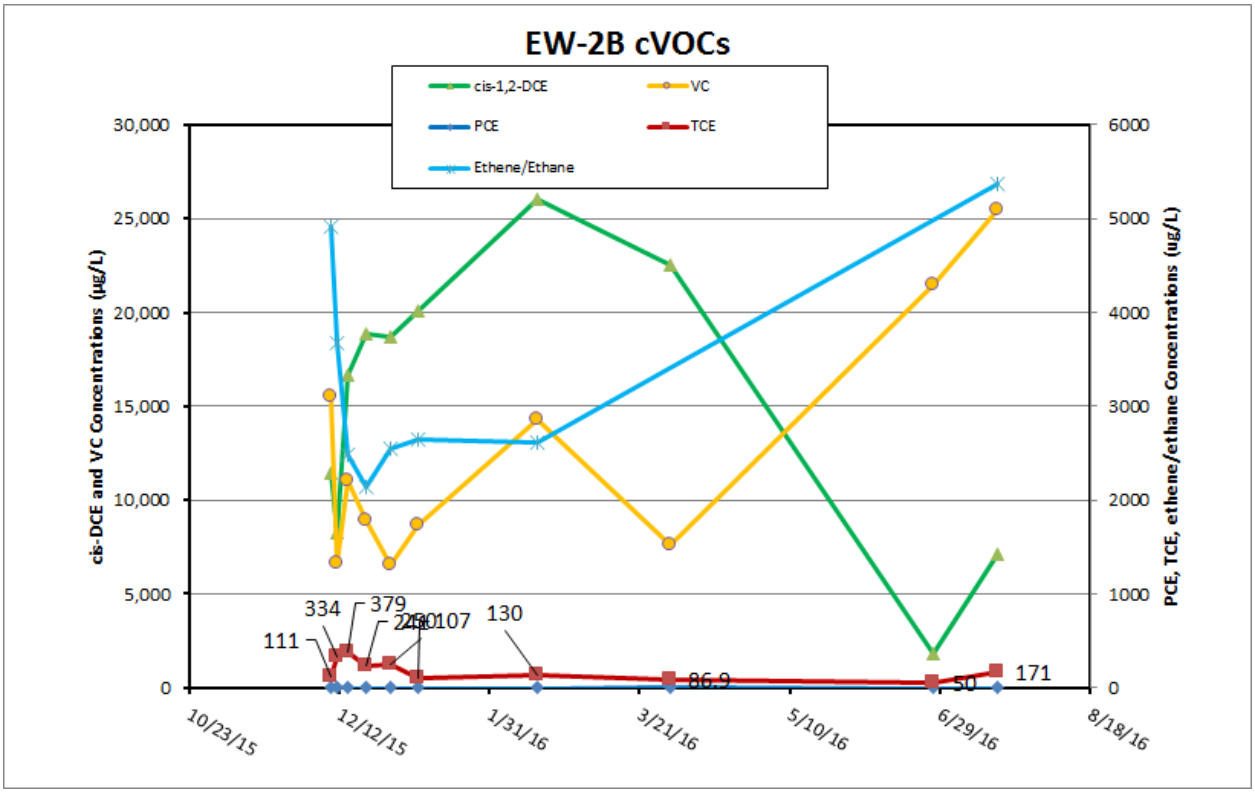


Figure 2. cVOC and ethene/ethane concentrations in EW-2B.

PUSH/PULL TESTS (RW-1A, RW-11B, AND RW-20B)

The Push/Pull tests were conducted in three onsite wells to evaluate the ability of the substrate to enhance anaerobic dechlorination. This section reviewed the trends at each push-pull monitoring well as follows:

***RW-1A*:** RW-1A is just outside the B-Zone injection area, and southeast of the Central Processing Area. The figures for RW-1A below shows the data collected from the baseline event to the most recent sampling event (7/18/16).

The previous memo showed that the substrate was delivered and it did create anaerobic conditions. The substrate is represented in the concentration of TOC, which is presented in Table 1 of the Work Plan. The baseline TOC concentration in RW-1A was low at 9.1 mg/L, then it immediately increased after the injection event to 7,970 mg/L at day 1. The TOC concentration then decreased steadily through week 30 to 27 mg/L, showing that the substrate is still present and being utilized by the bacteria (still above baseline values).

Figure 3 below presents the cVOC and ethene/ethane concentrations in RW-1A. PCE was detected at 1,150 µg/L during the baseline sampling event, and appears to have decreased slightly by week 1(ranging from 800-843 µg/L) as reducing conditions were being established. A more clear reduction in PCE is observed through week 3 (462 µg/L), then it increases slightly and holds from week 4 to week 10 (619-655 µg/L). During the week 30 sampling event, PCE decreased significantly to 142 ug/L, even in the presence of high TCE concentrations. TCE was detected at very high concentrations (33,600 µg/L baseline, indicative of trapped NAPL) compared to PCE, and we observed the same slight reduction through week 1 (ranging from 30,100-31,900 µg/L) as observed with the PCE (indicative of a 1 week lag phase). During the week 2 through week 10 sampling events, TCE was on a steady decreasing trend to 13,600 µg/L (week 10), which is a definitive decline from day 3/week 1. At week 30, TCE decreased again to 4,100 ug/L, which is almost of 90% reduction in TCE compared to baseline. cis-DCE concentrations were very stable after the re-injection event (26,700 µg/L), then we observe a gradual increase through week 2 (29,900 µg/L) showing the production of cis-DCE as the TCE begins its downward trend. Weeks 3 and 4 we observe cis-DCE production decrease (18,700-20,000 µg/L), which correlates to the TCE trend during this timeframe. Then during week 10 the cis-DCE concentrations increase significantly to 56,300 µg/L, as the groundwater pH rises (strong correlation). Cis-DCE continued to be generated as the very high concentration of TCE decreased over time, and at week 30 it was 57,100 ug/L. Based on other DNAPL sites, we will likely continue to see cis-DCE increase at this location until the TCE mass is mitigated over time. VC follows a similar trend showing generation of VC by week 1 (10,200 µg/L), then a reduction through week 4 (3,710-5,920 µg/L), again correlating strongly with the drop in groundwater pH. As observed with cis-DCE, the VC concentration rebounded significantly to 10,000 µg/L during week 10 as the pH increased above 6 standard units. VC generation continued through week 30, with concentrations increasing to 17,400 ug/L as the cis-DCE is being generated, then dechlorinated. Ethene/ethane improved slightly at day 3, and was maintained through week 1 (2,840 µg/L), showing the final end product production. As with the other cVOCs we see ethene/ethane concentrations decrease significantly (257-464 µg/L) from week 2 to week 3 as the pH ranges from 5.2-5.9 standard units. Ethene/ethane concentration are generated again (1,863 µg/L) at week 4 when the pH is still low (5.7), which doesn't correlate with the rest of the data. As the groundwater pH rises back to 6.2 by week 10, the ethene/ethane concentration are maintained at 1,660 µg/L. Then at week 30 as the VC increases, the ethene/ethane concentrations increase to 4,470 ug/L, which is higher than baseline conditions. This data show effective and complete dechlorination in a DNAPL area with one injection event.

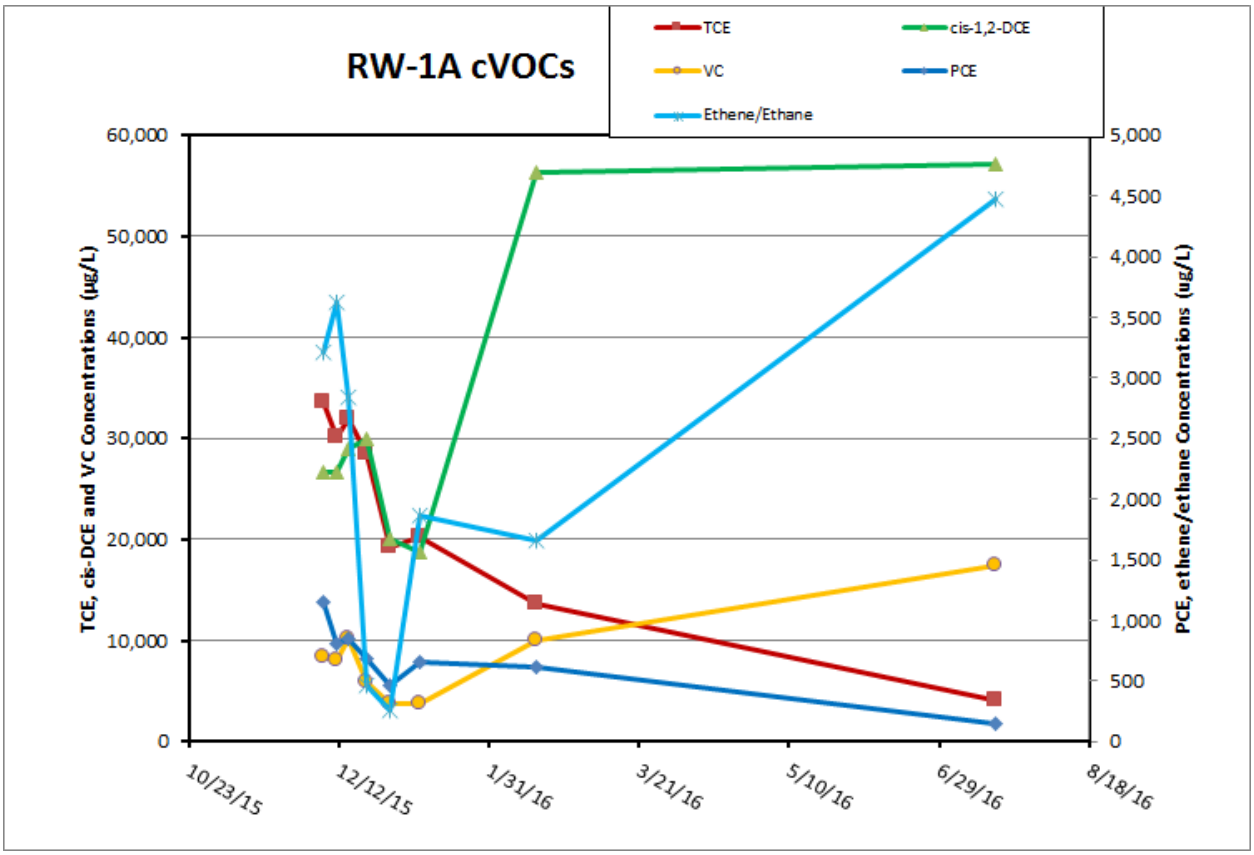


Figure 3. cVOC and ethene/ethane concentrations in RW-1A.

***RW-11B*:** RW-11B is located along the northwestern property boundary in the Northern Area. It isn't near any of the substrate injection areas, and this area has benzene, toluene, ethylbenzene and xylenes (BTEX) contamination in conjunction with cVOCs. The figure for RW-11B below shows the data collected from the baseline event to the most recent sampling event (7/18/16).

The previous memo showed that the substrate was delivered and it did create anaerobic conditions. The substrate is represented in the concentration of TOC, which is presented in Table 1 of the Work Plan. The baseline TOC concentration in RW-11B was low at 2.7 mg/L, then it immediately increased after the injection event to 9,730 mg/L at day 1. The TOC concentration then decreased steadily through week 30 to 7 mg/L, showing that the substrate is still present and being utilized by the bacteria (still above baseline values).

Figures 4 below presents the cVOC and ethene/ethane concentrations in RW-11B. PCE was detected at 930 µg/L during the baseline sampling event, and appears to have decreased significantly by Day 1 (202 µg/L). PCE decreases to non-detect at week 1 (half the detection limit is used to plot the data, 65 µg/L), then increased to through week 3 to 417 µg/L, as the groundwater pH falls below 5 standard units. As the pH rises back up to 6.8, PCE concentrations decrease non detect (20 µg/L), showing a strong correlation with the pH at week 10. By week 16 PCE was 20 ug/L, then below detection limits (5 ug/L) at week 30. TCE was detected at a moderate concentration (1,980 µg/L baseline and similar in concentration to PCE, unlike at RW-1A), and we observed the same reduction through week 2 (ranging from 434-484 µg/L) as

observed with the PCE. There was a stall in TCE dechlorination from week 2 to week 3, which is likely due to the decrease in groundwater pH. However, once the

pH started to rise up (weeks 4 and 10) TCE decreased significantly to non-detect (20 µg/L) showing very effective dechlorination of TCE. TCE remained low (11-15 ug/L) during the week 16 and 30 sampling events, showing near complete reduction of TCE. cis-DCE concentrations fell significantly after the re-injection event (from 7,000 to 2,640 µg/L), which didn't occur at RW-1A. Using the day 1 cis-DCE concentration as a baseline value, we observe a slow increase in cis-DCE to 3,240 µg/L by week 3, then it stalls by week 4 as the groundwater pH issue occurs. Then during week 10 the cis-DCE concentrations increase significantly to 5,190 µg/L, as the groundwater pH rises (strong correlation). The week 16 and 30 sampling events show a significant decrease in cis-DCE to 137 ug/L as the majority of the cis-DCE is being dechlorinated to VC. VC is much lower in concentration in this area due to the lack of injection events. Despite that, we observe decreasing initially, then rising and stalling/decreasing with the drop in pH, and then rising again at week 10. Again, correlating strongly with the drop in groundwater pH. As the cis-DCE decreased from week 16 to 30, the VC increased significantly to 6,750 ug/L (from a peak cis-DCE concentration of 5,190 ug/L, similar molar mass). Ethene/ethane data shows 1.1 µg/L during baseline, then we see very low detection continuing off and on through week 10. The detections of ethene/ethane (albeit low) still correlate with the groundwater pH like the other cVOCs. The lack of any significant ethene/ethane detections shows the lag phase associated with establishing these bacteria, and the lack of historical substrate injections in this area. As VC was being generated at week 30, we observe the first significant detection of ethene at 146 ug/L as the correct bacteria begin to establish themselves under these new conditions.

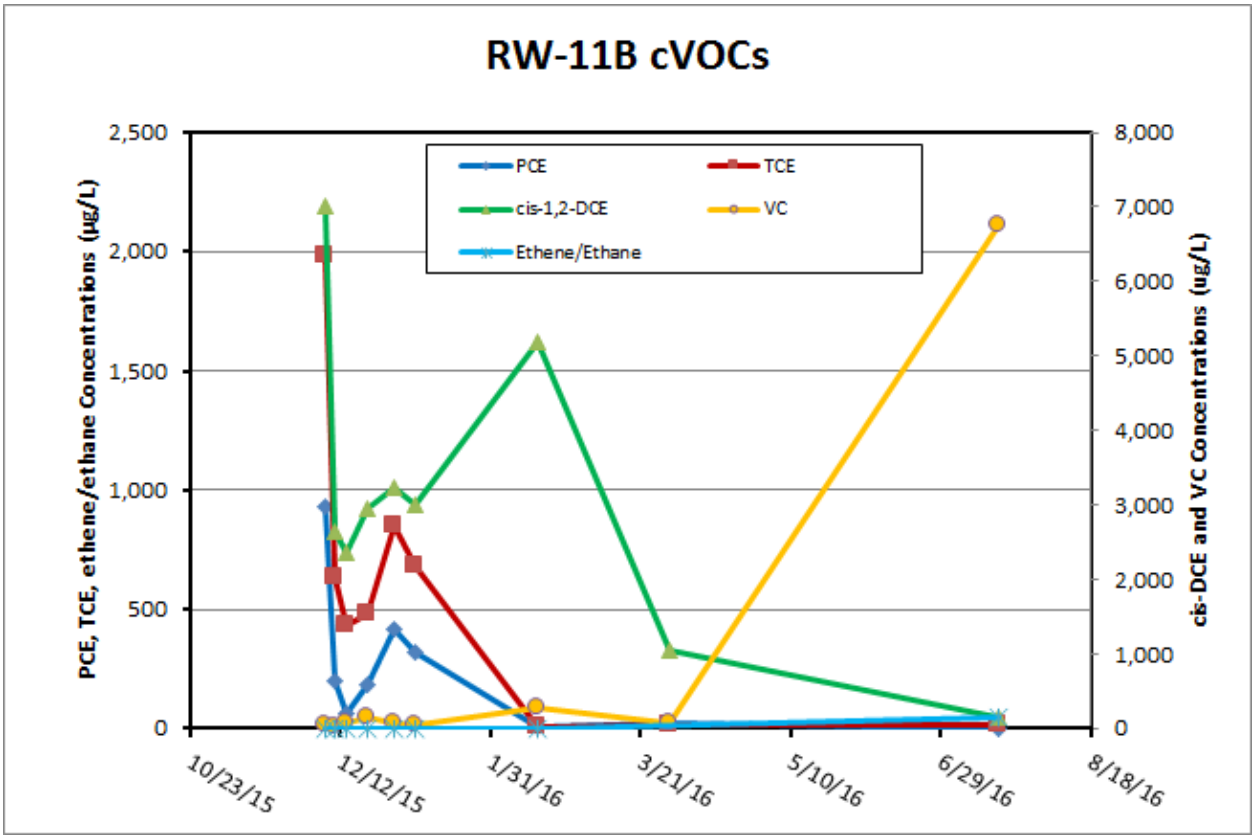


Figure 4. cVOC and ethene/ethane Concentrations in RW-11B.

***RW-20B*:** RW-20B is located in the Northern Area, and it is near (to the west of) the substrate injection areas (barrier wall application area). It is also the closest well to the San Francisco Bay, and therefore, more subject to SWI. The figures for RW-20B below shows the data collected from the baseline event to the most recent sampling event (7/18/16).

The previous memo showed that the substrate was delivered and it did create anaerobic conditions. The substrate is represented in the concentration of TOC, which is presented in Table 1 of the Work PLan. The baseline TOC concentration in RW-20B was low at 6.8 mg/L, then it immediately increased after the injection event to 3,710 mg/L at day 1, and increased again at week 1 to 4,410 mg/L. The TOC concentration then decreased through week 30 to 588 mg/L, showing that the substrate is still present and being utilized by the bacteria (still above baseline values).

Figure 5 below presents the cVOC and ethene/ethane concentrations in RW-20B. PCE was detected at 157 µg/L during the baseline sampling event, but decreased non detect the rest of the test (except a slight detection of 11 ug/L at week 11) and is not discussed herein. TCE was detected at a moderate concentration (2,320 µg/L baseline), and we observed a steady decrease in concentration through week 30 (7 µg/L). cis-DCE concentrations fell significantly after the re-injection event (from 9,880 to 5,280 µg/L). Using the day 5 cis-DCE concentration as a baseline value, we observe a slow decrease in cis-DCE to 3,290 µg/L by week 4, then it increases significantly to 6,990 µg/L at week 10 as the groundwater pH issue occurs. VC decreasing initially (14,700 µg/L to 6,990 µg/L), and continued to generally decline through week 4 (2,130 µg/L), then rising again significantly at week 10 (5,320 µg/L). From week 11 to week 30, VC decreased to 134 ug/L, then increased to 1,310 ug/L, which is far below the baseline concentration. Again, correlating strongly with the drop in groundwater pH. During the week Ethene/ethane data shows a high detection of 4,290 µg/L during baseline, then we see very low detection continuing through week 3 (169 µg/L). Then we observe it begin to increase slightly during week 4 and 10 (255-355 µg/L). The detections of ethene/ethane didn't increase until week 30, where ethene/ethane concentrations increased significantly to 1,750 ug/L, correlating strongly with the decrease in VC.

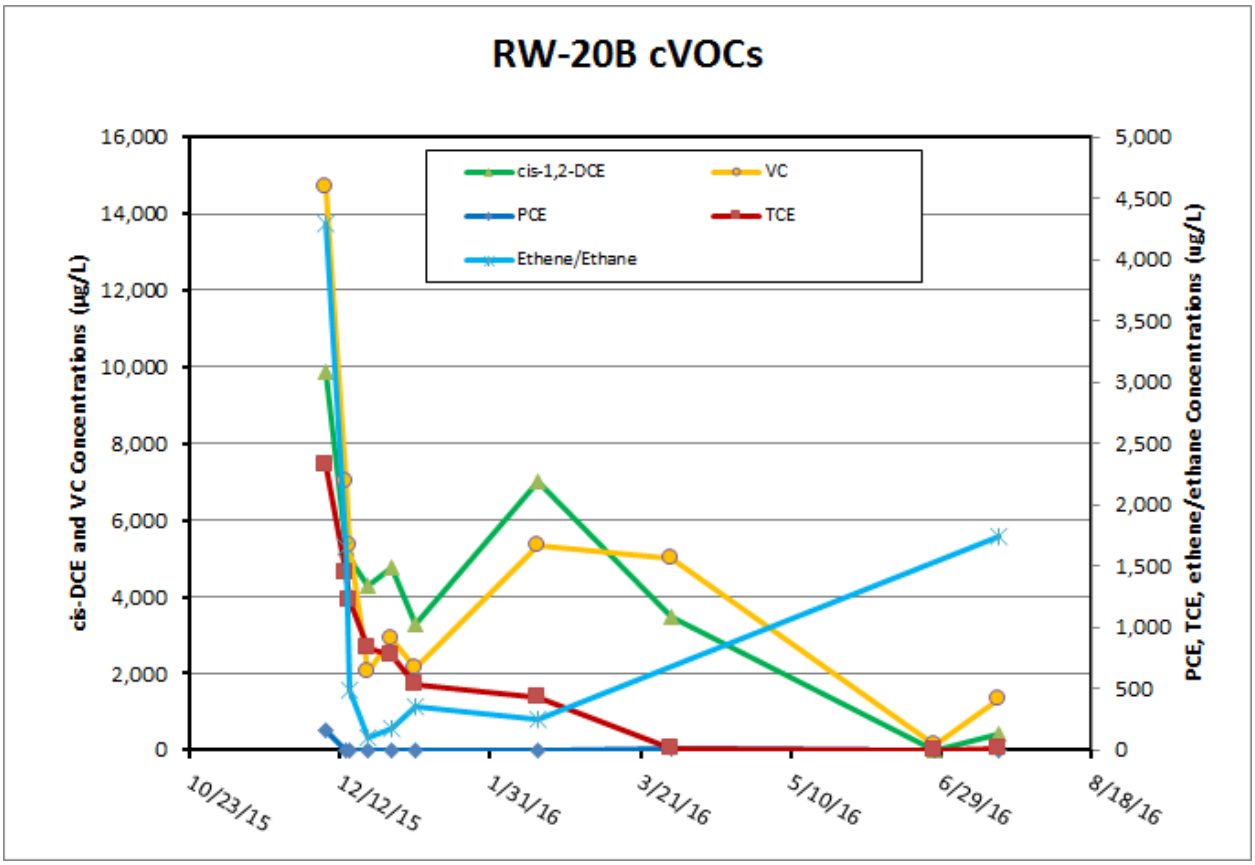


Figure v5. cVOC and ethene/ethane Concentrations in RW-20B.

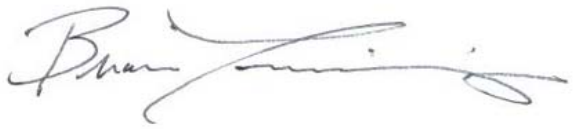
This data shows that the injection of substrate enhanced the overall anaerobic conditions of this area, and significantly enhanced the anaerobic dechlorination of the cVOCs. However, the injection of 5 percent substrate solution caused the groundwater pH to decrease below 6 standard units due to carbon dioxide production. This data demonstrates one of the reasons that slug injections as were previously performed aren't as favorable as groundwater recirculation. Groundwater recirculation allows you to inject a much lower concentration (less than 0.01-0.1 percent), which prevents this type of pH decrease.

SUMMARY AND CONCLUSIONS

The available site data indicates that aggressive reductive dechlorination has been stimulated in the target injection zones and Push/Pull wells following the injection of the Carbstrate™ substrate solution. Furthermore, ideal groundwater conditions (iron-reducing, sulfate-reducing and methanogenic) have been created to stimulate long-term dechlorination of residual solvent concentrations. The PCE/TCE, cis-DCE, and VC data is extremely encouraging, as well as the timeframe (30 weeks).

Please call me at 503-260-3799 with any questions or comments regarding this evaluation.

ETEC, LLC



Brian Timmins
Director

e-Hardcopy 2.0
Automated Report

Technical Report for

Ninyo & Moore

Romic Groundwater-East Palo Alto,CA

402643001

SGS Accutest Job Number: C46556

Sampling Date: 07/18/16

Report to:

Ninyo & Moore
1956 Webster Avenue Suite 400
Oakland, CA 94612
psims@ninyoandmoore.com; fmcfarland@ninyoandmoore.com;
edirksen@ninyoandmoore.com; klarson@ninyoandmoore.com
ATTN: Kris Larson

Total number of pages in report: 78

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

James J. Rhudy
Lab Director

Client Service contact: Nutan Kabir 408-588-0200

Certifications: CA (ELAP 2910) AK (UST-092) AZ (AZ0762) NV (CA00150) OR (CA300006) WA (C925) DoD ELAP (L-A-B L2242)

Sections: 1 2 3 4 5 6 7 8

Table of Contents

Sample Summary

Ninyo & Moore

Job No: C46556

Romic Groundwater-East Palo Alto,CA
Project No: 402643001

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
C46556-1	07/18/16	09:55	ED	07/18/16	AQ	Ground Water	RW-1A
C46556-2	07/18/16	10:45	ED	07/18/16	AQ	Ground Water	RW-8B
C46556-3	07/18/16	13:10	ED	07/18/16	AQ	Ground Water	RW-11B
C46556-4	07/18/16	14:00	ED	07/18/16	AQ	Ground Water	RW-20B
C46556-5	07/18/16	11:35	ED	07/18/16	AQ	Ground Water	EW-1B
C46556-6	07/18/16	09:00	ED	07/18/16	AQ	Ground Water	EW-2B
C46556-7	07/18/16	00:00	ED	07/18/16	AQ	Trip Blank Water	TRIP BLANK

Summary of Hits

Job Number: C46556
Account: Ninyo & Moore
Project: Romic Groundwater-East Palo Alto,CA
Collected: 07/18/16

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
C46556-1	**RW-1A**					
Acetone		295	50	10	ug/l	SW846 8260B
Benzene		60.7	2.5	0.50	ug/l	SW846 8260B
Chlorobenzene		28.1	2.5	0.50	ug/l	SW846 8260B
Chloroethane		2.8	2.5	0.50	ug/l	SW846 8260B
Chloroform		385 J	500	100	ug/l	SW846 8260B
Carbon disulfide		2.9	2.5	0.50	ug/l	SW846 8260B
1,1-Dichloroethane		914	500	100	ug/l	SW846 8260B
1,1-Dichloroethylene		1950	500	100	ug/l	SW846 8260B
1,2-Dichloroethane		17000	500	100	ug/l	SW846 8260B
1,2-Dichloropropane		8.8	2.5	0.50	ug/l	SW846 8260B
1,3-Dichloropropane		3.5	2.5	0.50	ug/l	SW846 8260B
cis-1,2-Dichloroethylene		57100	1000	200	ug/l	SW846 8260B
o-Dichlorobenzene		0.59 J	2.5	0.50	ug/l	SW846 8260B
trans-1,2-Dichloroethylene		399 J	500	100	ug/l	SW846 8260B
Ethylbenzene		233	2.5	0.50	ug/l	SW846 8260B
Freon 113		220 J	1000	100	ug/l	SW846 8260B
Isopropylbenzene		4.0	2.5	0.50	ug/l	SW846 8260B
4-Methyl-2-pentanone		3.3 J	25	2.5	ug/l	SW846 8260B
Methylene chloride		28.7	25	5.0	ug/l	SW846 8260B
Methyl ethyl ketone		383	25	5.0	ug/l	SW846 8260B
Naphthalene		2.0 J	13	1.3	ug/l	SW846 8260B
n-Propylbenzene		2.9 J	5.0	0.50	ug/l	SW846 8260B
1,1,1-Trichloroethane		2.5	2.5	0.50	ug/l	SW846 8260B
1,1,2-Trichloroethane		1170	500	110	ug/l	SW846 8260B
1,2,3-Trichloropropane		5.1	5.0	0.50	ug/l	SW846 8260B
1,2,4-Trimethylbenzene		41.1	5.0	0.50	ug/l	SW846 8260B
1,3,5-Trimethylbenzene		7.2	5.0	0.50	ug/l	SW846 8260B
Tetrachloroethylene		142	2.5	0.75	ug/l	SW846 8260B
Toluene		76.2	2.5	0.50	ug/l	SW846 8260B
Trichloroethylene		4100	500	100	ug/l	SW846 8260B
Trichlorofluoromethane		2.2 J	2.5	0.50	ug/l	SW846 8260B
Vinyl chloride		17400	500	100	ug/l	SW846 8260B
Xylene (total)		780 J	1000	230	ug/l	SW846 8260B
Methane [a]		4420	5.0	1.6	ug/l	RSKSOP-147/175
Ethene [a]		4470	10	4.3	ug/l	RSKSOP-147/175
Total Organic Carbon		27.2	25		mg/l	SM5310 C-00
C46556-2	**RW-8B**					
Benzene		190 J	200	40	ug/l	SW846 8260B
Chlorobenzene		59.0 J	200	40	ug/l	SW846 8260B
Chloroform		375	200	40	ug/l	SW846 8260B
1,1-Dichloroethane		827	200	40	ug/l	SW846 8260B

Summary of Hits

Job Number: C46556
Account: Ninyo & Moore
Project: Romic Groundwater-East Palo Alto,CA
Collected: 07/18/16

Lab Sample ID / Client Sample ID / Analyte	Result/ Qual	RL	MDL	Units	Method
1,1-Dichloroethylene	453	200	40	ug/l	SW846 8260B
1,2-Dichloroethane	2240	200	40	ug/l	SW846 8260B
cis-1,2-Dichloroethylene	5830	200	40	ug/l	SW846 8260B
trans-1,2-Dichloroethylene	171 J	200	40	ug/l	SW846 8260B
Ethylbenzene	94.3 J	200	40	ug/l	SW846 8260B
Toluene	710	200	40	ug/l	SW846 8260B
Trichloroethylene	100 J	200	40	ug/l	SW846 8260B
Vinyl chloride	11300	500	100	ug/l	SW846 8260B
Xylene (total)	271 J	400	92	ug/l	SW846 8260B
Methane [a]	2520	5.0	1.6	ug/l	RSKSOP-147/175
Ethane [a]	33.1	1.0	0.32	ug/l	RSKSOP-147/175
Ethene [a]	4610	10	4.3	ug/l	RSKSOP-147/175
Total Organic Carbon	68.6	20		mg/l	SM5310 C-00
C46556-3 RW-11B					
Benzene	81.2	25	5.0	ug/l	SW846 8260B
1,1-Dichloroethane	31.6	25	5.0	ug/l	SW846 8260B
1,2-Dichloroethane	9.6 J	25	5.0	ug/l	SW846 8260B
cis-1,2-Dichloroethylene	137	25	5.0	ug/l	SW846 8260B
Methyl ethyl ketone	98.1 J	250	50	ug/l	SW846 8260B
Trichloroethylene	11.3 J	25	5.0	ug/l	SW846 8260B
Vinyl chloride	6760	100	20	ug/l	SW846 8260B
Methane [a]	779	0.50	0.16	ug/l	RSKSOP-147/175
Ethane [a]	0.52 J	1.0	0.32	ug/l	RSKSOP-147/175
Ethene [a]	146	1.0	0.43	ug/l	RSKSOP-147/175
Total Organic Carbon	6.6	5.0		mg/l	SM5310 C-00
C46556-4 RW-20B					
Acetone [b]	137 J	500	100	ug/l	SW846 8260B
Benzene [b]	229	25	5.0	ug/l	SW846 8260B
Chlorobenzene [b]	311	25	5.0	ug/l	SW846 8260B
Chloroform [b]	12.4 J	25	5.0	ug/l	SW846 8260B
o-Chlorotoluene [b]	7.4 J	50	5.0	ug/l	SW846 8260B
1,1-Dichloroethane [b]	331	25	5.0	ug/l	SW846 8260B
1,1-Dichloroethylene [b]	6.8 J	25	5.0	ug/l	SW846 8260B
1,2-Dichloroethane [b]	551	25	5.0	ug/l	SW846 8260B
1,3-Dichloropropane [b]	15.1 J	25	5.0	ug/l	SW846 8260B
cis-1,2-Dichloroethylene [b]	406	25	5.0	ug/l	SW846 8260B
o-Dichlorobenzene [b]	8.3 J	25	5.0	ug/l	SW846 8260B
p-Dichlorobenzene [b]	10.4 J	25	5.0	ug/l	SW846 8260B
trans-1,2-Dichloroethylene [b]	94.8	25	5.0	ug/l	SW846 8260B
Ethylbenzene [b]	110	25	5.0	ug/l	SW846 8260B
Methyl ethyl ketone [b]	240 J	250	50	ug/l	SW846 8260B

Summary of Hits

Job Number: C46556
Account: Ninyo & Moore
Project: Romic Groundwater-East Palo Alto,CA
Collected: 07/18/16

Lab Sample ID / Client Sample ID / Analyte	Result/ Qual	RL	MDL	Units	Method
Naphthalene [b]	21.7 J	130	13	ug/l	SW846 8260B
n-Propylbenzene [b]	5.5 J	50	5.0	ug/l	SW846 8260B
1,2,4-Trimethylbenzene [b]	47.4 J	50	5.0	ug/l	SW846 8260B
Toluene [b]	395	25	5.0	ug/l	SW846 8260B
Trichloroethylene [b]	6.7 J	25	5.0	ug/l	SW846 8260B
Vinyl chloride [b]	1310	25	5.0	ug/l	SW846 8260B
Xylene (total) [b]	330	50	12	ug/l	SW846 8260B
Methane [c]	717	0.50	0.16	ug/l	RSKSOP-147/175
Ethene [c]	1750	1.0	0.43	ug/l	RSKSOP-147/175
Total Organic Carbon	588	250		mg/l	SM5310 C-00
C46556-5 EW-1B					
Chlorobenzene	180 J	500	100	ug/l	SW846 8260B
Chloroform	213 J	500	100	ug/l	SW846 8260B
1,1-Dichloroethane	527	500	100	ug/l	SW846 8260B
1,1-Dichloroethylene	1680	500	100	ug/l	SW846 8260B
1,2-Dichloroethane	3480	500	100	ug/l	SW846 8260B
cis-1,2-Dichloroethylene	58300	1000	200	ug/l	SW846 8260B
trans-1,2-Dichloroethylene	265 J	500	100	ug/l	SW846 8260B
Ethylbenzene	200 J	500	100	ug/l	SW846 8260B
Toluene	1110	500	100	ug/l	SW846 8260B
Trichloroethylene	655	500	100	ug/l	SW846 8260B
Vinyl chloride	22300	500	100	ug/l	SW846 8260B
Xylene (total)	426 J	1000	230	ug/l	SW846 8260B
Methane [a]	1190	1.0	0.32	ug/l	RSKSOP-147/175
Ethane [a]	37.9	1.0	0.32	ug/l	RSKSOP-147/175
Ethene [a]	4360	2.0	0.86	ug/l	RSKSOP-147/175
Total Organic Carbon	8.2	5.0		mg/l	SM5310 C-00
C46556-6 EW-2B					
Benzene [d]	332 J	500	100	ug/l	SW846 8260B
Chlorobenzene [d]	102 J	500	100	ug/l	SW846 8260B
Chloroform [d]	499 J	500	100	ug/l	SW846 8260B
1,1-Dichloroethane [d]	989	500	100	ug/l	SW846 8260B
1,1-Dichloroethylene [d]	315 J	500	100	ug/l	SW846 8260B
1,2-Dichloroethane [d]	3620	500	100	ug/l	SW846 8260B
cis-1,2-Dichloroethylene [d]	7090	500	100	ug/l	SW846 8260B
trans-1,2-Dichloroethylene [d]	231 J	500	100	ug/l	SW846 8260B
Ethylbenzene [d]	919	500	100	ug/l	SW846 8260B
1,2,4-Trimethylbenzene [d]	220 J	1000	100	ug/l	SW846 8260B
Toluene [d]	740	500	100	ug/l	SW846 8260B
Trichloroethylene [d]	171 J	500	100	ug/l	SW846 8260B
Vinyl chloride [d]	25500	500	100	ug/l	SW846 8260B

Summary of Hits

Job Number: C46556
Account: Ninyo & Moore
Project: Romic Groundwater-East Palo Alto,CA
Collected: 07/18/16

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
Xylene (total) [d]		1990	1000	230	ug/l	SW846 8260B
Methane [a]		1900	5.0	1.6	ug/l	RSKSOP-147/175
Ethene [a]		5370	10	4.3	ug/l	RSKSOP-147/175
Total Organic Carbon		166	100		mg/l	SM5310 C-00

C46556-7 TRIP BLANK

No hits reported in this sample.

(a) Analysis performed at SGS Accutest, Orlando FL.
(b) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was analyzed within 7 day holding time.
(c) Sample was not preserved to a pH < 2. Analysis performed at SGS Accutest, Orlando FL.
(d) Sample vial contained more than 0.5cm of sediment.

Sample Results

Report of Analysis

Report of Analysis

Client Sample ID:	RW-1A		
Lab Sample ID:	C46556-1	**Date Sampled:**	07/18/16
Matrix:	AQ - Ground Water	**Date Received:**	07/18/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Romic Groundwater-East Palo Alto,CA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	V34123.D	2.5	07/21/16	KZ	n/a	n/a	VV1407
Run #2	V34151.D	500	07/22/16	KZ	n/a	n/a	VV1408
Run #3	U36069.D	1000	07/25/16	MV	n/a	n/a	VU1489

	Purge Volume
Run #1	10.0 ml
Run #2	10.0 ml
Run #3	10.0 ml

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	295	50	10	ug/l	
71-43-2	Benzene	60.7	2.5	0.50	ug/l	
108-86-1	Bromobenzene	ND	2.5	0.50	ug/l	
74-97-5	Bromochloromethane	ND	2.5	0.50	ug/l	
75-27-4	Bromodichloromethane	ND	2.5	0.50	ug/l	
75-25-2	Bromoform	ND	2.5	0.55	ug/l	
104-51-8	n-Butylbenzene	ND	5.0	0.50	ug/l	
135-98-8	sec-Butylbenzene	ND	5.0	0.50	ug/l	
98-06-6	tert-Butylbenzene	ND	5.0	0.70	ug/l	
108-90-7	Chlorobenzene	28.1	2.5	0.50	ug/l	
75-00-3	Chloroethane	2.8	2.5	0.50	ug/l	
67-66-3	Chloroform	385 [a]	500	100	ug/l	J
95-49-8	o-Chlorotoluene	ND	5.0	0.50	ug/l	
106-43-4	p-Chlorotoluene	ND	5.0	0.65	ug/l	
75-15-0	Carbon disulfide	2.9	2.5	0.50	ug/l	
56-23-5	Carbon tetrachloride	ND	2.5	0.50	ug/l	
75-34-3	1,1-Dichloroethane	914 [a]	500	100	ug/l	
75-35-4	1,1-Dichloroethylene	1950 [a]	500	100	ug/l	
563-58-6	1,1-Dichloropropene	ND	2.5	0.50	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	5.0	1.0	ug/l	
106-93-4	1,2-Dibromoethane	ND	2.5	0.50	ug/l	
107-06-2	1,2-Dichloroethane	17000 [a]	500	100	ug/l	
78-87-5	1,2-Dichloropropane	8.8	2.5	0.50	ug/l	
142-28-9	1,3-Dichloropropane	3.5	2.5	0.50	ug/l	
594-20-7	2,2-Dichloropropane	ND	2.5	0.50	ug/l	
124-48-1	Dibromochloromethane	ND	2.5	0.50	ug/l	
75-71-8	Dichlorodifluoromethane	ND	2.5	0.50	ug/l	
156-59-2	cis-1,2-Dichloroethylene	57100 [b]	1000	200	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	2.5	0.50	ug/l	
541-73-1	m-Dichlorobenzene	ND	2.5	0.50	ug/l	

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	RW-1A		
Lab Sample ID:	C46556-1	**Date Sampled:**	07/18/16
Matrix:	AQ - Ground Water	**Date Received:**	07/18/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Romic Groundwater-East Palo Alto,CA		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
95-50-1	o-Dichlorobenzene	0.59	2.5	0.50	ug/l	J
106-46-7	p-Dichlorobenzene	ND	2.5	0.50	ug/l	
156-60-5	trans-1,2-Dichloroethylene	399 [a]	500	100	ug/l	J
10061-02-6	trans-1,3-Dichloropropene	ND	2.5	0.75	ug/l	
100-41-4	Ethylbenzene	233	2.5	0.50	ug/l	
76-13-1	Freon 113	220 [a]	1000	100	ug/l	J
591-78-6	2-Hexanone	ND	25	5.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	5.0	0.50	ug/l	
98-82-8	Isopropylbenzene	4.0	2.5	0.50	ug/l	
99-87-6	p-Isopropyltoluene	ND	5.0	0.50	ug/l	
108-10-1	4-Methyl-2-pentanone	3.3	25	2.5	ug/l	J
74-83-9	Methyl bromide	ND	5.0	0.50	ug/l	
74-87-3	Methyl chloride	ND	2.5	0.75	ug/l	
74-95-3	Methylene bromide	ND	2.5	0.50	ug/l	
75-09-2	Methylene chloride	28.7	25	5.0	ug/l	
78-93-3	Methyl ethyl ketone	383	25	5.0	ug/l	
1634-04-4	Methyl Tert Butyl Ether	ND	2.5	0.50	ug/l	
91-20-3	Naphthalene	2.0	13	1.3	ug/l	J
103-65-1	n-Propylbenzene	2.9	5.0	0.50	ug/l	J
100-42-5	Styrene	ND	2.5	0.50	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	2.5	0.75	ug/l	
71-55-6	1,1,1-Trichloroethane	2.5	2.5	0.50	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	2.5	0.50	ug/l	
79-00-5	1,1,2-Trichloroethane	1170 [a]	500	110	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	5.0	0.50	ug/l	
96-18-4	1,2,3-Trichloropropane	5.1	5.0	0.50	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	5.0	0.50	ug/l	
95-63-6	1,2,4-Trimethylbenzene	41.1	5.0	0.50	ug/l	
108-67-8	1,3,5-Trimethylbenzene	7.2	5.0	0.50	ug/l	
127-18-4	Tetrachloroethylene	142	2.5	0.75	ug/l	
108-88-3	Toluene	76.2	2.5	0.50	ug/l	
79-01-6	Trichloroethylene	4100 [a]	500	100	ug/l	
75-69-4	Trichlorofluoromethane	2.2	2.5	0.50	ug/l	J
75-01-4	Vinyl chloride	17400 [a]	500	100	ug/l	
108-05-4	Vinyl Acetate	ND	13	1.0	ug/l	
1330-20-7	Xylene (total)	780 [a]	1000	230	ug/l	J

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Run# 3	Limits
1868-53-7	Dibromofluoromethane	102%	104%	97%	80-123%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	RW-1A		
Lab Sample ID:	C46556-1	**Date Sampled:**	07/18/16
Matrix:	AQ - Ground Water	**Date Received:**	07/18/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Romic Groundwater-East Palo Alto,CA		

VOA 8260 Special List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Run# 3	Limits
2037-26-5	Toluene-D8	104%	101%	98%	88-112%
460-00-4	4-Bromofluorobenzene	102%	101%	89%	79-114%

(a) Result is from Run# 2
(b) Result is from Run# 3

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	RW-1A		
Lab Sample ID:	C46556-1	**Date Sampled:**	07/18/16
Matrix:	AQ - Ground Water	**Date Received:**	07/18/16
Method:	RSKSOP-147/175	**Percent Solids:**	n/a
Project:	Romic Groundwater-East Palo Alto,CA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	FF34982.D	1	07/21/16	AFL	n/a	n/a	F:GFF1370
Run #2 [a]	FF34990.D	10	07/21/16	AFL	n/a	n/a	F:GFF1370

	Initial Volume	Headspace Volume	Volume Injected	Temperature
Run #1	38.0 ml	5.0 ml	500 ul	20 Deg. C
Run #2	38.0 ml	5.0 ml	500 ul	20 Deg. C

CAS No.	Compound	Result	RL	MDL	Units	Q
74-82-8	Methane	4420 [b]	5.0	1.6	ug/l	
74-84-0	Ethane	ND	1.0	0.32	ug/l	
74-85-1	Ethene	4470 [b]	10	4.3	ug/l	

(a) Analysis performed at SGS Accutest, Orlando FL.
(b) Result is from Run# 2

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	RW-1A		
Lab Sample ID:	C46556-1	**Date Sampled:**	07/18/16
Matrix:	AQ - Ground Water	**Date Received:**	07/18/16
		Percent Solids:	n/a
Project:	Romic Groundwater-East Palo Alto,CA		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Total Organic Carbon	27.2	25	mg/l	25	07/21/16 16:58	EB	SM5310 C-00

RL = Reporting Limit

Report of Analysis

Client Sample ID:	RW-8B		
Lab Sample ID:	C46556-2	**Date Sampled:**	07/18/16
Matrix:	AQ - Ground Water	**Date Received:**	07/18/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Romic Groundwater-East Palo Alto,CA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	V34152.D	200	07/22/16	KZ	n/a	n/a	VV1408
Run #2	U36070.D	500	07/25/16	MV	n/a	n/a	VU1489

	Purge Volume
Run #1	10.0 ml
Run #2	10.0 ml

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	4000	800	ug/l	
71-43-2	Benzene	190	200	40	ug/l	J
108-86-1	Bromobenzene	ND	200	40	ug/l	
74-97-5	Bromochloromethane	ND	200	40	ug/l	
75-27-4	Bromodichloromethane	ND	200	40	ug/l	
75-25-2	Bromoform	ND	200	44	ug/l	
104-51-8	n-Butylbenzene	ND	400	40	ug/l	
135-98-8	sec-Butylbenzene	ND	400	40	ug/l	
98-06-6	tert-Butylbenzene	ND	400	56	ug/l	
108-90-7	Chlorobenzene	59.0	200	40	ug/l	J
75-00-3	Chloroethane	ND	200	40	ug/l	
67-66-3	Chloroform	375	200	40	ug/l	
95-49-8	o-Chlorotoluene	ND	400	40	ug/l	
106-43-4	p-Chlorotoluene	ND	400	52	ug/l	
75-15-0	Carbon disulfide	ND	200	40	ug/l	
56-23-5	Carbon tetrachloride	ND	200	40	ug/l	
75-34-3	1,1-Dichloroethane	827	200	40	ug/l	
75-35-4	1,1-Dichloroethylene	453	200	40	ug/l	
563-58-6	1,1-Dichloropropene	ND	200	40	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	400	80	ug/l	
106-93-4	1,2-Dibromoethane	ND	200	40	ug/l	
107-06-2	1,2-Dichloroethane	2240	200	40	ug/l	
78-87-5	1,2-Dichloropropane	ND	200	40	ug/l	
142-28-9	1,3-Dichloropropane	ND	200	40	ug/l	
594-20-7	2,2-Dichloropropane	ND	200	40	ug/l	
124-48-1	Dibromochloromethane	ND	200	40	ug/l	
75-71-8	Dichlorodifluoromethane	ND	200	40	ug/l	
156-59-2	cis-1,2-Dichloroethylene	5830	200	40	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	200	40	ug/l	
541-73-1	m-Dichlorobenzene	ND	200	40	ug/l	
95-50-1	o-Dichlorobenzene	ND	200	40	ug/l	
106-46-7	p-Dichlorobenzene	ND	200	40	ug/l	

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	RW-8B		
Lab Sample ID:	C46556-2	**Date Sampled:**	07/18/16
Matrix:	AQ - Ground Water	**Date Received:**	07/18/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Romic Groundwater-East Palo Alto,CA		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
156-60-5	trans-1,2-Dichloroethylene	171	200	40	ug/l	J
10061-02-6	trans-1,3-Dichloropropene	ND	200	60	ug/l	
100-41-4	Ethylbenzene	94.3	200	40	ug/l	J
76-13-1	Freon 113	ND	400	40	ug/l	
591-78-6	2-Hexanone	ND	2000	400	ug/l	
87-68-3	Hexachlorobutadiene	ND	400	40	ug/l	
98-82-8	Isopropylbenzene	ND	200	40	ug/l	
99-87-6	p-Isopropyltoluene	ND	400	40	ug/l	
108-10-1	4-Methyl-2-pentanone	ND	2000	200	ug/l	
74-83-9	Methyl bromide	ND	400	40	ug/l	
74-87-3	Methyl chloride	ND	200	60	ug/l	
74-95-3	Methylene bromide	ND	200	40	ug/l	
75-09-2	Methylene chloride	ND	2000	400	ug/l	
78-93-3	Methyl ethyl ketone	ND	2000	400	ug/l	
1634-04-4	Methyl Tert Butyl Ether	ND	200	40	ug/l	
91-20-3	Naphthalene	ND	1000	100	ug/l	
103-65-1	n-Propylbenzene	ND	400	40	ug/l	
100-42-5	Styrene	ND	200	40	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	200	60	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	200	40	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	200	40	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	200	44	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	400	40	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	400	40	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	400	40	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	400	40	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	400	40	ug/l	
127-18-4	Tetrachloroethylene	ND	200	60	ug/l	
108-88-3	Toluene	710	200	40	ug/l	
79-01-6	Trichloroethylene	100	200	40	ug/l	J
75-69-4	Trichlorofluoromethane	ND	200	40	ug/l	
75-01-4	Vinyl chloride	11300 [a]	500	100	ug/l	
108-05-4	Vinyl Acetate	ND	1000	80	ug/l	
1330-20-7	Xylene (total)	271	400	92	ug/l	J

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	107%	98%	80-123%
2037-26-5	Toluene-D8	103%	97%	88-112%
460-00-4	4-Bromofluorobenzene	103%	88%	79-114%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	RW-8B		
Lab Sample ID:	C46556-2	**Date Sampled:**	07/18/16
Matrix:	AQ - Ground Water	**Date Received:**	07/18/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Romic Groundwater-East Palo Alto,CA		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q

(a) Result is from Run# 2

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	RW-8B		
Lab Sample ID:	C46556-2	**Date Sampled:**	07/18/16
Matrix:	AQ - Ground Water	**Date Received:**	07/18/16
Method:	RSKSOP-147/175	**Percent Solids:**	n/a
Project:	Romic Groundwater-East Palo Alto,CA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	FF34983.D	1	07/21/16	AFL	n/a	n/a	F:GFF1370
Run #2 [a]	FF34991.D	10	07/21/16	AFL	n/a	n/a	F:GFF1370

	Initial Volume	Headspace Volume	Volume Injected	Temperature
Run #1	38.0 ml	5.0 ml	500 ul	20 Deg. C
Run #2	38.0 ml	5.0 ml	500 ul	20 Deg. C

CAS No.	Compound	Result	RL	MDL	Units	Q
74-82-8	Methane	2520 [b]	5.0	1.6	ug/l	
74-84-0	Ethane	33.1	1.0	0.32	ug/l	
74-85-1	Ethene	4610 [b]	10	4.3	ug/l	

(a) Analysis performed at SGS Accutest, Orlando FL.
(b) Result is from Run# 2

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	RW-8B		
Lab Sample ID:	C46556-2	**Date Sampled:**	07/18/16
Matrix:	AQ - Ground Water	**Date Received:**	07/18/16
		Percent Solids:	n/a
Project:	Romic Groundwater-East Palo Alto,CA		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Total Organic Carbon	68.6	20	mg/l	20	07/21/16 16:58	EB	SM5310 C-00

RL = Reporting Limit

Report of Analysis

Client Sample ID: RW-11B
Lab Sample ID: C46556-3
Matrix: AQ - Ground Water
Method: SW846 8260B
Project: Romic Groundwater-East Palo Alto,CA

Date Sampled: 07/18/16
Date Received: 07/18/16
Percent Solids: n/a

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	V34125.D	25	07/21/16	KZ	n/a	n/a	VV1407
Run #2	V34153.D	100	07/22/16	KZ	n/a	n/a	VV1408

	Purge Volume
Run #1	10.0 ml
Run #2	10.0 ml

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	500	100	ug/l	
71-43-2	Benzene	81.2	25	5.0	ug/l	
108-86-1	Bromobenzene	ND	25	5.0	ug/l	
74-97-5	Bromochloromethane	ND	25	5.0	ug/l	
75-27-4	Bromodichloromethane	ND	25	5.0	ug/l	
75-25-2	Bromoform	ND	25	5.5	ug/l	
104-51-8	n-Butylbenzene	ND	50	5.0	ug/l	
135-98-8	sec-Butylbenzene	ND	50	5.0	ug/l	
98-06-6	tert-Butylbenzene	ND	50	7.0	ug/l	
108-90-7	Chlorobenzene	ND	25	5.0	ug/l	
75-00-3	Chloroethane	ND	25	5.0	ug/l	
67-66-3	Chloroform	ND	25	5.0	ug/l	
95-49-8	o-Chlorotoluene	ND	50	5.0	ug/l	
106-43-4	p-Chlorotoluene	ND	50	6.5	ug/l	
75-15-0	Carbon disulfide	ND	25	5.0	ug/l	
56-23-5	Carbon tetrachloride	ND	25	5.0	ug/l	
75-34-3	1,1-Dichloroethane	31.6	25	5.0	ug/l	
75-35-4	1,1-Dichloroethylene	ND	25	5.0	ug/l	
563-58-6	1,1-Dichloropropene	ND	25	5.0	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	50	10	ug/l	
106-93-4	1,2-Dibromoethane	ND	25	5.0	ug/l	
107-06-2	1,2-Dichloroethane	9.6	25	5.0	ug/l	J
78-87-5	1,2-Dichloropropane	ND	25	5.0	ug/l	
142-28-9	1,3-Dichloropropane	ND	25	5.0	ug/l	
594-20-7	2,2-Dichloropropane	ND	25	5.0	ug/l	
124-48-1	Dibromochloromethane	ND	25	5.0	ug/l	
75-71-8	Dichlorodifluoromethane	ND	25	5.0	ug/l	
156-59-2	cis-1,2-Dichloroethylene	137	25	5.0	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	25	5.0	ug/l	
541-73-1	m-Dichlorobenzene	ND	25	5.0	ug/l	
95-50-1	o-Dichlorobenzene	ND	25	5.0	ug/l	
106-46-7	p-Dichlorobenzene	ND	25	5.0	ug/l	

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	RW-11B		
Lab Sample ID:	C46556-3	**Date Sampled:**	07/18/16
Matrix:	AQ - Ground Water	**Date Received:**	07/18/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Romic Groundwater-East Palo Alto,CA		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
156-60-5	trans-1,2-Dichloroethylene	ND	25	5.0	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	25	7.5	ug/l	
100-41-4	Ethylbenzene	ND	25	5.0	ug/l	
76-13-1	Freon 113	ND	50	5.0	ug/l	
591-78-6	2-Hexanone	ND	250	50	ug/l	
87-68-3	Hexachlorobutadiene	ND	50	5.0	ug/l	
98-82-8	Isopropylbenzene	ND	25	5.0	ug/l	
99-87-6	p-Isopropyltoluene	ND	50	5.0	ug/l	
108-10-1	4-Methyl-2-pentanone	ND	250	25	ug/l	
74-83-9	Methyl bromide	ND	50	5.0	ug/l	
74-87-3	Methyl chloride	ND	25	7.5	ug/l	
74-95-3	Methylene bromide	ND	25	5.0	ug/l	
75-09-2	Methylene chloride	ND	250	50	ug/l	
78-93-3	Methyl ethyl ketone	98.1	250	50	ug/l	J
1634-04-4	Methyl Tert Butyl Ether	ND	25	5.0	ug/l	
91-20-3	Naphthalene	ND	130	13	ug/l	
103-65-1	n-Propylbenzene	ND	50	5.0	ug/l	
100-42-5	Styrene	ND	25	5.0	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	25	7.5	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	25	5.0	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	25	5.0	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	25	5.5	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	50	5.0	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	50	5.0	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	50	5.0	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	50	5.0	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	50	5.0	ug/l	
127-18-4	Tetrachloroethylene	ND	25	7.5	ug/l	
108-88-3	Toluene	ND	25	5.0	ug/l	
79-01-6	Trichloroethylene	11.3	25	5.0	ug/l	J
75-69-4	Trichlorofluoromethane	ND	25	5.0	ug/l	
75-01-4	Vinyl chloride	6760 [a]	100	20	ug/l	
108-05-4	Vinyl Acetate	ND	130	10	ug/l	
1330-20-7	Xylene (total)	ND	50	12	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	103%	107%	80-123%
2037-26-5	Toluene-D8	101%	101%	88-112%
460-00-4	4-Bromofluorobenzene	100%	102%	79-114%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	RW-11B		
Lab Sample ID:	C46556-3	**Date Sampled:**	07/18/16
Matrix:	AQ - Ground Water	**Date Received:**	07/18/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Romic Groundwater-East Palo Alto,CA		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q

(a) Result is from Run# 2

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	RW-11B		
Lab Sample ID:	C46556-3	**Date Sampled:**	07/18/16
Matrix:	AQ - Ground Water	**Date Received:**	07/18/16
Method:	RSKSOP-147/175	**Percent Solids:**	n/a
Project:	Romic Groundwater-East Palo Alto,CA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	FF34984.D	1	07/21/16	AFL	n/a	n/a	F:GFF1370
Run #2							

	Initial Volume	Headspace Volume	Volume Injected	Temperature
Run #1	38.0 ml	5.0 ml	500 ul	20 Deg. C
Run #2				

CAS No.	Compound	Result	RL	MDL	Units	Q
74-82-8	Methane	779	0.50	0.16	ug/l	
74-84-0	Ethane	0.52	1.0	0.32	ug/l	J
74-85-1	Ethene	146	1.0	0.43	ug/l	

(a) Analysis performed at SGS Accutest, Orlando FL.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	RW-11B		
Lab Sample ID:	C46556-3	**Date Sampled:**	07/18/16
Matrix:	AQ - Ground Water	**Date Received:**	07/18/16
		Percent Solids:	n/a
Project:	Romic Groundwater-East Palo Alto,CA		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Total Organic Carbon	6.6	5.0	mg/l	5	07/21/16 16:58	EB	SM5310 C-00

RL = Reporting Limit

Report of Analysis

Client Sample ID:	RW-20B		
Lab Sample ID:	C46556-4	**Date Sampled:**	07/18/16
Matrix:	AQ - Ground Water	**Date Received:**	07/18/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Romic Groundwater-East Palo Alto,CA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	V34154.D	25	07/22/16	KZ	n/a	n/a	VV1408
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	137	500	100	ug/l	J
71-43-2	Benzene	229	25	5.0	ug/l	
108-86-1	Bromobenzene	ND	25	5.0	ug/l	
74-97-5	Bromochloromethane	ND	25	5.0	ug/l	
75-27-4	Bromodichloromethane	ND	25	5.0	ug/l	
75-25-2	Bromoform	ND	25	5.5	ug/l	
104-51-8	n-Butylbenzene	ND	50	5.0	ug/l	
135-98-8	sec-Butylbenzene	ND	50	5.0	ug/l	
98-06-6	tert-Butylbenzene	ND	50	7.0	ug/l	
108-90-7	Chlorobenzene	311	25	5.0	ug/l	
75-00-3	Chloroethane	ND	25	5.0	ug/l	
67-66-3	Chloroform	12.4	25	5.0	ug/l	J
95-49-8	o-Chlorotoluene	7.4	50	5.0	ug/l	J
106-43-4	p-Chlorotoluene	ND	50	6.5	ug/l	
75-15-0	Carbon disulfide	ND	25	5.0	ug/l	
56-23-5	Carbon tetrachloride	ND	25	5.0	ug/l	
75-34-3	1,1-Dichloroethane	331	25	5.0	ug/l	
75-35-4	1,1-Dichloroethylene	6.8	25	5.0	ug/l	J
563-58-6	1,1-Dichloropropene	ND	25	5.0	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	50	10	ug/l	
106-93-4	1,2-Dibromoethane	ND	25	5.0	ug/l	
107-06-2	1,2-Dichloroethane	551	25	5.0	ug/l	
78-87-5	1,2-Dichloropropane	ND	25	5.0	ug/l	
142-28-9	1,3-Dichloropropane	15.1	25	5.0	ug/l	J
594-20-7	2,2-Dichloropropane	ND	25	5.0	ug/l	
124-48-1	Dibromochloromethane	ND	25	5.0	ug/l	
75-71-8	Dichlorodifluoromethane	ND	25	5.0	ug/l	
156-59-2	cis-1,2-Dichloroethylene	406	25	5.0	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	25	5.0	ug/l	
541-73-1	m-Dichlorobenzene	ND	25	5.0	ug/l	
95-50-1	o-Dichlorobenzene	8.3	25	5.0	ug/l	J
106-46-7	p-Dichlorobenzene	10.4	25	5.0	ug/l	J

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	RW-20B		
Lab Sample ID:	C46556-4	**Date Sampled:**	07/18/16
Matrix:	AQ - Ground Water	**Date Received:**	07/18/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Romic Groundwater-East Palo Alto,CA		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
156-60-5	trans-1,2-Dichloroethylene	94.8	25	5.0	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	25	7.5	ug/l	
100-41-4	Ethylbenzene	110	25	5.0	ug/l	
76-13-1	Freon 113	ND	50	5.0	ug/l	
591-78-6	2-Hexanone	ND	250	50	ug/l	
87-68-3	Hexachlorobutadiene	ND	50	5.0	ug/l	
98-82-8	Isopropylbenzene	ND	25	5.0	ug/l	
99-87-6	p-Isopropyltoluene	ND	50	5.0	ug/l	
108-10-1	4-Methyl-2-pentanone	ND	250	25	ug/l	
74-83-9	Methyl bromide	ND	50	5.0	ug/l	
74-87-3	Methyl chloride	ND	25	7.5	ug/l	
74-95-3	Methylene bromide	ND	25	5.0	ug/l	
75-09-2	Methylene chloride	ND	250	50	ug/l	
78-93-3	Methyl ethyl ketone	240	250	50	ug/l	J
1634-04-4	Methyl Tert Butyl Ether	ND	25	5.0	ug/l	
91-20-3	Naphthalene	21.7	130	13	ug/l	J
103-65-1	n-Propylbenzene	5.5	50	5.0	ug/l	J
100-42-5	Styrene	ND	25	5.0	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	25	7.5	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	25	5.0	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	25	5.0	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	25	5.5	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	50	5.0	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	50	5.0	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	50	5.0	ug/l	
95-63-6	1,2,4-Trimethylbenzene	47.4	50	5.0	ug/l	J
108-67-8	1,3,5-Trimethylbenzene	ND	50	5.0	ug/l	
127-18-4	Tetrachloroethylene	ND	25	7.5	ug/l	
108-88-3	Toluene	395	25	5.0	ug/l	
79-01-6	Trichloroethylene	6.7	25	5.0	ug/l	J
75-69-4	Trichlorofluoromethane	ND	25	5.0	ug/l	
75-01-4	Vinyl chloride	1310	25	5.0	ug/l	
108-05-4	Vinyl Acetate	ND	130	10	ug/l	
1330-20-7	Xylene (total)	330	50	12	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	105%		80-123%
2037-26-5	Toluene-D8	101%		88-112%
460-00-4	4-Bromofluorobenzene	101%		79-114%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	RW-20B		
Lab Sample ID:	C46556-4	**Date Sampled:**	07/18/16
Matrix:	AQ - Ground Water	**Date Received:**	07/18/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Romic Groundwater-East Palo Alto,CA		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q

(a) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was analyzed within 7 day holding time.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	RW-20B		
Lab Sample ID:	C46556-4	**Date Sampled:**	07/18/16
Matrix:	AQ - Ground Water	**Date Received:**	07/18/16
Method:	RSKSOP-147/175	**Percent Solids:**	n/a
Project:	Romic Groundwater-East Palo Alto,CA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	FF34985.D	1	07/21/16	AFL	n/a	n/a	F:GFF1370
Run #2							

	Initial Volume	Headspace Volume	Volume Injected	Temperature
Run #1	38.0 ml	5.0 ml	500 ul	20 Deg. C
Run #2				

CAS No.	Compound	Result	RL	MDL	Units	Q
74-82-8	Methane	717	0.50	0.16	ug/l	
74-84-0	Ethane	ND	1.0	0.32	ug/l	
74-85-1	Ethene	1750	1.0	0.43	ug/l	

(a) Sample was not preserved to a pH < 2. Analysis performed at SGS Accutest, Orlando FL.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	RW-20B		
Lab Sample ID:	C46556-4	**Date Sampled:**	07/18/16
Matrix:	AQ - Ground Water	**Date Received:**	07/18/16
		Percent Solids:	n/a
Project:	Romic Groundwater-East Palo Alto,CA		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Total Organic Carbon	588	250	mg/l	250	07/21/16 16:58	EB	SM5310 C-00

RL = Reporting Limit

Report of Analysis

Client Sample ID:	EW-1B		
Lab Sample ID:	C46556-5	**Date Sampled:**	07/18/16
Matrix:	AQ - Ground Water	**Date Received:**	07/18/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Romic Groundwater-East Palo Alto,CA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	V34127.D	500	07/21/16	KZ	n/a	n/a	VV1407
Run #2	V34155.D	1000	07/22/16	KZ	n/a	n/a	VV1408

	Purge Volume
Run #1	10.0 ml
Run #2	10.0 ml

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	10000	2000	ug/l	
71-43-2	Benzene	ND	500	100	ug/l	
108-86-1	Bromobenzene	ND	500	100	ug/l	
74-97-5	Bromochloromethane	ND	500	100	ug/l	
75-27-4	Bromodichloromethane	ND	500	100	ug/l	
75-25-2	Bromoform	ND	500	110	ug/l	
104-51-8	n-Butylbenzene	ND	1000	100	ug/l	
135-98-8	sec-Butylbenzene	ND	1000	100	ug/l	
98-06-6	tert-Butylbenzene	ND	1000	140	ug/l	
108-90-7	Chlorobenzene	180	500	100	ug/l	J
75-00-3	Chloroethane	ND	500	100	ug/l	
67-66-3	Chloroform	213	500	100	ug/l	J
95-49-8	o-Chlorotoluene	ND	1000	100	ug/l	
106-43-4	p-Chlorotoluene	ND	1000	130	ug/l	
75-15-0	Carbon disulfide	ND	500	100	ug/l	
56-23-5	Carbon tetrachloride	ND	500	100	ug/l	
75-34-3	1,1-Dichloroethane	527	500	100	ug/l	
75-35-4	1,1-Dichloroethylene	1680	500	100	ug/l	
563-58-6	1,1-Dichloropropene	ND	500	100	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	1000	200	ug/l	
106-93-4	1,2-Dibromoethane	ND	500	100	ug/l	
107-06-2	1,2-Dichloroethane	3480	500	100	ug/l	
78-87-5	1,2-Dichloropropane	ND	500	100	ug/l	
142-28-9	1,3-Dichloropropane	ND	500	100	ug/l	
594-20-7	2,2-Dichloropropane	ND	500	100	ug/l	
124-48-1	Dibromochloromethane	ND	500	100	ug/l	
75-71-8	Dichlorodifluoromethane	ND	500	100	ug/l	
156-59-2	cis-1,2-Dichloroethylene	58300 [a]	1000	200	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	500	100	ug/l	
541-73-1	m-Dichlorobenzene	ND	500	100	ug/l	
95-50-1	o-Dichlorobenzene	ND	500	100	ug/l	
106-46-7	p-Dichlorobenzene	ND	500	100	ug/l	

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	EW-1B		
Lab Sample ID:	C46556-5	**Date Sampled:**	07/18/16
Matrix:	AQ - Ground Water	**Date Received:**	07/18/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Romic Groundwater-East Palo Alto,CA		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
156-60-5	trans-1,2-Dichloroethylene	265	500	100	ug/l	J
10061-02-6	trans-1,3-Dichloropropene	ND	500	150	ug/l	
100-41-4	Ethylbenzene	200	500	100	ug/l	J
76-13-1	Freon 113	ND	1000	100	ug/l	
591-78-6	2-Hexanone	ND	5000	1000	ug/l	
87-68-3	Hexachlorobutadiene	ND	1000	100	ug/l	
98-82-8	Isopropylbenzene	ND	500	100	ug/l	
99-87-6	p-Isopropyltoluene	ND	1000	100	ug/l	
108-10-1	4-Methyl-2-pentanone	ND	5000	500	ug/l	
74-83-9	Methyl bromide	ND	1000	100	ug/l	
74-87-3	Methyl chloride	ND	500	150	ug/l	
74-95-3	Methylene bromide	ND	500	100	ug/l	
75-09-2	Methylene chloride	ND	5000	1000	ug/l	
78-93-3	Methyl ethyl ketone	ND	5000	1000	ug/l	
1634-04-4	Methyl Tert Butyl Ether	ND	500	100	ug/l	
91-20-3	Naphthalene	ND	2500	250	ug/l	
103-65-1	n-Propylbenzene	ND	1000	100	ug/l	
100-42-5	Styrene	ND	500	100	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	500	150	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	500	100	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	500	100	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	500	110	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	1000	100	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	1000	100	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	1000	100	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	1000	100	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	1000	100	ug/l	
127-18-4	Tetrachloroethylene	ND	500	150	ug/l	
108-88-3	Toluene	1110	500	100	ug/l	
79-01-6	Trichloroethylene	655	500	100	ug/l	
75-69-4	Trichlorofluoromethane	ND	500	100	ug/l	
75-01-4	Vinyl chloride	22300	500	100	ug/l	
108-05-4	Vinyl Acetate	ND	2500	200	ug/l	
1330-20-7	Xylene (total)	426	1000	230	ug/l	J

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	104%	106%	80-123%
2037-26-5	Toluene-D8	101%	101%	88-112%
460-00-4	4-Bromofluorobenzene	99%	100%	79-114%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	EW-1B		
Lab Sample ID:	C46556-5	**Date Sampled:**	07/18/16
Matrix:	AQ - Ground Water	**Date Received:**	07/18/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Romic Groundwater-East Palo Alto,CA		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q

(a) Result is from Run# 2

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	EW-1B		
Lab Sample ID:	C46556-5	**Date Sampled:**	07/18/16
Matrix:	AQ - Ground Water	**Date Received:**	07/18/16
Method:	RSKSOP-147/175	**Percent Solids:**	n/a
Project:	Romic Groundwater-East Palo Alto,CA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	FF34993.D	1	07/21/16	AFL	n/a	n/a	F:GFF1370
Run #2 [a]	FF34986.D	1	07/21/16	AFL	n/a	n/a	F:GFF1370

	Initial Volume	Headspace Volume	Volume Injected	Temperature
Run #1	38.0 ml	5.0 ml	250 ul	20 Deg. C
Run #2	38.0 ml	5.0 ml	500 ul	20 Deg. C

CAS No.	Compound	Result	RL	MDL	Units	Q
74-82-8	Methane	1190	1.0	0.32	ug/l	
74-84-0	Ethane	37.9 [b]	1.0	0.32	ug/l	
74-85-1	Ethene	4360	2.0	0.86	ug/l	

(a) Analysis performed at SGS Accutest, Orlando FL.
(b) Result is from Run# 2

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	EW-1B		
Lab Sample ID:	C46556-5	**Date Sampled:**	07/18/16
Matrix:	AQ - Ground Water	**Date Received:**	07/18/16
		Percent Solids:	n/a
Project:	Romic Groundwater-East Palo Alto,CA		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Total Organic Carbon	8.2	5.0	mg/l	5	07/21/16 16:58	EB	SM5310 C-00

RL = Reporting Limit

Report of Analysis

Client Sample ID:	EW-2B		
Lab Sample ID:	C46556-6	**Date Sampled:**	07/18/16
Matrix:	AQ - Ground Water	**Date Received:**	07/18/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Romic Groundwater-East Palo Alto,CA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	V34128.D	500	07/21/16	KZ	n/a	n/a	VV1407
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	10000	2000	ug/l	
71-43-2	Benzene	332	500	100	ug/l	J
108-86-1	Bromobenzene	ND	500	100	ug/l	
74-97-5	Bromochloromethane	ND	500	100	ug/l	
75-27-4	Bromodichloromethane	ND	500	100	ug/l	
75-25-2	Bromoform	ND	500	110	ug/l	
104-51-8	n-Butylbenzene	ND	1000	100	ug/l	
135-98-8	sec-Butylbenzene	ND	1000	100	ug/l	
98-06-6	tert-Butylbenzene	ND	1000	140	ug/l	
108-90-7	Chlorobenzene	102	500	100	ug/l	J
75-00-3	Chloroethane	ND	500	100	ug/l	
67-66-3	Chloroform	499	500	100	ug/l	J
95-49-8	o-Chlorotoluene	ND	1000	100	ug/l	
106-43-4	p-Chlorotoluene	ND	1000	130	ug/l	
75-15-0	Carbon disulfide	ND	500	100	ug/l	
56-23-5	Carbon tetrachloride	ND	500	100	ug/l	
75-34-3	1,1-Dichloroethane	989	500	100	ug/l	
75-35-4	1,1-Dichloroethylene	315	500	100	ug/l	J
563-58-6	1,1-Dichloropropene	ND	500	100	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	1000	200	ug/l	
106-93-4	1,2-Dibromoethane	ND	500	100	ug/l	
107-06-2	1,2-Dichloroethane	3620	500	100	ug/l	
78-87-5	1,2-Dichloropropane	ND	500	100	ug/l	
142-28-9	1,3-Dichloropropane	ND	500	100	ug/l	
594-20-7	2,2-Dichloropropane	ND	500	100	ug/l	
124-48-1	Dibromochloromethane	ND	500	100	ug/l	
75-71-8	Dichlorodifluoromethane	ND	500	100	ug/l	
156-59-2	cis-1,2-Dichloroethylene	7090	500	100	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	500	100	ug/l	
541-73-1	m-Dichlorobenzene	ND	500	100	ug/l	
95-50-1	o-Dichlorobenzene	ND	500	100	ug/l	
106-46-7	p-Dichlorobenzene	ND	500	100	ug/l	

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	EW-2B		
Lab Sample ID:	C46556-6	**Date Sampled:**	07/18/16
Matrix:	AQ - Ground Water	**Date Received:**	07/18/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Romic Groundwater-East Palo Alto,CA		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
156-60-5	trans-1,2-Dichloroethylene	231	500	100	ug/l	J
10061-02-6	trans-1,3-Dichloropropene	ND	500	150	ug/l	
100-41-4	Ethylbenzene	919	500	100	ug/l	
76-13-1	Freon 113	ND	1000	100	ug/l	
591-78-6	2-Hexanone	ND	5000	1000	ug/l	
87-68-3	Hexachlorobutadiene	ND	1000	100	ug/l	
98-82-8	Isopropylbenzene	ND	500	100	ug/l	
99-87-6	p-Isopropyltoluene	ND	1000	100	ug/l	
108-10-1	4-Methyl-2-pentanone	ND	5000	500	ug/l	
74-83-9	Methyl bromide	ND	1000	100	ug/l	
74-87-3	Methyl chloride	ND	500	150	ug/l	
74-95-3	Methylene bromide	ND	500	100	ug/l	
75-09-2	Methylene chloride	ND	5000	1000	ug/l	
78-93-3	Methyl ethyl ketone	ND	5000	1000	ug/l	
1634-04-4	Methyl Tert Butyl Ether	ND	500	100	ug/l	
91-20-3	Naphthalene	ND	2500	250	ug/l	
103-65-1	n-Propylbenzene	ND	1000	100	ug/l	
100-42-5	Styrene	ND	500	100	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	500	150	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	500	100	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	500	100	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	500	110	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	1000	100	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	1000	100	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	1000	100	ug/l	
95-63-6	1,2,4-Trimethylbenzene	220	1000	100	ug/l	J
108-67-8	1,3,5-Trimethylbenzene	ND	1000	100	ug/l	
127-18-4	Tetrachloroethylene	ND	500	150	ug/l	
108-88-3	Toluene	740	500	100	ug/l	
79-01-6	Trichloroethylene	171	500	100	ug/l	J
75-69-4	Trichlorofluoromethane	ND	500	100	ug/l	
75-01-4	Vinyl chloride	25500	500	100	ug/l	
108-05-4	Vinyl Acetate	ND	2500	200	ug/l	
1330-20-7	Xylene (total)	1990	1000	230	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	104%		80-123%
2037-26-5	Toluene-D8	101%		88-112%
460-00-4	4-Bromofluorobenzene	101%		79-114%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	EW-2B		
Lab Sample ID:	C46556-6	**Date Sampled:**	07/18/16
Matrix:	AQ - Ground Water	**Date Received:**	07/18/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Romic Groundwater-East Palo Alto,CA		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q

(a) Sample vial contained more than 0.5cm of sediment.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	EW-2B		
Lab Sample ID:	C46556-6	**Date Sampled:**	07/18/16
Matrix:	AQ - Ground Water	**Date Received:**	07/18/16
Method:	RSKSOP-147/175	**Percent Solids:**	n/a
Project:	Romic Groundwater-East Palo Alto,CA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	FF34987.D	1	07/21/16	AFL	n/a	n/a	F:GFF1370
Run #2 [a]	FF34992.D	10	07/21/16	AFL	n/a	n/a	F:GFF1370

	Initial Volume	Headspace Volume	Volume Injected	Temperature
Run #1	38.0 ml	5.0 ml	500 ul	20 Deg. C
Run #2	38.0 ml	5.0 ml	500 ul	20 Deg. C

CAS No.	Compound	Result	RL	MDL	Units	Q
74-82-8	Methane	1900 [b]	5.0	1.6	ug/l	
74-84-0	Ethane	ND	1.0	0.32	ug/l	
74-85-1	Ethene	5370 [b]	10	4.3	ug/l	

(a) Analysis performed at SGS Accutest, Orlando FL.
(b) Result is from Run# 2

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	EW-2B		
Lab Sample ID:	C46556-6	**Date Sampled:**	07/18/16
Matrix:	AQ - Ground Water	**Date Received:**	07/18/16
		Percent Solids:	n/a
Project:	Romic Groundwater-East Palo Alto,CA		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Total Organic Carbon	166	100	mg/l	100	07/21/16 16:58	EB	SM5310 C-00

RL = Reporting Limit

Report of Analysis

Client Sample ID:	TRIP BLANK		
Lab Sample ID:	C46556-7	**Date Sampled:**	07/18/16
Matrix:	AQ - Trip Blank Water	**Date Received:**	07/18/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Romic Groundwater-East Palo Alto,CA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	V34119.D	1	07/21/16	KZ	n/a	n/a	VV1407
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	20	4.0	ug/l	
71-43-2	Benzene	ND	1.0	0.20	ug/l	
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.20	ug/l	
75-25-2	Bromoform	ND	1.0	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.20	ug/l	
75-00-3	Chloroethane	ND	1.0	0.20	ug/l	
67-66-3	Chloroform	ND	1.0	0.20	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	ND	1.0	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	1.0	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	1.0	0.20	ug/l	
106-46-7	p-Dichlorobenzene	ND	1.0	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	TRIP BLANK		
Lab Sample ID:	C46556-7	**Date Sampled:**	07/18/16
Matrix:	AQ - Trip Blank Water	**Date Received:**	07/18/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Romic Groundwater-East Palo Alto,CA		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
76-13-1	Freon 113	ND	2.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
108-10-1	4-Methyl-2-pentanone	ND	10	1.0	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	10	2.0	ug/l	
78-93-3	Methyl ethyl ketone	ND	10	2.0	ug/l	
1634-04-4	Methyl Tert Butyl Ether	ND	1.0	0.20	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
100-42-5	Styrene	ND	1.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	1.0	0.20	ug/l	
75-01-4	Vinyl chloride	ND	1.0	0.20	ug/l	
108-05-4	Vinyl Acetate	ND	5.0	0.40	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	102%		80-123%
2037-26-5	Toluene-D8	102%		88-112%
460-00-4	4-Bromofluorobenzene	100%		79-114%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Chain of Custody

CHAIN OF CUSTODY

SGS ACCUTEST

2105 Lundy Ave, San Jose, CA 95131
(408) 588-0200 FAX: (408) 588-0201

FED-EX Tracking #: | Bottle Order Control #:
SGS Accutest Quote #: | SGS Accutest NC Job #: C46556

Client / Reporting Information

Company Name: Ninyo + Moore
Address: 1956 Webster St, Ste 400
City: Oakland State: CA Zip: 94608
Project Contact: Kris Larson
Phone #: 510 343 3000
Sampler's Name: Emily Dineen

Project Information

Project Name: Romic
Street: 2081 Bay Rd
City: East Palo Alto State: CA
Project #: 402643001
EMAIL: klarson@ninyoandmoore.com
Client Purchase Order #:

Requested Analysis

Matrix Codes: WW- Wastewater; GW- Ground Water; SW- Surface Water; SO- Soil; OI-Oil; WP-Wipe; LIQ - Non-aqueous Liquid; AIR; DW- Drinking Water (Perchlorate Only)

SGS Accutest Sample ID	Sample ID / Field Point / Point of Collection	Collection Date	Time	Sampled by	Matrix	# of bottles	Number of preserved Bottles: HCl, MeOH, HNO3, H2SO4, NONE, NaHSO4, MEOH, UNPRES	VOCs + TPH-g	Dissolved gases (methane, ethane, ethene)	TOC	LAB USE ONLY
1	RW-1A	7/18	0955	GRO	GW	8		X	X	X	
2	RW-8B		1045					X	X	X	
3	RW-11B		1310					X	X	X	
4	RW-20B		1400					X	X	X	
5	GW-1B		1135					X	X	X	
6	GW-2B		0900					X	X	X	
7	TRIP BLANK										

Turnaround Time (Business days)

Approved By / Date:

- [X] 10 Day
- [ ] 5 Day
- [ ] 3 Day
- [ ] 2 Day
- [ ] 1 Day
- [ ] Same Day

Emergency T/A data available VIA Labtrack

Data Deliverable Information

- [ ] Commercial "A" - Results only
- [ ] Commercial "B" - Results with QC summaries
- [ ] Commercial "B+" - Results, QC, and chromatograms
- [ ] FULL1 - Level 4 data package
- [ ] EDF for Geotracker [ ] EDD Format
- Provide EDF Global ID:
- Provide EDF Logcode:

Comments / Remarks

please cc psimac@ninyoandmoore.com

Sample Custody must be documented below each time samples change possession, including courier delivery.

	Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1		7/18/14 1510	1 Lee Sumlee	2		2
3	Relinquished by:	Date Time:	Received By: 3	Relinquished By: 4	Date Time:	Received By: 4
5	Relinquished by:	Date Time:	Received By: 5	Custody Seal # NONE	Appropriate Bottle / Pres. Y / N; Labels match Coc? Y / N; Headspace Y / N; Separate Receiving Check List used: Y / N; On Ice Y / N	Cooler Temp. 4.1/5.1 °C

C46556: Chain of Custody
Page 1 of 3

SGS Accutest Sample Receipt Summary

Job Number: C46556 **Client:** NINYO & MOORE **Project:** ROMIC

Date / Time Received: 7/18/2016 3:10:00 PM **Delivery Method:** Client **Airbill #'s:**

Cooler Temps (Initial/Adjusted): #1: (4.1/5.1);

Cooler Security	Y	or	N		Y	or	N
1. Custody Seals Present:	☐		☑	3. COC Present:	☑		☐
2. Custody Seals Intact:	☐		☐	4. Smpl Dates/Time OK	☑		☐

Cooler Temperature	Y	or	N
1. Temp criteria achieved:	☑		☐
2. Cooler temp verification:	IR GUN		
3. Cooler media:	Ice (Bag)		
4. No, Coolers	1		

Quality Control Preservation	Y	N	N/A
1. Trip Blank present / cooler:	☑	☐	☐
2. Trip Blank listed on COC:	☐	☑	☐
3. Samples preserved properly:	☑	☐	
4. VOCs headspace free:	☑	☐	☐

Sample Integrity - Documentation	Y	or	N
1. Sample labels present on bottles:	☑		☐
2. Container labeling complete:	☑		☐
3. Sample container label / COC agree:	☐		☑

Sample Integrity - Condition	Y	or	N
1. Sample recvd within HT:	☑		☐
2. All containers accounted for:	☑		☐
3. Condition of sample:	Intact		

Sample Integrity - Instructions	Y	N	N/A
1. Analysis requested is clear:	☑	☐	
2. Bottles received for unspecified tests	☐	☑	
3. Sufficient volume recvd for analysis:	☑	☐	
4. Compositing instructions clear:	☐	☐	☑
5. Filtering instructions clear:	☐	☐	☑

Comments Trip blanks (2) not listed on the COC

Sample Receipt Summary - Problem Resolution

Accutest Job Number: C46556

CSR: Nutan Kabir **Response Date:** 7/20/2016

Response: Client wants us to analyze the trip blank.

C46556: Chain of Custody
Page 3 of 3

GC/MS Volatiles

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

Method Blank Summary

Job Number: C46556
Account: NMCAO Ninyo & Moore
Project: Romic Groundwater-East Palo Alto,CA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VV1407-MB	V34118.D	1	07/21/16	KZ	n/a	n/a	VV1407

The QC reported here applies to the following samples: **Method:** SW846 8260B

C46556-1, C46556-3, C46556-5, C46556-6, C46556-7

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	20	4.0	ug/l	
71-43-2	Benzene	ND	1.0	0.20	ug/l	
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.20	ug/l	
75-25-2	Bromoform	ND	1.0	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.20	ug/l	
75-00-3	Chloroethane	ND	1.0	0.20	ug/l	
67-66-3	Chloroform	ND	1.0	0.20	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	ND	1.0	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	1.0	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	1.0	0.20	ug/l	
106-46-7	p-Dichlorobenzene	ND	1.0	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
76-13-1	Freon 113	ND	2.0	0.20	ug/l	

Method Blank Summary

Job Number: C46556
Account: NMCAO Ninyo & Moore
Project: Romic Groundwater-East Palo Alto,CA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VV1407-MB	V34118.D	1	07/21/16	KZ	n/a	n/a	VV1407

The QC reported here applies to the following samples: **Method:** SW846 8260B

C46556-1, C46556-3, C46556-5, C46556-6, C46556-7

CAS No.	Compound	Result	RL	MDL	Units	Q
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
108-10-1	4-Methyl-2-pentanone	ND	10	1.0	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	10	2.0	ug/l	
78-93-3	Methyl ethyl ketone	ND	10	2.0	ug/l	
1634-04-4	Methyl Tert Butyl Ether	ND	1.0	0.20	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
100-42-5	Styrene	ND	1.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	1.0	0.20	ug/l	
75-01-4	Vinyl chloride	ND	1.0	0.20	ug/l	
108-05-4	Vinyl Acetate	ND	5.0	0.40	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries		Limits
1868-53-7	Dibromofluoromethane	101%	80-123%
2037-26-5	Toluene-D8	101%	88-112%

Method Blank Summary

Job Number: C46556
Account: NMCAO Ninyo & Moore
Project: Romic Groundwater-East Palo Alto,CA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VV1407-MB	V34118.D	1	07/21/16	KZ	n/a	n/a	VV1407

The QC reported here applies to the following samples: **Method:** SW846 8260B

C46556-1, C46556-3, C46556-5, C46556-6, C46556-7

CAS No.	Surrogate Recoveries		Limits
460-00-4	4-Bromofluorobenzene	99%	79-114%

Method Blank Summary

Job Number: C46556
Account: NMCAO Ninyo & Moore
Project: Romic Groundwater-East Palo Alto,CA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VV1408-MB	V34147.D	1	07/22/16	KZ	n/a	n/a	VV1408

The QC reported here applies to the following samples: **Method:** SW846 8260B

C46556-1, C46556-2, C46556-3, C46556-4, C46556-5

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	20	4.0	ug/l	
71-43-2	Benzene	ND	1.0	0.20	ug/l	
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.20	ug/l	
75-25-2	Bromoform	ND	1.0	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.20	ug/l	
75-00-3	Chloroethane	ND	1.0	0.20	ug/l	
67-66-3	Chloroform	ND	1.0	0.20	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	ND	1.0	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	1.0	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	1.0	0.20	ug/l	
106-46-7	p-Dichlorobenzene	ND	1.0	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
76-13-1	Freon 113	ND	2.0	0.20	ug/l	

Method Blank Summary

Job Number: C46556
Account: NMCAO Ninyo & Moore
Project: Romic Groundwater-East Palo Alto,CA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VV1408-MB	V34147.D	1	07/22/16	KZ	n/a	n/a	VV1408

The QC reported here applies to the following samples: **Method:** SW846 8260B

C46556-1, C46556-2, C46556-3, C46556-4, C46556-5

CAS No.	Compound	Result	RL	MDL	Units	Q
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
108-10-1	4-Methyl-2-pentanone	ND	10	1.0	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	10	2.0	ug/l	
78-93-3	Methyl ethyl ketone	ND	10	2.0	ug/l	
1634-04-4	Methyl Tert Butyl Ether	ND	1.0	0.20	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
100-42-5	Styrene	ND	1.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	1.0	0.20	ug/l	
75-01-4	Vinyl chloride	ND	1.0	0.20	ug/l	
108-05-4	Vinyl Acetate	ND	5.0	0.40	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries		Limits
1868-53-7	Dibromofluoromethane	102%	80-123%
2037-26-5	Toluene-D8	102%	88-112%

Method Blank Summary

Job Number: C46556
Account: NMCAO Ninyo & Moore
Project: Romic Groundwater-East Palo Alto,CA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VV1408-MB	V34147.D	1	07/22/16	KZ	n/a	n/a	VV1408

The QC reported here applies to the following samples: **Method:** SW846 8260B

C46556-1, C46556-2, C46556-3, C46556-4, C46556-5

CAS No.	Surrogate Recoveries		Limits
460-00-4	4-Bromofluorobenzene	100%	79-114%

Method Blank Summary

Job Number: C46556
Account: NMCAO Ninyo & Moore
Project: Romic Groundwater-East Palo Alto,CA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VU1489-MB	U36064.D	1	07/25/16	MV	n/a	n/a	VU1489

The QC reported here applies to the following samples: **Method:** SW846 8260B

C46556-1, C46556-2

CAS No.	Compound	Result	RL	MDL	Units	Q
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
75-01-4	Vinyl chloride	ND	1.0	0.20	ug/l	

CAS No.	Surrogate Recoveries		Limits
1868-53-7	Dibromofluoromethane	93%	80-123%
2037-26-5	Toluene-D8	99%	88-112%
460-00-4	4-Bromofluorobenzene	89%	79-114%

Blank Spike/Blank Spike Duplicate Summary

Job Number: C46556
Account: NMCAO Ninyo & Moore
Project: Romic Groundwater-East Palo Alto,CA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VV1407-BS	V34115.D	1	07/21/16	KZ	n/a	n/a	VV1407
VV1407-BSD	V34116.D	1	07/21/16	KZ	n/a	n/a	VV1407

The QC reported here applies to the following samples: **Method:** SW846 8260B

C46556-1, C46556-3, C46556-5, C46556-6, C46556-7

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
67-64-1	Acetone	80	85.3	107	85.2	107	0	55-147/17
71-43-2	Benzene	20	20.3	102	20.6	103	1	76-120/10
108-86-1	Bromobenzene	20	20.1	101	20.4	102	1	80-123/10
74-97-5	Bromochloromethane	20	21.0	105	21.4	107	2	79-124/10
75-27-4	Bromodichloromethane	20	20.2	101	20.4	102	1	75-121/10
75-25-2	Bromoform	20	21.0	105	20.9	105	0	62-127/10
104-51-8	n-Butylbenzene	20	19.9	100	20.0	100	1	74-129/10
135-98-8	sec-Butylbenzene	20	19.8	99	20.1	101	2	75-128/11
98-06-6	tert-Butylbenzene	20	19.8	99	20.0	100	1	74-127/11
108-90-7	Chlorobenzene	20	20.1	101	20.1	101	0	79-119/10
75-00-3	Chloroethane	20	22.5	113	23.1	116* [a]	3	60-115/14
67-66-3	Chloroform	20	20.5	103	20.9	105	2	75-122/10
95-49-8	o-Chlorotoluene	20	19.5	98	20.8	104	6	76-125/12
106-43-4	p-Chlorotoluene	20	20.2	101	20.3	102	0	76-126/11
75-15-0	Carbon disulfide	20	17.0	85	17.5	88	3	51-130/13
56-23-5	Carbon tetrachloride	20	20.7	104	20.9	105	1	72-128/13
75-34-3	1,1-Dichloroethane	20	20.7	104	21.2	106	2	70-121/10
75-35-4	1,1-Dichloroethylene	20	19.7	99	19.9	100	1	62-125/13
563-58-6	1,1-Dichloropropene	20	19.9	100	20.2	101	1	68-116/11
96-12-8	1,2-Dibromo-3-chloropropane	20	18.5	93	19.0	95	3	64-129/11
106-93-4	1,2-Dibromoethane	20	20.7	104	20.3	102	2	81-124/10
107-06-2	1,2-Dichloroethane	20	20.6	103	20.8	104	1	74-122/10
78-87-5	1,2-Dichloropropane	20	21.0	105	21.3	107	1	75-123/10
142-28-9	1,3-Dichloropropane	20	21.5	108	21.2	106	1	81-127/11
594-20-7	2,2-Dichloropropane	20	20.0	100	20.3	102	1	66-130/12
124-48-1	Dibromochloromethane	20	20.6	103	20.5	103	0	76-124/10
75-71-8	Dichlorodifluoromethane	20	23.3	117	24.7	124	6	26-163/26
156-59-2	cis-1,2-Dichloroethylene	20	21.4	107	22.1	111	3	75-128/10
10061-01-5	cis-1,3-Dichloropropene	20	21.5	108	21.6	108	0	76-131/10
541-73-1	m-Dichlorobenzene	20	19.8	99	20.4	102	3	79-121/10
95-50-1	o-Dichlorobenzene	20	19.6	98	20.0	100	2	79-120/10
106-46-7	p-Dichlorobenzene	20	19.8	99	20.3	102	2	79-120/10
156-60-5	trans-1,2-Dichloroethylene	20	19.1	96	19.4	97	2	67-116/11
10061-02-6	trans-1,3-Dichloropropene	20	20.5	103	20.2	101	1	73-125/10
100-41-4	Ethylbenzene	20	20.3	102	20.4	102	0	78-123/10
76-13-1	Freon 113	20	21.9	110	21.9	110	0	59-129/18

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: C46556
Account: NMCAO Ninyo & Moore
Project: Romic Groundwater-East Palo Alto,CA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VV1407-BS	V34115.D	1	07/21/16	KZ	n/a	n/a	VV1407
VV1407-BSD	V34116.D	1	07/21/16	KZ	n/a	n/a	VV1407

The QC reported here applies to the following samples: **Method:** SW846 8260B

C46556-1, C46556-3, C46556-5, C46556-6, C46556-7

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
591-78-6	2-Hexanone	80	84.4	106	83.5	104	1	71-145/12
87-68-3	Hexachlorobutadiene	20	19.2	96	19.5	98	2	70-130/12
98-82-8	Isopropylbenzene	20	20.0	100	20.0	100	0	77-125/10
99-87-6	p-Isopropyltoluene	20	19.9	100	20.2	101	1	76-126/10
108-10-1	4-Methyl-2-pentanone	80	81.9	102	82.0	103	0	70-142/11
74-83-9	Methyl bromide	20	21.0	105	21.7	109	3	65-124/13
74-87-3	Methyl chloride	20	21.1	106	20.9	105	1	47-143/20
74-95-3	Methylene bromide	20	20.8	104	21.0	105	1	80-125/10
75-09-2	Methylene chloride	20	19.2	96	20.0	100	4	65-124/15
78-93-3	Methyl ethyl ketone	80	83.9	105	84.3	105	0	66-145/12
1634-04-4	Methyl Tert Butyl Ether	20	20.2	101	20.8	104	3	73-120/10
91-20-3	Naphthalene	20	20.1	101	20.8	104	3	66-120/12
103-65-1	n-Propylbenzene	20	19.7	99	19.9	100	1	75-125/10
100-42-5	Styrene	20	20.5	103	20.5	103	0	73-126/10
630-20-6	1,1,1,2-Tetrachloroethane	20	20.3	102	20.3	102	0	79-126/10
71-55-6	1,1,1-Trichloroethane	20	20.7	104	21.4	107	3	73-125/11
79-34-5	1,1,2,2-Tetrachloroethane	20	20.8	104	21.0	105	1	78-127/10
79-00-5	1,1,2-Trichloroethane	20	20.6	103	20.5	103	0	79-122/10
87-61-6	1,2,3-Trichlorobenzene	20	18.4	92	19.0	95	3	70-128/12
96-18-4	1,2,3-Trichloropropane	20	21.2	106	20.9	105	1	66-127/10
120-82-1	1,2,4-Trichlorobenzene	20	18.4	92	19.2	96	4	72-125/11
95-63-6	1,2,4-Trimethylbenzene	20	19.7	99	20.0	100	2	76-124/10
108-67-8	1,3,5-Trimethylbenzene	20	20.2	101	20.3	102	0	79-130/10
127-18-4	Tetrachloroethylene	20	20.3	102	20.4	102	0	72-124/13
108-88-3	Toluene	20	20.1	101	20.1	101	0	78-121/10
79-01-6	Trichloroethylene	20	20.3	102	20.6	103	1	75-119/10
75-69-4	Trichlorofluoromethane	20	22.7	114	22.9	115	1	68-130/19
75-01-4	Vinyl chloride	20	24.0	120	24.1	121	0	57-137/18
108-05-4	Vinyl Acetate	20	20.8	104	21.0	105	1	66-158/11
1330-20-7	Xylene (total)	60	60.3	101	60.5	101	0	78-122/10

CAS No.	Surrogate Recoveries	BSP	BSD	Limits
1868-53-7	Dibromofluoromethane	100%	102%	80-123%
2037-26-5	Toluene-D8	99%	97%	88-112%

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: C46556
Account: NMCAO Ninyo & Moore
Project: Romic Groundwater-East Palo Alto,CA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VV1407-BS	V34115.D	1	07/21/16	KZ	n/a	n/a	VV1407
VV1407-BSD	V34116.D	1	07/21/16	KZ	n/a	n/a	VV1407

The QC reported here applies to the following samples: **Method:** SW846 8260B

C46556-1, C46556-3, C46556-5, C46556-6, C46556-7

CAS No.	Surrogate Recoveries	BSP	BSD	Limits
460-00-4	4-Bromofluorobenzene	99%	99%	79-114%

(a) Outside laboratory control limits (high bias); but within marginal exceedence criteria.

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: C46556
Account: NMCAO Ninyo & Moore
Project: Romic Groundwater-East Palo Alto,CA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VV1408-BS	V34143.D	1	07/22/16	KZ	n/a	n/a	VV1408
VV1408-BSD	V34144.D	1	07/22/16	KZ	n/a	n/a	VV1408

The QC reported here applies to the following samples: **Method:** SW846 8260B

C46556-1, C46556-2, C46556-3, C46556-4, C46556-5

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
67-64-1	Acetone	80	89.4	112	84.9	106	5	55-147/17
71-43-2	Benzene	20	20.0	100	21.0	105	5	76-120/10
108-86-1	Bromobenzene	20	19.3	97	20.3	102	5	80-123/10
74-97-5	Bromochloromethane	20	20.5	103	21.4	107	4	79-124/10
75-27-4	Bromodichloromethane	20	20.1	101	20.9	105	4	75-121/10
75-25-2	Bromoform	20	20.2	101	20.3	102	0	62-127/10
104-51-8	n-Butylbenzene	20	19.4	97	20.0	100	3	74-129/10
135-98-8	sec-Butylbenzene	20	19.4	97	20.1	101	4	75-128/11
98-06-6	tert-Butylbenzene	20	19.3	97	19.9	100	3	74-127/11
108-90-7	Chlorobenzene	20	19.3	97	20.0	100	4	79-119/10
75-00-3	Chloroethane	20	22.8	114	23.7	119* [a]	4	60-115/14
67-66-3	Chloroform	20	20.3	102	21.2	106	4	75-122/10
95-49-8	o-Chlorotoluene	20	20.0	100	20.9	105	4	76-125/12
106-43-4	p-Chlorotoluene	20	19.7	99	20.3	102	3	76-126/11
75-15-0	Carbon disulfide	20	17.3	87	17.5	88	1	51-130/13
56-23-5	Carbon tetrachloride	20	20.4	102	21.0	105	3	72-128/13
75-34-3	1,1-Dichloroethane	20	20.7	104	21.5	108	4	70-121/10
75-35-4	1,1-Dichloroethylene	20	19.4	97	19.7	99	2	62-125/13
563-58-6	1,1-Dichloropropene	20	19.9	100	20.5	103	3	68-116/11
96-12-8	1,2-Dibromo-3-chloropropane	20	18.6	93	18.6	93	0	64-129/11
106-93-4	1,2-Dibromoethane	20	19.9	100	20.1	101	1	81-124/10
107-06-2	1,2-Dichloroethane	20	20.5	103	21.4	107	4	74-122/10
78-87-5	1,2-Dichloropropane	20	20.9	105	21.7	109	4	75-123/10
142-28-9	1,3-Dichloropropane	20	20.6	103	21.3	107	3	81-127/11
594-20-7	2,2-Dichloropropane	20	20.3	102	20.5	103	1	66-130/12
124-48-1	Dibromochloromethane	20	19.8	99	20.4	102	3	76-124/10
75-71-8	Dichlorodifluoromethane	20	24.7	124	24.7	124	0	26-163/26
156-59-2	cis-1,2-Dichloroethylene	20	21.3	107	22.7	114	6	75-128/10
10061-01-5	cis-1,3-Dichloropropene	20	20.9	105	21.9	110	5	76-131/10
541-73-1	m-Dichlorobenzene	20	19.2	96	20.2	101	5	79-121/10
95-50-1	o-Dichlorobenzene	20	19.2	96	19.9	100	4	79-120/10
106-46-7	p-Dichlorobenzene	20	19.2	96	20.1	101	5	79-120/10
156-60-5	trans-1,2-Dichloroethylene	20	18.9	95	19.6	98	4	67-116/11
10061-02-6	trans-1,3-Dichloropropene	20	19.7	99	20.1	101	2	73-125/10
100-41-4	Ethylbenzene	20	19.8	99	20.4	102	3	78-123/10
76-13-1	Freon 113	20	21.2	106	21.5	108	1	59-129/18

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: C46556
Account: NMCAO Ninyo & Moore
Project: Romic Groundwater-East Palo Alto,CA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VV1408-BS	V34143.D	1	07/22/16	KZ	n/a	n/a	VV1408
VV1408-BSD	V34144.D	1	07/22/16	KZ	n/a	n/a	VV1408

The QC reported here applies to the following samples: **Method:** SW846 8260B

C46556-1, C46556-2, C46556-3, C46556-4, C46556-5

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
591-78-6	2-Hexanone	80	83.7	105	83.5	104	0	71-145/12
87-68-3	Hexachlorobutadiene	20	18.8	94	19.5	98	4	70-130/12
98-82-8	Isopropylbenzene	20	19.3	97	19.7	99	2	77-125/10
99-87-6	p-Isopropyltoluene	20	19.5	98	20.0	100	3	76-126/10
108-10-1	4-Methyl-2-pentanone	80	82.1	103	84.4	106	3	70-142/11
74-83-9	Methyl bromide	20	21.5	108	21.9	110	2	65-124/13
74-87-3	Methyl chloride	20	21.5	108	20.7	104	4	47-143/20
74-95-3	Methylene bromide	20	20.5	103	21.4	107	4	80-125/10
75-09-2	Methylene chloride	20	19.4	97	20.3	102	5	65-124/15
78-93-3	Methyl ethyl ketone	80	82.6	103	84.6	106	2	66-145/12
1634-04-4	Methyl Tert Butyl Ether	20	20.0	100	20.8	104	4	73-120/10
91-20-3	Naphthalene	20	20.0	100	20.2	101	1	66-120/12
103-65-1	n-Propylbenzene	20	19.3	97	20.0	100	4	75-125/10
100-42-5	Styrene	20	19.8	99	20.4	102	3	73-126/10
630-20-6	1,1,1,2-Tetrachloroethane	20	19.6	98	20.3	102	4	79-126/10
71-55-6	1,1,1-Trichloroethane	20	20.7	104	21.3	107	3	73-125/11
79-34-5	1,1,2,2-Tetrachloroethane	20	20.2	101	21.0	105	4	78-127/10
79-00-5	1,1,2-Trichloroethane	20	20.0	100	20.5	103	2	79-122/10
87-61-6	1,2,3-Trichlorobenzene	20	18.4	92	18.7	94	2	70-128/12
96-18-4	1,2,3-Trichloropropane	20	21.0	105	20.8	104	1	66-127/10
120-82-1	1,2,4-Trichlorobenzene	20	18.3	92	18.8	94	3	72-125/11
95-63-6	1,2,4-Trimethylbenzene	20	19.3	97	20.1	101	4	76-124/10
108-67-8	1,3,5-Trimethylbenzene	20	19.6	98	20.2	101	3	79-130/10
127-18-4	Tetrachloroethylene	20	19.3	97	19.8	99	3	72-124/13
108-88-3	Toluene	20	19.5	98	20.0	100	3	78-121/10
79-01-6	Trichloroethylene	20	20.0	100	20.7	104	3	75-119/10
75-69-4	Trichlorofluoromethane	20	22.5	113	22.9	115	2	68-130/19
75-01-4	Vinyl chloride	20	24.5	123	24.6	123	0	57-137/18
108-05-4	Vinyl Acetate	20	20.6	103	21.6	108	5	66-158/11
1330-20-7	Xylene (total)	60	58.1	97	60.1	100	3	78-122/10

CAS No.	Surrogate Recoveries	BSP	BSD	Limits
1868-53-7	Dibromofluoromethane	102%	103%	80-123%
2037-26-5	Toluene-D8	100%	98%	88-112%

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: C46556
Account: NMCAO Ninyo & Moore
Project: Romic Groundwater-East Palo Alto,CA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VV1408-BS	V34143.D	1	07/22/16	KZ	n/a	n/a	VV1408
VV1408-BSD	V34144.D	1	07/22/16	KZ	n/a	n/a	VV1408

The QC reported here applies to the following samples: **Method:** SW846 8260B

C46556-1, C46556-2, C46556-3, C46556-4, C46556-5

CAS No.	Surrogate Recoveries	BSP	BSD	Limits
460-00-4	4-Bromofluorobenzene	100%	99%	79-114%

(a) Outside laboratory control limits (high bias); not detected in associated samples.

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: C46556
Account: NMCAO Ninyo & Moore
Project: Romic Groundwater-East Palo Alto,CA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VU1489-BS	U36060.D	1	07/25/16	MV	n/a	n/a	VU1489
VU1489-BSD	U36061.D	1	07/25/16	MV	n/a	n/a	VU1489

The QC reported here applies to the following samples: **Method:** SW846 8260B

C46556-1, C46556-2

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
156-59-2	cis-1,2-Dichloroethylene	20	19.1	96	19.0	95	1	75-128/10
75-01-4	Vinyl chloride	20	17.9	90	19.7	99	10	57-137/18

CAS No.	Surrogate Recoveries	BSP	BSD	Limits
1868-53-7	Dibromofluoromethane	101%	101%	80-123%
2037-26-5	Toluene-D8	96%	98%	88-112%
460-00-4	4-Bromofluorobenzene	96%	98%	79-114%

* = Outside of Control Limits.

Laboratory Control Sample Summary

Job Number: C46556
Account: NMCAO Ninyo & Moore
Project: Romic Groundwater-East Palo Alto,CA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VU1489-LCS	U36063.D	1	07/25/16	MV	n/a	n/a	VU1489

The QC reported here applies to the following samples: **Method:** SW846 8260B

C46556-1, C46556-2

CAS No.	Compound	Spike ug/l	LCS ug/l	LCS %	Limits

CAS No.	Surrogate Recoveries	BSP	Limits
1868-53-7	Dibromofluoromethane	98%	80-123%
2037-26-5	Toluene-D8	100%	88-112%
460-00-4	4-Bromofluorobenzene	93%	79-114%

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C46556
Account: NMCAO Ninyo & Moore
Project: Romic Groundwater-East Palo Alto,CA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C46556-5MS	V34136.D	500	07/21/16	KZ	n/a	n/a	VV1407
C46556-5MSD	V34137.D	500	07/21/16	KZ	n/a	n/a	VV1407
C46556-5	V34127.D	500	07/21/16	KZ	n/a	n/a	VV1407

The QC reported here applies to the following samples: **Method:** SW846 8260B

C46556-1, C46556-3, C46556-5, C46556-6, C46556-7

CAS No.	Compound	C46556-5 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
67-64-1	Acetone	ND		40000	47600	119	40000	46200	116	3	55-147/17
71-43-2	Benzene	ND		10000	10600	106	10000	10800	108	2	76-120/10
108-86-1	Bromobenzene	ND		10000	10100	101	10000	10300	103	2	80-123/10
74-97-5	Bromochloromethane	ND		10000	10900	109	10000	11300	113	4	79-124/10
75-27-4	Bromodichloromethane	ND		10000	10500	105	10000	10800	108	3	75-121/10
75-25-2	Bromoform	ND		10000	10300	103	10000	10300	103	0	62-127/10
104-51-8	n-Butylbenzene	ND		10000	9800	98	10000	9750	98	1	74-129/10
135-98-8	sec-Butylbenzene	ND		10000	9910	99	10000	9940	99	0	75-128/11
98-06-6	tert-Butylbenzene	ND		10000	9940	99	10000	10100	101	2	74-127/11
108-90-7	Chlorobenzene	180	J	10000	10300	101	10000	10500	103	2	79-119/10
75-00-3	Chloroethane	ND		10000	12200	122* [a]	10000	12300	123* [a]	1	60-115/14
67-66-3	Chloroform	213	J	10000	11300	111	10000	11500	113	2	75-122/10
95-49-8	o-Chlorotoluene	ND		10000	10500	105	10000	10700	107	2	76-125/12
106-43-4	p-Chlorotoluene	ND		10000	10300	103	10000	10400	104	1	76-126/11
75-15-0	Carbon disulfide	ND		10000	9130	91	10000	9240	92	1	51-130/13
56-23-5	Carbon tetrachloride	ND		10000	10600	106	10000	10700	107	1	72-128/13
75-34-3	1,1-Dichloroethane	527		10000	11800	113	10000	12000	115	2	70-121/10
75-35-4	1,1-Dichloroethylene	1680		10000	11800	101	10000	12100	104	3	62-125/13
563-58-6	1,1-Dichloropropene	ND		10000	10200	102	10000	10500	105	3	68-116/11
96-12-8	1,2-Dibromo-3-chloropropane	ND		10000	9840	98	10000	9610	96	2	64-129/11
106-93-4	1,2-Dibromoethane	ND		10000	10400	104	10000	10500	105	1	81-124/10
107-06-2	1,2-Dichloroethane	3480		10000	14400	109	10000	14600	111	1	74-122/10
78-87-5	1,2-Dichloropropane	ND		10000	10900	109	10000	11200	112	3	75-123/10
142-28-9	1,3-Dichloropropane	ND		10000	11000	110	10000	11100	111	1	81-127/11
594-20-7	2,2-Dichloropropane	ND		10000	9280	93	10000	9210	92	1	66-130/12
124-48-1	Dibromochloromethane	ND		10000	10400	104	10000	10400	104	0	76-124/10
75-71-8	Dichlorodifluoromethane	ND		10000	10000	100	10000	11500	115	14	26-163/26
156-59-2	cis-1,2-Dichloroethylene	53700	E	10000	63600	99	10000	66400	127	4	75-128/10
10061-01-5	cis-1,3-Dichloropropene	ND		10000	10700	107	10000	10900	109	2	76-131/10
541-73-1	m-Dichlorobenzene	ND		10000	10100	101	10000	10200	102	1	79-121/10
95-50-1	o-Dichlorobenzene	ND		10000	10200	102	10000	10200	102	0	79-120/10
106-46-7	p-Dichlorobenzene	ND		10000	10100	101	10000	10100	101	0	79-120/10
156-60-5	trans-1,2-Dichloroethylene	265	J	10000	10300	100	10000	10500	102	2	67-116/11
10061-02-6	trans-1,3-Dichloropropene	ND		10000	10100	101	10000	10100	101	0	73-125/10
100-41-4	Ethylbenzene	200	J	10000	10600	104	10000	10700	105	1	78-123/10
76-13-1	Freon 113	ND		10000	9810	98	10000	9850	99	0	59-129/18

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C46556
Account: NMCAO Ninyo & Moore
Project: Romic Groundwater-East Palo Alto,CA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C46556-5MS	V34136.D	500	07/21/16	KZ	n/a	n/a	VV1407
C46556-5MSD	V34137.D	500	07/21/16	KZ	n/a	n/a	VV1407
C46556-5	V34127.D	500	07/21/16	KZ	n/a	n/a	VV1407

The QC reported here applies to the following samples: **Method:** SW846 8260B

C46556-1, C46556-3, C46556-5, C46556-6, C46556-7

CAS No.	Compound	C46556-5 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
591-78-6	2-Hexanone	ND		40000	44300	111	40000	43600	109	2	71-145/12
87-68-3	Hexachlorobutadiene	ND		10000	9090	91	10000	9080	91	0	70-130/12
98-82-8	Isopropylbenzene	ND		10000	10200	102	10000	10200	102	0	77-125/10
99-87-6	p-Isopropyltoluene	ND		10000	9850	99	10000	9890	99	0	76-126/10
108-10-1	4-Methyl-2-pentanone	ND		40000	44100	110	40000	44000	110	0	70-142/11
74-83-9	Methyl bromide	ND		10000	11300	113	10000	11400	114	1	65-124/13
74-87-3	Methyl chloride	ND		10000	11200	112	10000	11300	113	1	47-143/20
74-95-3	Methylene bromide	ND		10000	10800	108	10000	11100	111	3	80-125/10
75-09-2	Methylene chloride	ND		10000	10400	104	10000	10500	105	1	65-124/15
78-93-3	Methyl ethyl ketone	ND		40000	44400	111	40000	44700	112	1	66-145/12
1634-04-4	Methyl Tert Butyl Ether	ND		10000	10900	109	10000	10900	109	0	73-120/10
91-20-3	Naphthalene	ND		10000	10600	106	10000	10500	105	1	66-120/12
103-65-1	n-Propylbenzene	ND		10000	9910	99	10000	9990	100	1	75-125/10
100-42-5	Styrene	ND		10000	10400	104	10000	10600	106	2	73-126/10
630-20-6	1,1,1,2-Tetrachloroethane	ND		10000	10400	104	10000	10500	105	1	79-126/10
71-55-6	1,1,1-Trichloroethane	ND		10000	11300	113	10000	11400	114	1	73-125/11
79-34-5	1,1,2,2-Tetrachloroethane	ND		10000	10700	107	10000	10700	107	0	78-127/10
79-00-5	1,1,2-Trichloroethane	ND		10000	10600	106	10000	10600	106	0	79-122/10
87-61-6	1,2,3-Trichlorobenzene	ND		10000	9480	95	10000	9420	94	1	70-128/12
96-18-4	1,2,3-Trichloropropane	ND		10000	10800	108	10000	10800	108	0	66-127/10
120-82-1	1,2,4-Trichlorobenzene	ND		10000	9390	94	10000	9400	94	0	72-125/11
95-63-6	1,2,4-Trimethylbenzene	ND		10000	10100	101	10000	10200	102	1	76-124/10
108-67-8	1,3,5-Trimethylbenzene	ND		10000	10200	102	10000	10200	102	0	79-130/10
127-18-4	Tetrachloroethylene	ND		10000	9920	99	10000	10000	100	1	72-124/13
108-88-3	Toluene	1110		10000	11300	102	10000	11600	105	3	78-121/10
79-01-6	Trichloroethylene	655		10000	10900	102	10000	11300	106	4	75-119/10
75-69-4	Trichlorofluoromethane	ND		10000	10600	106	10000	11600	116	9	68-130/19
75-01-4	Vinyl chloride	22300		10000	34000	117	10000	35000	127	3	57-137/18
108-05-4	Vinyl Acetate	ND		10000	11400	114	10000	11400	114	0	66-158/11
1330-20-7	Xylene (total)	426	J	30000	31100	102	30000	31600	104	2	78-122/10

CAS No.	Surrogate Recoveries	MS	MSD	C46556-5	Limits
1868-53-7	Dibromofluoromethane	106%	106%	104%	80-123%
2037-26-5	Toluene-D8	101%	100%	101%	88-112%

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C46556
Account: NMCAO Ninyo & Moore
Project: Romic Groundwater-East Palo Alto,CA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C46556-5MS	V34136.D	500	07/21/16	KZ	n/a	n/a	VV1407
C46556-5MSD	V34137.D	500	07/21/16	KZ	n/a	n/a	VV1407
C46556-5	V34127.D	500	07/21/16	KZ	n/a	n/a	VV1407

The QC reported here applies to the following samples: **Method:** SW846 8260B

C46556-1, C46556-3, C46556-5, C46556-6, C46556-7

CAS No.	Surrogate Recoveries	MS	MSD	C46556-5	Limits
460-00-4	4-Bromofluorobenzene	101%	101%	99%	79-114%

(a) Outside control limits due to matrix interference.

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C46556
Account: NMCAO Ninyo & Moore
Project: Romic Groundwater-East Palo Alto,CA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C46600-2MS	V34164.D	1	07/22/16	KZ	n/a	n/a	VV1408
C46600-2MSD	V34165.D	1	07/22/16	KZ	n/a	n/a	VV1408
C46600-2	V34150.D	1	07/22/16	KZ	n/a	n/a	VV1408

The QC reported here applies to the following samples: **Method:** SW846 8260B

C46556-1, C46556-2, C46556-3, C46556-4, C46556-5

CAS No.	Compound	C46600-2 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
67-64-1	Acetone	10.8	J	80	129	148* [a]	80	121	138	6	55-147/17
71-43-2	Benzene	ND		20	25.7	129* [a]	20	24.0	120	7	76-120/10
108-86-1	Bromobenzene	ND		20	24.1	121	20	22.5	113	7	80-123/10
74-97-5	Bromochloromethane	ND		20	26.0	130* [a]	20	24.4	122	6	79-124/10
75-27-4	Bromodichloromethane	ND		20	25.4	127* [a]	20	23.8	119	7	75-121/10
75-25-2	Bromoform	ND		20	23.3	117	20	22.0	110	6	62-127/10
104-51-8	n-Butylbenzene	ND		20	24.7	124	20	22.9	115	8	74-129/10
135-98-8	sec-Butylbenzene	ND		20	25.0	125	20	23.2	116	7	75-128/11
98-06-6	tert-Butylbenzene	ND		20	24.4	122	20	23.0	115	6	74-127/11
108-90-7	Chlorobenzene	ND		20	24.5	123* [a]	20	22.8	114	7	79-119/10
75-00-3	Chloroethane	ND		20	30.2	151* [b]	20	23.3	117* [b]	26* [b]	60-115/14
67-66-3	Chloroform	ND		20	26.4	132* [a]	20	24.8	124* [a]	6	75-122/10
95-49-8	o-Chlorotoluene	ND		20	25.3	127* [a]	20	23.8	119	6	76-125/12
106-43-4	p-Chlorotoluene	ND		20	24.9	125	20	23.3	117	7	76-126/11
75-15-0	Carbon disulfide	ND		20	23.1	116	20	21.3	107	8	51-130/13
56-23-5	Carbon tetrachloride	ND		20	26.9	135* [a]	20	25.3	127	6	72-128/13
75-34-3	1,1-Dichloroethane	ND		20	27.2	136* [a]	20	25.5	128* [a]	6	70-121/10
75-35-4	1,1-Dichloroethylene	ND		20	25.9	130* [a]	20	24.3	122	6	62-125/13
563-58-6	1,1-Dichloropropene	ND		20	26.0	130* [a]	20	24.4	122* [a]	6	68-116/11
96-12-8	1,2-Dibromo-3-chloropropane	ND		20	22.1	111	20	20.4	102	8	64-129/11
106-93-4	1,2-Dibromoethane	ND		20	24.4	122	20	22.7	114	7	81-124/10
107-06-2	1,2-Dichloroethane	ND		20	26.0	130* [a]	20	24.1	121	8	74-122/10
78-87-5	1,2-Dichloropropane	ND		20	26.4	132* [a]	20	24.9	125* [a]	6	75-123/10
142-28-9	1,3-Dichloropropane	ND		20	26.0	130* [a]	20	24.1	121	8	81-127/11
594-20-7	2,2-Dichloropropane	ND		20	23.7	119	20	21.7	109	9	66-130/12
124-48-1	Dibromochloromethane	ND		20	24.4	122	20	22.7	114	7	76-124/10
75-71-8	Dichlorodifluoromethane	ND		20	35.7	179* [a]	20	28.1	141	24	26-163/26
156-59-2	cis-1,2-Dichloroethylene	ND		20	27.2	136* [a]	20	25.8	129* [a]	5	75-128/10
10061-01-5	cis-1,3-Dichloropropene	ND		20	25.5	128	20	24.0	120	6	76-131/10
541-73-1	m-Dichlorobenzene	ND		20	23.9	120	20	22.6	113	6	79-121/10
95-50-1	o-Dichlorobenzene	ND		20	23.6	118	20	22.4	112	5	79-120/10
106-46-7	p-Dichlorobenzene	ND		20	23.9	120	20	22.3	112	7	79-120/10
156-60-5	trans-1,2-Dichloroethylene	ND		20	24.5	123* [a]	20	23.1	116	6	67-116/11
10061-02-6	trans-1,3-Dichloropropene	ND		20	24.1	121	20	22.0	110	9	73-125/10
100-41-4	Ethylbenzene	ND		20	25.5	128* [a]	20	23.6	118	8	78-123/10
76-13-1	Freon 113	ND		20	29.5	148* [a]	20	27.7	139* [a]	6	59-129/18

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C46556
Account: NMCAO Ninyo & Moore
Project: Romic Groundwater-East Palo Alto,CA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C46600-2MS	V34164.D	1	07/22/16	KZ	n/a	n/a	VV1408
C46600-2MSD	V34165.D	1	07/22/16	KZ	n/a	n/a	VV1408
C46600-2	V34150.D	1	07/22/16	KZ	n/a	n/a	VV1408

The QC reported here applies to the following samples: **Method:** SW846 8260B

C46556-1, C46556-2, C46556-3, C46556-4, C46556-5

CAS No.	Compound	C46600-2 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
591-78-6	2-Hexanone	ND		80	105	131	80	96.5	121	8	71-145/12
87-68-3	Hexachlorobutadiene	ND		20	23.1	116	20	21.9	110	5	70-130/12
98-82-8	Isopropylbenzene	ND		20	24.9	125	20	23.2	116	7	77-125/10
99-87-6	p-Isopropyltoluene	ND		20	24.3	122	20	22.6	113	7	76-126/10
108-10-1	4-Methyl-2-pentanone	ND		80	103	129	80	95.7	120	7	70-142/11
74-83-9	Methyl bromide	ND		20	26.8	134* [a]	20	20.7	104	26* [a]	65-124/13
74-87-3	Methyl chloride	1.1		20	29.0	140	20	25.8	124	12	47-143/20
74-95-3	Methylene bromide	ND		20	25.5	128* [a]	20	24.0	120	6	80-125/10
75-09-2	Methylene chloride	ND		20	24.5	123	20	22.8	114	7	65-124/15
78-93-3	Methyl ethyl ketone	ND		80	106	133	80	99.0	124	7	66-145/12
1634-04-4	Methyl Tert Butyl Ether	ND		20	25.2	126* [a]	20	23.6	118	7	73-120/10
91-20-3	Naphthalene	ND		20	23.7	119	20	22.4	112	6	66-120/12
103-65-1	n-Propylbenzene	ND		20	24.5	123	20	23.1	116	6	75-125/10
100-42-5	Styrene	ND		20	24.6	123	20	22.5	113	9	73-126/10
630-20-6	1,1,1,2-Tetrachloroethane	ND		20	24.7	124	20	23.0	115	7	79-126/10
71-55-6	1,1,1-Trichloroethane	ND		20	27.9	140* [a]	20	25.8	129* [a]	8	73-125/11
79-34-5	1,1,2,2-Tetrachloroethane	ND		20	24.9	125	20	23.4	117	6	78-127/10
79-00-5	1,1,2-Trichloroethane	ND		20	25.0	125* [a]	20	23.2	116	7	79-122/10
87-61-6	1,2,3-Trichlorobenzene	ND		20	21.6	108	20	20.5	103	5	70-128/12
96-18-4	1,2,3-Trichloropropane	ND		20	25.5	128* [a]	20	23.7	119	7	66-127/10
120-82-1	1,2,4-Trichlorobenzene	ND		20	21.7	109	20	20.7	104	5	72-125/11
95-63-6	1,2,4-Trimethylbenzene	ND		20	24.4	122	20	22.6	113	8	76-124/10
108-67-8	1,3,5-Trimethylbenzene	ND		20	24.6	123	20	23.2	116	6	79-130/10
127-18-4	Tetrachloroethylene	ND		20	24.7	124	20	23.2	116	6	72-124/13
108-88-3	Toluene	ND		20	24.8	124* [a]	20	23.1	116	7	78-121/10
79-01-6	Trichloroethylene	ND		20	25.8	129* [a]	20	24.0	120* [a]	7	75-119/10
75-69-4	Trichlorofluoromethane	ND		20	31.9	160* [a]	20	24.4	122	27* [a]	68-130/19
75-01-4	Vinyl chloride	ND		20	32.9	165* [a]	20	24.9	125	28* [a]	57-137/18
108-05-4	Vinyl Acetate	ND		20	25.8	129	20	23.1	116	11	66-158/11
1330-20-7	Xylene (total)	ND		60	74.3	124* [a]	60	69.0	115	7	78-122/10

CAS No.	Surrogate Recoveries	MS	MSD	C46600-2	Limits
1868-53-7	Dibromofluoromethane	106%	107%	107%	80-123%
2037-26-5	Toluene-D8	100%	100%	101%	88-112%

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C46556
Account: NMCAO Ninyo & Moore
Project: Romic Groundwater-East Palo Alto,CA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C46600-2MS	V34164.D	1	07/22/16	KZ	n/a	n/a	VV1408
C46600-2MSD	V34165.D	1	07/22/16	KZ	n/a	n/a	VV1408
C46600-2	V34150.D	1	07/22/16	KZ	n/a	n/a	VV1408

The QC reported here applies to the following samples: **Method:** SW846 8260B

C46556-1, C46556-2, C46556-3, C46556-4, C46556-5

CAS No.	Surrogate Recoveries	MS	MSD	C46600-2	Limits
460-00-4	4-Bromofluorobenzene	101%	100%	100%	79-114%

(a) Outside laboratory control limits.
(b) Outside laboratory control limits (high bias); not detected in associated samples.

* = Outside of Control Limits.

General Chemistry

6

QC Data Summaries

Includes the following where applicable:

- Method Blank and Blank Spike Summaries
- Duplicate Summaries
- Matrix Spike Summaries

METHOD BLANK AND SPIKE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: C46556
Account: NMCAO - Ninyo & Moore
Project: Romic Groundwater-East Palo Alto,CA

Analyte	Batch ID	RL	MB Result	Units	Spike Amount	BSP Result	BSP %Recov	QC Limits
Total Organic Carbon	GP9607/GN19350	1.0	0.0	mg/l	5	5.1	102.7	75-125%

Associated Samples:
Batch GP9607: C46556-1, C46556-2, C46556-3, C46556-4, C46556-5, C46556-6
(*) Outside of QC limits

BLANK SPIKE DUPLICATE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: C46556
Account: NMCAO - Ninyo & Moore
Project: Romic Groundwater-East Palo Alto,CA

Analyte	Batch ID	Units	Spike Amount	BSD Result	RPD	QC Limit
Total Organic Carbon	GP9607/GN19350	mg/l	5	5.2	0.9	

Associated Samples:
Batch GP9607: C46556-1, C46556-2, C46556-3, C46556-4, C46556-5, C46556-6
(*) Outside of QC limits

Misc. Forms

Custody Documents and Other Forms

(SGS Accutest Southeast)

Includes the following where applicable:

- Chain of Custody

CHAIN OF CUSTODY

SGS ACCUTEST

2105 Lundy Avenue, San Jose, CA 95131
TEL. 408-588-0200 FAX: 408-588-0201
www.sgs.com

FED-EX Tracking #: | Bottle Order Control #:
SGS Accutest Quote #: | Accutest Job #: C46556

Client / Reporting Information

Company Name: SGS Accutest Laboratories
Street Address: 2105 Lundy Avenue
City: San Jose, State: CA, Zip: 9513
Contact: utan.kabir@sgs.com
Phone #: 408-588-0200
Sampler(s) Name(s): ED

Project Information

Project Name: Romic Groundwater-East Palo Alto,CA
Street:
City: State:
Project #:
Client Purchase Order #:
Project Manager:

Billing Information (If different from Report to)

Company Name:
Street Address:
City: State: Zip:
Attention:

Requested Analysis (see TEST CODE sheet)

Matrix Codes: DW - Drinking Water; GW - Ground Water; WW - Water; SW - Surface Water; SC - Soil; SL- Sludge; SED-Sediment; OI - Oil; LIQ - Other Liquid; AIR - Air; SOL - Other Solid; WP - Wipe; FB-Field Blank; EB-Equipment Blank; RB- Rinse Blank; TB-Trip Blank

Field ID / Point of Collection	MEOH/DI Vial #	Collection Date	Collection Time	Sampled by	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	NONE	DI Water	MEOH	ENCORE	VRSK175DGMEE	LAB USE ONLY
RW-1A		7/18/16	9:55:00 AM	ED	AQ										X	
RW-8B		7/18/16	10:45:00 AM	ED	AQ										X	
RW-11B		7/18/16	1:10:00 PM	ED	AQ										X	
RW-20B		7/18/16	2:00:00 PM	ED	AQ										X	
EW-1B		7/18/16	11:35:00 AM	ED	AQ										X	
EW-2B		7/18/16	9:00:00 AM	ED	AQ										X	

Turnaround Time (Business days)

Approved By (SGS Accutest PM): / Data:

- [ ] Std. 10 Business Days
- [ ] 5 Day RUSH
- [ ] 3 Day EMERGENCY
- [ ] 2 Day EMERGENCY
- [ ] 1 Day EMERGENCY
- [X] other Due 7/25/2016

Emergency & Rush T/A data available VIA Labilink

Data Deliverable Information

- [ ] Commercial "A" (Level 1)
- [ ] Commercial "B" (Level 2)
- [ ] FULL.T1 (Level 3+4)
- [ ] NJ Reduced
- [ ] Commercial "C"
- [ ] NYASP Category A
- [ ] NYASP Category B
- [ ] State Forms
- [ ] EDD Format
- [X] Other COMMB

Commercial "A" = Results Only
Commercial "B" = Results + QC Summary
NJ Reduced = Results + QC Summary + Partial Raw data

Comments / Special Instructions

Please sub to ALSE for RSK175DGMEE.

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1 Ze'ghami	7/19/16 15:09	1 Fedex	2 Fedex		2
Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
		3	4		4
Relinquished by:	Date Time:	Received By:	Custody Seal #	Intact / Not intact	Preserved where applicable
		5			On Ice (1) Cooler Temp. 3.4

7.1

7

C46556: Chain of Custody
Page 1 of 3
SGS Accutest Southeast

ACCUTEST LABORATORIES SAMPLE RECEIPT CONFIRMATION

ACCUTEST'S JOB NUMBER: C46556 CLIENT: ALNC PROJECT: Ronic Groundwater

DATE/TIME RECEIVED: 7/21/16 915 {MM/DD/YY 24:00} NUMBER OF COOLERS RECEIVED: 1

METHOD OF DELIVERY: (FEDEX) UPS ACCUTEST COURIER DELIVERY OTHER: _____

AIRBILL NUMBERS: 7767 9436 5150

COOLER INFORMATION

- [ ] CUSTODY SEAL NOT PRESENT OR NOT INTACT
- [ ] CHAIN OF CUSTODY NOT RECEIVED (COC)
- [ ] ANALYSIS REQUESTED IS UNCLEAR OR MISSING
- [ ] SAMPLE DATES OR TIMES UNCLEAR OR MISSING
- [ ] TEMPERATURE CRITERIA NOT MET

TRIP BLANK INFORMATION

- [ ] TRIP BLANK PROVIDED
- [X] TRIP BLANK NOT PROVIDED
- [X] TRIP BLANK NOT ON COC
- [ ] TRIP BLANK INTACT
- [ ] TRIP BLANK NOT INTACT
- [ ] RECEIVED WATER TRIP BLANK
- [ ] RECEIVED SOIL TRIP BLANK

MISC. INFORMATION

NUMBER OF ENCORES ? 25-GRAM_____ 5-GRAM_____

NUMBER OF 5035 FIELD KITS ? _____

NUMBER OF LAB FILTERED METALS ? _____

TEMPERATURE INFORMATION

- [ ] IR THERM ID 1 CORR. FACTOR +0.0
- [ ] OBSERVED TEMPS: 3.4
- [ ] CORRECTED TEMPS: 3.4 (USED FOR LIMS)

SAMPLE INFORMATION

- [ ] INCORRECT NUMBER OF CONTAINERS USED
- [ ] SAMPLE RECEIVED IMPROPERLY PRESERVED
- [ ] INSUFFICIENT VOLUME FOR ANALYSIS
- [ ] DATES/TIMES ON COC DO NOT MATCH SAMPLE LABEL
- [ ] ID'S ON COC DO NOT MATCH LABEL
- [ ] VOC VIALS HAVE HEADSPACE (MACRO BUBBLES)
- [ ] BOTTLES RECEIVED BUT ANALYSIS NOT REQUESTED
- [ ] NO BOTTLES RECEIVED FOR ANALYSIS REQUESTED
- [ ] UNCLEAR FILTERING OR COMPOSITING INSTRUCTIONS
- [ ] SAMPLE CONTAINER(S) RECEIVED BROKEN
- [ ] 5035 FIELD KITS NOT RECEIVED WITHIN 48 HOURS
- [ ] BULK VOA SOIL JARS NOT RECEIVED WITHIN 48 HOURS
- [ ] % SOLIDS JAR NOT RECEIVED
- [ ] RESIDUAL CHLORINE PRESENT LOT#_____

{APPLICABLE TO EPA 600 SERIES OR NORTH CAROLINA ORGANICS}

TEST STRIP LOT#s pH 0-3 230315 pH 10-12 219813A OTHER (specify) _____

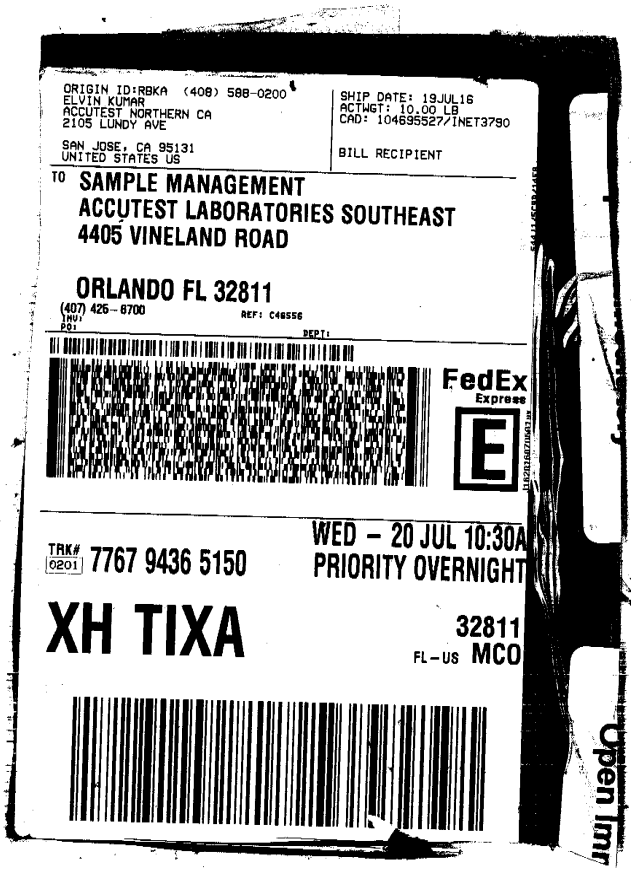
SUMMARY OF COMMENTS: _____

TECHNICIAN SIGNATURE/DATE: 7/21/16 REVIEWER SIGNATURE/DATE: 7-21-16

NF 11/15 RECEIPTLOG040416.xls

7.1

7



7.1

7

C46556: Chain of Custody
Page 3 of 3

GC Volatiles

QC Data Summaries

(SGS Accutest Southeast)

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

Method Blank Summary

Job Number: C46556
Account: ALNCA SGS Accutest Northern California
Project: NMCAO: Romic Groundwater-East Palo Alto,CA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GFF1370-MB	FF34979.D	1	07/21/16	EG	n/a	n/a	GFF1370

The QC reported here applies to the following samples: **Method:** RSKSOP-147/175

C46556-1, C46556-2, C46556-3, C46556-4, C46556-5, C46556-6

CAS No.	Compound	Result	RL	MDL	Units	Q
74-82-8	Methane	ND	0.50	0.16	ug/l	
74-84-0	Ethane	ND	1.0	0.32	ug/l	
74-85-1	Ethene	ND	1.0	0.43	ug/l	

Blank Spike/Blank Spike Duplicate Summary

Job Number: C46556
Account: ALNCA SGS Accutest Northern California
Project: NMCAO: Romic Groundwater-East Palo Alto,CA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GFF1370-BS	FF34980.D	1	07/21/16	EG	n/a	n/a	GFF1370
GFF1370-BSD	FF34981.D	1	07/21/16	EG	n/a	n/a	GFF1370

The QC reported here applies to the following samples: **Method:** RSKSOP-147/175

C46556-1, C46556-2, C46556-3, C46556-4, C46556-5, C46556-6

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
74-82-8	Methane	108	113	105	130	120	14	62-139/30
74-84-0	Ethane	219	223	102	252	115	12	67-141/30
74-85-1	Ethene	290	291	100	330	114	13	68-141/30

8.2.1

8

* = Outside of Control Limits.

Matrix Spike Summary

Job Number: C46556
Account: ALNCA SGS Accutest Northern California
Project: NMCAO: Romic Groundwater-East Palo Alto,CA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C46522-2MS	FF34997.D	1	07/21/16	EG	n/a	n/a	GFF1370
C46522-2	FF34994.D	1	07/21/16	EG	n/a	n/a	GFF1370

The QC reported here applies to the following samples: **Method:** RSKSOP-147/175

C46556-1, C46556-2, C46556-3, C46556-4, C46556-5, C46556-6

CAS No.	Compound	C46522-2 ug/l	Q	Spike ug/l	MS ug/l	MS %	Limits
74-82-8	Methane	120		108	229	101	62-139
74-84-0	Ethane	1.0 U		219	259	118	67-141
74-85-1	Ethene	1.0 U		290	334	115	68-141

8.3.1

8

* = Outside of Control Limits.

Duplicate Summary

Job Number: C46556
Account: ALNCA SGS Accutest Northern California
Project: NMCAO: Romic Groundwater-East Palo Alto,CA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C46522-2DUP	FF34996.D	1	07/21/16	EG	n/a	n/a	GFF1370
C46522-2	FF34994.D	1	07/21/16	EG	n/a	n/a	GFF1370

The QC reported here applies to the following samples: **Method:** RSKSOP-147/175

C46556-1, C46556-2, C46556-3, C46556-4, C46556-5, C46556-6

CAS No.	Compound	C46522-2 ug/l	Q	DUP ug/l	Q	RPD	Limits
74-82-8	Methane	120		133		10	30
74-84-0	Ethane	1.0 U		ND		nc	30
74-85-1	Ethene	1.0 U		ND		nc	30

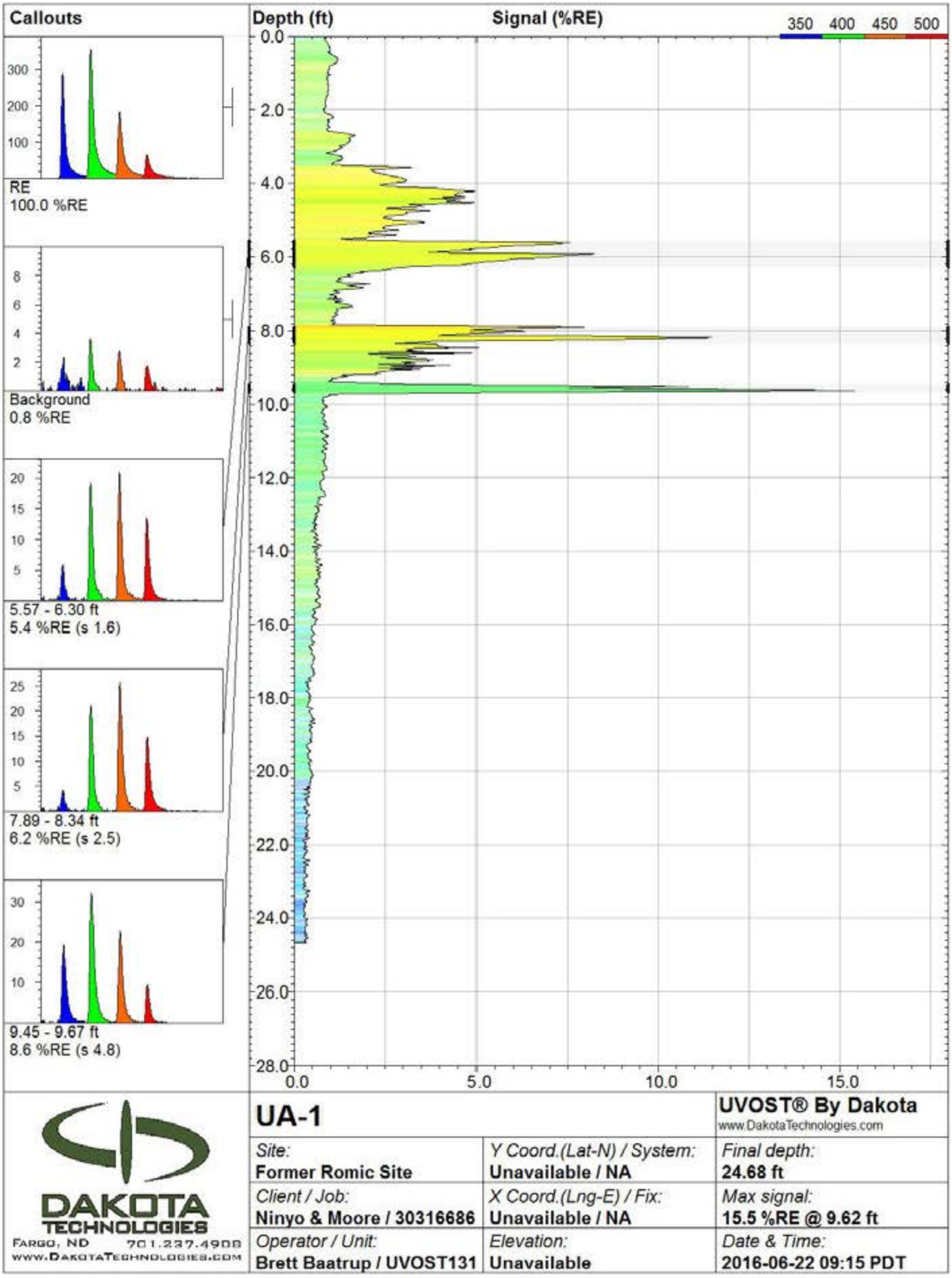
8.4.1

8

* = Outside of Control Limits.

APPENDIX B

UVOST INVESTIGATION LOGS

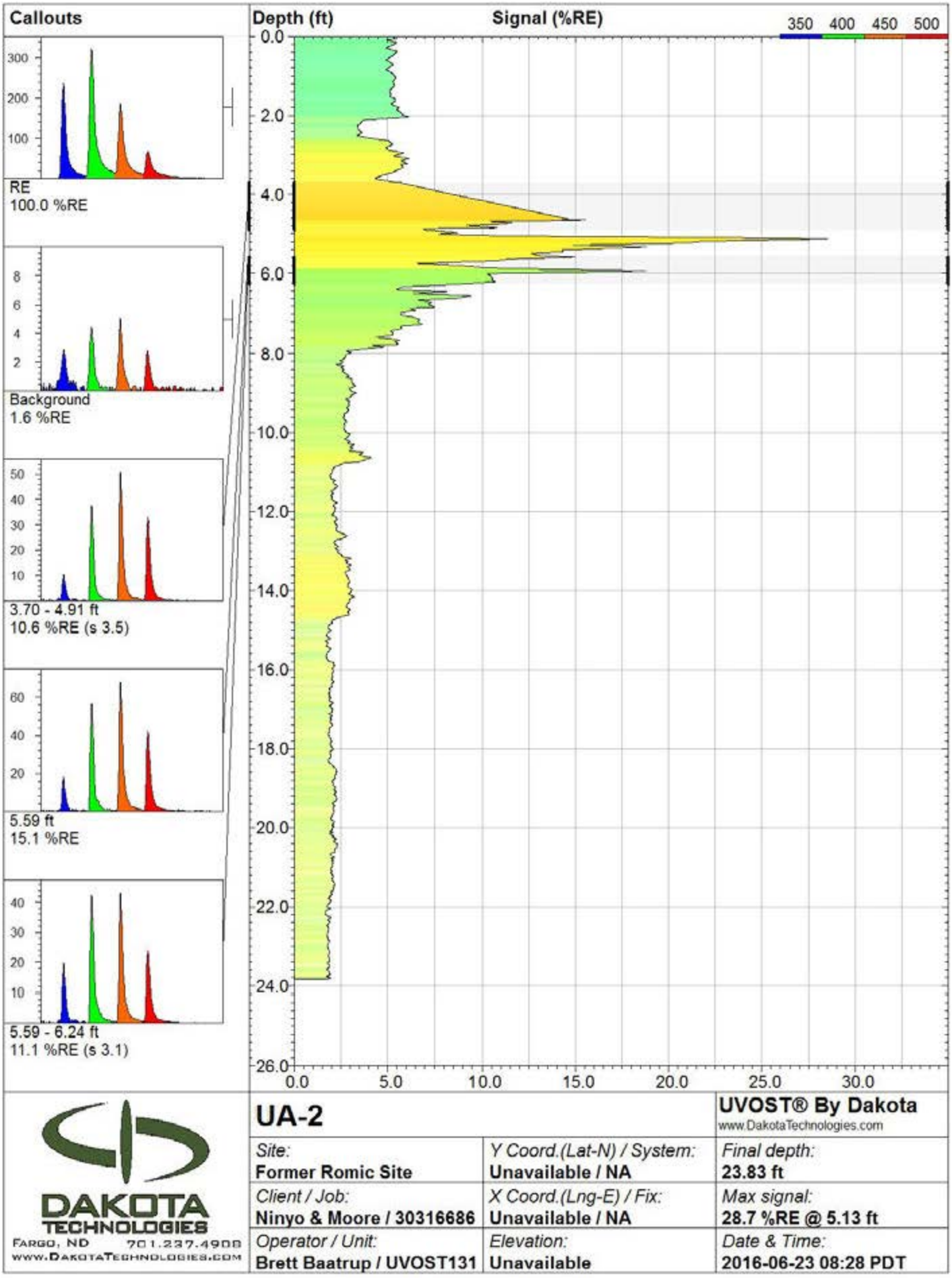


DAKOTA TECHNOLOGIES
FARGO, ND 701.237.4908
WWW.DAKOTATECHNOLOGIES.COM

UA-1

UVOST® By Dakota
www.DakotaTechnologies.com

Site: **Former Romic Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **24.68 ft**
Client / Job: **Ninyo & Moore / 30316686**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **15.5 %RE @ 9.62 ft**
Operator / Unit: **Brett Baatrup / UVOST131**	*Elevation:* **Unavailable**	*Date & Time:* **2016-06-22 09:15 PDT**



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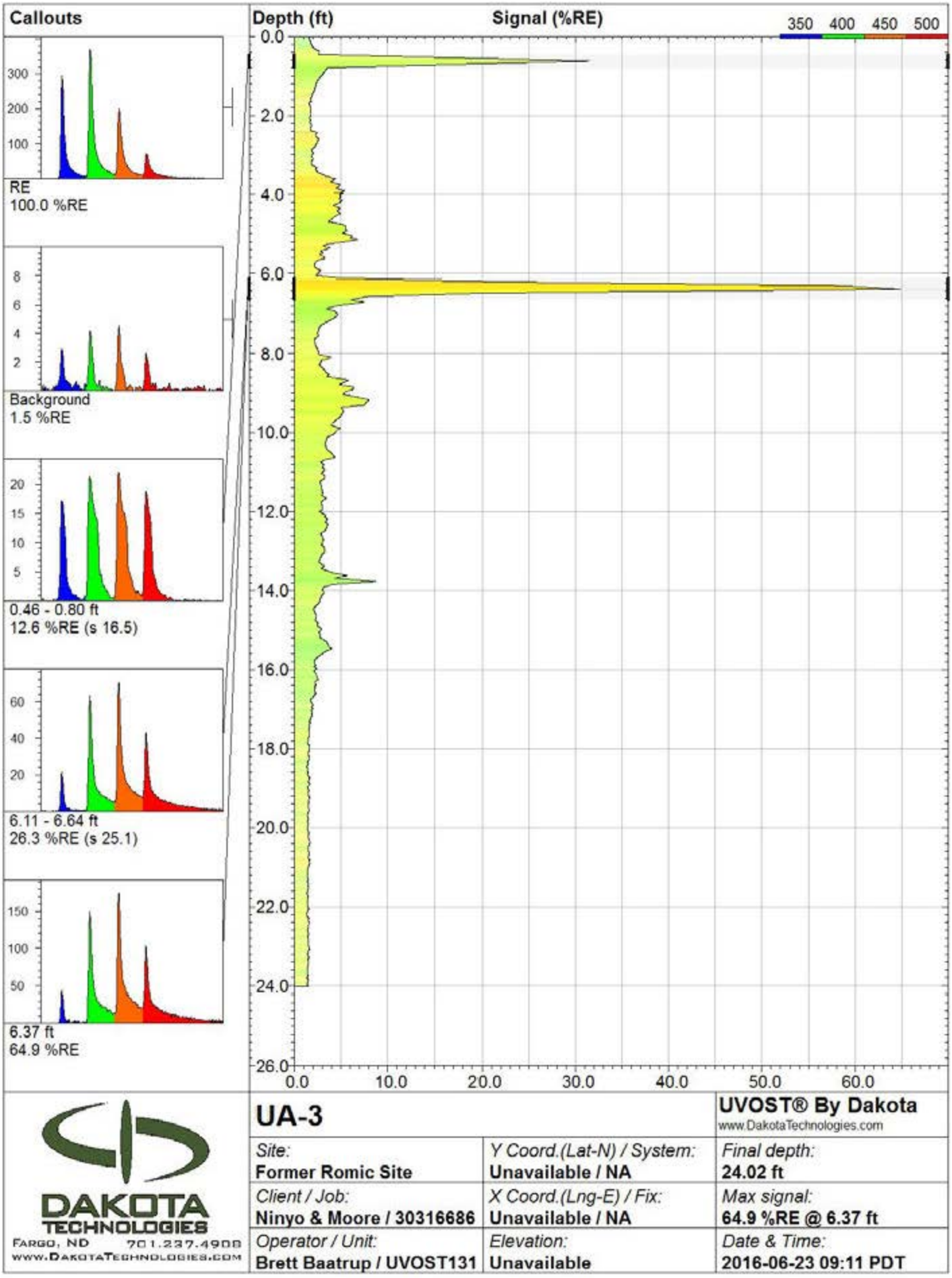
WWW.DAKOTATECHNOLOGIES.COM

UA-2

UVOST® By Dakota
www.DakotaTechnologies.com

Site: **Former Romic Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **23.83 ft**
Client / Job: **Ninyo & Moore / 30316686**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **28.7 %RE @ 5.13 ft**
Operator / Unit: **Brett Baatrup / UVOST131**	*Elevation:* **Unavailable**	*Date & Time:* **2016-06-23 08:28 PDT**



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UA-3

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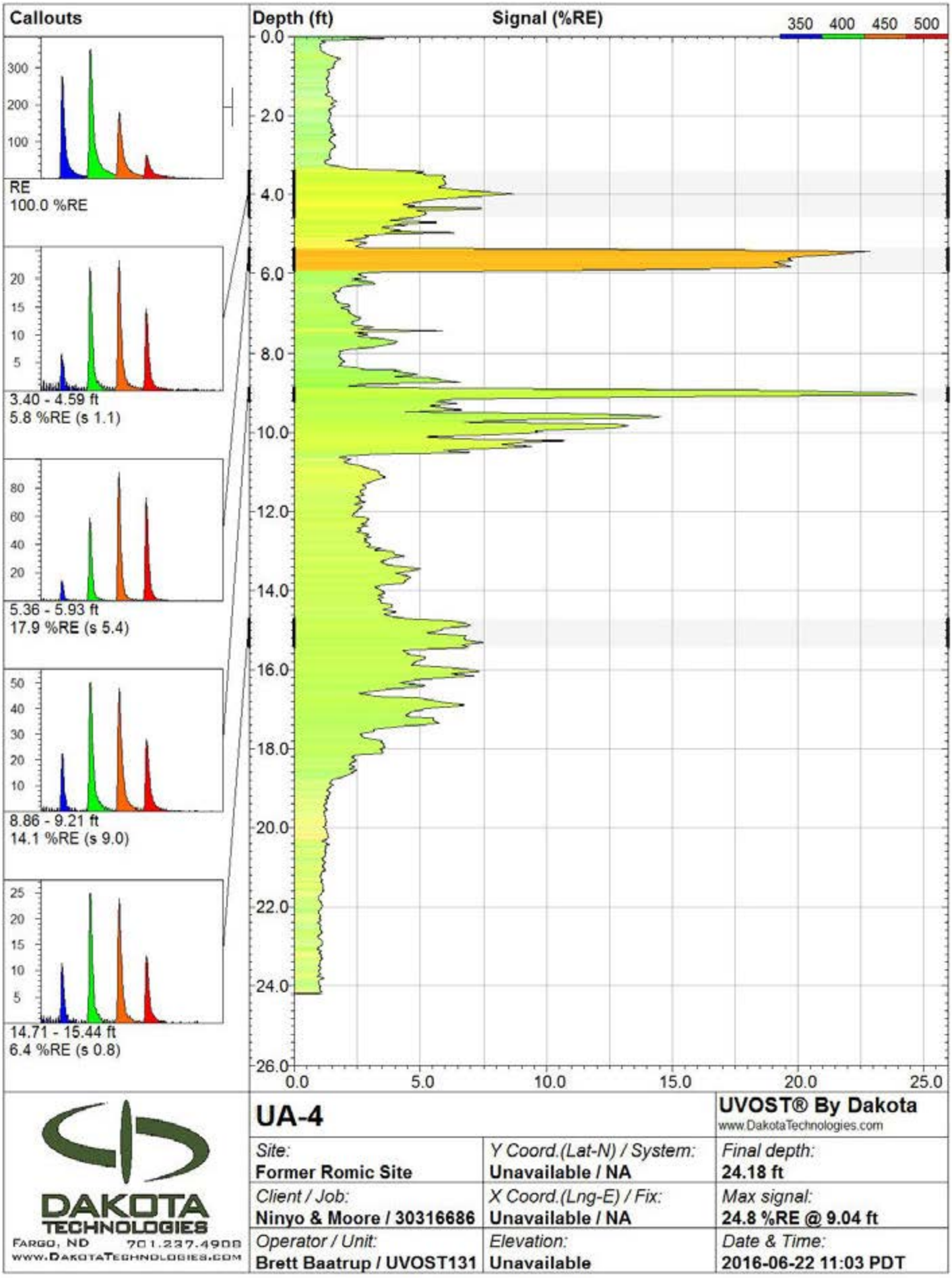
Site: **Former Romic Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **24.02 ft**
Client / Job: **Ninyo & Moore / 30316686**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **64.9 %RE @ 6.37 ft**
Operator / Unit: **Brett Baatrup / UVOST131**	*Elevation:* **Unavailable**	*Date & Time:* **2016-06-23 09:11 PDT**



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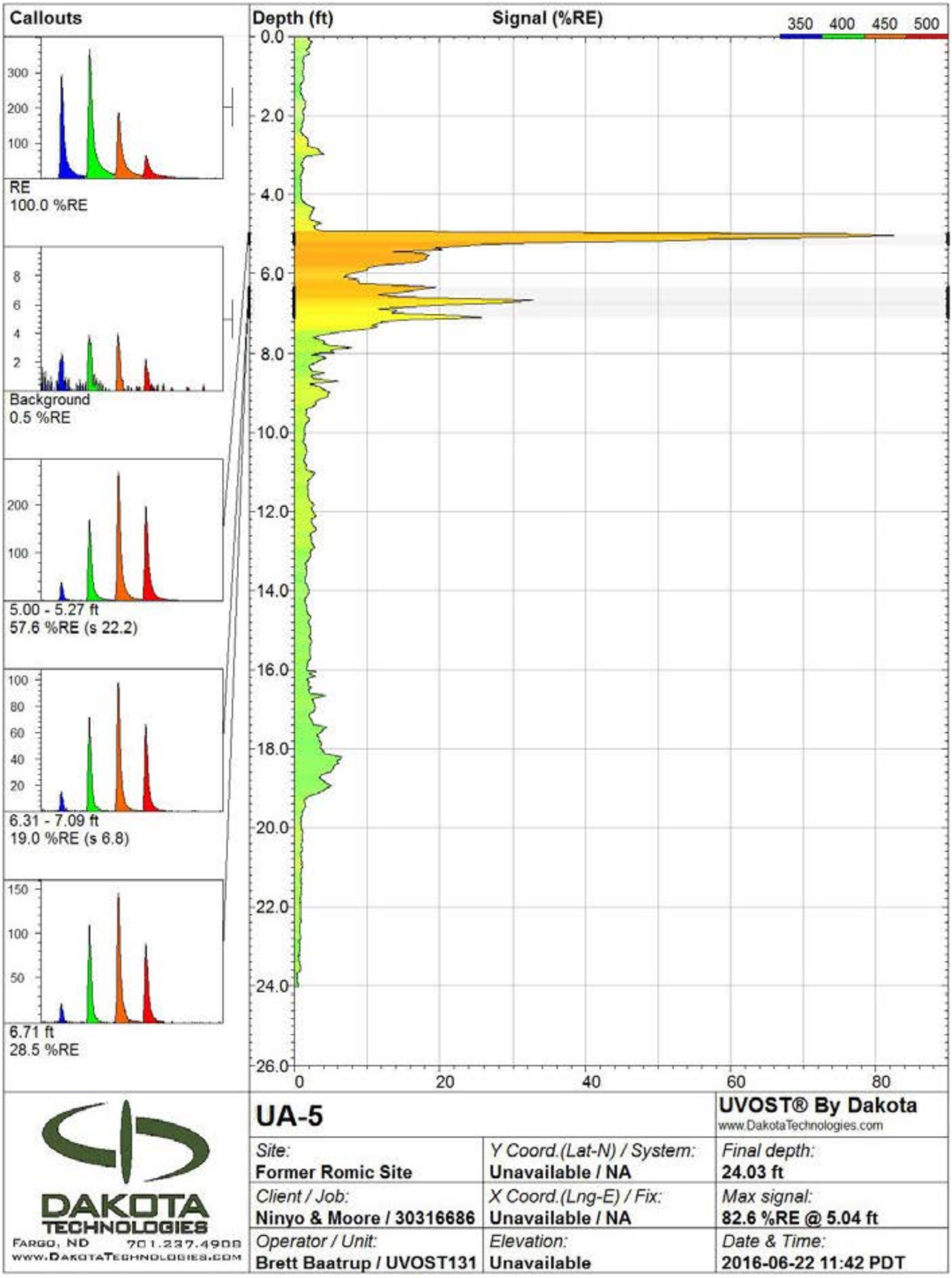
Site: **Former Romic Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **24.18 ft**
Client / Job: **Ninyo & Moore / 30316686**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **24.8 %RE @ 9.04 ft**
Operator / Unit: **Brett Baatrup / UVOST131**	*Elevation:* **Unavailable**	*Date & Time:* **2016-06-22 11:03 PDT**



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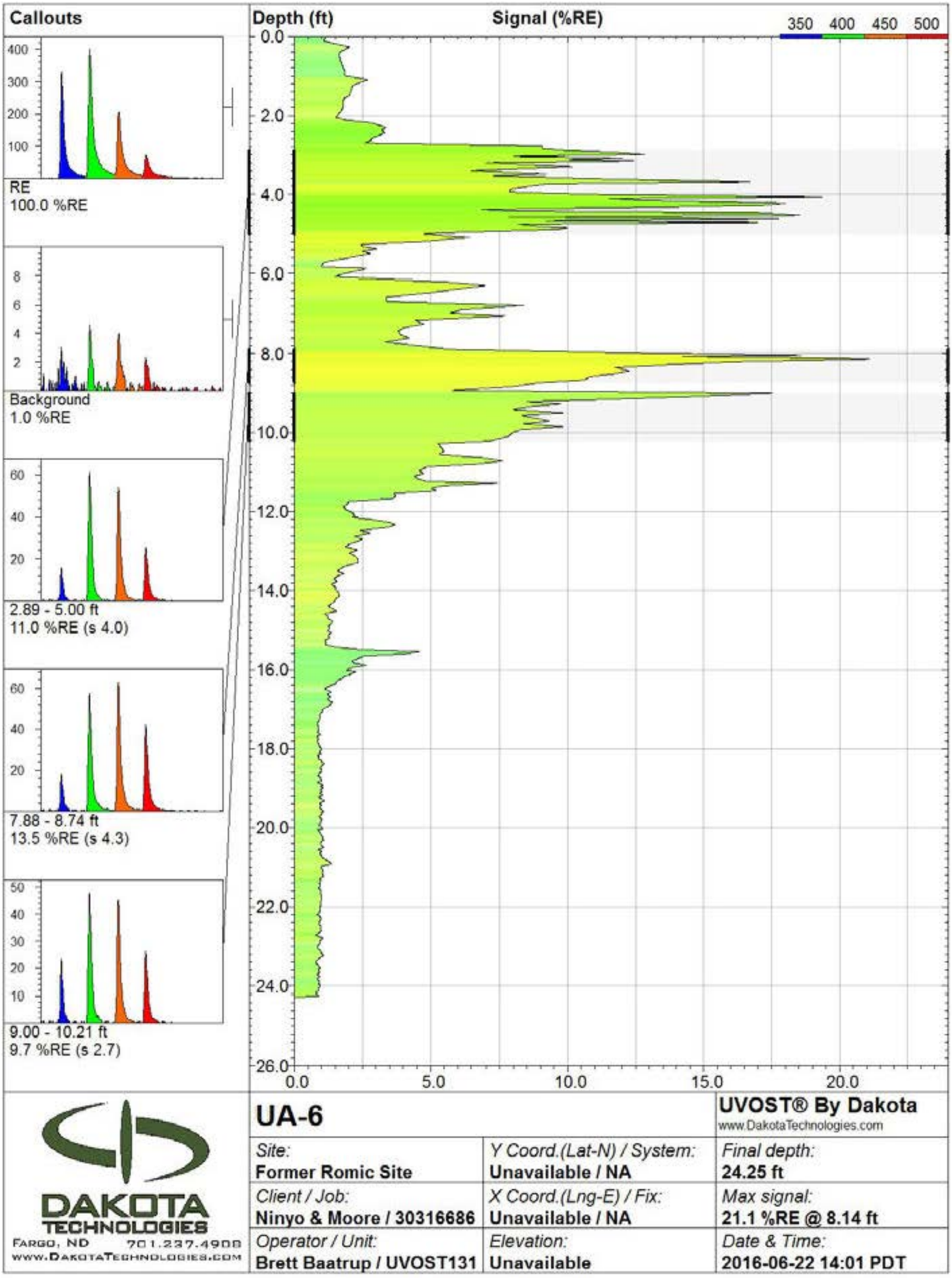
Site: **Former Romic Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **24.03 ft**
Client / Job: **Ninyo & Moore / 30316686**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **82.6 %RE @ 5.04 ft**
Operator / Unit: **Brett Baatrup / UVOST131**	*Elevation:* **Unavailable**	*Date & Time:* **2016-06-22 11:42 PDT**



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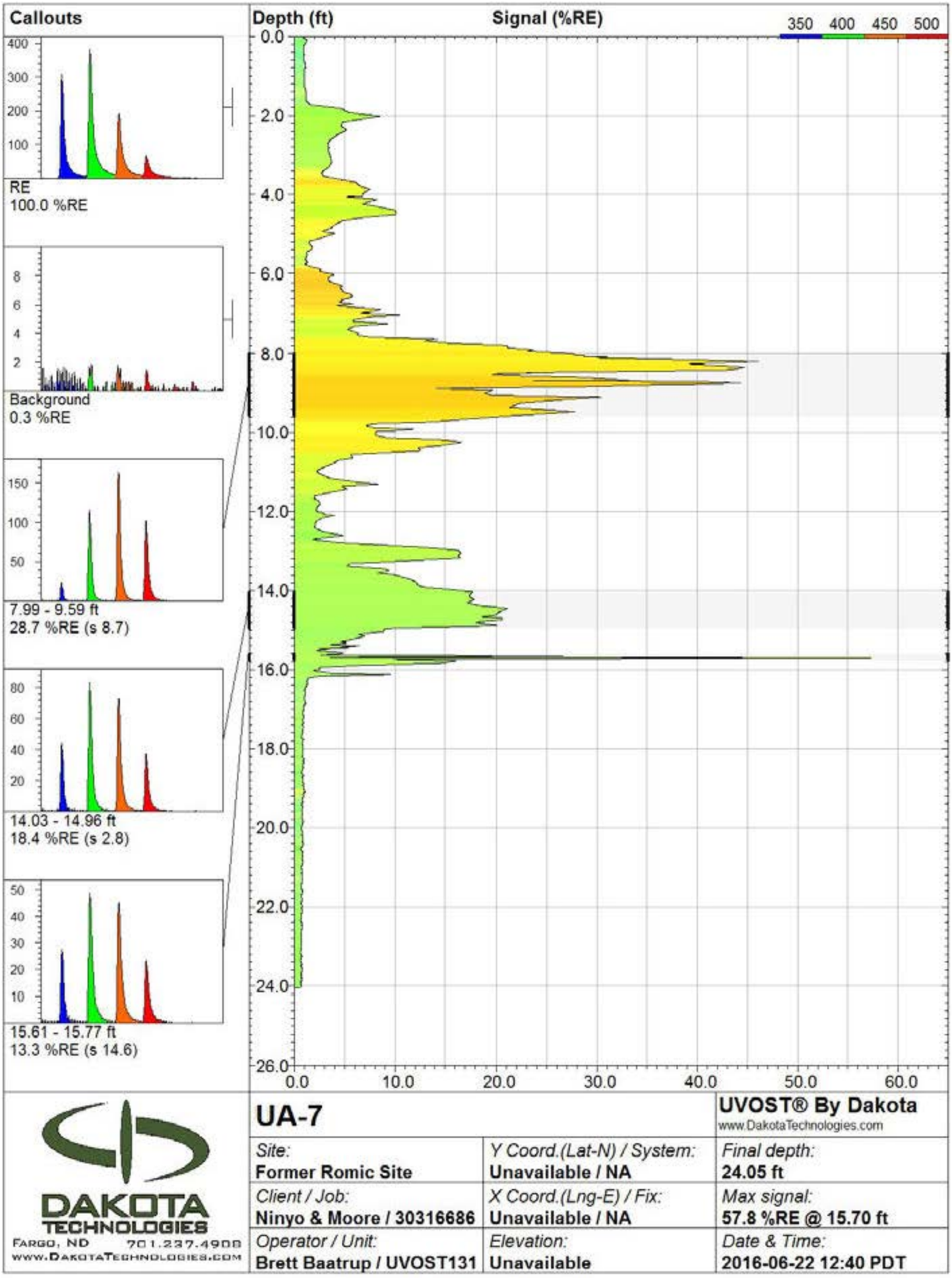
Site: **Former Romic Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **24.25 ft**
Client / Job: **Ninyo & Moore / 30316686**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **21.1 %RE @ 8.14 ft**
Operator / Unit: **Brett Baatrup / UVOST131**	*Elevation:* **Unavailable**	*Date & Time:* **2016-06-22 14:01 PDT**



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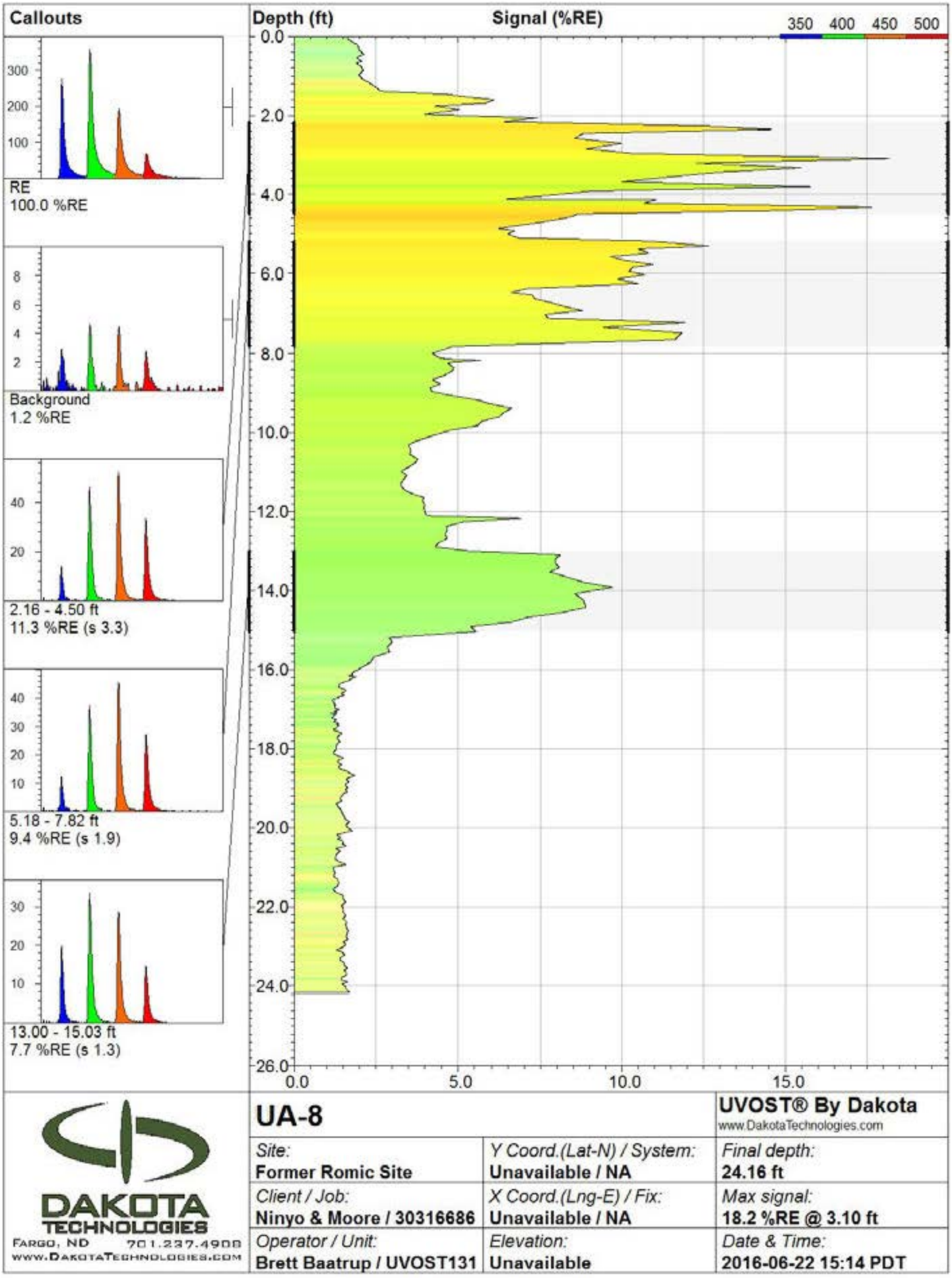
Site: **Former Romic Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **24.05 ft**
Client / Job: **Ninyo & Moore / 30316686**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **57.8 %RE @ 15.70 ft**
Operator / Unit: **Brett Baatrup / UVOST131**	*Elevation:* **Unavailable**	*Date & Time:* **2016-06-22 12:40 PDT**



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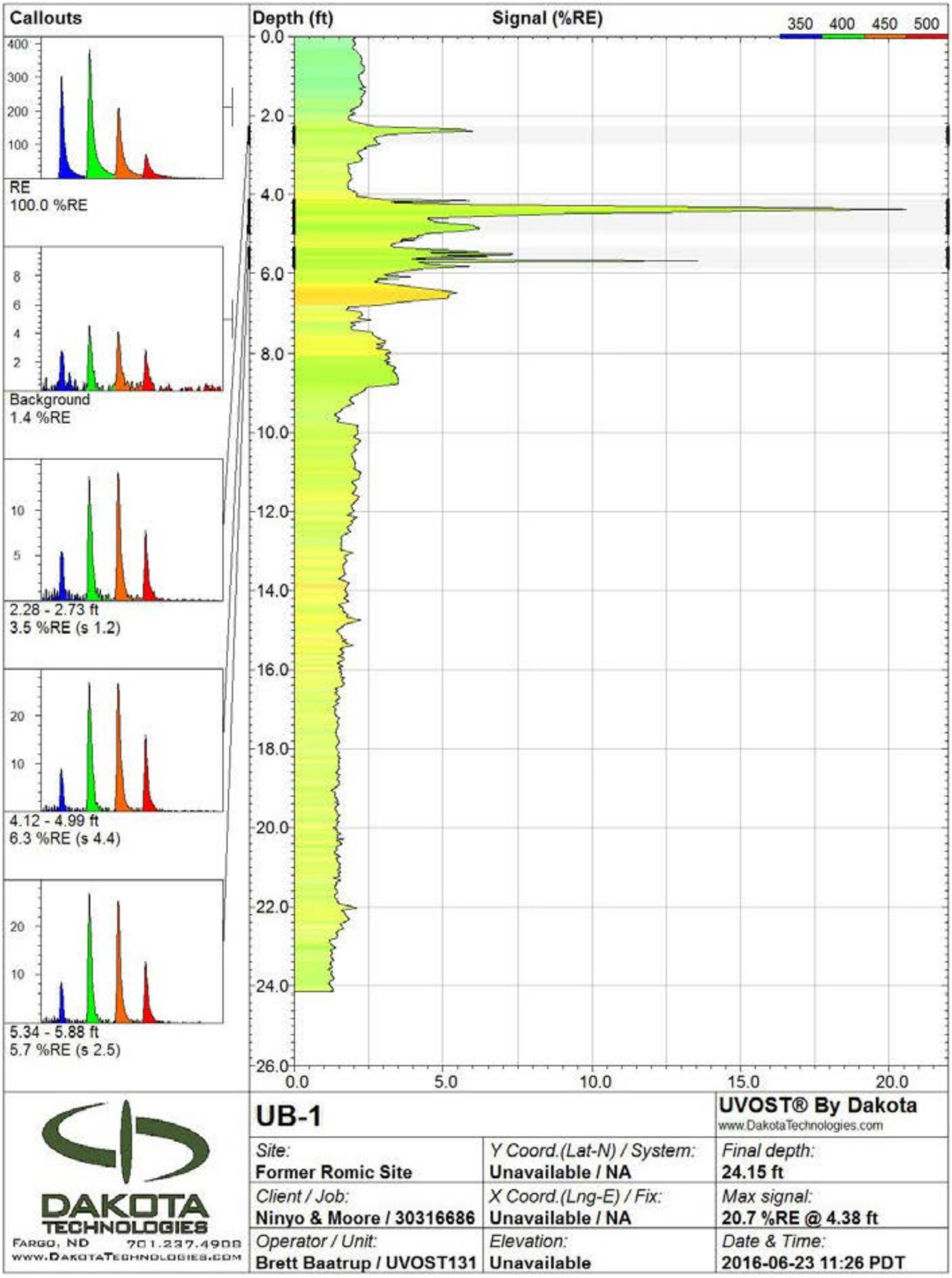
Site: **Former Romic Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **24.16 ft**
Client / Job: **Ninyo & Moore / 30316686**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **18.2 %RE @ 3.10 ft**
Operator / Unit: **Brett Baatrup / UVOST131**	*Elevation:* **Unavailable**	*Date & Time:* **2016-06-22 15:14 PDT**



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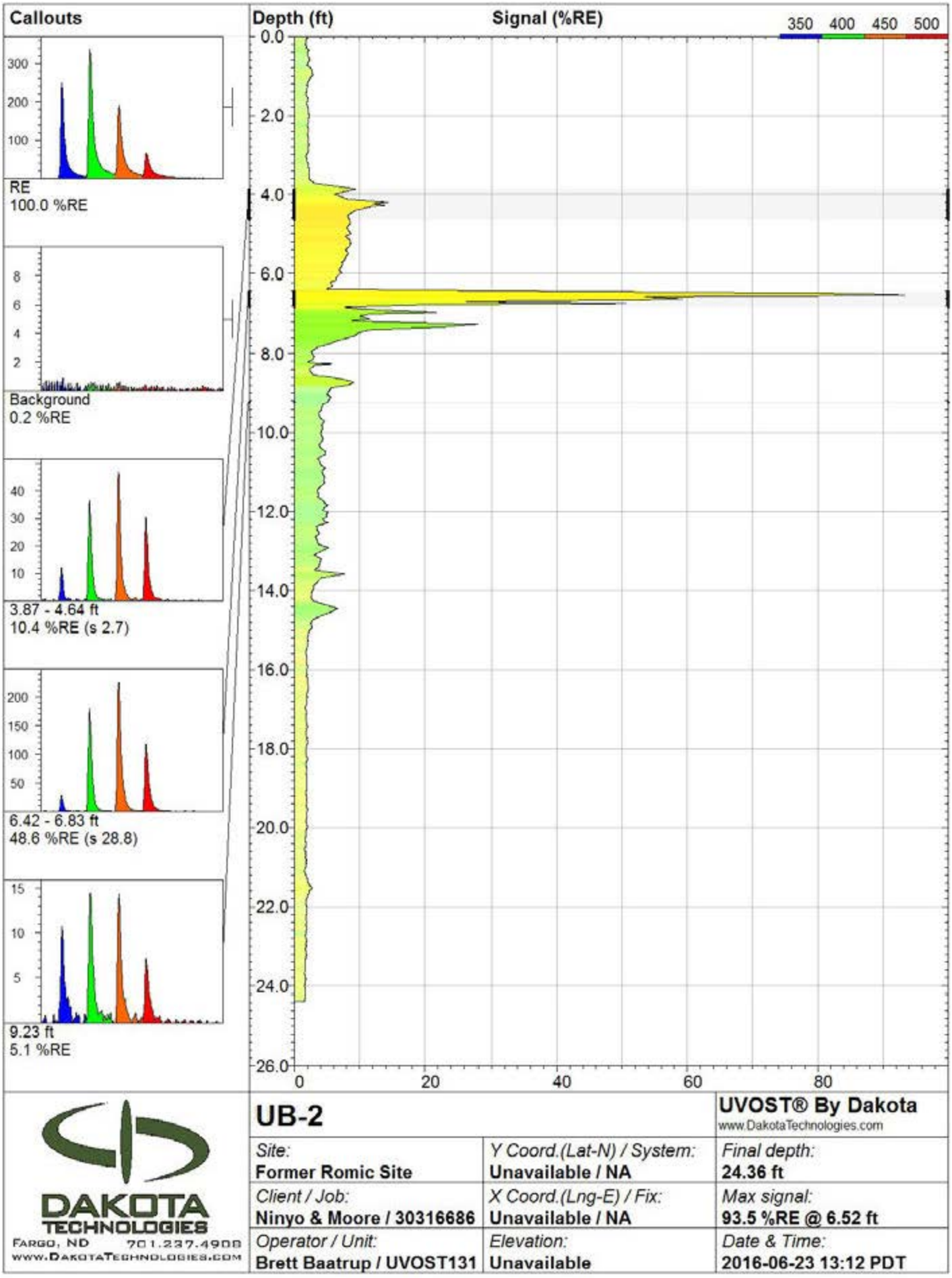
Site: **Former Romic Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **24.15 ft**
Client / Job: **Ninyo & Moore / 30316686**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **20.7 %RE @ 4.38 ft**
Operator / Unit: **Brett Baatrup / UVOST131**	*Elevation:* **Unavailable**	*Date & Time:* **2016-06-23 11:26 PDT**



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UB-2

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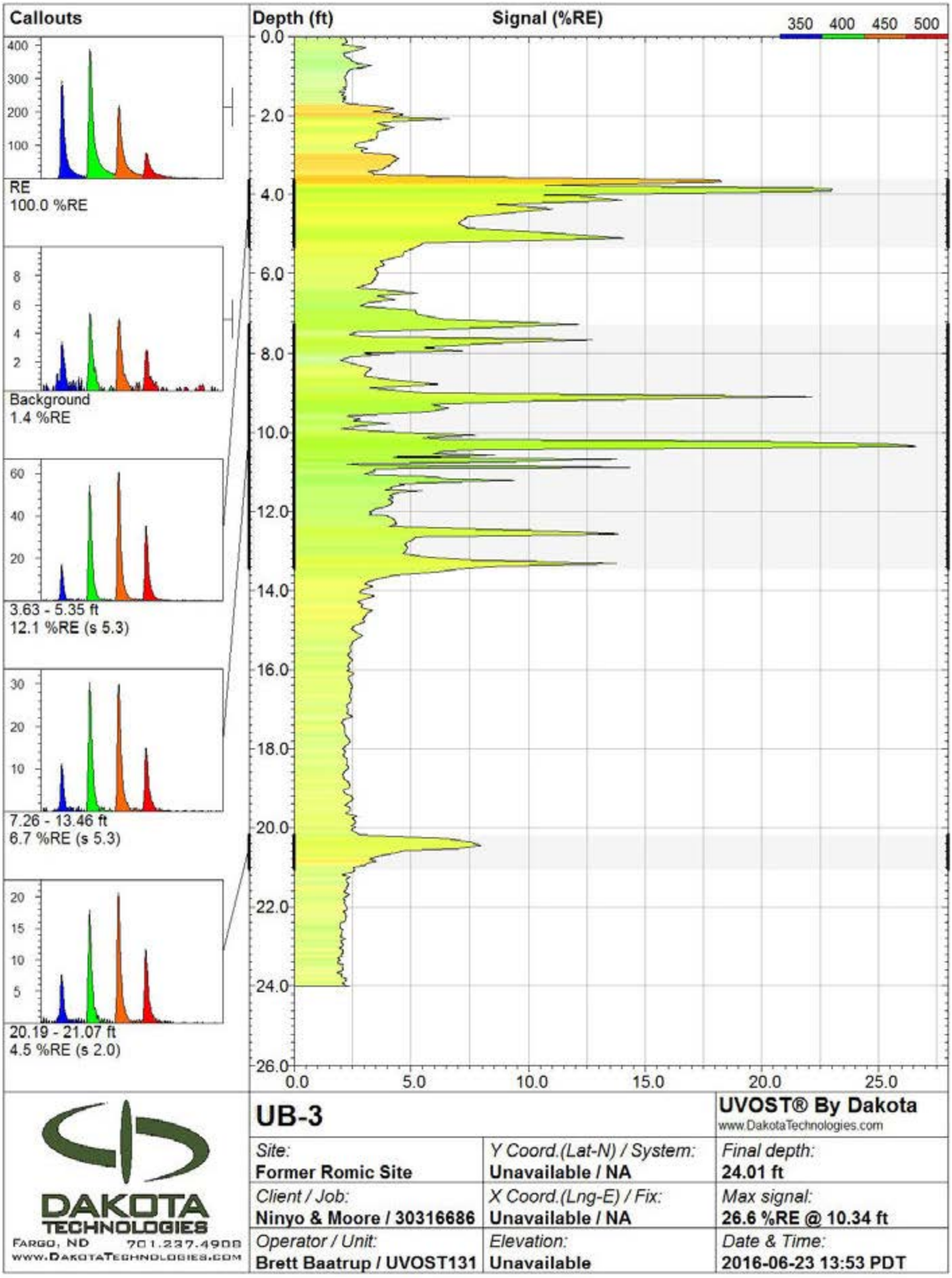
Site: **Former Romic Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **24.36 ft**
Client / Job: **Ninyo & Moore / 30316686**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **93.5 %RE @ 6.52 ft**
Operator / Unit: **Brett Baatrup / UVOST131**	*Elevation:* **Unavailable**	*Date & Time:* **2016-06-23 13:12 PDT**



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UB-3

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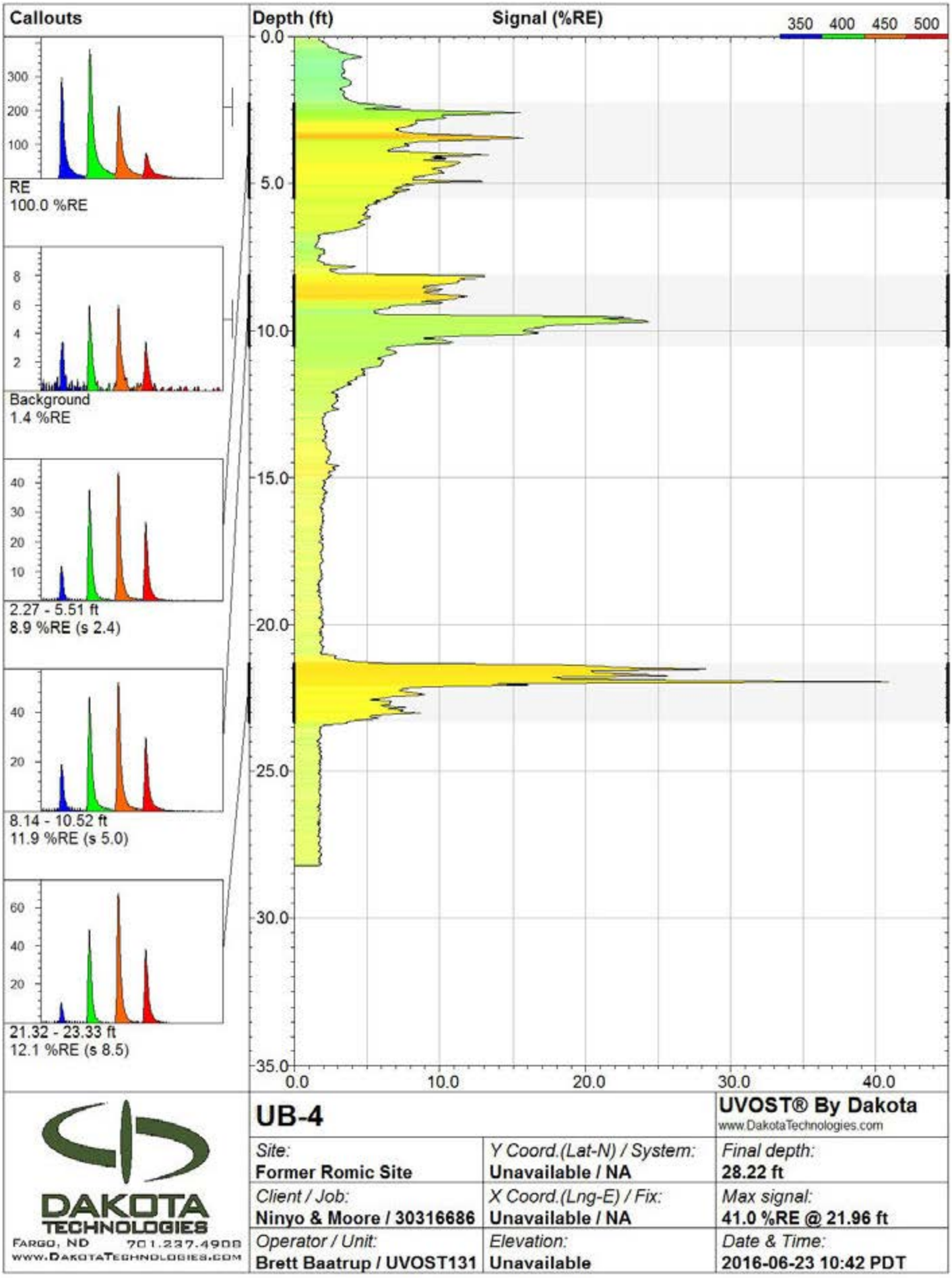
Site: **Former Romic Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **24.01 ft**
Client / Job: **Ninyo & Moore / 30316686**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **26.6 %RE @ 10.34 ft**
Operator / Unit: **Brett Baatrup / UVOST131**	*Elevation:* **Unavailable**	*Date & Time:* **2016-06-23 13:53 PDT**



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UB-4

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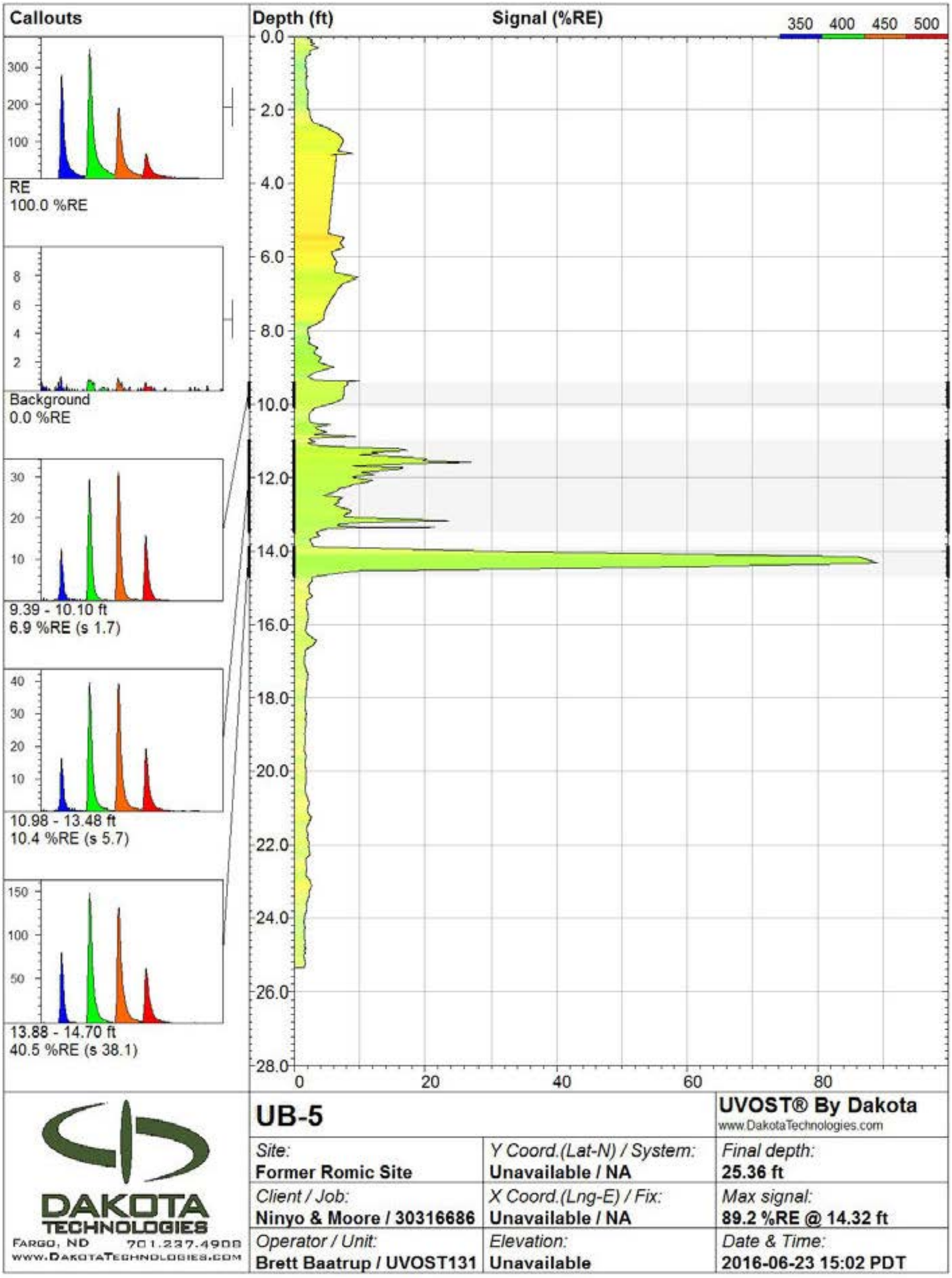
Site: **Former Romic Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **28.22 ft**
Client / Job: **Ninyo & Moore / 30316686**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **41.0 %RE @ 21.96 ft**
Operator / Unit: **Brett Baatrup / UVOST131**	*Elevation:* **Unavailable**	*Date & Time:* **2016-06-23 10:42 PDT**



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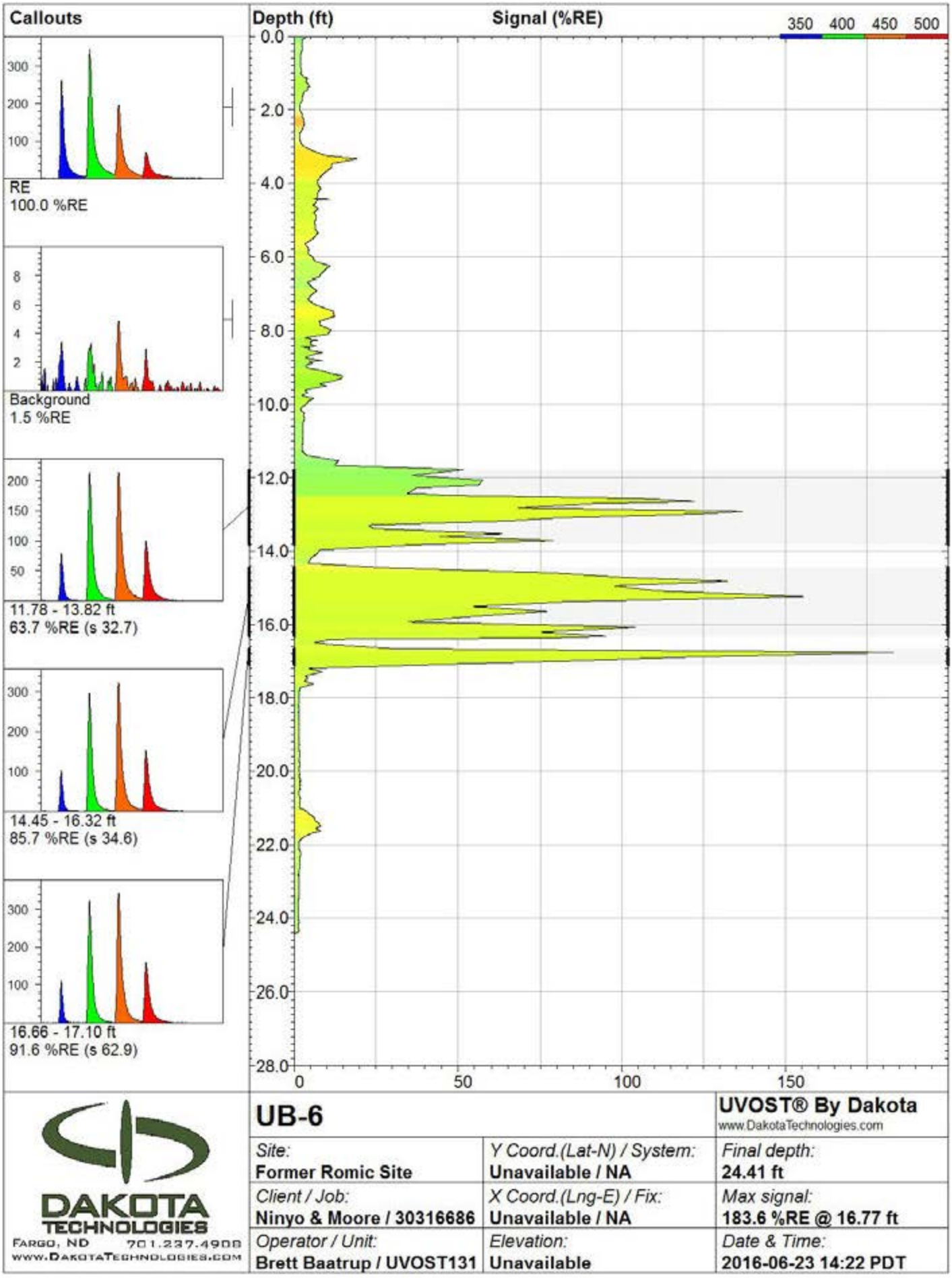
Site: **Former Romic Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **25.36 ft**
Client / Job: **Ninyo & Moore / 30316686**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **89.2 %RE @ 14.32 ft**
Operator / Unit: **Brett Baatrup / UVOST131**	*Elevation:* **Unavailable**	*Date & Time:* **2016-06-23 15:02 PDT**



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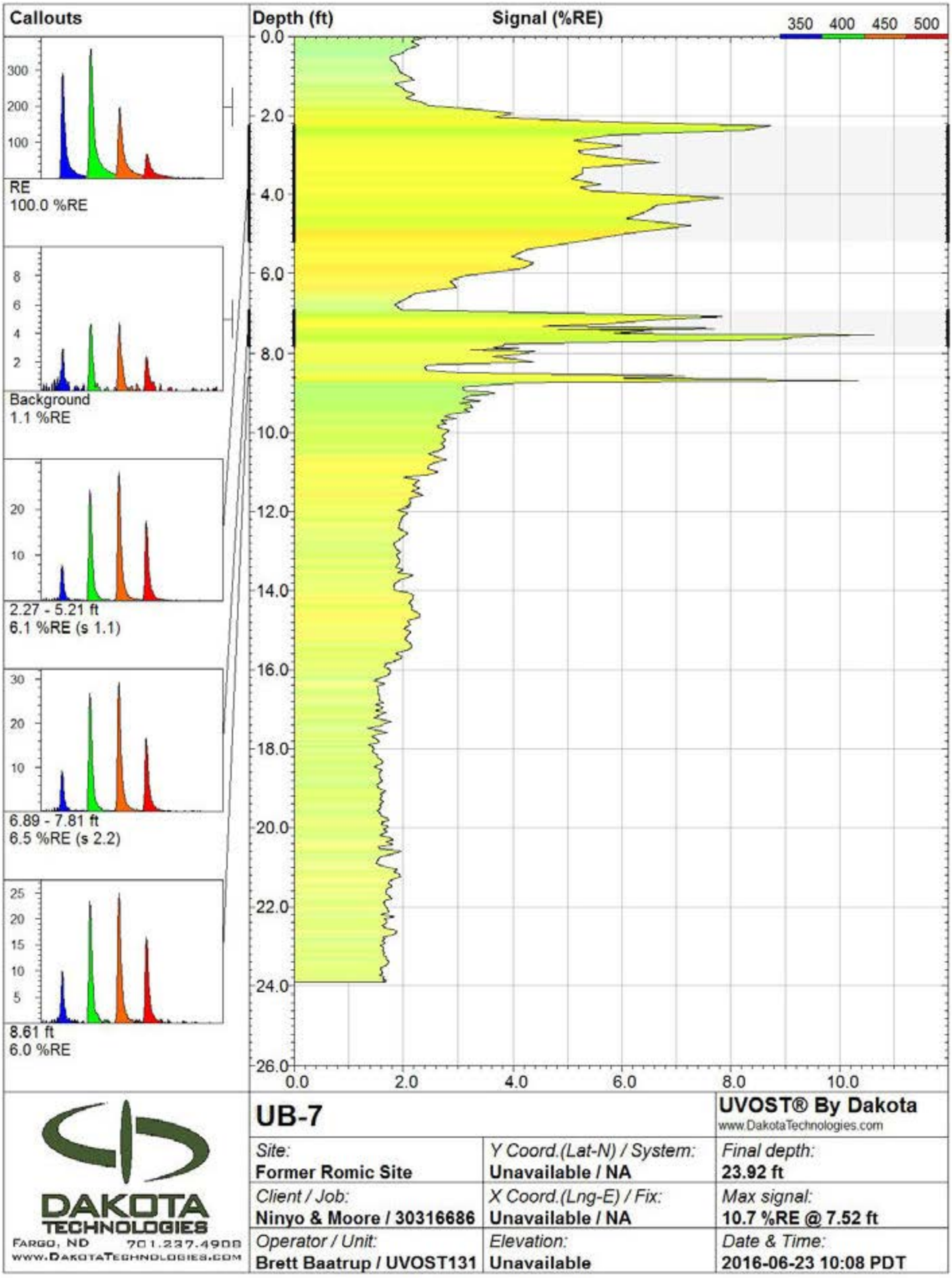
Site: **Former Romic Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **24.41 ft**
Client / Job: **Ninyo & Moore / 30316686**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **183.6 %RE @ 16.77 ft**
Operator / Unit: **Brett Baatrup / UVOST131**	*Elevation:* **Unavailable**	*Date & Time:* **2016-06-23 14:22 PDT**



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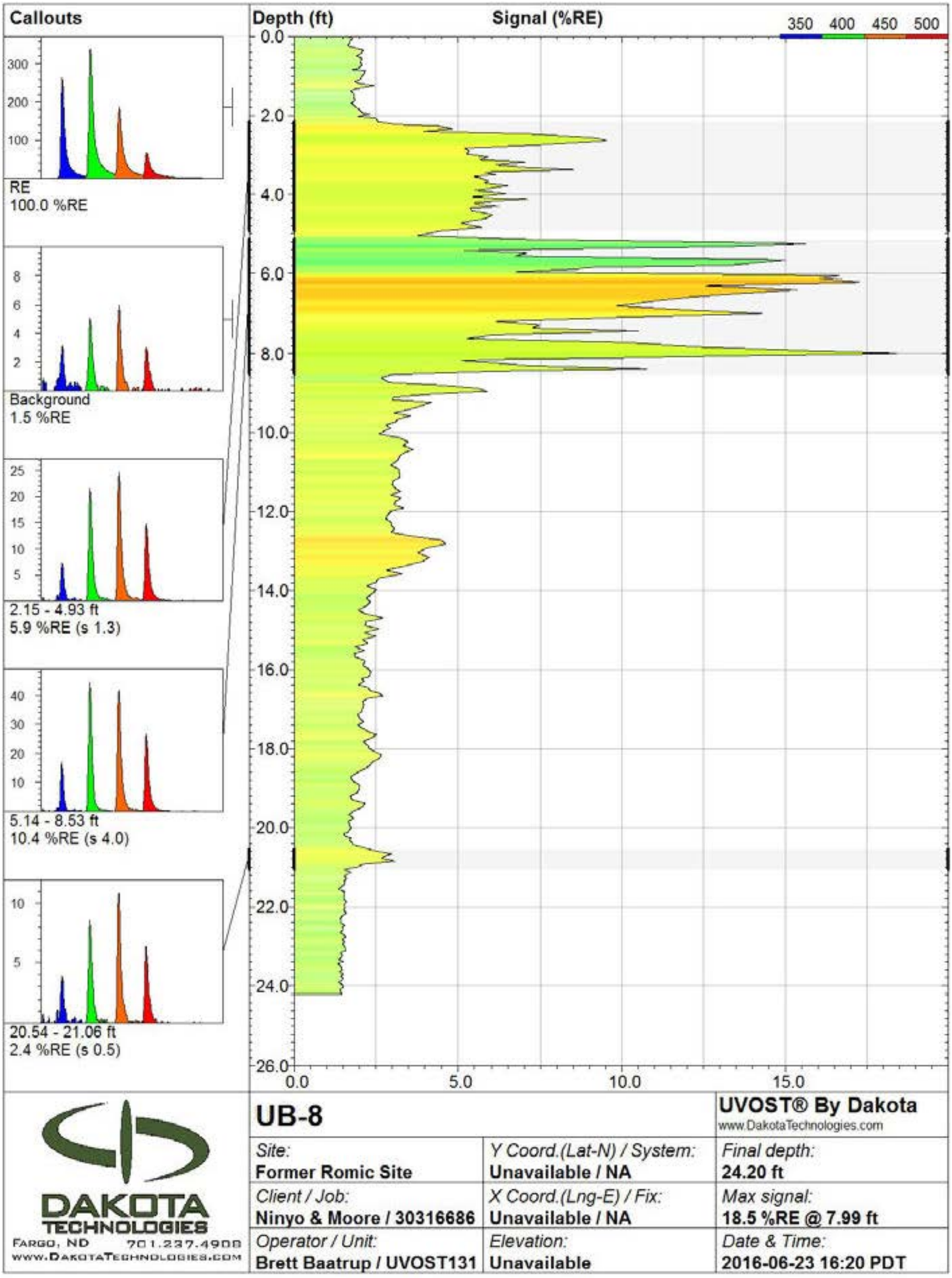
Site: **Former Romic Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **23.92 ft**
Client / Job: **Ninyo & Moore / 30316686**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **10.7 %RE @ 7.52 ft**
Operator / Unit: **Brett Baatrup / UVOST131**	*Elevation:* **Unavailable**	*Date & Time:* **2016-06-23 10:08 PDT**



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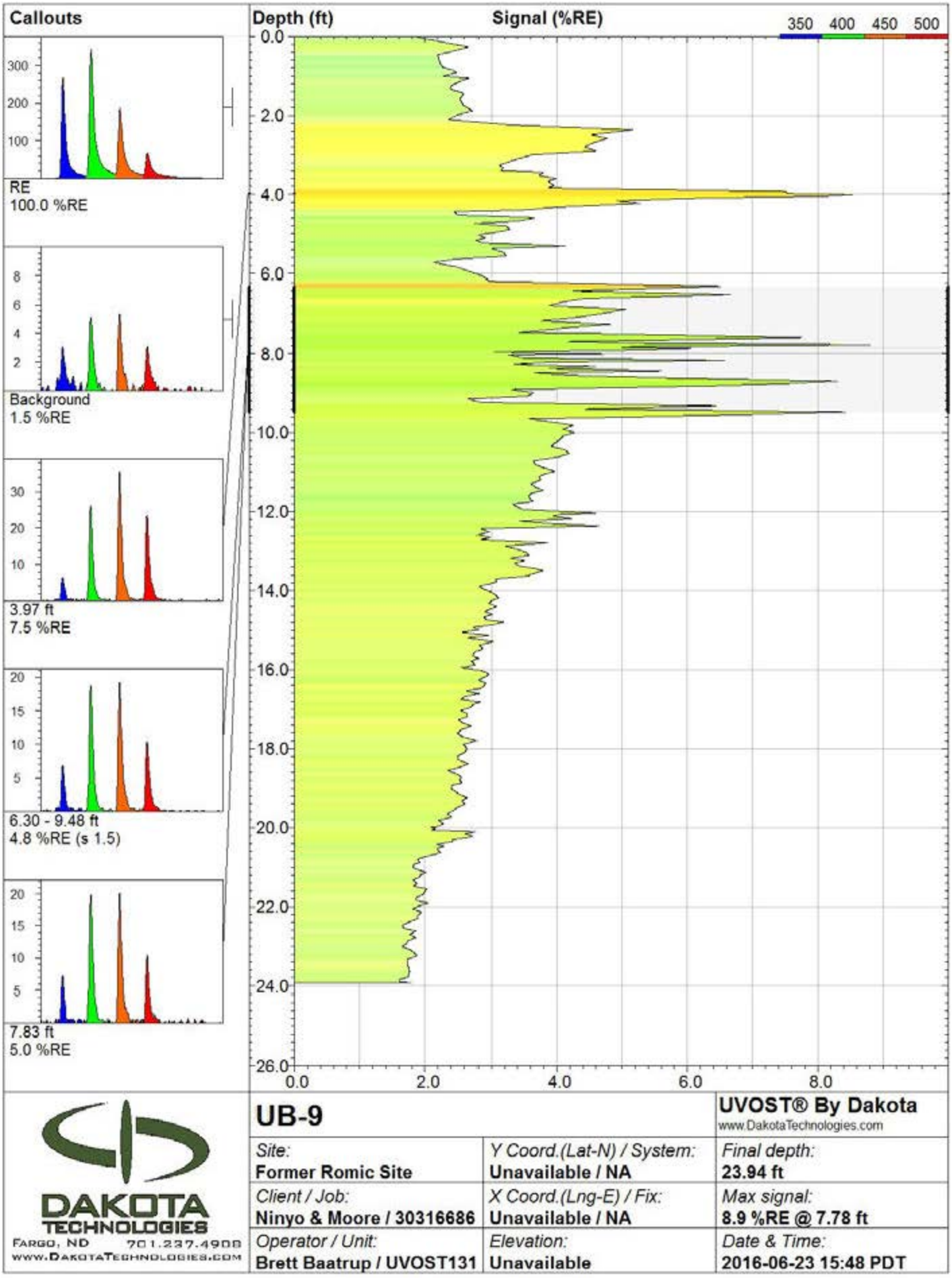
Site: **Former Romic Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **24.20 ft**
Client / Job: **Ninyo & Moore / 30316686**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **18.5 %RE @ 7.99 ft**
Operator / Unit: **Brett Baatrup / UVOST131**	*Elevation:* **Unavailable**	*Date & Time:* **2016-06-23 16:20 PDT**



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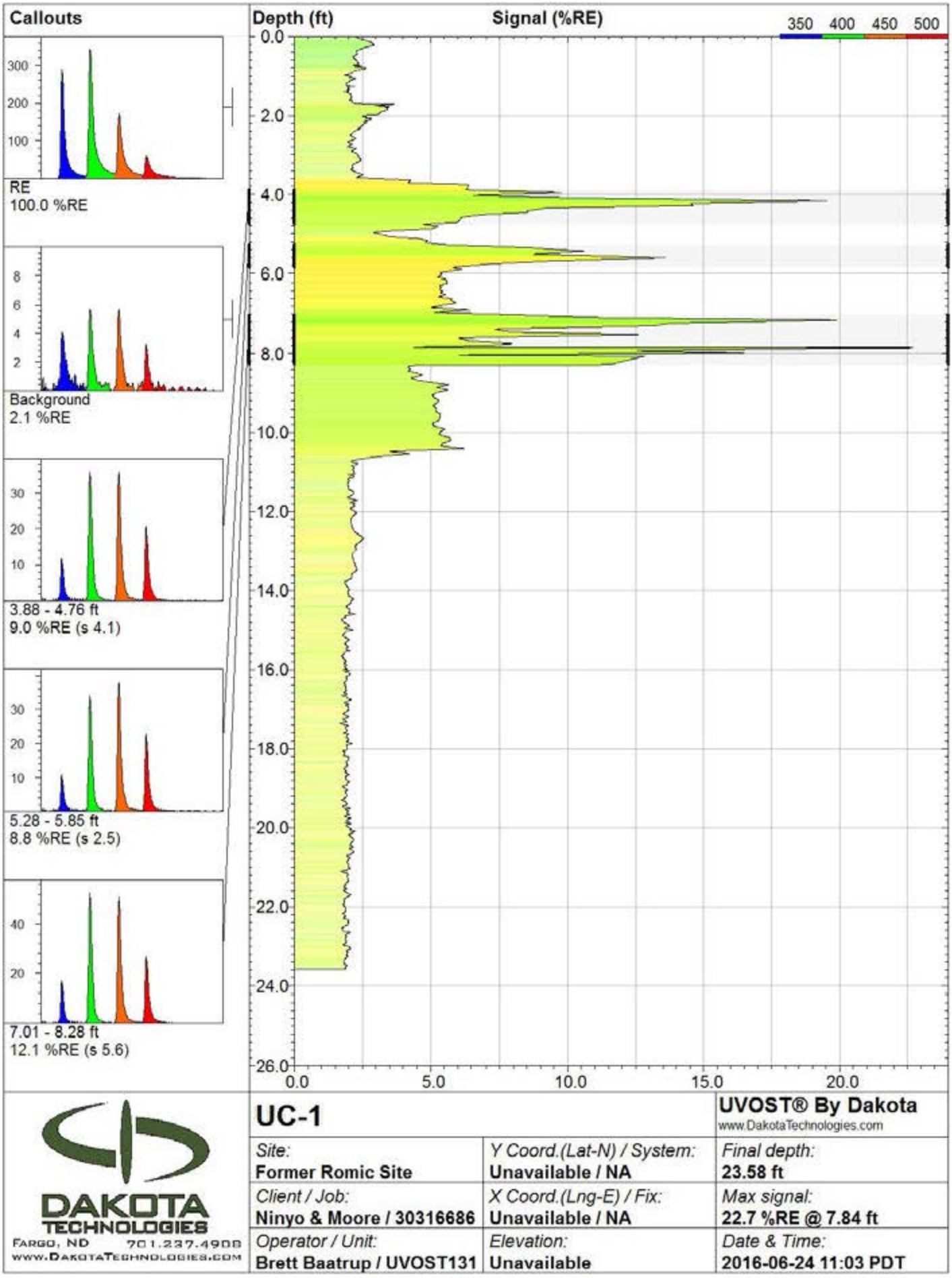
Site: **Former Romic Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **23.94 ft**
Client / Job: **Ninyo & Moore / 30316686**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **8.9 %RE @ 7.78 ft**
Operator / Unit: **Brett Baatrup / UVOST131**	*Elevation:* **Unavailable**	*Date & Time:* **2016-06-23 15:48 PDT**



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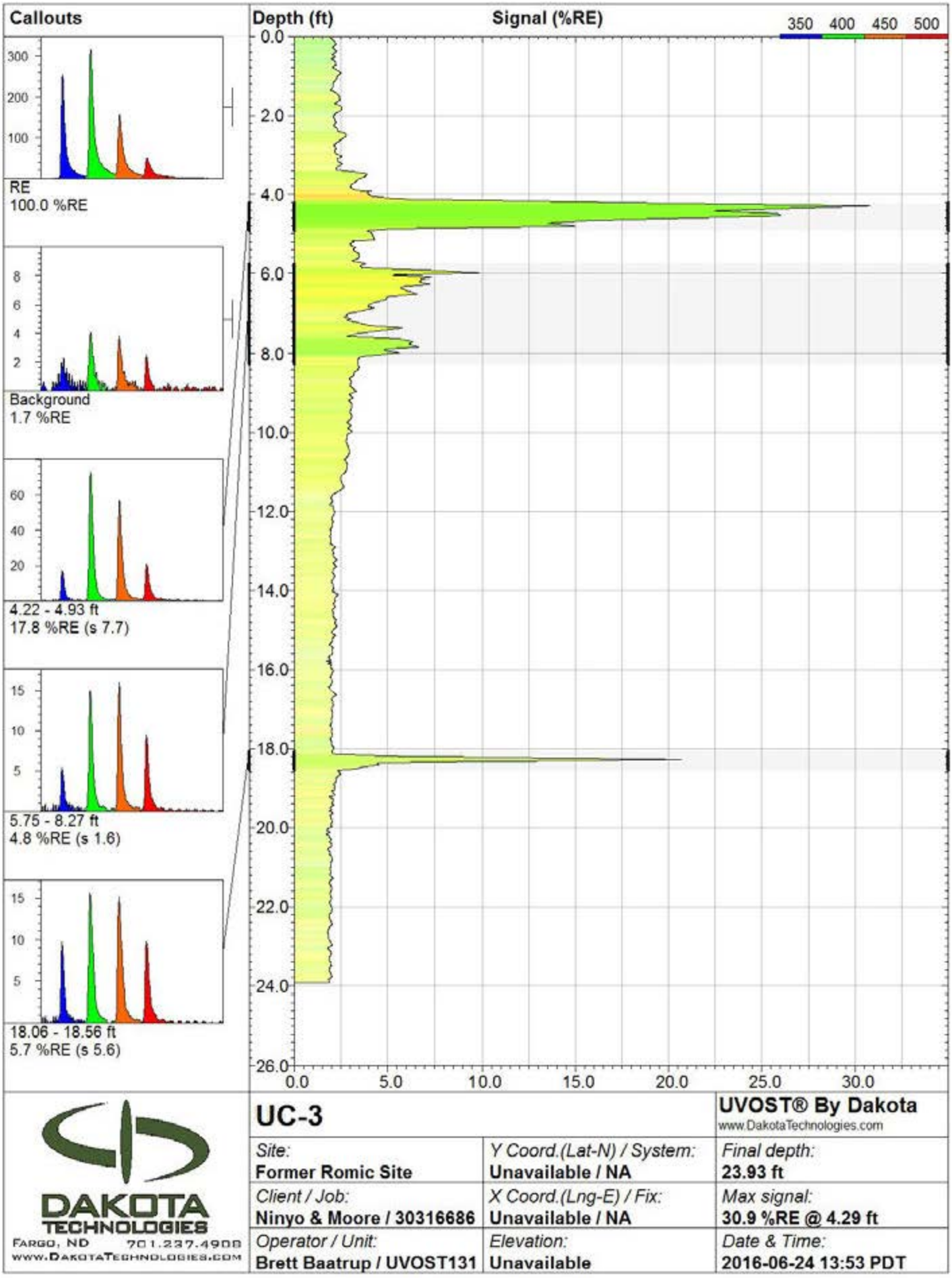
Site: **Former Romic Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **23.58 ft**
Client / Job: **Ninyo & Moore / 30316686**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **22.7 %RE @ 7.84 ft**
Operator / Unit: **Brett Baatrup / UVOST131**	*Elevation:* **Unavailable**	*Date & Time:* **2016-06-24 11:03 PDT**



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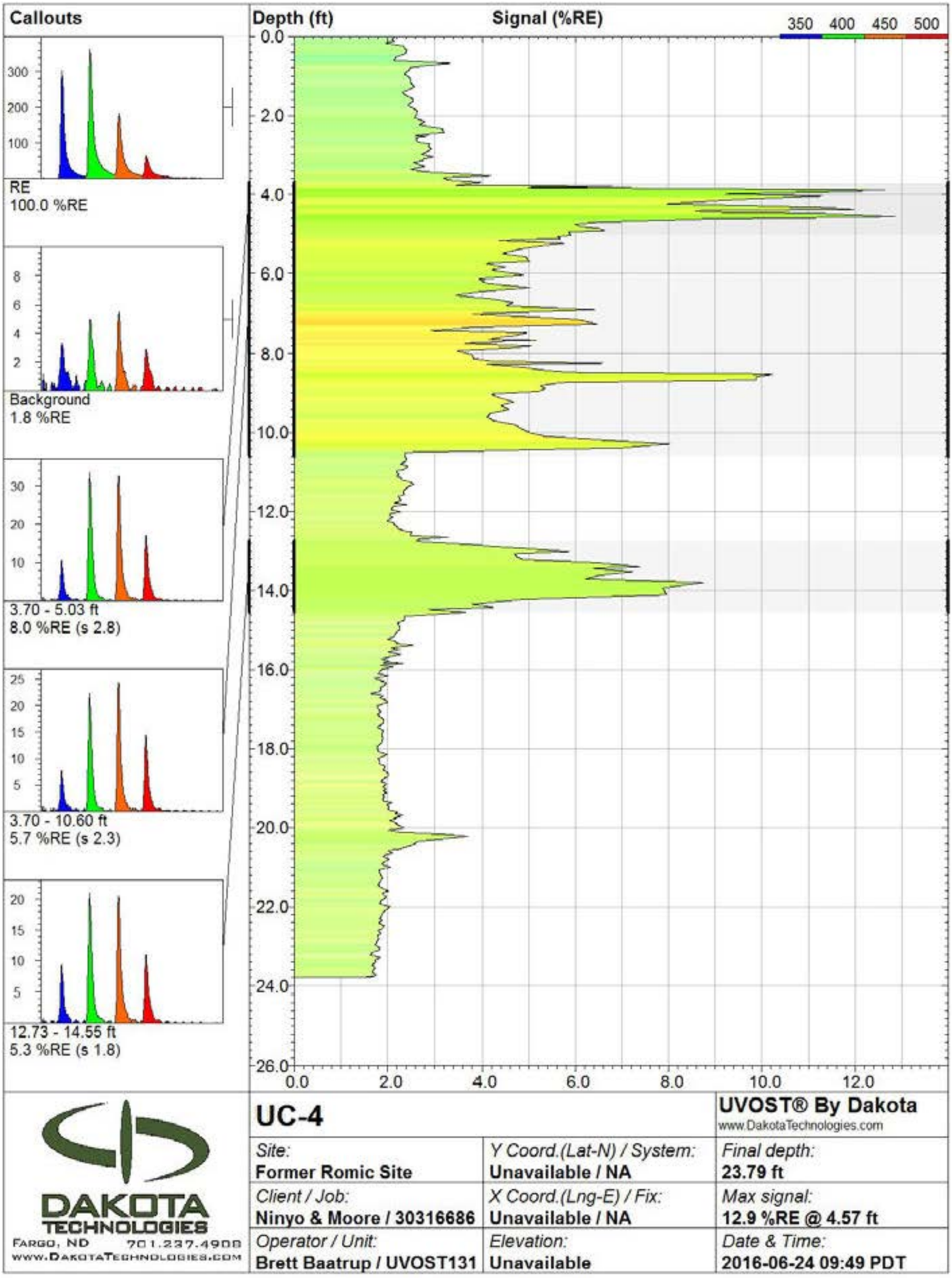
Site: **Former Romic Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **23.93 ft**
Client / Job: **Ninyo & Moore / 30316686**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **30.9 %RE @ 4.29 ft**
Operator / Unit: **Brett Baatrup / UVOST131**	*Elevation:* **Unavailable**	*Date & Time:* **2016-06-24 13:53 PDT**



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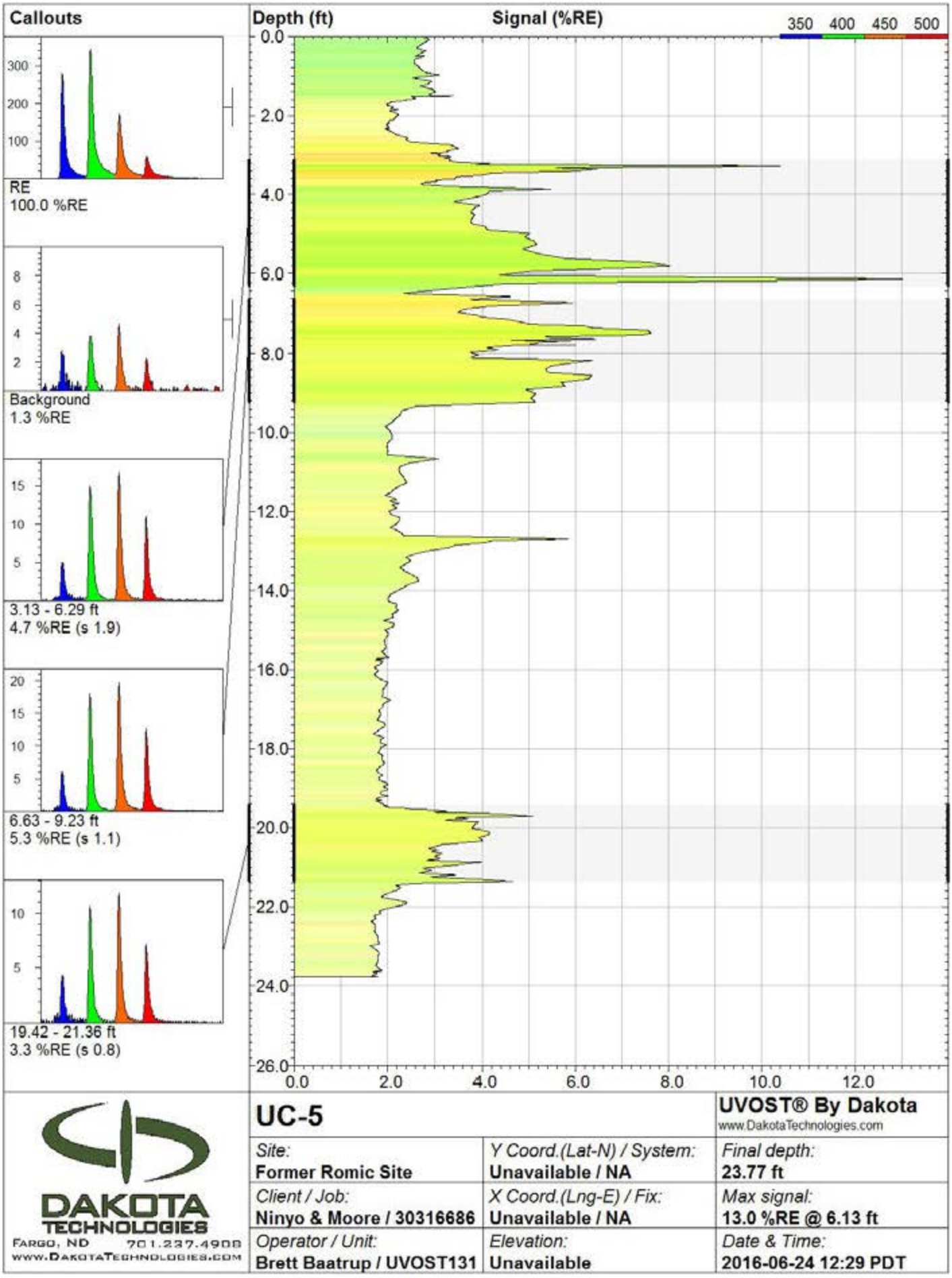
Site: **Former Romic Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **23.79 ft**
Client / Job: **Ninyo & Moore / 30316686**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **12.9 %RE @ 4.57 ft**
Operator / Unit: **Brett Baatrup / UVOST131**	*Elevation:* **Unavailable**	*Date & Time:* **2016-06-24 09:49 PDT**



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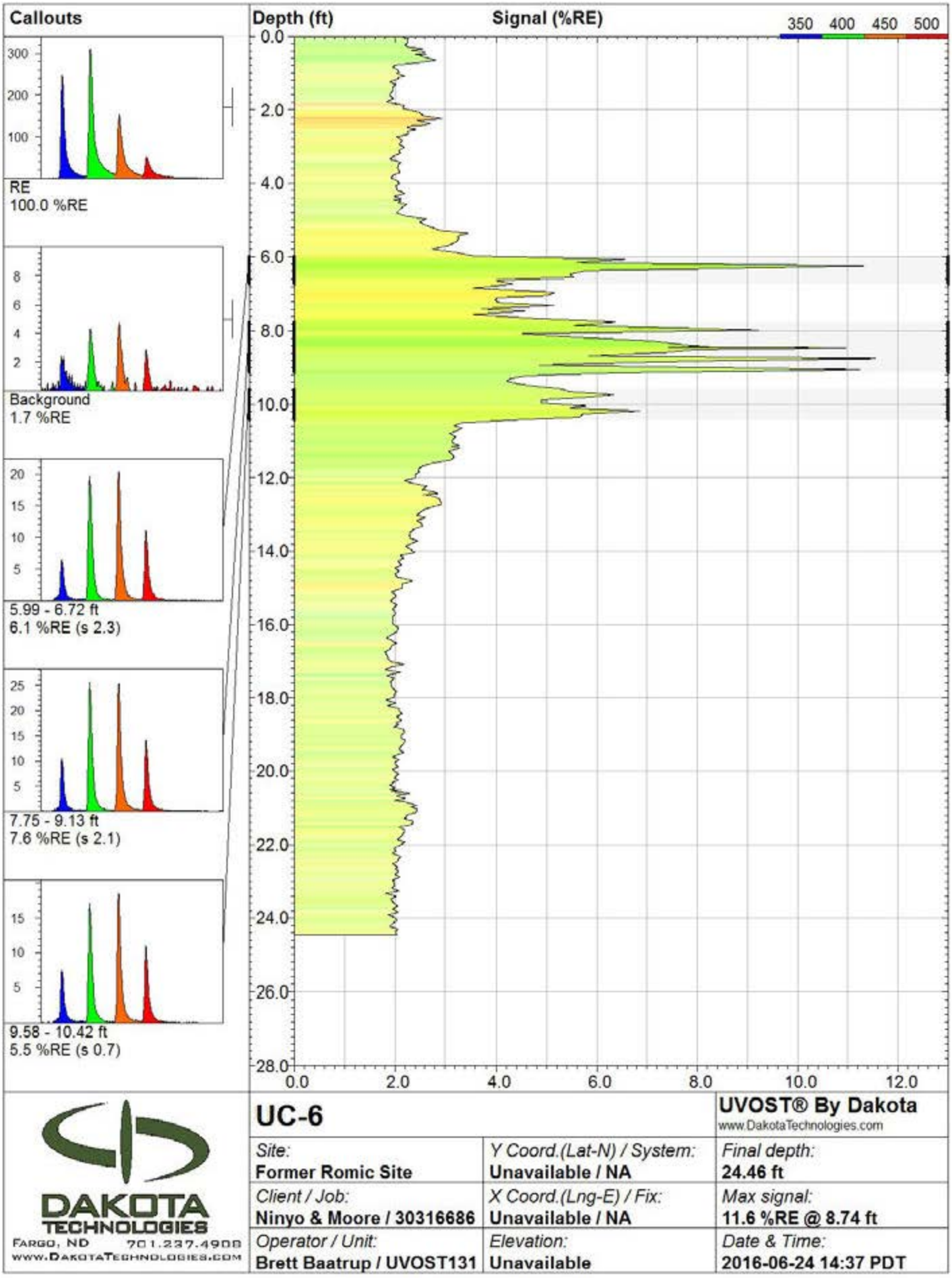
Site: **Former Romic Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **23.77 ft**
Client / Job: **Ninyo & Moore / 30316686**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **13.0 %RE @ 6.13 ft**
Operator / Unit: **Brett Baatrup / UVOST131**	*Elevation:* **Unavailable**	*Date & Time:* **2016-06-24 12:29 PDT**



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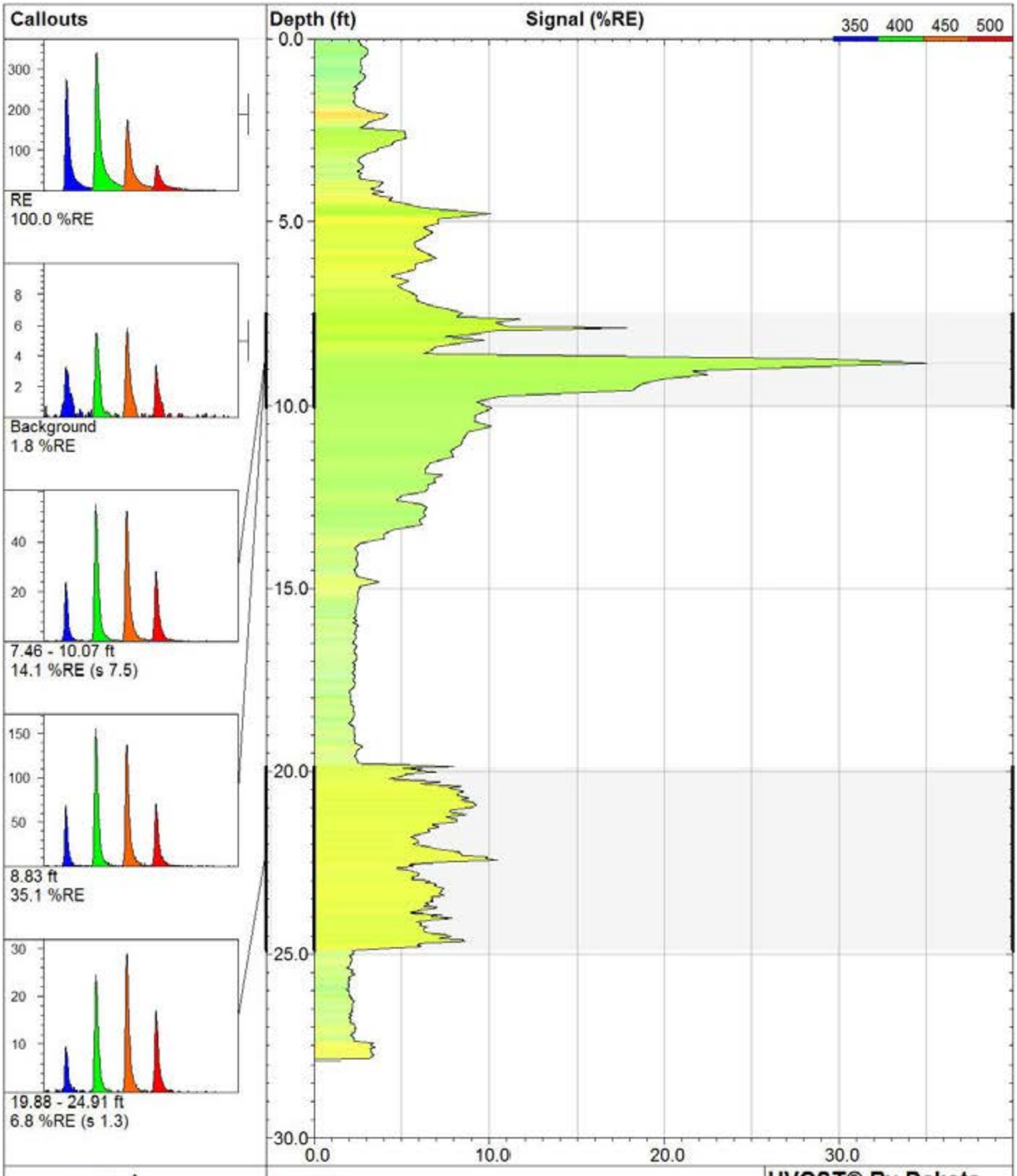
Site: **Former Romic Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **24.46 ft**
Client / Job: **Ninyo & Moore / 30316686**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **11.6 %RE @ 8.74 ft**
Operator / Unit: **Brett Baatrup / UVOST131**	*Elevation:* **Unavailable**	*Date & Time:* **2016-06-24 14:37 PDT**



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Site: **Former Romic Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **27.87 ft**
Client / Job: **Ninyo & Moore / 30316686**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **35.1 %RE @ 8.83 ft**
Operator / Unit: **Brett Baatrup / UVOST131**	*Elevation:* **Unavailable**	*Date & Time:* **2016-06-24 09:05 PDT**

APPENDIX C

PUMP TEST FIELD FORMS

27.07

Pump Test

Note low tide in Channel

Ninyo & Moore

Project Name/Site:	Ramos	Pumping Well: RW-2B	Flow Meter Used: Totalizer
Date:	7/31/16	Pump Depth: 40'	Pump Used: Grundfos 2"
Technician:	Hart Flowrate	Flow Rate in GPM: 2.0 gpm	Calibraion Date/Time:

Time:	~~RW-19B~~ (DTW in Feet)	~~RW-20B~~ (DTW in Feet)	~~RW-21B~~ (DTW in Feet)	~~GW-4~~ (DTW in Feet)	~~GW-5~~ (DTW in Feet)	~~GW-6~~ (DTW in Feet)	~~RW-2B~~ DTW (in Feet)
0945	176 Ht	1 gpm	using Bucket/Timer Calibration				
0950	"	2 gpm	using Sensus Totalizer	"	dial	1.2 measurement / 30 sec	
0955	176.55	2 gpm	"	"	dial	1 gal → 30 sec	
1000	176.55	2 gpm	"	"	dial	3 gal → 1 min	
1005	176.55	2 gpm	"	"	dial	2 gal → 57 sec	
1010	176.55	2 gpm	"	"	dial	2 gal → 60 sec	
1015	176.55	2 gpm	"	"	dial	2 gal → 55 sec	
1020	176.55	2 gpm	"	"	dial	2 gal → 55 sec	
1045	176.55	2 gpm	"	"	dial	2 gal → 60 sec	
1100	176.55	2 gpm	"	"	dial	2.5 gal → 60 sec	
1115	216.60	3 gpm	"	"	dial	3 gal → 60 sec	
1130	216.60	3 gpm	"	"	dial	3.0 gal → 62 sec	
1145	216.60	3 gpm	"	"	dial	3.0 gal → 63 sec	
1200	216.60	3 gpm	"	"	dial	3.0 gal → 62 sec	
1215	216.60	3 gpm	"	"	dial	3.0 gal → 60 sec	
1230	216.60	3 gpm	"	"	dial	3.0 gal → 62 sec	
1245	216.60	3 gpm	"	"	dial	3.0 gal → 62 sec	
1300	216.60	3 gpm	"	"	dial	3.0 gal → 63 sec	
1315	307.10	3.5 gpm	"	"	dial	3 gal → 60 sec	
1330	340.1	3.75	"	"	dial	3.75 → 60	
1345	340.1	3.75	"	"	dial	1 gal → 16 sec	
1400	340.1	3.75	"	"	dial	1 gal → 17 sec	
1415	340.1	3.75	"	"	dial	1 gal → 16 sec	
1430	340.1	3.75	"	"	dial	1 gal → 15 sec	
1445	340.1	3.75	"	"	dial	1 gal → 16 sec	
1500	340.1	3.75	"	"	dial	1 gal → 16 sec	
1515	400	3.75	"	"	dial	1 gal → 16 sec	

Pump Test

Ninyo & Moore

Project Name/Site:	Pomic 402643001	Pumping Well: RW-2B	TD = 42ft	Flow Meter Used:	
Date:	7 July 2016	Pump Depth: 40ft		Pump Used:	
Technician:	WDI FSM	Flow Rate in GPM:		Calibraion Date/Time:	

Time:	RW-19B (DTW in Feet)	RW-20B (DTW in Feet)	RW-21B (DTW in Feet)	OW-4 (DTW in Feet)	OW-5 (DTW in Feet)	OW-6 (DTW in Feet)	RW-2B DTW (in Feet)
Initial (0900)	7.12	7.10	7.44	6.63	6.89	6.94	~~6~~ 6.92
		Leakage → not able to complete					
		Stop attempt @ 1200					

8.85 initial DTW

Pump Test

* Depths measured @ PVC inside metal casing

Ninyo & Moore

Project Name/Site:	402643001 Ronic	Pumping Well: RW-4A	well depth: 20-13	Flow Meter Used:	
Date:	07/27/2016	Pump Depth:	depth to rock ~~8.85~~	Pump Used:	
Technician:	GDD & FSM	Flow Rate in GPM:		Calibraion Date/Time:	

Time:	RW-2A (DTW in Feet)	RW-29A (DTW in Feet)	OW-1 (DTW in Feet)	OW-2 (DTW in Feet)	OW-3 (DTW in Feet)	RW-4A	Comments
0915 (1st rdg)	7.78	8.09	7.49	9.48	free prod no rdg.	16.82	Visible stream on water
0930	7.76	8.09	7.51	9.35	" "	16.88	0.2 gpm
0945	7.76	8.10	7.56	9.24	no rdg.	17.23	
1000	7.76	8.10	7.52	9.15		17.81	
1015	7.78	8.09	7.54	9.05	No Read.	18.31	OW3 Product
1030	7.78	8.10	7.56	8.96	" "	18.31	too sticky
1045	7.78	8.09	7.58	8.85	" "	18.31	
1100	7.78	8.09	7.57	8.78	" "	18.05	
1115	7.79	8.07	~~7.93~~ 7.65	8.73	" "	19.21	
1130	7.78	8.07	7.61	8.79	" "	19.05	

Pump Test

Begin @ 0845

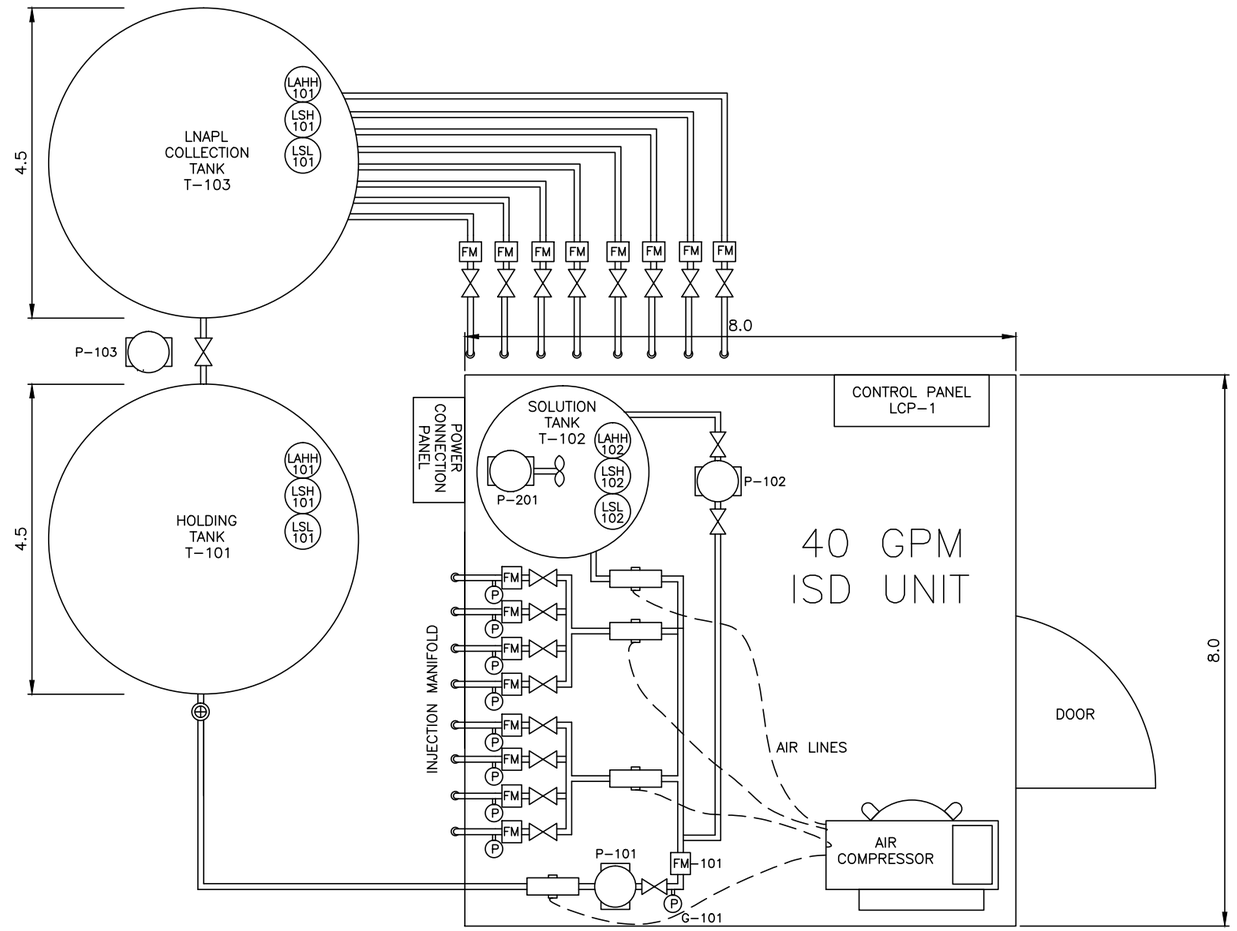
Ninyo & Moore

Project Name/Site:		Pumping Well: RW-2B	Flow Meter Used: totalizer
Date:	7/8/16	Pump Depth: 40 Ft	Pump Used:
Technician:	CLED, FSM	Flow Rate in GPM: 2 gal/min	Calibraion Date/Time:

Time:	RW-19B (DTW in Feet)	RW-20B (DTW in Feet)	RW-21B (DTW in Feet)	OW-4 (DTW in Feet)	OW-5 (DTW in Feet)	OW-6 (DTW in Feet)	RW-2B DTW (in Feet)
initial → 0800	7.21	7.13	7.48	6.71	6.96	6.96	7.01
0900	7.25	7.18	7.50	6.73	7.00	7.02	20.5
0915	7.25	7.18	7.51	6.79	7.01	7.03	21.35
0930	7.27	7.19	7.53	6.86	7.04	7.02	21.88
0945	7.28	7.19	7.56	7.00	7.04	7.04	22.37
1000	7.29	7.19	7.58	7.14	7.04	7.05	22.70
1015	7.29	7.20	7.61	7.33	7.05	7.06	22.94
1030	7.29	7.21	7.63	7.50	7.06	7.08	23.18
1045	7.31	7.21	7.64	7.67	7.06	7.06	23.31
			3 GAL / MIN				
~~1100~~							
1100	7.32	7.32	7.67	7.84	7.08	7.08	26.13
1115	7.34	7.24	7.69	8.00	7.09	7.08	~~27.82~~ 27.30
1130	7.34	7.25	7.71	8.19	7.09	7.09	27.90
1145	7.34	7.25	~~7.70~~	8.41	7.11	7.11	27.36
1200	7.29	7.27	7.80	8.47	7.13	7.11	28.35
1215	7.29	7.28	7.82	8.71	7.15	7.14	28.12
1230	7.26	7.29	~~7.84~~	9.13	7.17	7.14	27.70
1245	7.29	7.30	7.89	9.33	7.20	7.16	27.61
1300	7.31	7.31	7.91	9.45	7.21	7.14	27.52
		~~7.33~~					
			~~4~~ gal/min				
			~~7.99~~				
1315	7.33	7.31	7.94	9.59	7.23	7.17	325
1330	7.35	7.31	7.98	9.77	7.25	7.18	28.29
1345	7.35	7.32	7.99	9.90	7.27	7.19	27.6
1400	7.34	~~7.33~~ 7.33	8.02	10.07	7.29	7.24	27.44
1415	7.45	7.34	8.02	10.24	7.31	7.24	27.18
1430	7.39	7.34	8.03	10.39	7.32	7.27	27.18
1445	7.42	7.35	8.03	10.52	7.35	7.28	27.15
1500	7.43	7.33	8.04	10.64	7.36	7.28	27.41
1515	7.34	7.34	8.04	10.77	7.37	7.28	27.22

APPENDIX D

REMEDIATION EQUIPMENT ENCLOSURE



SCALE

0 1' 2' 3' 4' 5'

NOTE:

ACTUAL UNIT LAYOUT MAY DIFFER SLIGHTLY FROM THE LAYOUT SHOWN ABOVE.

EQUIPMENT REFERENCE TABLE	
DESCRIPTION	P&ID REF.
HOLDING TANK	T-101
SUBSTRATE SOLUTION TANK	T-102
MAIN INJECTION PUMP	P-101
SUBSTRATE METERING PUMP	P-102
SUBSTRATE MIXER PUMP	P-201
MAIN INJECTION TOTALIZER FLOWMETER	FM-101
MAIN INJECTION PRESSURE GAGE/SWITCH	G-101
TANK T-101 FLOAT CONTROLS	LSH-101
TANK T-102 FLOAT CONTROLS	LSH-102
PROGRAMMABLE LOGIC CONTROLLER	LCP-1

LAYOUT SYMBOL LEGEND	
DESCRIPTION	SYMBOL
BALL OR GATE VALVE	
AIR-ACTUATED BALL VALVE	
SOLENOID VALVE	
PRESSURE GAGE	P
PUMP	
LEVEL SWITCH - HIGH	LSH
LEVEL SWITCH - LOW	LSL
LEVEL ALARM - HIGH/HIGH	LAHH
LOGIC INPUT DECISION	YES
FLOW METER	FM

REVISION	DESCRIPTION	DATE	APPROVED

tec LLC

40 GPM ISD RECIRCULATION SYSTEM

EQUIPMENT LAYOUT DIAGRAM

DRAWN BY	DKL		DATE NOV 2010
DESIGNED BY	GJL		DRAWING NO. 2
CHECKED BY	BT		
APPROVED BY	BT		REVISION 0

H:/ACAD/ISD 10A-20A.DWG

MAIN SCREEN (1)

The touch screen controls all components of the ISD™ Model 20 and is used to program automatic operation. Various equipment components can also be manually controlled, but only for the equipment testing purposes. **Please note that in "Manual" mode, the equipment component will only run for one minute before shutting off automatically**.

The main screen contains five Equipment Blocks. The following list provides a brief description of each Equipment Block. Please refer to the diagram on the following page for reference.

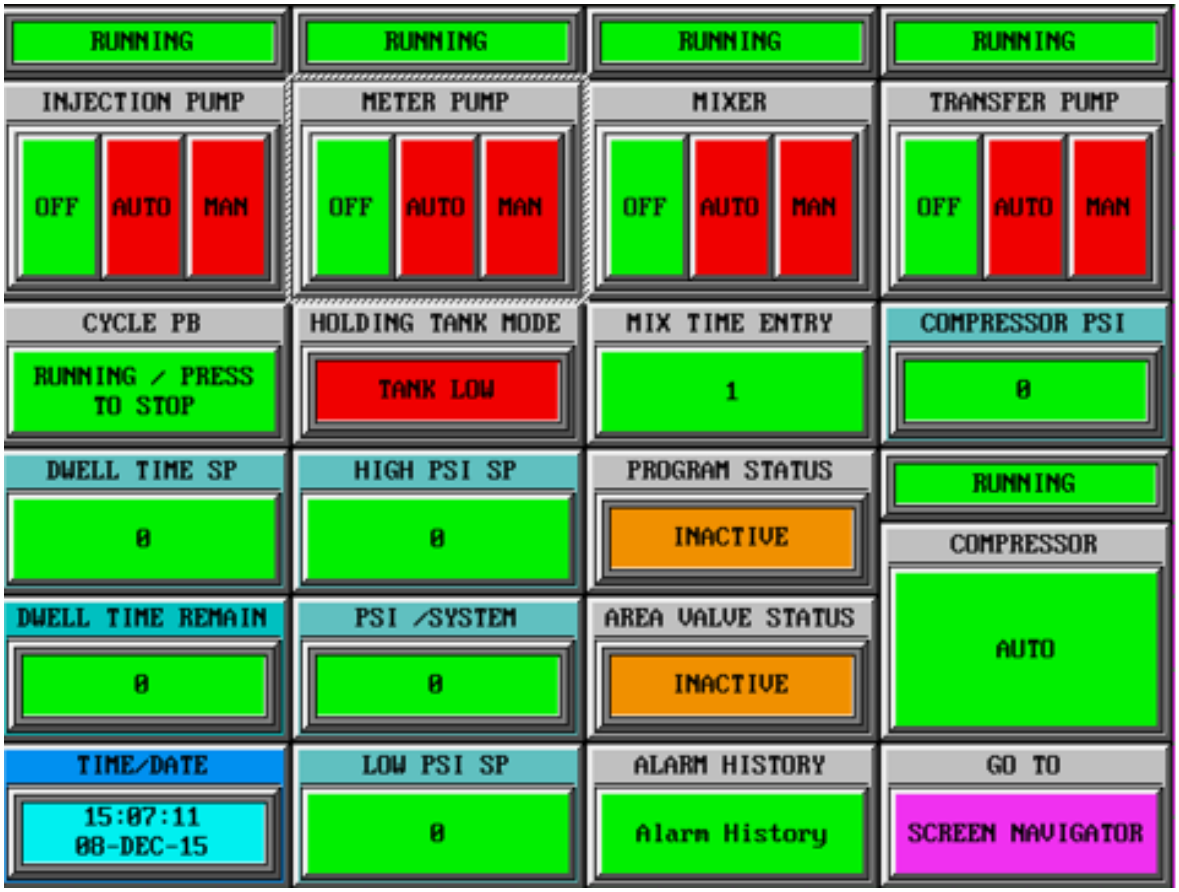
- **Injection Pump** – The Injection Pump transfers water from the Tank 2 and injects it through the Air Actuated Ball Valves Gallery 1 through 4 (SV1 thru SV4).
- **Transfer Pump** – The Transfer Pump Transfers water from Tank number 1 to Tank number 2. It is used when pretreating water with carbon.
- **Metering Pump** – The Metering Pump automatically injects CarBstrate on a continuous basis whenever the Injection Pump is running and the solution tank has sufficient water. When products in the solution tank are low, the tank will automatically refill and mix, during the fill cycle the metering pump will turn off. (This helps to keep the solution tank clean)
- **Mixer** – The Mixer mixes the CarBstrate (added to the tank manually) with water it is float actuated and timer controlled. The timer is on the Data Entry Screen.
- **Compressor** – The Air Compressor supplies air to the air-actuated ball valves. The compressor is a stand-alone unit and automatically shuts off when desired pressure is reached. Therefore, the compressor button should always be set to "Auto". The compressor has only two modes – Auto and Off.

Each system component has its own Equipment Block that displays the equipment name, includes three buttons ("Off", "Auto", and "Manual"), and a corresponding Indicator Banner that signals the current status of the equipment ("Running" or "Stopped"). Each equipment component can be set to "Off", "Auto", or "Manual". For example, to set the Injection Pump to "Auto", simply touch the "Auto" button on the screen. The activated button background will turn green, while the "Off" and "Manual" buttons on that Equipment Block remain red. When a system component is in operation, the Indicator Banner for that Equipment Block will display "Running" on a green background. When the equipment is not in operation, the Indicator Banner for that Equipment Block will display "Stopped" on a yellow background. **The ISD 20 Touch Panel allows you to view and monitor system data from a variety of operations, including:**

- Tank no. 2 (holding tank)
- Injection pump and compressor pressures.
- Current Time (military)
- Program Status (Injection Program #.)
- Area Valve Status (SV1 thru SV6)
- Alarm history

A picture of the Touch Screen with associated Equipment Blocks and Indicators is shown below:

Touch Screen Operation
ISD™ Model 20



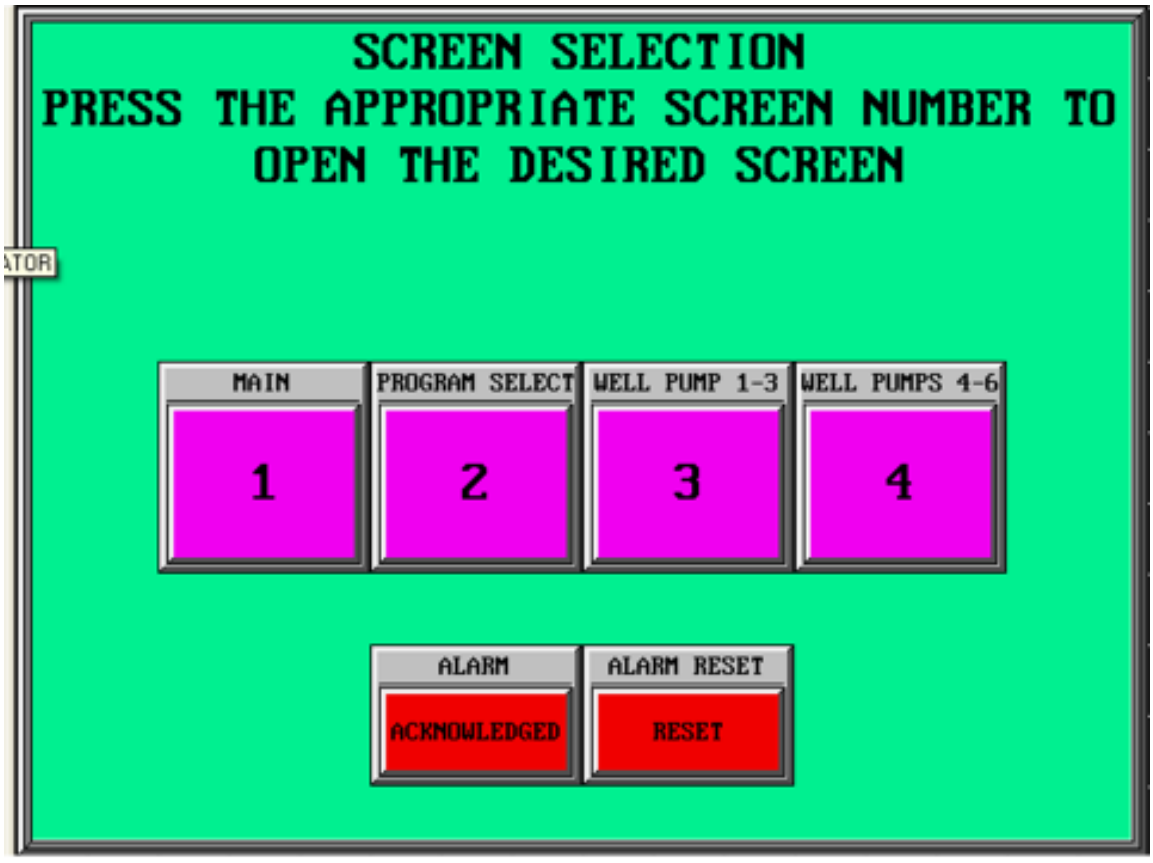
SCREEN NAVIGATOR SCREEN

The Screen Navigator is accessed by pressing the Screen Navigator button in the lower right corner of the Main screen. The Screen Navigator allows you to move through the various program screens. There are Four available screens to choose from:

- 1. Main
- 2. Program Selection
- 3. Well Pumps 1-3
- 4. Well Pumps 4-6

Press the appropriate button 1 thru 5 to view the desired screen. For example, to return to the Main screen, press button 1.
The Alarm Acknowledged and Reset buttons are found at the bottom of the screen.

A picture of the Screen Navigator is shown below.



PROGRAM SELECTION SCREEN (2)

The Program Selection screen allows you to set the run times for all four Gallery's. The ISD 20 unit contains four (4) Air Actuated Ball Valves, designated Gallery 1 through Gallery 4. The water injection time for each Ball Valve is programmed on the Program Selection screen. Each of the 4 available programs contains buttons to adjust the total water injection time for each valve SV1 through SV4. This allows you to perform a wide variety of injection schemes on any schedule, giving you maximum remediation flexibility. The total injection time for each Program 1 thru 4 is tabulated at the right of the screen.

Note: Each program follows the following sequence: SV1 is activated first, followed by SV2, SV3, and so on. These Solenoid Valves cannot be activated out of this sequence, meaning that SV1 will always open before SV2 as long as time is programmed for SV1.

To set the injection time for SV1 through SV4:

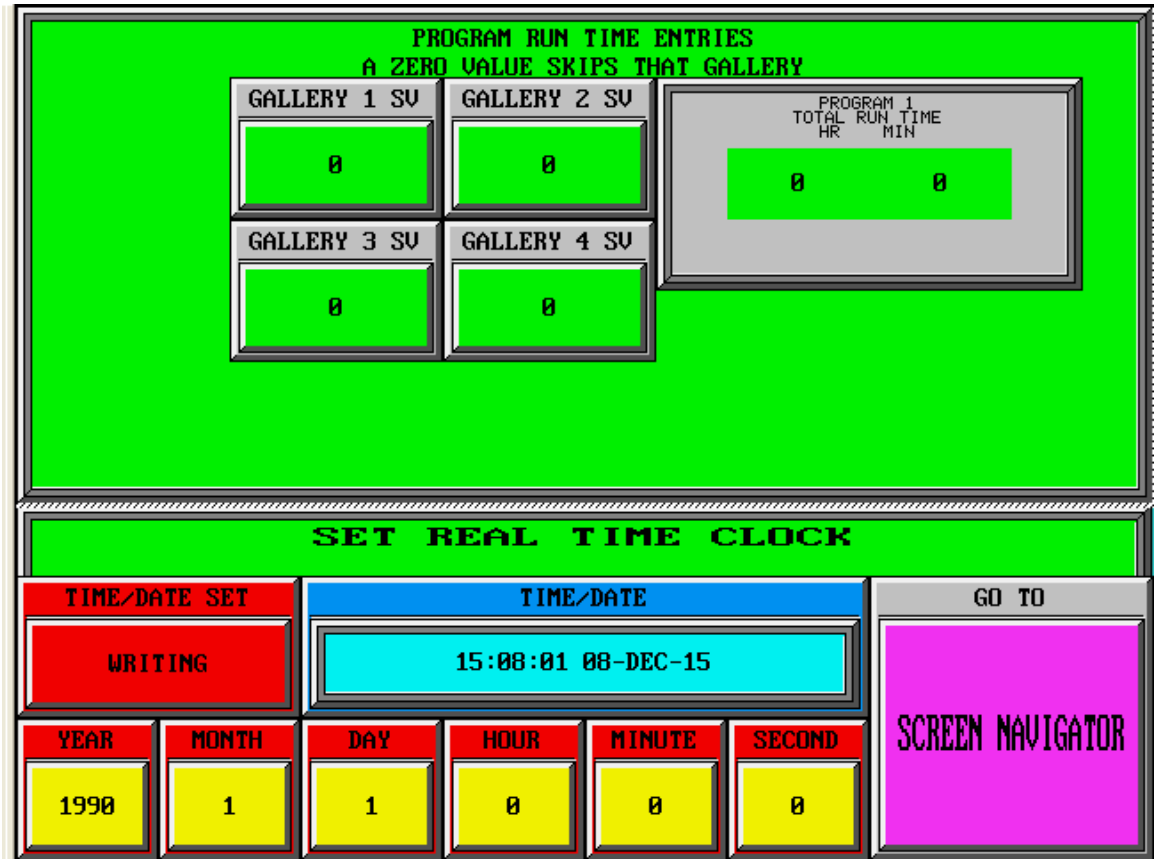
1. Select the desired valve SV1 through SV4 under the appropriate program.
2. Type in the desired injection time for each valve, from 1 to 120 minutes, and press the Enter button. A zero (0) value indicates that this valve should not be opened, and skips on to the next valve.
3. Repeat this process until you have set up your desired program.
4. Press the Screen Navigator Button to return to the Screen Navigator.

Note: Once your injection times for each valve have been programed you will need to set a Dwell Time for the program. This is done on the Main Screen. The Dwell Time is the time that the system is off before it Cycles back through your preset run times for each Ball Valve.

The current time can be set at the bottom of this screen. Once you have set the current date and time in the buttons below press the Wright button to enter the new time into the PLC.

A picture of the Program Selection Screen is shown below.

Touch Screen Operation
ISD™ Model 20



WELL PUMPS PROGRAM SCREENS (3 & 4)

Each well pump has its own Equipment Block that includes three buttons (“Off”, “Auto”, and “Manual”), and a corresponding Indicator Banner that signals the current status of the equipment (“Running” or “Stopped”). Each well pump can be set to “Off”, “Auto”, or “Manual”. For example, to set the Well Pump 1 to “Auto”, simply touch the “Auto” button on the screen. The activated button background will turn green, while the “Off” and “Manual” buttons on that Equipment Block remain red. When a system component is in operation, the Indicator Banner for that Equipment Block will display “Running” on a green background. When the equipment is not in operation, the Indicator Banner for that Equipment Block will display “Stopped” on a yellow background. In “Auto” well pumps are Amperage controlled, with a amp reader above each well pump motor starter inside of the Main Control Panel. The amp readers send a signal to the PLC to turn the pump off when there is not sufficient amperage (pump is not pumping water).

Below each Well Pump Blocks (“Off”, “Auto”, and “Manual”), is a WP Dwell entry and an WP Dwell Timer. To set the Dwell times press the WP Dwell Entry and program in the desired time. The WP Dwell Timer will be a countdown of the Dwell Time remaining before the pump will restart.

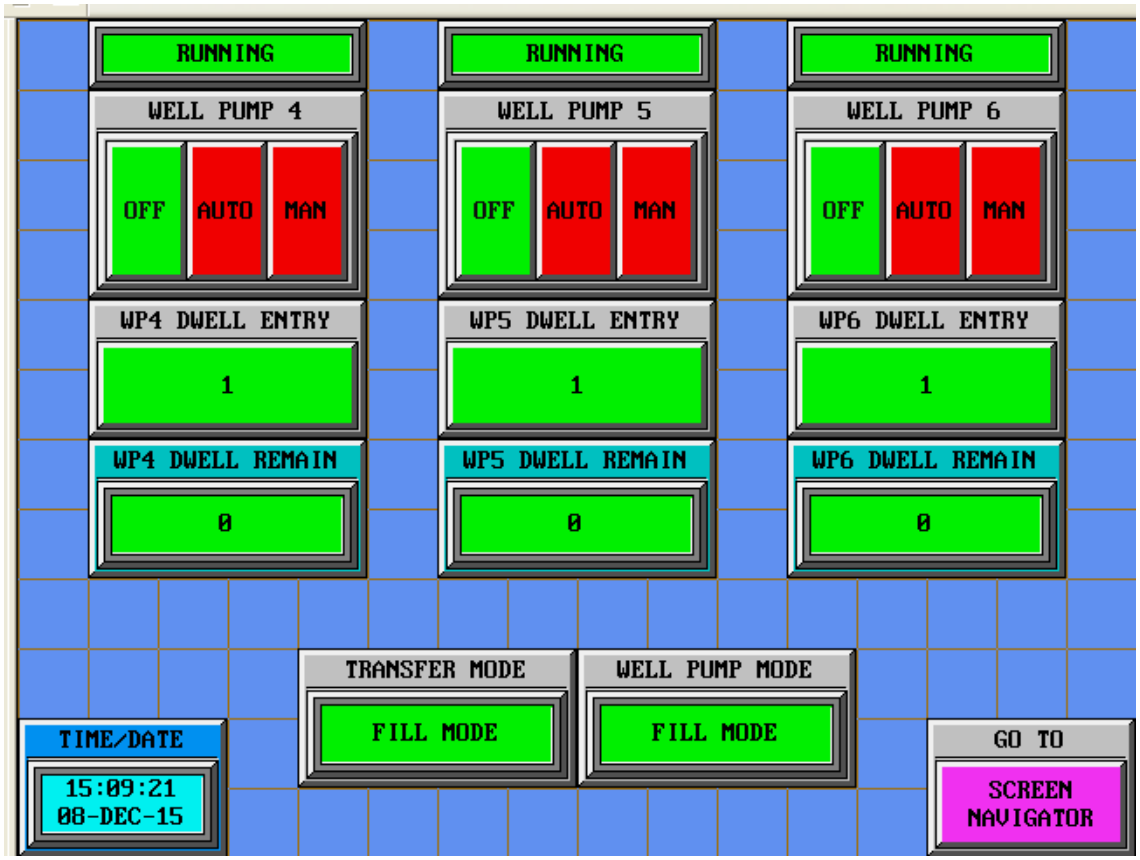
The well pumps are also controlled by floats in TANK 1 see banner Well Pump Mode on the Screen below. Tank Full (on a yellow banner means the tank is full and the pumps will not run. Fill Mode (on a green banner) means the pumps can Tank 1.

Note: If you are not using GAC for pretreatment you will need to place the Tank 1 High and High/High floats in Tank 2 and the Tank 2 Low float also in Tank 2. IF USING ONLY ONE TANK IT IS CALLED TANK 2.

Touch the Screen Navigator button to return to the Screen Navigator screen.

A picture of the Well Pumps Program Screens is shown below.

Touch Screen Operation
ISD™ Model 20



ALARM BANNERS

The ISD 20™ unit has several system alarms the four main alarms are stated below.

1. Injection Pump Low Pressure
2. XFR Pump Low Pressure
3. Tank 1 high/high alarm
4. Tank 2 high/high alarm

An Alarm Banner is triggered when a major system component experiences a malfunction. These malfunctions can be the result of improper system setup, improper system operation, or a component failure. When an alarm is triggered, perform the following activities:

1. Acknowledge the alarm by pressing the Alarm Acknowledge button the bottom of the Main screen.
2. Read the banner at bottom of the Main screen to find out what alarm was triggered.
3. Refer to the Troubleshooting section of this manual to identify and correct the problem.
4. Press the Alarm Reset button to reset the alarm and restart the system.
5. Remain at the site to ensure that the problem has been corrected and the system is operating normally. If the problem has not been corrected, the same alarm banner will reappear after a few minutes.
6. The Alarm history located at the bottom of the Main Screen is a useful tool to track the alarm conditions.

OPERATION AND MAINTENANCE MANUAL
ISD MODEL 20 (20 ISD) Unit 107
ETEC LLC.

1.0 INTRODUCTION

This manual provides instructions for installing, operating, and maintaining the ISD™ Model 20 In situ Delivery System (ISD™) system. ISD™ is designed for use with ETEC's advanced biological products to accomplish rapid in situ biological cleanup of chlorinated solvents.

If you need additional assistance with your ISD™, please contact:

Greg Landers
Operations Manager
(971) 222-3903

ETEC LLC.
6635 3830 S Truman St. Bldg. 12
Washougal, Washington 98671
www.etecllc.com

2.0 INITIAL HOOKUP

2.1 Equipment and Site Requirements

The following items need to be provided by the client:

1. Level pad for water tank and ISD™
2. Power source: 220 Volt, 60 Amp, Single-Phase
3. Electrician for power connections.
4. Plumbing from all injection and extraction wells.
5. Cold weather protection for all above ground piping and holding tanks.

Set ISD™ 20 with the injection manifold facing the stubbed up piping going to the injection and extraction wells. The water tank receiving extracted groundwater is called the "Tank 1." TIf using GAC pretreatment of groundwater, the water tank that has pretreated ground water is called "Tank 2." Refer to the picture on the right for tank placement.

Note: The ISD™ 20 Can use one or two holding tanks. If pretreatment is desired the system will have two tanks. The picture above is an ISD that is not pretreating the extracted ground water.

2.2 Plumbing

Naming Convention: All connections described below are described from the position of a person facing the injection fittings on the side of ISD™ (to the left of the door).

Note: Install ball valves at all of the tank connections. Water should be free of debris.

2.2.1 Tank 1 Connections

Install the provided bulk-head fittings into tank 1. Tank 1 will have one 1½-inch connection and six 1-inch connections.

1. Tank 1 inlet 6 each (from extraction wells): locate at top of tank.
2. Tank 1 outlet 1 each (1½-inch): locate 1-foot from bottom of the tank

2.2.2 Tank 2 Connections (only with GAC Pretreatment)

1. Tank 2 inlet 1 each (from Tank 1 through pretreatment GAC): locate at top of tank.
2. Tank 2 outlet 1 each (1½-inch): locate 1-foot from bottom of the tank

.

Note: If Pretreatment is not required you will only need to hook up the Tank 2 outlet and the Tank 1 inlets.

2.2.3 ISD™ Inlet Connections

There is one inlet connection from the tank 1 and one from tank 2. They area 1½-inch diameter PVC connection fittings.

1. Connect the 1 ½-inch port on Tank 1 to the suction side of the ETEC supplied transfer pump. Remember to install a ball valve between Tank 1 and the transfer pump to manually shut off water (this will transfer ground water from tank 1 through GAC to tank 2).
2. Install the supplied 1 ½-inch Y-strainer between the ball valve and the transfer pump. Connect the 1 ½-inch port on Tank 2 to the inlet port on the side of the ISD™. Remember to install a ball valve between Tank 2 and the inlet connection on the side of the ISD™ to manually shut off water. (This line will be used for water supply to the ISD™.
3. Install the supplied 1 ½-inch Y-strainer between the ball valve and the ISD™.

2.2.4 ISD ™ Extraction and Transfer Connections

There are six 1-inch extraction pump connections on tank 1and one 1-inch transfer connection on tank 2. (The transfer will need to be plumbed through the GAC vessel)

1. Connect the six extraction supply lines to the six ports located on tank 1. The lines should travel through the ETEC supplied flow meters and gate valves. The gate valves will be used to adjust the water flow coming from the well pumps.
2. Connect the outlet side of the transfer pump to the 1-inch inlet port on the top of tank 2.
3. The picture on the right shows the extraction hook up on a single tank (no Transfer Pump)

2.2.5 ISD ™ Injection Connections

The injection manifold consists of four Galleries (ball valves) split into five independent injection lines, except for Gallery #4 with two injection lines. Thus, there are 17 injection lines for connection to your injection wells/trenches.

1. Connect the desired number of injection lines to your injection wells/trenches. The top five lines are gallery #1, the middle five lines are gallery #2 and the bottom five lines are gallery #3. Gallery #4 can be used also if needed.

This injection line numbering coincides with the control panel functions, and consistent numbering is critical to proper system operation.

Note: Make sure to label each injection line on the correct flow meter inside the ISD™.

2.3 Level-Control Floats

There are three level control floats for the tank 1 and three level control floats for tank 2. The floats will need to be mounted to a piece of PVC pipe using wire ties (DO NOT USE TAPE) within the tank to eliminate tangling problems. After placing the float, leave the wire leads draped out of the tank access hole for easy electrical connection (see next section).

1. Mount the Tank 1 low-level float (pump down) so that it trips when the water level is approximately 2 feet from the bottom of the tank. (This float will shut off the transfer pump if the water level goes low).
2. Allow enough slack in the float to sufficiently fill the Tank 1 before the float goes to the up position (2 to 3 feet of travel).
3. Mount the Tank 1 high-level float (pump up) so that it trips when the water level is approximately 2 feet from the top of the tank. (This float will shut off the well pumps when Tank 1 is full)
4. Mount the Tank 1 high/high-level float (pump up) so that it trips when the water level is approximately 1 foot from the top of the tank. (This float will cause a system alarm if the tank fills that high)
5. Mount the Tank 2 low-level float (pump down) so that it trips when the water level is approximately 2 feet from the bottom of the tank. (This float will shut off the injection pump if the water level goes low).
6. Mount the Tank 2 high-level float (pump up) so that it trips when the water level is approximately 2 feet from the top of the tank. (This float will shut off the transfer pump when Tank 2 is full)
7. Mount the Tank 2 high/high-level float (pump up) so that it trips when the water level is approximately 1 foot from the top of the tank. (This float will cause a system alarm if the tank fills that high)

Electrical

Note: All electrical connections should be performed by a qualified electrician. For float connection, electrician may choose to install a junction box on the holding tank to provide extended wiring reach independent of supplied float wire length.

2.4.1 ISD ™ Breaker Panel Wiring

1. Make sure control panel is in the "Off" position.
2. Wire main breaker panel (located on the side of the unit) 240-Volt, 60-Amp, Single-Phase power supply.

2.4.2 ISD ™ Float Wiring

1. Make sure control panel is in the "Off" position.
2. Uncover junction box (labeled Floats) located on the side of unit.
3. Wire the Tank 1 low-level float (pump down) to its labeled position in the junction box.
4. Wire the Tank1 high-level and high/high floats (pump up) to their labeled positions in the junction box.
5. Wire the Tank 2 low-level float (pump down) to its labeled position in the junction box,
6. Wire the Tank 2 high-level and high/high floats (pump up) to their labeled positions in the junction box.

2.4.3 ISD ™ Well Pump Wiring

1. Make sure control panel is in the "Off" position.
2. Uncover junction box (Labeled Well Pumps) located on the side of unit.
3. Wire well pumps to the labeled terminal blocks.
4. This well pump numbering coincides with the control panel functions, and consistent numbering is critical to proper system operation.

3.0 PRE-STARTUP

Note: Do not start the system until all plumbing and electrical hook-ups are completed. The holding tank should be full of water.

1. Push in the Emergency Stop button, and turn the control panel main disconnect to the "On" position. **Caution: test incoming power to insure the voltage is correct.**
2. Flip the 60 an 30 Amp breakers (located on the side of unit) to the on position.
3. Pull out the Emergency Stop button
4. **Caution: test incoming power to insure the voltage is correct.**
5. Turn all Touch Screen Manual-Off-Auto buttons (MOA buttons) to the "Off" position
6. Turn the compressor switch to "Auto." Also turn the manual on/off switch located on the compressor itself to the "Auto" position.
7. Let compressor pressure build to 90 psi before going to next step.
8. Turn Well Pump no. 1 to Auto and set a dwell time for WP1 on the Data Entry Screen.
9. Follow the above step for all well pumps that are wired to the unit.
10. Turn the Transfer Pump to "AUTO". **Note: skip this step if you are only using one tank.**
11. Wait until Tank 2 Banner on the Main Screen says "Level Ok" before proceeding to the next step.
12. Ensure the injection gate valves are in the open position. (Located next to the Gallery flow meters) They will need to be adjusted at start up.

4.0 CONTROL PANEL OPERATION

The ISD™ Model 20 meters CarBstrate in the liquid form into the injected water. The integrated Touch Screen controls all equipment components and functions for the ISD™ system. Please refer to the Touch Screen Operation section for detailed instructions on how to program your injections.

Attention: The Touch Screen Operation section (Appendix B) must be read and understood before system start-up is initiated. FAILURE TO DO SO CAN RESULT IN SIGNIFICANT EQUIPMENT DAMAGE.

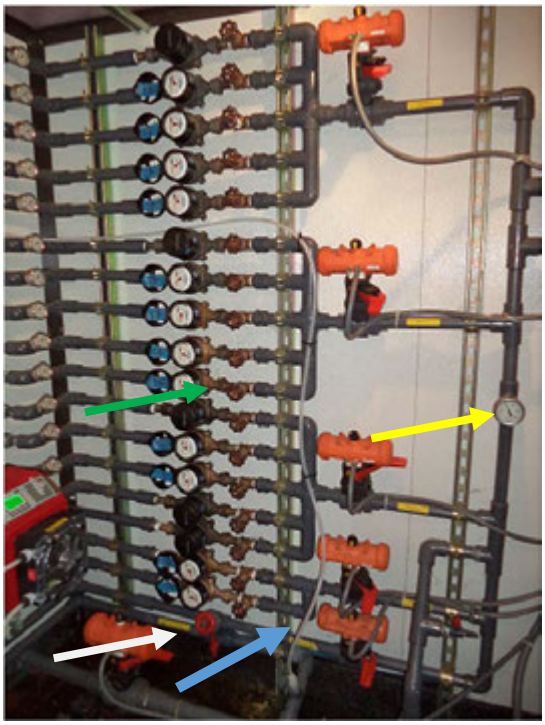
Note: Do not perform any startup operations until all plumbing, electrical hook-ups, and pre-startup procedures are completed. Tank(s) should be full of water.

Programmed injection times should be set for water injection prior to start-up. Please see Touch Screen Operation section (Appendix B) for details. When Touch Screen Cycle Start Button (located on the Main Screen) is pressed the system will start running based the programed Gallery run times. : Gallery injection times should be adjusted according to site conditions, including inlet flow rate, desired water injection rate, etc. In general, water injection time should be maximized.

4.1 Injection System Start Up

1. Set gallery run times on the Program Screen (i,e, the amount of time the gallery will be active/injecting).
2. Set system Dwell time on the Main Screen(i.e. the time that the system will not inject water after it has run a cycle).
3. Set high and low pressure set points on the Main Screen. Low pressure should be set at 10 psi and High pressure should be set at 60psi. (**High pressure is not used on the ISD 20)**

4. Adjust the injection pump button to “Auto”. The ISD™ will start injecting into Gallery 1.
5. Adjust the Solution Fill Gate Valve on the outlet side of the solution fill air actuated ball valve (see picture on right white arrow) so that system pressure does not drop below 20 psi (see picture on right yellow arrow) while the solution tank is filling.
6. The solution tank fills automatically every time the solution tank low float goes low.
7. Check each of the individual Pressure Gages. If reading exceeds 20 psi into any area, adjust the area gate valve to relieve flow and pressure to the that area. (see picture at right green arrow).



4.2 Solution Tank, Metering Pump and Mixer Start Up

The ISD™ Model 20 is capable of metering CarBstrate in the liquid form. This is very helpful for evenly distributing the substrate into the subsurface.

Up to 200 lbs of CarBstrate can be added to the solution tank at one time. The solution tank will automatically refill and rinse the tank after the CarbStrate has been injected.
To add CarBstrate to the tank follow the steps below:

1. Shut off the mixer and metering pump at the control panel.
2. Lift the lid off of the tank.
3. The CarBstrate should be added when the solution tank is no more than half full of water.
4. Add the desired amount of CarBstrate. Replace the lid.
5. Open the solution Fill ball valve (**see picture above blue arrow**) and fill the solution tank to the high float mark.
6. Turn on the mixer in Manual mix mode until all the CarBstrate is dissolved.
7. Set the metering pump to “Auto” on the touch screen.
8. Adjust the speed GPH (gallons per hour) on the metering pump to the desired settings.
9. GPH can be verified by using the site tube located to the left of the metering pump. (see picture at right)

5.0 SHUT DOWN

For extended shut down during freezing weather or before shipment of the Model 20 ISD, all CarBstrate will need to be emptied from the solution tank also all water lines will need to be cleared of water.

1. Hook compressed air line to the Injection Line (maximum 50 psi).
2. Manually open one of the gallery ball valves.
3. Manually open Injection Ball Valve located on the Injection Line.
4. Run for approximately 20 seconds, or until all water is discharged from the gallery ball valves.

6.0 ROUTINE MAINTENANCE

The Model 20 ISD requires a minimal level of routine maintenance.

1. Clean the foam air filter located on the side of the compressor.
2. Check all compressed air lines for leaks.
3. Change oil in air compressor every 6 months.
4. Lubricate door hinges on unit every 6 months.
5. Lubricate all louver hinge assemblies every 6 months.
6. Check all pipe and hose fittings every six months to ensure leak-free operation.
7. Keep interior of unit clean and free of debris that could damage equipment.

7.0 TROUBLESHOOTING

Problem	**Probable Cause**	**Solution**
System will not start	• Main breaker switch off • Alarm shut down • Cycle On Off is off • Panel MOA switches not in Auto • Emergency stop button pressed	• Turn breaker on • Fix alarm condition • Set To On • Turn switches to Auto • Pull out stop button
Injection pump high water pressure alarm	• High pressure switch adjusted incorrectly • Plugged injection line • Defective gallery ball valve	• Adjust switch to alarm at 80 psi • Clean or replace line • Clean or replace valve
Injection pump low water pressure alarm	• Ball valve at tank outlet not open • Inlet line to injection pump leaking • Discharge line leaking • Air pressure not set to 90 psi • Pump clogged	• Open valve and prime pump • Repair line and prime pump • Repair lines and prime pump • Adjust compressor regulator 90 psi • Clean out pump impellers
Metering pump is not pumping product	• Metering pump is off • MOA switch in Off • Suction Line is Clogged	• Turn pump on • Turn MOA switch) to Auto • Clean Suction Line
Transfer pump high water pressure alarm	• High pressure switch adjusted incorrectly • Plugged injection line • Defective gallery ball valve	• Adjust switch to alarm at 80 psi • Clean or replace line • Clean or replace valve
Transfer pump low water pressure alarm	• Ball valve at tank outlet not open • Inlet line to injection pump leaking • Discharge line leaking • Air pressure not set to 90 psi • Pump clogged	• Open valve and prime pump • Repair line and prime pump • Repair lines and prime pump • Adjust compressor regulator 90 psi • Clean out pump impellers
Metering Pump is Pumping to much Product	• Improper pump setting	Adjust pump settings (GPH)

Cycle Set but injection pump will not start	• Injection pump HOA not in Auto • Alarm condition enabled • Defective pump • Water Level low in Tank 2	• Turn switch to Auto • Fix alarm condition • Replace pump • Wait until level is ok
air compressor will not start	• Air compressor HOA switch not in Auto • Air compressor manual switch is not in Auto • Alarm condition enabled • Defective air compressor	• Turn HOA switch to Auto • Turn switch to Auto • Fix alarm condition • Troubleshoot air compressor
	•	•

OPERATION AND MAINTENANCE MANUAL
ISD™ MODEL 20-AUTOMATIC (40)
ETEC, LLC

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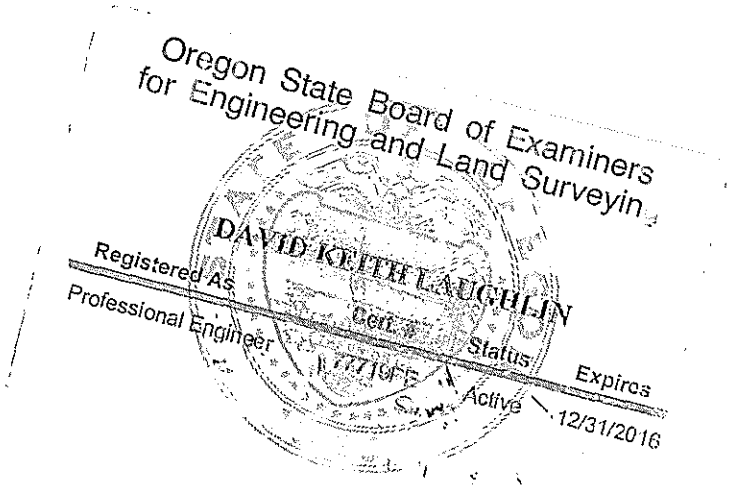

Board of Licensure for Professional Engineers & Professional Surveyors

This is to certify that

David K. Laughlin

has complied with all requirements of the Board including the Professional Development Program and is duly licensed as a Professional Engineer and is hereby authorized to practice as such in the State of New Mexico until 12/31/2016.

Signature

18606

License No.

Paul Brasher, PE
Board Chair

John T. Romero Sr., PE
Board Secretary

DAVID LAUGHLIN, P.E

OREGON PE LICENSURE : 77719PE

NEW MEXICO PE LICENSURE : 18606

APPENDIX E

CARBSTRATE™ MATERIAL SAFETY DATA SHEET

3830 S Truman Rd. Bldg. 12
Washougal, WA 98671
(971) 222-3903 Fax
www.etecllc.com

Safety Data Sheet

Revision Date: 05/12/15

Section 1: Product and Company Identification

Product Name: **CarBstrate ™**
MSDS Number: Not Assigned
Chemical Name: Proprietary
Chemical Family: Substrate Mixture

Recommended Use: Anaerobic bioremediation product
Restrictions on Use: No Data

Company: ETEC, LLC
3830 S Truman Rd. Bldg. 12
Washougal, WA 98671
USA

Telephone: (971) 222-3616

Emergency Telephone: (800) 535-5053
Medical Emergencies: (800) 301-7976
U.S. Coast Guard National Response Center: (800) 424-8802

Section 2: GHS Hazards Identification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Skin Irritant	Category 2
Eye Irritant	Category 2
Specific Target Organ Toxicity - Single Exposure (Respiratory system)	Category 3

Label Elements:

Signal Word: Warning

Hazard Statements:

Causes skin irritation.
Causes eye irritation.
May cause respiratory irritation.

Precautionary Statements:

Avoid breathing dust/ fume/ gas/ mist/ vapors/ spray.
Wash skin thoroughly after handling.
Use only outdoors or in a well-ventilated area.
Wear protective gloves/ eye protection/ face protection.
IF ON SKIN: Wash with plenty of soap and water.
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Call a POISON CENTER or doctor/ physician if you feel unwell.
Specific treatment (see supplemental first aid instructions on this label).
If skin irritation occurs: Get medical advice/ attention.
If eye irritation persists: Get medical advice/ attention.
Take off contaminated clothing and wash before reuse.
Store in a well-ventilated place. Keep container tightly closed.
Store locked up.
Dispose of contents/ container to an approved waste disposal plant.

Hazards not otherwise classified (HNOC) or not covered by GHS - none

Section 3: Composition/Information on Ingredients

Ingredients as defined by 29 CFR 1910.1200:

Chemical Ingredients:	CAS Number:	Percent Range:
Trade Secret	-	~20%

The specific chemical identity and/or exact percentage of the composition has been withheld as Trade Secret in accordance with paragraph (i) of §1910.1200.

Section 4: First Aid Measures

Description of first aid measures:

Inhalation: Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, give artificial respiration. Call a poison center or doctor/physician if you feel unwell.

Skin Contact: Wash with plenty of soap and water. Take off contaminated clothing and wash before reuse. If skin irritation occurs: Get medical advice/attention.

Eye Contact: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.

Ingestion: Never give anything by mouth to an unconscious person. Rinse mouth with water.

Most important symptoms and effects, both acute and delayed: See sections 2 and/or 11.

Indication of any immediate medical attention and special treatment needed: No data available.

Section 5: Fire Fighting Measures

Suitable Extinguishing Media: Use any means suitable for extinguishing surrounding fire.

Unsuitable Extinguishing Media: No known information.

Specific Hazards Arising from the chemical/substance: May decompose upon heating to produce corrosive and/or toxic fumes.

Hazardous Combustion Products: Nitrogen oxides, phosphorous oxides, ammonia.

Protective Equipment and Precautions for Fire-Fighters: As in any fire, wear self-contained breathing apparatus and full protective gear.

Section 6: Accidental Release Measures

Personal precautions, protective equipment and emergency procedures: Ensure adequate ventilation. Use personal protective equipment. Avoid dust formation. Do not breathe dust/fume/gas/mist/vapors/spray.

Environmental Precautions: Do not release to the environment. See section 12 for further environmental data.

Methods for Containment/Cleaning Up: Avoid dust formation. Pick up and transfer to properly labeled containers. Ventilate area and wash spill site after material pickup is complete.

Section 7: Handling and Storage

Precautions for Safe Handling: Avoid breathing dust. Use only outdoors or in a well-ventilated area. Wash thoroughly after handling. Keep out of reach of children. Handle in accordance with good industrial hygiene and safety practice.

Conditions for safe storage, including any incompatibilities:

Storage: Store locked up. Keep in tightly closed container, store in a cool, dry, ventilated place.

Section 8: Exposure Controls/Personal Protection

Exposure Limits: There are no OSHA PEL's, NIOSH REL's, or ACGIH TLV's applicable to this material.

Engineering Controls: Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment:

Eye Protection: Wear appropriate eye protection/face protection.

Hand Protection: Wear appropriate protective gloves.

Skin and Body Protection: Wear appropriate protective clothing to prevent skin exposure. Take off contaminated clothing and wash before reuse.

Respiratory Protection: Use only in a well-ventilated area. Avoid breathing dust. Wear appropriate NIOSH approved respirator if exposure limits are exceeded or irritation occurs.

Hygiene Measures: Wash thoroughly after handling. Handle in accordance with good industrial hygiene and safety practice.

Section 9: Physical and Chemical Properties

Appearance/Physical State:	Crystals
Color:	White to Yellow
Odor:	Not Available
Odor Threshold:	Not Available
pH:	Not Applicable
Melting/Freezing Point:	Not Available
Initial Boiling Point:	Not Available
Flash Point:	Not Available
Evaporation Rate:	Not Applicable
Flammability (solid, gas):	Not Available
Lower Explosive Limit:	Not Available
Upper Explosive Limit:	Not Available
Vapor Pressure:	Not Available
Vapor Density:	Not Applicable
Relative Density:	1.00
Solubility:	Completely soluble in water
Partition Coefficient:	Not Available
Autoignition Temperature:	Not Available
Decomposition Temperature:	Not Available

Section 10: Stability and Reactivity

Reactivity: No information available.

Stability: Stable under ordinary conditions of use and storage.

Possibility of hazardous reactions: No information available.

Conditions to Avoid: Extremes in temperature and direct sunlight.

Incompatible Materials: Strong oxidizing agents, strong acids, strong bases, Magnesium.

Hazardous Decomposition Products: Other decomposition products - No data available. In case of fire: see section 5.

Hazardous Polymerization: Will not occur.

Section 11: Toxicological Information

Information on Likely Routes of Exposure:

Inhalation: May cause respiratory irritation if inhaled.
Ingestion: No information available.
Skin Contact: Causes skin irritation.
Eye Contact: Causes eye irritation.

Toxicity Data:

Chemical Name	LD50 ORAL	LD50 DERMAL	LC50 INHALATION
Trade Secret	6500 mg/kg (Rat)	7950 mg/kg (Rabbit)	No data

Symptoms: No information available.

Delayed and Immediate Effects, Chronic Effects from Short and Long Term Exposure:

Sensitization: No information available.
Mutagenic Effects: No information available.
Reproductive Toxicity: No information available.
STOT – Single Exposure: Respiratory system.
STOT – Repeated Exposure: No information available.
Aspiration Hazard: No information available.
Chronic Exposure: No information available.
Aggravation of Pre-existing Conditions: Asthma

Carcinogenicity:

Component	CAS	NTP	IARC	OSHA
Trade Secret	N/A	Not listed	Not listed	Not listed

Additional Information: To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Section 12: Ecological Information

Ecotoxicity:

This product is safe for the environment at the concentrations predicted under normal use conditions.

Persistance and Degradability: No information available.

Bioaccumulative Potential: No information available.

Mobility in Soil: No information available.

Other Adverse Effects: No information available.

Section 13: Disposal Considerations

Dispose of contents/container in accordance with all applicable local, state and federal regulations.

Section 14: Transport Information

For Transportation Emergencies Involving This Material, Call:
ChemTrec 1-800-424-9300 Company Code: E419

DOT (LAND): Not regulated.

Section 15: Regulatory Information

SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 311/312 Hazard Categories:

Acute Health Hazard	Yes
Chronic Health Hazard	No
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

SARA 313: The Trade Secret component is subject to reporting levels (>1.0%) established by SARA Title III, Section 313:

State Right-to-Know:

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Trade Secret	-	X	X	-	-

TSCA: Not Applicable

California Prop. 65 Components: This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

Section 16: Other Information

NFPA Rating:

Health Hazard:	2
Fire:	0
Reactivity Hazard:	1

Legend:

ACGIH: American Conference of Governmental & Industrial Hygienists
CAS: Chemical Abstract Service
CFR: Code of Federal Regulations
DOT: Department of Transportation
DSL/NDSL: Domestic Substances List/Non-Domestic Substances List
IARC: International Agency for the Research of Cancer
IATA: International Air Traffic Association
ICAO: International Civil Aviation Organization
IMDG: International Maritime Dangerous Goods

IMO: International Maritime Organizations
NFPA: National Fire Protection Association Health, Flammability & Reactivity; Hazard Scale 0 =minimal/none 4= significant
NTP: National Toxicology Program
OSHA: Occupational Safety & Health Administration
PEL: Permissible Exposure Limits
RCRA: Resource Conservation & Recovery Act
RQ: Reportable Quantity
RTK: Right-To-Know
SARA: Superfund Amendments & Reauthorization Act
STEL: Short Term Exposure Limit
TLV: Threshold Limit Value
TSCA: Toxic Substances Control Act
TWA: Time Weighted Average
TCLP: Toxicity Characteristic Leaching Procedure
VOC: Volatile Organic Compounds

Disclaimer: The information contained in this SDS is presented in good faith and believed to be accurate based on the information provided. The SDS does not purport to be all inclusive, and shall be used only as a guide. While ETEC, LLC believes that the data contained herein comply with 29 CFR 1910.1200, they are not to be taken as a warranty or representation for which ETEC, LLC assumes legal responsibility. ETEC, LLC shall not be held liable or accountable for any loss or damage associated with the use of this material and information. The recommended industrial hygiene and safe use, handling, storage, and disposal procedures are believed to be generally applicable. However, since the use, handling, storage, and disposal are beyond ETEC, LLC control, it is the responsibility of the user both to determine safe conditions for use of this product and to assume liability of loss, damage, or expense arising out of the material's improper use.