Proactive by Design

STATUS REPORT
(April 2, 2020 through April 23, 2021)
CHARIHO REGIONAL MIDDLE SCHOOL

455 Switch Road
Richmond, Rhode Island
RIDEM LUST CASE # LS-2906A

June 2021
File No. 03.0033632.02

PREPARED FOR SUBMITTAL TO:
Rhode Island Department of Environmental Management
Providence, Rhode Island

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June 8, 2021
File No. 33632.02, C

Mr. Michael Cote
Rhode Island Department of Environmental Management
Leaking Underground Storage Tank Program
235 Promenade Street
Providence, Rhode Island 02908-5767

Re: *Status Report*
(April 2, 2020 through April 23, 2021)
Chariho Regional Middle School
455 Switch Road
Richmond, Rhode Island
RIDEM LUST Case No. LS-2906A

Dear Mr. Cote:

On behalf of our Client, the Chariho School District, GZA GeoEnvironmental, Inc. (GZA) prepared this *Status Report* on the remediation of the residual No. 2 fuel oil in soil and groundwater at the Chariho Regional Middle School, in Richmond, Rhode Island (the Site). This report presents the results of monitoring of the operation of the biovent and vacuum enhanced product recovery system between April 2, 2020 and December 21, 2020. In addition, the results of the annual (April 2021) monitoring of groundwater conditions in selected monitoring wells are presented. The remediation and monitoring program described herein was performed in accordance with the RIDEM-approved August 25, 2010 *Corrective Action Plan* (CAP), subject to the RIDEM approved modifications in GZA's September 28, 2010 email and in an April 7, 2016 RIDEM letter, approving system operation and monitoring modifications.

While both the extent and levels of measurable No. 2 fuel oil LNAPL have been markedly reduced at the Site by the ten years of operation of the bioventing remediation system, as some measurable LNAPL was observed in some monitoring wells and RIDEM is requiring that LNAPL be reduced to below measurable levels at all monitoring wells, as discussed in Section 5.00 of the attached report, we recommend that current system operation and monitoring program be continued in 2021.

If you have any questions or comments, please do not hesitate to contact John Spirito or Albert Flori at (401) 421-4140, or via email at john.spirito@gza.com and/or albert.flori@gza.com.

Very truly yours,

GZA GEOENVIRONMENTAL, INC.

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cc: Edward Draper & Gina Picard, Chariho School District

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1.00 INTRODUCTION

On behalf of our Client, the Chariho Regional School District, GZA GeoEnvironmental, Inc. (GZA) prepared this *Status Report* on the remediation of the residual No. 2 fuel oil in soil and groundwater at the Chariho Regional Middle School, in Richmond, Rhode Island (the Site). This report presents the results of monitoring of the operation of the biovent and vacuum enhanced product recovery system between April 2, 2020 and December 21, 2020. In addition, the results of the annual (April 2021) monitoring of groundwater conditions in selected monitoring wells are presented. A site *Locus Plan* is provided as Figure 1. The locations of monitoring and remedial wells are shown on Figure 2. This report is presented subject to the Limitations presented in Appendix A.

1.10 SUMMARY OPINION

In GZA's opinion, the operation of the biovent system, which began in December 2010, has achieved the intended decline in recoverable and measurable Light Non-Aqueous Phase Liquid (LNAPL) in monitoring wells and that reduction of measurable LNAPL in a limited number of the monitoring wells will be accomplished by further active system operation of the remediation system. Figure 3 shows that Chariho's selection of bioremediation in 2010 increased the rate of fuel oil removal by a factor of ten over the low rates reportedly achieved between 2006 through 2010 by the groundwater pump and treat system operation. It also shows that we have reduced the mass of remaining LNAPL to the extent that rates of LNAPL removal have generally been declining (flattening of removal curve), since 2016. Due to drought conditions this past summer and fall (2020), the rate of decline did not continue as much as we had expected. However, we expect the decline to resume this year (2021), with a return to more normal groundwater levels[1]. Figures 4 and 5 illustrate that remediation has achieved a significant reduction in both the LNAPL thickness and in the rate of LNAPL recovery. Figure 6 shows that the remediation has also lowered the TVOC PID readings in the soil vapor within the unsaturated zone. Lastly, our report shows that natural attenuation processes in the subsurface have maintained volatile organic compound (VOC) concentrations below RIDEM's GA Groundwater Objectives on the downgradient side of the LNAPL plume, following the cessation of pump and treat system operation in 2009. We believe that given the reduction in the residual LNAPL that has been achieved, natural degradation processes will keep the concentrations of petroleum hydrocarbons in the subsurface below a level of concern for vapor intrusion into indoor air and control petroleum hydrocarbon migration in groundwater, even without continued operation of the biovent and LNAPL vacuum recovery system.

While we have achieved the noted reductions and the plume migration is being controlled by natural processes, continued system operation is being required by RIDEM until we have removed measurable LNAPL from all monitoring wells. As shown in Figure 5, some monitoring wells continue to have measurable LNAPL, though at fractions of prior measured thickness and only during times of low groundwater elevations.

As illustrated in Figure 3, since 1999 a total of approximately 31,200 gallons are estimated to have been removed by the remedial actions that have been conducted at the Site, with the majority (78%) being removed by the bioremediation initiated by GZA in 2010. GZA estimates that the following approximate breakdown of LNAPL removal has been achieved:

- 2,000 gallons removed by soil removal in 1999;
- 4,701 gallons removed in the period from 1999 to 2010 (11 years) by the pump and treat system operation; and
- 24,499 gallons removed in the period from the end of 2010 through 2020 (10 years) by the bioremediation & LNAPL recovery system after the shutdown of the pump and treat system.

[1] During times of drought, the unusually low groundwater levels will temporarily result in higher rates of biodegradation due to higher oxygen levels and more measurable LNAPL in monitoring wells. However, with return to normal, higher groundwater elevations, the rates and thickness of LNAPL should decline, as the drought would have led to greater removal of the limited residual fuel oil that remains.

Ninety-nine percent (99%) of the removal by the current treatment system (2010 through 2020) is via biodegradation with only approximately 1% attributable to direct recovery[2].

During the nine months of system operation (April 2, 2020 through December 21, 2020) during the current annual reporting period (April 2, 2020 through April 23, 2021), GZA estimates the biovent system removed approximately 1,912 gallons of petroleum product, which is equivalent to an average removal rate of approximately 217 gallons per month over the nine months of operation. This rate of removal is comparable to the rates that the bioremediation system has been achieving since start-up in December 2010. As shown on Figure 3, in the past ten years the bioremediation system has achieved rates of removal of between 123 and 300 gallons per month with an average removal rate of approximately of 224 gallons per month. In this reporting period, we also recorded a slight increase in the rate of LNAPL accumulation in the monitoring/remedial wells at the Site (Figures 4 and 5) since the last reporting period, likely attributed to the drought conditions in the summer/fall of 2020.

Monitoring data continue to indicate that natural attenuation processes are effectively limiting the migration of significant dissolved volatile organic compound (VOC) levels within and downgradient of the diminished areas with any remaining measurable LNAPL thickness in monitoring wells. Tables 12 to 14 show that VOCs continue to be below RIDEM Method 1 GA Groundwater Objectives in the downgradient monitoring well MW-701. As prior monitoring of downgradient perimeter monitoring wells MW-600 and MW-601 had shown VOC levels in groundwater at those wells were below GA Groundwater Objectives for at least thirteen years, monitoring of these wells was discontinued after April 2020. Also, Tables 10 and 11 reveal that even for the monitoring wells MW-400 and MW-401, which are located closer to the original release areas (former UST and boiler area) than the three perimeter wells (MW-600, MW-601 and MW-701), dissolved VOCs declined to below GA Objectives over seven years ago, which allowed for cessation of monitoring of VOC concentration at those wells after 2016. Measurable LNAPL, which was observed in the past at MW-401, has not been observed at MW-400 since September 2012. No LNAPL or sheen has been observed at downgradient well MW-400 since at least 2010. The improved conditions in groundwater allowed RIDEM to approve of termination of monitoring of VOC levels at MW-400 and MW-401 in 2017. We believe that the VOC data show that even without hydraulic control of groundwater flow (end of pumping in 2009) natural attenuation mechanisms continued to control VOC plume migration, as expected. As discussed within the report, we believe that natural attenuation processes also limited the migration of dissolved petroleum hydrocarbons not characterized by the VOC analysis results.

[2] The limited direct recovery was the result of petroleum constituent adsorption on the granular activated carbon air emission control vessel and bailing or pumping of LNAPL from the on-site recovery wells.

1.20 BACKGROUND

A description of the Site and the nature of the original (1999) No. 2 fuel oil release conditions are provided below. In addition, a summary of key remedial actions completed prior to this reporting period, and the conceptual site model (CSM) which describes the nature, extent, and potential migration of released constituents and remedial goals, are reviewed in this section.

1.20.1 Site and Area Description

The Site, which is located at 455 Switch Road, includes the area adjacent to and downgradient of the former location of the No. 2 fuel oil underground storage tank (UST) and associated piping, which prior to 1999 ran below ground between the UST and the boiler room in the Middle School. The underground piping was reportedly replaced with aboveground piping when the new aboveground tank was installed in 1999. The Site was listed with RIDEM's Leaking UST (LUST) program (RIDEM LUST Case # LS-2906A) in approximately 1999, as a result of the presence of:

- Measurable fuel oil (LNAPL) in groundwater monitoring wells; and
- Fuel oil VOCs in groundwater (dissolved) above GA Groundwater Objectives.

Groundwater at the Site and surrounding area is designated a GAA groundwater resource area by RIDEM, indicating it is (in its unimpacted condition) considered by RIDEM to be suitable for public or private drinking water use without treatment.

Figure 1 depicts the location of the former fuel oil UST and UST piping, the existing above ground storage tank (AST) that replaced the UST, existing monitoring and remedial wells and equipment, and approximate layout of the Middle School and other buildings on the property (e.g., High School and Vocational Technical School). This figure also shows the approximate maximum observed historical extent of the fuel oil plume and the location of three active public water supply wells, which are labeled as GW-1, GW-2, and GW-3. GZA understands that these three water supply wells serve all the on-site potable water supply needs of the School District's facilities at the Site.

We note that, as discussed in more detail below, none of these three public water supply wells are estimated to be downgradient of the plume and have not been and are not expected to be impacted by the release. As reviewed in GZA's August 2010 *Corrective Action Plan* (CAP) and past (2010 through 2019) status reports, groundwater flow is estimated to be in an easterly direction across the release area. A former water supply well, which is located adjacent to the Vocational Technical School ("Votech Well"), which is downgradient of the plume, is no longer utilized for drinking water purposes. Based on discussions with Chariho's maintenance personnel in 2010, this former water supply well was converted earlier to use only to supply non-potable water to the fire suppression system, and there were no plans for future potable use of this well, though it may be used in the future for other non-potable purposes (e.g., watering lawns). Chariho personnel have confirmed that this remains the current and future planned limited use for this well.

The land surrounding the school property includes extensive turf fields approximately 1,300 feet to the north and approximately 800 feet to the east of the Middle School, as is visible (grass fields) on Figure 1. GZA understands that there are irrigation supply wells on the turf fields that are utilized by the turf farm to water the turf fields, not for potable uses. These wells are reportedly located over 1,000 feet from the estimated limits of the fuel oil release plume.

The nearest residential properties are located over 1,000 feet to the south. These residential homes are reportedly served by private water supply wells located adjacent to the homes. These wells are not located downgradient of the Site's plume.

1.20.2 Historical Release Conditions/Past (pre-2010) Remedial Actions

The original release of No. 2 fuel oil was identified as being from the piping system between the former 10,000-gallon UST (1999) and the boiler room (2002) adjacent to the Middle School courtyard. The UST was installed and put into service in 1989, as part of the construction of the Middle School. It is our understanding that the fuel oil supply and return lines to the boiler and emergency generator were set within a 4-inch diameter secondary containment polyvinyl chloride pipeline. Leakage of oil apparently occurred from the piping between the UST and the boiler room, with the oil finding its way to the subsurface from an opening in the containment pipe near the UST and, also, at a fuel oil piping manhole near the boiler room within the courtyard of the Middle School. Leakage may have also occurred along the approximately 150 feet of line between the UST and the boiler room, though we understand the piping was inspected by others when removed and concluded to be in good condition.

In 1999, Beta Group, Inc. (Beta) oversaw the removal of the UST and approximately 800 cubic yards of fuel oil impacted soil from the immediate area of the UST on the west side of the Middle School building. The approximate area of excavation is shown in Figure 2. Floating petroleum product was reportedly observed on top of the groundwater table in the UST excavation at a depth below ground surface of approximately 19 feet. As mentioned above, the UST was replaced with an AST (8,000-gallon), which has been utilized since that date to store fuel oil for on-site use in heating the school buildings. We also understand that the active fuel oil transfer lines between the AST and boiler are now located above ground.

As was described in more detail in GZA's August 2010 CAP, following the removal of the UST and 800 cubic yards of impacted soil, between 1999 and 2010, the following remedial actions were completed by Beta:

1. UST Area Groundwater Extraction and Product Recovery: In 1999, Beta initiated the recovery of LNAPL, floating petroleum (fuel oil) product, by extracting groundwater and depressing the groundwater table at one or more recovery wells in the former UST area on the west side of the Middle School Building. Initially, the system appears to have relied on manual product recovery (hand bailing) from wells RW-1, RW-2 and RW-4, and active pumping of product and groundwater from RW-3. The locations of each of these wells are shown on Figure 2.

2. Downgradient Area Groundwater Extraction and Product Recovery: As the LNAPL (measurable in well) was subsequently shown to extend beyond the UST area under the building and to the east side of the Middle School building, active recovery was expanded in the period from 2003 to 2005. The system was expanded to include wells MW-401, MW-402, MW-500, and MW-501. Horizontal "recovery" wells, HW-1 and HW-2, were also installed by Beta beneath the building, as shown on Figure 2, although we understand that they were not utilized for any significant (if any) period of groundwater extraction or product recovery. Based on information in Beta's report, we believe HW-1 was installed at a depth that would have been submerged below the water table during the wetter seasons of the year. MW-402 and MW-501 are located adjacent to the former fuel oil piping manhole in the inner courtyard of the Middle School. MW-402 was only utilized briefly for LNAPL recovery, until being replaced as the recovery well by MW-501. MW-500 and MW-401 are located on the eastern downgradient side of the building. In addition, in approximately 2005, groundwater extraction was extended in the UST area with the connection of the groundwater and product recovery system piping to product recovery well RW-4. The locations of these wells, the former UST (current location of replacement AST), and former UST piping to the boiler room are shown on Figure 2.

3. Groundwater Extraction with Surfactant Injections: In May of 2008 and on three dates in 2009, surfactant was injected to the subsurface at the Site by Beta, as part of an attempt to mobilize and increase the recovery of

residual oil from the subsurface. Approximately 123 gallons of fuel oil was reportedly recovered between May and December of 2009. According to Beta, this rate of recovery was comparable to that observed over similar time periods in the preceding years, though they speculated that greater quantities may have been recovered if the groundwater table had not been unusually elevated during the period of the injections and recovery.

The estimated maximum historical (pre-2000) limits of the LNAPL and/or dissolved VOC plume with concentrations above GA Objectives are shown in Figure 2. This depiction assumes that the LNAPL plume may have extended across the entire area under the building adjacent to and downgradient of the former UST and boiler room fuel oil release locations, as the existing building covers a significant portion of the area downgradient of the former release locations and monitoring wells have not been installed below the building. Therefore, the full lateral extent of the floating product was and still is not known below the building, though we suspect only limited LNAPL is likely to remain below the building at this time, given the reductions in LNAPL in existing wells. Up to 2004, sampling and analysis of groundwater samples from monitoring wells appeared to show the presence of dissolved levels of VOCs above RIDEM GA Groundwater Objectives up to 230 and 140 feet downgradient of the former UST and downgradient of the manhole in the inner courtyard (adjacent to the interior area boiler room), respectively. The estimated maximum historical extent was somewhere between the perimeter wells MW-600, MW-601, and MW-701, which have not had detectable LNAPL or VOCs above GA Objectives, and wells MW-400 and MW-401, which have either had (prior to 2014) detectable LNAPL and/or VOCs above GA Objectives. As we had seen some TPH above 500 µg/L and detectable levels of VOCs in the groundwater samples collected in 2011 from MW-701, but not at MW-600 or MW-601, we had assumed the historical maximum extent was likely closer to MW-701 than to MW-600 or MW-601, as shown in Figure 2, possibly due to the influence of HW-1 (as a preferential pathway) and the past surfactant injections, as described above.

Beginning in 1999, the petroleum product that was recovered with the extracted groundwater (up to July 2010) was reportedly separated from the groundwater in an oil/water separator in the treatment shed, which was installed adjacent to the new fuel oil AST. The groundwater from the oil/water separator was treated with activated carbon and discharged to an adjacent drainage swale, where the groundwater infiltrated into the ground. A RIPDES permit was issued by RIDEM for this discharge and RIPDES Discharge Monitoring Reports were filed on a quarterly basis from January 2000 through September 2010.

Beta's status reports on the operation and monitoring of the RIPDES system up to 2009 indicated that the LNAPL and dissolved phase plumes had not and were not expected to migrate to or adversely impact the existing public drinking water supply wells at the Site. As stated above, groundwater flow in the plume area was and is estimated to be in an easterly direction, not in the northerly direction of these water supply wells. As shown on Figure 1, the nearest of these water supply wells is located cross-gradient, over 200 feet to the north of the UST release location. The other two wells are located approximately 300 and 750 feet to the north and northeast, respectively, from the release area. We understand that sampling and analysis of water samples from each of the three Chariho Water Supply Wells (GW-1 to GW-3) over the years of Site groundwater pump and treat remediation (performed by Beta) showed the absence of water quality impacts from the fuel oil release. Based upon GZA's earlier review of the historical data for the three-water supply wells up to June 2018, no targeted VOCs or semi-VOCs were reported above laboratory detection limits.

1.20.3 Bioremediation Remedy (December 2010 through April 2020)

As reviewed in the 2010 CAP, GZA concluded that the dissolved VOC and LNAPL fuel oil in the groundwater had not and would not migrate a significant distance beyond the observed limits, even without continued groundwater extraction. We reached this conclusion based upon the observation that even without hydraulic capture of the entire plume for

extended periods of time[3], in the years prior to 2010, actual migration was being attenuated. This lack of significant migration of dissolved VOC constituents from the LNAPL plume and original release areas (UST and Courtyard) is consistent with the expected behavior of a No. 2 fuel oil release, since naturally occurring bacteria are quite effective at degrading the dissolved constituents beyond the LNAPL plume limits. We also noted that there was no indication that the LNAPL that was being detected in the monitoring and remedial wells was migrating beyond the previously defined limits. The LNAPL limits had shrunk. This is typically what we and others[4] have observed at fuel oil release sites where migration is through porous media without preferential pathways (e.g., utility lines that intercept the water table). Once the source of the leaked oil has been halted, and certainly after the source area LNAPL mass has been greatly reduced, it was our opinion that LNAPL would not migrate further.

This opinion regarding limited migration was subject to the assumption that horizontal well HW-1 was not acting as a significant preferential pathway to LNAPL and/or dissolved plume movement, and that the addition of surfactants in 2008 and on three dates in 2009 had not significantly increased dissolved plume mobility. Beta indicated in their reports on the surfactant work that the addition of surfactant had not resulted in an increased migration of dissolved constituents, nor did they believe it had mobilized significant mass of the residual oil beyond that recovered at the time of the injections. As noted in our CAP and shown in Figure 3, the rates of LNAPL recovery appeared to be relatively low and consistent prior to and following the surfactant additions in the period from January 2008 to July 2010. As noted below, in 2010, GZA proposed monitoring of dissolved constituents in the downgradient perimeter wells to test the assumption that no significant LNAPL and/or dissolved VOC plume mobilization was occurring and, if needed, to take alternate remedial actions.

GZA shut down the groundwater extraction wells at the Site in July 2010 and initiated operation of the RIDEM approved biovent and vacuum enhanced product recovery system in December 2010. Installation, which included modifying existing wells MW-501 & RW-3 to serve as biovent wells and installing new biovent wells at locations designated as soil vapor extraction (SVE) wells SVE-1 through SVE-4, was completed by New Hampshire Boring, Inc. with GZA observation and logging, in accordance with the approved CAP. The location of the installed biovent wells and product recovery units are shown in Figure 2. Active product only recovery units (Magnum Spill Busters) were installed in monitoring wells MW-203, MW-500 and MW-501 and manual product bailing has been performed from the existing monitoring well network. The SVE blower and two-1,000-pound activated carbon vessels were placed within the existing remediation shed, which is located near the southwest corner of the Middle School. GZA initiated the operation of the biovent wells to achieve aerobic biodegradation of the remaining No. 2 fuel oil in the unsaturated zone and establish vacuums beneath the school building and to enhance direct physical LNAPL recovery. The SVE system also served to achieve recovery of and treatment of petroleum constituents in the extracted soil vapor by passage through activated carbon units.

Except for a few short shutdowns due to some brief power failures, the system operated continuously from December 14, 2010 through December 28, 2015 and during the months of April through December since April 2016. On April 7, 2016, RIDEM approved of shutdown during the winter months, as conditions had improved, and little fuel oil removal was occurring in the colder winter months. As described in the last annual status report (dated June 29, 2020), which covered from December 2010 up to April 2020, over the ten years of SVE and Product Recovery system operation, the system was estimated to have removed a total of 153,595 pounds (or 22,587 gallons) of petroleum hydrocarbons from the subsurface

[3] Downgradient capture was initially not performed beyond the UST area and was not performed prior to 2004 in the area downgradient of the boiler area plume. In addition, even after all recovery wells were installed, in GZA's opinion, it appears that for extended periods of time capture of the entire plume width was not occurring before the end of groundwater pump and treat system operation in 2010.

[4] Rice, D.W., 1995, California Leaking Underground Fuel Tank (LUFT) Historical Case Analyses. University of California. Submitted to California State Water Resources Control Board UST Program.

primarily through biodegradation. In addition, based upon annual groundwater monitoring, groundwater conditions at and downgradient of the historical limits of the LNAPL and dissolved petroleum plume continued to show relatively low dissolved VOC concentrations (primarily below detectable levels and all below GA Objectives) at the furthest downgradient wells (perimeter wells).

1.20.4 Remedial Goals – Status (as of April 2020)

While no significant threats to public health and/or the environment have been identified at the fuel oil release Site, RIDEM LUST Program regulations and guidance[5], require that "free product", which is typically considered as measurable LNAPL (greater than 0.01 feet) in an observation well, be removed to the maximum extent practical to "minimize the spread of contamination." In addition, concentrations of petroleum contamination in groundwater are required to either be reduced to below the applicable standards or may be reduced to the extent feasible provided certain conditions are met, including a demonstration that there are no significant threats to public health or the environment.

To achieve regulatory closure, we had understood that we would need to demonstrate to the Department's satisfaction that LNAPL removal has been achieved to the extent practical and feasible. In addition, we understood that RIDEM may require that groundwater be restored to GA Groundwater Objectives[6] through natural processes, after RIDEM approves of shutdown of the active system. In a letter from the Department on April 7, 2016, RIDEM stipulated that "since the site is located in a Wellhead Protection Area (WHPA) for two public wells servicing the Chariho Regional Middle School, every effort must be made to remove free-phase petroleum product in affected wells and to control migration of the plume into previously uncontaminated zones. Presently [2016], analytical data from downgradient wells is showing [2016] the presence of dissolved TPH concentrations since the implementation of the bioventing system." GZA presented in our August 30, 2017 status report an analysis of the likely cause[7] of the increase in dissolved TPH in groundwater samples in 2011 at MW-701, one of the downgradient wells and proposed continued monitoring of TPH and VOC concentrations in downgradient monitoring wells.

We also subsequently sought and received approval for the closure of the horizontal wells, including HW-1. We believed this well may have been acting as a preferential pathway, to move more impacted groundwater from the residual LNAPL area closer to MW-701, than would occur without the presence of HW-1. As described in GZA's January 30, 2019 letter to the Department, HW-1 & HW-2 and the following monitoring wells: RW-2, MW-102, MW-103, MW-202, MW-302 and MW-303 were closed between December 28 and 29, 2018. GZA observed the decommissioning of the two horizontal wells (HW-1 and HW-2) and six monitoring wells. The wells were decommissioned by our drilling subcontractor, Hoffman Environmental Services, of North Kingstown, RI, in accordance with the requirements contained in Appendix 1 of RIDEM's Groundwater Quality Rules, dated June 2010.

As was stated in the 2010 CAP, a significant drop in the rate of petroleum product removal was expected once we achieved removal of the measurable LNAPL in the monitoring wells. As our initial 2009 rough estimate of the released volume was 12,000 gallons and removal rates were approximately 3,000 gallons per year, we initially expected a significant drop in measurable LNAPL and LNAPL physical removal within a few years of the initiation of bioremediation. However,

[5] The LUST Program regulations and guidance include the April 2011 **Rules and Regulations for Underground Storage Facilities used for Petroleum Products and Hazardous Materials (Regulation #DEM-OWM-UST03-11)** and October 2000 **Leaking UST Program Guidance Document**.

[6] We had understood that closure might be achieved by establishing a "Residual Zone" in accordance with Rule 13.3 of the RIDEM Groundwater Quality Regulations. However, we now understand that RIDEM is no longer granting approvals under this regulation, pending future revisions to their regulations.

[7] We believe the weight of evidence indicates that the addition of surfactants in 2008 and 2009 and the presence of horizontal well HW-1 increased the extent of the dissolved TPH plume in the area between the building and MW-701, at least up to 2015, though the dissolved TPH and VOC plume appears to remain stable or decreasing. Surfactants were added in the area of HW-1, and HW-1 intercepts the groundwater table during periods of the year, thus becoming a preferential pathway for groundwater flow.

as discussed in subsequent status reports, it became apparent to GZA that a much larger volume was released. Based on fuel oil delivery records obtained in 2013 from Chariho, as discussed in the prior status reports[8], the actual fuel oil volume released between 1989 and 2002 to the subsurface was estimated to be closer to 66,000 gallons.

By the implementation of the current remedy in 2010, GZA's last report stated that we believed that every effort had been undertaken to remove free phase LNAPL and recommendations were included in the report to continue bioremediation system operation and monitoring of natural attenuation mechanisms. Given that we were observing diminished LNAPL thickness and physical recovery of LNAPL between 2010 and April 2019, we assumed that the actual release of fuel oil was closer to 66,000 gallons than the earlier lower estimate. Assuming this was a reasonable estimate of the original release, we calculated that it was likely we would see a significant decline in both LNAPL thickness and the rate of LNAPL removal within 3 years (by 2022). We arrived at this estimate in our August 30, 2017 status report by subtracting out the estimates of the mass removed to date and the residual mass immobilized by the soil in the smear zone, using American Petroleum Institute (API) published residual saturation values.

In our June 2020 annual report, which covered the period up to April of 2020, we noted that we were observing a significant sustained decline in the rate of removal, which was expected when the residual measurable LNAPL had been reduced to low levels. At that point, the recoating of exposed soil by the remaining measurable LNAPL would no longer occur to the same extent within the unsaturated zone with seasonal fluctuations in the groundwater table. We recommended that approval from RIDEM be sought for cessation of active remediation and the start of a Monitored Natural Attenuation (MNA) program. The Program was to be developed with RIDEM review to allow us to demonstrate to RIDEM that natural degradation processes would be sufficient to continue the removal of the remaining measurable LNAPL while ensuring the migration of the plume was controlled.

In an April 27, 2020 letter RIDEM denied the request and indicated that active remediation is to continue until measurable LNAPL (i.e., separate phase product) is no longer present in Site monitoring wells and dissolved constituents are reduced to below applicable groundwater standards (i.e., GA Groundwater Objectives). RIDEM indicated in the letter that they considered the Site particularly sensitive, given that the plume is below the School Building and within the Wellhead Protection Area of the nearby public water supply wells.

2.00 MONITORING PROGRAM (April 2020 through April 2021)

The monitoring program[9] performed for the SVE & Product Recovery system for the period from April 2, 2020 through April 23, 2021 is reviewed below. This is followed by a review of the groundwater quality monitoring performed at the RIDEM approved monitoring program locations.

2.10 SVE & PRODUCT RECOVERY

As recommended in an earlier status report and approved by RIDEM on April 7, 2016, since April 2016, the SVE system has been operated throughout the year with the exception of the coldest and/or wettest months (January through March) when the system has been shut down. The system has been restarted in April of each year since 2016. Prior to 2016 the

[8] Refer to Appendix D of the April 2017 Status report for the estimates of released fuel oil from fuel oil delivery records and of the fuel oil remaining, after estimating the likely range of immobilized fuel oil in the smear zone at the Site (calculations based on published values for residual fuel oil saturation (between approximately 8 and 12 gallons per cubic yard of soil).

[9] Per the recommendations in our August 30, 2017 status report, the original RIDEM approved monitoring program was modified as follows: 1) Reduced the frequency of monthly monitoring of the system operation to quarterly monitoring during the first six months of the year (higher groundwater elevations) to monthly from June through December, during the anticipated low groundwater elevation conditions; and 2) Reduced the semi-annual collection and analysis of groundwater samples to annual monitoring (since April 2014).

remedial system, which began operation in December 2010, operated throughout the year. In June 2020 and again in April 2021 GZA adjusted the valves on the biovent wells to achieve increased venting at RW-3, MW-501, and SVE-1 and reduce soil vapor extraction from the remaining SVE wells (SVE-2, SVE-3 and SVE-4), as there was no measurable LNAPL in these areas in 2019. These adjustments were made to help enhance direct recovery of any remaining LNAPL, primarily in the area of SVE-1 and MW-500.

During this reporting period, as required by RIDEM, GZA personnel monitored the SVE & Product Recovery system monthly from June through December 2020 and in April 2020 and April 2021, as described below:

1. SVE System: During each monitoring visit, the following data were collected at each of the SVE wells: (1) air flow rates; (2) vacuum response in inches of water column (IW); (3) total volatile organic compound (TVOC) photo-ionization detector (PID) readings, and (4) oxygen (O_2), carbon dioxide (CO_2), and Lower Explosive Limit (LEL) soil vapor readings. The vacuums (in inches of water column (WC)) applied at each SVE well and at the intake of the blower were measured using a magnehelic pressure differential gauge capable of measuring vacuums of greater than 0.01 inches of WC. The individual vent well and the combined flow rate of soil vapor is measured by orifice plate flow meters. Samples of the soil vapor extracted from each individual SVE well were collected each month using a vacuum pump at the sampling ports. The sample from each SVE location was collected into a Tedlar soil gas bag. The vapor samples were then immediately pumped from the sample bag through a MiniRAE photoionization detector (PID) equipped with a 10.6 eV lamp to measure TVOC readings and, also, through a LandTech infrared gas meter to measure the O_2, CO_2, methane (CH_4), and LEL levels in the sample. Tables 1 through 6 show the monitoring results for biovent wells SVE-1 through SVE-4, MW-501, and RW-3, respectively, and Table 7 presents a summary of the monitoring results for the combined biovent system.

2. Product Recovery System: During each monitoring visit, the depth to water and product thickness at each product recovery unit and at each monitoring well that has exhibited the past presence of measurable LNAPL were measured using an ORS oil/water interface probe. Measurements were performed on a monthly schedule. These measurements are summarized in Table 8A. The depth of accumulated product in 55-gallon recovery drums, which are connected to the Magnum Spill Buster LNAPL recovery pumps at each of the three product recovery wells, is summarized in Table 9.

2.20 GROUNDWATER

The below described groundwater monitoring program has been performed to confirm that remedial actions and natural attenuation processes are controlling LNAPL and dissolved plume migration:

Prior to purging groundwater to collect samples or purge LNAPL from on-site wells, on April 23, 2021, GZA measured the depth to static groundwater and the thickness of LNAPL using an ORS oil/water interface probe in all accessible wells. In addition, we monitored LNAPL thickness and groundwater elevations on a semi-annual basis in all accessible existing monitoring well locations. The recorded depths to the water table are compiled in Table 8A.

Per the current RIDEM approved monitoring program, GZA collected samples by the below described methods from MW-701 on April 23, 2021. Samples were collected in accordance with the US EPA's September 19, 2017 "Low Stress (low flow) Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells". During low flow groundwater sampling a variable speed submersible pump was utilized to control the rate of purging and limit the drawdown caused by this operation. Dedicated 3/8-inch O.D. polyethylene tubing installed in each of the existing wells was utilized as the intake and discharge tubing for the pumps. Pharmaceutical grade tubing was utilized as the pump head tubing and connected to the intake and discharge tubing by clamps sufficient to prevent

the introduction of air into the sample. Samples were collected in laboratory provided containers, packed in an ice chest and transported under chain-of-custody protocol to ESS Laboratory located in Cranston, Rhode Island, for VOC analysis by EPA Method 8260B and TPH by EPA Method 8100. Appendix B includes the laboratory data sheets for the April 2021 samples. Tables 10 through 15 summarize the results of historic groundwater VOC laboratory analyses at key monitoring well locations and field screening data collected during low flow sampling.

Measured depths to static groundwater table ranged from approximately 17 to 28 feet below ground surface this reporting period. Figure 6 shows that regional groundwater elevations, which are assumed to mirror the rise and fall of groundwater at the Site, rose and fell as in past years, with more of the unsaturated zone exposed in the summer and fall and much less in the winter/spring. Figure 2, which presents groundwater contours developed from the April 2020 data and the previously surveyed well elevations, shows groundwater flow in an easterly direction, assuming that groundwater flow is perpendicular to the inferred groundwater contours. This estimated flow direction is consistent with historical observations.

3.00 SVE MONITORING RESULTS

The results of the SVE monitoring are reviewed below with respect to vacuum response and vapor flow; SVE system soil vapor TVOC readings; oxygen introduction and consumption, and carbon dioxide generation by the SVE system; estimated rates of hydrocarbon removal (via in-situ aerobic biodegradation, physical venting to the GAC unit, and direct product recovery); and GAC Unit maintenance. The review is for the portion of the current reporting period when the SVE system was operating (April 2, 2020 through December 21, 2020).

3.10 VACUUM RESPONSE AND VAPOR FLOW

During this reporting period, total system flow averaged approximately 127 standard cubic feet per minute (scfm) at an average applied operating vacuum of approximately 19 inches WC. Flow rates at each vent well were observed to range between approximately 10 and 26 scfm and averaged 20 scfm. Refer to Table 7 for a summary of combined vent system flow data and Tables 1 through 6 for individual vent well monitoring data. In June 2020, the biovent wells were adjusted to achieve increased venting (to help enhance direct recovery of any remaining LNAPL) at RW-3, MW-501, and SVE-1 (flow rates averaging 25 scfm) and reduce soil vapor extraction from the remaining SVE wells SVE-2, SVE-3 and SVE-4 (flow rates averaging 14 scfm). At an average applied vacuum over this reporting period at each well head of 2 to 11 inches of WC, which are comparable to past vacuums (annual averages have ranged between 1 and 19 inches at individual wells, as shown in Tables 1 through 6), we believe the operation of the vent wells during this period achieved the desired radius of influence. We estimated from the July 2010 pilot vent test that the observed applied vacuums of between 2 and 25 inches of WC at individual extraction wells would create a radius of influence of approximately 40 to 50 feet and the above described flows. The extraction wells are located within approximately 50 to 80 feet of each other. Therefore, at the observed applied vacuums, we would expect the radius of influence of the wells to overlap and cover the estimated plume limits.

3.20 EXTRACTED VAPOR TVOC READINGS

As noted in past reports and illustrated in Figure 6, TVOC readings for the soil vapor extracted from each SVE well, which had been above 100 ppmv at some biovent wells during the first six months of bioremediation, have declined markedly and have been below 5 ppmv during most monitoring periods since 2016. GZA shaded in yellow the periods in Figure 6 when groundwater elevations at a nearby USGS regional monitoring well were below the historic mean elevation. The low groundwater elevation periods at the USGS well mirror those measured at the Site. As shown in Figure 6, the seasonal periods of low groundwater elevations have coincided with the periods of higher TVOC PID readings, primarily at RW-3,

SVE-1 and MW-501. RW-3 and MW-501 are located within the immediate areas of the original No. 2 fuel oil releases (the former UST area and boiler room area, respectively); areas expected to have had more residual fuel oil above and below the groundwater table than other areas of the Site. SVE-1 is the nearest downgradient well to MW-501. TVOC readings in the first six months of operation (2011) were recorded for MW-501, SVE-1 and RW-3 at up to 150, 92 and 260 ppmv, respectively. During the current reporting period, the TVOC PID readings only rose near or slightly above 10 ppmv at SVE-1 and MW-501 in the fall, when the water tables were at seasonal low levels. All other vent wells exhibited low TVOC PID readings throughout the year. Over the last four years, we have observed some of the longest periods of low TVOC PID readings at all locations, even during the periods of low groundwater elevations. Tables 1 through 6 present the TVOC PID readings for each of the SVE wells over the last ten years.

The decline in TVOC readings in the extracted soil vapor, after the first few months of operation, is believed to reflect the removal of the more volatile fraction of the fuel oil from the exposed (unsaturated) soil zone, the zone of residual fuel oil in soil that was above the groundwater table in the period from February through June of 2011. As groundwater tables rose and declined in the period from 2014 through 2016, it appeared that some additional but limited volatile fraction was exposed in the courtyard (MW-501) and downgradient of the courtyard (SVE-1 area) and thence removed by the SVE (biovent) system. This was evident in the TVOC rise at MW-501 and SVE-1 to above 10 ppmv, during the low groundwater table period in 2014, 2015, and 2016. Since 2016, there was little evidence of a sustained rise above 10 ppmv, even at these wells. In the last four years, TVOC PID readings only rose near or above 10 ppmv at SVE-1, MW-501, and RW-3 and then only slightly, during periods of lower groundwater elevations.

3.30 OXYGEN AND CARBON DIOXIDE

As shown in Tables 1 through 6, oxygen (O_2) levels in the unsaturated soil zone are being maintained at sufficient levels to support aerobic biological activity via the operation of the soil vapor extraction (SVE) system. Measured O_2 levels in samples of the vapor extracted from the remedial area during the period of April 2, 2020 to December 21, 2020 averaged from 18.9% to 20.4% at individual vent wells. Theoretically, soil gas oxygen levels as small as 4% are deemed sufficient to achieve an aerobic environment for bacteria, which exist primarily within the water film on soil particles[10]. Thus, the aerobic environment established by the vent system is likely to stimulate existing biological activity within the unsaturated zone to efficiently biodegrade residual hydrocarbon contamination.

We note that by raising the oxygen levels in the soil vapor within and above the fuel oil smear zone (zone of residual oil within groundwater fluctuation zone), the rate of oxygen diffusion into the groundwater should also be increased. This should enhance fuel oil degradation both above and below the groundwater table, particularly in the upper groundwater table.

Oxygen introduced by the SVE (biovent) system to the soil within the source area undergoes transformation to carbon dioxide (CO_2) through biodegradation. Data recorded from April 2, 2020 to December 21, 2020 correspond to the O_2 levels achieved through venting and CO_2 generated by biodegradation. The difference between ambient oxygen (21%) and ambient carbon dioxide (0.04%) levels and measured levels are assumed to be approximately equal to the amount of O_2 consumption and CO_2 generation during intervals of venting (i.e., other natural or anthropogenic sources of organic matter are assumed not to be degraded and oxygen loss due to the presence of reducing constituents like ferrous iron are assumed not to be present at significant levels). Based on the averages during this reporting period, we observed average O_2 depletion of approximately 1.2% (i.e., consumption of oxygen levels in soil vapor from 21% down to 20.1%) and CO_2 levels increased in soil vapor from atmospheric levels of 0.04% to an average of approximately 0.8% (See Appendix C).

[10]Dineen, D., et. al., 1992, "In-Situ Biodegradation of Petroleum Hydrocarbons in Unsaturated Soils". Chapter 14 of Text: "Contaminated Soils", edited by P. Kostecki and E.J. Calabrese, Jr. Lewis Publishers, Chelsea, MI.

The observed ratio of the carbon dioxide increase and oxygen decrease, referred to as the respiratory quotient, at the biovent well locations during this reporting period ranged from 61% to 72%. These quotients are within the expected range for biodegradation of the fuel oil. Respiratory quotients based upon chemical stoichiometry of the complete oxidation of constituents similar to fuel oil constituents: methane, hexane, benzene, and glucose, range from 50% to 100%. Lower quotients (25 to 50%), about half of those expected according to chemical stoichiometry, are sometimes observed and may be observed in the future at the Site. When observed, these lower quotients are likely attributed to carbon dioxide loss to the bacteria's use of carbon in the generation of biomass.

Assuming comparable soil vapor extraction rates, the observed percentages of CO_2 generated over time are an indication of the degree of bioactivity at each vent well, and are summarized on the following table:

MEAN PERCENT CARBON DIOXIDE GENERATION			
Time Period	**Moderate >1%**	**Lowest < or equal to 1%**	**Average %**
1 – Dec. 14, 2010 to May 25, 2011	SVE-3, SVE-4, MW-501, RW-3	SVE-1, SVE-2	1.6
2 – May 26, 2011 to Nov. 22, 2011	MW-501, RW-3	SVE-1, SVE-2, SVE-3, SVE-4	0.8
3 – Nov. 23, 2011 to April 17, 2012	MW-501, RW-3	SVE-1, SVE-2, SVE-3, SVE-4	0.9
4 – April 18. 2012 to Dec. 3, 2012	SVE-4, MW-501, RW-3	SVE-1, SVE-2, SVE-3	1.0
5 – Dec. 4, 2012 to Dec. 20, 2013	SVE-4, MW-501, RW-3	SVE-1, SVE-2, SVE-3	1.2
6 – Dec. 21, 2013 to April 22, 2015	MW-501, RW-3	SVE-1, SVE-2, SVE-3, SVE-4	0.9
7 – April 23, 2015 to April 20, 2016	SVE-4, RW-3	SVE-1, SVE-2, SVE-3, MW-501	0.8
8 – April 21, 2016 to April 18, 2017	SVE-4, RW-3	SVE-1, SVE-2, SVE-3, MW-501	0.7
9 – April 19, 2017 to Dec. 20, 2017	none above 1 %	SVE-1, SVE-2, SVE-3, SVE-4, MW-501, RW-3	0.6
10 – April 23, 2018 to Dec. 27, 2018	RW-3	SVE-1, SVE-2, SVE-3, SVE-4, MW-501	0.6
11 – April 29, 2019 to Dec. 29, 2019	None above 1%	SVE-1, SVE-2, SVE-3, SVE-4, MW-501, RW-3	0.5
12 – April 2, 2020 to Dec. 21, 2020	RW-3	SVE-1, SVE-2, SVE-3, SVE-4, MW-501	0.8

Carbon dioxide generation on the Site was at the highest level observed since 2016, though much lower than observed in the first six months of operation in 2010, and comparable to that in recent years. During the current reporting period the mean carbon dioxide level at SVE-1, SVE-2, SVE-3, SVE-4, RW-3, and MW-501 was 0.5, 0.4, 0.8, 1.0, 0.7, and 1.4%, respectively. Consistent with the expectation of lower fuel oil residual within the downgradient area of the LNAPL plume, relatively low carbon dioxide levels continued to be in the soil vapor extracted from the SVE well locations, SVE-1, SVE-2, SVE-3, which are located furthest from either of the two release areas (UST and boiler areas).

As in the last reporting period, which was from April 2019 through April 2020, the wells with the highest mean carbon dioxide generation (biodegradation) included only RW-3, which is in the original UST release area. During this reporting period, the mean carbon dioxide level at RW-3 was 1.4%. We note that, as shown in Tables 1 through 6, the higher carbon dioxide levels were observed primarily in the months of August through November when temperatures in the ground are generally higher (leading to increased biological activity), groundwater table elevations were lowest, and more LNAPL residual zone was exposed.

3.40 REMOVAL VIA VENTING, BIODEGRADATION AND DIRECT RECOVERY

As reviewed below, for the current biovent system operating period[11], April 2, 2020 to December 21, 2020, we estimate that approximately 1,912 gallons (13,003 pounds) of fuel oil were removed from the subsurface through a combination of physical venting onto the GAC unit, aerobic biodegradation via bioventing, and direct recovery of product from the wells, with biodegradation representing approximately 99% of the total. This is based upon the following:

1. Venting Removal on GAC Unit represents only 0.3% of total removal this reporting period at the Site: During the period of April 2, 2020 to December 21, 2020, approximately 43 pounds (6.3 gallons) of hydrocarbons are estimated to have been removed by the direct venting of soil vapor from the unsaturated zone within the contaminated area. This value was estimated using average combined venting flow rates and average influent TVOC PID readings. This should be viewed as an approximation, since TVOC PID readings are only relative indicators of hydrocarbon levels. Refer to the tables in Appendix C for the calculation of venting removal.

2. Aerobic Biodegradation (>99% of total removal): Aerobic bioactivity within the remedial area is estimated to have resulted in the biodegradation of approximately 12,957 pounds (1,905 gallons) of hydrocarbons during the current monitoring period. The amount of hydrocarbons biodegraded was calculated by applying the following relationships and using the average of the two calculated values: 3.5 pounds of O_2 is required to mineralize 1 pound of hydrocarbons (calculation assumes that significant oxygen consumption is not occurring due to the oxidation of naturally occurring organics and/or inorganics); and 3.1 pounds of CO_2 is generated when the 1 pound of hydrocarbon is mineralized (degraded) but we assumed that approximately half of the CO_2 generated is utilized in growth of bacterial mass. Therefore, for each pound of hydrocarbon consumed, the measured CO_2 increase in soil gas would be approximately 1.6 pounds. Refer to the tables in Appendix C for Biodegradation Calculations.

3. Direct Recovery from Wells (0.02% of total removal): During the current reporting period, approximately 0.4 gallons of product were recovered utilizing the automated operation of the Magnum Spill Busters and from hand bailing of individual well SVE-1, as summarized on Tables 8A & 9. The Spill Busters are currently set within wells MW-203, MW-500, and MW-501. The small amount recovered this reporting period is equivalent to the recovery of approximately 0.001 gallons of product per day or approximately 0.008 pounds per day; a fraction of that removed by biodegradation.

As the current reporting period removal is calculated to be 1,912 gallons (13,003 pounds) and the prior removal totals (up to April 2020) were calculated to be 22,587 gallons (153, 595 pounds), the total fuel oil removal as of December 2020 is 24,499 gallons (166,598) pounds of fuel oil.

[11] The biovent system was only operated from April through December 2020 during the current reporting period of April 2020 through April 2021. Though some biodegradation likely occurred during the winter months, as we are not operating or monitoring the system during these months, we have no means of calculating the removal during the winter.

Appendix C presents and the table below summarizes the estimated rate of physical removal of VOCs by the granular activated carbon vessel on the vent system ("SVE"), hydrocarbon removal via biodegradation ("biodegradation"), and direct product removal by vacuum recovery and manual bailing ("Product"):

Estimated Average Rates of Removal (#/day)				
Time Period	**Direct***	**SVE**	**Biodegradation**	**Total Removal**
1999 to 2004 (Pump & Treat only)	1.7	-	-	1.7
February 2005 to July 2010 (Pump & Treat)	0.26	-	-	0.26
1 – December 14, 2010 to May 25, 2011	1.0	1.6	65.0	67.6
2 – May 26, 2011 to November 22, 2011	0.15	0.22	37.8	38.2
3 – November 23, 2011 to April 17, 2012	0.12	0.15	37.9	38.2
4 – April 18, 2012 to December 3, 2012	0.50	0.16	44.2	44.9
5 – December 4, 2012 to December 20, 2013	0.81	0.12	62.5	63.4
6 – December 21, 2013 to April 22, 2015	0.50	0.42	63.9	64.8
7 – April 23, 2015 to April 20, 2016	0.38	0.25	67.7	68.3
8 – April 21, 2016 to April 18, 2017	0.96	0.29	45.8	47.1
9 – April 19, 2017 to December 20, 2017	0.16	0.12	34.6	34.9
10 – April 23, 2018 to December 27, 2018	0.02	0.08	35.8	35.9
11 – April 29, 2019 to December 31, 2019	0.004	0.09	27.8	27.9
12 – April 2, 2020 to December 21, 2020	0.011	0.16	49.1	49.3

*Direct refers to the physical removal of LNAPL from the wells on the Site, either by bailing or the automated recovery system. SVE refers to physical venting of the LNAPL.

As shown in the data calculations in Appendix C, the highest rate of removal of fuel oil during the current reporting period was achieved via biodegradation at biovent wells MW-501 and RW-3. The estimated biodegradation removal rate at these two wells was approximately 9 and 19 pounds per 24-hour vent cycle, whereas the other wells had biodegradation removal rates of between 4 and 7 pounds per 24-hour vent cycle. The relative higher rate of removal at RW-3 is consistent with the fact that it is operated within the areas of the former UST, while the elevated rate at MW-501 is consistent with its location in the other release area (boiler area). Significantly more residual oil would be expected to be present within the radius of bioventing influence of these two SVE wells, than the zones of the other SVE wells.

The rate of fuel oil removal by the bioremediation system during this reporting period (April 2020 to December 2020) was the highest observed since 2016, consistent with the drought conditions that occurred this summer and fall. LNAPL was removed over the nine-month period of operation at a mean rate of approximately 49 pounds per day or 217 gallons per month, which is comparable to the average removal rate of 224 gallons per month observed since bioremediation began in 2010. This removal rate over this reporting period shows an increase from the past three years, likely due to the dry weather conditions causing the water table to be at its lowest since system operation began, exposing more of the unsaturated zone to direct bioventing. Figure 3 shows that the adoption of bioremediation in 2010 increased the rate of removal by an order of magnitude over the groundwater pump and treat system removal rate reported between 2005 and 2010, and that only in 2018/2019 had the rate of removal begun to decline. With the exception of the decline after the first six months of biovent system operation from approximately 68 pounds per day to approximately 38 pounds per day over the period from May 2011 through April 2012, the removal rates remained above 60 pounds per day over a three-year period (December 2012 through April 2016), declining only recently to the approximately 35, 36, and 28 pounds per day in 2017, 2018, and 2019, respectively, and most recently increasing to 49 pounds per day in 2020 due to drought conditions. We believe the decline in removal rates during the second and third reporting periods was attributable to higher than normal groundwater levels, which reduced the residual oil exposed in the unsaturated zone. With the

exception of the increase in 2020 (drought) we appear to be beginning to observe a significant sustained decline in the rate of removal, which we expected would occur when the residual measurable LNAPL had been reduced to low levels (as discussed below), such that continued recoating of exposed soil no longer occurs to the same extent within the unsaturated zone with seasonal fluctuations in the groundwater table.

LNAPL continues to be observed in the monitoring wells located in the two fuel oil release areas (former UST area and the outdoor courtyard adjacent to the boiler room) and the area downgradient of these areas on the east and south sides of the Middle School. The wells with detectable LNAPL on one or more dates during the current reporting period included MW-203, MW-301, MW-402, MW-500, MW-501, and SVE-1 as identified (shaded data) in Table 8A. These wells are located within the historical limits of the LNAPL, as shown on Figure 2. The monitoring and recovery wells with measurable LNAPL are located within the estimated radius of influence of the product recovery/biovent wells. As the remedial effort continues, the average thickness of recoverable product is expected to continue an overall gradual decline, with seasonal increases and decreases, corresponding to groundwater elevation, which may temporarily distort this long-term trend.

As is evident from a review of the data in Table 8B and in Figure 5, which presents the maximum observed LNAPL thickness at monitoring wells that have had significant measurable LNAPL in the past, there has been an overall decline in LNAPL thickness in Site monitoring wells, though there have been, as expected, significant fluctuations in thickness from year to year rather than a steady consistent drop. This variation in thickness is due to the complexities of LNAPL distribution and the mechanisms that allow for the fuel oil to accumulate in an observation well. One of the key variables is the relative level of the groundwater table, with thickness often increasing at times of lower groundwater elevation. As shown in Figure 5, the mean of the annual LNAPL thickness has declined and should continue to decline with the significant volumes of fuel oil that continue to be removed each year. We have also observed markedly lower fuel oil volumes recovered directly from the recovery wells, as illustrated in Figure 4, which also provides the trend in the annual average of the monthly LNAPL readings in wells. Up until 2018, the one exception has been the continued recovery of LNAPL from MW-402 and MW-501 at rates that were only moderately lower than recovered in 2009 and 2010. These wells are located in the boiler release area. The current reporting period (April 2, 2020 to December 21, 2020) showed an increase in LNAPL thickness in several wells from the more recent years, likely due to the lowered water table resulting in increased exposure of the unsaturated zone, supported by the fact that LNAPL thicknesses did not significantly increase until the water table dropped precipitously in October. Even with these exceptions included these data show that there is much less measurable and recoverable fuel oil remaining in the subsurface at the Site than prior to bioventing initiation in 2004.

3.50 GAC UNIT MAINTENANCE

Replacement of the carbon in the two – 1,000-pound granular activated carbon vessels has not been necessary to date (since start-up). As indicated in the February 14, 2011 “Registration of Air Pollution Control Equipment” report, the calculated rates of removal of VOCs were well below the criteria specified in RIDEM Air Pollution Regulation #22. Given the initial estimates of VOC emission rates and the fact that VOC levels in the extracted soil vapor have continued to decline, GZA believes that GAC treatment was and is still not required under existing air pollution regulations. However, as a precaution against nuisance odors emitting from the system, GZA recommended and still recommends continued use of the GAC unit.

4.00 GROUNDWATER ANALYTICAL RESULTS

The results of the laboratory analysis of groundwater samples collected on April 23, 2021 from downgradient monitoring well MW-701 were consistent with the historical characterization of Site conditions, as follows:

- Low VOC Concentrations downgradient of plume – below GA Groundwater Objectives: During this period, as shown in Table 14, VOC concentrations at downgradient perimeter well MW-701, which have been below GA Groundwater Objectives for over 11 years, were below detection limits and the GA Objectives; and

- Low TPH Concentration downgradient of plume: Consistent with prior monitoring the TPH concentration was relatively low at downgradient perimeter monitoring well MW-701, only 1.1 mg/L. The groundwater at this well also exhibited aerobic conditions (moderate dissolved oxygen level, 3.4 mg/L) and positive ORP readings, conditions indicating the wells are beyond the limits of the dissolved petroleum hydrocarbon plume.

We believe these monitoring results are continued evidence of the natural attenuation of the No. 2 fuel oil dissolved plume; there is no evidence of migration of significant levels of VOCs beyond the historical limits of the plume. If natural attenuation mechanisms were not significant, at the groundwater seepage rates calculated for the Site by Beta[12] (approximately 140 feet per year[13]), dissolved VOCs and TPH would have had the potential to move from the area of MW-400 to and beyond the area of downgradient well MW-701 many years ago, since well MW-701 is only approximately 100 feet downgradient of the MW-400, the well that previously exhibited VOC concentrations above Objectives (see Table 10).

5.00 CONCLUSIONS/DISCUSSION/RECOMMENDATIONS

The SVE and Product Recovery system, which was installed in December 2010 in accordance with the RIDEM approved CAP and has operated over approximately a ten-year period, is estimated to have removed a total of 166,598 pounds (24,499 gallons) of petroleum hydrocarbons from the subsurface and the remedial system and natural processes have controlled plume migration. The majority (over 99%) of this removal has been achieved via aerobic biodegradation in the subsurface. This past reporting year, only a very small amount of LNAPL (0.4 gallons) continued to accumulate in the Site wells and require physical removal. Figure 5 shows that maximum measured LNAPL thickness has been reduced from over 8 feet to just over a foot, with six wells continuing to have measurable LNAPL over the last year of remediation. No measurable LNAPL was observed this reporting period in the monitoring wells located outside the historical extent of the plume, or even at the wells located inside the downgradient edge. Groundwater conditions at and downgradient of the historical limits of the LNAPL and dissolved petroleum plume continue to show the absence of dissolved VOC concentrations above RIDEM Method 1 GA Objectives at the downgradient (perimeter) wells. There has been no exceedance of GA Groundwater Objectives in at least ten years of monitoring the downgradient wells and VOC levels have not been observed in groundwater at two of the monitoring wells, MW-600 and MW-601, for the last ten years.

We are confident that the LNAPL and the dissolved petroleum plume are stable, that there is no threat to public health or the environment, even if active remediation were halted now. However, RIDEM, as indicated in their April 28, 2020 letter, is requiring continued active remediation until we achieve removal of the remaining measurable LNAPL and demonstrate that GA Groundwater Objectives are met in the groundwater across the Site, given the sensitivity of the Site.

[12] Beta provided these calculations for the UST area in their November 1999 Site Investigation Report/CAP using a hydraulic conductivity of 30 feet per day, hydraulic gradient of 0.005 (for UST area not entire plume), and porosity of 0.4.
[13] We note that at the measured hydraulic conductivity of 30 feet per day, observed hydraulic gradient of 0.015 for the length of plume, and at an assumed porosity of 0.2 the groundwater seepage velocity would be 821 feet per year.

Given RIDEM's stated position, we recommend the continued operation of the remedial system operation and monitoring program, as described below:

- Continue to operate the SVE blower from April through December to promote aerobic biodegradation at the former UST and boiler manhole locations and in the remaining area of measurable LNAPL (area of SVE-1 and MW-500);
- Monitor the system operation every month, consistent with the current monitoring program;
- Continue to monitor VOC and TPH concentrations at MW-701 in April of each year to assess if plume control continues to be maintained: this is the only downgradient well that had continued to have low but detectable VOC levels. The other two downgradient monitoring wells had not had detectable VOC levels in at least the prior ten years and there had not been an indication of a rise in TPH concentrations at these wells; and
- Continue to provide annual reports to RIDEM on the progress of remediation and monitoring.

Once we observe that there is no measurable LNAPL in the monitoring and recovery wells at the Site, we would collect groundwater samples from other representative well locations to demonstrate to RIDEM that GA Groundwater Objectives have been met.

6.00 SCHEDULE

The next annual groundwater monitoring event is scheduled to be performed in April 2022. The results from this round will be presented in the next annual status report, along with the results of the monthly monitoring of the SVE and product recovery systems.

TABLES

TABLE 1

SVE-1
Summary of Soil Vapor Monitoring
December 2010 to Present

Chariho Regional Middle School
Richmond, Rhode Island

Date	Vacuum (inches of H_2O)	Flow (CFM)	TVOC (ppmv)	O_2 (%)	CO_2 (%)	LEL (%)
12/14/2010	3	15	30	17.7	2.7	0
12/21/2010	4	15	92	18.6	1.6	0
12/29/2010	0	15	4	19.7	1.2	0
1/20/2011	1	15	7	19.9	1.0	0
2/24/2011	3	15	2	20.6	0.4	0
3/17/2011	3	15	0.0	20.5	0.2	0
4/19/2011	2	23	0.3	20.5	0.2	0
5/25/2011	2	22	0.0	20.7	0.1	0
6/21/2011	3	24	0.0	20.3	0.4	0
7/28/2011	2	20	2.0	20.6	0.2	0
8/24/2011	2	21	1.2	20.4	0.3	0
9/12/2011	1	17	0.0	20.1	0.7	0
10/25/2011	1	18	0.0	20.6	0.3	0
11/22/2011	1	18	0.0	20.5	0.4	0
12/23/2011	0	17	0.2	20.2	0.7	0
1/13/2012	1	18	0.0	20.4	0.4	0
2/28/2012	1	15	0.0	20.8	0.1	0
3/27/2012	1	20	0.0	20.5	0.4	0
4/17/2012	1	18	0.0	20.4	0.2	0
5/30/2012	2	17	0.0	20.5	0.3	0
6/20/2012	2	17	0.0	20.4	0.3	0
7/19/2012	1	17	0.0	20.3	0.4	0
8/21/2012	1	19	0.0	20.2	0.5	0
9/24/2012	2	20	0.4	20.5	0.4	0
10/10/2012	2	20	1.4	20.4	0.6	0
11/15/2012	2	20	0.0	19.9	0.9	0
12/3/2012	1	16	0.0	20.1	0.6	0
1/23/2013	--	16	--	--	--	--
2/20/2013	2	19	0.0	19.4	1.3	0
3/26/2013	1	15	0.0	20.1	0.5	0
4/15/2013	2	18	0.4	20.4	0.2	0
5/31/2013	2	20	1.6	20.3	0.3	0
6/24/2013	1	20	0.6	20.2	0.3	0
7/29/2013	2	18	0.7	20.5	0.2	0
8/14/2013	2	20	1.1	20.2	0.5	0
9/30/2013	2	21	2.6	20.4	0.4	0
10/29/2013	1	21	6.4	19.5	1.4	0
11/26/2013	1	20	3.1	19.9	0.8	0
12/20/2013	2	18	1.7	19.1	1.8	0
1/28/2014	1	18	0.2	20.0	0.8	0

TABLE 1

SVE-1
Summary of Soil Vapor Monitoring
December 2010 to Present

Chariho Regional Middle School
Richmond, Rhode Island

Date	Vacuum (inches of H_2O)	Flow (CFM)	TVOC (ppmv)	O_2 (%)	CO_2 (%)	LEL (%)
3/24/2014	2	18	0.6	20.1	0.6	0
4/15/2014	2	18	8.6	20.2	0.6	0
6/24/2014	2	21	0.1	20.5	0.2	0
7/24/2014	2	18	0.7	20.5	0.3	0
8/27/2014	2	20	8.2	20.0	0.8	0
9/29/2014	2	21	23	20.3	0.4	0
10/8/2014	2	21	30	20.2	0.6	0
11/26/2014	1	20	54	18.3	1.9	0
12/22/2014	2	20	11	20.3	0.4	0
2/25/2015	4	20	2.5	20.5	0.3	0
4/22/2015	2	20	1.7	20.3	0.2	0
6/24/2015	2	19	0.4	20.3	0.3	0
7/20/2015	2	18	0.2	20.6	0.3	0
8/28/2015	2	18	3.2	20.5	0.4	0
9/23/2015	2	18	16	20.0	0.5	0
10/29/2015	1	18	19	19.9	0.5	0
11/25/2015	1	18	30	19.9	1.0	0
12/28/2015	2	18	15	19.8	1.1	0
4/20/2016	2	21	0.0	19.8	0.8	0
6/22/2016	2	20	0.8	20.6	0.3	0
7/22/2016	2	20	0.6	20.7	0.2	0
8/26/2016	2	20	8.6	20.6	0.3	0
9/29/2016	3	21	18	20.5	0.4	0
10/27/2016	3	21	27	20.1	0.8	0
11/17/2016	2	23	12	20.2	0.7	0
12/13/2016	2	23	1.9	19.6	1.2	0
4/18/2017	2	17	0.2	20.6	0.3	0
6/22/2017	2	17	0.4	20.7	0.2	0
7/17/2017	1	17	0.6	20.7	0.2	0
8/31/2017	2	17	1.2	20.2	0.4	0
9/28/2017	2	20	0.1	20.4	0.5	0
10/27/2017	2	18	7.8	20.4	0.5	0
11/28/2017	2	18	2.8	20.3	0.6	0
12/20/2017	2	18	2.4	20.3	0.6	0
4/23/2018	1	20	5.5	20.5	0.4	0
6/6/2018	2	21	1.1	20.6	0.3	0
7/18/2018	2	20	1.0	20.6	0.2	0
8/24/2018	2	20	0.2	20.6	0.3	0
9/25/2018	2	22	3.6	19.0	1.6	0
10/22/2018	2	21	3.4	20.5	0.4	0
11/26/2018	2	21	0.7	20.5	0.4	0

TABLE 1

SVE-1
Summary of Soil Vapor Monitoring
December 2010 to Present

Chariho Regional Middle School
Richmond, Rhode Island

Date	Vacuum (inches of H_2O)	Flow (CFM)	TVOC (ppmv)	O_2 (%)	CO_2 (%)	LEL (%)
12/27/2018	2	21	0.8	20.7	0.2	0
4/29/2019	2	18	0.0	20.4	0.5	0
6/18/2019	1	17	1.7	20.7	0.2	0
7/31/2019	1	16	0.0	20.7	0.2	0
8/30/2019	2	16	4.3	20.7	0.2	0
9/16/2019	2	16	6.4	20.4	0.3	0
10/28/2019	2	17	3.6	20.5	0.4	0
11/20/2019	3	17	0.1	20.4	0.5	0
12/31/2019	2	17	0.0	20.3	0.5	0
4/2/2020	2	18	2.2	20.2	0.7	0
6/8/2020	4	28	2.3	20.0	0.6	0
7/29/2020	3	28	2.2	19.4	0.8	0
8/25/2020	3	28	7.4	20.1	0.6	0
9/22/2020	3	28	14	20.3	0.5	0
10/27/2020	3	27	7.7	20.3	0.6	0
11/17/2020	4	26	2.6	20.3	0.5	0
12/21/2020	1	26	4.5	20.8	0.0	0
4/23/2021	3	29	2.3	19.0	1.4	0

Date	Average					Total Run Time (days)
	Flow (cfm)	Vacuum (in H_2O)	TVOC [(1)] (ppm)	O_2 (%)	CO_2 (%)	
12/14/10 - 5/25/11	17	2	17	19.8	0.9	162
5/26/11 - 11/22/11	19	2	0.5	20.4	0.4	180
11/23/11 - 4/17/12	17	1	0.04	20.5	0.4	147
4/18/12 - 12/3/12	18	1	0.2	20.3	0.5	230
12/4/13 - 12/20/13	19	2	1.7	20.0	0.7	381
12/21/13 - 4/22/15	19	2	11.6	20.1	0.6	452
4/23/15 - 4/20/16	18	2	10.4	20.1	0.6	364
4/21/16 - 4/18/17	21	2	8.7	20.4	0.5	363
4/19/17 - 12/20/17	18	2	2.2	20.4	0.4	246
4/23/18 - 12/27/18	21	2	2.0	20.4	0.5	249
4/29/19 - 12/31/19	17	2	2.0	20.5	0.4	247
4/2/20 - 12/21/20	26	3	5.3	20.2	0.5	264

Notes:

1. TVOC means Total Volatile Organic Compounds. Readings are in parts per million on volume to volume basis (ppmv).
2. TVOC concentrations were determined using a Photoionization Detector (PID), equipped with a 10.6 ev lamp.
3. O_2, CO_2, LEL, CH_4 measurements were determined using a LANDTEC GA90 - Infrared gas analyzer.
4. "--" means not monitored

TABLE 2

SVE-2
Summary of Soil Vapor Monitoring
December 2010 to Present

Chariho Regional Middle School
Richmond, Rhode Island

Date	Vacuum (inches of H_2O)	Flow (CFM)	TVOC (ppmv)	O_2 (%)	CO_2 (%)	LEL (%)
12/14/2010	4	15	0.4	19.4	1.7	0
12/21/2010	2	15	3.5	19.7	1.0	0
12/29/2010	0	15	2.0	20.0	0.9	0
1/20/2011	2	15	11	20.0	1.0	0
2/24/2011	4	15	1.8	20.7	0.4	0
3/17/2011	4	15	0.0	20.6	0.0	0
4/19/2011	3	23	0.2	20.5	0.3	0
5/25/2011	3	22	0.0	20.5	0.2	0
6/21/2011	4	24	0.0	20.3	0.4	0
7/28/2011	2	20	0.0	20.7	0.2	0
8/24/2011	2	21	0.5	20.2	0.4	0
9/12/2011	2	17	0.0	20.1	0.6	0
10/25/2011	2	18	0.0	20.2	0.5	0
11/22/2011	1	18	0.0	20.5	0.0	0
12/23/2011	0	17	0.5	20.0	0.8	0
1/13/2012	1	18	0.4	20.2	0.6	0
2/28/2012	1	15	0.0	20.5	0.4	0
3/27/2012	2	20	0.0	20.5	0.4	0
4/17/2012	2	18	0.0	20.5	0.3	0
5/30/2012	2	17	0.0	20.2	0.5	0
6/20/2012	2	17	0.0	20.1	0.5	0
7/19/2012	1	17	0.0	20.2	0.5	0
8/21/2012	1	19	0.0	20.0	0.7	0
9/24/2012	2	20	0.0	20.4	0.6	0
10/10/2012	2	20	1.4	20.2	0.7	0
11/15/2012	1	20	0.0	20.2	0.6	0
12/3/2012	1	16	0.0	20.2	0.5	0
1/23/2013	--	16	--	--	--	--
2/20/2013	5	19	0.0	20.0	0.5	0
3/26/2013	2	15	0.0	20.3	0.5	0
4/15/2013	2	18	0.0	20.5	0.2	0
5/31/2013	2	20	0.4	20.4	0.4	0
6/24/2013	1	20	0.4	20.2	0.4	0
7/29/2013	2	18	0.6	20.4	0.5	0
8/14/2013	2	20	0.8	20.1	0.6	0
9/30/2013	2	21	0.3	20.5	0.4	0
10/29/2013	2	20	1.2	20.1	0.7	0
11/26/2013	1	20	1.2	20.4	0.6	0
12/20/2013	1	18	0.5	20.2	0.8	0
1/28/2014	0	18	0.0	20.4	0.5	0

TABLE 2

SVE-2
Summary of Soil Vapor Monitoring
December 2010 to Present

Chariho Regional Middle School
Richmond, Rhode Island

Date	Vacuum (inches of H_2O)	Flow (CFM)	TVOC (ppmv)	O_2 (%)	CO_2 (%)	LEL (%)
3/24/2014	1	18	0.4	20.4	0.4	0
4/15/2014	2	18	0.1	20.5	0.3	0
6/24/2014	2	21	0.0	20.4	0.4	0
7/24/2014	2	18	0.0	20.2	0.5	0
8/27/2014	2	19	0.0	20.2	0.7	0
9/29/2014	2	21	0.0	20.7	0.1	0
10/8/2014	2	21	1.6	20.7	0.1	0
11/26/2014	2	20	0.0	20.2	0.7	0
12/22/2014	2	20	0.0	20.5	0.3	0
2/25/2015	5	20	2.1	20.5	0.3	0
4/22/2015	2	20	1.4	20.3	0.4	0
6/24/2015	2	20	0.1	20.2	0.4	0
7/20/2015	2	19	0.3	20.7	0.4	0
8/28/2015	2	20	0.5	20.4	0.5	0
9/23/2015	2	20	2.6	20.2	0.5	0
10/29/2015	2	20	1.1	19.8	0.6	0
11/25/2015	2	20	2.5	20.3	0.6	0
12/28/2015	2	20	0.3	20.3	0.6	0
4/20/2016	2	21	0.2	20.2	0.7	0
6/22/2016	2	21	0.3	20.5	0.4	0
7/22/2016	2	21	0.8	20.5	0.4	0
8/26/2016	2	21	4.7	20.5	0.4	0
9/29/2016	3	22	0.7	20.5	0.4	0
10/27/2016	4	25	0.6	20.3	0.6	0
11/17/2016	2	24	0.6	20.4	0.5	0
12/13/2016	2	24	1.2	20.2	0.6	0
4/18/2017	2	21	0.1	20.6	0.3	0
6/22/2017	2	21	0.1	20.5	0.4	0
7/17/2017	2	21	0.2	20.5	0.4	0
8/31/2017	2	21	0.1	20.2	0.6	0
9/28/2017	1	17	2.7	20.1	0.5	0
10/27/2017	2	22	1.0	20.3	0.6	0
11/28/2017	2	20	0.5	20.3	0.6	0
12/20/2017	2	20	0.3	20.3	0.6	0
4/23/2018	1	17	0.8	20.2	0.7	0
6/6/2018	2	22	0.1	20.4	0.5	0
7/18/2018	2	21	0.1	20.5	0.3	0
8/24/2018	2	21	0.2	20.5	0.4	0
9/25/2018	2	21	0.9	20.0	0.9	0
10/22/2018	2	20	0.8	20.5	0.4	0
11/26/2018	2	20	0.0	20.5	0.4	0

TABLE 2

SVE-2
Summary of Soil Vapor Monitoring
December 2010 to Present

Chariho Regional Middle School
Richmond, Rhode Island

Date	Vacuum (inches of H_2O)	Flow (CFM)	TVOC (ppmv)	O_2 (%)	CO_2 (%)	LEL (%)
12/27/2018	2	20	0.2	20.7	0.2	0
4/29/2019	3	23	0.0	20.0	0.8	0
6/18/2019	2	22	0.0	20.0	0.5	0
7/31/2019	2	21	0.0	20.5	0.4	0
8/30/2019	2	21	0.5	20.4	0.5	0
9/16/2019	2	21	0.4	20.1	0.6	0
10/28/2019	2	21	0.8	20.4	0.5	0
11/20/2019	1	22	0.2	20.5	0.4	0
12/31/2019	1	22	0.0	20.3	0.6	0
4/2/2020	2	21	2.0	20.4	0.5	0
6/8/2020	1	12	0.3	20.1	0.6	0
7/29/2020	2	21	0.0	19.8	0.7	0
8/25/2020	2	22	0.2	20.3	0.5	0
9/22/2020	2	27	0.9	20.4	0.4	0
10/27/2020	3	26	0.7	20.5	0.4	0
11/17/2020	4	22	1.2	20.5	0.3	0
12/21/2020	4	22	0.5	20.8	0.0	0
4/23/2021	1	15	0.3	19.7	0.8	0

Date	Average					Total Run Time (days)
	Flow (cfm)	Vacuum (in H_2O)	TVOC [(1)] (ppm)	O_2 (%)	CO_2 (%)	
12/14/10 - 5/25/11	17	3	2.4	20.2	0.7	162
5/26/11 - 11/22/11	19	2	0.1	20.3	0.4	180
11/23/11 - 4/17/12	17	1	0.2	20.3	0.5	147
4/18/12 - 12/3/12	18	2	0.2	20.2	0.6	230
12/4/13 - 12/20/13	19	2	0.5	20.3	0.5	381
12/21/13 - 4/22/15	19	2	0.5	20.4	0.4	452
4/23/15 - 4/20/16	20	2	1.0	20.3	0.5	364
4/21/16 - 4/18/17	22	2	1.1	20.4	0.5	363
4/19/17 - 12/20/17	20	2	0.7	20.3	0.5	246
4/23/18 - 12/27/18	20	2	0.4	20.4	0.5	249
4/29/19 - 12/31/19	21	2	0.3	20.3	0.5	247
4/2/20 - 12/21/20	22	3	0.7	20.4	0.4	264

Notes:

1. TVOC means Total Volatile Organic Compounds. Readings are in parts per million on volume to volume basis (ppmv).
2. TVOC concentrations were determined using a Photoionization Detector (PID), equipped with a 10.6 ev lamp.
3. O_2, CO_2, LEL, CH_4 measurements were determined using a LANDTEC GA90 - Infrared gas analyzer.
4. "--" means not monitored

TABLE 3

SVE-3
Summary of Soil Vapor Monitoring
December 2010 to Present

Chariho Regional Middle School
Richmond, Rhode Island

Date	Vacuum (inches of H_2O)	Flow (CFM)	TVOC (ppmv)	O_2 (%)	CO_2 (%)	LEL (%)
12/14/2010	10	10	40	16.6	3.7	0
12/21/2010	10	10	48	19.1	1.9	0
12/29/2010	10	10	57	19.2	1.7	0
1/20/2011	13	10	1.3	20.2	0.4	0
2/24/2011	8	10	0.7	20.3	0.6	0
3/17/2011	10	10	0.7	20.3	0.6	0
4/19/2011	10	21	0.6	20.8	0.2	0
5/25/2011	9	16	0.0	20.7	0.1	0
6/21/2011	8	18	0.0	20.2	0.3	0
7/28/2011	7	20	0.0	20.6	0.2	0
8/24/2011	10	21	1.6	20.3	0.4	0
9/12/2011	8	17	0.1	20.0	0.7	0
10/25/2011	5	19	0.0	20.1	0.6	0
11/22/2011	8	19	0.0	20.4	0.5	0
12/23/2011	11	17	0.5	19.7	0.8	0
1/13/2012	11	18	0.6	20.4	0.5	0
2/28/2012	2	15	0.0	20.6	0.3	0
3/27/2012	9	20	0.0	20.5	0.4	0
4/17/2012	6	18	0.0	20.3	0.4	0
5/30/2012	9	17	0.0	20.7	0.2	0
6/20/2012	7	17	0.0	20.4	0.3	0
7/19/2012	8	17	0.0	20.4	0.3	0
8/21/2012	8	19	0.0	20.4	0.3	0
9/24/2012	8	20	0.0	20.4	0.4	0
10/10/2012	7	20	0.0	20.0	1.0	0
11/15/2012	7	20	0.0	19.2	1.3	0
12/3/2012	7	16	0.0	19.8	0.8	0
1/23/2013	6	16	0.0	19.2	1.1	0
2/20/2013	7	18	0.0	20.4	0.6	0
3/26/2013	8	15	0.0	20.0	0.9	0
4/15/2013	9	18	0.0	20.2	0.5	0
5/31/2013	9	20	0.7	20.4	0.2	0
6/24/2013	9	20	0.9	20.2	0.4	0
7/29/2013	9	18	1.1	20.4	0.2	0
8/14/2013	8	20	1.5	19.4	0.7	0
9/30/2013	7	21	0.4	20.0	0.7	0
10/29/2013	6	20	1.1	18.6	2.2	0
11/26/2013	7	20	0.4	20.2	0.8	0
12/20/2013	9	19	0.4	20.0	0.9	0
1/28/2014	6	19	0.0	20.0	0.8	0

TABLE 3

SVE-3
Summary of Soil Vapor Monitoring
December 2010 to Present

Chariho Regional Middle School
Richmond, Rhode Island

Date	Vacuum (inches of H_2O)	Flow (CFM)	TVOC (ppmv)	O_2 (%)	CO_2 (%)	LEL (%)
3/24/2014	6	19	0.1	20.2	0.5	0
4/15/2014	8	18	0.2	20.6	0.2	0
6/24/2014	9	21	0.0	20.5	0.2	0
7/24/2014	8	18	0.0	20.4	0.4	0
8/27/2014	6	20	1.0	19.7	1.0	0
9/29/2014	2	21	0.9	20.7	0.1	0
10/8/2014	7	21	0.2	20.4	0.4	0
11/26/2014	10	20	0.0	20.7	0.1	0
12/22/2014	9	20	0.0	20.6	0.2	0
2/25/2015	10	20	0.5	20.4	0.3	0
4/22/2015	9	20	0.9	20.2	0.2	0
6/24/2015	9	21	0.0	20.3	0.3	0
7/20/2015	8	20	0.0	20.7	0.3	0
8/28/2015	8	22	0.0	20.4	0.4	0
9/23/2015	8	22	0.0	19.7	0.3	0
10/29/2015	6	20	0.6	20.3	0.4	0
11/25/2015	4	20	0.1	20.5	0.4	0
12/28/2015	8	21	0.0	20.3	0.5	0
4/20/2016	8	21	0.1	19.0	0.8	0
6/22/2016	8	20	0.1	20.7	0.2	0
7/22/2016	7	21	0.1	20.7	0.2	0
8/26/2016	8	21	2.0	20.6	0.3	0
9/29/2016	7	16	1.1	20.4	0.5	0
10/27/2016	5	18	0.0	20.1	0.8	0
11/17/2016	5	18	0.8	18.4	2.4	0
12/13/2016	5	18	0.1	19.9	1.0	0
4/18/2017	7	19	0.1	20.7	0.2	0
6/22/2017	8	18	0.1	20.5	0.4	0
7/17/2017	8	18	0.2	20.6	0.2	0
8/31/2017	7	20	0.2	19.4	0.8	0
9/28/2017	6	19	0.3	20.0	0.5	0
10/27/2017	9	18	0.2	20.1	0.6	0
11/28/2017	8	19	0.0	20.4	0.5	0
12/20/2017	8	19	0.6	20.4	0.5	0
4/23/2018	8	19	0.0	20.2	0.7	0
6/6/2018	9	18	0.1	20.7	0.2	0
7/18/2018	7	20	0.2	20.6	0.2	0
8/24/2018	8	20	0.2	20.8	0.1	0
9/25/2018	7	21	0.1	18.7	1.3	0
10/22/2018	8	19	0.0	20.3	0.6	0
11/26/2018	8	19	0.0	20.4	0.5	0

TABLE 3

SVE-3
Summary of Soil Vapor Monitoring
December 2010 to Present

Chariho Regional Middle School
Richmond, Rhode Island

Date	Vacuum (inches of H_2O)	Flow (CFM)	TVOC (ppmv)	O_2 (%)	CO_2 (%)	LEL (%)
12/27/2018	8	19	0.1	20.7	0.2	0
4/29/2019	9	21	0.0	20.1	0.8	0
6/18/2019	10	22	0.3	20.7	0.2	0
7/31/2019	10	21	0.0	20.8	0.1	0
8/30/2019	10	21	0.6	20.8	0.1	0
9/16/2019	9	22	0.2	20.5	0.3	0
10/28/2019	8	19	0.1	20.2	0.7	0
11/20/2019	7	19	1.1	20.1	0.7	0
12/31/2019	13	19	0.0	19.8	1.0	0
4/2/2020	4	14	0.1	19.8	1.1	0
6/8/2020	4	12	0.7	19.1	0.8	0
7/29/2020	3	7	0.0	17.6	1.6	0
8/25/2020	3	10	0.5	19.6	1.0	0
9/22/2020	3	11	1.1	20.3	0.5	0
10/27/2020	1	8	0.3	20.2	0.7	0
11/17/2020	1	10	0.0	20.2	0.6	0
12/21/2020	2	10	0.3	20.8	0.0	0
4/23/2021	5	15	0.0	17.4	2.4	0

Date	Average					Total Run Time (days)
	Flow (cfm)	Vacuum (in H_2O)	TVOC [(1)] (ppm)	O_2 (%)	CO_2 (%)	
12/14/10 - 5/25/11	12	10	19	19.7	1.2	162
5/26/11 - 11/22/11	19	8	0.3	20.3	0.5	180
11/23/11 - 4/17/12	17	8	0.2	20.3	0.5	147
4/18/12 - 12/3/12	18	7	0.0	20.2	0.6	230
12/4/13 - 12/20/13	19	8	0.5	19.9	0.8	381
12/21/13 - 4/22/15	20	8	0.3	20.4	0.4	452
4/23/15 - 4/20/16	21	7	0.1	20.2	0.4	364
4/21/16 - 4/18/17	19	6	0.5	20.2	0.7	363
4/19/17 - 12/20/17	18	8	0.2	20.2	0.5	246
4/23/18 - 12/27/18	19	8	0.1	20.3	0.5	249
4/29/19 - 12/31/19	20	10	0.3	20.4	0.4	247
4/2/20 - 12/21/20	10	2	0.4	19.7	0.8	264

Notes:

1. TVOC means Total Volatile Organic Compounds. Readings are in parts per million on volume to volume basis (ppmv).
2. TVOC concentrations were determined using a Photoionization Detector (PID), equipped with a 10.6 ev lamp.
3. O_2, CO_2, LEL, CH_4 measurements were determined using a LANDTEC GA90 - Infrared gas analyzer.
4. "--" means not monitored

TABLE 4

SVE-4
Summary of Soil Vapor Monitoring
December 2010 to Present

Chariho Regional Middle School
Richmond, Rhode Island

Date	Vacuum (inches of H_2O)	Flow (CFM)	TVOC (ppmv)	O_2 (%)	CO_2 (%)	LEL (%)
12/14/2010	10	15	50	13.0	6.6	2
12/21/2010	10	15	67	17.1	3.7	0
12/29/2010	8	15	57	17.0	3.0	0
1/20/2011	9	15	80	18.4	2.4	0
2/24/2011	7	15	1.1	19.7	1.2	0
3/17/2011	10	15	0.0	20.5	0.4	0
4/19/2011	9	23	0.6	20.5	0.6	0
5/25/2011	9	19	0.0	20.4	0.3	0
6/21/2011	8	20	0.0	20.0	0.6	0
7/28/2011	7	20	0.0	20.2	0.6	0
8/24/2011	10	21	1.4	20.0	0.8	0
9/12/2011	7	17	0.1	19.7	1.2	0
10/25/2011	6	19	0.0	19.6	1.2	0
11/22/2011	9	19	0.0	19.7	1.1	0
12/23/2011	11	17	0.7	19.8	1.1	0
1/13/2012	11	18	0.4	20.0	0.9	0
2/28/2012	3	15	0.0	20.3	0.5	0
3/27/2012	8	20	0.0	20.2	0.5	0
4/17/2012	6	18	0.0	20.0	0.6	0
5/30/2012	2	17	0.0	20.5	0.4	0
6/20/2012	6	17	0.0	20.2	0.5	0
7/19/2012	6	17	0.0	20.0	0.8	0
8/21/2012	6	19	0.0	20.0	0.7	0
9/24/2012	6	20	0.9	20.1	0.9	0
10/10/2012	5	20	0.0	19.4	1.8	0
11/15/2012	5	20	0.0	16.7	2.8	0
12/3/2012	5	16	0.0	18.7	1.7	0
1/23/2013	6	16	0.0	16.0	3.0	0
2/20/2013	5	19	0.0	17.7	3.0	0
3/26/2013	7	15	0.1	19.0	1.7	0
4/15/2013	7	18	0.1	20.0	0.7	0
5/31/2013	6	20	1.8	19.8	0.8	0
6/24/2013	7	20	0.5	19.7	0.7	0
7/29/2013	7	18	1.0	20.2	0.6	0
8/14/2013	7	20	1.8	18.5	1.3	0
9/30/2013	7	21	1.5	19.3	1.3	0
10/29/2013	5	20	2.4	16.9	2.8	0
11/26/2013	5	20	2.1	18.7	1.9	0
12/20/2013	6	19	1.1	17.2	2.9	0
1/28/2014	7	19	0.0	20.9	0.0	0

TABLE 4

SVE-4
Summary of Soil Vapor Monitoring
December 2010 to Present

Chariho Regional Middle School
Richmond, Rhode Island

Date	Vacuum (inches of H_2O)	Flow (CFM)	TVOC (ppmv)	O_2 (%)	CO_2 (%)	LEL (%)
3/24/2014	7	19	0.2	19.8	0.8	0
4/15/2014	7	18	0.1	20.2	0.4	0
6/24/2014	8	21	0.0	20.3	0.4	0
7/24/2014	7	18	0.0	20.2	0.6	0
8/27/2014	5	19	3.2	19.4	1.6	0
9/29/2014	2	21	9.4	20.4	0.4	0
10/8/2014	8	21	11	19.3	1.4	0
11/26/2014	8	20	4.7	18.0	2.0	0
12/22/2014	9	20	2.3	19.7	1.0	0
2/25/2015	10	20	0.6	19.2	1.3	0
4/22/2015	8	20	1.0	19.7	0.4	0
6/24/2015	8	21	0.1	19.9	0.6	0
7/20/2015	7	25	0.0	20.2	0.6	0
8/28/2015	7	24	0.0	19.7	0.9	0
9/23/2015	7	24	0.5	18.9	1.1	0
10/29/2015	5	20	4.3	19.2	1.2	0
11/25/2015	4	23	0.1	19.2	1.7	0
12/28/2015	7	24	5.7	19.3	1.6	0
4/20/2016	6	21	0.1	18.9	0.8	0
6/22/2016	7	18	0.2	20.2	0.7	0
7/22/2016	6	19	0.0	20.3	0.6	0
8/26/2016	6	20	2.7	19.9	1.0	0
9/29/2016	2	17	6.5	19.1	1.5	0
10/27/2016	2	18	7.3	18.4	2.5	0
11/17/2016	5	18	1.6	20.1	0.8	0
12/13/2016	5	18	0.2	17.8	2.4	0
4/18/2017	9	21	0.1	20.6	0.3	0
6/22/2017	10	19	0.1	20.7	0.2	0
7/17/2017	9	20	0.2	20.4	0.4	0
8/31/2017	8	21	0.1	19.9	0.5	0
9/28/2017	7	23	0.4	19.4	0.9	0
10/27/2017	10	19	0.2	19.4	1.1	0
11/28/2017	9	20	0.1	19.9	1.0	0
12/20/2017	9	20	0.6	20.0	0.9	0
4/23/2018	9	20	0.2	20.1	0.8	0
6/6/2018	10	19	0.1	20.4	0.5	0
7/18/2018	9	19	0.2	20.5	0.4	0
8/24/2018	9	20	0.1	20.3	0.6	0
9/25/2018	8	22	0.3	17.3	1.6	0
10/22/2018	9	20	0.2	19.8	1.1	0
11/26/2018	9	20	0.0	20.0	0.9	0

TABLE 4

SVE-4
Summary of Soil Vapor Monitoring
December 2010 to Present

Chariho Regional Middle School
Richmond, Rhode Island

Date	Vacuum (inches of H_2O)	Flow (CFM)	TVOC (ppmv)	O_2 (%)	CO_2 (%)	LEL (%)
12/27/2018	9	20	0.1	20.3	0.6	0
4/29/2019	9	19	0.0	20.2	0.6	0
6/18/2019	11	20	0.0	20.3	0.4	0
7/31/2019	10	20	0.0	20.6	0.3	0
8/30/2019	9	21	0.7	20.5	0.4	0
9/16/2019	10	20	0.5	20.0	0.7	0
10/28/2019	11	18	0.1	20.0	0.9	0
11/20/2019	8	18	0.9	20.0	0.9	0
12/31/2019	16	18	0.0	19.8	0.8	0
4/2/2020	5	21	0.1	19.9	1.0	0
6/8/2020	4	12	2.9	19.3	0.6	0
7/29/2020	3	7	0.0	17.9	1.4	0
8/25/2020	3	11	0.2	19.3	1.3	0
9/22/2020	2	12	1.0	19.9	0.9	0
10/27/2020	1	7	1.4	19.4	1.3	0
11/17/2020	1	11	0.0	19.4	1.4	0
12/21/2020	1	11	0.4	20.8	0.0	0
4/23/2021	5	13	0.0	17.6	1.6	0

Date	Average					Total Run Time (days)
	Flow (cfm)	Vacuum (in H_2O)	TVOC [(1)] (ppm)	O_2 (%)	CO_2 (%)	
12/14/10 - 5/25/11	16	9	32	18.3	2.3	162
5/26/2011 - 11/22/11	19	8	0.3	19.9	0.9	180
11/23/11 - 4/17/12	17	8	0.2	20.1	0.7	147
4/18/12 - 12/3/12	18	5	0.1	19.5	1.2	230
12/4/13 - 12/20/13	19	6	1.0	18.6	1.7	381
12/21/13 - 4/22/15	20	7	2.7	19.8	0.9	452
4/23/15 - 4/20/16	23	7	1.4	19.4	1.1	364
4/21/16 - 4/18/17	19	5	2.3	19.6	1.2	363
4/19/17 - 12/20/17	20	9	0.2	20.0	0.7	246
4/23/18 - 12/27/18	20	9	0.2	19.8	0.8	249
4/29/19 - 12/31/19	19	11	0.3	20.2	0.6	247
4/2/20 - 12/21/20	11	2	0.8	19.5	1.0	264

Notes:

1. TVOC means Total Volatile Organic Compounds. Readings are in parts per million on volume to volume basis (ppmv).
2. TVOC concentrations were determined using a Photoionization Detector (PID), equipped with a 10.6 ev lamp.
3. O_2, CO_2, LEL, CH_4 measurements were determined using a LANDTEC GA90 - Infrared gas analyzer.
4. "--" means not monitored

TABLE 5

MW-501
Summary of Soil Vapor Monitoring
December 2010 to Present

Chariho Regional Middle School
Richmond, Rhode Island

Date	Vacuum (inches of H_2O)	Flow (CFM)	TVOC (ppmv)	O_2 (%)	CO_2 (%)	LEL (%)
12/14/2010	3	16	120	14.8	5.3	0
12/21/2010	3	15	120	17.8	2.5	0
12/29/2010	2	15	83	18.4	2.3	0
1/20/2011	2	15	150	18.8	1.8	0
2/24/2011	4	15	3.6	20.1	0.9	0
3/17/2011	4	15	1.3	20.3	0.5	0
4/19/2011	3	23	2.3	20.1	0.5	0
5/25/2011	3	22	1.8	20.4	0.3	0
6/21/2011	6	24	3.2	20.1	0.5	0
7/28/2011	3	20	2.1	20.4	0.5	0
8/24/2011	5	21	4.2	20.1	0.6	0
9/12/2011	2	17	25	15.9	4.1	0
10/25/2011	2	18	0.7	20.0	0.8	0
11/22/2011	4	18	0.3	20.1	0.6	0
12/23/2011	1	17	39	17.3	2.9	0
1/13/2012	1	18	2.0	19.6	1.1	0
2/28/2012	2	15	0.0	20.2	0.5	0
3/27/2012	2	20	0.3	20.0	0.7	0
4/17/2012	2	18	0.9	20.2	0.4	0
5/30/2012	2	17	1.6	20.2	0.5	0
6/20/2012	3	17	1.4	20.0	0.5	0
7/19/2012	4	17	1.1	20.2	0.7	0
8/21/2012	4	19	1.5	20.1	0.5	0
9/24/2012	4	20	1.4	20.0	1.0	0
10/10/2012	2	20	1.4	19.7	1.2	0
11/15/2012	1	20	4.5	16.8	2.9	0
12/3/2012	2	16	2.9	20.0	0.7	0
1/23/2013	2	16	0.0	18.2	2.7	0
2/20/2013	2	19	0.0	18.4	2.3	0
3/26/2013	--	--	--	--	--	--
4/15/2013	1	18	7.2	19.3	1.3	0
5/31/2013	2	20	8.5	20.2	0.5	0
6/24/2013	1	20	11	20.0	0.6	0
7/29/2013	3	18	14	20.2	0.4	0
8/14/2013	3	20	14	17.9	1.9	0
9/30/2013	3	21	3.1	20.0	0.6	0
10/29/2013	2	21	7.1	18.2	2.2	0
11/26/2013	2	20	5.0	20.3	0.6	0
12/20/2013	2	19	2.7	19.4	1.4	0
1/28/2014	1	19	13	19.7	1.4	0

TABLE 5

MW-501
Summary of Soil Vapor Monitoring
December 2010 to Present

Chariho Regional Middle School
Richmond, Rhode Island

Date	Vacuum (inches of H_2O)	Flow (CFM)	TVOC (ppmv)	O_2 (%)	CO_2 (%)	LEL (%)
3/24/2014	1	19	1.6	20.0	0.6	0
4/15/2014	2	18	2.9	20.0	0.8	0
6/24/2014	2	21	32	20.6	0.2	0
7/24/2014	2	18	33	20.3	0.4	0
8/27/2014	2	20	39	18.3	2.5	0
9/29/2014	3	21	64	20.1	0.5	0
10/8/2014	3	21	62	20.0	0.7	0
11/26/2014	2	20	17	18.0	2.1	0
12/22/2014	2	20	7.2	19.9	0.8	0
2/25/2015	2	20	8.5	18.6	1.5	0
4/22/2015	2	20	8.2	18.9	1.3	0
6/24/2015	2	19	5.6	19.7	0.5	0
7/20/2015	3	18	4.6	20.3	0.5	0
8/28/2015	3	18	6.2	20.1	0.6	0
9/23/2015	2	20	15	20.0	0.6	0
10/29/2015	3	20	28	19.5	0.6	0
11/25/2015	2	21	5.2	20.4	0.5	0
12/28/2015	3	19	17	19.7	1.2	0
4/20/2016	2	21	1.1	18.4	1.7	0
6/22/2016	2	21	2.3	20.2	0.3	0
7/22/2016	3	20	3.8	20.6	0.3	0
8/26/2016	2	19	43	20.2	0.4	0
9/29/2016	2	21	31	20.4	0.5	0
10/27/2016	1	20	24	20.2	0.7	0
11/17/2016	2	19	11	20.1	0.8	0
12/13/2016	2	19	3.6	19.9	1.0	0
4/18/2017	2	21	5.4	20.7	0.2	0
6/22/2017	2	26	2.3	20.8	0.1	0
7/17/2017	3	25	14	20.8	0.1	0
8/31/2017	2	26	7.0	19.9	0.4	0
9/28/2017	1	25	7.0	20.2	0.4	0
10/27/2017	2	27	8.0	20.5	0.4	0
11/28/2017	2	25	1.1	20.5	0.4	0
12/20/2017	2	25	11	20.4	0.5	0
4/23/2018	1	25	1.3	20.4	0.5	0
6/6/2018	1	22	3.9	20.8	0.1	0
7/18/2018	2	21	9.2	20.5	0.1	0
8/24/2018	2	21	7.8	20.7	0.1	0
9/25/2018	1	22	3.8	19.5	1.3	0
10/22/2018	2	22	8.1	20.6	0.3	0
11/26/2018	2	22	2.9	20.6	0.3	0

TABLE 5

MW-501
Summary of Soil Vapor Monitoring
December 2010 to Present

Chariho Regional Middle School
Richmond, Rhode Island

Date	Vacuum (inches of H_2O)	Flow (CFM)	TVOC (ppmv)	O_2 (%)	CO_2 (%)	LEL (%)
12/27/2018	2	22	0.2	20.7	0.2	0
4/29/2019	1	20	0.0	20.7	0.2	0
6/18/2019	1	20	2.9	20.8	0.1	0
7/31/2019	2	18	0.0	20.8	0.0	0
8/30/2019	2	18	5.4	20.9	0.0	0
9/16/2019	2	18	7.7	20.7	0.1	0
10/28/2019	3	22	9.4	20.7	0.2	0
11/20/2019	3	19	1.3	20.6	0.3	0
12/31/2019	2	19	0.0	20.3	0.6	0
4/2/2020	2	21	4.2	19.8	1.1	0
6/8/2020	2	31	4.1	19.0	1.0	0
7/29/2020	2	25	5.0	18.4	1.3	0
8/25/2020	3	23	15	19.9	0.7	0
9/22/2020	2	26	8.7	20.4	0.4	0
10/27/2020	3	27	9.0	20.4	0.5	0
11/17/2020	1	24	1.4	20.4	0.4	0
12/21/2020	7	24	7.9	20.7	0.0	0
4/23/2021	3	30	6.0	17.0	3.5	0

Date	Average					Total Run Time (days)
	Flow (cfm)	Vacuum (in H_2O)	TVOC [(1)] (ppm)	O_2 (%)	CO_2 (%)	
12/14/10 - 5/25/11	17	3	60	18.8	1.8	162
5/26/2011 - 11/22/11	19	4	5.9	19.4	1.2	180
11/23/11 - 4/17/12	17	2	8.4	19.5	1.1	147
4/18/12 - 12/3/12	18	3	2.0	19.6	1.0	230
12/4/13 - 12/20/13	19	2	6.6	19.3	1.3	381
12/21/13 - 4/22/15	20	2	23.9	19.5	1.1	452
4/23/15 - 4/20/16	19	2	10.3	19.8	0.8	364
4/21/16 - 4/18/17	20	2	15.5	20.3	0.5	363
4/19/17 - 12/20/17	26	2	7.3	20.4	0.3	246
4/23/18 - 12/27/18	22	2	4.7	20.5	0.4	249
4/29/19 - 12/31/19	19	2	3.8	20.7	0.2	247
4/2/20 - 12/21/20	25	3	6.9	19.9	0.7	264

Notes:

1. TVOC means Total Volatile Organic Compounds. Readings are in parts per million on volume to volume basis (ppmv).
2. TVOC concentrations were determined using a Photoionization Detector (PID), equipped with a 10.6 ev lamp.
3. O_2, CO_2, LEL, CH_4 measurements were determined using a LANDTEC GA90 - Infrared gas analyzer.
4. "--" means not monitored

TABLE 6

RW-3
Summary of Soil Vapor Monitoring
December 2010 to Present

Chariho Regional Middle School
Richmond, Rhode Island

Date	Vacuum (inches of H_2O)	Flow (CFM)	TVOC (ppmv)	O_2 (%)	CO_2 (%)	LEL (%)
12/14/2010	12	15	--	8.9	10.1	19
12/21/2010	21	15	260	14.7	5.4	0
12/29/2010	26	15	220	15.9	3.8	0
1/20/2011	22	15	200	17.4	2.7	0
2/24/2011	23	15	2.2	19.9	0.8	0
3/17/2011	24	15	0.2	20.2	0.5	0
4/19/2011	12	18	2.1	20.5	0.5	0
5/25/2011	10	21	0.0	20.5	0.3	0
6/21/2011	10	19	1.4	19.5	0.9	0
7/28/2011	12	20	25	18.8	1.5	0
8/24/2011	12	21	70	18.7	1.8	0
9/12/2011	15	17	13	17.9	2.0	0
10/25/2011	13	18	0.0	20.2	0.7	0
11/22/2011	12	18	0.0	20.1	0.9	0
12/23/2011	12	17	26	11.3	5.7	0
1/13/2012	13	18	23	18.4	1.8	0
2/28/2012	14	15	0.3	20.2	0.7	0
3/27/2012	14	20	1.0	20.2	0.5	0
4/17/2012	12	18	0.0	19.7	0.7	0
5/30/2012	8	17	0.0	19.9	0.9	0
6/20/2012	9	17	1.4	19.2	1.1	0
7/19/2012	10	17	1.5	20.2	0.7	0
8/21/2012	10	19	26	19.2	1.4	0
9/24/2012	12	20	41	19.2	1.6	0
10/10/2012	10	20	14	19.5	1.8	0
11/15/2012	9	20	19	10.9	5.9	0
12/3/2012	15	16	31	19.4	1.1	0
1/23/2013	14	16	0.0	12.1	5.9	0
2/20/2013	10	19	9.0	14.8	3.8	0
3/26/2013	17	15	0.1	14.0	3.9	0
4/15/2013	10	18	2.1	20.1	0.8	0
5/31/2013	8	20	5.6	19.9	1.1	0
6/24/2013	8	20	2.1	19.5	1.2	0
7/29/2013	8	18	3.4	19.7	0.8	0
8/14/2013	10	20	6.6	14.7	3.5	0
9/30/2013	11	21	6.4	19.9	1.1	0
10/29/2013	10	21	5.4	17.1	2.1	0
11/26/2013	16	20	3.4	20.0	1.2	0
12/20/2013	12	19	4.8	12.2	6.1	0
1/28/2014	3	19	1.8	16.8	3.6	0

TABLE 6

RW-3
Summary of Soil Vapor Monitoring
December 2010 to Present

Chariho Regional Middle School
Richmond, Rhode Island

Date	Vacuum (inches of H_2O)	Flow (CFM)	TVOC (ppmv)	O_2 (%)	CO_2 (%)	LEL (%)
3/24/2014	11	19	1.4	20.0	0.8	0
4/15/2014	10	18	0.5	20.1	0.5	0
6/24/2014	8	21	2.8	20.2	0.4	0
7/24/2014	8	18	0.0	19.9	0.9	0
8/27/2014	8	20	12	17.5	3.8	0
9/29/2014	8	21	19	19.9	0.9	0
10/8/2014	8	21	23	19.6	1.0	0
11/26/2014	7	20	23	15.2	5.7	0
12/22/2014	8	20	8.2	18.3	2.2	0
2/25/2015	10	20	6.6	18.9	1.3	0
4/22/2015	8	20	6.0	17.4	2.5	0
6/24/2015	10	23	1.9	20.0	0.5	0
7/20/2015	10	24	1.5	20.5	0.6	0
8/28/2015	11	22	5.4	20.0	0.9	0
9/23/2015	10	21	7.4	19.1	1.0	0
10/29/2015	15	22	9.2	19.2	0.9	0
11/25/2015	12	22	7.7	19.9	1.0	0
12/28/2015	11	23	5.1	19.6	1.3	0
4/20/2016	5	20	0.4	14.5	4.0	0
6/22/2016	7	21	4.5	20.0	0.8	0
7/22/2016	7	20	2.5	20.1	0.6	0
8/26/2016	7	19	4.0	19.8	0.9	0
9/29/2016	11	20	4.2	19.7	1.1	0
10/27/2016	16	22	0.5	19.5	1.4	0
11/17/2016	9	23	6.8	19.6	1.3	0
12/13/2016	9	23	2.8	16.0	3.7	0
4/18/2017	7	18	0.6	20.6	0.3	0
6/22/2017	6	19	0.4	20.6	0.2	0
7/17/2017	6	19	0.7	20.3	0.5	0
8/31/2017	6	18	0.3	18.1	1.8	0
9/28/2017	6	18	0.7	17.6	1.7	0
10/27/2017	7	19	0.9	18.6	1.4	0
11/28/2017	6	19	0.2	20.1	0.7	0
12/20/2017	6	19	0.5	20.2	0.7	0
4/23/2018	1	18	0.0	20.6	0.3	0
6/6/2018	7	20	0.1	20.5	0.4	0
7/18/2018	7	18	0.4	20.2	0.5	0
8/24/2018	7	18	1.3	20.1	0.8	0
9/25/2018	7	19	3.2	12.7	4.9	0
10/22/2018	6	19	1.8	20.0	0.8	0
11/26/2018	6	19	1.9	20.4	0.5	0

TABLE 6

RW-3
Summary of Soil Vapor Monitoring
December 2010 to Present

Chariho Regional Middle School
Richmond, Rhode Island

Date	Vacuum (inches of H_2O)	Flow (CFM)	TVOC (ppmv)	O_2 (%)	CO_2 (%)	LEL (%)
12/27/2018	6	19	0.3	20.6	0.3	0
4/29/2019	7	21	0.0	20.2	0.7	0
6/18/2019	9	21	0.0	20.5	0.4	0
7/31/2019	10	19	0.0	20.7	0.2	0
8/30/2019	8	20	0.2	20.5	0.4	0
9/16/2019	9	20	1.3	20.2	0.6	0
10/28/2019	17	30	12	20.3	0.6	0
11/20/2019	13	22	13	20.2	0.6	0
12/31/2019	11	22	0.1	17.1	2.6	0
4/2/2020	4	16	0.2	19.5	1.4	0
6/8/2020	14	31	0.2	18.1	1.5	0
7/29/2020	7	26	0.4	13.3	3.9	0
8/25/2020	9	27	0.5	19.4	1.5	0
9/22/2020	9	28	1.2	20.0	0.9	0
10/27/2020	11	28	2.5	20.0	0.9	0
11/17/2020	16	26	0.5	20.1	0.9	0
12/21/2020	21	26	4.0	20.9	0.0	0
4/23/2021	10	29	2.9	14.1	5.2	0

Date	Average					Total Run Time (days)
	Flow (cfm)	Vacuum (in H_2O)	TVOC [(1)] (ppm)	O_2 (%)	CO_2 (%)	
12/14/10 - 5/25/11	16	19	98	17.3	3.0	162
5/26/2011 - 11/22/11	19	12	18	19.2	1.3	180
11/23/11 - 4/17/12	17	13	10	18.0	1.9	147
4/18/12 - 12/3/12	18	10	17	18.4	1.8	230
12/4/13 - 12/20/13	19	11	4.1	17.0	2.6	381
12/21/13 - 4/22/15	20	8	8.7	18.7	2.0	452
4/23/15 - 4/20/16	22	11	4.8	19.1	1.3	364
4/21/16 - 4/18/17	21	9	3.2	19.4	1.3	363
4/19/17 - 12/20/17	19	6	0.5	19.4	1.0	246
4/23/18 - 12/27/18	19	6	1.1	19.4	1.1	249
4/29/19 - 12/31/19	22	11	3.8	19.9	0.8	247
4/2/20 - 12/21/20	26	11	1.2	18.9	1.4	264

Notes:

1. TVOC means Total Volatile Organic Compounds. Readings are in parts per million on volume to volume basis (ppmv).
2. TVOC concentrations were determined using a Photoionization Detector (PID), equipped with a 10.6 ev lamp.
3. O_2, CO_2, LEL, CH_4 measurements were determined using a LANDTEC GA90 - Infrared gas analyzer.
4. "--" means not monitored

TABLE 7

COMBINED VENT SYSTEM FLOWS, VACUUMS AND TVOC READINGS

Chariho Regional Middle School
Richmond, Rhode Island

Date	Total Combine Flow			Effluent TVOC (ppmv)	Notes
	Flow (CFM)	Vacuum (in H_2O)	TVOC (ppmv)		
12/14/2010	112	14	--	0.0	Start up @ 09:30.
12/21/2010	117	27	5	0.0	
12/29/2010	108	28	9	0.0	
1/20/2011	127	25	35	0.0	
2/24/2011	117	37	3	0.0	
3/17/2011	117	26	0.2	0.0	
4/19/2011	140	15	2	0.0	
5/25/2011	135	13	0.0	0.0	
6/21/2011	144	12	0.9	0.0	
7/28/2011	117	20	0.4	0.0	
8/24/2011	124	17	3.3	0.0	
9/12/2011	99	23	13	0.0	
10/25/2011	108	29	0.0	0.0	
11/22/2011	104	39	0.0	0.0	
12/23/2011	99	39	18	0.0	
1/13/2012	108	39	1.7	0.0	
2/28/2012	90	41	1.5	5.6	
3/27/2012	117	22	1.0	1.6	
4/17/2012	108	31	0.4	3.3	
5/30/2012	102	30	0.0	2.6	
6/20/2012	104	28	0.0	0.0	
7/19/2012	104	22	0.0	0.0	
8/21/2012	112	23	0.0	0.0	
9/24/2012	117	20	2.8	1.8	
10/10/2012	117	23	0.0	0.0	
11/15/2012	121	22	0.0	1.9	
12/3/2012	99	20	2.9	5.6	
1/23/2013	99	34	0.0	0.0	
2/20/2013	112	24	0.0	0.0	
3/26/2013	90	28	0.1	0.0	
4/15/2013	117	20	2.7	8.3	
5/31/2013	117	18	4.9	15	
6/24/2013	117	17	3.1	15	
7/29/2013	105	18	4.5	9.1	
8/14/2013	117	21	6.5	3.9	
9/30/2013	126	21	5.5	7.7	
10/29/2013	126	19	5.7	1.8	
11/26/2013	117	30	4.1	2.5	
12/20/2013	112	29	1.7	1.0	
1/28/2014	108	44	2.1	0.0	
3/24/2014	99	40	1.0	5.1	Blower was down from 2/21/14 to 3/4/14 for repair.
4/15/2014	122	13	1.2	6.3	
6/24/2014	126	19	1.3	11	
7/24/2014	105	18	3.5	6.3	
8/27/2014	117	18	10	4.5	
9/29/2014	126	24	5.6	5.7	
10/8/2014	126	19	22	13	
11/26/2014	117	29	17	0.4	
12/22/2014	117	30	5.8	1.3	
2/25/2015	125	25	6.8	0.0	System down from 1/21/15 to 2/25/15 for repair.
4/22/2015	125	14	2.6	2.8	
6/24/2015	135	14	1.8	13	
7/20/2015	136	14	0.8	9.7	

TABLE 7

COMBINED VENT SYSTEM FLOWS, VACUUMS AND TVOC READINGS

Chariho Regional Middle School
Richmond, Rhode Island

Date	Total Combine Flow			Effluent TVOC (ppmv)	Notes
	Flow (CFM)	Vacuum (in H_2O)	TVOC (ppmv)		
8/28/2015	138	14	2.6	15	
9/23/2015	135	14	2.3	6.1	
10/29/2015	126	20	13	21	
11/25/2015	108	33	11	12	
12/28/2015	133	15	11	18	
4/20/2016	124	15	0.5	1.4	
6/22/2016	136	14	1.8	20	
7/22/2016	137	14	4.1	13	
8/26/2016	136	14	17	55	
9/29/2016	124	23	5.8	14	
10/27/2016	121	27	3.5	3.6	
11/17/2016	130	18	6.9	12	
12/13/2016	118	18	4.1	0.7	
4/18/2017	135	17	1.1	4.6	
6/22/2017	132	17	0.5	9.8	
7/17/2017	134	17	1.3	10.1	
8/31/2017	135	17	0.5	0.9	
9/28/2017	124	16	1.2	1.3	
10/27/2017	135	18	1.4	0.6	
11/28/2017	103	39	1.1	4.5	
12/20/2017	103	38	1.3	6.4	System shut down for winter.
4/23/2018	113	35	0.1	0.6	System restarted.
6/6/2018	135	18	0.9	2.8	
7/18/2018	135	17	0.4	8.2	
8/24/2018	135	17	2.0	5.4	
9/25/2018	120	18	2.8	0.4	
10/22/2018	113	30	2.4	1.4	
11/26/2018	109	31	2.6	1.2	
12/27/2018	117	32	0.6	0.5	System shut down for winter.
4/29/2019	109	21	0.0	0.0	System restarted.
6/18/2019	132	21	0.0	0.3	
7/31/2019	134	19	0.0	5.7	
8/30/2019	130	19	0.5	2.4	
9/16/2019	130	20	6.7	9.6	
10/28/2019	116	39	11	3.9	
11/20/2019	108	33	0.7	7.0	
12/31/2019	113	30	0.0	0.0	System shut down for winter.
4/2/2020	125	10	0.3	0.9	System restarted.
6/8/2020	115	18	0.3	0.5	Individual well flows adjusted.
7/29/2020	126	12	0.9	1.0	
8/25/2020	137	14	0.9	6.2	
9/22/2020	137	18	2.5	1.3	
10/27/2020	126	23	2.4	3.1	
11/17/2020	126	26	1.5	0.9	
12/21/2020	126	33	0.7	4.2	System shut down for winter.
4/23/2021	123	18	0.2	0.9	System restarted. Individual well flows adjusted.

Notes:

1. TVOC means Total Volatile Organic Compounds. Readings are in parts per million on volume to volume basis (ppmv).
2. TVOC concentrations were determined using a Photoionization Detector (PID), equipped with a 10.6 ev lamp.
3. "--" means not monitored

TABLE 8A
WATER AND PRODUCT LEVEL MEASUREMENTS
(DECEMBER 2010 TO APRIL 2021)
CHARIHO REGIONAL MIDDLE SCHOOL

455 Switch Road
Richmond, RI

WELL ID	MP (PVC) Elev. (ft) (g) Past [1]	MP (PVC) Elev. (ft) (g) Current [2]	S.G. [e]	December 14, 2010 Depth (ft) to Water	December 14, 2010 Product Thickness (ft)	December 14, 2010 GW Elev. (ft)	January 3, 2011 Depth (ft) to Water	January 3, 2011 Product Thickness (ft)	January 3, 2011 GW Elev. (ft)	January 20, 2011 Depth (ft) to Water	January 20, 2011 Product Thickness (ft)	January 20, 2011 GW Elev. (ft)	February 24, 2011 Depth (ft) to Water	February 24, 2011 Product Thickness (ft)	February 24, 2011 GW Elev. (ft)	March 17, 2011 Depth (ft) to Water	March 17, 2011 Product Thickness (ft)	March 17, 2011 GW Elev. (ft)	April 19, 2011 Depth (ft) to Water	April 19, 2011 Product Thickness (ft)	April 19, 2011 GW Elev. (ft)	May 25, 2011 Depth (ft) to Water	May 25, 2011 Product Thickness (ft)	May 25, 2011 GW Elev. (ft)
MW-102	--	96.37		Dry @ 16.35			Dry @ 16.35			--	--	--	--	--	--	15.63	ND	80.74	--	--	--	--	--	--
MW-103	88.45	99.89		21.32	ND	78.57	--	--	--	--	--	--	--	--	--	19.62	ND	80.27	--	--	--	--	--	--
MW-201	87.48	98.83		--	--	--	--	--	--	--	--	--	--	--	--	18.34	ND	80.49	--	--	--	--	--	--
MW-202	88.52	99.91		22.83	ND	77.08	--	--	--	--	--	--	--	--	--	20.52	ND	79.39	--	--	--	--	--	--
MW-203	90.52	102.82		26.00	**0.35**	77.11	26.05	**0.2**	76.93	26.30	**0.65**	77.05	25.68	**0.01**	77.15	23.73	**0.05**	79.13	23.54	ND	79.28	23.64	ND	79.18
MW-204	87.58	100.03		23.46	ND	76.57	23.25	ND	76.78	--	--	--	--	--	--	21.15	ND	78.88	--	--	--	--	--	--
MW-301	87.12	98.59		19.70	ND	78.89	19.85	ND	78.74	--	--	--	--	--	--	18.12	ND	80.47	--	--	--	--	--	--
MW-302	87.01	98.59		19.81	ND	78.78	19.9	ND	78.69	--	--	--	--	--	--	18.16	ND	80.43	--	--	--	--	--	--
MW-303	87.54	99.00		20.42	ND	78.58	20.45	ND	78.55	--	--	--	--	--	--	18.72	ND	80.28	--	--	--	--	--	--
MW-400	87.42	99.86		23.32	ND	76.54	23.12	ND	76.74	--	--	--	--	--	--	21.04	ND	78.82	--	--	--	--	--	--
MW-401	87.37	99.80		23.22	**0.62**	77.09	23.07	**0.05**	76.77	--	--	--	22.27	ND	77.53	20.96	ND	78.84	20.86	ND	78.94	20.81	ND	78.99
MW-402	88.69	99.87		22.73	**0.73**	77.74	23.14	**0.69**	77.30	23.18	**0.76**	77.31	22.30	**0.39**	77.89	20.57	ND	79.30	20.29	ND	79.58	20.16	ND	79.71
MW-500	89.86	102.53	0.82	26.21	**0.31**	76.57	25.77	**0.05**	76.80	26.20	**0.67**	76.88	24.98	**0.01**	77.56	23.62	ND	78.91	23.54	ND	78.99	23.50	**0.02**	79.05
MW-501	90.57	100.42		25.26	**0.16**	75.29	23.29	**0.05**	77.17	23.17	**0.17**	77.39	23.03	**0.16**	77.52	21.54	**0.01**	78.89	20.92	ND	79.50	20.90	**0.04**	79.55
MW-600 [3]	86.88	99.26		22.91	ND	76.43	22.63	ND	76.71	--	--	--	--	--	--	20.58	ND	78.76	--	--	--	--	--	--
MW-601	87.10	99.57		23.10	ND	76.47	22.82	ND	76.75	--	--	--	--	--	--	20.75	ND	78.82	--	--	--	--	--	--
MW-700	88.16	99.62		20.68	ND	78.94	--	--	--	--	--	--	--	--	--	19.03	ND	80.59	--	--	--	--	--	--
MW-701	86.59	99.03		22.66	ND	76.37	22.4	ND	76.63	--	--	--	--	--	--	20.29	ND	78.74	--	--	--	--	--	--
RW-2	87.96	99.35		20.36	ND	78.99	20.53	ND	78.82	--	--	--	--	--	--	18.81	ND	80.54	--	--	--	--	--	--
RW-3	89.67	100.46		Dry @ 20.70			Dry @ 20.70			--	--	--	--	--	--	Dry @ 19.15			--	--	--	--	--	--
RW-4	89.74	100.39		21.64	ND	78.75	21.72	ND	--	--	--	--	--	--	--	19.98	ND	80.41	--	--	--	--	--	--
SVE-1	--	100.81		26.17	**2.22**	76.46	24.88	**1.02**	76.77	24.45	**0.63**	76.88	23.26	ND	77.55	21.98	**0.05**	78.87	22.40	**0.66**	78.95	21.65	**0.01**	79.17
SVE-2	--	100.33		23.75	ND	76.58	23.55	ND	--	--	--	--	--	--	--	21.45	ND	78.88	--	--	--	--	--	--
SVE-3	--	100.80		20.90	ND	79.90	Dry @ 22.6			--	--	--	--	--	--	21.15	ND	79.65	20.91	ND	79.89	21.07	ND	79.73
SVE-4	--	99.85		22.71	ND	77.14	--	--	--	--	--	--	--	--	--	20.38	ND	79.47	--	--	--	--	--	--

WELL ID	MP (PVC) Elev. (ft) (g) Past [1]	MP (PVC) Elev. (ft) (g) Current [2]	S.G. [e]	June 21, 2011 Depth (ft) to Water	June 21, 2011 Product Thickness (ft)	June 21, 2011 GW Elev. (ft)	July 28, 2011 Depth (ft) to Water	July 28, 2011 Product Thickness (ft)	July 28, 2011 GW Elev. (ft)	August 24, 2011 Depth (ft) to Water	August 24, 2011 Product Thickness (ft)	August 24, 2011 GW Elev. (ft)	September 12, 2011 Depth (ft) to Water	September 12, 2011 Product Thickness (ft)	September 12, 2011 GW Elev. (ft)	October 25, 2011 Depth (ft) to Water	October 25, 2011 Product Thickness (ft)	October 25, 2011 GW Elev. (ft)	November 22, 2011 Depth (ft) to Water	November 22, 2011 Product Thickness (ft)	November 22, 2011 GW Elev. (ft)	December 23, 2011 Depth (ft) to Water	December 23, 2011 Product Thickness (ft)	December 23, 2011 GW Elev. (ft)
MW-102	--	96.37		15.46	ND	80.91	--	--	--	--	--	--	16.16	ND	80.21	--	--	--	--	--	--	14.46	ND	81.91
MW-103	88.45	99.89		19.50	ND	80.39	--	--	--	--	--	--	20.09	ND	79.80	--	--	--	--	--	--	18.55	ND	81.34
MW-201	87.48	98.83		18.19	ND	80.64	--	--	--	--	--	--	18.85	ND	79.98	--	--	--	--	--	--	17.24	ND	81.59
MW-202	88.52	99.91		20.67	ND	79.24	--	--	--	--	--	--	20.88	ND	79.03	--	--	--	--	--	--	19.46	ND	80.45
MW-203	90.52	102.82		24.03	**0.03**	78.81	24.86	**0.05**	78.00	24.45	**0.02**	78.39	24.26	**0.15**	78.68	24.10	**0.09**	78.79	23.85	**0.05**	79.01	23.70	ND	79.12
MW-204	87.58	100.03		21.47	ND	78.56	--	--	--	--	--	--	21.62	ND	78.41	--	--	--	--	--	--	20.27	ND	79.76
MW-301	87.12	98.59		18.59	ND	80.00	--	--	--	--	--	--	19.19	ND	79.40	--	--	--	--	--	--	17.54	ND	81.05
MW-302	87.01	98.59		18.05	ND	80.54	--	--	--	--	--	--	18.65	ND	79.94	--	--	--	--	--	--	17.06	ND	81.53
MW-303	87.54	99.00		17.95	ND	81.05	--	--	--	--	--	--	18.62	ND	80.38	--	--	--	--	--	--	17.03	ND	81.97
MW-400	87.42	99.86		21.38	ND	78.48	--	--	--	--	--	--	21.50	ND	78.36	--	--	--	--	--	--	20.14	ND	79.72
MW-401	87.37	99.80		21.25	**0.11**	78.64	--	--	--	--	--	--	21.40	sheen *	78.40	21.32	ND	78.48	--	--	--	20.09	ND	79.71
MW-402	88.69	99.87		20.63	**0.02**	79.26	21.65	**0.73**	78.82	21.30	**0.12**	78.67	21.18	**0.26**	78.90	21.17	**0.30**	78.95	20.51	ND	79.36	19.52	ND	80.35
MW-500	89.86	102.53	0.82	23.66	**0.05**	78.91	24.74	**0.31**	78.04	24.31	**0.03**	78.24	24.08	ND	78.45	24.03	ND	78.50	23.63	**0.31**	79.15	20.72	ND	81.81
MW-501	90.57	100.42		21.29	**0.16**	79.26	22.06	**0.16**	78.49	21.84	**0.04**	78.61	21.68	**0.05**	78.78	21.60	**0.08**	78.89	21.12	**0.01**	79.31	20.21	ND	80.21
MW-600 [3]	86.88	99.26		20.90	ND	78.44	--	--	--	--	--	--	20.90	ND	78.36	--	--	--	--	--	--	19.56	ND	79.70
MW-601	87.10	99.57		21.09	ND	78.48	--	--	--	--	--	--	21.20	ND	78.37	--	--	--	--	--	--	19.87	ND	79.70
MW-700	88.16	99.62		18.88	ND	80.74	--	--	--	--	--	--	20.51	ND	79.11	--	--	--	--	--	--	17.93	ND	81.69
MW-701	86.59	99.03		20.65	ND	78.38	--	--	--	--	--	--	20.30	ND	78.73	--	--	--	--	--	--	20.31	ND	78.72
RW-2	87.96	99.35		18.64	ND	80.71	--	--	--	--	--	--	19.35	ND	80.00	--	--	--	--	--	--	17.69	ND	81.66
RW-3	89.67	100.46		19.88	ND	80.69	--	--	--	--	--	--	19.55	ND	80.91	--	--	--	--	--	--	18.80	ND	81.66
RW-4	89.74	100.39		19.83	ND	80.56	--	--	--	--	--	--	20.47	ND	79.92	--	--	--	--	--	--	18.90	ND	81.49
SVE-1	--	100.81		22.41	**0.33**	78.67	23.52	**0.61**	77.79	23.00	**0.52**	78.24	22.55	**0.20**	78.42	22.35	**0.05**	78.50	22.11	**0.09**	78.77	21.49	**0.53**	79.75
SVE-2	--	100.33		21.78	ND	78.55	--	--	--	--	--	--	21.92	ND	78.41	--	--	--	--	--	--	20.59	ND	79.74
SVE-3	--	100.80		21.6	ND	79.20	22.42	ND	78.38	--	--	--	21.92	ND	78.88	21.51	ND	79.29	--	--	--	20.38	ND	80.42
SVE-4	--	99.85		20.31	ND	79.54	--	--	--	--	--	--	20.66	ND	79.19	--	--	--	--	--	--	19.26	ND	80.59

TABLE 8A
WATER AND PRODUCT LEVEL MEASUREMENTS
(DECEMBER 2010 TO APRIL 2021)
CHARIHO REGIONAL MIDDLE SCHOOL

455 Switch Road
Richmond, RI

WELL ID	MP (PVC) Elev. (ft) (g) Past [1]	MP (PVC) Elev. (ft) (g) Current [2]	S.G. [e]	January 13, 2012 Depth (ft) to Water	January 13, 2012 Product Thickness (ft)	January 13, 2012 GW Elev. (ft)	February 28, 2012 Depth (ft) to Water	February 28, 2012 Product Thickness (ft)	February 28, 2012 GW Elev. (ft)	April 17, 2012 Depth (ft) to Water	April 17, 2012 Product Thickness (ft)	April 17, 2012 GW Elev. (ft)	May 30, 2012 Depth (ft) to Water	May 30, 2012 Product Thickness (ft)	May 30, 2012 GW Elev. (ft)	June 20, 2012 Depth (ft) to Water	June 20, 2012 Product Thickness (ft)	June 20, 2012 GW Elev. (ft)	July 19, 2012 Depth (ft) to Water	July 19, 2012 Product Thickness (ft)	July 19, 2012 GW Elev. (ft)	August 21, 2012 Depth (ft) to Water	August 21, 2012 Product Thickness (ft)	August 21, 2012 GW Elev. (ft)
MW-102	--	96.37		--	--	--	--	--	--	15.73	ND	80.64	--	--	--	15.47	ND	80.90	--	--	--	--	--	--
MW-103	88.45	99.89		--	--	--	--	--	--	19.81	ND	80.08	--	--	--	19.60	ND	80.29	--	--	--	--	--	--
MW-201	87.48	98.83		--	--	--	--	--	--	18.48	ND	80.35	--	--	--	18.24	ND	80.59	--	--	--	--	--	--
MW-202	88.52	99.91		--	--	--	--	--	--	21.15	ND	78.76	--	--	--	20.79	ND	79.12	--	--	--	--	--	--
MW-203	90.52	102.82		22.85	**0.01**	79.98	23.68	**0.02**	79.16	24.50	**0.10**	78.40	23.96	**0.02**	78.88	24.18	**0.06**	78.69	24.74	**0.03**	78.10	24.77	**0.02**	78.07
MW-204	87.58	100.03		--	--	--	--	--	--	21.98	ND	78.05	--	--	--	21.62	ND	78.41	--	--	--	--	--	--
MW-301	87.12	98.59		--	--	--	--	--	--	18.92	ND	79.67	--	--	--	18.02	ND	80.57	--	--	--	--	--	--
MW-302	87.01	98.59		--	--	--	--	--	--	18.31	ND	80.28	--	--	--	18.10	ND	80.49	--	--	--	--	--	--
MW-303	87.54	99.00		--	--	--	--	--	--	18.24	ND	80.76	--	--	--	18.83	ND	80.17	--	--	--	--	--	--
MW-400	87.42	99.86		--	--	--	--	--	--	21.83	ND	78.03	--	--	--	21.52	ND	78.34	--	--	--	--	--	--
MW-401	87.37	99.80		20.27	ND	79.53	21.85	ND	77.95	21.74	sheen *	78.06	21.23	ND	78.57	21.41	ND	78.39	21.98	ND	77.82	22.01	ND	77.79
MW-402	88.69	99.87		19.57	**0.01**	80.31	20.06	ND	79.81	21.40	**0.49**	78.87	20.56	ND	79.31	20.71	**0.01**	79.17	21.39	**0.18**	78.63	21.37	**0.02**	78.52
MW-500	89.86	102.53	0.82	22.93	ND	79.60	23.61	**0.11**	79.01	24.49	**0.11**	78.13	23.90	ND	78.63	24.13	**0.05**	78.44	24.78	**0.18**	77.90	24.89	**0.24**	77.84
MW-501	90.57	100.42		20.29	**0.02**	80.15	20.76	ND	79.66	21.71	**0.10**	78.79	21.20	sheen	79.22	21.42	**0.04**	79.03	22.00	**0.15**	78.54	22.02	**0.10**	78.48
MW-600 [3]	86.88	99.26		--	--	--	--	--	--	21.26	ND	78.00	--	--	--	20.95	ND	78.31	--	--	--	--	--	--
MW-601	87.10	99.57		--	--	--	--	--	--	21.57	ND	78.00	--	--	--	21.24	ND	78.33	--	--	--	--	--	--
MW-700	88.16	99.62		--	--	--	--	--	--	19.10	ND	80.52	--	--	--	20.76	ND	78.86	--	--	--	--	--	--
MW-701	86.59	99.03		--	--	--	--	--	--	21.09	ND	77.94	--	--	--	18.88	ND	80.15	--	--	--	--	--	--
RW-2	87.96	99.35		--	--	--	--	--	--	18.89	ND	80.46	--	--	--	18.70	ND	80.65	--	--	--	--	--	--
RW-3	89.67	100.46		--	--	--	--	--	--	DRY @ 19.75			--	--	--	20.32	ND	80.14	20.08	**0.23**	80.57	20.90	**0.30**	79.81
RW-4	89.74	100.39		--	--	--	--	--	--	20.12	ND	80.27	--	--	--	19.9	ND	80.49	--	--	--	--	--	--
SVE-1	--	100.81		21.93	**0.82**	79.55	22.60	**0.88**	78.93	23.20	**0.58**	78.01	22.20	ND	78.61	22.4	**0.01**	78.42	23.19	**0.31**	77.87	23.21	**0.30**	77.85
SVE-2	--	100.33		--	--	--	--	--	--	22.26	ND	78.07	--	--	--	21.95	ND	78.38	--	--	--	--	--	--
SVE-3	--	100.80		--	--	--	--	--	--	21.15	ND	79.65	--	--	--	21.71	ND	79.09	--	--	--	21.77	ND	79.03
SVE-4	--	99.85		--	--	--	--	--	--	20.81	ND	79.04	--	--	--	20.38	ND	79.47	--	--	--	--	--	--

WELL ID	MP (PVC) Elev. (ft) (g) Past [1]	MP (PVC) Elev. (ft) (g) Current [2]	S.G. [e]	September 24, 2012 Depth (ft) to Water	September 24, 2012 Product Thickness (ft)	September 24, 2012 GW Elev. (ft)	October 10, 2012 Depth (ft) to Water	October 10, 2012 Product Thickness (ft)	October 10, 2012 GW Elev. (ft)	November 15, 2012 Depth (ft) to Water	November 15, 2012 Product Thickness (ft)	November 15, 2012 GW Elev. (ft)	December 3, 2012 Depth (ft) to Water	December 3, 2012 Product Thickness (ft)	December 3, 2012 GW Elev. (ft)	January 23, 2013 Depth (ft) to Water	January 23, 2013 Product Thickness (ft)	January 23, 2013 GW Elev. (ft)	February 20, 2013 Depth (ft) to Water	February 20, 2013 Product Thickness (ft)	February 20, 2013 GW Elev. (ft)	March 26, 2013 Depth (ft) to Water	March 26, 2013 Product Thickness (ft)	March 26, 2013 GW Elev. (ft)
MW-102	--	96.37		DRY @ 16.23			--	--	--	--	--	--	DRY @ 16.23			--	--	--	--	--	--	DRY @ 15.93		
MW-103	88.45	99.89		20.95	ND	78.94	--	--	--	--	--	--	23.73	ND	76.16	--	--	--	--	--	--	20.34	ND	79.55
MW-201	87.48	98.83		19.63	ND	79.20	--	--	--	--	--	--	20.95	ND	77.88	--	--	--	--	--	--	19.10	ND	79.73
MW-202	88.52	99.91		22.25	ND	77.66	--	--	--	--	--	--	22.26	ND	77.65	--	--	--	--	--	--	21.18	ND	78.73
MW-203	90.52	102.82		26.05	**0.60**	77.26	26.03	**0.09**	76.86	26.77	**0.11**	76.14	27.13	**0.10**	75.77	26.88	**0.59**	76.42	25.87	**0.03**	76.97	24.40	ND	78.42
MW-204	87.58	100.03		22.98	ND	77.05	--	--	--	--	--	--	24.39	ND	75.64	--	--	--	--	--	--	21.27	ND	78.76
MW-301	87.12	98.59		20.05	ND	78.54	--	--	--	--	--	--	21.35	ND	77.24	--	--	--	--	--	--	18.91	ND	79.68
MW-302	87.01	98.59		19.48	ND	79.11	--	--	--	--	--	--	20.78	ND	77.81	--	--	--	--	--	--	18.91	ND	79.68
MW-303	87.54	99.00		19.41	ND	79.59	--	--	--	--	--	--	20.72	ND	78.28	--	--	--	--	--	--	19.42	ND	79.58
MW-400	87.42	99.86		22.84	ND	77.02	--	--	--	--	--	--	24.26	ND	75.60	--	--	--	--	--	--	21.62	ND	78.24
MW-401	87.37	99.80		22.74	**0.01**	77.07	23.13	ND	76.67	23.82	ND	75.98	24.14	ND	75.66	--	--	--	--	--	--	21.52	ND	78.28
MW-402	88.69	99.87		22.58	**0.56**	77.75	23.08	**0.65**	77.32	24.32	**1.21**	76.54	24.63	**1.21**	76.23	23.81	**0.81**	76.72	23.17	**0.47**	77.09	21.22	ND	78.65
MW-500	89.86	102.53	0.82	25.95	**0.36**	76.88	26.48	**0.81**	76.71	28.48	**1.86**	75.58	26.99	**0.06**	75.59	26.67	**0.64**	76.38	25.67	**0.11**	76.95	24.21	ND	78.32
MW-501	90.57	100.42		22.85	**0.10**	77.65	24.20	**1.39**	77.36	26.09	**2.49**	76.37	20.10	**0.05**	80.36	24.77	**0.03**	75.67	24.75	**1.63**	77.01	21.86	ND	78.56
MW-600 [3]	86.88	99.26		22.24	ND	77.02	--	--	--	--	--	--	23.65	ND	75.61	--	--	--	--	--	--	21.00	ND	78.26
MW-601	87.10	99.57		22.53	ND	77.04	--	--	--	--	--	--	23.95	ND	75.62	--	--	--	--	--	--	21.32	ND	78.25
MW-700	88.16	99.62		20.21	ND	79.41	--	--	--	--	--	--	21.53	ND	78.09	--	--	--	--	--	--	19.78	ND	79.84
MW-701	86.59	99.03		22.08	ND	76.95	--	--	--	--	--	--	23.47	ND	75.56	--	--	--	--	--	--	20.80	ND	78.23
RW-2	87.96	99.35		20.06	ND	79.29	--	--	--	--	--	--	21.38	ND	77.97	--	--	--	--	--	--	19.60	ND	79.75
RW-3	89.67	100.46		DRY @ 21			--	--	--	DRY @ 21			DRY @ 21			--	--	--	--	--	--	21.00	**0.3**	79.71
RW-4	89.74	100.39		21.28	ND	79.11	--	--	--	--	--	--	22.53	ND	77.86	--	--	--	--	--	--	20.73	ND	79.66
SVE-1	--	100.81		24.09	**0.46**	77.10	25.37	**1.48**	76.65	27.24	**2.82**	75.88	27.13	**2.32**	75.58	24.21	**1.39**	77.74	23.98	**0.02**	76.85	22.52	ND	78.29
SVE-2	--	100.33		23.29	ND	77.04	--	--	--	--	--	--	24.71	ND	75.62	--	--	--	--	--	--	22.05	ND	78.28
SVE-3	--	100.80		22.50	ND	78.30	22.6	ND	78.20	Dry @ 22.7			22.72	**0.14**	78.19	--	--	--	21.19	ND	79.61	22.16	**0.01**	79.71
SVE-4	--	99.85		22.14	ND	77.71	--	--	--	--	--	--	23.61	ND	76.24	--	--	--	--	--	--	21.10	ND	78.75

TABLE 8A
WATER AND PRODUCT LEVEL MEASUREMENTS
(DECEMBER 2010 TO APRIL 2021)
CHARIHO REGIONAL MIDDLE SCHOOL

455 Switch Road
Richmond, RI

WELL ID	MP (PVC) Elev. (ft) (g) Past [1]	MP (PVC) Elev. (ft) (g) Current [2]	S.G. [e]	April 15, 2013 Depth (ft) to Water	April 15, 2013 Product Thickness (ft)	April 15, 2013 GW Elev. (ft)	May 31, 2013 Depth (ft) to Water	May 31, 2013 Product Thickness (ft)	May 31, 2013 GW Elev. (ft)	June 24, 2013 Depth (ft) to Water	June 24, 2013 Product Thickness (ft)	June 24, 2013 GW Elev. (ft)	July 29, 2013 Depth (ft) to Water	July 29, 2013 Product Thickness (ft)	July 29, 2013 GW Elev. (ft)	August 14, 2013 Depth (ft) to Water	August 14, 2013 Product Thickness (ft)	August 14, 2013 GW Elev. (ft)	September 30, 2013 Depth (ft) to Water	September 30, 2013 Product Thickness (ft)	September 30, 2013 GW Elev. (ft)	October 29, 2013 Depth (ft) to Water	October 29, 2013 Product Thickness (ft)	October 29, 2013 GW Elev. (ft)
MW-102	--	96.37		--	--	--	--	--	--	15.55	ND	80.82	--	--	--	--	--	--	DRY @ 15.65			--	--	--
MW-103	88.45	99.89		--	--	--	--	--	--	19.43	ND	80.46	--	--	--	--	--	--	20.60	ND	79.29	--	--	--
MW-201	87.48	98.83		--	--	--	--	--	--	18.19	ND	80.64	--	--	--	--	--	--	19.25	ND	79.58	--	--	--
MW-202	88.52	99.91		--	--	--	--	--	--	20.11	ND	79.80	--	--	--	--	--	--	21.90	ND	78.01	--	--	--
MW-203	90.52	102.82		24.51	sheen	78.31	25.18	**0.03**	77.66	23.38	ND	79.44	24.06	ND	78.76	24.58	sheen	78.24	25.24	**0.04**	77.61	26.09	**0.06**	76.78
MW-204	87.58	100.03		--	--	--	--	--	--	20.78	ND	79.25	--	--	--	--	--	--	22.55	ND	77.48	--	--	--
MW-301	87.12	98.59		--	--	--	--	--	--	17.96	ND	80.63	--	--	--	--	--	--	19.05	ND	79.54	--	--	--
MW-302	87.01	98.59		--	--	--	--	--	--	18.01	ND	80.58	--	--	--	--	--	--	19.15	ND	79.44	--	--	--
MW-303	87.54	99.00		--	--	--	--	--	--	18.53	ND	80.47	--	--	--	--	--	--	19.69	ND	79.31	--	--	--
MW-400	87.42	99.86		--	--	--	--	--	--	20.64	ND	79.22	--	--	--	--	--	--	22.50	ND	77.36	--	--	--
MW-401	87.37	99.80		--	--	--	--	--	--	20.56	ND	79.24	--	--	--	--	--	--	22.37	ND	77.43	--	--	--
MW-402	88.69	99.87		21.23	ND	78.64	22.26	**0.51**	78.03	20.29	ND	79.58	20.61	ND	79.26	21.58	ND	78.29	21.75	**0.03**	78.14	22.48	ND	77.39
MW-500	89.86	102.53	0.82	24.34	sheen	78.19	25.04	ND	77.49	23.31	ND	79.22	23.90	**0.02**	78.65	24.45	**0.05**	78.12	25.01	**0.04**	77.55	26.87	**0.02**	75.68
MW-501	90.57	100.42		21.92	ND	78.50	23.65	**1.32**	77.85	20.98	ND	79.44	21.39	**0.04**	79.06	21.85	**0.03**	78.59	22.58	**0.17**	77.98	24.45	**0.03**	75.99
MW-600 [3]	86.88	99.26		--	--	--	--	--	--	20.04	ND	79.22	--	--	--	--	--	--	21.89	ND	77.37	--	--	--
MW-601	87.10	99.57		--	--	--	--	--	--	20.35	ND	79.22	--	--	--	--	--	--	22.18	ND	77.39	--	--	--
MW-700	88.16	99.62		--	--	--	--	--	--	18.98	ND	80.64	--	--	--	--	--	--	19.87	ND	79.75	--	--	--
MW-701	86.59	99.03		--	--	--	--	--	--	19.82	ND	79.21	--	--	--	--	--	--	21.70	ND	77.33	--	--	--
RW-2	87.96	99.35		--	--	--	--	--	--	18.68	ND	80.67	--	--	--	--	--	--	19.74	ND	79.61	--	--	--
RW-3	89.67	100.46		DRY @ 21			--	--	--	20.15	**0.30**	80.31	--	--	--	--	--	--	DRY @ 21			DRY @ 21		
RW-4	89.74	100.39		--	--	--	--	--	--	19.82	ND	80.57	--	--	--	--	--	--	20.92	ND	79.47	--	--	--
SVE-1	--	100.81		22.65	sheen	78.16	23.95	**0.77**	77.49	22.04	**0.59**	79.25	22.63	**0.46**	78.56	23.31	**0.68**	78.06	24.00	**0.81**	77.47	25.2	**1.25**	76.64
SVE-2	--	100.33		--	--	--	--	--	--	21.06	ND	79.27	--	--	--	--	--	--	22.89	ND	77.44	--	--	--
SVE-3	--	100.80		21.91	ND	78.89	21.64	ND	79.16	21.06	ND	79.74	--	--	--	--	--	--	22.48	ND	78.32	--	--	--
SVE-4	--	99.85		--	--	--	--	--	--	19.99	ND	79.86	--	--	--	--	--	--	21.76	ND	78.09	--	--	--

WELL ID	MP (PVC) Elev. (ft) (g) Past [1]	MP (PVC) Elev. (ft) (g) Current [2]	S.G. [e]	November 26, 2013 Depth (ft) to Water	November 26, 2013 Product Thickness (ft)	November 26, 2013 GW Elev. (ft)	December 20, 2013 Depth (ft) to Water	December 20, 2013 Product Thickness (ft)	December 20, 2013 GW Elev. (ft)	January 28, 2014 Depth (ft) to Water	January 28, 2014 Product Thickness (ft)	January 28, 2014 GW Elev. (ft)	February 21, 2014 Depth (ft) to Water	February 21, 2014 Product Thickness (ft)	February 21, 2014 GW Elev. (ft)	March 24, 2014 Depth (ft) to Water	March 24, 2014 Product Thickness (ft)	March 24, 2014 GW Elev. (ft)	April 22, 2014 Depth (ft) to Water	April 22, 2014 Product Thickness (ft)	April 22, 2014 GW Elev. (ft)	June 24, 2014 Depth (ft) to Water	June 24, 2014 Product Thickness (ft)	June 24, 2014 GW Elev. (ft)
MW-102	--	96.37		--	--	--	DRY @ 15.65			--	--	--	--	--	--	--	--	--	14.28	ND	82.09	14.55	ND	81.82
MW-103	88.45	99.89		--	--	--	22.06	ND	77.83	--	--	--	--	--	--	--	--	--	18.12	ND	81.77	18.62	ND	81.27
MW-201	87.48	98.83		--	--	--	20.80	ND	78.03	--	--	--	--	--	--	--	--	--	16.92	ND	81.91	17.28	ND	81.55
MW-202	88.52	99.91		--	--	--	23.22	ND	76.69	--	--	--	--	--	--	--	--	--	19.00	ND	80.91	19.68	ND	80.23
MW-203	90.52	102.82		26.76	**0.15**	76.18	26.52	**0.12**	76.40	25.40	**0.01**	77.43	25.86	**0.01**	76.97	24.59	ND	78.23	22.26	**0.01**	80.57	23.21	ND	79.61
MW-204	87.58	100.03		--	--	--	23.88	ND	76.15	--	--	--	--	--	--	--	--	--	19.76	ND	80.27	20.82	ND	79.21
MW-301	87.12	98.59		--	--	--	20.61	**0.06**	78.03	--	--	--	--	--	--	--	--	--	16.71	ND	81.88	17.06	ND	81.53
MW-302	87.01	98.59		--	--	--	20.67	ND	77.92	--	--	--	--	--	--	--	--	--	16.75	ND	81.84	17.16	ND	81.43
MW-303	87.54	99.00		--	--	--	21.16	ND	77.84	--	--	--	--	--	--	--	--	--	17.26	ND	81.74	17.73	ND	81.27
MW-400	87.42	99.86		--	--	--	23.74	ND	76.12	--	--	--	--	--	--	--	--	--	19.68	ND	80.18	20.73	ND	79.13
MW-401	87.37	99.80		--	--	--	23.65	ND	76.15	--	--	--	--	--	--	--	--	--	19.50	ND	80.30	20.59	ND	79.21
MW-402	88.69	99.87		23.02	**0.02**	76.87	24.42	**1.31**	76.52	22.29	**0.07**	77.64	22.15	**0.25**	77.93	21.34	ND	78.53	19.12	ND	80.75	19.72	ND	80.15
MW-500	89.86	102.53	0.82	26.62	**0.17**	76.05	26.38	**0.06**	76.20	25.20	ND	77.33	24.88	ND	77.65	24.45	ND	78.08	24.29	ND	78.24	24.06	**0.41**	78.81
MW-501	90.57	100.42		24.10	**0.02**	76.34	24.00	**0.05**	76.46	27.90	ND	72.52	22.62	ND	77.80	22.02	ND	78.40	19.84	ND	80.58	20.53	**0.02**	79.91
MW-600 [3]	86.88	99.26		--	--	--	23.14	ND	76.12	--	--	--	--	--	--	--	--	--	19.10	ND	80.16	20.16	ND	79.10
MW-601	87.10	99.57		--	--	--	23.40	ND	76.17	--	--	--	--	--	--	--	--	--	19.41	ND	80.16	20.42	ND	79.15
MW-700	88.16	99.62		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	17.68	ND	81.94	17.86	ND	81.76
MW-701	86.59	99.03		--	--	--	22.94	ND	76.09	--	--	--	--	--	--	--	--	--	18.92	ND	80.11	19.99	ND	79.04
RW-2	87.96	99.35		--	--	--	21.23	ND	78.12	--	--	--	--	--	--	--	--	--	17.38	ND	81.97	17.71	ND	81.64
RW-3	89.67	100.46		DRY @ 21			DRY @ 21			--	--	--	--	--	--	--	--	--	18.70	**0.28**	81.99	18.70	**0.21**	81.76
RW-4	89.74	100.39		--	--	--	22.43	ND	77.96	--	--	--	--	--	--	--	--	--	18.53	ND	81.86	18.91	ND	81.48
SVE-1	--	100.81		26.48	**2.03**	75.99	26.32	**1.96**	76.10	23.48	ND	77.33	23.22	ND	77.59	23.72	ND	77.09	21.43	**1.02**	80.22	22.36	**0.93**	79.21
SVE-2	--	100.33		--	--	--	24.2	ND	76.13	--	--	--	--	--	--	--	--	--	20.09	ND	80.24	21.15	ND	79.18
SVE-3	--	100.80		--	--	--	DRY @ 22.75			--	--	--	--	--	--	--	--	--	20.09	ND	80.71	20.81	ND	79.99
SVE-4	--	99.85		--	--	--	23.16	ND	76.69	--	--	--	--	--	--	--	--	--	18.89	ND	80.96	19.56	ND	80.29

TABLE 8A
WATER AND PRODUCT LEVEL MEASUREMENTS
(DECEMBER 2010 TO APRIL 2021)
CHARIHO REGIONAL MIDDLE SCHOOL

455 Switch Road
Richmond, RI

WELL ID	MP (PVC) Elev. (ft) (g) Past [1]	MP (PVC) Elev. (ft) (g) Current [2]	S.G. [e]	July 25, 2014 Depth (ft) to Water	July 25, 2014 Product Thickness (ft)	July 25, 2014 GW Elev. (ft)	August 27, 2014 Depth (ft) to Water	August 27, 2014 Product Thickness (ft)	August 27, 2014 GW Elev. (ft)	September 29, 2014 Depth (ft) to Water	September 29, 2014 Product Thickness (ft)	September 29, 2014 GW Elev. (ft)	October 8, 2014 Depth (ft) to Water	October 8, 2014 Product Thickness (ft)	October 8, 2014 GW Elev. (ft)	November 26, 2014 Depth (ft) to Water	November 26, 2014 Product Thickness (ft)	November 26, 2014 GW Elev. (ft)	December 22, 2014 Depth (ft) to Water	December 22, 2014 Product Thickness (ft)	December 22, 2014 GW Elev. (ft)	April 23, 2015 Depth (ft) to Water	April 23, 2015 Product Thickness (ft)	April 23, 2015 GW Elev. (ft)
MW-102	--	96.37		--	--	--	--	--	--	DRY @ 15.52			--	--	--	--	--	--	DRY @ 15.52			15.20	--	81.17
MW-103	88.45	99.89		--	--	--	--	--	--	20.99	--	78.90	--	--	--	--	--	--	21.75	--	78.14	19.27	--	80.62
MW-201	87.48	98.83		--	--	--	--	--	--	19.62	--	79.21	--	--	--	--	--	--	20.54	--	78.29	17.95	--	80.88
MW-202	88.52	99.91		--	--	--	--	--	--	22.62	--	77.29	--	--	--	--	--	--	22.81	--	77.10	20.19	--	79.72
MW-203	90.52	102.82		24.10	**0.01**	78.73	25.07	ND	77.75	26.06	**0.01**	76.77	26.34	**0.06**	76.53	27.52	**0.42**	75.64	26.21	**0.04**	76.64	23.61	ND	79.21
MW-204	87.58	100.03		--	--	--	--	--	--	23.38	--	76.65	--	--	--	--	--	--	23.39	--	76.64	21.17	--	78.86
MW-301	87.12	98.59		--	--	--	--	--	--	19.41	--	79.18	--	--	--	--	--	--	20.27	--	78.32	17.75	--	80.84
MW-302	87.01	98.59		--	--	--	--	--	--	19.5	--	79.09	--	--	--	--	--	--	20.32	--	78.27	17.81	--	80.78
MW-303	87.54	99.00		--	--	--	--	--	--	20.08	--	78.92	--	--	--	--	--	--	20.84	--	78.16	18.36	--	80.64
MW-400	87.42	99.86		--	--	--	--	--	--	23.29	--	76.57	--	--	--	--	--	--	23.27	--	76.59	21.06	--	78.80
MW-401	87.37	99.80		--	--	--	--	--	--	23.16	--	76.64	--	--	--	--	--	--	23.19	--	76.61	20.94	--	78.86
MW-402	88.69	99.87		20.46	ND	79.41	21.44	ND	78.43	22.45	--	77.42	22.72	ND	77.15	23.82	**0.14**	76.16	23.14	**0.34**	77.01	20.35	ND	79.52
MW-500	89.86	102.53	0.82	24.16	**0.20**	78.53	24.55	**0.38**	78.29	26.38	**0.61**	76.65	26.08	**0.15**	76.57	27.00	**0.10**	75.61	25.89	ND	76.64	23.63	ND	78.90
MW-501	90.57	100.42		21.28	**0.08**	79.21	22.10	**0.08**	78.39	23.18	**0.11**	77.33	23.30	**0.20**	77.28	24.49	**0.09**	76.00	23.63	**0.11**	76.88	21.10	ND	79.32
MW-600 [3]	86.88	99.26		--	--	--	--	--	--	22.70	--	76.56	--	--	--	--	--	--	22.64	--	76.62	20.46	--	78.80
MW-601	87.10	99.57		--	--	--	--	--	--	22.98	--	76.59	--	--	--	--	--	--	22.93	--	76.64	20.76	--	78.81
MW-700	88.16	99.62		--	--	--	--	--	--	20.16	--	79.46	--	--	--	--	--	--	21.09	--	78.53	18.65	--	80.97
MW-701	86.59	99.03		--	--	--	--	--	--	22.53	--	76.50	--	--	--	--	--	--	22.47	--	76.56	20.26	--	78.77
RW-2	87.96	99.35		--	--	--	--	--	--	20.04	--	79.31	--	--	--	--	--	--	20.97	--	78.38	18.44	--	80.91
RW-3	89.67	100.46		--	--	--	--	--	--	21.30	**0.08**	79.23	--	--	--	--	--	--	DRY @ 21			DRY @ 21		
RW-4	89.74	100.39		--	--	--	--	--	--	21.29	--	79.10	--	--	--	--	--	--	24.18	--	76.21	--	--	--
SVE-1	--	100.81		22.60	**0.35**	78.21	23.32	**0.17**	77.63	24.46	**0.43**	76.70	24.68	**0.34**	76.41	26.82	**1.90**	75.55	26.82	ND	73.99	21.90	ND	78.91
SVE-2	--	100.33		--	--	--	--	--	--	23.70	--	76.63	--	--	--	--	--	--	23.72	--	76.61	21.45	--	78.88
SVE-3	--	100.80		--	--	--	--	--	--	DRY @ 22.7			--	--	--	--	--	--	DRY @ 22.7			21.08	--	79.72
SVE-4	--	99.85		--	--	--	--	--	--	22.46	--	77.39	--	--	--	--	--	--	22.72	--	77.13	20.03	--	79.82

WELL ID	MP (PVC) Elev. (ft) (g) Past [1]	MP (PVC) Elev. (ft) (g) Current [2]	S.G. [e]	June 24, 2015 Depth (ft) to Water	June 24, 2015 Product Thickness (ft)	June 24, 2015 GW Elev. (ft)	July 20, 2015 Depth (ft) to Water	July 20, 2015 Product Thickness (ft)	July 20, 2015 GW Elev. (ft)	August 28, 2015 Depth (ft) to Water	August 28, 2015 Product Thickness (ft)	August 28, 2015 GW Elev. (ft)	September 23, 2015 Depth (ft) to Water	September 23, 2015 Product Thickness (ft)	September 23, 2015 GW Elev. (ft)	October 29, 2015 Depth (ft) to Water	October 29, 2015 Product Thickness (ft)	October 29, 2015 GW Elev. (ft)	November 25, 2015 Depth (ft) to Water	November 25, 2015 Product Thickness (ft)	November 25, 2015 GW Elev. (ft)	December 28, 2015 Depth (ft) to Water	December 28, 2015 Product Thickness (ft)	December 28, 2015 GW Elev. (ft)
MW-102	--	96.37		--	--	--	--	--	--	--	--	--	Dry @ 14.96			--	--	--	--	--	--	--	--	--
MW-103	88.45	99.89		--	--	--	--	--	--	--	--	--	22.91	ND	76.98	--	--	--	--	--	--	--	--	--
MW-201	87.48	98.83		--	--	--	--	--	--	--	--	--	20.60	ND	78.23	--	--	--	--	--	--	--	--	--
MW-202	88.52	99.91		--	--	--	--	--	--	--	--	--	23.30	ND	76.61	--	--	--	--	--	--	--	--	--
MW-203	90.52	102.82		24.03	ND	78.79	25.31	**0.02**	77.53	26.23	**0.02**	76.61	27.20	**0.29**	75.86	27.64	**0.48**	75.57	28.27	**0.82**	75.22	27.80	**0.68**	75.58
MW-204	87.58	100.03		--	--	--	--	--	--	--	--	--	24.25	ND	75.78	--	--	--	--	--	--	--	--	--
MW-301	87.12	98.59		--	--	--	--	--	--	--	--	--	20.37	ND	78.22	--	--	--	--	--	--	--	--	--
MW-302	87.01	98.59		--	--	--	--	--	--	--	--	--	20.46	ND	78.13	--	--	--	--	--	--	--	--	--
MW-303	87.54	99.00		--	--	--	--	--	--	--	--	--	21.12	ND	77.88	--	--	--	--	--	--	--	--	--
MW-400	87.42	99.86		--	--	--	--	--	--	--	--	--	24.15	ND	75.71	--	--	--	--	--	--	--	--	--
MW-401	87.37	99.80		--	--	--	--	--	--	--	--	--	24.02	ND	75.78	--	--	--	--	--	--	--	--	--
MW-402	88.69	99.87		21.51	ND	78.36	21.82	ND	78.05	22.71	ND	77.16	23.91	**0.33**	76.23	26.06	**0.85**	74.51	26.19	**1.82**	75.17	26.54	**1.49**	74.55
MW-500	89.86	102.53	0.82	24.90	**0.05**	77.67	25.21	**0.10**	77.40	26.07	**0.06**	76.51	26.77	**0.03**	75.78	27.37	**0.40**	75.49	28.42	**1.22**	75.11	27.91	**1.06**	75.49
MW-501	90.57	100.42		22.19	**0.15**	78.35	22.94	**0.22**	77.66	23.76	**0.11**	76.75	24.24	**0.12**	76.28	25.90	**0.07**	74.58	26.51	**0.39**	74.23	26.12	**0.37**	74.60
MW-600 [3]	86.88	99.26		--	--	--	--	--	--	--	--	--	23.57	ND	75.69	--	--	--	--	--	--	--	--	--
MW-601	87.10	99.57		--	--	--	--	--	--	--	--	--	23.86	ND	75.71	--	--	--	--	--	--	--	--	--
MW-700	88.16	99.62		--	--	--	--	--	--	--	--	--	21.15	ND	78.47	--	--	--	--	--	--	--	--	--
MW-701	86.59	99.03		--	--	--	--	--	--	--	--	--	23.39	ND	75.64	--	--	--	--	--	--	--	--	--
RW-2	87.96	99.35		--	--	--	--	--	--	--	--	--	21	ND	78.35	--	--	--	--	--	--	--	--	--
RW-3	89.67	100.46		20.1	**0.05**	80.40	DRY @ 19.64'			21.27	**0.13**	79.30	Dry @ 18.10			--	--	--	Dry @ 20.52'			Dry @ 19.90'		
RW-4	89.74	100.39		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SVE-1	--	100.81		23.09	ND	77.72	23.34	ND	77.47	24.23	ND	76.58	24.94	**0.01**	75.88	26.03	**0.90**	75.52	26.61	**1.16**	75.15	25.63	**0.43**	75.53
SVE-2	--	100.33		--	--	--	--	--	--	--	--	--	24.51	ND	75.82	--	--	--	--	--	--	--	--	--
SVE-3	--	100.80		--	--	--	--	--	--	--	--	--	22.27	ND	78.53	--	--	--	--	--	--	--	--	--
SVE-4	--	99.85		--	--	--	--	--	--	--	--	--	22.95	ND	76.90	--	--	--	--	--	--	--	--	--

TABLE 8A
WATER AND PRODUCT LEVEL MEASUREMENTS
(DECEMBER 2010 TO APRIL 2021)
CHARIHO REGIONAL MIDDLE SCHOOL

455 Switch Road
Richmond, RI

WELL ID	MP (PVC) Elev. (ft) (g) Past [1]	MP (PVC) Elev. (ft) (g) Current [2]	S.G. [e]	April 20, 2016 Depth (ft) to Water	April 20, 2016 Product Thickness (ft)	April 20, 2016 GW Elev. (ft)	June 22, 2016 Depth (ft) to Water	June 22, 2016 Product Thickness (ft)	June 22, 2016 GW Elev. (ft)	July 22, 2016 Depth (ft) to Water	July 22, 2016 Product Thickness (ft)	July 22, 2016 GW Elev. (ft)	August 26, 2016 Depth (ft) to Water	August 26, 2016 Product Thickness (ft)	August 26, 2016 GW Elev. (ft)	September 29, 2016 Depth (ft) to Water	September 29, 2016 Product Thickness (ft)	September 29, 2016 GW Elev. (ft)	October 27, 2016 Depth (ft) to Water	October 27, 2016 Product Thickness (ft)	October 27, 2016 GW Elev. (ft)	November 17, 2016 Depth (ft) to Water	November 17, 2016 Product Thickness (ft)	November 17, 2016 GW Elev. (ft)
MW-102	--	96.37		Dry @ 14.75'			--	--	--	--	--	--	--	--	--	Dry @ 14.75'			--	--	--	--	--	--
MW-103	88.45	99.89		19.86	ND	80.03	--	--	--	--	--	--	--	--	--	22.11	--	--	--	--	--	--	--	--
MW-201	87.48	98.83		18.58	ND	80.25	--	--	--	--	--	--	--	--	--	20.79	--	--	--	--	--	--	--	--
MW-202	88.52	99.91		20.75	ND	79.16	--	--	--	--	--	--	--	--	--	23.54	--	--	--	--	--	--	--	--
MW-203	90.52	102.82		23.99	ND	78.83	24.87	**0.02**	77.97	25.34	**0.01**	77.49	26.14	**0.01**	76.69	27.03	**0.03**	75.81	27.63	**0.13**	75.30	27.92	**0.42**	75.24
MW-204	87.58	100.03		21.39	ND	78.64	--	--	--	--	--	--	--	--	--	24.32	--	--	--	--	--	--	--	--
MW-301	87.12	98.59		18.36	ND	80.23	--	--	--	--	--	--	--	--	--	20.55	--	--	--	--	--	--	--	--
MW-302	87.01	98.59		18.40	ND	80.19	--	--	--	--	--	--	--	--	--	20.65	--	--	--	--	--	--	--	--
MW-303	87.54	99.00		18.94	ND	80.06	--	--	--	--	--	--	--	--	--	21.20	--	--	--	--	--	--	--	--
MW-400	87.42	99.86		21.22	ND	78.64	--	--	--	--	--	--	--	--	--	24.24	--	--	--	--	--	--	--	--
MW-401	87.37	99.80		21.14	ND	78.66	--	--	--	--	--	--	--	--	--	24.11	--	--	--	--	--	--	--	--
MW-402	88.69	99.87		20.78	sheen *	79.09	21.47	ND	78.40	21.95	ND	77.92	22.99	**0.35**	77.17	25.63	**2.29**	76.12	28.11	**2.35**	73.69	28.10	**2.25**	73.62
MW-500	89.86	102.53	0.82	23.89	ND	78.64	24.72	ND	77.81	25.17	**0.01**	77.37	24.94	**0.01**	77.60	26.82	**0.01**	75.72	27.52	**0.25**	75.22	27.84	**0.56**	75.15
MW-501	90.57	100.42		21.52	sheen *	78.90	22.14	**0.08**	78.35	22.80	**0.36**	77.92	23.58	**0.42**	77.18	24.41	**0.35**	76.30	25.19	**0.44**	75.59	25.28	**0.37**	75.44
MW-600 [3]	86.88	99.26		20.61	ND	78.65	--	--	--	--	--	--	--	--	--	23.65	--	--	--	--	--	--	--	--
MW-601	87.10	99.57		20.96	ND	78.61	--	--	--	--	--	--	--	--	--	23.94	--	--	--	--	--	--	--	--
MW-700	88.16	99.62		19.29	ND	80.33	--	--	--	--	--	--	--	--	--	21.38	--	--	--	--	--	--	--	--
MW-701	86.59	99.03		20.43	ND	78.60	--	--	--	--	--	--	--	--	--	23.5	--	--	--	--	--	--	--	--
RW-2	87.96	99.35		19.72	ND	79.63	--	--	--	--	--	--	--	--	--	21.25	--	--	--	--	--	--	--	--
RW-3	89.67	100.46		Dry @ 19.23'			20.40	**0.17**	80.20	Dry @ 19.23'			Dry @ 19.23'			Dry @ 19.23'			Dry @ 19.23'			Dry @ 19.23'		
RW-4	89.74	100.39		20.23	ND	80.16	--	--	--	--	--	--	--	--	--	22.39	--	--	--	--	--	--	--	--
SVE-1	--	100.81		22.15	ND	78.66	22.99	**0.04**	77.85	23.45	**0.10**	77.44	24.31	**0.17**	76.64	25.04	**0.02**	75.79	25.51	**0.03**	75.32	25.51	**0.11**	75.39
SVE-2	--	100.33		21.70	ND	78.63	--	--	--	--	--	--	--	--	--	24.60	--	--	--	--	--	--	--	--
SVE-3	--	100.80		21.72	ND	79.08	--	--	--	--	--	--	--	--	--	Dry @ 22.65'			--	--	--	--	--	--
SVE-4	--	99.85		20.54	ND	79.31	--	--	--	--	--	--	--	--	--	24.36	--	--	--	--	--	--	--	--

WELL ID	MP (PVC) Elev. (ft) (g) Past [1]	MP (PVC) Elev. (ft) (g) Current [2]	S.G. [e]	December 13, 2016 Depth (ft) to Water	December 13, 2016 Product Thickness (ft)	December 13, 2016 GW Elev. (ft)	April 18, 2017 Depth (ft) to Water	April 18, 2017 Product Thickness (ft)	April 18, 2017 GW Elev. (ft)	June 22, 2017 Depth (ft) to Water	June 22, 2017 Product Thickness (ft)	June 22, 2017 GW Elev. (ft)	July 17, 2017 Depth (ft) to Water	July 17, 2017 Product Thickness (ft)	July 17, 2017 GW Elev. (ft)	August 31, 2017 Depth (ft) to Water	August 31, 2017 Product Thickness (ft)	August 31, 2017 GW Elev. (ft)	September 28, 2017 Depth (ft) to Water	September 28, 2017 Product Thickness (ft)	September 28, 2017 GW Elev. (ft)	October 27, 2017 Depth (ft) to Water	October 27, 2017 Product Thickness (ft)	October 27, 2017 GW Elev. (ft)
MW-102	--	96.37		--	--	--	Dry @ 14.60'			--	--	--	--	--	--	--	--	--	Dry @ 14.60'			--	--	--
MW-103	88.45	99.89		--	--	--	19.42	ND	80.47	--	--	--	--	--	--	--	--	--	20.60	ND	79.29	--	--	--
MW-201	87.48	98.83		--	--	--	18.19	ND	80.64	--	--	--	--	--	--	--	--	--	19.23	ND	79.60	--	--	--
MW-202	88.52	99.91		--	--	--	20.21	ND	79.70	--	--	--	--	--	--	--	--	--	21.87	ND	78.04	--	--	--
MW-203	90.52	102.82		27.02	**0.91**	76.55	23.44	ND	79.38	23.11	<0.01	79.71	23.57	ND	79.25	24.76	**0.01**	78.07	25.34	ND	77.48	26.65	ND	76.17
MW-204	87.58	100.03		--	--	--	20.83	ND	79.20	--	--	--	--	--	--	--	--	--	22.76	ND	77.27	--	--	--
MW-301	87.12	98.59		--	--	--	17.94	ND	80.65	--	--	--	--	--	--	--	--	--	19.02	ND	79.57	--	--	--
MW-302	87.01	98.59		--	--	--	18.51	ND	80.08	--	--	--	--	--	--	--	--	--	19.11	ND	79.48	--	--	--
MW-303	87.54	99.00		--	--	--	17.97	ND	81.03	--	--	--	--	--	--	--	--	--	19.68	ND	79.32	--	--	--
MW-400	87.42	99.86		--	--	--	20.70	ND	79.16	--	--	--	--	--	--	--	--	--	22.66	ND	77.20	--	--	--
MW-401	87.37	99.80		--	--	--	20.59	ND	79.21	--	--	--	--	--	--	--	--	--	22.51	ND	77.29	--	--	--
MW-402	88.69	99.87		23.69	**2.21**	77.99	20.36	ND	79.51	19.72	ND	80.15	20.10	ND	79.77	19.98	**0.03**	79.91	21.88	ND	77.99	22.32	ND	77.55
MW-500	89.86	102.53	0.82	26.87	**0.80**	76.32	23.32	ND	79.21	23.44	**0.36**	79.39	23.99	**0.46**	78.92	24.92	**0.28**	77.84	25.36	**0.18**	77.32	25.55	**0.01**	76.99
MW-501	90.57	100.42		24.66	**0.31**	76.01	21.10	**0.02**	79.34	20.44	ND	79.98	20.75	ND	79.67	21.95	**0.02**	78.49	22.96	**0.52**	77.89	23.20	**0.11**	77.31
MW-600 [3]	86.88	99.26		--	--	--	20.06	ND	79.20	--	--	--	--	--	--	--	--	--	22.04	ND	77.22	--	--	--
MW-601	87.10	99.57		--	--	--	20.39	ND	79.18	--	--	--	--	--	--	--	--	--	22.34	ND	77.23	--	--	--
MW-700	88.16	99.62		--	--	--	18.92	ND	80.70	--	--	--	--	--	--	--	--	--	19.78	ND	79.84	--	--	--
MW-701	86.59	99.03		--	--	--	19.90	ND	79.13	--	--	--	--	--	--	--	--	--	21.92	ND	77.11	--	--	--
RW-2	87.96	99.35		--	--	--	18.65	ND	80.70	--	--	--	--	--	--	--	--	--	19.65	ND	79.70	--	--	--
RW-3	89.67	100.46		Dry @ 19.75'			19.80	ND	80.66	18.60	**0.02**	81.88	18.95	**0.03**	81.53	21.28	ND	79.18	Dry @ 19.20'			Dry @ 19.20'		
RW-4	89.74	100.39		--	--	--	19.81	ND	80.58	--	--	--	--	--	--	--	--	--	20.87	ND	79.52	--	--	--
SVE-1	--	100.81		25.23	**0.19**	75.74	21.6	ND	79.21	21.4	**0.02**	79.43	21.85	**0.03**	78.98	22.95	**0.02**	77.88	23.47	**0.01**	77.35	23.77	ND	77.04
SVE-2	--	100.33		--	--	--	21.12	ND	79.21	--	--	--	--	--	--	--	--	--	23.01	ND	77.32	--	--	--
SVE-3	--	100.80		--	--	--	21.17	ND	79.63	--	--	--	--	--	--	--	--	--	Dry @ 22.65'			--	--	--
SVE-4	--	99.85		--	--	--	20.03	ND	79.82	--	--	--	--	--	--	--	--	--	21.47	ND	78.38	--	--	--

TABLE 8A
WATER AND PRODUCT LEVEL MEASUREMENTS
(DECEMBER 2010 TO APRIL 2021)
CHARIHO REGIONAL MIDDLE SCHOOL

455 Switch Road
Richmond, RI

WELL ID	MP (PVC) Elev. (ft) (g) Past [1]	MP (PVC) Elev. (ft) (g) Current [2]	S.G. [e]	November 28, 2017 Depth (ft) to Water	November 28, 2017 Product Thickness (ft)	November 28, 2017 GW Elev. (ft)	December 20, 2017 Depth (ft) to Water	December 20, 2017 Product Thickness (ft)	December 20, 2017 GW Elev. (ft)	April 23, 2018 Depth (ft) to Water	April 23, 2018 Product Thickness (ft)	April 23, 2018 GW Elev. (ft)	June 6, 2018 Depth (ft) to Water	June 6, 2018 Product Thickness (ft)	June 6, 2018 GW Elev. (ft)	July 18, 2018 Depth (ft) to Water	July 18, 2018 Product Thickness (ft)	July 18, 2018 GW Elev. (ft)	August 24, 2018 Depth (ft) to Water	August 24, 2018 Product Thickness (ft)	August 24, 2018 GW Elev. (ft)	September 25, 2018 Depth (ft) to Water	September 25, 2018 Product Thickness (ft)	September 25, 2018 GW Elev. (ft)
MW-102	--	96.37		--	--	--	--	--	--	13.43	ND	82.94	--	--	--	--	--	--	--	--	--	--	--	--
MW-103	88.45	99.89		--	--	--	--	--	--	17.62	ND	82.27	--	--	--	--	--	--	--	--	--	--	--	--
MW-201	87.48	98.83		--	--	--	--	--	--	16.21	ND	82.62	--	--	--	--	--	--	--	--	--	--	--	--
MW-202	88.52	99.91		--	--	--	--	--	--	18.42	ND	81.49	--	--	--	--	--	--	--	--	--	--	--	--
MW-203	90.52	102.82		25.00	ND	77.82	25.02	ND	77.80	22.08	ND	80.74	22.93	**0.01**	79.90	24.09	ND	78.73	24.88	ND	77.94	25.89	**0.21**	77.10
MW-204	87.58	100.03		--	--	--	--	--	--	19.66	ND	80.37	--	--	--	--	--	--	--	--	--	--	--	--
MW-301	87.12	98.59		--	--	--	--	--	--	16.01	ND	82.58	--	--	--	--	--	--	--	--	--	--	--	--
MW-302	87.01	98.59		--	--	--	--	--	--	16.13	ND	82.46	--	--	--	--	--	--	--	--	--	--	--	--
MW-303	87.54	99.00		--	--	--	--	--	--	16.69	ND	82.31	--	--	--	--	--	--	--	--	--	--	--	--
MW-400	87.42	99.86		--	--	--	--	--	--	19.56	ND	80.30	--	--	--	--	--	--	--	--	--	--	--	--
MW-401	87.37	99.80		--	--	--	--	--	--	19.41	ND	80.39	--	--	--	--	--	--	--	--	--	--	--	--
MW-402	88.69	99.87		21.72	ND	78.15	22.45	**0.01**	77.43	18.54	ND	81.33	19.27	ND	80.60	20.33	ND	79.54	21.19	ND	78.68	22.05	ND	77.82
MW-500	89.86	102.53	0.82	24.85	ND	77.68	24.85	ND	77.68	22.19	**0.13**	80.45	23.09	**0.24**	79.64	24.20	**0.23**	78.52	24.77	**0.05**	77.80	25.58	**0.12**	77.05
MW-501	90.57	100.42		23.15	**0.04**	77.30	21.74	ND	78.68	19.36	sheen	81.06	20.04	ND	80.38	21.07	sheen	79.35	21.03	**0.12**	79.49	22.96	**0.18**	77.61
MW-600[3]	86.88	99.26		--	--	--	--	--	--	18.98	ND	80.28	--	--	--	--	--	--	--	--	--	--	--	--
MW-601	87.10	99.57		--	--	--	--	--	--	19.27	ND	80.30	--	--	--	--	--	--	--	--	--	--	--	--
MW-700	88.16	99.62		--	--	--	--	--	--	16.84	ND	82.78	--	--	--	--	--	--	--	--	--	--	--	--
MW-701	86.59	99.03		--	--	--	--	--	--	18.88	ND	80.15	--	--	--	--	--	--	--	--	--	--	--	--
RW-2	87.96	99.35		--	--	--	--	--	--	16.65	ND	82.70	--	--	--	--	--	--	--	--	--	--	--	--
RW-3	89.67	100.46		Dry @ 19.20'			Dry @ 19.20'			17.94	**0.04**	82.55	17.80	ND	82.66	Dry @ 19.20'			Dry @ 19.20'			Dry @ 19.20'		
RW-4	89.74	100.39		--	--	--	--	--	--	17.89	ND	82.50	--	--	--	--	--	--	--	--	--	--	--	--
SVE-1	--	100.81		23.12	ND	77.69	23.13	ND	77.68	21.16	**0.91**	80.40	21.51	**0.49**	79.70	22.55	**0.37**	78.56	23.13	**0.05**	77.72	23.69	ND	77.12
SVE-2	--	100.33		--	--	--	--	--	--	19.96	ND	80.37	--	--	--	--	--	--	--	--	--	--	--	--
SVE-3	--	100.80		--	--	--	--	--	--	19.81	ND	80.99	--	--	--	--	--	--	--	--	--	--	--	--
SVE-4	--	99.85		--	--	--	--	--	--	18.37	ND	81.48	--	--	--	--	--	--	--	--	--	--	--	--

WELL ID	MP (PVC) Elev. (ft) (g) Past [1]	MP (PVC) Elev. (ft) (g) Current [2]	S.G. [e]	October 22, 2018 Depth (ft) to Water	October 22, 2018 Product Thickness (ft)	October 22, 2018 GW Elev. (ft)	November 26, 2018 Depth (ft) to Water	November 26, 2018 Product Thickness (ft)	November 26, 2018 GW Elev. (ft)	December 28, 2018 Depth (ft) to Water	December 28, 2018 Product Thickness (ft)	December 28, 2018 GW Elev. (ft)	April 29, 2019 Depth (ft) to Water	April 29, 2019 Product Thickness (ft)	April 29, 2019 GW Elev. (ft)	June 18, 2019 Depth (ft) to Water	June 18, 2019 Product Thickness (ft)	June 18, 2019 GW Elev. (ft)	July 31, 2019 Depth (ft) to Water	July 31, 2019 Product Thickness (ft)	July 31, 2019 GW Elev. (ft)	August 30, 2019 Depth (ft) to Water	August 30, 2019 Product Thickness (ft)	August 30, 2019 GW Elev. (ft)
MW-102	--	96.37		Dry @ 14.55'			--	--	--	--	--	--	*Note (5)*			--	--	--	--	--	--	--	--	--
MW-103	88.45	99.89		20.25	ND	79.64	--	--	--	--	--	--	*Note (5)*			--	--	--	--	--	--	--	--	--
MW-201	87.48	98.83		18.96	ND	79.87	--	--	--	--	--	--	15.29	ND	83.54	--	--	--	--	--	--	--	--	--
MW-202	88.52	99.91		21.02	ND	78.89	--	--	--	--	--	--	*Note (5)*			--	--	--	--	--	--	--	--	--
MW-203	90.52	102.82		24.44	ND	78.38	22.63	ND	80.19	22.18	ND	80.64	21.11	ND	81.71	21.48	ND	81.34	22.03	ND	80.79	22.93	ND	79.89
MW-204	87.58	100.03		21.87	ND	78.16	--	--	--	--	--	--	18.81	ND	81.22	--	--	--	--	--	--	--	--	--
MW-301	87.12	98.59		18.73	ND	79.86	--	--	--	--	--	--	15.06	ND	83.53	--	--	--	--	--	--	--	--	--
MW-302	87.01	98.59		18.83	ND	79.76	--	--	--	--	--	--	*Note (5)*			--	--	--	--	--	--	--	--	--
MW-303	87.54	99.00		19.35	ND	79.65	--	--	--	--	--	--	*Note (5)*			--	--	--	--	--	--	--	--	--
MW-400	87.42	99.86		21.72	ND	78.14	--	--	--	--	--	--	18.68	ND	81.18	--	--	--	--	--	--	--	--	--
MW-401	87.37	99.80		21.61	ND	78.19	--	--	--	--	--	--	18.60	ND	81.20	--	--	--	--	--	--	--	--	--
MW-402	88.69	99.87		21.13	ND	78.74	19.59	ND	80.28	18.79	ND	81.08	17.55	ND	82.32	17.66	ND	82.21	18.22	ND	81.65	19.28	ND	80.59
MW-500	89.86	102.53	0.82	24.32	ND	78.21	22.52	ND	80.01	22.22	ND	80.31	21.29	ND	81.24	21.65	sheen	80.88	22.32	**0.20**	80.37	23.24	**0.28**	79.52
MW-501	90.57	100.42		21.89	**0.11**	78.62	20.22	**0.01**	80.21	19.59	sheen	80.83	18.07	ND	82.35	--	--	--	18.35	ND	82.07	19.43	ND	80.99
MW-600[3]	86.88	99.26		21.11	ND	78.15	--	--	--	--	--	--	18.41	ND	80.85	--	--	--	--	--	--	--	--	--
MW-601	87.10	99.57		21.37	ND	78.20	--	--	--	--	--	--	18.16	ND	81.41	--	--	--	--	--	--	--	--	--
MW-700	88.16	99.62		19.55	ND	80.07	--	--	--	--	--	--	16.04	ND	83.58	--	--	--	--	--	--	--	--	--
MW-701	86.59	99.03		20.88	ND	78.15	--	--	--	--	--	--	17.92	ND	81.11	--	--	--	--	--	--	--	--	--
RW-2	87.96	99.35		19.42	ND	79.93	--	--	--	--	--	--	*Note (5)*			--	--	--	--	--	--	--	--	--
RW-3	89.67	100.46		19.16	ND	81.30	Dry @ 19.20'			18.22	ND	82.24	16.66	ND	83.80	16.57	ND	83.89	Dry @ 18.10'			Obstruction @ 8.70'		
RW-4	89.74	100.39		20.81	ND	79.58	--	--	--	--	--	--	16.97	ND	83.42	--	--	--	--	--	--	--	--	--
SVE-1	--	100.81		22.58	ND	78.23	20.76	ND	80.05	21.07	sheen	79.74	19.60	**0.01**	81.22	20.73	**0.34**	80.36	21.09	**0.77**	80.35	22.07	**0.93**	79.50
SVE-2	--	100.33		22.15	ND	78.18	--	--	--	--	--	--	19.05	ND	81.28	--	--	--	--	--	--	--	--	--
SVE-3	--	100.80		21.90	ND	78.90	--	--	--	--	--	--	18.23	ND	82.57	--	--	--	--	--	--	--	--	--
SVE-4	--	99.85		20.01	ND	79.84	--	--	--	--	--	--	16.94	ND	82.91	--	--	--	--	--	--	--	--	--

TABLE 8A
WATER AND PRODUCT LEVEL MEASUREMENTS
(DECEMBER 2010 TO APRIL 2021)
CHARIHO REGIONAL MIDDLE SCHOOL

455 Switch Road
Richmond, RI

WELL ID	MP (PVC) Elev. (ft) (g) Past [1]	MP (PVC) Elev. (ft) (g) Current [2]	S.G. [e]	Sept 16, 2019 Depth (ft) to Water	Sept 16, 2019 Product Thickness (ft)	Sept 16, 2019 GW Elev. (ft)	Oct 28, 2019 Depth (ft) to Water	Oct 28, 2019 Product Thickness (ft)	Oct 28, 2019 GW Elev. (ft)	Nov 20, 2019 Depth (ft) to Water	Nov 20, 2019 Product Thickness (ft)	Nov 20, 2019 GW Elev. (ft)	Dec 31, 2019 Depth (ft) to Water	Dec 31, 2019 Product Thickness (ft)	Dec 31, 2019 GW Elev. (ft)	April 2, 2020 Depth (ft) to Water	April 2, 2020 Product Thickness (ft)	April 2, 2020 GW Elev. (ft)	June 8, 2020 Depth (ft) to Water	June 8, 2020 Product Thickness (ft)	June 8, 2020 GW Elev. (ft)	July 29, 2020 Depth (ft) to Water	July 29, 2020 Product Thickness (ft)	July 29, 2020 GW Elev. (ft)
MW-102	--	96.37		*Note (5)*			--	--	--	--	--	--	--	--	--	*Note (5)*			*Note (5)*			*Note (5)*		
MW-103	88.45	99.89		*Note (5)*			--	--	--	--	--	--	--	--	--	*Note (5)*			*Note (5)*			*Note (5)*		
MW-201	87.48	98.83		17.12	ND	81.71	--	--	--	--	--	--	--	--	--	16.95	ND	81.88	--	--	--	--	--	--
MW-202	88.52	99.91		*Note (5)*			--	--	--	--	--	--	--	--	--	*Note (5)*			*Note (5)*			*Note (5)*		
MW-203	90.52	102.82		23.32	ND	79.50	23.92	ND	78.90	23.95	ND	78.87	22.48	ND	80.34	22.75	ND	80.07	24.13	ND	78.69	24.59	ND	78.23
MW-204	87.58	100.03		21	ND	79.03	--	--	--	--	--	--	--	--	--	20.26	ND	79.77	--	--	--	--	--	--
MW-301	87.12	98.59		16.92	ND	81.67	--	--	--	--	--	--	--	--	--	16.72	ND	81.87	--	--	--	--	--	--
MW-302	87.01	98.59		*Note (5)*			--	--	--	--	--	--	--	--	--	*Note (5)*			*Note (5)*			*Note (5)*		
MW-303	87.54	99.00		*Note (5)*			--	--	--	--	--	--	--	--	--	*Note (5)*			*Note (5)*			*Note (5)*		
MW-400	87.42	99.86		20.89	ND	78.97	--	--	--	--	--	--	--	--	--	20.15	ND	79.71	--	--	--	--	--	--
MW-401	87.37	99.80		20.75	ND	79.05	--	--	--	--	--	--	--	--	--	20.02	ND	79.78	--	--	--	--	--	--
MW-402	88.69	99.87		19.62	ND	80.25	20.35	ND	79.52	20.34	ND	79.53	19.20	ND	80.67	19.27	ND	80.60	19.53	ND	80.34	20.81	ND	79.06
MW-500	89.86	102.53	0.82	23.62	**0.25**	79.12	23.90	ND	78.63	23.87	**0.01**	78.66	23.49	ND	79.04	22.75	ND	79.78	23.28	**0.17**	79.39	24.57	**0.16**	78.09
MW-501	90.57	100.42		20.36	ND	80.06	21.15	ND	79.27	20.80	ND	79.62	20.06	ND	80.36	20.91	ND	79.51	20.38	ND	80.04	21.67	ND	78.75
MW-600[3]	86.88	99.26		20.33	ND	78.93	--	--	--	--	--	--	--	--	--	19.57	ND	79.69	--	--	--	--	--	--
MW-601	87.10	99.57		20.59	ND	78.98	--	--	--	--	--	--	--	--	--	19.86	ND	79.71	--	--	--	--	--	--
MW-700	88.16	99.62		17.66	ND	81.96	--	--	--	--	--	--	--	--	--	17.62	ND	82.00	--	--	--	--	--	--
MW-701	86.59	99.03		20.07	ND	78.96	--	--	--	--	--	--	--	--	--	19.37	ND	79.66	--	--	--	--	--	--
RW-2	87.96	99.35		*Note (5)*			--	--	--	--	--	--	--	--	--	*Note (5)*			*Note (5)*			*Note (5)*		
RW-3	89.67	100.46		Dry @ 18.05'			Dry @ 17.95'			18.80	ND	81.66	Dry @ 18.00'			18.34	ND	82.12	18.19	ND	82.27	Dry @ 18.00'		
RW-4	89.74	100.39		18.82	ND	81.57	--	--	--	--	--	--	--	--	--	18.59	ND	81.80	--	--	--	--	--	--
SVE-1	--	100.81		22.15	**0.53**	79.09	22.16	**0.02**	78.67	22.12	ND	78.69	20.93	**0.21**	80.05	21.31	**0.30**	79.75	21.74	**0.41**	79.41	22.70	**0.02**	78.13
SVE-2	--	100.33		21.29	ND	79.04	--	--	--	--	--	--	--	--	--	20.51	ND	79.82	--	--	--	--	--	--
SVE-3	--	100.80		20.92	ND	79.88	--	--	--	--	--	--	--	--	--	20.05	ND	80.75	--	--	--	--	--	--
SVE-4	--	99.85		19.47	ND	80.38	--	--	--	--	--	--	--	--	--	18.55	ND	81.30	--	--	--	--	--	--

WELL ID	MP (PVC) Elev. (ft) (g) Past [1]	MP (PVC) Elev. (ft) (g) Current [2]	S.G. [e]	Aug 25, 2020 Depth (ft) to Water	Aug 25, 2020 Product Thickness (ft)	Aug 25, 2020 GW Elev. (ft)	Sept 22, 2020 Depth (ft) to Water	Sept 22, 2020 Product Thickness (ft)	Sept 22, 2020 GW Elev. (ft)	Oct 2, 2020 Depth (ft) to Water	Oct 2, 2020 Product Thickness (ft)	Oct 2, 2020 GW Elev. (ft)	Nov 17, 2020 Depth (ft) to Water	Nov 17, 2020 Product Thickness (ft)	Nov 17, 2020 GW Elev. (ft)	Dec 21, 2020 Depth (ft) to Water	Dec 21, 2020 Product Thickness (ft)	Dec 21, 2020 GW Elev. (ft)	April 23, 2021 Depth (ft) to Water	April 23, 2021 Product Thickness (ft)	April 23, 2021 GW Elev. (ft)
MW-201	87.48	98.83		--	--	--	19.72	ND	79.11	--	--	--	--	--	--	--	--	--	17.89	ND	80.94
MW-203	90.52	102.82		25.40	ND	77.42	26.22	ND	76.60	27.72	**0.64**	75.62	28.08	**1.20**	75.72	25.47	**0.10**	77.43	23.80	ND	79.02
MW-204	87.58	100.03		--	--	--	23.59	ND	76.44	--	--	--	--	--	--	--	--	--	21.23	ND	78.80
MW-301	87.12	98.59		--	--	--	19.52	**0.01**	79.08	--	--	--	--	--	--	--	--	--	17.66	ND	80.93
MW-400	87.42	99.86		--	--	--	23.49	ND	76.37	--	--	--	--	--	--	--	--	--	21.11	ND	78.75
MW-401	87.37	99.80		--	--	--	23.33	ND	76.47	--	--	--	--	--	--	--	--	--	21.01	ND	78.79
MW-402	88.69	99.87		21.65	ND	78.22	22.61	ND	77.26	24.91	**0.87**	75.67	23.62	**0.02**	76.27	22.16	**0.01**	77.72	20.22	ND	79.65
MW-500	89.86	102.53		25.44	**0.29**	77.33	26.19	**0.22**	76.52	27.12	**0.30**	75.66	26.85	**0.02**	75.70	25.19	ND	77.34	23.70	ND	78.83
MW-501	90.57	100.42		22.24	ND	78.18	23.00	ND	77.42	23.41	ND	77.01	24.10	**0.58**	76.80	22.80	**0.29**	77.86	21.25	ND	79.17
MW-600[3]	86.88	99.26	0.82	--	--	--	22.88	ND	76.38	--	--	--	--	--	--	--	--	--	20.80	ND	78.46
MW-601	87.10	99.57		--	--	--	23.14	ND	76.43	--	--	--	--	--	--	--	--	--	20.53	ND	79.04
MW-700	88.16	99.62		--	--	--	20.28	ND	79.34	--	--	--	--	--	--	--	--	--	18.57	ND	81.05
MW-701	86.59	99.03		--	--	--	22.72	ND	76.31	--	--	--	--	--	--	--	--	--	20.30	ND	78.73
RW-3	89.67	100.46		Dry @ 18.05'			Dry @ 18.00'			Dry @ 18.00'			Dry @ 18.05'			Dry @ 18.05'			Obstruction @ 9.95'		
RW-4	89.74	100.39		--	--	--	21.39	ND	79.00	--	--	--	--	--	--	--	--	--	19.56	ND	80.83
SVE-1	--	100.81		23.42	**0.04**	77.42	24.29	**0.02**	76.54	25.04	**0.02**	75.79	25.09	ND	75.72	23.45	ND	77.36	21.98	ND	78.83
SVE-2	--	100.33		--	--	--	23.87	ND	76.46	--	--	--	--	--	--	--	--	--	21.54	ND	78.79
SVE-3	--	100.80		--	--	--	23.76	ND	77.04	--	--	--	--	--	--	--	--	--	21.35	ND	79.45
SVE-4	--	99.85		--	--	--	22.55	ND	77.30	--	--	--	--	--	--	--	--	--	20.00	ND	79.85

Notes:

a. Depth to product and water from top of PVC in feet measured with ORS oil/water interface probe.
b. ND - no product layer detected (detection limit = 0.01 feet).
c. "--" - indicates groundwater measurements were not obtained.
d. All groundwater measurments are relative to the to the top of the PVC well casing.
e. S.G. - Specific Gravity of petroleum product.

1. Monitoring Well elevations produced by Beta Group, Inc.
2. Monitoring Well elevations taken from PVC, surveyed by GZA on February 24, 2011.
3. The MP Elev for MW-600 was adjust from 99.34 ft to 99.26 ft in September 2011, because the PVC was cut while the parking lot was repaved.
4. Active product recovery, utilizing a spill buster, in monitoring wells MW-203, MW-500, and MW-501.
5. Monitoring wells (MW-102, MW-103, MW-202, MW-302, MW-303 and RW-2) were decommissioned on December 28 and 29, 2018.
* - A sheen was observed on the purge water during the groundwater sampling low flow purging procedure.

Values at or above 0.01.

- Physically removed measureable product post measurement.

TABLE 8B

Comparison of Annual Historical Maximum LNAPL Thickness (2005 to 2020)

Chariho Regional Middle School
Richmond, RI

Monitoring Well	Maximum LNAPL Thickness Measured in Observation Well (feet)															
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
MW-201	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-202	0.8	0.1	ND	ND	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
MW-203	5.1	3.5	2.8	1.3	3.2	2.6	0.7	0.6	0.6	0.4	0.8	0.9	0.01	0.2	ND	1.2
MW-204	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-301	ND	ND	0.2	0.2	ND	ND	ND	ND	0.06	ND	ND	ND	ND	ND	ND	0.01
MW-400	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-401	0.6	0.2	ND	ND	ND	0.4	ND	0.01	ND	ND	ND	ND	ND	ND	ND	ND
MW-402	4.2	2.1	5.2	3.7	0.2	0.7	0.8	1.2	1.3	0.3	1.8	2.4	0.03	ND	ND	0.9
MW-500	8.4	1.8	6.8	5.0	3.5	2.8	0.7	1.9	0.6	0.6	1.2	0.8	0.5	0.2	0.3	0.3
MW-501	1.1	3.1	4.8	2.6	1.3	4.7	0.2	2.5	1.6	0.2	0.4	0.4	0.5	0.2	ND	0.6
RW-1	0.3	0.7	0.01	ND	ND	-	-	-	-	-	-	-	-	-	-	-
RW-2	0.02	ND	0.04	0.02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
RW-3	0.01	ND	-	-	-	-	ND	0.3	0.3	0.3	0.1	0.2	0.03	0.04	ND	ND
RW-4	ND	-	-	-	-	ND	ND	ND	ND	ND	-	-	-	ND	ND	ND
SVE-1	-	-	-	-	-	2.2	0.6	2.8	2.0	1.9	1.2	0.2	0.03	0.4	0.9	0.4
SVE-3	-	-	-	-	-	ND	ND	0.1	0.01	ND	ND	ND	ND	ND	ND	ND
Deviation from Mean Groundwater Elevation	-2.1	-1.2	-2.9	-1.6	-0.9	-2.4	-1.0	-2.2	-2.2	-2.6	-2.7	-2.5	-2.0	-2.1	-1.8	-3.0

Note: 1. ND = no LNAPL detected in observation well, detection limit assumed at <0.01 for data collected by Beta prior to 2010 (GZA), although Beta reported as 0.00 feet.

2. "Deviation from Mean Groundwater" was derived from USGS monitoring station RI-SNW 1198 in South Kingstown, RI showing the difference between the historical mean (1999-2020) and the yearly seasonal low. For example, in 2020 the lowest observed level of the groundwater table at SNW-1198 was 11.54 feet. The mean depth to groundwater from 1999 to 2020 at SNW-1198 was 8.56 feet. Therefore, the deviation from the mean in 2020 was 8.56 minus 11.54 of -2.98 feet, as

3. SVE-1 and SVE-3 were installed in November of 2010 and RW-1 was destroyed in 2009.

(-) = data not available on the indicated dates.

4. MW-202 and RW-2 were decommissioned in December 2018.

TABLE 9

PRODUCT RECOVERY SYSTEM
INSPECTION LOG
"Magnum Spill Buster Units & Bailing"

Chariho Regional Middle School
Richmond, RI

	MW-203 (collection drum)			MW-500 (collection drum)			MW-501 (collection drum)		
Date	Depth to Product (ft)	Product Thickness (ft)	Product (Gallons)	Depth to Product (ft)	Product Thickness (ft)	Product (Gallons)	Depth to Product (ft)	Product Thickness (ft)	Product (Gallons)
12/14/10	2.70	0.08	1.6	2.60	0.18	3.6	2.58	0.20	4.0
01/03/11	2.66	0.12	2.4	2.53	0.25	5.0	2.45	0.33	6.5
01/20/11	2.65	0.13	2.6	2.47	0.31	6.1	2.28	0.50	9.9
02/24/11	2.64	0.14	2.8	2.47	0.31	6.1	2.05	0.73	14.5
03/17/11	2.64	0.14	2.8	2.46	0.32	6.3	2.05	0.73	14.5
04/19/11	2.64	0.14	2.8	2.46	0.32	6.3	2.04	0.74	14.7
05/25/11	2.64	0.14	2.8	2.46	0.32	6.3	2.04	0.74	14.7
06/21/11	2.64	0.14	2.8	2.44	0.34	6.7	2.04	0.74	14.7
07/28/11	2.64	0.14	2.8	2.44	0.34	6.7	2.03	0.75	14.9
08/24/11	2.64	0.14	2.8	2.44	0.34	6.7	1.95	0.83	16.4
09/12/11	2.64	0.14	2.8	2.44	0.34	6.7	1.92	0.86	17.0
10/26/11	2.64	0.14	2.8	2.44	0.34	6.7	1.86	0.92	18.2
11/22/11	2.64	0.14	2.8	2.44	0.34	6.7	1.86	0.92	18.2
12/23/11	2.64	0.14	2.8	2.44	0.34	6.7	1.86	0.92	18.2
01/13/12	2.64	0.14	2.8	2.34	0.44	8.7	1.86	0.92	18.2
02/28/12	2.64	0.14	2.8	2.34	0.44	8.7	1.86	0.92	18.2
04/17/12	2.63	0.15	3.0	2.32	0.46	9.1	1.86	0.92	18.2
05/30/12	2.63	0.15	3.0	2.32	0.46	9.1	1.80	0.98	19.4
06/20/12	2.63	0.15	3.0	2.32	0.46	9.1	1.80	0.98	19.4
07/19/12	2.63	0.15	3.0	2.32	0.46	9.1	1.80	0.98	19.4
08/21/12	2.63	0.15	3.0	2.26	0.52	10.3	1.64	1.14	22.6
09/24/12	2.63	0.15	3.0	2.26	0.52	10.3	1.44	1.34	26.5
10/10/12	2.63	0.15	3.0	2.25	0.53	10.5	1.35	1.43	28.3
11/15/12	2.63	0.15	3.0	2.25	0.53	10.5	1.35	1.43	28.3
12/03/12	2.63	0.15	3.0	2.08	0.70	13.9	1.25	1.53	30.3
							0.00	2.78	0.0 [(2)]
01/23/13	2.63	0.15	3.0	1.73	1.05	20.8	2.51	0.27	5.3
02/28/13	2.63	0.15	3.0	1.73	1.05	20.8	2.36	0.42	8.3
03/26/13	2.63	0.15	3.0	1.73	1.05	20.8	2.35	0.43	8.5
04/15/13	2.63	0.15	3.0	1.72	1.06	21.0	2.35	0.43	8.5
05/31/13	2.63	0.15	3.0	2.65	0.13	0.0 [(3)]	2.31	0.47	9.3
06/24/13	2.63	0.15	3.0	2.62	0.16	0.6	2.17	0.61	12.1
07/29/13	2.63	0.15	3.0	2.62	0.16	0.6	2.17	0.61	12.1
08/14/13	2.63	0.15	3.0	2.56	0.22	1.8	2.15	0.63	12.5
09/30/13	2.63	0.15	3.0	2.50	0.28	3.0	1.92	0.86	17.0
10/29/13	2.63	0.15	3.0	2.43	0.35	4.4	1.81	0.97	19.2
11/26/13	2.62	0.16	3.2	2.38	0.40	5.3	1.44	1.34	26.5
12/20/13	2.62	0.16	3.2	2.25	0.53	7.9	1.25	1.53	30.3
01/28/14	2.62	0.16	3.2	2.23	0.55	8.3	1.09	1.69	33.5
02/21/14	2.62	0.16	3.2	2.23	0.55	8.3	1.09	1.69	33.5
03/24/14	2.62	0.16	3.2	2.23	0.55	8.3	1.09	1.69	33.5
04/22/14	2.62	0.16	3.2	2.78	0.00	0.0 [(2)]	2.78	0.00	0.0 [(2)]
06/24/14	2.62	0.16	3.2	2.72	0.06	1.2	2.78	0.00	0.0
07/25/14	2.62	0.16	3.2	2.72	0.06	1.2	2.78	0.00	0.0
08/27/14	2.62	0.16	3.2	2.72	0.06	1.2	2.78	0.00	0.0
09/29/14	2.62	0.16	3.2	2.65	0.13	2.6	2.49	0.29	5.7
10/08/14	2.62	0.16	3.2	2.65	0.13	2.6	2.46	0.32	6.3
11/26/14	2.59	0.19	3.8	2.56	0.22	4.4	2.04	0.74	14.7
12/22/14	2.55	0.23	4.6	2.54	0.24	4.8	1.84	0.94	18.6
02/25/15	2.55	0.23	4.6	2.52	0.26	5.1	1.72	1.06	21.0
04/22/15	2.55	0.23	4.6	2.52	0.26	5.1	1.60	1.18	23.4
06/24/15	2.50	0.28	5.5	2.50	0.28	5.5	1.60	1.18	23.4
07/20/15	2.50	0.28	5.5	2.50	0.28	5.5	1.54	1.24	24.6

TABLE 9

PRODUCT RECOVERY SYSTEM
INSPECTION LOG
"Magnum Spill Buster Units & Bailing"

Chariho Regional Middle School
Richmond, RI

Date	MW-203 (collection drum)			MW-500 (collection drum)			MW-501 (collection drum)		
	Depth to Product (ft)	Product Thickness (ft)	Product (Gallons)	Depth to Product (ft)	Product Thickness (ft)	Product (Gallons)	Depth to Product (ft)	Product Thickness (ft)	Product (Gallons)
08/28/15	2.50	0.28	5.5	2.50	0.28	5.5	1.10	1.68	33.3
09/23/15	2.50	0.28	5.5	2.50	0.28	5.5	1.00	1.78	35.2
10/29/15	2.50	0.28	5.5	2.50	0.28	5.5	0.88	1.90	37.6
							2.78	0.00	0.0 (2)
11/25/15	2.50	0.28	5.5	2.50	0.28	5.5	2.56	0.22	4.4
12/28/15	2.50	0.28	5.5	2.50	0.28	5.5	2.56	0.22	4.4
04/20/16	2.50	0.28	5.5	2.50	0.28	5.5	2.55	0.23	4.6
06/22/16	2.50	0.28	5.5	2.50	0.28	5.5	2.55	0.23	4.6
07/22/16	2.50	0.28	5.5	2.50	0.28	5.5	2.28	0.50	9.9
08/26/16	2.50	0.28	5.5	2.50	0.28	5.5	2.03	0.75	14.9
09/29/16	2.50	0.28	5.5	2.50	0.28	5.5	1.60	1.18	23.4
10/27/16	2.50	0.28	5.5	2.50	0.28	5.5	1.43	1.35	26.7
11/17/16	2.50	0.28	5.5	2.50	0.28	5.5	1.43	1.35	26.7
12/13/16	2.50	0.28	5.5	2.50	0.28	5.5	0.56	2.22	44.0
	--	--	0.0(2)	--	--	0.0(2)	--	--	0.0(2)
04/18/17	--	--	0.0	--	--	0.0	2.19	0.59	11.7
06/22/17	--	--	0.0	--	--	0.0	2.15	0.63	12.5
07/17/17	--	--	0.0	--	--	0.0	2.14	0.64	12.7
08/31/17	--	--	0.0	--	--	0.0	2.14	0.64	12.7
09/28/17	--	--	0.0	--	--	0.0	2.07	0.71	14.1
10/27/17	--	--	0.0	--	--	0.0	1.95	0.83	16.4
11/28/17	--	--	0.0	--	--	0.0	1.94	0.84	16.6
12/20/17	--	--	0.0	--	--	0.0	1.90	0.88	17.4
04/23/18	--	--	0.0	--	--	0.0	1.90	0.88	17.4
06/06/18	--	--	0.0	--	--	0.0	1.90	0.88	17.4
07/18/18	--	--	0.0	--	--	0.0	1.90	0.88	17.4
08/24/18	--	--	0.0	--	--	0.0	1.90	0.88	17.4
09/25/18	--	--	0.0	--	--	0.0	1.89	0.89	17.6
10/22/18	--	--	0.0	--	--	0.0	1.87	0.91	18.0
11/26/18	--	--	0.0	--	--	0.0	1.87	0.91	18.0
12/28/18	--	--	0.0	--	--	0.0	1.87	0.91	18.0
04/29/19	--	--	0.0	--	--	0.0	1.87	0.91	18.0
06/18/19	--	--	0.0	--	--	0.0	1.87	0.91	18.0
07/31/19	--	--	0.0	--	--	0.0	1.87	0.91	18.0
08/30/19	--	--	0.0	--	--	0.0	1.87	0.91	18.0
09/16/19	--	--	0.0	--	--	0.0	1.86	0.92	18.2
10/28/19	--	--	0.0	--	--	0.0	1.86	0.92	18.2
11/20/19	--	--	0.0	--	--	0.0	1.86	0.92	18.2
12/31/19	--	--	0.0	--	--	0.0	1.86	0.92	18.2
04/02/20	--	--	0.0	--	--	0.0	1.84	0.94	18.6
06/08/20	--	--	0.0	--	--	0.0	1.84	0.94	18.6
07/29/20	--	--	0.0	--	--	0.0	1.84	0.94	18.6
08/25/20	--	--	0.0	--	--	0.0	1.84	0.94	18.6
09/22/20	--	--	0.0	--	--	0.0	1.84	0.94	18.6
10/27/20	--	--	0.0	--	--	0.0	1.84	0.94	18.6
11/17/20	--	--	0.0	--	--	0.0	1.84	0.94	18.6
12/21/20	--	--	0.0	--	--	0.0	1.84	0.94	18.6
04/23/21	--	--	0.0	--	--	0.0	1.84	0.94	18.6
Total			5.5			34.8			164.0

Notes: 1. Drum: A = 2.62 ft^2, H = 2.78 ft, 1 inch = 1.65 gal
2. Product was transferred to the storage container in the remedial shed.
3. Product was transferred to the storage container in the remedial shed. Approximately 0.13 feet of product remained in the drum.

TABLE 10
GROUNDWATER LABORATORY RESULTS - TPH and VOCs
CHARIHO REGIONAL MIDDLE SCHOOL

455 Switch Road
Richmond, Rhode Island

CONSTITUENT OF CONCERN	RIDEM GA Groundwater Objective	Constituent Concentration (mg/l)												
		MW-400												
		3/3/2003	4/21/2003	7/22/2003	12/31/2003	3/31/2004	6/28/2004	9/28/2004	12/29/2004	3/25/2005	6/30/2005	9/28/2005	12/15/2005	3/24/2006
TPH (mg/l) EPA Method 8100														
TPH 8100	NE	**3.8**	**0.128**	**0.462**	**1.63**	**1.3**	**1.34**	**1.83**	**2.41**	**1.63**	**0.74**	**0.932**	**0.562**	**0.921**
VOCs (mg/l) - EPA Method 8260														
Benzene	0.005	**0.046**	**0.0173**	**0.0093**	**0.0082**	**0.006**	**0.0175**	**0.0138**	**0.0242**	**0.02**	**0.007**	**0.0065**	**0.0066**	**0.0049**
Ethylbenzene	0.7	**0.099**	**0.0405**	**0.019**	**0.0025**	**0.0062**	**0.0027**	**0.0014**	ND	**0.0019**	**0.001**	ND	ND	ND
Isopropylbenzene	NE	**0.015**	**0.0055**	**0.0034**	**0.0039**	**0.0018**	**0.0046**	**0.0039**	ND	**0.0063**	**0.0028**	**0.003**	**0.0025**	**0.0018**
MTBE	0.04	**0.12**	**0.0211**	**0.013**	**0.082**	**0.0603**	**0.0223**	**0.0091**	**0.0081**	**0.0061**	**0.0056**	**0.0062**	**0.002**	ND
Napthalene	NE	**0.150**	**0.114**	**0.053**	**0.021**	**0.0244**	**0.0653**	**0.0863**	**0.0976**	**0.0758**	**0.0249**	**0.041**	**0.030**	**0.0096**
n-Butylbenzene	NE	ND	**0.0031**	**0.0039**	**0.0026**	**0.0012**	**0.003**	**0.0033**	**0.0171**	**0.0042**	**0.0021**	ND	ND	ND
n-Propylbenzene	NE	**0.026**	**0.0092**	**0.0056**	**0.0019**	**0.0018**	**0.0024**	**0.0016**	ND	**0.0024**	**0.009**	ND	ND	ND
Toluene	1	**0.0036**	**0.008**	ND	**0.001**	**0.0007**	**0.0013**	ND	ND	**0.0011**	ND	ND	ND	ND
1,2,4-Trimethylbenzene	NE	**0.18**	**0.0874**	**0.052**	**0.048**	**0.0391**	**0.0822**	**0.0774**	**0.114**	**0.0931**	**0.0366**	**0.048**	**0.039**	**0.019**
sec-Butylbenzene	NE	**0.011**	**0.003**	**0.0026**	**0.0025**	**0.0008**	**0.0031**	**0.002**	ND	**0.0039**	**0.0018**	ND	ND	ND
Xylenes	10	**0.263**	**0.1228**	**0.072**	**0.072**	**0.0618**	**0.1005**	**0.130**	**0.1532**	**0.1314**	**0.0493**	**0.069**	**0.0513**	**0.031**
p-Isopropyltoluene	NE	**0.011**	ND	**0.003**	**0.003**	ND	ND	ND	**0.0184**	**0.0043**	ND	ND	**0.0018**	**0.0013**
1,3,5-Trimethylbenzene	NE	**0.050**	**0.0222**	**0.014**	**0.016**	**0.0125**	**0.0213**	**0.0276**	**0.0392**	**0.0263**	**0.0104**	**0.0140**	**0.012**	**0.0069**
Indicator Parameters (Field & Laboratory)														
pH (SU)	-	--	--	--	--	--	--	--	--	--	--	--	--	--
Specific Conductivity (µS/cm)	-	--	--	--	--	--	--	--	--	--	--	--	--	--
Turbidity	-	--	--	--	--	--	--	--	--	--	--	--	--	--
Dissolved Oxygen - DO (mg/l)	-	--	--	--	--	--	--	--	--	--	--	--	--	--
Temperature (°C)	-	--	--	--	--	--	--	--	--	--	--	--	--	--
Oxidation-Reduction Potential -ORP (mV)	-	--	--	--	--	--	--	--	--	--	--	--	--	--
Product Thickness (feet)	-	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:

a) RIDEM Method 1 Objective as provided in RIDEM's March 1993 Site Remediation Regulation as amended August 1996 and February 2004.

NE - indicates no Method 1 RIDEM objective established.

NT - sample not tested for this parameter. Samples with measureable product (LNAPL) or sheen present in well during sampling event were not subjected to laboratory analysis.

- Indicates an individual compound exceeded the RIDEM Method 1 GA Groundwater Objective.

- Floating Product or the presence of a sheen on the purge water was detected at time of sampling.

TABLE 10
GROUNDWATER LABORATORY RESULTS - TPH and VOCs
CHARIHO REGIONAL MIDDLE SCHOOL

455 Switch Road
Richmond, Rhode Island

CONSTITUENT OF CONCERN	RIDEM GA Groundwater Objective	Constituent Concentration (mg/l)												
		MW-400												
		6/23/2006	9/29/2006	12/22/2006	3/20/2007	6/19/2007	9/26/2007	12/3/2007	3/27/2008	6/25/2008	9/24/2008	12/3/2008	3/24/2009	6/24/2009
TPH (mg/l) EPA Method 8100														
TPH 8100	NE	**0.211**	**0.841**	**0.44**	**1.09**	ND	**0.585**	**1.21**	**1.35**	**0.256**	**0.399**	**0.618**	ND	ND
VOCs (mg/l) - EPA Method 8260														
Benzene	0.005	**0.0019**	**0.013**	**0.0049**	**0.016**	ND	ND	**0.00487**	**0.0117**	**0.012**	**0.012**	**0.0026**	ND	**0.059**
Ethylbenzene	0.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	NE	**0.0014**	**0.0075**	**0.0039**	**0.0043**	ND	**0.00611**	**0.0045**	**0.00558**	**0.0042**	**0.0076**	**0.0022**	ND	**0.0012**
MTBE	0.04	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Napthalene	NE	**0.013**	**0.062**	**0.012**	**0.070**	ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Butylbenzene	NE	ND	0.0056	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Propylbenzene	NE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	NE	**0.02**	**0.072**	**0.017**	**0.065**	ND	**0.0152**	**0.0173**	**0.046**	**0.018**	**0.021**	**0.0053**	**0.011**	ND
sec-Butylbenzene	NE	ND	ND	ND	**0.0029**	ND	ND	ND	ND	ND	ND	**0.0013**	ND	**0.0077**
Xylenes	10	**0.022**	**0.087**	**0.0245**	**0.0828**	ND	**0.0139**	**0.0245**	**0.0468**	**0.021**	**0.021**	**0.0057**	**0.0095**	**0.001**
p-Isopropyltoluene	NE	ND	ND	ND	**0.0027**	ND	**0.00571**	ND	ND	**0.0024**	**0.0049**	**0.0014**	ND	**0.068**
1,3,5-Trimethylbenzene	NE	**0.008**	**0.007**	ND	**0.0033**	ND	ND	**0.00658**	ND	ND	ND	**0.0014**	ND	ND
Indicator Parameters (Field & Laboratory)														
pH (SU)	-	--	--	--	--	--	--	--	--	--	--	--	--	--
Specific Conductivity (µS/cm)	-	--	--	--	--	--	--	--	--	--	--	--	--	--
Turbidity	-	--	--	--	--	--	--	--	--	--	--	--	--	--
Dissolved Oxygen - DO (mg/l)	-	--	--	--	--	--	--	--	--	--	--	--	--	--
Temperature (°C)	-	--	--	--	--	--	--	--	--	--	--	--	--	--
Oxidation-Reduction Potential -ORP (mV)	-	--	--	--	--	--	--	--	--	--	--	--	--	--
Product Thickness (feet)	-	--	--	--	--	--	--	--	--	--	--	--	--	--

TABLE 10
GROUNDWATER LABORATORY RESULTS - TPH and VOCs
CHARIHO REGIONAL MIDDLE SCHOOL

455 Switch Road
Richmond, Rhode Island

CONSTITUENT OF CONCERN	RIDEM GA Groundwater Objective	Constituent Concentration (mg/l)											
		MW-400											
		9/17/2009	12/29/2009	3/22/2010	1/3/2011	9/12/2011	4/17/2012	9/24/2012	3/26/2013	9/30/2013	4/22/2014	4/23/2015	4/21/2016
TPH (mg/l) EPA Method 8100													
TPH 8100	NE	ND	ND	ND	**1.9**	**1.0**	**0.610**	**3.58**	**3.34**	**1.74**	**0.56**	**2.97**	**0.57**
VOCs (mg/l) - EPA Method 8260													
Benzene	0.005	ND	**0.057**	ND	**0.016**	**0.0035**	**0.0031**	**0.0073**	**0.0088**	**0.0023**	<0.001	**0.0012**	<0.001
Ethylbenzene	0.7	ND	ND	ND	**0.004**	<0.001	<0.001	**0.0057**	**0.0040**	**0.0048**	<0.001	**0.0038**	<0.001
Isopropylbenzene	NE	ND	**0.087**	ND	**0.0058**	**0.0039**	**0.0023**	**0.0052**	**0.0039**	**0.0053**	<0.001	<0.001	<0.001
MTBE	0.04	ND	ND	ND	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002
Napthalene	NE	ND	ND	ND	<0.002	<0.002	<0.002	**0.0028**	<0.001	<0.001	<0.001	<0.001	<0.001
n-Butylbenzene	NE	ND	ND	ND	**0.0018**	<0.001	<0.001	**0.0014**	**0.0010**	**0.0010**	<0.001	<0.001	<0.001
n-Propylbenzene	NE	ND	ND	ND	**0.002**	<0.001	<0.001	**0.0032**	**0.0032**	**0.0033**	<0.001	**0.0011**	<0.001
Toluene	1	ND	ND	ND	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,2,4-Trimethylbenzene	NE	ND	**0.003**	ND	**0.0026**	**0.0014**	<0.001	**0.0015**	<0.001	<0.001	<0.001	<0.001	<0.001
sec-Butylbenzene	NE	ND	**0.0052**	ND	**0.0033**	**0.0022**	**0.0012**	**0.0028**	**0.0022**	**0.0030**	<0.001	<0.001	<0.001
Xylenes	10	ND	ND	ND	**0.021**	**0.002**	<0.002	**0.0075**	**0.0025**	**0.0012**	<0.002	**0.0033**	<0.002
p-Isopropyltoluene	NE	ND	ND	ND	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,3,5-Trimethylbenzene	NE	ND	ND	ND	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Indicator Parameters (Field & Laboratory)													
pH (SU)	-	--	--	--	6.3	5.5	5.7	5.7	5.9	5.9	5.2	5.9	5.8
Specific Conductivity (µS/cm)	-	--	--	--	364	420	326	351	380	381	1460	630	548
Turbidity	-	--	--	--	1	2	2	1	2	4	4	4	3
Dissolved Oxygen - DO (mg/l)	-	--	--	--	0.3	0.9	1.2	1.2	1.5	1.4	6.3	3.9	2.1
Temperature (°C)	-	--	--	--	13.2	16.2	15.5	15.3	13.9	15.8	13.2	13.0	14.2
Oxidation-Reduction Potential -ORP (mV)	-	--	--	--	203	177	136	226	119	110	191	78	151
Product Thickness (feet)	-	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

TABLE 11
GROUNDWATER LABORATORY RESULTS - TPH and VOCs
CHARIHO REGIONAL MIDDLE SCHOOL

455 Switch Road
Richmond, Rhode Island

CONSTITUENT OF CONCERN	RIDEM GA Groundwater Objective	Constituent Concentration (mg/l) MW-401												
		3/3/2003	4/24/2003	7/22/2003	12/31/2003	12/29/2004	12/15/2005	3/20/2007	6/19/2007	9/26/2007	12/3/2007	3/27/2008	6/25/2008	9/24/2008
TPH (mg/l) EPA Method 8100														
TPH 8100	NE	**3.9**	**0.68**	**3.5**	**56.1**	**89**	**15.1**	**55.5**	**16.7**	**1.06**	**7.27**	**28.1**	**6.02**	**1.59**
VOCs (mg/l) - EPA Method 8260														
Benzene	0.005	**0.0061**	**0.0013**	**0.0044**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	0.7	**0.045**	**0.0104**	**0.0081**	**0.0048**	ND	**0.0016**	**0.003**	**0.0092**	**0.0159**	ND	ND	ND	**0.0013**
Isopropylbenzene	NE	**0.0058**	**0.0018**	**0.0012**	**0.001**	ND	**0.0011**	ND	ND	ND	ND	ND	ND	**0.0011**
MTBE	0.04	**0.0039**	**0.0216**	**0.0027**	**0.0019**	ND	**0.0031**	ND	ND	ND	ND	ND	ND	ND
Napthalene	NE	**0.073**	**0.0418**	**0.024**	**0.0046**	**0.0754**	**0.015**	**0.021**	ND	ND	ND	ND	**0.0043**	**0.0087**
n-Butylbenzene	NE	ND	**0.0025**	**0.0047**	ND	**0.0296**	ND	**0.0014**	ND	ND	ND	ND	ND	ND
n-Propylbenzene	NE	**0.0093**	**0.0025**	**0.002**	**0.0013**	ND	**0.001**	ND	ND	**0.00556**	ND	ND	ND	ND
Toluene	1	ND	ND	**0.0016**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	NE	**0.078**	**0.0411**	**0.03**	**0.011**	**0.0322**	**0.013**	**0.014**	**0.0279**	**0.0532**	**0.024**	**0.023**	**0.0089**	**0.016**
sec-Butylbenzene	NE	**0.0037**	**0.001**	**0.0016**	**0.0013**	ND	ND	**0.0011**	ND	ND	ND	ND	ND	ND
Xylenes	10	**0.185**	0.089	0.045	**0.027**	**0.0344**	**0.0269**	**0.0242**	**0.0488**	**0.03850**	ND	**0.00513**	**0.0083**	**0.0025**
p-Isopropyltoluene	NE	**0.0027**	**0.0017**	**0.006**	**0.0054**	ND	**0.0066**	**0.0013**	**ND**	**0.00873**	ND	ND	**0.0027**	**0.0028**
1,3,5-Trimethylbenzene	NE	**0.029**	**0.0211**	**0.017**	**0.013**	**0.0384**	**0.0094**	ND	ND	**0.0112**	ND	ND	**0.0013**	ND
Indicator Parameters (Field & Laboratory)														
pH (SU)	-	--	--	--	--	--	--	--	--	--	--	--	--	--
Specific Conductivity (µS/cm)	-	--	--	--	--	--	--	--	--	--	--	--	--	--
Turbidity	-	--	--	--	--	--	--	--	--	--	--	--	--	--
Dissolved Oxygen - DO (mg/l)	-	--	--	--	--	--	--	--	--	--	--	--	--	--
Temperature (°C)	-	--	--	--	--	--	--	--	--	--	--	--	--	--
Oxidation-Reduction Potential -ORP (mV)	-	--	--	--	--	--	--	--	--	--	--	--	--	--
Product Thickness (feet)	-	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:

a) RIDEM Method 1 Objective as provided in RIDEM's March 1993 Site Remediation Regulation as amended August 1996 and February 2004.

NE - indicates no Method 1 RIDEM objective established.

NT - sample not tested for this parameter. Samples with measureable product (LNAPL) or sheen present in well during sampling event were not subjected to laboratory analysis.

- Indicates an individual compound exceeded the RIDEM Method 1 GA Groundwater Objective.

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TABLE 11
GROUNDWATER LABORATORY RESULTS - TPH and VOCs
CHARIHO REGIONAL MIDDLE SCHOOL

455 Switch Road
Richmond, Rhode Island

CONSTITUENT OF CONCERN	RIDEM GA Groundwater Objective	Constituent Concentration (mg/l) MW-401												
		12/3/2008	3/24/2009	6/24/2009	9/17/2009	12/29/2009	1/3/2011	9/12/2011	4/17/2012	9/24/2012	3/26/2013	4/22/2014	4/23/2015	4/21/2016
TPH (mg/l) EPA Method 8100														
TPH 8100	NE	**5.88**	**15.5**	**4.78**	**3.62**	**8.9**	NT	NT	NT	**6.31**	**7.95**	**10.5**	**21.3**	**6.9**
VOCs (mg/l) - EPA Method 8260														
Benzene	0.005	ND	ND	ND	ND	**0.0053**	NT	NT	NT	<0.001	**0.001**	<0.001	<0.001	<0.001
Ethylbenzene	0.7	ND	ND	**0.00068**	**0.0013**	**0.00086**	NT	NT	NT	**0.0084**	**0.0013**	<0.001	<0.001	<0.001
Isopropylbenzene	NE	ND	ND	**0.00068**	**0.0038**	**0.0018**	NT	NT	NT	**0.0047**	**0.0011**	**0.0029**	<0.001	<0.001
MTBE	0.04	ND	ND	ND	ND	ND	NT	NT	NT	<0.001	<0.001	<0.001	<0.001	<0.002
Napthalene	NE	**0.0084**	**0.005**	**0.011**	ND	**0.0025**	NT	NT	NT	**0.0202**	**0.0062**	**0.0023**	**0.0023**	**0.002**
n-Butylbenzene	NE	ND	ND	ND	ND	ND	NT	NT	NT	<0.001	<0.001	<0.001	<0.001	<0.001
n-Propylbenzene	NE	ND	ND	ND	**0.00082**	ND	NT	NT	NT	**0.0025**	<0.001	<0.001	<0.001	<0.001
Toluene	1	ND	ND	ND	ND	ND	NT	NT	NT	<0.001	<0.001	<0.001	<0.001	<0.001
1,2,4-Trimethylbenzene	NE	**0.023**	ND	**0.0075**	**0.063**	**0.021**	NT	NT	NT	**0.0205**	**0.0172**	**0.0153**	**0.0023**	<0.001
sec-Butylbenzene	NE	ND	ND	ND	**0.0022**	**0.00083**	NT	NT	NT	<0.001	<0.001	**0.0012**	<0.001	<0.001
Xylenes	10	**0.005**	**0.0031**	**0.0064**	**0.0412**	**0.0057**	NT	NT	NT	**0.0082**	**0.0052**	**0.0054**	<0.002	<0.002
p-Isopropyltoluene	NE	**0.0023**	ND	**0.0018**	**0.00052**	ND	NT	NT	NT	<0.001	<0.001	<0.001	<0.001	<0.001
1,3,5-Trimethylbenzene	NE	**0.0023**	ND	ND	ND	ND	NT	NT	NT	<0.001	<0.001	<0.001	<0.001	<0.001
Indicator Parameters (Field & Laboratory)														
pH (SU)	-	--	--	--	--	--	NT	NT	NT	5.9	6.1	5.2	6.0	6.3
Specific Conductivity (µS/cm)	-	--	--	--	--	--	NT	NT	NT	175	150	151	135	174
Turbidity	-	--	--	--	--	--	NT	NT	NT	4	5	5	9	9
Dissolved Oxygen - DO (mg/l)	-	--	--	--	--	--	NT	NT	NT	0.2	0.2	0.2	0.3	2.2
Temperature (°C)	-	--	--	--	--	--	NT	NT	NT	15.4	14.2	13.8	13.7	15.5
Oxidation-Reduction Potential -ORP (mV)	-	--	--	--	--	--	NT	NT	NT	37	-14	51	-74	14
Product Thickness (feet)	-	**--**	**--**	**--**	**--**	**--**	**0.05**	**sheen**	**sheen**	**sheen**	**sheen**	**sheen**	**sheen**	**sheen**

TABLE 12
GROUNDWATER LABORATORY RESULTS - TPH and VOCs
CHARIHO REGIONAL MIDDLE SCHOOL

455 Switch Road
Richmond, Rhode Island

CONSTITUENT OF CONCERN	RIDEM GA Groundwater Objective	Constituent Concentration (mg/l) MW-600												
		6/25/2008	9/24/2008	12/3/2008	3/24/2009	6/24/2009	9/17/2009	12/29/2009	3/22/2010	1/3/2011	9/12/2011	4/17/2012	9/24/2012	3/26/2013
TPH (mg/l) EPA Method 8100														
TPH 8100	NE	ND	ND	ND	ND	ND	ND	ND	ND	<0.2	<0.2	<0.2	**0.19**	**0.36**
VOCs (mg/l) - EPA Method 8260														
Benzene	0.005	ND	ND	ND	ND	ND	ND	ND	ND	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.7	ND	ND	ND	ND	ND	ND	ND	ND	<0.001	<0.001	<0.001	<0.001	<0.001
Isopropylbenzene	NE	ND	ND	ND	ND	ND	ND	ND	ND	<0.001	<0.001	<0.001	<0.001	<0.001
MTBE	0.04	ND	ND	ND	ND	ND	ND	ND	ND	<0.001	<0.001	<0.001	<0.001	<0.001
Napthalene	NE	ND	ND	ND	ND	ND	ND	ND	ND	<0.002	<0.002	<0.002	<0.001	<0.001
n-Butylbenzene	NE	ND	ND	ND	ND	ND	ND	ND	ND	<0.001	<0.001	<0.001	<0.001	<0.001
n-Propylbenzene	NE	ND	ND	ND	ND	ND	ND	ND	ND	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	1	ND	ND	ND	ND	ND	ND	ND	ND	<0.001	<0.001	<0.001	<0.001	<0.001
1,2,4-Trimethylbenzene	NE	ND	ND	ND	ND	ND	ND	ND	ND	<0.001	<0.001	<0.001	<0.001	<0.001
sec-Butylbenzene	NE	ND	ND	ND	ND	ND	ND	ND	ND	<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes	10	ND	ND	ND	ND	ND	ND	ND	ND	<0.002	<0.002	<0.002	<0.003	<0.002
p-Isopropyltoluene	NE	ND	ND	ND	ND	ND	ND	ND	ND	<0.001	<0.001	<0.001	<0.001	<0.001
1,3,5-Trimethylbenzene	NE	ND	ND	ND	ND	ND	ND	ND	ND	<0.001	<0.001	<0.001	<0.001	<0.001
Indicator Parameters (Field & Laboratory)														
pH (SU)	-	--	--	--	--	--	--	--	--	5.5	5.1	5.1	5.1	5.3
Specific Conductivity (µS/cm)	-	--	--	--	--	--	--	--	--	69	210	123	110	106
Turbidity	-	--	--	--	--	--	--	--	--	1	1	2	5	4
Dissolved Oxygen - DO (mg/l)	-	--	--	--	--	--	--	--	--	8.7	7.9	9.1	9.6	8.6
Temperature (°C)	-	--	--	--	--	--	--	--	--	14.8	15.9	14.8	16.4	13.7
Oxidation-Reduction Potential -ORP (mV)	-	--	--	--	--	--	--	--	--	254	219	206	249	192
Product Thickness (feet)	-	--	--	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01

Notes:

a) RIDEM Method 1 Objective as provided in RIDEM's March 1993 Site Remediation Regulation as amended August 1996 and February 2004.

NE - indicates no Method 1 RIDEM objective established.

NT - sample not tested for this parameter. Samples with measureable product (LNAPL) or sheen present in well during sampling event were not subjected to laboratory analysis.

- Indicates an individual compound exceeded the RIDEM Method 1 GA Groundwater Objective.

- Floating Product or the presence of a sheen on the purge water was detected at time of sampling.

TABLE 12
GROUNDWATER LABORATORY RESULTS - TPH and VOCs
CHARIHO REGIONAL MIDDLE SCHOOL

455 Switch Road
Richmond, Rhode Island

CONSTITUENT OF CONCERN	RIDEM GA Groundwater Objective	Constituent Concentration (mg/l)							
		MW-600							
		4/22/2014	4/23/2015	4/21/2016	4/18/2017	4/23/2018	4/19/2019	4/30/2019	4/2/2020
TPH (mg/l) EPA Method 8100									
TPH 8100	NE	**0.23**	**0.45**	**0.13**	<0.19	**1.22**	--	**0.25**	<0.19
VOCs (mg/l) - EPA Method 8260									
Benzene	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	--	<0.001
Ethylbenzene	0.7	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	--	<0.001
Isopropylbenzene	NE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	--	<0.001
MTBE	0.04	<0.001	<0.001	<0.002	<0.001	<0.001	<0.001	--	<0.001
Napthalene	NE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	--	<0.001
n-Butylbenzene	NE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	--	<0.001
n-Propylbenzene	NE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	--	<0.001
Toluene	1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	--	<0.001
1,2,4-Trimethylbenzene	NE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	--	<0.001
sec-Butylbenzene	NE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	--	<0.001
Xylenes	10	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	--	<0.002
p-Isopropyltoluene	NE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	--	<0.001
1,3,5-Trimethylbenzene	NE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	--	<0.001
Indicator Parameters (Field & Laboratory)									
pH (SU)	-	4.8	5.3	5.3	4.3	8.1	4.9	5.0	5.1
Specific Conductivity (µS/cm)	-	79	62	155	199	191	305	38	207
Turbidity	-	4	10	9	5	12	5	22	5
Dissolved Oxygen - DO (mg/l)	-	8.5	8.3	5.4	7.5	2.0	--	6.2	8.8
Temperature (°C)	-	13.4	12.6	17.0	13.5	5.7	7.7	12.6	13.0
Oxidation-Reduction Potential -ORP (mV)	-	264	144	143	130	219	123	292	272
Product Thickness (feet)	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

TABLE 13
GROUNDWATER LABORATORY RESULTS - TPH and VOCs
CHARIHO REGIONAL MIDDLE SCHOOL

455 Switch Road
Richmond, Rhode Island

CONSTITUENT OF CONCERN	RIDEM GA Groundwater Objective	Constituent Concentration (mg/l) MW-601												
		6/25/2008	9/24/2008	12/3/2008	3/24/2009	6/24/2009	9/17/2009	12/29/2009	3/22/2010	1/3/2011	9/12/2011	4/17/2012	9/24/2012	3/26/2013
TPH (mg/l) EPA Method 8100														
TPH 8100	NE	ND	ND	ND	ND	ND	ND	ND	ND	<0.2	<0.2	<0.2	<0.19	<0.21
VOCs (mg/l) - EPA Method 8260														
Benzene	0.005	ND	ND	ND	ND	ND	ND	ND	ND	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.7	ND	ND	ND	ND	ND	ND	ND	ND	<0.001	<0.001	<0.001	<0.001	<0.001
Isopropylbenzene	NE	ND	ND	ND	ND	ND	ND	ND	ND	<0.001	<0.001	<0.001	<0.001	<0.001
MTBE	0.04	ND	ND	ND	ND	ND	ND	ND	ND	<0.001	<0.001	<0.001	<0.001	<0.001
Napthalene	NE	ND	ND	ND	ND	ND	ND	ND	ND	<0.002	<0.002	<0.002	<0.001	<0.001
n-Butylbenzene	NE	ND	ND	ND	ND	ND	ND	ND	ND	<0.001	<0.001	<0.001	<0.001	<0.001
n-Propylbenzene	NE	ND	ND	ND	ND	ND	ND	ND	ND	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	1	ND	ND	ND	ND	ND	ND	ND	ND	<0.001	<0.001	<0.001	<0.001	<0.001
1,2,4-Trimethylbenzene	NE	ND	ND	ND	ND	ND	ND	ND	ND	<0.001	<0.001	<0.001	<0.001	<0.001
sec-Butylbenzene	NE	ND	ND	ND	ND	ND	ND	ND	ND	<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes	10	ND	ND	ND	ND	ND	ND	ND	ND	<0.002	<0.002	<0.002	<0.003	<0.002
p-Isopropyltoluene	NE	ND	ND	ND	ND	ND	ND	ND	ND	<0.001	<0.001	<0.001	<0.001	<0.001
1,3,5-Trimethylbenzene	NE	ND	ND	ND	ND	ND	ND	ND	ND	<0.001	<0.001	<0.001	<0.001	<0.001
Indicator Parameters (Field & Laboratory)														
pH (SU)	-	--	--	--	--	--	--	--	--	5.5	5.3	5.1	5.1	5.3
Specific Conductivity (µS/cm)	-	--	--	--	--	--	--	--	--	106	139	119	122	121
Turbidity	-	--	--	--	--	--	--	--	--	1	3	1	3	4
Dissolved Oxygen - DO (mg/l)	-	--	--	--	--	--	--	--	--	8.8	7.2	9.7	10.3	9.7
Temperature (°C)	-	--	--	--	--	--	--	--	--	13.0	15.8	15.1	15.7	13.2
Oxidation-Reduction Potential -ORP (mV)	-	--	--	--	--	--	--	--	--	245	234	206	241	200
Product Thickness (feet)	-	--	--	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01

Notes:

a) RIDEM Method 1 Objective as provided in RIDEM's March 1993 Site Remediation Regulation as amended August 1996 and February 2004.

NE - indicates no Method 1 RIDEM objective established.

NT - sample not tested for this parameter. Samples with measureable product (LNAPL) or sheen present in well during sampling event were not subjected to laboratory analysis.

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- Floating Product or the presence of a sheen on the purge water was detected at time of sampling.

TABLE 13
GROUNDWATER LABORATORY RESULTS - TPH and VOCs
CHARIHO REGIONAL MIDDLE SCHOOL

455 Switch Road
Richmond, Rhode Island

CONSTITUENT OF CONCERN	RIDEM GA Groundwater Objective	Constituent Concentration (mg/l)							
		MW-601							
		4/22/2014	4/23/2015	4/21/2016	4/18/2017	4/23/2018	4/19/2019	4/30/2019	4/2/2020
TPH (mg/l) EPA Method 8100									
TPH 8100	NE	<0.19	**0.28**	<0.10	<0.19	<0.19	--	<0.19	<0.19
VOCs (mg/l) - EPA Method 8260									
Benzene	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	--	<0.001
Ethylbenzene	0.7	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	--	<0.001
Isopropylbenzene	NE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	--	<0.001
MTBE	0.04	<0.001	<0.001	<0.002	<0.001	<0.001	<0.001	--	<0.001
Napthalene	NE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	--	<0.001
n-Butylbenzene	NE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	--	<0.001
n-Propylbenzene	NE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	--	<0.001
Toluene	1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	--	<0.001
1,2,4-Trimethylbenzene	NE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	--	<0.001
sec-Butylbenzene	NE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	--	<0.001
Xylenes	10	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	--	<0.002
p-Isopropyltoluene	NE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	--	<0.001
1,3,5-Trimethylbenzene	NE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	--	<0.001
Indicator Parameters (Field & Laboratory)									
pH (SU)	-	5.0	5.3	5.2	4.6	5.5	4.9	5.1	4.9
Specific Conductivity (µS/cm)	-	106	115	127	110	489	510	154	161
Turbidity	-	4	11	3	3	4	4	24	5
Dissolved Oxygen - DO (mg/l)	-	7.9	10.8	9.1	7.8	6.5	--	9.5	9.6
Temperature (°C)	-	13.6	13.0	14.2	12.5	3.6	7.4	13.0	13.3
Oxidation-Reduction Potential -ORP (mV)	-	255	158	170	128	232	103	276	292
Product Thickness (feet)	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

TABLE 14
GROUNDWATER LABORATORY RESULTS - TPH and VOCs
CHARIHO REGIONAL MIDDLE SCHOOL

455 Switch Road
Richmond, Rhode Island

CONSTITUENT OF CONCERN	RIDEM GA Groundwater Objective	Constituent Concentration (mg/l)									
		MW-701									
		6/24/2009	9/17/2009	12/29/2009	3/22/2010	1/3/2011	9/12/2011	4/17/2012	9/24/2012	3/26/2013	9/30/2013
TPH (mg/l) EPA Method 8100											
TPH 8100	NE	ND	ND	ND	ND	<0.2	**0.610**	**0.230**	**1.29**	**1.22**	**0.80**
TPH 8100 with Silica Gel Clean (SGC)	NE	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
VOCs (mg/l) - EPA Method 8260											
Benzene	0.005	ND	ND	ND	ND	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.7	ND	ND	ND	ND	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Isopropylbenzene	NE	ND	ND	ND	ND	<0.001	**0.0016**	**0.0018**	**0.0018**	**0.0020**	**0.0029**
MTBE	0.04	ND	ND	ND	ND	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Napthalene	NE	ND	ND	ND	ND	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001
n-Butylbenzene	NE	ND	ND	ND	ND	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
n-Propylbenzene	NE	ND	ND	ND	ND	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	1	ND	ND	ND	ND	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,2,4-Trimethylbenzene	NE	ND	ND	ND	ND	<0.001	**0.0063**	**0.0059**	**0.0075**	**0.0020**	**0.0022**
sec-Butylbenzene	NE	ND	ND	ND	ND	<0.001	**0.0011**	**0.0012**	**0.0013**	**0.0015**	**0.0018**
Xylenes	10	ND	ND	ND	ND	<0.002	**0.0023**	**0.0036**	<0.003	<0.002	<0.002
p-Isopropyltoluene	NE	ND	ND	ND	ND	<0.001	**0.0014**	**0.0016**	<0.001	<0.001	<0.001
1,3,5-Trimethylbenzene	NE	ND	ND	ND	ND	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Indicator Parameters (Field & Laboratory)											
pH (SU)	-	--	--	--	--	5.3	5.3	5.2	5.2	5.5	5.5
Specific Conductivity (µS/cm)	-	--	--	--	--	108	125	130	140	112	113
Turbidity	-	--	--	--	--	1	2	2	2	1	2
Dissolved Oxygen - DO (mg/l)	-	--	--	--	--	2.2	0.6	0.6	0.3	0.7	0.6
Temperature (°C)	-	--	--	--	--	14.2	16.1	14.7	15.4	13.2	15.6
Oxidation-Reduction Potential -ORP (mV)	-	--	--	--	--	257	238	21	245	160	142
Product Thickness (feet)	-	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Notes:

a) RIDEM Method 1 Objective as provided in RIDEM's March 1993 Site Remediation Regulation as amended August 1996 and February 2004.

NE - indicates no Method 1 RIDEM objective established.

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TABLE 14
GROUNDWATER LABORATORY RESULTS - TPH and VOCs
CHARIHO REGIONAL MIDDLE SCHOOL

455 Switch Road
Richmond, Rhode Island

CONSTITUENT OF CONCERN	RIDEM GA Groundwater Objective	Constituent Concentration (mg/l)									
		MW-701									
		4/22/2014	4/23/2015	4/21/2016	4/18/2017	4/23/2018	4/19/2019	4/30/2019	6/18/2019	4/2/2020	4/23/2021
TPH (mg/l) EPA Method 8100											
TPH 8100	NE	**1.76**	**1.43**	**0.68**	**0.75**	**1.28**	--	**3.16**	**0.98**	**2.24**	**1.07**
TPH 8100 with Silica Gel Clean (SGC)	NE	NT	NT	NT	NT	NT	NT	NT	**0.59**	**1.22**	NT
VOCs (mg/l) - EPA Method 8260											
Benzene	0.005	**0.0029**	<0.001	<0.001	<0.001	<0.001	<0.001	--	--	<0.001	<0.001
Ethylbenzene	0.7	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	--	--	<0.001	<0.001
Isopropylbenzene	NE	**0.0034**	**0.0026**	**0.001**	**0.0014**	**0.0018**	<0.001	--	--	<0.001	<0.001
MTBE	0.04	<0.001	<0.001	<0.002	<0.001	<0.001	<0.001	--	--	<0.001	<0.001
Napthalene	NE	**0.0052**	**0.0026**	**0.001**	<0.001	**0.0057**	**0.0018**	--	--	**0.0011**	<0.001
n-Butylbenzene	NE	**0.0011**	<0.001	<0.001	<0.001	<0.001	<0.001	--	--	<0.001	<0.001
n-Propylbenzene	NE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	--	--	<0.001	<0.001
Toluene	1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	--	--	<0.001	<0.001
1,2,4-Trimethylbenzene	NE	**0.004**	<0.001	<0.001	<0.001	<0.001	<0.001	--	--	<0.001	<0.001
sec-Butylbenzene	NE	**0.0021**	**0.0018**	<0.001	<0.001	**0.0010**	<0.001	--	--	<0.001	<0.001
Xylenes	10	**0.0034**	<0.002	<0.002	<0.002	<0.002	**0.0014**	--	--	<0.002	<0.002
p-Isopropyltoluene	NE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	--	--	<0.001	<0.001
1,3,5-Trimethylbenzene	NE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	--	--	<0.001	<0.001
Indicator Parameters (Field & Laboratory)											
pH (SU)	-	5.2	5.6	6.4	5.1	8.7	5.4	5.4	5.4	5.2	5.4
Specific Conductivity (µS/cm)	-	169	136	131	237	430	459	270	854	392	295
Turbidity	-	4	3	5	4	7	5	44	4	5	5
Dissolved Oxygen - DO (mg/l)	-	0.6	0.9	3.5	1.1	--	--	0.1	6.0	2.0	3.4
Temperature (°C)	-	13.5	12.8	16.7	13.5	4.1	6.8	12.4	14.9	12.9	13.6
Oxidation-Reduction Potential -ORP (mV)	-	212	167	82	117	159	86	226	229	266	308
Product Thickness (feet)	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

TABLE 15
GROUNDWATER LABORATORY RESULTS - TPH and VOCs
CHARIHO REGIONAL MIDDLE SCHOOL

455 Switch Road
Richmond, Rhode Island

CONSTITUENT OF CONCERN	RIDEM GA Groundwater Objective	Constituent Concentration (mg/l)			
		MW-700			
		6/24/2009	9/17/2009	12/29/2009	4/21/2016
TPH (mg/l) EPA Method 8100					
TPH 8100	NE	ND	ND	<0.50	<0.10
VOCs (mg/l) - EPA Method 8260					
Benzene	0.005	ND	ND	<0.0005	<0.001
Ethylbenzene	0.7	ND	ND	<0.0005	<0.001
Isopropylbenzene	NE	ND	ND	<0.0005	<0.001
MTBE	0.04	ND	ND	<0.001	<0.002
Napthalene	NE	ND	ND	<0.0025	<0.001
n-Butylbenzene	NE	ND	ND	<0.0005	<0.001
n-Propylbenzene	NE	ND	ND	<0.0005	<0.001
Toluene	1	ND	ND	<0.00075	<0.001
1,2,4-Trimethylbenzene	NE	ND	ND	<0.0025	<0.001
sec-Butylbenzene	NE	ND	ND	<0.0005	<0.001
Xylenes	10	ND	ND	<0.001	<0.002
p-Isopropyltoluene	NE	ND	ND	<0.0005	<0.001
1,3,5-Trimethylbenzene	NE	ND	ND	<0.0025	<0.001
Indicator Parameters (Field & Laboratory)					
pH (SU)	-	--	--	--	6.0
Specific Conductivity (µS/cm)	-	--	--	--	92
Turbidity	-	--	--	--	3
Dissolved Oxygen - DO (mg/l)	-	--	--	--	10.2
Temperature (°C)	-	--	--	--	10.8
Oxidation-Reduction Potential -ORP (mV)	-	--	--	--	163
Product Thickness (feet)	-	--	--	--	<0.01

Notes:

a) RIDEM Method 1 Objective as provided in RIDEM's March 1993 Site Remediation Regulation as amended August 1996 and February 2004.

NE - indicates no Method 1 RIDEM objective established.

NT - sample not tested for this parameter. Samples with measureable product (LNAPL) or sheen present in well during sampling event were not subjected to laboratory analysis.

- Indicates an individual compound exceeded the RIDEM Method 1 GA Groundwater Objective.

- Floating Product or the presence of a sheen on the purge water was detected at time of sampling.

FIGURES

GENERAL NOTES:

1. BASE MAP DEVELOPED FROM A RIGIS ELECTRONIC IMAGE FILE. DIGITAL AERIAL OTHOPHOTOGRAPHY DATED 2003
2. INFORMATION ON APPROXIMATE LOCATIONS OF WATER SUPPLY WELLS (GW-1, GW-2 & GW-3) FROM BETA SITE PLANS AND VOCATIONAL WELL AND ON-SITE WASTEWATER TREATMENT SYSTEM LEACH FIELD FROM CHARIHO PERSONNEL.

LEGEND:

GW-1 — ACTIVE PUBLIC WATER SUPPLY WELL FOR SCHOOL

VOTECH WELL — VOTECH WELL (INACTIVE)

N / W / E / S

0 150 300 600

APPROXIMATE SCALE IN FEET

CHARIHO REGINAL MIDDLE SCHOOL

RICHMOND, RHODE ISLAND

LOCUS PLAN

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
30 ROADWAY
PROVIDENCE, RHODE ISLAND 02909
(401) 421-4140

PREPARED FOR:

PROJ MGR:	AIF	REVIEWED BY:	JJS	CHECKED BY:	JJS	FIGURE 1
DESIGNED BY:	AIF	DRAWN BY:	CRB	SCALE:	AS NOTED	SHEET NO.
DATE	JULY 2018	PROJECT NO.	33632.02	REVISION NO.		

J:\ENV\33632.00.JJS\10-360.ALG\FIGURES\GZA DWGS\33632.00_F1_RO

NOTES:

1. BASE MAP DEVELOPED FROM PLAN PROVIDED BY DOWDELL ENGINEERS, INC. ENTITLED "TOPOGRAPHIC PLAN ASSESSOR'S 10B LOT2 CHARIHO REGIONAL MIDDLE SCHOOL," DATED JUNE 3, 2009 , ORIGINAL SCALE 1"=40', DRAWING No.SS-1.
2. MONITORING WELL ELEVATIONS AND LOCATIONS WERE FIELD SURVEYED BY GZA ON FEBRUARY 24, 2011.

LEGEND

- GW-3 — DRINKING WATER WELL
- MW-501 — SPILL BUSTER WITHIN SHED ENCLOSURE
- MW-400 — MONITORING WELL (INSTALLED BY OTHERS)
- SVE-1 — SOIL VAPOR EXTRACTION WELLS INSTALLED BY NEW HAMPSHIRE BORING IN NOVEMBER 2010 AND OBSERVED BY GZA PERSONNEL.
- BIOVENT SOIL VAPOR LINES
- MW-302 — MONITORING WELLS DECOMMISSIONED BY HOFFMAN ENVIRONMENTAL SERVICES ON DECEMBER 28 AND 29, 2018, OBSERVED BY GZA PERSONNEL.
- HORIZONTAL WELLS (HW-1 & HW-2) DECOMMISSIONED BY HOFFMAN ENVIRONMENTAL SERVICES ON DECEMBER 28 AND 29, 2018, OBSERVED BY GZA PERSONNEL.
- (80.07) — GROUNDWATER ELEVATIONS IN FEET (4-2-20)
  * – Indicates water level not believed to be representative of the existing conditions on the date of measurement.
- 80.0 — GROUNDWATER CONTOUR (4-2-20)

0 25 50 100
APPROXIMATE SCALE IN FEET

CHARIHO REGIONAL MIDDLE SCHOOL
455 SWITCH ROAD
RICHMOND, RHODE ISLAND

EXPLORATION LOCATION PLAN

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
188 VALLEY STREET, SUITE 300
PROVIDENCE, RHODE ISLAND 02909
(401) 421-4140

PREPARED FOR:

PROJ MGR: AIF	REVIEWED BY: JJS	CHECKED BY: JJS	FIGURE 2
DESIGNED BY: AIF	DRAWN BY: CRB	SCALE: AS NOTED	
DATE APRIL 2020	PROJECT NO. 33632.02	REVISION NO.	SHEET NO.

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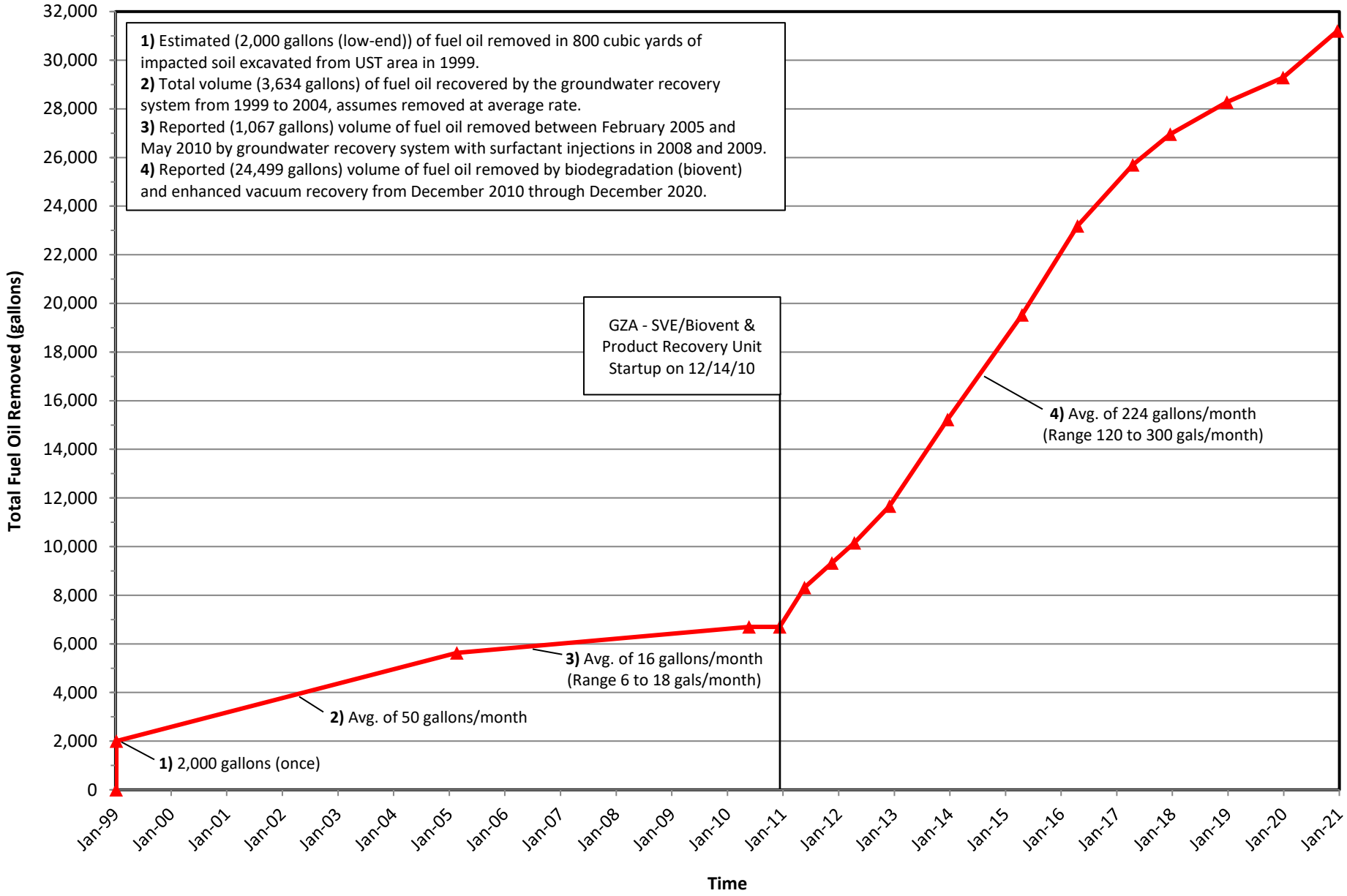
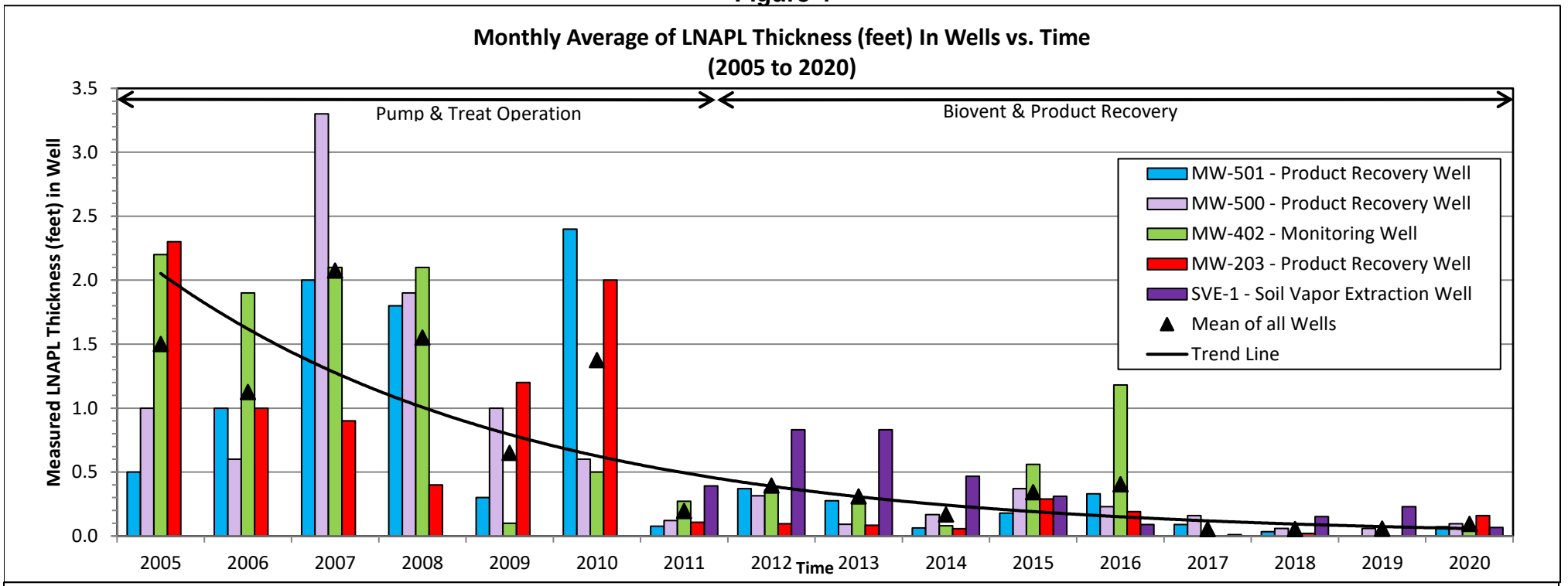
Figure 3
FUEL OIL REMOVAL
1999 - 2020
Chariho Middle School



J:\ENV\33632.02.jjs\Status Report - April 2021\Tables\Total Product Removed Figure 3

Figure 4


Monthly Average of LNAPL Thickness (feet) In Wells vs. Time
(2005 to 2020)
Pump & Treat Operation
Biovent & Product Recovery
Measured LNAPL Thickness (feet) in Well
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
Time
MW-501 - Product Recovery Well
MW-500 - Product Recovery Well
MW-402 - Monitoring Well
MW-203 - Product Recovery Well
SVE-1 - Soil Vapor Extraction Well
Mean of all Wells
Trend Line

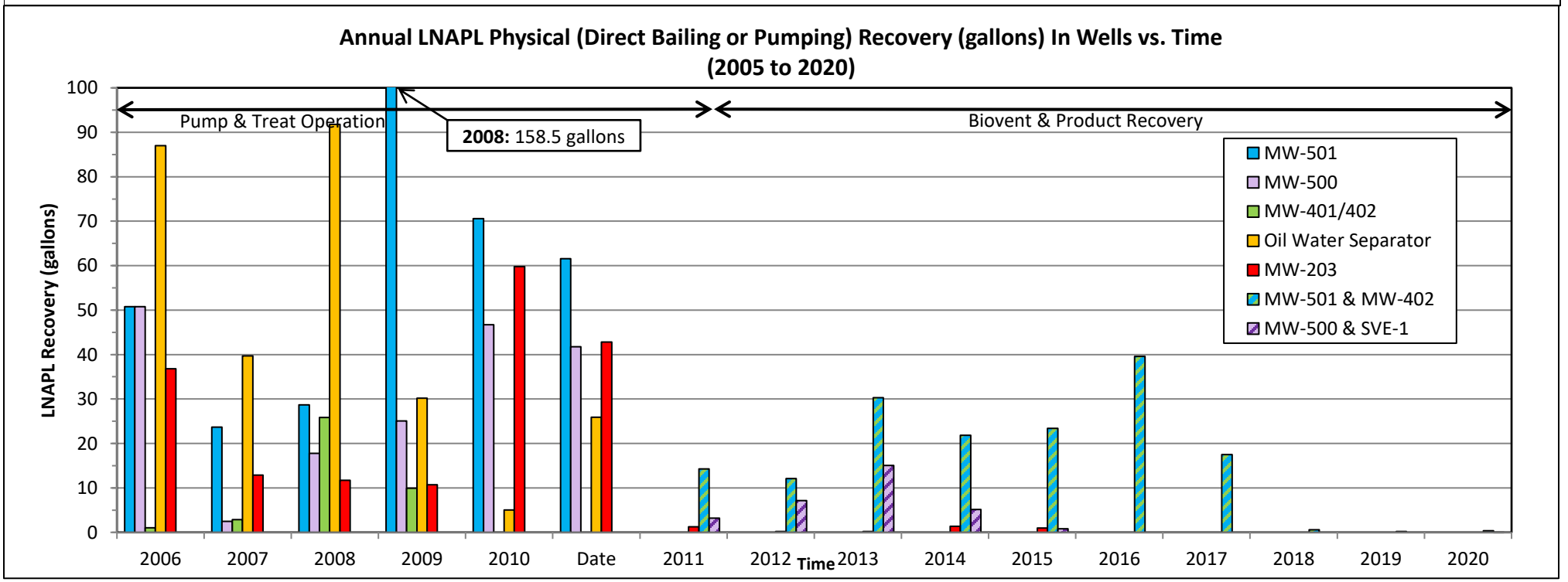
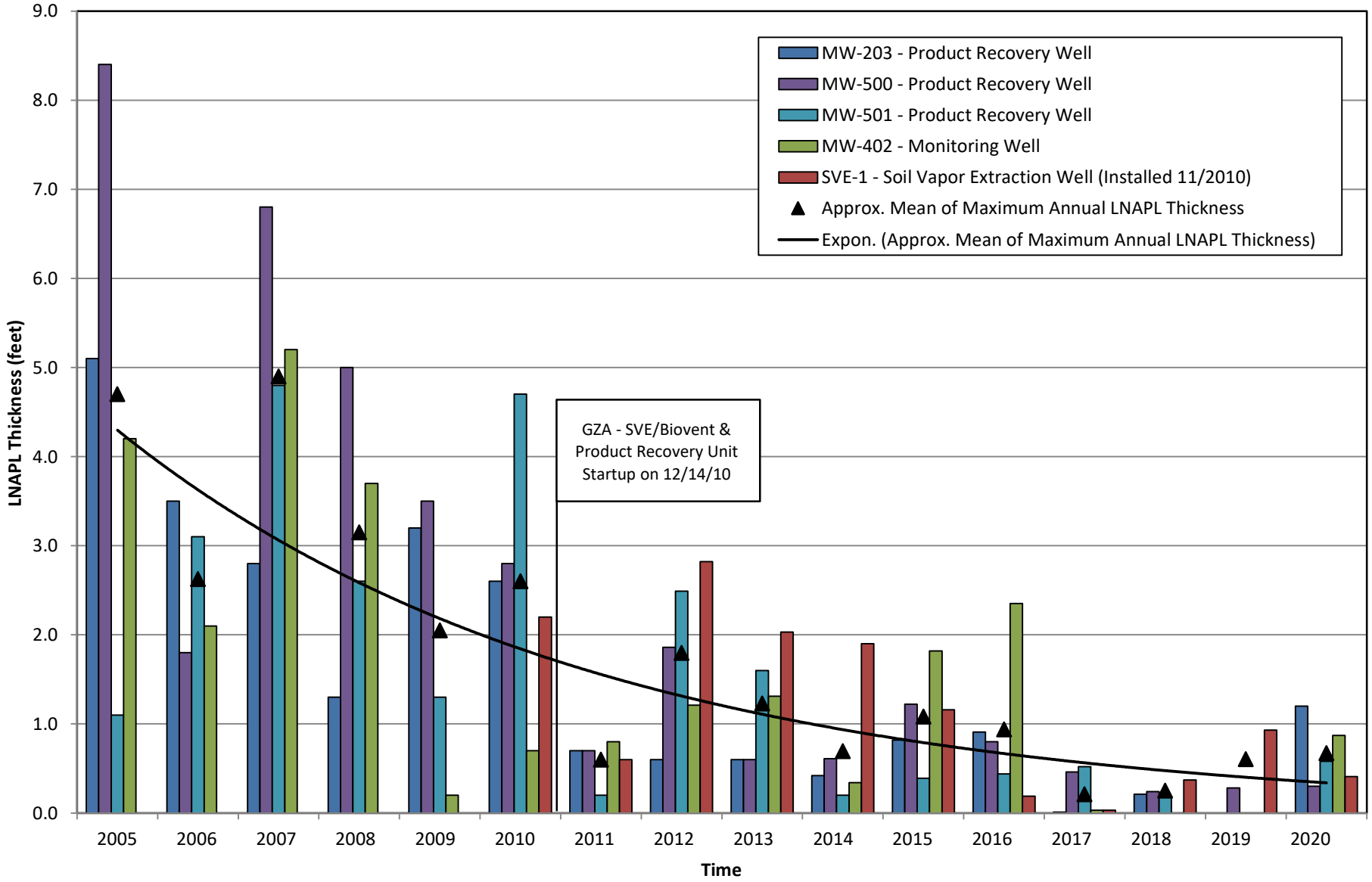
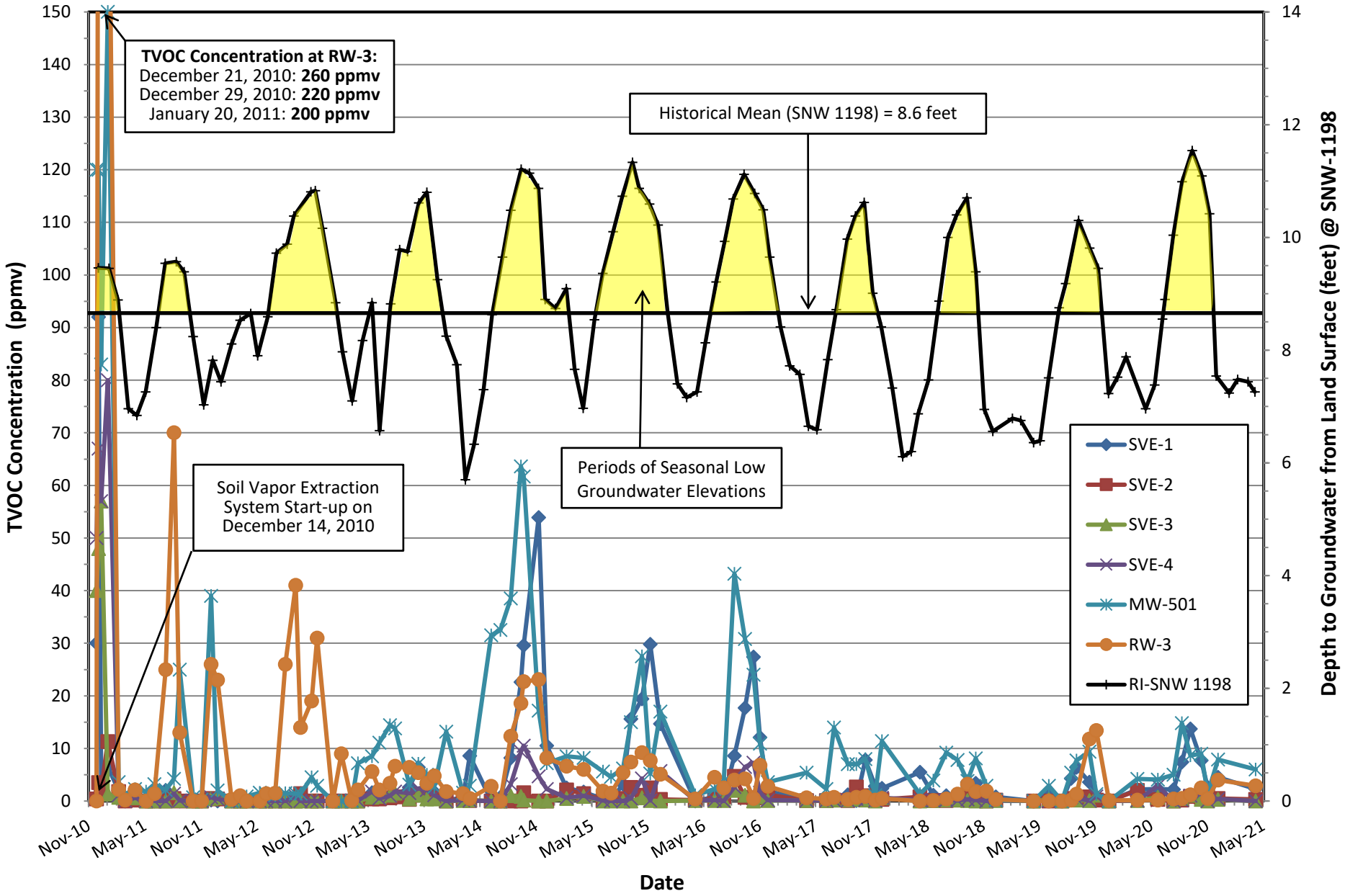

Annual LNAPL Physical (Direct Bailing or Pumping) Recovery (gallons) In Wells vs. Time
(2005 to 2020)
Pump & Treat Operation
Biovent & Product Recovery
2008: 158.5 gallons
LNAPL Recovery (gallons)
100
90
80
70
60
50
40
30
20
10
0
2006
2007
2008
2009
2010
Date
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
Time
MW-501
MW-500
MW-401/402
Oil Water Separator
MW-203
MW-501 & MW-402
MW-500 & SVE-1

Figure 5
Maximum Annual LNAPL Thickness In Product Recovery/Monitoring Wells
(2005 to 2020)
Chariho Middle School



J:\ENV\33632.02.jjs\Status Report - April 2021\Tables\GW-product thickness tables 8-9

Figure 6
Historical Trends of TVOC Soil Vapor Concentrations at Individual Vent Wells
(December 2010 to December 2020)
Chariho Middle School



Note: USGS (water elevations) are for USGS monitoring well RI-SNW 1198 (USGS 412935071355701) which is located in South Kingstown, RI in a sand & gravel outwash aquifer.

APPENDIX A

LIMITATIONS

GEOHYDROLOGICAL LIMITATIONS

Use of Report

1. GZA GeoEnvironmental, Inc. (GZA) prepared this report on behalf of, and for the exclusive use of our Client for the stated purpose(s) and location(s) identified in the Proposal for Services and/or Report. Use of this report, in whole or in part, at other locations, or for other purposes, may lead to inappropriate conclusions; and we do not accept any responsibility for the consequences of such use(s). Further, reliance by any party not expressly identified in the agreement, for any use, without our prior written permission, shall be at that party's sole risk, and without any liability to GZA.

Standard of Care

2. GZA's findings and conclusions are based on the work conducted as part of the Scope of Services set forth in the Proposal for Services and/or Report and reflect our professional judgment. These findings and conclusions must be considered not as scientific or engineering certainties, but rather as our professional opinions concerning the limited data gathered during the course of our work. Conditions other than described in this report may be found at the subject location(s).

3. GZA's services were performed using the degree of skill and care ordinarily exercised by qualified professionals performing the same type of services, at the same time, under similar conditions, at the same or a similar property. No warranty, expressed or implied, is made. Specifically, GZA does not and cannot represent that the Site contains no hazardous material, oil, or other latent condition beyond that observed by GZA during its study. Additionally, GZA makes no warranty that any response action or recommended action will achieve all of its objectives or that the findings of this study will be upheld by a local, state or federal agency.

4. In conducting our work, GZA relied upon certain information made available by public agencies, Client and/or others. GZA did not attempt to independently verify the accuracy or completeness of that information. Inconsistencies in this information which we have noted, if any, are discussed in the Report.

Subsurface Conditions

5. The generalized soil profile(s) provided in our Report are based on widely-spaced subsurface explorations and are intended only to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized, and were based on our assessment of subsurface conditions. The composition of strata, and the transitions between strata, may be more variable and more complex than indicated. For more specific information on soil conditions at a specific location refer to the exploration logs.

6. Water level readings have been made in test holes (as described in the Report) and monitoring wells at the specified times and under the stated conditions. These data have been reviewed and interpretations have been made in this report. Fluctuations in the level of the groundwater however occur due to temporal or spatial variations in areal recharge rates, soil heterogeneities, the presence of subsurface utilities, and/or natural or artificially induced perturbations. The observed water table may be other than indicated in the Report.

Compliance with Codes and Regulations

7. We used reasonable care in identifying and interpreting applicable codes and regulations necessary to execute our scope of work. These codes and regulations are subject to various, and possibly contradictory, interpretations. Interpretations and compliance with codes and regulations by other parties is beyond our control.

Screening and Analytical Testing

8. GZA collected environmental samples at the locations identified in the Report. These samples were analyzed for the specific parameters identified in the report. Additional constituents, for which analyses were not conducted, may be present in soil, groundwater, surface water, sediment and/or air. Future Site activities and uses may result in a requirement for additional testing.

9. Our interpretation of field screening and laboratory data is presented in the Report. Unless otherwise noted, we relied upon the laboratory's QA/QC program to validate these data.

10. Variations in the types and concentrations of contaminants observed at a given location or time may occur due to release mechanisms, disposal practices, changes in flow paths, and/or the influence of various physical, chemical, biological or radiological processes. Subsequently observed concentrations may be other than indicated in the Report.

Interpretation of Data

11. Our opinions are based on available information as described in the Report, and on our professional judgment. Additional observations made over time, and/or space, may not support the opinions provided in the Report.

Additional Information

12. In the event that the Client or others authorized to use this report obtain information on environmental or hazardous waste issues at the Site not contained in this report, such information shall be brought to GZA's attention forthwith. GZA will evaluate such information and, on the basis of this evaluation, may modify the conclusions stated in this report.

Additional Services

13. GZA recommends that we be retained to provide services during any future investigations, design, implementation activities, construction, and/or property development/ redevelopment at the Site. This will allow us the opportunity to: i) observe conditions and compliance with our design concepts and opinions; ii) allow for changes in the event that conditions are other than anticipated; iii) provide modifications to our design; and iv) assess the consequences of changes in technologies and/or regulations.

APPENDIX B

LABORATORY REPORTS

- April 23, 2021

CERTIFICATE OF ANALYSIS

Al Flori
GZA GeoEnvironmental, Inc.
188 Valley Street
Providence, RI 02909

RE: Chariho (03.0033632.02)
ESS Laboratory Work Order Number: 21D0860

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.

Laurel Stoddard
Laboratory Director

REVIEWED
By ESS Laboratory at 12:54 pm, Apr 30, 2021

Analytical Summary
The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

The test results present in this report are in compliance with TNI and relative state standards, and/or client Quality Assurance Project Plans (QAPP). The laboratory has reviewed the following: Sample Preservations, Hold Times, Initial Calibrations, Continuing Calibrations, Method Blanks, Blank Spikes, Blank Spike Duplicates, Duplicates, Matrix Spikes, Matrix Spike Duplicates, Surrogates and Internal Standards. Any results which were found to be outside of the recommended ranges stated in our SOPs will be noted in the Project Narrative.

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: Chariho

ESS Laboratory Work Order: 21D0860

SAMPLE RECEIPT

The following samples were received on April 23, 2021 for the analyses specified on the enclosed Chain of Custody Record.

Lab Number	Sample Name	Matrix	Analysis
21D0860-01	MW-701	Ground Water	8100M, 8260B

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: Chariho

ESS Laboratory Work Order: 21D0860

PROJECT NARRATIVE

8100M Total Petroleum Hydrocarbons
D1D0483-CCV5 **Continuing Calibration %Diff/Drift is above control limit (CD+).**

No other observations noted.

End of Project Narrative.

DATA USABILITY LINKS

To ensure you are viewing the most current version of the documents below, please clear your internet cookies for www.ESSLaboratory.com. Consult your IT Support personnel for information on how to clear your internet cookies.

Definitions of Quality Control Parameters

Semivolatile Organics Internal Standard Information

Semivolatile Organics Surrogate Information

Volatile Organics Internal Standard Information

Volatile Organics Surrogate Information

EPH and VPH Alkane Lists

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: Chariho

ESS Laboratory Work Order: 21D0860

CURRENT SW-846 METHODOLOGY VERSIONS

Analytical Methods

1010A - Flashpoint
6010C - ICP
6020A - ICP MS
7010 - Graphite Furnace
7196A - Hexavalent Chromium
7470A - Aqueous Mercury
7471B - Solid Mercury
8011 - EDB/DBCP/TCP
8015C - GRO/DRO
8081B - Pesticides
8082A - PCB
8100M - TPH
8151A - Herbicides
8260B - VOA
8270D - SVOA
8270D SIM - SVOA Low Level
9014 - Cyanide
9038 - Sulfate
9040C - Aqueous pH
9045D - Solid pH (Corrosivity)
9050A - Specific Conductance
9056A - Anions (IC)
9060A - TOC
9095B - Paint Filter
MADEP 04-1.1 - EPH
MADEP 18-2.1 - VPH

Prep Methods

3005A - Aqueous ICP Digestion
3020A - Aqueous Graphite Furnace / ICP MS Digestion
3050B - Solid ICP / Graphite Furnace / ICP MS Digestion
3060A - Solid Hexavalent Chromium Digestion
3510C - Separatory Funnel Extraction
3520C - Liquid / Liquid Extraction
3540C - Manual Soxhlet Extraction
3541 - Automated Soxhlet Extraction
3546 - Microwave Extraction
3580A - Waste Dilution
5030B - Aqueous Purge and Trap
5030C - Aqueous Purge and Trap
5035A - Solid Purge and Trap

SW846 Reactivity Methods 7.3.3.2 (Reactive Cyanide) and 7.3.4.1 (Reactive Sulfide) have been withdrawn by EPA. These methods are reported per client request and are not NELAP accredited.

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: Chariho
Client Sample ID: MW-701
Date Sampled: 04/23/21 12:29
Percent Solids: N/A
Initial Volume: 1060
Final Volume: 1
Extraction Method: 3510C

ESS Laboratory Work Order: 21D0860
ESS Laboratory Sample ID: 21D0860-01
Sample Matrix: Ground Water
Units: mg/L
Analyst: TLW
Prepared: 4/23/21 15:59

8100M Total Petroleum Hydrocarbons

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Total Petroleum Hydrocarbons	**1.07** (0.19)		8100M		1	04/27/21 15:53	D1D0483	DD12303

	%Recovery	Qualifier	Limits
Surrogate: O-Terphenyl	*100 %*		*40-140*

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: Chariho
Client Sample ID: MW-701
Date Sampled: 04/23/21 12:29
Percent Solids: N/A
Initial Volume: 5
Final Volume: 5
Extraction Method: 5030B

ESS Laboratory Work Order: 21D0860
ESS Laboratory Sample ID: 21D0860-01
Sample Matrix: Ground Water
Units: mg/L
Analyst: MD

8260B Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
1,1,1,2-Tetrachloroethane	ND (0.0010)		8260B		1	04/26/21 13:20	D1D0477	DD12618
1,1,1-Trichloroethane	ND (0.0010)		8260B		1	04/26/21 13:20	D1D0477	DD12618
1,1,2,2-Tetrachloroethane	ND (0.0005)		8260B		1	04/26/21 13:20	D1D0477	DD12618
1,1,2-Trichloroethane	ND (0.0010)		8260B		1	04/26/21 13:20	D1D0477	DD12618
1,1-Dichloroethane	ND (0.0010)		8260B		1	04/26/21 13:20	D1D0477	DD12618
1,1-Dichloroethene	ND (0.0010)		8260B		1	04/26/21 13:20	D1D0477	DD12618
1,1-Dichloropropene	ND (0.0020)		8260B		1	04/26/21 13:20	D1D0477	DD12618
1,2,3-Trichlorobenzene	ND (0.0010)		8260B		1	04/26/21 13:20	D1D0477	DD12618
1,2,3-Trichloropropane	ND (0.0010)		8260B		1	04/26/21 13:20	D1D0477	DD12618
1,2,4-Trichlorobenzene	ND (0.0010)		8260B		1	04/26/21 13:20	D1D0477	DD12618
1,2,4-Trimethylbenzene	ND (0.0010)		8260B		1	04/26/21 13:20	D1D0477	DD12618
1,2-Dibromo-3-Chloropropane	ND (0.0050)		8260B		1	04/26/21 13:20	D1D0477	DD12618
1,2-Dibromoethane	ND (0.0010)		8260B		1	04/26/21 13:20	D1D0477	DD12618
1,2-Dichlorobenzene	ND (0.0010)		8260B		1	04/26/21 13:20	D1D0477	DD12618
1,2-Dichloroethane	ND (0.0010)		8260B		1	04/26/21 13:20	D1D0477	DD12618
1,2-Dichloropropane	ND (0.0010)		8260B		1	04/26/21 13:20	D1D0477	DD12618
1,3,5-Trimethylbenzene	ND (0.0010)		8260B		1	04/26/21 13:20	D1D0477	DD12618
1,3-Dichlorobenzene	ND (0.0010)		8260B		1	04/26/21 13:20	D1D0477	DD12618
1,3-Dichloropropane	ND (0.0010)		8260B		1	04/26/21 13:20	D1D0477	DD12618
1,4-Dichlorobenzene	ND (0.0010)		8260B		1	04/26/21 13:20	D1D0477	DD12618
1,4-Dioxane - Screen	ND (0.500)		8260B		1	04/26/21 13:20	D1D0477	DD12618
1-Chlorohexane	ND (0.0010)		8260B		1	04/26/21 13:20	D1D0477	DD12618
2,2-Dichloropropane	ND (0.0010)		8260B		1	04/26/21 13:20	D1D0477	DD12618
2-Butanone	ND (0.0100)		8260B		1	04/26/21 13:20	D1D0477	DD12618
2-Chlorotoluene	ND (0.0010)		8260B		1	04/26/21 13:20	D1D0477	DD12618
2-Hexanone	ND (0.0100)		8260B		1	04/26/21 13:20	D1D0477	DD12618
4-Chlorotoluene	ND (0.0010)		8260B		1	04/26/21 13:20	D1D0477	DD12618
4-Isopropyltoluene	ND (0.0010)		8260B		1	04/26/21 13:20	D1D0477	DD12618
4-Methyl-2-Pentanone	ND (0.0250)		8260B		1	04/26/21 13:20	D1D0477	DD12618
Acetone	ND (0.0100)		8260B		1	04/26/21 13:20	D1D0477	DD12618
Benzene	ND (0.0010)		8260B		1	04/26/21 13:20	D1D0477	DD12618
Bromobenzene	ND (0.0020)		8260B		1	04/26/21 13:20	D1D0477	DD12618

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: Chariho
Client Sample ID: MW-701
Date Sampled: 04/23/21 12:29
Percent Solids: N/A
Initial Volume: 5
Final Volume: 5
Extraction Method: 5030B

ESS Laboratory Work Order: 21D0860
ESS Laboratory Sample ID: 21D0860-01
Sample Matrix: Ground Water
Units: mg/L
Analyst: MD

8260B Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Bromochloromethane	ND (0.0010)		8260B		1	04/26/21 13:20	D1D0477	DD12618
Bromodichloromethane	ND (0.0006)		8260B		1	04/26/21 13:20	D1D0477	DD12618
Bromoform	ND (0.0010)		8260B		1	04/26/21 13:20	D1D0477	DD12618
Bromomethane	ND (0.0020)		8260B		1	04/26/21 13:20	D1D0477	DD12618
Carbon Disulfide	ND (0.0010)		8260B		1	04/26/21 13:20	D1D0477	DD12618
Carbon Tetrachloride	ND (0.0010)		8260B		1	04/26/21 13:20	D1D0477	DD12618
Chlorobenzene	ND (0.0010)		8260B		1	04/26/21 13:20	D1D0477	DD12618
Chloroethane	ND (0.0020)		8260B		1	04/26/21 13:20	D1D0477	DD12618
Chloroform	ND (0.0010)		8260B		1	04/26/21 13:20	D1D0477	DD12618
Chloromethane	ND (0.0020)		8260B		1	04/26/21 13:20	D1D0477	DD12618
cis-1,2-Dichloroethene	ND (0.0010)		8260B		1	04/26/21 13:20	D1D0477	DD12618
cis-1,3-Dichloropropene	ND (0.0004)		8260B		1	04/26/21 13:20	D1D0477	DD12618
Dibromochloromethane	ND (0.0010)		8260B		1	04/26/21 13:20	D1D0477	DD12618
Dibromomethane	ND (0.0010)		8260B		1	04/26/21 13:20	D1D0477	DD12618
Dichlorodifluoromethane	ND (0.0020)		8260B		1	04/26/21 13:20	D1D0477	DD12618
Diethyl Ether	ND (0.0010)		8260B		1	04/26/21 13:20	D1D0477	DD12618
Di-isopropyl ether	ND (0.0010)		8260B		1	04/26/21 13:20	D1D0477	DD12618
Ethyl tertiary-butyl ether	ND (0.0010)		8260B		1	04/26/21 13:20	D1D0477	DD12618
Ethylbenzene	ND (0.0010)		8260B		1	04/26/21 13:20	D1D0477	DD12618
Hexachlorobutadiene	ND (0.0006)		8260B		1	04/26/21 13:20	D1D0477	DD12618
Hexachloroethane	ND (0.0010)		8260B		1	04/26/21 13:20	D1D0477	DD12618
Isopropylbenzene	ND (0.0010)		8260B		1	04/26/21 13:20	D1D0477	DD12618
Methyl tert-Butyl Ether	ND (0.0010)		8260B		1	04/26/21 13:20	D1D0477	DD12618
Methylene Chloride	ND (0.0020)		8260B		1	04/26/21 13:20	D1D0477	DD12618
Naphthalene	ND (0.0010)		8260B		1	04/26/21 13:20	D1D0477	DD12618
n-Butylbenzene	ND (0.0010)		8260B		1	04/26/21 13:20	D1D0477	DD12618
n-Propylbenzene	ND (0.0010)		8260B		1	04/26/21 13:20	D1D0477	DD12618
sec-Butylbenzene	ND (0.0010)		8260B		1	04/26/21 13:20	D1D0477	DD12618
Styrene	ND (0.0010)		8260B		1	04/26/21 13:20	D1D0477	DD12618
tert-Butylbenzene	ND (0.0010)		8260B		1	04/26/21 13:20	D1D0477	DD12618
Tertiary-amyl methyl ether	ND (0.0010)		8260B		1	04/26/21 13:20	D1D0477	DD12618
Tetrachloroethene	ND (0.0010)		8260B		1	04/26/21 13:20	D1D0477	DD12618

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: Chariho
Client Sample ID: MW-701
Date Sampled: 04/23/21 12:29
Percent Solids: N/A
Initial Volume: 5
Final Volume: 5
Extraction Method: 5030B

ESS Laboratory Work Order: 21D0860
ESS Laboratory Sample ID: 21D0860-01
Sample Matrix: Ground Water
Units: mg/L
Analyst: MD

8260B Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Tetrahydrofuran	ND (0.0050)		8260B		1	04/26/21 13:20	D1D0477	DD12618
Toluene	ND (0.0010)		8260B		1	04/26/21 13:20	D1D0477	DD12618
trans-1,2-Dichloroethene	ND (0.0010)		8260B		1	04/26/21 13:20	D1D0477	DD12618
trans-1,3-Dichloropropene	ND (0.0004)		8260B		1	04/26/21 13:20	D1D0477	DD12618
Trichloroethene	ND (0.0010)		8260B		1	04/26/21 13:20	D1D0477	DD12618
Trichlorofluoromethane	ND (0.0010)		8260B		1	04/26/21 13:20	D1D0477	DD12618
Vinyl Acetate	ND (0.0050)		8260B		1	04/26/21 13:20	D1D0477	DD12618
Vinyl Chloride	ND (0.0010)		8260B		1	04/26/21 13:20	D1D0477	DD12618
Xylene O	ND (0.0010)		8260B		1	04/26/21 13:20	D1D0477	DD12618
Xylene P,M	ND (0.0020)		8260B		1	04/26/21 13:20	D1D0477	DD12618
Xylenes (Total)	ND (0.00200)		8260B		1	04/26/21 13:20		[CALC]

	%Recovery	Qualifier	Limits
Surrogate: 1,2-Dichloroethane-d4	*97 %*		*70-130*
Surrogate: 4-Bromofluorobenzene	*96 %*		*70-130*
Surrogate: Dibromofluoromethane	*95 %*		*70-130*
Surrogate: Toluene-d8	*100 %*		*70-130*

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: Chariho

ESS Laboratory Work Order: 21D0860

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8100M Total Petroleum Hydrocarbons										
Batch DD12303 - 3510C										
Blank										
Decane (C10)	ND	0.005	mg/L							
Docosane (C22)	ND	0.005	mg/L							
Dodecane (C12)	ND	0.005	mg/L							
Eicosane (C20)	ND	0.005	mg/L							
Hexacosane (C26)	ND	0.005	mg/L							
Hexadecane (C16)	ND	0.005	mg/L							
Nonadecane (C19)	ND	0.005	mg/L							
Nonane (C9)	ND	0.005	mg/L							
Octacosane (C28)	ND	0.005	mg/L							
Octadecane (C18)	ND	0.005	mg/L							
Tetracosane (C24)	ND	0.005	mg/L							
Tetradecane (C14)	ND	0.005	mg/L							
Total Petroleum Hydrocarbons	ND	0.20	mg/L							
Triacontane (C30)	ND	0.005	mg/L							
Surrogate: O-Terphenyl	*0.0954*		mg/L	*0.1000*		*95*	*40-140*			
LCS										
Decane (C10)	0.035	0.005	mg/L	0.05000		69	40-140			
Docosane (C22)	0.047	0.005	mg/L	0.05000		94	40-140			
Dodecane (C12)	0.041	0.005	mg/L	0.05000		82	40-140			
Eicosane (C20)	0.047	0.005	mg/L	0.05000		94	40-140			
Hexacosane (C26)	0.047	0.005	mg/L	0.05000		94	40-140			
Hexadecane (C16)	0.045	0.005	mg/L	0.05000		90	40-140			
Nonadecane (C19)	0.048	0.005	mg/L	0.05000		95	40-140			
Nonane (C9)	0.030	0.005	mg/L	0.05000		61	30-140			
Octacosane (C28)	0.047	0.005	mg/L	0.05000		95	40-140			
Octadecane (C18)	0.046	0.005	mg/L	0.05000		93	40-140			
Tetracosane (C24)	0.047	0.005	mg/L	0.05000		94	40-140			
Tetradecane (C14)	0.043	0.005	mg/L	0.05000		85	40-140			
Total Petroleum Hydrocarbons	0.668	0.20	mg/L	0.7000		95	40-140			
Triacontane (C30)	0.046	0.005	mg/L	0.05000		93	40-140			
Surrogate: O-Terphenyl	*0.0960*		mg/L	*0.1000*		*96*	*40-140*			
LCS										
Decane (C10)	0.006	0.005	mg/L	0.01000		60	40-140			
Docosane (C22)	0.010	0.005	mg/L	0.01000		101	40-140			
Dodecane (C12)	0.007	0.005	mg/L	0.01000		75	40-140			
Eicosane (C20)	0.010	0.005	mg/L	0.01000		99	40-140			
Hexacosane (C26)	0.010	0.005	mg/L	0.01000		102	40-140			
Hexadecane (C16)	0.009	0.005	mg/L	0.01000		88	40-140			
Nonadecane (C19)	0.011	0.005	mg/L	0.01000		112	40-140			
Nonane (C9)	0.005	0.005	mg/L	0.01000		53	30-140			
Octacosane (C28)	0.010	0.005	mg/L	0.01000		103	40-140			
Octadecane (C18)	0.009	0.005	mg/L	0.01000		95	40-140			

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: Chariho

ESS Laboratory Work Order: 21D0860

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8100M Total Petroleum Hydrocarbons										
Batch DD12303 - 3510C										
Tetracosane (C24)	0.010	0.005	mg/L	0.01000		101	40-140			
Tetradecane (C14)	0.009	0.005	mg/L	0.01000		86	40-140			
Total Petroleum Hydrocarbons	0.166	0.20	mg/L	0.1400		118	40-140			
Triacontane (C30)	0.010	0.005	mg/L	0.01000		99	40-140			
Surrogate: O-Terphenyl	*0.0911*		mg/L	*0.1000*		*91*	*40-140*			
LCS Dup										
Decane (C10)	0.037	0.005	mg/L	0.05000		74	40-140	6	25	
Docosane (C22)	0.048	0.005	mg/L	0.05000		95	40-140	0.9	25	
Dodecane (C12)	0.043	0.005	mg/L	0.05000		86	40-140	5	25	
Eicosane (C20)	0.047	0.005	mg/L	0.05000		95	40-140	0.9	25	
Hexacosane (C26)	0.048	0.005	mg/L	0.05000		95	40-140	1	25	
Hexadecane (C16)	0.046	0.005	mg/L	0.05000		91	40-140	0.9	25	
Nonadecane (C19)	0.048	0.005	mg/L	0.05000		96	40-140	0.5	25	
Nonane (C9)	0.032	0.005	mg/L	0.05000		65	30-140	6	25	
Octacosane (C28)	0.048	0.005	mg/L	0.05000		96	40-140	1	25	
Octadecane (C18)	0.047	0.005	mg/L	0.05000		93	40-140	0.7	25	
Tetracosane (C24)	0.048	0.005	mg/L	0.05000		95	40-140	1	25	
Tetradecane (C14)	0.044	0.005	mg/L	0.05000		88	40-140	4	25	
Total Petroleum Hydrocarbons	0.678	0.20	mg/L	0.7000		97	40-140	1	25	
Triacontane (C30)	0.047	0.005	mg/L	0.05000		94	40-140	1	25	
Surrogate: O-Terphenyl	*0.0949*		mg/L	*0.1000*		*95*	*40-140*			
8260B Volatile Organic Compounds										
Batch DD12618 - 5030B										
Blank										
1,1,1,2-Tetrachloroethane	ND	0.0010	mg/L							
1,1,1-Trichloroethane	ND	0.0010	mg/L							
1,1,2,2-Tetrachloroethane	ND	0.0005	mg/L							
1,1,2-Trichloroethane	ND	0.0010	mg/L							
1,1-Dichloroethane	ND	0.0010	mg/L							
1,1-Dichloroethene	ND	0.0010	mg/L							
1,1-Dichloropropene	ND	0.0020	mg/L							
1,2,3-Trichlorobenzene	ND	0.0010	mg/L							
1,2,3-Trichloropropane	ND	0.0010	mg/L							
1,2,4-Trichlorobenzene	ND	0.0010	mg/L							
1,2,4-Trimethylbenzene	ND	0.0010	mg/L							
1,2-Dibromo-3-Chloropropane	ND	0.0050	mg/L							
1,2-Dibromoethane	ND	0.0010	mg/L							
1,2-Dichlorobenzene	ND	0.0010	mg/L							
1,2-Dichloroethane	ND	0.0010	mg/L							
1,2-Dichloropropane	ND	0.0010	mg/L							
1,3,5-Trimethylbenzene	ND	0.0010	mg/L							
1,3-Dichlorobenzene	ND	0.0010	mg/L							

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: Chariho

ESS Laboratory Work Order: 21D0860

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8260B Volatile Organic Compounds										
Batch DD12618 - 5030B										
1,3-Dichloropropane	ND	0.0010	mg/L							
1,4-Dichlorobenzene	ND	0.0010	mg/L							
1,4-Dioxane - Screen	ND	0.500	mg/L							
1-Chlorohexane	ND	0.0010	mg/L							
2,2-Dichloropropane	ND	0.0010	mg/L							
2-Butanone	ND	0.0100	mg/L							
2-Chlorotoluene	ND	0.0010	mg/L							
2-Hexanone	ND	0.0100	mg/L							
4-Chlorotoluene	ND	0.0010	mg/L							
4-Isopropyltoluene	ND	0.0010	mg/L							
4-Methyl-2-Pentanone	ND	0.0250	mg/L							
Acetone	ND	0.0100	mg/L							
Benzene	ND	0.0010	mg/L							
Bromobenzene	ND	0.0020	mg/L							
Bromochloromethane	ND	0.0010	mg/L							
Bromodichloromethane	ND	0.0006	mg/L							
Bromoform	ND	0.0010	mg/L							
Bromomethane	ND	0.0020	mg/L							
Carbon Disulfide	ND	0.0010	mg/L							
Carbon Tetrachloride	ND	0.0010	mg/L							
Chlorobenzene	ND	0.0010	mg/L							
Chloroethane	ND	0.0020	mg/L							
Chloroform	ND	0.0010	mg/L							
Chloromethane	ND	0.0020	mg/L							
cis-1,2-Dichloroethene	ND	0.0010	mg/L							
cis-1,3-Dichloropropene	ND	0.0004	mg/L							
Dibromochloromethane	ND	0.0010	mg/L							
Dibromomethane	ND	0.0010	mg/L							
Dichlorodifluoromethane	ND	0.0020	mg/L							
Diethyl Ether	ND	0.0010	mg/L							
Di-isopropyl ether	ND	0.0010	mg/L							
Ethyl tertiary-butyl ether	ND	0.0010	mg/L							
Ethylbenzene	ND	0.0010	mg/L							
Hexachlorobutadiene	ND	0.0006	mg/L							
Hexachloroethane	ND	0.0010	mg/L							
Isopropylbenzene	ND	0.0010	mg/L							
Methyl tert-Butyl Ether	ND	0.0010	mg/L							
Methylene Chloride	ND	0.0020	mg/L							
Naphthalene	ND	0.0010	mg/L							
n-Butylbenzene	ND	0.0010	mg/L							
n-Propylbenzene	ND	0.0010	mg/L							
sec-Butylbenzene	ND	0.0010	mg/L							
Styrene	ND	0.0010	mg/L							
tert-Butylbenzene	ND	0.0010	mg/L							
Tertiary-amyl methyl ether	ND	0.0010	mg/L							

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: Chariho

ESS Laboratory Work Order: 21D0860

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8260B Volatile Organic Compounds										
Batch DD12618 - 5030B										
Tetrachloroethene	ND	0.0010	mg/L							
Tetrahydrofuran	ND	0.0050	mg/L							
Toluene	ND	0.0010	mg/L							
trans-1,2-Dichloroethene	ND	0.0010	mg/L							
trans-1,3-Dichloropropene	ND	0.0004	mg/L							
Trichloroethene	ND	0.0010	mg/L							
Trichlorofluoromethane	ND	0.0010	mg/L							
Vinyl Acetate	ND	0.0050	mg/L							
Vinyl Chloride	ND	0.0010	mg/L							
Xylene O	ND	0.0010	mg/L							
Xylene P,M	ND	0.0020	mg/L							
Surrogate: 1,2-Dichloroethane-d4	*0.0241*		mg/L	*0.02500*		*96*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*0.0239*		mg/L	*0.02500*		*96*	*70-130*			
Surrogate: Dibromofluoromethane	*0.0233*		mg/L	*0.02500*		*93*	*70-130*			
Surrogate: Toluene-d8	*0.0252*		mg/L	*0.02500*		*101*	*70-130*			
LCS										
1,1,1,2-Tetrachloroethane	0.0095	0.0010	mg/L	0.01000		95	70-130			
1,1,1-Trichloroethane	0.0097	0.0010	mg/L	0.01000		97	70-130			
1,1,2,2-Tetrachloroethane	0.0100	0.0005	mg/L	0.01000		100	70-130			
1,1,2-Trichloroethane	0.0100	0.0010	mg/L	0.01000		100	70-130			
1,1-Dichloroethane	0.0100	0.0010	mg/L	0.01000		100	70-130			
1,1-Dichloroethene	0.0112	0.0010	mg/L	0.01000		112	70-130			
1,1-Dichloropropene	0.0103	0.0020	mg/L	0.01000		103	70-130			
1,2,3-Trichlorobenzene	0.0101	0.0010	mg/L	0.01000		101	70-130			
1,2,3-Trichloropropane	0.0095	0.0010	mg/L	0.01000		95	70-130			
1,2,4-Trichlorobenzene	0.0103	0.0010	mg/L	0.01000		103	70-130			
1,2,4-Trimethylbenzene	0.0104	0.0010	mg/L	0.01000		104	70-130			
1,2-Dibromo-3-Chloropropane	0.0090	0.0050	mg/L	0.01000		90	70-130			
1,2-Dibromoethane	0.0103	0.0010	mg/L	0.01000		103	70-130			
1,2-Dichlorobenzene	0.0100	0.0010	mg/L	0.01000		100	70-130			
1,2-Dichloroethane	0.0093	0.0010	mg/L	0.01000		93	70-130			
1,2-Dichloropropane	0.0101	0.0010	mg/L	0.01000		101	70-130			
1,3,5-Trimethylbenzene	0.0106	0.0010	mg/L	0.01000		106	70-130			
1,3-Dichlorobenzene	0.0099	0.0010	mg/L	0.01000		99	70-130			
1,3-Dichloropropane	0.0101	0.0010	mg/L	0.01000		101	70-130			
1,4-Dichlorobenzene	0.0100	0.0010	mg/L	0.01000		100	70-130			
1,4-Dioxane - Screen	0.202	0.500	mg/L	0.2000		101	0-332			
1-Chlorohexane	0.0102	0.0010	mg/L	0.01000		102	70-130			
2,2-Dichloropropane	0.0106	0.0010	mg/L	0.01000		106	70-130			
2-Butanone	0.0502	0.0100	mg/L	0.05000		100	70-130			
2-Chlorotoluene	0.0102	0.0010	mg/L	0.01000		102	70-130			
2-Hexanone	0.0512	0.0100	mg/L	0.05000		102	70-130			
4-Chlorotoluene	0.0101	0.0010	mg/L	0.01000		101	70-130			
4-Isopropyltoluene	0.0101	0.0010	mg/L	0.01000		101	70-130			
4-Methyl-2-Pentanone	0.0460	0.0250	mg/L	0.05000		92	70-130			

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: Chariho

ESS Laboratory Work Order: 21D0860

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8260B Volatile Organic Compounds										
Batch DD12618 - 5030B										
Acetone	0.0506	0.0100	mg/L	0.05000		101	70-130			
Benzene	0.0098	0.0010	mg/L	0.01000		98	70-130			
Bromobenzene	0.0100	0.0020	mg/L	0.01000		100	70-130			
Bromochloromethane	0.0100	0.0010	mg/L	0.01000		100	70-130			
Bromodichloromethane	0.0089	0.0006	mg/L	0.01000		89	70-130			
Bromoform	0.0096	0.0010	mg/L	0.01000		96	70-130			
Bromomethane	0.0088	0.0020	mg/L	0.01000		88	70-130			
Carbon Disulfide	0.0088	0.0010	mg/L	0.01000		88	70-130			
Carbon Tetrachloride	0.0101	0.0010	mg/L	0.01000		101	70-130			
Chlorobenzene	0.0098	0.0010	mg/L	0.01000		98	70-130			
Chloroethane	0.0101	0.0020	mg/L	0.01000		101	70-130			
Chloroform	0.0096	0.0010	mg/L	0.01000		96	70-130			
Chloromethane	0.0082	0.0020	mg/L	0.01000		82	70-130			
cis-1,2-Dichloroethene	0.0105	0.0010	mg/L	0.01000		105	70-130			
cis-1,3-Dichloropropene	0.0105	0.0004	mg/L	0.01000		105	70-130			
Dibromochloromethane	0.0102	0.0010	mg/L	0.01000		102	70-130			
Dibromomethane	0.0099	0.0010	mg/L	0.01000		99	70-130			
Dichlorodifluoromethane	0.0086	0.0020	mg/L	0.01000		86	70-130			
Diethyl Ether	0.0091	0.0010	mg/L	0.01000		91	70-130			
Di-isopropyl ether	0.0106	0.0010	mg/L	0.01000		106	70-130			
Ethyl tertiary-butyl ether	0.0101	0.0010	mg/L	0.01000		101	70-130			
Ethylbenzene	0.0100	0.0010	mg/L	0.01000		100	70-130			
Hexachlorobutadiene	0.0103	0.0006	mg/L	0.01000		103	70-130			
Hexachloroethane	0.0096	0.0010	mg/L	0.01000		96	70-130			
Isopropylbenzene	0.0102	0.0010	mg/L	0.01000		102	70-130			
Methyl tert-Butyl Ether	0.0102	0.0010	mg/L	0.01000		102	70-130			
Methylene Chloride	0.0099	0.0020	mg/L	0.01000		99	70-130			
Naphthalene	0.0092	0.0010	mg/L	0.01000		92	70-130			
n-Butylbenzene	0.0103	0.0010	mg/L	0.01000		103	70-130			
n-Propylbenzene	0.0102	0.0010	mg/L	0.01000		102	70-130			
sec-Butylbenzene	0.0101	0.0010	mg/L	0.01000		101	70-130			
Styrene	0.0099	0.0010	mg/L	0.01000		99	70-130			
tert-Butylbenzene	0.0104	0.0010	mg/L	0.01000		104	70-130			
Tertiary-amyl methyl ether	0.0105	0.0010	mg/L	0.01000		105	70-130			
Tetrachloroethene	0.0097	0.0010	mg/L	0.01000		97	70-130			
Tetrahydrofuran	0.0083	0.0050	mg/L	0.01000		83	70-130			
Toluene	0.0098	0.0010	mg/L	0.01000		98	70-130			
trans-1,2-Dichloroethene	0.0107	0.0010	mg/L	0.01000		107	70-130			
trans-1,3-Dichloropropene	0.0098	0.0004	mg/L	0.01000		98	70-130			
Trichloroethene	0.0098	0.0010	mg/L	0.01000		98	70-130			
Trichlorofluoromethane	0.0098	0.0010	mg/L	0.01000		98	70-130			
Vinyl Acetate	0.0089	0.0050	mg/L	0.01000		89	70-130			
Vinyl Chloride	0.0092	0.0010	mg/L	0.01000		92	70-130			
Xylene O	0.0103	0.0010	mg/L	0.01000		103	70-130			
Xylene P,M	0.0210	0.0020	mg/L	0.02000		105	70-130			

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: Chariho

ESS Laboratory Work Order: 21D0860

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8260B Volatile Organic Compounds										
Batch DD12618 - 5030B										
Surrogate: 1,2-Dichloroethane-d4	*0.0240*		mg/L	*0.02500*		*96*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*0.0247*		mg/L	*0.02500*		*99*	*70-130*			
Surrogate: Dibromofluoromethane	*0.0246*		mg/L	*0.02500*		*98*	*70-130*			
Surrogate: Toluene-d8	*0.0248*		mg/L	*0.02500*		*99*	*70-130*			
LCS Dup										
1,1,1,2-Tetrachloroethane	0.0095	0.0010	mg/L	0.01000		95	70-130	0.1	25	
1,1,1-Trichloroethane	0.0097	0.0010	mg/L	0.01000		97	70-130	0.1	25	
1,1,2,2-Tetrachloroethane	0.0102	0.0005	mg/L	0.01000		102	70-130	1	25	
1,1,2-Trichloroethane	0.0101	0.0010	mg/L	0.01000		101	70-130	1	25	
1,1-Dichloroethane	0.0101	0.0010	mg/L	0.01000		101	70-130	1	25	
1,1-Dichloroethene	0.0116	0.0010	mg/L	0.01000		116	70-130	4	25	
1,1-Dichloropropene	0.0105	0.0020	mg/L	0.01000		105	70-130	2	25	
1,2,3-Trichlorobenzene	0.0103	0.0010	mg/L	0.01000		103	70-130	2	25	
1,2,3-Trichloropropane	0.0094	0.0010	mg/L	0.01000		94	70-130	2	25	
1,2,4-Trichlorobenzene	0.0104	0.0010	mg/L	0.01000		104	70-130	0.5	25	
1,2,4-Trimethylbenzene	0.0107	0.0010	mg/L	0.01000		107	70-130	2	25	
1,2-Dibromo-3-Chloropropane	0.0088	0.0050	mg/L	0.01000		88	70-130	1	25	
1,2-Dibromoethane	0.0103	0.0010	mg/L	0.01000		103	70-130	0.2	25	
1,2-Dichlorobenzene	0.0100	0.0010	mg/L	0.01000		100	70-130	0.1	25	
1,2-Dichloroethane	0.0094	0.0010	mg/L	0.01000		94	70-130	0.6	25	
1,2-Dichloropropane	0.0102	0.0010	mg/L	0.01000		102	70-130	0.9	25	
1,3,5-Trimethylbenzene	0.0107	0.0010	mg/L	0.01000		107	70-130	0.8	25	
1,3-Dichlorobenzene	0.0101	0.0010	mg/L	0.01000		101	70-130	2	25	
1,3-Dichloropropane	0.0102	0.0010	mg/L	0.01000		102	70-130	0.6	25	
1,4-Dichlorobenzene	0.0100	0.0010	mg/L	0.01000		100	70-130	0.4	25	
1,4-Dioxane - Screen	0.198	0.500	mg/L	0.2000		99	0-332	2	200	
1-Chlorohexane	0.0105	0.0010	mg/L	0.01000		105	70-130	3	25	
2,2-Dichloropropane	0.0103	0.0010	mg/L	0.01000		103	70-130	2	25	
2-Butanone	0.0496	0.0100	mg/L	0.05000		99	70-130	1	25	
2-Chlorotoluene	0.0103	0.0010	mg/L	0.01000		103	70-130	0.8	25	
2-Hexanone	0.0499	0.0100	mg/L	0.05000		100	70-130	3	25	
4-Chlorotoluene	0.0102	0.0010	mg/L	0.01000		102	70-130	1	25	
4-Isopropyltoluene	0.0103	0.0010	mg/L	0.01000		103	70-130	2	25	
4-Methyl-2-Pentanone	0.0450	0.0250	mg/L	0.05000		90	70-130	2	25	
Acetone	0.0494	0.0100	mg/L	0.05000		99	70-130	3	25	
Benzene	0.0099	0.0010	mg/L	0.01000		99	70-130	2	25	
Bromobenzene	0.0103	0.0020	mg/L	0.01000		103	70-130	2	25	
Bromochloromethane	0.0100	0.0010	mg/L	0.01000		100	70-130	0.9	25	
Bromodichloromethane	0.0089	0.0006	mg/L	0.01000		89	70-130	0.2	25	
Bromoform	0.0095	0.0010	mg/L	0.01000		95	70-130	0.6	25	
Bromomethane	0.0090	0.0020	mg/L	0.01000		90	70-130	2	25	
Carbon Disulfide	0.0088	0.0010	mg/L	0.01000		88	70-130	0	25	
Carbon Tetrachloride	0.0103	0.0010	mg/L	0.01000		103	70-130	2	25	
Chlorobenzene	0.0098	0.0010	mg/L	0.01000		98	70-130	0.1	25	

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: Chariho

ESS Laboratory Work Order: 21D0860

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8260B Volatile Organic Compounds										
Batch DD12618 - 5030B										
Chloroethane	0.0100	0.0020	mg/L	0.01000		100	70-130	0.6	25	
Chloroform	0.0100	0.0010	mg/L	0.01000		100	70-130	4	25	
Chloromethane	0.0083	0.0020	mg/L	0.01000		83	70-130	2	25	
cis-1,2-Dichloroethene	0.0107	0.0010	mg/L	0.01000		107	70-130	2	25	
cis-1,3-Dichloropropene	0.0104	0.0004	mg/L	0.01000		104	70-130	0.9	25	
Dibromochloromethane	0.0101	0.0010	mg/L	0.01000		101	70-130	0.8	25	
Dibromomethane	0.0100	0.0010	mg/L	0.01000		100	70-130	1	25	
Dichlorodifluoromethane	0.0083	0.0020	mg/L	0.01000		83	70-130	3	25	
Diethyl Ether	0.0092	0.0010	mg/L	0.01000		92	70-130	1	25	
Di-isopropyl ether	0.0106	0.0010	mg/L	0.01000		106	70-130	0.4	25	
Ethyl tertiary-butyl ether	0.0099	0.0010	mg/L	0.01000		99	70-130	2	25	
Ethylbenzene	0.0101	0.0010	mg/L	0.01000		101	70-130	0.8	25	
Hexachlorobutadiene	0.0106	0.0006	mg/L	0.01000		106	70-130	2	25	
Hexachloroethane	0.0096	0.0010	mg/L	0.01000		96	70-130	0.6	25	
Isopropylbenzene	0.0104	0.0010	mg/L	0.01000		104	70-130	2	25	
Methyl tert-Butyl Ether	0.0102	0.0010	mg/L	0.01000		102	70-130	0.8	25	
Methylene Chloride	0.0099	0.0020	mg/L	0.01000		99	70-130	0	25	
Naphthalene	0.0091	0.0010	mg/L	0.01000		91	70-130	2	25	
n-Butylbenzene	0.0105	0.0010	mg/L	0.01000		105	70-130	1	25	
n-Propylbenzene	0.0104	0.0010	mg/L	0.01000		104	70-130	2	25	
sec-Butylbenzene	0.0103	0.0010	mg/L	0.01000		103	70-130	2	25	
Styrene	0.0100	0.0010	mg/L	0.01000		100	70-130	1	25	
tert-Butylbenzene	0.0105	0.0010	mg/L	0.01000		105	70-130	1	25	
Tertiary-amyl methyl ether	0.0104	0.0010	mg/L	0.01000		104	70-130	2	25	
Tetrachloroethene	0.0098	0.0010	mg/L	0.01000		98	70-130	0.9	25	
Tetrahydrofuran	0.0080	0.0050	mg/L	0.01000		80	70-130	4	25	
Toluene	0.0099	0.0010	mg/L	0.01000		99	70-130	1	25	
trans-1,2-Dichloroethene	0.0109	0.0010	mg/L	0.01000		109	70-130	1	25	
trans-1,3-Dichloropropene	0.0098	0.0004	mg/L	0.01000		98	70-130	0.4	25	
Trichloroethene	0.0097	0.0010	mg/L	0.01000		97	70-130	1	25	
Trichlorofluoromethane	0.0100	0.0010	mg/L	0.01000		100	70-130	2	25	
Vinyl Acetate	0.0089	0.0050	mg/L	0.01000		89	70-130	0	25	
Vinyl Chloride	0.0094	0.0010	mg/L	0.01000		94	70-130	2	25	
Xylene O	0.0103	0.0010	mg/L	0.01000		103	70-130	0.1	25	
Xylene P,M	0.0214	0.0020	mg/L	0.02000		107	70-130	2	25	
Surrogate: 1,2-Dichloroethane-d4	*0.0238*		mg/L	*0.02500*		*95*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*0.0247*		mg/L	*0.02500*		*99*	*70-130*			
Surrogate: Dibromofluoromethane	*0.0245*		mg/L	*0.02500*		*98*	*70-130*			
Surrogate: Toluene-d8	*0.0248*		mg/L	*0.02500*		*99*	*70-130*			

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: Chariho ESS Laboratory Work Order: 21D0860

Notes and Definitions

U	Analyte included in the analysis, but not detected
CD+	Continuing Calibration %Diff/Drift is above control limit (CD+).
ND	Analyte NOT DETECTED at or above the MRL (LOQ), LOD for DoD Reports, MDL for J-Flagged Analytes
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
DL	Detection Limit
I/V	Initial Volume
F/V	Final Volume
§	Subcontracted analysis; see attached report
1	Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
2	Range result excludes concentrations of target analytes eluting in that range.
3	Range result excludes the concentration of the C9-C10 aromatic range.
Avg	Results reported as a mathematical average.
NR	No Recovery
[CALC]	Calculated Analyte
SUB	Subcontracted analysis; see attached report
RL	Reporting Limit
EDL	Estimated Detection Limit
MF	Membrane Filtration
MPN	Most Probably Number
TNTC	Too numerous to Count
CFU	Colony Forming Units

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: Chariho

ESS Laboratory Work Order: 21D0860

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

ENVIRONMENTAL

Rhode Island Potable and Non Potable Water: LAI00179
http://www.health.ri.gov/find/labs/analytical/ESS.pdf

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750
http://www.ct.gov/dph/lib/dph/environmental_health/environmental_laboratories/pdf/OutofStateCommercialLaboratories.pdf

Maine Potable and Non Potable Water, and Solid and Hazardous Waste: RI00002
http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/partners/labCert.shtml

Massachusetts Potable and Non Potable Water: M-RI002
http://public.dep.state.ma.us/Labcert/Labcert.aspx

New Hampshire (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 2424
http://des.nh.gov/organization/divisions/water/dwgb/nhelap/index.htm

New York (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: 11313
http://www.wadsworth.org/labcert/elap/comm.html

New Jersey (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: RI006
http://datamine2.state.nj.us/DEP_OPRA/OpraMain/pi_main?mode=pi_by_site&sort_order=PI_NAMEA&Select+a+Site:=58715

United States Department of Agriculture Soil Permit: P330-12-00139

Pennsylvania: 68-01752
http://www.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx

ESS Laboratory Sample and Cooler Receipt Checklist

Client: GZA - Providence, RI - GZA/KPB

Shipped/Delivered Via: Client

ESS Project ID: 21D0860
Date Received: 4/23/2021
Project Due Date: 4/30/2021
Days for Project: 5 Day

1. Air bill manifest present? No
   Air No.: NA
2. Were custody seals present? No
3. Is radiation count <100 CPM? Yes
4. Is a Cooler Present? Yes
   Temp: 4 Iced with: Ice
5. Was COC signed and dated by client? Yes
6. Does COC match bottles? Yes
7. Is COC complete and correct? Yes
8. Were samples received intact? Yes
9. **Were labs informed about short holds & rushes?** Yes / No / (NA)
10. Were any analyses received outside of hold time? Yes / (No)

11. Any Subcontracting needed? Yes / (No)
    ESS Sample IDs:
    Analysis:
    TAT:
12. Were VOAs received? (Yes) / No
    a. Air bubbles in aqueous VOAs? Yes / (No)
    b. Does methanol cover soil completely? Yes / No / NA

13. Are the samples properly preserved? (Yes) / No
    a. If metals preserved upon receipt: Date: Time: By:
    b. Low Level VOA vials frozen: Date: Time: By:

Sample Receiving Notes:

14. Was there a need to contact Project Manager? Yes / (No)
    a. Was there a need to contact the client? Yes / No
    Who was contacted? Date: Time: By:

Sample Number	Container ID	Proper Container	Air Bubbles Present	Sufficient Volume	Container Type	Preservative	Record pH (Cyanide and 608 Pesticides)
1	157848	Yes	N/A	Yes	1L Amber	NP	
1	157849	Yes	N/A	Yes	1L Amber	NP	
1	157850	Yes	N/A	Yes	VOA Vial	HCl	
1	157851	Yes	N/A	Yes	VOA Vial	HCl	
1	157852	Yes	N/A	Yes	VOA Vial	HCl	

2nd Review
Were all containers scanned into storage/lab? Initials AG
Are barcode labels on correct containers? (Yes) / No
Are all Flashpoint stickers attached/container ID # circled? Yes / No / NA
Are all Hex Chrome stickers attached? Yes / No / NA
Are all QC stickers attached? Yes / No / NA
Are VOA stickers attached if bubbles noted? Yes / No / NA

Completed By: Date & Time: 4/23/21 1434
Reviewed

ESS Laboratory Sample and Cooler Receipt Checklist

Client: GZA - Providence, RI - GZA/KPB

By: [signature]

Date & Time: 4/22/21 14:25

ESS Project ID: 21D0860

Date Received: 4/23/2021

CHAIN OF CUSTODY

ESS Lab # 21D0860 | Page 1 of 1

185 Frances Avenue
Cranston, RI 02921
Phone: 401-461-7181
Fax: 401-461-4486
www.esslaboratory.com

Turn Time: ☐ >5 ☒ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1 ☐ Same Day

Regulatory State: RI Criteria:

Is this project for any of the following?:
☐ CT RCP ☐ MA MCP ☐ RGP ☐ Permit ☐ 401 WQ

ELECTRONIC DELIVERABLES (Final Reports are PDF)
☐ Limit Checker ☐ State Forms ☐ EQuIS
☒ Excel ☐ Hard Copy ☐ Enviro Data
☐ CLP-Like Package ☒ Other (Specify) → ROF

CLIENT INFORMATION

Client: GZA
Address: 188 Valley St Ste 300.
Providence, RI 02909
Phone: 401-427-2722
Email Distribution List: albert.flori@gza.com
marissa.lima@gza.com

PROJECT INFORMATION

Project Name: Chariho
Project Location: Richmond RI
Project Number: 33632.02
Project Manager: Al Flori
Bill to: Same
PO#:
Quote#:

Client acknowledges that sampling is compliant with all EPA / State regulatory programs

REQUESTED ANALYSES

ESS Lab ID	Collection Date	Collection Time	Sample Type	Sample Matrix	Sample ID	VOC 8260	TPH 8100	Total Number of Bottles
1	4/23/21	1229	Grab	GW	MW-701	X	X	5
						V	A	5
						7	6	
						2	1	

Container Type: AC-Air Cassette AG-Amber Glass B-BOD Bottle C-Cubitainer J-Jar O-Other P-Poly S-Sterile V-Vial
Container Volume: 1-100 mL 2-2.5 gal 3-250 mL 4-300 mL 5-500 mL 6-1L 7-VOA 8-2 oz 9-4 oz 10-8 oz 11-Other*
Preservation Code: 1-Non Preserved 2-HCl 3-H2SO4 4-HNO3 5-NaOH 6-Methanol 7-Na2S2O3 8-ZnAce, NaOH 9-NH4Cl 10-DI H2O 11-Other*

Chain needs to be filled out neatly and completely for on time delivery.

Sampled by : Marissa Lima

Laboratory Use Only
Cooler Temperature (°C): 4 Ice

Comments: * Please specify "Other" preservative and containers types in this space

All samples submitted are subject to ESS Laboratory's payment terms and conditions.

Dissolved Filtration
☐ Lab Filter

Relinquished by (Signature)	Date	Time	Received by (Signature)	Relinquished by (Signature)	Date	Time	Received by (Signature)
	4/23/21	1348					
Relinquished by (Signature)	Date	Time	Received by (Signature)	Relinquished by (Signature)	Date	Time	Received by (Signature)

APPENDIX C

BIODEGRADATION AND SOIL VAPOR EXTRACTION
VOC REMOVAL CALCULATIONS

APPENDIX C
Soil Vapor Extraction
Biodegradation Calculations

Chariho Regional Middle School
Richmond, Rhode Island

Biological degradation of Petroleum based on Carbon Dioxide Levels in Soil Vapor

April 2, 2020 to December 21, 2020

Well I.D.	Average Flow (CFM)	Average O_2 (%)	Average CO_2 (%)	% Below 21	Respiration Quot. (%)	Mass of CO_2 (lb/day)	Biodegradation (lb of Hex./day)
SVE-1	26	20.2	0.5	-0.80	67.50	21.66	6.99
SVE-2	22	20.4	0.4	-0.60	71.67	13.89	4.48
SVE-3	10	19.7	0.8	-1.30	60.77	12.78	4.12
SVE-4	11	19.5	1.0	-1.50	66.00	17.98	5.80
MW-501	24	19.9	0.7	-1.10	61.82	25.40	8.19
RW-3	26	18.9	1.4	-2.10	65.71	58.12	18.75

Total lb of Hex. Removed/Day = 48.3

Calculations:

Mass CO_2 = Qsve * t * Pco_2 * γco_2

Mass CO_2 = Total Mass of CO_2 generated in lbs.

Qsve = Mean soil vapor extraction rate in standards cubic feet per minute (over time period t in minutes).

Pco_2 = Measured CO_2% composition of SVE soil vapor subtracted from atmospheric composition (0.04%).

γco_2 = Unit weight of CO_2 in lbs/cu.ft. = 0.1150 @ 68°F and standard pressure.

Biodegradation = Mass CO_2/(3.1 lbs of CO_2 generated to mineralize 1 lb of fuel oil (as hexane)).

APPENDIX C
Soil Vapor Extraction
Biodegradation Calculations (cont')

Chariho Regional Middle School
Richmond, Rhode Island

Biological degradation of Petroleum based on Oxygen Level in Soil Vapor

April 2, 2020 to December 21, 2020

Well I.D.	Average Flow (CFM)	% Below 21	Mass of O_2 Consumed (lb/day)	Biodegradation (lb of Hex./day)
SVE-1	26	-0.80	25.04	7.16
SVE-2	22	-0.60	15.44	4.41
SVE-3	10	-1.30	16.01	4.57
SVE-4	11	-1.50	20.52	5.86
MW-501	24	-1.10	31.55	9.01
RW-3	26	-2.10	65.81	18.80

Total lb of Hex. Removed/Day = 49.8

Calculations:

Mass O_2 = Qsve * t * Po_2 * γo_2

Mass O_2 = Total Mass of O_2 consumed in lbs.

Qsve = Mean soil vapor extraction rate in standards cubic feet per minute (over time period t in minutes).

Po_2 = Measured O_2% composition of SVE soil vapor subtracted from atmospheric composition.

γo_2 = Unit weight of O_2 in lbs/cu.ft. = 0.0831 @ 68°F and standard pressure.

Biodegradation = Mass O_2/(3.5 lbs of O_2 required to mineralize 1 lb of fuel oil (as hexane)).

APPENDIX C
Soil Vapor Extraction
Removal Rates

Chariho Regional Middle School
Richmond, Rhode Island

Soil Vapor Extraction TVOC Mass Removal Rate

April 2, 2020 to December 21, 2020

	SVE-1	SVE-2	SVE-3	SVE-4	MW-501	RW-3	TOTAL
Average Combined Venting Flow Rate (CFM) =	26	22	10	11	24	26	
Average Combined TVOC Concentration (ppmv) =	5.3	0.7	0.4	0.8	6.9	1.2	
Total Vent System Run Time (days) =	264	264	264	264	264	264	
Total Volume of Air Treated (ft^3) =	9,944,986	8,177,242	3,911,846	4,345,229	9,112,435	9,956,390	
Total Volume of TVOC (ft^3 of TVOC) =	53	6	2	3	63	12	
Molecular weight of Petroleum (g/mole) =	112	112	112	112	112	112	
lb / ft^3 of Petroleum =	0.3	0.3	0.3	0.3	0.3	0.3	
Lb's of Petroleum Removed =	16.5	1.8	0.5	1.1	19.7	3.7	(pounds) **43.3**
Lbs of Petroleum / 24-hour daily cycle Removed =	0.062	0.007	0.002	0.004	0.075	0.014	(pounds/24-hour cycle) **0.16**

APPENDIX C
Summary of Soil Vapor Extraction Removal Rates
(December 2010 to December 2020)

Chariho Regional Middle School
Richmond, Rhode Island

Summary of Petroleum Removed by Bio-Venting

		Dec. 14, 2010 through May 25, 2011 (162 days)	May 26, 2011 through Nov. 22, 2011 (180 days)	Nov 23, 2011 through April 17, 2012 (147 days)	April 18, 2012 through Dec. 3, 2012 (230 days)	Dec. 4, 2012 through Dec 20, 2013 (381 days)	Dec. 21, 2013 through April 22, 2015 (452 days)	April 23, 2015 through April 20, 2016 (364 days)	April 21, 2016 through April 18, 2017 (363 days)	April 19, 2017 through Dec 20, 2017 (246 days)	April 23, 2018 through Dec 27, 2018 (249 days)	April 29, 2019 through Dec 31, 2019 (247 days)	April 2, 2020 through Dec 21, 2020 (264 days)	BIO-VENTING TOTAL 12/14/10 to 12/21/20 (3,285 days)
Total lbs of Petroleum Removed by Soil Vapor Extraction		**267**	**39**	**21**	**36**	**47**	**190**	**89**	**104**	**29**	**20**	**23**	**43**	**907**
Total lbs removed by Magnum Spill Buster Units & Bailing - (gallons removed)		**162** (23.8 gal)	**27** (3.9 gal)	**18** (2.6 gal)	**115** (16.9 gal)	**309** (45.5 gal)	**228** (33.5 gal)	**137** (20.2 gal)	**352** (51.7 gal)	**39** (5.7 gal)	**4** (0.6 gal)	**1** (0.2 gal)	**3** (0.4 gal)	**1,394** (205 gal)
Total lbs of petroleum (approximated by utilizing biodegradation values for hexane) Removed by Biodegradation Values are based on Carbon Dioxide generated in soil vapor.		14,628	9,245	7,330	13,573	31,280	33,538	28,613	17,279	8,174	9,039	7,015	12,760	192,474
Total lbs of petroleum (approximated by utilizing biodegradation values for hexane) Removed by Biodegradation Values are based on depleted oxygen levels observed in soil vapor.		6,431	4,374	3,825	6,771	16,345	24,227	20,676	15,972	8,846	8,765	6,743	13,153	136,127
Average total lbs of petroleum removed by biodegradation		**10,530**	**6,810**	**5,578**	**10,172**	**23,812**	**28,883**	**24,644**	**16,625**	**8,510**	**8,902**	**6,879**	**12,957**	**164,300**
Total lbs of petroleum remediated		**10,958**	**6,875**	**5,616**	**10,322**	**24,168**	**29,301**	**24,871**	**17,081**	**8,578**	**8,922**	**6,903**	**13,003**	**166,598**
Total gallons of petroleum remediated		**1,612**	**1,011**	**826**	**1,518**	**3,554**	**4,309**	**3,657**	**2,512**	**1,261**	**1,312**	**1,015**	**1,912**	**24,499**
Rate of Removal in #/day	**Product Recovery**	**1.0**	**0.15**	**0.12**	**0.50**	**0.81**	**0.50**	**0.38**	**0.96**	**0.16**	**0.02**	**0.004**	**0.011**	**0.42**
	Vent	**1.6**	**0.22**	**0.15**	**0.16**	**0.12**	**0.42**	**0.25**	**0.29**	**0.12**	**0.08**	**0.09**	**0.16**	**0.28**
	Biological	**65.0**	**37.8**	**37.9**	**44.2**	**62.5**	**63.9**	**67.7**	**45.8**	**34.6**	**35.8**	**27.8**	**49.1**	**50.0**
	Total	**67.6**	**38.2**	**38.2**	**44.9**	**63.4**	**64.8**	**68.3**	**47.1**	**34.9**	**35.9**	**27.9**	**49.3**	**50.7**

Notes:
1. Calculations assume petroleum concentrations approximately equivalent to TVOC PID readings in samples of extracted soil vapor and an average SG = 0.82 (≈ 6.8 lbs/gal).

GZA GeoEnvironmental, Inc.