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Full Scale Soil Vapor Extraction System Design and Work Plan

Valley Pike VOC Site
2949 Valley Pike
Riverside, Ohio

July 2016

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Prepared For Mullins Rubber Products

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Section 1
Introduction

On January 8, 2016, Mullins Rubber Products (MRP) entered into an Administrative Order of Consent (AOC) with the United States Environmental Protection Agency (USEPA) to address Volatile Organic Compound (VOC) emissions, primarily tetrachloroethene (PCE) and trichloroethene (TCE) in the subsurface at the Valley Pike VOC Site (Site). The AOC included the design, installation and operation of a soil vapor extraction (SVE) system at the MRP property to address the source of VOCs.

In accordance with the AOC, and on behalf of MRP, TRC Environmental Corporation (TRC), prepared and submitted a SVE Pilot Test Work Plan to USEPA in November 2015. TRC installed the pilot-scale SVE system and implemented the long term SVE Pilot Test in January 2016. The purpose of the SVE Pilot test was to:

- Extract residual VOCs from the on-site soil matrix, reducing the long-term potential for migration of VOCS into soil gas and ground water, (*i.e.*, source control);
- Reduce or eliminate the potential for migration of vapor-phase VOCs from the Site; and
- Collect Site specific data for the design of a full scale SVE system to address the identified source area(s) beneath the Site.

Pilot Test activities were completed in March 2016. The SVE system has been kept in continuous operation following the completion of the Pilot Test to address residual source area VOCs while the full scale SVE design and installation is being undertaken.

In conjunction with the SVE Pilot Test, and on behalf of MRP, TRC implemented a Supplemental Source Area Investigation in May 2016 to:

- Evaluate potential source areas of VOCs in soil and ground water at the presumed source area;
- Supplement the SVE design by identifying additional recovery well locations and depth intervals; and
- Provide a baseline of pre-treatment VOC concentrations in soil (to be used in conjunction with subsequent post-treatment confirmation sampling to demonstrate the impact of SVE operation on VOC contaminations at the Site and the conditions of the AOC have been met).

The Supplemental Source Investigation documentation is included as Appendix A.

1.1 Site Description

The Valley Pike VOC Study Area is within the City of Riverside, Montgomery County, Ohio (Figure 1). The Study Area is primarily north of Valley Pike (aka, Valley Street), and approximately 0.5 mile north of the Mad River. The area of VOC detections is bordered on the north by Forest Home Avenue, south by Valley Pike, and west by Sagamore Avenue.

The Site is located within a mixed commercial and industrial area located east of Hypathia Avenue, west of Harshman Road, south of Transportation Drive and north of Valley Pike. (Figure 1). The Site property features the main production and office building, including the series of attached expansions completed over the past 40+ years, and several storage sheds. The Site is owned by Mullins Land Company, Inc., an MRP related entity.

1.2 Historic Site Operations

The Site began operations in 1942 as the Mullins Tire and Rubber Company. The primary operation at that time was retreading used tires. In 1955, the business expanded into molding different types of rubber products.

Historic operations included the degreasing of metal parts with chlorinated solvent in degreasers located (approximately) in the north corner of Paint Room #2 (Figure 2). Historic releases from the former degreasing activities is the presumed source of VOCs in the subsurface.

1.3 Current Site Operations

Current Site features are depicted on Figure 2. Beginning in the mid-1960s, the Site has focused on molding heavy-duty truck trailer suspension bushings. The anticipated future use is continued production of rubber-based products.

MRP's current operations include the degreasing of metal parts with chlorinated solvent in two vapor degreasers, prior to bonding with rubber parts. The vapor degreasers are located in the northwest part of the manufacturing area, near the north end of the building. According to MRP, the process uses, and has historically used, TCE since 1968 (Dinsmore and Shohl, LLP, 2013).

Non-contact cooling water from the degreasing tanks, storm drainage, and boiler blow-down water were historically discharged into the series of seven dry wells on the northern portion of the MRP property. In 2012, MRP installed a closed loop chiller system that eliminated the need to discharge cooling water to the injection wells. (Ohio EPA 2012, 2013).

1.4 Purpose and Scope

This Work Plan has been prepared to:

- Provide data collected from the 2016 Supplemental Source Area Investigation (Appendix A);
- Provide and evaluate the data collected during the SVE Pilot Test; and
- Provide design, installation operation and maintenance details for full-scale SVE system design and implementation in accordance with the AOC.

Section 2
Site Conditions

2.1 Site Topography

The Valley Pike VOC Site property and surrounding area is generally flat. The surface elevation at the Site property is approximately 782 feet above mean sea level (ft MSL) across the property. Surface elevation ranges from approximately 784 ft MSL to as low as 778 ft-MSL, moving from northeast to southwest across the surrounding area (Figure 1).

2.2 Site Geology

A review of available soil boring logs and reports from previous investigations, referenced in Section 7, shows that the subsurface materials underlying the Site property and surrounding area consist of varying thicknesses of fill materials overlying glacial-derived, unconsolidated deposits consisting of mixed and inter-bedded silt, sand, gravel, and clay.

At many boring locations, a layer of fill (generally silt or silty sand and gravel) ranging in thickness from one (1) to eight (8) feet was the first unit encountered.

Underlying the fill (Fill) is an unconsolidated unit consisting of unconsolidated sand and gravels (Upper Sand and Gravel). Ground water is not encountered in this unit, although perched precipitation that has infiltrated the subsurface was described at multiple soil boring locations (Tetra Tech, 2015; TRC, 2016).

Underlying the Upper Sand and Gravel, a discontinuous, dense glacial till (gray silty clay with varying amounts of fine to coarse gravel and cobbles) unit was encountered at depths ranging from approximately 15 to 35 feet bgs. This silty clay (Till) became increasingly moist and moderately plastic with depth, but remained stiff. The greatest thickness of the till material was observed at the boring for well MW-EPA-13, where over 20 feet was encountered. The thickness of the Till unit appears to decrease from north to south in the vicinity of the Site property and is absent at
MW-EPA-9 on the south side of Valley Pike (Tetra Tech, 2015).

Below the Till unit, saturated fine to coarse sand and gravel (Lower Sand and Gravel) were encountered at all locations.

2.3 Site Hydrogeology

During previous Site investigation, saturation was generally first encountered in the Lower Sand and Gravel unit at depths ranging from approximately 24 to 30 feet-bgs (see Section 7). Typically, saturated material was not present above the Till; however minor amounts of moisture indicative of a low-yielding seasonal or perched saturated zone(s) are described in the borings for wells MW-EPA-8, MW-EPA-11, and MW-EPA- 14. At the other locations, saturation was generally encountered immediately below the dense till in the lower sand and gravel unit. Saturation in the Lower Sand and Gravel unit clearly meets the definition of ground water.

Piezometric water levels in monitoring wells screened in the Lower Sand and Gravel unit have been measured to depths ranging from approximately 19 to 26 feet bgs (*i.e.*, several feet above the depth that saturation was first observed), suggesting that the Till unit may serve as a confining unit, where present.

Field observations during the soil boring program suggest that the presence of water above the Till is sporadic and associated with localized conditions and/or seasonal precipitation. At location MW-9, south of Valley Pike, where till was not encountered (Tetra Tech, 2015), the water table elevation was consistent with measurements at wells screened below the Till, indicating that the Till does not act as a continuous confining unit throughout the area; rather, it appears that the Till unit acts as a partially confining unit for the underlying, Lower Sand and Gravel saturated unit.

The ground water flow direction in the Lower Sand and Gravel aquifer is southwestward and generally parallel to Valley Pike (Tetra Tech, 2015; TRC, 2016). The horizontal gradient was extremely low (less than 0.001) within the eastern portion of the Site property and areas to the east, and steepened to approximately 0.004 within the area west of Site.

2.4 Summary of Investigation Activities

The following investigations have been performed at the Valley Pike VOC Site:

- Ohio EPA - Site Inspections(s) (November 2010);
- USEPA - Site Investigations (multiple investigations from December 2013 to December 2014);
- Tetra Tech - Contaminant Source Area Investigation (April 2015); and
- TRC – Supplemental Source Area Investigation (June 2016).

The TRC Supplemental Source Area Investigation is included as Appendix A.

PCE and its breakdown products (*i.e.,* TCE, *cis*-1-2-dichloroethene [*cis*-1,2-DCE], *trans*-1-2-dichloroethene [*trans*-1,2-DCE], and vinyl chloride) were measured in the subsurface throughout, and downgradient of, the presumed source area (most likely from historic releases from the former degreasing activities at Paint Room #2). Typically, VOC concentrations increased with depth and the highest VOC concentrations were measured at the transition of the Upper Sand and Gravel unit and underlying silty clay till unit (TRC, 2016).

Ground water sampling results yielded the highest VOC concentrations at MW-EPA-08, downgradient with of the presumed source area (Tetra Tech, 2015; TRC, 2016). Based on the south-southwest ground water flow direction, VOCs in ground water are suspected to be migrating offsite to the southwest (Tetra Tech, 2015).

The USEPA and Tetra Tech investigations concluded PCE and TCE have migrated to a residential neighborhood extending westward from Hypathia Avenue where vapor intrusion (VI) from the PCE- and TCE- in shallow ground water has been documented (USEPA, 2014; Tetra Tech, 2015). VI occurs when volatile chemicals in soil and/or ground water, migrate, volatilize, and infiltrate a building. Once beneath the building, VOC vapors can infiltrate the building through cracks in the foundation, cracks in a concrete slab, or directly through a dirt floor. VOCs such as PCE and TCE volatilize under normal atmospheric conditions. Based upon these conditions TRC conducted an SVE pilot test in order to support the design and installation of an SVE system to address source area VOCs in accordance with the AOC. SVE pilot test procedures and results are detailed below in Sections 3, 4 and 5.

The June 2016 Supplemental Source Investigation performed by TRC confirmed the presence of elevated concentrations of PCE and its breakdown constituents in soil at, and down gradient of, the reported locations of the former PCE degreasing activities, including soil samples collected from Press Room #1 and adjacent to the Trimming Department (Figure 2 of Appendix A). The absence of VOCs in soil samples collected from other potential source area locations demonstrate that the probable source of the VOCs in the subsurface are the former degreasing activities in the north corner of Paint Room #2. During this investigation, the highest PCE concentrations were found within the radius of influence of the pilot-scale SVE treatment system; however, PCE concentrations were also identified outside the radius of influence of the existing SVE treatment system. These data have been incorporated in the final SVE system design, as discussed below in Section 6.

Section 3
Conceptual SVE System Considerations

3.1 SVE Technology Overview

SVE is an *in-situ*, unsaturated (*i.e.*, vadose) zone soil remediation technology. A vacuum is applied to the soil to create a pressure differential and induce air flow and remove VOCs and some semi-volatile contaminants from the soil.

Airflow is induced in the unsaturated zone by creating a pressure gradient through the withdrawal of air from extraction wells or trenches in the subsurface. The vacuum exerted on the extraction wells is transmitted to the surrounding formation; the greater the vacuum applied, the larger the imposed pressure gradient and the greater the potential airflow. As air is drawn through the soil, contaminants that volatilize into the vapor phase are carried along with the bulk movement of the air through more permeable regions, primarily through advection.

The vapor leaving the soil may be treated to recover or destroy the contaminants (*e.g.*, adsorption on granular activated carbon, catalytic oxidation), depending on local and state air discharge regulations.

3.2 Conceptual Pilot System Design

Data collected over multiple investigations at the Valley Pike VOC Site have documented the presence of PCE and TCE in soil, ground water, and sub-slab vapor (see Section 7 for references). As a result, the AOC included the design, installation and operation of an SVE system at the MRP facility to remove source PCE and TCE concentrations. A pilot-scale SVE was installed in January 2016 and has been operating continuously since then, This Final SVE Design will include monitoring and treatment of effluent vapors until the source area is remediated based on post-mitigation vapor and soil monitoring.

The pilot-scale SVE system was designed for the following:

- To extract residual VOCs from the on-site soil matrix reducing the long-term potential for migration of VOCs into soil gas and ground water, (*i.e.* source control); and
- To reduce or eliminate the potential for lateral migration of affected soil gas from the site.

The pilot SVE system design was prepared with the following ancillary objectives:

- To provide data that can be used to design and optimize the full-scale SVE system; and
- To be expandable (*i.e.*, the pilot system components can be maintained and included in the full-scale system design).

The construction of the pilot-scale SVE system and pilot test data are summarized in Sections 4 and 5. The full-scale SVE system design and installation details are described in Section 7.

Section 4
Pilot SVE System Construction Documentation

The pilot SVE system was installed in general accordance with the Pilot Study Work Plan (TRC, November 2015). Construction details and results of the pilot study performance evaluation are described below. The pilot-scale SVE system layout is illustrated on Figure 3. Data gathered during the pilot test were used to support full-scale system design.

4.1 Extraction Wells

Three extraction wells (RW-01, RW-02, and RW-03) were installed in the vicinity of the former vapor degreaser location (Figure 3). The exact location of these extraction wells was determined during a pre-pilot test site walk by TRC with MRP representatives; final locations were based upon available drill rig access and header pipe access. Soil boring logs and well construction forms for these extraction wells are provided in Appendix B. Extraction well effectiveness was evaluated using installed multi-depth soil gas vacuum monitoring points equipped with vacuum monitoring gages.

The concrete floor slab at each extraction well location was saw-cut to expose the underlying sub-slab soils. Once the concrete was removed, each extraction well was constructed by drilling an 18-inch diameter hole to the top of the Till unit, generally encountered at a depth of 20 ft-bgs (i.e., 2 to 4 feet above the typical depth to ground water), using 6.25- inch inside diameter hollow stem augers. Each extraction well was constructed using a 4- inch diameter 30-slot (0.030-in) stainless steel well screen, generally installed from 8 to 18 ft below grade (10 ft long section). The annular space surrounding the wells screen was backfilled with uniform washed pea gravel. Bentonite chips/granular bentonite (hydrated in place) were placed above the pea gravel well screen pack to provide an effective surface seal and to minimize the potential for drawing air from the surface at each extraction well point. A non-shrinking concrete-bentonite grout was used to fill the remaining annular space.

The extraction well riser pipe consists of 4-inch diameter schedule 40 PVC that extends from the top of the well screen to approximately 6 inches below the surface. A pipe tee (capped in the direction of the surface) was installed at the top of the riser pipe, with the horizontal leg of the tee extending the riser pipe toward the wall, where it was connected to the vertical riser pipe. The horizontal portion of the riser pipe and pipe tee were bedded in sand, with a reinforced concrete surface seal will covering the pipe and the remaining void within the floor slab. Access to the extraction well was maintained by installing a flush-mount prospective casing at the pipe tee that connects the extraction well to the riser pipe.

Above-grade riser pipe at each soil vapor extraction was constructed of 4-inch diameter Schedule 80 PVC. The riser pipe was equipped with a lockable butterfly valve to control air flow from each well. The riser pipe was equipped with a sample tap for collection of photoionization detector (PID) readings, vapor flow measurements, and vacuum monitoring.

Each extraction well riser pipe was connected to an 8-inch diameter, schedule 80 header pipeline which leads to the treatment trailer housing the vacuum blower. The header pipeline was secured to the building wall and/or roof support structures and sloped 0.1 to 0.2 ft per 100 ft of pipe run to allow condensation to drain toward the extraction wells or toward an air-water separation tank housed in the treatment trailer.

4.2 SVE Pilot System Blower Details

The soil vapor extraction vacuum blower and appurtenances used during the pilot test are housed in a ventilated 8-ft wide by 18-ft long insulated trailer, located outside the Paint Room #1 of the main production building (Figure 3). A 4-inch diameter manifold pipe was connect to the vacuum header of the SVE blower within the SVE trailer. The vacuum header within the trailer contains the following components:

- Inlet vacuum gauge and air by-pass valve
- Air-water separation tank
- Inlet air filter
- Air flow meter
- Vacuum relief valve (to reduce blower vacuum in the event of a clogged inlet filter)

The SVE blower is a Roots, positive displacement-type vacuum blower capable of extracting over 500 standard cubic feet per minute (scfm) at 10-inches Hg (vacuum), powered with a 10 horsepower motor.

The blower exhaust manifold was equipped with the following components:

- Discharge silencer;
- Sample port; and
- Exhaust stack vented above the roof line.

The blower exhaust line is connected to two, 2,000-gallon containers containing granulated activated carbon (GAC) to adsorb VOC concentrations in the vapor stream, prior to discharge to the atmosphere.

A separate power drop was installed to provide power for both the pilot-scale and final SVE system.

4.3 Pilot Test Multi-Level Subsurface Vacuum Monitoring Point Details

Subsurface vacuum monitoring points were installed at six locations, as shown on Figure 3. Locations were selected to provide the required data for preparation of distance-drawdown plots to evaluate well efficiency and radius of vacuum influence for each well during the stepped-rate tests and the long-term constant rate test. At each location, a nested pair of vacuum monitoring points was installed:

- a deep point installed at a depth of 18 to 20 ft bgs (approx.); and
- a shallow point installed at a depth of 8 to 10 ft bgs (approx.).

Soil boring logs and well construction forms for these monitoring points are provided in Appendix B. Each nested pair was constructed in a single borehole. The 2.5-inch borehole was constructed to 20 ft bgs (approx.) using direct-push technology methodologies. Each vacuum monitoring point was constructed with a 6-inch long stainless steel monitoring implant (Geoprobe® Vapor Implant AT8617S) and a length of ¼-inch diameter tubing.

The deep monitoring point was installed at the bottom of each borehole at approximately 20 ft bgs. The annular space surrounding the deep monitoring point screen was backfilled with clean sand to approximately one (1) foot above the top of the screen. Granular bentonite chips were placed above the sand well screen in six (6) to eight (8)-inch lifts to approximately 1 foot below the bottom of the shallow monitoring point screen. Each lift was hydrated in place prior to the addition of the next lift to help ensure an effective seal between the shallow and deep monitoring point. An approximately one (1)-foot thick sand pack was installed above the bentonite seal to ensure that the bentonite does not swell to plug the shallow monitoring point.

The shallow monitoring point was installed above the sand at eight (8) to ten (10) ft-bgs. The annular space surrounding the shallow monitoring point screen was backfilled with clean sand to approximately one (1) foot above the top of the screen. Granular bentonite was placed above the sand well screen in six (6) to eight (8)-inch lifts to approximately one (1) ft bgs. Each lift was hydrated in place prior to the addition of the next lift to help ensure an effective seal between the shallow and deep monitoring point.

Each probe was capped with a ball valve and equipped with a barbed hose fitting. Care was taken to properly label each monitoring point so that the shallow and deep monitoring points are easy to distinguish.

Section 5
SVE Pilot Test and Data Evaluation

Pilot study performance evaluation was performed as outlined in Section 5 of the Pilot Study Work Plan and in support of full-scale SVE system design. Key parameters evaluated include:

- Air flow rates achievable from each pilot study extraction well under given vacuum conditions.
- Measurable vacuum at specified distances from each extraction well (zone of vacuum influence).
- Qualitative and quantitative estimates of VOC recovery from the extraction system over time to ensure air permit exemption compliance during the pilot study and assess the need for future air emission control devices and/or an air permit.
- Overall SVE system performance.

The pilot study performance evaluation included short-term stepped-rate tests for estimating individual extraction well capacities and a long-term constant rate test utilizing all three extraction wells to evaluate the overall area of influence and extraction system performance. Testing and monitoring locations are shown Figure 3.

5.1 Stepped-Rate Test Evaluation

As described in the Work Plan, stepped-rate tests were conducted on the installed pilot SVE system to evaluate vapor recovery rates obtainable from each extraction well at various applied vacuum conditions. These data were evaluated to determine the relationship between vacuum, airflow, VOC recovery based on PID readings, and radius of influence as described below.

Field Data

Each extraction well was isolated and tested separately by closing the valves at each of the other extraction points. Each extraction well was tested at multiple vacuum conditions to achieve different air flow rates from each tested well. The different vacuum conditions were achieved by opening dilution (make-up) air valve located immediately upstream of the SVE blower and/or closing the butterfly valve on the extraction point being evaluated:

- With no dilution air, the total air flow from each well ranged from 100 to 458 standard cubic feet per minute (scfm); and
- With both dilution valves partially open, the total flow from each well ranged from 61 to 360 scfm.

During each stepped-rate test, flow and vacuum were measured at the target extraction well, and vacuum was measured at temporary vacuum monitoring points and closed extraction wells to evaluate radius of influence. Stepped-rate test field data for extraction wells RW-01 thru RW-03 are presented in Tables 1 to 3; and summarized in Charts 1-1 to 1-5; 3-1 to 3-6, and 5-1 to 5-6.

In conjunction with routine blower maintenance, flow and pressure readings were collected on a weekly basis at each extraction well. As described below (Section 5.2), the air permit compliance evaluation indicated that make-up air was not needed to reduce the total flow from the system to maintain less than 15 lbs of VOCs extracted per month, as required for an air permit exemption (OAC 3745-31-03(C)(1)(e)).

Vacuum Versus Flow

The average observed vacuum at each extraction well was plotted as a function of flow using Microsoft® Excel, and fitted with a second order polynomial function. Charts 2, 4, and 6 illustrate flow as a function of applied vacuum for each extraction well. None of the wells were air-flow limited within the range of applied vacuums tested; however, the highest air flow readings were observed at RW-03, likely due to either the fewer number of right angle turns in the piping connecting this well to the blower, less air flow short circuiting to the surface, or a combination of both.

Radius of Influence (ROI)

For each stepped-rate test, vacuum pressure readings were collected at vacuum monitoring points and nearby extraction wells (Tables 1 thru 3). A comparison of field data for shallow and deep monitoring points found only little, if any, difference in vacuum pressure between paired shallow and deep monitoring points, indicating a uniform vertical vacuum/flow field, (*i.e.*, extraction well radius of influence is consistent through the extraction zone).

Vacuum at each monitoring location (shallow and deep points are plotted as separate points) was plotted as a function of distance from the extraction well and fitted with linear regression lines (Charts 1-1 to 1-5; 3-1 to 3-6, and 5-1 to 5-6). Linear regression lines were used to calculate the radius of influence for each test condition, assuming a threshold vacuum condition of 0.1 inches of water.

Resulting ROI (for the step tests performed with the extraction well valve completely open) are presented in Table 4 and depicted as observed in the constant rate test in Figure 4. In general, ROI at each well ranged from 42 to 61 feet; mean ROI ranged from 46.8 to 60.3 feet; the ROI at RW-01 was subsequently reduced to approximately 30 feet when the system was balanced to enhance recovery at RW-02 and RW-03 (Chart 1-5; Figure 3). Based on these data, a ROI of 50 feet is assumed for design consideration in the final SVE design.

5.2 Constant Rate Pilot Test Evaluation

Following the conclusion of individual stepped-rate tests, the SVE system was configured to operate all three extraction wells to perform a long-term (eight [8] week) constant rate pilot test. The purpose of the constant rate test was to evaluate the well operation configurations, extraction well efficiencies/achievable flow rates, system radius of influence(s), and vapor recovery rates/contamination reduction trends during system operation.

Initial constant rate data are summarized in Table 5. Observed air flow and vacuum readings are presented in Chart 7 and Chart 8, respectively. Based on these data, the system appears capable of maintaining the ROI observed during the step test. The system was ultimately balanced with total airflow at approximately 520 scfm and such that air flow at extraction wells RW-2 and RW-3 was maximized and airflow at RW-1 restricted, based on estimated VOC concentrations measured at each recovery well.

The pilot-scale treatment system continues to operate in this configuration until the final system design can be approved and the final system installed.

5.2.1 Vapor Performance Sampling Results

Air samples were collected in conjunction with standard O&M data at each of the three recovery wells, the blower influent sample port, and the post carbon sample port (*i.e.*, total of five air samples) on February 5, 2016 (*i.e.*, approximately one week after SVE pilot system start-up); a second round of air samples were collected approximately 30 days later on March 3, 2016. Samples were collected in accordance with the Pilot Test Work Plan and submitted to TestAmerica Laboratories (Knoxville, TN) for analysis of site-specific VOCs (PCE, TCE, *cis*-1,2-DCE, *trans*-1,2-DCE, and vinyl chloride).

VOC concentrations in vapor performance samples are presented in Table 6. PCE and TCE were detected at each recovery well location during both rounds of sampling at concentrations ranging from 0.13 to 17 ppm-v. The highest VOC concentrations (PCE from 15 to 17 ppm-v; TCE from 2.8 to 3.0 ppm-v) were measured at recovery well RW-03, located immediately adjacent to the former vapor degreaser location. VOCs showed a slight decline from the initial and second sample rounds demonstrating the system's ability to recover significant VOCs from the presumed source area vadose zone and reduce contaminant concentrations.

5.3 Air Permit Exemption Compliance Evaluation

An air permit evaluation was prepared to determine if an air permit would be required for operation of the pilot SVE system. The evaluation is presented in the Pilot Study Work Plan. Using available sub-slab soil gas data, TRC conservatively estimated a maximum concentration of VOCs in the SVE exhaust. This concentration was then used to calculate a maximum allowable air flow rate for the constant-rate test to maintain compliance the discretionary exemption of 10 pounds per day.

As noted above, extraction wells were highly conductive to flow such that relatively low (<5 inches water) vacuum was observed at each extraction well even with the blower dilution value completely closed (*i.e.*, no make-up air). With no make-up air, the blower capacity (approximately 520 SCFM) exceeded the calculated maximum allowable air flow rate of 450 SCFM. To ensure that the discretionary exemption limit was met, the SVE exhaust flow was routed through two, 2,000 gallon granular activated carbon (GAC) vessels.

During the constant rate pilot test, flow rate and VOC concentration data were collected to confirm compliance with the discretionary exemption requirements, in accordance with the Pilot Test Work Plan. VOC concentration data are summarized in Table 6; laboratory data reports are included as Appendix C. Total VOC emissions were determined by measuring flow rate and VOC concentration from the pilot SVE system. Calculated air emissions are presented in Table 7. Calculated air emissions remain well within the discretionary exemption limit.

The Pilot-Scale treatment system continues to operate continuously until the final system design can be approved and installed. Monthly VOC concentration and flow rate data continues to be collected during this time to ensure that the discretionary exemption limit is met.

Section 6

Full Scale SVE System Design and Installation

Full-scale SVE system design details and proposed installation methods are described below. The full-scale SVE layout is shown on Figure 4; the full-scale SVE piping and instrumentation diagram (PID) is included as Figure 5.

6.1 Extraction Well Design Details

Two additional extraction wells (RW-04 and RW-05) will be installed in Press Room #1 and the Trim Room (Figure 4), at locations of elevated VOC concentrations measured in the vadose zone (Appendix A). Extraction points will be constructed in accordance with the pilot study design (4- inch diameter 30-slot [0.030-in] stainless steel well screen, installed from 8 to 18 ft below grade [10 ft long screen]. The annular space surrounding the wells screen will be backfilled with uniform washed pea gravel. Bentonite chips/granular bentonite (hydrated in place) will be placed above the pea gravel well screen pack to provide an effective surface seal and to minimize the potential for drawing air from the surface at each extraction well point. A non-shrinking concrete-bentonite grout will fill the remaining annular space) and plumbed via 4-inch riser pipe to an 8-inch header pipe, which will be extended from RW-03.

6.2 Extraction Piping Design Details

The above-grade riser pipe and header pipe will be extended from RW-03 and constructed in accordance with the pilot study design. The header pipe will be secured to the ceiling using pipe hangers and supports. The header pipeline will penetrate two interior cinder block walls. Pipe size will remain consistent with that used in the pilot study.

6.3 Blower

The full scale SVE system will retain the blower and appurtenances from the pilot test housed in a ventilated 8-ft wide by 18-ft long insulated trailer, located outside the Paint Room #1. The SVE blower is a Roots positive displacement-type vacuum blower capable of extracting over 450 actual cubic feet per minute (acfm) at 10-inches Hg (vacuum), sufficient to maintain the established ROI at existing extraction wells and the two new extraction wells. Upon expansion, the SVE system will be re-balanced to maximize VOC recovery; blower performance and ROI will be confirmed by ongoing O&M.

6.4 Multi-Level Subsurface Vacuum Monitoring Point Details

Four (4) additional multi-depth soil gas vacuum monitoring points will be installed to evaluate the effectiveness of the full-scale SVE system to extract soil vapors and establish air flow in surrounding soils. Vacuum monitoring point locations are shown on Figure 4. At each location, a nested pair of vacuum monitoring points will be installed in accordance with the pilot study design.

6.5 Full-Scale System Start-Up

Following the expansion of the SVE system and installation of additional vacuum monitoring points, the SVE system will be configured (*i.e.*, balanced) to operate all five extraction wells. Valves at the blower and at individual extraction wells will be used to balance flow between each extraction well. The system will be considered balanced if the flow at all extraction wells is within 20-percent of the average extraction well flow rate. Once the system is balanced, the following data will be collected:

- Time;
- Pressure and temperature at the blower;
- Flow rate, pressure, and temperature at each extraction well; and
- Vacuum at vacuum monitoring points.

6.6 Long-Term Operation and Maintenance

Full Scale SVE system Operation and Maintenance (O&M) procedures and requirements are presented in the Soil Vapor Extraction Operations, Maintenance, and Monitoring Manual included as Appendix D.

Monthly O&M activities include monthly on-site system inspections to verify that the system is operating as expected. An operation and maintenance checklist will be completed by the field technician. At a minimum, the inspection will include the following:

- Flow and pressure readings at each extraction well;
- Differential pressure between the air filter inlet and outlet;
- Pressure and temperature at the blower (*i.e.*, exhaust stack);
- Inspection of the blower and motor; and
- Inspection of system piping, fittings and supports.

Deficiencies identified during system inspections will be corrected as soon as possible, typically within 30 days of discovery.

SVE performance and O&M data will be included in the monthly update reports to USEPA. Applicable air permit data will continue be provided to RAPCA upon major system modifications, and as required.

Section 7
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Tables

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Table 1
Step-Rate Test – **RW-01**
Soil Vapor Extraction Pilot Test
Valley Pike VOC Site (Riverside, Ohio)

Monitoring Location	Distance (feet)	RW-1-1		RW-1-2		RW-1-3		RW-1-4		RW-1-5	
		Vacuum (in. H_2O)	Flow (SCFM)	Vacuum (in. H_2O)	Flow (SCFM)	Vacuum (in. H_2O)	Flow (SCFM)	Vacuum (in. H_2O)	Flow (SCFM)	Vacuum (in. H_2O)	Flow (SCFM)
Make-Up Air Setting (1)		8		4		0		6		6	
Extraction Well Valve Setting (2)		6		6		6		4		2	
Blower		27.2	524	34.0	524	40.8	524	27.2	524	54.4	88.1
RW-1	--	5.0	61.1	5.0	78.5	5.0	100.4	5.0	54.5	2.3	34.9
RW-2	27.4	--	--	--	--	--	--	--	--	--	--
RW-3	46.8	--	--	--	--	--	--	--	--	--	--
MP-1S	5.9	1.1	--	1.3	--	1.7	--	1.1	--	0.5	--
MP-1D	5.9	0.90	--	1.1	--	1.5	--	1.0	--	0.4	--
MP-2S	11.5	0.61	--	0.82	--	1.1	--	0.70	--	0.20	--
MP-2D	11.5	0.60	--	0.78	--	1.0	--	0.76	--	0.19	--
MP-3S	19.0	0.38	--	0.50	--	0.67	--	0.48	--	0.10	--
MP-3D	19.0	0.36	--	0.48	--	0.64	--	0.44	--	0.09	--
MP-4S	21.9	0.38	--	0.50	--	0.72	--	0.41	--	0.12	--
MP-4D	21.9	0.34	--	0.47	--	0.67	--	0.38	--	0.09	--
MP-5S	44.4	0.13	--	0.17	--	0.24	--	0.14	--	0.02	--
MP-5D	44.4	0.19	--	0.24	--	0.35	--	0.20	--	0.01	--
MP-6S	54.5	0.07	--	0.15	--	0.19	--	0.11	--	0.01	--
MP-6D	54.5	0.08	--	0.17	--	0.20	--	0.13	--	0.01	--

Notes

(1) Make-up air settings based on the status of the air valve located immediately upstream of the SVE blower: at 0, the make-up air valve is completely closed; at 4, the valve has been opened four complete turns; at 8, the valve has been completely open.

(2) Extraction Well valve vetting based on the butterfly shut-off valve located on each extraction well: at 0, the butterfly valve is completely closed; at 6, the valve is completely open

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Table 2

Step-Rate Test – **RW-02**
Soil Vapor Extraction Pilot Test
Valley Pike VOC Site (Riverside, Ohio)

Monitoring Location	Distance (feet)	RW-2-1		RW-2-2		RW-2-3		RW-2-4		RW-2-5		RW-2-6	
		Vacuum (in. H_2O)	Flow (SCFM)	Vacuum (in. H_2O)	Flow (SCFM)	Vacuum (in. H_2O)	Flow (SCFM)	Vacuum (in. H_2O)	Flow (SCFM)	Vacuum (in. H_2O)	Flow (SCFM)	Vacuum (in. H_2O)	Flow (SCFM)
Make-Up Air Setting (1)		8		4		0		6		6		5	
Extraction Well Valve Setting (2)		6		6		6		6		4		2	
Blower		27.2	523.6	27.2	523.6	34.0	523.6	20.4	523.6	27.2	99.5	40.8	72.9
RW-1	27.4	--	--	--	--	--	--	--	--	--	--	--	--
RW-2	--	4.3	62.8	5.0	80.3	5.0	102.5	3.7	63.3	2.7	35.8	1.0	22.7
RW-3	21.3	--	--	--	--	--	--	--	--	--	--	--	--
MP-1S	34.7	0.4	--	0.5	--	0.5	--	0.4	--	0.2	--	0.2	--
MP-1D	34.7	0.34	--	0.43	--	0.48	--	0.31	--	0.22	--	0.14	--
MP-2S	31.1	0.25	--	0.32	--	0.35	--	0.18	--	0.14	--	0.02	--
MP-2D	31.1	0.34	--	0.45	--	0.50	--	0.28	--	0.28	--	0.06	--
MP-3S	11.1	0.48	--	0.64	--	0.70	--	0.42	--	0.31	--	0.11	--
MP-3D	11.1	0.83	--	1.10	--	1.25	--	0.75	--	0.57	--	0.23	--
MP-4S	10.0	0.58	--	0.76	--	0.96	--	0.51	--	0.38	--	0.16	--
MP-4D	10.0	0.80	--	1.00	--	1.20	--	0.73	--	0.57	--	0.23	--
MP-5S	25.7	0.29	--	0.35	--	0.45	--	0.24	--	0.16	--	0.06	--
MP-5D	10.0	0.43	--	0.57	--	0.73	--	0.39	--	0.27	--	0.10	--
MP-6S	28.2	0.29	--	0.35	--	0.44	--	0.23	--	0.16	--	0.04	--
MP-6D	28.2	0.32	--	0.39	--	0.48	--	0.29	--	0.18	--	0.07	--

Notes

(1) Make-up air settings based on the status of the air valve located immediately upstream of the SVE blower: at 0, the make-up air valve is completely closed; at 4, the valve has been opened four complete turns; at 8, the valve has been completely open.

(2) Extraction Well valve vetting based on the butterfly shut-off valve located on each extraction well: at 0, the butterfly valve is completely closed; at 6, the valve is completely open

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Table 3
Step-Rate Test – **RW-03**
Soil Vapor Extraction Pilot Test
Valley Pike VOC Site (Riverside, Ohio)

Monitoring Location	Distance (feet)	**RW-3-1**		**RW-3-2**		**RW-3-3**		**RW-3-4**		**RW-3-5**		**RW-3-6**	
		Vacuum (in. H_2O)	Flow (SCFM)	Vacuum (in. H_2O)	Flow (SCFM)	Vacuum (in. H_2O)	Flow (SCFM)	Vacuum (in. H_2O)	Flow (SCFM)	Vacuum (in. H_2O)	Flow (SCFM)	Vacuum (in. H_2O)	Flow (SCFM)
Make-Up Air Setting (1)		8		4		0		6		6		5	
Extraction Well Valve Setting (2)		6		6		6		6		4		2	
Blower		27.2	523.6	40.8	523.6	54.4	523.6	81.7	523.6	40.8	349.1	20.4	506.1
RW-1	46.8	--	--	--	--	--	--	--	--	--	--	--	--
RW-2	21.3	--	--	--	--	--	--	--	--	--	--	--	--
RW-3	--	5.0	392.7	5.0	506.1	5.0	240.0	5.0	458.1	1.5	174.5	4.5	218.2
MP-1S	53.4	0.32	--	0.36	--	0.32	--	0.23	--	0.08	--	0.17	--
MP-1D	53.4	0.30	--	0.36	--	0.30	--	0.21	--	0.07	--	0.17	--
MP-2S	46.0	0.19	--	0.28	--	0.22	--	0.15	--	0.00	--	0.08	--
MP-2D	46.0	0.28	--	0.38	--	0.30	--	0.20	--	0.00	--	0.13	--
MP-3S	34.9	DNM	--	DNM	--	DNM	--	DNM	--	DNM	--	DNM	--
MP-3D	34.9		--		--		--		--		--		--
MP-4S	23.6	0.42	--	0.54	--	0.50	--	0.26	--	0.04	--	0.25	--
MP-4D	23.6	0.54	--	0.70	--	0.60	--	0.39	--	0.07	--	0.34	--
MP-5S	14.6	0.50	--	0.64	--	0.56	--	0.40	--	0.10	--	0.36	--
MP-5D	14.6	0.82	--	1.00	--	0.90	--	0.64	--	0.17	--	0.56	--
MP-6S	8.3	0.89	--	1.10	--	1.00	--	0.70	--	0.20	--	0.54	--
MP-6D	8.3	0.94	--	1.20	--	1.10	--	0.76	--	0.18	--	0.60	--

Notes

(1) Make-up air settings based on the status of the air valve located immediately upstream of the SVE blower: at 0, the make-up air valve is completely closed; at 4, the valve has been opened four complete turns; at 8, the valve has been completely open.

(2) Extraction Well valve vetting based on the butterfly shut-off valve located on each extraction well: at 0, the butterfly valve is completely closed; at 6, the valve is completely open

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Table 4

Constant Rate Test
Soil Vapor Extraction Pilot Test
Valley Pike VOC Site (Riverside, Ohio)

Extraction Well	Calculated Radius of Influence (1)					
	Flow Rate (scfm)	ROI (feet)	Flow Rate (scfm)	ROI (feet)	Flow Rate (scfm)	ROI (feet)
RW-01	61.1	46.3	78.5	50.1	100.4	51.2
RW-02	62.8	46.5	80.3	47.2	102.5	46.6
RW-03	240.0	59.1	392.7	59.2	506.1	60.7

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Table 5

Constant Rate Test

Soil Vapor Extraction Pilot Test

Valley Pike VOC Site (Riverside, Ohio)

Monitoring Location	CR-1				CR-2				CR-3			
	Valve Setting (1)(2)	Vacuum (in-H$_2$0)	Flow (SCFM)	PID (PPM)	Valve Setting (1)(2)	Vacuum (in-H$_2$0)	Flow (SCFM)	PID (PPM)	Valve Setting (1)(2)	Vacuum (in-H$_2$0)	Flow (SCFM)	PID (PPM)
Blower	8	17.69	523.6	--	5.5	27.22	523.6	--	7.5	30.62	523.6	--
RW-1	2	1.30	26.2	DNM	2	0.50	6.8	0.5	2	0.60	78.5	0.9
RW-2	2	2.00	14.0	1.7	2	3.60	19.6	4.0	2	4.30	226.9	15.3
RW-3	6	1.90	10.1	11.0	6	3.60	16.6	28.0	6	4.20	209.4	21.0
MP-1S	--	0.40	--	--	--	0.44	--	--	--	0.54	--	--
MP-1D	--	0.30	--	--	--	0.41	--	--	--	0.50	--	--
MP-2S	--	0.40	--	--	--	0.31	--	--	--	0.40	--	--
MP-2D	--	0.46	--	--	--	0.42	--	--	--	0.50	--	--
MP-3S	--	0.39	--	--	--	0.49	--	--	--	0.68	--	--
MP-3D	--	0.62	--	--	--	0.98	--	--	--	1.05	--	--
MP-4S	--	0.46	--	--	--	0.65	--	--	--	0.79	--	--
MP-4D	--	0.61	--	--	--	0.87	--	--	--	1.05	--	--
MP-5S	--	0.30	--	--	--	0.50	--	--	--	0.59	--	--
MP-5D	--	0.49	--	--	--	0.79	--	--	--	0.80	--	--
MP-6S	--	0.39	--	--	--	0.63	--	--	--	0.78	--	--
MP-6D	--	0.41	--	--	--	0.66	--	--	--	0.81	--	--

Notes

(1) Make-up air settings based on the status of the air valve located immediately upstream of the SVE blower: at 0, the make-up air valve is completely closed; at 4, the valve has been opened four complete turns; at 8, the valve has been completely open.

(2) Extraction Well valve vetting based on the butterfly shut-off valve located on each extraction well: at 0, the butterfly valve is completely closed; at 6, the valve is completely open

DNM: Did not measure

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Table 6

Summary of Pilot Test Performance Data
Soil Vapor Extraction Pilot Test
Valley Pike VOC Site (Riverside, Ohio)

Analyte	Units	RW-01		RW-02		RW-03		BLOWER-IN (pre-Carbon)		BLOWER-OUT (post-Carbon)	
		2/5/2016	3/3/2016	2/5/2016	3/3/2016	2/5/2016	3/3/2016	2/5/2016	3/3/2016	2/5/2016	3/3/2016
Tetrachloroethene	(ppm-v)	**0.230**	**0.016**	**1.30**	**0.170**	**17**	**3.00**	**4.50**	**1.10**	**0.130**	**0.067**
Trichloroethene	(ppm-v)	**0.160**	**0.120**	**0.710**	**0.980**	**15**	**2.80**	**6.50**	**1.20**	ND	**0.001**
cis -1,2 Dichloroethene	(ppm-v)	ND	ND	**0.004**	ND	ND	ND	ND	ND	ND	ND
trans -1,2 Dichloroethene	(ppm-v)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	(ppm-v)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes
ppm-V: parts per million by volume
ND: COC not detected above laboratory reporting limits

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Table 7
Summary of Pilot Test VOC / HAP Emissions
Soil Vapor Extraction Pilot Test
Valley Pike VOC Site (Riverside, Ohio)

Chemical / Sample ID	CAS No.	Period 1: beginning of test to 2/25/16*			Period 2: 2/26/16 to end of test*			lbs/pilot test
		Concentration (µg/m$^{3)}$	hours	lb/period	Concentration (µg/m$^{3)}$	hours	lb/period	
Tetrachlorethene	127-18-4	**900**	708	1.25	**5.4**	840	8.90E-03	1.26
Trichloroethene	79-01-6	**360**	708	0.50	**3.4**	840	5.60E-03	0.51
cis-1,2-dichloroethene	156-59-2	*3.2*	708	4.44E-03	*3.2*	840	5.27E-03	9.72E-03
trans-1,2-dichloroethene	951-86-0	*3.2*	708	4.44E-03	*3.2*	840	5.27E-03	9.72E-03
Vinyl chloride	75-01-4	*2.0*	708	2.78E-03	*1.0*	840	1.65E-03	4.42E-03

Total VOCs:	1.79
Total HAPs:	**1.77**

Notes

🟩 indicates chemical is defined as a hazardous air pollutant (HAP)

bold font indicates actual data from laboratory analysis of samples taken 2/5/16 or 3/3/16

italic font detection limit where there was no detects from laboratory analysis of samples taken 2/5/16 or 3/3/16

* Period 1 is the first 708 hours of system operation from system startup on 1/27/16 to 2/25/2016. Emissions are calculated for this period using the data from sampling condu
Period 2 is the time from 2/26/2016 to the end of the pilot test on 3/31/2016 during which the system operated for 840 hours. Emissions are calculated for this period using the data from sampling conducted on 3/3/2016.

Calculations:

E system air flow (based on blower capacity) = 523.6 cfm
890 m^3/hr [= ft^3/min x 0.0283168 m^3/ft^3 x 60 min/hr]

Emission rate (lb/period) = Concentration, µg/m3 x 890 m3/hr air flow x 1 gram / 1,000,000 µg x 1 lb/453.6 grams x hours/period

Figures

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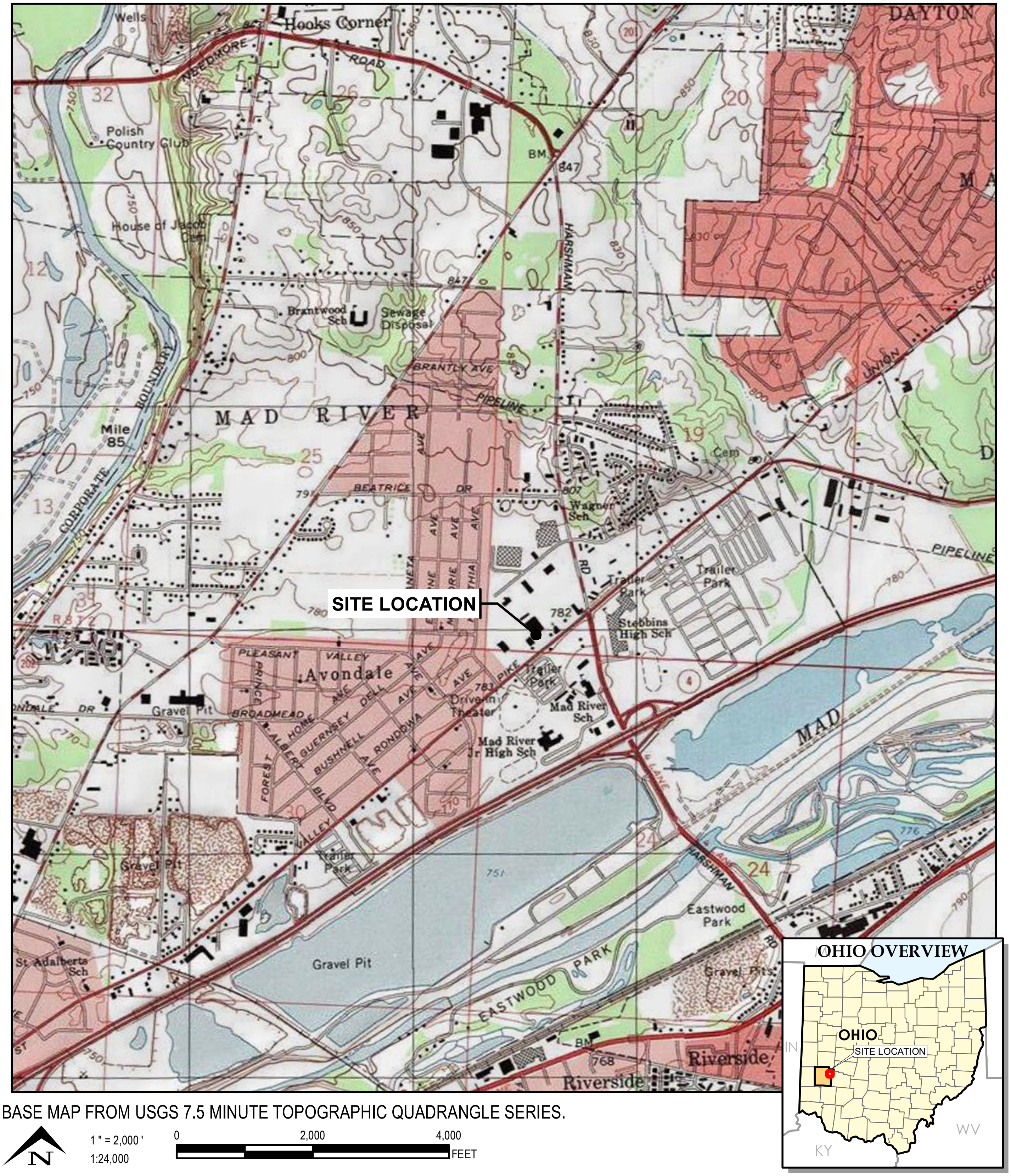

BASE MAP FROM USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE SERIES.

TRC

921 Eastwind Drive
Suite 122
Westerville, OH 43081
Phone: 614.423.6334

TRC - GIS

PROJECT:

VALLEY PIKE SITE
FINAL SVE DESIGN
2949 VALLEY PIKE
RIVERSIDE, MONTGOMERY COUNTY, OHIO

TITLE:

SITE LOCATION MAP

DRAWN BY:	J PAPEZ
CHECKED BY:	
APPROVED BY:	
DATE:	JULY 2016
PROJ. NO.:	243854
FILE:	243854-001slmSVE.mxd

FIGURE 1

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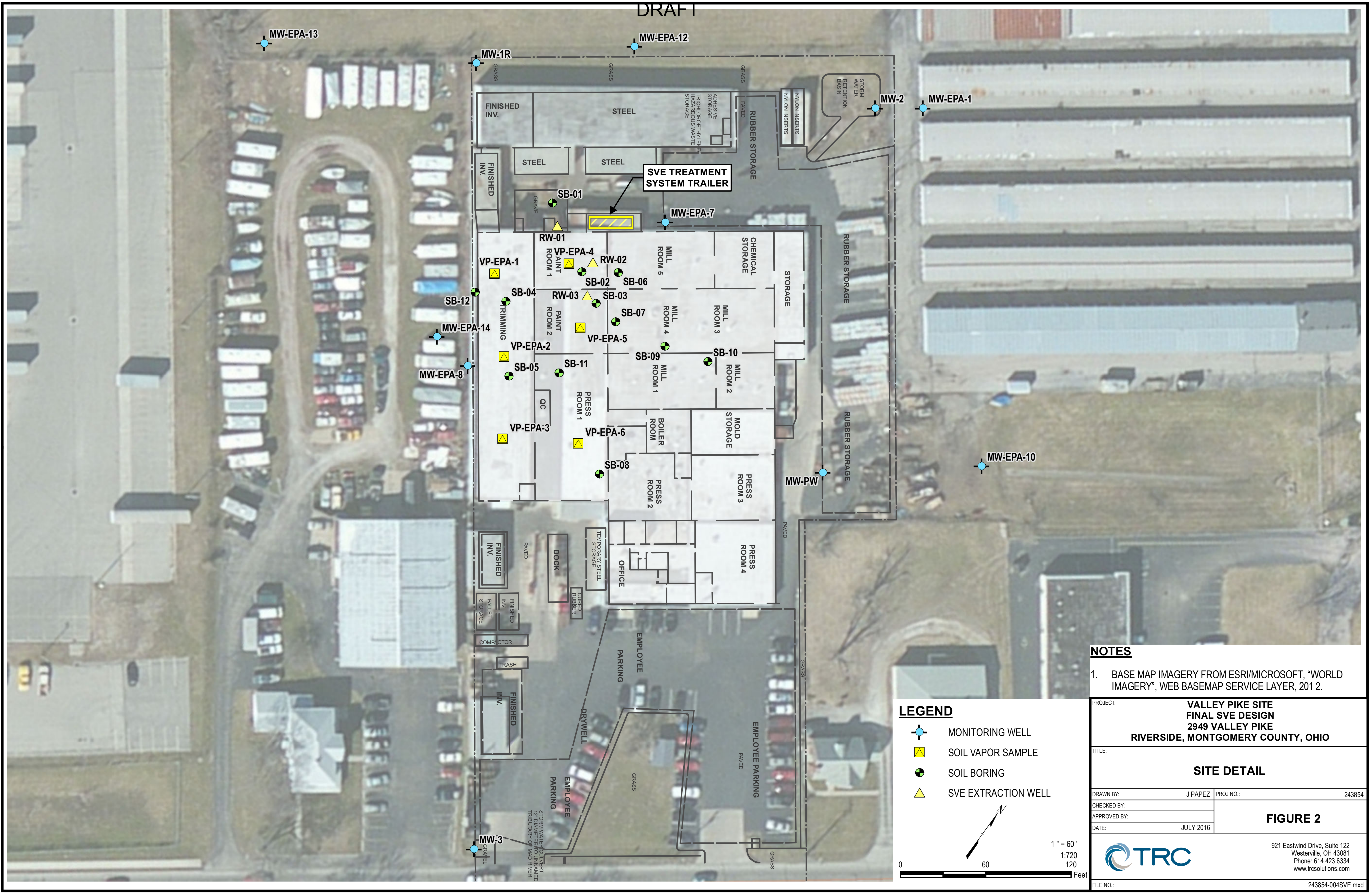

NOTES

1. BASE MAP IMAGERY FROM ESRI/MICROSOFT, "WORLD IMAGERY", WEB BASEMAP SERVICE LAYER, 201 2.

PROJECT:

VALLEY PIKE SITE
FINAL SVE DESIGN
2949 VALLEY PIKE
RIVERSIDE, MONTGOMERY COUNTY, OHIO

TITLE:

SITE DETAIL

DRAWN BY: J PAPEZ
PROJ NO.: 243854
CHECKED BY:
APPROVED BY:
DATE: JULY 2016

FIGURE 2

TRC
921 Eastwind Drive, Suite 122
Westerville, OH 43081
Phone: 614.423.6334
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FILE NO.: 243854-004SVE.mxd

Coordinate System: NAD 1983 StatePlane Ohio South FIPS 3402 Feet (Foot US)
Map Rotation: -36

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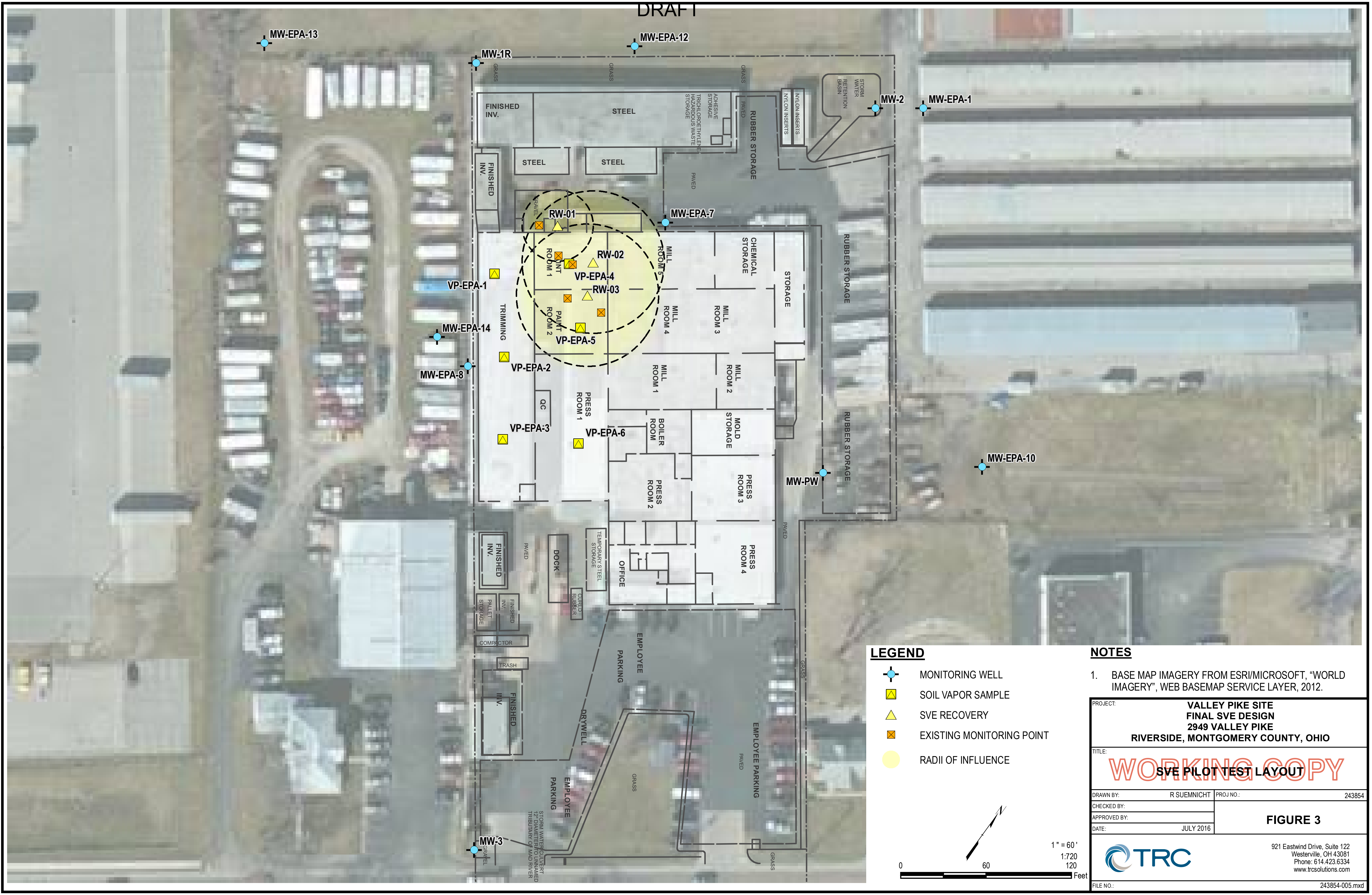
DRAFT



LEGEND

⊕ MONITORING WELL

△ SOIL VAPOR SAMPLE

△ SVE RECOVERY

☒ EXISTING MONITORING POINT

● RADII OF INFLUENCE

NOTES

1. BASE MAP IMAGERY FROM ESRI/MICROSOFT, "WORLD IMAGERY", WEB BASEMAP SERVICE LAYER, 2012.

PROJECT:
VALLEY PIKE SITE
FINAL SVE DESIGN
2949 VALLEY PIKE
RIVERSIDE, MONTGOMERY COUNTY, OHIO

TITLE:
SVE PILOT TEST LAYOUT

WORKING COPY

DRAWN BY:	R SUEMNICHT	PROJ NO.:	243854
CHECKED BY:		**FIGURE 3**	
APPROVED BY:			
DATE:	JULY 2016		

TRC

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Westerville, OH 43081
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FILE NO.: 243854-005.mxd

Coordinate System: NAD 1983 StatePlane Ohio South FIPS 3402 Feet (Foot US)
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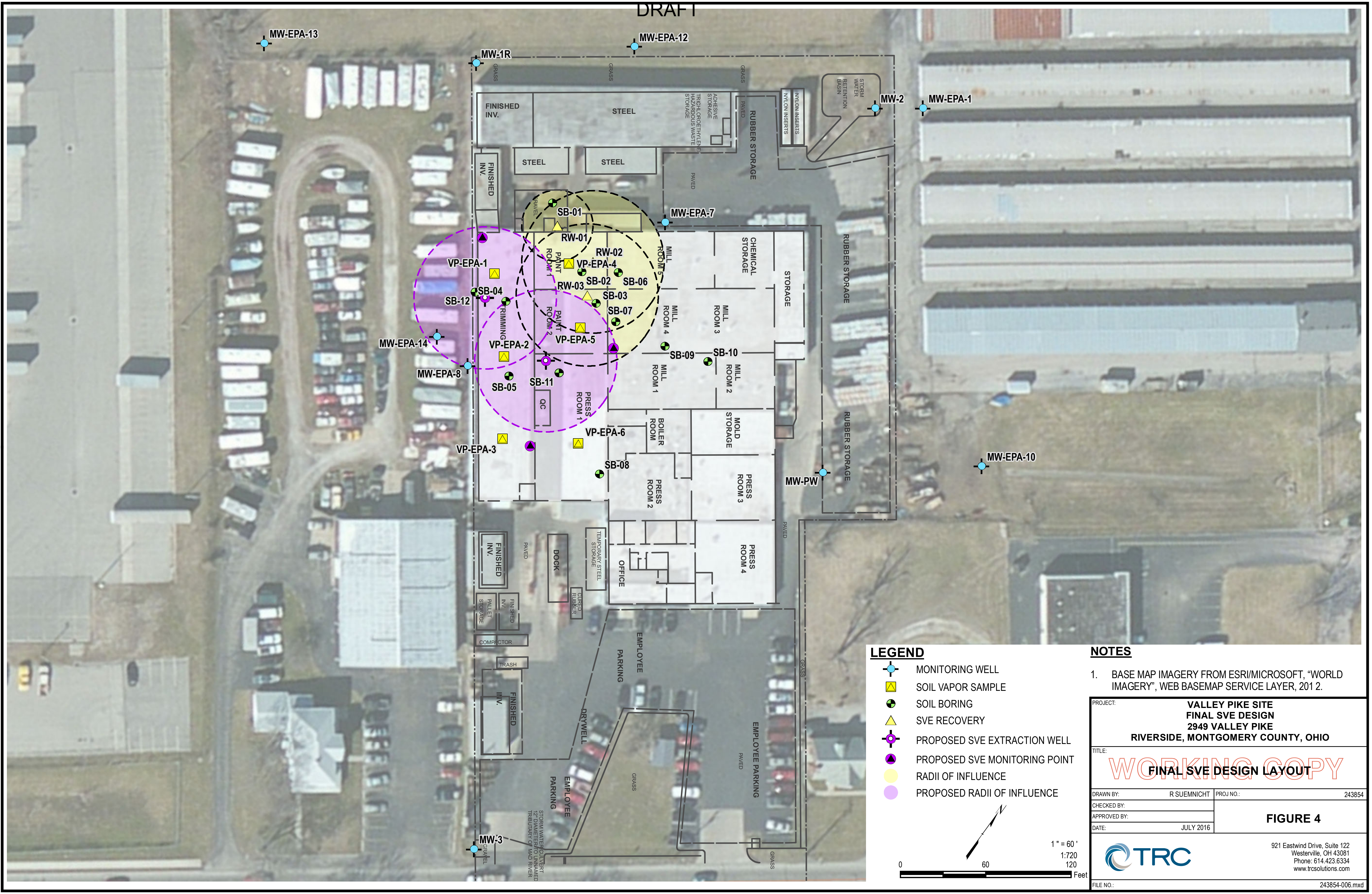

LEGEND

⌖	MONITORING WELL
△	SOIL VAPOR SAMPLE
◕	SOIL BORING
△	SVE RECOVERY
⊙	PROPOSED SVE EXTRACTION WELL
▲	PROPOSED SVE MONITORING POINT
●	RADII OF INFLUENCE
●	PROPOSED RADII OF INFLUENCE

NOTES

1. BASE MAP IMAGERY FROM ESRI/MICROSOFT, “WORLD IMAGERY”, WEB BASEMAP SERVICE LAYER, 201 2.

PROJECT:
VALLEY PIKE SITE
FINAL SVE DESIGN
2949 VALLEY PIKE
RIVERSIDE, MONTGOMERY COUNTY, OHIO

TITLE:
FINAL SVE DESIGN LAYOUT

DRAWN BY:	R SUEMNICHT	PROJ NO.:	243854
CHECKED BY:		**FIGURE 4**	
APPROVED BY:			
DATE:	JULY 2016		

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FILE NO.: 243854-006.mxd

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Map Rotation: -36

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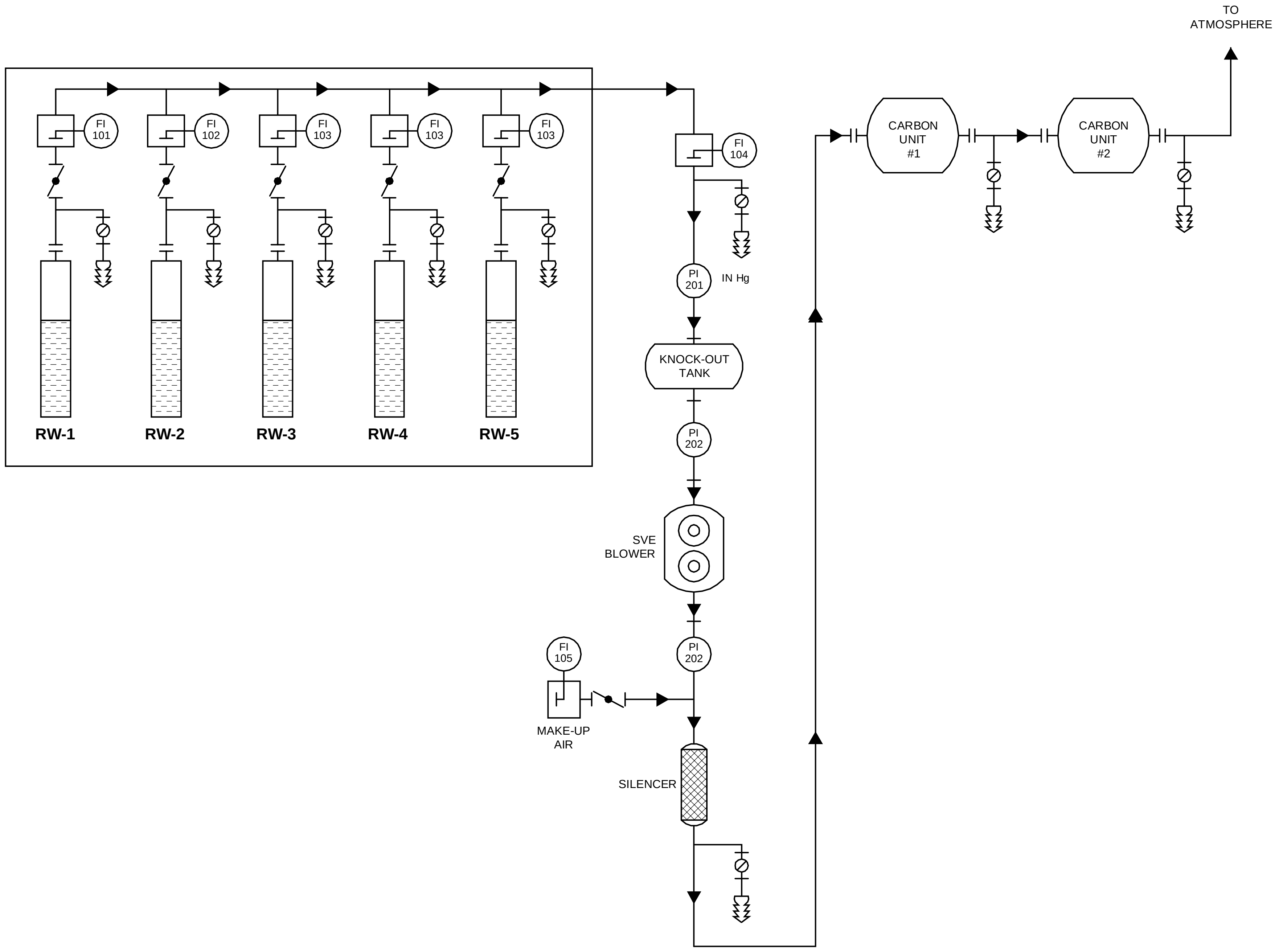

LEGEND

	BUTTERFLY VALVE
	BALL VALVE
	SAMPLE COLLECTION PORT
PI 202	PRESSURE INDICATOR
FI 105	FLOW RATE MEASUREMENT PORT
=	FLANGE OR UNION CONNECTION
	SVE PILOT SYSTEM EXTRACTION WELL

PROJECT:
VALLEY PIKE SITE
2949 VALLEY PIKE
RIVERSIDE, MONTGOMERY COUNTY, OHIO

TITLE:
SVE TREATMENT SYSTEM
PIPING AND INSTRUMENTATION DIAGRAM

DRAWN BY: DSTEHLE	SCALE:		PROJ. NO. 243854.0000.04.02
CHECKED BY: AJD/DK	AS INDICATED		FILE NO. 243854.0000.04.02.03.dwg
APPROVED BY: -	DATE PRINTED:		**FIGURE 5**
DATE: JULY 2016			

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Charts

Chart 5-2
RW-03 at ~506 CFM

Chart 5-3
RW-03 at ~240 CFM

Chart 5-4
RW-03 at ~458 CFM

Chart 5-5
RW-03 at ~174 CFM

Chart 5-6
SVE-1 at ~218 CFM

Chart 6
Vacuum vs. Flow at RW-03

Chart 7
Observed Air Flow During Constant Rate Test

Chart 8
Observed Vacuum During Constant Rate Test

DRAFT

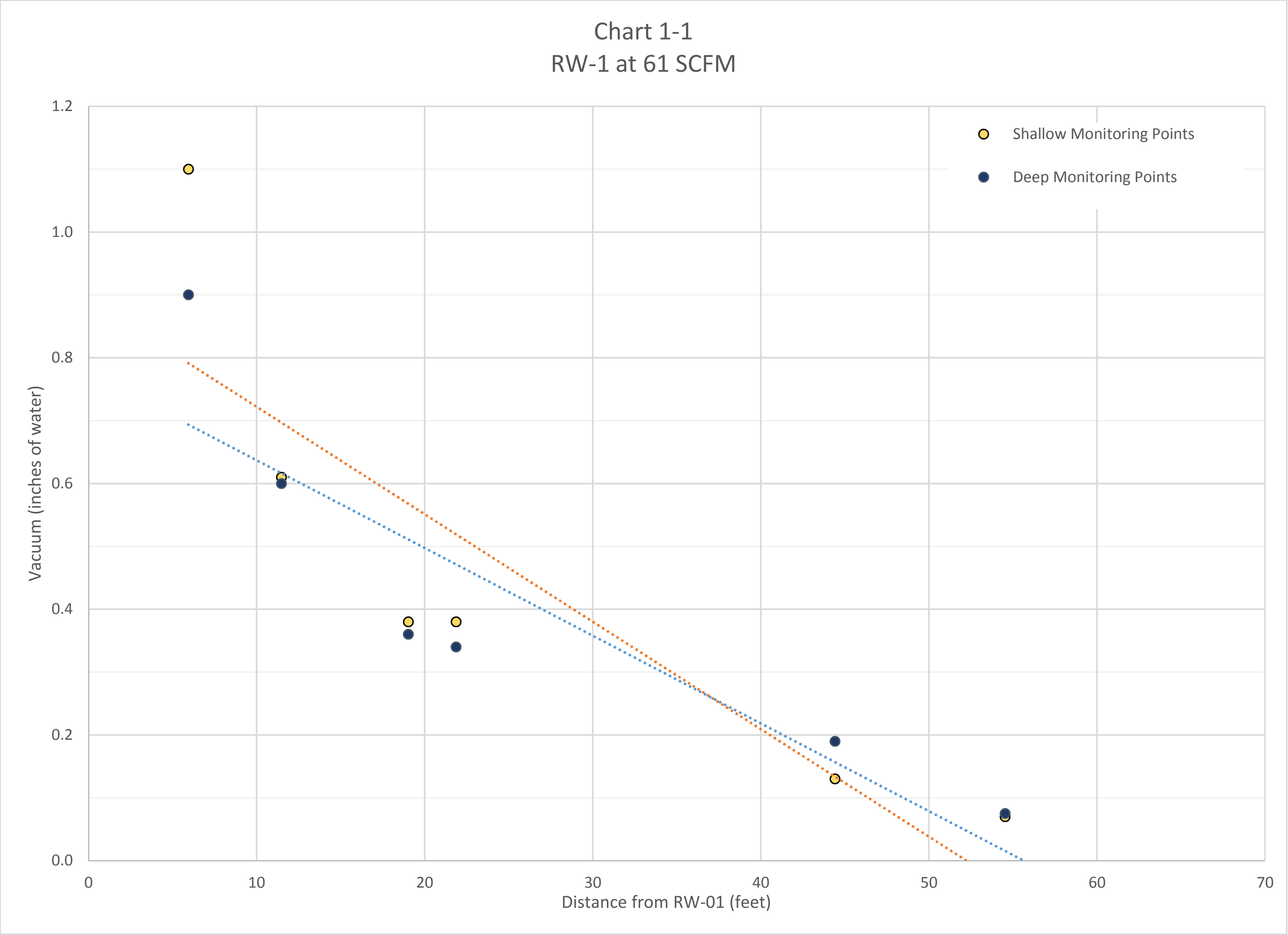

Chart 1-1
RW-1 at 61 SCFM
Vacuum (inches of water)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
10
20
30
40
50
60
70
Distance from RW-01 (feet)
Shallow Monitoring Points
Deep Monitoring Points

DRAFT

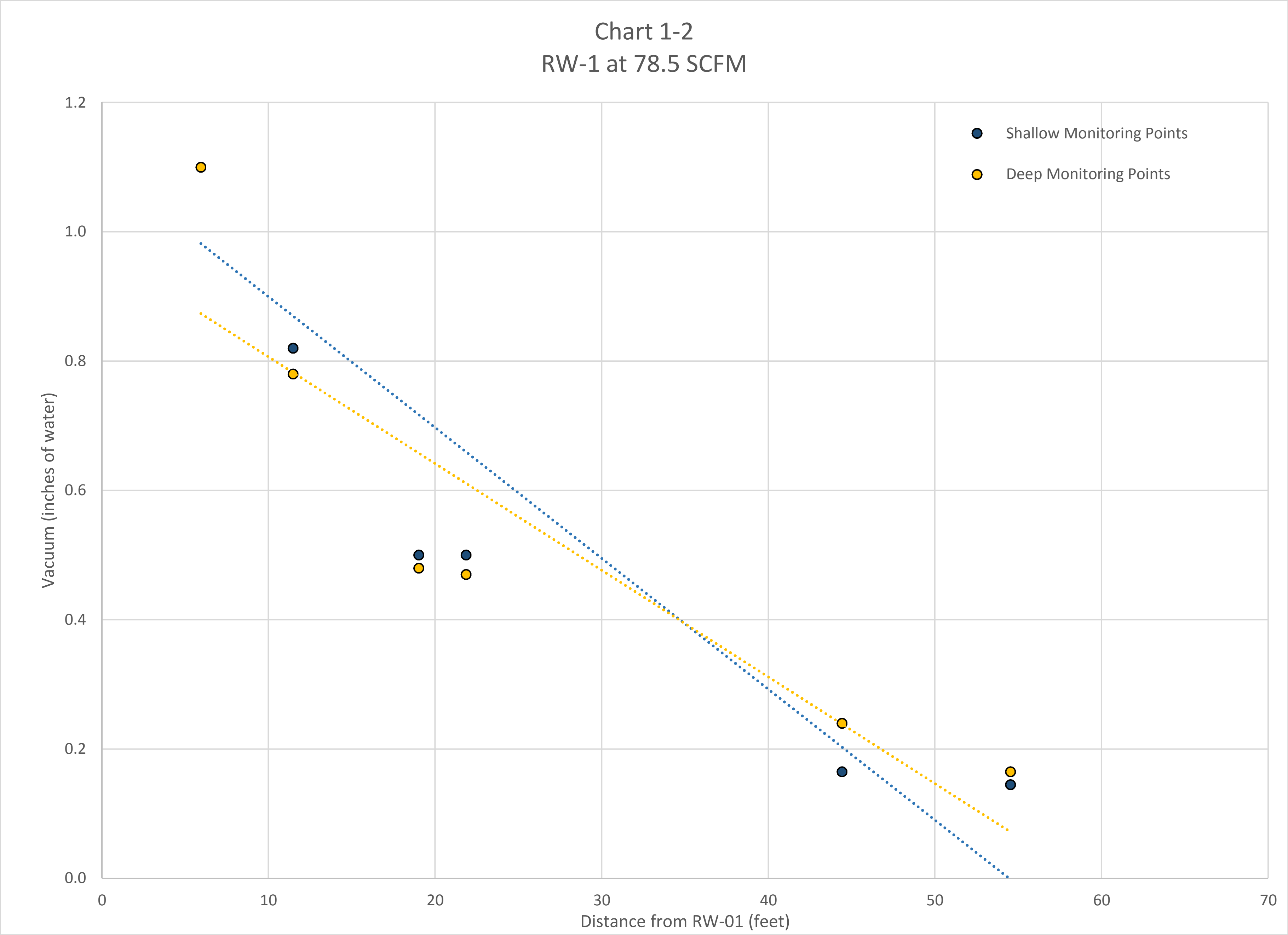
Chart 1-2
RW-1 at 78.5 SCFM
Shallow Monitoring Points
Deep Monitoring Points
Vacuum (inches of water)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
10
20
30
40
50
60
70
Distance from RW-01 (feet)

DRAFT

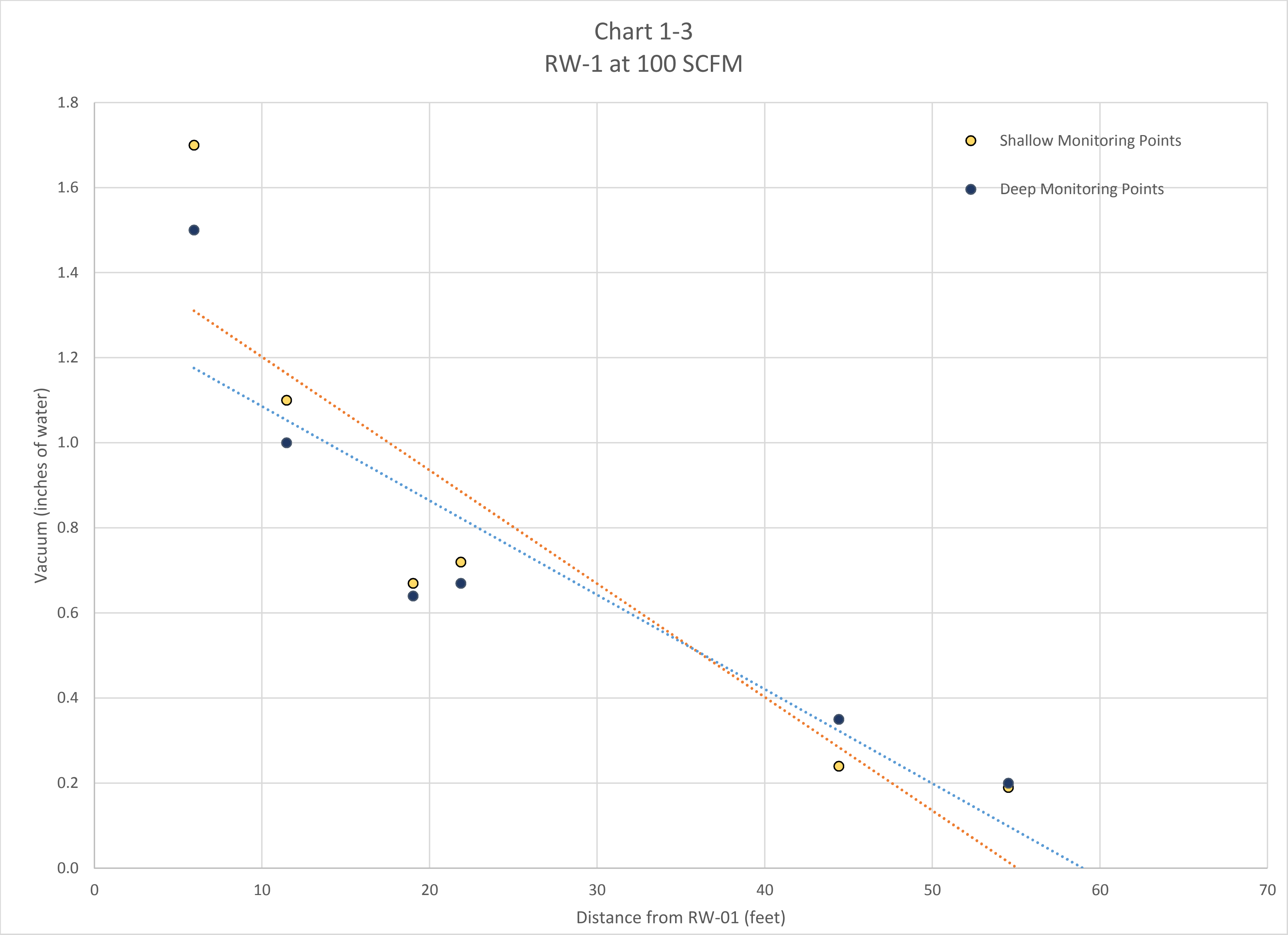
Chart 1-3
RW-1 at 100 SCFM
Vacuum (inches of water)
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
10
20
30
40
50
60
70
Distance from RW-01 (feet)
Shallow Monitoring Points
Deep Monitoring Points

DRAFT

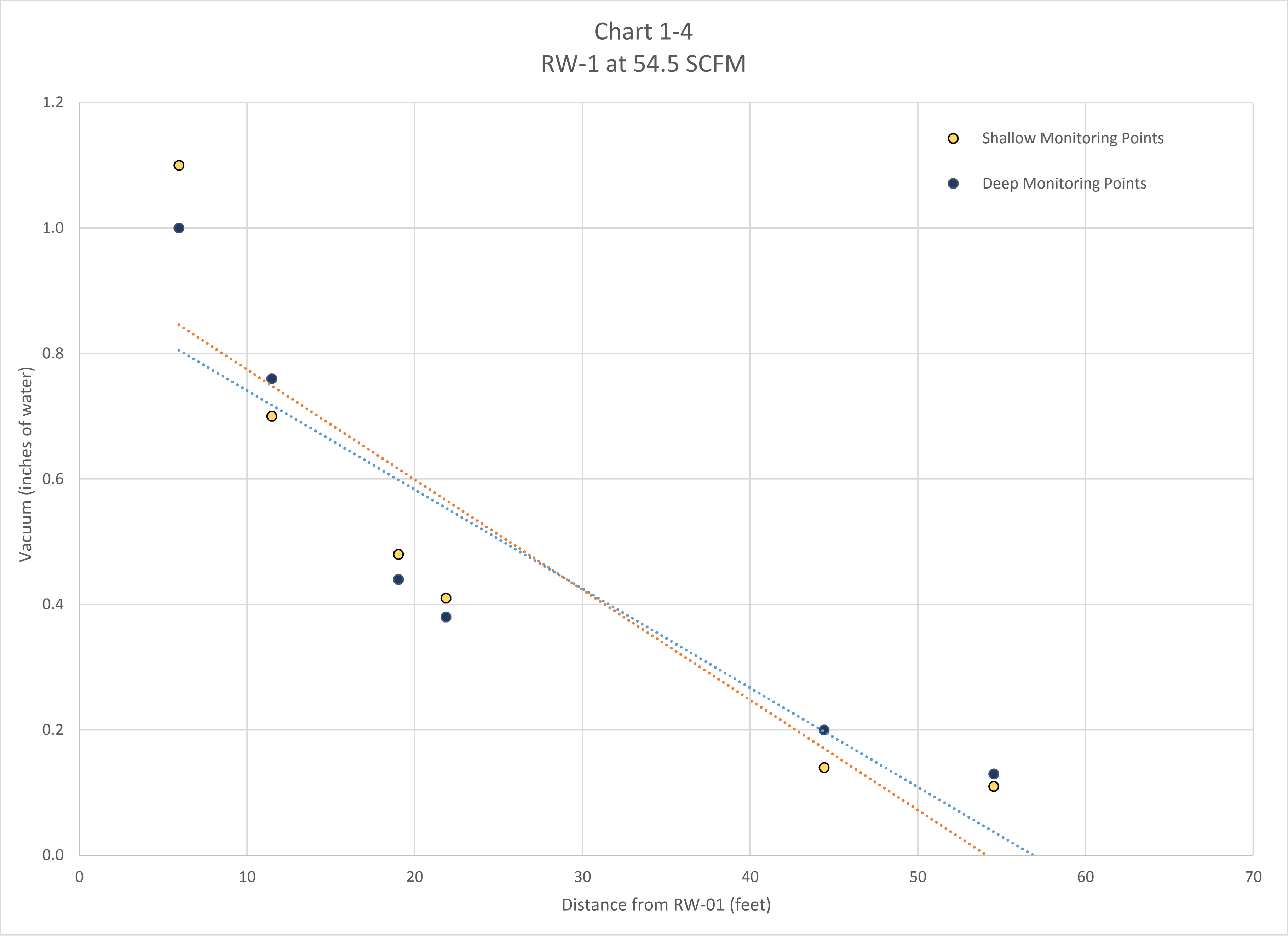
Chart 1-4
RW-1 at 54.5 SCFM
Vacuum (inches of water)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
10
20
30
40
50
60
70
Distance from RW-01 (feet)
Shallow Monitoring Points
Deep Monitoring Points

DRAFT

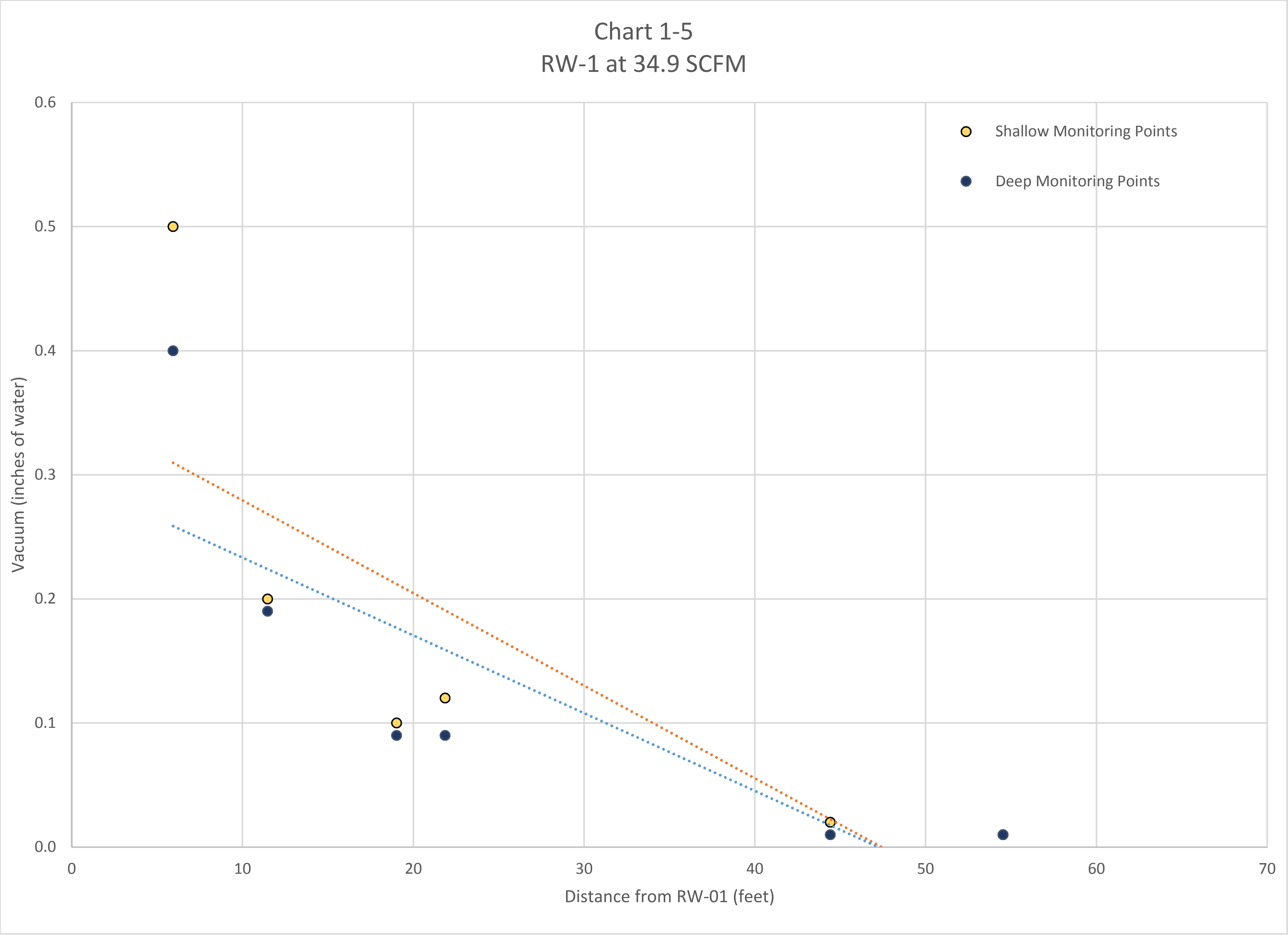
Chart 1-5
RW-1 at 34.9 SCFM
0.6
0.5
0.4
0.3
0.2
0.1
0.0
Vacuum (inches of water)
0
10
20
30
40
50
60
70
Distance from RW-01 (feet)
Shallow Monitoring Points
Deep Monitoring Points

DRAFT

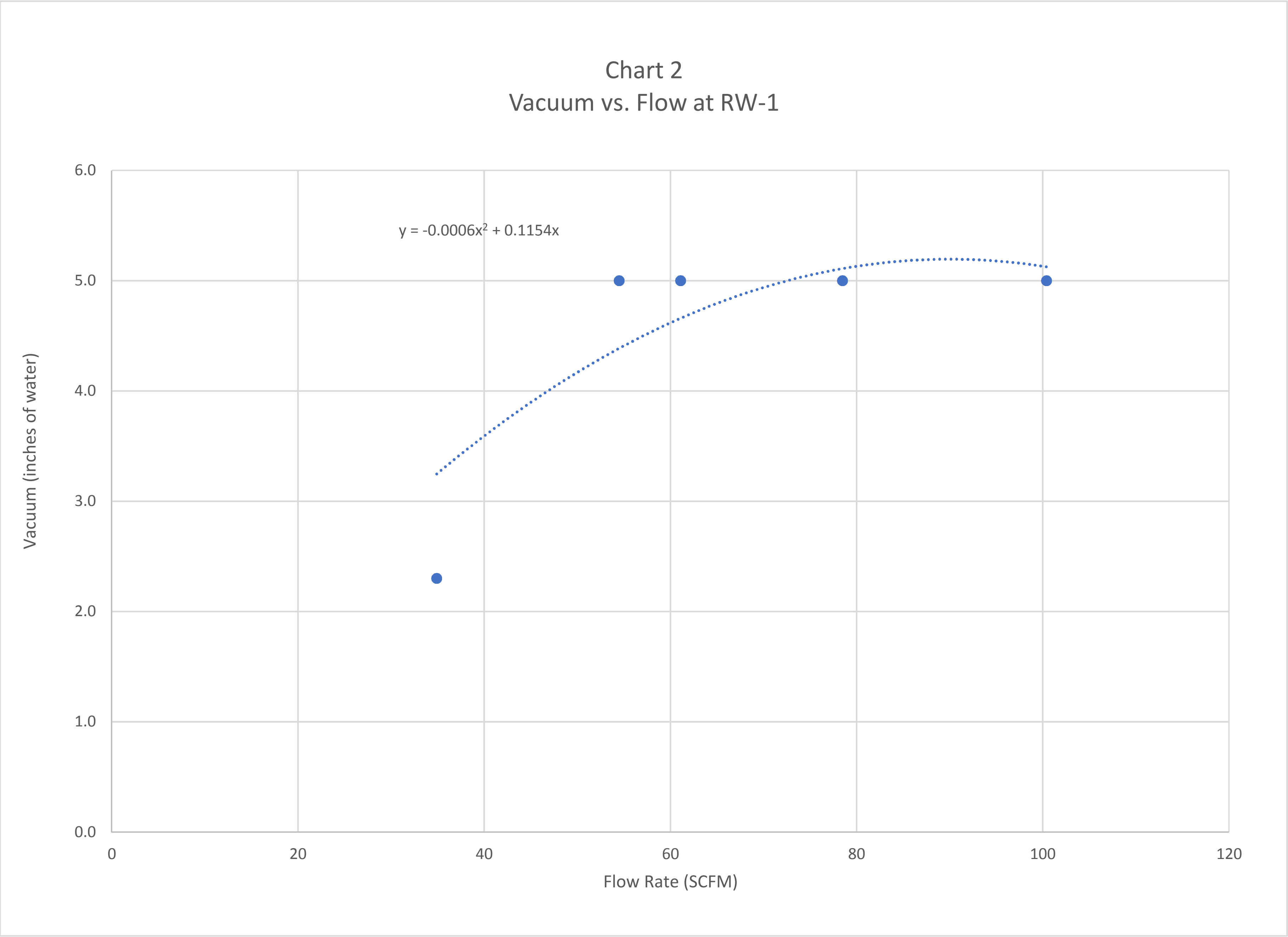

Chart 2

Vacuum vs. Flow at RW-1

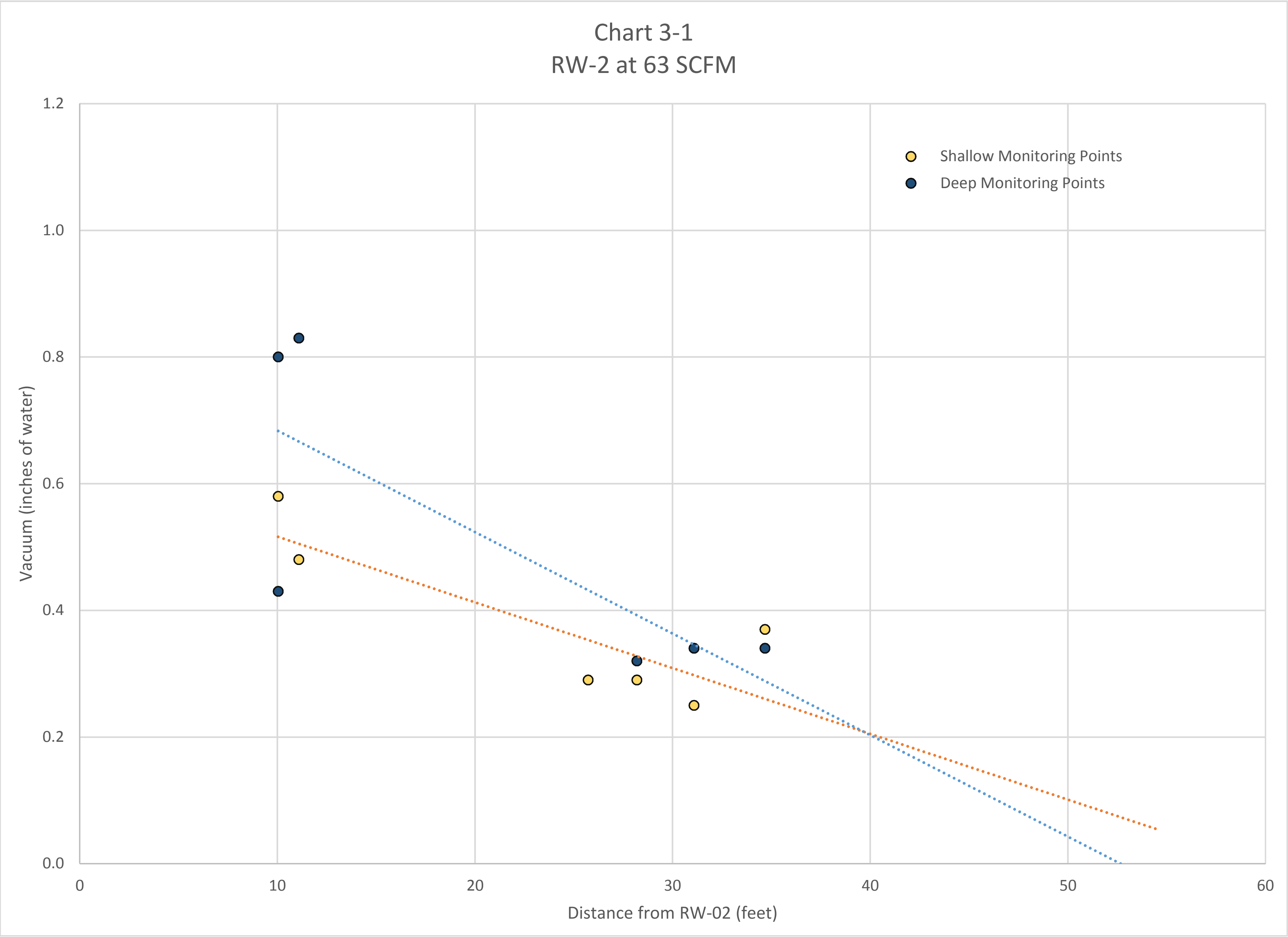

Chart 3-1

RW-2 at 63 SCFM

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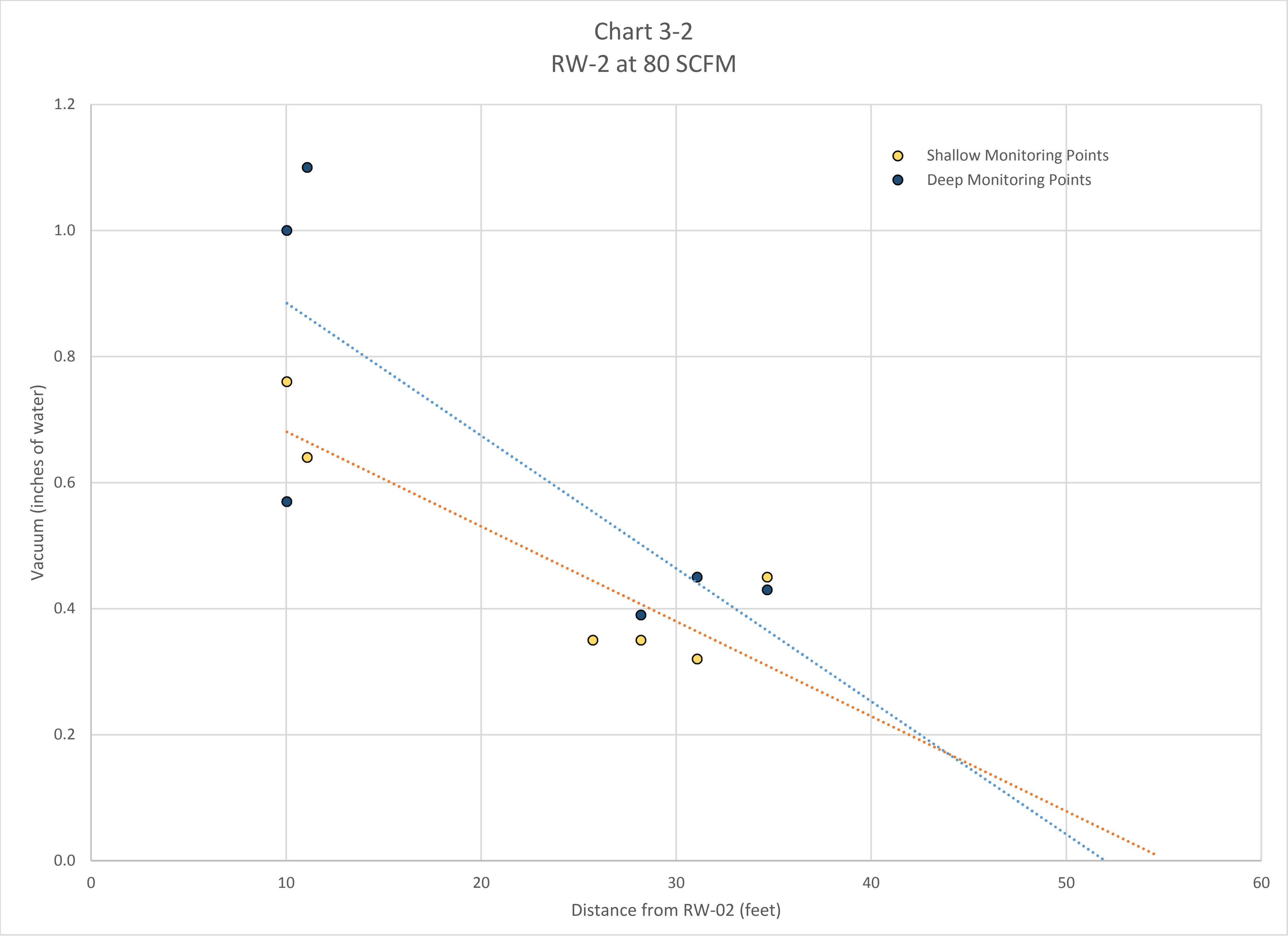
Chart 3-2
RW-2 at 80 SCFM
Shallow Monitoring Points
Deep Monitoring Points
Vacuum (inches of water)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
10
20
30
40
50
60
Distance from RW-02 (feet)

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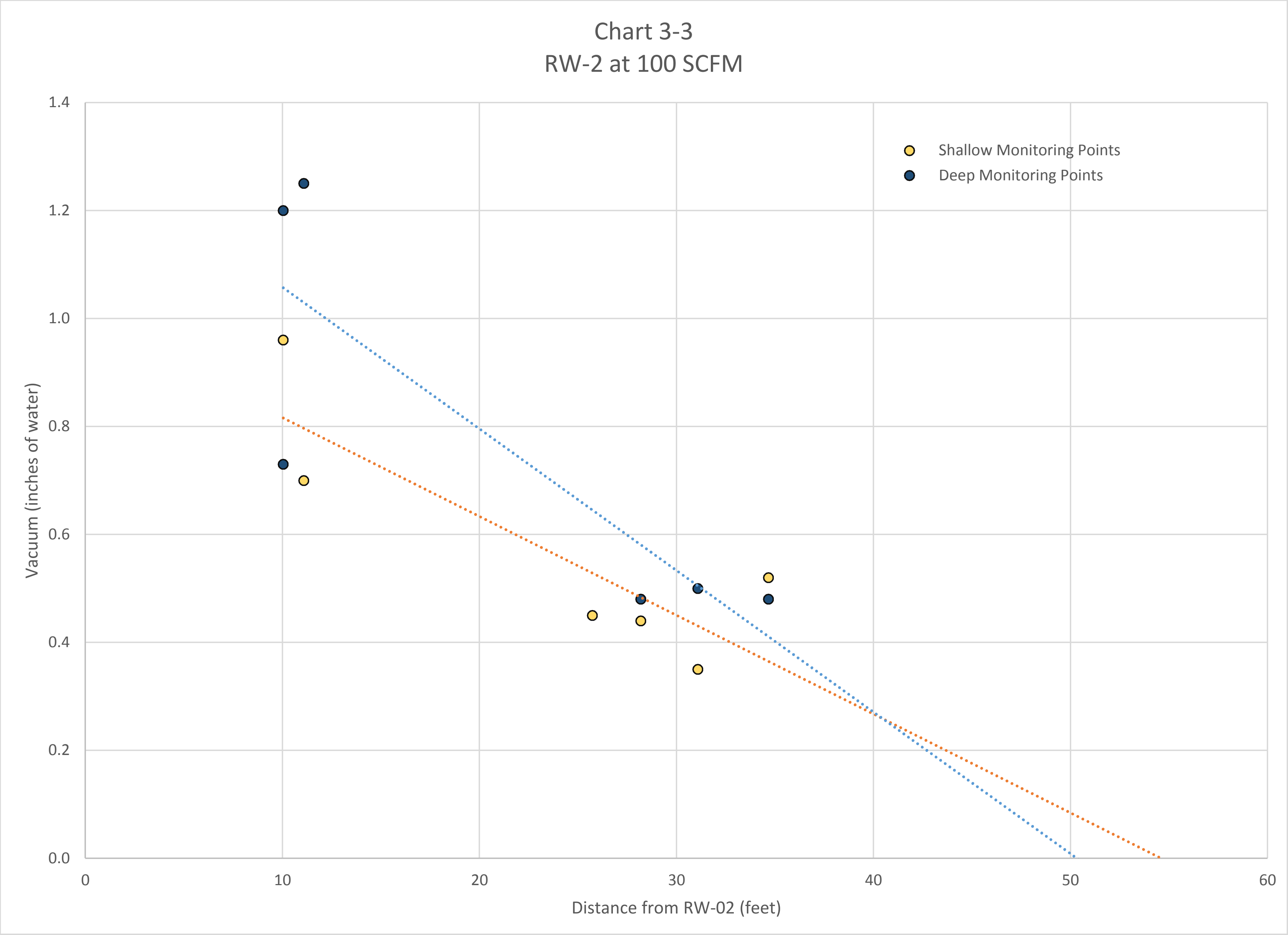
Chart 3-3
RW-2 at 100 SCFM
Shallow Monitoring Points
Deep Monitoring Points
Vacuum (inches of water)
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
10
20
30
40
50
60
Distance from RW-02 (feet)

DRAFT

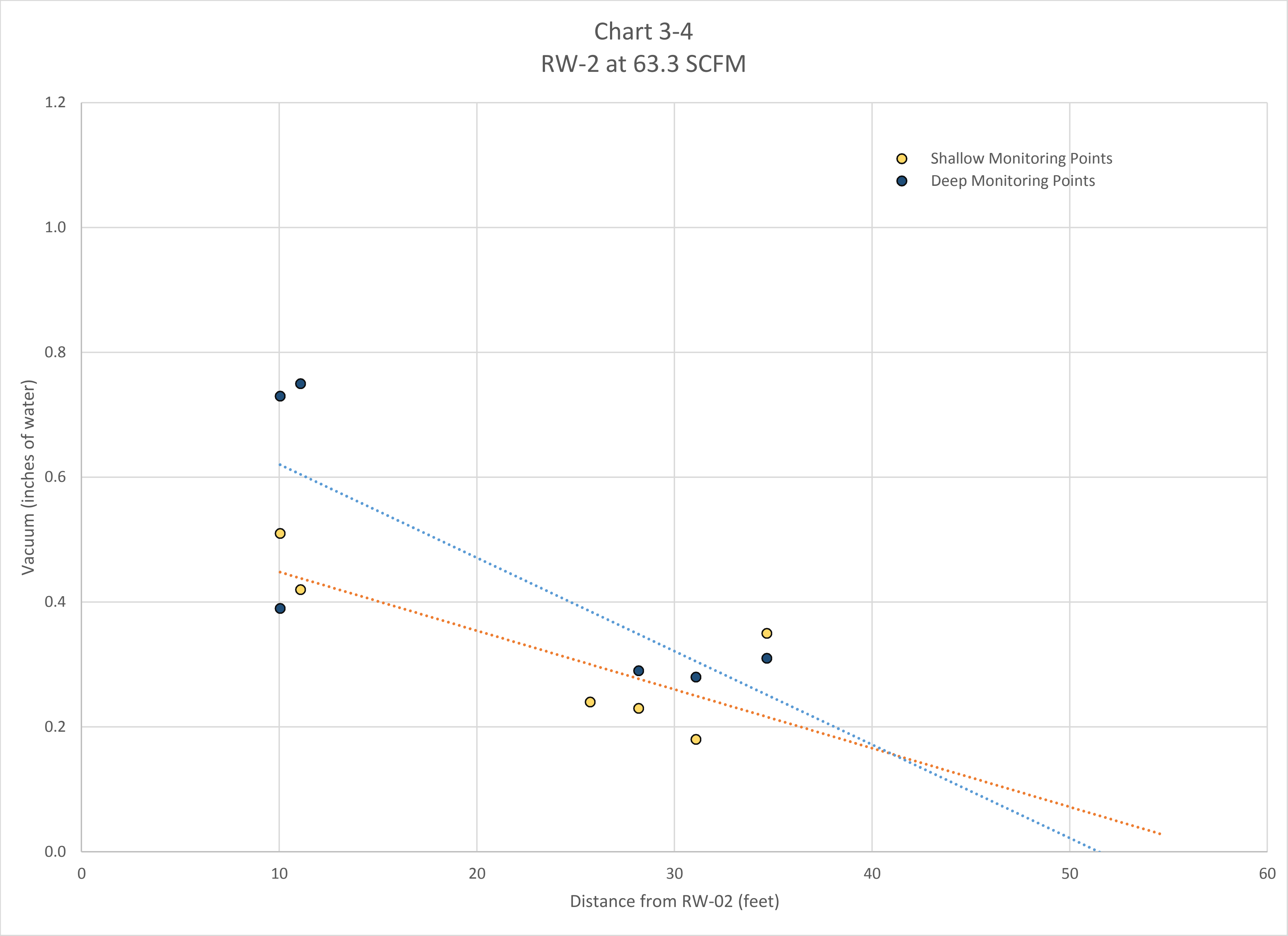
Chart 3-4
RW-2 at 63.3 SCFM
Shallow Monitoring Points
Deep Monitoring Points
Vacuum (inches of water)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
10
20
30
40
50
60
Distance from RW-02 (feet)

DRAFT

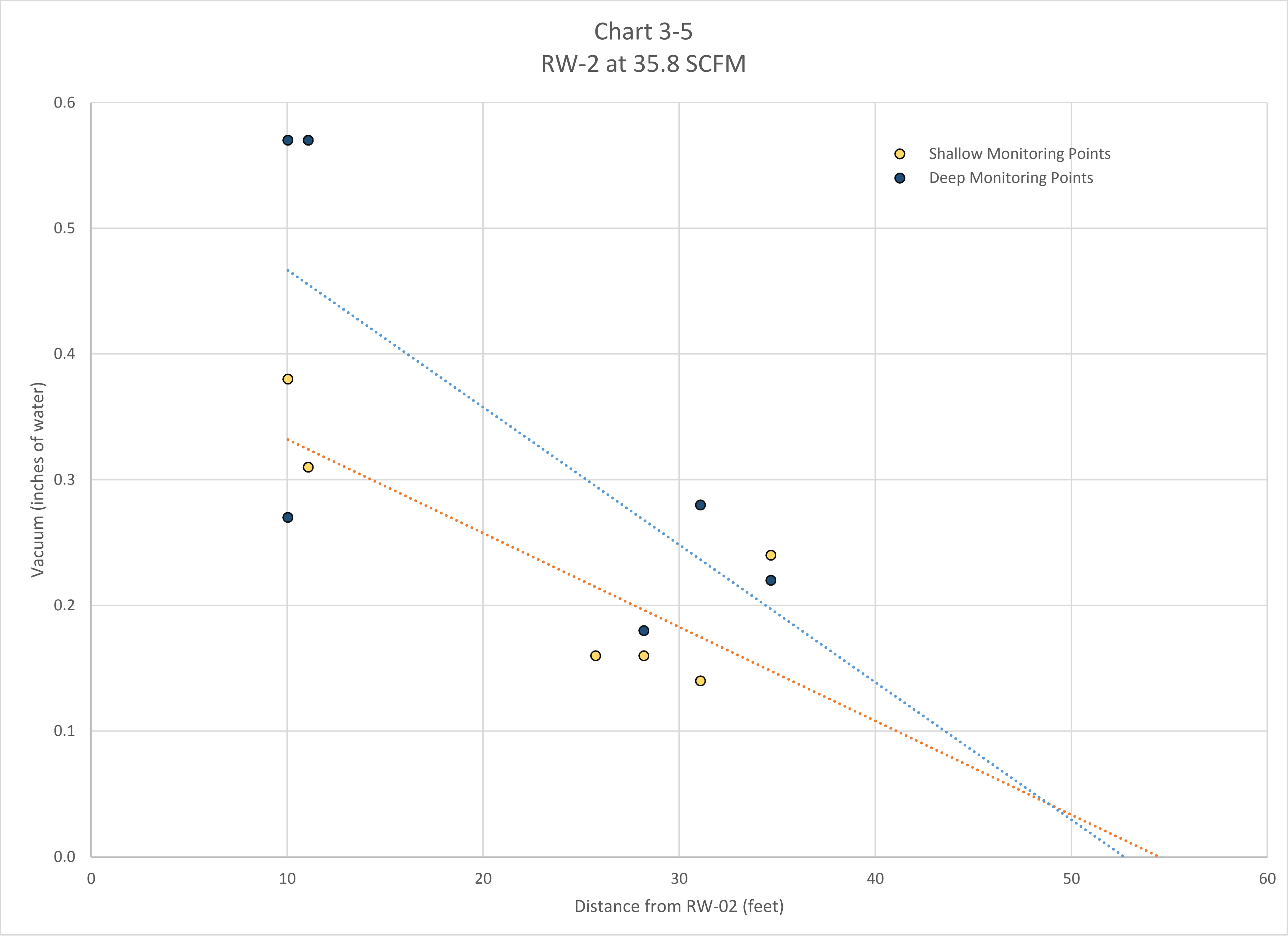
Chart 3-5
RW-2 at 35.8 SCFM
Shallow Monitoring Points
Deep Monitoring Points
Vacuum (inches of water)
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0
10
20
30
40
50
60
Distance from RW-02 (feet)

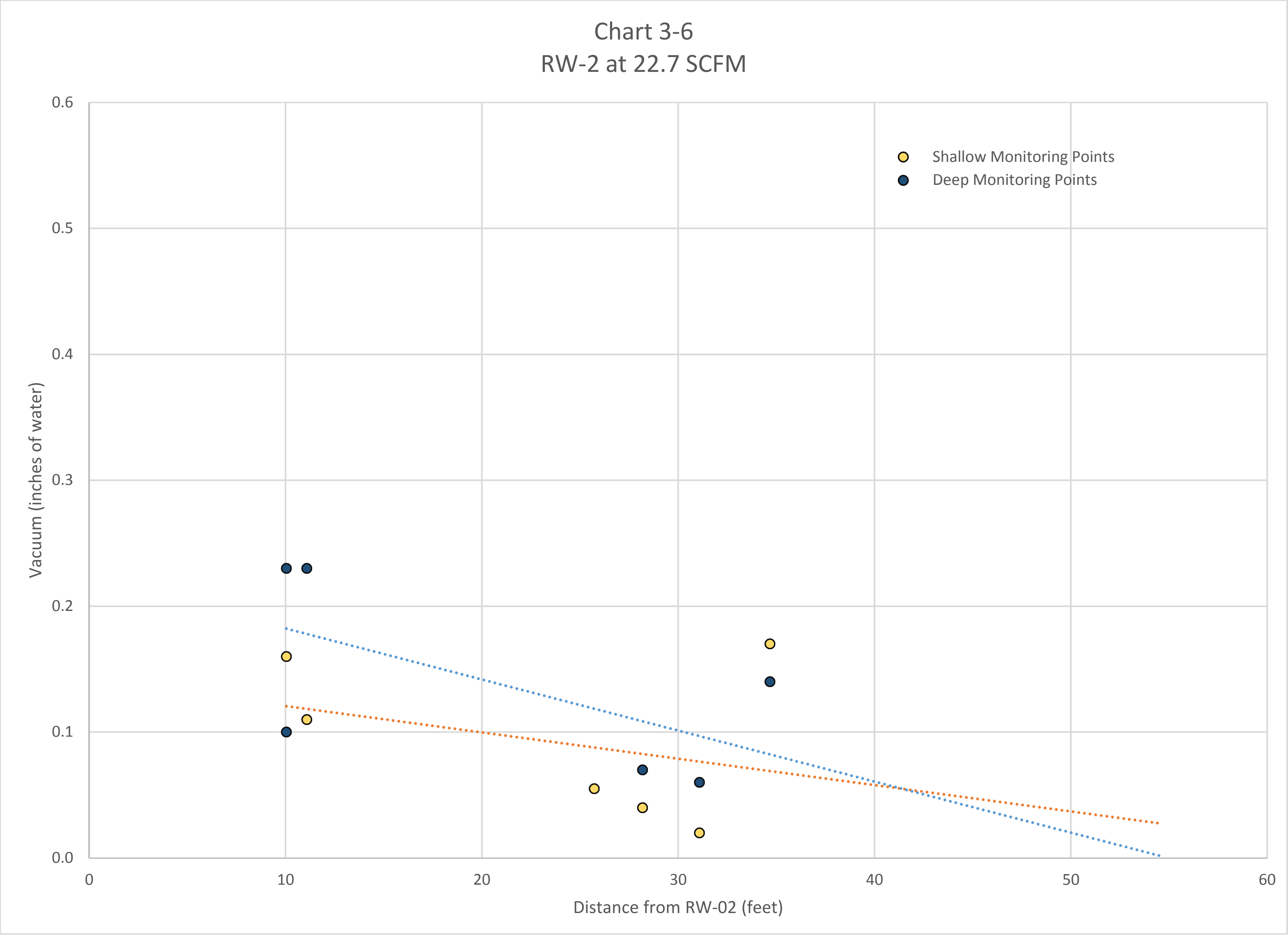
Chart 3-6
RW-2 at 22.7 SCFM
Shallow Monitoring Points
Deep Monitoring Points
Vacuum (inches of water)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0
10
20
30
40
50
60
Distance from RW-02 (feet)

DRAFT

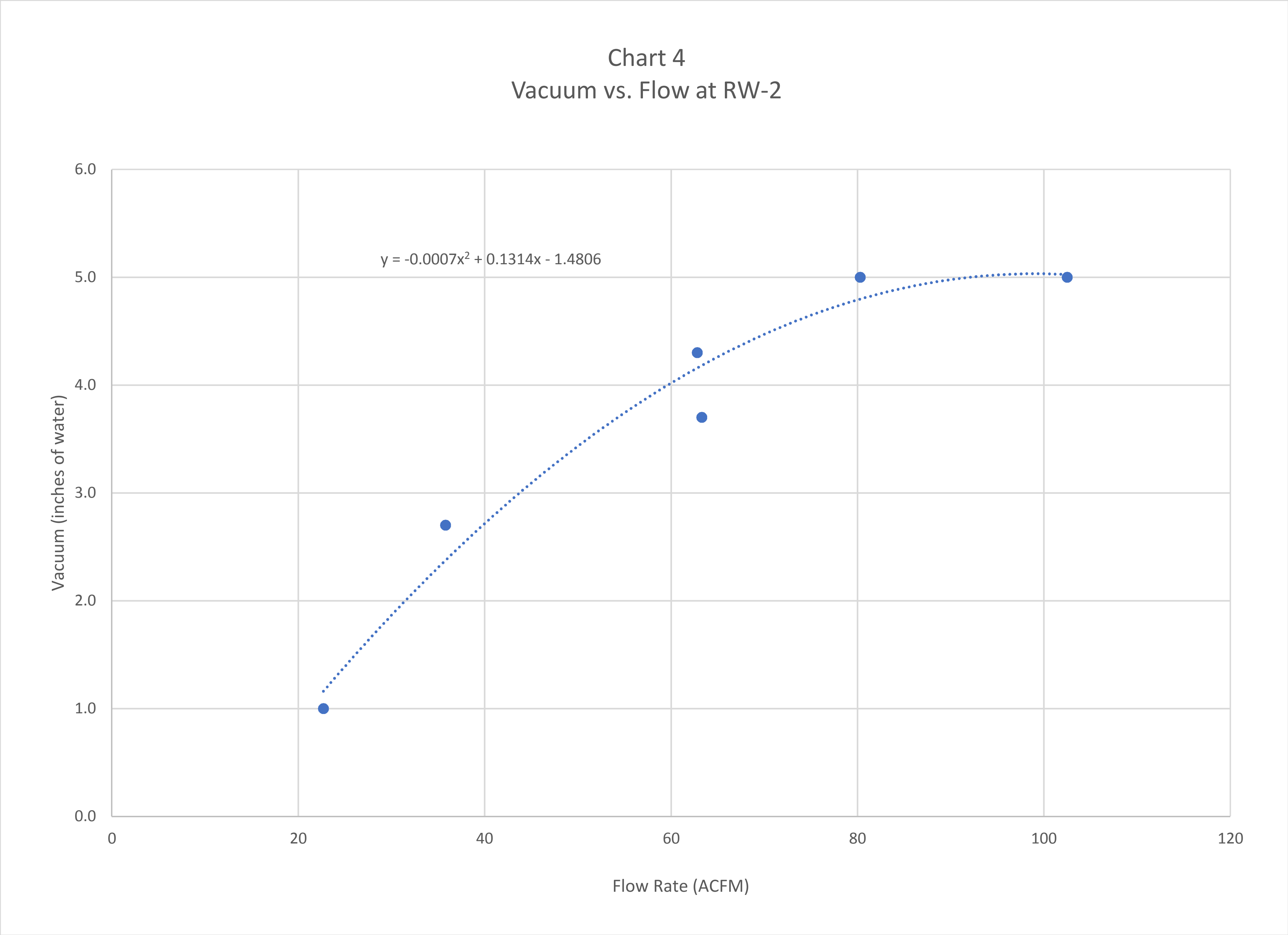

Chart 4
Vacuum vs. Flow at RW-2

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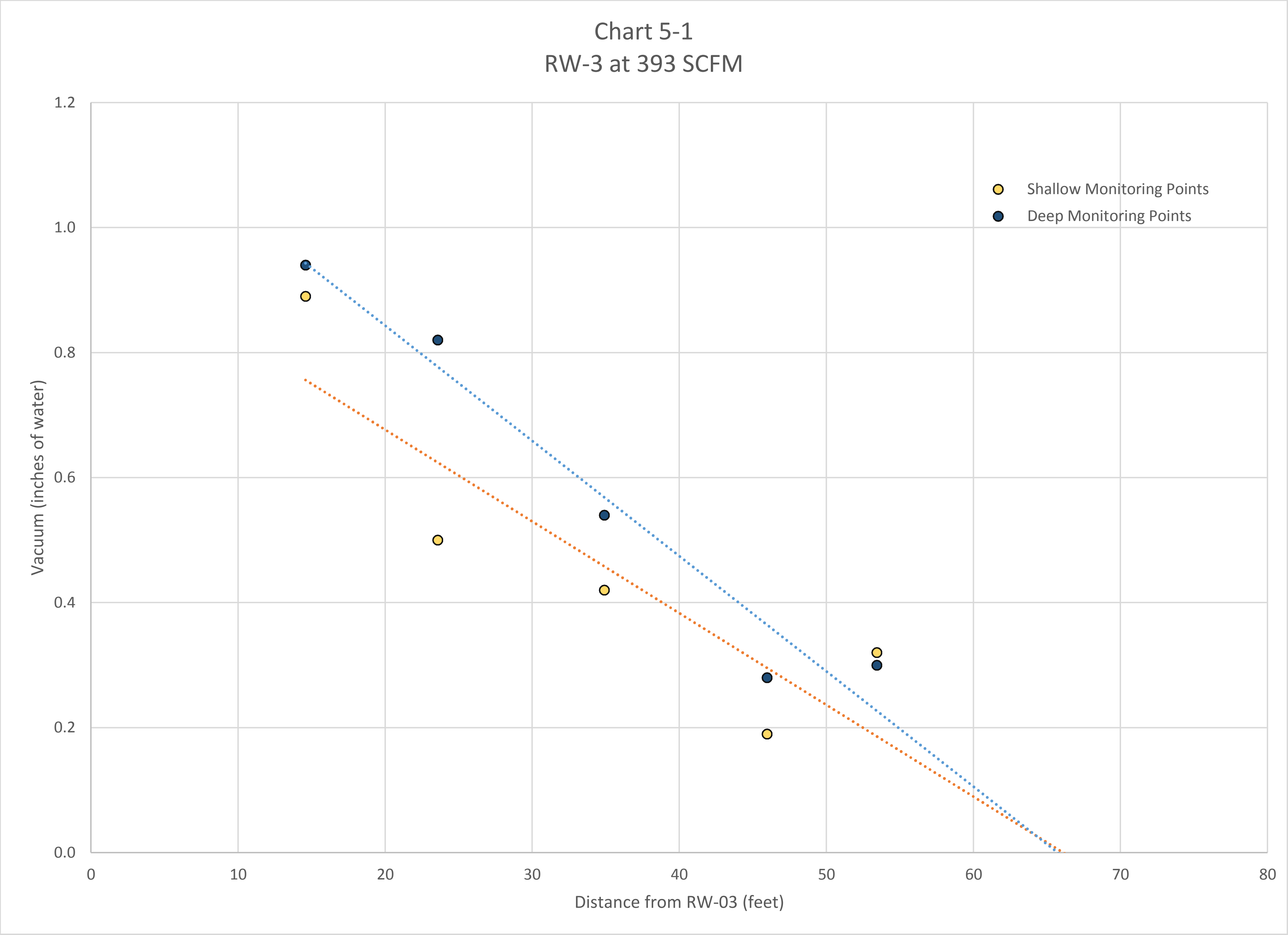
Chart 5-1
RW-3 at 393 SCFM
Vacuum (inches of water)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
10
20
30
40
50
60
70
80
Distance from RW-03 (feet)
Shallow Monitoring Points
Deep Monitoring Points

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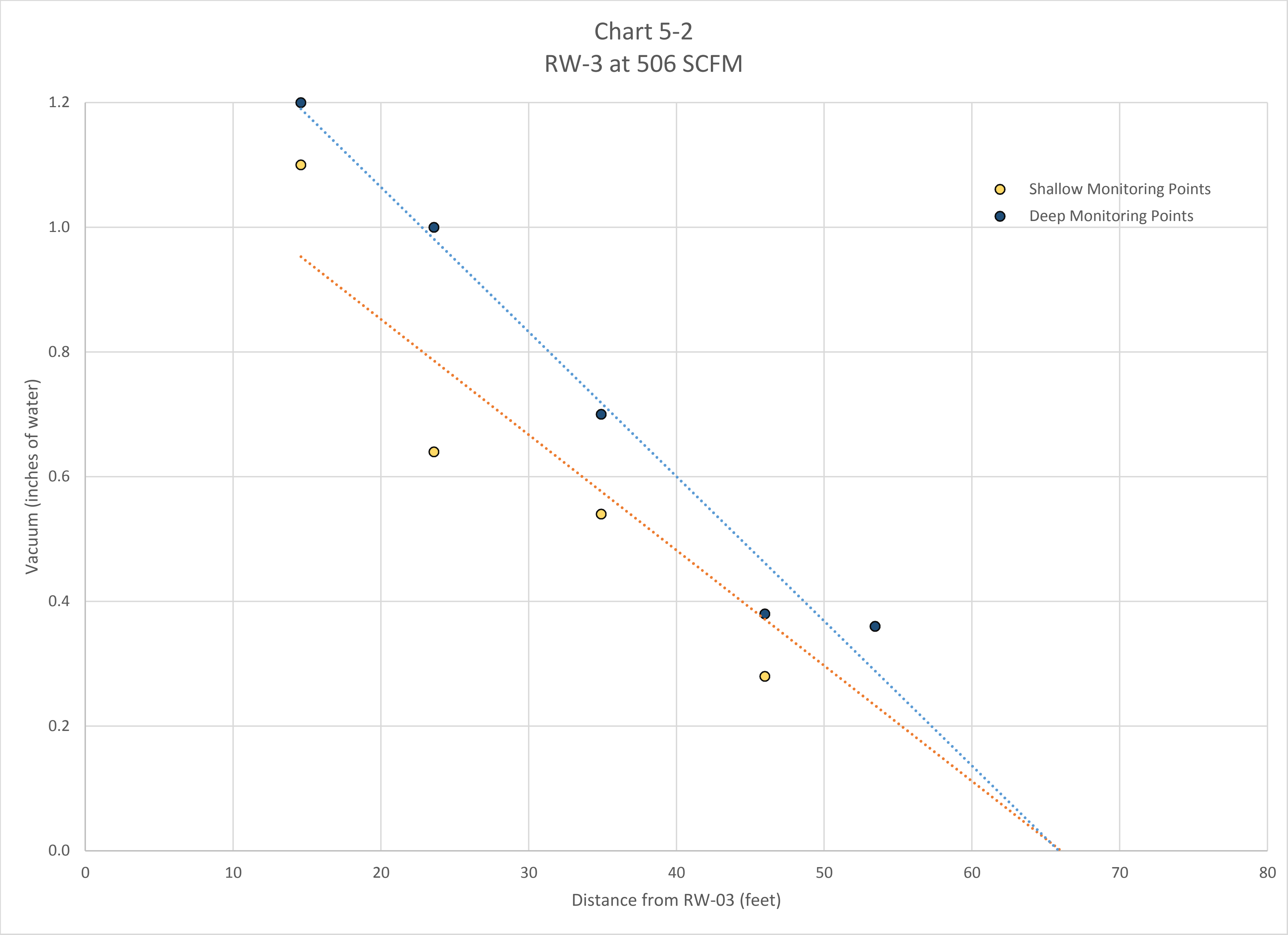


Chart 5-2
RW-3 at 506 SCFM
Shallow Monitoring Points
Deep Monitoring Points
Vacuum (inches of water)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
10
20
30
40
50
60
70
80
Distance from RW-03 (feet)

DRAFT

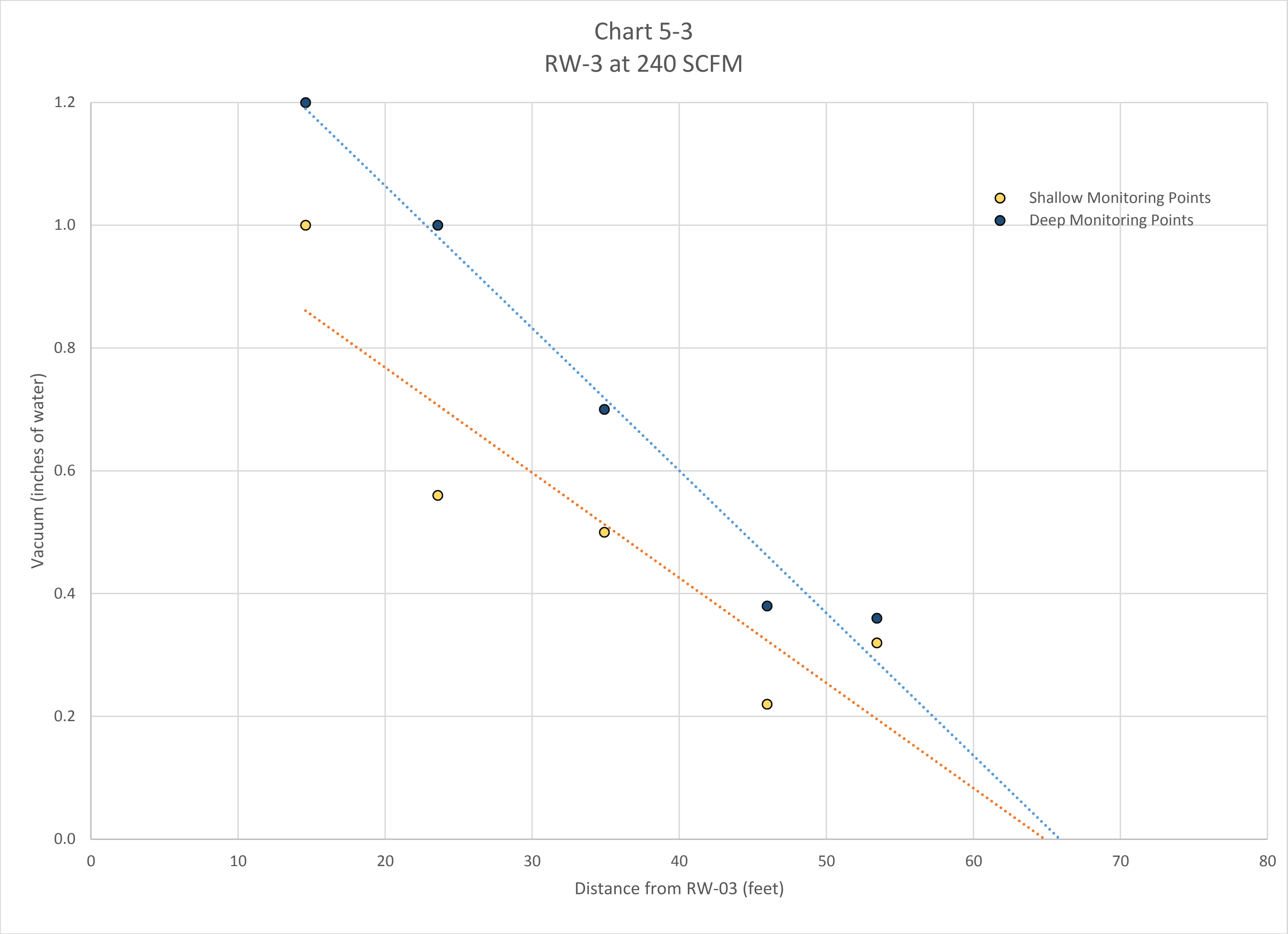


Chart 5-3
RW-3 at 240 SCFM
Vacuum (inches of water)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
10
20
30
40
50
60
70
80
Distance from RW-03 (feet)
Shallow Monitoring Points
Deep Monitoring Points

DRAFT

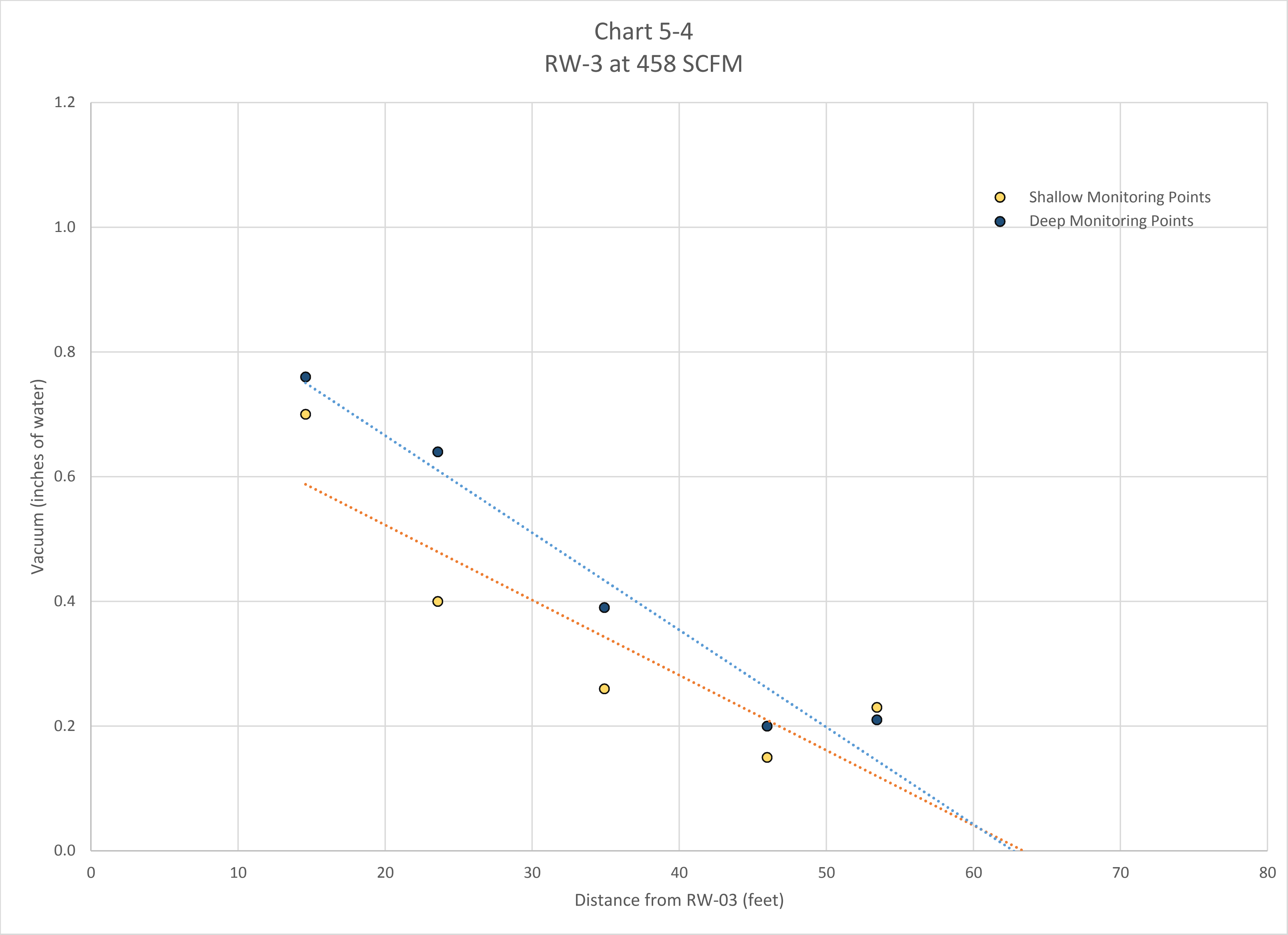


Chart 5-4
RW-3 at 458 SCFM
Vacuum (inches of water)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
10
20
30
40
50
60
70
80
Distance from RW-03 (feet)
Shallow Monitoring Points
Deep Monitoring Points

DRAFT

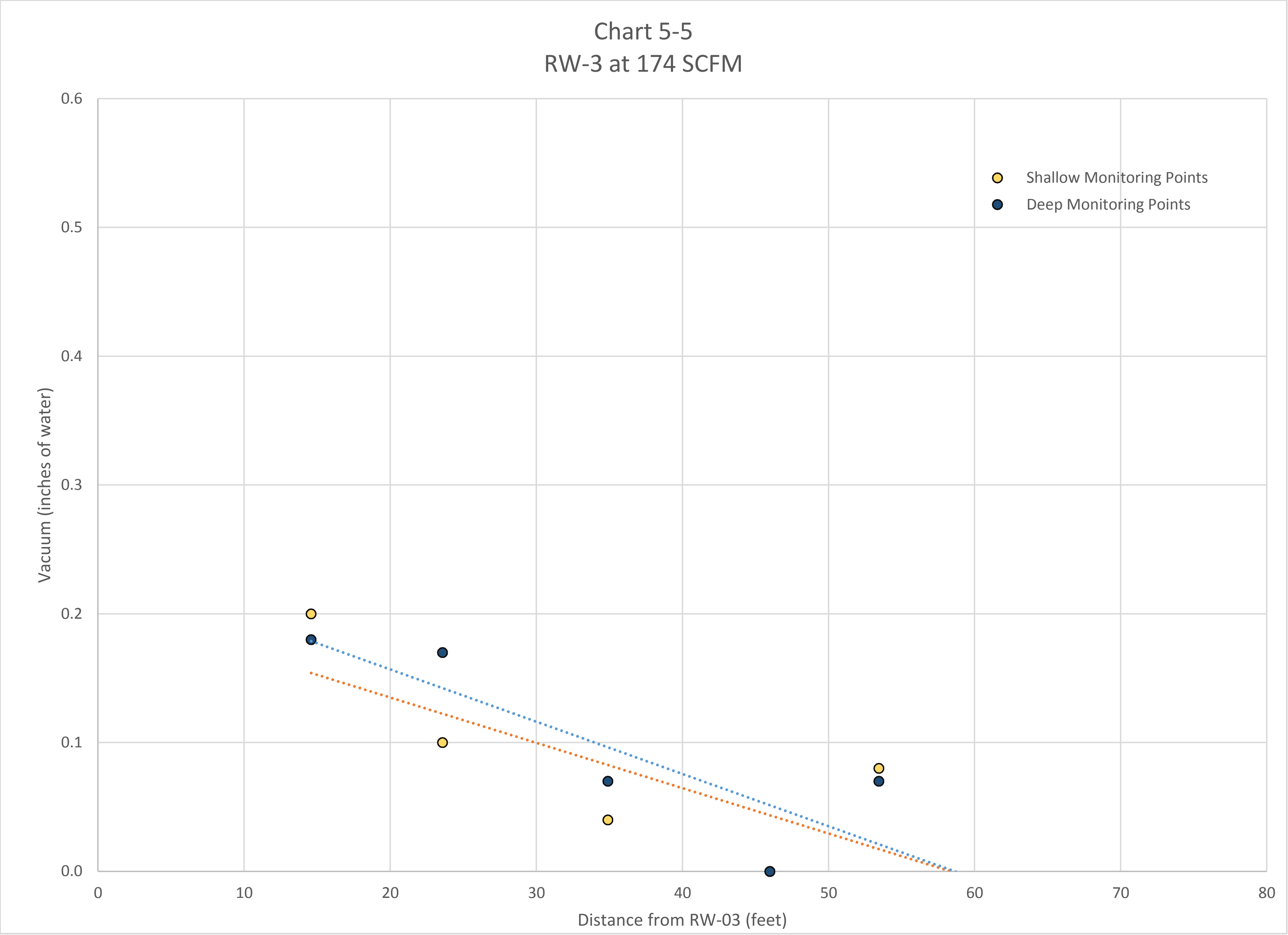


Chart 5-5
RW-3 at 174 SCFM
Vacuum (inches of water)
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0
10
20
30
40
50
60
70
80
Distance from RW-03 (feet)
Shallow Monitoring Points
Deep Monitoring Points

DRAFT

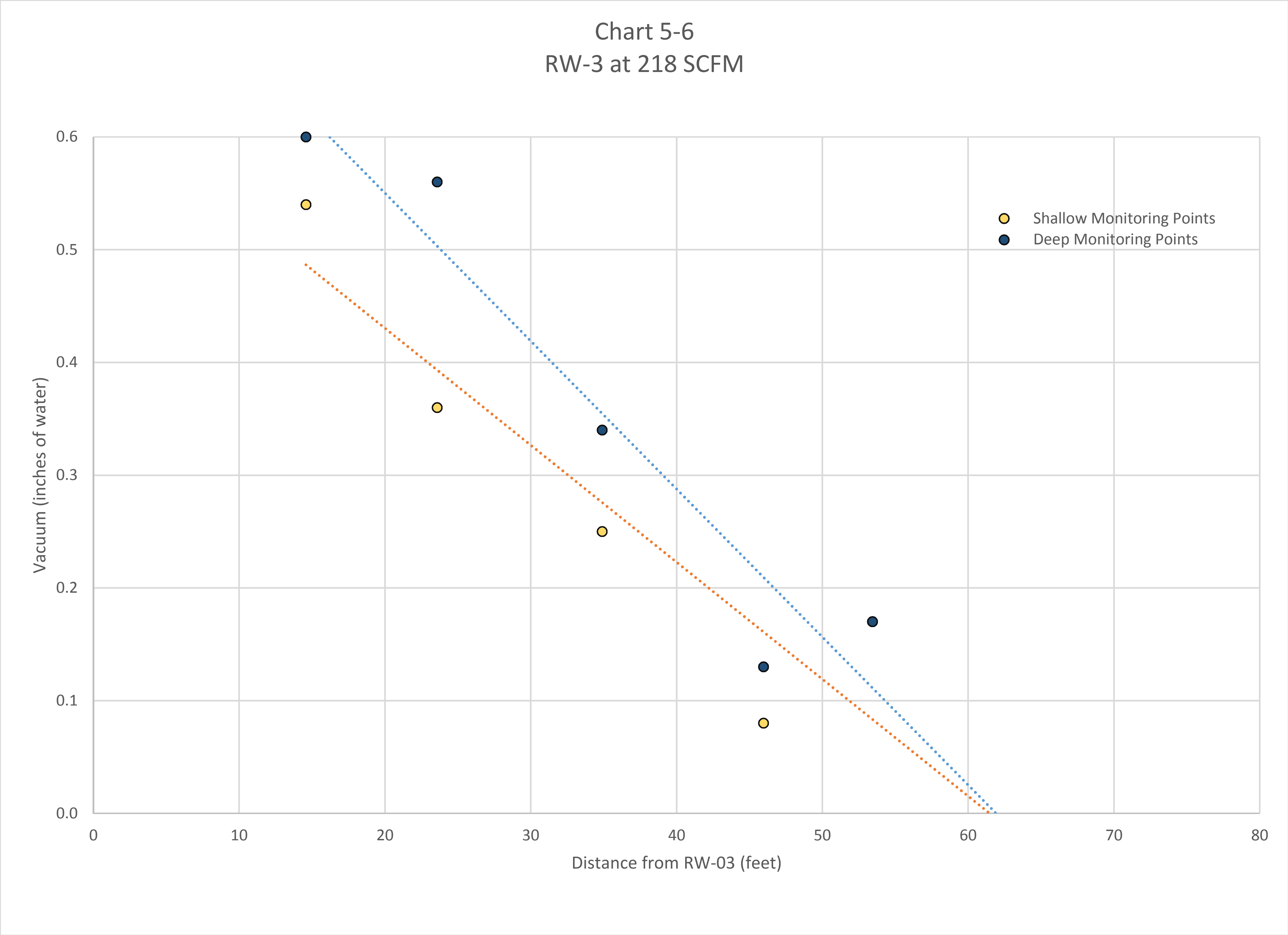


Chart 5-6
RW-3 at 218 SCFM
Vacuum (inches of water)
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0
10
20
30
40
50
60
70
80
Distance from RW-03 (feet)
Shallow Monitoring Points
Deep Monitoring Points

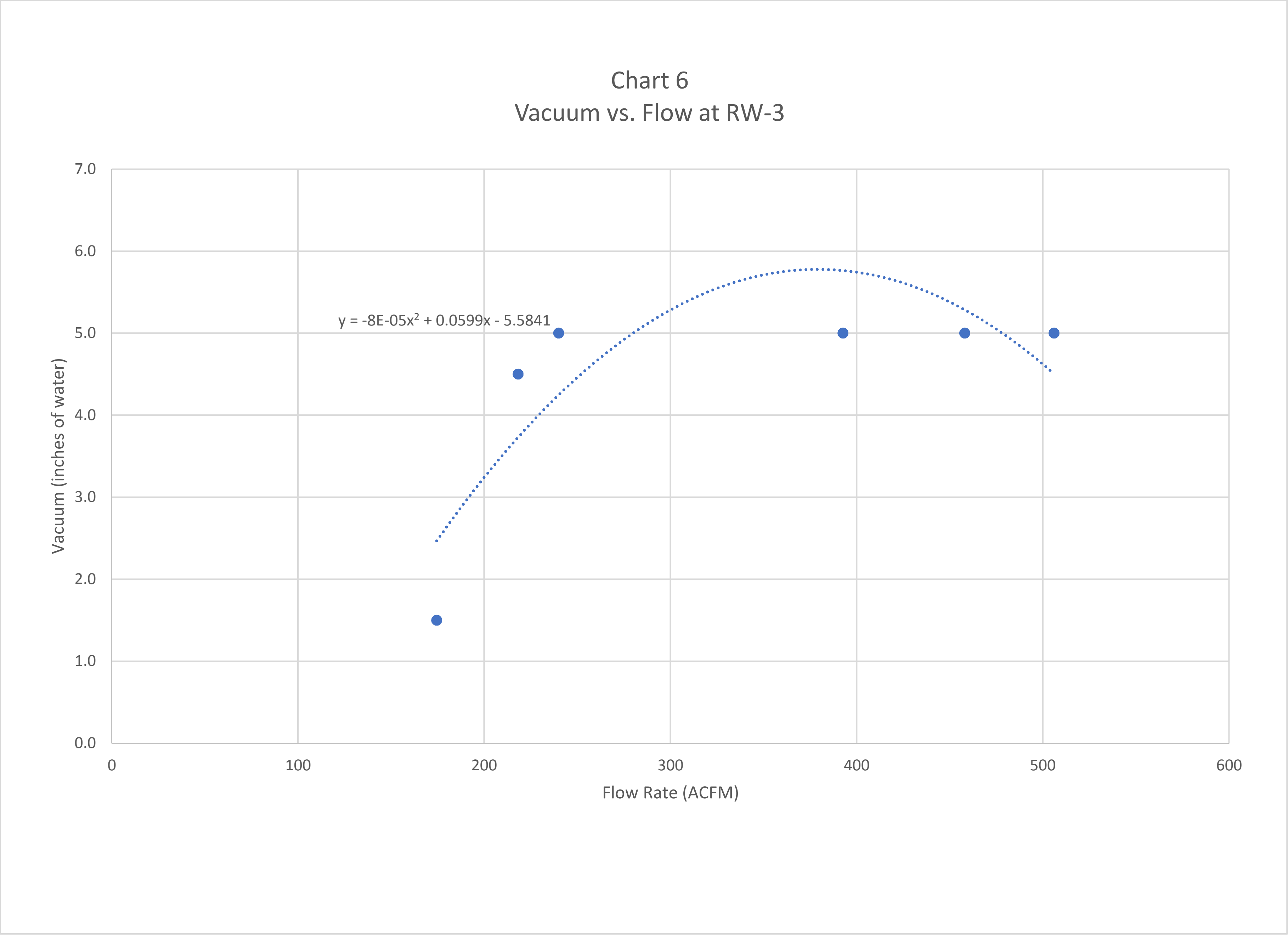
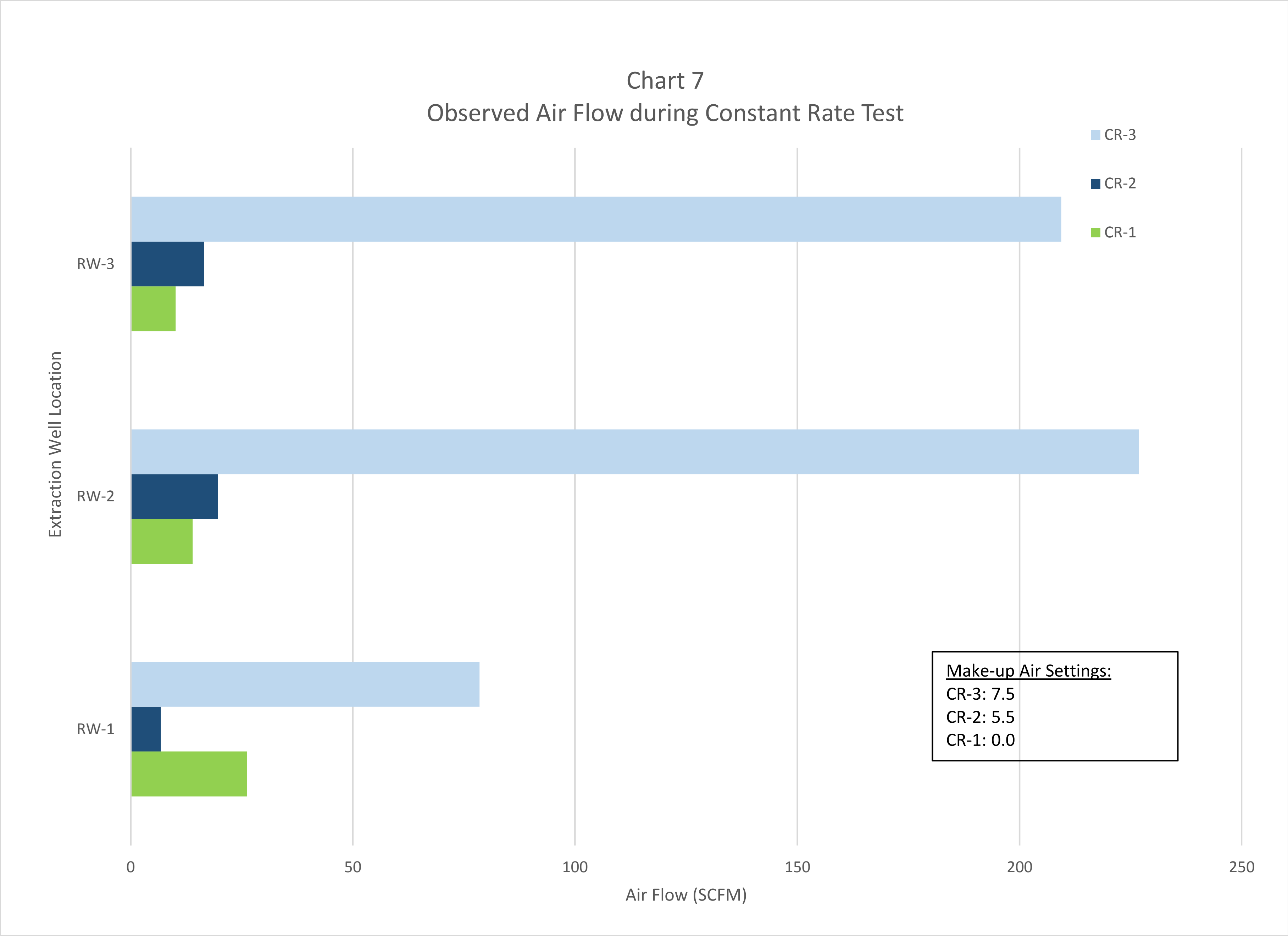


Chart 6
Vacuum vs. Flow at RW-3
y = -8E-05x² + 0.0599x - 5.5841
Vacuum (inches of water)
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
0
100
200
300
400
500
600
Flow Rate (ACFM)

DRAFT



Make-up Air Settings:
CR-3: 7.5
CR-2: 5.5
CR-1: 0.0

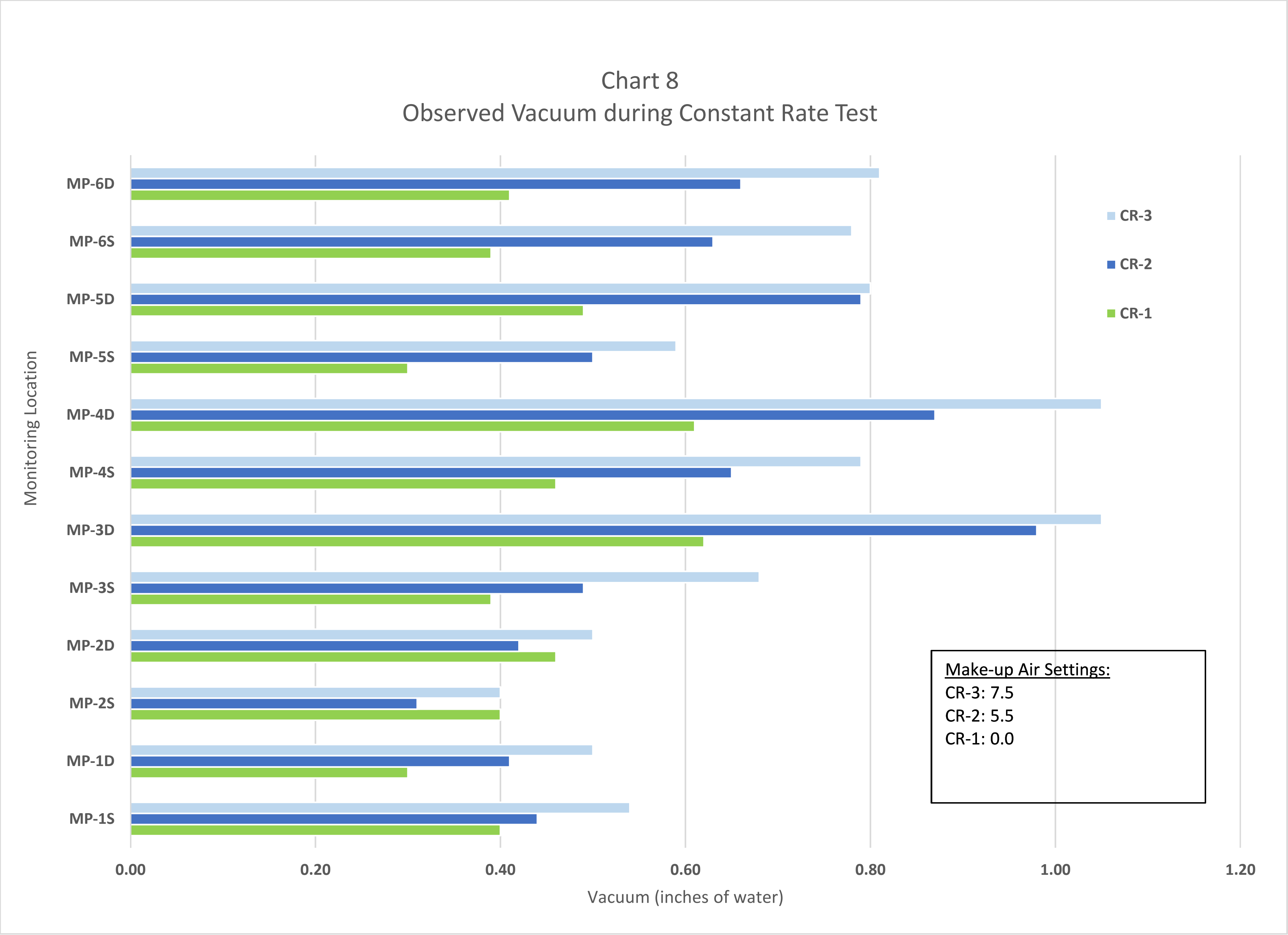


Chart 8
Observed Vacuum during Constant Rate Test

<u>Make-up Air Settings:</u>
CR-3: 7.5
CR-2: 5.5
CR-1: 0.0

Appendix A
Supplemental Source Area Investigation Technical Memorandum

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Technical Memorandum

Date:	June 30, 2016
To:	Timothy D. Hoffman - Dinsmore & Shohl, LLP William Mullins, Jr. - Mullins Rubber Products
From:	Brooks Bertl, PE, PG - , TRC Environmental Corporation David Kreeger, TRC Environmental Corporation
Project No.:	243856.P006.T000
Subject:	Supplemental Source Area Investigation Valley Pike VOC Site Riverside, Montgomery County, Ohio

Introduction

On January 8, 2016, representatives of the Valley Pike VOC Site (Site) entered into an Administrative Order of Consent (AOC) with the United States Environmental Protection Agency (USEPA) to address fugitive Volatile Organic Compound (VOC) emissions in the subsurface.

The Site is located at 2949 Valley Pike, Riverside, Montgomery County, Ohio (Figure 1). Previous investigations identified the presumed source of VOC contamination as the existing and/or former facility degreasers which contain PCE, based on soil vapor sampling and limited ground water sampling. These investigations identified the Valley Pike VOC site as the presumed source of offsite VOC fugitive emissions, however, they did not define or delineate the nature and extent of the source area.

The purpose of this Source Area Investigation is:

- Evaluate potential source areas of VOCs in soil and ground water;
- Finalize the Soil Vapor Extraction (SVE) design by identifying optimal recovery well locations and depth intervals; and
- Provide a baseline of pre-treatment VOC concentrations in soil to be used in conjunction with subsequent post-treatment confirmation sampling to demonstrate the impact of SVE operation on VOC contamination at the Site.

Summary of Field Activities

Source Area Delineation activities completed during May 2016 include the following:

- Advanced and collected soil samples from soil borings SB-01 to SB-12;
- Collect static water elevation measurements and ground water samples from on-property monitoring wells MW-1, MW-2, MW-3, MW-7, MW-8, and MW-PW.

Soil Sampling

Soil borings were advanced and sampled March 3 to 5, 2016. Soil boring locations are shown on Figure 2. Soil boring logs are included as Attachment A. Field activities were conducted in accordance with the Quality Assurance Project Plan (QAPP) (TRC, 2016).

At each location, an Ohio licensed drilling firm advanced a soil boring to a depth of 20 feet below ground surface (feet-bgs), or until the confining clay unit was encountered using direct push methodologies using a track-mounted rig. Soil samples were logged by a field geologist and screened with a photoionization detector (PID). One soil sample from each 10-foot interval at each soil boring location was collected for laboratory analysis (*i.e.,* two samples per boring). Specific sample intervals were based on field observations and screening results (*e.g.,* visual, olfactory, elevated PID readings, *etc*.).

Soil samples were preserved in the field and submitted Test America Laboratories (North Canton, Ohio) for analysis of Tetrachloroethene (PCE), Trichloroethene (TCE), *cis*-1,2-Dichloroethene (*cis*-1,2 DCE), *trans*-1,2-Dichloroethene (*trans*-1,2 DCE), and Vinyl chloride. Laboratory data for soils are summarized on Table 1. Laboratory Analytical reports are provided on CD-ROMs as Attachment B.

Ground Water Sampling

Ground water samples were collected from on-property monitoring wells MW-1, MW-7, MW-8, and MW-PW on March 5 and 6, 2016. Monitoring well locations are shown on Figure 2. Field activities were conducted in accordance with the QAPP (TRC, 2016).

TRC attempted to collect ground water samples from monitoring wells MW-2 and MW-3; however, these wells were compromised / damaged below ground surface and neither the low-flow pump nor a bailer could be utilized to reach ground water; therefore, no ground water samples were collected from these locations.

Representative ground water samples were collected using low-flow sampling techniques, in accordance with USEPA-approved methodologies. Ground water was be purged at a reduced rate until ground water stabilization for four indicator parameters (temperature, pH, specific conductance, and turbidity) was achieved. Additional ground water quality parameters (dissolved oxygen, oxidation-reduction potential, etc.) were measured but not but not used for determining stabilization.

Ground water samples were submitted Test America Laboratories (North Canton, Ohio) for analysis of PCE, TCE, *cis*-1,2 DCE, *trans*-1,2 DCE, and Vinyl chloride. Laboratory data for ground water are summarized on Table 2. Laboratory Analytical reports are provided in Attachment B.

Summary of Findings

Site Hydrogeology

At several locations silty clay fill material was the uppermost unit encountered; however, generally uppermost subsurface materials typically encountered at the site consisted of 14 to 20+ feet of sand and gravel material. Underlying the sand and gravel was a dry, stiff, gray silty clay unit. The clay unit became increasingly moist and moderately plastic with depth, but remained stiff. Due to the presence of VOCs in the shallow subsurface, this clay confining unit was not breached during drilling activities. No ground water was encountered during soil sampling activities, although perched water, interpreted as precipitation that had infiltrated the subsurface, was observed at SB-04.

On-property monitoring wells are screened in the saturated sand and gravel unit underlying the confining silty clay unit described above. Ground water flow is assumed to be consistent with the previous USEPA investigations and flowing to the south-southwest.

Source Area Evaluation

PCE and its breakdown products were measured in the subsurface throughout the presumed source area. The highest concentrations were observed in the Paint Room #2 / Mill Room #4 at soil borings SB-03 and SB-07. These soil borings were located abject to the existing SVE recovery well RW-03 as shown in Figure 2. Elevated VOC concentrations were also measured in Press Room #1 (SB-11) and along the northwest property line (SB-12). Typically, and consistent with previous USEPA investigations, VOC concentrations increased with depth and the highest VOC concentrations were measured at the transition of the sand / gravel unit and underlying silty clay unit.

Ground water sampling results were consistent with previous USEPA investigations. The highest VOC concentrations were measured downgradient of the presumed source area at MW-EPA-08. Based on the assumed (and previously documented) ground water flow direction, VOCs in ground water appear to be migrating offsite to the southwest.

Conclusions and Recommendations

Based on the findings of this Source Investigation, elevated concentrations of PCE and its breakdown constituents are present in soil at, and down gradient of, the reported locations of the former PCE degreasing activities, including soil samples collected from soil borings SB-11 in Press Room #1 and at SB-12, adjacent to the Trimming Department (Figure 2). The absence of VOCs in soil samples collected from other potential source area locations (*e.g.,* SB-08, SB-09, and SB-10) demonstrate that the probable source of the VOCs in the subsurface are the former degreasing activities in the Paint Room #2 / Mill Room #4 at soil borings SB-03 and SB-07.

The highest PCE concentrations are within the radius of influence of the existing SVE treatment system; however, elevated PCE concentrations were measured at SB-11 and SB-12, which are located outside the radius of influence of the existing SVE treatment system.

Based on the findings of this Source Investigation, elevated concentrations of PCE and its breakdown constituents are present in ground water downgradient of the presumed source area at MW-EPA-08. Based on the assumed (and previously documented) ground water flow direction, VOCs in ground water are appear to be migrating offsite to the southwest.

Based on the Source Area Investigation findings, TRC recommends the following:

- Expand the existing SVE treatment system by installing additional recovery wells adjacent to soil boring locations SB-11 and SB-12; and
- Install a monitoring well south of existing well MW-EPA-08 to serve as a replacement for monitoring well MW-3 and delineate the presence of VOCs in ground water for remedial considerations.

Attachments

Table 1 – Summary of VOC Concentrations in Soil
Table 2 – Summary of VOC Concentrations in Ground Water

Figure 1 – Site Location
Figure 2 – Soil and Ground Water Sample Locations

Attachment A – Soil Boring Diagrams
Attachment B – Laboratory Analytical Reports

Tables

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Table 1

Summary of VOC Concentrations in Soil
Valley Pike VOC Site (Riverside, Ohio)

Sample ID		Sample Date	*cis*-1,2-Dichloroethene	*trans*-1,2-Dichloroethene	Tetrachloroethene	Trichloroethene	Vinyl chloride
USEPA RBSL - Ind. Soil (1)			2,300,000	23,000,000	100,000	6,000	1,700
Units			ug/mg	ug/mg	ug/mg	ug/mg	ug/mg
SB-01	SB-01 (7-8)	5/2/2016	<4.3	<4.3	**12**	<4.3	<4.3
	SB-01 (17-18)	5/2/2016	<4.2	<4.2	**21**	<4.2	<4.2
SB-02	SB-02 (8-10)	5/3/2016	<200	<200	**210**	**220**	<200
	SB-02 (16-20)	5/3/2016	<4.2	<4.2	**22**	**58**	<4.2
SB-03	SB-03 (9-10)	5/3/2016	<3.8	<3.8	<3.8	**33**	<3.8
	SB-03 (15-16)	5/3/2016	<2,300	<2,300	**60,000**	**6,100**	<2,300
SB-04	SB-04 (6-8)	5/4/2016	<4.5	<4.5	<4.5	<4.5	<4.5
	SB-04 (17-19)	5/4/2016	<4.0	<4.0	**23**	<4.0	<4.0
SB-05	SB-05 (4-5)	5/4/2016	<4.3	<4.3	<4.3	<4.3	<4.3
	SB-05 (14-16)	5/4/2016	<4.1	<4.1	<4.1	<4.1	<4.1
SB-06	SB-06 (15-16)	5/3/2016	<4.1	<4.1	**13**	<4.1	<4.1
	SB-06 (21-23)	5/3/2016	<200	<200	**1,800**	<200	<200
SB-07	SB-07 (7-8)	5/3/2016	<210	<210	**460**	<210	<210
	SB-07 (19-20)	5/3/2016	<200	<200	**470**	<200	<200
	SB-07 (20-22)	5/3/2016	<100,000	<100,000	**2,000,000**	<100,000	<100,000
SB-08	SB-08 (3-4)	5/3/2016	<3.9	<3.9	**6.9**	<3.9	<3.9
	SB-08 (18.5-19.5)	5/3/2016	<220	<220	**1,300**	<220	<220
SB-09	SB-09 (4-8)	5/3/2016	<4.5	<4.5	<4.5	<4.5	<4.5
	SB-09 (19-20)	5/3/2016	<4.7	<4.7	**5.2**	<4.7	<4.7
SB-10	SB-10 (9-10)	5/3/2016	<4.2	<4.2	**6.3**	<4.2	<4.2
	SB-10 (15-16)	5/3/2016	<4.0	<4.0	**9.1**	<4.0	<4.0
SB-11	SB-11 (8-10)	5/4/2016	<4.1	<4.1	**5.0**	**6.3**	<4.1
	SB-11 (15-17)	5/4/2016	<320	<320	**8,400**	<320	<320
	SB-11 (17-19)	5/4/2016	<10,000	<10,000	**230,000**	<10,000	<10,000
SB-12	SB-12 (7-8)	5/5/2016	<4.4	<4.4	<4.4	<4.4	<4.4
	SB-12 (20-22)	5/5/2016	<200	<200	**790**	<200	<200
	SB-12 (24-25)	5/5/2016	<210	<210	**470**	**1,400**	<210
	SB-12 (27-28)	5/5/2016	<2,200	<2,200	**78,000**	**4,100**	<2,200

Notes

(1) USEPA Risk-Based Screening Levels (May 2016)

🟩 Indicates exceedence of USEPA RBSL for Industrial Soils

Table 2

Summary of VOC Concentrations in Ground Water
Valley Pike VOC Site (Riverside, Ohio)

Sample ID	Sample Date	*cis* -1,2-Dichloro-ethene	*trans* -1,2-Dichloro-ethene	Tetrachloro -ethene	Trichloro -ethene	Vinyl chloride
USEPA RBSL - Tap Water(1)		70	100	5	5	2
Units		ug/L	ug/L	ug/L	ug/L	ug/L
MW-01R	5/5/2016	<1.0	<1.0	5.9	<1.0	<1.0
MW-EPA-07	5/5/2016	<1.0	<1.0	3.0	<1.0	<1.0
MW-EPA-08	5/6/2016	<250	<250	5,500	<250	<250
MW-PW	5/5/2016	<1.0	<1.0	31	<1.0	<1.0

Notes
(1) USEPA Risk-Based Screening Levels for Tap Water (MCL) (May 2016)

🟦 Indicates exceedence of USEPA RBSL for Tap Water

Figures

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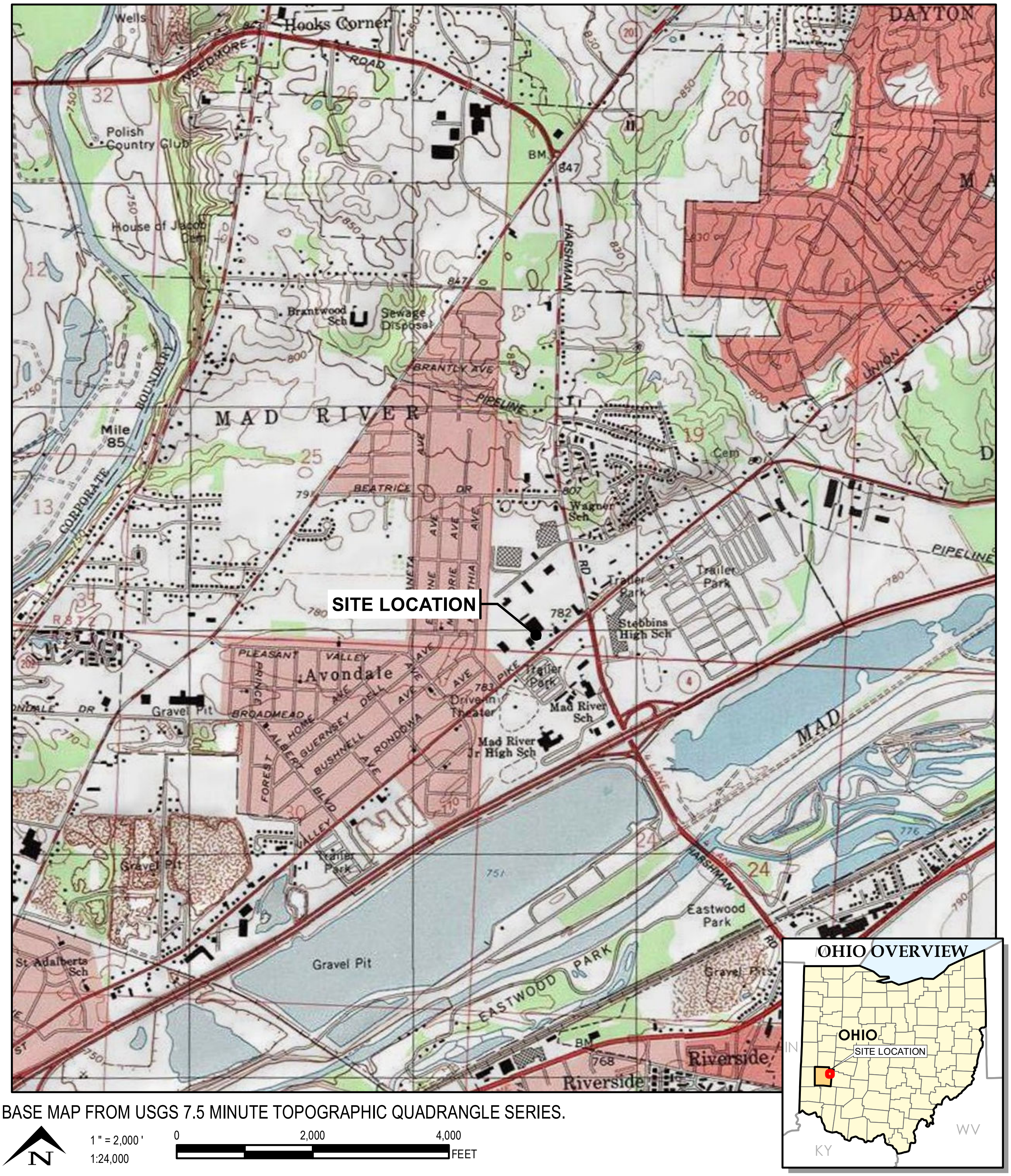


BASE MAP FROM USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE SERIES.

921 Eastwind Drive
Suite 122
Westerville, OH 43081
Phone: 614.423.6334

TRC - GIS

PROJECT:

VALLEY PIKE SITE
SUPPLEMENTAL SOURCE INVESTIGATION
2949 VALLEY PIKE
RIVERSIDE, MONTGOMERY COUNTY, OHIO

TITLE:

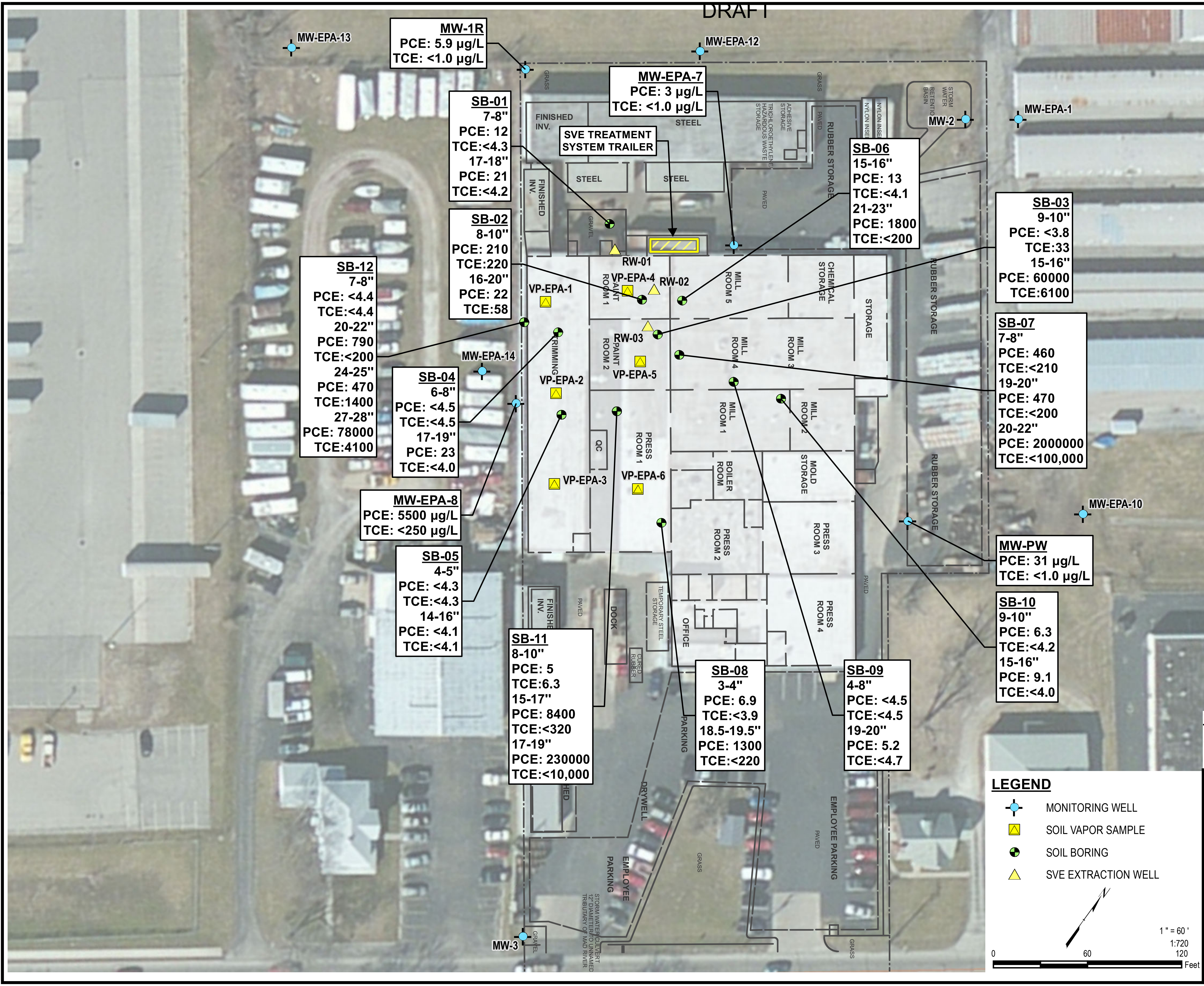
SITE LOCATION MAP

DRAWN BY:	J PAPEZ
CHECKED BY:	
APPROVED BY:	
DATE:	JULY 2016
PROJ. NO.:	243854
FILE:	243854-001slmSSI.mxd

FIGURE 1

E:\MullinsRubberProducts\RiversideOH\2016_243854\243854-001slmSSI.mxd -- Saved By: RSUEMNICHT on 7/21/2016, 15:29:17 PM

DRAFT



NOTES

1. BASE MAP IMAGERY FROM ESRI/MICROSOFT, "WORLD IMAGERY", WEB BASEMAP SERVICE LAYER, 201 2.

PROJECT:
VALLEY PIKE SITE
SUPPLEMENTAL SOURCE INVESTIGATION
2949 VALLEY PIKE
RIVERSIDE, MONTGOMERY COUNTY, OHIO

TITLE:
SITE DETAIL

DRAWN BY: J PAPEZ
PROJ NO.: 243854
CHECKED BY:
APPROVED BY:
DATE: JULY 2016

FIGURE 2

TRC
921 Eastwind Drive, Suite 122
Westerville, OH 43081
Phone: 614.423.6334
www.trcsolutions.com

FILE NO.: 243854-004SSI.mxd

TRC - GIS

Coordinate System: NAD 1983 StatePlane Ohio South FIPS 3402 Feet (Foot US)
Map Rotation: -36

Plot Date: 7/28/2016, 16:21:51 PM by RSUEMNICHT -- LAYOUT: ANSI B(11"x17")
Path: E:\MullinsRubberProducts\RiversideOH\2016_243854\243854-004SSI.mxd

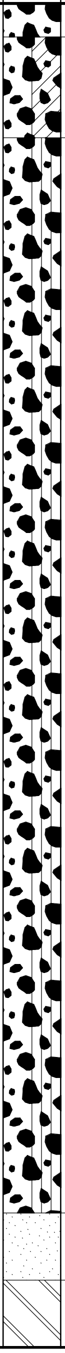
Attachment A
Soil Boring Diagrams

TRC

BORING NUMBER SB-01

PAGE 1 OF 1

CLIENT Mullins Rubber Products
PROJECT NAME Valley Pike VOC Site
PROJECT NUMBER 243854
PROJECT LOCATION Dayton, OH
DATE STARTED 5/2/16 **COMPLETED** 5/2/16
GROUND ELEVATION **HOLE SIZE** 2 inches
DRILLING CONTRACTOR Envirocore
GROUND WATER LEVELS:
DRILLING METHOD Direct Push
AT TIME OF DRILLING --- NA
LOGGED BY DMK **CHECKED BY** BRB
AT END OF DRILLING --- NA
NOTES Outside - vicinity of RW-01
AFTER DRILLING --- NA



DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (%)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	NOTES
0	1	10	PID = <10		**Sand and Gravel (GP)**, fine sand, fine gravel, loose, wet, dark brown (10YR 6/3), fill 0.5 **Silty Sandy Clay (GW-GC)**, trace gravel, medium dense, low plastic, damp, dark brown (10YR 3/3) 2.0	
			PID = <10		**Sand and Gravel (GW-SM)**, few silt, fine-coarse sand, fine-medium gravel, medium dense, dry, yellowish brown (10YR 5/4)	
5	2	75	PID = <10			
			PID = <10			Sample SB-01(7-8) collected for VOC analysis at 09:45
	3	75	PID = <10		grain size increases with depth	
10			PID = <10			
	4	75	PID = <10			
15			PID = <10			
	5	75	PID = <10		18.0	Sample SB-01(17-18) collected for VOC analysis at 10:00
20			PID = <10		**Sand (SP)**, few gravel, some silt, loose, wet, sweet odor, yellowish brown (10YR 5/4) 19.0 **Silty Clay (CL)**, trace sand, medium plastic, medium stiff, wet-damp, yellowish brown (10YR 5/4) 20.0	

Bottom of borehole at 20.0 feet.

TRC

BORING NUMBER SB-02

PAGE 1 OF 1

CLIENT Mullins Rubber Products
PROJECT NAME Valley Pike VOC Site
PROJECT NUMBER 243854
PROJECT LOCATION Dayton, OH
DATE STARTED 5/3/16 **COMPLETED** 5/3/16
GROUND ELEVATION **HOLE SIZE** 2 inches
DRILLING CONTRACTOR Envirocore
GROUND WATER LEVELS:
DRILLING METHOD Direct Push
AT TIME OF DRILLING --- NA
LOGGED BY DMK **CHECKED BY** BRB
AT END OF DRILLING --- NA
NOTES
AFTER DRILLING --- NA

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (%)	ENVIRONMENTAL DATA	GRAPHIC LOG		MATERIAL DESCRIPTION	NOTES
0					0.5	**Concrete**	
	1	75	PID = 30.1		1.5	**Sand and Gravel (GP-GM)**, some silt, some clay, loose, damp, dark brown (10YR 3/3)	
			PID = 3.1			**Sand and Gravel (GW-GM)**, few silt, fine-coarse sand, fine-medium rounded gravel, medium dense, dry, yellowish brown (10YR 5/4)	
5	2	75	PID = 2.5 PID = 2.8				Sample SB-02(8-10) collected for VOC analysis at 16:45
10	3	75	PID = 2.5 PID = 1.5			Grain size increases with depth	
15	4	75	PID = 2.7 PID = 3.5				Sample SB-02(16-20) collected for VOC analysis at 16:35
	5	10	PID = 5.3		20.0		
20	○ NR 6	0			22.0	No Recovery from 20.0'-22.0' BGS Smeared, suggesting silty clay	

Bottom of borehole at 22.0 feet.

DRAFT

TRC

BORING NUMBER SB-03

PAGE 1 OF 1

CLIENT Mullins Rubber Products

PROJECT NAME Valley Pike VOC Site

PROJECT NUMBER 243854

PROJECT LOCATION Dayton, OH

DATE STARTED 5/3/16 **COMPLETED** 5/3/16

GROUND ELEVATION **HOLE SIZE** 2 inches

DRILLING CONTRACTOR Envirocore

GROUND WATER LEVELS:

DRILLING METHOD Direct Push

AT TIME OF DRILLING --- NA

LOGGED BY DMK **CHECKED BY** BRB

AT END OF DRILLING --- NA

NOTES Paint Room #2

AFTER DRILLING --- NA

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (%)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	NOTES
0						
	1	45	PID = 3.8		0.5 **Concrete**	
					1.5 **Sandy Gravel (GP)**, dry, medium loose, light gray (10YR 7/1)	
					Sand and Gravel (GW-GM), fine-coarse sand, fine-medium rounded gravel, few silt, loose, dry, yellowish brown (10YR 5/4)	
			PID = 2.9			
5	2	75	PID = 2.2			
			PID = 2.7			
	3	75	PID = 3.2			Sample SB-03(9-10) collected for VOC analysis at 09:50
10						
			PID = 4.5		Grain size increases with depth	
	4	75	PID = 4.6			
15			PID = 15.1		15.0 **Silty Clay (CL)**, few sand, trace fine angular gravel, plastic, medium stiff, damp, yellowish brown (10YR 5/4) 16.0	Sample SB-03(15-16) collected for VOC analysis at 09:45

Bottom of borehole at 16.0 feet.

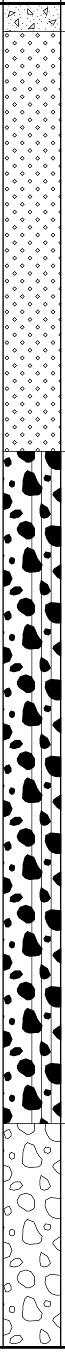
DRAFT

TRC

BORING NUMBER SB-04

PAGE 1 OF 1

CLIENT Mullins Rubber Products
PROJECT NAME Valley Pike VOC Site
PROJECT NUMBER 243854
PROJECT LOCATION Dayton, OH
DATE STARTED 5/4/16 **COMPLETED** 5/4/16
GROUND ELEVATION **HOLE SIZE** 2 inches
DRILLING CONTRACTOR Envirocore
GROUND WATER LEVELS:
DRILLING METHOD Direct Push
AT TIME OF DRILLING --- NA
LOGGED BY DMK **CHECKED BY** BRB
AT END OF DRILLING --- NA
NOTES Trim Room
AFTER DRILLING --- NA



DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (%)	ENVIRONMENTAL DATA	MATERIAL DESCRIPTION	NOTES
0	1	75	PID = 0.5 PID = 0.6	0.5 **Concrete** **Sand (SW)**, fine-coarse sand, some silt, loose, dry, yellowish brown (10YR 5/4)	
5	2	50	PID = 0.7 PID = 0.6	8.0	Sample SB-04(6-8) collected for VOC analysis at 16:45
10	3	50	PID = 0.8 PID = 1.0	**Sand and Gravel (GW-SM)**, fine-coarse sand, fine-medium rounded gravel, few silt, loose, dry, yellowish brown (10YR 5/4)	
15	4	50	PID = 0.8 PID = 0.8	Grain size increases with depth	
	5	75	PID = 0.8 PID = 1.0	Changed to wet at 19.5' BGS 20.0	Sample SB-04(17-19) collected for VOC analysis at 16:55
20	6	75		**Gravel (GP)**, fine gravel, some fine-coarse sand, loose, saturated, yellowish brown (10YR 5/4) 24.0	

Bottom of borehole at 24.0 feet.

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TRC

BORING NUMBER SB-05

PAGE 1 OF 1

CLIENT Mullins Rubber Products

PROJECT NAME Valley Pike VOC Site

PROJECT NUMBER 243854

PROJECT LOCATION Dayton, OH

DATE STARTED 5/4/16 **COMPLETED** 5/4/16

GROUND ELEVATION **HOLE SIZE** 2 inches

DRILLING CONTRACTOR Envirocore

GROUND WATER LEVELS:

DRILLING METHOD Direct Push

AT TIME OF DRILLING --- NA

LOGGED BY DMK **CHECKED BY** BRB

AT END OF DRILLING --- NA

NOTES Trim Room

AFTER DRILLING --- NA

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (%)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	NOTES
0	1	75		△	0.5 **Concrete**	
			PID = 0.8	○	**Sand and Gravel (GP-SM)**, few silt, fine-coarse sand, fine-medium rounded gravel, medium dense, dry-damp, yellowish brown (10YR 5/4)	
			PID = 0.9	○		
5	2	50	PID = 1.1	○		Sample SB-05(4-5) collected for VOC analysis at 16:00
			PID = 1.0	○		
10	3	50	PID = 0.9	○		
			PID = 1.2	○	Grain size increases with depth	
15	4	50	PID = 1.0	○		Sample SB-05(14-16) collected for VOC analysis at 16:10
			PID = 1.2	○	Changed to wet at 16.5' BGS	
	5	75	PID = 1.0	▨	17.0 **Silty Clay (CL)**, few Gravel, some sand, medium plastic, medium stiff, moist, yellowish brown (10YR 5/4	
20			PID = 1.0	▨	20.0	

Bottom of borehole at 20.0 feet.

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TRC

BORING NUMBER SB-06

PAGE 1 OF 1

CLIENT Mullins Rubber Products
PROJECT NAME Valley Pike VOC Site
PROJECT NUMBER 243854
PROJECT LOCATION Dayton, OH
DATE STARTED 5/3/16 **COMPLETED** 5/3/16
GROUND ELEVATION **HOLE SIZE** 2 inches
DRILLING CONTRACTOR Envirocore
GROUND WATER LEVELS:
DRILLING METHOD Direct Push
AT TIME OF DRILLING --- NA
LOGGED BY DMK **CHECKED BY** BRB
AT END OF DRILLING --- NA
NOTES Mill Room #5
AFTER DRILLING --- NA

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (%)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	NOTES
0	1	60	PID = 0.4	0.5	**Concrete**	
				1.5	**Silty Clay (CL)**, few fine-coarse sand, trace fine gravel, low plastic, stiff, damp, dark yellowish brown (10YR 3/4)	
			PID = 0.4		**Sand and Gravel (GW-SM)**, fine-coarse sand, fine-medium rounded gravel, few silt, loose, damp-dry, yellowish brown (10YR 5/4)	
5	2	65	PID = 0.5			
			PID = 0.6			
10	3	60	PID = 0.5			
			PID = 0.5		Grain size increases with depth	
	4	50	PID = 0.5			
15			PID = 0.5	15.0	**Sand (SP)**, fine sand, some silt, few gravel, damp-moist, loose, yellowish brown (10YR 5/4)	Sample SB-06(15-16) collected for VOC analysis at 15:05
	5	50	PID = 0.5			
20			PID = 0.5			
	6	90	PID = 0.6	22.0		Sample SB-06(21-23) collected for VOC analysis at 15:25
	7	100	PID = 0.9	24.0	**Silty Clay (CL)**, trace sand, medium plastic, medium stiff, moist, yellowish brown (10YR 5/4)	

Bottom of borehole at 24.0 feet.

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TRC

BORING NUMBER SB-07

CLIENT Mullins Rubber Products

PROJECT NAME Valley Pike VOC Site

PROJECT NUMBER 243854

PROJECT LOCATION Dayton, OH

DATE STARTED 5/3/16 **COMPLETED** 5/3/16

GROUND ELEVATION ______ **HOLE SIZE** 2 inches

DRILLING CONTRACTOR Envirocore

GROUND WATER LEVELS:

DRILLING METHOD Direct Push

AT TIME OF DRILLING --- NA

LOGGED BY DMK **CHECKED BY** BRB

AT END OF DRILLING --- NA

NOTES Mill Room #4

AFTER DRILLING --- NA

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (%)	ENVIRONMENTAL DATA	GRAPHIC LOG		MATERIAL DESCRIPTION	NOTES
0				▩	0.5	**Concrete**	
	1	50	PID = 0 PID = 0.2	▨	4.0	**Silty Clay (CL)**, few fine-coarse sand, trace fine sub-rounded gravel, low plastic, stiff, damp, dark brown (10YR 3/3) Black staining present 1.5'-2.5' BGS	
5	2	60	PID = 0.5 PID = 0.6	●		**Sand and Gravel (GW-SM)**, fine-coarse sand, fine-medium rounded gravel, few silt, loose, dry-damp, yellowish brown (10YR 5/4)	Sample SB-07(7-8) collected for VOC analysis at 13:40; DUP-01
10	3	60	PID = 0.5 PID = 0.8	●	12.0		
15	○ NR 4	0			16.0	No Recovery from 12.0'-16.0' BGS; Crumpled Lines	
	5	75	PID = 0.4 PID = 0.5	●	20.0	**Sand and Gravel (GW-SM)**, fine-coarse sand, fine-medium rounded gravel, few silt, loose, dry-damp, yellowish brown (10YR 5/4) Grain size increases with depth	Sample SB-07(19-20) collected for VOC analysis at 14:25
20	6	100	PID = 750	▨	22.0	**Silty Clay (CL)**, trace sand, medium plastic, medium stiff, damp-moist, yellowish brown (10YR 5/4)	Sample SB-07(21-22) collected for VOC analysis at 14:35

Bottom of borehole at 22.0 feet.

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TRC

BORING NUMBER SB-08

CLIENT Mullins Rubber Products
PROJECT NAME Valley Pike VOC Site
PROJECT NUMBER 243854
PROJECT LOCATION Dayton, OH
DATE STARTED 5/3/16 **COMPLETED** 5/3/16
GROUND ELEVATION **HOLE SIZE** 2 inches
DRILLING CONTRACTOR Envirocore
GROUND WATER LEVELS:
DRILLING METHOD Direct Push
AT TIME OF DRILLING --- NA
LOGGED BY DMK **CHECKED BY** BRB
AT END OF DRILLING --- NA
NOTES
AFTER DRILLING --- NA

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (%)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	NOTES
0	1	60	PID = 0.1		0.5 **Concrete** **Silty Clay (CL)**, some sand, few fine gravel, medium plastic, medium stiff, damp, dark yellowish brown (10YR 3/3)	
			PID = 0.2		3.0 **Sand and Gravel (GW-SM)**, fine-coarse sand, fine-medium rounded gravel, few silt, loose, damp-dry, yellowish brown (10YR 5/4)	Sample SB-08(3-4) collected for VOC analysis at 17:20
5	2	75	PID = 0.1			
			PID = 0.1			
10	3	75	PID = 0.1			
			PID = 0.2		Grain size increases with depth	
	4	75	PID = 0.1			
15			PID = 0.1			
	5	50	PID = 0.1			
20			PID = 0.1		Changed to wet from 19.5'-20.0' BGS 20.0	Sample SB-08(18.5-19.5) collected for VOC analysis at 17:30

Bottom of borehole at 20.0 feet.

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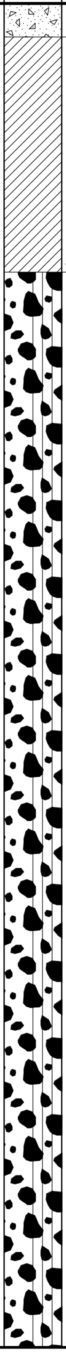
TRC

BORING NUMBER SB-09

PAGE 1 OF 1

CLIENT Mullins Rubber Products
PROJECT NAME Valley Pike VOC Site
PROJECT NUMBER 243854
PROJECT LOCATION Dayton, OH
DATE STARTED 5/3/16 **COMPLETED** 5/3/16
GROUND ELEVATION **HOLE SIZE** 2 inches
DRILLING CONTRACTOR Envirocore
GROUND WATER LEVELS:
DRILLING METHOD Direct Push
AT TIME OF DRILLING --- NA
LOGGED BY DMK **CHECKED BY** BRB
AT END OF DRILLING --- NA
NOTES Mill Room #4
AFTER DRILLING --- NA



DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (%)	ENVIRONMENTAL DATA	GRAPHIC LOG		MATERIAL DESCRIPTION	NOTES
0					0.5	**Concrete**	
	1	70	PID = 0.6 PID = 0.4		4.0	**Silty Clay (CL)**, few fine-coarse sand, trace fine sub-rounded gravel, low plastic, stiff, samp, yellowish brown (10YR 5/4)	
5	2	20	PID = 0.5			**Sand and Gravel (GW-SM)**, fine-coarse sand, fine-medium rounded gravel, few silt, loose, dry, yellowish brown (10YR 5/4)	Sample SB-09(4-8) collected for VOC analysis at 11:00
10	3	60	PID = 0.6 PID = 0.6				
15	4	50	PID = 0.5 PID = 0.5			Grain size increases with depth	
20	5	60	PID = 0.6 PID = 0.6		20.0	Silty Clay present in shoe	Sample SB-09(19-20) collected for VOC analysis at 11:10

Bottom of borehole at 20.0 feet.

TRC

BORING NUMBER SB-10

PAGE 1 OF 1

CLIENT Mullins Rubber Products
PROJECT NAME Valley Pike VOC Site
PROJECT NUMBER 243854
PROJECT LOCATION Dayton, OH
DATE STARTED 5/3/16 **COMPLETED** 5/3/16
GROUND ELEVATION **HOLE SIZE** 2 inches
DRILLING CONTRACTOR Envirocore
GROUND WATER LEVELS:
DRILLING METHOD Direct Push
AT TIME OF DRILLING --- NA
LOGGED BY DMK **CHECKED BY** BRB
AT END OF DRILLING --- NA
NOTES Mill Room #1
AFTER DRILLING --- NA

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (%)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	NOTES
0	1	50	PID = 0.3 PID = 0.3	▨	**Concrete** 0.5	
				▨	**Silty Clay (CL)**, few fine-coarse sand, trace fine sub-rounded gravel, low plastic, stiff, damp, dark yellowish brown (10YR 3/4) 4.0	
5	2	70	PID = 0.4 PID = 0.6	●	**Sand and Gravel (GW-SM)**, fine-coarse sand, fine-medium rounded gravel, few silt, loose, dry-damp, yellowish brown (10YR 5/4)	
10	3	60	PID = 0.6 PID = 0.5	●		Sample SB-10(9-10) collected for VOC analysis at 12:50
	4	60	PID = 0.5 PID = 0.3	●	Grain size increases with depth	
15				●	16.0	Sample SB-10(15-16) collected for VOC analysis at 13:10
	○ NR 5	0			No Recovery from 16.0'-20.0' BGS; crumpled tube	
20					Last foot (19.0'-20.0') seemed easier to drill 20.0	

Bottom of borehole at 20.0 feet.

TRC

BORING NUMBER SB-11

PAGE 1 OF 1

CLIENT Mullins Rubber Products
PROJECT NAME Valley Pike VOC Site
PROJECT NUMBER 243854
PROJECT LOCATION Dayton, OH
DATE STARTED 5/4/16 **COMPLETED** 5/4/16
GROUND ELEVATION **HOLE SIZE** 2 inches
DRILLING CONTRACTOR Envirocore
GROUND WATER LEVELS:
DRILLING METHOD Direct Push
AT TIME OF DRILLING --- NA
LOGGED BY DMK **CHECKED BY** BRB
AT END OF DRILLING --- NA
NOTES Press Room #1
AFTER DRILLING --- NA

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (%)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	NOTES
0	1	70		⁂	**Concrete** (0.5)	
			PID = 1	▨	**Silty Clay (CL)**, some sand, trace fine gravel, medium plastic, medium stiff, damp, dark yellowish brown (10YR 3/4) (3.0)	
			PID = 0.8	●	**Sand and Gravel (GW-SM)**, few silt, fine-coarse Sand, fine-medium rounded gravel, loose, dry, yellowish brown (10YR 5/4)	
5	2	60	PID = 1.1	●		
			PID = 1.3	●		
	3	60	PID = 1.2	●		Sample SB-11(8-10) collected for VOC analysis at 14:30
10			PID = 1.3	●	Grain size increases with depth	
	4	70	PID = 1.3	●		
15			PID = 1.7	●		Sample SB-11(15-17) collected for VOC analysis at 14:15
	5	100	PID = 2.4	●	(17.0)	
			PID = 7.9	▨	**Silty Clay (CL)**, trace gravel, trace sand, medium plastic, medium stiff, yellowish brown (10YR 5/4) (19.0)	Sample SB-11(17-19) collected for VOC analysis at 14:20; DUP-02
20			PID = 1.2	▨	**Silty Clay (CL)**, trace fine sand, high plastic, soft, damp, dark gray (10YR 3/1) (20.0)	

Bottom of borehole at 20.0 feet.

DRAFT

TRC

BORING NUMBER SB-12

PAGE 1 OF 1

CLIENT Mullins Rubber Products
PROJECT NAME Valley Pike VOC Site
PROJECT NUMBER 243854
PROJECT LOCATION Dayton, OH
DATE STARTED 5/5/16 **COMPLETED** 5/5/16
GROUND ELEVATION **HOLE SIZE** 2 inches
DRILLING CONTRACTOR Envirocore
GROUND WATER LEVELS:
DRILLING METHOD Direct Push
AT TIME OF DRILLING --- NA
LOGGED BY DMK **CHECKED BY** BRB
AT END OF DRILLING --- NA
NOTES Outdoors
AFTER DRILLING --- NA

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (%)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	NOTES
0	1	60	PID = 0.1		**Topsoil** 1.0 **Silty Clay (CL)**, trace gravel, few fine sand, medium dense, damp, dark brown (10YR 3/3)	
			PID = 0.1		2.5 **Sand and Gravel (GW-SM)**, few silt, fine-coarse sand, fine-medium rounded gravel, medium dense, damp-dry, yellowish brown (10YR 5/4)	
5	2	75	PID = 0.2			
			PID = 0.4			Sample SB-12(7-8) collected for VOC analysis at 09:20
10	3	75	PID = 0.1			
			PID = 0.4			
	4	75	PID = 0.4			
15			PID = 0.3		Grain size increases with depth	
	5	75	PID = 0.3			
20			PID = 0.3		19.5 **Gravel (GP)**, fine gravel, some fine-coarse sand, loose, damp, yellowish brown (10YR 5/4)	
	6	75	PID = 0.2		22.0	Sample SB-12(21-22) collected for VOC analysis at 10:00
			PID = 1.1		**Silty Clay (CL)**, trace-few fine gravel, few sand, medium plastic, medium stiff, low plastic, yellowish brown (10YR 5/4) Sand decreases with depth	
25	7	75	PID = 92			Sample SB-12(24-25) collected for VOC analysis at 10:15
			PID = 134		27.0 **Silty Clay (CL)**, trace fine sand, plastic, soft, moist, dark grayish brown (10YR 4/2) 28.0	Sample SB-12(27-28) collected for VOC analysis at 09:50

Bottom of borehole at 28.0 feet.

Attachment B
Laboratory Analytical Reports

DRAFT

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

1
2
3
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ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Canton
4101 Shuffel Street NW
North Canton, OH 44720
Tel: (330)497-9396

TestAmerica Job ID: 240-64423-1
Client Project/Site: Valley Pike

For:
TRC Environmental Corporation
11231 Cornell Park Drive
Cincinnati, Ohio 45242

Attn: Andrew Davis

Patrick O'Meara

Authorized for release by:
5/18/2016 1:23:07 PM

Patrick O'Meara, Manager of Project Management
(330)966-5725
patrick.omeara@testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Definitions/Glossary

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
H	Sample was prepped or analyzed beyond the specified holding time
X	Surrogate is outside control limits

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 240-64423-1

Laboratory: TestAmerica Canton

Narrative

CASE NARRATIVE

Client: TRC Environmental Corporation

Project: Valley Pike

Report Number: 240-64423-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

TestAmerica utilizes USEPA approved methods, where applicable, in all analytical work. The samples presented in this report were analyzed for the parameter(s) listed on the analytical methods summary page in accordance with the method(s) indicated and were analyzed in accordance with Ohio Voluntary Action Program protocols, where applicable. The following requested analytes, parameter groups or methods analyzed and contained in this report are not certified by the laboratory: VOC's by SW846 8260B HTV (Samples 1 - 3, 5, 6,13).

A summary of QC data for these analyses is included at the back of the report.

TestAmerica Canton attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the applicable methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

All solid sample results are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header.

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

RECEIPT

The samples were received on 5/5/2016 9:50 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 0.5º C and 2.3º C.

Receipt Exceptions

The following samples were preserved via freezing on 5-5-16 at 13:00: SB-01(7-8) (240-64423-1), SB-01(17-18) (240-64423-2), SB-03(9-10) (240-64423-3), SB-03(15-16) (240-64423-4), SB-09(4-8) (240-64423-5), SB-09(19-20) (240-64423-6), DUP-01 (240-64423-12) and SB-10(9-10) (240-64423-13). This is outside the 48 hour time frame required by the method.

VOLATILE ORGANIC COMPOUNDS (GCMS)

Samples SB-01(7-8) (240-64423-1), SB-01(17-18) (240-64423-2), SB-03(9-10) (240-64423-3), SB-03(15-16) (240-64423-4), SB-09(4-8) (240-64423-5), SB-09(19-20) (240-64423-6), SB-07(7-8) (240-64423-7), SB-07(19-20) (240-64423-8), SB-07(20-22) (240-64423-9), SB-06(15-16) (240-64423-10), SB-06(21-23) (240-64423-11), DUP-01 (240-64423-12), SB-10(9-10) (240-64423-13), SB-10(15-16) (240-64423-14), SB-02(8-10) (240-64423-15), SB-02(16-20) (240-64423-16), SB-08(3-4) (240-64423-17) and SB-08(18.5-19.5)

Job ID: 240-64423-1 (Continued)

Laboratory: TestAmerica Canton (Continued)

(240-64423-18) were analyzed for volatile organic compounds (GCMS) in accordance with EPA SW-846 Method 8260B. The samples were prepared on 05/05/2016 and 05/06/2016 and analyzed on 05/11/2016 and 05/13/2016.

1,2-Dichloroethane-d4 (Surr), 4-Bromofluorobenzene (Surr), Dibromofluoromethane (Surr) and Toluene-d8 (Surr) failed the surrogate recovery criteria high for SB-03(15-16) (240-64423-4). 1,2-Dichloroethane-d4 (Surr), 4-Bromofluorobenzene (Surr), Dibromofluoromethane (Surr) and Toluene-d8 (Surr) failed the surrogate recovery criteria high for SB-07(20-22) (240-64423-9).

Samples SB-03(15-16) (240-64423-4)[10X] and SB-07(20-22) (240-64423-9)[500X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

The following samples were preserved via freezing on 5-5-16 at 13:00: SB-01(7-8) (240-64423-1), SB-01(17-18) (240-64423-2), SB-03(9-10) (240-64423-3), SB-09(4-8) (240-64423-5), SB-09(19-20) (240-64423-6), and SB-10(9-10) (240-64423-13). This is outside the 48 hour time frame required by the method, and the results are qualified with a "H."

Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 240-229192.

Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 240-229166.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

VOLATILE ORGANIC COMPOUNDS (GCMS)
Samples TRIP BLANK (240-64423-19) and TRIP BLANK (240-64423-20) were analyzed for volatile organic compounds (GCMS) in accordance with EPA SW-846 Method 8260B. The samples were analyzed on 05/14/2016.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

PERCENT SOLIDS
Samples SB-01(7-8) (240-64423-1), SB-01(17-18) (240-64423-2), SB-03(9-10) (240-64423-3), SB-03(15-16) (240-64423-4), SB-09(4-8) (240-64423-5), SB-09(19-20) (240-64423-6), SB-07(7-8) (240-64423-7), SB-07(19-20) (240-64423-8), SB-07(20-22) (240-64423-9), SB-06(15-16) (240-64423-10), SB-06(21-23) (240-64423-11), DUP-01 (240-64423-12), SB-10(9-10) (240-64423-13), SB-10(15-16) (240-64423-14), SB-02(8-10) (240-64423-15), SB-02(16-20) (240-64423-16), SB-08(3-4) (240-64423-17) and SB-08(18.5-19.5) (240-64423-18) were analyzed for percent solids in accordance with EPA Method 160.3 MOD. The samples were analyzed on 05/05/2016.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Method Summary

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL CAN
Moisture	Percent Moisture	EPA	TAL CAN

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL CAN = TestAmerica Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

Sample Summary

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
240-64423-1	SB-01(7-8)	Solid	05/02/16 09:45	05/05/16 09:50
240-64423-2	SB-01(17-18)	Solid	05/02/16 10:00	05/05/16 09:50
240-64423-3	SB-03(9-10)	Solid	05/03/16 09:50	05/05/16 09:50
240-64423-4	SB-03(15-16)	Solid	05/03/16 09:55	05/05/16 09:50
240-64423-5	SB-09(4-8)	Solid	05/03/16 11:00	05/05/16 09:50
240-64423-6	SB-09(19-20)	Solid	05/03/16 11:10	05/05/16 09:50
240-64423-7	SB-07(7-8)	Solid	05/03/16 13:40	05/05/16 09:50
240-64423-8	SB-07(19-20)	Solid	05/03/16 14:25	05/05/16 09:50
240-64423-9	SB-07(20-22)	Solid	05/03/16 14:35	05/05/16 09:50
240-64423-10	SB-06(15-16)	Solid	05/03/16 15:05	05/05/16 09:50
240-64423-11	SB-06(21-23)	Solid	05/03/16 15:25	05/05/16 09:50
240-64423-12	DUP-01	Solid	05/03/16 00:00	05/05/16 09:50
240-64423-13	SB-10(9-10)	Solid	05/03/16 12:50	05/05/16 09:50
240-64423-14	SB-10(15-16)	Solid	05/03/16 13:10	05/05/16 09:50
240-64423-15	SB-02(8-10)	Solid	05/03/16 16:45	05/05/16 09:50
240-64423-16	SB-02(16-20)	Solid	05/03/16 16:35	05/05/16 09:50
240-64423-17	SB-08(3-4)	Solid	05/03/16 17:20	05/05/16 09:50
240-64423-18	SB-08(18.5-19.5)	Solid	05/03/16 17:30	05/05/16 09:50
240-64423-19	TRIP BLANK	Water	05/03/16 00:00	05/05/16 09:50
240-64423-20	TRIP BLANK	Water	05/03/16 00:00	05/05/16 09:50

Detection Summary

Client Sample ID: SB-01(7-8) Lab Sample ID: 240-64423-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Tetrachloroethene	12	H	4.3		ug/Kg	1	☼	8260B	Total/NA

Client Sample ID: SB-01(17-18) Lab Sample ID: 240-64423-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Tetrachloroethene	21	H	4.2		ug/Kg	1	☼	8260B	Total/NA

Client Sample ID: SB-03(9-10) Lab Sample ID: 240-64423-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Trichloroethene	33	H	3.8		ug/Kg	1	☼	8260B	Total/NA

Client Sample ID: SB-03(15-16) Lab Sample ID: 240-64423-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Tetrachloroethene	60000		2300		ug/Kg	10	☼	8260B	Total/NA
Trichloroethene	6100		2300		ug/Kg	10	☼	8260B	Total/NA

Client Sample ID: SB-09(4-8) Lab Sample ID: 240-64423-5

No Detections.

Client Sample ID: SB-09(19-20) Lab Sample ID: 240-64423-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Tetrachloroethene	5.2	H	4.7		ug/Kg	1	☼	8260B	Total/NA

Client Sample ID: SB-07(7-8) Lab Sample ID: 240-64423-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Tetrachloroethene	460		210		ug/Kg	1	☼	8260B	Total/NA

Client Sample ID: SB-07(19-20) Lab Sample ID: 240-64423-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Tetrachloroethene	470		200		ug/Kg	1	☼	8260B	Total/NA

Client Sample ID: SB-07(20-22) Lab Sample ID: 240-64423-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Tetrachloroethene	2000000		100000		ug/Kg	500	☼	8260B	Total/NA

Client Sample ID: SB-06(15-16) Lab Sample ID: 240-64423-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Tetrachloroethene	13		4.1		ug/Kg	1	☼	8260B	Total/NA

Client Sample ID: SB-06(21-23) Lab Sample ID: 240-64423-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Tetrachloroethene	1800		200		ug/Kg	1	☼	8260B	Total/NA

This Detection Summary does not include radiochemical test results.

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Client Sample ID: DUP-01 Lab Sample ID: 240-64423-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Tetrachloroethene	330		200		ug/Kg	1	☼	8260B	Total/NA

Client Sample ID: SB-10(9-10) Lab Sample ID: 240-64423-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Tetrachloroethene	6.3	H	4.2		ug/Kg	1	☼	8260B	Total/NA

Client Sample ID: SB-10(15-16) Lab Sample ID: 240-64423-14

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Tetrachloroethene	9.1		4.0		ug/Kg	1	☼	8260B	Total/NA

Client Sample ID: SB-02(8-10) Lab Sample ID: 240-64423-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Tetrachloroethene	210		200		ug/Kg	1	☼	8260B	Total/NA
Trichloroethene	220		200		ug/Kg	1	☼	8260B	Total/NA

Client Sample ID: SB-02(16-20) Lab Sample ID: 240-64423-16

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Tetrachloroethene	22		4.2		ug/Kg	1	☼	8260B	Total/NA
Trichloroethene	58		4.2		ug/Kg	1	☼	8260B	Total/NA

Client Sample ID: SB-08(3-4) Lab Sample ID: 240-64423-17

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Tetrachloroethene	6.9		3.9		ug/Kg	1	☼	8260B	Total/NA

Client Sample ID: SB-08(18.5-19.5) Lab Sample ID: 240-64423-18

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Tetrachloroethene	1300		220		ug/Kg	1	☼	8260B	Total/NA

Client Sample ID: TRIP BLANK Lab Sample ID: 240-64423-19

No Detections.

Client Sample ID: TRIP BLANK Lab Sample ID: 240-64423-20

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client Sample ID: SB-01(7-8)

Lab Sample ID: 240-64423-1

Date Collected: 05/02/16 09:45
Date Received: 05/05/16 09:50
Matrix: Solid
Percent Solids: 94.7

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND	H	4.3		ug/Kg	☼	05/05/16 13:00	05/11/16 05:57	1
Tetrachloroethene	**12**	**H**	4.3		ug/Kg	☼	05/05/16 13:00	05/11/16 05:57	1
trans-1,2-Dichloroethene	ND	H	4.3		ug/Kg	☼	05/05/16 13:00	05/11/16 05:57	1
Trichloroethene	ND	H	4.3		ug/Kg	☼	05/05/16 13:00	05/11/16 05:57	1
Vinyl chloride	ND	H	4.3		ug/Kg	☼	05/05/16 13:00	05/11/16 05:57	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*100*		*58 - 123*	*05/05/16 13:00*	*05/11/16 05:57*	*1*
4-Bromofluorobenzene (Surr)	*95*		*52 - 136*	*05/05/16 13:00*	*05/11/16 05:57*	*1*
Dibromofluoromethane (Surr)	*109*		*37 - 132*	*05/05/16 13:00*	*05/11/16 05:57*	*1*
Toluene-d8 (Surr)	*115*		*67 - 125*	*05/05/16 13:00*	*05/11/16 05:57*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	**94.7**		0.1		%			05/05/16 23:28	1

Client Sample Results

Client: TRC Environmental Corporation
Project/Site: Valley Pike

TestAmerica Job ID: 240-64423-1

Client Sample ID: SB-01(17-18)

Date Collected: 05/02/16 10:00
Date Received: 05/05/16 09:50

Lab Sample ID: 240-64423-2

Matrix: Solid
Percent Solids: 95.5

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND	H	4.2		ug/Kg	☼	05/05/16 13:00	05/11/16 06:19	1
Tetrachloroethene	**21**	**H**	4.2		ug/Kg	☼	05/05/16 13:00	05/11/16 06:19	1
trans-1,2-Dichloroethene	ND	H	4.2		ug/Kg	☼	05/05/16 13:00	05/11/16 06:19	1
Trichloroethene	ND	H	4.2		ug/Kg	☼	05/05/16 13:00	05/11/16 06:19	1
Vinyl chloride	ND	H	4.2		ug/Kg	☼	05/05/16 13:00	05/11/16 06:19	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*102*		*58 - 123*	*05/05/16 13:00*	*05/11/16 06:19*	*1*
4-Bromofluorobenzene (Surr)	*100*		*52 - 136*	*05/05/16 13:00*	*05/11/16 06:19*	*1*
Dibromofluoromethane (Surr)	*106*		*37 - 132*	*05/05/16 13:00*	*05/11/16 06:19*	*1*
Toluene-d8 (Surr)	*113*		*67 - 125*	*05/05/16 13:00*	*05/11/16 06:19*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	**95.5**		0.1		%			05/05/16 23:28	1

Client Sample Results

1 2 3 4 5 6 7 8 9 10 11 12 13 14

Client Sample ID: SB-03(9-10)

Lab Sample ID: 240-64423-3

Date Collected: 05/03/16 09:50
Matrix: Solid
Date Received: 05/05/16 09:50
Percent Solids: 97.5

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND	H	3.8		ug/Kg	☼	05/05/16 13:00	05/11/16 06:40	1
Tetrachloroethene	ND	H	3.8		ug/Kg	☼	05/05/16 13:00	05/11/16 06:40	1
trans-1,2-Dichloroethene	ND	H	3.8		ug/Kg	☼	05/05/16 13:00	05/11/16 06:40	1
Trichloroethene	**33**	**H**	3.8		ug/Kg	☼	05/05/16 13:00	05/11/16 06:40	1
Vinyl chloride	ND	H	3.8		ug/Kg	☼	05/05/16 13:00	05/11/16 06:40	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*104*		*58 - 123*	*05/05/16 13:00*	*05/11/16 06:40*	*1*
4-Bromofluorobenzene (Surr)	*98*		*52 - 136*	*05/05/16 13:00*	*05/11/16 06:40*	*1*
Dibromofluoromethane (Surr)	*110*		*37 - 132*	*05/05/16 13:00*	*05/11/16 06:40*	*1*
Toluene-d8 (Surr)	*112*		*67 - 125*	*05/05/16 13:00*	*05/11/16 06:40*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	**97.5**		0.1		%			05/05/16 23:28	1

Client Sample ID: SB-03(15-16)

Date Collected: 05/03/16 09:55
Date Received: 05/05/16 09:50

Lab Sample ID: 240-64423-4
Matrix: Solid
Percent Solids: 88.2

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		2300		ug/Kg	☼	05/06/16 10:39	05/11/16 09:51	10
Tetrachloroethene	**60000**		2300		ug/Kg	☼	05/06/16 10:39	05/11/16 09:51	10
trans-1,2-Dichloroethene	ND		2300		ug/Kg	☼	05/06/16 10:39	05/11/16 09:51	10
Trichloroethene	**6100**		2300		ug/Kg	☼	05/06/16 10:39	05/11/16 09:51	10
Vinyl chloride	ND		2300		ug/Kg	☼	05/06/16 10:39	05/11/16 09:51	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*251*	*X*	*39 - 128*	*05/06/16 10:39*	*05/11/16 09:51*	*10*
4-Bromofluorobenzene (Surr)	*237*	*X*	*26 - 141*	*05/06/16 10:39*	*05/11/16 09:51*	*10*
Dibromofluoromethane (Surr)	*231*	*X*	*30 - 122*	*05/06/16 10:39*	*05/11/16 09:51*	*10*
Toluene-d8 (Surr)	*263*	*X*	*33 - 134*	*05/06/16 10:39*	*05/11/16 09:51*	*10*

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	**88.2**		0.1		%			05/05/16 23:28	1

Client Sample Results

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Client Sample ID: SB-09(4-8)

Lab Sample ID: 240-64423-5

Date Collected: 05/03/16 11:00

Matrix: Solid

Date Received: 05/05/16 09:50

Percent Solids: 97.5

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND	H	4.5		ug/Kg	☼	05/05/16 13:00	05/11/16 07:01	1
Tetrachloroethene	ND	H	4.5		ug/Kg	☼	05/05/16 13:00	05/11/16 07:01	1
trans-1,2-Dichloroethene	ND	H	4.5		ug/Kg	☼	05/05/16 13:00	05/11/16 07:01	1
Trichloroethene	ND	H	4.5		ug/Kg	☼	05/05/16 13:00	05/11/16 07:01	1
Vinyl chloride	ND	H	4.5		ug/Kg	☼	05/05/16 13:00	05/11/16 07:01	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*102*		*58 - 123*	*05/05/16 13:00*	*05/11/16 07:01*	*1*
4-Bromofluorobenzene (Surr)	*97*		*52 - 136*	*05/05/16 13:00*	*05/11/16 07:01*	*1*
Dibromofluoromethane (Surr)	*107*		*37 - 132*	*05/05/16 13:00*	*05/11/16 07:01*	*1*
Toluene-d8 (Surr)	*112*		*67 - 125*	*05/05/16 13:00*	*05/11/16 07:01*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	**97.5**		0.1		%			05/05/16 23:28	1

1 2 3 4 5 6 7 8 9 10 11 12 13 14

Client Sample ID: SB-09(19-20)

Lab Sample ID: 240-64423-6

Date Collected: 05/03/16 11:10
Date Received: 05/05/16 09:50

Matrix: Solid
Percent Solids: 95.9

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND	H	4.7		ug/Kg	☼	05/05/16 13:00	05/11/16 07:23	1
Tetrachloroethene	**5.2**	**H**	4.7		ug/Kg	☼	05/05/16 13:00	05/11/16 07:23	1
trans-1,2-Dichloroethene	ND	H	4.7		ug/Kg	☼	05/05/16 13:00	05/11/16 07:23	1
Trichloroethene	ND	H	4.7		ug/Kg	☼	05/05/16 13:00	05/11/16 07:23	1
Vinyl chloride	ND	H	4.7		ug/Kg	☼	05/05/16 13:00	05/11/16 07:23	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*107*		*58 - 123*	*05/05/16 13:00*	*05/11/16 07:23*	*1*
4-Bromofluorobenzene (Surr)	*101*		*52 - 136*	*05/05/16 13:00*	*05/11/16 07:23*	*1*
Dibromofluoromethane (Surr)	*114*		*37 - 132*	*05/05/16 13:00*	*05/11/16 07:23*	*1*
Toluene-d8 (Surr)	*114*		*67 - 125*	*05/05/16 13:00*	*05/11/16 07:23*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	**95.9**		0.1		%			05/05/16 23:28	1

DRAFT

Client Sample Results

Client: TRC Environmental Corporation
Project/Site: Valley Pike

TestAmerica Job ID: 240-64423-1

Client Sample ID: SB-07(7-8)

Date Collected: 05/03/16 13:40
Date Received: 05/05/16 09:50

Lab Sample ID: 240-64423-7

Matrix: Solid
Percent Solids: 97.6

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		210		ug/Kg	☼	05/06/16 10:39	05/11/16 10:13	1
Tetrachloroethene	**460**		210		ug/Kg	☼	05/06/16 10:39	05/11/16 10:13	1
trans-1,2-Dichloroethene	ND		210		ug/Kg	☼	05/06/16 10:39	05/11/16 10:13	1
Trichloroethene	ND		210		ug/Kg	☼	05/06/16 10:39	05/11/16 10:13	1
Vinyl chloride	ND		210		ug/Kg	☼	05/06/16 10:39	05/11/16 10:13	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*119*		*39 - 128*	*05/06/16 10:39*	*05/11/16 10:13*	*1*
4-Bromofluorobenzene (Surr)	*110*		*26 - 141*	*05/06/16 10:39*	*05/11/16 10:13*	*1*
Dibromofluoromethane (Surr)	*108*		*30 - 122*	*05/06/16 10:39*	*05/11/16 10:13*	*1*
Toluene-d8 (Surr)	*122*		*33 - 134*	*05/06/16 10:39*	*05/11/16 10:13*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	**97.6**		0.1		%			05/05/16 23:28	1

Client Sample ID: SB-07(19-20)

Lab Sample ID: 240-64423-8

Date Collected: 05/03/16 14:25
Date Received: 05/05/16 09:50

Matrix: Solid
Percent Solids: 97.3

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		200		ug/Kg	☼	05/06/16 10:39	05/11/16 10:34	1
Tetrachloroethene	**470**		200		ug/Kg	☼	05/06/16 10:39	05/11/16 10:34	1
trans-1,2-Dichloroethene	ND		200		ug/Kg	☼	05/06/16 10:39	05/11/16 10:34	1
Trichloroethene	ND		200		ug/Kg	☼	05/06/16 10:39	05/11/16 10:34	1
Vinyl chloride	ND		200		ug/Kg	☼	05/06/16 10:39	05/11/16 10:34	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*116*		*39 - 128*	*05/06/16 10:39*	*05/11/16 10:34*	*1*
4-Bromofluorobenzene (Surr)	*106*		*26 - 141*	*05/06/16 10:39*	*05/11/16 10:34*	*1*
Dibromofluoromethane (Surr)	*106*		*30 - 122*	*05/06/16 10:39*	*05/11/16 10:34*	*1*
Toluene-d8 (Surr)	*122*		*33 - 134*	*05/06/16 10:39*	*05/11/16 10:34*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	**97.3**		0.1		%			05/05/16 23:28	1

Client Sample ID: SB-07(20-22)

Lab Sample ID: 240-64423-9

Date Collected: 05/03/16 14:35
Date Received: 05/05/16 09:50

Matrix: Solid
Percent Solids: 88.3

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		100000		ug/Kg	☼	05/06/16 10:39	05/11/16 10:55	500
Tetrachloroethene	**2000000**		100000		ug/Kg	☼	05/06/16 10:39	05/11/16 10:55	500
trans-1,2-Dichloroethene	ND		100000		ug/Kg	☼	05/06/16 10:39	05/11/16 10:55	500
Trichloroethene	ND		100000		ug/Kg	☼	05/06/16 10:39	05/11/16 10:55	500
Vinyl chloride	ND		100000		ug/Kg	☼	05/06/16 10:39	05/11/16 10:55	500

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*6922*	*X*	*39 - 128*	*05/06/16 10:39*	*05/11/16 10:55*	*500*
4-Bromofluorobenzene (Surr)	*6625*	*X*	*26 - 141*	*05/06/16 10:39*	*05/11/16 10:55*	*500*
Dibromofluoromethane (Surr)	*6204*	*X*	*30 - 122*	*05/06/16 10:39*	*05/11/16 10:55*	*500*
Toluene-d8 (Surr)	*6829*	*X*	*33 - 134*	*05/06/16 10:39*	*05/11/16 10:55*	*500*

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	**88.3**		0.1		%			05/05/16 23:28	1

Client Sample Results

Client Sample ID: SB-06(15-16)

Lab Sample ID: 240-64423-10

Date Collected: 05/03/16 15:05
Date Received: 05/05/16 09:50
Matrix: Solid
Percent Solids: 97.1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		4.1		ug/Kg	☼	05/05/16 13:00	05/11/16 07:44	1
Tetrachloroethene	**13**		4.1		ug/Kg	☼	05/05/16 13:00	05/11/16 07:44	1
trans-1,2-Dichloroethene	ND		4.1		ug/Kg	☼	05/05/16 13:00	05/11/16 07:44	1
Trichloroethene	ND		4.1		ug/Kg	☼	05/05/16 13:00	05/11/16 07:44	1
Vinyl chloride	ND		4.1		ug/Kg	☼	05/05/16 13:00	05/11/16 07:44	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*108*		*58 - 123*	*05/05/16 13:00*	*05/11/16 07:44*	*1*
4-Bromofluorobenzene (Surr)	*98*		*52 - 136*	*05/05/16 13:00*	*05/11/16 07:44*	*1*
Dibromofluoromethane (Surr)	*117*		*37 - 132*	*05/05/16 13:00*	*05/11/16 07:44*	*1*
Toluene-d8 (Surr)	*124*		*67 - 125*	*05/05/16 13:00*	*05/11/16 07:44*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	**97.1**		0.1		%			05/05/16 23:28	1

Client Sample ID: SB-06(21-23)

Date Collected: 05/03/16 15:25
Date Received: 05/05/16 09:50

Lab Sample ID: 240-64423-11

Matrix: Solid
Percent Solids: 95.2

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		200		ug/Kg	☼	05/06/16 10:39	05/11/16 11:16	1
Tetrachloroethene	**1800**		200		ug/Kg	☼	05/06/16 10:39	05/11/16 11:16	1
trans-1,2-Dichloroethene	ND		200		ug/Kg	☼	05/06/16 10:39	05/11/16 11:16	1
Trichloroethene	ND		200		ug/Kg	☼	05/06/16 10:39	05/11/16 11:16	1
Vinyl chloride	ND		200		ug/Kg	☼	05/06/16 10:39	05/11/16 11:16	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*115*		*39 - 128*	*05/06/16 10:39*	*05/11/16 11:16*	*1*
4-Bromofluorobenzene (Surr)	*102*		*26 - 141*	*05/06/16 10:39*	*05/11/16 11:16*	*1*
Dibromofluoromethane (Surr)	*105*		*30 - 122*	*05/06/16 10:39*	*05/11/16 11:16*	*1*
Toluene-d8 (Surr)	*113*		*33 - 134*	*05/06/16 10:39*	*05/11/16 11:16*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	**95.2**		0.1		%			05/05/16 23:28	1

Client Sample Results

1 2 3 4 5 6 7 8 9 10 11 12 13 14

Client Sample ID: DUP-01
Lab Sample ID: 240-64423-12

Date Collected: 05/03/16 00:00
Matrix: Solid
Date Received: 05/05/16 09:50
Percent Solids: 98.2

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		200		ug/Kg	☼	05/06/16 10:39	05/11/16 11:37	1
Tetrachloroethene	**330**		200		ug/Kg	☼	05/06/16 10:39	05/11/16 11:37	1
trans-1,2-Dichloroethene	ND		200		ug/Kg	☼	05/06/16 10:39	05/11/16 11:37	1
Trichloroethene	ND		200		ug/Kg	☼	05/06/16 10:39	05/11/16 11:37	1
Vinyl chloride	ND		200		ug/Kg	☼	05/06/16 10:39	05/11/16 11:37	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*118*		*39 - 128*	*05/06/16 10:39*	*05/11/16 11:37*	*1*
4-Bromofluorobenzene (Surr)	*106*		*26 - 141*	*05/06/16 10:39*	*05/11/16 11:37*	*1*
Dibromofluoromethane (Surr)	*104*		*30 - 122*	*05/06/16 10:39*	*05/11/16 11:37*	*1*
Toluene-d8 (Surr)	*117*		*33 - 134*	*05/06/16 10:39*	*05/11/16 11:37*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	**98.2**		0.1		%			05/05/16 23:28	1

Client Sample ID: SB-10(9-10) Lab Sample ID: 240-64423-13

Date Collected: 05/03/16 12:50 **Matrix: Solid**
Date Received: 05/05/16 09:50 **Percent Solids: 97.3**

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND	H	4.2		ug/Kg	☼	05/05/16 13:00	05/13/16 04:53	1
Tetrachloroethene	**6.3**	**H**	4.2		ug/Kg	☼	05/05/16 13:00	05/13/16 04:53	1
trans-1,2-Dichloroethene	ND	H	4.2		ug/Kg	☼	05/05/16 13:00	05/13/16 04:53	1
Trichloroethene	ND	H	4.2		ug/Kg	☼	05/05/16 13:00	05/13/16 04:53	1
Vinyl chloride	ND	H	4.2		ug/Kg	☼	05/05/16 13:00	05/13/16 04:53	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*77*		*58 - 123*	*05/05/16 13:00*	*05/13/16 04:53*	*1*
4-Bromofluorobenzene (Surr)	*65*		*52 - 136*	*05/05/16 13:00*	*05/13/16 04:53*	*1*
Dibromofluoromethane (Surr)	*72*		*37 - 132*	*05/05/16 13:00*	*05/13/16 04:53*	*1*
Toluene-d8 (Surr)	*75*		*67 - 125*	*05/05/16 13:00*	*05/13/16 04:53*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	**97.3**		0.1		%			05/05/16 23:28	1

Client Sample Results

1 2 3 4 5 6 7 8 9 10 11 12 13 14

Client Sample ID: SB-10(15-16)

Date Collected: 05/03/16 13:10
Date Received: 05/05/16 09:50

Lab Sample ID: 240-64423-14

Matrix: Solid
Percent Solids: 96.9

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		4.0		ug/Kg	☼	05/05/16 13:00	05/11/16 08:05	1
Tetrachloroethene	**9.1**		4.0		ug/Kg	☼	05/05/16 13:00	05/11/16 08:05	1
trans-1,2-Dichloroethene	ND		4.0		ug/Kg	☼	05/05/16 13:00	05/11/16 08:05	1
Trichloroethene	ND		4.0		ug/Kg	☼	05/05/16 13:00	05/11/16 08:05	1
Vinyl chloride	ND		4.0		ug/Kg	☼	05/05/16 13:00	05/11/16 08:05	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*107*		*58 - 123*	*05/05/16 13:00*	*05/11/16 08:05*	*1*
4-Bromofluorobenzene (Surr)	*101*		*52 - 136*	*05/05/16 13:00*	*05/11/16 08:05*	*1*
Dibromofluoromethane (Surr)	*112*		*37 - 132*	*05/05/16 13:00*	*05/11/16 08:05*	*1*
Toluene-d8 (Surr)	*116*		*67 - 125*	*05/05/16 13:00*	*05/11/16 08:05*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	**96.9**		0.1		%			05/05/16 23:28	1

Client Sample Results

Client Sample ID: SB-02(8-10)

Lab Sample ID: 240-64423-15

Date Collected: 05/03/16 16:45
Date Received: 05/05/16 09:50
Matrix: Solid
Percent Solids: 97.0

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		200		ug/Kg	☼	05/06/16 10:39	05/11/16 12:20	1
Tetrachloroethene	**210**		200		ug/Kg	☼	05/06/16 10:39	05/11/16 12:20	1
trans-1,2-Dichloroethene	ND		200		ug/Kg	☼	05/06/16 10:39	05/11/16 12:20	1
Trichloroethene	**220**		200		ug/Kg	☼	05/06/16 10:39	05/11/16 12:20	1
Vinyl chloride	ND		200		ug/Kg	☼	05/06/16 10:39	05/11/16 12:20	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*109*		*39 - 128*	*05/06/16 10:39*	*05/11/16 12:20*	*1*
4-Bromofluorobenzene (Surr)	*95*		*26 - 141*	*05/06/16 10:39*	*05/11/16 12:20*	*1*
Dibromofluoromethane (Surr)	*97*		*30 - 122*	*05/06/16 10:39*	*05/11/16 12:20*	*1*
Toluene-d8 (Surr)	*108*		*33 - 134*	*05/06/16 10:39*	*05/11/16 12:20*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	**97.0**		0.1		%			05/05/16 23:28	1

Client Sample Results

Client Sample ID: SB-02(16-20)

Lab Sample ID: 240-64423-16

Date Collected: 05/03/16 16:35
Matrix: Solid
Date Received: 05/05/16 09:50
Percent Solids: 95.5

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		4.2		ug/Kg	☼	05/05/16 13:00	05/11/16 08:26	1
Tetrachloroethene	**22**		4.2		ug/Kg	☼	05/05/16 13:00	05/11/16 08:26	1
trans-1,2-Dichloroethene	ND		4.2		ug/Kg	☼	05/05/16 13:00	05/11/16 08:26	1
Trichloroethene	**58**		4.2		ug/Kg	☼	05/05/16 13:00	05/11/16 08:26	1
Vinyl chloride	ND		4.2		ug/Kg	☼	05/05/16 13:00	05/11/16 08:26	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*102*		*58 - 123*	*05/05/16 13:00*	*05/11/16 08:26*	*1*
4-Bromofluorobenzene (Surr)	*94*		*52 - 136*	*05/05/16 13:00*	*05/11/16 08:26*	*1*
Dibromofluoromethane (Surr)	*108*		*37 - 132*	*05/05/16 13:00*	*05/11/16 08:26*	*1*
Toluene-d8 (Surr)	*119*		*67 - 125*	*05/05/16 13:00*	*05/11/16 08:26*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	**95.5**		0.1		%			05/05/16 23:28	1

Client Sample ID: SB-08(3-4)

Date Collected: 05/03/16 17:20
Date Received: 05/05/16 09:50

Lab Sample ID: 240-64423-17

Matrix: Solid
Percent Solids: 94.7

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		3.9		ug/Kg	☼	05/05/16 13:00	05/13/16 05:15	1
Tetrachloroethene	**6.9**		3.9		ug/Kg	☼	05/05/16 13:00	05/13/16 05:15	1
trans-1,2-Dichloroethene	ND		3.9		ug/Kg	☼	05/05/16 13:00	05/13/16 05:15	1
Trichloroethene	ND		3.9		ug/Kg	☼	05/05/16 13:00	05/13/16 05:15	1
Vinyl chloride	ND		3.9		ug/Kg	☼	05/05/16 13:00	05/13/16 05:15	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*74*		*58 - 123*	*05/05/16 13:00*	*05/13/16 05:15*	*1*
4-Bromofluorobenzene (Surr)	*65*		*52 - 136*	*05/05/16 13:00*	*05/13/16 05:15*	*1*
Dibromofluoromethane (Surr)	*69*		*37 - 132*	*05/05/16 13:00*	*05/13/16 05:15*	*1*
Toluene-d8 (Surr)	*73*		*67 - 125*	*05/05/16 13:00*	*05/13/16 05:15*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	**94.7**		0.1		%			05/05/16 23:28	1

Client Sample ID: SB-08(18.5-19.5)

Date Collected: 05/03/16 17:30
Date Received: 05/05/16 09:50

Lab Sample ID: 240-64423-18

Matrix: Solid
Percent Solids: 97.8

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		220		ug/Kg	☼	05/06/16 10:39	05/13/16 05:36	1
Tetrachloroethene	**1300**		220		ug/Kg	☼	05/06/16 10:39	05/13/16 05:36	1
trans-1,2-Dichloroethene	ND		220		ug/Kg	☼	05/06/16 10:39	05/13/16 05:36	1
Trichloroethene	ND		220		ug/Kg	☼	05/06/16 10:39	05/13/16 05:36	1
Vinyl chloride	ND		220		ug/Kg	☼	05/06/16 10:39	05/13/16 05:36	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*89*		*39 - 128*	*05/06/16 10:39*	*05/13/16 05:36*	*1*
4-Bromofluorobenzene (Surr)	*88*		*26 - 141*	*05/06/16 10:39*	*05/13/16 05:36*	*1*
Dibromofluoromethane (Surr)	*82*		*30 - 122*	*05/06/16 10:39*	*05/13/16 05:36*	*1*
Toluene-d8 (Surr)	*94*		*33 - 134*	*05/06/16 10:39*	*05/13/16 05:36*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	**97.8**		0.1		%			05/05/16 23:28	1

Client Sample ID: TRIP BLANK

Date Collected: 05/03/16 00:00
Date Received: 05/05/16 09:50

Lab Sample ID: 240-64423-19
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		1.0		ug/L			05/14/16 16:15	1
Tetrachloroethene	ND		1.0		ug/L			05/14/16 16:15	1
trans-1,2-Dichloroethene	ND		1.0		ug/L			05/14/16 16:15	1
Trichloroethene	ND		1.0		ug/L			05/14/16 16:15	1
Vinyl chloride	ND		1.0		ug/L			05/14/16 16:15	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*93*		*78 - 125*		*05/14/16 16:15*	*1*
4-Bromofluorobenzene (Surr)	*99*		*61 - 120*		*05/14/16 16:15*	*1*
Dibromofluoromethane (Surr)	*103*		*79 - 120*		*05/14/16 16:15*	*1*
Toluene-d8 (Surr)	*101*		*80 - 120*		*05/14/16 16:15*	*1*

Client Sample Results

Client Sample ID: TRIP BLANK

Lab Sample ID: 240-64423-20

Date Collected: 05/03/16 00:00
Date Received: 05/05/16 09:50

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		1.0		ug/L			05/14/16 16:37	1
Tetrachloroethene	ND		1.0		ug/L			05/14/16 16:37	1
trans-1,2-Dichloroethene	ND		1.0		ug/L			05/14/16 16:37	1
Trichloroethene	ND		1.0		ug/L			05/14/16 16:37	1
Vinyl chloride	ND		1.0		ug/L			05/14/16 16:37	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*91*		*78 - 125*		*05/14/16 16:37*	*1*
4-Bromofluorobenzene (Surr)	*96*		*61 - 120*		*05/14/16 16:37*	*1*
Dibromofluoromethane (Surr)	*100*		*79 - 120*		*05/14/16 16:37*	*1*
Toluene-d8 (Surr)	*100*		*80 - 120*		*05/14/16 16:37*	*1*

Surrogate Summary

Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		12DCE	BFB	DBFM	TOL
Lab Sample ID	**Client Sample ID**	**(58-123)**	**(52-136)**	**(37-132)**	**(67-125)**
240-64423-1	SB-01(7-8)	100	95	109	115
240-64423-2	SB-01(17-18)	102	100	106	113
240-64423-3	SB-03(9-10)	104	98	110	112
240-64423-5	SB-09(4-8)	102	97	107	112
240-64423-6	SB-09(19-20)	107	101	114	114
240-64423-10	SB-06(15-16)	108	98	117	124
240-64423-13	SB-10(9-10)	77	65	72	75
240-64423-14	SB-10(15-16)	107	101	112	116
240-64423-16	SB-02(16-20)	102	94	108	119
240-64423-17	SB-08(3-4)	74	65	69	73
LCS 240-229723/6	Lab Control Sample	94	94	106	110
LCS 240-230141/13	Lab Control Sample	75	74	79	80
MB 240-229192/1-A	Method Blank	96	94	98	107
MB 240-229192/3-A	Method Blank	91	86	89	89

Surrogate Legend

12DCE = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		12DCE	BFB	DBFM	TOL
Lab Sample ID	**Client Sample ID**	**(39-128)**	**(26-141)**	**(30-122)**	**(33-134)**
240-64423-4	SB-03(15-16)	251 X	237 X	231 X	263 X
240-64423-7	SB-07(7-8)	119	110	108	122
240-64423-8	SB-07(19-20)	116	106	106	122
240-64423-9	SB-07(20-22)	6922 X	6625 X	6204 X	6829 X
240-64423-11	SB-06(21-23)	115	102	105	113
240-64423-12	DUP-01	118	106	104	117
240-64423-15	SB-02(8-10)	109	95	97	108
240-64423-18	SB-08(18.5-19.5)	89	88	82	94
LCS 240-229166/2-A	Lab Control Sample	102	93	101	99
MB 240-229166/1-A	Method Blank	103	93	93	105

Surrogate Legend

12DCE = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Surrogate Summary

Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		12DCE	**BFB**	**DBFM**	**TOL**
Lab Sample ID	**Client Sample ID**	**(78-125)**	**(61-120)**	**(79-120)**	**(80-120)**
240-64423-19	TRIP BLANK	93	99	103	101
240-64423-20	TRIP BLANK	91	96	100	100
LCS 240-230335/4	Lab Control Sample	84	101	94	112
MB 240-230335/6	Method Blank	92	96	98	106

Surrogate Legend

12DCE = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8260B - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 240-229166/1-A
Matrix: Solid
Analysis Batch: 229723

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 229166

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		250		ug/Kg		05/06/16 10:39	05/11/16 09:09	1
Tetrachloroethene	ND		250		ug/Kg		05/06/16 10:39	05/11/16 09:09	1
trans-1,2-Dichloroethene	ND		250		ug/Kg		05/06/16 10:39	05/11/16 09:09	1
Trichloroethene	ND		250		ug/Kg		05/06/16 10:39	05/11/16 09:09	1
Vinyl chloride	ND		250		ug/Kg		05/06/16 10:39	05/11/16 09:09	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*103*		*39 - 128*	*05/06/16 10:39*	*05/11/16 09:09*	*1*
4-Bromofluorobenzene (Surr)	*93*		*26 - 141*	*05/06/16 10:39*	*05/11/16 09:09*	*1*
Dibromofluoromethane (Surr)	*93*		*30 - 122*	*05/06/16 10:39*	*05/11/16 09:09*	*1*
Toluene-d8 (Surr)	*105*		*33 - 134*	*05/06/16 10:39*	*05/11/16 09:09*	*1*

Lab Sample ID: LCS 240-229166/2-A
Matrix: Solid
Analysis Batch: 229723

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 229166

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
cis-1,2-Dichloroethene	1000	988		ug/Kg		99	60 - 125
Tetrachloroethene	1000	868		ug/Kg		87	58 - 131
trans-1,2-Dichloroethene	1000	951		ug/Kg		95	58 - 121
Trichloroethene	1000	944		ug/Kg		94	59 - 124
Vinyl chloride	1000	702		ug/Kg		70	33 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*102*		*39 - 128*
4-Bromofluorobenzene (Surr)	*93*		*26 - 141*
Dibromofluoromethane (Surr)	*101*		*30 - 122*
Toluene-d8 (Surr)	*99*		*33 - 134*

Lab Sample ID: MB 240-229192/1-A
Matrix: Solid
Analysis Batch: 229723

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 229192

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		5.0		ug/Kg		05/06/16 12:09	05/11/16 04:54	1
Tetrachloroethene	ND		5.0		ug/Kg		05/06/16 12:09	05/11/16 04:54	1
trans-1,2-Dichloroethene	ND		5.0		ug/Kg		05/06/16 12:09	05/11/16 04:54	1
Trichloroethene	ND		5.0		ug/Kg		05/06/16 12:09	05/11/16 04:54	1
Vinyl chloride	ND		5.0		ug/Kg		05/06/16 12:09	05/11/16 04:54	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*96*		*58 - 123*	*05/06/16 12:09*	*05/11/16 04:54*	*1*
4-Bromofluorobenzene (Surr)	*94*		*52 - 136*	*05/06/16 12:09*	*05/11/16 04:54*	*1*
Dibromofluoromethane (Surr)	*98*		*37 - 132*	*05/06/16 12:09*	*05/11/16 04:54*	*1*
Toluene-d8 (Surr)	*107*		*67 - 125*	*05/06/16 12:09*	*05/11/16 04:54*	*1*

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 240-229192/3-A
Matrix: Solid
Analysis Batch: 230141

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 229192

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		5.0		ug/Kg		05/06/16 12:09	05/13/16 04:11	1
Tetrachloroethene	ND		5.0		ug/Kg		05/06/16 12:09	05/13/16 04:11	1
trans-1,2-Dichloroethene	ND		5.0		ug/Kg		05/06/16 12:09	05/13/16 04:11	1
Trichloroethene	ND		5.0		ug/Kg		05/06/16 12:09	05/13/16 04:11	1
Vinyl chloride	ND		5.0		ug/Kg		05/06/16 12:09	05/13/16 04:11	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*91*		*58 - 123*	*05/06/16 12:09*	*05/13/16 04:11*	*1*
4-Bromofluorobenzene (Surr)	*86*		*52 - 136*	*05/06/16 12:09*	*05/13/16 04:11*	*1*
Dibromofluoromethane (Surr)	*89*		*37 - 132*	*05/06/16 12:09*	*05/13/16 04:11*	*1*
Toluene-d8 (Surr)	*89*		*67 - 125*	*05/06/16 12:09*	*05/13/16 04:11*	*1*

Lab Sample ID: LCS 240-229723/6
Matrix: Solid
Analysis Batch: 229723

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
cis-1,2-Dichloroethene	50.0	52.1		ug/Kg		104	76 - 120
Tetrachloroethene	50.0	54.3		ug/Kg		109	79 - 120
trans-1,2-Dichloroethene	50.0	55.1		ug/Kg		110	78 - 120
Trichloroethene	50.0	54.5		ug/Kg		109	79 - 120
Vinyl chloride	50.0	49.3		ug/Kg		99	57 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*94*		*58 - 123*
4-Bromofluorobenzene (Surr)	*94*		*52 - 136*
Dibromofluoromethane (Surr)	*106*		*37 - 132*
Toluene-d8 (Surr)	*110*		*67 - 125*

Lab Sample ID: LCS 240-230141/13
Matrix: Solid
Analysis Batch: 230141

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
cis-1,2-Dichloroethene	25.0	21.9		ug/Kg		88	76 - 120
Tetrachloroethene	25.0	22.4		ug/Kg		90	79 - 120
trans-1,2-Dichloroethene	25.0	24.2		ug/Kg		97	78 - 120
Trichloroethene	25.0	22.5		ug/Kg		90	79 - 120
Vinyl chloride	25.0	22.1		ug/Kg		88	57 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*75*		*58 - 123*
4-Bromofluorobenzene (Surr)	*74*		*52 - 136*
Dibromofluoromethane (Surr)	*79*		*37 - 132*
Toluene-d8 (Surr)	*80*		*67 - 125*

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 240-230335/6
Matrix: Water
Analysis Batch: 230335

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		1.0		ug/L			05/14/16 11:27	1
Tetrachloroethene	ND		1.0		ug/L			05/14/16 11:27	1
trans-1,2-Dichloroethene	ND		1.0		ug/L			05/14/16 11:27	1
Trichloroethene	ND		1.0		ug/L			05/14/16 11:27	1
Vinyl chloride	ND		1.0		ug/L			05/14/16 11:27	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*92*		*78 - 125*		*05/14/16 11:27*	*1*
4-Bromofluorobenzene (Surr)	*96*		*61 - 120*		*05/14/16 11:27*	*1*
Dibromofluoromethane (Surr)	*98*		*79 - 120*		*05/14/16 11:27*	*1*
Toluene-d8 (Surr)	*106*		*80 - 120*		*05/14/16 11:27*	*1*

Lab Sample ID: LCS 240-230335/4
Matrix: Water
Analysis Batch: 230335

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
cis-1,2-Dichloroethene			10.0	10.5		ug/L		105	79 - 120
Tetrachloroethene			10.0	11.5		ug/L		115	78 - 121
trans-1,2-Dichloroethene			10.0	11.3		ug/L		113	80 - 124
Trichloroethene			10.0	10.3		ug/L		103	80 - 121
Vinyl chloride			10.0	11.1		ug/L		111	52 - 121

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*84*		*78 - 125*
4-Bromofluorobenzene (Surr)	*101*		*61 - 120*
Dibromofluoromethane (Surr)	*94*		*79 - 120*
Toluene-d8 (Surr)	*112*		*80 - 120*

Method: Moisture - Percent Moisture

Lab Sample ID: 240-64423-1 DU
Matrix: Solid
Analysis Batch: 229093

Client Sample ID: SB-01(7-8)
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Percent Solids	94.7			96.1		%				1	20

Lab Sample ID: 240-64423-10 DU
Matrix: Solid
Analysis Batch: 229093

Client Sample ID: SB-06(15-16)
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Percent Solids	97.1			97.1		%				0	20

GC/MS VOA

Prep Batch: 229166

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-64423-4	SB-03(15-16)	Total/NA	Solid	5035	
240-64423-7	SB-07(7-8)	Total/NA	Solid	5035	
240-64423-8	SB-07(19-20)	Total/NA	Solid	5035	
240-64423-9	SB-07(20-22)	Total/NA	Solid	5035	
240-64423-11	SB-06(21-23)	Total/NA	Solid	5035	
240-64423-12	DUP-01	Total/NA	Solid	5035	
240-64423-15	SB-02(8-10)	Total/NA	Solid	5035	
240-64423-18	SB-08(18.5-19.5)	Total/NA	Solid	5035	
LCS 240-229166/2-A	Lab Control Sample	Total/NA	Solid	5035	
MB 240-229166/1-A	Method Blank	Total/NA	Solid	5035	

Prep Batch: 229192

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-64423-1	SB-01(7-8)	Total/NA	Solid	5035	
240-64423-2	SB-01(17-18)	Total/NA	Solid	5035	
240-64423-3	SB-03(9-10)	Total/NA	Solid	5035	
240-64423-5	SB-09(4-8)	Total/NA	Solid	5035	
240-64423-6	SB-09(19-20)	Total/NA	Solid	5035	
240-64423-10	SB-06(15-16)	Total/NA	Solid	5035	
240-64423-13	SB-10(9-10)	Total/NA	Solid	5035	
240-64423-14	SB-10(15-16)	Total/NA	Solid	5035	
240-64423-16	SB-02(16-20)	Total/NA	Solid	5035	
240-64423-17	SB-08(3-4)	Total/NA	Solid	5035	
MB 240-229192/1-A	Method Blank	Total/NA	Solid	5035	
MB 240-229192/3-A	Method Blank	Total/NA	Solid	5035	

Analysis Batch: 229723

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-64423-1	SB-01(7-8)	Total/NA	Solid	8260B	229192
240-64423-2	SB-01(17-18)	Total/NA	Solid	8260B	229192
240-64423-3	SB-03(9-10)	Total/NA	Solid	8260B	229192
240-64423-4	SB-03(15-16)	Total/NA	Solid	8260B	229166
240-64423-5	SB-09(4-8)	Total/NA	Solid	8260B	229192
240-64423-6	SB-09(19-20)	Total/NA	Solid	8260B	229192
240-64423-7	SB-07(7-8)	Total/NA	Solid	8260B	229166
240-64423-8	SB-07(19-20)	Total/NA	Solid	8260B	229166
240-64423-9	SB-07(20-22)	Total/NA	Solid	8260B	229166
240-64423-10	SB-06(15-16)	Total/NA	Solid	8260B	229192
240-64423-11	SB-06(21-23)	Total/NA	Solid	8260B	229166
240-64423-12	DUP-01	Total/NA	Solid	8260B	229166
240-64423-14	SB-10(15-16)	Total/NA	Solid	8260B	229192
240-64423-15	SB-02(8-10)	Total/NA	Solid	8260B	229166
240-64423-16	SB-02(16-20)	Total/NA	Solid	8260B	229192
LCS 240-229166/2-A	Lab Control Sample	Total/NA	Solid	8260B	229166
LCS 240-229723/6	Lab Control Sample	Total/NA	Solid	8260B	
MB 240-229166/1-A	Method Blank	Total/NA	Solid	8260B	229166
MB 240-229192/1-A	Method Blank	Total/NA	Solid	8260B	229192

Analysis Batch: 230141

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-64423-13	SB-10(9-10)	Total/NA	Solid	8260B	229192

GC/MS VOA (Continued)

Analysis Batch: 230141 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-64423-17	SB-08(3-4)	Total/NA	Solid	8260B	229192
240-64423-18	SB-08(18.5-19.5)	Total/NA	Solid	8260B	229166
LCS 240-230141/13	Lab Control Sample	Total/NA	Solid	8260B	
MB 240-229192/3-A	Method Blank	Total/NA	Solid	8260B	229192

Analysis Batch: 230335

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-64423-19	TRIP BLANK	Total/NA	Water	8260B	
240-64423-20	TRIP BLANK	Total/NA	Water	8260B	
LCS 240-230335/4	Lab Control Sample	Total/NA	Water	8260B	
MB 240-230335/6	Method Blank	Total/NA	Water	8260B	

General Chemistry

Analysis Batch: 229093

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-64423-1	SB-01(7-8)	Total/NA	Solid	Moisture	
240-64423-1 DU	SB-01(7-8)	Total/NA	Solid	Moisture	
240-64423-2	SB-01(17-18)	Total/NA	Solid	Moisture	
240-64423-3	SB-03(9-10)	Total/NA	Solid	Moisture	
240-64423-4	SB-03(15-16)	Total/NA	Solid	Moisture	
240-64423-5	SB-09(4-8)	Total/NA	Solid	Moisture	
240-64423-6	SB-09(19-20)	Total/NA	Solid	Moisture	
240-64423-7	SB-07(7-8)	Total/NA	Solid	Moisture	
240-64423-8	SB-07(19-20)	Total/NA	Solid	Moisture	
240-64423-9	SB-07(20-22)	Total/NA	Solid	Moisture	
240-64423-10	SB-06(15-16)	Total/NA	Solid	Moisture	
240-64423-10 DU	SB-06(15-16)	Total/NA	Solid	Moisture	
240-64423-11	SB-06(21-23)	Total/NA	Solid	Moisture	
240-64423-12	DUP-01	Total/NA	Solid	Moisture	
240-64423-13	SB-10(9-10)	Total/NA	Solid	Moisture	
240-64423-14	SB-10(15-16)	Total/NA	Solid	Moisture	
240-64423-15	SB-02(8-10)	Total/NA	Solid	Moisture	
240-64423-16	SB-02(16-20)	Total/NA	Solid	Moisture	
240-64423-17	SB-08(3-4)	Total/NA	Solid	Moisture	
240-64423-18	SB-08(18.5-19.5)	Total/NA	Solid	Moisture	

Client Sample ID: SB-01(7-8)

Lab Sample ID: 240-64423-1
Date Collected: 05/02/16 09:45
Matrix: Solid
Date Received: 05/05/16 09:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	229093	05/05/16 23:28	JWW	TAL CAN

Client Sample ID: SB-01(7-8)

Lab Sample ID: 240-64423-1
Date Collected: 05/02/16 09:45
Matrix: Solid
Date Received: 05/05/16 09:50
Percent Solids: 94.7

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			229192	05/05/16 13:00	LAM	TAL CAN
Total/NA	Analysis	8260B		1	229723	05/11/16 05:57	TJL2	TAL CAN

Client Sample ID: SB-01(17-18)

Lab Sample ID: 240-64423-2
Date Collected: 05/02/16 10:00
Matrix: Solid
Date Received: 05/05/16 09:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	229093	05/05/16 23:28	JWW	TAL CAN

Client Sample ID: SB-01(17-18)

Lab Sample ID: 240-64423-2
Date Collected: 05/02/16 10:00
Matrix: Solid
Date Received: 05/05/16 09:50
Percent Solids: 95.5

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			229192	05/05/16 13:00	LAM	TAL CAN
Total/NA	Analysis	8260B		1	229723	05/11/16 06:19	TJL2	TAL CAN

Client Sample ID: SB-03(9-10)

Lab Sample ID: 240-64423-3
Date Collected: 05/03/16 09:50
Matrix: Solid
Date Received: 05/05/16 09:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	229093	05/05/16 23:28	JWW	TAL CAN

Client Sample ID: SB-03(9-10)

Lab Sample ID: 240-64423-3
Date Collected: 05/03/16 09:50
Matrix: Solid
Date Received: 05/05/16 09:50
Percent Solids: 97.5

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			229192	05/05/16 13:00	LAM	TAL CAN
Total/NA	Analysis	8260B		1	229723	05/11/16 06:40	TJL2	TAL CAN

Client Sample ID: SB-03(15-16)

Lab Sample ID: 240-64423-4
Date Collected: 05/03/16 09:55
Matrix: Solid
Date Received: 05/05/16 09:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	229093	05/05/16 23:28	JWW	TAL CAN

Client Sample ID: SB-03(15-16)

Lab Sample ID: 240-64423-4
Date Collected: 05/03/16 09:55
Matrix: Solid
Date Received: 05/05/16 09:50
Percent Solids: 88.2

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			229166	05/06/16 10:39	LAM	TAL CAN
Total/NA	Analysis	8260B		10	229723	05/11/16 09:51	TJL2	TAL CAN

Client Sample ID: SB-09(4-8)

Lab Sample ID: 240-64423-5
Date Collected: 05/03/16 11:00
Matrix: Solid
Date Received: 05/05/16 09:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	229093	05/05/16 23:28	JWW	TAL CAN

Client Sample ID: SB-09(4-8)

Lab Sample ID: 240-64423-5
Date Collected: 05/03/16 11:00
Matrix: Solid
Date Received: 05/05/16 09:50
Percent Solids: 97.5

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			229192	05/05/16 13:00	LAM	TAL CAN
Total/NA	Analysis	8260B		1	229723	05/11/16 07:01	TJL2	TAL CAN

Client Sample ID: SB-09(19-20)

Lab Sample ID: 240-64423-6
Date Collected: 05/03/16 11:10
Matrix: Solid
Date Received: 05/05/16 09:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	229093	05/05/16 23:28	JWW	TAL CAN

Client Sample ID: SB-09(19-20)

Lab Sample ID: 240-64423-6
Date Collected: 05/03/16 11:10
Matrix: Solid
Date Received: 05/05/16 09:50
Percent Solids: 95.9

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			229192	05/05/16 13:00	LAM	TAL CAN
Total/NA	Analysis	8260B		1	229723	05/11/16 07:23	TJL2	TAL CAN

Lab Chronicle

Client Sample ID: SB-07(7-8) Lab Sample ID: 240-64423-7

Date Collected: 05/03/16 13:40 **Matrix: Solid**
Date Received: 05/05/16 09:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	229093	05/05/16 23:28	JWW	TAL CAN

Client Sample ID: SB-07(7-8) Lab Sample ID: 240-64423-7

Date Collected: 05/03/16 13:40 **Matrix: Solid**
Date Received: 05/05/16 09:50 **Percent Solids: 97.6**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			229166	05/06/16 10:39	LAM	TAL CAN
Total/NA	Analysis	8260B		1	229723	05/11/16 10:13	TJL2	TAL CAN

Client Sample ID: SB-07(19-20) Lab Sample ID: 240-64423-8

Date Collected: 05/03/16 14:25 **Matrix: Solid**
Date Received: 05/05/16 09:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	229093	05/05/16 23:28	JWW	TAL CAN

Client Sample ID: SB-07(19-20) Lab Sample ID: 240-64423-8

Date Collected: 05/03/16 14:25 **Matrix: Solid**
Date Received: 05/05/16 09:50 **Percent Solids: 97.3**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			229166	05/06/16 10:39	LAM	TAL CAN
Total/NA	Analysis	8260B		1	229723	05/11/16 10:34	TJL2	TAL CAN

Client Sample ID: SB-07(20-22) Lab Sample ID: 240-64423-9

Date Collected: 05/03/16 14:35 **Matrix: Solid**
Date Received: 05/05/16 09:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	229093	05/05/16 23:28	JWW	TAL CAN

Client Sample ID: SB-07(20-22) Lab Sample ID: 240-64423-9

Date Collected: 05/03/16 14:35 **Matrix: Solid**
Date Received: 05/05/16 09:50 **Percent Solids: 88.3**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			229166	05/06/16 10:39	LAM	TAL CAN
Total/NA	Analysis	8260B		500	229723	05/11/16 10:55	TJL2	TAL CAN

Lab Chronicle

Client: TRC Environmental Corporation
Project/Site: Valley Pike

TestAmerica Job ID: 240-64423-1

Client Sample ID: SB-06(15-16)

Lab Sample ID: 240-64423-10

Date Collected: 05/03/16 15:05
Date Received: 05/05/16 09:50

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	229093	05/05/16 23:28	JWW	TAL CAN

Client Sample ID: SB-06(15-16)

Lab Sample ID: 240-64423-10

Date Collected: 05/03/16 15:05
Date Received: 05/05/16 09:50

Matrix: Solid
Percent Solids: 97.1

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			229192	05/05/16 13:00	LAM	TAL CAN
Total/NA	Analysis	8260B		1	229723	05/11/16 07:44	TJL2	TAL CAN

Client Sample ID: SB-06(21-23)

Lab Sample ID: 240-64423-11

Date Collected: 05/03/16 15:25
Date Received: 05/05/16 09:50

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	229093	05/05/16 23:28	JWW	TAL CAN

Client Sample ID: SB-06(21-23)

Lab Sample ID: 240-64423-11

Date Collected: 05/03/16 15:25
Date Received: 05/05/16 09:50

Matrix: Solid
Percent Solids: 95.2

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			229166	05/06/16 10:39	LAM	TAL CAN
Total/NA	Analysis	8260B		1	229723	05/11/16 11:16	TJL2	TAL CAN

Client Sample ID: DUP-01

Lab Sample ID: 240-64423-12

Date Collected: 05/03/16 00:00
Date Received: 05/05/16 09:50

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	229093	05/05/16 23:28	JWW	TAL CAN

Client Sample ID: DUP-01

Lab Sample ID: 240-64423-12

Date Collected: 05/03/16 00:00
Date Received: 05/05/16 09:50

Matrix: Solid
Percent Solids: 98.2

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			229166	05/06/16 10:39	LAM	TAL CAN
Total/NA	Analysis	8260B		1	229723	05/11/16 11:37	TJL2	TAL CAN

Lab Chronicle

Client Sample ID: SB-10(9-10)

Lab Sample ID: 240-64423-13
Date Collected: 05/03/16 12:50
Matrix: Solid
Date Received: 05/05/16 09:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	229093	05/05/16 23:28	JWW	TAL CAN

Client Sample ID: SB-10(9-10)

Lab Sample ID: 240-64423-13
Date Collected: 05/03/16 12:50
Matrix: Solid
Date Received: 05/05/16 09:50
Percent Solids: 97.3

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			229192	05/05/16 13:00	LAM	TAL CAN
Total/NA	Analysis	8260B		1	230141	05/13/16 04:53	TJL2	TAL CAN

Client Sample ID: SB-10(15-16)

Lab Sample ID: 240-64423-14
Date Collected: 05/03/16 13:10
Matrix: Solid
Date Received: 05/05/16 09:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	229093	05/05/16 23:28	JWW	TAL CAN

Client Sample ID: SB-10(15-16)

Lab Sample ID: 240-64423-14
Date Collected: 05/03/16 13:10
Matrix: Solid
Date Received: 05/05/16 09:50
Percent Solids: 96.9

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			229192	05/05/16 13:00	LAM	TAL CAN
Total/NA	Analysis	8260B		1	229723	05/11/16 08:05	TJL2	TAL CAN

Client Sample ID: SB-02(8-10)

Lab Sample ID: 240-64423-15
Date Collected: 05/03/16 16:45
Matrix: Solid
Date Received: 05/05/16 09:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	229093	05/05/16 23:28	JWW	TAL CAN

Client Sample ID: SB-02(8-10)

Lab Sample ID: 240-64423-15
Date Collected: 05/03/16 16:45
Matrix: Solid
Date Received: 05/05/16 09:50
Percent Solids: 97.0

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			229166	05/06/16 10:39	LAM	TAL CAN
Total/NA	Analysis	8260B		1	229723	05/11/16 12:20	TJL2	TAL CAN

Client Sample ID: SB-02(16-20)

Lab Sample ID: 240-64423-16
Date Collected: 05/03/16 16:35
Matrix: Solid
Date Received: 05/05/16 09:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	229093	05/05/16 23:28	JWW	TAL CAN

Client Sample ID: SB-02(16-20)

Lab Sample ID: 240-64423-16
Date Collected: 05/03/16 16:35
Matrix: Solid
Date Received: 05/05/16 09:50
Percent Solids: 95.5

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			229192	05/05/16 13:00	LAM	TAL CAN
Total/NA	Analysis	8260B		1	229723	05/11/16 08:26	TJL2	TAL CAN

Client Sample ID: SB-08(3-4)

Lab Sample ID: 240-64423-17
Date Collected: 05/03/16 17:20
Matrix: Solid
Date Received: 05/05/16 09:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	229093	05/05/16 23:28	JWW	TAL CAN

Client Sample ID: SB-08(3-4)

Lab Sample ID: 240-64423-17
Date Collected: 05/03/16 17:20
Matrix: Solid
Date Received: 05/05/16 09:50
Percent Solids: 94.7

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			229192	05/05/16 13:00	LAM	TAL CAN
Total/NA	Analysis	8260B		1	230141	05/13/16 05:15	TJL2	TAL CAN

Client Sample ID: SB-08(18.5-19.5)

Lab Sample ID: 240-64423-18
Date Collected: 05/03/16 17:30
Matrix: Solid
Date Received: 05/05/16 09:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	229093	05/05/16 23:28	JWW	TAL CAN

Client Sample ID: SB-08(18.5-19.5)

Lab Sample ID: 240-64423-18
Date Collected: 05/03/16 17:30
Matrix: Solid
Date Received: 05/05/16 09:50
Percent Solids: 97.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			229166	05/06/16 10:39	LAM	TAL CAN
Total/NA	Analysis	8260B		1	230141	05/13/16 05:36	TJL2	TAL CAN

Lab Chronicle

Client Sample ID: TRIP BLANK

Lab Sample ID: 240-64423-19

Date Collected: 05/03/16 00:00

Matrix: Water

Date Received: 05/05/16 09:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	230335	05/14/16 16:15	RJQ	TAL CAN

Client Sample ID: TRIP BLANK

Lab Sample ID: 240-64423-20

Date Collected: 05/03/16 00:00

Matrix: Water

Date Received: 05/05/16 09:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	230335	05/14/16 16:37	RJQ	TAL CAN

Laboratory References:

TAL CAN = TestAmerica Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

Certification Summary

Laboratory: TestAmerica Canton

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
California	NELAP	9	01144CA	06-30-14 *
California	State Program	9	2927	04-30-17
Connecticut	State Program	1	PH-0590	12-31-17
Florida	NELAP	4	E87225	06-30-16 *
Illinois	NELAP	5	200004	07-31-16 *
Kansas	NELAP	7	E-10336	07-31-16 *
Kentucky (UST)	State Program	4	58	02-23-17
Kentucky (WW)	State Program	4	98016	12-31-16
L-A-B	DoD ELAP		L2315	07-18-16
Minnesota	NELAP	5	039-999-348	12-31-16
Nevada	State Program	9	OH-000482008A	07-31-16 *
New Jersey	NELAP	2	OH001	06-30-16 *
New York	NELAP	2	10975	03-31-17
Ohio VAP	State Program	5	CL0024	09-14-17
Oregon	NELAP	10	4062	02-23-17
Pennsylvania	NELAP	3	68-00340	08-31-16 *
Texas	NELAP	6	T104704517-15-5	08-31-16 *
USDA	Federal		P330-13-00319	11-26-16
Virginia	NELAP	3	460175	09-14-16
Washington	State Program	10	C971	01-12-17
West Virginia DEP	State Program	3	210	12-31-16
Wisconsin	State Program	5	999518190	08-31-16 *

* Certification renewal pending - certification considered valid.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

CHAIN OF CUSTODY
AND
RECEIVING DOCUMENTS

240-64423 Chain of Custody

TestAmerica Canton
4101 Shuffel Street NW
North Canton, OH 44720
Phone (330) 497-9396 Fax (330) 497-0772

2.8/C2.3
1.0/C0.5

Chain of Custody Record

TestAmerica THE LEADER IN ENVIR

Columbus

240507

DRAFT

Client Information
Client Contact: Mr. David Kreeger
Company: TRC Environmental Corporation.
Address: 921 Eastwind Drive
City: Westerville
State, Zip: OH, 43081
Phone: 513-315-6748(Tel) /734 904-3312 (CELL)
Email: dkreeger@trcsolutions.com
Project Name: ~~Mullins Rubber Products Soils~~ (OU) VALLEY PIKE SITE
Site:

Sampler: DAVID KREEGER
Phone: (734) 904-3312
Due Date Requested:
TAT Requested (days): STANDARD TAT
PO #: TBD 94838
WO #: 243854.0000.0000, phase 6
Project #: 24016117
SSOW#:

Lab PM: O'Meara, Patrick J
E-Mail: patrick.omeara@testamericainc.com

Carrier Tracking No(s):

COC No: 240-34503-15017.1
Page: Page 1 of 2
Job #:

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - ph 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8260B - TCL VOCs PCE, TCE, 12-DCE, VC	8260B - TCL VOCs PCE, TCE, 12-DCE, VC		Total Number of containers	Special Instructions/Note:
			Preservation Code:		X	X	N	A		X	
SB-01 (7-8)	5/2/2016	9:45	GRAB	Solid			X	~~X~~	DK		
SB-01(17-18)		1000		Solid			X	~~X~~			OHIO VAP PROTOCOLS
SB-03(9-10)	5/3/2016	950		Solid			X	~~X~~			FOR: PCE, TCE,
SB-03(15-16)		955		Solid			X	~~X~~			CIS-12 DCE, TRANS-12 DCE
SB-09(4-8)		11:00		Solid			X	~~X~~			VINYL CHLORIDE
SB-09(19-20)		11:10		Solid			X	~~X~~			
SB-07(7-8)		1340		Solid			X	~~X~~			
SB-07(19-20)		1425		Solid			X	~~X~~			
SB-07(20-22)		1435		Solid			X	~~X~~			
SB-06(15-16)		1505		Solid			X	~~X~~			
SB-06 (21-23)		1525		Solid			X	~~X~~			

Dayton
210

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For ____ Months

Deliverable Requested: I, II, III, IV, Other (specify) OHIO VAP CERTIFIED DATA PACKAGE

Special Instructions/QC Requirements: OHIO VAP CERTIFIED QC PROTOCOLS

Empty Kit Relinquished by: Date: Time: Method of Shipment:

Relinquished by:	Date/Time: 5/4/2016 12:00	Company TRC	Received by:	Date/Time: 5/4/16 1201	Company TA
Relinquished by:	Date/Time: 5/4/16 1650	Company TA	Received by:	Date/Time: 5/5/16 0950	Company TA Can
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: △ Yes △ No
Custody Seal No.:
Cooler Temperature(s) °C and Other Remarks:

TestAmerica Canton
4101 Shuffel Street NW
North Canton, OH 44720
Phone (330) 497-9396 Fax (330) 497-0772

Chain of Custody Record

TestAmerica THE LEADER IN ENVIR

Columbus

240507

DRAFT

Client Information	Sampler: DAVID KREEGER	Lab PM: O'Meara, Patrick J	Carrier Tracking No(s):
Client Contact: Mr. David Kreeger	Phone: (734) 904-3312	E-Mail: patrick.omeara@testamericainc.com	
COC No: 240-34503-15017.2	Page: Page 2 of 2	Job #:	

Company: TRC Environmental Corporation.	
Address: 921 Eastwind Drive	Due Date Requested:
City: Westerville	TAT Requested (days): STANDARD TAT
State, Zip: OH, 43081	
Phone: 513-315-6748(Tel) / (734) 904-3312 (CELL)	PO #: ~~TBD~~ 94888
Email: dkreeger@trcsolutions.com	WO #: 243854.0000.0000, phase 6
Project Name: Mullins Rubber Products-Soils	Project #: 24016117
Site:	SSOW#:

Analysis Requested

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8260B - TCL VOCs PCE, TCE, 12DCE, VC	8260B - TCL VOCs PCE, TCE, 12DCE, VC	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	A N		
DUP-01	5/3/2016	—	GRAB	Solid			X	X		
SB-10 (9-10)		1250		Solid			X	X		OHIO VAP CERTIFIED
SB-10 (15-16)		1310		Solid			X	X		FOR: PCE, TCE,
SB-02 (8-10)		1645		Solid			X	X		CIS-1,2,DCE, TRANS-12-
SB-02 (16-20)		1635		Solid			X	X		DCE, AND VINYL
SB-08 (3-4)		1720		Solid			X	X		CHLORIDE
SB-08 (18.5-19.5)	↓	1730	↓	Solid			X	X		
TRIP BLANK				Water				X		
TRIP BLANK				Water				X		

Dayton 210

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - ph 4-5
L - EDA	Z - other (specify)

Other:

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Deliverable Requested: I, II, III, IV, Other (specify) OHIO VAP CERTIFIED DATA PACKAGE

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For ______ Months

Special Instructions/QC Requirements: OHIO VAP CERTIFIED QC

Empty Kit Relinquished by: | Date: | Time: | Method of Shipment:

Relinquished by:	Date/Time: 5/4/2016 12:00	Company TRC	Received by:	Date/Time: 5/4/16 1201	Company TA
Relinquished by:	Date/Time: 5/4/16 1650	Company TA	Received by:	Date/Time: 5/5/16 0950	Company TA Can
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: △ Yes △ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

TestAmerica Canton Sample Receipt Form/Narrative **Login # :** 69493
Canton Facility

Client TRC Site Name ______

Cooler unpacked by: Denny Burns

Cooler Received on 5/5/16 Opened on 5/5/16

FedEx: 1st Grd [✓ Exp] UPS FAS Stetson Client Drop Off TestAmerica Courier Other ______

Receipt After-hours: Drop-off Date/Time ______ Storage Location ______

TestAmerica Cooler # ______ [✓ Foam Box] Client Cooler Box Other Multiple

Packing material used: Bubble Wrap [✓ Foam] Plastic Bag None Other ______

COOLANT: [✓ Wet Ice] Blue Ice Dry Ice Water None

1. Cooler temperature upon receipt ☑ See Multiple Cooler Form
   IR GUN# 48 (CF -1.9 °C) Observed Cooler Temp. ______ °C Corrected Cooler Temp. ______ °C
   IR GUN# 36 (CF -1.5 °C) Observed Cooler Temp. ______ °C Corrected Cooler Temp. ______ °C
   [✓ IR GUN# 18] (CF -0.5 °C) Observed Cooler Temp. ______ °C Corrected Cooler Temp. ______ °C
2. Were custody seals on the outside of the cooler(s)? If Yes Quantity 1 each [✓ Yes] No
   -Were custody seals on the outside of the cooler(s) signed & dated? [✓ Yes] No NA
   -Were custody seals on the bottle(s) or bottle kits (LLHg/MeHg)? Yes [✓ No]
3. Shippers' packing slip attached to the cooler(s)? [✓ Yes] No
4. Did custody papers accompany the sample(s)? [✓ Yes] No
5. Were the custody papers relinquished & signed in the appropriate place? [✓ Yes] No
6. Was/were the person(s) who collected the samples clearly identified on the COC? [✓ Yes] No
7. Did all bottles arrive in good condition (Unbroken)? [✓ Yes] No
8. Could all bottle labels be reconciled with the COC? [✓ Yes] No
9. Were correct bottle(s) used for the test(s) indicated? [✓ Yes] No
10. Sufficient quantity received to perform indicated analyses? [✓ Yes] No
11. Are these work share samples? Yes [✓ No]
    If yes, Questions 12-16 have been checked at the originating laboratory.
12. Were sample(s) at the correct pH upon receipt? Yes No [✓ NA] pH Strip Lot# **HC559158**
13. Were VOAs on the COC? [✓ Yes] No
14. Were air bubbles >6 mm in any VOA vials? Yes [✓ No] NA
15. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # 353630 1VB [✓ Yes] No
16. Was a LL Hg or Me Hg trip blank present? ______ Yes [✓ No]

Contacted PM PJO Date 5/5/16 by JB via Verbal [✓ Voice Mail] Other

Concerning #18 HTV

17. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES Samples processed by: ______

SB-01 (7-8), SB-01 (17-18), SB-03 (9-10), SB-03 (15-16),
SB-09 (4-8), SB-09 (19-20), Dup-01, SB-10 (9-10)

18. SAMPLE CONDITION

Sample(s) see above were received after the recommended holding time had expired.
Sample(s) ______ were received in a broken container.
Sample(s) ______ were received with bubble >6 mm in diameter. (Notify PM)

19. SAMPLE PRESERVATION

Sample(s) ______ were further preserved in the laboratory.
Time preserved: ______ Preservative(s) added/Lot number(s): ______.

Ref: SOP NC-SC-0005, Sample Receiving

TestAmerica Multiple Cooler Receipt Form/Narrative **Login # :** 64423
Canton Facility

Cooler #	IR Gun #	Observed Temp °C	Corrected Temp °C	Coolant
TA No 4	8	2.8	2.3	ICE
〃	〃	1.0	0.5	〃

X:\X-Drive Document Control\SOPs\Work Instructions\Word Version Work Instructions\WI-NC-099H-071615 Cooler Receipt Form_page 2 - Multiple Coolers.doc rls

DRAFT

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

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ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Canton
4101 Shuffel Street NW
North Canton, OH 44720
Tel: (330)497-9396

TestAmerica Job ID: 240-64479-1
Client Project/Site: Valley Pike

For:
TRC Environmental Corporation
11231 Cornell Park Drive
Cincinnati, Ohio 45242

Attn: Andrew Davis

Patrick O'Meara

Authorized for release by:
5/17/2016 5:54:22 PM

Patrick O'Meara, Manager of Project Management
(330)966-5725
patrick.omeara@testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Definitions/Glossary

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
X	Surrogate is outside control limits

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 240-64479-1

Laboratory: TestAmerica Canton

Narrative

CASE NARRATIVE

Client: TRC Environmental Corporation

Project: Valley Pike

Report Number: 240-64479-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

TestAmerica utilizes USEPA approved methods, where applicable, in all analytical work. The samples presented in this report were analyzed for the parameter(s) listed on the analytical methods summary page in accordance with the method(s) indicated and were analyzed in accordance with Ohio Voluntary Action Program protocols, where applicable.

A summary of QC data for these analyses is included at the back of the report.

TestAmerica Canton attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the applicable methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

All solid sample results are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header.

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

RECEIPT

The samples were received on 5/6/2016 9:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 0.3º C and 0.9º C.

VOLATILE ORGANIC COMPOUNDS (GCMS)

Samples SB-11(8-10) (240-64479-1), SB-11(15-17) (240-64479-2), SB-11(17-19) (240-64479-3), SB-05(4-5) (240-64479-4), SB-05(14-16) (240-64479-5), SB-04(6-8) (240-64479-6), SB-04(17-19) (240-64479-7), DUP-02 (240-64479-8), SB-12(7-8) (240-64479-11), SB-12(20-22) (240-64479-12), SB-12(24-25) (240-64479-13) and SB-12(27-28) (240-64479-14) were analyzed for volatile organic compounds (GCMS) in accordance with EPA SW-846 Method 8260B. The samples were prepared on 05/06/2016 and analyzed on 05/12/2016.

1,2-Dichloroethane-d4 (Surr) failed the surrogate recovery criteria high for SB-11(17-19) (240-64479-3). Refer to the QC report for details.

Samples SB-11(15-17) (240-64479-2)[1.67X], SB-11(17-19) (240-64479-3)[50X], DUP-02 (240-64479-8)[33.33X] and SB-12(27-28) (240-64479-14)[10X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

Job ID: 240-64479-1 (Continued)

Laboratory: TestAmerica Canton (Continued)

Insufficient sample volume was available on the following samples to perform a matrix spike/matrix spike duplicate/sample duplicate (MS/MSD/DUP) associated with preparation batch 240-229245 and analytical batch 240-230032: SB-11(15-17) (240-64479-2), SB-11(17-19) (240-64479-3), DUP-02 (240-64479-8), SB-12(20-22) (240-64479-12), SB-12(24-25) (240-64479-13) and SB-12(27-28) (240-64479-14) .

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

VOLATILE ORGANIC COMPOUNDS (GCMS)

Samples TRIP BLANK-04 (240-64479-9) and TRIP BLANK-03 (240-64479-10) were analyzed for volatile organic compounds (GCMS) in accordance with EPA SW-846 Method 8260B. The samples were analyzed on 05/13/2016.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

PERCENT SOLIDS

Samples SB-11(8-10) (240-64479-1), SB-11(15-17) (240-64479-2), SB-11(17-19) (240-64479-3), SB-05(4-5) (240-64479-4), SB-05(14-16) (240-64479-5), SB-04(6-8) (240-64479-6), SB-04(17-19) (240-64479-7), DUP-02 (240-64479-8), SB-12(7-8) (240-64479-11), SB-12(20-22) (240-64479-12), SB-12(24-25) (240-64479-13) and SB-12(27-28) (240-64479-14) were analyzed for percent solids in accordance with EPA Method 160.3 MOD. The samples were analyzed on 05/06/2016.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Method Summary

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL CAN
Moisture	Percent Moisture	EPA	TAL CAN

Protocol References:

EPA = US Environmental Protection Agency
SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL CAN = TestAmerica Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

Sample Summary

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
240-64479-1	SB-11(8-10)	Solid	05/04/16 14:30	05/06/16 09:30
240-64479-2	SB-11(15-17)	Solid	05/04/16 14:15	05/06/16 09:30
240-64479-3	SB-11(17-19)	Solid	05/04/16 14:20	05/06/16 09:30
240-64479-4	SB-05(4-5)	Solid	05/04/16 16:00	05/06/16 09:30
240-64479-5	SB-05(14-16)	Solid	05/04/16 16:10	05/06/16 09:30
240-64479-6	SB-04(6-8)	Solid	05/04/16 16:45	05/06/16 09:30
240-64479-7	SB-04(17-19)	Solid	05/04/16 16:55	05/06/16 09:30
240-64479-8	DUP-02	Solid	05/04/16 00:00	05/06/16 09:30
240-64479-9	TRIP BLANK-04	Water	05/04/16 00:00	05/06/16 09:30
240-64479-10	TRIP BLANK-03	Water	05/04/16 00:00	05/06/16 09:30
240-64479-11	SB-12(7-8)	Solid	05/05/16 09:20	05/06/16 09:30
240-64479-12	SB-12(20-22)	Solid	05/05/16 10:00	05/06/16 09:30
240-64479-13	SB-12(24-25)	Solid	05/05/16 10:15	05/06/16 09:30
240-64479-14	SB-12(27-28)	Solid	05/05/16 09:50	05/06/16 09:30

DRAFT

Detection Summary

Client: TRC Environmental Corporation
Project/Site: Valley Pike

TestAmerica Job ID: 240-64479-1

Client Sample ID: SB-11(8-10) — Lab Sample ID: 240-64479-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Tetrachloroethene	5.0		4.1		ug/Kg	1	☼	8260B	Total/NA
Trichloroethene	6.3		4.1		ug/Kg	1	☼	8260B	Total/NA

Client Sample ID: SB-11(15-17) — Lab Sample ID: 240-64479-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Tetrachloroethene	8400		320		ug/Kg	1.667	☼	8260B	Total/NA

Client Sample ID: SB-11(17-19) — Lab Sample ID: 240-64479-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Tetrachloroethene	230000		10000		ug/Kg	50	☼	8260B	Total/NA

Client Sample ID: SB-05(4-5) — Lab Sample ID: 240-64479-4

No Detections.

Client Sample ID: SB-05(14-16) — Lab Sample ID: 240-64479-5

No Detections.

Client Sample ID: SB-04(6-8) — Lab Sample ID: 240-64479-6

No Detections.

Client Sample ID: SB-04(17-19) — Lab Sample ID: 240-64479-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Tetrachloroethene	23		4.0		ug/Kg	1	☼	8260B	Total/NA

Client Sample ID: DUP-02 — Lab Sample ID: 240-64479-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Tetrachloroethene	240000		7500		ug/Kg	33.333	☼	8260B	Total/NA

Client Sample ID: TRIP BLANK-04 — Lab Sample ID: 240-64479-9

No Detections.

Client Sample ID: TRIP BLANK-03 — Lab Sample ID: 240-64479-10

No Detections.

Client Sample ID: SB-12(7-8) — Lab Sample ID: 240-64479-11

No Detections.

Client Sample ID: SB-12(20-22) — Lab Sample ID: 240-64479-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Tetrachloroethene	790		200		ug/Kg	1	☼	8260B	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client Sample ID: SB-12(24-25) Lab Sample ID: 240-64479-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Tetrachloroethene	470		210		ug/Kg	1	☼	8260B	Total/NA
Trichloroethene	1400		210		ug/Kg	1	☼	8260B	Total/NA

Client Sample ID: SB-12(27-28) Lab Sample ID: 240-64479-14

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Tetrachloroethene	78000		2200		ug/Kg	10	☼	8260B	Total/NA
Trichloroethene	4100		2200		ug/Kg	10	☼	8260B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client Sample ID: SB-11(8-10)

Lab Sample ID: 240-64479-1

Date Collected: 05/04/16 14:30
Date Received: 05/06/16 09:30
Matrix: Solid
Percent Solids: 97.3

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		4.1		ug/Kg	☼	05/06/16 13:00	05/12/16 19:13	1
Tetrachloroethene	**5.0**		4.1		ug/Kg	☼	05/06/16 13:00	05/12/16 19:13	1
trans-1,2-Dichloroethene	ND		4.1		ug/Kg	☼	05/06/16 13:00	05/12/16 19:13	1
Trichloroethene	**6.3**		4.1		ug/Kg	☼	05/06/16 13:00	05/12/16 19:13	1
Vinyl chloride	ND		4.1		ug/Kg	☼	05/06/16 13:00	05/12/16 19:13	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*94*		*58 - 123*	*05/06/16 13:00*	*05/12/16 19:13*	*1*
4-Bromofluorobenzene (Surr)	*91*		*52 - 136*	*05/06/16 13:00*	*05/12/16 19:13*	*1*
Dibromofluoromethane (Surr)	*85*		*37 - 132*	*05/06/16 13:00*	*05/12/16 19:13*	*1*
Toluene-d8 (Surr)	*101*		*67 - 125*	*05/06/16 13:00*	*05/12/16 19:13*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	**97.3**		0.1		%			05/06/16 16:20	1

Client Sample ID: SB-11(15-17)

Date Collected: 05/04/16 14:15
Date Received: 05/06/16 09:30

Lab Sample ID: 240-64479-2

Matrix: Solid
Percent Solids: 96.6

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		320		ug/Kg	☼	05/06/16 21:03	05/12/16 14:13	1.667
Tetrachloroethene	**8400**		320		ug/Kg	☼	05/06/16 21:03	05/12/16 14:13	1.667
trans-1,2-Dichloroethene	ND		320		ug/Kg	☼	05/06/16 21:03	05/12/16 14:13	1.667
Trichloroethene	ND		320		ug/Kg	☼	05/06/16 21:03	05/12/16 14:13	1.667
Vinyl chloride	ND		320		ug/Kg	☼	05/06/16 21:03	05/12/16 14:13	1.667

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*108*		*39 - 128*	*05/06/16 21:03*	*05/12/16 14:13*	*1.667*
4-Bromofluorobenzene (Surr)	*106*		*26 - 141*	*05/06/16 21:03*	*05/12/16 14:13*	*1.667*
Dibromofluoromethane (Surr)	*92*		*30 - 122*	*05/06/16 21:03*	*05/12/16 14:13*	*1.667*
Toluene-d8 (Surr)	*120*		*33 - 134*	*05/06/16 21:03*	*05/12/16 14:13*	*1.667*

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	**96.6**		0.1		%			05/06/16 16:20	1

Client Sample Results

Client Sample ID: SB-11(17-19)

Lab Sample ID: 240-64479-3

Date Collected: 05/04/16 14:20
Matrix: Solid
Date Received: 05/06/16 09:30
Percent Solids: 91.3

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		10000		ug/Kg	☼	05/06/16 21:03	05/12/16 14:34	50
Tetrachloroethene	**230000**		10000		ug/Kg	☼	05/06/16 21:03	05/12/16 14:34	50
trans-1,2-Dichloroethene	ND		10000		ug/Kg	☼	05/06/16 21:03	05/12/16 14:34	50
Trichloroethene	ND		10000		ug/Kg	☼	05/06/16 21:03	05/12/16 14:34	50
Vinyl chloride	ND		10000		ug/Kg	☼	05/06/16 21:03	05/12/16 14:34	50

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*137*	*X*	*39 - 128*	*05/06/16 21:03*	*05/12/16 14:34*	*50*
4-Bromofluorobenzene (Surr)	*112*		*26 - 141*	*05/06/16 21:03*	*05/12/16 14:34*	*50*
Dibromofluoromethane (Surr)	*79*		*30 - 122*	*05/06/16 21:03*	*05/12/16 14:34*	*50*
Toluene-d8 (Surr)	*99*		*33 - 134*	*05/06/16 21:03*	*05/12/16 14:34*	*50*

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	**91.3**		0.1		%			05/06/16 16:20	1

1 2 3 4 5 6 7 8 9 10 11 12 13 14

Client Sample ID: SB-05(4-5)

Date Collected: 05/04/16 16:00
Date Received: 05/06/16 09:30

Lab Sample ID: 240-64479-4

Matrix: Solid
Percent Solids: 96.8

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		4.3		ug/Kg	☼	05/06/16 13:00	05/12/16 19:35	1
Tetrachloroethene	ND		4.3		ug/Kg	☼	05/06/16 13:00	05/12/16 19:35	1
trans-1,2-Dichloroethene	ND		4.3		ug/Kg	☼	05/06/16 13:00	05/12/16 19:35	1
Trichloroethene	ND		4.3		ug/Kg	☼	05/06/16 13:00	05/12/16 19:35	1
Vinyl chloride	ND		4.3		ug/Kg	☼	05/06/16 13:00	05/12/16 19:35	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*89*		*58 - 123*	*05/06/16 13:00*	*05/12/16 19:35*	*1*
4-Bromofluorobenzene (Surr)	*94*		*52 - 136*	*05/06/16 13:00*	*05/12/16 19:35*	*1*
Dibromofluoromethane (Surr)	*81*		*37 - 132*	*05/06/16 13:00*	*05/12/16 19:35*	*1*
Toluene-d8 (Surr)	*101*		*67 - 125*	*05/06/16 13:00*	*05/12/16 19:35*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	**96.8**		0.1		%			05/06/16 16:20	1

Client Sample ID: SB-05(14-16)

Date Collected: 05/04/16 16:10
Date Received: 05/06/16 09:30

Lab Sample ID: 240-64479-5

Matrix: Solid
Percent Solids: 95.2

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		4.1		ug/Kg	☼	05/06/16 13:00	05/12/16 19:56	1
Tetrachloroethene	ND		4.1		ug/Kg	☼	05/06/16 13:00	05/12/16 19:56	1
trans-1,2-Dichloroethene	ND		4.1		ug/Kg	☼	05/06/16 13:00	05/12/16 19:56	1
Trichloroethene	ND		4.1		ug/Kg	☼	05/06/16 13:00	05/12/16 19:56	1
Vinyl chloride	ND		4.1		ug/Kg	☼	05/06/16 13:00	05/12/16 19:56	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*92*		*58 - 123*	*05/06/16 13:00*	*05/12/16 19:56*	*1*
4-Bromofluorobenzene (Surr)	*88*		*52 - 136*	*05/06/16 13:00*	*05/12/16 19:56*	*1*
Dibromofluoromethane (Surr)	*83*		*37 - 132*	*05/06/16 13:00*	*05/12/16 19:56*	*1*
Toluene-d8 (Surr)	*100*		*67 - 125*	*05/06/16 13:00*	*05/12/16 19:56*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	**95.2**		0.1		%			05/06/16 16:20	1

Client Sample ID: SB-04(6-8)

Date Collected: 05/04/16 16:45
Date Received: 05/06/16 09:30

Lab Sample ID: 240-64479-6

Matrix: Solid
Percent Solids: 96.6

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		4.5		ug/Kg	☼	05/06/16 13:00	05/12/16 20:18	1
Tetrachloroethene	ND		4.5		ug/Kg	☼	05/06/16 13:00	05/12/16 20:18	1
trans-1,2-Dichloroethene	ND		4.5		ug/Kg	☼	05/06/16 13:00	05/12/16 20:18	1
Trichloroethene	ND		4.5		ug/Kg	☼	05/06/16 13:00	05/12/16 20:18	1
Vinyl chloride	ND		4.5		ug/Kg	☼	05/06/16 13:00	05/12/16 20:18	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*92*		*58 - 123*	*05/06/16 13:00*	*05/12/16 20:18*	*1*
4-Bromofluorobenzene (Surr)	*91*		*52 - 136*	*05/06/16 13:00*	*05/12/16 20:18*	*1*
Dibromofluoromethane (Surr)	*85*		*37 - 132*	*05/06/16 13:00*	*05/12/16 20:18*	*1*
Toluene-d8 (Surr)	*102*		*67 - 125*	*05/06/16 13:00*	*05/12/16 20:18*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	**96.6**		0.1		%			05/06/16 16:20	1

1
2
3
4
5
6
7
8
9
10
11
12
13
14

Client Sample ID: SB-04(17-19)

Lab Sample ID: 240-64479-7

Date Collected: 05/04/16 16:55
Date Received: 05/06/16 09:30

Matrix: Solid
Percent Solids: 94.6

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		4.0		ug/Kg	☼	05/06/16 13:00	05/12/16 20:39	1
Tetrachloroethene	**23**		4.0		ug/Kg	☼	05/06/16 13:00	05/12/16 20:39	1
trans-1,2-Dichloroethene	ND		4.0		ug/Kg	☼	05/06/16 13:00	05/12/16 20:39	1
Trichloroethene	ND		4.0		ug/Kg	☼	05/06/16 13:00	05/12/16 20:39	1
Vinyl chloride	ND		4.0		ug/Kg	☼	05/06/16 13:00	05/12/16 20:39	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*91*		*58 - 123*	*05/06/16 13:00*	*05/12/16 20:39*	*1*
4-Bromofluorobenzene (Surr)	*100*		*52 - 136*	*05/06/16 13:00*	*05/12/16 20:39*	*1*
Dibromofluoromethane (Surr)	*85*		*37 - 132*	*05/06/16 13:00*	*05/12/16 20:39*	*1*
Toluene-d8 (Surr)	*108*		*67 - 125*	*05/06/16 13:00*	*05/12/16 20:39*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	**94.6**		0.1		%			05/06/16 16:20	1

Client Sample ID: DUP-02

Lab Sample ID: 240-64479-8

Date Collected: 05/04/16 00:00
Date Received: 05/06/16 09:30

Matrix: Solid
Percent Solids: 89.6

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		7500		ug/Kg	☼	05/06/16 21:03	05/12/16 14:56	33.333
Tetrachloroethene	**240000**		7500		ug/Kg	☼	05/06/16 21:03	05/12/16 14:56	33.333
trans-1,2-Dichloroethene	ND		7500		ug/Kg	☼	05/06/16 21:03	05/12/16 14:56	33.333
Trichloroethene	ND		7500		ug/Kg	☼	05/06/16 21:03	05/12/16 14:56	33.333
Vinyl chloride	ND		7500		ug/Kg	☼	05/06/16 21:03	05/12/16 14:56	33.333

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*83*		*39 - 128*	*05/06/16 21:03*	*05/12/16 14:56*	*33.333*
4-Bromofluorobenzene (Surr)	*76*		*26 - 141*	*05/06/16 21:03*	*05/12/16 14:56*	*33.333*
Dibromofluoromethane (Surr)	*54*		*30 - 122*	*05/06/16 21:03*	*05/12/16 14:56*	*33.333*
Toluene-d8 (Surr)	*56*		*33 - 134*	*05/06/16 21:03*	*05/12/16 14:56*	*33.333*

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	**89.6**		0.1		%			05/06/16 16:20	1

Client Sample Results

Client Sample ID: TRIP BLANK-04

Lab Sample ID: 240-64479-9

Date Collected: 05/04/16 00:00

Matrix: Water

Date Received: 05/06/16 09:30

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		1.0		ug/L			05/13/16 16:40	1
Tetrachloroethene	ND		1.0		ug/L			05/13/16 16:40	1
trans-1,2-Dichloroethene	ND		1.0		ug/L			05/13/16 16:40	1
Trichloroethene	ND		1.0		ug/L			05/13/16 16:40	1
Vinyl chloride	ND		1.0		ug/L			05/13/16 16:40	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*93*		*78 - 125*		*05/13/16 16:40*	*1*
4-Bromofluorobenzene (Surr)	*88*		*61 - 120*		*05/13/16 16:40*	*1*
Dibromofluoromethane (Surr)	*100*		*79 - 120*		*05/13/16 16:40*	*1*
Toluene-d8 (Surr)	*108*		*80 - 120*		*05/13/16 16:40*	*1*

Client Sample Results

Client Sample ID: TRIP BLANK-03

Lab Sample ID: 240-64479-10

Date Collected: 05/04/16 00:00
Date Received: 05/06/16 09:30

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		1.0		ug/L			05/13/16 17:02	1
Tetrachloroethene	ND		1.0		ug/L			05/13/16 17:02	1
trans-1,2-Dichloroethene	ND		1.0		ug/L			05/13/16 17:02	1
Trichloroethene	ND		1.0		ug/L			05/13/16 17:02	1
Vinyl chloride	ND		1.0		ug/L			05/13/16 17:02	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*91*		*78 - 125*		*05/13/16 17:02*	*1*
4-Bromofluorobenzene (Surr)	*89*		*61 - 120*		*05/13/16 17:02*	*1*
Dibromofluoromethane (Surr)	*99*		*79 - 120*		*05/13/16 17:02*	*1*
Toluene-d8 (Surr)	*108*		*80 - 120*		*05/13/16 17:02*	*1*

Client Sample Results

Client Sample ID: SB-12(7-8)

Lab Sample ID: 240-64479-11

Date Collected: 05/05/16 09:20
Matrix: Solid
Date Received: 05/06/16 09:30
Percent Solids: 95.4

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		4.4		ug/Kg	☼	05/06/16 13:00	05/12/16 21:00	1
Tetrachloroethene	ND		4.4		ug/Kg	☼	05/06/16 13:00	05/12/16 21:00	1
trans-1,2-Dichloroethene	ND		4.4		ug/Kg	☼	05/06/16 13:00	05/12/16 21:00	1
Trichloroethene	ND		4.4		ug/Kg	☼	05/06/16 13:00	05/12/16 21:00	1
Vinyl chloride	ND		4.4		ug/Kg	☼	05/06/16 13:00	05/12/16 21:00	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*88*		*58 - 123*	*05/06/16 13:00*	*05/12/16 21:00*	*1*
4-Bromofluorobenzene (Surr)	*93*		*52 - 136*	*05/06/16 13:00*	*05/12/16 21:00*	*1*
Dibromofluoromethane (Surr)	*82*		*37 - 132*	*05/06/16 13:00*	*05/12/16 21:00*	*1*
Toluene-d8 (Surr)	*101*		*67 - 125*	*05/06/16 13:00*	*05/12/16 21:00*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	**95.4**		0.1		%			05/06/16 16:20	1

Client Sample ID: SB-12(20-22)

Date Collected: 05/05/16 10:00
Date Received: 05/06/16 09:30

Lab Sample ID: 240-64479-12

Matrix: Solid
Percent Solids: 93.7

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		200		ug/Kg	☼	05/06/16 21:03	05/12/16 15:17	1
Tetrachloroethene	**790**		200		ug/Kg	☼	05/06/16 21:03	05/12/16 15:17	1
trans-1,2-Dichloroethene	ND		200		ug/Kg	☼	05/06/16 21:03	05/12/16 15:17	1
Trichloroethene	ND		200		ug/Kg	☼	05/06/16 21:03	05/12/16 15:17	1
Vinyl chloride	ND		200		ug/Kg	☼	05/06/16 21:03	05/12/16 15:17	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*111*		*39 - 128*	*05/06/16 21:03*	*05/12/16 15:17*	*1*
4-Bromofluorobenzene (Surr)	*104*		*26 - 141*	*05/06/16 21:03*	*05/12/16 15:17*	*1*
Dibromofluoromethane (Surr)	*95*		*30 - 122*	*05/06/16 21:03*	*05/12/16 15:17*	*1*
Toluene-d8 (Surr)	*122*		*33 - 134*	*05/06/16 21:03*	*05/12/16 15:17*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	**93.7**		0.1		%			05/06/16 16:38	1

Client Sample ID: SB-12(24-25)

Date Collected: 05/05/16 10:15
Date Received: 05/06/16 09:30

Lab Sample ID: 240-64479-13

Matrix: Solid
Percent Solids: 92.4

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		210		ug/Kg	☼	05/06/16 21:03	05/12/16 15:39	1
Tetrachloroethene	**470**		210		ug/Kg	☼	05/06/16 21:03	05/12/16 15:39	1
trans-1,2-Dichloroethene	ND		210		ug/Kg	☼	05/06/16 21:03	05/12/16 15:39	1
Trichloroethene	**1400**		210		ug/Kg	☼	05/06/16 21:03	05/12/16 15:39	1
Vinyl chloride	ND		210		ug/Kg	☼	05/06/16 21:03	05/12/16 15:39	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*108*		*39 - 128*	*05/06/16 21:03*	*05/12/16 15:39*	*1*
4-Bromofluorobenzene (Surr)	*102*		*26 - 141*	*05/06/16 21:03*	*05/12/16 15:39*	*1*
Dibromofluoromethane (Surr)	*93*		*30 - 122*	*05/06/16 21:03*	*05/12/16 15:39*	*1*
Toluene-d8 (Surr)	*117*		*33 - 134*	*05/06/16 21:03*	*05/12/16 15:39*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	**92.4**		0.1		%			05/06/16 16:38	1

Client Sample Results

1 2 3 4 5 6 7 8 9 10 11 12 13 14

Client Sample ID: SB-12(27-28)

Date Collected: 05/05/16 09:50
Date Received: 05/06/16 09:30

Lab Sample ID: 240-64479-14

Matrix: Solid
Percent Solids: 92.5

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		2200		ug/Kg	☼	05/06/16 21:03	05/12/16 16:00	10
Tetrachloroethene	**78000**		2200		ug/Kg	☼	05/06/16 21:03	05/12/16 16:00	10
trans-1,2-Dichloroethene	ND		2200		ug/Kg	☼	05/06/16 21:03	05/12/16 16:00	10
Trichloroethene	**4100**		2200		ug/Kg	☼	05/06/16 21:03	05/12/16 16:00	10
Vinyl chloride	ND		2200		ug/Kg	☼	05/06/16 21:03	05/12/16 16:00	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*115*		*39 - 128*	*05/06/16 21:03*	*05/12/16 16:00*	*10*
4-Bromofluorobenzene (Surr)	*106*		*26 - 141*	*05/06/16 21:03*	*05/12/16 16:00*	*10*
Dibromofluoromethane (Surr)	*85*		*30 - 122*	*05/06/16 21:03*	*05/12/16 16:00*	*10*
Toluene-d8 (Surr)	*122*		*33 - 134*	*05/06/16 21:03*	*05/12/16 16:00*	*10*

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	**92.5**		0.1		%			05/06/16 16:38	1

Surrogate Summary

Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		12DCE	**BFB**	**DBFM**	**TOL**
Lab Sample ID	**Client Sample ID**	**(58-123)**	**(52-136)**	**(37-132)**	**(67-125)**
240-64479-1	SB-11(8-10)	94	91	85	101
240-64479-4	SB-05(4-5)	89	94	81	101
240-64479-5	SB-05(14-16)	92	88	83	100
240-64479-6	SB-04(6-8)	92	91	85	102
240-64479-7	SB-04(17-19)	91	100	85	108
240-64479-11	SB-12(7-8)	88	93	82	101
LCS 240-230032/5	Lab Control Sample	91	92	93	99
MB 240-230032/6	Method Blank	91	89	83	100

Surrogate Legend

12DCE = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		12DCE	**BFB**	**DBFM**	**TOL**
Lab Sample ID	**Client Sample ID**	**(39-128)**	**(26-141)**	**(30-122)**	**(33-134)**
240-64479-2	SB-11(15-17)	108	106	92	120
240-64479-3	SB-11(17-19)	137 X	112	79	99
240-64479-8	DUP-02	83	76	54	56
240-64479-12	SB-12(20-22)	111	104	95	122
240-64479-13	SB-12(24-25)	108	102	93	117
240-64479-14	SB-12(27-28)	115	106	85	122
LCS 240-229245/2-A	Lab Control Sample	89	95	90	100
MB 240-229245/1-A	Method Blank	93	91	81	105

Surrogate Legend

12DCE = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		12DCE	**BFB**	**DBFM**	**TOL**
Lab Sample ID	**Client Sample ID**	**(78-125)**	**(61-120)**	**(79-120)**	**(80-120)**
240-64479-9	TRIP BLANK-04	93	88	100	108
240-64479-10	TRIP BLANK-03	91	89	99	108
LCS 240-230162/4	Lab Control Sample	85	108	96	108
MB 240-230162/7	Method Blank	92	93	97	106

Surrogate Legend

12DCE = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)

DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

QC Sample Results

Method: 8260B - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 240-229245/1-A
Matrix: Solid
Analysis Batch: 230032

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 229245

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		250		ug/Kg		05/06/16 21:03	05/12/16 13:51	1
Tetrachloroethene	ND		250		ug/Kg		05/06/16 21:03	05/12/16 13:51	1
trans-1,2-Dichloroethene	ND		250		ug/Kg		05/06/16 21:03	05/12/16 13:51	1
Trichloroethene	ND		250		ug/Kg		05/06/16 21:03	05/12/16 13:51	1
Vinyl chloride	ND		250		ug/Kg		05/06/16 21:03	05/12/16 13:51	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*93*		*39 - 128*	*05/06/16 21:03*	*05/12/16 13:51*	*1*
4-Bromofluorobenzene (Surr)	*91*		*26 - 141*	*05/06/16 21:03*	*05/12/16 13:51*	*1*
Dibromofluoromethane (Surr)	*81*		*30 - 122*	*05/06/16 21:03*	*05/12/16 13:51*	*1*
Toluene-d8 (Surr)	*105*		*33 - 134*	*05/06/16 21:03*	*05/12/16 13:51*	*1*

Lab Sample ID: LCS 240-229245/2-A
Matrix: Solid
Analysis Batch: 230032

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 229245

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
cis-1,2-Dichloroethene	1000	1040		ug/Kg		104	60 - 125
Tetrachloroethene	1000	1100		ug/Kg		110	58 - 131
trans-1,2-Dichloroethene	1000	976		ug/Kg		98	58 - 121
Trichloroethene	1000	1100		ug/Kg		110	59 - 124
Vinyl chloride	1000	803		ug/Kg		80	33 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*89*		*39 - 128*
4-Bromofluorobenzene (Surr)	*95*		*26 - 141*
Dibromofluoromethane (Surr)	*90*		*30 - 122*
Toluene-d8 (Surr)	*100*		*33 - 134*

Lab Sample ID: MB 240-230032/6
Matrix: Solid
Analysis Batch: 230032

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		5.0		ug/Kg			05/12/16 11:21	1
Tetrachloroethene	ND		5.0		ug/Kg			05/12/16 11:21	1
trans-1,2-Dichloroethene	ND		5.0		ug/Kg			05/12/16 11:21	1
Trichloroethene	ND		5.0		ug/Kg			05/12/16 11:21	1
Vinyl chloride	ND		5.0		ug/Kg			05/12/16 11:21	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*91*		*58 - 123*		*05/12/16 11:21*	*1*
4-Bromofluorobenzene (Surr)	*89*		*52 - 136*		*05/12/16 11:21*	*1*
Dibromofluoromethane (Surr)	*83*		*37 - 132*		*05/12/16 11:21*	*1*
Toluene-d8 (Surr)	*100*		*67 - 125*		*05/12/16 11:21*	*1*

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 240-230032/5
Matrix: Solid
Analysis Batch: 230032

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
cis-1,2-Dichloroethene	50.0	56.3		ug/Kg		113	76 - 120
Tetrachloroethene	50.0	57.5		ug/Kg		115	79 - 120
trans-1,2-Dichloroethene	50.0	58.6		ug/Kg		117	78 - 120
Trichloroethene	50.0	58.8		ug/Kg		118	79 - 120
Vinyl chloride	20.0	21.9		ug/Kg		110	57 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*91*		*58 - 123*
4-Bromofluorobenzene (Surr)	*92*		*52 - 136*
Dibromofluoromethane (Surr)	*93*		*37 - 132*
Toluene-d8 (Surr)	*99*		*67 - 125*

Lab Sample ID: MB 240-230162/7
Matrix: Water
Analysis Batch: 230162

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		1.0		ug/L			05/13/16 08:37	1
Tetrachloroethene	ND		1.0		ug/L			05/13/16 08:37	1
trans-1,2-Dichloroethene	ND		1.0		ug/L			05/13/16 08:37	1
Trichloroethene	ND		1.0		ug/L			05/13/16 08:37	1
Vinyl chloride	ND		1.0		ug/L			05/13/16 08:37	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*92*		*78 - 125*		*05/13/16 08:37*	*1*
4-Bromofluorobenzene (Surr)	*93*		*61 - 120*		*05/13/16 08:37*	*1*
Dibromofluoromethane (Surr)	*97*		*79 - 120*		*05/13/16 08:37*	*1*
Toluene-d8 (Surr)	*106*		*80 - 120*		*05/13/16 08:37*	*1*

Lab Sample ID: LCS 240-230162/4
Matrix: Water
Analysis Batch: 230162

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
cis-1,2-Dichloroethene	10.0	10.8		ug/L		108	79 - 120
Tetrachloroethene	10.0	11.3		ug/L		113	78 - 121
trans-1,2-Dichloroethene	10.0	11.4		ug/L		114	80 - 124
Trichloroethene	10.0	10.4		ug/L		104	80 - 121
Vinyl chloride	10.0	11.2		ug/L		112	52 - 121

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*85*		*78 - 125*
4-Bromofluorobenzene (Surr)	*108*		*61 - 120*
Dibromofluoromethane (Surr)	*96*		*79 - 120*
Toluene-d8 (Surr)	*108*		*80 - 120*

1 2 3 4 5 6 7 8 9 10 11 12 13 14

Method: Moisture - Percent Moisture

Lab Sample ID: 240-64479-6 DU
Matrix: Solid
Analysis Batch: 229223

Client Sample ID: SB-04(6-8)
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Percent Solids	96.6			97.0		%				0.5	20

GC/MS VOA

Prep Batch: 229192

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-64479-1	SB-11(8-10)	Total/NA	Solid	5035	
240-64479-4	SB-05(4-5)	Total/NA	Solid	5035	
240-64479-5	SB-05(14-16)	Total/NA	Solid	5035	
240-64479-6	SB-04(6-8)	Total/NA	Solid	5035	
240-64479-7	SB-04(17-19)	Total/NA	Solid	5035	
240-64479-11	SB-12(7-8)	Total/NA	Solid	5035	

Prep Batch: 229245

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-64479-2	SB-11(15-17)	Total/NA	Solid	5035	
240-64479-3	SB-11(17-19)	Total/NA	Solid	5035	
240-64479-8	DUP-02	Total/NA	Solid	5035	
240-64479-12	SB-12(20-22)	Total/NA	Solid	5035	
240-64479-13	SB-12(24-25)	Total/NA	Solid	5035	
240-64479-14	SB-12(27-28)	Total/NA	Solid	5035	
LCS 240-229245/2-A	Lab Control Sample	Total/NA	Solid	5035	
MB 240-229245/1-A	Method Blank	Total/NA	Solid	5035	

Analysis Batch: 230032

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-64479-1	SB-11(8-10)	Total/NA	Solid	8260B	229192
240-64479-2	SB-11(15-17)	Total/NA	Solid	8260B	229245
240-64479-3	SB-11(17-19)	Total/NA	Solid	8260B	229245
240-64479-4	SB-05(4-5)	Total/NA	Solid	8260B	229192
240-64479-5	SB-05(14-16)	Total/NA	Solid	8260B	229192
240-64479-6	SB-04(6-8)	Total/NA	Solid	8260B	229192
240-64479-7	SB-04(17-19)	Total/NA	Solid	8260B	229192
240-64479-8	DUP-02	Total/NA	Solid	8260B	229245
240-64479-11	SB-12(7-8)	Total/NA	Solid	8260B	229192
240-64479-12	SB-12(20-22)	Total/NA	Solid	8260B	229245
240-64479-13	SB-12(24-25)	Total/NA	Solid	8260B	229245
240-64479-14	SB-12(27-28)	Total/NA	Solid	8260B	229245
LCS 240-229245/2-A	Lab Control Sample	Total/NA	Solid	8260B	229245
LCS 240-230032/5	Lab Control Sample	Total/NA	Solid	8260B	
MB 240-229245/1-A	Method Blank	Total/NA	Solid	8260B	229245
MB 240-230032/6	Method Blank	Total/NA	Solid	8260B	

Analysis Batch: 230162

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-64479-9	TRIP BLANK-04	Total/NA	Water	8260B	
240-64479-10	TRIP BLANK-03	Total/NA	Water	8260B	
LCS 240-230162/4	Lab Control Sample	Total/NA	Water	8260B	
MB 240-230162/7	Method Blank	Total/NA	Water	8260B	

General Chemistry

Analysis Batch: 229223

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-64479-1	SB-11(8-10)	Total/NA	Solid	Moisture	
240-64479-2	SB-11(15-17)	Total/NA	Solid	Moisture	

General Chemistry (Continued)

Analysis Batch: 229223 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-64479-3	SB-11(17-19)	Total/NA	Solid	Moisture	
240-64479-4	SB-05(4-5)	Total/NA	Solid	Moisture	
240-64479-5	SB-05(14-16)	Total/NA	Solid	Moisture	
240-64479-6	SB-04(6-8)	Total/NA	Solid	Moisture	
240-64479-6 DU	SB-04(6-8)	Total/NA	Solid	Moisture	
240-64479-7	SB-04(17-19)	Total/NA	Solid	Moisture	
240-64479-8	DUP-02	Total/NA	Solid	Moisture	
240-64479-11	SB-12(7-8)	Total/NA	Solid	Moisture	
240-64479-12	SB-12(20-22)	Total/NA	Solid	Moisture	
240-64479-13	SB-12(24-25)	Total/NA	Solid	Moisture	
240-64479-14	SB-12(27-28)	Total/NA	Solid	Moisture	

Client Sample ID: SB-11(8-10)

Lab Sample ID: 240-64479-1

Date Collected: 05/04/16 14:30

Matrix: Solid

Date Received: 05/06/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	229223	05/06/16 16:20	BLW	TAL CAN

Client Sample ID: SB-11(8-10)

Lab Sample ID: 240-64479-1

Date Collected: 05/04/16 14:30

Matrix: Solid

Date Received: 05/06/16 09:30

Percent Solids: 97.3

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			229192	05/06/16 13:00	LAM	TAL CAN
Total/NA	Analysis	8260B		1	230032	05/12/16 19:13	SAM	TAL CAN

Client Sample ID: SB-11(15-17)

Lab Sample ID: 240-64479-2

Date Collected: 05/04/16 14:15

Matrix: Solid

Date Received: 05/06/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	229223	05/06/16 16:20	BLW	TAL CAN

Client Sample ID: SB-11(15-17)

Lab Sample ID: 240-64479-2

Date Collected: 05/04/16 14:15

Matrix: Solid

Date Received: 05/06/16 09:30

Percent Solids: 96.6

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			229245	05/06/16 21:03	LAM	TAL CAN
Total/NA	Analysis	8260B		1.667	230032	05/12/16 14:13	SAM	TAL CAN

Client Sample ID: SB-11(17-19)

Lab Sample ID: 240-64479-3

Date Collected: 05/04/16 14:20

Matrix: Solid

Date Received: 05/06/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	229223	05/06/16 16:20	BLW	TAL CAN

Client Sample ID: SB-11(17-19)

Lab Sample ID: 240-64479-3

Date Collected: 05/04/16 14:20

Matrix: Solid

Date Received: 05/06/16 09:30

Percent Solids: 91.3

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			229245	05/06/16 21:03	LAM	TAL CAN
Total/NA	Analysis	8260B		50	230032	05/12/16 14:34	SAM	TAL CAN

Lab Chronicle

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Client Sample ID: SB-05(4-5)

Lab Sample ID: 240-64479-4

Date Collected: 05/04/16 16:00
Matrix: Solid
Date Received: 05/06/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	229223	05/06/16 16:20	BLW	TAL CAN

Client Sample ID: SB-05(4-5)

Lab Sample ID: 240-64479-4

Date Collected: 05/04/16 16:00
Matrix: Solid
Date Received: 05/06/16 09:30
Percent Solids: 96.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			229192	05/06/16 13:00	LAM	TAL CAN
Total/NA	Analysis	8260B		1	230032	05/12/16 19:35	SAM	TAL CAN

Client Sample ID: SB-05(14-16)

Lab Sample ID: 240-64479-5

Date Collected: 05/04/16 16:10
Matrix: Solid
Date Received: 05/06/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	229223	05/06/16 16:20	BLW	TAL CAN

Client Sample ID: SB-05(14-16)

Lab Sample ID: 240-64479-5

Date Collected: 05/04/16 16:10
Matrix: Solid
Date Received: 05/06/16 09:30
Percent Solids: 95.2

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			229192	05/06/16 13:00	LAM	TAL CAN
Total/NA	Analysis	8260B		1	230032	05/12/16 19:56	SAM	TAL CAN

Client Sample ID: SB-04(6-8)

Lab Sample ID: 240-64479-6

Date Collected: 05/04/16 16:45
Matrix: Solid
Date Received: 05/06/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	229223	05/06/16 16:20	BLW	TAL CAN

Client Sample ID: SB-04(6-8)

Lab Sample ID: 240-64479-6

Date Collected: 05/04/16 16:45
Matrix: Solid
Date Received: 05/06/16 09:30
Percent Solids: 96.6

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			229192	05/06/16 13:00	LAM	TAL CAN
Total/NA	Analysis	8260B		1	230032	05/12/16 20:18	SAM	TAL CAN

Client Sample ID: SB-04(17-19)

Lab Sample ID: 240-64479-7

Date Collected: 05/04/16 16:55
Date Received: 05/06/16 09:30

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	229223	05/06/16 16:20	BLW	TAL CAN

Client Sample ID: SB-04(17-19)

Lab Sample ID: 240-64479-7

Date Collected: 05/04/16 16:55
Date Received: 05/06/16 09:30

Matrix: Solid
Percent Solids: 94.6

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			229192	05/06/16 13:00	LAM	TAL CAN
Total/NA	Analysis	8260B		1	230032	05/12/16 20:39	SAM	TAL CAN

Client Sample ID: DUP-02

Lab Sample ID: 240-64479-8

Date Collected: 05/04/16 00:00
Date Received: 05/06/16 09:30

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	229223	05/06/16 16:20	BLW	TAL CAN

Client Sample ID: DUP-02

Lab Sample ID: 240-64479-8

Date Collected: 05/04/16 00:00
Date Received: 05/06/16 09:30

Matrix: Solid
Percent Solids: 89.6

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			229245	05/06/16 21:03	LAM	TAL CAN
Total/NA	Analysis	8260B		33.333	230032	05/12/16 14:56	SAM	TAL CAN

Client Sample ID: TRIP BLANK-04

Lab Sample ID: 240-64479-9

Date Collected: 05/04/16 00:00
Date Received: 05/06/16 09:30

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	230162	05/13/16 16:40	RJQ	TAL CAN

Client Sample ID: TRIP BLANK-03

Lab Sample ID: 240-64479-10

Date Collected: 05/04/16 00:00
Date Received: 05/06/16 09:30

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	230162	05/13/16 17:02	RJQ	TAL CAN

Client Sample ID: SB-12(7-8)

Lab Sample ID: 240-64479-11
Date Collected: 05/05/16 09:20
Date Received: 05/06/16 09:30
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	229223	05/06/16 16:20	BLW	TAL CAN

Client Sample ID: SB-12(7-8)

Lab Sample ID: 240-64479-11
Date Collected: 05/05/16 09:20
Date Received: 05/06/16 09:30
Matrix: Solid
Percent Solids: 95.4

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			229192	05/06/16 13:00	LAM	TAL CAN
Total/NA	Analysis	8260B		1	230032	05/12/16 21:00	SAM	TAL CAN

Client Sample ID: SB-12(20-22)

Lab Sample ID: 240-64479-12
Date Collected: 05/05/16 10:00
Date Received: 05/06/16 09:30
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	229223	05/06/16 16:38	BLW	TAL CAN

Client Sample ID: SB-12(20-22)

Lab Sample ID: 240-64479-12
Date Collected: 05/05/16 10:00
Date Received: 05/06/16 09:30
Matrix: Solid
Percent Solids: 93.7

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			229245	05/06/16 21:03	LAM	TAL CAN
Total/NA	Analysis	8260B		1	230032	05/12/16 15:17	SAM	TAL CAN

Client Sample ID: SB-12(24-25)

Lab Sample ID: 240-64479-13
Date Collected: 05/05/16 10:15
Date Received: 05/06/16 09:30
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	229223	05/06/16 16:38	BLW	TAL CAN

Client Sample ID: SB-12(24-25)

Lab Sample ID: 240-64479-13
Date Collected: 05/05/16 10:15
Date Received: 05/06/16 09:30
Matrix: Solid
Percent Solids: 92.4

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			229245	05/06/16 21:03	LAM	TAL CAN
Total/NA	Analysis	8260B		1	230032	05/12/16 15:39	SAM	TAL CAN

Lab Chronicle

Client Sample ID: SB-12(27-28)

Lab Sample ID: 240-64479-14

Date Collected: 05/05/16 09:50
Matrix: Solid
Date Received: 05/06/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	229223	05/06/16 16:38	BLW	TAL CAN

Client Sample ID: SB-12(27-28)

Lab Sample ID: 240-64479-14

Date Collected: 05/05/16 09:50
Matrix: Solid
Date Received: 05/06/16 09:30
Percent Solids: 92.5

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			229245	05/06/16 21:03	LAM	TAL CAN
Total/NA	Analysis	8260B		10	230032	05/12/16 16:00	SAM	TAL CAN

Laboratory References:

TAL CAN = TestAmerica Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

Certification Summary

Laboratory: TestAmerica Canton

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
California	NELAP	9	01144CA	06-30-14 *
California	State Program	9	2927	04-30-17
Connecticut	State Program	1	PH-0590	12-31-17
Florida	NELAP	4	E87225	06-30-16 *
Illinois	NELAP	5	200004	07-31-16 *
Kansas	NELAP	7	E-10336	07-31-16 *
Kentucky (UST)	State Program	4	58	02-23-17
Kentucky (WW)	State Program	4	98016	12-31-16
L-A-B	DoD ELAP		L2315	07-18-16
Minnesota	NELAP	5	039-999-348	12-31-16
Nevada	State Program	9	OH-000482008A	07-31-16 *
New Jersey	NELAP	2	OH001	06-30-16 *
New York	NELAP	2	10975	03-31-17
Ohio VAP	State Program	5	CL0024	09-14-17
Oregon	NELAP	10	4062	02-23-17
Pennsylvania	NELAP	3	68-00340	08-31-16 *
Texas	NELAP	6	T104704517-15-5	08-31-16 *
USDA	Federal		P330-13-00319	11-26-16
Virginia	NELAP	3	460175	09-14-16
Washington	State Program	10	C971	01-12-17
West Virginia DEP	State Program	3	210	12-31-16
Wisconsin	State Program	5	999518190	08-31-16 *

* Certification renewal pending - certification considered valid.

CHAIN OF CUSTODY
AND
RECEIVING DOCUMENTS

240-64479 Chain of Custody

TestAmerica Canton
4101 Shuffel Street NW
North Canton, OH 44720
Phone (330) 497-9396 Fax (330) 497-0772

0.8/C0.3
1.4/C0.9

Chain of Custody Record

TestAmerica Columbus
THE LEADER IN ENVIR
240507

DRAFT

Client Information	Sampler: DAVID KREEGER	Lab PM: O'Meara, Patrick J	Carrier Tracking No(s):	COC No: 240-34678-15017.1
Client Contact: Mr. David Kreeger	Phone: (734) 904-3312	E-Mail: patrick.omeara@testamericainc.com		Page: Page 1 of 2
Company: TRC Environmental Corporation.				Job #:
Address: 921 Eastwind Drive	Due Date Requested:			
City: Westerville	TAT Requested (days): STANDARD TAT			
State, Zip: OH, 43081				
Phone: 513-315-6748(Tel) / (734) 904-3312 (CELL)	PO #: 94838			
Email: dkreeger@trcsolutions.com	WO #: 243854.0000.0000, phase 6			
Project Name: ~~Mullins Rubber Products Soils~~ VALLEY PIKE (SOILS)	Project #: 24016117			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - ph 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8260B - TCL VOCs PCE, TCE, DCE, VC	8260B - TCL VOCs PCE, TCE, DCE, VC	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	A		
SB-11 (8-10)	5/4/2016	1430	GRAB	Solid			X			
SB-11 (15-17)		1415		Solid			X			
SB-11 (17-19)		1420		Solid			X			VAP CERTIFIED DATA
SB-05 (4-5)		1600		Solid			X			FOR PCE, TCE,
SB-05 (14-16)		1610		Solid			X			CIS-1,2,DCE, TRANS-1,2DCE,
SB-04 (6-8)		1645		Solid			X			AND VINYL CHLORIDE
SB-04 (17-19)		1655		Solid			X			
DUP-02		—		Solid			X			
				Solid						
TRIP BLANK-04				W ~~Solid~~				X		
TRIP BLANK-03				W ~~Solid~~				X		

Dayton
210

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Deliverable Requested: I, II, III, IV, Other (specify) VAP CERTIFIED / EDD: EQUIS - TRC SOLUTIONS

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For ______ Months

Special Instructions/QC Requirements: VAP CERTIFIED PROTOCOL

Empty Kit Relinquished by:		Date:	Time:		Method of Shipment:	
Relinquished by:	Date/Time: 5/5/2016 1348	Company TRC	Received by:	Date/Time: 5/5/16		Company TestAmerica
Relinquished by:	Date/Time: 5/5/16 16 36	Company TA	Received by:	Date/Time: 5/6/16 930		Company TANC
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:		Company
Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks:			

TestAmerica Canton
4101 Shuffel Street NW
North Canton, OH 44720
Phone (330) 497-9396 Fax (330) 497-0772

Chain of Custody Record

TestAmerica THE LEADER IN ENVIR

Columbus
240507

DRAFT

Client Information	Sampler: DAVID KREEGER	Lab PM: O'Meara, Patrick J	Carrier Tracking No(s):	COC No: 240-34678-15017.2
Client Contact: Mr. David Kreeger	Phone: (734) 904-3312	E-Mail: patrick.omeara@testamericainc.com		Page: Page 2 of 2
Company: TRC Environmental Corporation.		**Analysis Requested**		Job #:
Address: 921 Eastwind Drive	Due Date Requested:			
City: Westerville	TAT Requested (days): STANDARD TAT			
State, Zip: OH, 43081				
Phone: 513-315-6748(Tel) / (734) 904-3312 (CELL)	PO #: 94838			
Email: dkreeger@trcsolutions.com	WO #: 243854.0000.0000, phase 6			
Project Name: Mullins Rubber Products-Soils	Project #: 24016117			
Site:	SSOW#:			

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - ph 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8260B - TCL VOCs PCE, TCE, 12DCE, VC	8260B - TCL VOCs	Total Number of containers	Special Instructions/Note:
				Preservation Code:			N	A		
SB-12 (7-8)	5/5/2016	9:20	GRAB	Solid			X			
SB-12 (20-22)	5/5/2016	1000		Solid			X			VAP CERTIFIED ANALYSIS
SB-12 (24-25)	5/5/2016	1015		Solid			X			FOR PCE, TCE, CIS-12-DCE,
SB-12 (27-28)	5/5/2016	9:50		Solid			X			TRANS-12 DCE, AND
				Solid						VINYL CHLORIDE
				Water						
				Water						

Dayton
210

Possible Hazard Identification
☐ *Non-Hazard* ☐ *Flammable* ☐ *Skin Irritant* ☐ *Poison B* ☐ *Unknown* ☐ *Radiological*

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* ______ *Months*

Deliverable Requested: I, II, III, IV, Other (specify) VAP CERTIFIED / EDD: ~~TRC~~ EQUIS_TRCSOLUTIONS

Special Instructions/QC Requirements: VAP CERTIFIED QC PROTOCOL

Empty Kit Relinquished by:	Date:		Time:		Method of Shipment:
Relinquished by:	Date/Time: 5/5/2016 1340	Company TRC	Received by:	Date/Time: 5/5/16 1348	Company TestAmerica
Relinquished by:	Date/Time: 5/5/16 16 30	Company TA	Received by: Jacquelyn Terrel	Date/Time: 5/6/16 930	Company TANC
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No
Custody Seal No.:
Cooler Temperature(s) °C and Other Remarks:

DRAFT

TestAmerica Canton Sample Receipt Form/Narrative **Login # :** 64479
Canton Facility

Client IRC Site Name ____________

Cooler unpacked by: J. Jerrel

Cooler Received on 5/6/16 Opened on 5/6/16

FedEx: 1st Grd [✓ Exp] UPS FAS Stetson Client Drop Off TestAmerica Courier Other ____________

Receipt After-hours: Drop-off Date/Time ____________ Storage Location ____________

TestAmerica Cooler # ____________ Foam Box [✓ Client Cooler] Box Other Multiple

Packing material used: [✓ Bubble Wrap] Foam Plastic Bag None Other ____________

COOLANT: [✓ Wet Ice] Blue Ice Dry Ice Water None

1. Cooler temperature upon receipt ☑ See Multiple Cooler Form

IR GUN# 48 (CF -1.9 °C) Observed Cooler Temp.______°C Corrected Cooler Temp.______°C
IR GUN# 36 (CF -1.5 °C) Observed Cooler Temp.______°C Corrected Cooler Temp.______°C
IR GUN# I8 (CF -0.5 °C) Observed Cooler Temp.______°C Corrected Cooler Temp.______°C

2. Were custody seals on the outside of the cooler(s)? If Yes Quantity ______ Yes [✓ No]
-Were custody seals on the outside of the cooler(s) signed & dated? Yes No [✓ NA]
-Were custody seals on the bottle(s) or bottle kits (LLHg/MeHg)? Yes [✓ No]
3. Shippers' packing slip attached to the cooler(s)? [✓ Yes] No
4. Did custody papers accompany the sample(s)? [✓ Yes] No
5. Were the custody papers relinquished & signed in the appropriate place? [✓ Yes] No
6. Was/were the person(s) who collected the samples clearly identified on the COC? [✓ Yes] No
7. Did all bottles arrive in good condition (Unbroken)? [✓ Yes] No
8. Could all bottle labels be reconciled with the COC? [✓ Yes] No
9. Were correct bottle(s) used for the test(s) indicated? [✓ Yes] No
10. Sufficient quantity received to perform indicated analyses? [✓ Yes] No
11. Are these work share samples? Yes [✓ No]

If yes, Questions 12-16 have been checked at the originating laboratory.

12. Were sample(s) at the correct pH upon receipt? Yes No [✓ NA] pH Strip Lot# HC559158
13. Were VOAs on the COC? Yes [✓ No]
14. Were air bubbles >6 mm in any VOA vials? Yes No [✓ NA]
15. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # B53630NB [✓ Yes] ~~No~~ JRF
16. Was a LL Hg or Me Hg trip blank present? ____________ Yes [✓ No]

Contacted PM ________ Date ________ by ________ via Verbal Voice Mail Other

Concerning ____________

17. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES

Samples processed by:

18. SAMPLE CONDITION

Sample(s) ____________ were received after the recommended holding time had expired.
Sample(s) ____________ were received in a broken container.
Sample(s) ____________ were received with bubble >6 mm in diameter. (Notify PM)

19. SAMPLE PRESERVATION

Sample(s) ____________ were further preserved in the laboratory.
Time preserved: ________ Preservative(s) added/Lot number(s): ____________.

Ref: SOP NC-SC-0005, Sample Receiving
L:\QAQC\QA Department\QA TARDIS\Document Control\Work Instructions\WI-NC-099X-011816 Cooler Receipt Form.doc djl

DRAFT

TestAmerica Multiple Cooler Receipt Form/Narrative
Canton Facility

Login # : 64479

Cooler #	IR Gun #	Observed Temp °C	Corrected Temp °C	Coolant
Client	18	0.8	0.3	ICE
↓	↓	1.4	0.9	↓

DRAFT

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Canton
4101 Shuffel Street NW
North Canton, OH 44720
Tel: (330)497-9396

TestAmerica Job ID: 240-64471-1
Client Project/Site: Valley Pike

For:
TRC Environmental Corporation
11231 Cornell Park Drive
Cincinnati, Ohio 45242

Attn: Andrew Davis

Patrick O'Meara

Authorized for release by:
5/17/2016 5:56:19 PM

Patrick O'Meara, Manager of Project Management
(330)966-5725
patrick.omeara@testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 240-64471-1

Laboratory: TestAmerica Canton

Narrative

CASE NARRATIVE

Client: TRC Environmental Corporation

Project: Valley Pike

Report Number: 240-64471-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

TestAmerica utilizes USEPA approved methods, where applicable, in all analytical work. The samples presented in this report were analyzed for the parameter(s) listed on the analytical methods summary page in accordance with the method(s) indicated and were analyzed in accordance with Ohio Voluntary Action Program protocols, where applicable.

A summary of QC data for these analyses is included at the back of the report.

TestAmerica Canton attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the applicable methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

RECEIPT
The samples were received on 5/6/2016 9:20 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 0.9º C.

VOLATILE ORGANIC COMPOUNDS (GCMS)
Samples MW-EPA-07/20160505 (240-64471-1), MW-PW/20160505 (240-64471-2), MW-01R/20160505 (240-64471-3) and TB-01/20160505 (240-64471-4) were analyzed for volatile organic compounds (GCMS) in accordance with EPA SW-846 Method 8260B. The samples were analyzed on 05/14/2016.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Method Summary

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL CAN

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL CAN = TestAmerica Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

Sample Summary

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
240-64471-1	MW-EPA-07/20160505	Water	05/05/16 13:04	05/06/16 09:20
240-64471-2	MW-PW/20160505	Water	05/05/16 14:03	05/06/16 09:20
240-64471-3	MW-01R/20160505	Water	05/05/16 14:59	05/06/16 09:20
240-64471-4	TB-01/20160505	Water	05/05/16 00:00	05/06/16 09:20

Detection Summary

Client Sample ID: MW-EPA-07/20160505 Lab Sample ID: 240-64471-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Tetrachloroethene	3.0		1.0		ug/L	1		8260B	Total/NA

Client Sample ID: MW-PW/20160505 Lab Sample ID: 240-64471-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Tetrachloroethene	31		1.0		ug/L	1		8260B	Total/NA

Client Sample ID: MW-01R/20160505 Lab Sample ID: 240-64471-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Tetrachloroethene	5.9		1.0		ug/L	1		8260B	Total/NA

Client Sample ID: TB-01/20160505 Lab Sample ID: 240-64471-4

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client Sample ID: MW-EPA-07/20160505

Lab Sample ID: 240-64471-1

Date Collected: 05/05/16 13:04

Matrix: Water

Date Received: 05/06/16 09:20

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		1.0		ug/L			05/14/16 13:21	1
Tetrachloroethene	**3.0**		1.0		ug/L			05/14/16 13:21	1
trans-1,2-Dichloroethene	ND		1.0		ug/L			05/14/16 13:21	1
Trichloroethene	ND		1.0		ug/L			05/14/16 13:21	1
Vinyl chloride	ND		1.0		ug/L			05/14/16 13:21	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*92*		*78 - 125*		*05/14/16 13:21*	*1*
4-Bromofluorobenzene (Surr)	*92*		*61 - 120*		*05/14/16 13:21*	*1*
Dibromofluoromethane (Surr)	*101*		*79 - 120*		*05/14/16 13:21*	*1*
Toluene-d8 (Surr)	*107*		*80 - 120*		*05/14/16 13:21*	*1*

Client Sample ID: MW-PW/20160505

Lab Sample ID: 240-64471-2

Date Collected: 05/05/16 14:03
Date Received: 05/06/16 09:20

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		1.0		ug/L			05/14/16 13:42	1
Tetrachloroethene	**31**		1.0		ug/L			05/14/16 13:42	1
trans-1,2-Dichloroethene	ND		1.0		ug/L			05/14/16 13:42	1
Trichloroethene	ND		1.0		ug/L			05/14/16 13:42	1
Vinyl chloride	ND		1.0		ug/L			05/14/16 13:42	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*90*		*78 - 125*		*05/14/16 13:42*	*1*
4-Bromofluorobenzene (Surr)	*90*		*61 - 120*		*05/14/16 13:42*	*1*
Dibromofluoromethane (Surr)	*99*		*79 - 120*		*05/14/16 13:42*	*1*
Toluene-d8 (Surr)	*106*		*80 - 120*		*05/14/16 13:42*	*1*

Client Sample ID: MW-01R/20160505

Date Collected: 05/05/16 14:59
Date Received: 05/06/16 09:20

Lab Sample ID: 240-64471-3

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		1.0		ug/L			05/14/16 14:04	1
Tetrachloroethene	**5.9**		1.0		ug/L			05/14/16 14:04	1
trans-1,2-Dichloroethene	ND		1.0		ug/L			05/14/16 14:04	1
Trichloroethene	ND		1.0		ug/L			05/14/16 14:04	1
Vinyl chloride	ND		1.0		ug/L			05/14/16 14:04	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*88*		*78 - 125*		*05/14/16 14:04*	*1*
4-Bromofluorobenzene (Surr)	*90*		*61 - 120*		*05/14/16 14:04*	*1*
Dibromofluoromethane (Surr)	*99*		*79 - 120*		*05/14/16 14:04*	*1*
Toluene-d8 (Surr)	*105*		*80 - 120*		*05/14/16 14:04*	*1*

Client Sample Results

Client Sample ID: TB-01/20160505

Lab Sample ID: 240-64471-4

Date Collected: 05/05/16 00:00

Matrix: Water

Date Received: 05/06/16 09:20

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		1.0		ug/L			05/14/16 14:26	1
Tetrachloroethene	ND		1.0		ug/L			05/14/16 14:26	1
trans-1,2-Dichloroethene	ND		1.0		ug/L			05/14/16 14:26	1
Trichloroethene	ND		1.0		ug/L			05/14/16 14:26	1
Vinyl chloride	ND		1.0		ug/L			05/14/16 14:26	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*89*		*78 - 125*		*05/14/16 14:26*	*1*
4-Bromofluorobenzene (Surr)	*90*		*61 - 120*		*05/14/16 14:26*	*1*
Dibromofluoromethane (Surr)	*99*		*79 - 120*		*05/14/16 14:26*	*1*
Toluene-d8 (Surr)	*105*		*80 - 120*		*05/14/16 14:26*	*1*

Surrogate Summary

Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		12DCE	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(78-125)	(61-120)	(79-120)	(80-120)
240-64471-1	MW-EPA-07/20160505	92	92	101	107
240-64471-2	MW-PW/20160505	90	90	99	106
240-64471-3	MW-01R/20160505	88	90	99	105
240-64471-4	TB-01/20160505	89	90	99	105
LCS 240-230335/4	Lab Control Sample	84	101	94	112
MB 240-230335/6	Method Blank	92	96	98	106

Surrogate Legend

12DCE = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8260B - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 240-230335/6
Matrix: Water
Analysis Batch: 230335

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		1.0		ug/L			05/14/16 11:27	1
Tetrachloroethene	ND		1.0		ug/L			05/14/16 11:27	1
trans-1,2-Dichloroethene	ND		1.0		ug/L			05/14/16 11:27	1
Trichloroethene	ND		1.0		ug/L			05/14/16 11:27	1
Vinyl chloride	ND		1.0		ug/L			05/14/16 11:27	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*92*		*78 - 125*		*05/14/16 11:27*	*1*
4-Bromofluorobenzene (Surr)	*96*		*61 - 120*		*05/14/16 11:27*	*1*
Dibromofluoromethane (Surr)	*98*		*79 - 120*		*05/14/16 11:27*	*1*
Toluene-d8 (Surr)	*106*		*80 - 120*		*05/14/16 11:27*	*1*

Lab Sample ID: LCS 240-230335/4
Matrix: Water
Analysis Batch: 230335

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
cis-1,2-Dichloroethene	10.0	10.5		ug/L		105	79 - 120
Tetrachloroethene	10.0	11.5		ug/L		115	78 - 121
trans-1,2-Dichloroethene	10.0	11.3		ug/L		113	80 - 124
Trichloroethene	10.0	10.3		ug/L		103	80 - 121
Vinyl chloride	10.0	11.1		ug/L		111	52 - 121

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*84*		*78 - 125*
4-Bromofluorobenzene (Surr)	*101*		*61 - 120*
Dibromofluoromethane (Surr)	*94*		*79 - 120*
Toluene-d8 (Surr)	*112*		*80 - 120*

QC Association Summary

GC/MS VOA

Analysis Batch: 230335

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-64471-1	MW-EPA-07/20160505	Total/NA	Water	8260B	
240-64471-2	MW-PW/20160505	Total/NA	Water	8260B	
240-64471-3	MW-01R/20160505	Total/NA	Water	8260B	
240-64471-4	TB-01/20160505	Total/NA	Water	8260B	
LCS 240-230335/4	Lab Control Sample	Total/NA	Water	8260B	
MB 240-230335/6	Method Blank	Total/NA	Water	8260B	

Lab Chronicle

Client Sample ID: MW-EPA-07/20160505

Lab Sample ID: 240-64471-1

Date Collected: 05/05/16 13:04

Matrix: Water

Date Received: 05/06/16 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	230335	05/14/16 13:21	RJQ	TAL CAN

Client Sample ID: MW-PW/20160505

Lab Sample ID: 240-64471-2

Date Collected: 05/05/16 14:03

Matrix: Water

Date Received: 05/06/16 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	230335	05/14/16 13:42	RJQ	TAL CAN

Client Sample ID: MW-01R/20160505

Lab Sample ID: 240-64471-3

Date Collected: 05/05/16 14:59

Matrix: Water

Date Received: 05/06/16 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	230335	05/14/16 14:04	RJQ	TAL CAN

Client Sample ID: TB-01/20160505

Lab Sample ID: 240-64471-4

Date Collected: 05/05/16 00:00

Matrix: Water

Date Received: 05/06/16 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	230335	05/14/16 14:26	RJQ	TAL CAN

Laboratory References:

TAL CAN = TestAmerica Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

Certification Summary

Client: TRC Environmental Corporation
Project/Site: Valley Pike

TestAmerica Job ID: 240-64471-1

Laboratory: TestAmerica Canton

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
California	NELAP	9	01144CA	06-30-14 *
California	State Program	9	2927	04-30-17
Connecticut	State Program	1	PH-0590	12-31-17
Florida	NELAP	4	E87225	06-30-16 *
Illinois	NELAP	5	200004	07-31-16 *
Kansas	NELAP	7	E-10336	07-31-16 *
Kentucky (UST)	State Program	4	58	02-23-17
Kentucky (WW)	State Program	4	98016	12-31-16
L-A-B	DoD ELAP		L2315	07-18-16
Minnesota	NELAP	5	039-999-348	12-31-16
Nevada	State Program	9	OH-000482008A	07-31-16 *
New Jersey	NELAP	2	OH001	06-30-16 *
New York	NELAP	2	10975	03-31-17
Ohio VAP	State Program	5	CL0024	09-14-17
Oregon	NELAP	10	4062	02-23-17
Pennsylvania	NELAP	3	68-00340	08-31-16 *
Texas	NELAP	6	T104704517-15-5	08-31-16 *
USDA	Federal		P330-13-00319	11-26-16
Virginia	NELAP	3	460175	09-14-16
Washington	State Program	10	C971	01-12-17
West Virginia DEP	State Program	3	210	12-31-16
Wisconsin	State Program	5	999518190	08-31-16 *

* Certification renewal pending - certification considered valid.

CHAIN OF CUSTODY
AND
RECEIVING DOCUMENTS

240-64471 Chain of Custody

TestAmerica Canton
4101 Shuffel Street NW
North Canton, OH 44720
Phone (330) 497-9396 Fax (330) 497-0772

1.4/Co.9

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Cincinnati
210501

Client Information

Client Contact: Andrew Davis
Company: TRC Environmental Corporation
Address: 11231 Cornell Park Drive
City: Cincinnati
State, Zip: OH, 45242
Phone: 513-315-6748(Tel)
Email: ajdavis@trcsolutions.com
Project Name: Mullins Rubber Products
Site:

Sampler: Andrew Davis
Phone: 513-489-2255
Due Date Requested:
TAT Requested (days): Normal TAT
PO #: TBD
WO #: 243854.0000.0000, phase 6
Project #: 24016117
SSOW#:

Lab PM: O'Meara, Patrick J
E-Mail: patrick.omeara@testamericainc.com
Carrier Tracking No(s):
COC No: 240-34504-15019.1
Page: Page 1 of 1
Job #:

Preservation Codes:
A - HC
B - Na
C - Zn
D - Nit
E - Na
F - Me
G - An
H - Asi
I - Ice
J - DI
K - ED
L - ED
Other:

Analysis Requested

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8260B - ~~TCL VOCs~~ PCE, TCE, DCE, VC	Total Number of containers
			Preservation Code:				A	
MW-EPA-07 / 20160505	5/5/16	1304	G	Water			X	
MW-PW / 20160505	|	1403	|	Water			X	
MW-01R / 20160505	|	1459	|	Water			X	
TB-01 / 20160505	|	—	|	Water			X	
				Water				
				Water				
				Water				
				Water				

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Deliverable Requested: I, II, III, IV, Other (specify) VAP Certified / EDD: Equis - TRC Solutions

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For ______ Months

Special Instructions/QC Requirements: VAP Certified Protocol

Empty Kit Relinquished by: Date: Time: Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Andrew Davis	5/5/16 1619	TRC		5/5/16 1619	TA
	5/5/16 1025	TA		5-6-16 920	TA

Custody Seals Intact: ∆ Yes ∆ No
Custody Seal No.:
Cooler Temperature(s) °C and Other Remarks:

DRAFT

TestAmerica Canton Sample Receipt Form/Narrative **Login # :** 64471
Canton Facility

Client TRC Site Name ____________

Cooler unpacked by:

Cooler Received on 5-6-16 Opened on 5-6-16

FedEx: 1st [✓ Grd] Exp UPS FAS Stetson Client Drop Off TestAmerica Courier Other ____________

Receipt After-hours: Drop-off Date/Time ____________ Storage Location ____________

TestAmerica Cooler # ____________ Foam Box [✓ Client Cooler] Box Other ____________

Packing material used: [✓ Bubble Wrap] Foam Plastic Bag None Other ____________

COOLANT: [✓ Wet Ice] Blue Ice Dry Ice Water None

1. Cooler temperature upon receipt ☐ See Multiple Cooler Form

IR GUN# 48 (CF -1.9 °C) Observed Cooler Temp. ______ °C Corrected Cooler Temp. ______ °C
IR GUN# 36 (CF -1.5 °C) Observed Cooler Temp. ______ °C Corrected Cooler Temp. ______ °C
IR GUN# 18 (CF -0.5 °C) Observed Cooler Temp. 1.4 °C Corrected Cooler Temp. 0.9 °C

2. Were custody seals on the outside of the cooler(s)? If Yes Quantity 1 [✓ Yes] No
-Were custody seals on the outside of the cooler(s) signed & dated? [✓ Yes] No NA
-Were custody seals on the bottle(s) or bottle kits (LLHg/MeHg)? Yes [✓ No]
3. Shippers' packing slip attached to the cooler(s)? [✓ Yes] No
4. Did custody papers accompany the sample(s)? [✓ Yes] No
5. Were the custody papers relinquished & signed in the appropriate place? [✓ Yes] No
6. Was/were the person(s) who collected the samples clearly identified on the COC? [✓ Yes] No
7. Did all bottles arrive in good condition (Unbroken)? ~~Yes~~ [✓ No]
8. Could all bottle labels be reconciled with the COC? [✓ Yes] No
9. Were correct bottle(s) used for the test(s) indicated? [✓ Yes] No
10. Sufficient quantity received to perform indicated analyses? [✓ Yes] No
11. Are these work share samples? Yes [✓ No]

If yes, Questions 12-16 have been checked at the originating laboratory.

12. Were sample(s) at the correct pH upon receipt? Yes No [✓ NA] pH Strip Lot# HC559158
13. Were VOAs on the COC? [✓ Yes] No
14. Were air bubbles >6 mm in any VOA vials? Yes [✓ No] NA
15. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # ____________ [✓ Yes] No
16. Was a LL Hg or Me Hg trip blank present? ____________ Yes [✓ No]

Contacted PM ____________ Date ____________ by ____________ via Verbal Voice Mail Other
Concerning ____________

17. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES

Samples processed by:

18. SAMPLE CONDITION

Sample(s) ____________ were received after the recommended holding time had expired.
Sample(s) 1x40 each for MW-PW + MW-01R were received in a broken container.
Sample(s) ____________ were received with bubble >6 mm in diameter. (Notify PM)

19. SAMPLE PRESERVATION

Sample(s) ____________ were further preserved in the laboratory.
Time preserved: ____________ Preservative(s) added/Lot number(s): ____________

Ref: SOP NC-SC-0005, Sample Receiving
L:\QAQC\QA Department\QA TARDIS\Document Control\Work Instructions\WI-NC-099X-011816 Cooler Receipt Form.doc djl

DRAFT

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

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ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Canton
4101 Shuffel Street NW
North Canton, OH 44720
Tel: (330)497-9396

TestAmerica Job ID: 240-64571-1
Client Project/Site: Valley Pike

For:
TRC Environmental Corporation
11231 Cornell Park Drive
Cincinnati, Ohio 45242

Attn: Andrew Davis

Patrick O'Meara

Authorized for release by:
5/19/2016 5:22:33 PM

Patrick O'Meara, Manager of Project Management
(330)966-5725
patrick.omeara@testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Definitions/Glossary

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 240-64571-1

Laboratory: TestAmerica Canton

Narrative

CASE NARRATIVE

Client: TRC Environmental Corporation

Project: Valley Pike

Report Number: 240-64571-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

TestAmerica utilizes USEPA approved methods, where applicable, in all analytical work. The samples presented in this report were analyzed for the parameter(s) listed on the analytical methods summary page in accordance with the method(s) indicated and were analyzed in accordance with Ohio Voluntary Action Program protocols, where applicable.

A summary of QC data for these analyses is included at the back of the report.

TestAmerica Canton attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the applicable methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

RECEIPT
The samples were received on 5/7/2016 10:00 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 0.3° C.

VOLATILE ORGANIC COMPOUNDS (GCMS)
Samples MW-EPA-08/20160506 (240-64571-1) and TB-01/20160506 (240-64571-2) were analyzed for volatile organic compounds (GCMS) in accordance with EPA SW-846 Method 8260B. The samples were analyzed on 05/19/2016.

Sample MW-EPA-08/20160506 (240-64571-1)[250X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

There was an MS/MSD analyzed in batch 230638 but it could not be reported because the associated parent sample needed reanalyzed in a different batch. Associated samples: MW-EPA-08/20160506 (240-64571-1) and TB-01/20160506 (240-64571-2).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Method Summary

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL CAN

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL CAN = TestAmerica Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

Sample Summary

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
240-64571-1	MW-EPA-08/20160506	Water	05/06/16 10:02	05/07/16 10:00
240-64571-2	TB-01/20160506	Water	05/06/16 00:00	05/07/16 10:00

Detection Summary

Client Sample ID: MW-EPA-08/20160506 — Lab Sample ID: 240-64571-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Tetrachloroethene	5500		250		ug/L	250		8260B	Total/NA

Client Sample ID: TB-01/20160506 — Lab Sample ID: 240-64571-2

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: TRC Environmental Corporation
Project/Site: Valley Pike

TestAmerica Job ID: 240-64571-1

Client Sample ID: MW-EPA-08/20160506

Date Collected: 05/06/16 10:02
Date Received: 05/07/16 10:00

Lab Sample ID: 240-64571-1

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		250		ug/L			05/19/16 08:12	250
Tetrachloroethene	**5500**		250		ug/L			05/19/16 08:12	250
trans-1,2-Dichloroethene	ND		250		ug/L			05/19/16 08:12	250
Trichloroethene	ND		250		ug/L			05/19/16 08:12	250
Vinyl chloride	ND		250		ug/L			05/19/16 08:12	250

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*81*		*78 - 125*		*05/19/16 08:12*	*250*
4-Bromofluorobenzene (Surr)	*79*		*61 - 120*		*05/19/16 08:12*	*250*
Dibromofluoromethane (Surr)	*86*		*79 - 120*		*05/19/16 08:12*	*250*
Toluene-d8 (Surr)	*90*		*80 - 120*		*05/19/16 08:12*	*250*

1 2 3 4 5 6 7 8 9 10 11 12 13 14

Client Sample Results

Client Sample ID: TB-01/20160506

Lab Sample ID: 240-64571-2

Date Collected: 05/06/16 00:00

Matrix: Water

Date Received: 05/07/16 10:00

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		1.0		ug/L			05/19/16 08:35	1
Tetrachloroethene	ND		1.0		ug/L			05/19/16 08:35	1
trans-1,2-Dichloroethene	ND		1.0		ug/L			05/19/16 08:35	1
Trichloroethene	ND		1.0		ug/L			05/19/16 08:35	1
Vinyl chloride	ND		1.0		ug/L			05/19/16 08:35	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*81*		*78 - 125*		*05/19/16 08:35*	*1*
4-Bromofluorobenzene (Surr)	*78*		*61 - 120*		*05/19/16 08:35*	*1*
Dibromofluoromethane (Surr)	*84*		*79 - 120*		*05/19/16 08:35*	*1*
Toluene-d8 (Surr)	*90*		*80 - 120*		*05/19/16 08:35*	*1*

Surrogate Summary

Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		12DCE	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(78-125)	(61-120)	(79-120)	(80-120)
240-64571-1	MW-EPA-08/20160506	81	79	86	90
240-64571-2	TB-01/20160506	81	78	84	90
LCS 240-230882/4	Lab Control Sample	82	92	88	97
MB 240-230882/6	Method Blank	80	80	83	91

Surrogate Legend

12DCE = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8260B - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 240-230882/6
Matrix: Water
Analysis Batch: 230882

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		1.0		ug/L			05/19/16 00:11	1
Tetrachloroethene	ND		1.0		ug/L			05/19/16 00:11	1
trans-1,2-Dichloroethene	ND		1.0		ug/L			05/19/16 00:11	1
Trichloroethene	ND		1.0		ug/L			05/19/16 00:11	1
Vinyl chloride	ND		1.0		ug/L			05/19/16 00:11	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*80*		*78 - 125*		*05/19/16 00:11*	*1*
4-Bromofluorobenzene (Surr)	*80*		*61 - 120*		*05/19/16 00:11*	*1*
Dibromofluoromethane (Surr)	*83*		*79 - 120*		*05/19/16 00:11*	*1*
Toluene-d8 (Surr)	*91*		*80 - 120*		*05/19/16 00:11*	*1*

Lab Sample ID: LCS 240-230882/4
Matrix: Water
Analysis Batch: 230882

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
cis-1,2-Dichloroethene	10.0	10.5		ug/L		105	79 - 120
Tetrachloroethene	10.0	9.12		ug/L		91	78 - 121
trans-1,2-Dichloroethene	10.0	10.5		ug/L		105	80 - 124
Trichloroethene	10.0	9.83		ug/L		98	80 - 121
Vinyl chloride	10.0	10.2		ug/L		102	52 - 121

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*82*		*78 - 125*
4-Bromofluorobenzene (Surr)	*92*		*61 - 120*
Dibromofluoromethane (Surr)	*88*		*79 - 120*
Toluene-d8 (Surr)	*97*		*80 - 120*

QC Association Summary

GC/MS VOA

Analysis Batch: 230882

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-64571-1	MW-EPA-08/20160506	Total/NA	Water	8260B	
240-64571-2	TB-01/20160506	Total/NA	Water	8260B	
LCS 240-230882/4	Lab Control Sample	Total/NA	Water	8260B	
MB 240-230882/6	Method Blank	Total/NA	Water	8260B	

Lab Chronicle

Client Sample ID: MW-EPA-08/20160506

Lab Sample ID: 240-64571-1

Date Collected: 05/06/16 10:02

Matrix: Water

Date Received: 05/07/16 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		250	230882	05/19/16 08:12	RJQ	TAL CAN

Client Sample ID: TB-01/20160506

Lab Sample ID: 240-64571-2

Date Collected: 05/06/16 00:00

Matrix: Water

Date Received: 05/07/16 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	230882	05/19/16 08:35	RJQ	TAL CAN

Laboratory References:

TAL CAN = TestAmerica Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

Certification Summary

Laboratory: TestAmerica Canton

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
California	NELAP	9	01144CA	06-30-14 *
California	State Program	9	2927	04-30-17
Connecticut	State Program	1	PH-0590	12-31-17
Florida	NELAP	4	E87225	06-30-16 *
Illinois	NELAP	5	200004	07-31-16 *
Kansas	NELAP	7	E-10336	07-31-16 *
Kentucky (UST)	State Program	4	58	02-23-17
Kentucky (WW)	State Program	4	98016	12-31-16
L-A-B	DoD ELAP		L2315	07-18-16
Minnesota	NELAP	5	039-999-348	12-31-16
Nevada	State Program	9	OH-000482008A	07-31-16 *
New Jersey	NELAP	2	OH001	06-30-16 *
New York	NELAP	2	10975	03-31-17
Ohio VAP	State Program	5	CL0024	09-14-17
Oregon	NELAP	10	4062	02-23-17
Pennsylvania	NELAP	3	68-00340	08-31-16 *
Texas	NELAP	6	T104704517-15-5	08-31-16 *
USDA	Federal		P330-13-00319	11-26-16
Virginia	NELAP	3	460175	09-14-16
Washington	State Program	10	C971	01-12-17
West Virginia DEP	State Program	3	210	12-31-16
Wisconsin	State Program	5	999518190	08-31-16 *

* Certification renewal pending - certification considered valid.

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TestAmerica Laboratories, Inc.

CHAIN OF CUSTODY
AND
RECEIVING DOCUMENTS

240-64571 Chain of Custody

Chain of Custody Record

TAL-4124 (1007)

CANTON

0.8/CO.3

Temperature on Receipt ______

Drinking Water? Yes ☐ No ☒

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

DRAFT

Cincinnati

210501

Client: TRC

Address: 11231 Cornell Park Drive

City: Cincinnati State: OH Zip Code: 45240

Project Name and Location (State): Mullins – Dayton, OH

Contract/Purchase Order/Quote No.: Project # 243854.0006

Project Manager: Brooks Bertt

Telephone Number (Area Code)/Fax Number: 317-517-2616

Site Contact: Andrew Davis

Lab Contact: Pat O'Meara

Carrier/Waybill Number:

Date: 5/6/16

Lab Number:

Chain of Custody Number: 291021

Page 1 of 1

Analysis (Attach list if more space is needed)

Special Instructions/ Conditions of Receipt

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Matrix: Aqueous	Matrix: Sed.	Matrix: Soil	Matrix:	Containers & Preservatives: Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/ NaOH		8260B (PCE, TCE, DCE, VC)
MW-EPA-08/20160506	5/6/16	1002		X							X				X
TB-01 /20160506	|	–		X							X				X

Possible Hazard Identification

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown

Sample Disposal

☐ Return To Client ☒ Disposal By Lab ☐ Archive For ______ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required

☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☐ 21 Days ☒ Other Standard

QC Requirements (Specify): VAP Certified, EDD - Equis TRC Solutions

	Date	Time		Date	Time
1. Relinquished By	5/6/16	1150	1. Received By	5/6/16	11:50
2. Relinquished By	5/6/16	11:50	2. Received By	5-7-16	10:00am
3. Relinquished By			3. Received By		

Comments

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

TestAmerica Canton Sample Receipt Form/Narrative **Login # :** 64571
Canton Facility

Client TRC Site Name Mullins-Dayton, OH

Cooler unpacked by: Jenny Stiller

Cooler Received on 5-7-16 Opened on 5-7-16

FedEx: 1st Grd [✓ Exp] UPS FAS Stetson Client Drop Off TestAmerica Courier Other ____

Receipt After-hours: Drop-off Date/Time ____ Storage Location ____

TestAmerica Cooler # 3242 Foam Box Client Cooler Box Other ____

Packing material used: [✓ Bubble Wrap] Foam Plastic Bag None Other ____

COOLANT: [✓ Wet Ice] Blue Ice Dry Ice Water None

1. Cooler temperature upon receipt ☐ See Multiple Cooler Form
   - IR GUN# 48 (CF **-1.9** °C) Observed Cooler Temp. ____ °C Corrected Cooler Temp. ____ °C
   - IR GUN# 36 (CF **-1.5** °C) Observed Cooler Temp. ____ °C Corrected Cooler Temp. ____ °C
   - IR GUN# I8 (CF **-0.5** °C) Observed Cooler Temp. 0.8 °C Corrected Cooler Temp. 0.3 °C
2. Were custody seals on the outside of the cooler(s)? If Yes Quantity 1 [✓ Yes] No
   - -Were custody seals on the outside of the cooler(s) signed & dated? [✓ Yes] No NA
   - -Were custody seals on the bottle(s) or bottle kits (LLHg/MeHg)? Yes [✓ No]
3. Shippers' packing slip attached to the cooler(s)? [✓ Yes] No
4. Did custody papers accompany the sample(s)? [✓ Yes] No
5. Were the custody papers relinquished & signed in the appropriate place? [✓ Yes] No
6. Was/were the person(s) who collected the samples clearly identified on the COC? Yes [✓ No]
7. Did all bottles arrive in good condition (Unbroken)? [✓ Yes] No
8. Could all bottle labels be reconciled with the COC? [✓ Yes] No
9. Were correct bottle(s) used for the test(s) indicated? [✓ Yes] No
10. Sufficient quantity received to perform indicated analyses? [✓ Yes] No
11. Are these work share samples? Yes [✓ No]
    If yes, Questions 12-16 have been checked at the originating laboratory.
12. Were sample(s) at the correct pH upon receipt? Yes No [✓ NA] pH Strip Lot# **HC559158**
13. Were VOAs on the COC? [✓ Yes] No
14. Were air bubbles >6 mm in any VOA vials? Yes [✓ No] NA
15. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # 348 [✓ Yes] No
16. Was a LL Hg or Me Hg trip blank present? ____ Yes [✓ No]

Contacted PM ____ Date ____ by ____ via Verbal Voice Mail Other

Concerning ____

17. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES

Samples processed by:

18. SAMPLE CONDITION

Sample(s) ____ were received after the recommended holding time had expired.

Sample(s) ____ were received in a broken container.

Sample(s) ____ were received with bubble >6 mm in diameter. (Notify PM)

19. SAMPLE PRESERVATION

Sample(s) ____ were further preserved in the laboratory.

Time preserved: ____ Preservative(s) added/Lot number(s): ____.

Ref: SOP NC-SC-0005, Sample Receiving
L:\QAQC\QA Department\QA TARDIS\Document Control\Work Instructions\WI-NC-099X-011816 Cooler Receipt Form.doc djl

Appendix B
Soil Boring Logs and Monitoring Well Construction Diagrams

DRAFT

TRC

BORING NUMBER MP-01

PAGE 1 OF 1

CLIENT Mullins Rubber Products

PROJECT NAME Valley Pike VOC Site

PROJECT NUMBER 243854

PROJECT LOCATION Dayton, OH

DATE STARTED 1/13/16 **COMPLETED** 1/13/16

GROUND ELEVATION **HOLE SIZE** 2.25 inches

DRILLING CONTRACTOR Envirocore

GROUND WATER LEVELS:

DRILLING METHOD Direct Push

AT TIME OF DRILLING --- NA

LOGGED BY DMK **CHECKED BY** BRB

AT END OF DRILLING --- NA

NOTES Outdoors - outside Paint Room

AFTER DRILLING --- NA

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (%)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	NOTES
0.0	1	60	PID = <10		**Gravel (GP)**, some sand, wet, fill	
					0.5	
					Sand and Gravel (GP-GM), fine-coarse rounded gravel, fine-coarse sand, trace silt, damp-dry, yellowish brown (10YR 5/4), loose	
2.5			PID = <10			
5.0	2	70	PID = <10			
			PID = <10		Grain size coarsens with depth	
7.5						
	3	70	PID = <10			MP-01S placed 8.0'-9.0' BGS
10.0			PID = <10			
12.5	4	70	PID = <10			MP-01D placed 14.0'-15.0' BGS
15.0					15.0	
			PID = <10		**Silty Clay (CL)**, few fine average-subaverage gravel, few medium-coarse sand, plastic, stiff, damp, dark yellowish brown (10YR 3/6)	
					16.0	

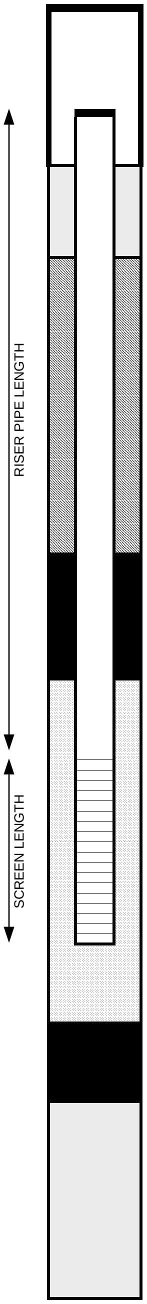
Bottom of borehole at 16.0 feet.

DRAFT

PAGE ______ OF ______

WELL CONSTRUCTION DIAGRAM

PROJ. NAME: VALLEY PIKE VOC SITE		WELL ID:	**MP-01S**
PROJ. NO: 243854.00	DATE INSTALLED: 1/11/2016 INSTALLED BY: DMK		CHECKED BY: AJD



ELEVATION (BENCHMARK: USGS)	DEPTH BELOW OR ABOVE GROUND SURFACE (FEET)	
NA	0.0	GROUND SURFACE
NA	0.0	TOP OF CASING
NA		
	1.5	CEMENT SURFACE PLUG
		GROUT/BACKFILL MATERIAL BENTONITE SLURRY
10.50		GROUT/BACKFILL METHOD FILL FROM ABOVE
	2.5	GROUT
		BENTONITE SEAL MATERIAL GRANULAR
	7.0	BENTONITE SEAL
NA	8.5	TOP OF SCREEN
0.50		FILTER PACK MATERIAL FINE, WASHED SAND
NA	9.0	BOTTOM OF SCREEN
	9.5	BOTTOM OF FILTER PACK
	NA	BENTONITE PLUG
		BACKFILL MATERIAL BENTONITE CHIPS
NA	16.0	HOLE BOTTOM

NOTES:

MP-01S co-located with monitoring point MP-01D.

CASING AND SCREEN DETAILS

TYPE OF RISER: 1/4-INCH TEFLON TUBING

PIPE SCHEDULE: NA

PIPE JOINTS: CLAMPED

SOLVENT USED? NO

SCREEN TYPE: GEOPROBE® VAPOR IMPLANT AT8617S

SCR. SLOT SIZE: NA

BOREHOLE DIAMETER:	2.5	IN.	FROM	0	TO	16	FT.
	NA	IN.	FROM	NA	TO	NA	FT.
SURF. CASING DIAMETER:	NA	IN.	FROM	NA	TO	NA	FT.
	NA	IN.	FROM	NA	TO	NA	FT.

WELL DEVELOPMENT

DEVELOPMENT METHOD: NA

TIME DEVELOPING: NA HOURS

WATER REMOVED: NA GALLONS

WATER ADDED: NA GALLONS

WATER CLARITY BEFORE / AFTER DEVELOPMENT

CLARITY BEFORE: NA

COLOR BEFORE: NA

CLARITY AFTER: NA

COLOR AFTER: NA

ODOR (IF PRESENT): NA

WATER LEVEL SUMMARY

MEASUREMENT (FEET)			DATE	TIME
DTB BEFORE DEVELOPING:	NA	T/PVC	NA	NA
DTB AFTER DEVELOPING:	NA	T/PVC	NA	NA
SWE BEFORE DEVELOPING:	NA	T/PVC	NA	NA
SWE AFTER DEVELOPING:	NA	T/PVC	NA	NA
OTHER SWE:	NA	T/PVC	NA	NA
OTHER SWE:	NA	T/PVC	NA	NA

PROTECTIVE CASING DETAILS

PERMANENT, LEGIBLE WELL LABEL ADDED? ☑ YES ☐ NO

PROTECTIVE COVER AND LOCK INSTALLED? ☑ YES ☐ NO

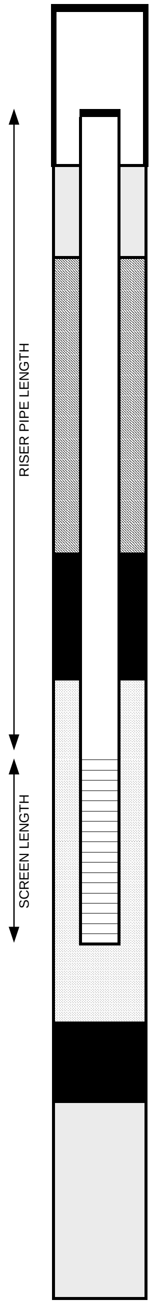
LOCK KEY NUMBER: NA

DRAFT

WELL CONSTRUCTION DIAGRAM

PROJ. NAME:	VALLEY PIKE VOC SITE	WELL ID:	**MP-01D**
PROJ. NO: 243854.00	DATE INSTALLED: 1/11/2016	INSTALLED BY: DMK	CHECKED BY: AJD

ELEVATION (BENCHMARK: USGS)	DEPTH BELOW OR ABOVE GROUND SURFACE (FEET)	
NA	0.0	GROUND SURFACE
NA	0.0	TOP OF CASING
NA		
	1.5	CEMENT SURFACE PLUG
		GROUT/BACKFILL MATERIAL BENTONITE SLURRY
		GROUT/BACKFILL METHOD FILL FROM ABOVE
17.50		
	2.5	GROUT
		BENTONITE SEAL MATERIAL GRANULAR
	13.5	BENTONITE SEAL
NA	14.5	TOP OF SCREEN
		FILTER PACK MATERIAL FINE, WASHED SAND
0.50		
NA	15.0	BOTTOM OF SCREEN
	16.0	BOTTOM OF FILTER PACK
	NA	BENTONITE PLUG
		BACKFILL MATERIAL NA
NA	16.0	HOLE BOTTOM



NOTES:

MP-01D co-located with monitoring point MP-01S.

CASING AND SCREEN DETAILS

TYPE OF RISER: 1/4-INCH TEFLON TUBING

PIPE SCHEDULE: NA

PIPE JOINTS: CLAMPED

SOLVENT USED? NO

SCREEN TYPE: GEOPROBE® VAPOR IMPLANT AT8617S

SCR. SLOT SIZE: NA

BOREHOLE DIAMETER:	2.5 IN.	FROM 0	TO 16	FT.
	IN.	FROM	TO	FT.
SURF. CASING DIAMETER:	IN.	FROM	TO	FT.
	IN.	FROM	TO	FT.

WELL DEVELOPMENT

DEVELOPMENT METHOD: NA

TIME DEVELOPING: NA HOURS

WATER REMOVED: NA GALLONS

WATER ADDED: NA GALLONS

WATER CLARITY BEFORE / AFTER DEVELOPMENT

CLARITY BEFORE: NA

COLOR BEFORE: NA

CLARITY AFTER: NA

COLOR AFTER: NA

ODOR (IF PRESENT): NA

WATER LEVEL SUMMARY

MEASUREMENT (FEET)			DATE	TIME
DTB BEFORE DEVELOPING:	NA	T/PVC	NA	NA
DTB AFTER DEVELOPING:	NA	T/PVC	NA	NA
SWE BEFORE DEVELOPING:	NA	T/PVC	NA	NA
SWE AFTER DEVELOPING:	NA	T/PVC	NA	NA
OTHER SWE:	NA	T/PVC	NA	NA
OTHER SWE:	NA	T/PVC	NA	NA

PROTECTIVE CASING DETAILS

PERMANENT, LEGIBLE WELL LABEL ADDED? ☑ YES ☐ NO

PROTECTIVE COVER AND LOCK INSTALLED? ☑ YES ☐ NO

LOCK KEY NUMBER: NA

REVISED 06/2011

DRAFT

TRC

BORING NUMBER MP-02

PAGE 1 OF 1

CLIENT Mullins Rubber Products
PROJECT NAME Valley Pike VOC Site
PROJECT NUMBER 243854
PROJECT LOCATION Dayton, OH
DATE STARTED 1/14/16 **COMPLETED** 1/14/16
GROUND ELEVATION **HOLE SIZE** 2.25 inches
DRILLING CONTRACTOR Envirocore
GROUND WATER LEVELS:
DRILLING METHOD Direct Push
AT TIME OF DRILLING --- NA
LOGGED BY DMK **CHECKED BY** BRB
AT END OF DRILLING --- NA
NOTES Paint Room
AFTER DRILLING --- NA

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (%)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	NOTES
0					**Concrete**	
0.5					**Gravel (GP)**, fine gravel, fine-coarse sand, dry, loose, fill	
			PID = 21		**Sand and Gravel (GP-GM)**, fine-coarse rounded gravel, fine-coarse sand, trace silt, dry-damp, loose, yellowish brown (10YR 5/4)	
	1	75				
			PID = 20			
5			PID = 22			
	2	75				
			PID = 23			
8.0					Grain size coarsens with depth	
			PID = 19			MP-02S placed 9.0'-10.0' BGS
10	3	75				
			PID = 21			PID Readings may be suspect to to presence of active PCE degreaser
			PID = 24			
	4	75				
15			PID = 21			
	5	75				
			PID = 18			MP-02D placed 18.0'-19.0' BGS
19.5						

Refusal at 19.5 feet.
Bottom of borehole at 19.5 feet.

DRAFT

PAGE ______ OF ______

TRC

WELL CONSTRUCTION DIAGRAM

PROJ. NAME: VALLEY PIKE VOC SITE

WELL ID: **MP-02S**

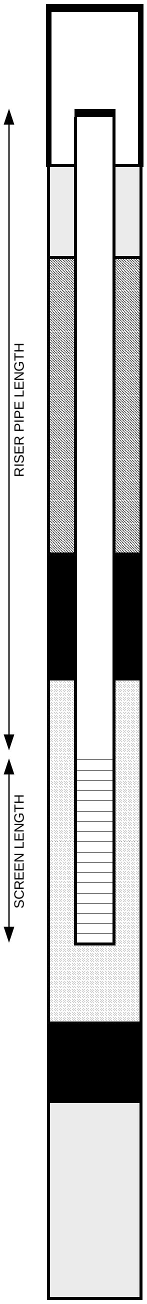
PROJ. NO: 243854.00

DATE INSTALLED: 1/11/2016

INSTALLED BY: DMK

CHECKED BY: AJD

ELEVATION (BENCHMARK: USGS)	DEPTH BELOW OR ABOVE GROUND SURFACE (FEET)	
NA	0.0	GROUND SURFACE
NA	0.0	TOP OF CASING
NA		
	1.5	CEMENT SURFACE PLUG
		GROUT/BACKFILL MATERIAL
		BENTONITE SLURRY
		GROUT/BACKFILL METHOD
11.50		FILL FROM ABOVE
	2.5	GROUT
		BENTONITE SEAL MATERIAL
		GRANULAR
	8.0	BENTONITE SEAL
NA	9.0	TOP OF SCREEN
		FILTER PACK MATERIAL
0.50		FINE, WASHED SAND
NA	9.5	BOTTOM OF SCREEN
	10.0	BOTTOM OF FILTER PACK
	NA	BENTONITE PLUG
		BACKFILL MATERIAL
		BENTONITE CHIPS
NA	19.5	HOLE BOTTOM



NOTES:

MP-02S co-located with monitoring point MP-02D.

CASING AND SCREEN DETAILS

TYPE OF RISER: 1/4-INCH TEFLON TUBING

PIPE SCHEDULE: NA

PIPE JOINTS: CLAMPED

SOLVENT USED? NO

SCREEN TYPE: GEOPROBE® VAPOR IMLANT AT8617S

SCR. SLOT SIZE: NA

BOREHOLE DIAMETER:
2.5 IN. FROM 0 TO 19.5 FT.
NA IN. FROM NA TO NA FT.

SURF. CASING DIAMETER:
NA IN. FROM NA TO NA FT.
NA IN. FROM NA TO NA FT.

WELL DEVELOPMENT

DEVELOPMENT METHOD: NA

TIME DEVELOPING: NA HOURS

WATER REMOVED: NA GALLONS

WATER ADDED: NA GALLONS

WATER CLARITY BEFORE / AFTER DEVELOPMENT

CLARITY BEFORE: NA

COLOR BEFORE: NA

CLARITY AFTER: NA

COLOR AFTER: NA

ODOR (IF PRESENT): NA

WATER LEVEL SUMMARY

MEASUREMENT (FEET)			DATE	TIME
DTB BEFORE DEVELOPING:	NA	T/PVC	NA	NA
DTB AFTER DEVELOPING:	NA	T/PVC	NA	NA
SWE BEFORE DEVELOPING:	NA	T/PVC	NA	NA
SWE AFTER DEVELOPING:	NA	T/PVC	NA	NA
OTHER SWE:	NA	T/PVC	NA	NA
OTHER SWE:	NA	T/PVC	NA	NA

PROTECTIVE CASING DETAILS

PERMANENT, LEGIBLE WELL LABEL ADDED? ☑ YES ☐ NO

PROTECTIVE COVER AND LOCK INSTALLED? ☑ YES ☐ NO

LOCK KEY NUMBER: NA

REVISED 06/2011

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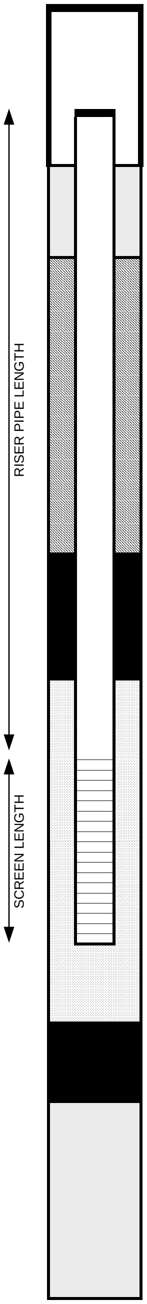
PAGE ______ OF ______

WELL CONSTRUCTION DIAGRAM

PROJ. NAME:	VALLEY PIKE VOC SITE	WELL ID:	**MP-02D**
PROJ. NO: 243854.00	DATE INSTALLED: 1/11/2016	INSTALLED BY: DMK	CHECKED BY: AJD



ELEVATION (BENCHMARK: USGS)	DEPTH BELOW OR ABOVE GROUND SURFACE (FEET)	
NA	0.0	GROUND SURFACE
NA	0.0	TOP OF CASING
NA		
	1.5	CEMENT SURFACE PLUG
		GROUT/BACKFILL MATERIAL BENTONITE SLURRY
21.00		GROUT/BACKFILL METHOD FILL FROM ABOVE
	2.5	GROUT
		BENTONITE SEAL MATERIAL GRANULAR
	17.5	BENTONITE SEAL
NA	18.5	TOP OF SCREEN
0.50		FILTER PACK MATERIAL FINE, WASHED SAND
NA	19.0	BOTTOM OF SCREEN
	19.5	BOTTOM OF FILTER PACK
	NA	BENTONITE PLUG
		BACKFILL MATERIAL NA
NA	19.5	HOLE BOTTOM

NOTES:

MP-02D co-located with monitoring point MP-02S.

CASING AND SCREEN DETAILS

TYPE OF RISER: 1/4-INCH TEFLON TUBING

PIPE SCHEDULE: NA

PIPE JOINTS: CLAMPED

SOLVENT USED? NO

SCREEN TYPE: GEOPROBE® VAPOR IMLANT AT8617S

SCR. SLOT SIZE: NA

BOREHOLE DIAMETER:	2.5	IN.	FROM	0	TO	19.5	FT.
	NA	IN.	FROM	NA	TO	NA	FT.
SURF. CASING DIAMETER:	NA	IN.	FROM	NA	TO	NA	FT.
	NA	IN.	FROM	NA	TO	NA	FT.

WELL DEVELOPMENT

DEVELOPMENT METHOD: NA

TIME DEVELOPING:	NA	HOURS
WATER REMOVED:	NA	GALLONS
WATER ADDED:	NA	GALLONS

WATER CLARITY BEFORE / AFTER DEVELOPMENT

CLARITY BEFORE: NA

COLOR BEFORE: NA

CLARITY AFTER: NA

COLOR AFTER: NA

ODOR (IF PRESENT): NA

WATER LEVEL SUMMARY

MEASUREMENT (FEET)			DATE	TIME
DTB BEFORE DEVELOPING:	NA	T/PVC	NA	NA
DTB AFTER DEVELOPING:	NA	T/PVC	NA	NA
SWE BEFORE DEVELOPING:	NA	T/PVC	NA	NA
SWE AFTER DEVELOPING:	NA	T/PVC	NA	NA
OTHER SWE:	NA	T/PVC	NA	NA
OTHER SWE:	NA	T/PVC	NA	NA

PROTECTIVE CASING DETAILS

PERMANENT, LEGIBLE WELL LABEL ADDED? ☑ YES ☐ NO

PROTECTIVE COVER AND LOCK INSTALLED? ☑ YES ☐ NO

LOCK KEY NUMBER: NA

REVISED 06/2011

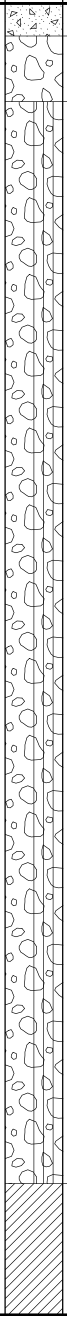
DRAFT

TRC

BORING NUMBER MP-03

PAGE 1 OF 1

CLIENT Mullins Rubber Products
PROJECT NAME Valley Pike VOC Site
PROJECT NUMBER 243854
PROJECT LOCATION Dayton, OH
DATE STARTED 1/14/16 **COMPLETED** 1/14/16
GROUND ELEVATION **HOLE SIZE** 2.25 inches
DRILLING CONTRACTOR Envirocore
GROUND WATER LEVELS:
DRILLING METHOD Direct Push
AT TIME OF DRILLING --- NA
LOGGED BY DMK **CHECKED BY** BRB
AT END OF DRILLING --- NA
NOTES Paint Room
AFTER DRILLING --- NA

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (%)	ENVIRONMENTAL DATA	GRAPHIC LOG		MATERIAL DESCRIPTION	NOTES
0					0.5	**Concrete**	
			PID = 22		1.5	**Gravel (GP)**, some sand, loose, dry, fill	
	1	75				**Sand and Gravel (GP-GM)**, fine-coarse gravel, fine-coarse sand, trace silt, loose, dry-damp, yellowish brown, (10YR 5/4)	
			PID = 23				
5	2	75	PID = 23			Grain size coarsens with depth	
			PID = 24				
			PID = 20				MP-03S placed 9.0'-10.0' BGS
10	3	70					
			PID = 22				PID Readings may be suspect to to presence of active PCE degreaser
			PID = 26				
	4	75					
15			PID = 22				
							MP-03D placed 17.0'-18.0' BGS
	5	75	PID = 19		18.0	**Silty Clay (CL)**, few fine subangular gravel, fine-coarse sand, plastic, medium-stiff, damp, dark yellowish brown (10YR 3/6)	
20					20.0		

Bottom of borehole at 20.0 feet.

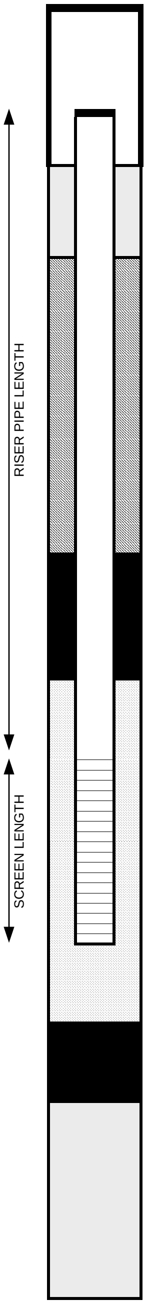
DRAFT

PAGE _______ OF _______

WELL CONSTRUCTION DIAGRAM

PROJ. NAME:	VALLEY PIKE VOC SITE	WELL ID:	**MP-03S**
PROJ. NO: 243854.00	DATE INSTALLED: 1/11/2016	INSTALLED BY: DMK	CHECKED BY: AJD

ELEVATION (BENCHMARK: USGS)	DEPTH BELOW OR ABOVE GROUND SURFACE (FEET)	
NA	0.0	GROUND SURFACE
NA	0.0	TOP OF CASING
NA		
	1.5	CEMENT SURFACE PLUG
		GROUT/BACKFILL MATERIAL BENTONITE SLURRY
		GROUT/BACKFILL METHOD
11.50		FILL FROM ABOVE
	2.5	GROUT
		BENTONITE SEAL MATERIAL GRANULAR
	8.0	BENTONITE SEAL
NA	9.0	TOP OF SCREEN
		FILTER PACK MATERIAL
0.50		FINE, WASHED SAND
NA	9.5	BOTTOM OF SCREEN
	10.0	BOTTOM OF FILTER PACK
	NA	BENTONITE PLUG
		BACKFILL MATERIAL BENTONITE CHIPS
NA	20.0	HOLE BOTTOM



NOTES:

MP-03S co-located with monitoring point MP-03D.

CASING AND SCREEN DETAILS

TYPE OF RISER: 1/4-INCH TEFLON TUBING

PIPE SCHEDULE: NA

PIPE JOINTS: CLAMPED

SOLVENT USED? NO

SCREEN TYPE: GEOPROBE® VAPOR IMLANT AT8617S

SCR. SLOT SIZE: NA

BOREHOLE DIAMETER:	2.5	IN.	FROM	0	TO	20	FT.
	NA	IN.	FROM	NA	TO	NA	FT.
SURF. CASING DIAMETER:	NA	IN.	FROM	NA	TO	NA	FT.
	NA	IN.	FROM	NA	TO	NA	FT.

WELL DEVELOPMENT

DEVELOPMENT METHOD: NA

TIME DEVELOPING: NA HOURS

WATER REMOVED: NA GALLONS

WATER ADDED: NA GALLONS

WATER CLARITY BEFORE / AFTER DEVELOPMENT

CLARITY BEFORE: NA

COLOR BEFORE: NA

CLARITY AFTER: NA

COLOR AFTER: NA

ODOR (IF PRESENT): NA

WATER LEVEL SUMMARY

MEASUREMENT (FEET)			DATE	TIME
DTB BEFORE DEVELOPING:	NA	T/PVC	NA	NA
DTB AFTER DEVELOPING:	NA	T/PVC	NA	NA
SWE BEFORE DEVELOPING:	NA	T/PVC	NA	NA
SWE AFTER DEVELOPING:	NA	T/PVC	NA	NA
OTHER SWE:	NA	T/PVC	NA	NA
OTHER SWE:	NA	T/PVC	NA	NA

PROTECTIVE CASING DETAILS

PERMANENT, LEGIBLE WELL LABEL ADDED? ☑ YES ☐ NO

PROTECTIVE COVER AND LOCK INSTALLED? ☑ YES ☐ NO

LOCK KEY NUMBER: NA

REVISED 06/2011

DRAFT

PAGE _______ OF _______

WELL CONSTRUCTION DIAGRAM

PROJ. NAME: VALLEY PIKE VOC SITE

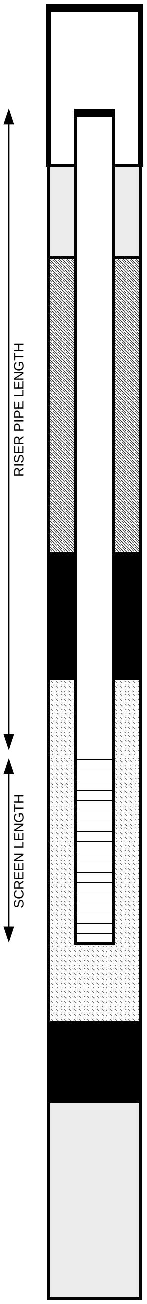
WELL ID: **MP-03D**

PROJ. NO: 243854.00

DATE INSTALLED: 1/11/2016

INSTALLED BY: DMK

CHECKED BY: AJD



ELEVATION (BENCHMARK: USGS)	DEPTH BELOW OR ABOVE GROUND SURFACE (FEET)	
NA	0.0	GROUND SURFACE
NA	0.0	TOP OF CASING
NA		
	1.5	CEMENT SURFACE PLUG
		GROUT/BACKFILL MATERIAL BENTONITE SLURRY
21.50		GROUT/BACKFILL METHOD FILL FROM ABOVE
	2.5	GROUT
		BENTONITE SEAL MATERIAL GRANULAR
	16.5	BENTONITE SEAL
NA	17.5	TOP OF SCREEN
0.50		FILTER PACK MATERIAL FINE, WASHED SAND
NA	18.0	BOTTOM OF SCREEN
	20.0	BOTTOM OF FILTER PACK
	NA	BENTONITE PLUG
		BACKFILL MATERIAL NA
NA	20.0	HOLE BOTTOM

NOTES:

MP-03D co-located with monitoring point MP-03S.

CASING AND SCREEN DETAILS

TYPE OF RISER: 1/4-INCH TEFLON TUBING

PIPE SCHEDULE: NA

PIPE JOINTS: CLAMPED

SOLVENT USED? NO

SCREEN TYPE: GEOPROBE® VAPOR IMLANT AT8617S

SCR. SLOT SIZE: NA

BOREHOLE DIAMETER: 2.5 IN. FROM 0 TO 20 FT.

NA IN. FROM NA TO NA FT.

SURF. CASING DIAMETER: NA IN. FROM NA TO NA FT.

NA IN. FROM NA TO NA FT.

WELL DEVELOPMENT

DEVELOPMENT METHOD: NA

TIME DEVELOPING: NA HOURS

WATER REMOVED: NA GALLONS

WATER ADDED: NA GALLONS

WATER CLARITY BEFORE / AFTER DEVELOPMENT

CLARITY BEFORE: NA

COLOR BEFORE: NA

CLARITY AFTER: NA

COLOR AFTER: NA

ODOR (IF PRESENT): NA

WATER LEVEL SUMMARY

MEASUREMENT (FEET)			DATE	TIME
DTB BEFORE DEVELOPING:	NA	T/PVC	NA	NA
DTB AFTER DEVELOPING:	NA	T/PVC	NA	NA
SWE BEFORE DEVELOPING:	NA	T/PVC	NA	NA
SWE AFTER DEVELOPING:	NA	T/PVC	NA	NA
OTHER SWE:	NA	T/PVC	NA	NA
OTHER SWE:	NA	T/PVC	NA	NA

PROTECTIVE CASING DETAILS

PERMANENT, LEGIBLE WELL LABEL ADDED? ☑ YES ☐ NO

PROTECTIVE COVER AND LOCK INSTALLED? ☑ YES ☐ NO

LOCK KEY NUMBER: NA

REVISED 06/2011

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TRC

BORING NUMBER MP-04

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CLIENT Mullins Rubber Products

PROJECT NAME Valley Pike VOC Site

PROJECT NUMBER 243854

PROJECT LOCATION Dayton, OH

DATE STARTED 1/14/16 **COMPLETED** 1/14/16

GROUND ELEVATION **HOLE SIZE** 2.25 inches

DRILLING CONTRACTOR Envirocore

GROUND WATER LEVELS:

DRILLING METHOD Direct Push

AT TIME OF DRILLING --- NA

LOGGED BY DMK **CHECKED BY** BRB

AT END OF DRILLING --- NA

NOTES

AFTER DRILLING --- NA

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (%)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	NOTES
0				0.5	**Concrete**	
			PID = 18	1.5	**Gravel (GP)**, some sand, loose, dry, fill	
	1	75	PID = 20		**Sand and Gravel (GP-GM)**, fine-coarse rounded gravel, fine-coarse sand, trace silt, loose, dry-damp, yellowish brown (10YR 5/4)	
5	2	75	PID = 20			
			PID = 21		Grain size coarsens with depth	
	3	75	PID = 19			MP-04S placed 8.5'-9.5' BGS
10			PID = 24			PID Readings may be suspect to to presence of active PCE degreaser
	4	75	PID = 20			
15			PID = 20	17.0		MP-04D placed 16.0'-17.0' BGS
	5	75	PID = 20		**Silty Clay (CL)**, few fine subangular gravel, few fine-coarse sand, plastic, stiff, damp, dark yellowish brown (10YR 3/6)	
20				20.0		

Bottom of borehole at 20.0 feet.

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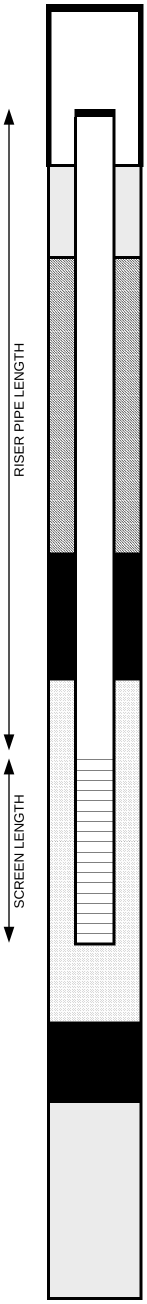
WELL CONSTRUCTION DIAGRAM

PROJ. NAME: VALLEY PIKE VOC SITE		WELL ID:	**MP-04S**
PROJ. NO: 243854.00	DATE INSTALLED: 1/11/2016	INSTALLED BY: DMK	CHECKED BY: AJD



ELEVATION (BENCHMARK: USGS)	DEPTH BELOW OR ABOVE GROUND SURFACE (FEET)	
NA	0.0	GROUND SURFACE
NA	0.0	TOP OF CASING
NA		
	1.5	CEMENT SURFACE PLUG
		GROUT/BACKFILL MATERIAL BENTONITE SLURRY
11.00		GROUT/BACKFILL METHOD FILL FROM ABOVE
	2.5	GROUT
		BENTONITE SEAL MATERIAL GRANULAR
	7.5	BENTONITE SEAL
NA	8.5	TOP OF SCREEN
0.50		FILTER PACK MATERIAL FINE, WASHED SAND
NA	9.0	BOTTOM OF SCREEN
	9.5	BOTTOM OF FILTER PACK
	NA	BENTONITE PLUG
		BACKFILL MATERIAL BENTONITE CHIPS
NA	20.0	HOLE BOTTOM

NOTES:

MP-04S co-located with monitoring point MP-04D.

CASING AND SCREEN DETAILS

TYPE OF RISER: 1/4-INCH TEFLON TUBING

PIPE SCHEDULE: NA

PIPE JOINTS: CLAMPED

SOLVENT USED? NO

SCREEN TYPE: Geoprobe® Vapor Implant AT8617S

SCR. SLOT SIZE: NA

BOREHOLE DIAMETER:	2.5	IN.	FROM	0	TO	20	FT.
	NA	IN.	FROM	NA	TO	NA	FT.
SURF. CASING DIAMETER:	NA	IN.	FROM	NA	TO	NA	FT.
	NA	IN.	FROM	NA	TO	NA	FT.

WELL DEVELOPMENT

DEVELOPMENT METHOD: NA

TIME DEVELOPING: NA HOURS

WATER REMOVED: NA GALLONS

WATER ADDED: NA GALLONS

WATER CLARITY BEFORE / AFTER DEVELOPMENT

CLARITY BEFORE: NA

COLOR BEFORE: NA

CLARITY AFTER: NA

COLOR AFTER: NA

ODOR (IF PRESENT): NA

WATER LEVEL SUMMARY

MEASUREMENT (FEET)			DATE	TIME
DTB BEFORE DEVELOPING:	NA	T/PVC	NA	NA
DTB AFTER DEVELOPING:	NA	T/PVC	NA	NA
SWE BEFORE DEVELOPING:	NA	T/PVC	NA	NA
SWE AFTER DEVELOPING:	NA	T/PVC	NA	NA
OTHER SWE:	NA	T/PVC	NA	NA
OTHER SWE:	NA	T/PVC	NA	NA

PROTECTIVE CASING DETAILS

PERMANENT, LEGIBLE WELL LABEL ADDED? ☑ YES ☐ NO

PROTECTIVE COVER AND LOCK INSTALLED? ☑ YES ☐ NO

LOCK KEY NUMBER: NA

REVISED 06/2011

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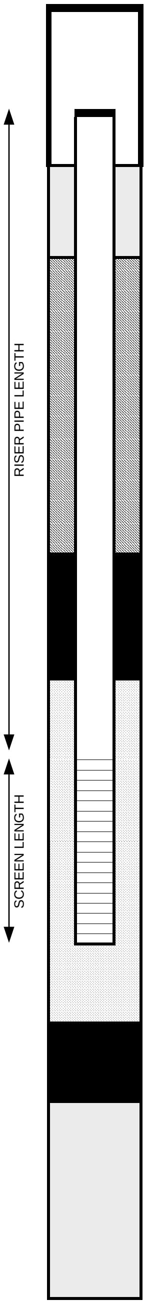
WELL CONSTRUCTION DIAGRAM

PROJ. NAME: VALLEY PIKE VOC SITE		WELL ID:	**MP-04D**
PROJ. NO: 243854.00	DATE INSTALLED: 1/11/2016	INSTALLED BY: DMK	CHECKED BY: AJD

ELEVATION (BENCHMARK: USGS)	DEPTH BELOW OR ABOVE GROUND SURFACE (FEET)	
NA	0.0	GROUND SURFACE
NA	0.0	TOP OF CASING
NA		
	1.5	CEMENT SURFACE PLUG
		GROUT/BACKFILL MATERIAL BENTONITE SLURRY
		GROUT/BACKFILL METHOD FILL FROM ABOVE
21.50		
	2.5	GROUT
		BENTONITE SEAL MATERIAL GRANULAR
	15.5	BENTONITE SEAL
NA	16.5	TOP OF SCREEN
		FILTER PACK MATERIAL FINE, WASHED SAND
0.50		
NA	17.0	BOTTOM OF SCREEN
	20.0	BOTTOM OF FILTER PACK
	NA	BENTONITE PLUG
		BACKFILL MATERIAL NA
NA	20.0	HOLE BOTTOM



NOTES:

MP-04D co-located with monitoring point MP-04S.

CASING AND SCREEN DETAILS

TYPE OF RISER: 1/4-INCH TEFLON TUBING

PIPE SCHEDULE: NA

PIPE JOINTS: CLAMPED

SOLVENT USED? NO

SCREEN TYPE: GEOPROBE® VAPOR IMLANT AT8617S

SCR. SLOT SIZE: NA

BOREHOLE DIAMETER: 2.5 IN. FROM 0 TO 20 FT.
NA IN. FROM NA TO NA FT.

SURF. CASING DIAMETER: NA IN. FROM NA TO NA FT.
NA IN. FROM NA TO NA FT.

WELL DEVELOPMENT

DEVELOPMENT METHOD: NA

TIME DEVELOPING: NA HOURS

WATER REMOVED: NA GALLONS

WATER ADDED: NA GALLONS

WATER CLARITY BEFORE / AFTER DEVELOPMENT

CLARITY BEFORE: NA

COLOR BEFORE: NA

CLARITY AFTER: NA

COLOR AFTER: NA

ODOR (IF PRESENT): NA

WATER LEVEL SUMMARY

MEASUREMENT (FEET)			DATE	TIME
DTB BEFORE DEVELOPING:	NA	T/PVC	NA	NA
DTB AFTER DEVELOPING:	NA	T/PVC	NA	NA
SWE BEFORE DEVELOPING:	NA	T/PVC	NA	NA
SWE AFTER DEVELOPING:	NA	T/PVC	NA	NA
OTHER SWE:	NA	T/PVC	NA	NA
OTHER SWE:	NA	T/PVC	NA	NA

PROTECTIVE CASING DETAILS

PERMANENT, LEGIBLE WELL LABEL ADDED? ☑ YES ☐ NO

PROTECTIVE COVER AND LOCK INSTALLED? ☑ YES ☐ NO

LOCK KEY NUMBER: NA

REVISED 06/2011

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TRC

BORING NUMBER MP-05

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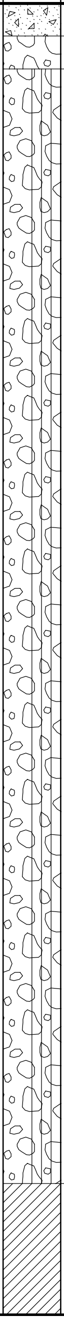
CLIENT Mullins Rubber Products
PROJECT NAME Valley Pike VOC Site
PROJECT NUMBER 243854
PROJECT LOCATION Dayton, OH
DATE STARTED 1/12/16 **COMPLETED** 1/12/16
GROUND ELEVATION **HOLE SIZE** 2.25 inches
DRILLING CONTRACTOR Envirocore
GROUND WATER LEVELS:
DRILLING METHOD Direct Push
AT TIME OF DRILLING --- NA
LOGGED BY DMK **CHECKED BY** BRB
AT END OF DRILLING --- NA
NOTES
AFTER DRILLING --- NA



DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (%)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	NOTES
0					0.5 **Concrete**	
					1.0 **Gravel (GP)**, some sand, dry, fill	
	1	75	PID = 10		**Sand and Gravel (GP-GM)**, fine-coarse rounded gravel, fine-coarse sand, trace silt, dry-damp, yellowish brown (10YR 5/4), loose	
			PID = 10			
5	2	75	PID = 10			
			PID = 10		Grain size coarsens with depth	
	3	75	PID = 12			MP-05S placed 9.0'-10.0' BGS
10			PID = 11			
	4	75	PID = 16		Sweet odor	
15			PID = 15			
	5	75	PID = 10		18.0	
			PID = 16		**Silty Clay (CL)**, few fine subangular gravel, few medium-coarse sand, plastic, stiff, damp, dark yellowish brown (10YR 3/6)	MP-05D placed 18.0'-19.0' BGS
20					20.0	

Bottom of borehole at 20.0 feet.

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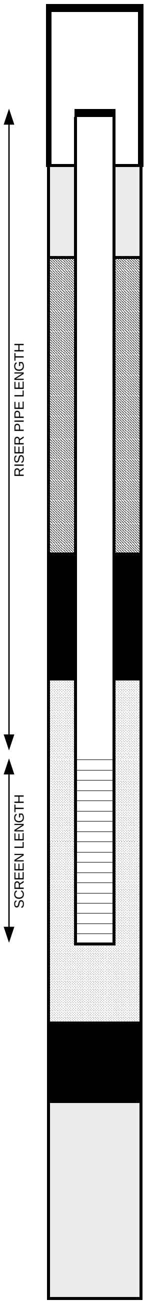
WELL CONSTRUCTION DIAGRAM

PROJ. NAME:	VALLEY PIKE VOC SITE	WELL ID:	**MP-05S**
PROJ. NO: 243854.00	DATE INSTALLED: 1/11/2016	INSTALLED BY: DMK	CHECKED BY: AJD



ELEVATION (BENCHMARK: USGS)	DEPTH BELOW OR ABOVE GROUND SURFACE (FEET)	
NA	0.0	GROUND SURFACE
NA	0.0	TOP OF CASING
NA		
	1.5	CEMENT SURFACE PLUG
		GROUT/BACKFILL MATERIAL BENTONITE SLURRY
11.50		GROUT/BACKFILL METHOD FILL FROM ABOVE
	2.5	GROUT
		BENTONITE SEAL MATERIAL GRANULAR
	8.0	BENTONITE SEAL
NA	9.0	TOP OF SCREEN
0.50		FILTER PACK MATERIAL FINE, WASHED SAND
NA	9.5	BOTTOM OF SCREEN
	10.0	BOTTOM OF FILTER PACK
	NA	BENTONITE PLUG
		BACKFILL MATERIAL BENTONITE CHIPS
NA	20.0	HOLE BOTTOM

NOTES:

MP-05S co-located with monitoring point MP-05D.

CASING AND SCREEN DETAILS

TYPE OF RISER: 1/4-INCH TEFLON TUBING

PIPE SCHEDULE: NA

PIPE JOINTS: CLAMPED

SOLVENT USED? NO

SCREEN TYPE: GEOPROBE® VAPOR IMLANT AT8617S

SCR. SLOT SIZE: NA

BOREHOLE DIAMETER:	2.5	IN.	FROM	0	TO	20	FT.
	NA	IN.	FROM	NA	TO	NA	FT.
SURF. CASING DIAMETER:	NA	IN.	FROM	NA	TO	NA	FT.
	NA	IN.	FROM	NA	TO	NA	FT.

WELL DEVELOPMENT

DEVELOPMENT METHOD: NA

TIME DEVELOPING: NA HOURS

WATER REMOVED: NA GALLONS

WATER ADDED: NA GALLONS

WATER CLARITY BEFORE / AFTER DEVELOPMENT

CLARITY BEFORE: NA

COLOR BEFORE: NA

CLARITY AFTER: NA

COLOR AFTER: NA

ODOR (IF PRESENT): NA

WATER LEVEL SUMMARY

MEASUREMENT (FEET)			DATE	TIME
DTB BEFORE DEVELOPING:	NA	T/PVC	NA	NA
DTB AFTER DEVELOPING:	NA	T/PVC	NA	NA
SWE BEFORE DEVELOPING:	NA	T/PVC	NA	NA
SWE AFTER DEVELOPING:	NA	T/PVC	NA	NA
OTHER SWE:	NA	T/PVC	NA	NA
OTHER SWE:	NA	T/PVC	NA	NA

PROTECTIVE CASING DETAILS

PERMANENT, LEGIBLE WELL LABEL ADDED? ☑ YES ☐ NO

PROTECTIVE COVER AND LOCK INSTALLED? ☑ YES ☐ NO

LOCK KEY NUMBER: NA

REVISED 06/2011

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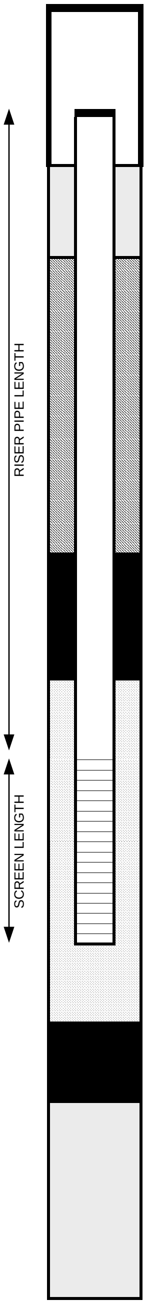
WELL CONSTRUCTION DIAGRAM

PROJ. NAME:	VALLEY PIKE VOC SITE	WELL ID:	**MP-05D**
PROJ. NO: 243854.00	DATE INSTALLED: 1/11/2016	INSTALLED BY: DMK	CHECKED BY: AJD

ELEVATION (BENCHMARK: USGS)	DEPTH BELOW OR ABOVE GROUND SURFACE (FEET)	
NA	0.0	GROUND SURFACE
NA	0.0	TOP OF CASING
NA		
	1.5	CEMENT SURFACE PLUG
		GROUT/BACKFILL MATERIAL BENTONITE SLURRY
		GROUT/BACKFILL METHOD FILL FROM ABOVE
21.50		
	2.5	GROUT
		BENTONITE SEAL MATERIAL GRANULAR
	17.5	BENTONITE SEAL
NA	18.5	TOP OF SCREEN
		FILTER PACK MATERIAL FINE, WASHED SAND
0.50		
NA	19.0	BOTTOM OF SCREEN
	20.0	BOTTOM OF FILTER PACK
	NA	BENTONITE PLUG
		BACKFILL MATERIAL NA
NA	20.0	HOLE BOTTOM



NOTES:

MP-05D co-located with monitoring point MP-05S.

CASING AND SCREEN DETAILS

TYPE OF RISER: 1/4-INCH TEFLON TUBING

PIPE SCHEDULE: NA

PIPE JOINTS: CLAMPED

SOLVENT USED? NO

SCREEN TYPE: GEOPROBE® VAPOR IMLANT AT8617S

SCR. SLOT SIZE: NA

BOREHOLE DIAMETER:	2.5	IN.	FROM	0	TO	20	FT.
	NA	IN.	FROM	NA	TO	NA	FT.
SURF. CASING DIAMETER:	NA	IN.	FROM	NA	TO	NA	FT.
	NA	IN.	FROM	NA	TO	NA	FT.

WELL DEVELOPMENT

DEVELOPMENT METHOD: NA

TIME DEVELOPING: NA HOURS

WATER REMOVED: NA GALLONS

WATER ADDED: NA GALLONS

WATER CLARITY BEFORE / AFTER DEVELOPMENT

CLARITY BEFORE: NA

COLOR BEFORE: NA

CLARITY AFTER: NA

COLOR AFTER: NA

ODOR (IF PRESENT): NA

WATER LEVEL SUMMARY

MEASUREMENT (FEET)			DATE	TIME
DTB BEFORE DEVELOPING:	NA	T/PVC	NA	NA
DTB AFTER DEVELOPING:	NA	T/PVC	NA	NA
SWE BEFORE DEVELOPING:	NA	T/PVC	NA	NA
SWE AFTER DEVELOPING:	NA	T/PVC	NA	NA
OTHER SWE:	NA	T/PVC	NA	NA
OTHER SWE:	NA	T/PVC	NA	NA

PROTECTIVE CASING DETAILS

PERMANENT, LEGIBLE WELL LABEL ADDED? ☑ YES ☐ NO

PROTECTIVE COVER AND LOCK INSTALLED? ☑ YES ☐ NO

LOCK KEY NUMBER: NA

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TRC

BORING NUMBER MP-06

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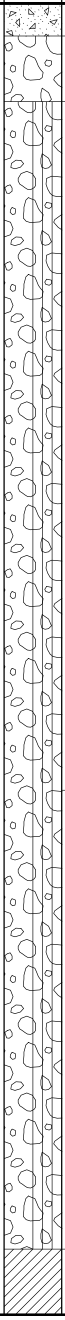
CLIENT Mullins Rubber Products
PROJECT NAME Valley Pike VOC Site
PROJECT NUMBER 243854
PROJECT LOCATION Dayton, OH
DATE STARTED 1/12/16 **COMPLETED** 1/12/16
GROUND ELEVATION **HOLE SIZE** 2.25 inches
DRILLING CONTRACTOR Envirocore
GROUND WATER LEVELS:
DRILLING METHOD Direct Push
AT TIME OF DRILLING --- NA
LOGGED BY DMK **CHECKED BY** BRB
AT END OF DRILLING --- NA
NOTES
AFTER DRILLING --- NA

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (%)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	NOTES
0					0.5 **Concrete**	
			PID = 10		**Gravel (GP)**, fine-coarse gravel, some fine-coarse sand, dry 1.5	
	1	70			**Sand and Gravel (GP-GM)**, fine-coarse rounded gravel, medium-coarse sand, trace silt, dry-damp, loose, yellowish brown (10YR 5/4)	
			PID = 10			
5			PID = 10			
	2	70				
			PID = 12		Grain size coarsens with depth	
			PID = 13			MP-06S placed 9.0'-10.0' BGS
10	3	75				
			PID = 12		12.0	
					Sweet odor	
			PID = 18			
	4	75				
15			PID = 21			
			PID = 20			
	5	75				MP-05D placed 18.0'-19.0' BGS
			PID = 24		19.0 **Silty Clay (CL)**, few fine subangular gravel, fine-coarse sand, plastic, medium stiff, dark yellowish brown (10YR 3/6)	
20					20.0	

Bottom of borehole at 20.0 feet.

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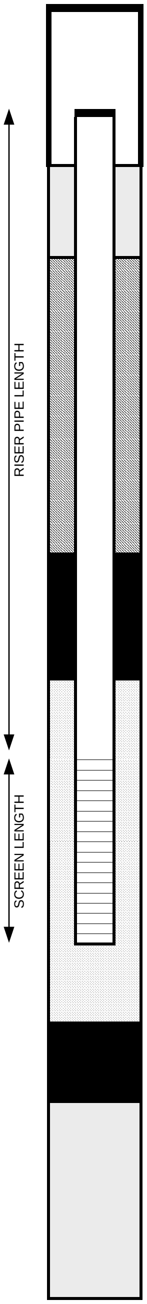
WELL CONSTRUCTION DIAGRAM

PROJ. NAME: VALLEY PIKE VOC SITE		WELL ID:	**MP-06S**
PROJ. NO: 243854.00	DATE INSTALLED: 1/11/2016 INSTALLED BY: DMK		CHECKED BY: AJD



ELEVATION (BENCHMARK: USGS)	DEPTH BELOW OR ABOVE GROUND SURFACE (FEET)	
NA	0.0	GROUND SURFACE
NA	0.0	TOP OF CASING
NA		
	1.5	CEMENT SURFACE PLUG
		GROUT/BACKFILL MATERIAL BENTONITE SLURRY
		GROUT/BACKFILL METHOD FILL FROM ABOVE
11.50		
	2.5	GROUT
		BENTONITE SEAL MATERIAL GRANULAR
	8.0	BENTONITE SEAL
NA	9.0	TOP OF SCREEN
		FILTER PACK MATERIAL FINE, WASHED SAND
0.50		
NA	9.5	BOTTOM OF SCREEN
	10.0	BOTTOM OF FILTER PACK
	NA	BENTONITE PLUG
		BACKFILL MATERIAL BENTONITE CHIPS
NA	20.0	HOLE BOTTOM

NOTES:

MP-06S co-located with monitoring point MP-06D.

CASING AND SCREEN DETAILS

TYPE OF RISER: 1/4-INCH TEFLON TUBING

PIPE SCHEDULE: NA

PIPE JOINTS: CLAMPED

SOLVENT USED? NO

SCREEN TYPE: GEOPROBE® VAPOR IMPLANT AT8617S

SCR. SLOT SIZE: NA

BOREHOLE DIAMETER: 2.5 IN. FROM 0 TO 20 FT.
NA IN. FROM NA TO NA FT.

SURF. CASING DIAMETER: NA IN. FROM NA TO NA FT.
NA IN. FROM NA TO NA FT.

WELL DEVELOPMENT

DEVELOPMENT METHOD: NA

TIME DEVELOPING: NA HOURS

WATER REMOVED: NA GALLONS

WATER ADDED: NA GALLONS

WATER CLARITY BEFORE / AFTER DEVELOPMENT

CLARITY BEFORE: NA

COLOR BEFORE: NA

CLARITY AFTER: NA

COLOR AFTER: NA

ODOR (IF PRESENT): NA

WATER LEVEL SUMMARY

MEASUREMENT (FEET)			DATE	TIME
DTB BEFORE DEVELOPING:	NA	T/PVC	NA	NA
DTB AFTER DEVELOPING:	NA	T/PVC	NA	NA
SWE BEFORE DEVELOPING:	NA	T/PVC	NA	NA
SWE AFTER DEVELOPING:	NA	T/PVC	NA	NA
OTHER SWE:	NA	T/PVC	NA	NA
OTHER SWE:	NA	T/PVC	NA	NA

PROTECTIVE CASING DETAILS

PERMANENT, LEGIBLE WELL LABEL ADDED? ☑ YES ☐ NO

PROTECTIVE COVER AND LOCK INSTALLED? ☑ YES ☐ NO

LOCK KEY NUMBER: NA

DRAFT

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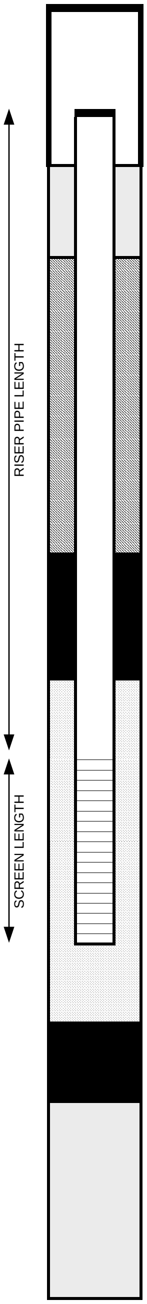
WELL CONSTRUCTION DIAGRAM

PROJ. NAME:	VALLEY PIKE VOC SITE	WELL ID:	**MP-06D**
PROJ. NO: 243854.00	DATE INSTALLED: 1/11/2016	INSTALLED BY: DMK	CHECKED BY: AJD

ELEVATION (BENCHMARK: USGS)	DEPTH BELOW OR ABOVE GROUND SURFACE (FEET)	
NA	0.0	GROUND SURFACE
NA	0.0	TOP OF CASING
NA		
	1.5	CEMENT SURFACE PLUG
		GROUT/BACKFILL MATERIAL BENTONITE SLURRY
		GROUT/BACKFILL METHOD FILL FROM ABOVE
21.50		
	2.5	GROUT
		BENTONITE SEAL MATERIAL GRANULAR
	17.5	BENTONITE SEAL
NA	18.5	TOP OF SCREEN
		FILTER PACK MATERIAL FINE, WASHED SAND
0.50		
NA	19.0	BOTTOM OF SCREEN
	20.0	BOTTOM OF FILTER PACK
	NA	BENTONITE PLUG
		BACKFILL MATERIAL NA
NA	20.0	HOLE BOTTOM



NOTES:

MP-06D co-located with monitoring point MP-06S.

CASING AND SCREEN DETAILS

TYPE OF RISER: 1/4-INCH TEFLON TUBING

PIPE SCHEDULE: NA

PIPE JOINTS: CLAMPED

SOLVENT USED? NO

SCREEN TYPE: GEOPROBE® VAPOR IMLANT AT8617S

SCR. SLOT SIZE: NA

BOREHOLE DIAMETER:	2.5	IN. FROM	0	TO	20	FT.
	NA	IN. FROM	NA	TO	NA	FT.
SURF. CASING DIAMETER:	NA	IN. FROM	NA	TO	NA	FT.
	NA	IN. FROM	NA	TO	NA	FT.

WELL DEVELOPMENT

DEVELOPMENT METHOD: NA

TIME DEVELOPING:	NA	HOURS
WATER REMOVED:	NA	GALLONS
WATER ADDED:	NA	GALLONS

WATER CLARITY BEFORE / AFTER DEVELOPMENT

CLARITY BEFORE: NA

COLOR BEFORE: NA

CLARITY AFTER: NA

COLOR AFTER: NA

ODOR (IF PRESENT): NA

WATER LEVEL SUMMARY

MEASUREMENT (FEET)			DATE	TIME
DTB BEFORE DEVELOPING:	NA	T/PVC	NA	NA
DTB AFTER DEVELOPING:	NA	T/PVC	NA	NA
SWE BEFORE DEVELOPING:	NA	T/PVC	NA	NA
SWE AFTER DEVELOPING:	NA	T/PVC	NA	NA
OTHER SWE:	NA	T/PVC	NA	NA
OTHER SWE:	NA	T/PVC	NA	NA

PROTECTIVE CASING DETAILS

PERMANENT, LEGIBLE WELL LABEL ADDED? ☑ YES ☐ NO

PROTECTIVE COVER AND LOCK INSTALLED? ☑ YES ☐ NO

LOCK KEY NUMBER: NA

REVISED 06/2011

~~DRAFT~~

TRC

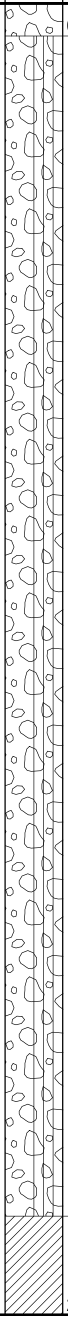
BORING NUMBER RW-01

PAGE 1 OF 1

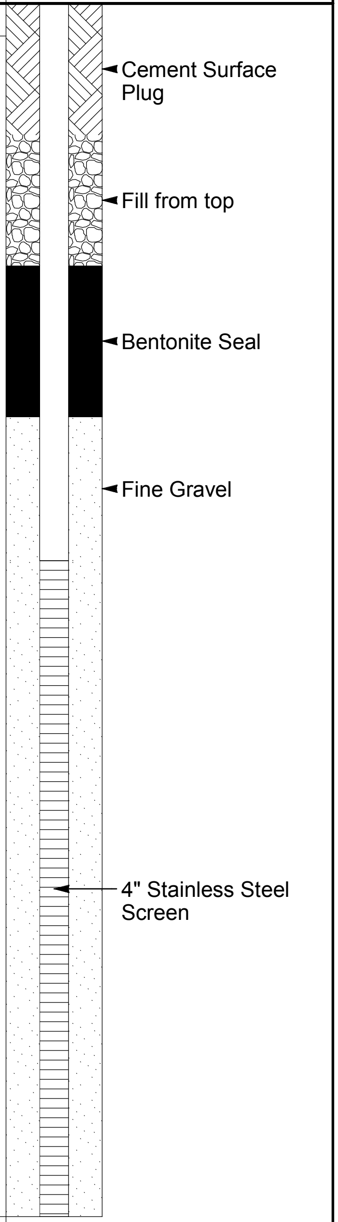
CLIENT Mullins Rubber Products
PROJECT NAME Valley Pike VOC Site
PROJECT NUMBER 243854
PROJECT LOCATION Dayton, OH
DATE STARTED 1/11/16 **COMPLETED** 1/11/16
GROUND ELEVATION **HOLE SIZE** 2.25 inches
DRILLING CONTRACTOR Envirocore
GROUND WATER LEVELS:
DRILLING METHOD Direct Push
AT TIME OF DRILLING --- NA
LOGGED BY DMK **CHECKED BY** BRB
AT END OF DRILLING --- NA
NOTES Outdoors - outside Paint Room
AFTER DRILLING --- NA

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (%)	ENVIRONMENTAL DATA	MATERIAL DESCRIPTION
0	1	60	PID = 10 PID = 10	**Gravel (GP)**, with some sand, wet, fill 0.5 **Sand and Gravel (GP-GM)**, fine-coarse rounded gravel, fine-coarse sand, trace silt, damp-dry, yellowish brown (10YR 5/4), loose Grain size coarsens with depth
5	2	70	PID = 10 PID = 10	
10	3	70	PID = 10 PID = 10	
15	4	75	PID = 10 PID = 10	Sweet odor
20	5	75	PID = 10 PID = 10	18.5 **Silty Clay (CL)**, trace, fine angular-subangular gravel, few firm sand, plastic, stiff, dark yellowish brown (10YR 3/6), damp, sweet odor 20.0

GRAPHIC LOG



WELL DIAGRAM



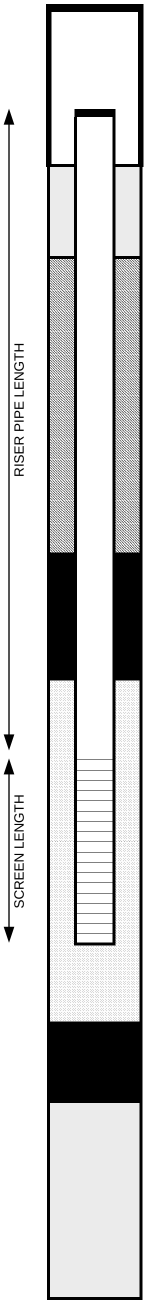
NOTES
RW-01 screened from 8.5'-18.5' BGS

Bottom of borehole at 20.0 feet.

DRAFT

WELL CONSTRUCTION DIAGRAM

PROJ. NAME: VALLEY PIKE VOC SITE
WELL ID: **RW-01**
PROJ. NO: 243854.00
DATE INSTALLED: 1/11/2016
INSTALLED BY: DMK
CHECKED BY: AJD



ELEVATION (BENCHMARK: USGS)	DEPTH BELOW OR ABOVE GROUND SURFACE (FEET)	
NA	0.0	GROUND SURFACE
NA	0.0	TOP OF CASING
NA		
	2.0	CEMENT SURFACE PLUG
		GROUT/BACKFILL MATERIAL BENTONITE SLURRY
		GROUT/BACKFILL METHOD FILL FROM ABOVE
8.50		
	4.0	GROUT
		BENTONITE SEAL MATERIAL MEDIUM CHIPS
	6.3	BENTONITE SEAL
NA	8.5	TOP OF SCREEN
		FILTER PACK MATERIAL FINE GRAVEL
10.00		
NA	18.5	BOTTOM OF SCREEN
	18.5	BOTTOM OF FILTER PACK
	NA	BENTONITE PLUG
		BACKFILL MATERIAL NA
NA	18.5	HOLE BOTTOM

NOTES:

RECOVERY WELL CUT-OFF BELOW GRADE,
CAPPED WITH T-JOINT, AND PLUMBED TO SVE
SVE SYSTEM.

CASING AND SCREEN DETAILS

TYPE OF RISER: 4-INCH PVC

PIPE SCHEDULE: 80

PIPE JOINTS: THREADED O-RINGS

SOLVENT USED? NO

SCREEN TYPE: 4-INCH STAINLESS STEEL

SCR. SLOT SIZE: 30 Slot

BOREHOLE DIAMETER:	10	IN. FROM	0	TO	18.5	FT.
	NA	IN. FROM	NA	TO	NA	FT.
SURF. CASING DIAMETER:	NA	IN. FROM	NA	TO	NA	FT.
	NA	IN. FROM	NA	TO	A	FT.

WELL DEVELOPMENT

DEVELOPMENT METHOD: NA

TIME DEVELOPING: NA HOURS
WATER REMOVED: NA GALLONS
WATER ADDED: NA GALLONS

WATER CLARITY BEFORE / AFTER DEVELOPMENT

CLARITY BEFORE: NA
COLOR BEFORE: NA
CLARITY AFTER: NA
COLOR AFTER: NA

ODOR (IF PRESENT): NA

WATER LEVEL SUMMARY

MEASUREMENT (FEET)			DATE	TIME
DTB BEFORE DEVELOPING:	NA	T/PVC	NA	NA
DTB AFTER DEVELOPING:	NA	T/PVC	NA	NA
SWE BEFORE DEVELOPING:	NA	T/PVC	NA	NA
SWE AFTER DEVELOPING:	NA	T/PVC	NA	NA
OTHER SWE:	NA	T/PVC	NA	NA
OTHER SWE:	NA	T/PVC	NA	NA

PROTECTIVE CASING DETAILS

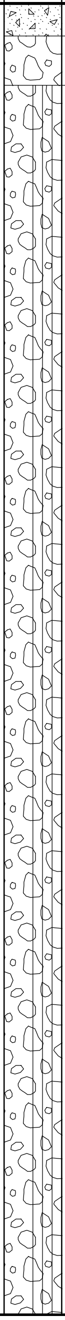
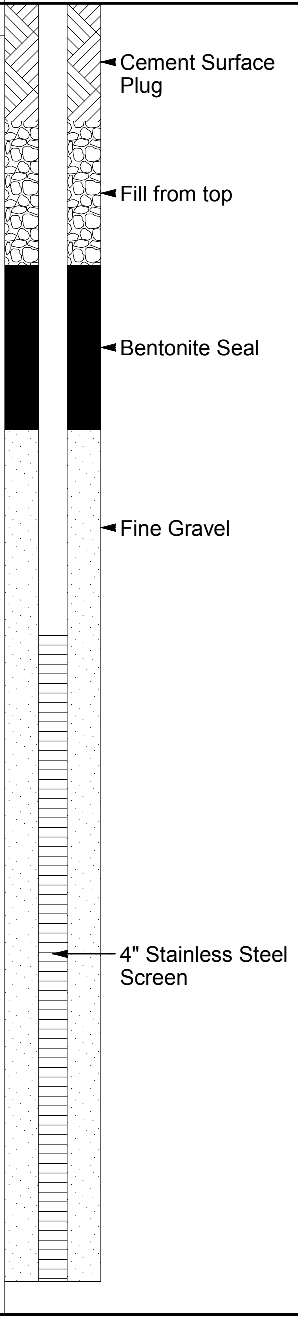
PERMANENT, LEGIBLE WELL LABEL ADDED? ☑ YES ☐ NO
PROTECTIVE COVER AND LOCK INSTALLED? ☑ YES ☐ NO
LOCK KEY NUMBER: NA

TRC

BORING NUMBER RW-02

PAGE 1 OF 1

CLIENT Mullins Rubber Products
PROJECT NAME Valley Pike VOC Site
PROJECT NUMBER 243854
PROJECT LOCATION Dayton, OH
DATE STARTED 1/14/16 **COMPLETED** 1/14/16
GROUND ELEVATION **HOLE SIZE** 2.25 inches
DRILLING CONTRACTOR Envirocore
GROUND WATER LEVELS:
DRILLING METHOD Direct Push
AT TIME OF DRILLING --- NA
LOGGED BY DMK **CHECKED BY** BRB
AT END OF DRILLING --- NA
NOTES Paint Room
AFTER DRILLING --- NA

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (%)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
0	1	70	PID = 20		0.5 **Concrete** 1.3 **Gravel (GP)**, medium, angular, some medium-coarse sand, damp, fill **Sand and Gravel (GP-GM)**, fine-coarse rounded gravel, medium-coarse sand, trace few silt, dry, yellowish brown (10YR 5/4), loose	
			PID = 22			
5	2	75	PID = 21		Grain size coarsens with depth	
			PID = 23			
			PID = 23			
10	3	75	PID = 20			
			PID = 17			
15	4	75	PID = 25			
	5	75	PID = 19			
20			PID = 21		PID Readings may be suspect to to presence of active PCE degreaser 20.0	

Bottom of borehole at 20.0 feet.

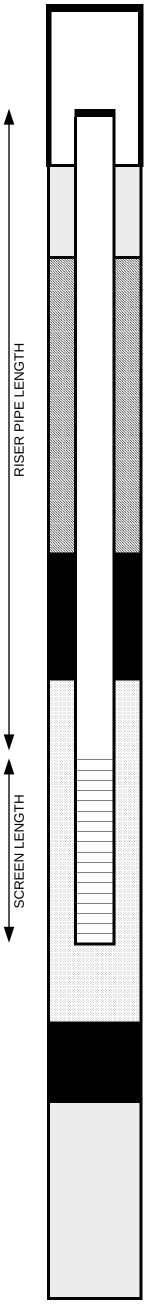
DRAFT

PAGE ______ OF ______

WELL CONSTRUCTION DIAGRAM

PROJ. NAME:	VALLEY PIKE VOC SITE	WELL ID:	**RW-02**
PROJ. NO: 243854.00	DATE INSTALLED: 1/14/2016	INSTALLED BY: DMK	CHECKED BY: AJD

ELEVATION (BENCHMARK: USGS)	DEPTH BELOW OR ABOVE GROUND SURFACE (FEET)	
NA	0.0	GROUND SURFACE
NA	0.0	TOP OF CASING
NA		
	2.0	CEMENT SURFACE PLUG
		GROUT/BACKFILL MATERIAL BENTONITE SLURRY
NA		GROUT/BACKFILL METHOD
9.50		FILL FROM ABOVE
	4.0	GROUT
		BENTONITE SEAL MATERIAL MEDIUM CHIPS
	6.5	BENTONITE SEAL
NA	9.5	TOP OF SCREEN
10.00		FILTER PACK MATERIAL FINE GRAVEL
NA	19.5	BOTTOM OF SCREEN
	19.5	BOTTOM OF FILTER PACK
	NA	BENTONITE PLUG
		BACKFILL MATERIAL NA
NA	19.5	HOLE BOTTOM



NOTES:

RECOVERY WELL CUT-OFF BELOW GRADE, CAPPED WITH T-JOINT, AND PLUMBED TO SVE SVE SYSTEM

CASING AND SCREEN DETAILS

TYPE OF RISER: 4-INCH PVC

PIPE SCHEDULE: 80

PIPE JOINTS: THREADED O-RINGS

SOLVENT USED? NO

SCREEN TYPE: 4-INCH STAINLESS STEEL

SCR. SLOT SIZE: 30 Slot

BOREHOLE DIAMETER:	10	IN. FROM	0	TO	19.5	FT.
	NA	IN. FROM	NA	TO	NA	FT.
SURF. CASING DIAMETER:	NA	IN. FROM	NA	TO	NA	FT.
	NA	IN. FROM	NA	TO	NA	FT.

WELL DEVELOPMENT

DEVELOPMENT METHOD: NA

TIME DEVELOPING: NA HOURS

WATER REMOVED: NA GALLONS

WATER ADDED: NA GALLONS

WATER CLARITY BEFORE / AFTER DEVELOPMENT

CLARITY BEFORE: NA

COLOR BEFORE: NA

CLARITY AFTER: NA

COLOR AFTER: NA

ODOR (IF PRESENT): NA

WATER LEVEL SUMMARY

MEASUREMENT (FEET)			DATE	TIME
DTB BEFORE DEVELOPING:	NA	T/PVC	NA	NA
DTB AFTER DEVELOPING:	NA	T/PVC	NA	NA
SWE BEFORE DEVELOPING:	NA	T/PVC	NA	NA
SWE AFTER DEVELOPING:	NA	T/PVC	NA	NA
OTHER SWE:	NA	T/PVC	NA	NA
OTHER SWE:	NA	T/PVC	NA	NA

PROTECTIVE CASING DETAILS

PERMANENT, LEGIBLE WELL LABEL ADDED? ☑ YES ☐ NO

PROTECTIVE COVER AND LOCK INSTALLED? ☑ YES ☐ NO

LOCK KEY NUMBER: NA

REVISED 06/2011

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TRC

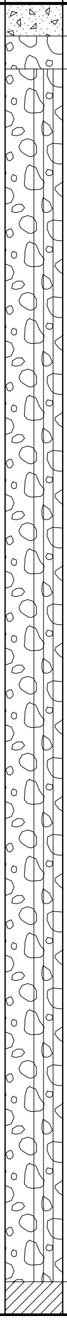
BORING NUMBER RW-03

PAGE 1 OF 1

CLIENT Mullins Rubber Products
PROJECT NAME Valley Pike VOC Site
PROJECT NUMBER 243854
PROJECT LOCATION Dayton, OH
DATE STARTED 1/11/16 **COMPLETED** 1/11/16
GROUND ELEVATION **HOLE SIZE** 2.25 inches
DRILLING CONTRACTOR Envirocore
GROUND WATER LEVELS:
DRILLING METHOD Direct Push
AT TIME OF DRILLING --- NA
LOGGED BY DMK **CHECKED BY** BRB
AT END OF DRILLING --- NA
NOTES
AFTER DRILLING --- NA

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (%)	ENVIRONMENTAL DATA
0			
			PID = 10
	1	70	
			PID = 10
5			
			PID = 10
	2	75	
			PID = 12
			PID = 15
10	3	75	
			PID = 14
			PID = 21
	4	75	
15			
			PID = 20
	5	50	
			PID = 15
20			

GRAPHIC LOG



MATERIAL DESCRIPTION

0.5 **Concrete**

1.0 **Gravel (GP)**, medium, angular, some medium-coarse sand, dry, fill

Sand and Gravel (GP-GM), fine-coarse rounded gravel, medium-coarse sand, trace silt, dry-damp, yellowish brown (10YR 5/4), loose

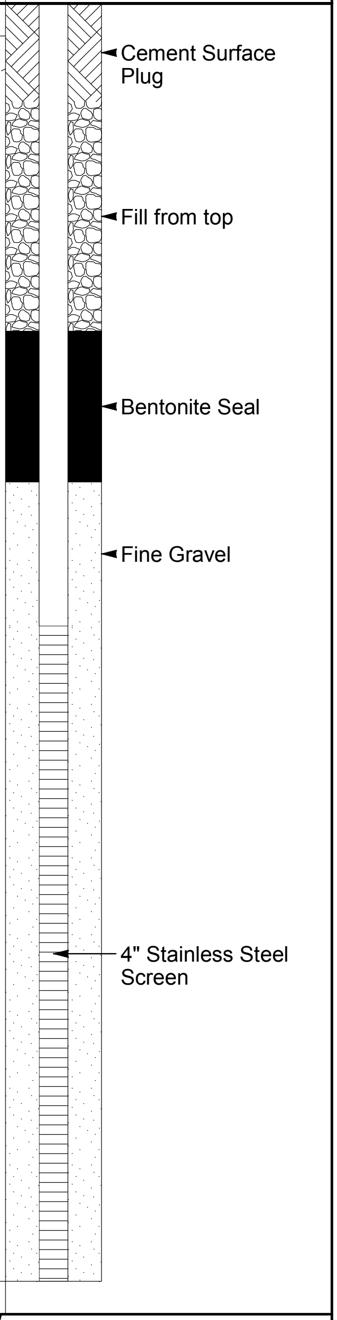
Grain size coarsens with depth

Sweet odor

19.5

20.0 **Silty Clay (CL)**, trace gravel, few sand, plastic, stiff, damp, dark yellowish brown (10YR 3/6), sweet odor

WELL DIAGRAM



Bottom of borehole at 20.0 feet.

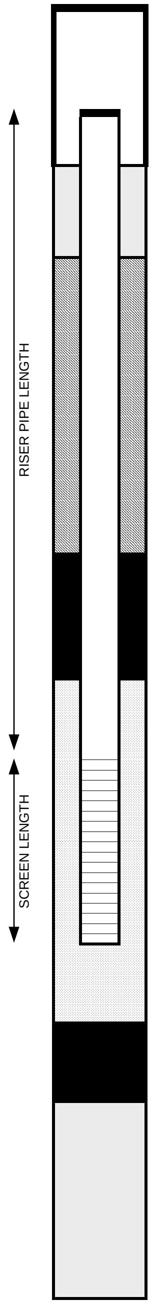
ENVIRONMENTAL BH - GINT STD US LAB.GDT - 5/27/16 11:33 - C:\USERS\PUBLIC\DOCUMENTS\BENTLEY\GINT\PROJECTS\VALLEY PIKE - SVE PILOT TEST.GPJ

DRAFT

PAGE _______ OF _______

WELL CONSTRUCTION DIAGRAM

PROJ. NAME:	VALLEY PIKE VOC SITE	WELL ID:	**RW-03**
PROJ. NO: 243854.00	DATE INSTALLED: 1/11/2016	INSTALLED BY: DMK	CHECKED BY: AJD



ELEVATION (BENCHMARK: USGS)	DEPTH BELOW OR ABOVE GROUND SURFACE (FEET)	
NA	0.0	GROUND SURFACE
NA	0.0	TOP OF CASING
NA		
	1.5	CEMENT SURFACE PLUG
		GROUT/BACKFILL MATERIAL BENTONITE SLURRY
NA		
9.50		GROUT/BACKFILL METHOD FILL FROM ABOVE
	5.0	GROUT
		BENTONITE SEAL MATERIAL MEDIUM CHIPS
	7.3	BENTONITE SEAL
NA	9.5	TOP OF SCREEN
10.00		FILTER PACK MATERIAL FINE GRAVEL
NA	19.5	BOTTOM OF SCREEN
	19.5	BOTTOM OF FILTER PACK
	NA	BENTONITE PLUG
		BACKFILL MATERIAL NA
NA	19.5	HOLE BOTTOM

NOTES:

RECOVERY WELL CUT-OFF BELOW GRADE,
CAPPED WITH T-JOINT, AND PLUMBED TO SVE
SVE SYSTEM

CASING AND SCREEN DETAILS

TYPE OF RISER: 4-INCH PVC

PIPE SCHEDULE: 80

PIPE JOINTS: THREADED O-RINGS

SOLVENT USED? NO

SCREEN TYPE: 4-INCH STAINLESS STEEL

SCR. SLOT SIZE: 30 Slot

BOREHOLE DIAMETER:
10 IN. FROM 0 TO 19.5 FT.
NA IN. FROM NA TO NA FT.

SURF. CASING DIAMETER:
NA IN. FROM NA TO NA FT.
NA IN. FROM NA TO NA FT.

WELL DEVELOPMENT

DEVELOPMENT METHOD: NA

TIME DEVELOPING: NA HOURS
WATER REMOVED: NA GALLONS
WATER ADDED: NA GALLONS

WATER CLARITY BEFORE / AFTER DEVELOPMENT

CLARITY BEFORE: NA
COLOR BEFORE: NA
CLARITY AFTER: NA
COLOR AFTER: NA

ODOR (IF PRESENT): NA

WATER LEVEL SUMMARY

MEASUREMENT (FEET)			DATE	TIME
DTB BEFORE DEVELOPING:	NA	T/PVC	NA	NA
DTB AFTER DEVELOPING:	NA	T/PVC	NA	NA
SWE BEFORE DEVELOPING:	NA	T/PVC	NA	NA
SWE AFTER DEVELOPING:	NA	T/PVC	NA	NA
OTHER SWE:	NA	T/PVC	NA	NA
OTHER SWE:	NA	T/PVC	NA	NA

PROTECTIVE CASING DETAILS

PERMANENT, LEGIBLE WELL LABEL ADDED? ☑ YES ☐ NO
PROTECTIVE COVER AND LOCK INSTALLED? ☑ YES ☐ NO
LOCK KEY NUMBER: NA

REVISED 06/2011

Appendix C
Laboratory Data Reports

DRAFT

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
Tel: (865)291-3000

TestAmerica Job ID: 140-4375-1
Client Project/Site: Mullins Rubber Products-SVE Pilot

For:
TRC Environmental Corporation
11231 Cornell Park Drive
Cincinnati, Ohio 45242

Attn: Andrew Davis

Terry Walker Wasmund

Authorized for release by:
2/22/2016 4:03:53 PM

Terry Walker Wasmund, Project Manager II
(865)291-3000
terry.wasmund@testamericainc.com

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LINKS

Review your project results through TotalAccess

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Visit us at:
www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Definitions/Glossary

Qualifiers

Air - GC/MS VOA

Qualifier	Qualifier Description
E	Result exceeded calibration range.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Job ID: 140-4375-1

Laboratory: TestAmerica Knoxville

Narrative

Job Narrative
140-4375-1

Receipt

The samples were received on 2/6/2016 at 9:30 AM. The samples arrived in good condition and properly preserved.

Air - GC/MS VOA

Method(s) TO 15 LL, TO-15: EPA methods TO-14A and TO-15 specify the use of humidified “zero air” as the blank reagent for canister cleaning, instrument calibration and sample analysis. Ultra-high purity humidified nitrogen from a cryogenic reservoir is used in place of “zero air” by TestAmerica Knoxville.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Ohio VAP Requirements

Unless otherwise described in this paragraph, TestAmerica Laboratories, Inc. performed the analyses within its current VAP certification. The laboratory was certified for each analyte, parameter group and method used at the time that it performed the analyses. The analyses were performed consistent with the laboratory's standard operating procedures and quality assurance program plan as approved under OAC 3745-300-04.

Comments

No additional comments.

Detection Summary

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Client Sample ID: RW-1 Lab Sample ID: 140-4375-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Tetrachloroethene	230	E	0.80		ppb v/v	1		TO-15	Total/NA
Trichloroethene	160		0.40		ppb v/v	1		TO-15	Total/NA
Tetrachloroethene - DL	230		1.8		ppb v/v	1		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Tetrachloroethene	1600	E	5.4		ug/m3	1		TO-15	Total/NA
Trichloroethene	850		2.1		ug/m3	1		TO-15	Total/NA
Tetrachloroethene - DL	1600		12		ug/m3	1		TO-15	Total/NA

Client Sample ID: RW-2 Lab Sample ID: 140-4375-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	4.4		0.80		ppb v/v	1		TO-15	Total/NA
Tetrachloroethene	640	E	0.80		ppb v/v	1		TO-15	Total/NA
Trichloroethene	980	E	0.40		ppb v/v	1		TO-15	Total/NA
Tetrachloroethene - DL	710		19		ppb v/v	5.28		TO-15	Total/NA
Trichloroethene - DL	1300		9.6		ppb v/v	5.28		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	17		3.2		ug/m3	1		TO-15	Total/NA
Tetrachloroethene	4400	E	5.4		ug/m3	1		TO-15	Total/NA
Trichloroethene	5300	E	2.1		ug/m3	1		TO-15	Total/NA
Tetrachloroethene - DL	4800		130		ug/m3	5.28		TO-15	Total/NA
Trichloroethene - DL	6900		52		ug/m3	5.28		TO-15	Total/NA

Client Sample ID: RW-3 Lab Sample ID: 140-4375-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Tetrachloroethene	17000	E	75		ppb v/v	41.49		TO-15	Total/NA
Trichloroethene	15000	E	38		ppb v/v	41.49		TO-15	Total/NA
Tetrachloroethene - DL	10000		150		ppb v/v	41.49		TO-15	Total/NA
Trichloroethene - DL	15000		75		ppb v/v	41.49		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Tetrachloroethene	110000	E	510		ug/m3	41.49		TO-15	Total/NA
Trichloroethene	83000	E	200		ug/m3	41.49		TO-15	Total/NA
Tetrachloroethene - DL	70000		1000		ug/m3	41.49		TO-15	Total/NA
Trichloroethene - DL	81000		410		ug/m3	41.49		TO-15	Total/NA

Client Sample ID: BLOWER-IN Lab Sample ID: 140-4375-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Tetrachloroethene	4500		43		ppb v/v	43.46		TO-15	Total/NA
Trichloroethene	6500		22		ppb v/v	43.46		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Tetrachloroethene	31000		290		ug/m3	43.46		TO-15	Total/NA
Trichloroethene	35000		120		ug/m3	43.46		TO-15	Total/NA

Client Sample ID: BLOWER-OUT Lab Sample ID: 140-4375-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Tetrachloroethene	130		0.80		ppb v/v	1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: BLOWER-OUT (Continued) Lab Sample ID: 140-4375-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Trichloroethene	67		0.40		ppb v/v	1		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Tetrachloroethene	900		5.4		ug/m3	1		TO-15	Total/NA
Trichloroethene	360		2.1		ug/m3	1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client Sample ID: RW-1

Lab Sample ID: 140-4375-1

Date Collected: 02/05/16 10:53

Matrix: Air

Date Received: 02/06/16 09:30

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.80		ppb v/v			02/10/16 20:36	1
Tetrachloroethene	**230**	**E**	0.80		ppb v/v			02/10/16 20:36	1
trans-1,2-Dichloroethene	ND		0.80		ppb v/v			02/10/16 20:36	1
Trichloroethene	**160**		0.40		ppb v/v			02/10/16 20:36	1
Vinyl chloride	ND		0.80		ppb v/v			02/10/16 20:36	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		3.2		ug/m3			02/10/16 20:36	1
Tetrachloroethene	**1600**	**E**	5.4		ug/m3			02/10/16 20:36	1
trans-1,2-Dichloroethene	ND		3.2		ug/m3			02/10/16 20:36	1
Trichloroethene	**850**		2.1		ug/m3			02/10/16 20:36	1
Vinyl chloride	ND		2.0		ug/m3			02/10/16 20:36	1

Method: TO-15 - Volatile Organic Compounds in Ambient Air - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrachloroethene	**230**		1.8		ppb v/v			02/11/16 16:09	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrachloroethene	**1600**		12		ug/m3			02/11/16 16:09	1

Client Sample Results

Client Sample ID: RW-2

Lab Sample ID: 140-4375-2

Date Collected: 02/05/16 10:47
Date Received: 02/06/16 09:30
Sample Container: Summa Canister 1L

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**4.4**		0.80		ppb v/v			02/10/16 21:31	1
Tetrachloroethene	**640**	**E**	0.80		ppb v/v			02/10/16 21:31	1
trans-1,2-Dichloroethene	ND		0.80		ppb v/v			02/10/16 21:31	1
Trichloroethene	**980**	**E**	0.40		ppb v/v			02/10/16 21:31	1
Vinyl chloride	ND		0.80		ppb v/v			02/10/16 21:31	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**17**		3.2		ug/m3			02/10/16 21:31	1
Tetrachloroethene	**4400**	**E**	5.4		ug/m3			02/10/16 21:31	1
trans-1,2-Dichloroethene	ND		3.2		ug/m3			02/10/16 21:31	1
Trichloroethene	**5300**	**E**	2.1		ug/m3			02/10/16 21:31	1
Vinyl chloride	ND		2.0		ug/m3			02/10/16 21:31	1

Method: TO-15 - Volatile Organic Compounds in Ambient Air - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrachloroethene	**710**		19		ppb v/v			02/11/16 17:04	5.28
Trichloroethene	**1300**		9.6		ppb v/v			02/11/16 17:04	5.28

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrachloroethene	**4800**		130		ug/m3			02/11/16 17:04	5.28
Trichloroethene	**6900**		52		ug/m3			02/11/16 17:04	5.28

Client Sample Results

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Client Sample ID: RW-3

Lab Sample ID: 140-4375-3

Date Collected: 02/05/16 10:45

Matrix: Air

Date Received: 02/06/16 09:30

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		75		ppb v/v			02/11/16 17:59	41.49
Tetrachloroethene	**17000**	**E**	75		ppb v/v			02/11/16 17:59	41.49
trans-1,2-Dichloroethene	ND		75		ppb v/v			02/11/16 17:59	41.49
Trichloroethene	**15000**	**E**	38		ppb v/v			02/11/16 17:59	41.49
Vinyl chloride	ND		75		ppb v/v			02/11/16 17:59	41.49

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		300		ug/m3			02/11/16 17:59	41.49
Tetrachloroethene	**110000**	**E**	510		ug/m3			02/11/16 17:59	41.49
trans-1,2-Dichloroethene	ND		300		ug/m3			02/11/16 17:59	41.49
Trichloroethene	**83000**	**E**	200		ug/m3			02/11/16 17:59	41.49
Vinyl chloride	ND		190		ug/m3			02/11/16 17:59	41.49

Method: TO-15 - Volatile Organic Compounds in Ambient Air - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrachloroethene	**10000**		150		ppb v/v			02/13/16 09:26	41.49
Trichloroethene	**15000**		75		ppb v/v			02/13/16 09:26	41.49

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrachloroethene	**70000**		1000		ug/m3			02/13/16 09:26	41.49
Trichloroethene	**81000**		410		ug/m3			02/13/16 09:26	41.49

Client Sample ID: BLOWER-IN

Lab Sample ID: 140-4375-4

Date Collected: 02/05/16 11:01

Matrix: Air

Date Received: 02/06/16 09:30

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		43		ppb v/v			02/10/16 23:22	43.46
Tetrachloroethene	**4500**		43		ppb v/v			02/10/16 23:22	43.46
trans-1,2-Dichloroethene	ND		43		ppb v/v			02/10/16 23:22	43.46
Trichloroethene	**6500**		22		ppb v/v			02/10/16 23:22	43.46
Vinyl chloride	ND		43		ppb v/v			02/10/16 23:22	43.46

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		170		ug/m3			02/10/16 23:22	43.46
Tetrachloroethene	**31000**		290		ug/m3			02/10/16 23:22	43.46
trans-1,2-Dichloroethene	ND		170		ug/m3			02/10/16 23:22	43.46
Trichloroethene	**35000**		120		ug/m3			02/10/16 23:22	43.46
Vinyl chloride	ND		110		ug/m3			02/10/16 23:22	43.46

Client Sample Results

Client Sample ID: BLOWER-OUT
Lab Sample ID: 140-4375-5

Date Collected: 02/05/16 10:56
Matrix: Air
Date Received: 02/06/16 09:30
Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.80		ppb v/v			02/11/16 00:18	1
Tetrachloroethene	**130**		0.80		ppb v/v			02/11/16 00:18	1
trans-1,2-Dichloroethene	ND		0.80		ppb v/v			02/11/16 00:18	1
Trichloroethene	**67**		0.40		ppb v/v			02/11/16 00:18	1
Vinyl chloride	ND		0.80		ppb v/v			02/11/16 00:18	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		3.2		ug/m3			02/11/16 00:18	1
Tetrachloroethene	**900**		5.4		ug/m3			02/11/16 00:18	1
trans-1,2-Dichloroethene	ND		3.2		ug/m3			02/11/16 00:18	1
Trichloroethene	**360**		2.1		ug/m3			02/11/16 00:18	1
Vinyl chloride	ND		2.0		ug/m3			02/11/16 00:18	1

Default Detection Limits

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	RL	MDL	Units	Method
cis-1,2-Dichloroethene	0.080	0.024	ppb v/v	TO-15
cis-1,2-Dichloroethene	0.32	0.095	ug/m3	TO-15
Tetrachloroethene	0.080	0.016	ppb v/v	TO-15
Tetrachloroethene	0.54	0.11	ug/m3	TO-15
trans-1,2-Dichloroethene	0.080	0.020	ppb v/v	TO-15
trans-1,2-Dichloroethene	0.32	0.079	ug/m3	TO-15
Trichloroethene	0.040	0.014	ppb v/v	TO-15
Trichloroethene	0.21	0.075	ug/m3	TO-15
Vinyl chloride	0.080	0.029	ppb v/v	TO-15
Vinyl chloride	0.20	0.074	ug/m3	TO-15

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Lab Sample ID: MB 140-4310/8
Matrix: Air
Analysis Batch: 4310

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.080		ppb v/v			02/10/16 19:41	1
Tetrachloroethene	ND		0.080		ppb v/v			02/10/16 19:41	1
trans-1,2-Dichloroethene	ND		0.080		ppb v/v			02/10/16 19:41	1
Trichloroethene	ND		0.040		ppb v/v			02/10/16 19:41	1
Vinyl chloride	ND		0.080		ppb v/v			02/10/16 19:41	1

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.32		ug/m3			02/10/16 19:41	1
Tetrachloroethene	ND		0.54		ug/m3			02/10/16 19:41	1
trans-1,2-Dichloroethene	ND		0.32		ug/m3			02/10/16 19:41	1
Trichloroethene	ND		0.21		ug/m3			02/10/16 19:41	1
Vinyl chloride	ND		0.20		ug/m3			02/10/16 19:41	1

Lab Sample ID: MB 140-4321/4
Matrix: Air
Analysis Batch: 4321

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.080		ppb v/v			02/11/16 15:13	1
Tetrachloroethene	ND		0.080		ppb v/v			02/11/16 15:13	1
trans-1,2-Dichloroethene	ND		0.080		ppb v/v			02/11/16 15:13	1
Trichloroethene	ND		0.040		ppb v/v			02/11/16 15:13	1
Vinyl chloride	ND		0.080		ppb v/v			02/11/16 15:13	1

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.32		ug/m3			02/11/16 15:13	1
Tetrachloroethene	ND		0.54		ug/m3			02/11/16 15:13	1
trans-1,2-Dichloroethene	ND		0.32		ug/m3			02/11/16 15:13	1
Trichloroethene	ND		0.21		ug/m3			02/11/16 15:13	1
Vinyl chloride	ND		0.20		ug/m3			02/11/16 15:13	1

Lab Sample ID: MB 140-4324/7
Matrix: Air
Analysis Batch: 4324

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.080		ppb v/v			02/13/16 08:31	1
Tetrachloroethene	ND		0.080		ppb v/v			02/13/16 08:31	1
trans-1,2-Dichloroethene	ND		0.080		ppb v/v			02/13/16 08:31	1
Trichloroethene	ND		0.040		ppb v/v			02/13/16 08:31	1
Vinyl chloride	ND		0.080		ppb v/v			02/13/16 08:31	1

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.32		ug/m3			02/13/16 08:31	1
Tetrachloroethene	ND		0.54		ug/m3			02/13/16 08:31	1
trans-1,2-Dichloroethene	ND		0.32		ug/m3			02/13/16 08:31	1
Trichloroethene	ND		0.21		ug/m3			02/13/16 08:31	1
Vinyl chloride	ND		0.20		ug/m3			02/13/16 08:31	1

QC Association Summary

Air - GC/MS VOA

Analysis Batch: 4310

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-4375-1	RW-1	Total/NA	Air	TO-15	
140-4375-2	RW-2	Total/NA	Air	TO-15	
140-4375-4	BLOWER-IN	Total/NA	Air	TO-15	
140-4375-5	BLOWER-OUT	Total/NA	Air	TO-15	
MB 140-4310/8	Method Blank	Total/NA	Air	TO-15	

Analysis Batch: 4321

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-4375-1 - DL	RW-1	Total/NA	Air	TO-15	
140-4375-2 - DL	RW-2	Total/NA	Air	TO-15	
140-4375-3	RW-3	Total/NA	Air	TO-15	
MB 140-4321/4	Method Blank	Total/NA	Air	TO-15	

Analysis Batch: 4324

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-4375-3 - DL	RW-3	Total/NA	Air	TO-15	
MB 140-4324/7	Method Blank	Total/NA	Air	TO-15	

Lab Chronicle

Client Sample ID: RW-1

Lab Sample ID: 140-4375-1

Date Collected: 02/05/16 10:53

Matrix: Air

Date Received: 02/06/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	50 mL	500 mL	4310	02/10/16 20:36	AFB	TAL KNX
	Instrument ID:	MJ								
Total/NA	Analysis	TO-15	DL	1	22 mL	500 mL	4321	02/11/16 16:09	AFB	TAL KNX
	Instrument ID:	MJ								

Client Sample ID: RW-2

Lab Sample ID: 140-4375-2

Date Collected: 02/05/16 10:47

Matrix: Air

Date Received: 02/06/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	50 mL	500 mL	4310	02/10/16 21:31	AFB	TAL KNX
	Instrument ID:	MJ								
Total/NA	Analysis	TO-15	DL	5.28	11 mL	500 mL	4321	02/11/16 17:04	AFB	TAL KNX
	Instrument ID:	MJ								

Client Sample ID: RW-3

Lab Sample ID: 140-4375-3

Date Collected: 02/05/16 10:45

Matrix: Air

Date Received: 02/06/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		41.49	22 mL	500 mL	4321	02/11/16 17:59	AFB	TAL KNX
	Instrument ID:	MJ								
Total/NA	Analysis	TO-15	DL	41.49	11 mL	500 mL	4324	02/13/16 09:26	AFB	TAL KNX
	Instrument ID:	MJ								

Client Sample ID: BLOWER-IN

Lab Sample ID: 140-4375-4

Date Collected: 02/05/16 11:01

Matrix: Air

Date Received: 02/06/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		43.46	40 mL	500 mL	4310	02/10/16 23:22	AFB	TAL KNX
	Instrument ID:	MJ								

Client Sample ID: BLOWER-OUT

Lab Sample ID: 140-4375-5

Date Collected: 02/05/16 10:56

Matrix: Air

Date Received: 02/06/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	50 mL	500 mL	4310	02/11/16 00:18	AFB	TAL KNX
	Instrument ID:	MJ								

Lab Chronicle

Client Sample ID: Method Blank

Lab Sample ID: MB 140-4310/8
Date Collected: N/A
Matrix: Air
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	500 mL	500 mL	4310	02/10/16 19:41	AFB	TAL KNX
	Instrument ID: MJ									

Client Sample ID: Method Blank

Lab Sample ID: MB 140-4321/4
Date Collected: N/A
Matrix: Air
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	500 mL	500 mL	4321	02/11/16 15:13	AFB	TAL KNX
	Instrument ID: MJ									

Client Sample ID: Method Blank

Lab Sample ID: MB 140-4324/7
Date Collected: N/A
Matrix: Air
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	500 mL	500 mL	4324	02/13/16 08:31	AFB	TAL KNX
	Instrument ID: MJ									

Laboratory References:

TAL KNX = TestAmerica Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

Certification Summary

Client: TRC Environmental Corporation
Project/Site: Mullins Rubber Products-SVE Pilot

TestAmerica Job ID: 140-4375-1

Laboratory: TestAmerica Knoxville

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Ohio VAP	State Program	5	CL0059	01-16-17

Method Summary

Method	Method Description	Protocol	Laboratory
TO-15	Volatile Organic Compounds in Ambient Air	EPA	TAL KNX

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

TAL KNX = TestAmerica Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

Sample Summary

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
140-4375-1	RW-1	Air	02/05/16 10:53	02/06/16 09:30
140-4375-2	RW-2	Air	02/05/16 10:47	02/06/16 09:30
140-4375-3	RW-3	Air	02/05/16 10:45	02/06/16 09:30
140-4375-4	BLOWER-IN	Air	02/05/16 11:01	02/06/16 09:30
140-4375-5	BLOWER-OUT	Air	02/05/16 10:56	02/06/16 09:30

TAL Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
phone 865-291-3000 fax 865-584-4315

Canister Samples Chain of Custody Record

TestAmerica assumes no liability with respect to the collection and shipment of these samples.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

DRAFT

Client Contact Information
Company: TRC
Address: 11231 Cornell Park Drive
City/State/Zip: Cincinnati OH 45242
Phone: 513-489-2255
FAX:
Project Name: Mullins Rubber Products - SVE Pilot
Site/location: Riverside, OH
PO # 92041

Project Manager: Brooks Bertl
Phone: 317-517-2616
Site Contact: Andrew Davis : 513-315-6748
TAL Contact:

Sampled By: Andrew Davis

1 of 1 COCs

Analysis Turnaround Time
[✓ Standard] (Specify)
Rush (Specify)

Sample Identification	Sample Date(s)	Time Start	Time Stop	Canister Vacuum in Field, "Hg (Start)	Canister Vacuum in Field, 'Hg (Stop)	Flow Controller ID	Canister ID	TO-15	TO-14A	EPA 3C	EPA 25C	ASTM D-1946	Other (Please specify in notes section)	Sample Type	Indoor Air	Ambient Air	Soil Gas	Landfill Gas	Other (Please specify in notes section)
RW-1	2/5/16	1053	1053	-29.1		NA	11033	X											
RW-2	2/5/16	1047	1047	-29.1		NA	10517	X											
RW-3	2/5/16	1045	1045	-29.0		NA	09578	X											
Blower-In	2/5/16	1101	1101	-29.0		NA	10918	X											
Blower-Out	2/5/16	1056	1056	-28.9		NA	09661	X											

Sampled by :
Received @ ambient, 1 cooler
FedEx Po trk#7003 1337 9319
KU 2/6/16, KU 2/6/16
Custody seal intact

Temperature (Fahrenheit)

	Interior	Ambient	
Start			
Stop			

Pressure (inches of Hg)

	Interior	Ambient	
Start			
Stop			

140-4375 Chain of Custody

Cincinnati
210501

Special Instructions/QC Requirements & Comments:

Canisters Shipped by:	Date/Time:	Canisters Received by:
Samples Relinquished by:	Date/Time: 2/5/16 1414	Received by: 2/5/16 1414
Relinquished by:	Date/Time: 2/5/16 1414	Received by: 2/6/16 0930

5 cans
No flow

15 14 13 12 11 10 9 8 7 6 5 4 3 2 1

DRAFT

Login Sample Receipt Checklist

Client: TRC Environmental Corporation

Job Number: 140-4375-1

Login Number: 4375
List Number: 1
Creator: Dameron, Bryan K

List Source: TestAmerica Knoxville

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	N/A	
Cooler Temperature is recorded.	N/A	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	N/A	CHECKED IN LAB
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	N/A	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	N/A	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	N/A	
Residual Chlorine Checked.	N/A	

TestAmerica Knoxville - Air Canister Initial Pressure Check

Gauge ID: G1
Date: 2/8/2016

Analyst	Sample ID	Asset #	Cleaning Job	Cert	Size (L)	Pressure @ Receipt (-in Hg or +psig)	Time	Comments
AFB	140-4375-a-1	11033	4311	b	1	+0.6	16:10	
AFB	140-4375-a-2	10517	4311	b	1	0.0	16:11	
AFB	140-4375-a-3	09578	4311	b	1	+0.5	16:12	
AFB	140-4375-a-4	10978	4311	b	1	+1.4	16:13	
AFB	140-4375-a-5	09661	4311	b	1	+0.7	16:14	

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ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
Tel: (865)291-3000

TestAmerica Job ID: 140-4563-1
Client Project/Site: Mullins Vapor Sampling, Riverside, OH

For:
TRC Environmental Corporation
11231 Cornell Park Drive
Cincinnati, Ohio 45242

Attn: Andrew Davis

Terry Walker Wasmund

Authorized for release by:
3/11/2016 1:26:12 PM

Terry Walker Wasmund, Project Manager II
(865)291-3000
terry.wasmund@testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Table of Contents

Definitions/Glossary

Qualifiers

Air - GC/MS VOA

Qualifier	Qualifier Description
E	Result exceeded calibration range.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Job ID: 140-4563-1

Laboratory: TestAmerica Knoxville

Narrative

Job Narrative
140-4563-1

Receipt
The samples were received on 3/5/2016 at 9:30 AM. The samples arrived in good condition and properly preserved.

Air - GC/MS VOA
Method(s) TO 15 LL, TO-15: EPA methods TO-14A and TO-15 specify the use of humidified “zero air” as the blank reagent for canister cleaning, instrument calibration and sample analysis. Ultra-high purity humidified nitrogen from a cryogenic reservoir is used in place of “zero air” by TestAmerica Knoxville.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Ohio VAP Requirements
Unless otherwise described in this paragraph, TestAmerica Laboratories, Inc. performed the analyses within its current VAP certification. The laboratory was certified for each analyte, parameter group and method used at the time that it performed the analyses. The analyses were performed consistent with the laboratory's standard operating procedures and quality assurance program plan as approved under OAC 3745-300-04.

Comments
No additional comments.

Detection Summary

Client Sample ID: CARBON OUTLET — Lab Sample ID: 140-4563-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Trichloroethene	0.64		0.40		ppb v/v	1		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Trichloroethene	3.4		2.1		ug/m3	1		TO-15	Total/NA

Client Sample ID: BLOWER INLET — Lab Sample ID: 140-4563-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Tetrachloroethene	1100		8.1		ppb v/v	3.63		TO-15	Total/NA
Trichloroethene	1200		4.0		ppb v/v	3.63		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Tetrachloroethene	7600		55		ug/m3	3.63		TO-15	Total/NA
Trichloroethene	6500		22		ug/m3	3.63		TO-15	Total/NA

Client Sample ID: RW-1 — Lab Sample ID: 140-4563-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Tetrachloroethene	16		0.80		ppb v/v	1		TO-15	Total/NA
Trichloroethene	120		0.40		ppb v/v	1		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Tetrachloroethene	110		5.4		ug/m3	1		TO-15	Total/NA
Trichloroethene	650		2.1		ug/m3	1		TO-15	Total/NA

Client Sample ID: RW-2 — Lab Sample ID: 140-4563-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Tetrachloroethene	170		5.2		ppb v/v	3.51		TO-15	Total/NA
Trichloroethene	980		2.6		ppb v/v	3.51		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Tetrachloroethene	1200		35		ug/m3	3.51		TO-15	Total/NA
Trichloroethene	5300		14		ug/m3	3.51		TO-15	Total/NA

Client Sample ID: RW-3 — Lab Sample ID: 140-4563-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Tetrachloroethene	3000	E	13		ppb v/v	3.31		TO-15	Total/NA
Trichloroethene	2800	E	6.6		ppb v/v	3.31		TO-15	Total/NA
Tetrachloroethene - DL	5700		40		ppb v/v	10.88		TO-15	Total/NA
Trichloroethene - DL	2600		20		ppb v/v	10.88		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Tetrachloroethene	20000	E	90		ug/m3	3.31		TO-15	Total/NA
Trichloroethene	15000	E	36		ug/m3	3.31		TO-15	Total/NA
Tetrachloroethene - DL	39000		270		ug/m3	10.88		TO-15	Total/NA
Trichloroethene - DL	14000		110		ug/m3	10.88		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client Sample ID: CARBON OUTLET
Lab Sample ID: 140-4563-1
Date Collected: 03/03/16 12:46
Matrix: Air
Date Received: 03/05/16 09:30
Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.80		ppb v/v			03/08/16 21:55	1
Tetrachloroethene	ND		0.80		ppb v/v			03/08/16 21:55	1
trans-1,2-Dichloroethene	ND		0.80		ppb v/v			03/08/16 21:55	1
Trichloroethene	**0.64**		0.40		ppb v/v			03/08/16 21:55	1
Vinyl chloride	ND		0.40		ppb v/v			03/08/16 21:55	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		3.2		ug/m3			03/08/16 21:55	1
Tetrachloroethene	ND		5.4		ug/m3			03/08/16 21:55	1
trans-1,2-Dichloroethene	ND		3.2		ug/m3			03/08/16 21:55	1
Trichloroethene	**3.4**		2.1		ug/m3			03/08/16 21:55	1
Vinyl chloride	ND		1.0		ug/m3			03/08/16 21:55	1

Client Sample Results

Client Sample ID: BLOWER INLET

Lab Sample ID: 140-4563-2

Date Collected: 03/03/16 12:49
Matrix: Air
Date Received: 03/05/16 09:30
Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		8.1		ppb v/v			03/08/16 23:47	3.63
Tetrachloroethene	**1100**		8.1		ppb v/v			03/08/16 23:47	3.63
trans-1,2-Dichloroethene	ND		8.1		ppb v/v			03/08/16 23:47	3.63
Trichloroethene	**1200**		4.0		ppb v/v			03/08/16 23:47	3.63
Vinyl chloride	ND		4.0		ppb v/v			03/08/16 23:47	3.63

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		32		ug/m3			03/08/16 23:47	3.63
Tetrachloroethene	**7600**		55		ug/m3			03/08/16 23:47	3.63
trans-1,2-Dichloroethene	ND		32		ug/m3			03/08/16 23:47	3.63
Trichloroethene	**6500**		22		ug/m3			03/08/16 23:47	3.63
Vinyl chloride	ND		10		ug/m3			03/08/16 23:47	3.63

Client Sample Results

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15

Client Sample ID: RW-1

Lab Sample ID: 140-4563-3

Date Collected: 03/03/16 12:57
Matrix: Air
Date Received: 03/05/16 09:30
Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.80		ppb v/v			03/09/16 00:41	1
Tetrachloroethene	**16**		0.80		ppb v/v			03/09/16 00:41	1
trans-1,2-Dichloroethene	ND		0.80		ppb v/v			03/09/16 00:41	1
Trichloroethene	**120**		0.40		ppb v/v			03/09/16 00:41	1
Vinyl chloride	ND		0.40		ppb v/v			03/09/16 00:41	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		3.2		ug/m3			03/09/16 00:41	1
Tetrachloroethene	**110**		5.4		ug/m3			03/09/16 00:41	1
trans-1,2-Dichloroethene	ND		3.2		ug/m3			03/09/16 00:41	1
Trichloroethene	**650**		2.1		ug/m3			03/09/16 00:41	1
Vinyl chloride	ND		1.0		ug/m3			03/09/16 00:41	1

Client Sample Results

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Client Sample ID: RW-2

Lab Sample ID: 140-4563-4

Date Collected: 03/03/16 13:03
Date Received: 03/05/16 09:30
Sample Container: Summa Canister 1L

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		5.2		ppb v/v			03/09/16 01:37	3.51
Tetrachloroethene	**170**		5.2		ppb v/v			03/09/16 01:37	3.51
trans-1,2-Dichloroethene	ND		5.2		ppb v/v			03/09/16 01:37	3.51
Trichloroethene	**980**		2.6		ppb v/v			03/09/16 01:37	3.51
Vinyl chloride	ND		2.6		ppb v/v			03/09/16 01:37	3.51

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		21		ug/m3			03/09/16 01:37	3.51
Tetrachloroethene	**1200**		35		ug/m3			03/09/16 01:37	3.51
trans-1,2-Dichloroethene	ND		21		ug/m3			03/09/16 01:37	3.51
Trichloroethene	**5300**		14		ug/m3			03/09/16 01:37	3.51
Vinyl chloride	ND		6.6		ug/m3			03/09/16 01:37	3.51

Client Sample Results

Client Sample ID: RW-3

Lab Sample ID: 140-4563-5

Date Collected: 03/03/16 13:09
Date Received: 03/05/16 09:30
Sample Container: Summa Canister 1L

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		13		ppb v/v			03/09/16 02:31	3.31
Tetrachloroethene	**3000**	**E**	13		ppb v/v			03/09/16 02:31	3.31
trans-1,2-Dichloroethene	ND		13		ppb v/v			03/09/16 02:31	3.31
Trichloroethene	**2800**	**E**	6.6		ppb v/v			03/09/16 02:31	3.31
Vinyl chloride	ND		6.6		ppb v/v			03/09/16 02:31	3.31

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		52		ug/m3			03/09/16 02:31	3.31
Tetrachloroethene	**20000**	**E**	90		ug/m3			03/09/16 02:31	3.31
trans-1,2-Dichloroethene	ND		52		ug/m3			03/09/16 02:31	3.31
Trichloroethene	**15000**	**E**	36		ug/m3			03/09/16 02:31	3.31
Vinyl chloride	ND		17		ug/m3			03/09/16 02:31	3.31

Method: TO-15 - Volatile Organic Compounds in Ambient Air - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrachloroethene	**5700**		40		ppb v/v			03/09/16 20:05	10.88
Trichloroethene	**2600**		20		ppb v/v			03/09/16 20:05	10.88

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrachloroethene	**39000**		270		ug/m3			03/09/16 20:05	10.88
Trichloroethene	**14000**		110		ug/m3			03/09/16 20:05	10.88

Default Detection Limits

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	RL	MDL	Units	Method
cis-1,2-Dichloroethene	0.080	0.024	ppb v/v	TO-15
cis-1,2-Dichloroethene	0.32	0.095	ug/m3	TO-15
Tetrachloroethene	0.080	0.016	ppb v/v	TO-15
Tetrachloroethene	0.54	0.11	ug/m3	TO-15
trans-1,2-Dichloroethene	0.080	0.020	ppb v/v	TO-15
trans-1,2-Dichloroethene	0.32	0.079	ug/m3	TO-15
Trichloroethene	0.040	0.014	ppb v/v	TO-15
Trichloroethene	0.21	0.075	ug/m3	TO-15
Vinyl chloride	0.040	0.029	ppb v/v	TO-15
Vinyl chloride	0.10	0.074	ug/m3	TO-15

QC Sample Results

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Lab Sample ID: MB 140-4431/4
Matrix: Air
Analysis Batch: 4431

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.080		ppb v/v			03/08/16 15:26	1
Tetrachloroethene	ND		0.080		ppb v/v			03/08/16 15:26	1
trans-1,2-Dichloroethene	ND		0.080		ppb v/v			03/08/16 15:26	1
Trichloroethene	ND		0.040		ppb v/v			03/08/16 15:26	1
Vinyl chloride	ND		0.040		ppb v/v			03/08/16 15:26	1

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.32		ug/m3			03/08/16 15:26	1
Tetrachloroethene	ND		0.54		ug/m3			03/08/16 15:26	1
trans-1,2-Dichloroethene	ND		0.32		ug/m3			03/08/16 15:26	1
Trichloroethene	ND		0.21		ug/m3			03/08/16 15:26	1
Vinyl chloride	ND		0.10		ug/m3			03/08/16 15:26	1

Lab Sample ID: MB 140-4437/4
Matrix: Air
Analysis Batch: 4437

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.080		ppb v/v			03/09/16 15:03	1
Tetrachloroethene	ND		0.080		ppb v/v			03/09/16 15:03	1
trans-1,2-Dichloroethene	ND		0.080		ppb v/v			03/09/16 15:03	1
Trichloroethene	ND		0.040		ppb v/v			03/09/16 15:03	1
Vinyl chloride	ND		0.040		ppb v/v			03/09/16 15:03	1

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.32		ug/m3			03/09/16 15:03	1
Tetrachloroethene	ND		0.54		ug/m3			03/09/16 15:03	1
trans-1,2-Dichloroethene	ND		0.32		ug/m3			03/09/16 15:03	1
Trichloroethene	ND		0.21		ug/m3			03/09/16 15:03	1
Vinyl chloride	ND		0.10		ug/m3			03/09/16 15:03	1

Air - GC/MS VOA

Analysis Batch: 4431

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-4563-1	CARBON OUTLET	Total/NA	Air	TO-15	
140-4563-2	BLOWER INLET	Total/NA	Air	TO-15	
140-4563-3	RW-1	Total/NA	Air	TO-15	
140-4563-4	RW-2	Total/NA	Air	TO-15	
140-4563-5	RW-3	Total/NA	Air	TO-15	
MB 140-4431/4	Method Blank	Total/NA	Air	TO-15	

Analysis Batch: 4437

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-4563-5 - DL	RW-3	Total/NA	Air	TO-15	
MB 140-4437/4	Method Blank	Total/NA	Air	TO-15	

Lab Chronicle

Client: TRC Environmental Corporation
Project/Site: Mullins Vapor Sampling, Riverside, OH

TestAmerica Job ID: 140-4563-1

Client Sample ID: CARBON OUTLET

Lab Sample ID: 140-4563-1

Date Collected: 03/03/16 12:46

Matrix: Air

Date Received: 03/05/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	50 mL	500 mL	4431	03/08/16 21:55	HMT	TAL KNX
	Instrument ID: MJ									

Client Sample ID: BLOWER INLET

Lab Sample ID: 140-4563-2

Date Collected: 03/03/16 12:49

Matrix: Air

Date Received: 03/05/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		3.63	18 mL	500 mL	4431	03/08/16 23:47	HMT	TAL KNX
	Instrument ID: MJ									

Client Sample ID: RW-1

Lab Sample ID: 140-4563-3

Date Collected: 03/03/16 12:57

Matrix: Air

Date Received: 03/05/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	50 mL	500 mL	4431	03/09/16 00:41	HMT	TAL KNX
	Instrument ID: MJ									

Client Sample ID: RW-2

Lab Sample ID: 140-4563-4

Date Collected: 03/03/16 13:03

Matrix: Air

Date Received: 03/05/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		3.51	27 mL	500 mL	4431	03/09/16 01:37	HMT	TAL KNX
	Instrument ID: MJ									

Client Sample ID: RW-3

Lab Sample ID: 140-4563-5

Date Collected: 03/03/16 13:09

Matrix: Air

Date Received: 03/05/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15	DL	10.88	11 mL	500 mL	4437	03/09/16 20:05	HMT	TAL KNX
	Instrument ID: MG									
Total/NA	Analysis	TO-15		3.31	10 mL	500 mL	4431	03/09/16 02:31	HMT	TAL KNX
	Instrument ID: MJ									

Lab Chronicle

Client Sample ID: Method Blank

Lab Sample ID: MB 140-4431/4
Date Collected: N/A
Matrix: Air
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	500 mL	500 mL	4431	03/08/16 15:26	HMT	TAL KNX
	Instrument ID: MJ									

Client Sample ID: Method Blank

Lab Sample ID: MB 140-4437/4
Date Collected: N/A
Matrix: Air
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	500 mL	500 mL	4437	03/09/16 15:03	HMT	TAL KNX
	Instrument ID: MG									

Laboratory References:

TAL KNX = TestAmerica Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

Certification Summary

Client: TRC Environmental Corporation
TestAmerica Job ID: 140-4563-1
Project/Site: Mullins Vapor Sampling, Riverside, OH

Laboratory: TestAmerica Knoxville

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Ohio VAP	State Program	5	CL0059	01-16-17

Method Summary

Client: TRC Environmental Corporation
Project/Site: Mullins Vapor Sampling, Riverside, OH

TestAmerica Job ID: 140-4563-1

Method	Method Description	Protocol	Laboratory
TO-15	Volatile Organic Compounds in Ambient Air	EPA	TAL KNX

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

TAL KNX = TestAmerica Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

Sample Summary

Client: TRC Environmental Corporation
Project/Site: Mullins Vapor Sampling, Riverside, OH

TestAmerica Job ID: 140-4563-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
140-4563-1	CARBON OUTLET	Air	03/03/16 12:46	03/05/16 09:30
140-4563-2	BLOWER INLET	Air	03/03/16 12:49	03/05/16 09:30
140-4563-3	RW-1	Air	03/03/16 12:57	03/05/16 09:30
140-4563-4	RW-2	Air	03/03/16 13:03	03/05/16 09:30
140-4563-5	RW-3	Air	03/03/16 13:09	03/05/16 09:30

TAL Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
phone 865-291-3000 fax 865-584-4315

Canister Samples Chain of Custody Record

TestAmerica assumes no liability with respect to the collection and shipment of these samples.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Contact Information
Company: TRC
Address: 11231 Cornell Park Drive
City/State/Zip Cincinnati, OH 45242
Phone: 513-489-2255
FAX: 513-489-2535
Project Name: Mullins Vapor Sampling
Site/location: Riverside, OH
PO # 92041

Project Manager: Brooks Bertl
Phone: 317-517-2616
Site Contact: Andrew Davis
TAL Contact: Terry Wasmund

Analysis Turnaround Time
Standard (Specify) 1 Week
Rush (Specify)

Sampled By: Andrew Davis

1 of 1 COCs

140-4563 Chain of Custody

Sample Identification	Sample Date(s)	Time Start	Time Stop	Canister Vacuum in Field, "Hg (Start)	Canister Vacuum in Field, 'Hg (Stop)	Flow Controller ID	Canister ID	TO-15	TO-14A	EPA 3C	EPA 25C	ASTM D-1946	Other (Please specify in notes section)	*Sample Type*	Indoor Air	Ambient Air	Soil Gas	Landfill Gas	Other (Please specify in notes section)
Carbon Outlet	3/3/16	1246	1246	-28.6		NA	10841	X											
Blower Inlet	3/3/16	1249	1249	-28.3		NA	09750	X											
RW-1	3/3/16	1257	1257			NA	10746	X											
RW-2	3/3/16	1303	1303			NA	10961	X											
RW-3	3/3/16	1309	1309	-28.6		NA	09735	X											

Sampled by : A. Davis

Receivell @ ambient, 1 box Fedex PO, trk# 7003 1338 0621
Received @ ambient
Custody seal intact
KV 3/5/16

	Temperature (Fahrenheit)		
	Interior	Ambient	
Start			
Stop			

	Pressure (inches of Hg)		
	Interior	Ambient	
Start			
Stop			

Cincinnati
210501

Special Instructions/QC Requirements & Comments:

1 Week TAT

Canisters Shipped by:	Date/Time:	Canisters Received by:
Samples Relinquished by:	Date/Time: 3/4/16 0917	Received by: 3/4/16 917
Relinquished by:	Date/Time: 3/4/16 917	Received by: 3/5/16 0939

Scan
No flow

DRAFT

Login Sample Receipt Checklist

Client: TRC Environmental Corporation

Job Number: 140-4563-1

Login Number: 4563
List Number: 1
Creator: Wilson, Ken

List Source: TestAmerica Knoxville

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	N/A	
Cooler Temperature is recorded.	N/A	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	N/A	This is checked in the lab.
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	N/A	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	N/A	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	N/A	
Residual Chlorine Checked.	N/A	

TestAmerica Knoxville - Air Canister Initial Pressure Check

Gauge ID: G1
Date: 3/7/2016

Analyst	Sample ID	Asset #	Cleaning Job	Cert	Size (L)	Pressure @ Receipt (-in Hg or +psig)	Time	Comments
AFB	140-4563-a-1	10841	4425	B	1	0	1855	
AFB	140-4563-a-2	09750	4425	B	1	-1.7	1856	
AFB	140-4563-a-3	10746	4425	B	1	0	1857	
AFB	140-4563-a-4	10961	4425	B	1	0	1858	
AFB	140-4563-a-5	09735	4425	B	1	0	1859	

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Appendix D
Soil Vapor Extraction Operations, Maintenance, and Monitoring Manual

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DRAFT

Soil Vapor Extraction Operations Maintenance, and Monitoring Manual

Valley Pike VOC Site
2949 Valley Pike
Riverside, Ohio

July 2016

DRAFT

Soil Vapor Extraction Operations, Maintenance and Monitoring Manual

Valley Pike VOC Site
2949 Valley Pike
Riverside, Ohio

July 2016

Prepared For
Mullins Rubber Products

Andrew Davis, E.I.T.
Staff Engineer

Brooks R. Bertl, P.E.
Project Engineer

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Executive Summary

The Source Area Investigation Report for the Valley Pike VOC Site prepared by Tetra Tech, Inc. in April 2015 identified a probable source for Volatile Organic Compounds (VOCs), primarily tetrachloroethene (PCE) and trichloroethene (TCE), in soil, groundwater and soil vapor on the Mullins Rubber Products (MRP) property. As a result, a draft Administrative Settlement Agreement and Order on Consent for Removal Action between MRP and the United States Environmental Protection Agency (USEPA) (the Settlement Agreement) has been prepared.

The Settlement Agreement included the design, installation and operation of a soil vapor extraction (SVE) system at the MRP property to address the suspected source of PCE and TCE. On behalf of MRP, TRC Environmental Corporation (TRC) has designed and installed an SVE system in accordance with the Settlement Agreement. This Operation and Maintenance (O&M) Manual has been prepared by TRC for continued O&M as the SVE system addresses PCE and TCE in the soil beneath the MRP property.

Section 1
Introduction

This O&M Manual has been prepared for the continued O&M of the SVE system currently operating at the Valley Pike VOC Site. A brief description of this Site is presented below.

1.1 Site Description

As identified by previous USEPA investigation, the Valley Pike VOC Study Area is an area of VOCs in groundwater within the City of Riverside, Montgomery County, Ohio. The Study Area is primarily north of Valley Pike (aka, Valley Street), and approximately 0.5 mile north of the Mad River. The area of VOC detections is bordered on the north by Forest Home Avenue, south by Valley Pike, and west by Sagamore Avenue. The source area is reported to be located within a mixed commercial and industrial area located east of Hypathia Avenue, west of Harshman Road, south of Transportation Drive and north of Valley Pike as illustrated in Figure 1.

The area in the Site vicinity underwent extensive development between 1900 and the 1950s. Primary uses of land in the area transitioned gradually from agricultural to a mixture of primarily commercial and residential. Several reported former auto garages and gas stations, and one possible dry cleaner, formerly operated in the area. Within the Site vicinity, VOCs in groundwater and sub-slab vapor have been detected at downgradient properties with respect to westerly groundwater flow direction. Relatively high VOC concentrations have been detected in soil, groundwater and soil vapor samples collected at the MRP property.

The approximately 3.2 acre MRP property features the main production and office building, including the series of attached expansions completed over the past 40+ years, several storage sheds, and four production wells as illustrated in Figure 2. The MRP property is owned by Mullins Land Company, Inc.

1.2 Purpose and Scope

As noted above, and SVE system has been installed to address VOC impacted soil beneath the MRP property. The purpose of this document (SVE O&M Manual) is to provide information and procedures to ensure the proper operation and maintenance of the SVE system installed at the MRP Site. In addition to operation and maintenance, this manual provides guidelines for trouble shooting, record keeping and monitoring for the SVE system.

Section 2
Treatment System Components

The major components of the SVE system at the MRP Site consists of the SVE extraction wells, vacuum monitoring ports, liquid knockout tank, SVE vacuum blower and granular activated carbon (GAC) vessels. A general schematic of the SVE system is shown in Figure 3 and a process and instrumentation diagram for the entire SVE system is shown in Figure 4. SVE extraction wells and vacuum monitoring point locations are shown on Figure 5 and typical extraction well and monitoring port construction diagrams are included in Figure 6 Each of the components of the SVE system are described in detail below.

The soil vapor extraction system design includes five SVE wells. Each SVE well is constructed using 4-inch diameter schedule 40 PVC piping extending from the surface to 8 feet (ft) below ground surface (bgs). This piping then connected to 4-inch diameter 30-slot (0.030-in) stainless steel well screens, installed from 8 to 18 ft bgs (10 ft long sections). The annular space surrounding the wells was backfilled with uniform washed pea gravel. Bentonite ships/granular bentonite (hydrated in place) were placed above the pea gravel well screen pack to provide an effective surface seal and to minimize the potential for drawing air from the surface at each extraction well point. A non-shrinking concrete-bentonite grout was used to fill the remaining annular space. Each SVE well was enclosed with a removable 8-inch diameter stainless steel flush mount well cover (see Figure 6).

2.1 Soil Vapor Monitoring Points (MP-1 S/D through MP-10 S/D)

The effectiveness of the extraction wells to extract soil vapors and establish vacuum in surrounding soils is evaluated using multi-depth soil gas vacuum monitoring points utilizing detachable Magnehelic vacuum monitoring gauges. A total of ten permanent subsurface vacuum monitoring points are located in areas surrounding the SVE wells (see Figure 5). Each SVE well has two (2) corresponding vacuum monitoring points located at distances of approximately 10 ft and 20 ft from each recovery well. At each location, a nested pair of vacuum monitoring points are used to measure vacuum levels:

- a deep point installed at a depth of 18 to 20 ft bgs (approx.); and
- a shallow point installed at a depth of 8 to 10 ft bgs (approx.).

The multi-level vacuum monitoring point design allows for an assessment of flow patterns within the subsurface soils, specifically as it relates to depth within the vadose zone soils.

Each nested pair of vacuum monitoring points is located in a single 2.5-inch borehole. Vacuum monitoring points were constructed with a 6-inch long stainless steel monitoring implant and attached to a length of ¼-inch inner diameter Teflon tubing.

Deep monitoring points were installed at the bottom of each borehole at approximately 20 ft bgs. The annular space surrounding monitoring point screens were backfilled with clean sand to approximately one (1) foot above the top of the screen. Granular bentonite chips were placed above the sand well screen in six (6) to eight (8)-inch lifts to approximately 1 foot below the bottom of the shallow monitoring point screen. Bentonite lifts were hydrated in place to help ensure an effective seal between the shallow and deep monitoring points. Approximately one (1)-foot thick sand packs were installed above the bentonite seals to ensure the bentonite would not swell to plug the shallow monitoring points.

Shallow monitoring points were installed above the sand at eight (8) to 10 ft bgs. The annular space surrounding the shallow monitoring point screens were also backfilled with clean sand to approximately one (1) foot above the top of the screen. Granular bentonite was then placed above the sand well screen in six (6) to eight (8)-inch lifts to approximately one (1) ft bgs. Each lift was hydrated in place to help ensure an effective seal between shallow and deep monitoring points.

Tubing from nested pairs extend at least 12-inches above the top of the upper bentonite seal. Care was taken to properly label the tubing of each monitoring point to easily discern between deep and shallow points. Tubing probes were capped with ball valves and equipped with barbed hose fittings. Each monitoring point was enclosed with a removable 7-inch diameter stainless steel flush mount well cover. A typical construction diagram of the soil vapor monitoring ports can be found in Figure 6.

2.2 Extraction Piping Design

Extraction well riser pipes consist of 4-inch diameter schedule 40 PVC extended from the top of the well screen to approximately 6-inches below the surface. Pipe tees (capped in the horizontal direction) were installed at the top of the riser pipe, with the vertical leg of the tee extending above grade. Above-grade riser pipe is connected to the pipe tee at each SVE well location and is constructed of 4-inch diameter schedule 80 PVC. The riser pipe at each of the SVE well locations is equipped with lockable butterfly valves to control air flow. Riser pipes are also equipped with sample taps for collection of photoionization detector (PID) readings, vapor flow measurements, vapor samples, and vacuum monitoring.

Each extraction well riser pipe is connected to a six-inch diameter schedule 80 PVC header pipeline. This header pipeline connects all SVE wells together and ultimately connects to the inlet of the SVE treatment system trailer (see Figures 3 and 4).

2.3 SVE System Vacuum Blower

The SVE system vacuum blower and appurtenances are housed in a ventilated 8 ft by 18 ft insulated trailer, located outside the MRP production building (Figure 3). A 4-inch diameter schedule 40 PVC manifold pipe connects the vacuum header of the SVE blower to the remaining SVE piping within the SVE trailer. The vacuum header within the trailer connects the following components:

- Inlet vacuum gauge and air by-pass valve
- Air-water separation tank
- Inlet air filter
- Air flow meter
- Vacuum relief valve (to reduce blower vacuum in the event of a clogged inlet filter)

The SVE blower is a Roots positive displacement-type blower capable of extracting up to 450 actual cubic feet per minute (acfm) at 10-inches Hg (vacuum). The blower is powered with a 10 horsepower motor. Blower and motor specifications are included in Attachment A. The blower exhaust manifold is equipped with the following components:

- Thermometer and thermostat (to shut the blower down on high temp condition caused by low air flow)
- Discharge silencer
- Sample port
- Exhaust stack vented above the roof line.
- The electrical power to the SVE blower is supplied using the existing building power supply.

2.4 Knockout Tank

Part of the blower system includes a conjoined knockout tank meant to trap any liquid condensate collected through the SVE procedure. The 25-gallon knockout tank is constructed of the same material as the SVE blower and by the same manufacturer. The location of the blower is beneath the SVE blower, near the floor of the SVE trailer. This location can be further identified in the process and instrumentation diagram shown in Figure 6. The knockout tank contains a valve that is to be left in the closed position to allow venting. Connected to the valve is approximately 6 feet of rubber hose which is used for draining the knockout tank of any accumulated water during O&M procedures. The process for emptying the knockout tank is described in greater detail in Section 4.3.3.

2.5 Carbon Vessels

The SVE system includes two 2,000 pound (lb) vapor phase vessels containing GAC for treatment of vapor phase VOCs collected by the SVE system. Each steel carbon vessel is approximately 96-inches tall and 48-inches in diameter. The two carbon vessels are connected in series at locations shown in Figures 3 and 4. Subsurface vapors recovered by the SVE blower are subsequently sent through a 6-inch diameter hose to the inlet of Carbon Vessel #1 and then through the outlet of Carbon Vessel #1 and into the inlet of Carbon Vessel #2. After passing completely through the GAC contained in both Carbon Vessel #1 and Carbon Vessel #2, treated vapor emissions are discharged to the atmosphere.

2.6 Control Panel

The primary control panel used for operation of the SVE system is located within the SVE trailer. The control panel is located on the broad side of the SVE blower, at the rear end of the trailer near the double doors. The control panel is locked and accessed by a key maintained by the O&M technician. The control panel is relatively simple and only two buttons on the control panel are necessary for operating the system. The green button is used to start the system and the red button will turn the system off. Detailed operations on how to start and stop the SVE system are discussed in Section 3.

Located on the outside of the SVE trailer is the primary electrical panel that supplies power to the blower and allows the system to operate. This panel contains a switch allowing the power supplied to the SVE system to be terminated. This switch should only ever be pulled in an emergency situation wherein the stop button located inside of the SVE trailer cannot be accessed or fails to stop the system. No other aspect of this panel should be tampered with by anyone other than professional electricians familiar with the complexities of the electrical system. This switch must be locked and tagged when it is in the off position.

Section 3
System Operations

The SVE system is in continuous operations and monitored on a monthly basis. Routine preventive maintenance is performed during the monthly monitoring trips in accordance with the maintenance schedules described in Section 4 and Table 1 of this O&M Manual. The operator is required to shut down the SVE system in order to perform this required maintenance and restart the system following completion of maintenance activities. The procedures for startup and shutdown of the SVE system for maintenance are described below.

3.1 System Startup Procedures

The process for starting the SVE system first requires that all system valves are in their appropriate positions. The knockout tank vent should be closed and all sample ports and barbs should also be in the closed position to prevent airflow from escaping. When the system is ready to be turned on, the operator must access the primary control panel located within the SVE trailer as noted in Section 2.7. To start the system, the green button on the control panel should be pressed. Once pressed, the SVE blower should start up immediately. The blower produces a significant amount of noise so hearing protection should always be worn when working inside or close to the SVE trailer while it is in operation. If the blower does not turn on after the green button is pressed, the electrical input to the trailer should be inspected at the electrical panel to ensure that the electrical switch is in the “ON” position. If the electrical switch is in the on position and the system is not operating, contact an electrician immediately.

3.2 System Shutdown Procedures

The process for shutting down the SVE system is similar to the startup procedures in that only one button must be pressed in order to achieve shutdown. In this case, the red button located on the primary control panel is to be pressed while the system is running in order to shut down the blower and thusly the entire SVE system. Once the red button is pressed, the SVE system should shut down immediately and all noise within the trailer should dissipate. If the system does not shut down when the red button is pressed, the primary electrical box on the outside of the SVE trailer can be used to shut the system down by pulling the switch to the “OFF” position to cut power to the trailer. In the unlikely event that this occurs, a person familiar with the MRP electrical system should be contacted to restart the SVE system.

Section 4
System Maintenance

All maintenance performed on any aspect of the SVE system shall be recorded on an O&M form found in Appendix B. Copies of completed O&M forms should be forwarded to TRC for review. The following section provides a detailed account of all necessary maintenance performed. Before performing maintenance on the system, the operator should review the maintenance record forms and relevant equipment maintenance manuals found in Table 1 and Appendix A. The maintenance requirements for the SVE system are described below.

4.1 Extraction Wells and Vacuum Monitoring Ports

SVE wells and monitoring point well caps shall be visually inspected for any signs of damage on a monthly basis. SVE wells are not to be opened and only the integrity of the exterior well casing is required for inspection on a monthly basis.

Monitoring port caps shall be visually inspected from the exterior as well as opened up to examine the contents within. Any dirt collecting in the rim of the well cap is to be removed to ensure a tight seal when well caps are replaced. Inside of the monitoring points, the Teflon tubing for both the shallow and deep monitoring points are to be inspected for any kinks or plugs. Stopcocks should be in place at the end of both tubes. The shallow and deep tubes labeling should be inspected and replaced if faded or illegible.

4.2 Piping and Fittings

The accessible piping and fittings of the SVE system shall be visually inspected monthly for any signs of damage. The main concern for damage to the piping would be at the risers extending above grade at each SVE well location. Frequent forklift traffic navigates throughout the facility and collisions with riser pipes are possible. Maintenance requires that high-visibility reflective tape be present on all riser pipes at SVE well locations to assist forklift drivers with keeping clear and avoiding collision.

Any leaks in the system piping would most likely occur at pipe or valve fittings. In addition to visual signs, such as crooked pipe connections or punctures, maintenance includes listening for hissing sounds while the system is in operation, indicating possible leaks. It is important to make sure that all sample barbs found on riser pipes near SVE wells are in the locked position and that port holes for collecting flow readings are covered with tape. It is also important to make sure that all butterfly valve settings remain as they are for current operation unless modifications to the system performance are to be made.

If any abnormalities are found in the integrity of the SVE pipe system, they should be reported to TRC personnel. TRC contact information can be found in Table 2.

4.3 Blower

The SVE blower shall be maintained in accordance with the respective operations and maintenance manual provided by the manufacturer included in Appendix A. Blower maintenance tasks include changing the oil and lubrication every other month. As well as emptying the knockout tank monthly. All blower maintenance tasks are to be performed when the blower is shut down, as explained in Section 3.

4.3.1 Changing Blower Oil

The following supplies and equipment are required in order to change the oil:

- One (1) quart of synthetic SAE 10W-30 motor oil;
- Sealable disposal container;
- Pan for spent oil;
- Small, flexible funnel;
- Shop towels; and
- Crescent wrench.

To change the oil on the SVE blower, the system must first be shut off using the procedure described in Section 3.2 for a period of at least 15 minutes. The oil fill port is located on the broad side of the blower, nearest the man-door access to the trailer. A more detailed description of the fill port can be found within the blower specifications in Appendix A.

To begin the oil change, be sure plenty of shop towels are readily available. These are normally stored within the trailer. Place the container to catch the spent oil into position beneath the blower fill port. Use the crescent wrench to remove the long, pen-shaped plug at the bottom of the oil holding tank and allow the spent oil to drain. Replace the plug once all oil has drained. Use wrench to remove the square, bolt-like plug located a couple of inches above the bottom plug. Place the flexible funnel in its place. Slowly begin to pour the new oil in. The tank requires approximately one (1) half-quart of new oil. When the oil begins to overflow from the point of entry, stop filling. Use the shop towels to wipe up any excess oil. Place spent oil into a sealable container and dispose of onsite. Mullins disposes their own oil products and will also arrange for spent blower oil disposal.

Oil that is not used during the oil change procedure can be stored inside of its original container and stored the trailer for use during the next oil change. Synthetic SAE 10W-30 motor oil for this procedure can be purchased from any auto parts store or many gas station.

4.3.2 Lubricating Blower

The following supplies are required for lubrication of the SVE blower:

- Midget grease gun;
- 3 oz. tube of Lucas Oil petroleum-based grease (or equivalent) ; and
- Shop towels.

Lubrication of the blower can only occur when the blower is shut down using the procedure described in Section 3.2. The grease gun for lubrication of the SVE blower is stored inside the SVE trailer, along with shop towels for use during the greasing operations. The grease for this procedure can be purchased at any hardware or home-improvement store. Ensure that the new grease container will properly fit the available grease gun.

The grease is applied using the grease gun to two inlet nipples found on the opposite side of the blower, across from where the oil change takes place. Attach the end of the grease gun nozzle onto each nipple and pump grease into the blower until it begins to come out of the corresponding outlet nipples on the opposite side. When this happens, stop. Use shop towels to clean up any excess grease.

4.3.3 Emptying Knockout Tank

The knockout tank is to be emptied on a monthly basis as part of the maintenance routine for the entire SVE system. The knockout tank can only be emptied when the system is shutdown as described in Section 3.2. The tank is emptied by moving the release valve into the open position and allowing any collected water to drain out of the hose and into a 5-gallon bucket. Any waste water collected from this procedure is to be placed into an available 55-gallon drum to await disposal arrangements.

Once the activities described in Sections 4.3.1. to 4.3.3 are completed, the SVE system can be restarted using the procedure described in Section 3.1

4.4 GAC Change Outs

TRC recommends that GAC change outs occur when chlorinated compounds being discharged into the atmosphere in following treatment exceed 25% of the allotted 10 lbs per day established by for this Site. The approximate amount of chlorinated compounds discharged per day can be determined from PID readings measured at the SVE outlet and confirmed by analytical laboratory results from Test America Laboratories, Inc. (Test America) obtained after collecting vapor samples from the outlet of Carbon Vessel #2. Measured PID readings around 25.0 ppm collected at the SVE outlet suggest that emission levels are nearing 25% (2.5 lbs per day) and carbon change out arrangements should be considered. Laboratory results should be obtained to confirm emission levels. PCE levels near 6.5 ppm and TCE levels near 8.5 ppm reported by the laboratory will indicate that emission levels are approaching the recommended change out emission level of 2.50 lbs/day.

When that the recommended GAC change out level is reached, as confirmed by laboratory analysis, the SVE system should be shut down and the spent GAC should be replaced. Chemviron of Wooster, Ohio should be notified to schedule and conduct the GAC replacement. Chemviron contact information can be found in Table 2.

Section 5

Sampling and Reporting

Monthly visits to the MRP site are required to ensure that the SVE system is running properly. During these monthly visits, data will be collected to confirm the SVE blower is maintaining proper vacuum and flow rate necessary to adequately remove VOCs from the soil beneath MRP. Vapor samples are also to be collected to confirm proper treatment of chlorinated compounds passing through the SVE system and those being discharged into the atmosphere do not exceed regulatory limits. The data collection and vapor sampling procedures are summarized below.

5.1 Vapor Sampling

Vapor sampling for laboratory analysis is to be performed on a monthly basis prior to shutting off the SVE system for aforementioned monthly maintenance tasks. A total of two (2) vapor samples are to be collected. The first vapor sample is collected from the sample port identified as the Blower Inlet, located on the inside of the SVE trailer where the SVE piping connects to the upstream side of the SVE blower. The second vapor sample is collected from the sample port identified as the Carbon Outlet, located on the outside of the SVE trailer, at the discharge of Carbon Vessel #2.

Vapor samples are to be collected in one (1) liter, batch-certified clean summa canisters provided by Test America for grab vapor samples for VOC analysis via Method TO-15. Contact information for Test America is found in Table 2. The detailed vapor sample collection procedure is explained in section 5.2 as part of the monthly system performance monitoring procedures.

5.2 System Performance Monitoring

SVE system monitoring will be completed monthly and recorded on MRP O&M forms found in Appendix B. The following tools and instruments are required to complete the monthly system performance monitoring tasks:

- Vacuum Gauge(s) – Magnehelic Differential Pressure Gauges (or equivalent) with sensitivity to 0.01 inch of water;
- Flow Measuring Device – Hot wire anemometer;
- Portable Temperature Probe;

- Photoionization Detector (PID);
- Barometer/Thermometer; and
- Crescent or socket wrenches.

Magnehelic differential pressure gauges and a hot wire anemometer with temperature probe capabilities are stored onsite in the SVE trailer. Ambient temperature and barometric pressure can be collected from daily weather reports at the time of the O&M site visit. A calibrated PID is the only necessary instrument required to bring to the site. Listed below is a detailed step by step procedure for performing the monthly O&M system performance monitoring:

- Step 1: Upon arriving at the MRP Site, first check in with the Mullins staff in the front office to notify them of the planned O&M activities. Proceed around the building to the SVE trailer location (see Figure 2).

- Step 2: Begin by making sure that the SVE system is running properly. The noise from the blower should be audible before opening up the trailer. Using the SVE trailer key (NOTE: Mullins staff possess a copy of the SVE trailer key, but any person assigned to perform O&M activities should have a key in their possession), open up both doors of the treatment trailer. Inspect the gauge readouts and check with previous O&M reports to see if readouts are consistent.

- Step 3: Proceed to visually inspect SVE piping and well covers at all SVE well and monitoring point locations. Listen for any hissing sounds indicating possible leakage from pipe, valves or fitting. Pay particular attention to the SVE wells risers for forklift damage.

- Step 4: Using a wrench, open up each monitoring point well cap. Brush off any accumulated dirt to ensure tight seal when wells are closed following O&M activities. Make sure that both shallow and deep Teflon tubing lines within well caps are intact. Check that markings on tubing indicating shallow and deep are clearly legible. Check that stopcocks are in place on both tubing ends. Remove stopcocks.

- Step 5: Attach magnehelic gauges to both shallow and deep lines using the flexible tubing connection attached to gauges and record the vacuums observed at each monitoring point. Once both vacuum readings have been recorded, close stop cocks, replace tape and close monitoring point well caps.

- Step 6: Connect magnehelic gauges to sample barbs on each SVE well riser pipe, located near butterfly valves. Open the lever on the sample barbs to allow flow. Record vacuum readings at each SVE well location. Remove magnehelic gauge connection and close sample barb lever once finished.

- Step 7: Using PID, measure VOC levels from each SVE well and from SVE blower inlet and outlet. At SVE wells, use the same sample barb locations used to measure vacuum for collection PID readings. At the SVE blower, the inlet barb is found on the rear side of the trailer as part of the connecting PVC piping. The blower outlet reading is taken from the outside of the SVE trailer. The sample barb is found on the PVC piping before connecting to Carbon Vessel #1.

- Step 8: Use the anemometer to measure both temperature and flow rate values. To operate the anemometer, simply turn it on and slide down the protective metal sleeve on the probe end before taking measurements. The anemometer is inserted in holes in the SVE piping found on the riser pipes at each SVE well location, close to the sample barbs and butterfly valves. These holes are to be covered with tape when sampling is completed. Air flow readings cannot be taken from the SVE blower inlet due to the flow being too high, however, the anemometer is still used to record temperature values. The hole for collecting these measurements is located within the trailer, on the rear side, near the location of the sample barb.

- Step 9: To collect vapor samples, first assemble summa canisters and connect lab-provided sample tubing. Vapor samples are to be collected at two (2) primary locations: Blower Inlet and Carbon Outlet. The Blower Inlet sample is collected from the same sample barb used to collect PID readings. The sample barb is labeled accordingly. The Carbon Outlet sample is collected from the PVC piping extending from the outlet of Carbon Vessel #2. There is another sample barb at this location for collection. If laboratory vapor samples are to be at SVE wells they can be collected from the same sample barbs used to collect PID measurements.

- Step 10: Once all measurements and necessary samples have been recorded, the system is to be turned off. Once off, regular maintenance procedures as described in Section 4 may commence. Copies of completed O&M forms are to be scanned and sent to Andrew Davis (ajdavis@trcsolutions.com) and Dave Kreeger (dkreeger@trcsolutions.com). Hard copies are to be kept onsite at MRP for reference.

TABLE 1
Maintenance Schedule Summary

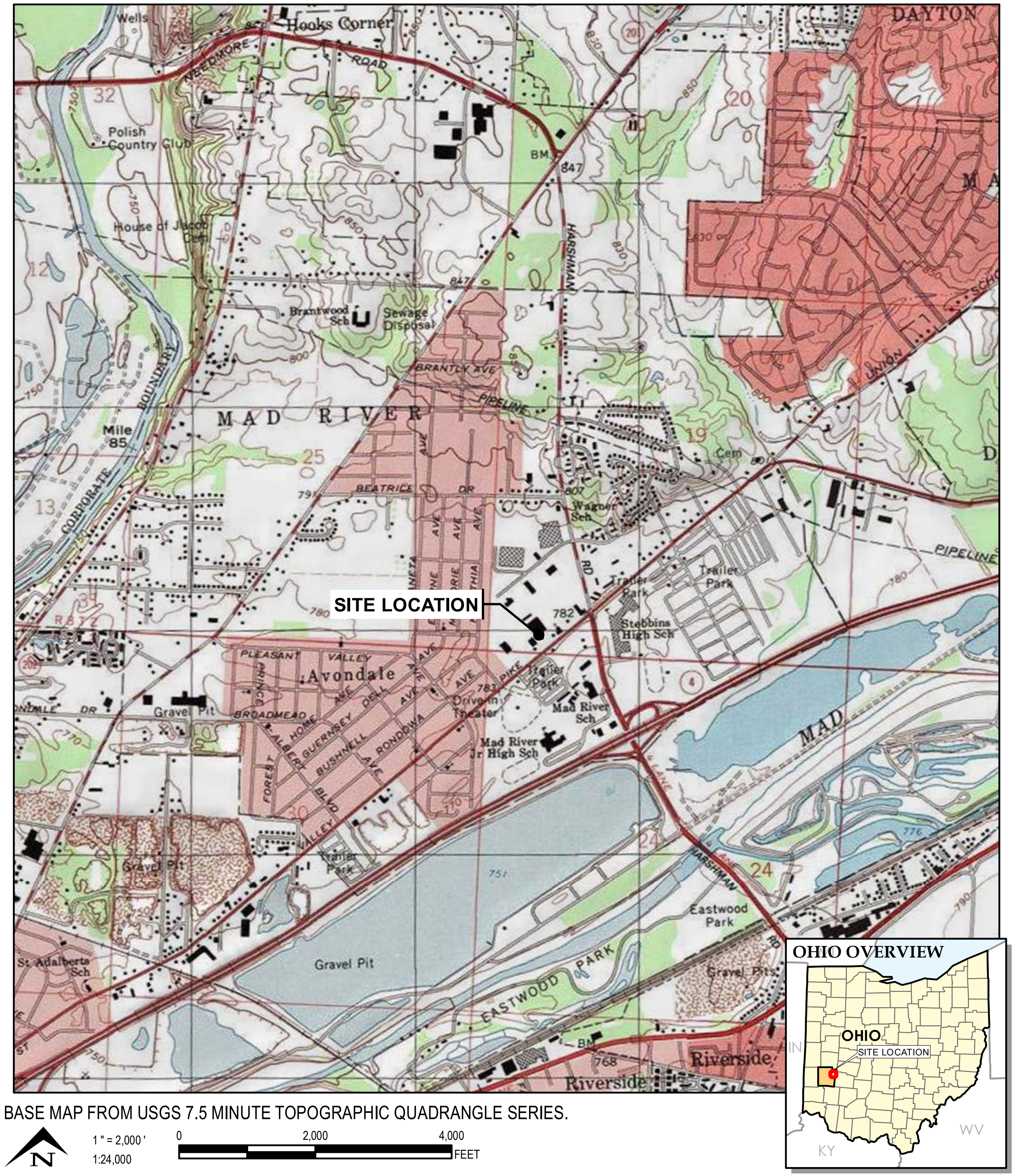
Equipment	No.	Description	Frequency
Rotary Blower	1	Change Oil in Blower Lubricate bearings	Every other Month
Knockout Tank	1	Remove condensate water	Monthly
Extraction Wells	5	Inspect	Monthly
Monitoring Points	10	Inspect	Monthly
SVE Plumbing	1	Inspect	Monthly

TABLE 2
Contact Information

Name	Company	Phone	Email	Address
Andrew Davis	TRC	Main: 513.489.2255 Cell: 513.315.6748	ajdavis@trcsolutions.com	11231 Cornell Park Drive, Cincinnati, OH
Dave Kreeger	TRC	Main: 614.423.6359 Cell: 734.904.3312	dkreeger@trcsolutions.com	921 Eastwind Drive, Suite 122, Westerville, OH
Joel Steiner	Chemviron	Main: 330.264.2000	joels@chemviron.com	2759 Long Road, Wooster, OH
Terry Wasmund	Test America Inc.	Main: 865.291.3000	terry.wasmund@testamericainc.com	5815 Middlebrook Pike, Knoxville, TN

FIGURE 1
Site Location Map

DRAFT



BASE MAP FROM USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE SERIES.

TRC

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Suite 122
Westerville, OH 43081
Phone: 614.423.6334

TRC - GIS

PROJECT:	VALLEY PIKE SITE 2949 VALLEY PIKE RIVERSIDE, MONTGOMERY COUNTY, OHIO
TITLE:	SITE LOCATION MAP

DRAWN BY:	PAPEZ J
CHECKED BY:	
APPROVED BY:	
DATE:	MAY 2016
PROJ. NO.:	243854
FILE:	243854-001slm.mxd

FIGURE 1

E:\MullinsRubberProducts\RiversideOH\2016_243854\243854-001slm.mxd -- Saved By: JPAPEZ on 5/11/2016, 15:35:12 PM

FIGURE 2
Facility Map

Plot Date: 5/13/2016, 14:14:48 PM by JPAPEZ -- LAYOUT: ANSI B (11"x17")
Path: E:\MullinsRubberProducts\RiversideOH\2016_243854\243854-002.mxd

Coordinate System: NAD 1983 StatePlane Ohio South FIPS 3402 Feet (Foot US)
Map Rotation: -36

DRAFT

TRC - GIS

BASEMAP IMAGERY FROM ESRI, "WORLD IMAGERY", 2013.

LEGEND

NOTES

1. MONITORING WELL AND SOIL VAPOR SAMPLE LOCATIONS FROM CONTAMINANT SOURCE AREA INVESTIGATION REPORT FOR THE VALLEY PIKE VOC SITE BY TETRATECH, INC., DATED APRIL 7, 2015.

0 60
FEET
1 " = 60 '
1:720

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Westerville, OH 43081
Phone: 614.423.6334
www.trcsolutions.com

PROJECT:
VALLEY PIKE SITE
2949 VALLEY PIKE
RIVERSIDE, MONTGOMERY COUNTY, OHIO

TITLE:
SITE MAP

DRAWN BY:	PAPEZ J
CHECKED BY:	
APPROVED BY:	
DATE:	MAY 2016
PROJ. NO.:	243854
FILE:	243854-002.mxd

FIGURE 2

FIGURE 3
MRP SVE System Overview

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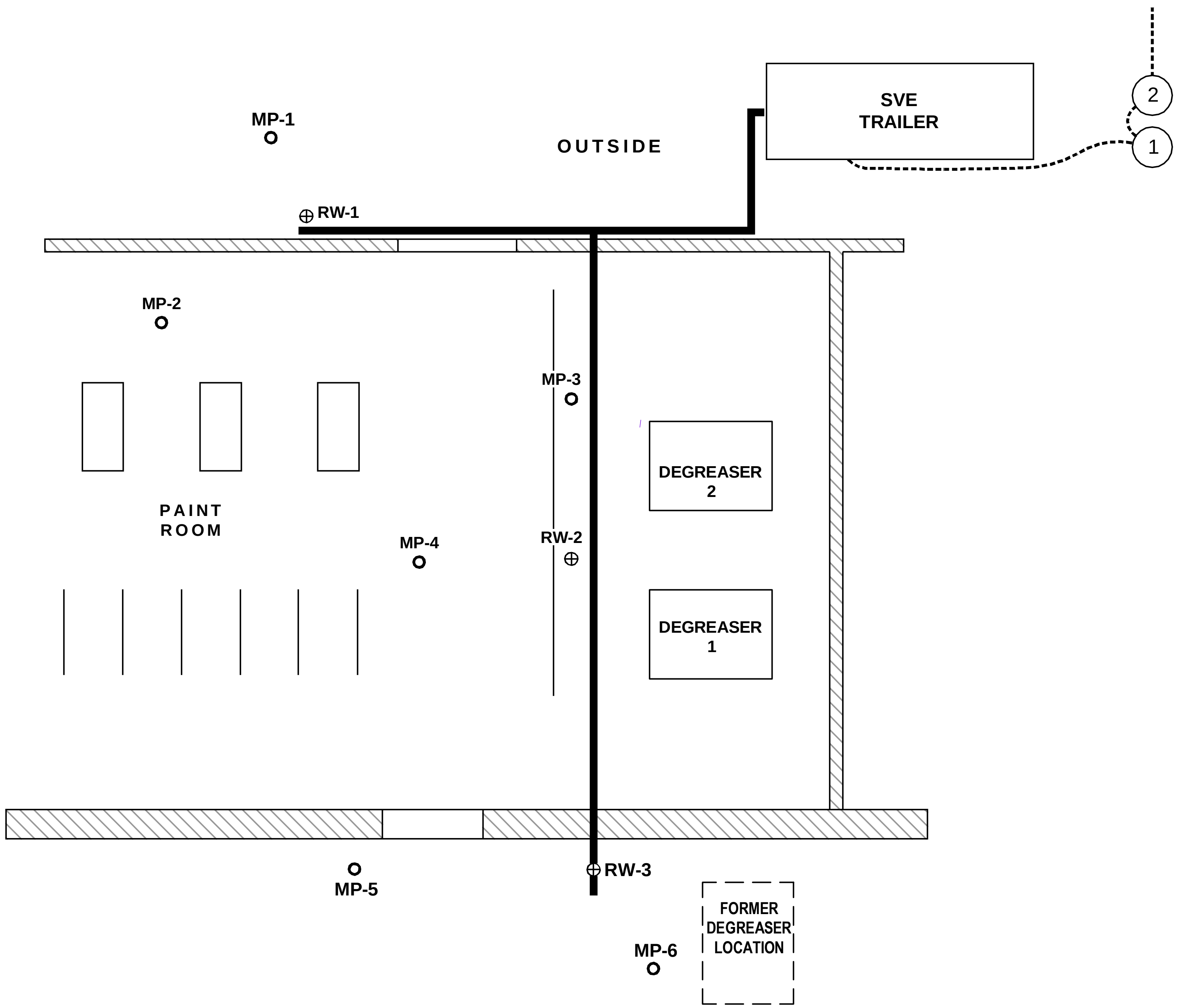
LEGEND

	BLOWER EXHAUST LINE
------------	SVE PILOT SYSTEM PIPING
▬▬▬	VAPOR MONITORING POINT
MP-1 ○	SVE PILOT SYSTEM EXTRACTION
RW-1 ⊕	WELL



0 10 20
APPROXIMATE SCALE IN FEET

PROJECT:
VALLEY PIKE VOC SITE
SOIL VAPOR EXTRACTION PILOT TEST

TITLE:
SITE DETAIL AND
SVE SYSTEM OVERVIEW

DRAWN BY: DSTEHLE	SCALE:	PROJ. NO. 243854.0000.04.02
CHECKED BY: AJD/DK	AS INDICATED	FILE NO. 243854.0000.04.02.02.dwg
APPROVED BY: -	DATE PRINTED:	**FIGURE 3**
DATE: FEBRUARY 2016		

TRC
1540 Eisenhower Place
Ann Arbor, MI 48108
Phone: 734.971.7080
Fax: 734.971.9022

PLOT DATA
Drawing Name: J:_TRC\Mullins Rubber\243854\0000\04\02\243854.0000.04.02.02.dwg
Operator Name: STEHLE, DIANAH
Drawing Plot Scale: 0.386863
Dwg Size: 0.68 Mb
Plot Date: February 17, 2016
Plot Time: 2:01 PM
Attached Xrefs:
Attached Images: PID Sketch 02_dk_Page_1; ROI Sketch 05;
Layout: FIG02 SVE Overview

FIGURE 4
Process and Instrumentation Diagram

DRAFT

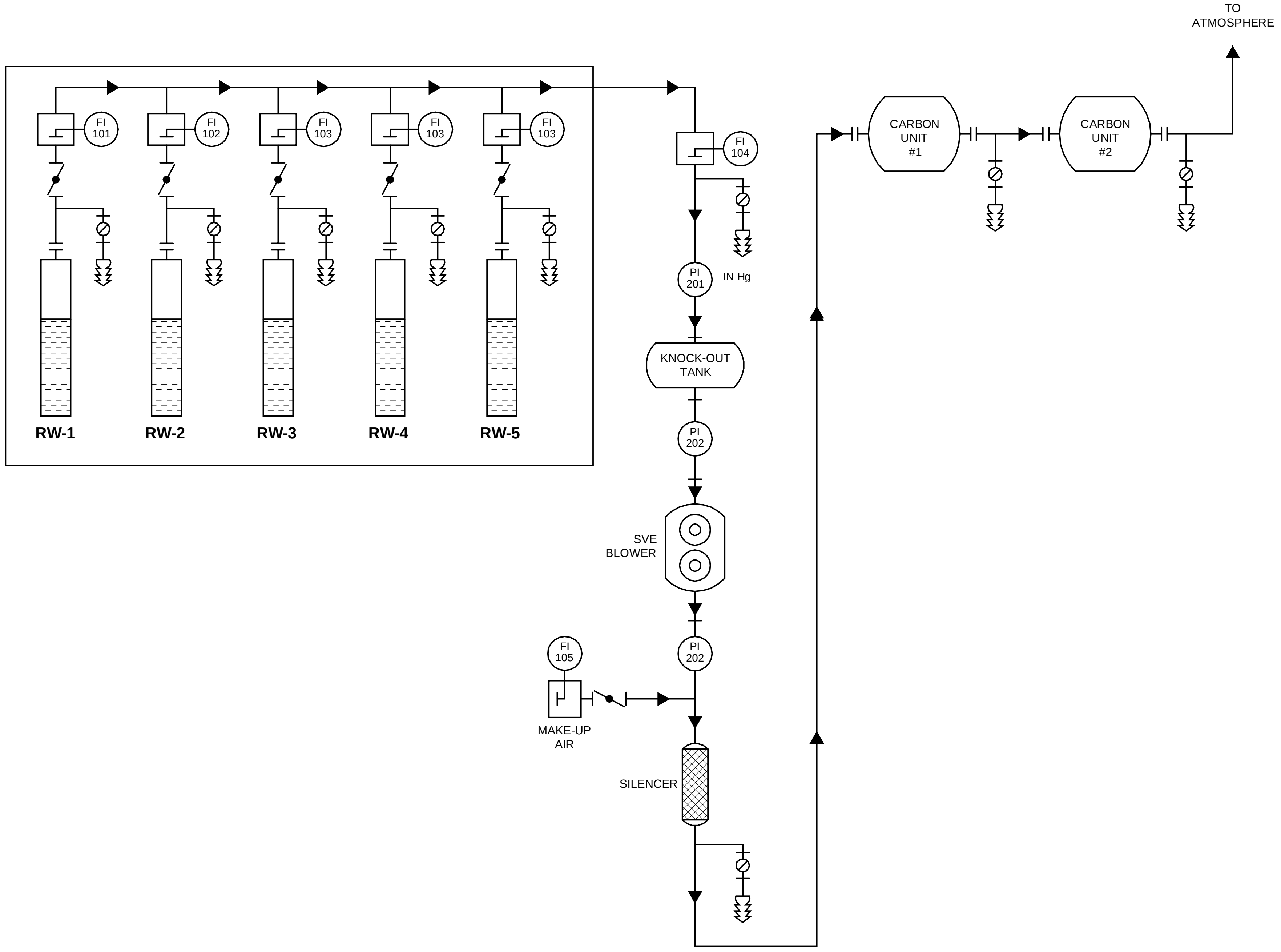
PLOT DATA
Drawing Name: J:_TRC\Mullins Rubber\243854\0000\06\243854.0000.04.02.03.dwg
Operator Name: STEHLE, DIANAH
Drawing Plot Scale: 0.386863

Dwg Size: 0.75 Mb
Plot Date: June 28, 2016
Plot Time: 10:40 AM

Attached Xrefs:
Attached Images: PID Sketch 02_dk_Page_1;
Layout: FIG03 P&ID

LEGEND

BUTTERFLY VALVE
BALL VALVE
SAMPLE COLLECTION PORT
PI 202 PRESSURE INDICATOR
FI 105 FLOW RATE MEASUREMENT PORT
= FLANGE OR UNION CONNECTION
SVE PILOT SYSTEM EXTRACTION WELL



PROJECT:
MULLINS RUBBER PRODUCTS
SOIL VAPOR EXTRACTION PILOT TEST

TITLE:
PIPING AND INSTRUMENTATION DIAGRAM

DRAWN BY: DSTEHLE
CHECKED BY: AJD/DK
APPROVED BY: -
DATE: JUNE 2016
SCALE: AS INDICATED
DATE PRINTED:
PROJ. NO. 243854.0000.04.02
FILE NO. 243854.0000.04.02.03.dwg
FIGURE 4

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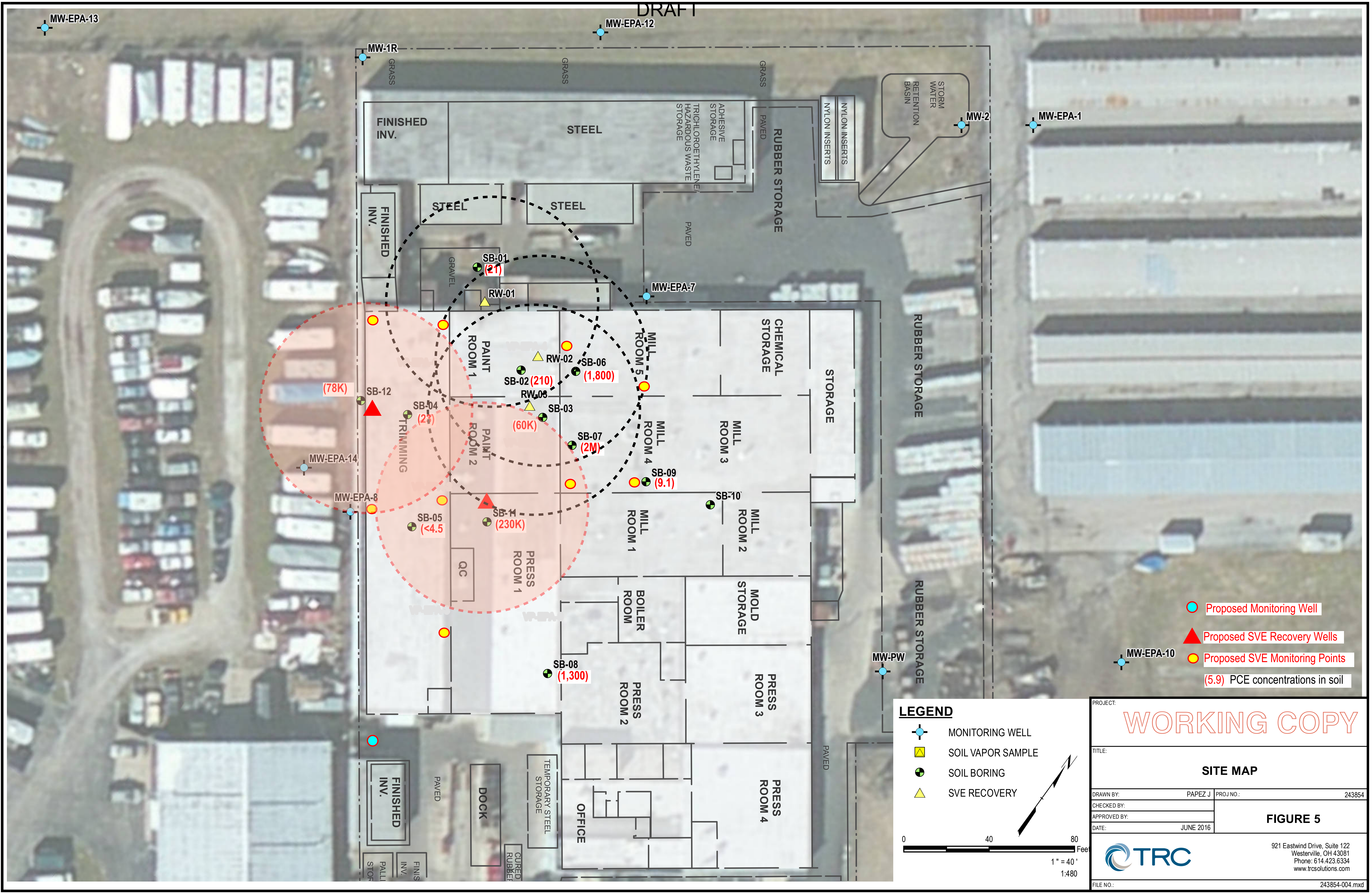
Phone: 734.971.7080
Fax: 734.971.9022

FIGURE 5
Location of SVE Wells and Monitoring Points

Coordinate System: NAD 1983 StatePlane Ohio South FIPS 3402 Feet (Foot US)
Map Rotation: -36

Plot Date:
Path:

DRAFT



Proposed Monitoring Well
Proposed SVE Recovery Wells
Proposed SVE Monitoring Points
(5.9) PCE concentrations in soil

LEGEND

- MONITORING WELL
- SOIL VAPOR SAMPLE
- SOIL BORING
- SVE RECOVERY

PROJECT:
WORKING COPY

TITLE:
SITE MAP

DRAWN BY: PAPEZ J	PROJ NO.: 243854
CHECKED BY:	
APPROVED BY:	**FIGURE 5**
DATE: JUNE 2016	

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www.trcsolutions.com

FILE NO.: 243854-004.mxd

FIGURE 6
Typical Well Construction Diagrams

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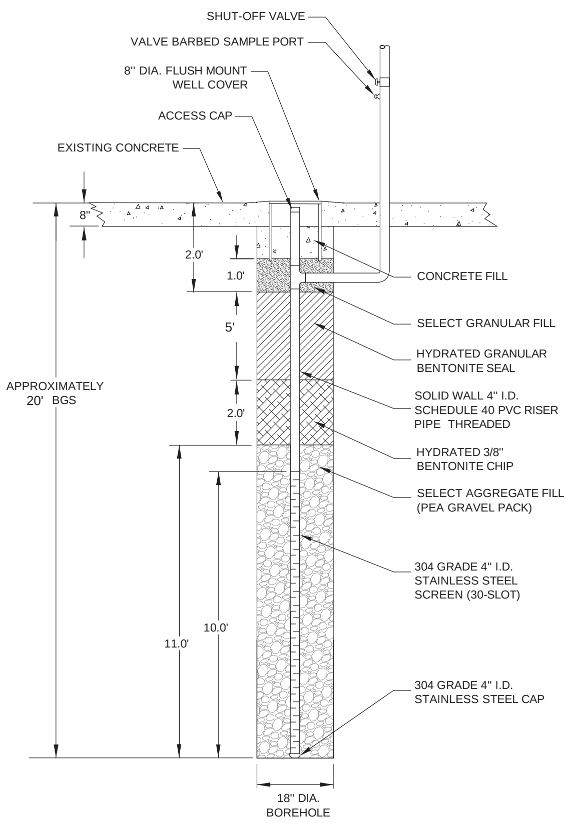
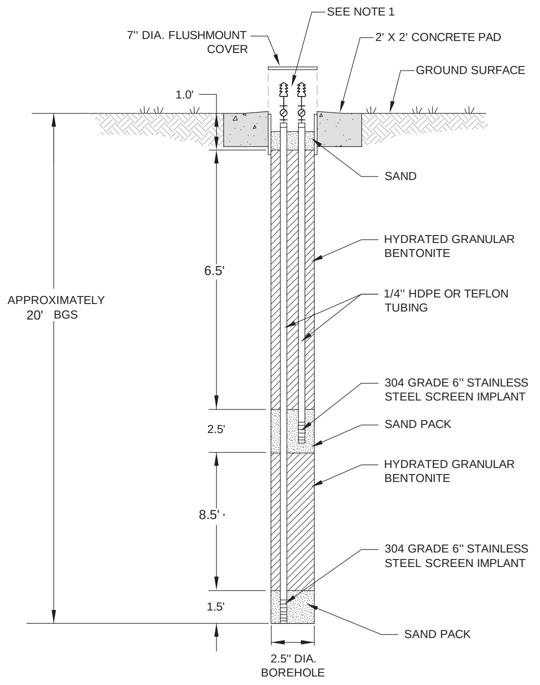


1
6

SOIL VAPOR EXTRACTION WELL
(TYPICAL)

(NOT TO SCALE)



2
6

MULTI-LEVEL VACUUM MONITORING POINT
(TYPICAL)

(NOT TO SCALE)

PLOT DATA
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Operator Name: STEHLE, DIANAH
Drawing Plot Scale: 0.386863
Dwg Size: 0.34 Mb
Plot Date: March 30, 2012
Plot Time: 7:24 AM
Attached Xref's:
Attached Images:
Layout: SHT7 of 7 Civil Details

NO.	BY	DATE	REVISION	APP'D
3				
2				
1				

PROJ:
Mullins Rubber Products
Riverside, Ohio

TITLE:
Extraction Well and Monitoring Point Details

Figure 6

TRC
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Ann Arbor, MI 48108
Phone: 734.971.7080
Fax: 734.971.9022

APPENDIX A
Blower Specifications

INSTALLATION OPERATION MAINTENANCE

ROOTS

Blowers Compressors Exhausters

US $3.00, Canada $4.50

Universal RAI®, URAI-DSL, URAI-G and Metric Series

Contents

Do These Things To Get The Most From Your ROOTS™ blower

☐ Check shipment for damage. If found, file claim with carrier and notify Roots.

☐ Unpack shipment carefully, and check contents against Packing List. Notify Roots if a shortage appears.

☐ Store in a clean, dry location until ready for installation. Lift by methods discussed under INSTALLATION to avoid straining or distorting the equipment. Keep covers on all openings. Protect against weather and corrosion if outdoor storage is necessary.

☐ Read OPERATING LIMITATIONS and INSTALLATION sections in this manual and plan the complete installation.

☐ Provide for adequate safeguards against accidents to persons working on or near the equipment during both installation and operation. See SAFETY PRECAUTIONS.

☐ Install all equipment correctly. Foundation design must be adequate and piping carefully done. Use recommended accessories for operating protection.

☐ **Make sure both driving and driven equipment is correctly lubricated before start-up. See LUBRICATION.**

☐ Read starting check points under OPERATION. Run equipment briefly to check for installation errors and make corrections. Follow with a trial run under normal operating conditions.

☐ In event of trouble during installation or operation, do not attempt repairs of Roots furnished equipment. Notify Roots, giving all nameplate information plus an outline of operating conditions and a description of the trouble. Unauthorized attempts at equipment repair may void Roots warranty.

☐ Units out of warranty may be repaired or adjusted by the owner. Good inspection and maintenance practices should reduce the need for repairs.

NOTE: Information in this manual is correct as of the date of publication. Roots reserves the right to make design or material changes without notice, and without obligation to make similar changes on equipment of prior manufacture.

For your nearest Roots Office, dial our Customer Service Hot Line toll free; 1 877 363 ROOT(S) (7668) or direct 832-590-2600.

ISRB-2002 rev.0207

DRESSER®
Roots

ROOTS™ products are sold subject to the current General Terms of Sale, GTS-5001 and Warranty Policy WP-5020. Copies are available upon request.

Contact your local Roots Office
or Roots Customer Service
Hot Line 1-877-363-ROOT(S) (7668) or
direct 832-590-2600.

Safety Precautions

It is important that all personnel observe safety precautions to minimize the chances of injury. Among many considerations, the following should be particularly noted:

- Blower casing and associated piping or accessories may become hot enough to cause major skin burns on contact.
- Internal and external rotating parts of the blower and driving equipment can produce serious physical injuries. Do not reach into any opening in the blower while it is operating, or while subject to accidental starting. Protect external moving parts with adequate guards.
- Disconnect power before doing any work, and avoid bypassing or rendering inoperative any safety or protective devices.
- If blower is operated with piping disconnected, place a strong coarse screen over the inlet and avoid standing in the discharge air stream. **CAUTION: Never cover the blower inlet with your hand or other part of body.**
- Stay clear of the blast from pressure relief valves and the suction area of vacuum relief valves.
- Use proper care and good procedures in handling, lifting, installing, operating and maintaining the equipment.
- Casing pressure must not exceed 25 PSI (1725 mbar) gauge. Do not pressurize vented cavities from an external source, nor restrict the vents without first consulting ROOTS.
- Do not use air blowers on explosive or hazardous gases.
- Other potential hazards to safety may also be associated with operation of this equipment. All personnel working in or passing through the area should be trained to exercise adequate general safety precautions.

Operating Limitations

A ROOTS blower or exhauster must be operated within certain approved limiting conditions to enable continued satisfactory performance. Warranty is contingent on such operation.

Maximum limits for pressure, temperature and speed are specified in TABLE 1 for various models & sizes of blowers & exhausters. These limits apply to all units of normal construction, when operated under standard atmospheric conditions. Be sure to arrange connections or taps for instruments, thermometers and pressure or vacuum gauges at or near the inlet and discharge connections of the unit. These, along with a tachometer, will enable periodic checks of operating conditions.

PRESSURE – The pressure rise, between inlet and discharge, must not exceed the figure listed for the specific unit frame size concerned. Also, in any system where the unit inlet is at a positive pressure above atmosphere a maximum case rating of 25 PSI gauge (1725 mbar) should not be exceeded without first consulting Roots. Never should the maximum allowable differential pressure be exceeded.

On vacuum service, with the discharge to atmospheric pressure, the inlet suction or vacuum must not be greater than values listed for the specific frame size.

TEMPERATURE – Blower & exhauster frame sizes are approved only for installations where the following temperature limitations can be maintained in service:

- Measured temperature rise must not exceed listed values when the inlet is at ambient temperature. Ambient is considered as the general temperature of the space around the unit. This is not outdoor temperature unless the unit is installed outdoors.
- If inlet temperature is higher than ambient, the listed allowable temperature rise values must be reduced by 2/3 of the difference between the actual measured inlet temperature and the ambient temperature.
- The average of the inlet and discharge temperature must not exceed 250°F. (121°C).
- The ambient temperature of the space the blower/motor is installed in should not be highter than 120°F (48.8°C).

SPEED – These blowers & exhausters may be operated at speeds up to the maximum listed for the various frame sizes. They may be direct coupled to suitable constant speed drivers if pressure/temperature conditions are also within limits. At low speeds, excessive temperature rise may be a limiting factor.

Special Note: The listed maximum allowable temperature rise for any particular blower & exhauster may occur well before its maximum pressure or vacuum rating is reached. This may occur at high altitude, low vacuum or at very low speed. The units' operating limit is always determined by the maximum rating reached first. It can be any one of the three: Pressure, Temperature or Speed.

Installation

ROOTS blowers & exhausters are treated after factory assembly to protect against normal atmospheric corrosion. The maximum period of internal protection is considered to be one year under average conditions, if shipping plugs & seals are not removed. Protection against chemical or salt water atmosphere is not provided. Avoid opening the unit until ready to start installation, as corrosion protection will be quickly lost due to evaporation.

If there is to be an extended period between installation and start up, the following steps should be taken to ensure corrosion protection.

- ☐ Coat internals of cylinder, gearbox and drive end bearing reservoir with Nox-Rust VCI-10 or equivalent. Repeat once a year or as conditions may require. Nox-Rust VCI-10 is petroleum soluble and does not have to be removed before lubricating. It may be obtained from Daubert Chemical Co., 2000 Spring Rd., Oak Brook, Ill. 60521.
- ☐ Paint shaft extension, inlet and discharge flanges, and all other exposed surfaces with Nox-Rust X-110 or equivalent.
- ☐ Seal inlet, discharge, and vent openings. It is not recommended that the unit be set in place, piped to the system, and allowed to remain idle for extended periods. If any part is left open to the atmosphere, the Nox-Rust VCI-10 vapor will escape and lose its effectiveness.
- ☐ Protect units from excessive vibration during storage.
- ☐ Rotate shaft three or four revolutions every two weeks.
- ☐ Prior to start up, remove flange covers on both inlet and discharge and inspect internals to insure absence of rust. Check all internal clearances. Also, at this time, remove gearbox and drive end bearing cover and inspect gear teeth and bearings for rust.

Because of the completely enclosed unit design, location of the installation is generally not a critical matter. A clean, dry and protected indoor location is preferred. However, an outdoor location will normally give satisfactory service. Important requirements are that the correct grade of lubricating oil be provided for expected operating temperatures, and that the unit be located so that routine checking and servicing can be performed conveniently. Proper care in locating driver and accessory equipment must also be considered.

Supervision of the installation by a ROOTS Service Engineer is not usually required for these units. Workmen with experience in installing light to medium weight machinery should be able to produce satisfactory results. Handling of the equipment needs to be accomplished with care, and in compliance with safe practices. Unit mounting must be solid, without strain or twist, and air piping must be clean, accurately aligned and properly connected.

Bare-shaft Units: Two methods are used to handle a unit without base. One is to use lifting lugs bolted into the top of the unit headplates. Test them first for tightness and fractures by tapping with a hammer. In lifting, keep the direction of cable pull on these bolts as nearly vertical as possible. If lifting lugs are not available, lifting slings may be passed under the cylinder adjacent to the headplates. Either method prevents strain on the extended drive shaft.

Packaged Units: When the unit is furnished mounted on a baseplate, with or without a driver, use of lifting slings passing under the base flanges is required. Arrange these slings so that no strains are placed on the unit casing or mounting feet, or on any mounted accessory equipment. **DO NOT** use the lifting lugs in the top of the unit headplates.

Before starting the installation, remove plugs, covers or seals from unit inlet and discharge connections and inspect the interior completely for foreign material. If cleaning is required, finish by washing the cylinder, headplates and impeller thoroughly with an appropriate solvent. Turn the drive shaft by hand to make sure that the impellers turn freely at all points. Anti-rust compound on the connection flanges and drive shaft extension may also be removed at this time with the same solvent. Cover the flanges until ready to connect piping.

Mounting

Care will pay dividends when arranging the unit mounting. This is especially true when the unit is a “bare-shaft” unit furnished without a baseplate. The convenient procedure may be to mount such a unit directly on a floor or small concrete pad, but this generally produces the least satisfactory results. It definitely causes the most problems in leveling and alignment and may result in a “Soft Foot” condition. Correct soft foot before operation to avoid unnecessary loading on the casing and bearings. Direct use of building structural framing members is not recommended.

For blowers without a base, it is recommended that a well anchored and carefully leveled steel or cast iron mounting plate be provided. The plate should be at least 1 inch (25 mm) thick, with its top surface machined flat, and large enough to provide leveling areas at one side and one end after the unit is mounted. It should have properly sized studs or tapped holes located to match the unit foot drilling. Proper use of a high quality machinist’s level is necessary for adequate installation.

With the mounting plate in place and leveled, set the unit on it without bolting and check for rocking. If it is not solid, determine the total thickness of shims required under one foot to stop rocking. Place half of this under each of the diagonally-opposite short feet, and tighten the mounting studs or screws. Rotate the drive shaft to make sure the impellers turn freely. If the unit is to be direct coupled to a driving motor, consider the height of the motor shaft and the necessity for it to be aligned very accurately with the unit shaft. Best unit arrangement is directly bolted to the mounting plate while the driver is on shims of at least 1/8 inch (3mm) thickness. This allows adjustment of motor position in final shaft alignment by varying the shim thickness.

Aligning

When unit and driver are factory mounted on a common baseplate, the assembly will have been properly aligned and is to be treated as a unit for leveling purposes. Satisfactory installation can be obtained by setting the baseplate on a concrete slab that is rigid and free of vibration, and leveling the top of the base carefully in two directions so that it is free of twist. The slab must be provided with suitable anchor bolts. The use of grouting under and partly inside the leveled and shimmed base is recommended.

It is possible for a base-mounted assembly to become twisted during shipment, thus disturbing the original alignment. For this reason, make the following checks after the base has been leveled and bolted down. Disconnect the drive and rotate the unit shaft by hand. It should turn freely at all points. Loosen the unit foot hold-down screws and determine whether all feet are evenly in contact with the base. If not, insert shims as required and again check for free impeller rotation. Finally, if unit is direct coupled to the driver, check shaft and coupling alignment carefully and make any necessary corrections.

In planning the installation, and before setting the unit, consider how piping arrangements are dictated by the unit design and assembly. Drive shaft rotation must be established accordingly and is indicated by an arrow near the shaft.

Typical arrangement on vertical units has the drive shaft at the top with counterclockwise rotation and discharge to the left. Horizontal units are typically arranged with the drive shaft at the left with counterclockwise rotation and discharge down. See Figure 4 for other various unit arrangements and possible conversions.

When a unit is DIRECT COUPLED to its driver, the driver RPM must be selected or governed so as not to exceed the maximum speed rating of the unit. Refer to Table 1 for allowable speeds of various unit sizes.

A flexible type coupling should always be used to connect the driver and unit shafts.

When direct coupling a motor or engine to a blower you must insure there is sufficient gap between the coupling halves and the element to prevent thrust loading the blower bearings. When a motor, engine or blower is operated the shafts may expand axially. If the coupling is installed in such a manner that there is not enough room for expansion the blower shaft can be forced back into the blower and cause the impeller to contact the gear end headplate resulting in damage to the blower. The two shafts must be in as near perfect alignment in all directions as possible, and the gap must be established with the motor armature on its electrical center if end-play exists. Coupling manufacturer's recommendations for maximum misalignment, although acceptable for the coupling, are normally too large to achieve smooth operation and maximum life of the blower.

The following requirements of a good installation are recommended. When selecting a coupling to be fitted to the blower shaft ROOTS recommends a taper lock style coupling to insure proper contact with the blower shaft. If the coupling must have a straight bore the coupling halves must be fitted to the two shafts with a line to line thru .001" interference fit. Coupling halves must be warmed up per coupling manufacturer's recommendations. Maximum deviation in offset alignment of the shafts should not exceed .005" (.13 mm) total indicator reading, taken on the two coupling hubs. Maximum deviation from parallel of the inside coupling faces should not exceed .001" (.03 mm) when checked at six points around the coupling.

When a unit is BELT DRIVEN, the proper selection of sheave diameters will result in the required unit speed. When selecting a sheave to be fitted to the blower shaft ROOTS recommends a taper lock style sheave to insure proper contact with the blower shaft. This flexibility can lead to operating temperature problems caused by unit speed being too low. Make sure the drive speed selected is within the allowable range for the specific unit size, as specified under Table 1.

Belt drive arrangements usually employ two or more V-belts running in grooved sheaves. Installation of the driver is less critical than for direct coupling, but its shaft must be level and parallel with the unit shaft. **The driver should be mounted on the inlet side of a vertical unit (horizontal piping) and on the side nearest to the shaft on a horizontal unit. SEE PAGE 6 - Acceptable Blower Drive Arrangement Options.** The driver must also be mounted on an adjustable base to permit installing, adjusting and removing the V-belts. To position the driver correctly, both sheaves need to be mounted on their shafts and the nominal shaft center distance known for the belt lengths to be used.

CAUTION: Drive couplings and sheaves (pulleys) should have an interference fit to the shaft of the blower (set screw types of attachment generally do not provide reliable service.) It is recommended that the drive coupling or sheave used have a taper lock style bushing which is properly sized to provide the correct interference fit required. Drive couplings, that require heating to fit on the blower shaft, should be installed per coupling manufacturer recommendations. A drive coupling or sheave should not be forced on to the shaft of the blower as this could affect internal clearances resulting in damage to the blower.

Engine drive applications often require special consideration to drive coupling selection to avoid harmful torsional vibrations. These vibrations may lead to blower damage if not dampened adequately. It is often necessary to install a flywheel and/or a torsionally soft elastic element coupling based on the engine manufacturer recommendations.

The driver sheave should also be mounted as close to its bearing as possible, and again should fit the shaft correctly. Position the driver on its adjustable base so that 2/3 of the total movement is available in the direction away from the unit, and mount the assembly so that the face of the sheave is accurately in line with the unit sheave. This position minimizes belt wear, and allows sufficient adjustment for both installing and tightening the belts. After belts are installed, adjust their tension in accordance with the manufacturer's instructions. However, only enough tension should be applied to prevent slippage when the unit is operating under load. Excessive tightening can lead to early bearing concerns or shaft breakage.

Before operating the drive under power to check initial belt tension, first remove covers from the unit connections. Make sure the interior is still clean, then rotate the shaft by hand. Place a coarse screen over the inlet connection to prevent anything being drawn into the unit while it is operating, and avoid standing in line with the discharge opening. Put oil in the sumps per instructions under **LUBRICATION.**

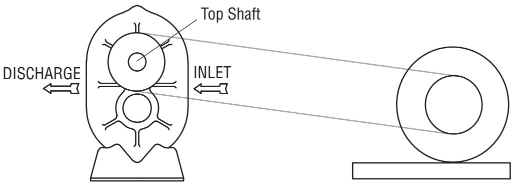
Piping

Before connecting piping, remove any remaining anti-rust compound from unit connections. Clean pipe should be no

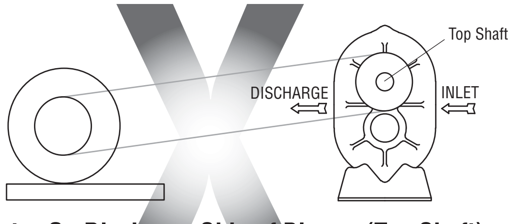
Acceptable Blower Drive Arrangement Options

ACCEPTABLE

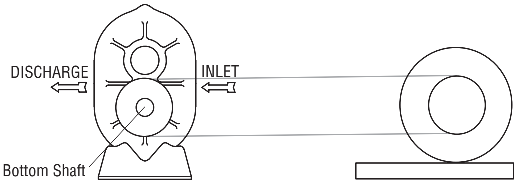
UNACCEPTABLE



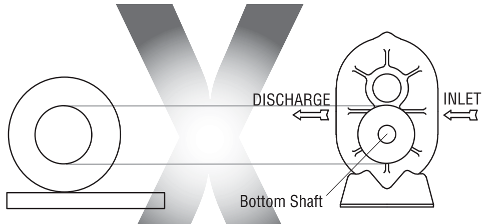
Motor On Inlet Side of Blower (Top Shaft)



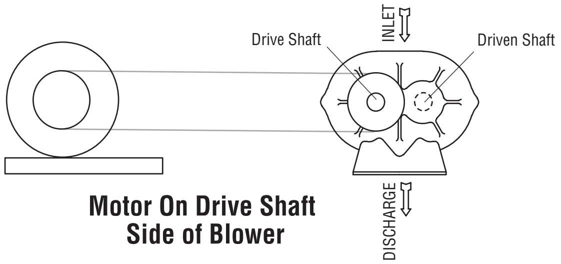
Motor On Discharge Side of Blower (Top Shaft)



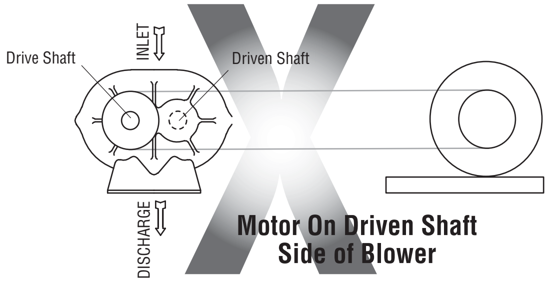
Motor On Inlet Side of Blower (Bottom Shaft)



Motor On Discharge Side of Blower (Bottom Shaft)



Motor On Drive Shaft Side of Blower



Motor On Driven Shaft Side of Blower

smaller than unit connections. In addition, make sure it is free of scale, cuttings, weld beads, or foreign material of any kind. To further guard against damage to the unit, especially when an inlet filter is not used, install a substantial screen of 16 mesh backed with hardware cloth at or near the inlet connections. Make provisions to clean this screen of collected debris after a few hours of operation. It should be removed when its usefulness has ended, as the wire will eventually deteriorate and small pieces going into the unit may cause serious damage.

Pipe flanges or male threads must meet the unit connections accurately and squarely. DO NOT attempt to correct misalignment by springing or cramping the pipe. In most cases this will distort the unit casing and cause impeller rubbing. In severe cases it can prevent operation or result in a broken drive shaft. For similar reasons, piping should be supported near the unit to eliminate dead weight strains. Also, if pipe expansion is likely to occur from temperature change, installation of flexible connectors or expansion joints is advisable.

Figure 3 represents an installation with all accessory items that might be required under various operating conditions. Inlet piping should be completely free of valves or other restrictions. When a shut-off valve can not be avoided, make sure a full size vacuum relief is installed nearest the unit inlet. This will protect against unit overload caused by accidental closing of the shut-off valve.

Need for an inlet silencer will depend on unit speed and pressure, as well as sound-level requirements in the general surroundings. An inlet filter is recommended, especially in dusty or sandy locations. A discharge silencer is also normally suggested, even though Whispair units operate at generally lower noise levels than conventional rotary blowers. Specific recommendations on silencing can be obtained from your local ROOTS distributor.

Discharge piping requires a pressure relief valve, and should include a manual unloading valve to permit starting the unit under no-load conditions. Reliable pressure/vacuum gauges and good thermometers at both inlet and discharge are recommended to allow making the important checks on unit operating conditions. The back-pressure regulator shown in Figure 3 is useful mainly when volume demands vary while the unit operates at constant output. If demand is constant, but somewhat lower than the unit output, excess may be blown off through the manual unloading valve.

In multiple unit installations where two or more units operate with a common header, use of check valves is mandatory. These should be of a direct acting or free swinging type, with one valve located in each line between the unit and header. Properly installed, they will protect against damage from reverse rotation caused by air and material back-flow through an idle unit.

After piping is completed, and before applying power, rotate the drive shaft by hand again. If it does not move with uniform freedom, look for uneven mounting, piping strain, excessive belt tension or coupling misalignment.

DO NOT operate the unit at this time unless it has been lubricated per instructions.

Technical Supplement for 32, 33, 36, 42, 45, 47, 53, 56, 59, 65, 68, 615 Universal RAI-G blowers

ROOTS Universal RAI-G rotary positive gas blowers are a design extension of the basic Universal RAI blower model. URAI-G blower uses (4) mechanical seals in place of the standard inboard lip seals to minimize gas leakage into the atmosphere. The seal chambers are piped to plugged connections. These should be opened periodically to confirm that there is no build-up of oil due to leakage by the mechanical seal. Special traps may be required for vacuum operation. These units are intended for gases which are compatible with cast iron case material, steel shafts, 300/400 series stainless steel and carbon seal components, viton o-rings and the oil/grease lubricants. If there are any questions regarding application or operation of this gas blower, please contact factory.

Precaution: URAI-G blowers: Care must be used when opening the head plate seal vent chamber plugs (43) as some gas will escape–if it is a pressure system, or the atmospheric air will leak in-if the system is under vacuum. There is a possibility of some gas leakage through the mechanical seals. This leakage on the gear end will escape through the gear box vent, and on the drive end, through the grease release fittings. If the gas leakage is undesirable, each seal chamber must be purged with an inert gas through one purge gas hole (43) per seal . There are two plugged purge gas holes(1/8 NPT) provided per seal. The purge gas pressure must be maintained one psi above the discharge gas pressure. Also, there exists a possibility of gear end oil and drive end grease leakage into the gas stream.

The lubricants selected must be compatible with the gas.

URAI GAS Blower Oil and Grease Specifications

The specified oil should be ROOTS synthetic P/N 813-106- of the proper viscosity.

When servicing drive end bearings of a Gas blower, use the specified NLGI #2 premium grade aluminum complex* grease, ROOTS P/N T20019001, with 300°F (149°C) service temperature and moisture resistance and good mechanical stability.

*ROOTS Synthetic Oil & Grease is superior in performance to petroleum based products. It has high oxidation stability, excellent corrosion protection, extremely high film strength and low coefficient of friction. Typical oil change intervals are increased 2-3 times over petroleum based lubricants. Also, ROOTS Synthetic Oil is 100% compatible with petroleum based oils. Simply drain the oil in the blower and refill the reservoirs with ROOTS Synthetic Oil to maintain optimum performance of your ROOTS blower.

Due to sludge build-up and seal leakage problems, Roots recommendation is **DO NOT USE** Mobil SHC synthetic oils in Roots blowers.

For Units with a Grease Lubricated Drive End

A simple but very effective lubrication system is employed on the drive shaft end bearings. Hydraulic pressure relief fittings are provided to vent any excess grease, preventing pressure build-up on the seals. A restriction plug and metering orifice prevent loss of lubricant from initial surges in lubricant pressure but permit venting excess lubricant under steadily rising pressures.

For grease lubricated drive end blowers see page 16, table 4, regarding specified greasing intervals.

When servicing drive end bearings of Non Gas blower, use the specified NLGI #2 premium grade microgel grease with 250°F (121°C) service temperature and moisture resistance and good mechanical stability. ROOTS specifies Shell Darina EP NLGI Grade 2. Product Code 71522 or Shell Darina SD 2 product code 506762B.

URAI GAS Blower Oil and Grease Specifications

The specified oil should be ROOTS synthetic P/N 813-106- of the proper viscosity.

When servicing drive end bearings of a Gas blower, use the specified NLGI #2 premium grade aluminum complex* grease, ROOTS P/N T20019001, with 300°F (149°C) service temperature and moisture resistance and good mechanical stability.

NOTE: Lithium based greases are not compatible with the ROOTS Synthetic grease used when assembling a Gas blower or the non-soap base grease used when assembling a standard URAI blower. Lithium based grease is not approved for any ROOTS blowers.

Using a pressure gun, slowly force new lubricant into each drive end bearing housing until traces of clean grease comes out of the relief fitting. The use of an electric or pneumatic grease gun could force the grease in too rapidly and thus invert the seals and should not be used.

To fill the gearbox, remove the breather plug (25) and the oil overflow plug (21) - see page 14. Fill the reservoir up to the overflow hole. Place the breather and the overflow plug back into their respective holes.

After a long shutdown, it is recommended that the grease fittings be removed, the old grease flushed out with kerosene or #10 lubricating oil, drained thoroughly, and bearings refilled with new grease. Be sure grease relief fittings are reinstalled. Grease should be added using a hand operated grease gun to the drive end bearings at varying time intervals depending on duty cycle and RPM. Table 4 has been prepared as a general greasing schedule guide based on average operating conditions. More frequent intervals may be necessary depending on the grease operating temperature and unusual circumstances.

For Units with Splash Lubrication on Both Ends

Bearings and oil seals are lubricated by the action of the timing gears or oil slingers which dip into the main oil sumps causing oil to splash directly on gears and into bearings and seals. A drain port is provided below each bearing to prevent an excessive amount of oil in the bearings. Seals located inboard of the bearings in each headplate effectively retain oil within the sumps. Any small leakage that may occur should the seals wear passes into a cavity in each vented headplate and is drained downward.

Oil sumps on each end of the blower are filled by removing top vent plugs, Item (25), and filling until oil reaches the middle of the oil level sight gauge when the unit is not operating, Item (45 or 53), DO NOT FILL PAST THE MIDDLE OF THE SIGHT GLASS.

Initial filling of the sumps should be accomplished with the blower not operating, in order to obtain the correct oil level. Approximate oil quantities required for blowers of the various models and configurations are listed in Table 3. Use a good grade of industrial type non-detergent, rust inhibiting, anti-foaming oil and of correct viscosity per Table 2. ***ROOTS synthetic oil (ROOTS P/N 813-106-) is highly recommended and specified.** ROOTS does not recommend automotive type lubricants, as they are not formulated with the properties mentioned above.

The oil level may rise or fall on the gauge during operation, to an extent depending somewhat on oil temperature and blower speed.

Proper lubrication is usually the most important single consideration in obtaining maximum service life and satisfactory operation from the unit. Unless operating conditions are quite severe, a weekly check of oil level and necessary addition of lubricant should be sufficient. During the first week of operation, check the oil levels in the oil sumps about once a day, and watch for leaks. Replenish as necessary. Thereafter, an occasional check should be sufficient. It is recommended that the oil be changed after initial 100 hours of operation. Frequent oil changing is not necessary unless the blower is operated in a very dusty location.

Normal life expectancy of petroleum based oils is about 2000 hours with an oil temperature of about 180°F (82°C). As the oil temperature increases by increments of 15-18°F (8°C - 10°C), the life is reduced by half. Example: Oil temperatures of 210-216°F (99°C - 102°C) will produce life expectancy of 1/4 or 500 hours. Therefore, it is considered normal to have oil change periods of 500 hours with petroleum based oils.

Normal life expectancy of ROOTS™ Synthetic Oil is about 4000 to 8000 hours with an oil temperature of about 180°F (82°C). As the oil temperature increases by increments of 15-18°F (8°C - 10°C), the life is reduced by half. Example: Oil temperatures of 210-216°F (99°C - 102°C) will produce life expectancy of 1/4 or 1000 to 2000 hours.

NOTE: To estimate oil temperature, multiply the discharge temperature of the blower by 0.80. Example: if the discharge air temperature of the blower is 200° F, it is estimated that the oil temperature is 160° F.

*ROOTS™ Synthetic Oil & Grease is superior in performance to petroleum based products. It has high oxidation stability, excellent corrosion protection, extremely high film strength and low coefficient of friction. Typical oil change intervals are increased 2-3 times over petroleum based lubricants. Also, ROOTS™ Synthetic Oil is 100% compatible with petroleum based oils. Simply drain the oil in the blower and refill the reservoirs with ROOTS™ Synthetic Oil to maintain optimum performance of your ROOTS™ blower.

Operation

Before operating a blower under power for the first time, recheck the unit and the installation thoroughly to reduce the likelihood of avoidable troubles. Use the following procedure check list as a guide, but consider any other special conditions in the installation.

☐ Be certain that no bolts, tools, rags, or debris have been left in the blower air chamber or piping.

☐ If an outdoor intake without filter is used, be sure the opening is located so it cannot pick up dirt and is protected by a strong screen or grille. Use of the temporary protective screen as described under INSTALLATION is strongly recommended.

☐ Recheck blower leveling, drive alignment and tightness of all mounting bolts if installation is not recent. If belt drive is used, adjust belt tension correctly.

☐ Turn drive shaft by hand to make sure impellers still rotate without bumping or rubbing at any point.

☐ Ensure oil levels in the main oil sumps are correct.

☐ Check lubrication of driver. If it is an electric motor, be sure that power is available and that electrical overload devices are installed and workable.

☐ Open the manual unloading valve in the discharge air line. If a valve is in the inlet piping, be sure it is open.

☐ Bump blower a few revolutions with driver to check that direction of rotation agrees with arrow near blower shaft, and that both coast freely to a stop.

After the preceding points are cleared, blower is ready for trial operation under “no-load” conditions. The following procedure is suggested to cover this initial operation test period.

a. Start blower, let it accelerate to full speed, then shut off. Listen for knocking sounds, both with power on and as speed slows down.

b. After blower comes to a complete stop, repeat above, but let blower run 2 or 3 minutes. Check for noises, such as knocking sounds.

c. After blower comes to a complete stop, operate blower for about 10 minutes unloaded. Check oil levels. Observe cylinder and headplate surfaces for development of hot spots such as burned paint, indicating impeller rubs. Be aware of any noticeable increase in vibration.

Assuming that all trials have been satisfactory, or that necessary corrections have been made, the blower should now have a final check run of at least one hour under normal operating conditions. After blower is restarted, gradually close the discharge unloading valve to apply working pressure. At this point it is recommended that a pressure gauge or manometer be connected into the discharge line if not already provided, and that thermometers be in both inlet and discharge lines. Readings from these instruments will show whether pressure or temperature ratings of the blower are being exceeded.

During the final run, check operating conditions frequently and observe the oil levels at reasonable intervals. If excessive noise or local heating develops, shut down immediately and determine the cause. If either pressure rise or temperature rise across the blower exceeds the limit specified in this manual, shut down and investigate conditions in the piping system. Refer to the TROUBLESHOOTING CHECKLIST for suggestions on various problems that may appear.

The blower should now be ready for continuous duty operation at full load. During the first few days make periodic checks to determine whether all conditions remain steady, or at least acceptable. This may be particularly important if the blower is supplying air to a process system where conditions can vary. At the first opportunity, stop the blower and clean the temporary inlet protective screen. If no appreciable amount of debris has collected, the screen may be removed. See comments under INSTALLATION. At this same time, verify leveling, coupling alignment or belt tension, and mounting bolt tightness.

Should operating experience prove that blower capacity is a little too high for the actual air requirements, a small excess may be blown off continuously through the manual unloading or vent valve. Never rely on the pressure relief valve as an automatic vent. Such use may cause the discharge pressure to become excessive, and can also result in failure of the valve itself. If blower capacity appears to be too low, refer to the TROUBLESHOOTING CHECKLIST.

Vibration Assessment Criteria

With measurements taken at the bearing locations on the housings, see chart below for an appropriate assessment guide for rotary lobe blowers rigidly mounted on stiff foundations.

In general, blower vibration levels should be monitored on a regular basis and the vibration trend observed for progressive or sudden change in level. If such a change occurs, the cause should be determined through spectral analysis.

As shown on the chart below, the level of all pass vibration will determine the need to measure discrete frequency vibration levels and the action required.

All Pass Vibration (in/sec)	Discrete Frequency Vibration (in/sec)	Action
0.45 or less	N/R	Acceptable
Greater than 0.45 but 1.0 or less	0.45 or less @ any frequency	Acceptable
	Greater than 0.45 @ any frequency	Investigate
Greater than 1.0	Less than 1.0	Investigate
	Greater than 1.0	Investigate

Troubleshooting Checklist

Trouble	Item	Possible Cause	Remedy
No flow	1	Speed too low	Check by tachometer and compare with published performance
	2	Wrong rotation	Compare actual rotation with Figure 1 Change driver if wrong
	3	Obstruction in piping	Check piping, valves, silencer to assure open flow path
Low capacity	4	Speed too low	See item 1, If belt drive, check for slippage and readjust tension
	5	Excessive pressure rise	Check inlet vacuum and discharge pressure and compare with Published performance
	6	Obstruction in piping	See item 3
	7	Excessive slip	Check inside of casing for worn or eroded surfaces causing excessive clearances
Excessive power	8	Speed too high	Check speed and compare with published performance
	9	Excessive pressure rise	See Item 5
	10	Impeller rubbing	Inspect outside of cylinder for high temperature areas, then check for impeller contact at these points. Correct blower mounting, drive alignment
	11	Scale, sludge, rust or product build up	Clean blower appropriately
Damage to bearings or gears	12	Inadequate lubrication	Check oil sump levels in gear and drive end headplates
	13	Excessive lubrication	Check oil levels. If correct, drain and refill with clean oil of recommended grade
	14	Excessive pressure rise	See Item 5
	15	Coupling misalignment	Check carefully. Realign if questionable
	16	Excessive belt tension	Readjust for correct tension
Vibration	17	Misalignment	See Item 15
	18	Impellers rubbing	See Item 10
	19	Worn bearings/gears	Check gear backlash and condition of bearings, and replace as indicated
	20	Unbalanced or rubbing impeller	Scale or process material may build up on casing and impellers, or inside impellers. Remove build-up to restore original clearances and impeller balance
	21	Driver or blower loose	Tighten mounting bolts securely
	22	Piping resonances	Determine whether standing wave pressure pulsations are present in the piping
	23	Scale/sludge build-ups	Clean out interior of impeller lobes to restore dynamic balance
	24	Casing strain	Re-work piping alignment to remove excess strain
Driver stops, or will not start	25	Impeller stuck	Check for excessive hot spot on headplate or cylinder. See item 10. Look for defective shaft bearing and/or gear teeth
	26	Scale, sludge, rust or product build-up	Clean blower appropriately
Excessive breather	27	Broken seal	Replace seals
Blow-by or excessive oil leakage to vent area	28	Defective O-ring	Replace seals and O-ring
Excessive oil leakage in vent area	29	Defective/plugged breather	Replace breather and monitor oil leakage
	30	Oil level too high	Check sump levels in gear and drive headplates.
	31	Oil type or viscosity incorrect	Check oil to insure it meets recommendations. Drain then fill with clean oil of recommended grade.
	32	Blower running hot	Check blower operating conditions to ensure they are within the operating limitations defined in this manual.

A good program of consistent inspection and maintenance is the most reliable method of minimizing repairs to a blower. A simple record of services and dates will help keep this work on a regular schedule. Basic service needs are:

- Lubrication
- Checking for hot spots
- Checking for increases or changes in vibration and noise
- Recording of operating pressures and temperatures

Above all, a blower must be operated within its specified rating limits, to obtain satisfactory service life.

A newly installed blower should be checked often during the first month of full-time operation. Attention there after may be less frequent assuming satisfactory performance. Lubrication is normally the most important consideration and weekly checks of lubricant levels in the gearbox and bearing reservoirs should be customary. Complete oil change schedules are discussed under **LUBRICATION.**

Driver lubrication practices should be in accordance with the manufacturer's instructions. If direct connected to the blower through a lubricated type coupling, the coupling should be checked and greased each time blower oil is changed. This will help reduce wear and prevent unnecessary vibration. In a belted drive system, check belt tension periodically and inspect for frayed or cracked belts.

In a new, and properly installed, unit there is no contact between the two impellers, or between the impellers and cylinder or headplates. Wear is confined to the bearings (which support and locate the shafts) the oil seals, and the timing gears. All are lubricated and wear should be minimal if clean oil of the correct grade is always used. Seals are subject to deterioration as well as wear, and may require replacement at varying periods.

Shaft bearings are designed for optimum life under average conditions with proper lubrication and are critical to the service life of the blower. Gradual bearing wear may allow a shaft position to change slightly, until rubbing develops between impeller and casing. This will cause spot heating, which can be detected by observing these surfaces. Sudden bearing failure is usually more serious. Since the shaft and impeller are no longer supported and properly located, extensive general damage to the blower casing and gears is likely to occur.

Oil seals should be considered expendable items, to be replaced whenever drainage from the headplate vent cavity becomes excessive or when the blower is disassembled for any reason. Some oil seal leakage may occur since an oil film under the lip is required for proper operation. Periodically leaked oil should be wiped off from surfaces. Minor seal leakage should not be considered as indicating seal replacement.

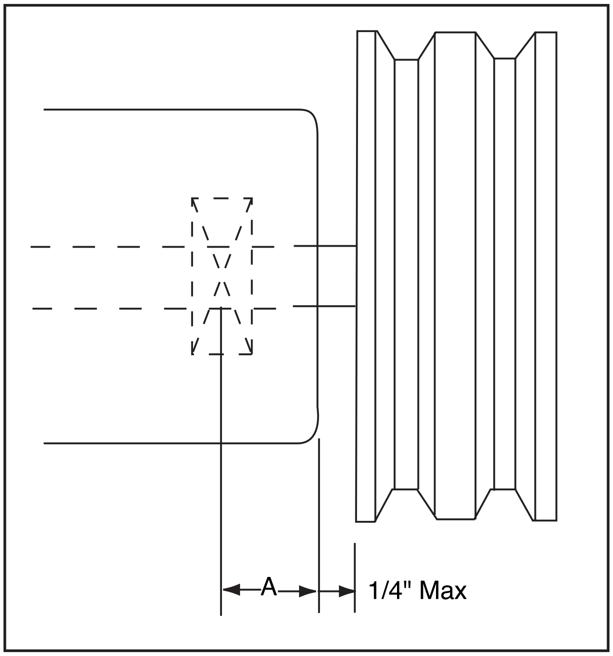
Timing gear wear, when correct lubrication is maintained, should be negligible. Gear teeth are cut to provide the correct amount of backlash, and gears correctly mounted on the shafts will accommodate a normal amount of tooth wear without permitting contact between lobes of the two impellers. However, too high an oil level will cause churning and excessive heating. This is indicated by unusually high temperature at the bottom of the gear housing. Consequent heating of the gears will result in loss of tooth-clearance , backlash and rapid wear of the gear teeth usually will develop. Continuation of this tooth wear will eventually produce impeller contacts (knocking), and from this point serious damage will be unavoidable if blower operation is continued. A similar situation can be produced suddenly by gear tooth fracture, which is usually brought on by sustained overloading or momentary shock loads.

Problems may also develop from causes other than internal parts failure. Operating clearances within a blower are only a few thousandths of an inch. This makes it possible for impeller interference or casing rubs to result from shifts in the blower mounting, or from changes in piping support. If this type of trouble is experienced, and the blower is found to be clean, try removing mounting strains. Loosen blower mounting bolts and reset the leveling and drive alignment. Then tighten mounting again, and make sure that all piping meets blower connections accurately and squarely Foreign materials in the blower will also cause trouble, which can only be cured by disconnecting the piping and thoroughly cleaning the blower interior.

A wide range of causes & solutions for operating troubles are covered in the **TROUBLE SHOOTING CHECKLIST.** The remedies suggested should be performed by qualified mechanics with a good background. Major repairs generally are to be considered beyond the scope of maintenance, and should be referred to an authorized ROOTS distributor.

Warranty failures should not be repaired at all, unless specific approval has been obtained through ROOTS before starting work. Unauthorized disassembly within the warranty period may void the warranty.

Figure 2 - Allowable Overhung Loads for V-Belt Drives Universal RAI®/URAI®-J Units



$$\text{Belt Pull lbs} = \frac{252100 \bullet \text{Motor HP}}{\text{Blower RPM} \bullet \text{Sheave Diameter}}$$

$$\text{Shaft Load (lb.in)} = \text{Belt Pull} \bullet (A + 1/4" + \frac{\text{Sheave Width}}{2})$$

Frame Size	Dimension "A"	Max Allowable Shaft Load (lb-in.)	Min Sheave Diameter
22, 24	0.61	150	4.00
32, 33, 36	0.80	400	5.00
42, 45, 47	1.02	650	5.00
53, 56, 59	1.13	1,325	6.00
65, 68, 615	1.36	2,250	8.00
76, 711, 718	1.16	2,300	9.50

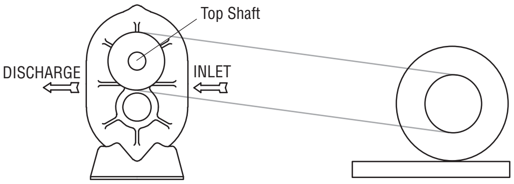
NOTE:
Arc of sheave belt contact on the smaller sheave not to be less than 170°

Driver to be installed on the inlet side for vertical units, and on the drive shaft side for horizontal units.

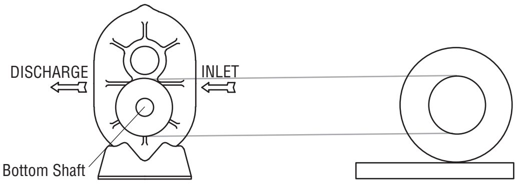
ROOTS recommends the use of two or more 3V, 5V or 8V belts and sheaves.

Acceptable Blower Drive Arrangement Options

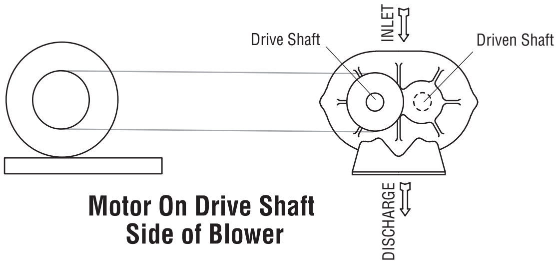
ACCEPTABLE



Motor On Inlet Side of Blower (Top Shaft)

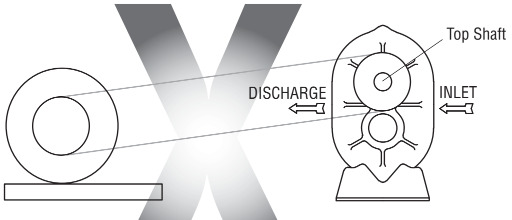


Motor On Inlet Side of Blower (Bottom Shaft)

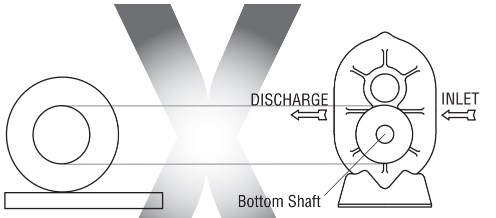


Motor On Drive Shaft Side of Blower

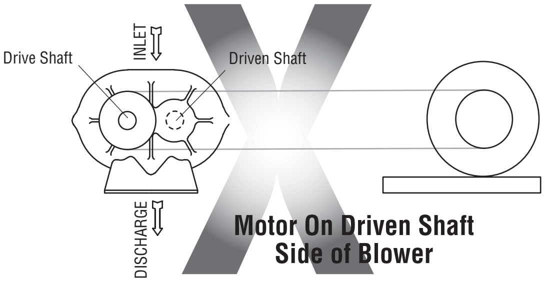
UNACCEPTABLE



Motor On Discharge Side of Blower (Top Shaft)

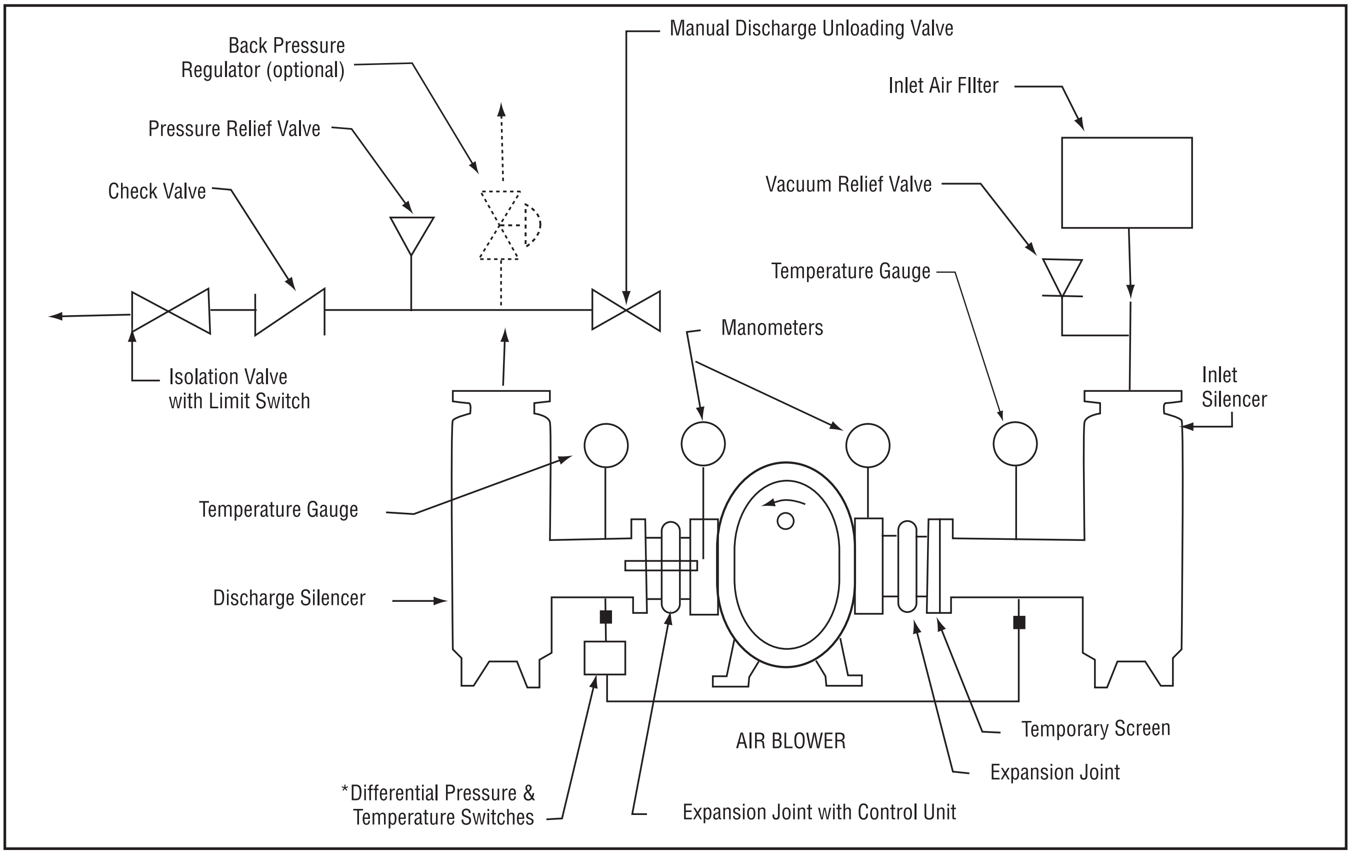


Motor On Discharge Side of Blower (Bottom Shaft)



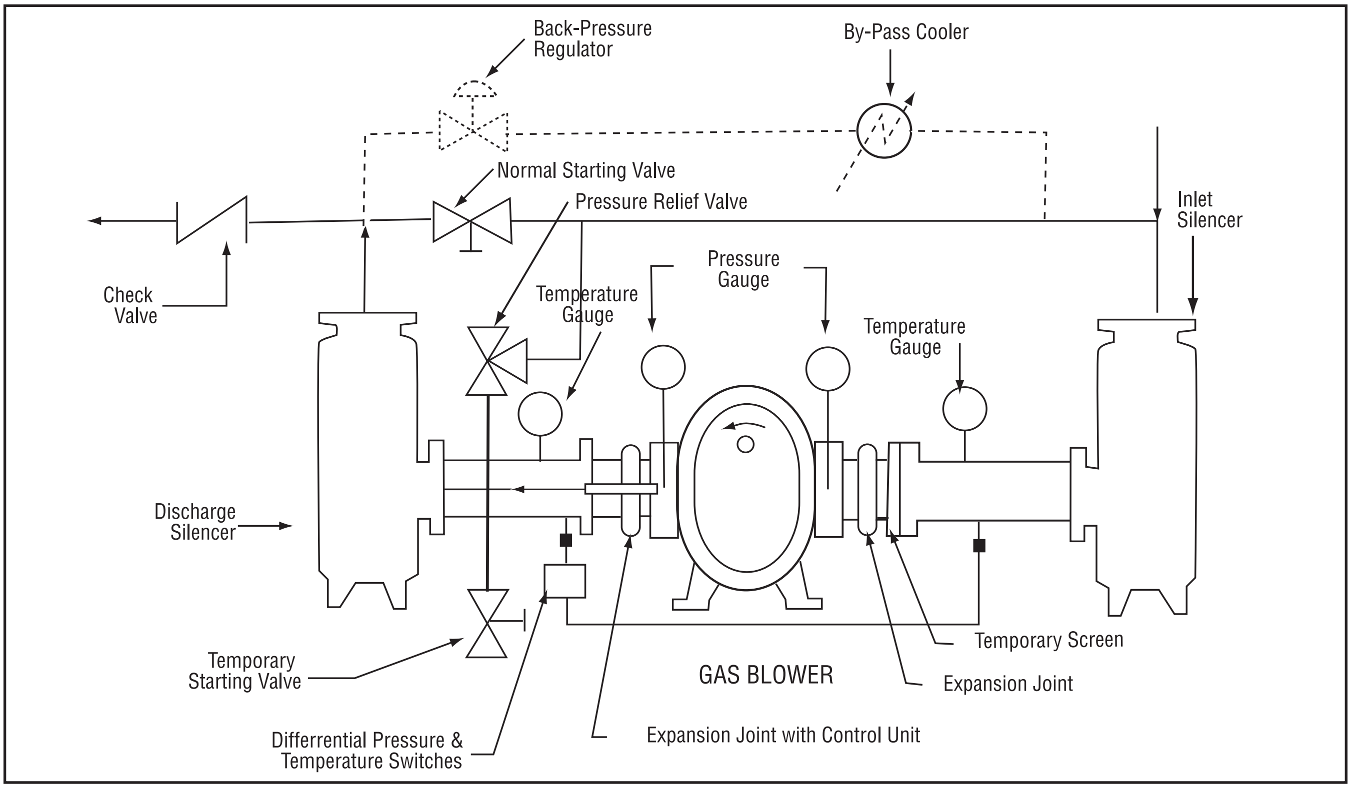
Motor On Driven Shaft Side of Blower

Figure 3a - Air Blower Installation with Accessories



Above are suggested locations for available accessories.

Figure 3b -Gas Blower Installation with Accessories



Above are suggested locations for available accessories.

Figure 4

Blower Orientation Conversion

Model	Reversible Rotation	Whispair™ Design
Universal RAI	yes	no
URAI-J Whispair™	no	yes
URAI-G	yes	no

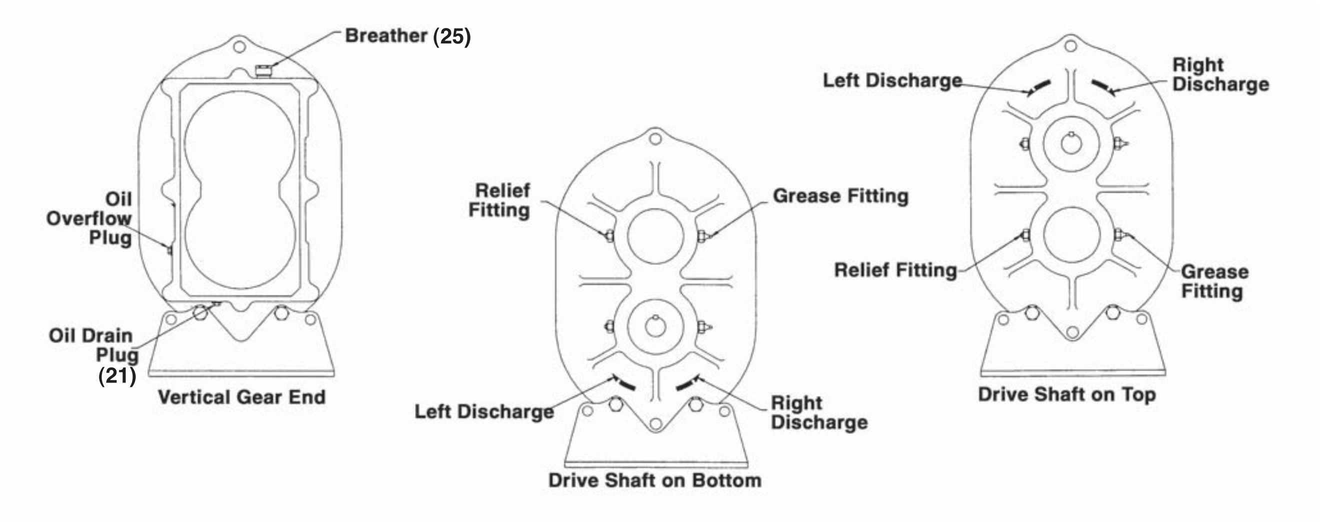
Special Note: WHISPAIR™ models are designed to operate with only one shaft rotation direction to take full advantage of the Whispair feature. Therefore, a WHISPAIR™ blower may be operated in the following combinations.

- CCW Rotation: Bottom Shaft; Right side discharge or a Left Shaft; Bottom discharge
- CCW Rotation: Top Shaft; Left side discharge or a Right Shaft; Top discharge

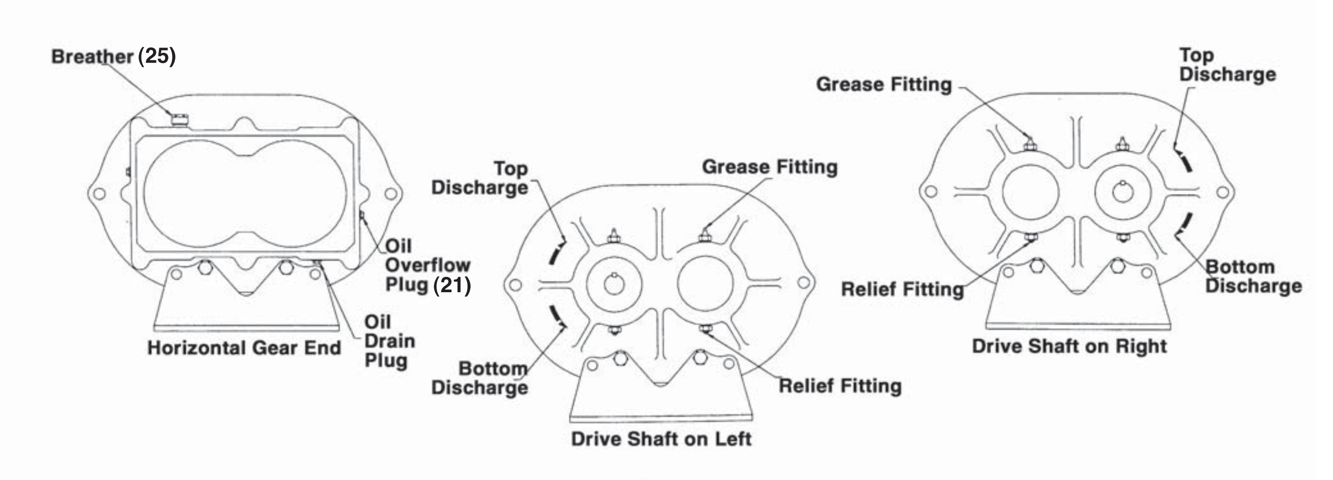
or

- CW Rotation: Bottom Shaft; Left side discharge or a Right Shaft Bottom discharge
- CW Rotation: Top Shaft; Right side discharge or a Left Shaft Top discharge

Blower Orientation and Lubrication Points: Grease Lubricated Drive End
Universal RAI series & URAI-G gas blowers



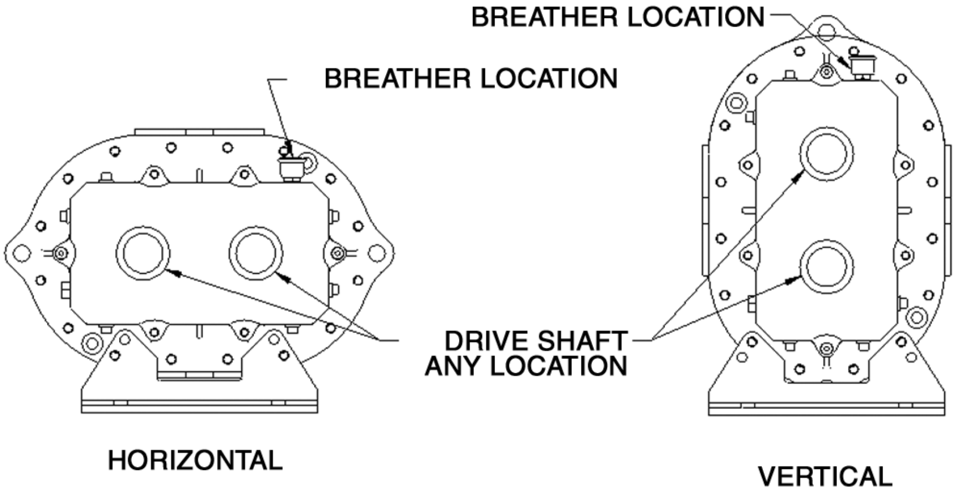
Vertical Mounting



Horizontal Mounting

DRAFT

Drive End Breather Orientation for U-RAI series - DSL with Oil Lube



U-RAI DLS BREATHER ORIENTATION

REVISED DATE: 1/11/05

Table 1 - Universal RAI series, Universal URAI-DSI & URAI-G gas blower,
Maximum Allowable Operating Conditions

Frame Size	Gear Diameter (Inch)	Speed RPM	Temp. Rise F° (C°)	Delta Pressure PSI (mbar)	Inlet Vacuum INHG (mbar)
22	2.5	5275	225 (125)	12 (827)	15 (500)
24	2.5	5275	210 (117)	7 (483)	15 (500)
32	3.5	3600	240 (133)	15 1034	16 (539)
33	3.5	3600	225 (125)	12 (827)	15 (500)
36	3.5	3600	225 (125)	7 (483)	15 (500)
42	4.0	3600	240 (133)	15 (1034)	16 (539)
45	4.0	3600	225 (125)	10 (690)	16 (539)
47	4.0	3600	225 (125)	7 (483)	15 (500)
53	5.0	2850	225 (125)	15 (1034)	16 (539)
56	5.0	2850	225 (125)	13 (896)	16 (539)
59	5.0	2850	225 (125)	7 (483)	15 (500)
65	6.0	2350	250 (130)	15 (1034)	16 (539)
68	6.0	2350	240 (133)	14 (965)	16 (539)
615	6.0	2350	130 (72)	7 (483)	14 (472)
76	7.0	2050	250 (139)	15 (1034)	16 (539)
711	7.0	2050	225 (125)	10 (690)	16 (539)
718	7.0	2050	130 (72)	6 (414)	12 (405)

Table 2 - Recommended Oil Grades

Ambient Temperature °F (°C)	ISO Viscosity No.
Above 90° (32°)	320
32° to 90° (0° to 32°)	220
0° to 32° (-18° to 0°)	150
Below 0° (-18°)	100

URAI GAS Blower Oil and Grease Specifications

The specified oil should be ROOTS synthetic P/N 813-106- of the proper viscosity.

Table 3 - Approximate Oil Sump Capacities

These capacities are provided to assist in stocking the correct amount of oil. Exact sump capacities may differ slightly. See "Lubrication" section for proper filling instructions.

UNIVERSAL RAI, URAI-J, URAI-G

Frame Size	Gear End Capacity Fl. Oz. (Liters)	
	Vertical	Horizontal
22	3.4 (.1)	6.1 (.18)
24	3.4 (.1)	6.1 (.18)
32	8.5 (.25)	16.0 (.47)
33	8.5 (.25)	16.0 (.47)
36	8.5 (.25)	16.0 (.47)
42	12.7 (.37)	14.5 (.43)
45	12.7 (.37)	14.5 (.43)
47	12.7 (.37)	14.5 (.43)
53	16.0 (.47)	27.6 (.82)
56	16.0 (.47)	27.6 (.82)
59	16.0 (.47)	27.6 (.82)
65	28.3 (.84)	52.1 (1.54)
68	28.3 (.84)	52.1 (1.54)
615	28.3 (.84)	52.1 (1.54)
76	32.3 (.96)	59.5 (1.76)
711	32.3 (.96)	59.5 (1.76)
718	32.3 (.96)	59.5 (1.76)

See page 14 and 15 for illustration of vertical and horizontal configurations.

UNIVERSAL URAI series-DSL Splash Lubricated Drive End

Note that the gear end sump capacity is provided on the adjacent table.

Frame Size	Drive End Capacity Fl. Oz. (Liters)	
	Vertical	Horizontal
32	4.0 (.12)	6.5 (.19)
33	4.0 (.12)	6.5 (.19)
36	4.0 (.12)	6.5 (.19)
42	5.5 (.16)	10.8 (.32)
45	5.5 (.16)	10.8 (.32)
47	5.5 (.16)	10.8 (.32)
53	7.5 (.22)	14.8 (.44)
56	7.5 (.22)	14.8 (.44))
59	7.5 (.22)	14.8 (.44)
65	16 (0.47)	31 (0.91)
68	16 (0.47)	31 (0.91)
615	16 (0.47)	31 (0.91)

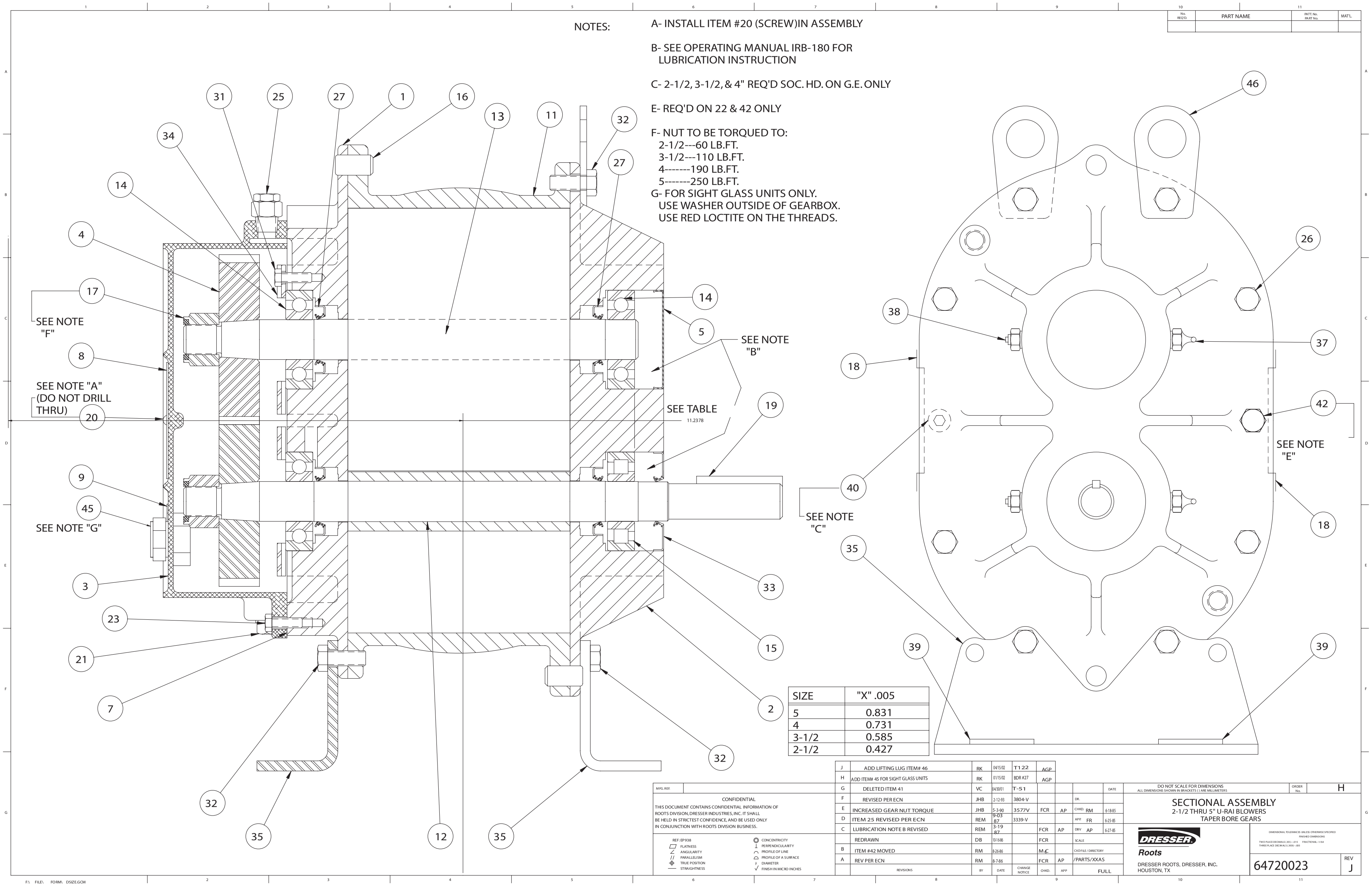
Table 4 - Universal URAI series with Grease Lubricated Drive End: Specified Bearing Greasing Intervals

Speed In RPM	Operating Hours Per Day		
	8	16	24
	Greasing Intervals in Weeks		
750-1000	7	4	2
1000-1500	5	2	1
1500-2000	4	2	1
2000-2500	3	1	1
2500-3000	2	1	1
3000 and up	1	1	1

The specified grease for servicing drive end bearings of a Gas blower, use a NLGI #2 premium grade aluminum complex* grease, ROOTS P/N T20019001 with 300°F (149°C) service temperature and moisture resistance and good mechanical stability.

When servicing drive end bearings of Non Gas blower, use a NLGI #2 premium grade microgel grease with 250°F (121°C) service temperature and moisture resistance and good mechanical stability. ROOTS specifies Shell Darina EP NLGI Grade 2. Product Code 71522.

NOTE: Lithium based greases are not compatible with the ROOTS Synthetic grease used when assembling a Gas blower or the non-soap base grease used when assembling a standard URAI blower. Lithium based grease is not approved for any ROOTS blowers.



No. REQ'D	PART NAME	PATT. No. PART No.	MAT'L.

NOTES:

A- INSTALL ITEM #20 (SCREW)IN ASSEMBLY

B- SEE OPERATING MANUAL IRB-180 FOR LUBRICATION INSTRUCTION

C- 2-1/2, 3-1/2, & 4" REQ'D SOC. HD. ON G.E. ONLY

E- REQ'D ON 22 & 42 ONLY

F- NUT TO BE TORQUED TO:
2-1/2---60 LB.FT.
3-1/2---110 LB.FT.
4-------190 LB.FT.
5-------250 LB.FT.

G- FOR SIGHT GLASS UNITS ONLY.
USE WASHER OUTSIDE OF GEARBOX.
USE RED LOCTITE ON THE THREADS.

SIZE	"X" .005
5	0.831
4	0.731
3-1/2	0.585
2-1/2	0.427

	REVISIONS	BY	DATE	CHANGE NOTICE	CHKD.	APP
J	ADD LIFTING LUG ITEM# 46	RK	04/15/02	T122	AGP	
H	ADD ITEM# 45 FOR SIGHT GLASS UNITS	RK	01/15/02	BDR #27	AGP	
G	DELETED ITEM 41	VC	04/30/01	T-51		
F	REVISED PER ECN	JHB	2-12-93	3804-V		
E	INCREASED GEAR NUT TORQUE	JHB	5-3-90	3577V	FCR	AP
D	ITEM 25 REVISED PER ECN	REM	9-03 87	3339-V		
C	LUBRICATION NOTE B REVISED	REM	3-19 87		FCR	AP
	REDRAWN	DB	10-16-86		FCR	
B	ITEM #42 MOVED	RM	8-26-86		M€	
A	REV PER ECN	RM	8-7-86		FCR	AP

MFG. REF.

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REF: EP938

▱ FLATNESS	◎ CONCENTRICITY
∠ ANGULARITY	⊥ PERPENDICULARITY
// PARALLELISM	⌒ PROFILE OF LINE
⌖ TRUE POSITION	⌓ PROFILE OF A SURFACE
— STRAIGHTNESS	ÿ DIAMETER
	√ FINISH IN MICRO INCHES

		DATE
DR.		
CHKD.	RM	6-18-85
APP.	FR	6-25-85
DBV	AP	6-27-85
SCALE	FULL	
CAD FILE / DIRECTORY	/PARTS/XXAS	

DO NOT SCALE FOR DIMENSIONS
ALL DIMENSIONS SHOWN IN BRACKETS { } ARE MILLIMETERS

ORDER No. H

SECTIONAL ASSEMBLY
2-1/2 THRU 5" U-RAI BLOWERS
TAPER BORE GEARS

DRESSER
Roots

DRESSER ROOTS, DRESSER, INC.
HOUSTON, TX

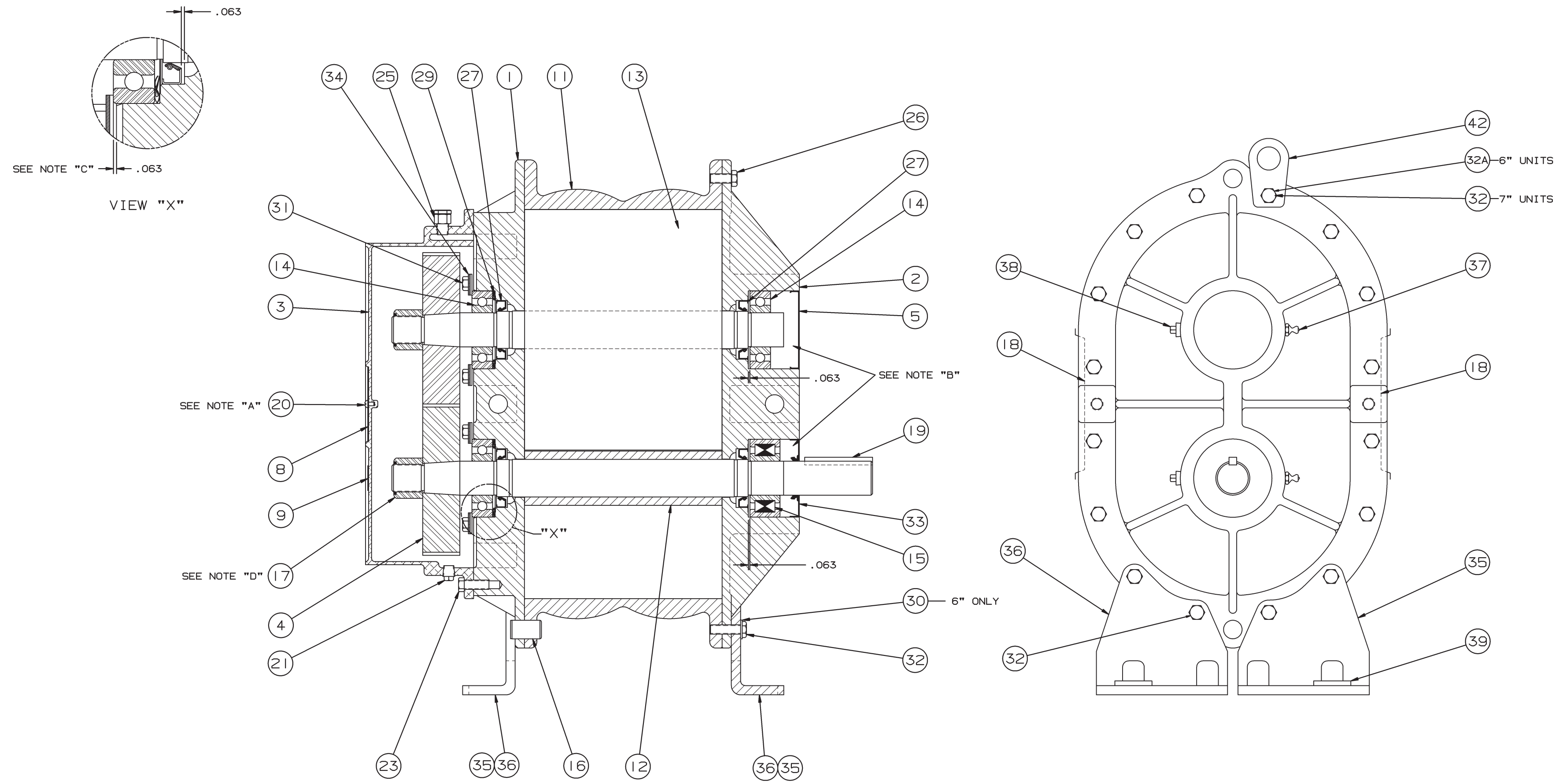
DIMENSIONAL TOLERANCES UNLESS OTHERWISE SPECIFIED
FINISHED DIMENSIONS
TWO PLACE DECIMALS (.XX)—.015 FRACTIONAL—1/64
THREE PLACE DECIMALS (.XXX)—.005

64720023

REV J

Assembly of UNIVERSAL RAI Series, Air Blowers, 2-1/2” Through 5” Gear Diameter

No. REQ'D.	PART NAME	PATT. No. PART No.	MAT'L.



NOTES

A INSTALL ITEM #20 (SCREW) IN ASSEMBLY

B SEE OPERATING MANUAL IRB-103
FOR LUBRICATION INSTRUCTION

C INSTALL BEARINGS AS SHOWN BEFORE
SETTING END CLEARANCE

D NUT TO BE TORQUED TO:
6"---400 LB. FT.
7"---550 LB. FT.

Ⓔ 3577V
Ⓓ 3389V
Ⓒ 3339V

MFG. REF. 62600023

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REF: EP938
▱ FLATNESS
∠ ANGULARITY
// PARALLELISM
⌖ TRUE POSITION
— STRAIGHTNESS
◎ CONCENTRICITY
⊥ PERPENDICULARITY
⌒ PROFILE OF LINE
⌓ PROFILE OF A SURFACE
Ø DIAMETER
√ FINISH IN MICRO INCHES

	REVISIONS	BY	DATE	CHANGE NOTICE	CHKD.	APP
H	ADDED ITEM 32A	AKP	12/12/05	7631V		
G	REMOVED ITEM 44	AJK	6/21/05	7527V		AGP
F	ADDED ITEM 44	RDR	3/4/05	7419V		

		DATE
DR.	REM	12/8/85
CHKD.	FCR	3/12/86
APP.	AP	8/8/86
DBV		

SCALE 6"=1'-0"
CAD FILE / DIRECTORY 64792A23
XASR

DO NOT SCALE FOR DIMENSIONS
ALL DIMENSIONS SHOWN IN BRACKETS [ ] ARE MILLIMETERS

ORDER No. 55-1242-2

SECTIONAL ASSEMBLY
FOR 6" & 7" U-RAI BLOWER
WITH TAPER GEAR FIT

DRESSER ROOTS

ROOTS DIVISION
DRESSER EQUIPMENT GROUP
A HALLIBURTON COMPANY
HOUSTON, TX USA

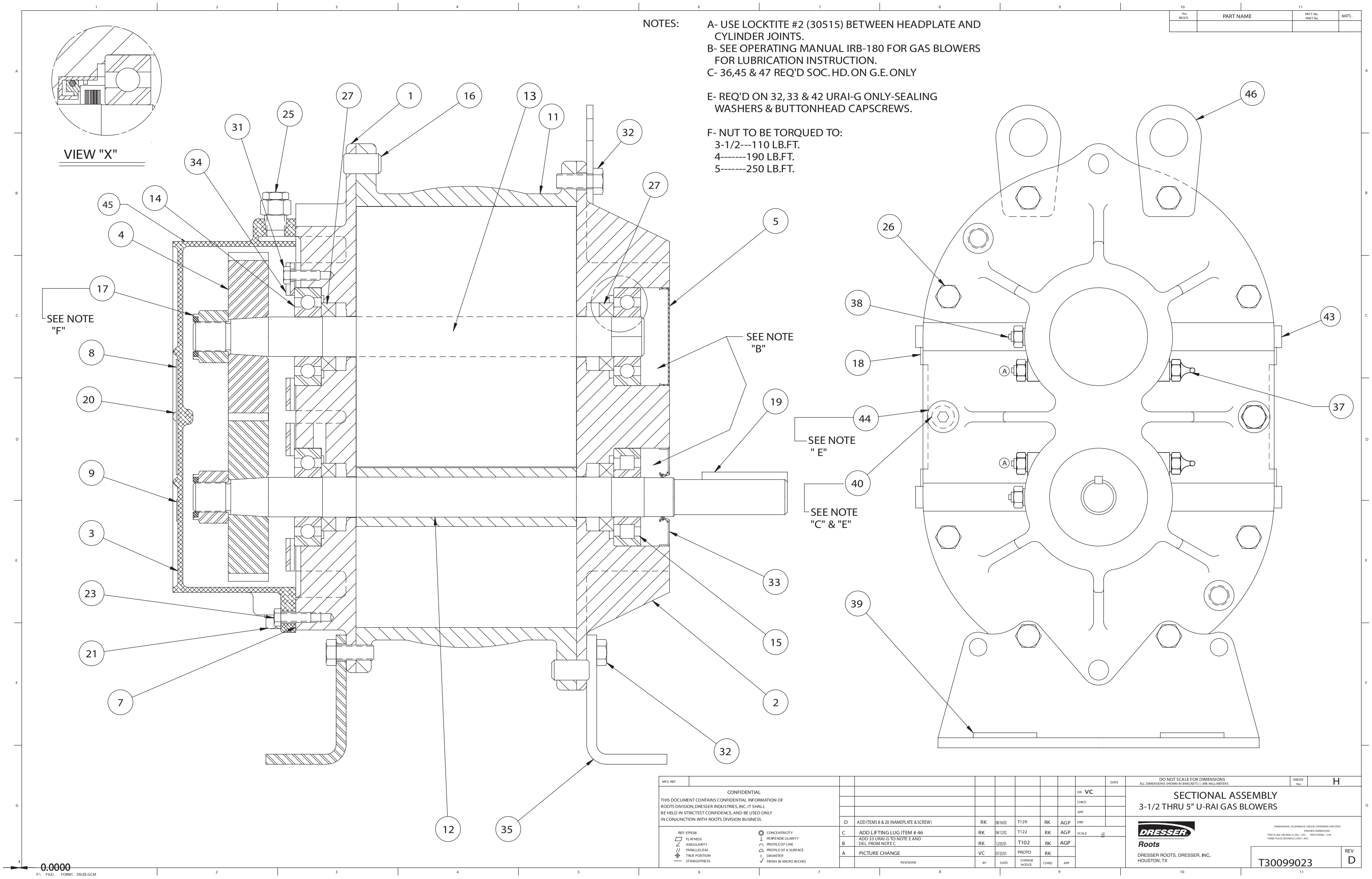
DIMENSIONAL TOLERANCES UNLESS OTHERWISE SPECIFIED
FINISHED DIMENSIONS
TWO PLACE DECIMALS (.XX)---±.015
THREE PLACE DECIMALS (.XXX)--±.005
FRACTIONAL--±1/64

64792023 REV H

F:\FILE\FORM\DSIZE.GCM

Assembly of UNIVERSAL RAI Blowers, 6” and 7” Diameter

DRAFT



NOTES:

A- USE LOCKTITE #2 (30515) BETWEEN HEADPLATE AND CYLINDER JOINTS.
B- SEE OPERATING MANUAL IRB-180 FOR GAS BLOWERS FOR LUBRICATION INSTRUCTION.
C- 36,45 & 47 REQ'D SOC. HD. ON G.E. ONLY

E- REQ'D ON 32, 33 & 42 URAI-G ONLY-SEALING WASHERS & BUTTONHEAD CAPSCREWS.

F- NUT TO BE TORQUED TO:
3-1/2---110 LB.FT.
4-------190 LB.FT.
5-------250 LB.FT.

MFG. REF.

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REF: EP938

▱ FLATNESS	◎ CONCENTRICITY
∠ ANGULARITY	⊥ PERPENDICULARITY
// PARALLELISM	⌒ PROFILE OF LINE
⌖ TRUE POSITION	⌓ PROFILE OF A SURFACE
— STRAIGHTNESS	⌀ DIAMETER
	√ FINISH IN MICRO INCHES

	REVISIONS	BY	DATE	CHANGE NOTICE	CHKD.	APP
D	ADD ITEMS 8 & 20 (NAMEPLATE & SCREW)	RK	08/16/02	T129	RK	AGP
C	ADD LIFTING LUG ITEM # 46	RK	04/12/02	T122	RK	AGP
B	ADD 33 URAI-G TO NOTE E AND DEL. FROM NOTE C	RK	12/05/01	T102	RK	AGP
A	PICTURE CHANGE	VC	07/25/01	PROTO	RK	

DR. VC
CHKD.
APP.
DBV
SCALE FULL
DATE

DO NOT SCALE FOR DIMENSIONS
ALL DIMENSIONS SHOWN IN BRACKETS [ ] ARE MILLIMETERS

ORDER No. H

SECTIONAL ASSEMBLY
3-1/2 THRU 5" U-RAI GAS BLOWERS

DRESSER
Roots
DRESSER ROOTS, DRESSER, INC.
HOUSTON, TX

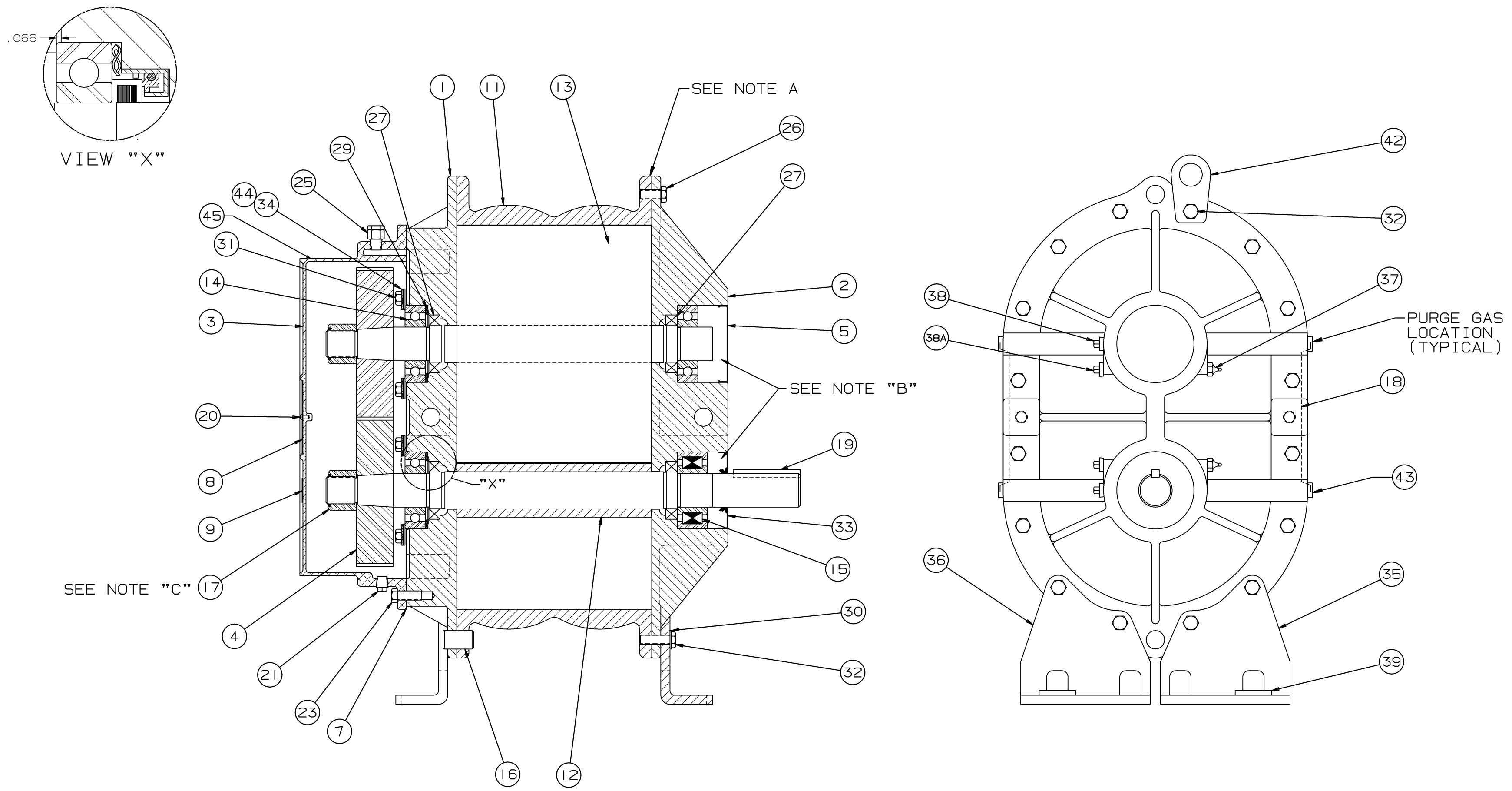
DIMENSIONAL TOLERANCES UNLESS OTHERWISE SPECIFIED
FINISHED DIMENSIONS
TWO PLACE DECIMALS (.XX)--.015 FRACTIONAL--1/64
THREE PLACE DECIMALS (.XXX)--.005

T30099023
REV D

Assembly of UNIVERSAL RAI-G Series Gas Blowers, 3-1/2”Through 5” Gear Diameter

DRAFT

No. REQ'D.	PART NAME	PATT. No. PART No.	MAT'L.



NOTES

A USE LOCKTITE #2 (30515) BETWEEN HEADPLATE AND CYLINDER JOINTS.

B SEE OPERATING MANUAL IRB-180 FOR LUBRICATION INSTRUCTION

C NUT TO BE TORQUED TO: 400 LB. FT.

MFG. REF.

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REF: EP938

▱ FLATNESS	◎ CONCENTRICITY
∠ ANGULARITY	⊥ PERPENDICULARITY
// PARALLELISM	⌒ PROFILE OF LINE
⌖ TRUE POSITION	⌓ PROFILE OF A SURFACE
— STRAIGHTNESS	Ø DIAMETER
	√ FINISH IN MICRO INCHES

	REVISIONS	BY	DATE	CHANGE NOTICE	CHKD.	APP
E	REV TO MECHANICAL SEAL	AKP	5/4/06	7457V		
D	ADDED ITEM #38A	RDR	5/3/05	7457V		AGP
C	ADD ITEMS # 8 & 20	RK	8/16/02	T129		
B	PICTURE CHANGE	VC	7/25/01	PROTO		
A	ADDED DIMENSION .066	VC	6/26/01	PROTO		

		DATE
DR.	VC	1/12/01
CHKD.		
APP.		
DBV		

SCALE 6"=1'-0"

CAD FILE / DIRECTORY T3011OA23

DO NOT SCALE FOR DIMENSIONS
ALL DIMENSIONS SHOWN IN BRACKETS [ ] ARE MILLIMETERS

ORDER No.

SECTIONAL ASSEMBLY
FOR 6" U-RAI GAS BLOWERS

DRESSER
Roots

Dresser ROOTS, Dresser, Inc.
Connersville, IN USA

DIMENSIONAL TOLERANCES UNLESS OTHERWISE SPECIFIED
FINISHED DIMENSIONS
TWO PLACE DECIMALS (.XX)---±.015
THREE PLACE DECIMALS (.XXX)--±.005
FRACTIONAL--±1/64

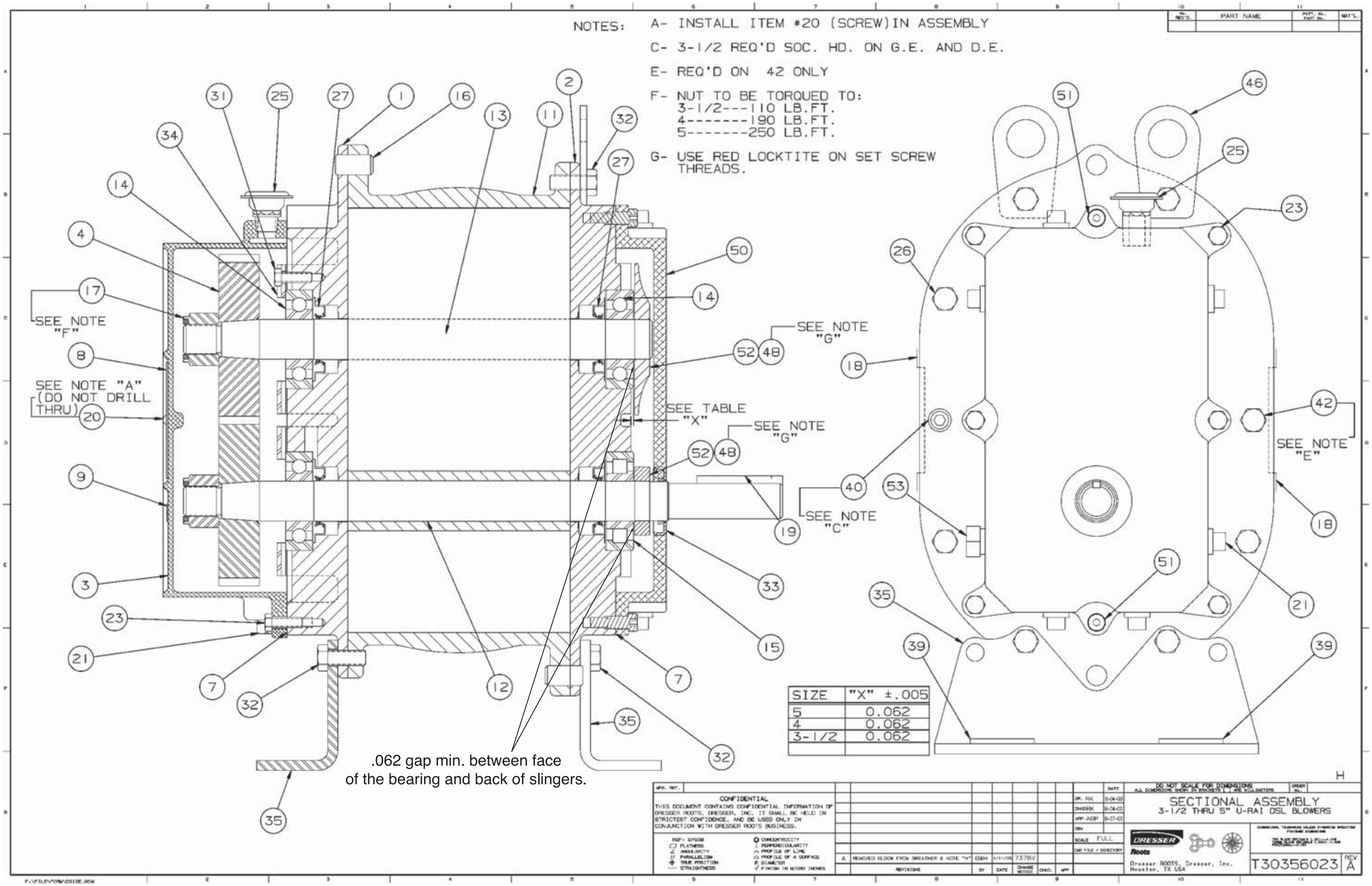
T30110023

REV E

F:\FILE\FORM\DSIZE.GCM

Assembly of UNIVERSAL RAI Series Gas Blowers, 6” Gear Diameter

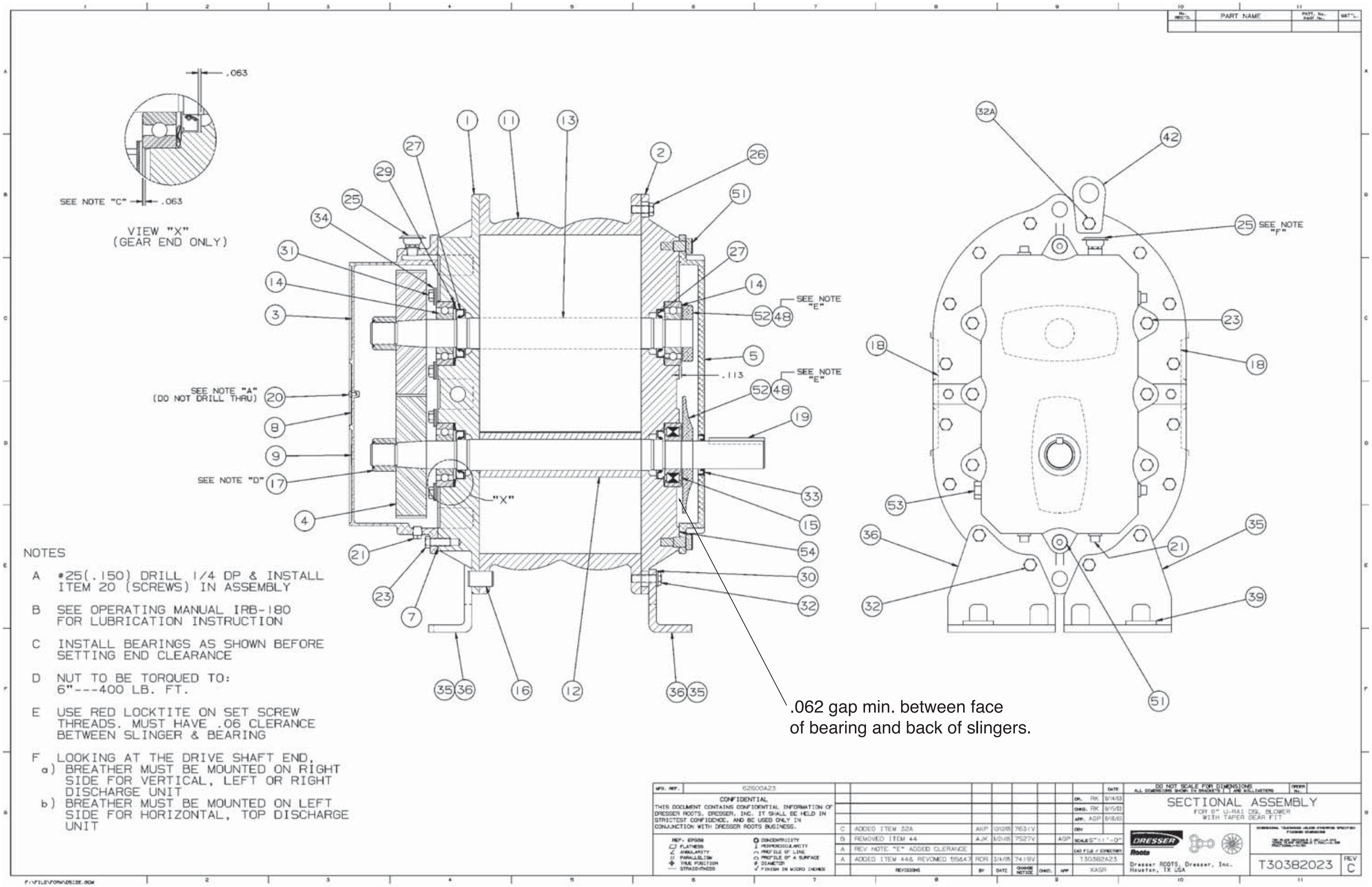
DRAFT



SIZE	"X" ±.005
5	0.062
4	0.062
3-1/2	0.062

.062 gap min. between face of the bearing and back of slingers.

Assembly of UNIVERSAL RAI Series - DSL with Splash Lubricated Drive End 3-5" Gear Diameter



NOTES

A #25(.150) DRILL 1/4 DP & INSTALL ITEM 20 (SCREWS) IN ASSEMBLY

B SEE OPERATING MANUAL IRB-180 FOR LUBRICATION INSTRUCTION

C INSTALL BEARINGS AS SHOWN BEFORE SETTING END CLEARANCE

D NUT TO BE TORQUED TO: 6"---400 LB. FT.

E USE RED LOCKTITE ON SET SCREW THREADS. MUST HAVE .06 CLERANCE BETWEEN SLINGER & BEARING

F LOOKING AT THE DRIVE SHAFT END,
a) BREATHER MUST BE MOUNTED ON RIGHT SIDE FOR VERTICAL, LEFT OR RIGHT DISCHARGE UNIT
b) BREATHER MUST BE MOUNTED ON LEFT SIDE FOR HORIZONTAL, TOP DISCHARGE UNIT

.062 gap min. between face
of bearing and back of slingers.

MFG. REF. 62800A23

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REF. EP038
⏥ FLATNESS
∠ ANGULARITY
// PARALLELISM
⌖ TRUE POSITION
— STRAIGHTNESS
◎ CONCENTRICITY
⊥ PERPENDICULARITY
⌒ PROFILE OF LINE
⌓ PROFILE OF A SURFACE
⌀ DIAMETER
√ FINISH IN MICRO INCHES

	REVISIONS	BY	DATE	CHANGE NOTICE	CHKD.	APP
C	ADDED ITEM 32A	AKP	12/12/05	7631V		
B	REMOVED ITEM 44	AJK	6/21/05	7527V		AGP
A	REV NOTE "E" ADDED CLERANCE					
A	ADDED ITEM 44& REVOMED 55&47	RDR	3/4/05	7419V		

		DATE
DR.	RK	8/14/03
CHKD.	RK	8/15/03
APP.	AGP	8/18/03
DEV		
SCALE 6"=1'-0"		
CAD FILE / DIRECTORY		
T30382A23		
XASR		

DO NOT SCALE FOR DIMENSIONS
ALL DIMENSIONS SHOWN IN BRACKETS [ ] ARE MILLIMETERS

ORDER No.

SECTIONAL ASSEMBLY
FOR 6" U-RAI DSL BLOWER
WITH TAPER GEAR FIT

DRESSER
Roots
Dresser ROOTS, Dresser, Inc.
Houston, TX USA

T30382023

REV
C

Assembly of UNIVERSAL RAI Series - DSL with Splash Lubricated Drive End 6” Gear Diameter

Universal RAI Series Blowers Parts List 2-1/2” – 5” Gear Diameter

(Refer to drawing #64720023)

Item #	Part Name	Qty.
1	Headplate Gear End	1
2	Headplate Drive End	1
3	Gearbox	1
4	Timing Gears	2
5	Cover-Blind (Plug Opening)	1
7	Gasket, Gear Box	1
11	Cylinder	1
12	Impeller & Shaft Drive	1
13	Impeller & Shaft Driven	1
14	Bearing, Ball	3
15	Bearing, Roller	1
16	Pin, Dowel	4
17	Gear Nut	2
19	Key	1
21	Plug, Pipe	3
23	Screw Hex	6
25	Breather (Plug Vent)	1
26	Screw, Hex	*
27	Seal, Lip Bearing	4
31	Screw, Hex, Nylock	4
32	Screw, Hex	6
33	Seal Lip-Drive	1
34	Clamp Plate	2
35	Foot	2
37	Fitting, Grease	2
38	Fitting, Relief	2
39	Washer Mounting	4
40	Screw Socket	2
42	Screw Hex	2

*Quantities vary by blower.

Universal RAI Series Blowers Parts List 6” & 7” Gear Diameter

(Refer to drawing #64792023)

Item #	Part Name	Qty.
1	Headplate Gear End	1
2	Headplate Drive End	1
3	Gearbox	1
4	Timing Gears	2
5	Cover-Blind (Plug Opening)	1
7	Gasket, Gear Box	1
11	Cylinder	1
12	Impeller & Shaft Drive	1
13	Impeller & Shaft Driven	1
14	Bearing, Ball	3
15	Bearing, Roller	1
16	Pin, Dowel	4
17	Gear Nut	2
19	Key	1
21	Plug, Pipe	3
23	Screw Hex Nylock	8
25	Breather (Plug Vent)	1
26	Screw, Hex	*
27	Seal, Lip Bearing	4
29	Washer, Spring Wavy	2
31	Screw, Hex, Nylock	4
32	Screw, Hex	10
33	Seal Lip-Drive	1
34	Clamp Plate	2
35	Foot	2
37	Fitting, Grease	2
38	Fitting, Relief	2
39	Washer Mounting	4

*Quantities vary by blower.

Universal RAI-DSL Series Blowers Parts List 3-1/2” – 5” Gear Diameter

(Refer to drawing #T30356023)

Item #	Part Name	Qty.
1	Headplate Gear End	1
2	Headplate Drive End	1
3	Gearbox	1
4	Timing Gears	2
7	Gasket, Gear Box, DE Cover	1
11	Cylinder	1
12	Impeller & Shaft Drive	1
13	Impeller & Shaft Driven	1
14	Bearing, Ball	3
15	Bearing, Roller	1
16	Pin, Dowel	4
17	Gear Nut	2
19	Key	1
21	Plug, Pipe	3
23	Screw Hex	6
25	Breather (Plug Vent)	1
26	Screw, Hex	*
27	Seal, Lip Bearing	4
31	Screw, Hex, Nylock	4
32	Screw, Hex	6
33	Seal Lip-Drive	1
34	Clamp Plate	2
35	Foot	2
39	Washer Mounting	4
40	Screw Socket	2
42	Screw Hex	2
48	DE Oil Slinger Set Screw	4
50	Drive End Cover	1
52	Drive End Oil Slinger	2
53	Oil Sight Glass	2

*Quantities vary by blower.

Universal RAI®-DSL Series Blowers Parts List 6” Gear Diameter

(Refer to drawing #T30382023)

Item #	Part Name	Qty.
1	Headplate Gear End	1
2	Headplate Drive End	1
3	Gearbox	1
4	Timing Gears	2
7	Gasket, Gear Box	1
11	Cylinder	1
12	Impeller & Shaft Drive	1
13	Impeller & Shaft Driven	1
14	Bearing, Ball	3
15	Bearing, Roller	1
16	Pin, Dowel	4
17	Gear Nut	2
19	Key	1
21	Plug, Pipe	3
23	Screw Hex Nylock	8
25	Breather (Plug Vent)	1
26	Screw, Hex	*
27	Seal, Lip Bearing	4
31	Screw, Hex, Nylock	4
32	Screw, Hex	10
33	Seal Lip-Drive	1
34	Clamp Plate	2
35	Foot	2
39	Washer Mounting	4
48	DE Oil Slinger Set Screw	4
50	Drive End Cover	1
52	Drive End Oil Slinger	2
53	Oil Sight Glass	2

*Quantities vary by blower.

Universal RAI Series Gas Blowers Parts List
3-1/2” & 5” Gear Diameter

(Refer to drawing #T30099023)

Item #	Part Name	Qty.
1	Headplate Gear End	1
2	Headplate Drive End	1
3	Gearbox	1
4	Timing Gears	2
5	Cover-Blind (Plug Opening)	1
7	Gasket, Gear Box	1
11	Cylinder	1
12	Impeller & Shaft Drive	1
13	Impeller & Shaft Driven	1
14	Bearing, Ball	3
15	Bearing, Roller	1
16	Pin, Dowel	4
17	Gear Nut	2
19	Key	1
21	Plug, Pipe	3
23	Screw Hex	8
25	Breather (Plug Vent)	1
26	Screw, Hex	14*
27	Seal, Bearing	4
31	Screw, Hex	4
32	Screw, Hex	4
33	Seal Lip-Drive	1
34	Clamp Plate	2
35	Foot	2
37	Fitting, Grease	2
38	Fitting, Relief	2
39	Washer Mounting	4
40	Screw Socket	2
42	Screw Hex	2

*Quantities vary by blower.

Universal RAI Series Gas Blowers Parts List
6” Gear Diameter

(Refer to drawing #T3011023)

Item #	Part Name	Qty.
1	Headplate Gear End	1
2	Headplate Drive End	1
3	Gearbox	1
4	Timing Gears	2
5	Cover-Blind (Plug Opening)	1
7	Gasket, Gear Box	1
7*	Gasket DE Cover	1
11	Cylinder	1
12	Impeller & Shaft Drive	1
13	Impeller & Shaft Driven	1
14	Bearing, Ball	3
15	Bearing, Roller	1
16	Pin, Dowel	4
17	Gear Nut	2
19	Key	1
21	Plug, Pipe	3
23	Screw Hex Nylock	8
25	Breather (Plug Vent)	1
26	Screw, Hex	14**
27	Seal, Bearing	4
31	Screw, Hex	4
32	Screw, Hex	10
33	Seal Lip-Drive	1
34	Clamp Plate	2
35	Foot	2
37	Fitting, Grease	2
38	Fitting, Relief	2
39	Washer Mounting	4
40	Screw Socket	2
42	Screw Hex	2
43	Plug	8
51	Shoulder Bolt	2
53	Oil Sight Glass	2

*DE cover gasket is not the same as the gasket used on the GE. You must specify the gasket required when ordering.
**Quantities vary by blower.

Specified Lubricants

ROOTS Synthetic Oil: ISO-VG-220 Grade

	Part Number
Quart	813-106-001
Gallon	813-106-002
Case (12 qts)	813-106-008

ROOTS Synthetic Oil: ISO-VG-320 Grade

	Part Number
Quart	813-106-004
Gallon	813-106-005
Case (12 qts)	813-106-007

ROOTS Synthetic Grease: NLGI #2

	Part Number
14.5 oz. Tube	T200019-001
5 Gallon Pail	T200019-003
Case (30 tubes)	T200019-002

Basic Connection & Drive Shaft Information

UNIVERSAL RAI (URAI) AIR BLOWERS

URAI AIR BLOWERS (with Grease Lubricated Drive End)

BOM # *	FRAME SIZE	INLET/DISCH CONN.	SHAFT DIAMETER	BARE WEIGHT
65102020	22	1" NPT	0.625"	32
65103020	24	2" NPT	0.625"	43
71048020	32	1.25" NPT	0.750"	69
65105020	33	2" NPT	0.750"	74
65106020	36	2.5" NPT	0.750"	102
65108020	42	1.5" NPT	0.875"	88
65109020	45	2.5" NPT	0.875"	109
65110020	47	3" NPT	0.875"	128
65112020	53	2.5" NPT	1.125"	143
65113020	56	4" NPT	1.125"	170
65114020	59	4" NPT	1.125"	204
65116020	65	3" NPT	1.375"	245
65117020	68	5" NPT	1.375"	285
65118020	615	6" Flange	1.375"	425
65120020	76	4" NPT	1.562"	400
65121020	711	6" Flange	1.562"	530
65122020	718	8" Flange	1.562"	650

Refer to Specification Sheet S-12K84

URAI-DSL AIR BLOWERS (with Dual Splash Lubrication *DSL*)

BOM # *	FRAME SIZE	INLET/DISCH CONN.	SHAFT DIAMETER	BARE WEIGHT
T30378020	32	1.25" NPT	0.750"	72
T30379020	33	2" NPT	0.750"	77
T30380020	36	2.5" NPT	0.750"	105
T30352020	42	1.5" NPT	0.875"	92
T30353020	45	2.5" NPT	0.875"	113
T30354020	47	3" NPT	0.875"	132
T30359020	53	2.5" NPT	1.125"	148
T30360020	56	4" NPT	1.125"	175
T30361020	59	4" NPT	1.125"	209
T30384020	65	3" NPT	1.375"	250
T30385020	68	5" NPT	1.375"	290
T30386020	615	6" Flange	1.375"	430

Refer to Specification Sheet S-27S03

Universal RAI air blowers include detachable mounting feet which permit vertical or horizontal installation. The units are center timed for rotation in either direction. The bearings on the URAI are grease lubricated on the drive end and splash lubricated on the gear end. The URAI-DSL is splash lubricated on BOTH ends.

UNIVERSAL RAI (URAI) GAS BLOWERS

URAI-G™ GAS BLOWERS (with Grease Lubricated Drive End)

BOM # *	FRAME SIZE	INLET/DISCH CONN.	SHAFT DIAMETER	BARE WEIGHT
710480G0	32	1.25" NPT	0.750"	69
651050G0	33	2" NPT	0.750	74
651060G0	36	2.5" NPT	0.750	102
651080G0	42	1.5" NPT	0.875"	88
651090G0	45	2.5" NPT	0.875	109
651100G0	47	3" NPT	0.875	128
651120G0	53	2.5" NPT	1.125"	143
651130G0	56	4" NPT	1.125	170
651140G0	59	4" NPT	1.125	204
651160G0	65	3" NPT	1.375"	245
651170G0	68	5" NPT	1.375	285
651180G0	615	6" NPT	1.375	425

Refer to Specification Sheet S-60A01

Universal RAI-G^{TM} gas blowers include detachable mounting feet which permit vertical or horizontal installation. **Feet are different for vertical and horizontal mounting**.

The units are center timed for rotation in either direction. The bearings on the Universal RAI-GTM are grease lubricated on the drive end and splash lubricated on the gear end. ROOTS Synthetic lubricant is recommended.

UNIVERSAL RAI (URAI-J) WHISPAIR AIR BLOWERS

URAI-J WHISPAIR AIR BLOWERS (with Grease Lubed Drive End)

BOM # *	FRAME SIZE	INLET/DISCH CONN.	SHAFT DIAMETER	BARE WEIGHT
74065020	33J	2" NPT	0.750"	84
74086020	36J	2.5" NPT	0.750	112
74066020	45J	2.5" NPT	0.875"	119
74087020	47J	3" NPT	0.875	138
74067020	56J	4" NPT	1.125"	180

Refer to Specification Sheet S-33A93

URAI-J-DSL WHISPAIR AIR BLOWERS (with Dual Splash Lubrication *DSL*)

BOM # *	FRAME SIZE	INLET/DISCH CONN.	SHAFT DIAMETER	BARE WEIGHT
T30417020	33J	2" NPT	0.750"	87
T30418020	36J	2.5" NPT	0.750	115
T30410020	45J	2.5" NPT	0.875"	122
T30412020	47J	3" NPT	0.875	141
T30415020	56J	4" NPT	1.125"	185

Refer to Specification Sheet S-30S03

URAI-J METRIC WHISPAIR AIR BLOWERS (with Grease Lubed Drive End)

BOM # *	FRAME SIZE	INLET/DISCH CONN.	SHAFT DIAMETER	BARE WEIGHT
TBD	33J	2" BSP	19 mm	84
740860M0	36J	2.5" BSP	19 mm	112
TBD	45J	2.5" BSP	24 mm	119
TBD	47J	3" BSP	24 mm	138
TBD	56J	4" BSP	28 mm	180

URAI-J-DSL METRIC WHISPAIR AIR BLOWERS (with Dual Splash Lubrication *DSL*)

BOM # *	FRAME SIZE	INLET/DISCH CONN.	SHAFT DIAMETER	BARE WEIGHT
TBD	33J	2" BSP	19 mm	87
T304660M0	36J	2.5" BSP	19 mm	115
TBD	45J	2.5" BSP	24 mm	122
T304550M0	47J	3" BSP	24 mm	141
TBD	56J	4" BSP	28 mm	185

Universal RAI-J air blowers incorporate the patented WhispairTM design in addition to the same features as the original URAI blowers. The URAI-J's are center timed, however the WhispairTM benefits can only be realized when the jet is located in the discharge position.

UNIVERSAL RAI METRIC (URAI-M) AIR BLOWERS

NOTE: METRIC URAI product has metric shaft diameter and connection sizes

URAI-METRIC AIR BLOWERS (with Grease Lubricated Drive End)

BOM # *	FRAME SIZE	INLET/DISCH CONN.	SHAFT DIAMETER	BARE WEIGHT
651020M0	22	1" BSP	16 mm	32
651030M0	24	2" BSP	16 mm	43
710480M0	32	1 1/4" BSP	19 mm	69
651050M0	33	2" BSP	19 mm	74
651060M0	36	2 1/2" BSP	19 mm	102
651080M0	42	1 1/2" BSP	24 mm	88
651090M0	45	2 1/2" BSP	24 mm	109
651100M0	47	3" BSP	24 mm	128
651120M0	53	2 1/2" BSP	28 mm	143
651130M0	56	4" BSP	28 mm	170
651140M0	59	4" BSP	28 mm	204
T30392060	65	3" BSP	32 mm	245
T30394060	68	5" BSP	32 mm	285
T30390060	615	150 NP10	32 mm	425
T30396060	76	4" BSP	38 mm	400
T30398060	711	150 NP10	38 mm	530
T30400060	718	200 NP10	38 mm	650

URAI-DSL-METRIC AIR BLOWERS (with Dual Splash Lubrication *DSL*)

BOM # *	FRAME SIZE	INLET/DISCH CONN.	SHAFT DIAMETER	BARE WEIGHT
T30463060	32	1 1/4" BSP	19 mm	72
T30464060	33	2" BSP	19 mm	77
T30465060	36	2 1/2" BSP	19 mm	105
T30451060	42	1 1/2" BSP	24 mm	92
T30452060	45	2 1/2" BSP	24 mm	113
T30453060	47	3" BSP	24 mm	132
T30459060	53	2 1/2" BSP	28 mm	148
T30460060	56	4" BSP	28 mm	175
T30461060	59	4" BSP	28 mm	209
T30472060	65	3" BSP	32 mm	250
T30473060	68	5" BSP	32 mm	290
T30474060	615	150 NP 10	32 mm	430

Universal RAI air blowers include detachable mounting feet which permit vertical or horizontal installation. The units are center timed for rotation in either direction. The bearings on the URAI are grease lubricated on the drive end and splash lubricated on the gear end. The URAI-DSL is splash lubricated on BOTH ends.

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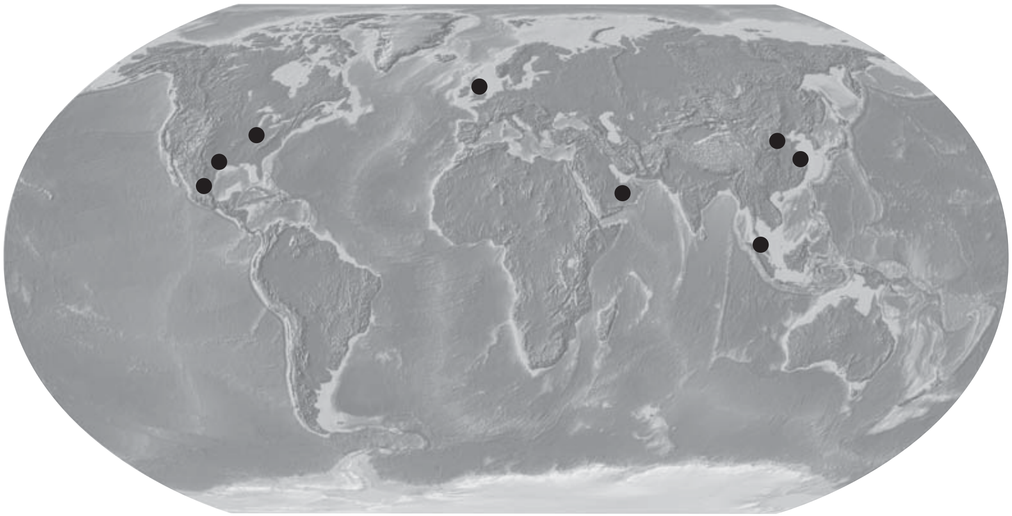

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APPENDIX B
Monthly O&M Log Forms

DRAFT

PAGE _______ OF _______

GENERAL NOTES

PROJECT NAME:	DATE:	TIME ARRIVED:
PROJECT NUMBER:	AUTHOR:	TIME LEFT:

WEATHER

TEMPERATURE: __________ °F WIND: __________ MPH VISIBILITY: __________

WORK / SAMPLING PERFORMED

PROBLEMS ENCOUNTERED	CORRECTIVE ACTION TAKEN

COMMUNICATION

NAME	REPRESENTING	SUBJECT / COMMENTS

INVESTIGATION DERIVED WASTE SUMMARY

WASTE MATRIX	QUANTITY	COMMENTS

SIGNED DATE

CHECKED BY DATE

REVISED 06/2011

DRAFT

PAGE _______ OF _______

SVE Pilot Test O&M Log

PROJECT NAME:	MRP - SVE Pilot Test	PREPARED		CHECKED	
PROJECT NUMBER:	234854.0000.0000	BY:	DATE:	BY:	DATE:

TEMPERATURE (^oF):	BAROMETRIC PRESSURE (in-Hg):	WEATHER:

Blower Readings

Blower Hours: **NA**
Blower Amperage: **NA**
Make-up Air Valve Setting (0-8) ____________
Make-up Air Rate: **NA**
Blower Vacuum (in Hg) ____________
Blower Flow: ____________
Blower Temp.: ____________
Blower PID: ____________
Blower Outlet Pressure: ____________
Blower Outlet Flow: **NA**
Blower Outlet Temp.: **NA**
Blower Outlet PID:

Monitoring Point Readings

Location	Time	Vacuum
MP-1S		
MP-1D		
MP-2S		
MP-2D		
MP-3S		
MP-3D		
MP-4S		
MP-4D		
MP-5S		
MP-5D		
MP-6S		
MP-6D		

Extraction Well Readings

Location	Time	Vacuum (in. H_20)	Humidity (%)	Temp (^oF)	Flow Rate (SCFM)	PID (ppm)	Notes
SVE-1							
SVE-2							
SVE-3							

Weekly Inspection Tasks

☐ Inspect Trailer Plumbing
☐ Lubrication of Blower
☐ Condensate Volume: ____________
☐ Volume Removed (gal): ____________
☐ Inspect SVE plumbing
☐ Inspect well/probe flush mount cover integrity

Monthly Inspection Tasks

☐ Inspect Transfer Pump
☐ Inspect all tanks
☐ Inspect all electrical connections
☐ Inspect flow meter
☐ Inspect blower oil
☐ Inspect/clean vent screens

Notes:

Prior to blower maintanence, turn blower off and allow to cool.

Lubricant Type: NLGI #2 premium grade aluminum complex grease, Roots P/N T20019001; **Oil Type:** 30w non-detergent or ROOTS synthetic oil (Roots P/N 813-106)

Lubrication Procedure: Add Lubricant at each of two lubrication points; pump lubricant **SLOWLY** until it begins to exude the oposite side of the blower

Oil Change Procedure: Open oil reservior at top and bottom, allowing oil to drain into the waste container. Once fully drained, close bottom and open side fitting. Use funnel to slowy add oil (~1/2 quart). Oil reservior is full when oil begins to ooze from the side fitting. Close top and side fitting.

Notes: ____________

BEFORE LEAVING:

(1) VERIFY THAT THE SYSTEM IS RUNNING (check that blower is running at expected SCFM).
(2) CALL PM/PROJECT ENGINEER AND GIVE SUMMARY OF SITE VISIT.
(3) MAKE SURE WELLS ACCESSED, SVE TRAILER, AND SITE GATE ARE CLOSED, LOCKED.

REVISED 06/2011