VIRGINIA DEPARTMENT OF ENVIRONMENT QUALITY

WASTE DIVISION

OFFICE OF REMEDIATION PROGRAMS

STATEMENT OF BASIS

UNIVAR USA INC.

MARTINSVILLE, VIRGINIA

EPA ID NO. VAD003111416

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1. INTRODUCTION

1.1 Facility Name

The Virginia Department of Environmental Quality (VDEQ) has prepared this Statement of Basis for Univar USA Inc. located at 825 Fisher Street, Martinsville, Virginia (hereinafter referred to as the Facility or Univar).

The Facility is subject to the Corrective Action Program under the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act (RCRA) of 1976, and the Hazardous and Solid Waste Amendments (HSWA) of 1984, 42 U.S.C. Sections 6901 to 6992k. The Corrective Action Program is designed to ensure that certain facilities subject to RCRA have investigated and cleaned up any releases of hazardous waste and waste constituents that have occurred at their property.

Information on the Corrective Action Program can be found by navigating http://www.epa.gov/reg3wcmd/correctiveaction.htm.

VDEQ has prepared this Statement of Basis in cooperation with the United States Environmental Protection Agency (EPA). VDEQ has reviewed all available Facility data and has determined that remediation is necessary for the Facility to satisfy its RCRA Corrective Action obligations.

VDEQ proposes its final remedy for the Facility in this Statement of Basis and is providing the opportunity for public comment and review on its proposal and the associated permit modification.

The Administrative Record (AR) for the Facility contains all documents, including data and quality assurance information, on which VDEQ's proposed decision is based. See Section 9.0, Public Participation, for information on how you may review the AR.

1.2 Proposed Decision

This Statement of Basis explains VDEQ's proposed decision that further actions to remediate soil and groundwater, also known as corrective measures, are necessary to protect human health and the environment given current and reasonably anticipated future land use. VDEQ's proposed decision requires the Facility to operate and maintain an aerobic bioremediation enhancement system, a soil vapor extraction system, and recovery of light non aqueous phase liquid (LNAPL). Additional remedial measures may be implemented as contingent remedies based on the effectiveness of the proposed remedies described. Institutional controls to restrict groundwater use and land use are proposed as well. The proposed corrective measures are discussed in Section 6.0.

This Statement of Basis summarizes information that can be found in greater detail in the work plans and reports reviewed by VDEQ, which can be found in the Administrative Record. The following figures are included:

- Figure 1 – Site Plan - Current Solid Waste Management Units (SWMUs), Hazardous Waste Management Units (HWMUs), and Areas of Concern (AOCs);

- Figure 2 - Well, Piezometer, and Surface Water Sample Location Map;
- Figure 3 - Soil Vapor Extraction, Biovent, and LNAPL Recovery System Plan;
- Figure 4 - Total BTEX (benzene, toluene, ethylbenzene and xylenes) Plus MBTE (methyl tert-butyl ether) Isocontour Map;
- Figure 5 - Total Chlorinated Volatile Organic Compound (VOC) Isocontour Map;
- Figure 6 - Total Ketones Isocontour Map; and
- Figure 7 - Proposed Remedial Measures Plan.

Table 1 shows the list of COCs and the respective remediation goals.

1.3 Importance of Public Input

The purpose of this document is to solicit public comment on VDEQ's proposed remedy prior to VDEQ completing its remedy selection for the Facility. The public may participate in the remedy selection process by reviewing this Statement of Basis and documents contained in the Administrative Record in support of VDEQ's proposed decision and submitting written comments to VDEQ during the public comment period. The information presented in this Statement of Basis can be found in greater detail in the work plans and reports submitted by the Facility to VDEQ and EPA. To gain a more comprehensive understanding of the RCRA activities that have been conducted at the Facility, VDEQ encourages the public to review these documents, which are found in the Administrative Record. A copy of the Administrative Record is available for public review, in electronic format, from the VDEQ contact person, whose address and telephone number is provided in Section 9.0.

VDEQ will make a final decision after considering all comments received during the comment period, consistent with applicable RCRA requirements and regulations. If the decision is substantially unchanged from the one proposed, VDEQ will issue a final decision and inform all persons who submitted written comments or requested notice of VDEQ's final determination. If the final decision is significantly different from the one proposed, VDEQ will issue a public notice explaining the new decision and will reopen the comment period. Each person who has submitted written comments will receive a written response from VDEQ.

VDEQ will incorporate the remedy selection in its modification of the Facility's Hazardous Waste Management Permit for Site-Wide Corrective Action.

2. FACILITY BACKGROUND

In 1947, the Prillaman Chemical Corporation (Prillaman) established a chemical distribution and solvent recycling, blending, and processing operation at 825 Fisher Street, Martinsville, Virginia. The Facility operated until 2001 when it was sold to Univar USA Inc. No known industrial usage occurred at this property prior to 1947. In 2003, Univar initiated closure of the Facility's industrial operations.

Customers served by the Facility included businesses involved with furniture manufacturers, dry cleaning, textiles, boat manufacturing, and associated industries. The former recycling operations required the storage and treatment of hazardous wastes shipped to the Facility by industrial customers. Prillaman provided hazardous waste management services under its permit issued by the Virginia Department of Environmental Quality (DEQ) in 1984. Hazardous wastes managed primarily included spent solvent products and reclaimed waste coating materials generated by furniture and other manufacturers.

The former operations area of the Facility is located in a hilly area, on a topographic high (approximate surface elevation of 977 feet [North American Vertical Datum 1988]). The main processing areas are located at the top of a slope which falls approximately 50 feet vertically to an unnamed tributary to Mulberry Creek (tributary), which flows generally from west to east along the northern property boundary. The area surrounding the Facility is zoned light industrial/residential.

The total property area is approximately 2.5 acres with about 1.3 acres occupied by the Facility's former offices, warehouse, distribution, recycling, and storage areas. Several non-hazardous chemical-handling areas existed at various topographic levels at the Facility. Those areas were used to recycle, repack, store, and distribute chemicals throughout the Facility. The area surrounding the facility has public water and sewer service supplied by the City of Martinsville. Martinsville's water is supplied by Beaver Creek Reservoir, located approximately 3.5 miles northwest of the Facility. No known drinking water supply wells exist downgradient of the Facility.

3. SUMMARY OF ENVIRONMENTAL INVESTIGATIONS AND INTERIM MEASURES

3.1 Environmental Investigations

Univar began environmental investigations at the Facility in 2003. Since then, numerous phases of work have been completed involving the sampling and analysis of soil, sediment, groundwater, surface water, and air. Initial corrective action activities (interim measures) for soil and groundwater were also implemented. The major phases of work completed and the associated dates are described below.

3.2 HWMU Closure

In 2003, prior to conducting sitewide environmental investigations, Univar implemented several activities for various SWMUs and HWMUs. This work included cleaning and removal of aboveground storage tanks (ASTs) and associated piping; and decontaminating of HWMU concrete surfaces using high pressure washing with surfactants and rinsing. Six HWMUs were addressed during the closure activities initiated in December 2003: 1) Tank Area A; 2) Tank Area B; 3) Former Tank Area; 4) Drum Storage Area #1; 5) Drum Storage Area #2; and 6) Drum Storage Area #3. Shallow and deep soil samples collected from each area were analyzed for VOCs, SVOCs, alcohols, and selected metals. Several of these constituents showed concentrations above the EPA Region III risk-based screening levels (RBSLs) for the protection of groundwater in all the units, but only ethylbenzene and arsenic resulted above the RBSLs for residential or industrial scenarios.

Based on the results of the hazardous waste related closure soil sampling and its knowledge of historic operations at the Facility, Univar conducted additional sampling at locations throughout the Facility. The intent of the expanded sampling program was to determine the source(s) and extent of subsurface impacts at the Facility. Due to the relatively small footprint of the former Facility, and the nature of past operations, it was postulated that operations in former process areas impacted soil and groundwater throughout the Facility, including beneath permitted areas. Due to the detected hazardous COCs in soils, subsoils, and groundwater, the Facility has not completed closure of the container storage and tank storage HWMUs. Due to the inability to clean close the units, the Department agreed to modify the Closure Plan schedule. A Class 1 Permit modification was submitted to VDEQ on March 21, 2013, and was approved by VDEQ in a letter dated April 3, 2013. In a letter dated April 9, 2013, the facility requested the referral of all the HWMUs to the Corrective Action program due to the inability to clean close them. The request was approved in a letter by the Department dated April 24, 2013.

The HWMUs, SWMUs and AOCs are listed below and shown in Figure 1.

1. Tank Area A and B: included still bottoms from the reclaiming of halogenated, non-halogenated spent solvents, and ignitable spent solvents.

2. Former Tank Area.

3. Drum Storage Areas 1, 2 and 3: used for storage of hazardous wastes.

4. Soil beneath the former Virgin Tank Farm (SWMU #31): Tanks, piping and valves have been removed.

5. Soil beneath the Former Manifold Room (SWMU #32): adjacent to the Virgin Tank Farm, it was formerly used to house manifold equipment.

6. Soil beneath the Former Recycle Area (SWMU #33): formerly housed several units used to separate and recycle non-hazardous spent product.

7. Soil beneath the Former Solvent Still (SWMU #34): formerly used as distillery for purifying spent solvent.

8. Site-Wide Groundwater (AOC #34).

9. Unnamed Tributary to Mulberry Creek (AOC #35).

10. LNAPL beneath the Virgin Tank Farm and around monitoring well MW-R8 (AOC #36): area of light non-aqueous phase liquid material in groundwater. It possibly originated from the Virgin Tank Farm or Manifold Room.

3.3 Phase I RFI

During the Phase I RFI, the following field activities were completed:

- Installed, gauged, and sampled groundwater monitoring wells and piezometers;
- Collected shallow soil and seep samples from the banks of the tributary;
- Collected surface water samples from the tributary and gauged stream flows;
- Installed a stormwater infiltration gallery west of, and upgradient to, any known subsurface impacts at the Facility;
- Completed two separate geophysical surveys to map bedrock contours at the Facility;
- Completed a Membrane Interface Probe (MIP) investigation to aid in defining the vertical and horizontal extent of subsurface volatile organic compound (VOC) impacts;

3.3.1 Soil Sampling and Analysis along Unnamed Tributary

Soil samples were collected at several locations along the south bank of the tributary to characterize the soils adjacent to the Tributary. The soil samples were collected to a maximum depth of 8 feet bgs and were analyzed for VOCs, SVOCs, alcohols, arsenic, barium, chromium, and lead. The following compounds were detected in one or more soil samples above the RBSLs for the protection of groundwater:

- Acetone;
- 2-Butanone;
- 1-1-Dichloroethane;
- Ethylbenzene;
- 4-Methyl-2-pentanone;
- Tetrachloroethene;
- Toluene;
- Xylene (total);
- n-Butanol;
- 2-Ethoxyethanol; and
- Arsenic.

Ethylbenzene was also detected in one sample above the RBSL for direct exposure (industrial scenario).

3.3.2 Surface Water (Tributary) Data

In 2005, surface water samples were collected from eight locations along the Tributary to determine the general quality of the stream. Those results indicated that the Tributary upstream of the Facility did not contain detectable concentrations of VOCs. VOC concentrations were detected downstream but showed a decrease in a downstream direction, except for acetone, chloroethane, ethylbenzene, and toluene. Only two SVOCs were detected in surface water samples (bis-(2-chlorisopropyl)ether and 2,4-dinitrophenol).

3.3.3 Groundwater Sampling and Analysis

Between March 2004 and April 2005, thirteen monitoring wells, numbered MW-R1 through MW-R8, MW-R9S, MW-R9D, MW-HS1S, MW-HS1D, and MW-HS2, were installed and sampled for VOCs and alcohols. Also, thirteen piezometers, numbered TP-1 through TP-3, TP-5 through TP-8, TP-9S, TP-9D, TP-10, TP-11S, TP-11D, and TP-14, were installed in the area of the tributary (Figure 2) and sampled for VOCs and alcohols.

The predominant detected compounds in the groundwater included the VOCs acetone, 2-butanone, 4-methyl-2-pentanone, toluene, xylene, chloroethane, and lesser concentrations of trichloroethene and tetrachloroethene, and their daughter products. The latter group of chlorinated VOCs was detected primarily in groundwater in the eastern portion of the site. Lower concentrations of benzene, ethylbenzene, and vinyl chloride were detected in samples from wells and piezometers on the south side of the Tributary. None of the piezometers on the north side of the Tributary contained VOCs, except for TP-9D. The following compounds were detected above their respective MCLs in one or more samples:

- Benzene;
- Toluene;
- Ethylbenzene;
- Xylene (total)
- 1,2-Dichloroethane;
- 1,1-Dichloroethylene;
- cis-1,2-Dichloroethylene;
- 1,2-Dichloropropane;
- Methylene chloride (Dichloromethane);
- Trichloroethene;

- Tetrachloroethene;
- 1,1,1-Trichloroethane;
- 1,1,2-Trichloroethane; and
- Vinyl chloride.

Alcohols were detected in samples from six of the eleven sampled monitoring wells, and in five of the thirteen piezometers near the Tributary. The detected alcohol concentrations ranged from 2.9 mg/L in MW-HS2 to 10,700 mg/L in the sample from well MW-R1. MCLs for alcohols were not established, but ethylene glycol, isobutyl alcohol, 2-ethoxyethanol, and methanol were detected above their respective tapwater RBSLs.

Eight RCRA metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver) were analyzed in groundwater samples from six monitoring wells, showing detections for barium, lead and chromium, all below their respective MCLs.

3.3.4 Phase I Conceptual Site Model (CSM)

The data used to develop the CSM presented in the Phase I RFI showed that primarily VOCs and lesser amounts of alcohols were released to the subsurface over decades of operation. The primary source areas were the virgin tank farm and manifold room, located on the western portion of the property, and the recycling area, located in the northeastern portion of the Facility (Figure 1). Lesser amounts of VOCs were released in other areas of the site, including the solvent still near the stormwater tank, and in the vicinity of the Quonset huts.

Chemicals released at the ground surface in process areas traveled vertically downward until they encountered the water table, generally at depths of approximately 35 feet. Some of the released chemicals were VOCs with densities less than water, and some were VOCs with densities greater than water. A layer of LNAPL was measured in some wells in the vicinity of the virgin tank farm and manifold room. The remaining released chemicals were chlorinated VOCs and alcohols. No evidence of separate phase dense, non-aqueous phase liquid (DNAPL), or alcohols were measured in any of the site monitoring wells.

Groundwater from the site flows to the north, where it is discharged to the Unnamed Tributary to Mulberry Creek (tributary). Evidence of impact in the tributary from seeps and surface water samples has been collected during the investigation. The impacted groundwater does not appear to flow past the tributary, based on data collected on the north side of the tributary.

The CSM was used to focus site investigation and resources for the Phase II RFI and Univar used these data to refine the CSM as required. The results of the Phase I RFI were documented in a report submitted to DEQ (BEI, 2006).

3.4 Trench Interim Measure

During the initial investigations, seeps discovered near the base of the hill near the tributary were determined to be likely sources of contaminants migrating to the tributary. Six seep samples were collected and analyzed for VOCs and alcohols, exhibiting a maximum concentration of total VOCs of 284 mg/Kg, and a maximum concentration of total alcohols of 183 mg/Kg. In response, Univar designed and installed a bioaeration trench interim measure (Figure 2) to minimize or eliminate VOCs from reaching the tributary. The 170-foot long trench was located to intercept the seeps and shallow groundwater and installed parallel to the tributary. The bottom of the trench was excavated to a maximum depth of about 12 feet below ground surface and four sections of slotted horizontal piping were placed along the bottom to distribute air into the trench. The trench was completed by filling it with gravel to the ground surface and pouring a concrete slab over its length. A series of groundwater extraction wells were installed within the trench to recirculate water, injection wells were installed upgradient, and monitoring points were installed to evaluate its effectiveness.

In September 2006, initial operation of the trench began by injecting compressed air into the horizontal piping, recirculating groundwater using extraction wells EW-1 and EQ-1, and injecting air into injection wells IW-1 and IW-2 (Figure 2). These extraction and injection wells were installed within the aeration trench. These methods were designed to strip VOCs and provide oxygen for in-situ biological treatment. After initial performance monitoring, in early 2007, trench operations were modified by increasing pump and blower capacities and installing an oxygen generator for the injection wells. Other changes to operation of the aeration trench were made over time to optimize its treatment efficiency.

In March 2009, Univar installed a line of five additional oxygen injection wells (INJ-1 through INJ-5) immediately upgradient from the trench (Figure 2). In October and November 2011, the Facility installed several additional injection, extraction and monitoring wells in the area adjacent to the Tributary to further evaluate the groundwater along the Tributary. Three extraction wells (EW-1 through EW-3) were installed upgradient from the aeration trench to supplement the existing trench operation, and to treat groundwater in a bedrock trough in that area (Figure 2).

Between October and November 2011, twelve injection wells (INJ-6 though INJ-17) were installed east and west of the existing aeration trench to allow expansion of the aeration operations in affected areas (Figure 2). Since startup, various monitoring points in and around the trench have been sampled quarterly. As of October 2012, a 99% reduction in VOC concentrations compared to baseline conditions (September 2006) was documented in most of these locations. Total VOC concentrations in surface water samples have fluctuated since operation of the bioaeration trench system. Sampling events with higher VOC concentrations may correspond to drought conditions in the area or seasonal changes in the volume of groundwater received by the tributary. Total VOC concentrations have remained at or below baseline concentrations. Univar will continue to evaluate the system performance to ensure continued protection of the stream.

3.5 Soil Vapor Extraction (SVE) Interim Measure

In October 2004 and September 2005, Univar completed short-term (one to two day) SVE pilot tests at the site to assess whether SVE could effectively remove VOCs in the vadose zone soils. During the test, a regenerative blower was connected to a single vertical extraction well and air sample data from the blower discharge showed that a significant mass of VOCs was removed by this technology. Therefore, between October 2005 and March 2006, Univar completed a long-term pilot test designed to further evaluate the potential air emissions and to evaluate the effectiveness of SVE at removing LNAPL. For this test, a total of 29 vertical extraction wells were installed in various source areas, each of which could be individually opened to the blower (Figure 3?). During the long-term pilot test, the blower used for the short-term test was used and various combinations of extraction wells were tested. Based on the positive results of this test, Univar submitted to DEQ a design and work plan for a full-scale system and also applied for and received an air discharge permit. The air discharge permit issued by DEQ established the VOC mass emissions for a 12-month period at 9.9 tons.

Full-scale operation of the SVE system began in December 2009 and is ongoing. Ten extraction wells were initially opened to the blower and additional wells were added over time. The calculated mass emissions from the system are summarized below.

Calendar Year	Total VOC Emissions (Tons)	Allowable VOC Emissions (Tons)[1]	Total HAP[2] Emissions (Tons)
2010	2.0	9.9	1.7
2011	2.9	9.9	2.4
2012	0.95	9.9	0.76

[1] Allowable emissions per air permit based on 12 month period.
[2] Hazardous air pollutant.

The LNAPL removal efficiency of the SVE system has not been calculated since LNAPL occurrence is highly variable. However, semi-quantitative observations (PID readings from the SVE discharge stack) show that SVE wells within the LNAPL plume generally extract higher concentrations of total VOCs than SVE wells in other areas on the site. LNAPL thickness is periodically measured during operation of the SVE system and used to assess the removal of the LNAPL. Thickness measurements are collected while the SVE system is turned off.

3.6 LNAPL Investigation and Recovery Pilot Test

A plume of LNAPL was characterized in the vicinity of the former virgin tank farm and manifold room using data from monitoring wells and piezometers. Between 2005 and 2010, periodic LNAPL thickness measurements were collected from wells in this area with an electronic meter, and corrected thicknesses of up to 0.6 feet were documented. Samples of the LNAPL showed that each had similar characteristics, indicating that they likely originated from the same source. Toluene, which was stored in the virgin tank farm in an Aboveground Storage Tank (AST), is the major chemical detected in the samples, and all samples had a density of less than 1 gram per milliliter, indicative of LNAPL.

The primary source of LNAPL appeared to be the virgin tank farm and the downgradient extent of the LNAPL plume (where the plume was reduced to a sheen on the groundwater) was approximately 140 feet from the virgin tank farm. During certain periods, the LNAPL is likely present in small pockets but rendered immobile due to changing subsurface conditions. In December 2009, the SVE system began operation and a well within the LNAPL plume was connected to the SVE blower. Several measurements from this well indicated that the SVE system removed LNAPL, while data collected from a well located in the virgin tank farm about 20 feet from the nearest SVE well indicated that the SVE system did not have a significant effect on LNAPL thickness at that distance. Monitoring LNAPL occurrence and thickness continues in conjunction with operation of the SVE system.

In February 2008 Univar conducted a pilot LNAPL recovery test using a submersible air-operated skimmer pump with an integrated hydrophobic filter. The pump was first installed in well MW-R6 inside of the virgin tank farm and operated with a compressed nitrogen cylinder and battery operated pump controller. The pump discharge was directed into a 55-gallon steel closed-top drum with an automatic high level shutoff. During the pilot test, LNAPL thickness measurements were made and the pump was moved to different wells within the virgin tank farm if they showed significant accumulations of product. In 2010, the pilot recovery test was suspended due to diminished recovery rates. About 50 gallons of LNAPL were recovered during the test. Figure 3 shows the network of LNAPL monitoring and recovery wells.

3.7 Phase II RFI

Between February and June 2010, Univar completed the following Phase II RFI tasks:

- Collected and analyzed data on the thickness and extent of the LNAPL plume in the vicinity of the virgin tank farm;
- Operated the soil vapor extraction system and evaluated its effect on the LNAPL plume;
- Installed shallow and deep monitoring well pairs near the former solvent still on either side of tributary;
- Collected samples from the new monitoring wells (two events) and submitted them for laboratory analysis;
- Completed a series of HydroPunch borings off-site along Fisher Street and the tributary; and
- Collected surface water samples in the tributary from off-site locations and submitted them for laboratory analysis.

The activities listed above are discussed in greater detail in the following sections.

3.7.1 LNAPL Removal

To help remediate the LNAPL plume, beginning late May 2010, polyethylene bailers were used to periodically remove accumulated product in selected wells, and the product was placed into a satellite accumulation area (55-gallon closed-top drum) for future off-site disposal. Between May 2010 and January 2012, about 50 gallons of a product/groundwater mixture were removed by bailing. Significant variations in LNAPL thickness were measured in closely spaced monitoring wells. This phenomenon was most notable in monitoring points installed in the manifold room, where monitoring wells installed within 5 feet of a location containing LNAPL did not indicate the presence of LNAPL. These data indicate that the LNAPL plume is not a continuous and hydraulically connected layer, but rather a series of smaller areas in which LNAPL is trapped due to various factors such as soil porosity, capillary pressure, and grain size. Changes in water table elevation, natural groundwater gradients, and ongoing remediation activities (SVE) also affect the migration of LNAPL.

3.7.2 Well Installation and Sampling

In December 2009, two monitoring well pairs were installed near the former solvent still to better characterize the horizontal and vertical extent of groundwater impacts. One well pair (MW-14S and MW-14D) was installed within about 50 to 60 feet downgradient from the former solvent still and the second well pair (MW-15S and MW-15D) was installed on the opposite side (north side) of the tributary (Figure 2). At these locations, the depth to groundwater was only about 2 to 3 feet below ground surface (ft bgs). Samples from the new monitoring wells were submitted for analysis of VOCs and alcohols. On a concentration basis, non-chlorinated VOCs were dominant in wells south of the tributary. Six chlorinated (with the highest concentration for 1,1,1-TCA) and seven non-chlorinated VOCs (with the highest concentrations for acetone, toluene, and 2-butanone) were detected in these wells above risk-based screening levels (RBSLs) or maximum contaminant levels (MCLs) promulgated at 40 C.F.R. 141, pursuant to Section 1412 of the Safe Drinking Water Act (SDWA), 42 USC Section 300g-1. These data indicate that a release from the solvent still area likely impacted the tributary. During both sampling events, VOCs and alcohols were not detected in wells north of the tributary, which provided further evidence that impacted groundwater did not migrate beyond the tributary.

In October 2011, seven monitoring wells (BR-13 through BR-19, Figure 2) were installed to depths approximately one foot into the bedrock in the far eastern portion of the site to better define the groundwater quality in that area. The samples were analyzed for VOCs and reported detections primarily of aromatic hydrocarbons, although high ketone detection was reported in BR-13.

3.7.3 Off-Site Groundwater Sampling

In April 2010, HydroPunch borings were completed off-site east of the former Prillaman Facility. At six locations along Fisher Street, the drill rig encountered refusal (between 22 and 40 ft bgs) above the water table, so no samples were collected and each boring was abandoned. The remaining borings were located on a west to east line about 160 feet wide along the south bank of the tributary. The total depth of the borings was between 5 and 14 ft bgs. Groundwater samples from these borings and from an existing piezometer (also off-site) were collected and submitted for analysis of VOCs and alcohols. With the exception of benzene detected near the detection limit at the piezometer, only chlorinated VOCs were detected in these samples. Alcohols were not detected in any of the samples.

In April-May, 2011 Univar completed additional field work to better characterize the nature and extent of off-site impacts. A different drilling technique was applied to penetrate the weathered saprolite above the bedrock (air hammer with push rig). Two new monitoring wells were installed about 170 feet east of the site and sampled for VOCs. One well was located near Fisher Street and the second well was installed near the tributary. At the well along Fisher Street, VOCs were not detected. Several chlorinated VOCs were detected at the well near the tributary just above the laboratory detection limits. These results provided data confirming the extent of groundwater impacts to the east.

3.7.4 Off-Site Surface Water Sampling

In February 2010, Univar collected samples of surface water from five locations in the tributary and submitted them for analysis of VOCs and alcohols. The first sample was located about 500 feet east of the northeast corner of the Univar property and subsequent samples were collected a linear distance of about 400-450 feet from each other. Five VOCs (acetone, 2-butanone, 4-methyl-2-pentanone, chloroethane, and toluene) were detected in one or more of the stream samples. Except for toluene, surface water quality criteria (for human health) were not available for any of the detected compounds. The detected concentrations of toluene in all samples were well below the Virginia water quality criterion for human health. Surface water results were also compared to available freshwater screening criteria for aquatic organisms published by USEPA Region III. Except for toluene, all results were below these screening criteria. Detected concentrations in the tributary decreased with increasing distance from the Univar property.

3.8 Phase II Conceptual Site Model (CSM)

Phase II RFI data were evaluated to refine the CSM developed in the Phase I RFI report. The mechanisms through which impacts to groundwater occur remain unchanged, but the nature and extent of impacts were updated. Data from new monitoring wells, sparge wells on the eastern end of the site and the sampling data from sparge wells near the stormwater tank indicate that there are several plumes of various contaminants originating from multiple areas (virgin tank farm, stormwater tank area, and various former processing locations to the east) that merge into a single plume as they migrate downgradient towards the tributary (Figures 4, 5, and 6). In general, ketones and hydrocarbons (BTEX) are the major VOCs with lower concentrations of chlorinated VOCs (in both the eastern and western portions of the site). Analytical data from the injection wells east of the trench indicate that the chlorinated VOCs are fairly well degraded in the eastern end of the site and that compounds at concentrations less than 500 ug/L remain in these wells. At the eastern-most injection wells, ketones and BTEX compounds are not present, and only low-level chlorinated compounds are present. In the western-most wells (downgradient from the stormwater tank) significant concentrations of ketones, BTEX and chlorinated VOC (greater than 10 mg/L) remain.

Univar expects to enhance the site’s biological site activity by pH adjustment and oxygenation. The hydrocarbons and ketones should easily degrade under these enhancement conditions and the residual total organic carbon (TOC) in the groundwater will enhance anaerobic dechlorination despite the addition of oxygen. pH moderation is expected to greatly improve dechlorination of the VOCs. The high oxygen demand in the groundwater will render the site hypoxic (low dissolved oxygen) that can allow anaerobic and aerobic reactions to proceed for a few years despite the oxygenation and it is expected that the chlorinated VOCs will degrade during this time frame. Chlorinated VOC daughter products will degrade aerobically under low oxygen conditions representing a second likely degradation pathway.

4. SUMMARY OF HUMAN HEALTH RISK

4.1 Soil Exposure Pathways

The Facility's future land use evaluation and feasible use of the property in the foreseeable future supported an industrial land use scenario as the reasonable scenario. The remediation goals for soil at the Facility will be based on industrial exposure scenario and protection of groundwater screening levels.

Human health exposure of contaminated surface soil may exist as an exposure pathway to workers, construction workers, and trespassers. Soils and subsoils are covered by concrete and asphalt and the site is enclosed by a chain link fence. The lower perimeter of the Facility may expose workers and trespassers by direct contact with the contaminated subsurface soils in the vicinity of the unnamed tributary of Mulberry Creek. The Facility has posted signs in this area warning trespassers and advising of site contamination. No workers are at the Facility site except the environmental consultants and construction workers performing the remediation.

4.2 Groundwater Exposure Pathways

Groundwater is not used at the Facility for drinking water; Univar and the City of Martinsville are serviced by a public water supply. A hierarchical approach will be used to select screening criteria based primarily on water supply standards: site-wide groundwater samples are compared to the EPA Maximum Contaminant Levels (MCLs) for drinking water or, if an MCL has not been promulgated, the EPA Region III Risk Based Concentrations (RBCs) for tap water. The use of drinking water standards is a conservative measure since groundwater at the Facility is not a drinking water source. However, these levels are appropriate for the protection of the groundwater resource and its most beneficial use.

Several groundwater sampling events conducted in wells located downgradient of the trench and upgradient of the receiving unnamed tributary (MP-1 to MP-12) indicated that contaminated groundwater, with concentrations of VOCs and alcohols above the MCLs or Tap Water RBCs, is discharging to the surface water stream (tributary). However, migration of contaminated groundwater is currently being mitigated and will be enhanced by the aeration/bioremediation trench system. Concentrations of groundwater contaminants upgradient of the trench, within the trench and downgradient of the trench have been decreasing with time, indicating that further migration of contaminated groundwater is not occurring.

4.3 Surface Water Exposure Pathways

Surface water samples are collected semi-annually from the tributary and are screened against the 9 VAC 25-260 Virginia Water Quality Standards for aquatic life or human health. Surface water sampling was conducted and analyzed for VOCs, SVOCs, alcohols, and metals. The results showed that the tributary is impacted mainly by VOCs, and occasional alcohol compounds. Concentrations of VOCs do not exceed the screening levels. Also, surface water contaminant concentrations decrease in the downstream direction, with some contaminants no longer detected at the farthest downstream sampling location, before surface water exits the Facility property boundary.

Human health exposure of contaminated surface water may exist as an exposure pathway to residents, workers and trespassers. The tributary flows in a southeasterly direction through the forested area approximately 100 feet north and downgradient from the Facility fence line. The nearest residential area is north of the Facility site and approximately 300 feet from the northern property line. "No Trespassing" signs and warning signs have been posted along the property boundary and along the tributary cautioning people (especially residents and trespassers) to avoid contact with the creek water.

4.4 Air Exposure Pathways (Outdoors)

Analysis included in the Dispersion Modeling and Risk Assessment Report indicated that the acute and chronic risk and hazard are within the current acceptable risk-based performance standards at the Facility site, at the property boundaries, and offsite the Facility property. The air emissions produced by the SVE system are regulated by a permit issued by the VDEQ Blue Ridge Regional Office. Since emission rates are expected to continue to decline over time, the total annual emission rate allowed by the air discharge permit (9.9 tons per year) is not expected to be exceeded.

5. CORRECTIVE ACTION OBJECTIVES

As a result of the environmental investigations and interim measures, the Facility intends on addressing all the documented releases from the SWMUs, HWMUs and AOCs listed in section 3.2.1 above through a site-wide Corrective Action process.

5.1 Soil

The Corrective Action objective for contaminated soil at the Facility is to prevent human and environmental receptor exposure to constituents of concern, and to control potential constituent migration. The remediation goals for soil are based on an industrial exposure scenario and the protection of groundwater. The soil cleanup remediation goals for the Facility are shown in Table 1.

5.2 Groundwater

The Corrective Action objective for contaminated groundwater at the Facility is to restore groundwater to drinking water standards. These standards are established by the maximum Contaminant Levels (MCLs) promulgated at 40 CFR 141, pursuant to Section 1412 of the Safe Drinking Water Act (SDWA), 42 USC Section 300g-1. For a contaminant of concern without an applicable MCL, EPA's Regional Screening Level (RSL) for tap water will be used. The groundwater remediation goals for the Facility are shown in Table 1.

5.3 Site-Specific Remediation Goals

Depending on the results of the remedial actions, the Facility may refine the clean-up targets by developing site-specific remediation goals in the future through a quantitative risk assessment process.

6. SUMMARY OF PROPOSED REMEDY

Based on the findings set forth in the RFI and CMS reports, VDEQ has determined that past operations at the Facility have resulted in soil and groundwater contamination. The proposed remedy for the Facility emphasizes source control through in-situ aerobic bioremediation enhancement system consisting of oxygen sparging wells and extraction wells that will operate with the existing aeration trench; expansion of the current SVE system; and expansion of the LNAPL recovery pumping system (Figure 7). VDEQ additionally proposes that long term groundwater and surface water monitoring be conducted to ensure clean up goals are met and for monitoring remedial effectiveness. Finally, VDEQ will require institutional controls be implemented as necessary to prevent current and potential future exposure to contamination. Details on the remedial measures proposed for the Facility are summarized in this section. Additional remediation measures may be pursued based on the clean-up progress; these additional remediation measures are described in section 6.4.

6.1 Aerobic Bioremediation Enhancement System

The existing aeration/bioremediation trench (stream area aeration trench IM) was originally installed in 2006 to deliver sufficient air flow to strip the chlorinated VOCs within the groundwater, and to provide sufficient oxygen to enhance the biodegradation of ketones. Since 2006 the system underwent several modification activities to improve stripping efficiency. The IM stream aeration trench has been performing well and is improving groundwater quality within, and downgradient of the trench system and in the stream. The following improvements in groundwater quality have been recorded in all sampling points for all VOC classes, alcohols and ketones: 99-100% treatment achieved within the trench; 95-99% treatment achieved in the downgradient wells; over 95% treatment achieved in the upgradient and trench entry point locations; and 67% treatment achieved in the stream sampling locations.

The proposed aerobic bioremediation enhancements consist of oxygen sparging wells and extraction wells that can operate with the existing aeration trench. Twelve (12) oxygen sparge points have been installed along the downgradient property boundary, east and west of the existing aeration trench, to aerate groundwater prior to its discharge to the tributary (Figure 7). A concentration of 90% oxygen will be introduced into the oxygen injection wells located within the source area(s) and at the downgradient property boundary. The three extraction wells have been drilled deeper than the existing aeration trench, so that extraction of deeper groundwater will provide a mechanism to treat deeper groundwater that may be left untreated by the existing shallow trench. The extracted groundwater will be discharged into the aeration trench; however, in the event of aquifer or recharge trench clogging, the groundwater will be allowed to discharge into the publicly owned treatment works (POTW).

Additional oxygen sparge wells may be installed adjacent to the existing groundwater treatment trench and adjacent to and upgradient from the tributary. Exact locations of these future sparge wells may change based on the clean-up progress.

6.2 SVE Expansion

The system has been in operation continuously since the day of startup in 2009. Laboratory analyses of the air discharge samples documented the presence of several chlorinated and non-chlorinated VOCs (mainly PCE, 1,1,1-TCA and toluene). Currently, emissions from the SVE system are well below the air permit requirements and the Facility is expected to increase extraction rates. The SVE system may be expanded to the stormwater tank source area and around the LNAPL area (Figure 7).

6.3 LNAPL Expansion

The Facility has been bailing 2-3 gallons of LNAPL per month from several wells. The Facility may install a LNAPL recovery pumping system at few locations (Figure 7). Pumps will operate on variable timer to maximize LNAPL recovery and minimize groundwater collection.

6.4 Additional Remedial Measures

Additional remedial measures may be implemented as contingent remedies based on the effectiveness of the proposed remedies described. The additional measures will be described in detail in the Corrective Measures Implementation Work Plan.

6.5 Long Term Groundwater and Surface Water Monitoring

Long term groundwater and surface water monitoring are proposed at the Facility in combination with the active remedial measures and institutional controls (ICs) to evaluate remedial effectiveness and to ensure long term cleanup goals, namely drinking water standards, are met and maintained. A Groundwater Monitoring Program has been developed that specifies the locations, frequency, and types of samples necessary to evaluate remedial effectiveness and whether it is capable of attaining clean up targets.

Long term groundwater and surface water monitoring will continue to be conducted at the Facility until it is demonstrated that long term cleanup goals/drinking water standards are met and maintained. Changes to the long-term groundwater monitoring program may be proposed by the Facility based on results from groundwater sampling and will be implemented through the existing Sampling and Analysis Plan.

6.6 Institutional Controls

Institutional controls will be implemented in order to protect human health and the environment and to maintain the current and future integrity of the remedy. Given the nature and extent of impacted media left in place, more than one institutional control is necessary to prevent activities which could interfere with the integrity or protectiveness of the remedy. Therefore, VDEQ has determined that institutional controls are necessary to ensure the short and long term reliability of the remedy. Institutional controls to be utilized at the site will:

1) notify prospective buyers of the property of the environmental conditions at the Facility and of VDEQ's selected corrective measures as part of the remedy for the Facility under RCRA Corrective Action;

2) prohibit use of the property for residential purposes (including single family homes, multiple family dwellings, schools, day care facilities, child care centers, apartment buildings, dormitories, other residential style facilities, hospitals, and in-patient health care facilities) within the surveyed footprint of the property boundaries;

3) prohibit the use of groundwater beneath the property except for non-contact cooling water and purposes to support selected corrective measures;

4) restrict activities that would interfere with or adversely impact the integrity of the remedy; and

5) restrict surface and subsurface soil excavation except in conformance with an appropriate Materials Management Plan.

Institutional controls described above will be implemented at the site through the following mechanisms;

- VDEQ anticipates that the above land and water use restrictions will be implemented through an environmental covenant to be entered pursuant to the Virginia Uniform Environmental Covenants Act (UECA), Va. Code, § 10.1-1238, *et seq.* and to be recorded with the deed for the Facility. A declaration of restrictive covenant or similar instrument consistent with applicable requirements under the laws of the Commonwealth of Virginia will be recorded with the real property records for the Site such that prospective purchasers of the Site will have constructive notice of land use restrictions. The declaration of restrictive covenants will contain the land use controls described above and will be recorded with the land records in the office of the clerk of the circuit court for the jurisdiction in which the Site is located within ninety (90) days of executing the declaration. The current owner and future owners of the Site will be obligated to comply with the recorded restrictive covenant since the covenant will run with the land;

- The existing Hazardous Waste Management Permit for Site-Wide Corrective Action will be modified to include the RCRA Corrective Action remedy decision after it is approved, and will be used as the controlling authority for implementation of the remedy through the VDEQ. The Permit will also be modified, as appropriate, to include land use restrictions as described above; and

- While groundwater beneath the site is not currently used as a drinking water source and there are no plans for such future use, to provide additional protection, the proposed remedy includes institutional controls to prohibit the development of wells for drinking water or other domestic uses at the Facility. A notification to prohibit well drilling under Virginia's Private Well Regulations, 12VAC 5-630-380 will be provided to the local health district (Henry County/ City of Martinsville) in writing describing the nature and extent, including a map, of the contaminated groundwater located on the Facility property. The notice will be updated every three (3) years to reflect the latest contaminated groundwater plume boundary. A copy of the notification will be provided to VDEQ.

6.7 Reporting

Univar will be required to submit annual reports containing, but not be limited to, groundwater monitoring data, system O&M data, and evaluation of remedial effectiveness. Univar will also be required to submit a remedy status evaluation report every three (3) years that evaluates the effectiveness of the remedies in meeting the human health and environmental protection objectives. This review may include, but not be limited to, review of Univar's compliance with any covenant requirements, groundwater and land uses on the property, and zoning maps or planning documents that may affect future land use in the impacted area. The report will include progress of the remedial measures and of meeting the cleanup targets or remedial goals.

VDEQ will review the progress of the remedy activities to confirm that clean up targets and remedial goals have been met. If VDEQ determines that Univar is not achieving clean up targets remedial goals, VDEQ may require Univar to perform additional studies and/or to modify the existing corrective measures. If new contamination is discovered or if the proposed remedial options cannot adequately mitigate risk to human health or the environment, additional corrective measures will be implemented. In the event that VDEQ requires Univar to perform additional studies and/or to modify the existing and additional corrective measures, an opportunity for public comment will be provided prior to the initiation of changes to the existing corrective measures, as necessary or appropriate.

6.8 Development and Implementation of a Materials Management Plan

VDEQ's proposed remedy requires the development and implementation of a Materials Management Plan to be approved by VDEQ before any earth moving activities, including construction and drilling, can be performed on SWMUs and HWMUs that contain COPCs above residential soil screening levels. The Materials Management Plan must also incorporate how groundwater known to contain COPCs above cleanup criteria will be handled and managed should earth moving and/or construction and drilling require contact with groundwater. The Materials Management Plan will detail how soil and groundwater will be managed during any future subsurface activities conducted on these SWMUs, HWMUS and in groundwater. The Materials Management Plan will detail how all excavated soils from these SWMUs, HWMUs and groundwater will be handled and disposed. The Materials Management Plan will include analysis of constituents detected at the parcel if not previously identified.

All soils and groundwater that are to be disposed of will be sampled and disposed of in accordance with applicable State and Federal regulations. In addition, the Materials Management Plan will include soil stabilization requirements to minimize contact between storm water runoff and the parcel soils. Soil stabilization measures may include the construction of berms to prevent storm water from flowing onto certain areas as well as the construction of sumps with pumps to remove ponded water from low lying areas.

The Materials Management Plan will include a Health and Safety Plan, Sampling and Analysis Plan and Quality Assurance Project Plan. The Health and Safety Plan will, among other things, identify the SWMU and HWMU locations at the Facility where contaminants remain in soils; detail how future on-site workers and contractors will be notified about such locations and about the presence of the contaminated soil and groundwater.

7. EVALUATION OF PROPOSED REMEDY

This section provides an evaluation of the proposed remedy using EPA's RCRA Corrective Action Program criteria. These criteria consist of three threshold criteria and seven balancing criteria. The criteria are applied in two phases. .In the first phase, VDEQ evaluates three Threshold Criteria as general goals. In the second phase, if there is more than one remedy which meets the Threshold Criteria, VDEQ evaluates seven Balancing Criteria to determine which proposed remedy alternative provides the best relative combination of attributes.

7.1 Threshold Criteria

7.1.1 Overall Protection of Human Health and the Environment

The ongoing interim measures (IMs) of the proposed remedy have already resulted in protection of human health and the environment by reducing constituent concentrations in soil and groundwater. The Facility met the Current Human Exposure Under Control (HH EI) and Migration of Contaminated Groundwater Under Control (GW EI) indicators on September 15, 2008.

Active remediation will ensure that no adverse impacts will occur and that overall protection of human health and the environment are maintained. For future uses, the proposed remedy requires soil and groundwater use restrictions to minimize the potential for human exposure to contamination and protect the integrity of the remedy.

With respect to Facility soils, although soils and subsoils are covered by concrete and asphalt and the site is enclosed with chain link fence, the lower perimeter of the Facility may expose workers and trespassers by direct contact with the contaminated surface soils in the vicinity of the tributary. The Facility has posted signs in this area warning trespassers and advising of site contamination.

7.1.2 Achieve Media Cleanup Objectives

The Facility's interim measures have contributed to decrease the levels of hazardous constituents in the soil and groundwater at the Facility. However, although the existing IMs have improved groundwater and soil quality, the improvement is not site wide and would not achieve site-wide clean-up. VDEQ anticipates that the installation of an aerobic bioremediation enhancement system, together with expansion of the LNAPL recovery and SVE systems will achieve those objectives. For soils, the current and reasonably anticipated future use is industrial. The institutional controls required in VDEQ's proposed remedy provide the necessary safeguards to ensure the Facility maintains its industrial use.

7.1.3 Source Control

The Facility includes a number of permitted HWMUs and SWMUs with documented releases of chemical of concern into soil and groundwater. Closure activities of the HWMUs and SWMUs began in 2003; all piping, tanks, equipment associated with the raw material and product storage, manufacturing and processing operations, recycling operations, and hazardous waste management, and other waste management was decontaminated, dismantled, and removed from the site. All concrete surfaces in manufacturing and processing, recycling areas, and hazardous waste management areas were decontaminated. The Facility has not completed closure of the HWMUs due to detected hazardous COCs in soils, subsoils, and groundwater. The closure of these units has been referred to site wide corrective action in a letter dated April 25, 2013.

Active remediation of soil and groundwater is being conducted through the operation and maintenance of the IMs: soil is actively being treated through the SVE system and the LNAPL recovery pumping system; groundwater is actively being remediated through the aeration trench. Enhancement and expansion of the current remedial measures have been deemed necessary for the attainment of media cleanup goals.

7.2 Balancing/Evaluation Criteria

7.2.1 Long-Term Effectiveness

The proposed remedy will maintain protection of human health and the environment over time by controlling exposure to the hazardous constituents remaining in soils and groundwater. The long-term reliability and effectiveness will be ensured through the use of the Facility's current Hazardous Waste Management Permit for Site-Wide Corrective Action and layering of institutional controls that will be implemented by an environmental covenant.

7.2.2 Reduction of Toxicity, Mobility, or Volume of the Hazardous Constituents

The Facility's interim measures have contributed to the control and decrease of LNAPL in the soils beneath the Virgin Tank Farm. The proposed remedies will enhance the control and decrease of hazardous constituents in the soil beneath the Virgin Tank Farm, and in the groundwater plumes originating from several areas (Virgin Tank Farm, stormwater tank area, and various former processing locations to the east) and flowing toward the unnamed tributary.

7.2.3 Short-Term Effectiveness

All the proposed and additional remedial measures describe in Section 6 satisfy the criteria of short term effectiveness, since their enhancement, expansion and operation would not likely lead to unacceptable exposure to site workers, the community nor the environment. In addition, VDEQ anticipates that the land use and groundwater use restrictions will be fully implemented through an environmental covenant as described in Section 6.6.

7.2.4 Implementability

The proposed remedy is anticipated to be fully implementable with readily available methods. No regulatory hurdles are anticipated for continued implementation.

7.2.5 Cost

The current annual operation and maintenance (O&M) cost of the remediation system is $190,000 based on the estimate provided in Tables 6-2 of the CMS report. This cost estimate will be updated if the Facility determines that alternative remedies will be necessary to reach clean-up goals.

7.2.6 Community Acceptance

Community acceptance of the proposed remedy will be determined based on comments from the public. The modification of Univar's Hazardous Waste Management Permit for Site-Wide Corrective Action, incorporating the remedy decision, will undergo public comment and a public meeting will be conducted. Additional details about public participation are provided in Section 9.0 below.

8. FINANCIAL ASSURANCE

Assurances of financial responsibility for corrective action will be provided in accordance with the Facility's current Permit as follows. Within ninety (90) calendar days of final acceptance of the proposed determination and corrective measures remedy by the VDEQ via the Facility's Permit modification, the Permittee shall submit an updated cost estimate for completing the approved remedies. The estimate may be based on the Corrective Measure Study, the approved remedies, or any other available information. The cost estimate for completing the approved remedies shall be updated pursuant to the development of more detailed information (e.g., Corrective Measure Design or Implementation) and any modifications to the approved remedies.

By March 31st following approval of the cost estimate for financial assurance, and each succeeding year, the Permittee shall demonstrate compliance with financial assurance to the Department for completing the approved remedies in accordance with 40 CFR § 264.101(b). By

March 31st following approval of any revised cost estimate, the Permittee shall demonstrate to the Department financial assurance for the updated cost estimates.
Financial assurance will be required by the Permit for ongoing operation and maintenance costs associated with the proposed determination including corrective/remedial measures, groundwater monitoring, and institutional controls during the Corrective Measures Implementation (CMI) period.

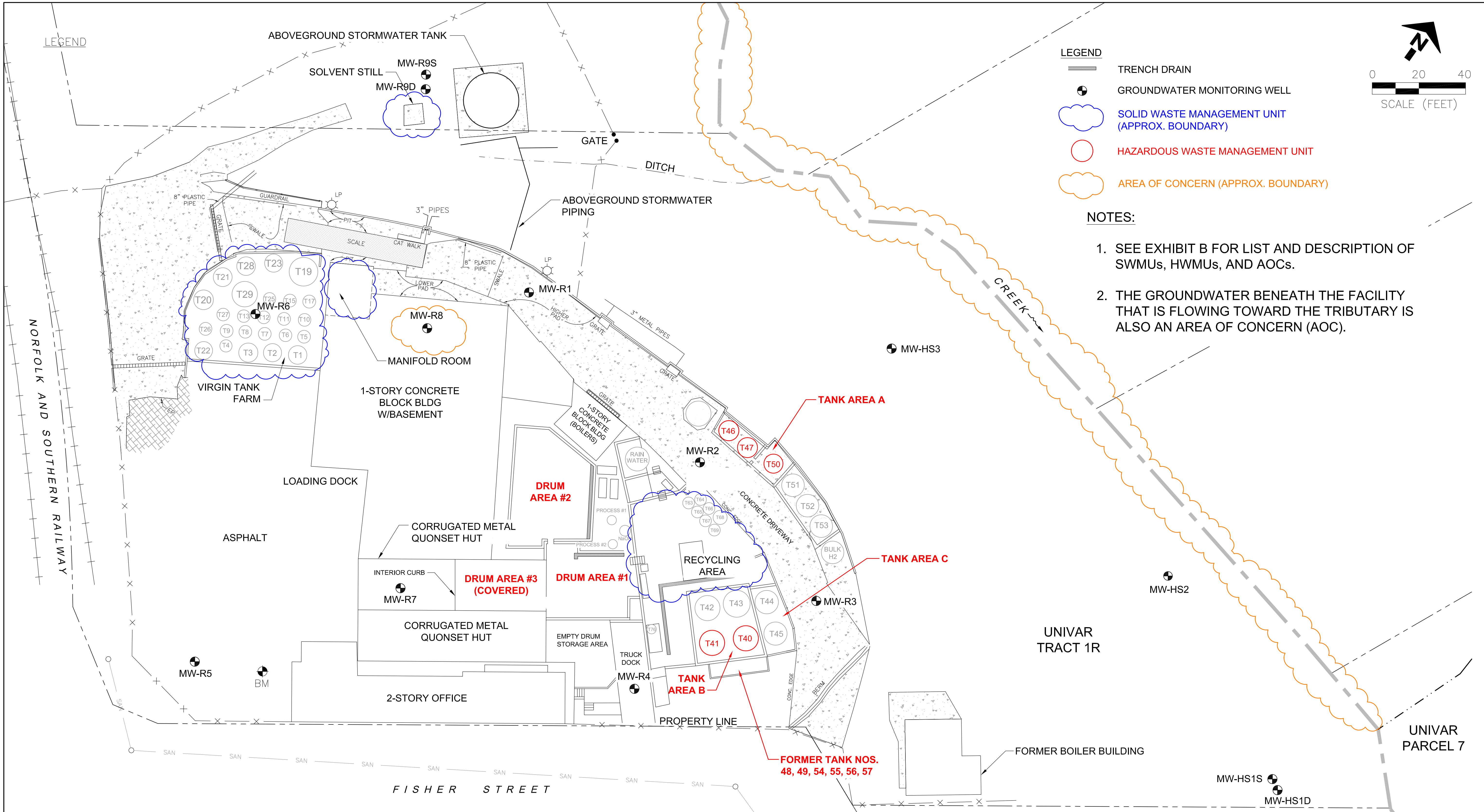
9. PUBLIC PARTICIPATION

Interested persons are invited to comment on VDEQ's proposed decision. The public comment period will last sixty (60) calendar days from the date the notice is published in a local newspaper. Comments may be submitted by mail, fax, e-mail, or phone to Ms. Laura Galli at the address listed below.

A public meeting will be held upon request fifteen (15) calendar days from the date the notice is published in a local newspaper. The Administrative Record contains all the information considered by VDEQ for its proposed remedy for the Facility. To receive a copy of the Administrative Record, contact Ms. Laura Galli at the address below:

Virginia Department of Environmental Quality
629 East Main Street
P.O. Box 1105
Richmond, VA 23218
Contact: Ms. Laura Galli
Phone: (804) 698 - 4218

Fax: (804) 698-4234
Email: laura.galli@deq.virginia.gov



NOTES:

1. SEE EXHIBIT B FOR LIST AND DESCRIPTION OF SWMUs, HWMUs, AND AOCs.
2. THE GROUNDWATER BENEATH THE FACILITY THAT IS FLOWING TOWARD THE TRIBUTARY IS ALSO AN AREA OF CONCERN (AOC).

NOTES:

1. LOCATION OF FORMER PROCESS UNIT BOUNDARIES BASED ON AVAILABLE FACILITY DRAWINGS.
2. THE PROPERTY LINES FOR PROPERTIES THAT INTERSECT THE CREEK ARE ALONG THE THREAD OF THE CREEK.

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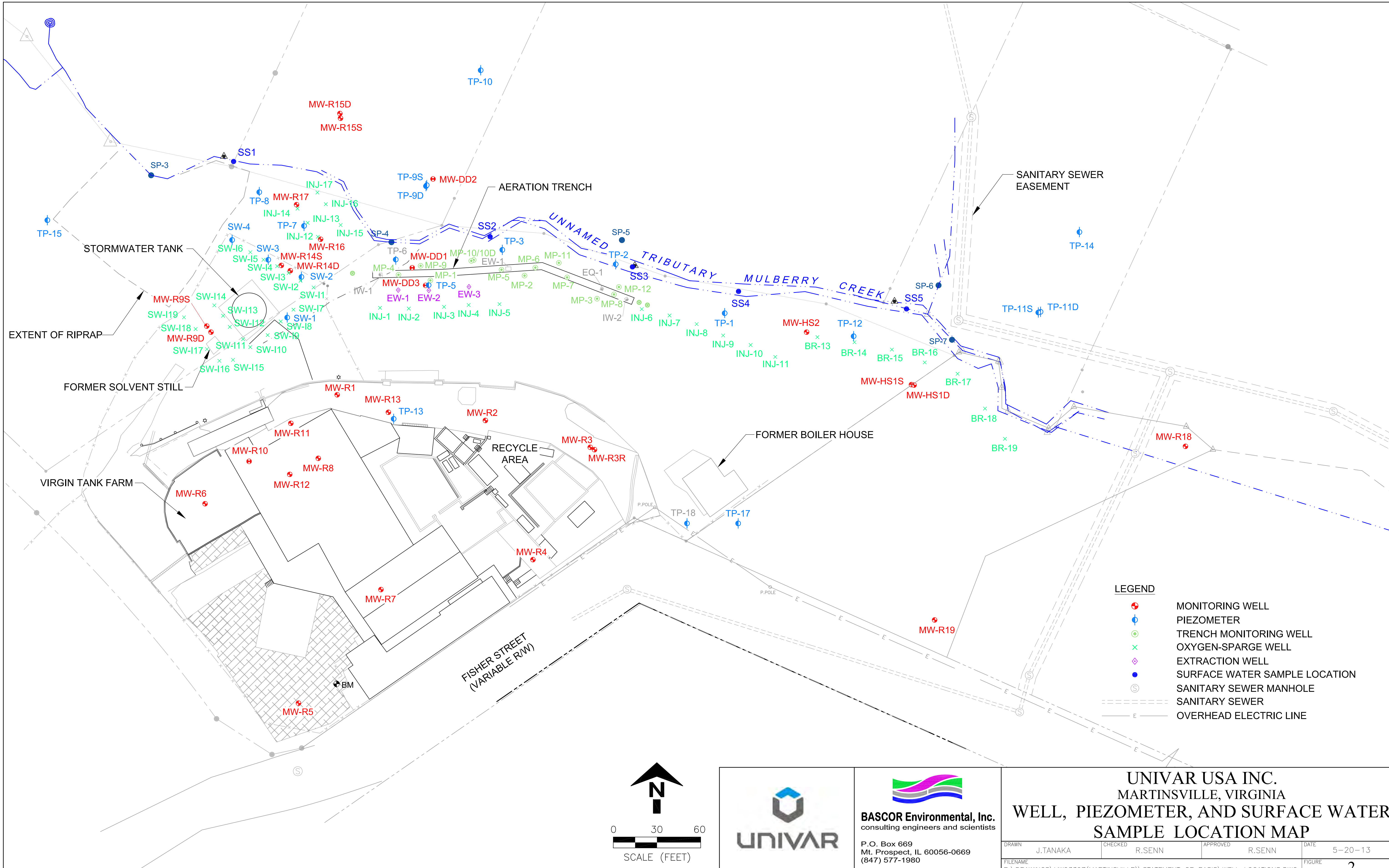
UNIVAR USA INC.
MARTINSVILLE, VIRGINIA
SITE PLAN - CURRENT SWMUs, HWMUs, AND AOCs

DRAWN	CHECKED	APPROVED	DATE
J.TANAKA	R.SENN	R.SENN	7-1-13

FILENAME P:\DRAWINGS\VW03397(MARTINSVILLE)\STATEMENT OF BASIS\SWMU-HWMU-AOC.DWG
FIGURE 1



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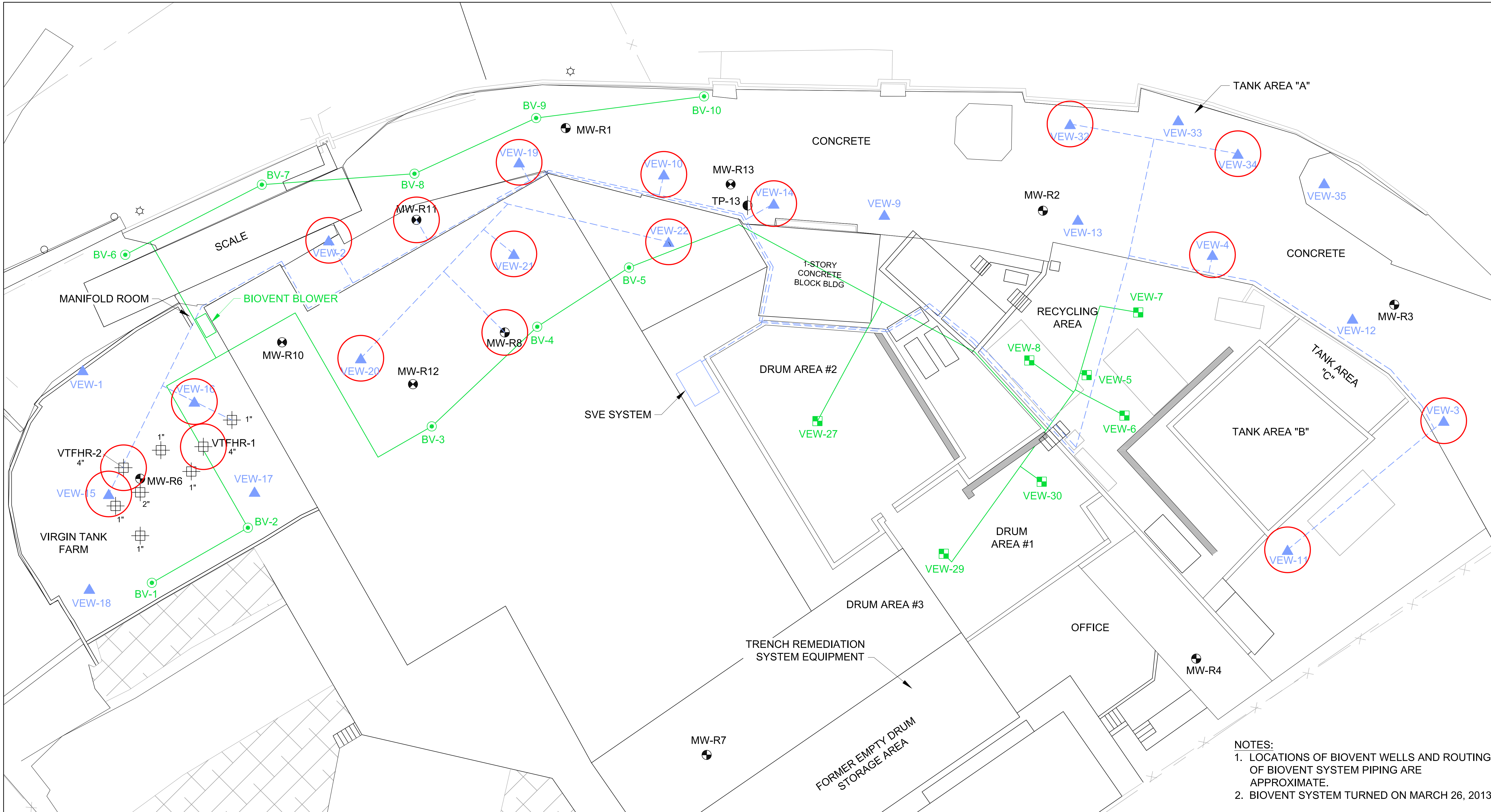
MARTINSVILLE, VIRGINIA

WELL, PIEZOMETER, AND SURFACE WATER SAMPLE LOCATION MAP

DRAWN	CHECKED	APPROVED	DATE
J.TANAKA	R.SENN	R.SENN	5-20-13

FILENAME	FIGURE
P:\DRAWINGS\VW03397(MARTINSVILLE)\STATEMENT OF BASIS\WELL LOCATIONS.DWG	2



NOTES:

1. LOCATIONS OF BIOVENT WELLS AND ROUTING OF BIOVENT SYSTEM PIPING ARE APPROXIMATE.
2. BIOVENT SYSTEM TURNED ON MARCH 26, 2013.

LEGEND

- SVE WELL
- SVE EXTRACTION PIPING
- MONITORING WELL
- LNAPL MONITORING/RECOVERY WELL
- WELLS OPEN TO SVE BLOWER AS OF 3-25-13
- SVE WELL CONVERTED TO BIOVENT WELL
- BIOVENT WELL
- BIOVENT SYSTEM PIPING
- DRAIN

N

0 10 20

SCALE (FEET)

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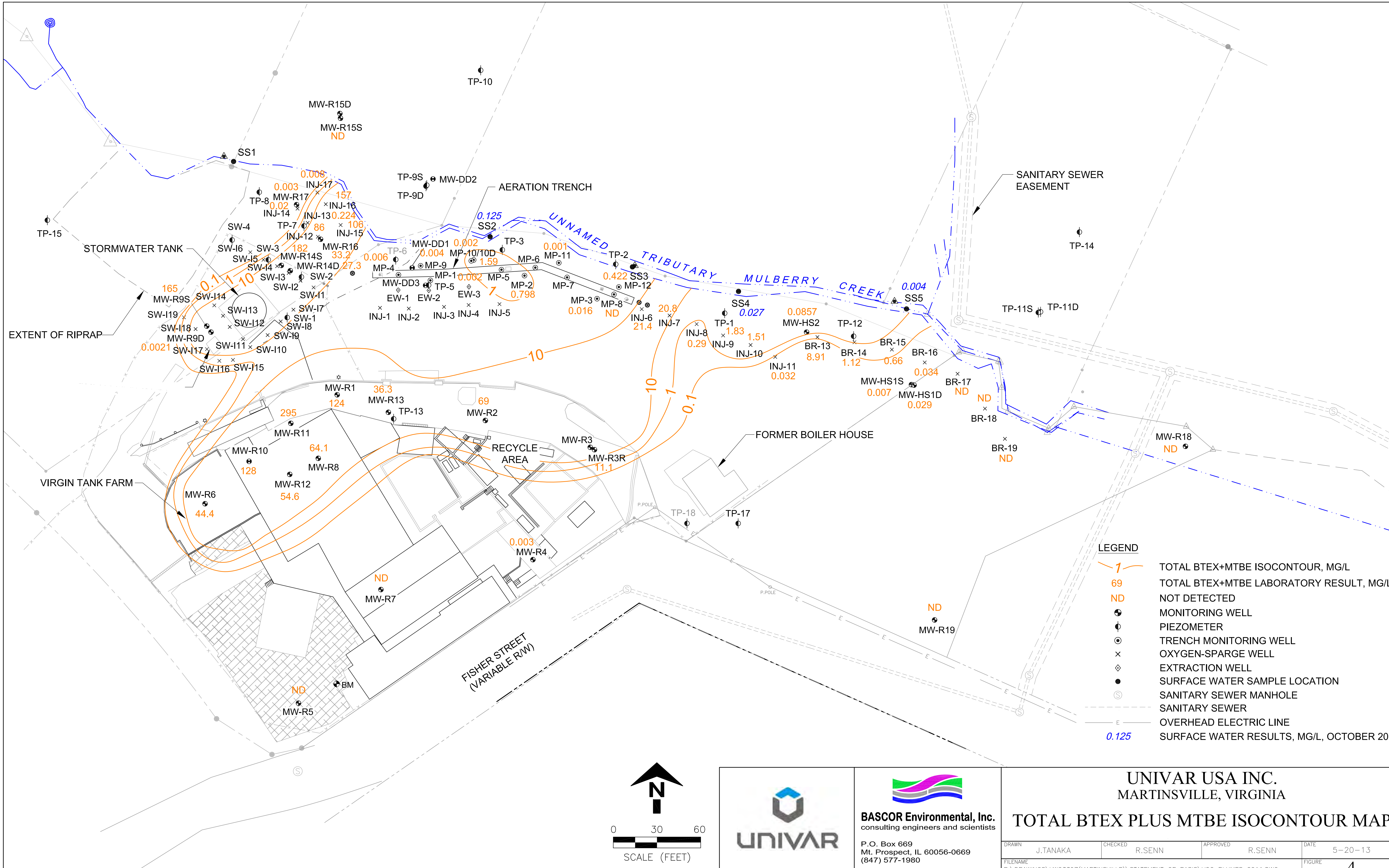
SOIL VAPOR EXTRACTION, BIOVENT, AND LNAPL RECOVERY SYSTEM PLAN

DRAWN	CHECKED	APPROVED	DATE
J.TANAKA	J.TANAKA	R.SENN	5–20–13

FILENAME	FIGURE
P:\DRAWINGS\VW03397(MARTINSVILLE)\STATEMENT OF BASIS\SVE BIOVENT LNAPL SYSTEM PLAN.DWG	3



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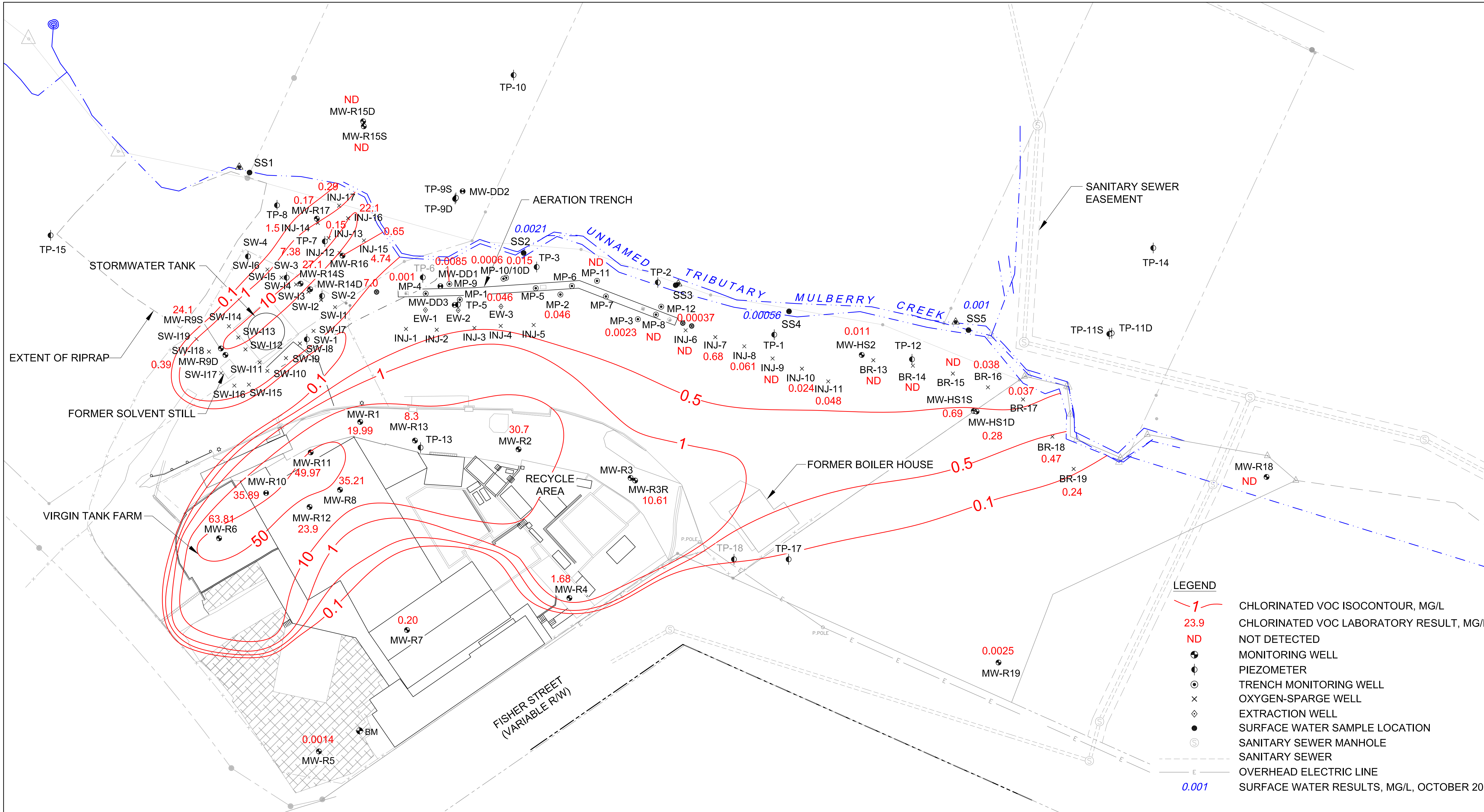
TOTAL BTEX PLUS MTBE ISOCONTOUR MAP

DRAWN	CHECKED	APPROVED	DATE
J.TANAKA	R.SENN	R.SENN	5-20-13

FILENAME P:\DRAWINGS\VW03397(MARTINSVILLE)\STATEMENT OF BASIS\VOC PLUMES 2011.DWG

FIGURE 4



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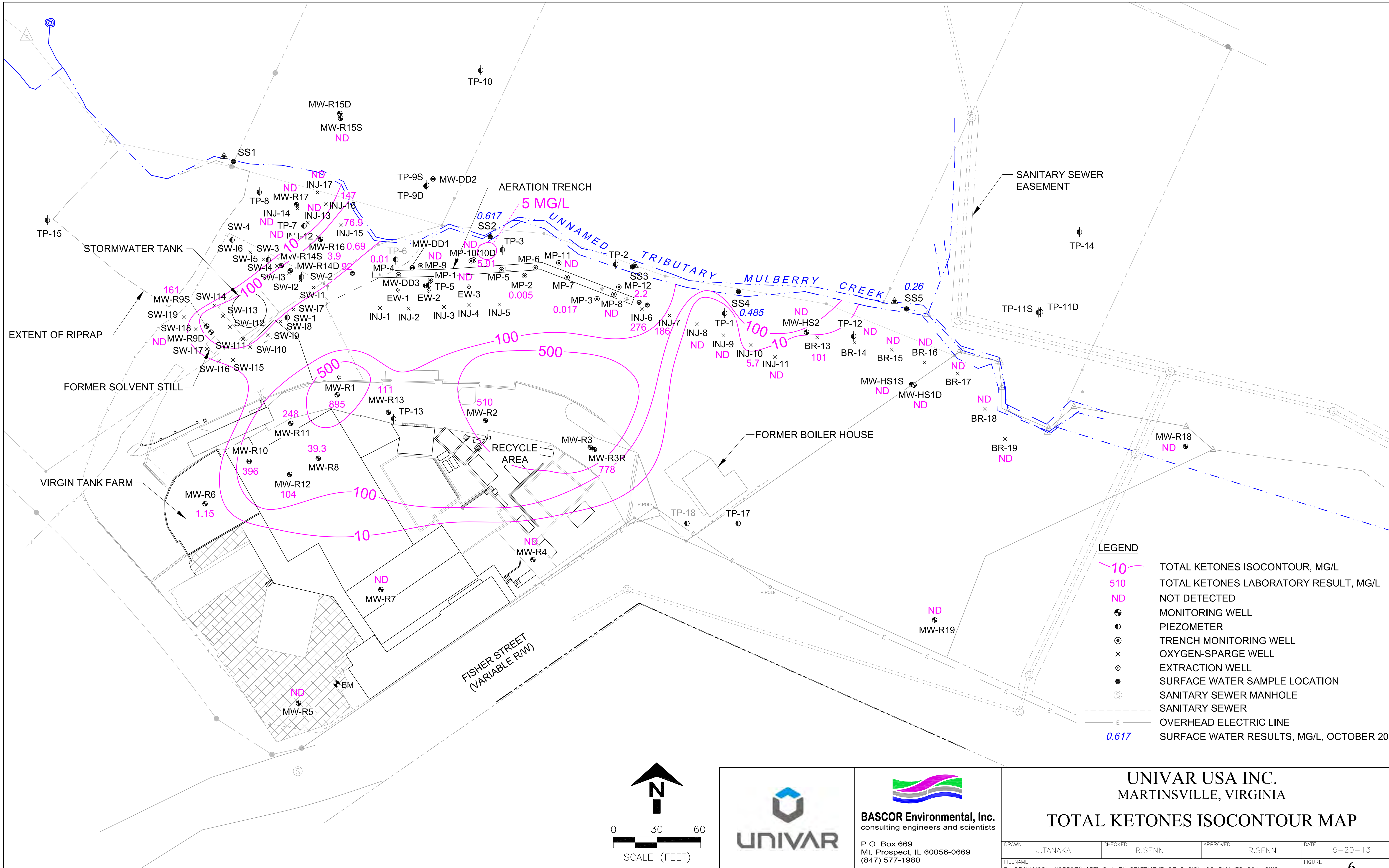
TOTAL CHLORINATED VOC ISOCONTOUR MAP

DRAWN	CHECKED	APPROVED	DATE
J.TANAKA	R.SENN	R.SENN	5-20-13

FILENAME P:\DRAWINGS\VW03397(MARTINSVILLE)\STATEMENT OF BASIS\VOC PLUMES 2011.DWG

FIGURE 5



TP-10
MW-R15D
MW-R15S
ND
SS1
TP-9S
MW-DD2
TP-9D
AERATION TRENCH
5 MG/L
0.617
SS2
UNNAMED TRIBUTARY
MULBERRY CREEK
TP-3
MP-10/10D
5.91
MP-11
TP-2
SS3
MP-12
2.2
TP-8
MW-R17
INJ-17
147
INJ-16
INJ-14
INJ-13
TP-7
76.9
INJ-15
INJ-12
SW-4
SW-I6
SW-3
MW-R16
0.69
SW-I5
MW-R14S
3.9
SW-I4
MW-R14D
92
SW-I3
SW-2
SW-I2
TP-6
MW-DD1
MP-4
0.01
MP-9
MP-1
MP-5
MP-6
MP-2
0.005
MP-7
MP-3
0.017
MP-8
MW-DD3
TP-5
EW-3
EW-1
EW-2
INJ-1
INJ-2
INJ-3
INJ-4
INJ-5
INJ-6
276
INJ-7
186
INJ-8
SS4
0.485
TP-1
INJ-9
INJ-10
5.7
INJ-11
MW-HS2
BR-13
101
TP-12
BR-14
BR-15
BR-16
0.26
SS5
TP-11S
TP-11D
TP-14
TP-15
STORMWATER TANK
161
MW-R9S
SW-I14
SW-I13
SW-I12
SW-I1
SW-I7
SW-1
SW-I8
SW-I9
SW-I10
SW-I11
SW-I19
SW-I18
MW-R9D
SW-I17
SW-I16
SW-I15
EXTENT OF RIPRAP
FORMER SOLVENT STILL
100
500
10
MW-R1
895
111
MW-R13
TP-13
510
MW-R2
248
MW-R11
MW-R10
396
39.3
MW-R8
MW-R12
104
RECYCLE AREA
MW-R3
MW-R3R
778
VIRGIN TANK FARM
MW-R6
1.15
MW-R4
MW-R7
MW-R5
BM
FISHER STREET (VARIABLE R/W)
FORMER BOILER HOUSE
TP-18
TP-17
P.POLE
MW-HS1S
MW-HS1D
BR-17
BR-18
BR-19
MW-R18
MW-R19
SANITARY SEWER EASEMENT
N
0 30 60
SCALE (FEET)
LEGEND
10 TOTAL KETONES ISOCONTOUR, MG/L
510 TOTAL KETONES LABORATORY RESULT, MG/L
ND NOT DETECTED
MONITORING WELL
PIEZOMETER
TRENCH MONITORING WELL
OXYGEN-SPARGE WELL
EXTRACTION WELL
SURFACE WATER SAMPLE LOCATION
SANITARY SEWER MANHOLE
SANITARY SEWER
OVERHEAD ELECTRIC LINE
0.617 SURFACE WATER RESULTS, MG/L, OCTOBER 2011
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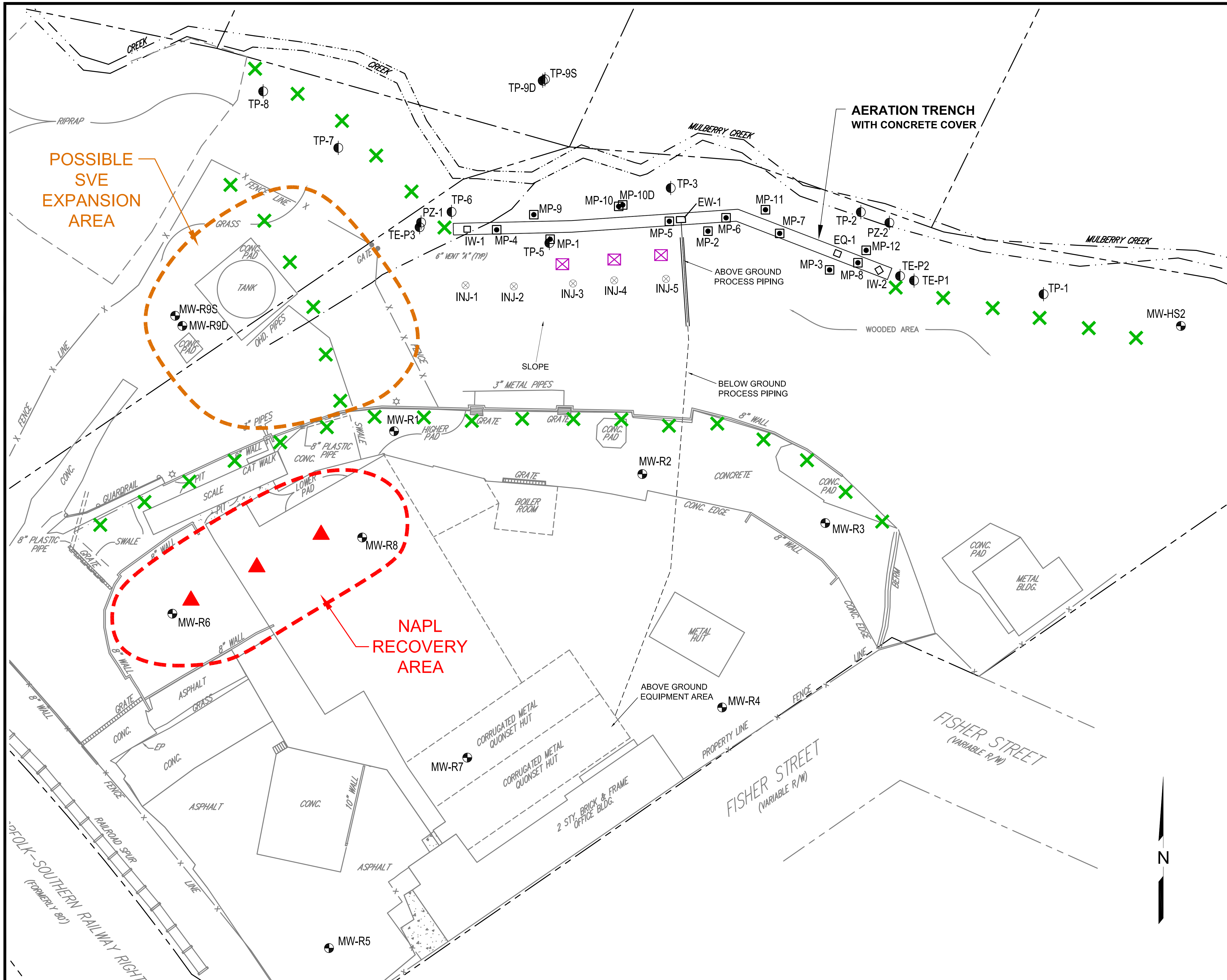
MARTINSVILLE, VIRGINIA
TOTAL KETONES ISOCONTOUR MAP
DRAWN J.TANAKA
CHECKED R.SENN
APPROVED R.SENN
DATE 5-20-13
FILENAME P:\DRAWINGS\VW03397(MARTINSVILLE)\STATEMENT OF BASIS\VOC PLUMES 2011.DWG
FIGURE 6



LEGEND

- MONITORING WELL
- PIEZOMETER
- INJECTION OR EXTRACTION WELL (EQ, IW, EW)
- AERATION MONITORING POINT
- AERATION POINT
- PROPOSED OXYGEN-SPARGE WELL (TENTATIVE LOCATION)
- EXTRACTION WELL (TENTATIVE LOCATION)
- NAPL RECOVERY WELL (TENTATIVE LOCATION)

MAP SOURCES: 1] "MONITORING WELL SURVEY FOR BASCOR" PREPARED BY J.A. GUSTIN AND ASSOC., COLLINSVILLE, VA, 8/2/07, CAD FILE "407001-A-OUT-08-14-07.DWG"; 2] "STREAM SAMPLING AND GAUGING LOCATION MAP" PREPARED BY BASCOR ENVIRONMENTAL, INC. FOR UNIVAR USA, INC., MARTINSVILLE, VA, 9/21/07, CAD FILE: "STREAM SAMPLE GAUGE LOCATIONS 08-2007 SCALE 1-50.DWG"

0 20' 40' 80'

SCALE IN FEET

iesi
Innovative Engineering Solutions, Inc.
25 SPRING STREET
WALPOLE, MASSACHUSETTS 02081
(508) 668-0033

TITLE
PROPOSED REMEDIAL MEASURES PLAN

PROJECT	CMS
SITE	MARTINSVILLE, VIRGINIA
CLIENT	UNIVAR USA, INC.

DRAWN	CHECKED	FILENAME	DATE	FIGURE
DMR	SAF	MARTSV CMS 2010	8/30/10	7

Table 1
Soil and Groundwater Remediation Clean-up Goals
Univar USA Inc., Martinsville, Virginia

	Groundwater Remediation Goal (ug/L)		Soi Remediation Goal, mg/kg		
Analyte	Ingestion	Source	Industrial Exposure	Protection of Groundwater	Source
i-Butanol; Isobutyl alcohol	4,600	(b)	18,000	0.95	(b)
n-Butanol; n-Butyl alcohol	1,500	(b)	62,000	0.32	(b)
Ethanol	NE	---	NE	NE	(b)
2-Ethoxyethanol	6,200	(b)	250,000	1.3	(b)
Ethylene Glycol	31,000	(b)	1,200,000	6	(b)
Methanol	7,800	(b)	310,000	1.6	(b)
i-Propanol	NE	---	4.2E+10	NE	(b)
n-Propanol	NE	---	NE	NE	(b)
Acetone	12,000	(b)	630,000	2.4	(b)
Benzene	5	(a)	5.4	0.0002	(b)
2-Butanone; MEK	4,900	(b)	200,000	1.0	(b)
Carbon disulfide	720	(b)	3,700	0.21	(b)
Carbon tetrachloride	5	(a)	3.0	0.00015	(b)
Chlorobenzene	100	(a)	1,400	0.049	(b)
Chloroform	80§	(a)	1.5	0.000053	(b)
cis-1,2-Dichloroethene	70	(a)	2,000	0.0082	(b)
Cyclohexane	13,000	(b)	29,000	13	(b)
1,2-Dichlorobenzene	600	(a)	9,800	0.27	(b)
1,3-Dichlorobenzene	NE	---	NE	NE	(b)
1,4-Dichlorobenzene	75	(a)	12	0.00040	(b)
1,1-Dichloroethane	2.4	(b)	17	0.00068	(b)
1,2-Dichloroethane	5	(a)	2.2	0.000042	(b)
1,1-Dichloroethene	7	(a)	1,100	0.093	(b)
Dichloromethane (Methylene chloride)	5	(a)	960	0.0025	(b)
1,2-Dichloropropane	5	(a)	4.7	0.00013	(b)
Diethyl Ether; Ethyl Ether	3,100	(b)	200,000	0.68	(b)
1,4-Dioxane	0.67	(b)	17	0.00014	(b)
Ethyl Acetate	14,000	(b)	920,000	2.9	(b)
Ethylbenzene	700	(a)	27	0.0015	(b)
Hexachlorobutadiene	0.26	(b)	22	0.0005	(b)
Isopropylbenzene (Cumene)	390	(b)	11,000	0.64	(b)
Methyl Acetate	16,000	(b)	1,000,000	3.2	(b)
4-Methyl-2-pentanone; MIBK	1000	(b)	53,000	0.23	(b)
Methylcyclohexane	NE	---	NE	NE	(b)
2-Nitropropane	0.0018	(b)	0.064	0.00000047	(b)
1,1,1,2-Tetrachloroethane	0.5	(b)	9.3	0.00019	(b)
1,1,2,2-Tetrachloroethane	0.066	(b)	2.8	0.000026	(b)
Tetrachloroethene	5	(a)	110	0.0044	(b)
Toluene	1,000	(a)	45,000	0.59	(b)

Table 1
Soil and Groundwater Remediation Clean-up Goals
Univar USA Inc., Martinsville, Virginia

	Groundwater Remediation Goal (ug/L)		Soi Remediation Goal, mg/kg		
Analyte	Ingestion	Source	Industrial Exposure	Protection of Groundwater	Source
trans-1,2-Dichloroethene	100	(a)	690	0.025	(b)
1,1,2-Trichlo-1,2,2-trifluoroethane	53,000	(b)	180,000	130	(b)
1,2,3-Trichlorobenzene	5.2	(b)	490	0.015	(b)
1,2,4-Trichlorobenzene	70	(a)	99	0.0029	(b)
1,1,1-Trichloroethane	200	(a)	38,000	2.6	(b)
1,1,2-Trichloroethane	5	(a)	5.3	0.000077	(b)
Trichloroethene	5	(a)	6	0.00016	(b)
Trichlorofluoromethane	1,100	(b)	3,400	0.69	(b)
Vinyl chloride	2	(a)	1.7	0.0000053	(b)
Xylene, Total; dimethyl benzene	10,000	(a)	2,700	0.19	(b)
4-Chloro-3-methylphenol; p-Chloro-m-cresol	1,100	(b)	62,000	1.30	(b)
Cyclohexanone	77,000	(b)	3,100,000	18	(b)
Diethyl phthalate	11,000	(b)	490,000	4.7	(b)
Dimethyl phthalate	NE	---	NE	NE	(b)
2,4-Dinitrotoluene	0.2	(b)	5.5	0.00028	(b)
Di-n-octyl phthalate	160	(b)	6,200	53	(b)
Hexachlorobenzene	1	(a)	1.1	0.00053	(b)
Hexachloroethane	0.79	(b)	43	0.00048	(b)
2-Methylphenol; o-cresol	720	(b)	31,000	0.58	(b)
3-Methylphenol; m-cresol	720	(b)	31,000	0.57	(b)
4-Methylphenol; p-cresol	1,400	(b)	62,000	1.1	(b)
Nitrobenzene; 2-Nitrobenzene	0.12	(b)	24	0.000079	(b)
Pyridine	15	(b)	1,000	0.0053	(b)
Arsenic	10	(a)	2.4	0.0013	(b)
Barium	2,000	(a)	190,000	120	(b)
Cadmium	5	(a)	800	0.52	(b)
Chromium (Total Cr)	100	(a)	NE	NE	(b)
Lead	15*	(a)	800	NE	(b)
Mercury	2	(a)	43	0.033	(b)
Selenium	50	(a)	5,100	0.4	(b)
Silver	71	(b)	5,100	0.6	(b)

Notes:
ug/L - micrograms per liter
mg/kg - milligrams per kilogram
NE - not established.
(a) National Primary Drinking Water Regulations.