STATEMENT OF BASIS

KOPPERS INC.
(BEAZER EAST, INC.)
SALEM, VIRGINIA

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I. INTRODUCTION

The Virginia Department of Environmental Quality (DEQ) has prepared this Statement of Basis (SB) to solicit public comment on its proposed decision for the Beazer East, Inc (Beazer) facility located at 4020 Koppers Road, Salem, Virginia (Facility). Koppers Inc. is the owner and operator of the property and wood treating operations, but Beazer is responsible for maintaining post-closure care for the regulated units (i.e., closed surface impoundments) and completing the Corrective Action Program. DEQ's proposed decision consists of the following components: 1) continue the DNAPL detection and recovery program, 2) monitor the groundwater contaminant plume for stability and attenuation by continuing the site-wide groundwater monitoring program and conducting periodic dye trace studies, 3) ongoing compliance with the Facility's Hazardous Waste Management Permit for Site-Wide Corrective Action (Permit), and 4) maintain compliance with institutional controls (ICs) in the form of land use restrictions for the entire property and final cap maintenance for the closed surface impoundments. This SB highlights key information relied upon by DEQ in making its proposed decision.

The Facility is subject to EPA's 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. § 6901 et seq. (Corrective Action Program). 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 hazardous constituents that have occurred at their property. For permitted facilities, DEQ retains primary authority in Virginia for the Corrective Action Program.

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

II. FACILITY BACKGROUND

The Facility is an 85 acre property owned and operated by Koppers Inc. located in Salem, Virginia. The Facility is adjacent to the Roanoke River on the northern side. Wood treating operations using creosote began in 1955 when Koppers Company, Inc. built the Facility. In 1988 BNS, a subsidiary of Beazer PLC, acquired all common stock of Koppers Company, Inc. Subsequently, the Facility was purchased by Koppers Industries, Inc., a new independent company. The name Koppers Industries, Inc. was changed to Koppers Inc. and in 1989, the company name of Koppers Company was changed to Beazer Materials and Services, Inc. and eventually was changed to Beazer East, Inc. in 1990. Current Facility operations still consist of wood treatment using creosote exclusively and Beazer East continues to maintain responsibility for the closed regulated units and the Corrective Action Program. A facility location map is included as Figure 1.

The Facility produces railroad cross ties by pressure treating wood using creosote. Xylene was historically used to dry untreated wood in cylinders, but was discontinued in 1986. A creosote/coal tar solution is delivered to the Facility in railcars and is unloaded at a transfer station with secondary containment and placed in the Facility's creosote holding tanks. Untreated wood is also delivered by railcar. The untreated wood is cut to size and placed in treatment cylinders to be seasoned prior to treatment by covering the wood with heated creosote and applying a vacuum to boil out excess water. The water is extracted and is the primary source

of the Facility's waste water. Subsequently, heated creosote is placed in the cylinder with the wood and pressure is applied to force creosote into the cells of the wood. The cross ties are removed from the cylinders and allowed to dry for approximately 24 hours on the drip track. Waste water at the Facility is collected in surge tanks and is then passed through an oil/water separator. Oil collected from the separator is recycled to the work tanks and collected solids are placed in 55-gallon drums and shipped off-site for incineration. Treated waste water is discharged to the publicly owned treatment works (POTW).

In 1981, the Facility filed for RCRA Interim Status for two hazardous waste management units, which included a container storage facility and surface impoundments (see Section III.A below). The units were listed as storage units for hazardous waste type K001 (bottom sediment sludge from wood treating processes using creosote and/or pentachlorophenol). RCRA Interim Status detection groundwater monitoring began in 1981, and based on the results a Groundwater Quality Assessment was conducted from 1984 through 1995. In 1988, the Facility stopped using the surface impoundments and began closure of the units in accordance with RCRA Closure requirements. Closure was completed in 1993. In 1996, Beazer was issued a Hazardous Waste Management Permit (Permit) for Post-Closure Care of the surface impoundments and in 1998 the container storage facility was closed in accordance with RCRA Closure requirements. Since then, Beazer has conducted post-closure care of the surface impoundments and performed environmental investigations in accordance with corrective action requirements including a Phase I RCRA Facility Investigation (RFI), Phase II RFI, Quantitative Risk Assessment (QRA), and a Corrective Measures Study (CMS).

III. SUMMARY OF ENVIRONMENTAL INVESTIGATIONS AND CLEANUP ACITIVIES

Based on a review of files maintained by the DEQ and EPA Region 3, a number of solid waste management units (SWMUs) were identified at the Facility. A site layout map is included as Figure 2 showing the location of each SWMU and a monitoring well location map is included as Figure 3. The following table lists each SWMU.

SWMU Identification Table

Identification	SWMU and AOC Description
SWMU-1	Past Land Farm
SWMU-2	Waste Pile
SWMU-3	Spray Field
SWMU-4	Charge (Drip) Tracks
SWMU-5	Surface Impoundments
SWMU-6	Container Storage Facility
SWMU-7	Creosote Unloading Area
SWMU-8	Landfill
SWMU-9	Runoff Collection System (Sump)
SWMU-10	Below Grade Solvent Storage Vault
SWMU-11	Creosote Storage Tanks
SWMU-12	Effluent Separator Tanks
SWMU-13	Wood Boiler
SWMU-14	Boiler Blowdown Sump

Identification	SWMU and AOC Description
SWMU-15	Waste Flyash Pile
SWMU-16	Saw Dust Pile
SWMU-17	Waste Oil Drum
SWMU-18	Tie Butt Storage Area
SWMU-19	Working Tanks (Past Location)
SWMU-20	Working Tanks (Current Location)

Based on operating history and records, it was determined that no further investigation or action was necessary at SWMUs 2, 9, 16, 17, 18, and 20 in order to meet the goals of the Corrective Action program. RCRA Closure was completed for SWMUs 5 and 6. A Verification Investigation, Phase I RFI, and Phase II RFI focused on the remaining SWMUs and combined them into three areas. The three areas include the Process Area, Drip Track Area, and Non-Process Area. In addition, groundwater was characterized site-wide during the environmental investigations. Below is a summary of the Facility's environmental investigations and cleanup history.

A. RCRA Closure Activities and Permitting

The Facility filed for RCRA Interim Status in 1981 for two hazardous waste management units, which included the surface impoundments (SWMU5) and the container storage facility (SWMU 6). At that time, an initial Groundwater Quality Assessment was implemented by installing four monitoring wells to characterize shallow groundwater at SWMU 5. Shallow groundwater is present within the alluvium that overlies the karst bedrock. Based on the results of the assessment, a four-phase Groundwater Quality Assessment was implemented in 1984 to further characterize site related contaminants (SRCs) detected in groundwater. SRCs primarily include semi-volatile organic compounds (SVOCs) in the form of polynuclear aromatic hydrocarbons (PAHs) and, to a lesser extent, volatile organic compounds (VOCs) including benzene, toluene, ethylbenzene, and xylenes (BTEX), which are associated with the use of creosote. Elevated concentrations of metals have also been observed in groundwater.

The first phase of the groundwater assessment included the installation of six additional monitoring wells in shallow groundwater. Results of sampling and analysis determined that additional wells were needed to evaluate the lateral and vertical extent of SRCs in groundwater. Based on the results, the second phase was implemented by installing an additional seventeen shallow wells and four wells screened at the alluvium/bedrock transitional zone. In 1987, phase three was implemented and included a geophysical survey, installation of twelve additional wells, sampling and analysis, and pump testing. Results of phase three indicated that additional wells south and southeast of SWMU 5 were necessary to evaluate the extent of SRCs in the bedrock aquifer.

In 1988, the Facility ceased operations of the surface impoundments and submitted a RCRA Post-Closure Care Permit (Permit) application to DEQ. Closure of the surface impoundments began in July 1988 and consisted of removal and disposal of sludge and impacted soil. In 1993 an engineered cap covering the footprint of the impoundments was installed. During this time, phase four of the groundwater assessment was implemented and included a fracture trace/lineament analysis, hydrologic features inventory, sampling of downgradient domestic and industrial wells, installation of thirteen additional on-site wells and one off-site

well, and aquifer testing. Results of these investigations indicated that shallow and bedrock groundwater was impacted with SRCs and limited DNAPL was observed in bedrock groundwater. In 1995, the Facility implemented a groundwater detection monitoring program at the surface impoundments, which subsequently transitioned into a groundwater corrective action monitoring program in accordance with the Post-Closure Care Permit requirements.

In 1996, the Facility submitted a closure plan for the container storage facility (SWMU 6). SWMU 6 was closed in accordance with the approved closure plan and RCRA hazardous waste closure requirements in August 1998. Subsequently, the container storage facility was removed from the Facility's Permit. In addition, EPA Region 3 issued the Facility a Corrective Action Permit, which required that the facility complete an RFI and evaluate and implement potential environmental cleanup options. In 2007, the Facility's Post-Closure Care Permit was renewed. At that time, regulated unit groundwater corrective action for the surface impoundments was deferred to the site-wide corrective action program and requirements of corrective action were incorporated into the Permit. Since then, the Facility has modified its groundwater monitoring network to be representative of site wide groundwater.

B. Corrective Action Program Activities

Since 1998, the Facility's Permits have included requirements of the Corrective Action Program in accordance with HSWA. The following is a summary of the RFI, QRA, and CMS that have been completed.

1. Phase I RFI

In 2002, the Facility conducted field activities in accordance with an approved RFI Work Plan in support of an RFI investigation. The RFI Report was developed and submitted to DEQ in September 2003. The Report characterized site geology and hydrogeology and the presence, magnitude, and nature and extent of SRCs in soil and groundwater. In addition, an assessment of DNAPL was conducted, an evaluation of natural attenuation of SRCs in groundwater was completed, and a site conceptual model was developed.

The soil quality assessment included surface and subsurface soil above the water table and focused on the process area, drip track area, and SWMUs 1, 3, 8, and 15. Thirty six soil borings were advanced in the process area and nineteen soil borings were advanced in the drip track area. Twenty soil borings were advanced to assess soil quality at SWMUs 1, 3, 8, and15. A total of 141 soil samples were collected for chemical analysis of BTEX and SVOCs. Results of the soil quality assessment indicated that SRCs detected above EPA residential and industrial Regional Screening Levels (RSLs) for direct contact were primarily limited to surface soil in the process area, with concentrations decreasing with depth. SRCs were also observed in surface soil at the drip track area and in one surface soil sample at SWMU 8 and one surface soil sample at SWMU 1.

The groundwater quality assessment included installation of monitoring wells within the Process Area, Drip Track Area, and areas downgradient in the southeast as sentinel wells for protection of human health. A number of these wells, including the sentinel wells, were installed as "well nests", which consist of placing three wells in the same location targeting overburden groundwater (A), the transition zone (B), and bedrock groundwater (C). As part of the assessment, DNAPL was characterized, a natural attenuation evaluation was completed, and

aquifer characteristics for both the water table and bedrock groundwater were obtained in addition to sample analysis for SRCs.

Results of the assessment indicated that shallow overburden groundwater has limited thickness (10 feet or less) with a potentiometric gradient showing flow from north to south and east towards the Roanoke River. Groundwater flow in the karst bedrock is generally in the same southeasterly direction following the gradient of the Roanoke River. DNAPL was observed in overburden and bedrock groundwater wells that are associated with the process area and the surface impoundments, but was limited to discreet intervals and locations. Measurable DNAPL was only observed in four monitoring locations, but no significant amounts of DNAPL were observed. There was little evidence of lateral migration of DNAPL and it appeared that observed DNAPL was associated with silt and clay lenses in the overburden and voids in the karst bedrock. Dissolved concentrations of SRCs (PAHs and BTEX) were observed above drinking water standards, namely Maximum Contaminant Levels (MCLs) or tap water RSLs for contaminants that do not have an MCL, in overburden and bedrock groundwater at the process area and the surface impoundments and downgradient to the southeast. In addition, the evaluation of natural attenuation indicated that a degree of biodegradation is occurring downgradient. Trend analysis of oxidation reduction potential, electron acceptors and metabolic by-products are supportive of SRC degradation and attenuation. Results of microbial analysis are also consistent, and differences consistent with SRC biodegradation were noted between microbial communities both near and distant from the SRC source.

Based on the results provided in the Phase I RFI Report (approved by DEQ on September 17, 2008), dye trace studies were proposed for bedrock groundwater to determine the ultimate fate of SRCs and DNAPL in karst groundwater and identify any potential receptors. In addition, a Phase II RFI Work Plan was developed in order to complete the nature and extent evaluation of SRCs observed in soil.

2. Dye Trace Studies

In 2004 and 2007, two dye trace studies were performed on site in the karst bedrock groundwater to determine the fate and transport of SRCs and DNAPL and to identify if any potential receptors were present. The 2004 study involved injection of trace dyes into transition zone well M-33A and bedrock well M-4C and monitoring for the presence of trace dye at on-site monitoring wells, the river, springs identified in vicinity of the site, and off-site domestic wells using dye detectors. The short term results of the 2004 study indicated that trace dye was not detected at any of the monitoring points on-site or off-site. However, it was noted that if dye was present in the river, which is the most likely receptor, it may not have been in sufficient amounts to overcome rapid dilution making it non-detectable by the dye detectors. The final step of the study was completed by deploying activated carbon units at each monitoring point. These carbon units remained in place for 18 months. Upon retrieval and analysis, the only river unit left intact that could be analyzed indicated inconclusive detections of dye, but monitoring well units showed evidence of dye in on-site wells M-14B, M-14C, M-16B, and M-17. However, no off-site monitoring points indicated the presence of dye.

In 2007 following the startup of two, new water supply wells for the City of Salem another dye trace study was conducted to determine if pumping at the new wells had any effect on groundwater on-site and off-site in vicinity of the Facility. During this study, larger quantities of dye were introduced to the aquifer using the same injection points (M-33A and M-4C). The

results of this study were similar to the 2004 study with the exception of observing dye in M-30C, which is near M-16, a location where dye was detected during the previous study. This result was determined to be a factor of introducing larger quantities of dye. Based on the results of these studies, it was concluded that SRCs are not likely capable of migrating off-site to receptors such as the river, springs, or water supply wells at concentrations that would pose an unacceptable risk to human health.

3. Phase II RFI

In 2009, the Facility conducted field activities in support of completing a Phase II RFI. The objectives of the investigation included; delineate the nature and extent of SRCs that exceeded EPA residential and industrial RSLs for direct contact and site screening levels (SSLs) for soil to groundwater transfer using a dilution attenuation factor of 20 (DAF-20); complete an ecological evaluation of the intermittent stream bisecting the site; and evaluate the integrity of the waste water treatment system. An additional 21 soil borings were advanced to further delineate SRCs in soil within the Process Area, Drip Track Area, and the Non-Process Area. Six sediment samples were collected from the stream bed to evaluate impacts to the ecological environment within the intermittent stream. In addition, a visual inspection of the storm water and waste water conveyance systems and the waste water treatment system was completed to evaluate its integrity.

In the Process Area, sample results indicated that VOCs were not detected above RSLs for direct contact and DAF-20 SSLs. Site related SVOCs were detected above screening criteria in three borings within the Process Area. One of the borings exceeded residential RSLs and DAF-20 SSLs, but not industrial RSLs. The other two borings exceeded all screening criteria specifically at depths 0-2 feet below ground surface (bgs) in one location and at 3-5 feet bgs in the other location. In the Drip Track Area, results indicate that VOCs were not detected above any screening criteria. Toluene was the only VOC detected at 0.91 micrograms per kilogram (ug/kg), which is well below residential RSLs and DAF-20 SSLs. Site related SVOCs were detected above all screening criteria in only one boring within the Drip Track Area at a depth of 0-2 feet bgs. VOCs were not detected above analytical method detection limits in samples collected from the Non-Process Area. Site related SVOCs were detected above screening criteria in two soil boring locations within the SWMU 1 location in the Non-Process Area. In one of the boring locations all screening criteria were exceeded at 0-2 feet bgs, but only residential RSLs and DAF-20 SSLs at 4-6 feet bgs. In the other boring location residential RSLs and DAF-20 SSLs were exceeded at 0-2 feet bgs.

In addition to collection of soil samples, six sediment samples were collected from Big Bear Rock Branch, an intermittent stream bisecting the site, in order to complete a screening level ecological risk assessment. Sample results indicated that VOCs were not detected and site related SVOCs were detected in two of the six samples. The highest concentrations of SVOCs were found in the sample located immediately downstream of the Norfolk Southern rail line and up gradient of the Facility's Process and Drip Track Areas. Results of the ecological risk assessment are provided in the section below, which discusses the quantitative risk assessment.

Lastly, a visual inspection of the Facility's storm water and waste water conveyance systems and waste water treatment system was conducted to evaluate their integrity. The evaluation included a review of historic treatment components and layout and a visual inspection of the current operating system. System components included in the inspection included the

equalization tanks, oil/water separator, biological treatment using a non-return sludge suspended growth aerobic reactor, treated water effluent tanks, and associated piping. All components are located within secondary containment with the exception of the piping, most of which is above ground. Underground piping is limited to connecting the treated water effluent tanks to the sanitary sewer system, which is the discharge location.

Based on the results of the Phase I and Phase II RFI, the nature and extent of SRCs in groundwater and soil was successfully delineated. In addition, the Facility agreed to use current drinking water standards (MCLs/RSLs) as cleanup goals for groundwater and recommended that a quantitative risk assessment focusing on soil and sediment be conducted to characterize potential risk to human health and the environment.

4. Quantitative Risk Assessment

Subsequent to the RFI activities, the Facility completed a quantitative risk assessment (*Risk Assessment – Koppers Inc. Roanoke Valley Plant, dated June 2011, ARCADIS*) that focused on quantitatively evaluating risk to human health associated with surface soil and subsurface soil on-site for current and future users. The risk assessment also included a screening level evaluation of groundwater for completeness and a screening level ecological risk assessment that focused on Big Bear Rock Branch, an intermittent stream bisecting the site.

The site is an industrial use Facility zoned in Salem's High Intensity Industrial District. However, the human health risk assessment evaluated the site under current and future residential and industrial use. It was conducted in accordance with guidance documents *Risk Assessment Guidance for Superfund* (RAGS), *Volume I: Human Health Evaluation Manual* (USEPA 1989), *Exposure Factors Handbook* (USEPA 1997a), *Risk-Based Closure Guidance* (DEQ 1999), and *Guidelines for Developing Health-Based Cleanup Goals Using Risk Assessment at Hazardous Waste Site Facility for Restricted Industrial Use* (DEQ 1995). The approach followed the four step process of hazard identification, dose response assessment, exposure assessment, and risk characterization.

Soil was identified as the media of concern and constituents of potential concern were identified through the screening process. The following constituents were identified regarding potential risk for direct contact and inhalation: benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, naphthalene, and dibenzofuran. In addition, these constituents and several other PAHs, SVOCs, benzene, ethylbenzene, and xylenes were identified as constituents of potential concern because they exceeded the transfer to groundwater SSLs. The site was evaluated in sections, which included the Process and Non-Process Areas. The Process Area in this case included the Drip Track and Treatment Cylinder Areas, which were evaluated individually as well. Current and future hypothetical receptors were identified. Results indicated that for current and future industrial use the potential excess lifetime cancer risk from carcinogenic constituents for receptors ranged from 8 x 10-8 for a construction worker in the Non-Process Area to 3 x 10-5 for hypothetical commercial/industrial workers in the Treatment Cylinder Area. These results fall within EPA's acceptable risk range of 1 x 10-6 to 1 x 10-4 for current and future industrial use. Hazard quotients were calculated for non-carcinogenic constituents and compared to a hazard index of 1. A hazard quotient that is more than 1 implies an increased potential risk to human health. Results indicated quotients ranging from 0.0002 for a trespasser in the Drip Track Area to 0.4 for hypothetical commercial/industrial worker in the Treatment

Cylinder Area. These results are below the acceptable hazard index of 1 for current and future industrial use.

A groundwater screening evaluation was completed to identify constituents of concern (COCs) in groundwater based on exceedance of MCLs or tap water RSLs if no MCL has been established for a constituent. The comparison indicated various site-related SVOCs, PAHs, VOCs, and inorganics are present in groundwater beneath the Site at concentrations exceeding MCLs (or tap water RSLs). Additionally, the historical groundwater record was evaluated to determine if constituents in soil that exceed the DAF-20 SSLs were also present in groundwater. For the constituents that are present in soil but are not found in groundwater, it can be determined based on the 30-year groundwater record that those constituents are not capable of transferring to groundwater. Therefore, groundwater COCs are limited to what is currently detected above drinking water standards. Because the Facility's cleanup goals for groundwater are drinking water standards, a quantitative risk assessment specific to groundwater was not completed.

In addition to the human health risk assessment, the Facility completed a screening level ecological risk assessment. Evaluation of the stream included collection of six sediment samples, results of which were evaluated using EPA Region 3 screening criteria found in *Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Sediment-Associated Biota* (Jones, D.S. G.W. Suter II and R.N. Hull, 1997). In addition, the Facility provided screening criteria for sediment from EPA Regions 4 and 5. Sample results indicated that VOCs were not detected and site related SVOCs were detected in two of the six samples. The highest concentrations of SVOCs were found in the sample located immediately downstream of the Norfolk Southern rail line and up gradient of the Facility's Process and Drip Track Areas. As part of the evaluation, a characterization of habitats and potential plant and animal species was completed in order to characterize risk. Since the stream is ephemeral or intermittent in nature conveying water only during times of high precipitation, no aquatic habitats were identified. The stream is also isolated from runoff from the Facility by a series of levees and culverts. A field survey indicated that no stressed vegetation was identified and since the stream is located in the center of an industrial facility, it is unlikely a suitable habitat for wildlife. However, results were screened and hazard quotients were established for each chemical retained for evaluation based on exceedance of the screening criteria. The hazard quotients were then compared to a hazard index of 1 to characterize overall risk. Results indicated that when using Region 3 screening criteria, hazard quotients ranged from 1.02 to 40 with benzo(b)fluoranthene and indeno(1,2,3-cd)pyrene having the higher quotients. When using Region 4 and 5 screening criteria, hazard quotients ranged from 0.1 to 3.9 and 0.1 to 16, respectively. These results are based on one of six sediment samples, which was located immediately downstream of the rail line and up gradient of the Process and Drip Track Areas. Based on this, it is likely that the results are indicative of potential runoff from the rail line and not a result from the Facility's wood treatment process. Since these results were not observed in the downstream samples, no further evaluation or action was necessary since these results do not represent an unacceptable risk to the environment.

Based on the results of the investigations and assessments, the Department approved the RFI and risk assessment on October 11, 2011 and required that the facility develop a CMS to evaluate potential cleanup remedies and impose institutional controls in the form of land use restrictions. The land use restrictions will be imposed through a covenant that meets the requirements of the Uniform Environmental Covenants Act (UECA), VA Code § 10.1-1238, et

seq. The CMS and institutional controls are discussed in more detail in the sections below.

5. Corrective Measures Study (CMS)

In 2012, the Facility conducted a site-wide groundwater monitoring event in support of completing a CMS. The CMS focused specifically on groundwater since the risk assessment previously conducted showed that constituents in soil and sediment in Big Bear Rock Branch were within EPA's acceptable risk ranges for industrial use and institutional controls will be imposed on the property. Based on historical investigation results described in the RFI, results of the 2012 site-wide groundwater sampling event, and the quantitative risk assessment, corrective action objectives were established in the CMS and are paraphrased below:

- Mitigate exposure to contamination left in soil by imposing land use restrictions that will ensure the property remains industrial and cannot be used for residential purposes. Soil disturbances such as excavation, trenching, etc. will be conducted in accordance with a Materials Management Plan.
- Ensure that groundwater cannot be used for any purpose other than environmental testing and/or non-contact cooling water.
- Mitigate constituent concentrations that exceed drinking water standards throughout the contaminant plume in the shallow overburden groundwater.
- Recover free phase DNAPL from bedrock groundwater. A DNAPL zone has not been identified, but occasionally it is observed in limited bedrock wells.
- Periodically reconfirm that SRCs are not migrating to potential off-site receptors through the karst bedrock.

The CMS included an evaluation of several potential remedies with respect to the corrective action objectives. The remedies included institutional controls, monitored plume stability, groundwater recirculation, in situ chemical oxidation, and biosparging. In addition, the occurrence of natural attenuation was evaluated concurrently with these remedies to assist in determining the most feasible remedy. Each remedy was evaluated based on ability to remediate sources, overall protection of human health, compliance with state and federal standards, short-term and long-term effectiveness, feasibility, cost, and community acceptance.

As a result, the Facility proposed institutional controls and monitored plume stability as the most readily implementable and feasible remedy that can meet the corrective action objectives. This determination was made because it was demonstrated that SRCs are not migrating off-site to potential receptors; evaluations indicate that natural attenuation is occurring in portions of the contaminant plume in the shallow overburden groundwater; and attenuation of the contaminant plume has been observed throughout the 30-year groundwater record. Results of the CMS also indicated that due to the lithology and aquifer characteristics beneath the site, in situ chemical oxidation, biosparging and groundwater recirculation would not likely be effective. In addition, the Facility will periodically perform a dye trace study to reconfirm that SRCs are not migrating off-site to potential receptors.

The Department approved the CMS on April 15, 2014. As part of the CMS the Facility developed a draft covenant containing institutional controls for review by the Department. As part of the proposed remedy, the Facility revised their Sampling and Analysis Plan (SAP) to be more comprehensive of groundwater site-wide and has submitted a Materials Management Plan (MMP). The SAP and MMP were approved by DEQ on December 30, 2014.

C. Current Conditions

Currently, the contaminant plume, which primarily consists of SVOCs, PAHs, benzene, ethylbenzene, and xylenes, is contained on site with the exception of naphthalene at one monitoring well (M-27A) east of the property boundary. Naphthalene in this location was not detected above the laboratory method detection limit (MDL) 0.2 ug/L. However, the MDL was higher than the tap water RSL 0.17 ug/L. Therefore, it must be considered as present until it is demonstrated that it is not detectable above the RSL. Elevated concentrations of metals are present in groundwater as well. However, it appears that this is due to the presence of organic SRCs and their effect on the groundwater since the Facility did not have a release of or historically manage metals. In the overburden groundwater the contaminant plume extends from the Process Area to the east where SWMU 5 is located and to a lesser extent to the southeast. Contaminants in bedrock groundwater extend from south of the Process Area and SWMU 5 to the east and southeast as well. However, unlike overburden groundwater, contaminants in the bedrock are present within the karst features including fractures, voids, and solution features. Figure 4 is included showing the SRCs in groundwater.

The Facility currently implements an annual groundwater monitoring program and semi-annual DNAPL measurement and recovery event site wide including groundwater monitoring wells within the source areas (limited wells where DNAPL has been periodically observed), locations cross gradient and downgradient of the source areas, sentinel wells located downgradient of the plume terminus, and well locations off-site. The Facility continues to monitor groundwater in accordance with Permit requirements and has modified their groundwater monitoring program to be more extensive to evaluate effectiveness and better achieve corrective action objectives

IV. CORRECTIVE ACTION OBJECTIVES

A. Soils

DEQ has determined that industrial risk based levels are protective of human health and the environment for individual contaminants at this Facility provided that the Facility is not used for residential purposes. Therefore, DEQs Corrective Action Objective for Facility soils is to control exposure to the hazardous constituents remaining in soils by requiring compliance with and maintenance of land use restrictions at the Facility. In addition, an agency approved Materials Management Plan will be required for any soil excavation and disturbance on the property. The requirement for a Materials Management Plan and the land use restrictions will be imposed by the Facility's Permit and covenant, which will be UECA compliant.

B. Groundwater

DEQ has determined that drinking water standards, namely MCLs or tap water RSLs for constituents that do not have an MCL, for contaminants are protective of human health and the environment for individual contaminants at this Facility. DEQ's Corrective Action Objectives for Facility groundwater are the following:

1. To control exposure to the hazardous constituents in the groundwater by requiring the compliance with and maintenance of a groundwater use restriction at the Facility as long as drinking water standards are exceeded. This restriction will be imposed by the

Facility's Permit and covenant, which will be UECA compliant;

2. To remediate remaining sources by recovering DNAPL when observed; and

3. To monitor stability and/or attenuation of concentrations of the following hazardous constituents in groundwater until drinking water standards are met.

Constituents and Standards

Constituent	Standard (ug/l)	Source
Benzene	5	MCL
Ethylbenzene	700	MCL
Xylenes	10,000	MCL
Acenaphthene	530	RSL
Benzo(a)anthracene	0.034	RSL
Benzo(a)pyrene	0.2	MCL
Benzo(b)fluoranthene	0.034	RSL
2-Chlorophenol	91	RSL
p-Chloro-m-cresol	1,400	RSL
Chrysene	3.4	RSL
Dibenzo(a,h)anthracene	0.0034	RSL
Dibenzofuran	7.9	RSL
2,4-Dichlorophenol	46	RSL
2,4-Dimethylphenol	360	RSL
2,4-Dinitrophenol	39	MCL
Fluoranthene	800	RSL
Fluorene	290	RSL
Indeno(1,2,3-cd)pyrene	0.034	RSL
2-Methylnaphthalene	36	RSL
Naphthalene	0.17	RSL
Phenol	5,800	RSL
2,3,4,6-Tetrachlorophenol	240	RSL
2,4,5-Trichlorophenol	1,200	RSL
2,4,6-Trichlorophenol	4	RSL
Arsenic	10	MCL
Nickel	390	RSL

C. Indoor Air

DEQ's Corrective Action Objective for indoor air is to control exposure to volatile hazardous constituents in indoor air by requiring the use of vapor mitigation in or beneath new, totally enclosed structures designed for occupation within 100 feet of the foot print of groundwater having site-related VOCs and SVOCs identified above protective levels (MCLs/RSLs) unless it is demonstrated to DEQ that vapor mitigation is not necessary to protect human health. This requirement will be imposed by the Facility's Permit and covenant, which will be UECA compliant.

V. SUMMARY OF PROPOSED REMEDY

A. Summary

Under this proposed remedy, DEQ is requiring the following actions:

1. Continue the DNAPL detection and recovery program to reduce and ultimately eliminate DNAPL as an ongoing source to groundwater contamination.
2. Continue the groundwater monitoring program to confirm stabilization and/or reductions in hazardous constituents on-site and continue to monitor sentinel wells off-site to confirm that SRCs are not migrating to potential receptors.
3. Perform a dye trace study every five years to reconfirm that SRCs are not migrating off-site to potential receptors.
4. Maintain compliance with land use restrictions and institutional controls. Institutional controls will be imposed by the Facility's Permit and a covenant which will be UECA compliant. Institutional controls include:
    a. The property shall not be used for residential purposes or for children's (under the age of 16) daycare facilities, schools, or playground purposes.
    b. Groundwater beneath the property shall not be used for any purposes except for environmental monitoring and testing, or for non-contact industrial use as may be approved by the agency subject to the considersations in the CMS. Any new groundwater wells installed on the Property must be approved by the agency.
    c. Excavation and disturbance on the property shall be conducted in accordance with an agency approved Materials Management Plan.
    d. Future modifications at the property that could be reasonably understood to adversely affect or interfere with the integrity or protectiveness of the final remedy will be evaluated to identify and address those potential impacts or interferences. No removal, disturbance, or alteration shall occur to any corrective action components installed at the property, including, but not limited to groundwater monitoring wells and the engineered cover installed over the closed surface impoundments, without agency approval.
    e. Vapor intrusion mitigation measures shall be installed in any newly constructed totally enclosed building(s) designed for occupation within 100 feet of the foot print of groundwater impacted with VOCs and SVOCs. Additionally, the need for vapor intrusion mitigation measures shall be assessed for any existing totally enclosed building(s) designed for occupation should the use of such building(s) be

modified from its current use in such a manner that vapor intrusion could become a human health risk. Vapor intrusion mitigation measures may be waived with agency approval based upon a demonstration that mitigation measures are not necessary for protection of human health.

B. Implementation

DEQ proposes to implement the remedy through the Facility's Hazardous Waste Management Permit for Site-Wide Corrective Action. Therefore, DEQ does not anticipate any regulatory constraints in implementing its remedy. In addition, a groundwater monitoring plan is already in place and the Facility revised their existing SAP to provide the basis for continued remedy implementation including groundwater monitoring, DNAPL detection and recovery, implementation of dye trace studies, and compliance with institutional controls. The Department approved the revised SAP on December 30, 2014 concurrent with the MMP.

C. Reporting Requirements

Compliance with and effectiveness of the proposed remedies and institutional controls at the Facility shall be evaluated and included in annual groundwater monitoring and corrective measures implementation reports. The Facility shall notify the Department of whether the institutional controls are being observed every three years.

VI. EVALUATION OF DEQ'S PROPOSED DECISION

This section provides a description of the criteria DEQ used to evaluate the proposed decision consistent with EPA guidance. The criteria are applied in two phases. In the first phase, DEQ evaluates three decision threshold criteria as general goals. In the second phase, for those remedies which meet the threshold criteria, DEQ then evaluates seven balancing criteria to determine which proposed decision alternative provides the best relative combination of attributes.

A. Threshold Criteria

1. Protect Human Health and the Environment

This proposed remedy protects human health and the environment from exposure to hazardous constituents in groundwater, indoor air, and in soil. DEQ's proposed decision meets this standard for current and future industrial land use. Based on the results of investigations and cleanup activities all known sources of contamination have been characterized and have been or are currently being addressed.

The property is currently used as an industrial facility consisting of a process area containing a treatment building, drip track, and associated out buildings. The non-process area includes administrative offices, storage areas, the closed surface impoundments, and unoccupied land. Potable water is supplied to the property by City of Salem municipal water supply system and stability and limited attenuation of hazardous constituents has been demonstrated. Required by this remedy, groundwater use for purposes other than environmental testing will be restricted via the Facility's Permit and UECA Covenant, and the DNAPL recovery and groundwater monitoring programs will be continued. In addition, periodic dye trace studies will be conducted to verify that SRCs are not migrating off-site to potential receptors. Institutional controls, in the form of land use restrictions, are necessary to be protective of human health due to soil and

groundwater. Institutional controls will be imposed by the Facility's Permit and UECA covenant. The Facility is required to maintain the institutional controls and continue the groundwater monitoring program until drinking water standards are met to ensure protection of human health and the environment.

2. Achieve Media Cleanup Objectives

DEQ's proposed remedy meets the appropriate cleanup objectives based on current and reasonable anticipated future land use and water resource use(s). The current use of the property is industrial and the reasonable anticipated future use of the property is industrial. The Facility will impose institutional controls as part of the remedy restricting certain land uses, such as residential use, use of the groundwater, vapor mitigation measures, and no disturbance of the engineered cover at the closed surface impoundments. Therefore, no additional institutional controls or corrective measures other than DNAPL recovery are necessary to protect human health and the environment.

For groundwater, a number of VOCs, SVOCs, and metals are still above drinking water standards. They are listed with their cleanup standard in Section IV.B.3 of this Statement of Basis. SRCs in groundwater are currently stable and it has been demonstrated that they are not migrating off-site to potential receptors. As part of this remedy, groundwater monitoring will continue to demonstrate ongoing stability and eventual attenuation/dissipation. It is anticipated that by depleting residual DNAPL through the detection and recovery program SRCs in groundwater will eventually attenuate/dissipate to below drinking water standards. Until then potable water is supplied to the Facility by the City of Salem's municipal system. Groundwater beneath the property is not used for any purpose other than environmental testing and its use will be restricted as part of this remedy via the Facility's Permit and covenant. Institutional controls restricting the use of groundwater at the Facility will remain in place and groundwater monitoring will continue until cleanup standards for these constituents have been met. Groundwater data and remedial effectiveness data will be evaluated periodically to ensure that contaminants continue to remain stable or decline in groundwater and that the remedy remains protective.

3. Remediating the Source of Releases

In all proposed decisions, DEQ and EPA seek to eliminate or reduce further releases of hazardous wastes or hazardous constituents that may pose a threat to human health and the environment. Since 1981, the Facility has identified all potential and/or known sources of releases and has removed or mitigated impacts from those releases. These activities have been completed in accordance with hazardous waste closure and corrective action program requirements. The residual DNAPL remaining in the karst bedrock groundwater is the last of the known sources of hazardous constituents at the Facility and it is being addressed under Corrective Action by this remedy.

B. Balancing/Evaluation Criteria

1. Long-Term Effectiveness

The proposed remedy will maintain protection of human health and the environment over time by demonstrating stability or attenuating concentrations of hazardous constituents in

groundwater and controlling exposure to hazardous constituents in groundwater, soil, and indoor air. DEQ's proposed decision requires DNAPL detection and recovery, groundwater monitoring, periodic dye trace studies to demonstrate that no SRCs are migrating off-site, and compliance with institutional controls which are protective in the short-term as well as in the long-term. Institutional controls are implemented through the Facility's Permit for Site-Wide Corrective Action and the Facility will file land use restrictions in the form of a covenant that meets requirements of UECA with the Facility's land deed. Groundwater monitoring will continue periodically to ensure that the remedy remains effective and that contaminant levels continue to remain stable or decline and do not leave the property.

2. Reduction of Toxicity, Mobility, or Volume of the Hazardous Constituents

The reduction of toxicity, mobility, and volume of hazardous constituents at SWMUs at the Facility has already been achieved by previous cleanup activities summarized above in accordance with the Virginia Solid and Hazardous Waste Management (VSHWM) Regulations for unit closure. DEQ's proposed remedy will further achieve reduction of toxicity, mobility, and volume of hazardous constituents in groundwater by recovering residual DNAPL when observed and monitoring stability and/or attenuation of hazardous constituents in groundwater. As the residual DNAPL is depleted, contaminants in groundwater are expected to attenuate/dissipate over time.

3. Short-Term Effectiveness

DEQ's proposed decision does not involve any activities, such as construction or excavation that would pose short-term risks to workers, residents, and the environment. DEQ's decision involves the periodic handling of DNAPL and contaminated groundwater in the form of purge water generated during groundwater sampling activities. However, the handling and management of these items will be completed by authorized personnel and in accordance with VSHWM Regulations and health and safety protocols developed by the Facility. In response to DNAPL recovery, decreases in hazardous constituents in groundwater are anticipated over time.

4. Implementability

DEQ's proposed decision is readily implementable. The Facility's DNAPL detection and recovery and groundwater monitoring programs are already in place. In 2007, the groundwater monitoring program was modified for site-wide groundwater monitoring. As part of the proposed remedy, the Facility modified the monitoring program to be more comprehensive of the overburden and bedrock groundwater and to better evaluate stability and/or attenuation of SRCs. The Facility's Permit will be modified to incorporate this remedy upon public acceptance, which will include institutional controls. During the CMS phase, the Facility drafted a covenant that meets the requirements of UECA. The covenant will be filed with the Facility's land deed upon public acceptance of the proposed remedy.

5. Cost

DEQ's proposed decision is cost effective. Given that capital costs associated with characterization, well installation, and pilot testing have already been executed, on-going costs for remedy implementation are limited to operation and maintenance of the DNAPL detection and recovery and groundwater monitoring programs, periodic dye trace studies, and general

operation and maintenance of the institutional controls and Permit.

6. Community Acceptance

DEQ will evaluate community acceptance of the proposed decision during the public comment period, which will last sixty (60) calendar days. DEQ's final decision will be described in the Facility's Hazardous Waste Management Permit for Site-Wide Corrective Action, which will be modified to include facets of the final remedy.

7. State/Support Agency Acceptance

DEQ will evaluate EPA's acceptance of the proposed remedy during the public comment period. DEQ's final decision will be described in the Facility's Hazardous Waste Management Permit for Site-Wide Corrective Action, which will be modified to include facets of the final remedy.

VII. ENVIRONMENTAL INDICATORS

Under the Government Performance and Results Act, EPA set national objectives to measure progress toward meeting the nation's major environmental goals. For Corrective Action, EPA evaluates two key environmental indicators for each facility: 1) current human exposures under control and 2) migration of contaminated groundwater under control. The Facility met these indicators on September 30, 2004 and September 29, 2003, respectively.

VIII. FINANCIAL ASSURANCE

The Facility is already providing financial assurance for continued groundwater monitoring and corrective action activities required by the Facility's Permit. Required by the Permit, updated cost estimates for DEQ's final decision are required and will be the basis for financial responsibility of the implementation and operation and maintenance of the final remedy.

IX. PUBLIC PARTICIPATION

Before DEQ makes a final decision on its proposal for the Facility, the public may participate in the decision selection process by reviewing this SB and documents contained in the Administrative Record for the Facility. The Administrative Record contains all information considered by DEQ in reaching this proposed decision. Interested parties are encouraged to review the Administrative Record and comment on DEQ's proposed decision. For additional information regarding the proposed remedy, please contact Mr. Brett Fisher at (804) 698-4219 or brett.fisher@deq.virginia.gov.

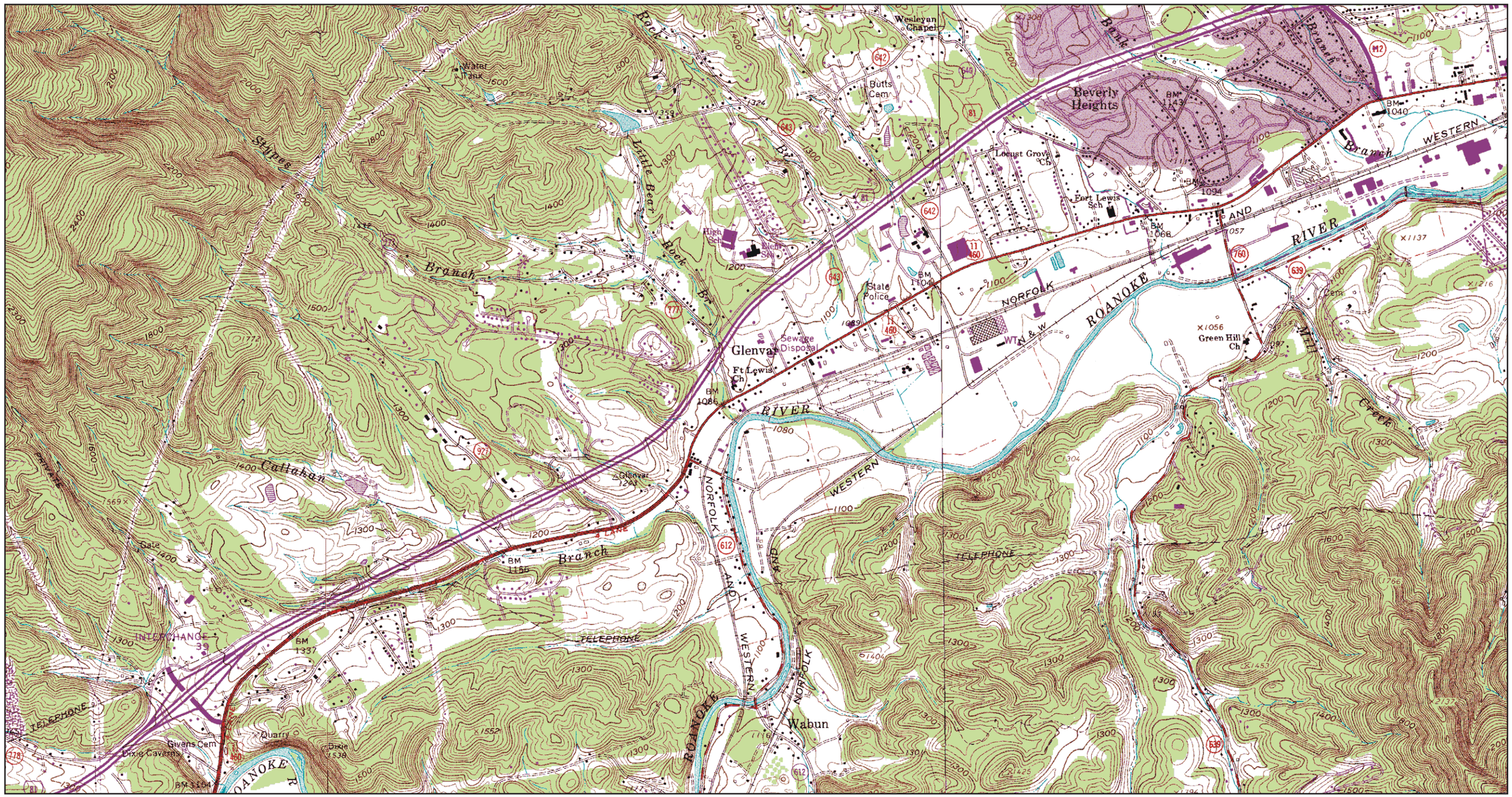
The public comment period will last sixty (60) calendar days from the date the notice is published in a local newspaper. Comments may be submitted by mail, fax, e-mail, or phone to Ms. Angela Alonso at the address listed below.

Virginia Department of Environmental Quality
629 East Main Street
P.O. Box 1105

Richmond, VA 23219
Contact: Angela Alonso
Phone: (804) 698-4328
Fax: (804) 698-4234
Email: angela.alonso@deq.virginia.gov

DEQ will make a final decision after considering all comments, consistent with the applicable RCRA requirements and regulations. If the decision is substantially unchanged from the one in this Statement of Basis, DEQ will issue a final decision and inform all persons who submitted written comments or requested notice of DEQ's final determination. If the final decision is significantly different from the one proposed, DEQ will issue a public notice explaining the new decision and will reopen the comment period.

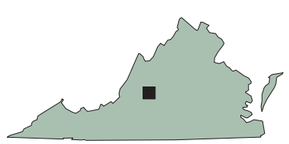
FIGURES



REFERENCE: BASE MAP USGS 7.5 MIN. QUADS. GLENVAR, VA, 1963, PHOTOREVISED 1984 AND SALEM, VA, 1994.

2000' 0 2000'

Approximate Scale: 1" = 2000'



Area Location

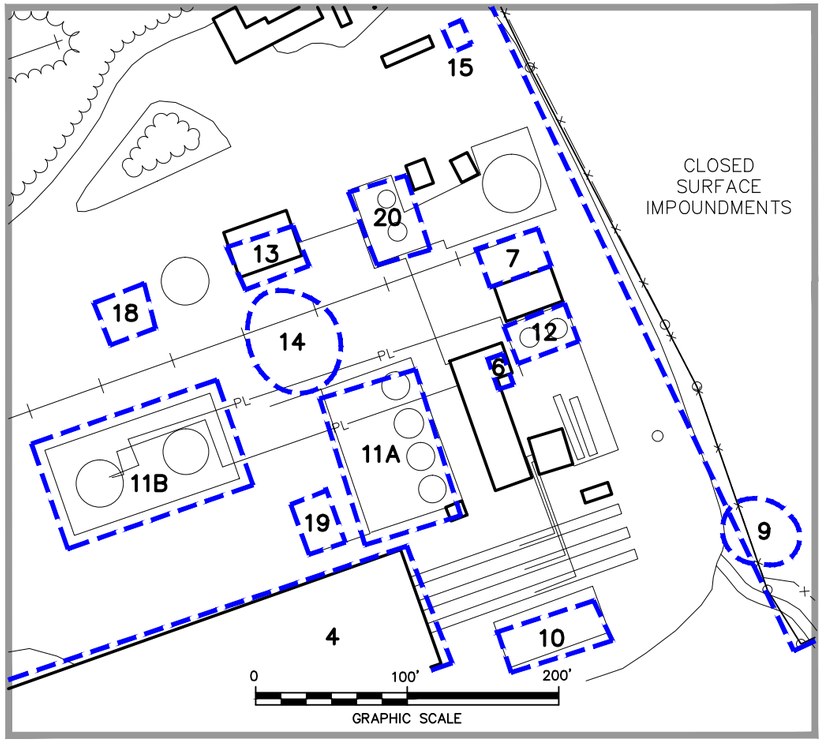
BEAZER EAST INC.
KI ROANOKE VALLEY PLANT
SALEM, VIRGINIA
CORRECTIVE MEASURES STUDY

SITE LOCATION MAP

ARCADIS

FIGURE
1

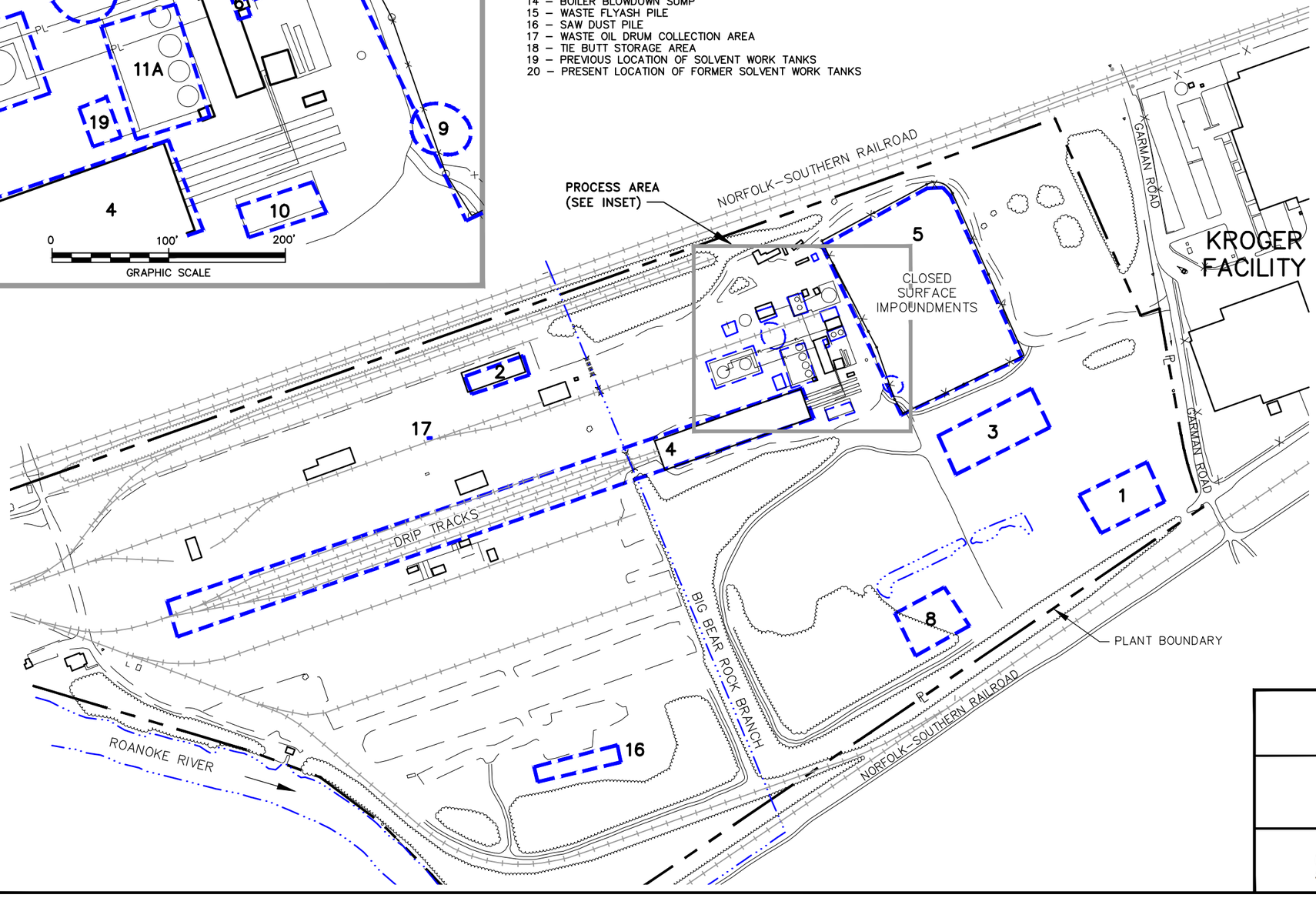
05/21/2013 SYRACUSE, NY-ENV/CAD-K.SARTORI, DJHOWES
B003923\0000\000001/CDR/39253N01.CDR



CLOSED SURFACE IMPOUNDMENTS

SWMU LEGEND

1 – PAST LAND FARM AREA
2 – WASTE PILE
3 – SPRAYFIELD
4 – DRIP TRACK
5 – SURFACE IMPOUNDMENTS
6 – CONTAINER STORAGE FACILITY
7 – CREOSOTE UNLOADING AREA
8 – LANDFILL
9 – RUNOFF COLLECTION SYSTEM (SUMP)
10 – BELOW GRADE SOLVENT STORAGE VAULT
11 – CREOSOTE WORK TANKS
12 – EFFLUENT SEPARATOR TANKS
13 – WOOD BOILER
14 – BOILER BLOWDOWN SUMP
15 – WASTE FLYASH PILE
16 – SAW DUST PILE
17 – WASTE OIL DRUM COLLECTION AREA
18 – TIE BUTT STORAGE AREA
19 – PREVIOUS LOCATION OF SOLVENT WORK TANKS
20 – PRESENT LOCATION OF FORMER SOLVENT WORK TANKS



LEGEND:

17 — SWMU DESIGNATION

SWMU BOUNDARY

NOTES:

1. BASE MAP SUPPLIED BY FLUOR DANIEL GTI; ACAD FILE SITEMAP.DWG, DATED 4/25/97, AT A SCALE OF 1"=300'.
2. MAP WAS COMPILED BY PIEDMONT AERIAL SURVEYS, 123 S. WALNUT CIRCLE, GREENSBORO, NC 27209–2631, USING STEREO PHOTOGRAMMETRIC METHODS FROM PHOTOGRAPHY DATED 11/19/94. GROUND CONTROL DATA WAS PROVIDED BY T.P. PARKER & SON, 816 BOULEVARD, SALEM, VIRGINIA 24153.

0 300' 600'
GRAPHIC SCALE

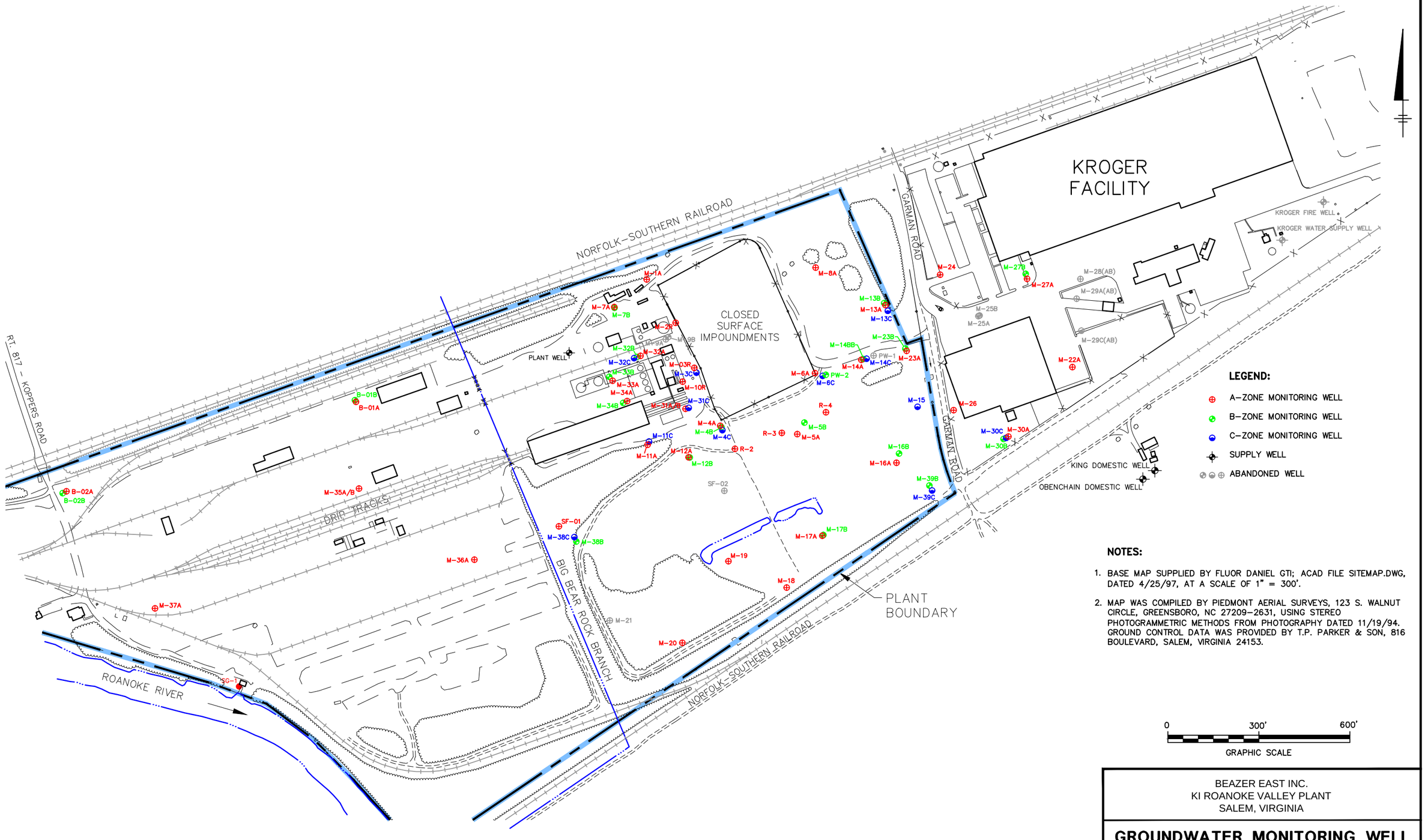
BEAZER EAST INC.
KI ROANOKE VALLEY PLANT
SALEM, VIRGINIA

SWMU LOCATION MAP

ARCADIS

FIGURE 2

CITY: SYRACUSE, NY DIV/GROUP: ENV10 DB: R. BASSETT PIC: J. S. HOLDEN PM/TM: H. EVANKO LYR: ON=*;OFF=REF; (FR2)
G:\ENV\CAD\SYRACUSE\ACTIB\039253\000\2\000\01\dwg\38821B05.DWG LAYOUT: 2 SAVED: 10/30/2014 11:13 AM ACADVER: 18.1S (LMS TECH) PAGESETUP: ---
XREFS: IMAGES: PROJECTNAME: ---
38821X02
39253X00



NOTES:

1. BASE MAP SUPPLIED BY FLUOR DANIEL GTI; ACAD FILE SITEMAP.DWG, DATED 4/25/97, AT A SCALE OF 1" = 300'.
2. MAP WAS COMPILED BY PIEDMONT AERIAL SURVEYS, 123 S. WALNUT CIRCLE, GREENSBORO, NC 27209-2631, USING STEREO PHOTOGRAMMETRIC METHODS FROM PHOTOGRAPHY DATED 11/19/94. GROUND CONTROL DATA WAS PROVIDED BY T.P. PARKER & SON, 816 BOULEVARD, SALEM, VIRGINIA 24153.

0 300' 600'

GRAPHIC SCALE

BEAZER EAST INC.
KI ROANOKE VALLEY PLANT
SALEM, VIRGINIA

GROUNDWATER MONITORING WELL LOCATION MAP

ARCADIS

FIGURE 3

SYR-ENVCAD-R. BASSETT LAYER: ON=*, OFF=REF
G:\ENVCAD\SYRACUSE\ACT\B0039253\0002\00001\dwg\39253B03.DWG SAVED:10/30/2014 1:57 PM LAYOUT:3 PAGESETUP:---- PENTABLE:PLTFULL.CTB PRINTED:10/30/2014 1:58 PM BY:RBASSETT
XREFS: IMAGES: PROJECTNAME: ----
39253X00
39253X02
PROJECTNAME: ----
XREFS: IMAGES:
39253X00
39253X02

M-16A							
	02/18/92	01/21/97	02/06/01	01/13/05	10/26/09	04/24/12	04/24/13
B	< 5	< 5	< 5	< 1	< 1	< 1	< 1
N	< 10	< 10	< 10	< 11	< 0.19	0.048 J	< 0.2

M-23A			
	07/25/95	09/05/96	04/25/12
B	< 5	< 5	< 1
N	< 10	**78**	**0.32**

M-13A	
	04/24/12
B	< 1
N	0.045 J

M-27A				
	01/22/97	02/06/01	01/22/02	04/25/12
B	< 5	< 5	< 5	< 1
N	< 250	< 10	< 200 J	< 0.20

M-14A						
	02/18/92	03/16/94	11/14/02	01/22/04	02/23/06	04/24/12
B	< 100 J	< 100 J	**67**	**28**	**24**	**29**
N	**4700**	**3900**	**3,600**	**1,500 D**	**930**	**550**

M-06A					
	8/11/92	03/01/95	02/25/98	01/22/02	04/24/12
B	< 250	< 25	**11 D**	**14**	0.12 J
N	**3000**	**860**	**380 D**	**530 J**	**0.85**

M-10R			
	02/18/92	03/02/95	04/25/12
B	**540**	**550**	**54**
N	**14000**	**700,000**	**120**

M-33A		
	11/14/02	04/25/12
B	< 1	< 1
N	< 1.5	**0.33**

M-34A		
	11/13/02	04/25/12
B	**130**	< 1
N	**3.6 J**	< 0.20

M-31A/B								
	11/11/02	03/24/08	05/28/09	04/16/10	10/13/10	04/12/11	04/24/12	04/25/13
B	280	500	250 [260]	200	230	200	210	250
N	7,100	8,800	6,200 [7,600]	4,600	4,200	3,700	4,000	2,300

M-11A	
	04/24/12
B	**11**
N	**5.5**

M-30A					
	11/12/02	01/12/05	10/26/09	04/24/12	04/24/13
B	< 1	< 1	< 1	< 1	< 1
N	< 11	< 9.9	0.039 J	0.066 J	< 0.2

M-26			
	02/19/92	02/21/96	04/25/12
B	< 5	< 5	< 1
N	<10 J	**18**	< 0.20

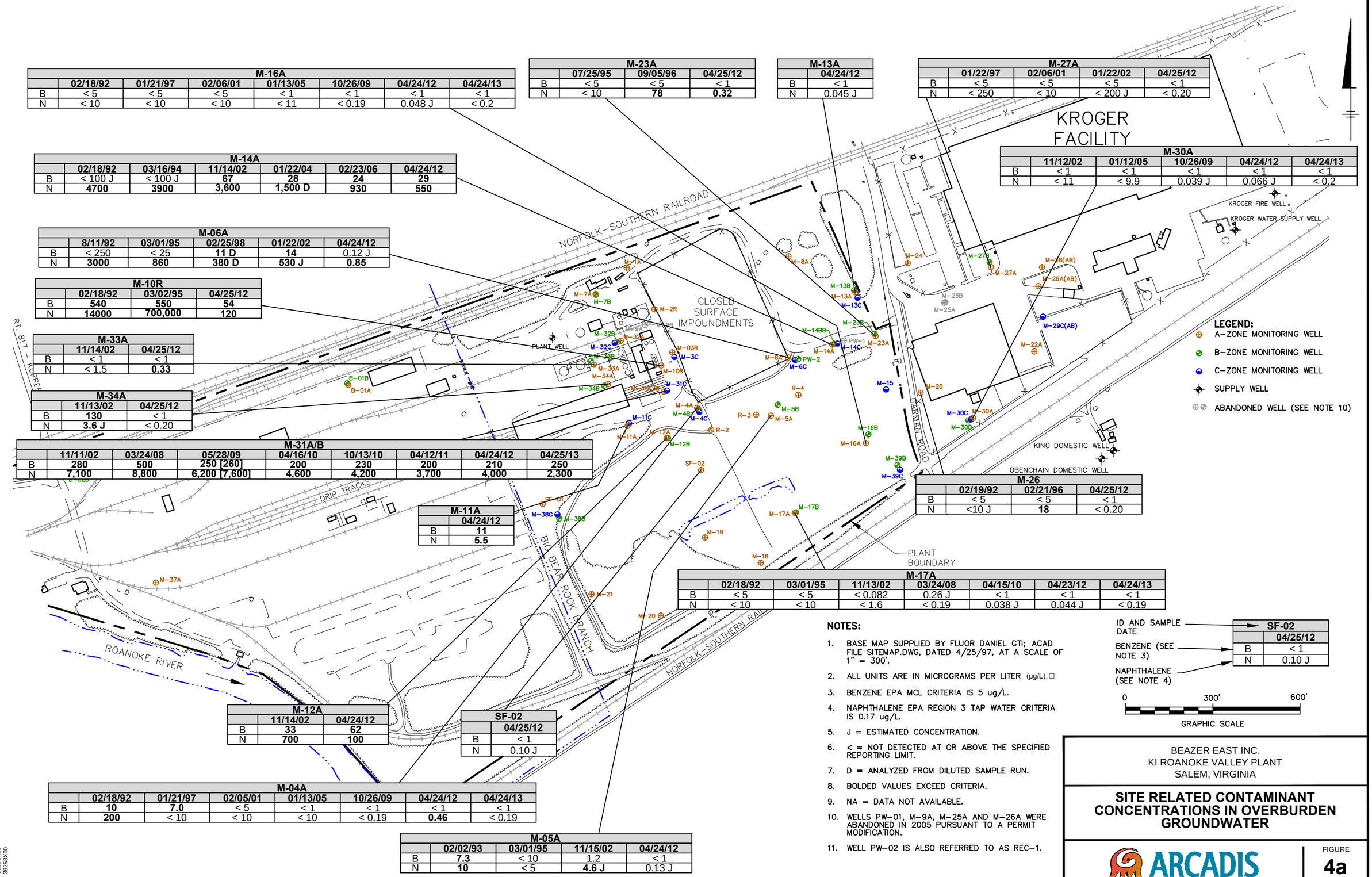
M-17A							
	02/18/92	03/01/95	11/13/02	03/24/08	04/15/10	04/23/12	04/24/13
B	< 5	< 5	< 0.082	0.26 J	< 1	< 1	< 1
N	< 10	< 10	< 1.6	< 0.19	0.038 J	0.044 J	< 0.19

M-12A		
	11/14/02	04/24/12
B	**33**	**62**
N	**700**	**100**

SF-02	
	04/25/12
B	< 1
N	0.10 J

M-04A							
	02/18/92	01/21/97	02/05/01	01/13/05	10/26/09	04/24/12	04/24/13
B	**10**	**7.0**	< 5	< 1	< 1	< 1	< 1
N	**200**	< 10	< 10	< 10	< 0.19	**0.46**	< 0.19

M-05A				
	02/02/93	03/01/95	11/15/02	04/24/12
B	**7.3**	< 10	1.2	< 1
N	**10**	< 5	**4.6 J**	0.13 J



NOTES:

1. BASE MAP SUPPLIED BY FLUOR DANIEL GTI; ACAD FILE SITEMAP.DWG, DATED 4/25/97, AT A SCALE OF 1" = 300'.
2. ALL UNITS ARE IN MICROGRAMS PER LITER (µg/L).□
3. BENZENE EPA MCL CRITERIA IS 5 ug/L.
4. NAPHTHALENE EPA REGION 3 TAP WATER CRITERIA IS 0.17 ug/L.
5. J = ESTIMATED CONCENTRATION.
6. < = NOT DETECTED AT OR ABOVE THE SPECIFIED REPORTING LIMIT.
7. D = ANALYZED FROM DILUTED SAMPLE RUN.
8. BOLDED VALUES EXCEED CRITERIA.
9. NA = DATA NOT AVAILABLE.
10. WELLS PW-01, M-9A, M-25A AND M-26A WERE ABANDONED IN 2005 PURSUANT TO A PERMIT MODIFICATION.
11. WELL PW-02 IS ALSO REFERRED TO AS REC-1.

BEAZER EAST INC.
KI ROANOKE VALLEY PLANT
SALEM, VIRGINIA

SITE RELATED CONTAMINANT CONCENTRATIONS IN OVERBURDEN GROUNDWATER

ARCADIS

FIGURE **4a**

M-23B								
	04/29/97	05/22/01	04/20/05	10/26/09	04/16/10	04/12/11	04/24/12	04/24/13
B	< 50	66	31	30	18	23	30	27
N	660	550 D	210	340	2.9	220	210	130

M-30B							
	11/12/02	02/23/06	09/18/08	04/15/10	04/11/11	04/24/12	04/24/13
B	< 1	< 1	< 1	< 1	< 1	< 1	< 1
N	< 11	< 9.8	0.11 J	**0.17 J**	< 0.20	**0.19 J**	< 0.2

M-30C							
	11/12/02	02/23/06	09/18/08	04/15/10	04/11/11	04/24/12	04/24/13
B	< 1	0.28 J	< 1	< 1	< 1	< 1	< 1
N	< 9.7	< 10	0.081 J	0.033 J	< 0.20	0.042 J	< 0.2

KING DOMESTIC						
	02/21/96	02/16/00	10/25/04	09/17/08	04/23/12	04/24/13
B	< 5	< 5	< 1	< 1	< 1	< 1
N	< 10	< 10	< 9.6	< 0.19	< 0.19	< 0.19

M-31C								
	11/13/02	03/24/08	05/28/09	04/16/10	10/13/10	04/12/11	04/24/12	04/25/13
B	200	56 [57]	430	69	350	350	220	250
N	3,700	140 [130]	7,200	1,800	1,900	2,400	3,600	2,800

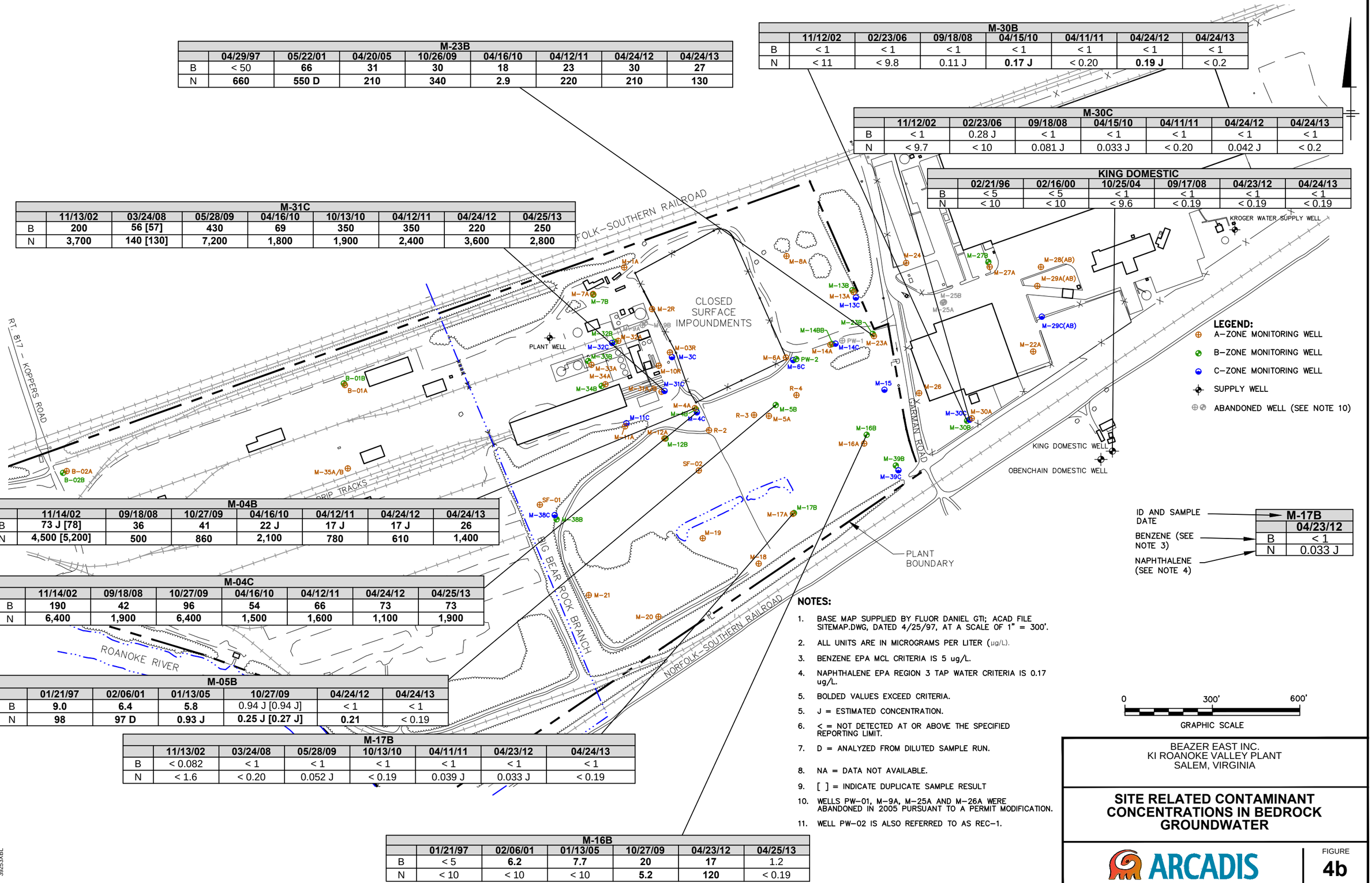
M-04B							
	11/14/02	09/18/08	10/27/09	04/16/10	04/12/11	04/24/12	04/24/13
B	73 J [78]	36	41	22 J	17 J	17 J	26
N	4,500 [5,200]	500	860	2,100	780	610	1,400

M-04C							
	11/14/02	09/18/08	10/27/09	04/16/10	04/12/11	04/24/12	04/25/13
B	190	42	96	54	66	73	73
N	6,400	1,900	6,400	1,500	1,600	1,100	1,900

M-05B						
	01/21/97	02/06/01	01/13/05	10/27/09	04/24/12	04/24/13
B	9.0	6.4	5.8	0.94 J [0.94 J]	< 1	< 1
N	98	97 D	0.93 J	0.25 J [0.27 J]	0.21	< 0.19

M-17B							
	11/13/02	03/24/08	05/28/09	10/13/10	04/11/11	04/23/12	04/24/13
B	< 0.082	< 1	< 1	< 1	< 1	< 1	< 1
N	< 1.6	< 0.20	0.052 J	< 0.19	0.039 J	0.033 J	< 0.19

M-16B						
	01/21/97	02/06/01	01/13/05	10/27/09	04/23/12	04/25/13
B	< 5	6.2	7.7	20	17	1.2
N	< 10	< 10	< 10	5.2	120	< 0.19



M-17B	
	04/23/12
B	< 1
N	0.033 J

ID AND SAMPLE DATE

BENZENE (SEE NOTE 3)

NAPHTHALENE (SEE NOTE 4)

LEGEND:

- A–ZONE MONITORING WELL
- B–ZONE MONITORING WELL
- C–ZONE MONITORING WELL
- SUPPLY WELL
- ABANDONED WELL (SEE NOTE 10)

NOTES:

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7. D = ANALYZED FROM DILUTED SAMPLE RUN.
8. NA = DATA NOT AVAILABLE.
9. [ ] = INDICATE DUPLICATE SAMPLE RESULT
10. WELLS PW–01, M–9A, M–25A AND M–26A WERE ABANDONED IN 2005 PURSUANT TO A PERMIT MODIFICATION.
11. WELL PW–02 IS ALSO REFERRED TO AS REC–1.

0 300' 600'

GRAPHIC SCALE

BEAZER EAST INC.
KI ROANOKE VALLEY PLANT
SALEM, VIRGINIA

SITE RELATED CONTAMINANT CONCENTRATIONS IN BEDROCK GROUNDWATER

ARCADIS

FIGURE **4b**

ATTACHMENT 1

Administrative Record

Index of Documents for Statement of Basis

Beazer East, Inc.
4020 Koppers Road
Salem, VA
EPA ID#: VAD003125770

ADMINISTRATIVE RECORD
Index of Documents for STATEMENT OF BASIS

This index includes documents that the Virginia Department of Environmental Quality (VDEQ) relied upon to develop and propose the final remedy selection determination described in the Statement of Basis. These documents were prepared for the Beazer East, Inc. facility and are listed chronologically by document date.

1. Preliminary Review of Solid Waste Management Units At Koppers Company Roanoke Valley Plant, A.T. Kearney, Inc., The Earth Technology Corporation, July 31, 1986.
2. RCRA Facility Assessment of Koppers Company – Roanoke Valley Plant, A.T. Kearney, Inc., The Earth Technology Corporation, September 5, 1986.
3. Deed Notification, Notification of Hazardous Waste Activity, Beazer East, Inc., July 6, 1994.
4. Closure Verification and Financial Assurance for RCRA Surface Impoundments, Closed as a Landfill at the Roanoke Valley Wood Treating Plant (Koppers), Virginia Department of Environmental Quality, August 9, 1995.
5. Revised Modified Closure Work Plan for the Koppers Roanoke Valley Wood Treating Plant's Container Storage Facility, Beazer East, Inc., October 1996.
6. RCRA Facility Investigation Work Plan, Phase I, Volumes I and II, IT Corporation, January 1999.
7. RCRA Facility Investigation Report, Phase I, Blasland, Bouck & Lee, Inc., September 2003.
8. Work Plan, Dye Tracing Study, Koppers Wood Treating Facility, Blasland, Bouck & Lee, Inc., March 3, 2004.
9. Interim Memo Report, Beazer/Koppers Dye Study, Ewers Water Consultants Inc., October 25, 2004 – Revised October 14, 2005.
10. Groundwater Tracer Study and Electronic Groundwater Monitoring Study, Koppers Wood Treating Facility, Ewers Water Consultants Inc., ARCADIS U.S., Inc., April 5, 2007.
11. RCRA Facility Investigation Report, Approval Letter, Virginia Department of Environmental Quality, September 11, 2008.
12. Phase II RCRA Facility Investigation Work Plan, Koppers Inc. Roanoke Valley Site, ARCADIS U.S., Inc., December 2008, Revised April 2009, Revised August 2009.
13. Phase II Resource Conservation and Recovery Act Facility Investigation Report, Koppers Inc. Roanoke Valley Site, ARCADIS U.S., Inc., February 2010.
14. Evaluation of Potential Future Land Use, Koppers Inc. Roanoke Valley Plant, ARCADIS U.S., Inc., March 26, 2010.
15. Revised Risk Assessment Work Plan, Koppers Inc. Roanoke Valley Plant, ARCADIS U.S., Inc., January 19, 2011.

16. Risk Assessment, Koppers Inc. (KI) Roanoke Valley Plant, Volumes I, II, and III, ARCADIS U.S., Inc., June 2011.
17. Risk Assessment Report, Approval Letter, Virginia Department of Environmental Quality, October 11, 2011.
18. Corrective Measures Study Work Plan, Koppers Inc. Roanoke Valley Plant, ARCADIS U.S., Inc., August 2012.
19. Corrective Measures Study Report, Koppers Inc. Roanoke Valley Plant, ARCADIS U.S., Inc., December 2013.
20. 2013 Annual Groundwater Monitoring Report, Field & Technical Services, LLC, February 27, 2014.
21. Corrective Measures Study, Approval Letter, Virginia Department of Environmental Quality, April 15, 2014.
22. Groundwater Sampling and Analysis Plan for Site-Wide Corrective Action Groundwater Monitoring, Koppers Inc. Roanoke Valley Plant, ARCADIS U.S., Inc., December 2014.
23. Materials Management Plan, Koppers Inc. Roanoke Valley Plant, Beazer East, Inc., December 19, 2014